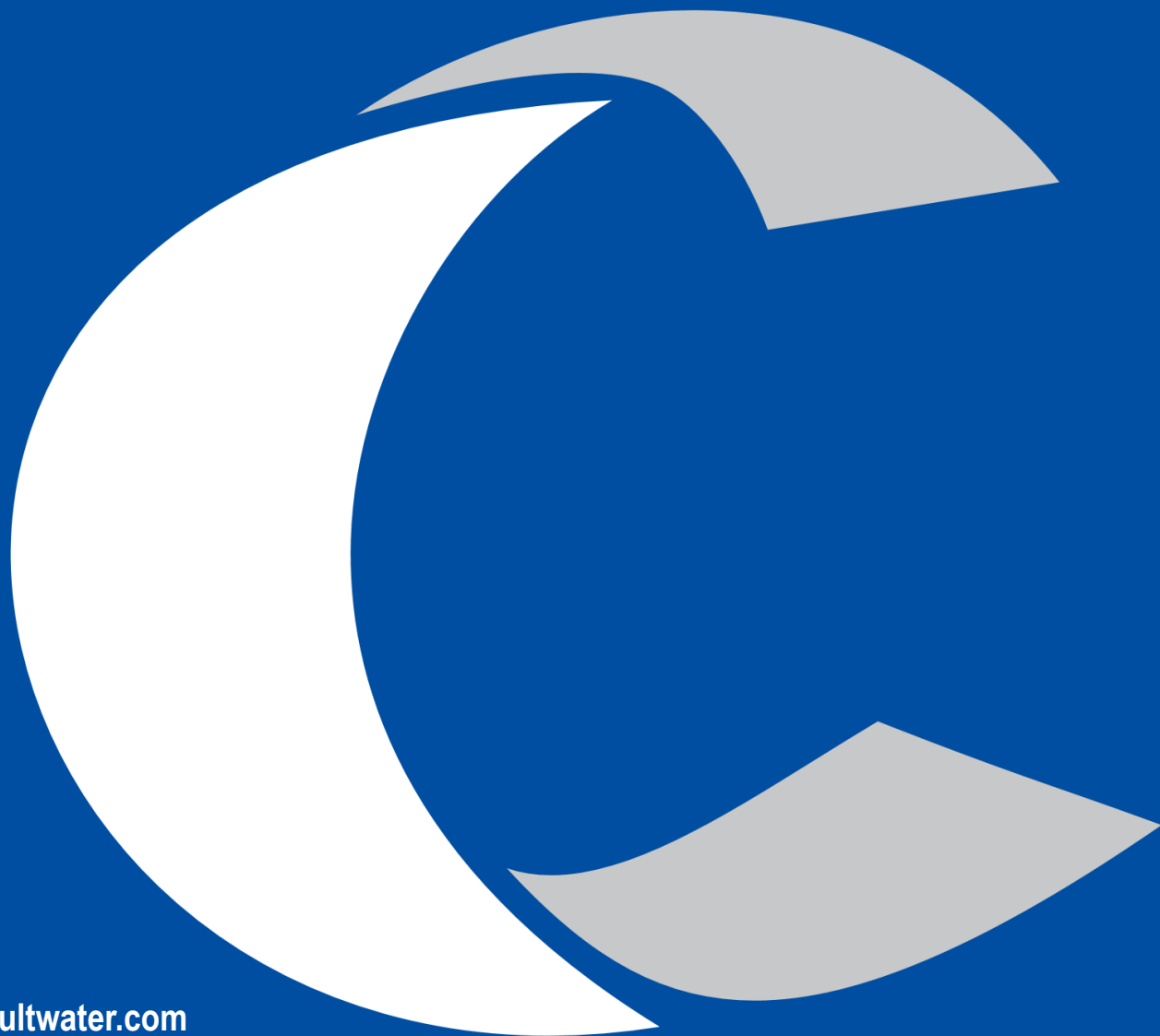


Catapult Water Intelligence

Disposal Across the Montney Duvernay

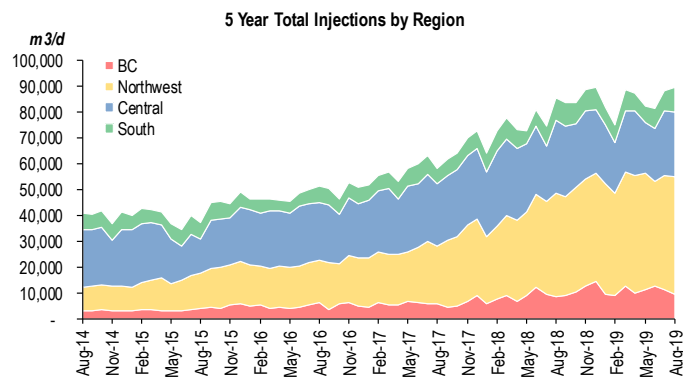




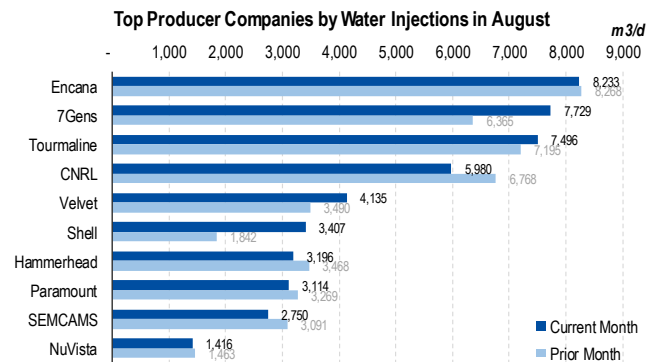
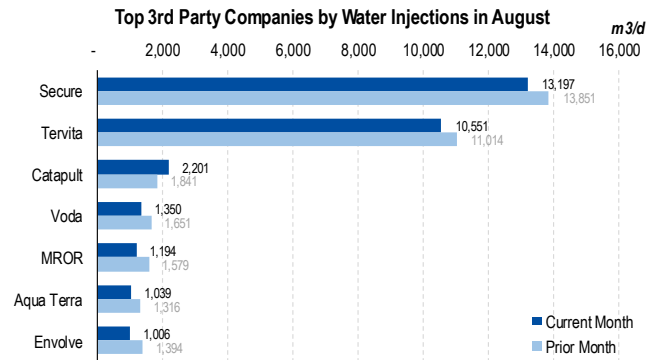
Disposal Across the Montney Duvernay

Injection Report September 2019

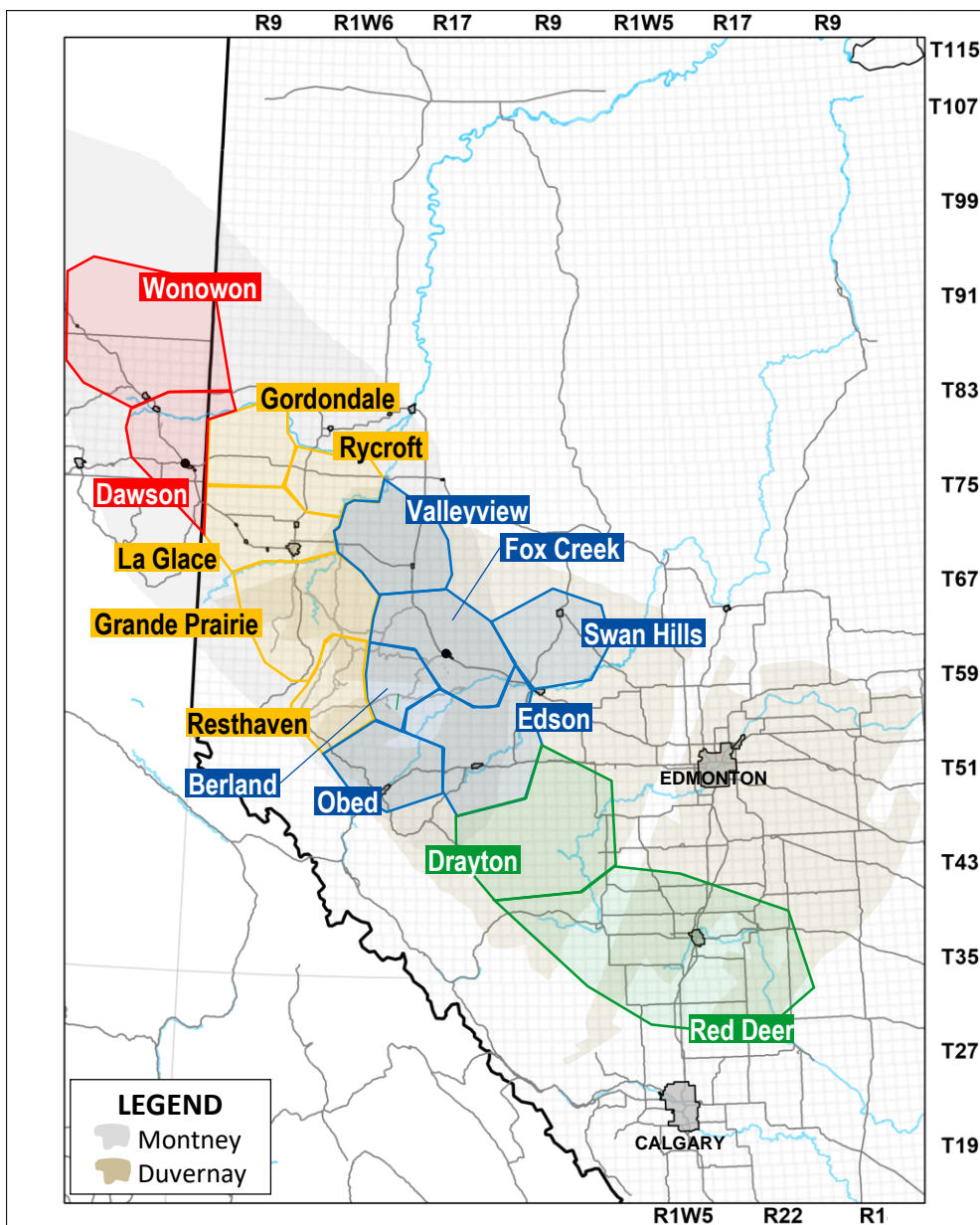
Updated with data from August



Injections for the month of August reached a new all-time high of 89,451 m3/d, up 1.5% from prior month. South Grande Prairie continues to comprise the majority share of the increase, as well as total volume, although there was a noteworthy spike in Southern Alberta injections. 7Gens has resumed disposing to levels unseen since the start of the year with a new record high of 7,730 m3/d for the month. Combined Gold Creek injections for the month total 27,620 m3/d more than offsetting the declines in other Northwest areas. Fox Creek has recovered much of its drop since November of last year with injections in August totalling 14,615 m3/d, bringing total Central region injections to 25,184 m3/d. BC continues to slide with a drop of 2,138 m3/d from prior month, largely attributed to a drop in injections by Encana and Whitecap. This, along with Canbriam's two disposal wells being taken offline in July, has resulted in a significant decline of roughly 1,600 m3/d in Wonowon area injections over the two month period. South Alberta saw a spike in injections predominantly from one facility, Shell Caroline, with a new regional high of 9,409 m3/d.



With the exception of Catapult, most third party facilities have made declines relative to prior month. Most notable this month was Shell's injections at its Caroline Gas Plant which is currently being transferred to Pieridae Energy; the deal closes this month. The plant disposed 2,511 m3/d of water into its 6-29 Leduc well, up from its year to date average of ~630 m3/d. We will be keeping an eye out for this one in October. 7Gens continues to push South Grand Prairie injections to new highs as their disposal combined with Pembina Kakwa River reached a new record of 8,865 m3/d. Velvet leaped more than 600 m3/d from prior month to 4,135 m3/d in September, in line with its upward trend earlier this year.

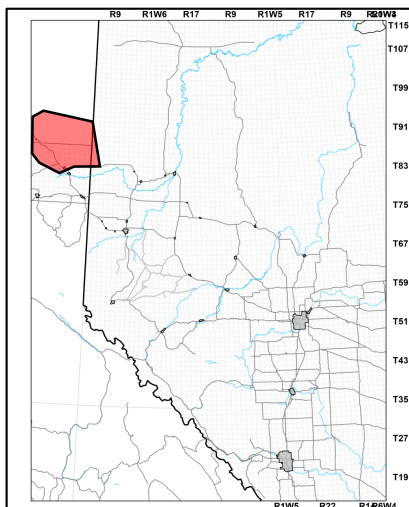
**METHODOLOGY:**

Areas were divided into four main regions: BC (RED), West (GOLD), Central (BLUE), and South (GREEN). Each region was further subdivided into areas taking into account market, facility location, and road access. The disposal wells included in this analysis were primarily selected based on the producing formation being the Montney/Duvernay but do include other sources (Spirit River, Charlie Lake, etc) that have a material effect on market dynamics for water handling. For the most part, wells that are considered part of an Enhanced Oil Recovery scheme are excluded from this analysis, with the exception of those that are disposing fluid produced from a separate formation.

DEFINITIONS:

'1st Party' volume refers to injections by facilities owned and operated by the producers themselves, whereas '3rd Party' refers to volume from facilities owned and operated by independent disposal/waste companies. 'Facilities' listed in the following charts are either batteries or waste plants that may be tied to more than one disposal well.

WONOWON



Top 5 Wonowon Facilities by Monthly Volume

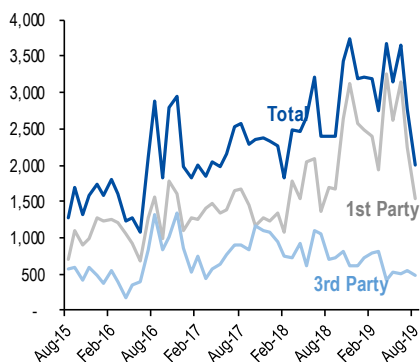
Name	Company	Volume (m3)
Tervita Mile 103	Tervita	12,503
CNRL Birch C-018-I/094-A-13 Disp	CNRL	11,421
Progress A-032-K/094-G-02	Progress	11,563
Kelt LNG C-093-I/094-A-12	Kelt	10,495
Whitecap Boundary Lake (8-2) Disp	Whitecap	4,261

Top 5 Wonowon Wells by Monthly Volume

LSD	Formation	Company	Volume (m3)
202/D-096-K/094-A-12/0	Upper Debolt	Tervita	12,503
200/C-032-K/094-G-02	Debolt	Progress	11,563
200/A-085-H/094-A-13/0	Bluesky	CNRL	11,421
200/C-093-I/094-A-12/4	Debolt	Kelt	10,495
100/02-29-084-13W6/2	Cadomin	Whitecap	4,261

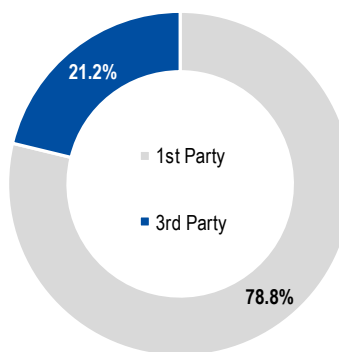
1st Party/3rd Party Injections over last Four Years

Monthly Injections in m3/d



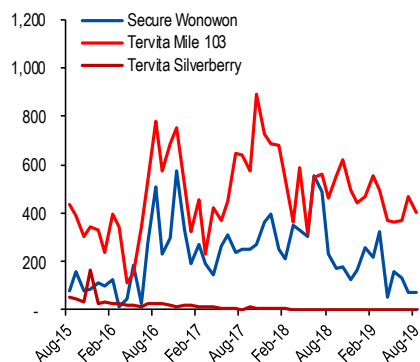
First Party vs Third Party

Rolling Three Month Average



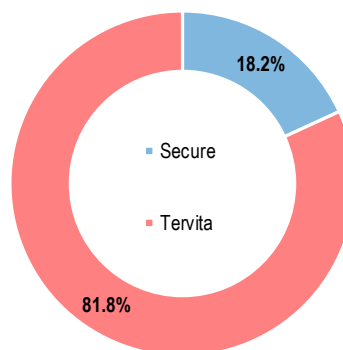
3rd Party Facility Injections over last Four Years

Monthly injections in m3/d

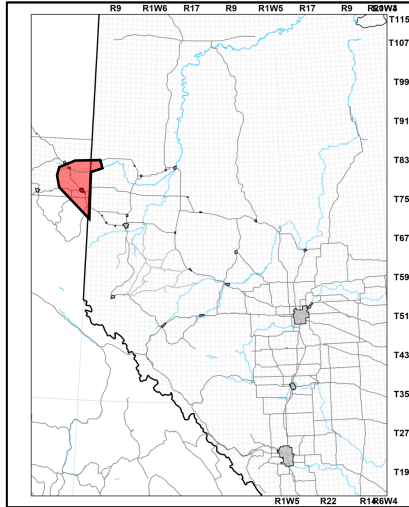


Market Share by Company

Rolling Three Month Average



DAWSON



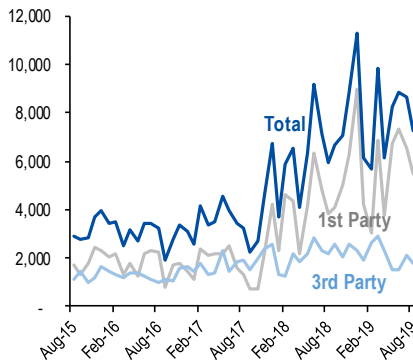
Top 5 Dawson Facilities by Monthly Volume

Name	Company	Volume (m3)
ECA Heritage C-046-H/093-P-09 Disp	Encana	29,770
ECA Tower (16-06) Disp	Encana	26,622
ECA Sunrise (01-27) Disp	Encana	24,340
ECA Sunrise (14-35) Disp	Encana	20,997
Secure Dawson Creek	Secure	18,688

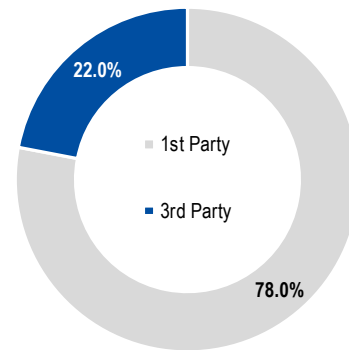
Top 5 Dawson Wells by Monthly Volume

LSD	Formation	Company	Volume (m3)
200/A-056-H/093-P-09/2	Baldonnel	Encana	29,770
102/06-05-081-17W6	Cadomin	Encana	26,622
100/14-28-078-17W6/0	Cadotte	Encana	24,340
100/14-35-078-17W6/4	Paddy/Cadotte	Encana	20,997
100/04-25-080-16W6/0	Bluesky	Tourmaline	17,349

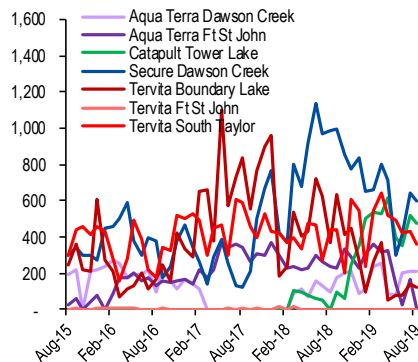
1st Party/3rd Party Injections over last Four Years Monthly Injections in m3/d



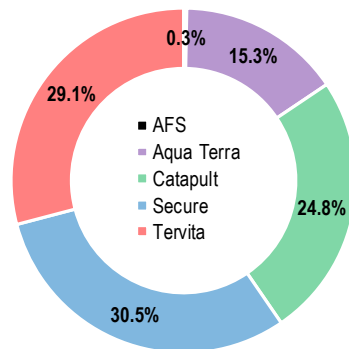
First Party vs Third Party Rolling Three Month Average



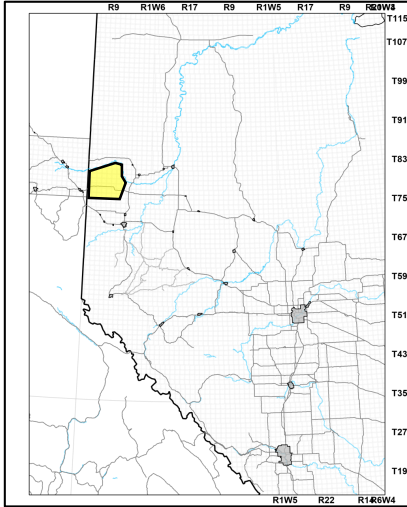
3rd Party Facility Injections over last Four Years Monthly injections in m3/d



Market Share by Company Rolling Three Month Average



GORDONDALE



Top 5 Gordondale Facilities by Monthly Volume

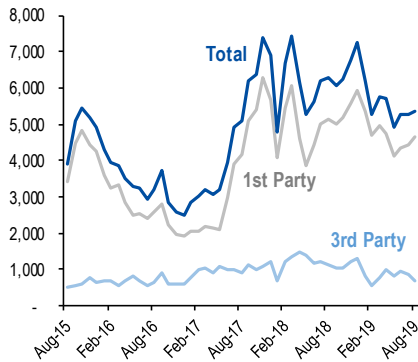
Name	Company	Volume (m3)
Tourmaline 15-13 Disp	Tourmaline	45,553
Tourmaline 12-6 Disp	Tourmaline	42,151
Birchcliff 3-22 Disp	Birchcliff	17,534
Birchcliff 5-27 Disp	Birchcliff	14,944
Kelt 6-33 Disp	Kelt	5,037

Top 5 Gordondale Wells by Monthly Volume

LSD	Formation	Company	Volume (m3)
100/13-15-081-08W6/2	Belloy	Tourmaline	35,179
102-12-13-082-09W6/0	Belloy	Tourmaline	25,139
102/07-13-082-09W6/4	Belloy	Tourmaline	20,414
103/07-06-079-11W6/0	Paddy-Cadotte	Birchcliff	14,944
100/11-22-078-12W6/3	Paddy-Cadotte	Birchcliff	11,455

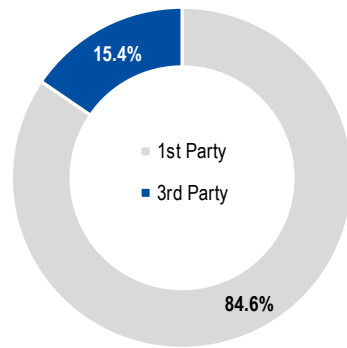
1st Party/3rd Party Injections over last Four Years

Monthly Injections in m3/d



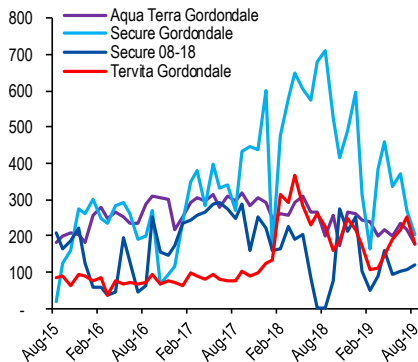
First Party vs Third Party

Rolling Three Month Average



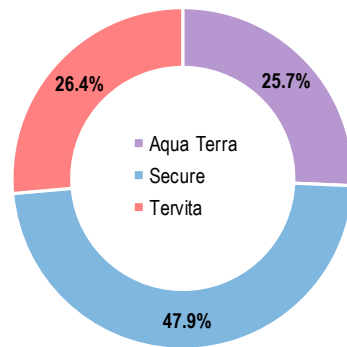
3rd Party Facility Injections over last Four Years

Monthly injections in m3/d



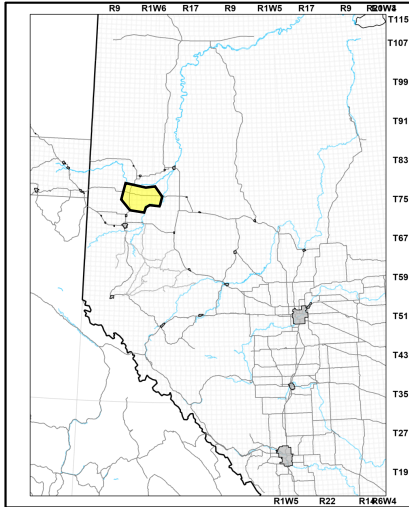
Market Share by Company

Rolling Three Month Average





RYCROFT



Top 4 Rycroft Facilities by Monthly Volume

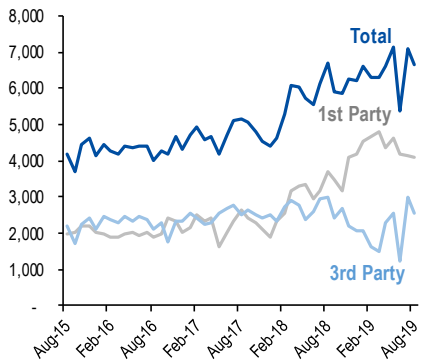
Name	Company	Volume (m3)
Tourmaline Spirit River Inj	Tourmaline	127,315
Secure Rycroft	Secure	47,574
Tervita Spirit River	Tervita	33,041
Voda Rycroft	Voda	23,824

Top 5 Rycroft Wells by Monthly Volume

LSD	Formation	Company	Volume (m3)
100/09-01-078-07W6/0	Belloy	Tourmaline	36,948
100/01-31-077-05W6/2	Cadomin	Tervita	33,041
100/03-07-078-04W6/2	Gething	Secure	29,008
100/14-22-077-07W6/4	Belloy	Tourmaline	22,190
100/15-11-078-05W6/2	Gething	Secure	18,566

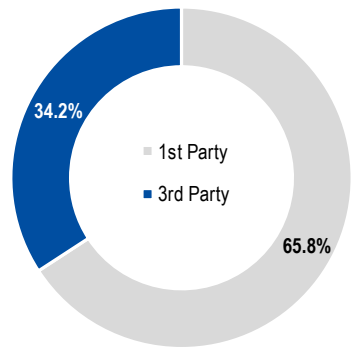
1st Party/3rd Party Injections over last Four Years

Monthly Injections in m3/d



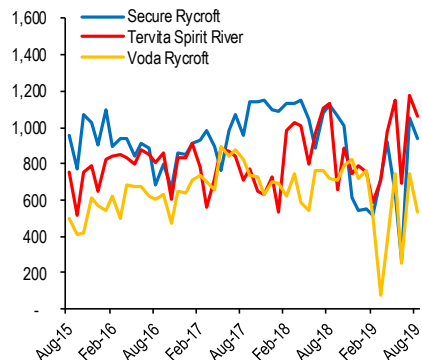
First Party vs Third Party

Rolling Three Month Average



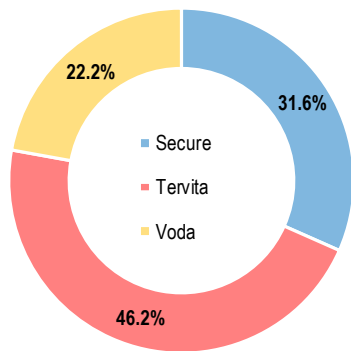
3rd Party Facility Injections over last Four Years

Monthly injections in m3/d

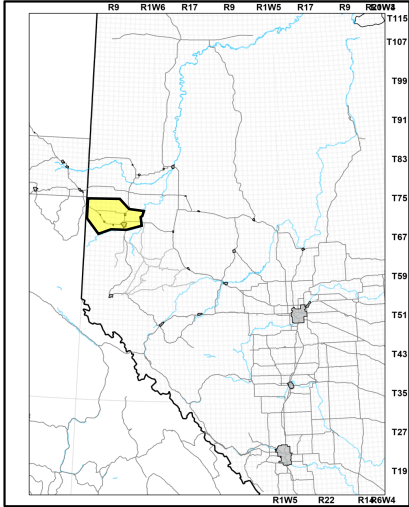


Market Share by Company

Rolling Three Month Average



LA GLACE



Top 5 La Glace Facilities by Monthly Volume

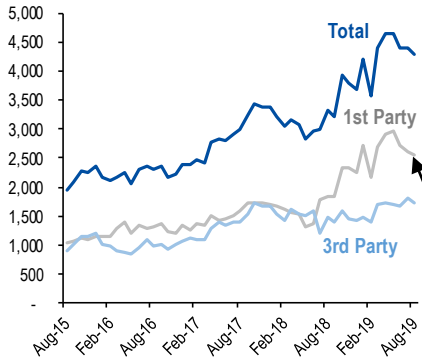
Name	Company	Volume (m3)
Tervita La Glace	Tervita	40,088
Encana Wembley 16-27 Disp	Encana	34,030
Advantage Glacier GP	Advantage	13,104
CNRL 14-34 Disp	CNRL	11,680
Encana Saddle Hills GP	Encana	8,859

Top 5 La Glace Wells by Monthly Volume

LSD	Formation	Company	Volume (m3)
100/16-27-072-09W6/0	Cadotte	Encana	34,030
100/13-36-072-09W6/0	Paddy	Tervita	16,126
100/04-34-075-12W6/0	Baldonnel	Advantage	13,078
100/08-09-072-08W6/0	Paddy	Tervita	13,025
100/13-36-072-09W6/0	Paddy	Tervita	10,937

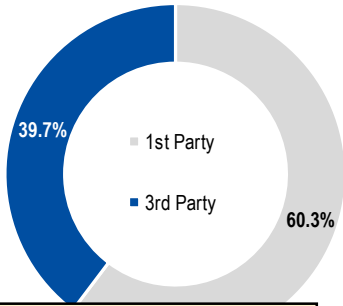
1st Party/3rd Party Injections over last Four Years

Monthly Injections in m3/d



First Party vs Third Party

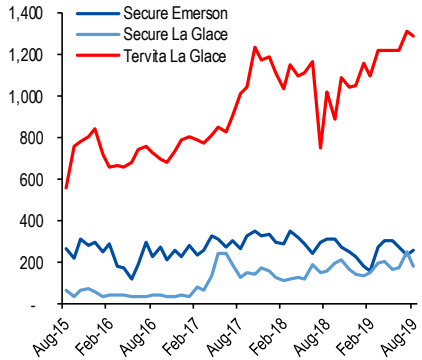
Rolling Three Month Average



*A revision was made to include volume from Encana Wembley that was previously, and incorrectly, excluded from the report

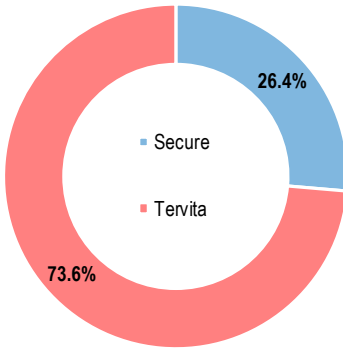
3rd Party Facility Injections over last Four Years

Monthly injections in m3/d

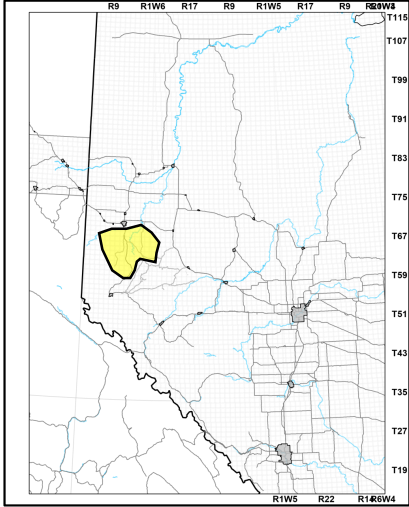


Market Share by Company

Rolling Three Month Average



GOLD CREEK



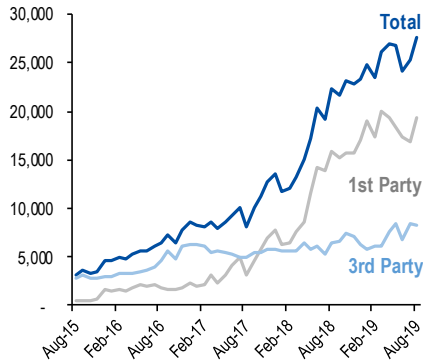
Top 5 Gold Creek Facilities by Monthly Volume

Name	Company	Volume (m3)
7Gens 16-17 Disp (Karr)	7Gens	121,146
7Gens 9-10 Disp (Karr)	7Gens	118,464
Secure Big Mountain Creek	Secure	92,009
Hammerhead GGS (9-3)	Hammerhead	73,972
Secure Gold Creek	Secure	55,720

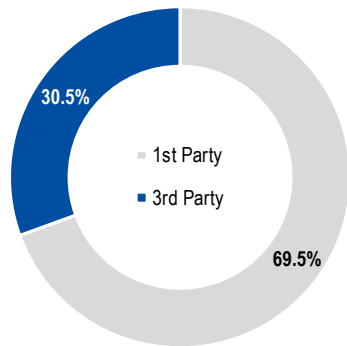
Top 5 Gold Creek Wells by Monthly Volume

LSD	Formation	Company	Volume (m3)
100/12-11-064-04W6/0	Winterburn	7Gens	118,464
100/05-21-064-04W6/0	Winterburn	7Gens	109,235
100/12-22-066-06W6/3	Leduc	NuVista	43,906
100/13-02-068-03W6/0	Belloy	Velvet	35,268
1W0/05-02-064-04W6/2	Winterburn	Pembina	35,190

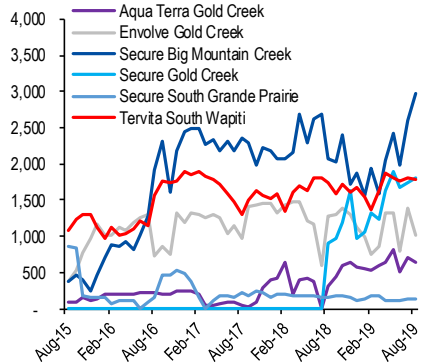
1st Party/3rd Party Injections over last Four Years Monthly Injections in m3/d



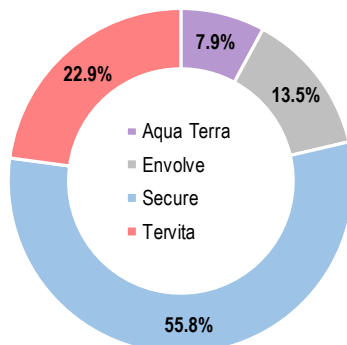
First Party vs Third Party Rolling Three Month Average



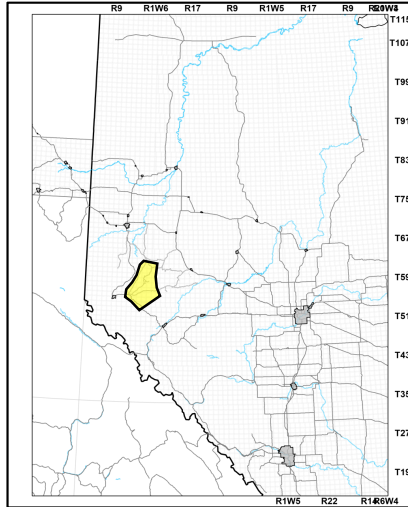
3rd Party Facility Injections over last Four Years Monthly injections in m3/d



Market Share by Company Rolling Three Month Average



RESTHAVEN



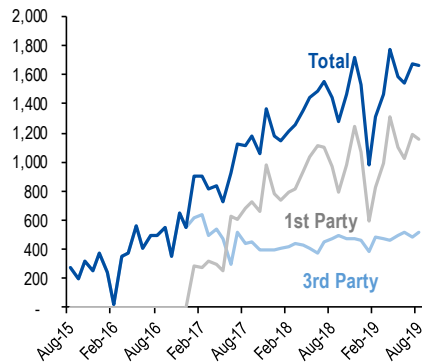
Top 5 Resthaven Facilities by Monthly Volume

Name	Company	Volume (m3)
Strath Jayar 06-08-062-03W6	Strath	26,679
Voda Grande Cache	Voda	15,893
XTO Resthaven 2-10-060-01W6	XTO	5,245
Cequence 4-23 Disp	Cequence	2,200
Cequence 2-21 Disp	Cequence	1,570

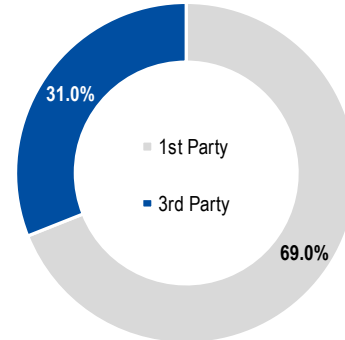
Top 5 Resthaven Wells by Monthly Volume

LSD	Formation	Company	Volume (m3)
100/10-07-062-03W6/0	Leduc	Strath	26,679
100/11-26-057-06W6/2	Doig/Montney	Voda	14,824
100/11-03-060-01W6/0	Belloy	XTO	5,245
100/02-21-061-26W5/2	Cadotte	Cequence	1,570
100/09-18-057-05W6/0	Nikanassin	Voda	1,070

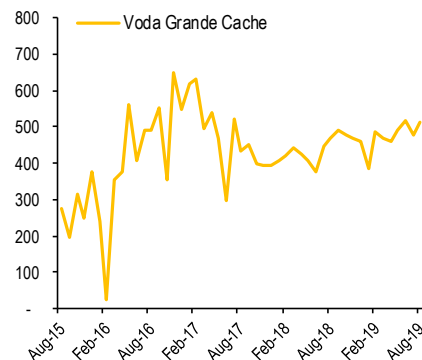
1st Party/3rd Party Injections over last Four Years Monthly Injections in m3/d



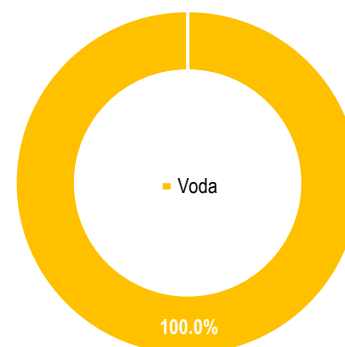
First Party vs Third Party Rolling Three Month Average



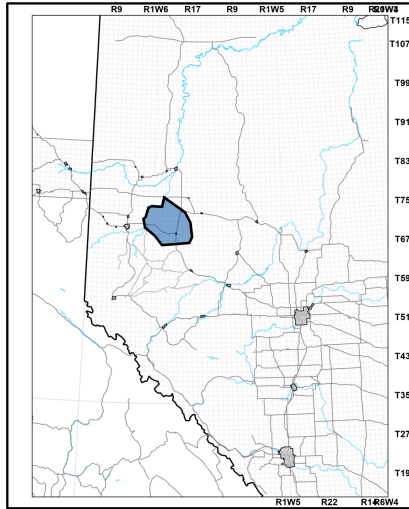
3rd Party Facility Injections over last Four Years Monthly injections in m3/d



Market Share by Company Rolling Three Month Average



VALLEYVIEW



Top 5 Valleyview Facilities by Monthly Volume

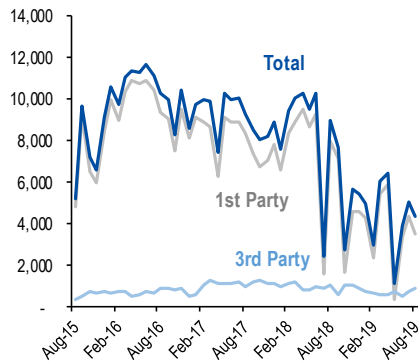
Name	Company	Volume (m3)
CNRL Sturgeon 11-2 Disp	CNRL	36,523
CNRL Sturgeon 7-31 Disp	CNRL	30,018
CNRL Sturgeon 9-26 Disp	CNRL	21,212
Tervita Valleyview	Tervita	20,001
CNRL Sturgeon 12-5 Disp	CNRL	18,715

Top 5 Valleyview Wells by Monthly Volume

LSD	Formation	Company	Volume (m3)
100/05-32-068-21W5/0	Leduc	CNRL	18,911
100/09-16-069-22W5/0	Leduc	Tervita	16,584
100/04-05-069-21W5/0	Leduc	CNRL	14,223
100/07-10-069-22W5/0	Leduc	CNRL	12,943
100/15-02-069-22W5/2	Leduc	CNRL	11,189

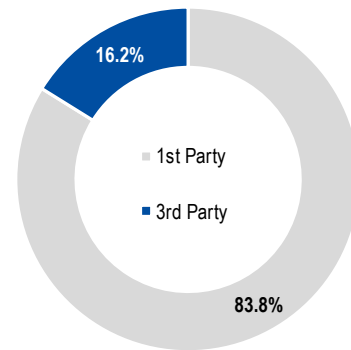
1st Party/3rd Party Injections over last Four Years

Monthly Injections in m3/d



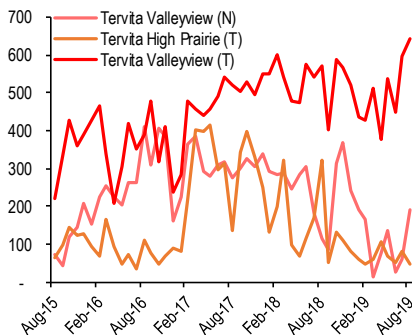
First Party vs Third Party

Rolling Three Month Average



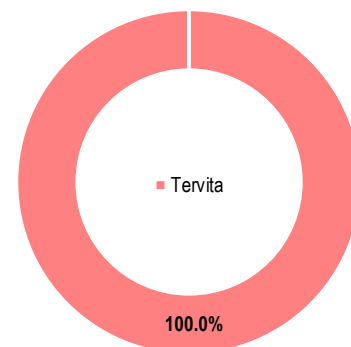
3rd Party Facility Injections over last Four Years

Monthly injections in m3/d

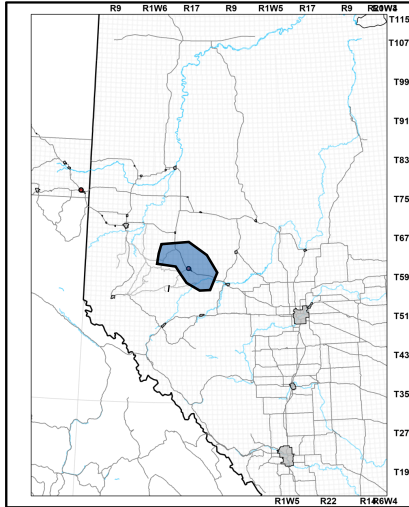


Market Share by Company

Rolling Three Month Average



FOX CREEK



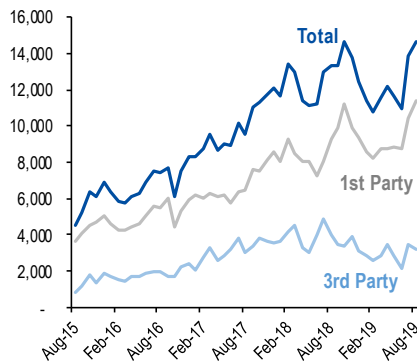
Top 5 Fox Creek Facilities by Monthly Volume

Name	Company	Volume (m3)
Encana 15-31 Gas Plant	Encana	66,465
SEMCAMS KA	Semcams	58,185
Paramount 8-9 Gas Plant	Paramount	45,526
Paramount 16-7 Injection	Paramount	40,576
Catapult Fox Creek	Catapult	32,089

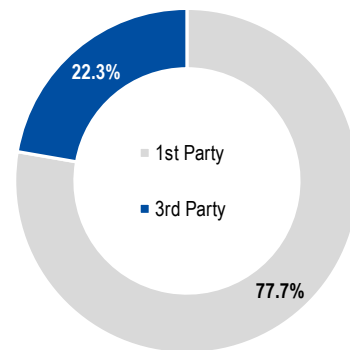
Top 5 Fox Creek Wells by Monthly Volume

LSD	Formation	Company	Volume (m3)
100/08-05-063-21W5/0	Debolt	Encana	66,465
100/12-14-064-19W5/2	Swan Hills	Paramount	45,526
100/14-06-062-19W5/0	Swan Hills	Semcams	43,888
100/04-20-064-18W5/0	Debolt	Paramount	40,576
100/04-06-062-18W5/0	Debolt	Catapult	28,812

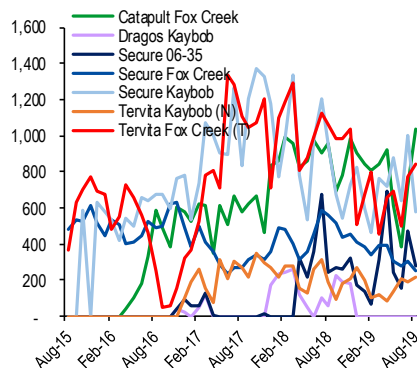
1st Party/3rd Party Injections over last Four Years
Monthly Injections in m3/d



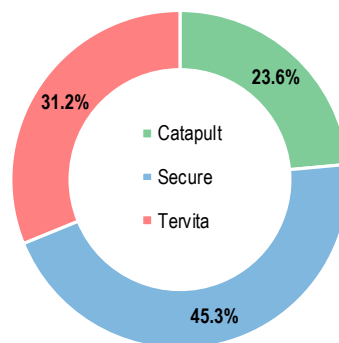
First Party vs Third Party
Rolling Three Month Average



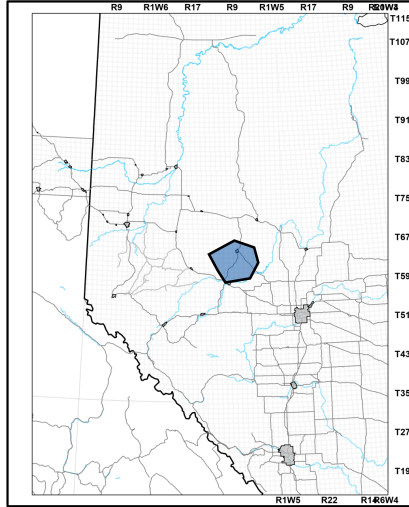
3rd Party Facility Injections over last Four Years
Monthly injections in m3/d



Market Share by Company
Rolling Three Month Average



SWAN HILLS



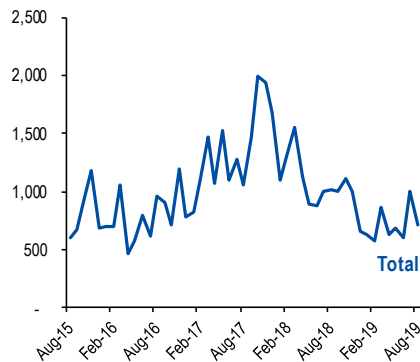
Top 5 Swan Hills Facilities by Monthly Volume

Name	Company	Volume (m3)
Tervita Greencourt (N)	Tervita	8,651
Tervita Judy Creek	Tervita	4,168
Secure Judy Creek	Secure	3,998
Voda Mayerthorpe	Voda	3,395
Tervita Swan Hills	Tervita	1,800

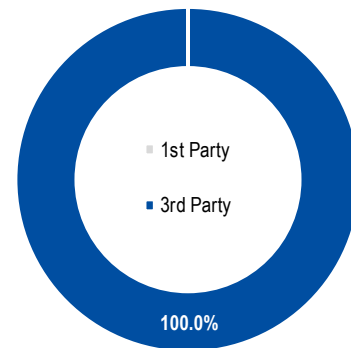
Top 5 Swan Hills Wells

LSD	Formation	Company	Volume (m3)
102/06-31-058-09W5/0	Pekisko	Tervita	8,651
100/16-31-056-08W5/0	Pekisko	Voda	3,395
100/06-29-063-09W5/2	Wabamun	Secure	2,977
100/02-06-063-11W5/2	Nisku	Tervita	2,312
100/02-06-063-11W5/2	Nisku	Tervita	1,856

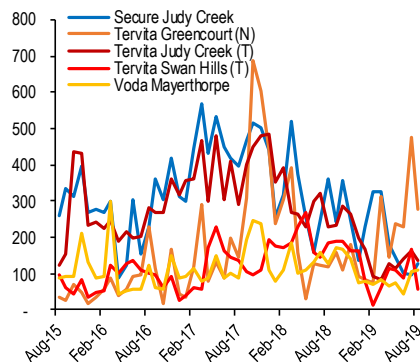
1st Party/3rd Party Injections over last Four Years
Monthly Injections in m3/d



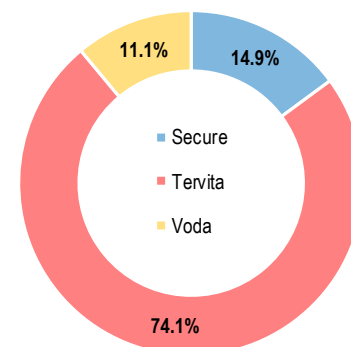
First Party vs Third Party
Rolling Three Month Average



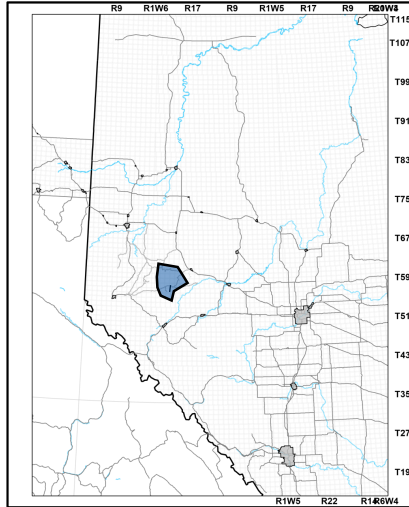
3rd Party Facility Injections over last Four Years
Monthly injections in m3/d



Market Share by Company
Rolling Three Month Average



BERLAND



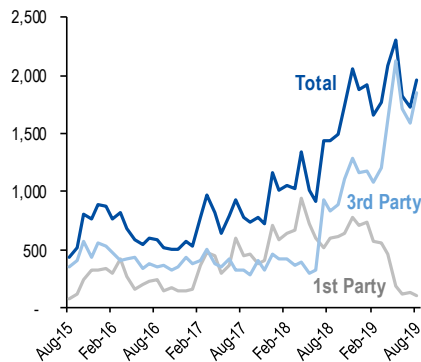
Top 5 Berland Facilities by Monthly Volume

Name	Company	Volume (m3)
Secure Tony Creek	Secure	24,574
Catapult Berland	Catapult	21,426
Secure Wild River	Secure	11,502
CNRL Wild River (4-3 Plant)	CNRL	2,156
SEMCAMS 16-32 GGS	Semcams	796

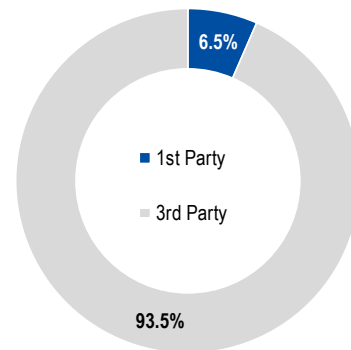
Top 5 Berland Wells by Monthly Volume

LSD	Formation	Company	Volume (m3)
100/06-21-062-22W5/0	Blueridge	Secure	24,574
100/01-19-059-23W5/0	Leduc	Catapult	21,426
100/06-09-057-22W5/0	Nisku	Secure	11,502
100/12-29-056-22W5/0	Montney	CNRL	2,156
100/10-02-059-22W5/0	Pekisko	Semcams	796

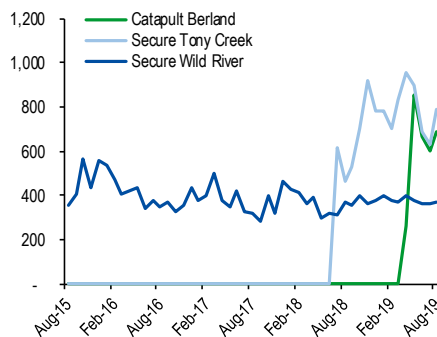
1st Party/3rd Party Injections over last Four Years Monthly Injections in m3/d



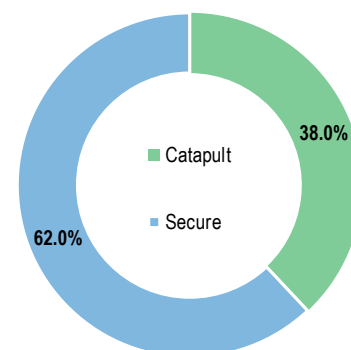
First Party vs Third Party Rolling Three Month Average



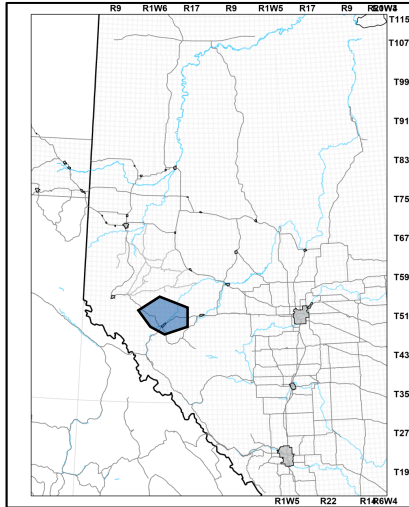
3rd Party Facility Injections over last Four Years Monthly injections in m3/d



Market Share by Company Rolling Three Month Average



OBED



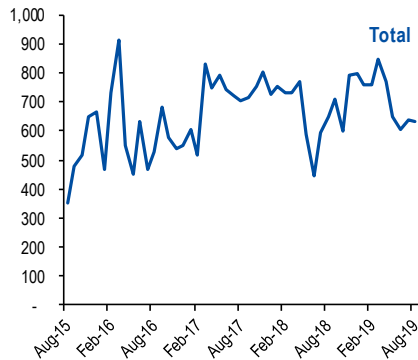
Top 2 Obed Facilities by Monthly Volume

Name	Company	Volume (m3)
Secure Obed (Lambert)	Secure	9,914
Secure Obed (Dalehurst)	Secure	9,720

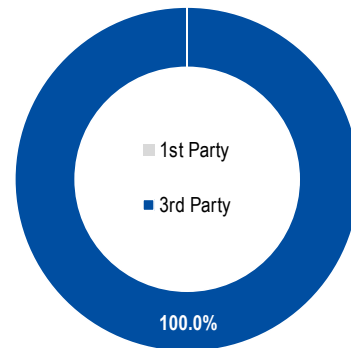
Top 4 Obed Wells by Monthly Volume

LSD	Formation	Company	Volume (m3)
100/09-30-052-22W5/2	Leduc	Secure	8,890
100/04-26-052-23W5/3	Leduc	Secure	8,737
100/09-30-052-22W5/2	Leduc	Secure	1,024
100/04-26-052-23W5/3	Leduc	Secure	984

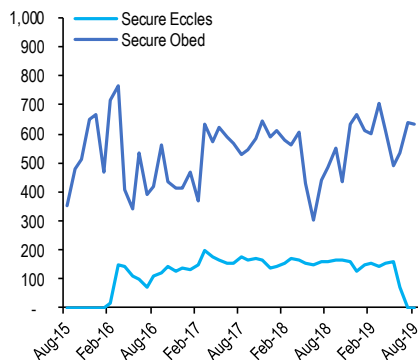
1st Party/3rd Party Injections over last Four Years
Monthly Injections in m3/d



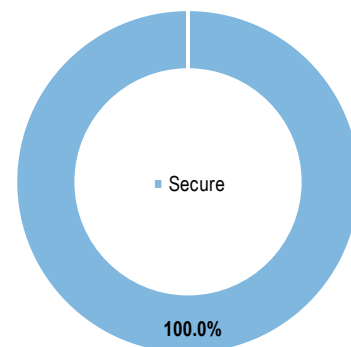
First Party vs Third Party
Rolling Three Month Average



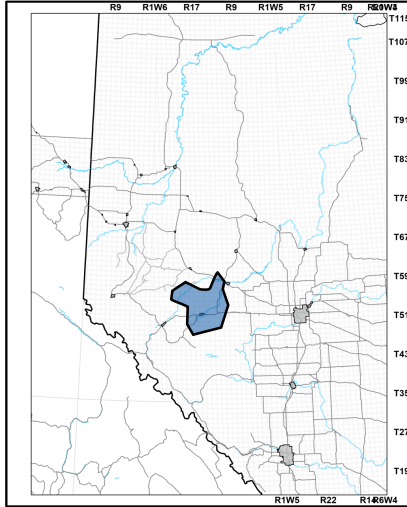
3rd Party Facility Injections over last Four Years
Monthly injections in m3/d



Market Share by Company
Rolling Three Month Average



EDSON



Top 5 Edson Facilities by Monthly Volume

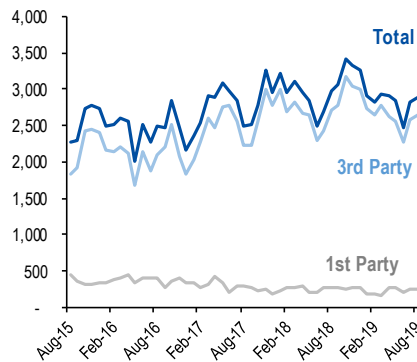
Name	Company	Volume (m3)
Secure Pine Creek	Secure	23,005
Secure Nosehill	Secure	18,942
Tervita West Edson	Tervita	16,493
Tervita Moose Creek	Tervita	12,934
Tervita Niton Junction (N)	Tervita	10,934

Top 5 Edson Wells by Monthly Volume

LSD	Formation	Company	Volume (m3)
100/08-01-055-18W5/0	Leduc	Secure	23,005
100/09-31-055-20W5/2	Leduc	Secure	18,942
100/15-16-053-19W5/0	Elkton	Tervita	14,175
100/06-13-052-16W5/2	Swan Hills	Tervita	9,540
100/11-19-054-17W5/0	Leduc	Repsol	6,994

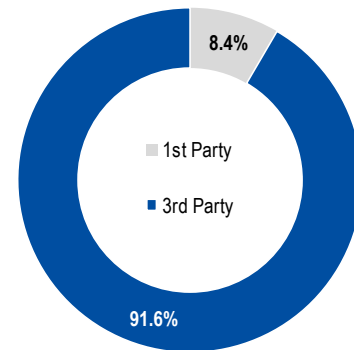
1st Party/3rd Party Injections over last Four Years

Monthly Injections in m3/d



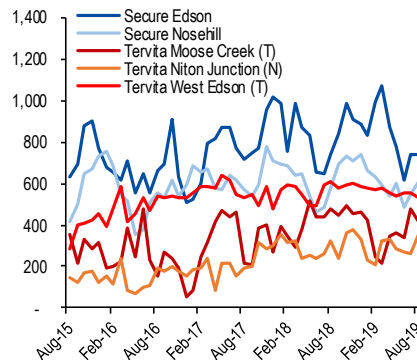
First Party vs Third Party

Rolling Three Month Average



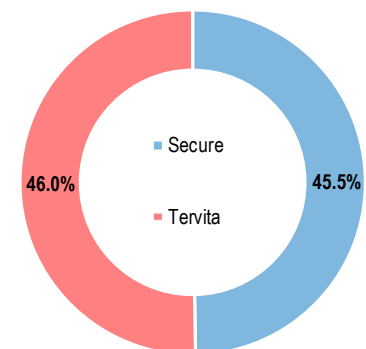
3rd Party Facility Injections over last Four Years

Monthly injections in m3/d

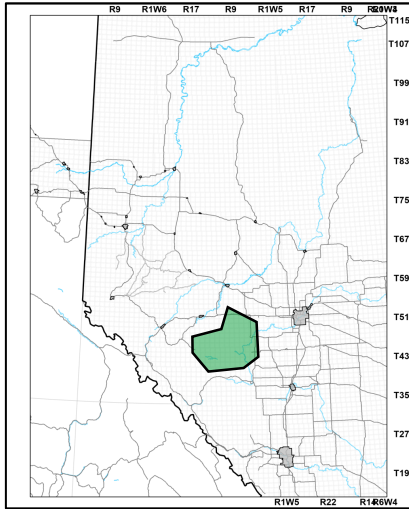


Market Share by Company

Rolling Three Month Average



DRAYTON



Top 5 Drayton Facilities by Monthly Volume

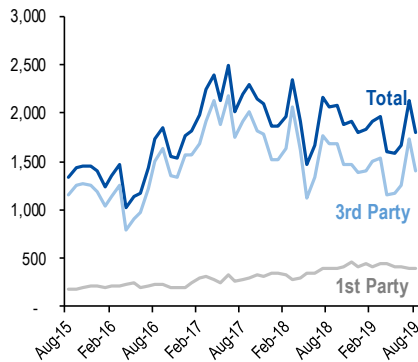
Name	Company	Volume (m3)
Secure Brazeau	Secure	22,577
Secure Drayton	Secure	10,104
Tervita Brazeau	Tervita	9,662
Voda Cynthia	Voda	6,113
Tervita Drayton (N)	Tervita	5,251

Top 5 Drayton Wells by Monthly Volume

LSD	Formation	Company	Volume (m3)
100/09-26-047-11W5/2	Nisku	Secure	14,172
100/10-13-047-11W5/2	Nisku	Tervita	7,442
104/06-02-049-10W5/0	Nisku	Voda	6,113
1W0/13-08-047-10W5/4	Nisku	Secure	5,651
104/12-32-048-06W5/0	Nordegg	Secure	5,622

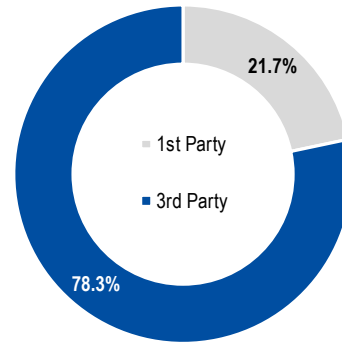
1st Party/3rd Party Injections over last Four Years

Monthly Injections in m3/d



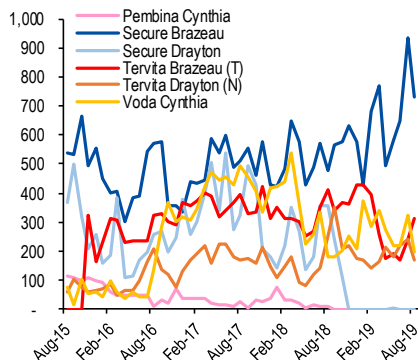
First Party vs Third Party

Rolling Three Month Average



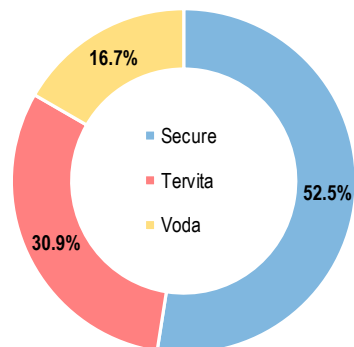
3rd Party Facility Injections over last Four Years

Monthly injections in m3/d



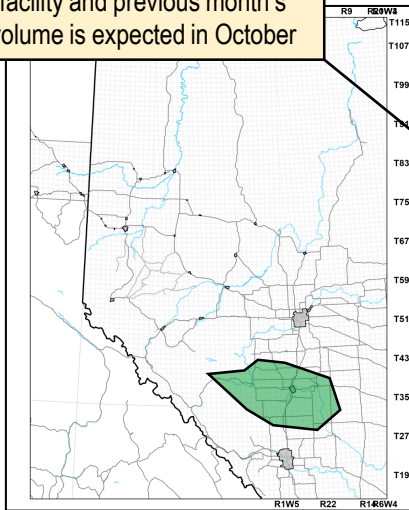
Market Share by Company

Rolling Three Month Average



RED DEER

*An upcoming revision to this facility and previous month's volume is expected in October



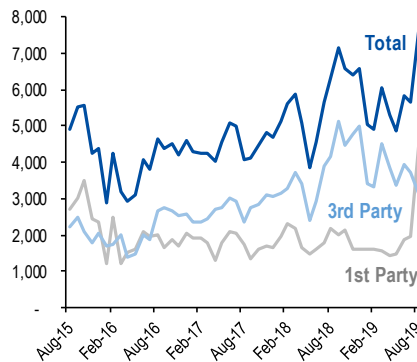
Top 5 Red Deer Facilities by Monthly Volume

Name	Company	Volume (m3)
Shell Caroline GP (3-30)	Shell	77,286
MROR Eckville	MROR	37,008
Alphabow Joffre (5-30) Disp	Alphabow	30,548
Secure Rocky Mountain House	Secure	25,079
Tervita Eckville (N)	Tervita	18,720

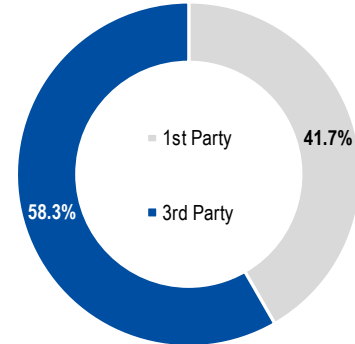
Top 5 Red Deer Wells by Monthly Volume

LSD	Formation	Company	Volume (m3)
102/06-29-034-05W5/2	Leduc	Shell	77,286
100/16-24-039-26W4/2	Leduc	Alphabow	30,548
102/10-07-040-08W5/2	Nisku	Secure	17,932
100/08-34-039-03W5/2	Leduc	MROR	17,132
100/01-30-039-03W5/0	Nisku	Tervita	13,515

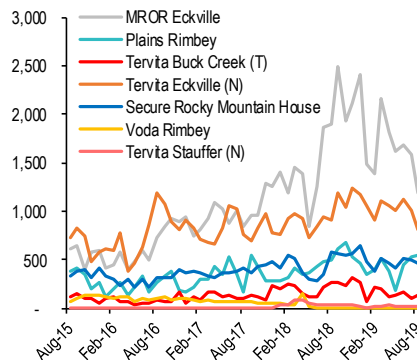
1st Party/3rd Party Injections over last Four Years
Monthly Injections in m3/d



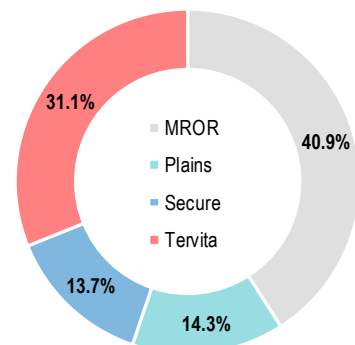
First Party vs Third Party
Rolling Three Month Average



3rd Party Facility Injections over last Four Years
Monthly injections in m3/d



Market Share by Company
Rolling Three Month Average



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