Imperial

Imperial Cold Lake Operations

Directive 054 Annual Submission

June 2022

Outline

Imperial Cold Lake Operations annual Directive 054 submission provides a performance update for the operating period of January 1st 2021 to December 31st, 2021.

- Background of scheme
- Subsurface

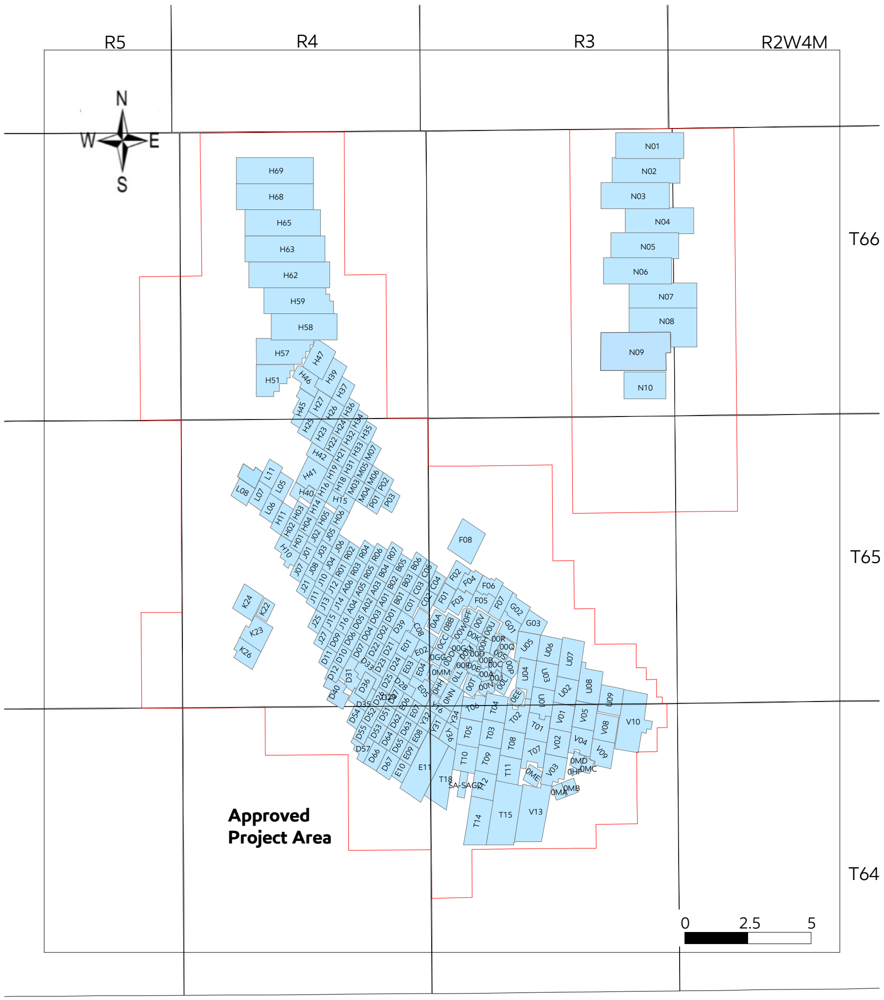
  Scheme Performance ○ Geoscience Overview ○ Pad Recovery ○ Co-injection
- Surface

  Built/Planned Surface Infrastructure Map ○ Facility Modifications ○ Facility Performance
- Historical and Upcoming Activity

  Suspension/Abandonment Activity ○ Regulatory and Operational Changes ○ Future Plans

Background of Scheme

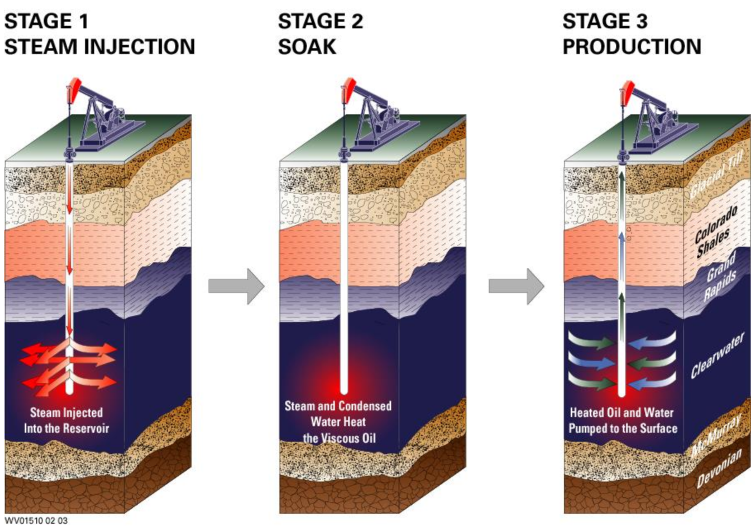
Background



Development History

60's – 70's	Lease acquisition Small scale research pilots
1975	Leming commercial pilot
'85 – '94	Phase 1 – 10 • Maskwa • Mahihkan
2002	Phase 11-13 Mahkeses • Cogeneration facility
2004	Approval area expanded • Nabiye, Mahihkan North
2015	Phase 14-16 Nabiye • Cogeneration facility

CSS Process Overview

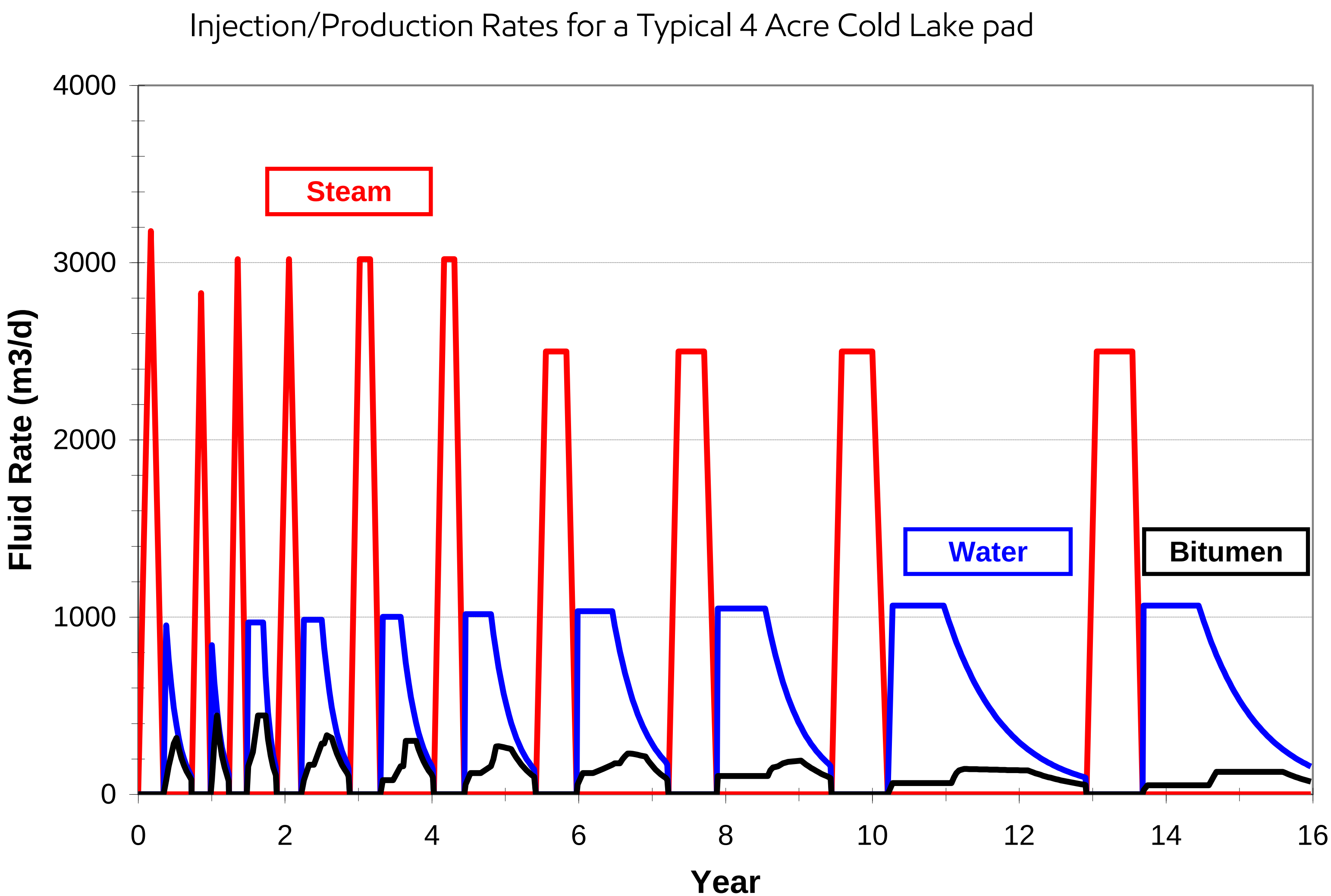


Mobilizing Agent:	Heat
Mobilizing Agent Delivery System:	Steam
Drive Mechanisms:	Compaction, solution gas drive, gravity drainage
Wells Required:	1
Well Type:	Deviated or horizontal
Operating Pressure:	Above fracture pressure

Cyclic Steam Stimulation (CSS)

- High-pressure, high-rate, cyclic process with multiple drive mechanisms:
  - compaction
  - solution gas drive
  - gravity drainage
- Steam injection heats bitumen to reduce its viscosity (4 - 6 weeks)
- Brief soak phase to confirm casing integrity and control inter-well communication (2 days – several weeks)
- Length of the production period increases from a few months in early cycles to multiple years in late cycles
- Full well life: 8 -17 cycles and up to 50 years including follow-up processes

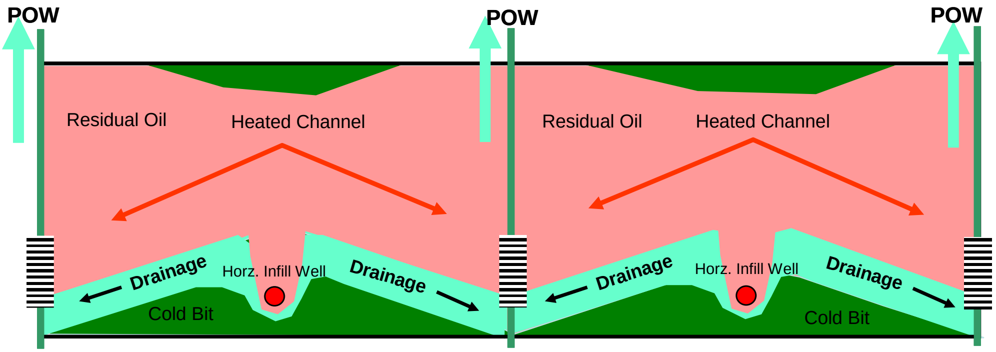
CSS Process Overview



Imperial | Cold Lake

Injector Only Infills (IOI)
Horizontal Injector Producer (HIP)

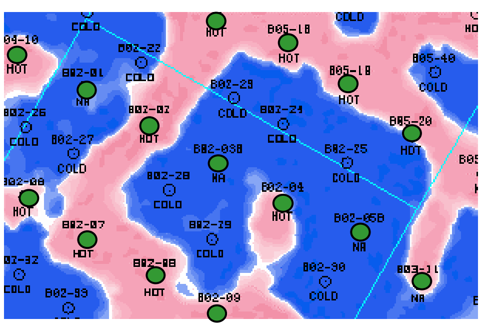
IOI / HIP Schematic



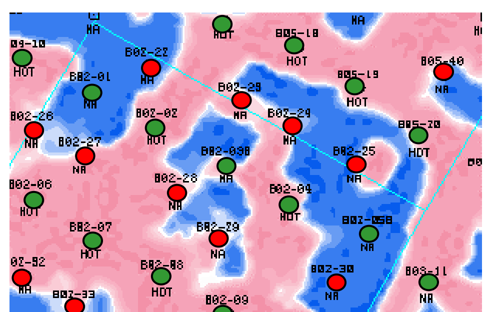
POW: Producer Only Well

- Infill wells direct cyclic steam to cold bitumen
- Steam distribution in horizontal wells controlled by limited entry perforations (~20 holes/1000 m well)
- For IOIs, existing deviated wells operate as cyclic producers. HIPs offer the ability to both produce and inject.

Increase in steam conformance following infilling



Pre-Infill 3D Seismic

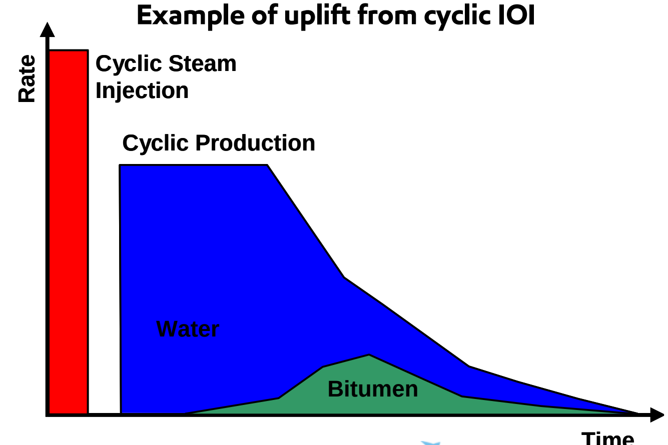


Post-Infill 3D Seismic

Hot reservoir (partially depleted)
Cold reservoir (undepleted)

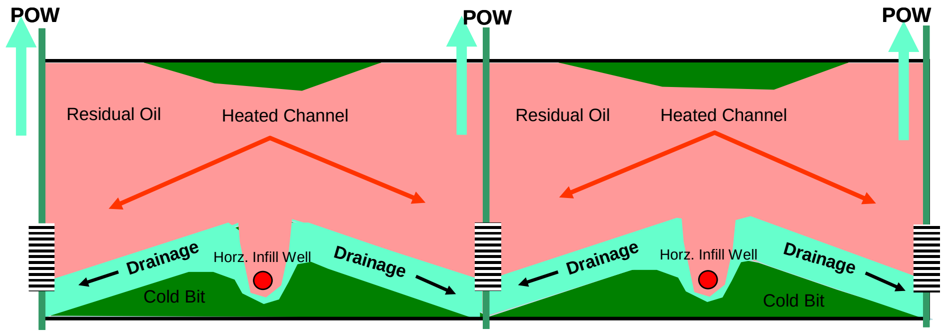
CSS wells
Infill wells

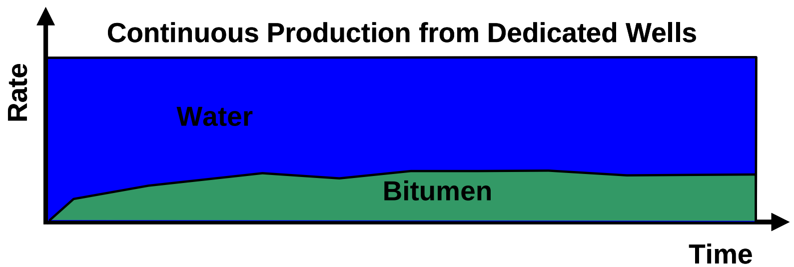
Example of uplift from cyclic IOI



Imperial | Cold Lake

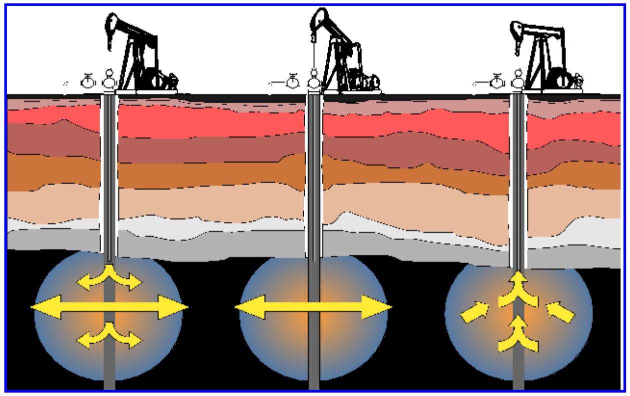
Steamflood Process Overview



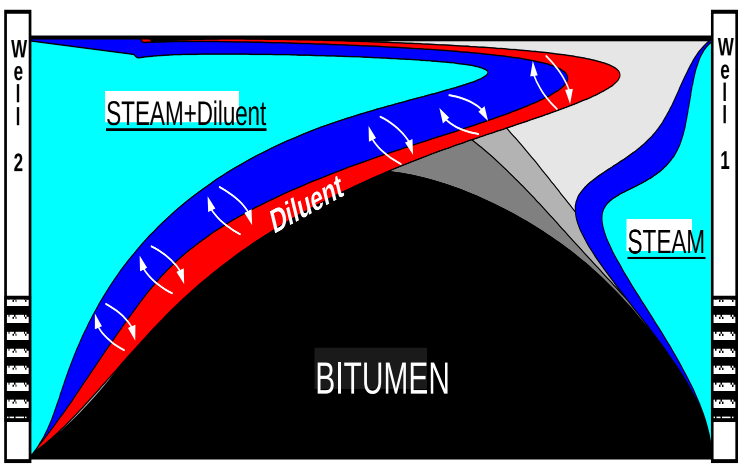


- Continuous steam injection, at low rates has the potential to:
  - Lower operating costs
  - Improve well operability
  - Reduce casing stress
- Target reservoir pressure between 0.5 to 1.5 MPa
- Continuous rather than cyclical steam injection through dedicated injectors and production from dedicated producers

LASER Process Overview



CSS Thermal Process



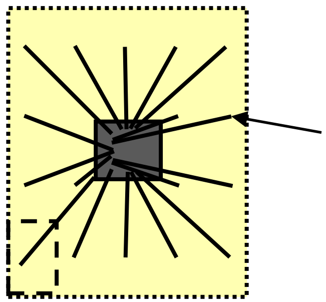
Liquid Addition to Steam for Enhancing Recovery

- LASER is a mid/late-life technology
  - Follow-up process for CSS
  - Implemented with greater than 2-3 cyclic cycles remaining
  - Alternative to purely thermal processes
- LASER is a cyclic steam process with the addition of a C5+ condensate to the steam during injection
  - Enhances gravity drainage efficiency by reducing in-situ viscosity beyond thermal limit
  - Potentially increases the recovery by >5% of EBIP
- Key process performance indicators
  - Incremental OSR over a purely thermal baseline
  - Fractional recovery of injected solvent

Imperial | Cold Lake

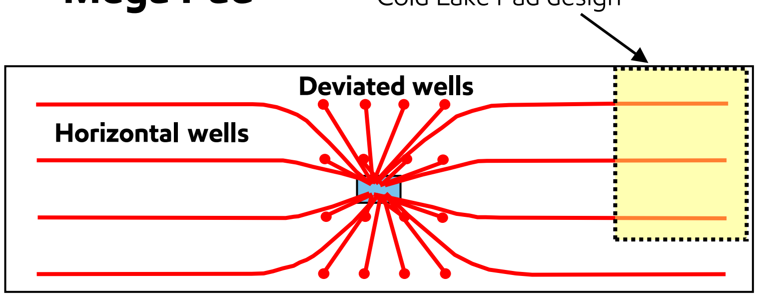
Pad Design

Original Pad Design



- Wells drilled directionally from central lease location
  - Reduced environmental disturbance
  - Improved development economics
  - Increased operational efficiencies
- Original pad design 20 wells on 4 acre spacing
- Current pad designs
  - Up to 35 wells on 4 or 8 acre spacing
  - Mix of deviated and/or horizontal wells

Mega Pad

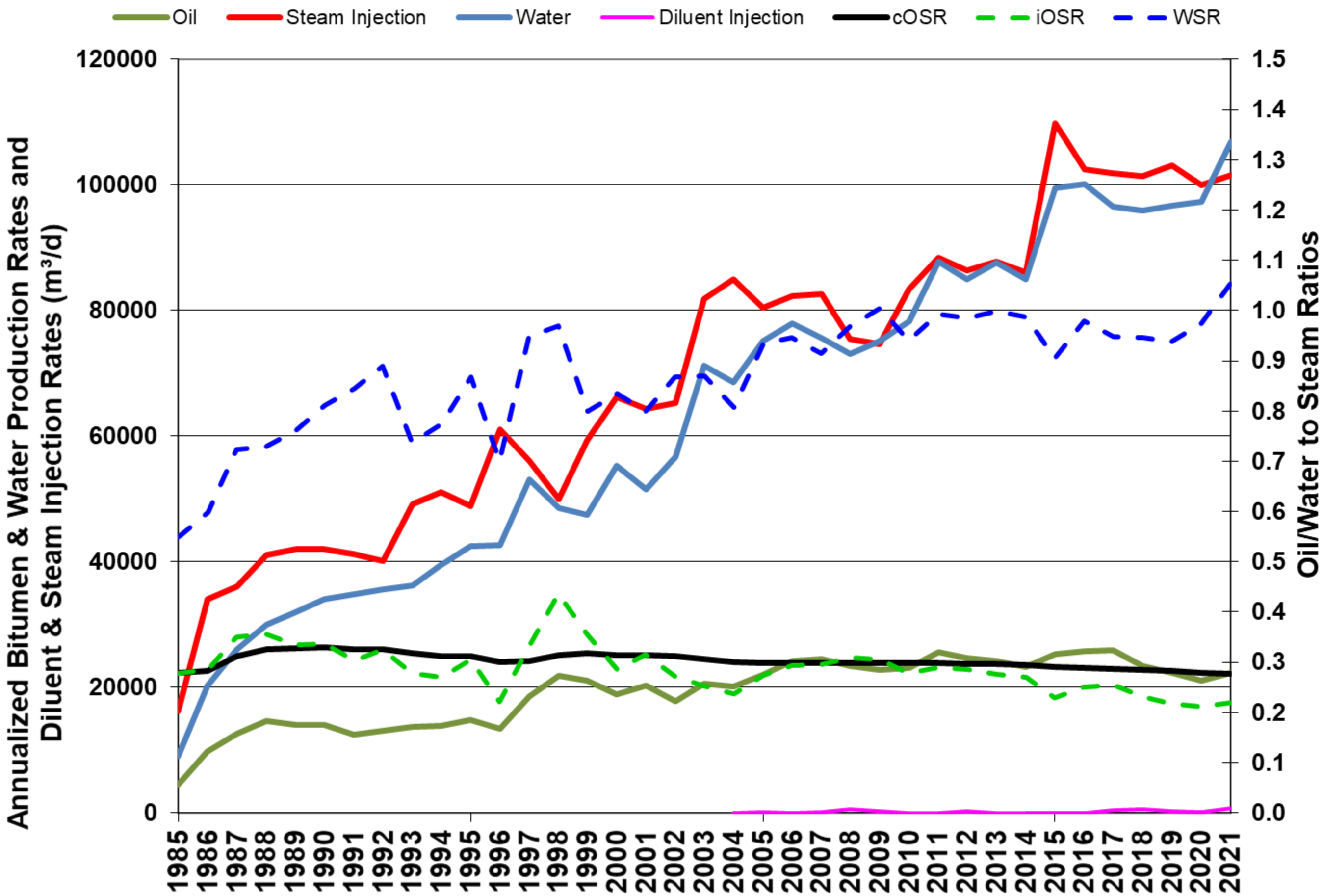


Subsurface

Scheme Lifespan Performance

Cold Lake Production Performance

Cold Lake Approval 8558 Area Production



	Bitumen Production	Steam Injection	Cumulative OSR
	10^3 m^3/d	10^3 m^3/d	
2020	21.1	99.9	0.28
2021	22.3	101.5	0.28

- Maximum daily bitumen production under approval 8558 of 40,000 m^3/d
- Production data includes CSP and SA-SAGD pilot projects
- Only commercial diluent injection included
- 2021 Producing Well Count: 4356

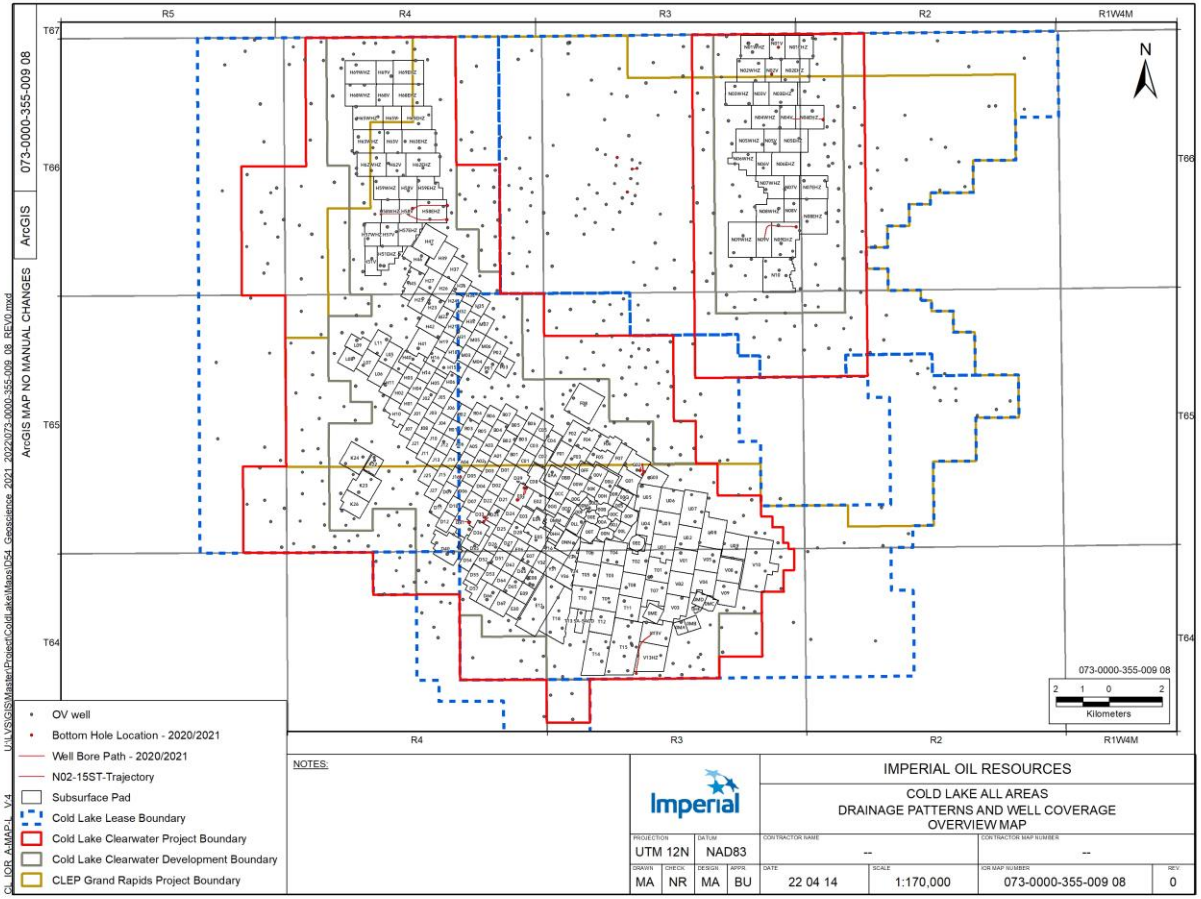
Imperial | Cold Lake

Cold Lake Major Events

Site	Plant	Phase	Year of Regulatory Approval	First Production	Decommissioned
Ethel	-	Pilot	1964	1964	1998
May	-	Pilot	1972	1972	1999
Leming	-	1	1973	1975	-
Maskwa	1	1, 2	1983	1985	-
Mahihkan	2	3, 4	1984	1985	-
Maskwa	3	5, 6	1985	1986	-
Mahihkan	4	7, 8	1986	1992	-
		9, 10		1995	-
Mahkeses	5	11, 12, 13	1999	2002	-
Mahihkan North	-	Extension to 9 and 10	2004	2005	-
Nabiye	6	14, 15, 16	2004	2015	-
Cold Lake Expansion Project (CLEP)	-		2018	-	-

Geoscience Overview

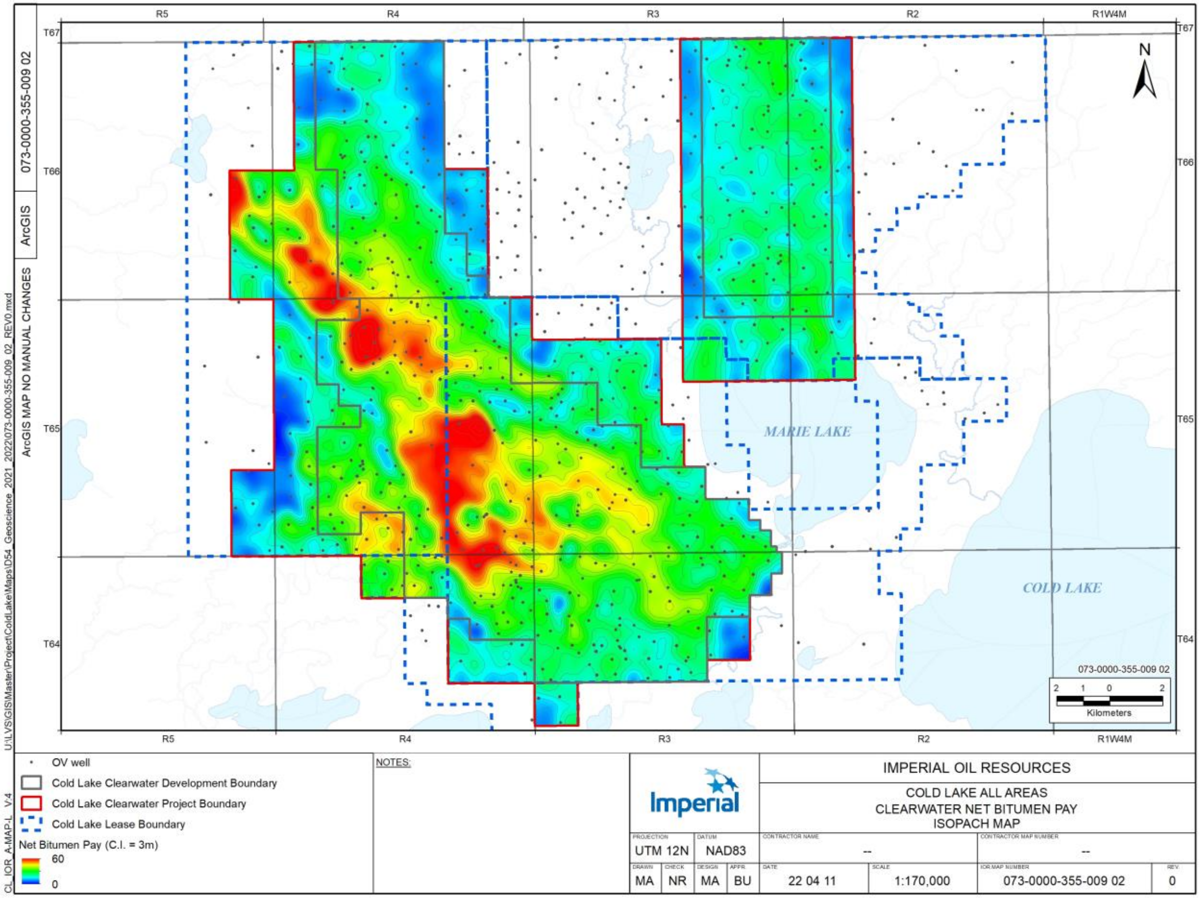
Drilled/Approved Map



Map Illustrates:

- Approved Project Area
- Approved Development Area
- Location and extent of existing development pads
- Annotated drainage pattern areas
- Distribution of OV core holes
- Wells drilled in 2020/21

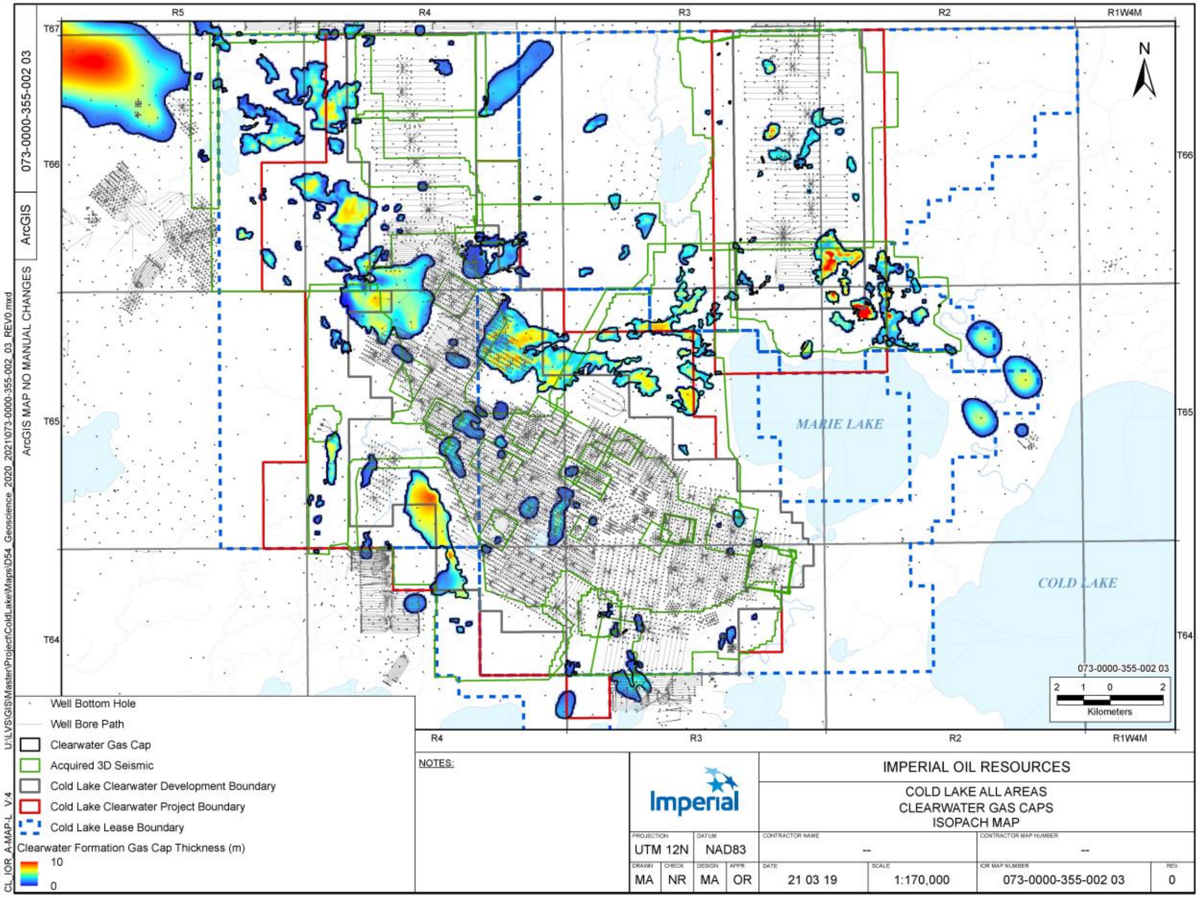
Isopach of Clearwater Net Bitumen Pay



- Map illustrates distribution of pay above 8 wt% saturation cut off
- Thin pay and pay immediately adjacent to water included in isopach calculation
- Thickness trend is consistent with orientation of main valley incision

Imperial | Cold Lake

Gas/Water Zones in Communication with Pay

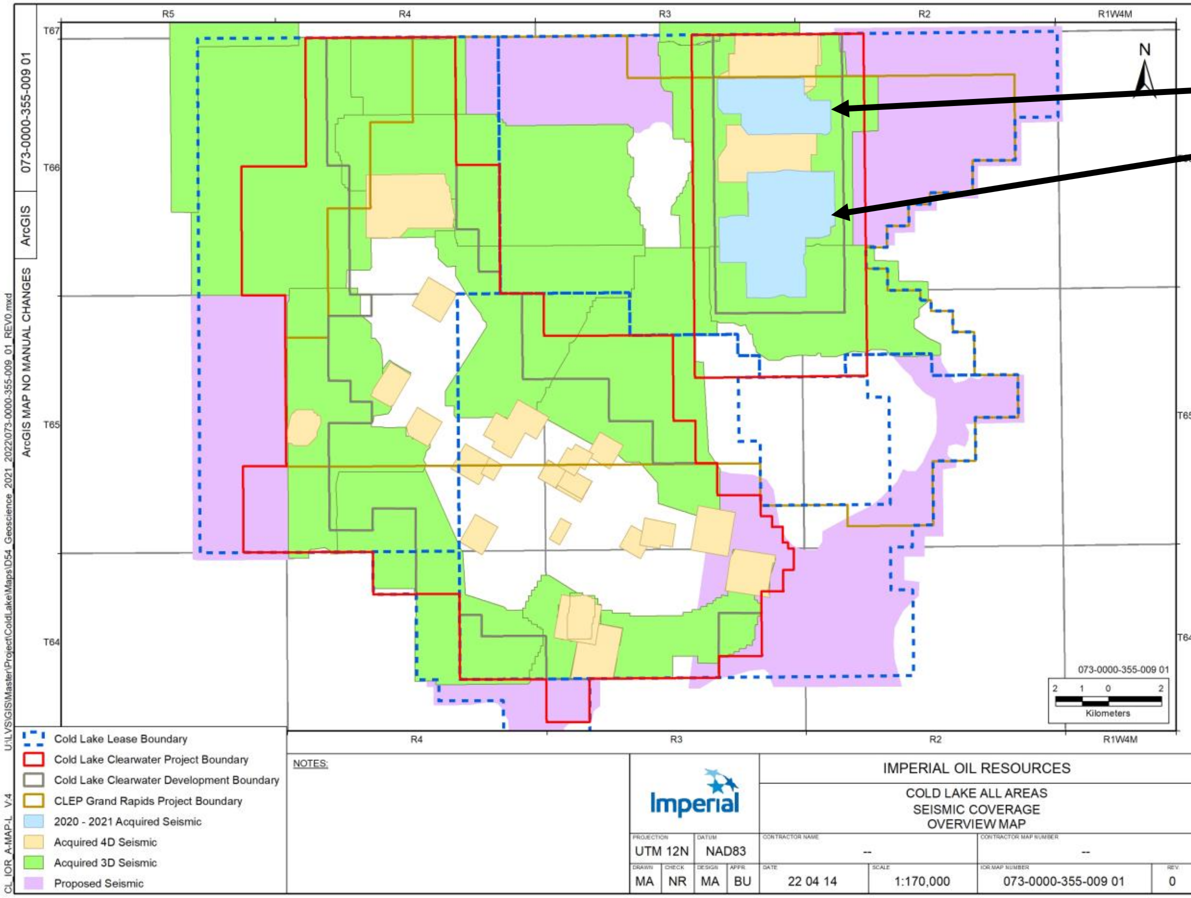


- CSS is highly sensitive to contact with potential thief zones.
- Contact with the saline water below operational pads is avoided by imposing a significant stand-off whenever mud barriers are deemed inadequate.
- Large gas caps are avoided, but a few small gas zones are in contact with the Cold Lake CSS operation.

Geomechanical anomalies

- No new open-hole DFIT tests were performed on the Colorado Group caprock in 2021
- No anomalous fracture closure pressures observed

Seismic Acquisition



N03/N04 Monitor 1

N07-N10 Monitor 1

- 4D monitor surveys acquired in winter 2021 across pads N03/N04 and N07-N10.

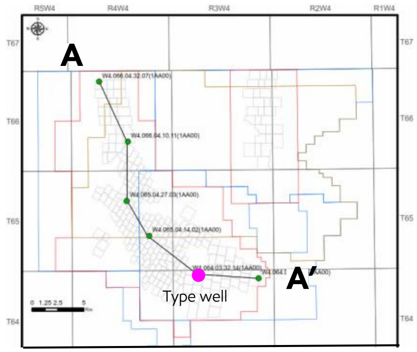
Map Illustrates:

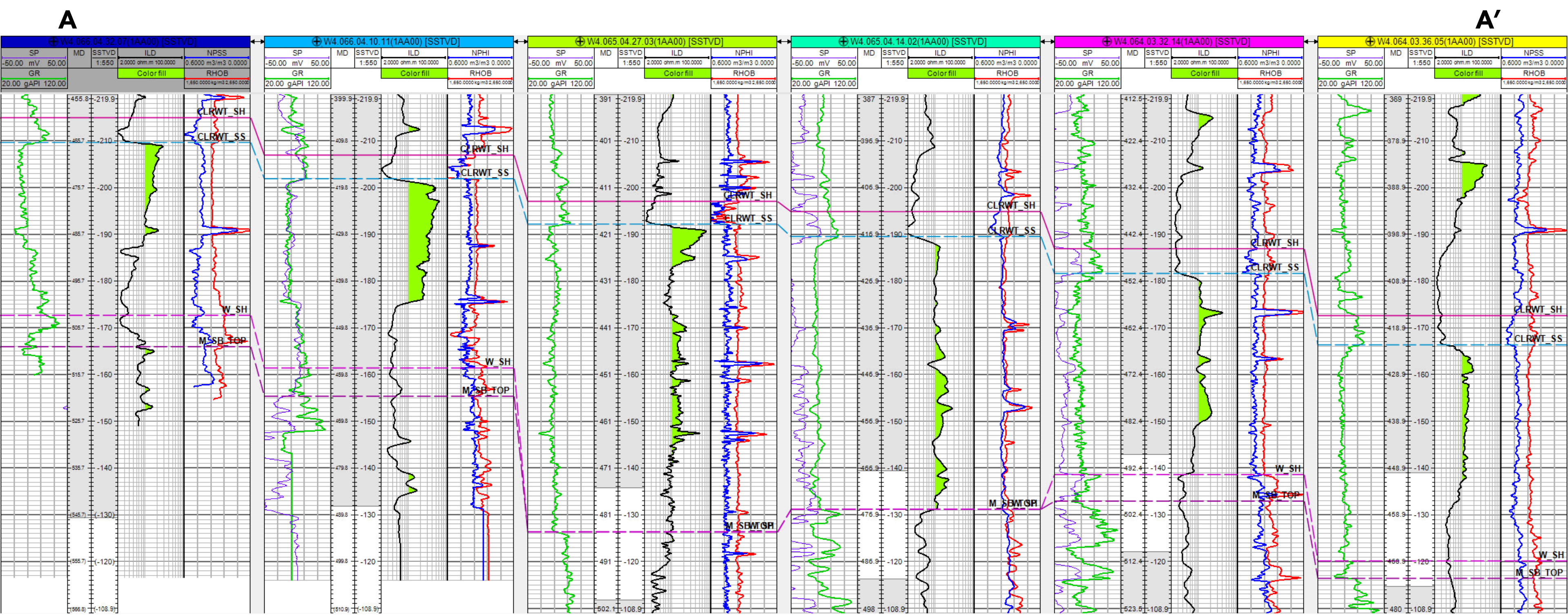
- Approved Project Area
- Approved Development Area
- Current 3D and 4D seismic coverage with recent additions highlighted in blue

Representative Structural Well Log Cross Section

Cross section represents stratigraphic and structural variability within the Clearwater Formation from northwest to southeast.

- Cold Lake Leases
- Approved project boundary
- Developed pads
- Grand Rapids project boundary





CLRWT_SH = Clearwater Shale

CLRWT_SS = Top of Clearwater Sandstone

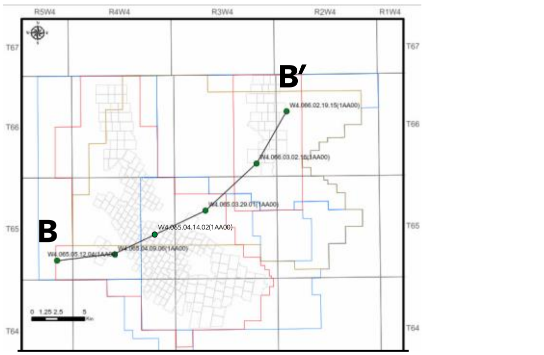
W_SH = Wabiskaw Shale

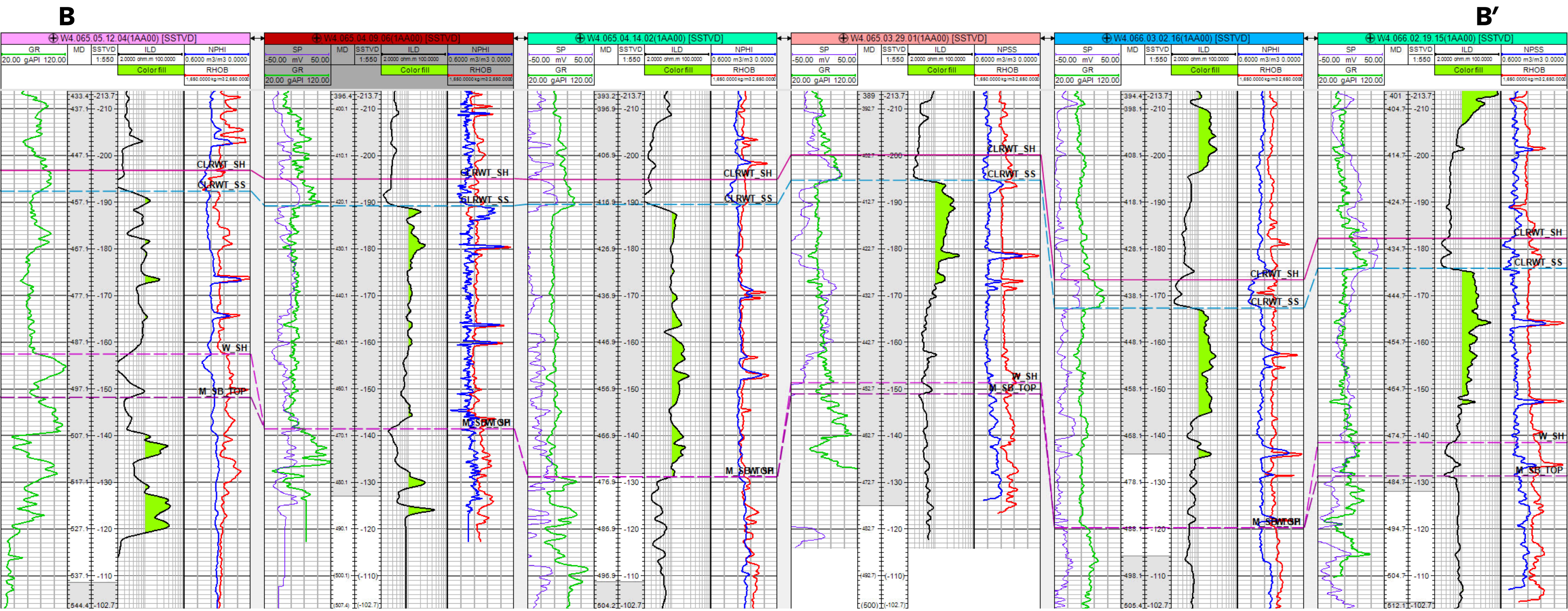
M_SB_TOP = McMurray Sequence Boundary Top

Representative Structural Well Log Cross Section

Cross section represents stratigraphic and structural variability within the Clearwater Formation from southwest to northeast.

- Cold Lake Leases
- Approved project boundary
- Developed pads
- Grand Rapids project boundary





CLRWT_SH = Clearwater Shale

CLRWT_SS = Top of Clearwater Sandstone

W_SH = Wabiskaw Shale

M_SB_TOP = McMurray Sequence Boundary Top

Imperial | Cold Lake

Average Reservoir Properties and OBIP

Reservoir and Fluid Properties

Depth	Clearwater @ 400M
Depositional Facies	Continental scale fluvial-deltaic system
Sands	Unconsolidated, reactive, clay clasts
Diagenetic Cements	Mixed-layer clays
Bitumen API Gravity	10.2
Bitumen Viscosity	100,000 cp @ 13 C 8 cp @ 200C
Bitumen Saturation	Average 70%

Reservoir Property	Range	Average
Porosity	27-35%	33%
Permeability	1-4 Darcies	1.5 Darcies
Bitumen wt%	6-14%	10.5%
Total Net Pay	0-60m	30m

Original-Bitumen-in-Place (OBIP)

Clearwater Fm	*8 Wt %* (E6m3)	*8 Wt %* (MBO)	*% Recovery*
Project Area	2,348	14,766	11.1
Development Area	1,671	10,507	15.5
Combined Active Well Pattern Area	1,032	6,491	25.2

CALCULATION METHOD

OBIP = A * H * So * P

A = Area (m^2)
H = Net pay (m)
So = Oil Saturation (%)
P = avg Porosity

Imperial | Cold Lake

Pad Reservoir Properties and Recovery Information

Pad Recovery

Pad	Net Pay (m)	Porosity	Permeability (D)	Average Effective So	Effective OBIP (e3 m^3)	Drainage Area (m^2)	Recovery to YE 2021		Ultimate Recovery (% EBIP)
							e3 m^3	% EBIP	
00A	30	0.33	1.3	0.67	1184	193591	152	13%	EUR = Recovery to Date
00B	27	0.33	1.4	0.68	1772	231800	126	7%	EUR = Recovery to Date
00C	25	0.33	1.2	0.68	1559	211035	216	14%	EUR = Recovery to Date
00D	29	0.33	1.5	0.67	1236	169839	212	17%	EUR = Recovery to Date
00E	28	0.33	1.3	0.69	1257	207993	150	12%	EUR = Recovery to Date
00F	22	0.33	1.4	0.68	1079	151975	233	22%	EUR = Recovery to Date
00G	29	0.34	1.6	0.67	2097	271522	358	17%	EUR = Recovery to Date
00H	28	0.33	1.4	0.69	2010	257344	291	14%	EUR = Recovery to Date
00J	36	0.33	1.3	0.68	850	134339	249	29%	EUR = Recovery to Date
00K	31	0.33	1.7	0.70	1905	233962	489	26%	EUR = Recovery to Date
00L	35	0.34	1.8	0.72	2019	280504	450	22%	EUR = Recovery to Date
00M	26	0.34	1.5	0.66	982	129945	68	7%	EUR = Recovery to Date
00N	28	0.33	1.7	0.67	1648	245719	490	30%	EUR = Recovery to Date
00P	32	0.33	1.7	0.69	2341	331516	714	30%	EUR = Recovery to Date
00Q	35	0.35	2.0	0.73	1988	220552	342	17%	EUR = Recovery to Date
00R	33	0.34	1.6	0.71	1764	210698	116	7%	EUR = Recovery to Date
00S	26	0.34	1.4	0.68	1174	135701	136	12%	EUR = Recovery to Date
00T	35	0.32	1.7	0.70	2644	381551	846	32%	EUR = Recovery to Date
00U	30	0.34	2.0	0.65	2093	311961	1081	52%	52% - 55%
00V	27	0.34	1.8	0.62	1938	339636	764	39%	40% - 45%
00W	26	0.33	1.8	0.65	1895	337998	1384	73%	75% - 80%
0AA	30	0.34	1.8	0.69	2533	322867	1115	44%	EUR = Recovery to Date
0BB	29	0.35	2.0	0.64	2107	324551	1645	78%	80% - 82%
0EE	36	0.33	1.7	0.72	1854	273856	575	31%	EUR = Recovery to Date
0FF	33	0.33	1.8	0.66	1825	248143	1249	68%	68% - 70%
0HF	20	0.33	1.9	0.72	297	60352	102	34%	EUR = Recovery to Date
0HH	19	0.32	1.6	0.66	1032	218243	637	62%	63% - 65%
0LL	22	0.32	1.6	0.67	1587	327247	735	46%	EUR = Recovery to Date
0MA	27	0.33	2.1	0.73	1454	202005	126	9%	EUR = Recovery to Date
0MB	29	0.33	1.7	0.70	1942	251246	452	23%	EUR = Recovery to Date
0MC	26	0.34	2.0	0.78	1087	206478	496	46%	EUR = Recovery to Date
0MD	30	0.33	1.9	0.73	816	209255	496	61%	EUR = Recovery to Date
0ME	31	0.32	1.6	0.71	2276	352968	533	23%	EUR = Recovery to Date

- Pad production updated to Year End 2021
- Effective OBIP (Original Bitumen in Place) is volume of bitumen >8 wt% between top of Effective Pay and base of Effective Pay

Pad Recovery

Pad	Net Pay (m)	Porosity	Permeability (D)	Average Effective So	Effective OBIP (e3m3)	Drainage Area (m2)	Recovery to YE 2021		Ultimate Recovery (% EBIP)
							e3m3	% EBIP	
0MM	23	0.33	1.7	0.63	1607	329151	756	47%	50% - 55%
0NN	21	0.33	1.5	0.66	2252	490646	1042	46%	50% - 55%
A01	28	0.32	1.8	0.65	2010	328813	956	48%	48% - 50%
A02	32	0.32	1.9	0.67	2298	333501	1174	51%	51% - 55%
A03	35	0.32	1.7	0.66	2418	325264	973	40%	40% - 45%
A04	32	0.32	2.0	0.68	2378	330758	1544	65%	65% - 70%
A05	26	0.32	1.7	0.65	1766	326066	830	47%	47% - 50%
A06	35	0.32	1.7	0.65	2475	335476	1201	49%	50% - 70%
B01	28	0.33	1.6	0.64	1994	327465	941	47%	47% - 50%
B02	27	0.34	1.8	0.65	2066	336542	1035	50%	50% - 55%
B03	28	0.33	1.7	0.66	2034	324926	1199	59%	59% - 60%
B04	35	0.33	1.6	0.63	2463	329819	1003	41%	45% - 50%
B05	18	0.33	1.7	0.63	2143	335722	1459	68%	68% - 70%
B06	27	0.33	1.7	0.67	2000	329908	1085	54%	54% - 55%
C01	32	0.32	1.4	0.64	2204	330162	944	43%	43% - 45%
C02	25	0.32	1.5	0.65	1762	328513	1146	65%	65% - 67%
C03	35	0.33	1.7	0.67	2532	324721	1714	68%	68% - 70%
C04	29	0.33	1.7	0.64	2044	330793	938	46%	46% - 50%
C05	29	0.33	1.7	0.65	2105	326483	792	38%	40% - 45%
C08	29	0.34	1.6	0.63	4091	654794	1310	32%	60% - 70%
D01	35	0.32	1.7	0.64	2405	329559	1026	43%	43% - 45%
D02	38	0.32	1.7	0.66	2673	326299	879	33%	55% - 65%
D03	36	0.32	1.9	0.67	2494	318726	1357	54%	55% - 65%
D04	42	0.32	2.0	0.68	3065	331559	1776	58%	75% - 85%
D05	41	0.32	1.9	0.67	2863	325578	1744	61%	61% - 70%
D06	47	0.32	2.3	0.70	3463	322502	2982	86%	90% - 95%
D07	41	0.32	2.1	0.69	3052	330962	2270	74%	80% - 95%
D09	40	0.33	2.2	0.68	3075	330529	2512	82%	85% - 95%
D10	39	0.33	2.2	0.68	2961	325822	2252	76%	80% - 95%
D11	24	0.33	1.3	0.71	2431	319000	80	3%	EUR = Recovery to Date
D12	25	0.33	1.5	0.64	1856	337253	570	31%	31% - 35%
D21	32	0.32	1.5	0.64	2516	329138	852	34%	55% - 65%
D22	38	0.32	1.8	0.67	3027	331542	1512	50%	55% - 60%
D23	34	0.33	1.7	0.64	2847	321196	1530	54%	70% - 80%
D24	32	0.33	1.4	0.63	2232	325490	966	43%	50% - 55%

Pad Recovery

Pad	Net Pay (m)	Porosity	Permeability (D)	Average Effective So	Effective OBIP (e3m3)	Drainage Area (m2)	Recovery to YE 2021		Ultimate Recovery (% EBIP)
							e3m3	% EBIP	
D25	41	0.32	1.7	0.67	2914	326409	1306	45%	55% - 60%
D26	47	0.32	2.1	0.69	3378	325318	1585	47%	47% - 50%
D27	41	0.32	1.8	0.67	2885	322159	1097	38%	40% - 45%
D28	29	0.33	1.4	0.62	2256	373383	930	41%	70% - 75%
D31	42	0.32	2.0	0.69	5438	562341	2777	51%	75% - 90%
D33	31	0.32	1.9	0.67	3453	504798	2220	64%	65% - 70%
D35	36	0.32	1.8	0.66	2966	384577	1149	39%	50% - 60%
D36	32	0.32	1.9	0.69	2902	409002	1206	42%	50% - 60%
D39	30	0.33	1.7	0.63	3541	556388	1255	35%	60% - 70%
D40	21	0.33	1.5	0.65	4390	977926	194	4%	25% - 40%
D51	32	0.33	2.2	0.70	2450	326718	1257	51%	60% - 75%
D52	35	0.33	2.0	0.67	2667	337762	791	30%	30% - 33%
D53	35	0.33	1.9	0.66	2554	331550	1700	67%	70% - 75%
D54	27	0.33	1.5	0.63	1941	334858	652	34%	35% - 40%
D55	28	0.32	1.4	0.61	1878	331475	652	35%	40% - 43%
D57	9	0.32	1.5	0.68	769	380291	97	13%	EUR = Recovery to Date
D62	31	0.34	2.0	0.67	2250	320178	1509	67%	70% - 75%
D63	30	0.34	1.7	0.62	2121	334418	1251	59%	60% - 70%
D64	32	0.32	2.0	0.69	2345	321448	1793	76%	76% - 80%
D65	29	0.32	2.0	0.70	2177	331446	1422	65%	65% - 75%
D66	13	0.33	1.7	0.73	1498	495376	187	12%	EUR = Recovery to Date
D67	27	0.32	1.7	0.67	3031	496595	692	23%	25% - 35%
E01	25	0.33	1.4	0.60	2560	498220	1278	50%	70% - 80%
E02	24	0.33	1.4	0.61	1968	388866	1028	52%	60% - 70%
E03	21	0.33	1.5	0.59	2005	320130	1043	52%	60% - 70%
E04	30	0.33	1.6	0.61	2153	343432	969	45%	55% - 70%
E05	30	0.33	1.5	0.62	3513	567540	1258	36%	50% - 60%
E07	34	0.34	1.4	0.59	2280	325221	263	12%	EUR = Recovery to Date
E08	24	0.33	1.5	0.62	1664	328747	631	38%	40% - 45%
E09	22	0.32	1.6	0.65	1622	330440	756	47%	47% - 50%
E10	25	0.32	1.7	0.67	1820	330934	631	35%	35% - 40%
E11	20	0.33	1.5	0.64	8334	1908027	1385	17%	35% - 50%
F01	29	0.34	1.7	0.61	2780	454370	1249	45%	45% - 55%
F02	24	0.32	1.5	0.66	2551	482594	810	32%	40% - 50%
F03	28	0.33	1.6	0.63	2958	490118	1629	55%	60% - 70%
F04	23	0.32	1.4	0.64	2446	494641	1152	47%	50% - 60%

Pad Recovery

Pad	Net Pay (m)	Porosity	Permeability (D)	Average Effective So	Effective OBIP (e3m3)	Drainage Area (m2)	Recovery to YE 2021		Ultimate Recovery (% EBIP)
							e3m3	% EBIP	
F05	33	0.34	1.8	0.64	3356	468232	1935	58%	60% - 70%
F06	21	0.33	1.6	0.64	2223	482036	1194	54%	55% - 65%
F07	26	0.33	1.4	0.61	2976	541922	1733	58%	58% - 65%
F08	9	0.33	1.3	0.63	2510	1287327	536	21%	21% - 25%
G01	32	0.33	1.6	0.65	3936	559883	1969	50%	50% - 60%
G02	23	0.33	1.4	0.62	2769	573215	1304	47%	50% - 60%
G03	19	0.33	1.3	0.62	2165	543772	1287	59%	60% - 70%
H01	40	0.32	1.9	0.68	2493	329061	1936	78%	80% - 85%
H02	32	0.32	1.7	0.68	2343	328573	1213	52%	55% - 60%
H03	41	0.33	1.4	0.61	2636	328976	450	17%	25% - 35%
H04	38	0.32	1.2	0.65	2372	326043	515	22%	25% - 30%
H05	40	0.32	1.3	0.64	2565	330248	353	14%	35% - 40%
H10	15	0.32	1.2	0.64	1813	562300	673	37%	37% - 40%
H11	28	0.32	1.5	0.65	2880	488848	1419	49%	60% - 70%
H14	36	0.33	1.4	0.62	2483	330604	405	16%	20% - 25%
H15	29	0.33	1.7	0.65	3069	483319	1295	42%	50% - 60%
H16	24	0.33	1.8	0.66	1734	331365	1020	59%	60% - 65%
H18	29	0.33	2.2	0.69	2171	329107	973	45%	45% - 55%
H19	27	0.33	1.9	0.67	2027	331169	1322	65%	65% - 75%
H21	28	0.32	1.8	0.68	2074	329180	1457	70%	70% - 75%
H22	30	0.33	2.0	0.68	2227	327559	1425	64%	70% - 75%
H23	28	0.32	1.9	0.68	3325	491421	2345	71%	75% - 80%
H24	24	0.32	1.7	0.69	1790	327075	760	42%	45% - 50%
H25	29	0.33	1.7	0.65	3091	487810	2153	70%	70% - 75%
H26	22	0.33	1.8	0.68	2517	494164	1227	49%	49% - 55%
H27	26	0.33	1.9	0.69	2923	488491	1557	53%	55% - 65%
H31	24	0.33	1.8	0.66	1745	327260	1084	62%	62% - 65%
H32	24	0.32	1.8	0.69	1755	326110	826	47%	47% - 55%
H33	23	0.32	1.7	0.67	1661	329580	644	39%	40% - 50%
H34	19	0.31	1.4	0.68	1386	322027	323	23%	23% - 25%
H35	18	0.32	1.4	0.68	1350	329729	384	28%	30% - 40%
H36	19	0.32	1.4	0.67	1385	330145	354	26%	26% - 30%
H37	13	0.32	1.5	0.68	1452	491579	523	36%	40% - 45%
H39	19	0.32	1.6	0.67	3088	731066	632	20%	35% - 45%
H40	26	0.32	1.4	0.64	2244	402849	1206	54%	55% - 65%

Pad Recovery

Pad	Net Pay (m)	Porosity	Permeability (D)	Average Effective So	Effective OBIP (e3m3)	Drainage Area (m2)	Recovery to YE 2021		Ultimate Recovery (% EBIP)
							e3m3	% EBIP	
H41	37	0.33	1.6	0.64	6349	787380	2169	34%	40% - 50%
H42	27	0.34	1.7	0.63	2852	481573	1776	62%	62% - 70%
H45	28	0.33	1.9	0.67	3632	573025	1315	36%	45% - 55%
H46	26	0.33	1.8	0.67	3415	595398	1716	50%	55% - 65%
H47	21	0.32	1.5	0.67	4326	952906	1314	30%	40% - 60%
H51	25	0.33	1.5	0.63	6307	1178021	1226	19%	40% - 50%
H57	21	0.33	1.4	0.66	8408	1768000	1704	20%	40% - 50%
H58	18	0.33	1.6	0.68	8726	2163529	2481	28%	40% - 50%
H59	18	0.33	1.7	0.70	9191	2186138	2728	30%	40% - 50%
H62	13	0.33	1.6	0.65	7338	2734667	1823	25%	30% - 40%
H63	12	0.33	1.6	0.63	6580	2742767	1605	24%	25% - 35%
H65	12	0.33	1.6	0.64	7021	2641134	1680	24%	25% - 35%
H68	10	0.33	1.5	0.63	5060	2490035	1494	30%	30% - 35%
H69	13	0.33	1.5	0.67	7615	2630744	1072	14%	20% - 30%
J01	37	0.32	2.0	0.70	2748	322674	2240	82%	85% - 95%
J02	33	0.32	1.7	0.67	2022	319882	1392	69%	70% - 75%
J03	39	0.32	2.1	0.69	2648	334676	1875	71%	75% - 90%
J04	44	0.32	1.8	0.66	2512	323742	1983	79%	80% - 85%
J05	35	0.32	1.6	0.65	2188	326851	921	42%	50% - 60%
J06	44	0.33	1.6	0.64	2640	338008	1175	44%	60% - 85%
J07	35	0.32	1.8	0.66	2516	325143	1914	76%	76% - 80%
J08	36	0.33	2.2	0.69	3126	331895	2819	90%	90% - 95%
J10	37	0.32	2.1	0.70	2691	318885	2218	82%	85% - 95%
J11	37	0.33	2.2	0.69	2793	326172	1312	47%	60% - 70%
J12	34	0.32	2.1	0.69	2407	316498	2032	84%	84% - 85%
J13	38	0.32	2.4	0.70	2923	316967	2682	92%	92% - 95%
J14	33	0.32	2.4	0.70	2467	323087	1791	73%	75% - 80%
J15	36	0.33	2.4	0.69	2686	321799	2534	94%	94% - 96%
J16	40	0.32	2.3	0.69	2881	315616	2169	75%	85% - 95%
J21	40	0.33	2.0	0.66	2807	324665	1482	53%	55% - 65%
J25	33	0.33	1.9	0.66	2350	324313	967	41%	50% - 55%
J27	30	0.32	1.7	0.65	2113	328353	448	21%	21% - 25%
K23	17	0.34	1.4	0.59	2876	848469	686	24%	25% - 30%
K24	9	0.34	1.2	0.59	1414	809673	512	36%	36% - 40%
K26	30	0.33	1.3	0.59	3939	651536	309	8%	10% - 15%

Imperial | Cold Lake

Pad Recovery

Pad	Net Pay (m)	Porosity	Permeability (D)	Average Effective So	Effective OBIP (e3m3)	Drainage Area (m2)	Recovery to YE 2021		Ultimate Recovery (% EBIP)
							e3m3	% EBIP	
L05	32	0.32	1.5	0.64	3273	495108	1492	46%	55% - 60%
L06	25	0.32	1.5	0.64	2682	490761	1766	66%	70% - 75%
L07	30	0.33	1.6	0.64	3213	501860	1718	53%	55% - 65%
L08	17	0.32	1.3	0.63	1657	473030	489	29%	40% - 45%
L09	29	0.33	1.3	0.63	2770	453662	632	23%	25% - 30%
L11	35	0.33	1.7	0.65	3627	489812	1662	46%	55% - 65%
M03	31	0.33	2.0	0.67	2313	327035	897	39%	40% - 45%
M04	31	0.33	2.0	0.67	2273	330753	890	39%	40% - 45%
M05	23	0.33	1.7	0.65	1681	327665	639	38%	40% - 45%
M06	26	0.33	1.8	0.66	1891	333545	462	24%	25% - 30%
M07	17	0.32	1.5	0.67	1264	328371	375	30%	30% - 35%
N01	16	0.33	1.5	0.65	8330	2407368	1566	19%	25% - 40%
N02	15	0.33	1.6	0.65	8175	2409732	1059	13%	20% - 35%
N03	14	0.33	1.5	0.66	7598	2401244	853	11%	15% - 25%
N04	15	0.33	1.5	0.66	8042	2399090	931	12%	15% - 25%
N05	12	0.33	1.5	0.66	6140	2396682	748	12%	15% - 20%
N06	11	0.32	1.5	0.66	5171	2119119	585	11%	15% - 20%
N07	13	0.33	1.6	0.64	6284	2200195	644	10%	15% - 20%
N08	15	0.33	1.5	0.63	8486	2736576	753	9%	15% - 20%
N09	15	0.32	1.6	0.62	10603	3464504	714	7%	15% - 20%
N10	16	0.33	1.4	0.63	5028	1461900	195	4%	10% - 20%
P01	24	0.33	1.9	0.66	1728	317709	800	46%	46% - 50%
P02	22	0.33	1.6	0.65	1497	317130	347	23%	23% - 25%
P03	20	0.33	1.7	0.67	1461	329951	497	34%	34% - 36%
R01	31	0.32	1.8	0.68	2135	313829	1286	60%	60% - 70%
R02	32	0.33	1.5	0.62	2144	317549	1001	47%	60% - 65%
R03	32	0.32	1.5	0.63	2247	336378	890	40%	40% - 45%
R04	28	0.33	1.4	0.63	2015	332424	515	26%	30% - 40%
R05	23	0.32	1.3	0.62	1569	325946	766	49%	50% - 60%
R06	22	0.33	1.5	0.65	1526	324747	480	31%	31% - 33%
R07	18	0.33	1.6	0.64	1301	333947	670	51%	51% - 53%
T01	31	0.33	1.8	0.65	5119	743062	1227	24%	40% - 50%
T02	27	0.34	1.7	0.64	4758	806525	916	19%	40% - 50%
T03	23	0.34	1.6	0.62	3836	775850	866	23%	25% - 40%
T04	23	0.33	1.6	0.64	3867	775056	760	20%	40% - 50%

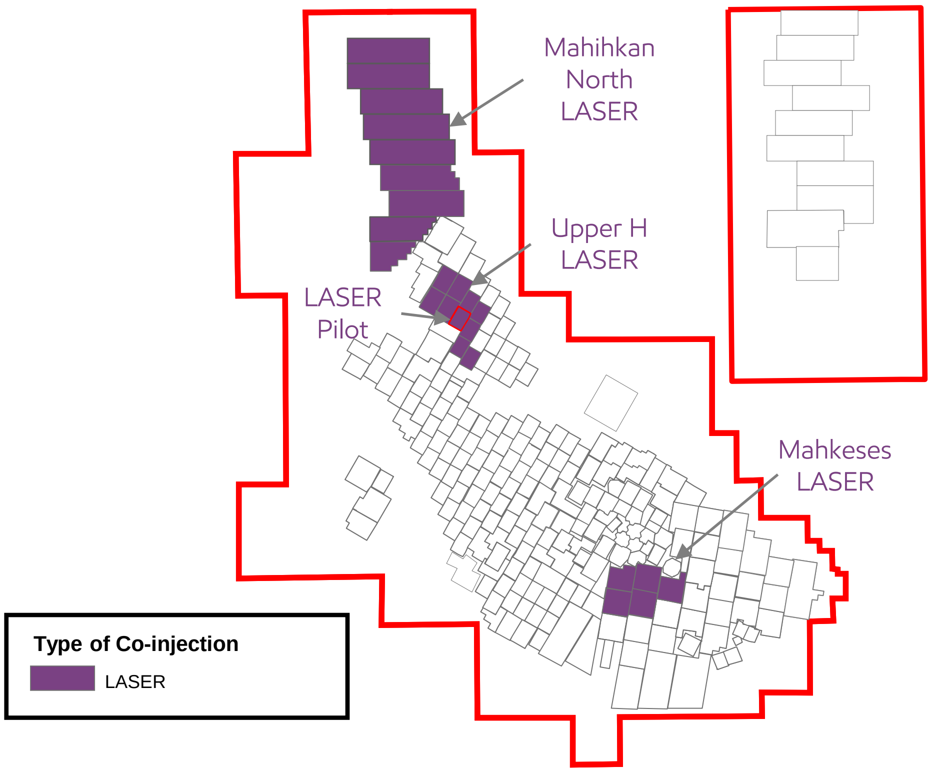
Pad Recovery

Pad	Net Pay (m)	Porosity	Permeability (D)	Average Effective So	Effective OBIP (e3m3)	Drainage Area (m2)	Recovery to YE 2021		Ultimate Recovery (% EBIP)
							e3m3	% EBIP	
T05	30	0.33	1.6	0.63	5087	806129	851	17%	40% - 50%
T06	23	0.34	2.1	0.63	3527	725691	865	25%	45% - 60%
T07	27	0.33	1.8	0.66	4596	745035	1073	23%	40% - 50%
T08	28	0.33	1.6	0.66	4832	774990	876	18%	35% - 50%
T09	24	0.33	1.4	0.62	3998	775378	562	14%	35% - 50%
T10	27	0.32	1.4	0.61	4207	764798	641	15%	20% - 25%
T11	22	0.32	1.5	0.65	3634	774660	711	20%	20% - 25%
T12	22	0.33	1.5	0.63	3663	774955	797	22%	25% - 35%
T14	19	0.33	1.9	0.68	6183	1414932	1168	19%	25% - 35%
T15	19	0.33	1.6	0.64	9513	2263668	1416	15%	20% - 35%
T18	18	0.32	1.4	0.64	5371	1384662	889	17%	20% - 35%
U01	27	0.33	1.7	0.65	4753	809886	1411	30%	40% - 50%
U02	22	0.32	1.2	0.64	3589	778146	1184	33%	45% - 60%
U03	27	0.33	1.5	0.65	4568	775924	1228	27%	50% - 65%
U04	28	0.34	1.6	0.63	4606	742187	1406	31%	40% - 50%
U05	31	0.33	1.7	0.64	5484	805485	1210	22%	35% - 50%
U06	25	0.33	1.5	0.63	4038	776166	766	19%	25% - 30%
U07	20	0.32	1.3	0.62	4843	1177341	1073	22%	30% - 45%
U08	19	0.33	1.2	0.63	4124	1050172	1166	28%	30% - 40%
U09	19	0.32	1.2	0.64	3316	814398	1229	37%	40% - 50%
V01	26	0.33	1.6	0.63	4293	775459	1250	29%	45% - 60%
V02	27	0.34	1.8	0.64	4579	775578	1119	24%	30% - 40%
V03	27	0.33	1.8	0.66	5060	828179	908	18%	30% - 40%
V04	21	0.32	1.3	0.65	3491	740131	1376	39%	45% - 60%
V05	23	0.32	1.2	0.64	3988	790349	1384	35%	40% - 50%
V08	22	0.33	1.4	0.63	3710	775455	1458	39%	45% - 60%
V09	20	0.33	1.5	0.65	3384	740326	1465	43%	50% - 60%
V10	20	0.33	1.4	0.63	8672	2017560	1757	20%	25% - 35%
V13	18	0.33	1.5	0.63	7774	2068506	1273	16%	20% - 30%
Y16	31	0.32	1.5	0.65	2612	393434	1042	40%	50% - 60%
Y31	35	0.32	1.4	0.62	2399	329976	815	34%	50% - 60%
Y32	32	0.33	1.4	0.60	2262	338472	433	19%	45% - 50%
Y34	26	0.34	1.7	0.61	1769	333186	762	43%	50% - 60%
Y36	28	0.32	1.2	0.63	2446	406801	1013	41%	50% - 60%

Co-injection

Map of Co-injection

- Liquid Addition to Steam for Enhanced Recovery (LASER) is the only commercial co-injection scheme implemented at Cold Lake.
- LASER involves the cyclic co-injection of diluent with steam.
- The original pilot of the LASER technology was conducted at H22 pad, starting in 2002.
- The first commercial application of LASER, started in 2007, expanded diluent injection to 10 pads in the Upper H area of the Mahihkan field.
- In 2017 LASER was expanded to 9 pads in the Mahihkan North area.
- In 2021 LASER was expanded to 5 pads in the Mahkeses field



Imperial | Cold Lake

LASER Co-injection Strategy

Injection

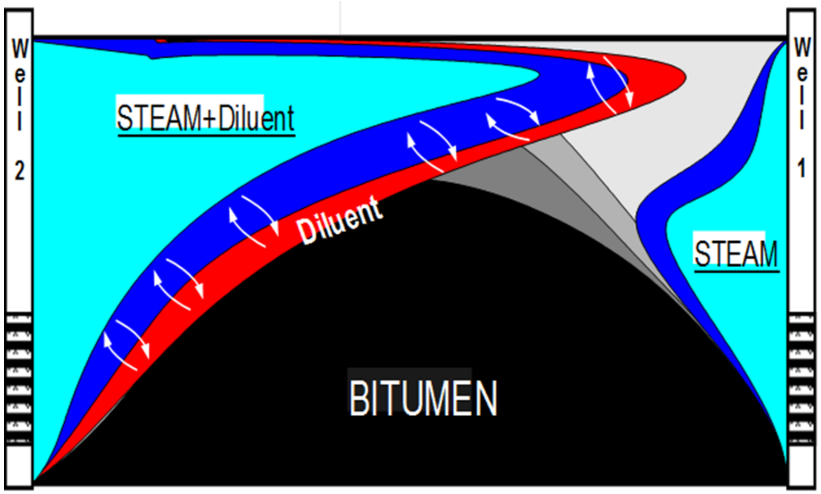
- At the original pilot, diluent was injected at a ratio of 6% diluent volume to cold-water-equivalent steam volume into 8 wells (equivalent to a ratio of 2.4% for the 20 well pad).
- The cycle diluent ratio for the commercial LASER projects at Upper H, Mahihkan North and Mahkeses ranged from 3 – 6% with an average of approximately 5%. H23 pad at Upper H was tested with a diluent ratio as high as 8.6%.
- At Upper H the diluent injection system was located at the individual pads, while at Mahihkan North and Mahkeses the diluent was injected into the steam line that supports the specific pads.
- With the exception of H23 pad, cycle diluent ratio for a pad does not exceed 8%, but the instantaneous diluent ratio can be up to 20% depending on pipeline limits.

Production

- Re-produced diluent is measured at each pad by taking production samples and analyzing the hydrocarbon composition.
- A diluent recovery of approximately 80% has been demonstrated at the Upper H LASER project.
- Produced diluent reduces the amount of diluent that needs to be added at the plant to meet the blend requirement.
- A diluent recovery unit (DRU) that started up in 2008 (Mahihkan) and 2021 (Mahkeses) which minimizes the volume of diluent that is burned along with the produced gas in the steam generators.

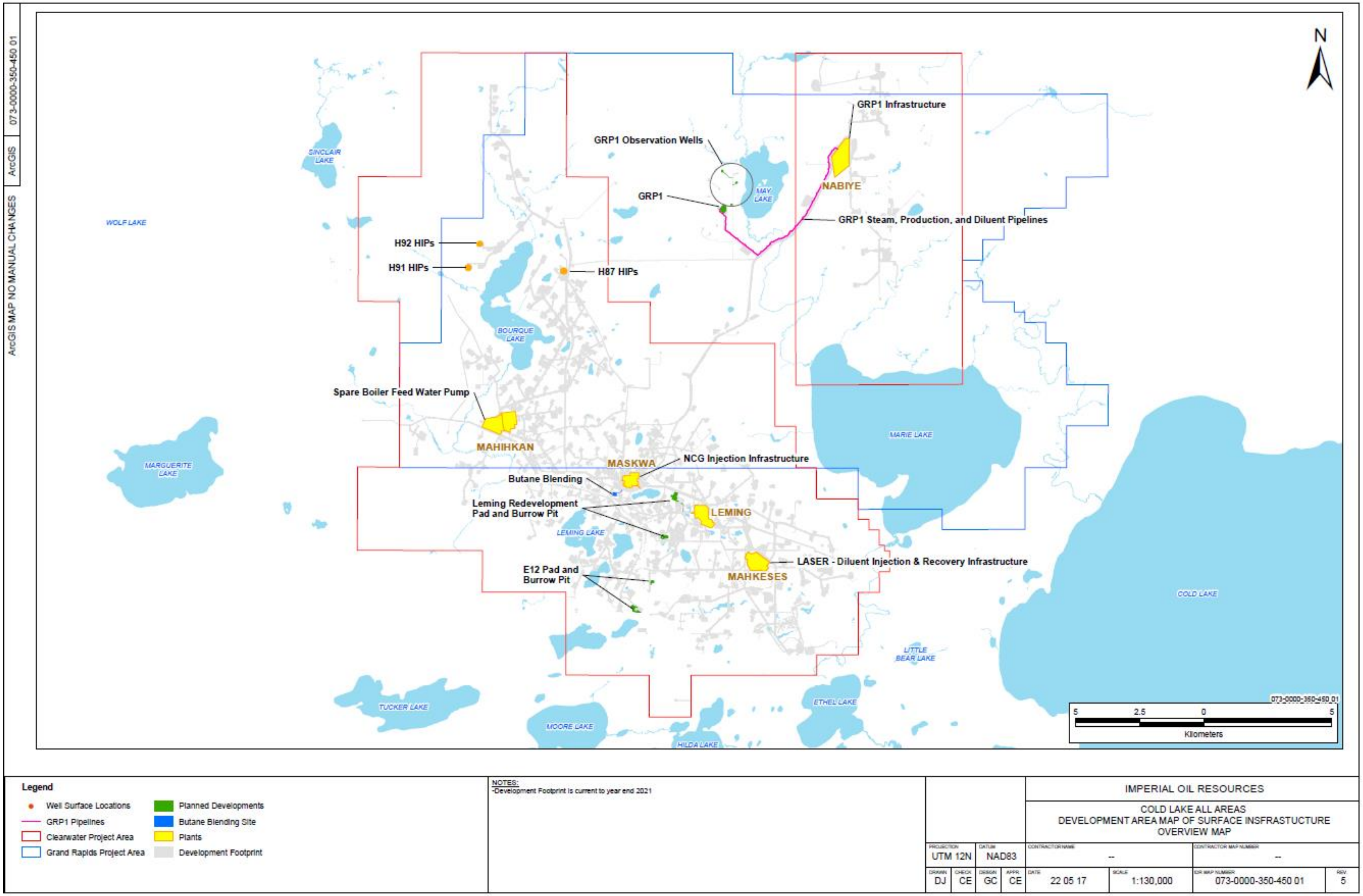
Impact of LASER Co-injection

- The efficiency of the CSS process decreases with time due to the following factors:
  - More steam is required each cycle to pressurize the steam chamber as the depletion level increases
  - Inter-well communication makes it more difficult to confine steam and build pressure
  - Heat loss to the overburden increases as the steam chamber grows
- Co-injection of diluent provides another mobilization mechanism that increases the efficiency of mid- to late-cycle CSS. Injected diluent condenses and mixes with unswept bitumen, lowering its viscosity.
- Higher bitumen mobility increases the oil to steam ratio (OSR) and reduces the greenhouse gas intensity of the process.
- LASER operations were not predicted to have an impact on wellbore integrity based on earlier trial phases. Operating results over the past year in Mahihkan North and Mahkeses have further affirmed those prior experiences.



Surface

Built and Planned Surface Infrastructure



Map illustrates newly built/planned surface infrastructure from January – December 2021.

Facility Modifications in 2021

- Mahkeses LASER
  - Diluent injection and recovery infrastructure have been added at the Mahkeses central processing facility (CPF) for LASER. Started up in 2021.
- Butane blending
  - Construction was completed to add a butane blending facility at the Maskwa CPF. Startup planned in Q2 2022.

Comparison of Annual Operational Bitumen/Steam Rates to Design

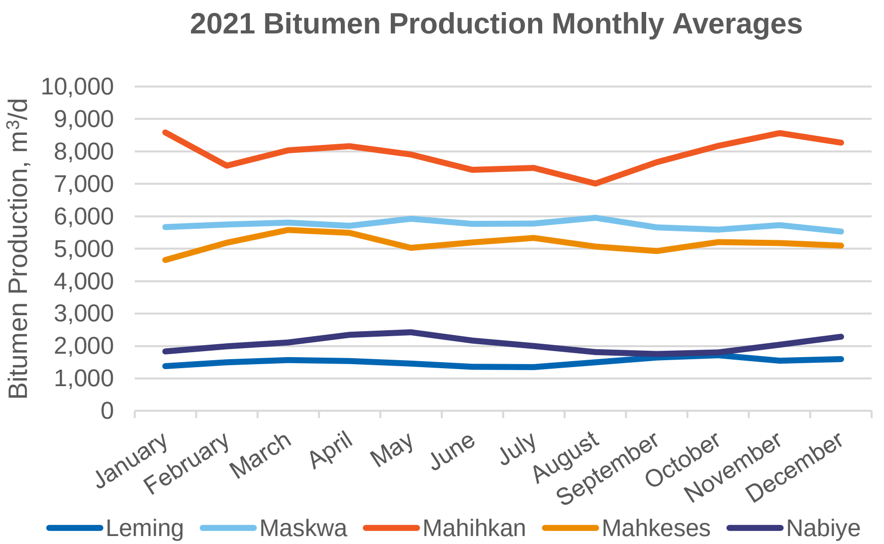
Plant License Limits

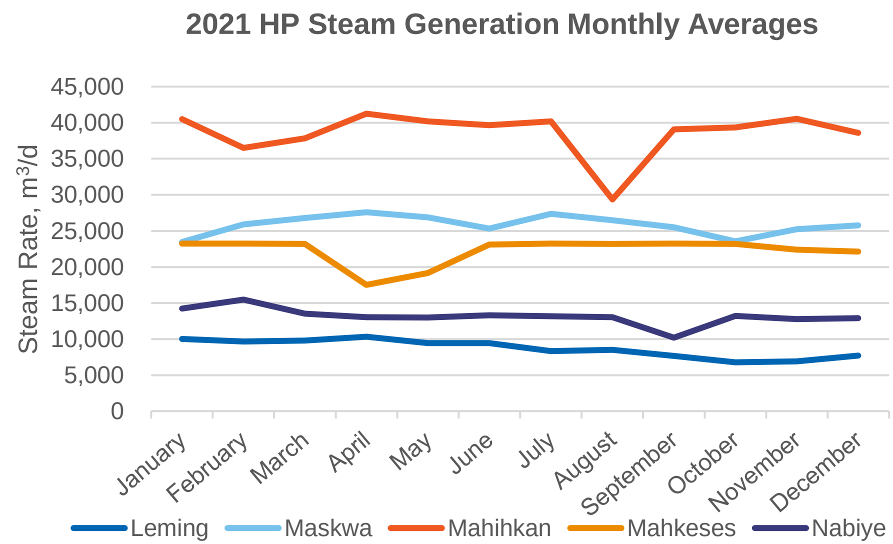
Agency	Maximum Daily Inlet Limits	Units	Maskwa	Mahihkan	Mahkeses	Leming	Nabiye	District
AER	Bitumen Inlet	m^3/d	11,000	15,000	8,000	5,000	8,000	40,000
AER	Gas Inlet	km^3/d	600	600	500	250	280	--
AER	Water Inlet	m^3/d	38,000	50,000	28,000	13,500	22,665	--
AER	H_2S Inlet Composition	mol/kmol	9.99	10.00	9.99	9.99	20.00	--
AER	Sulphur Inlet	t/d	8.13	3.00	4.43	3.39	3.76	--
Agency	**Maximum Daily Emission Limits**	**Units**	**Maskwa**	**Mahihkan**	**Mahkeses**	**Leming**	**Nabiye**	**District**
AER	Sulphur	t/d	2.00	3.00	2.00	1.05	1.11	--
AER	NOx	kg/hr	196.66	167.3	135.00	80.24	135.75	--
AER	CO_2	t/d	4,532.00	4,500.00	4,917.00	1,596.40	4323.00	--
AER	Continuous Flaring	km^3/d	0	0	0	0	0	--
AER	Continuous Venting	km^3/d	0	0	0.02	0	0.16	--
AENV	Sulphur Dioxide (SO_2)	t/d	4.00	--	--	2.10	--	13.15
AENV	NOx	kg/hr	--	--	126.00	--	135.75	--
Agency	**Calendar Quarter-Year Daily AVERAGE Emission Limits**	**Units**	**Maskwa**	**Mahihkan**	**Mahkeses**	**Leming**	**Nabiye**	**District**
AER	Sulphur	t/d	1.00	--	--	1.00	--	--
AER	Inlet Produced Gas Sulphur Recovery	%	70.0%	69.7%	69.7%	--	70.0%	--
AENV	Sulphur Dioxide (SO_2)	t/d	--	1.80	1.08	--	1.08	--

Facility Performance

Bitumen Production	Maskwa	Mahihkan	Leming	Mahkeses	Nabiye	District
AER Inlet Bitumen License Limits (m³/d)	11,000	15,000	5,000	8,000	8,000	40,000
Actual Jan/21 – Dec/21 (m³/d)	5,738	7,905	1,512	5,160	2,048	22,364

High Pressure (HP) Steam Generation	Maskwa	Mahihkan	Leming	Mahkeses	Nabiye	District
Design Steam Generation Capacity (m³/d)	27,816	41,724	10,958	23,200	23,200	126,898
Actual Jan/21 – Dec/21 (m³/d)	25,821	38,586	8,729	22,247	13,168	108,550





Major Scheduled Downtime

- Mahihkan P2 Shutdown – 28 days, August
- Mahkeses Slowdown – 28 days, April/May
- Nabiye Slowdown – 22 days, September/October

Historical and Upcoming Activity

Summary of Suspension/ Abandonment Activity

Abandonment Outlook

Historic Assessments Supporting Abandonment Scope

- ‘Flow Behind Pipe’ assessment in 2011-2012 (E07 pad testing) confirmed:
  - Hydraulic isolation exists behind casing at key formation tops on Cold Lake wellbores.
  - Post-steam cement bond logs are not required as they do not reflect the high degree of hydraulic isolation behind casing.
- Aquifer isolation study completed in 2016 confirmed that isolation of aquifers at the time of full subsurface abandonment is not necessary

Pad Level Well Abandonment

- LL pad subsurface abandonment initiated 4Q2021, cut & cap planned for 2022
- N pad subsurface abandonment initiated 1Q2022, cut & cap planned for 2022
- D57 pad abandonment scheme approval in place; subsurface abandonment initiated 1Q2022, cut & cap planned for 2022
- Q and S pads abandonment scheme approval in place; Q pad subsurface abandonment initiated 1Q2022, cut & cap planned for 2022; S pad abandonment planned 2022+
- CC and DD pads subsurface abandonment completed 2019-2020; monitoring 7 wells, prior to cut & cap planned 2022+
- E07 pad subsurface abandonment planned 2023+

Individual Well Abandonment

- 20 Shale monitoring well abandonments: 14 fully subsurface abandoned in prior years, remaining 6 in progress in 2022+
- 1 OWA partnered well abandonment in 2021: COGI 1-29
- 17 other individual well abandonments completed in 2021

Suspension/Abandonment Justification

Pad	Recovery Factor (% EBIP)	Justification for Abandonment
00N	30%	Pad had reached end of economic viability. The CSS wells were approved to be converted to water disposal wells in 2001, but have since discontinued injection in favor of injecting into disposal wells in the Cambrian reservoir.
00Q	17%	Pilot pad drilled to study the impact of spacing on CSS recovery, wells are at higher risk of near surface or intermediate casing failures due to the casing material, connection type and risk of external corrosion.
00S	12%	Pilot pad drilled to study the impact of spacing on CSS recovery, wells are at higher risk of near surface or intermediate casing failures due to the casing material, connection type and risk of external corrosion. Select wells may be retained for future development monitoring.
0CC	39%	Pad drilled in 1984 to test different strategies for completion lower in the Clearwater formation. Testing has been completed and pad has reached end of economic viability.
0DD	51%	Pad drilled in 1984 to study reservoir stress states, surface heave, formation movement, and temperature changes. Testing has been completed and pad has reached end of economic viability.
0LL	46%	Pad has reached end of economic viability and will not receive future steam.
B03	59%	Awaiting results of B02 Enhanced Late Life Process (ELP) pilot before abandoning.
D57	13%	Established connection to bottom water in initial two CSS cycles resulting in a high water cut making future CSS cycles uneconomic. Several plug back recompletions to increase standoff from the bottom water and limit water production were performed before the third CSS cycle, but were unsuccessful.
E07	12%	Resource redeveloped with horizontal wells from D29 pad as E07 pad restricted to lower steam volumes following an oil-in-shale anomaly encountered while drilling leading to suboptimal CSS performance.

Summary of Recent Regulatory and Operational Changes

Regulatory Approvals in 2021

Application Title	Brief Summary	Application Number	Application Category	Approval Number	Approval Date
Sulphur update	Alternative Sulphur management plan at Maskwa, Mahihkan, Mahkeses and Nabiye	1932181	Category 2 Scheme Amendment	8558VV	2021-03-31
NCG scheme	Co-inject natural gas and steam at 4 F02 infill injector wells to support Maskwa F01 subsurface pad	1932703	Category 2 Scheme Amendment	8558WW	2021-05-18
Clearwater SAGD Pad at Leming Site	Develop and operation of an 11 well pair pad (Y01) for recovery from the Clearwater resource using the SAGD process. - Expansion of field facilities - Modifications at Leming CPF	1933335	Category 2 Scheme Amendment	8558XX	2021-10-20
Pad D57 abandonment and modification of various clauses	- Clarification of Clause 8 - Abandonment Consent Request for D57 pad - Proposal to rescind Clause 7 - Clarification of Clause 11(8) and 11(9) - Clarification of Clause 22	1933446	Category 2 Scheme Amendment	8558YY	2021-11-22
Alternative sulphur management plan, as proposed for the Maskwa CPF	Scenario 1: Over-recover sulphur at the Mahkeses and Nabiye CPFs during the same quarter Scenario 2: Over-recover sulphur at the Mahkeses and Nabiye CPFs over 2 or 3 quarters Scenario 3: Curtail production at Maskwa CPF	1934608	Category 2 Scheme Amendment	8558ZZ	2021-12-08
P4 LP-BFW Pump (spare)	Installation of a spare low pressure boiler feed water pump to maintain boiler feed water rates at the Mahihkan CPF	1935427	Category 1 Scheme Amendment	Letter	2022-01-10
Water Act Licence for Surface Runoff and Shallow Groundwater	Consolidated 7 licences and 2 TDL's into 1 and expanding how water can be used across site	001-00478569	N/A	00478569-00-00	2021-12-07

Summary of Scheme Performance

District
- 20 wells were redrilled or sidetracked in CSS and steamflood areas across district to improve overall recovery efficiency.

Mahihkan
- H87, H91, and H92 HIPs steamed for the first time with LASER. This is the first application of a "2x infill" strategy in Cold Lake. Studies show that 2x infilling improves recovery levels when compared to 1x HIPs and enables steamflood at 8-acre pads in late life.

Mahkeses
- Select pads at Mahkeses steamed their first cycle of LASER in 2021.

Nabiye
- Moderate Pressure Steam Drive (MPSD) steam strategy trial continued in 2021. The MPSD process involves dedicated steam injectors (20-30% of wells) on 4 pads injecting at low steam rates below fracture pressure.

Lessons and Successes

Regulatory

- Cold Lake water level dropped throughout 2021, operations successfully prepared for a potential switch from Cold Lake water to groundwater (was not required)
- Obtained AER approval for an alternate sulphur recovery approach (over-recovery at Mahihkan/Nabiye to offset Maskwa recovery requirements)
- Executed aerial unmanned vehicle (AUV) survey to support future application for alternate Leak Detection And Repair (LDAR) program
- New Water Act Licence for surface runoff and shallow groundwater (consolidated 9 licences into 1)
- Received AER closure letter on Inactive Well Compliance Program (IWCP) stating Imperial achieved 100% compliance with Directive 013

Lessons and Successes

Operational

- Improved salt water disposal pump and wellbore capacity to achieve record disposal levels, reducing in-situ well downtime and improving bitumen production
- Installed new low NOx burner equipped with novel burner diagnostics technology to test reliability and safety performance
- Successfully drilled, completed, steamed (LASER) and produced first ever 2x horizontal-injector-producer (HIP) infill wells in Mahihkan North
- Enhanced pipeline integrity program across the asset
    - Inspected over 5km of production pipeline system with crawler technology, doubling our total inspection coverage
    - Performed 6 in-line pipeline inspections, including first bi-directional inspection on Mahihkan ground water pipeline
    - Utilized new-to-site Spyne Eddy Current Array technology to improve crack detection inspections for stress corrosion cracking on aboveground production pipelines

T13 SA-SAGD Pilot

- Research surveillance was completed in 2021. Wells were produced until September 2021. No current plans to resume steam injection.

Account of Compliance History

- 41 AER reportable releases
  - 10% reduction in government reportable spills compared to previous year
  - 90 % of volume released in 2021 was contained on pad / plant lease
- 100 AER Inspections (including post incident inspections)
  - (95) inspections satisfactory, (5) inspections resulted in non-compliances, (11) inspection resulted in information requests
- 6 voluntary self-disclosures (operational compliance in nature)
  - (2) Nabiye lime sludge lagoon freeboard incident
  - (1) Surface casing vent flow testing not completed within 90 days of drill rig release
  - (1) Landfill C204 leachate head water level above allowable limit
  - (1) Eco-Pit late submission of 60 day sampling data report
  - (1) N02W02 pad slope extended outside of approved disposition into previously cleared area & cable was constructed to south side of pad vs. north where LOC was applied for
- 2 contraventions (maintenance and administrative in nature)
  - (1) Untested surface water overflowed berm due to heavy rainfall from previous day
  - (1) Missed collecting 2nd day water sample from a surface water release
- 1 noise complaint
  - (1) SE side of Marie Lake due to use of cannons at night at Nabiye lime sludge lagoon

Future Plans

Scheme Performance Outlook

District

- Butane blending project planned to start in 2022. The addition of butane in the final sales product has the potential to reduce the amount of diluent required to meet pipeline specification and improve asset profitability.
- Niche rig drilling program planned to redrill multiple wells in high and low pressure areas across district to increase volumes.

Mahihkan

- Cycle 2 of LASER diluent injection ongoing at select Mahihkan North pads to increase production and decrease emissions intensity of these pads.

Mahkeses

- Cycle 1 of LASER diluent injection ongoing at select pads to increase production and decrease emissions intensity of these pads.

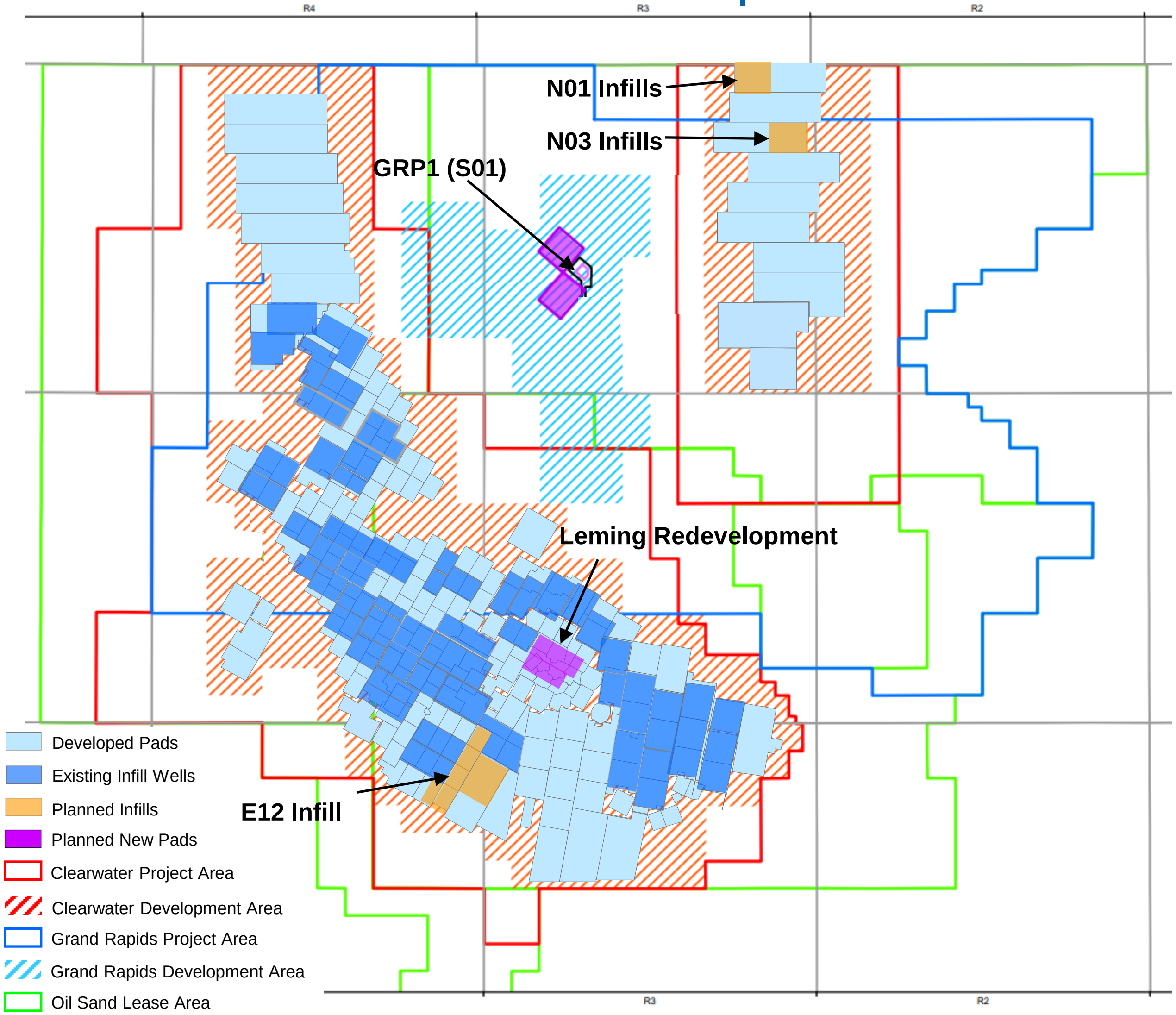
Maskwa

- Planned to drill HIP and IOI wells at E12 pad to infill multiple pads from a common surface location.

Nabiye

- Planned to drill first commercial SA-SAGD wells into Grand Rapids reservoir at GRP1 S01 pad
- Niche rig planned to redrill horizontal wells with liner integrity issues to improve steam distribution and productivity
- Niche rig planned to drill HIP wells on portions of N01 and N03 pads to support the transition to low pressure recovery processes

Map of 5 Year Planned Development



Planned developments represent only commercial technologies (i.e., CSS, SAGD, SA-SAGD)

Imperial | Cold Lake

AER Applications Outlook

The following is a list of scheme and EPEA regulatory applications expected to be submitted to AER in 2022.

- Enhanced Late-Life Process experimental approval confidentiality reinstatement
- Nabiye Lime Sludge Lagoon EPEA and scheme amendment
- Grand Rapids Phase 1 drill well trajectories extension scheme amendment
- Mahihkan P2 and P4 HLE pump addition scheme amendment
- Mahkeses LASER pump replacement scheme amendment
- Non-Condensable Gas (NCG) co-injection compressor installation facility amendment