Cenovus Energy Inc. Sunrise Thermal Project Progress Report Scheme 10419 2022 Update

June 30, 2023





Oil & gas and financial information

Oil & gas information

The estimates of reserves were prepared effective December 31, 2021. All estimates of reserves were prepared by independent qualified reserves evaluators, based on definitions contained in the Canadian Oil and Gas Evaluation Handbook and in accordance with National Instrument 51-101 *Standards of Disclosure for Oil and Gas Activities*. Additional information with respect to pricing and additional reserves and other oil and gas information, including the material risks and uncertainties associated with reserves estimates, is contained in our AIF and Form 40-F for the year ended December 31, 2021, available on SEDAR at www.sedar.com, EDGAR at www.sec.gov and on our website at cenovus.com.

Certain natural gas volumes have been converted to barrels of oil equivalent (BOE) on the basis of one barrel (bbl) to six thousand cubic feet (Mcf). BOE may be misleading, particularly if used in isolation. A conversion ratio of one bbl to six Mcf is based on an energy equivalency conversion method primarily applicable at the burner tip and does not represent value equivalency at the well head.

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Advisory

This presentation contains information in compliance with:

AER Directive 054 - Performance Presentations, Auditing, and Surveillance of In Situ Oil Sands Schemes

This document contains forward-looking information prepared and submitted pursuant to Alberta regulatory requirements and is not intended to be relied upon for the purpose of making investment decisions, including without limitation, to purchase, hold or sell any securities of Cenovus Energy Inc.





Subsection 4.1 1 Introduction





Area Map PROJECT OVERVIEW



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Subsection 4.2 2-7 Subsurface





Production Plot

Section 4.2.2



Cenovus *NCG was reduced to test effect on pump efficiencies – had minimal impact. NCG co-injection resumed.

Development Area Map

Section 4.2.3.a





SAGD Pay Isopach Map

Section 4.2.3.b



Base of IHS (Inclined Heterolithic Strata)

Lithological surface which marks the base of an extensive mud-rich interval above the McMurray reservoir containing common "inclined heterolithic strata."

Base of MU2 (McMurray Unconformity 2)

Unconformity and surface of tidal/fluvial erosion marking the base of the main McMurray reservoir interval at Sunrise.

SAGD Top Gas Isopach Map

Section 4.2.3.c

Geomechanical – Surface Heave

Section 4.2.3.d

Seismic

Section 4.2.3.e

• No seismic was acquired during the reporting period

3D Seismic Coverage

Representative Cross-Section

Section 4.2.4

Reservoir Parameters

Sections 4.2.5 and 4.2.6

Pad	Area (m²)	Height (m)	Porosity (%)	So (%)	OBIP (10 ³ m ³)
Project Area	169,824,090	31	30	70	1,122,109
Development Area 1	9,652,335	33	30	71	67,283
Development Area 2	3,979,931	33	30	72	28,793
Development Area 3	31,017,594	28	29	71	178,525

			Average				Cum Oil		Estimated Ultimate	
	Area	Height	Permeability	Porosity	So	PBIP	(Mm³)	Recovery	Recovery	Ultimate Recovery as
Pad	(m²)	(m)	(D)	(%)	(%)	(Mm³)	to Dec 31, 2022	(%) PBIP	(Mm³)	% of PBIP
B 13-08 (B)	620,533	31.0	7.0	30%	74%	4,247	2,286	54%	2,897	68%
B 14-08 (C)	439,315	32.0	7.0	31%	76%	3,316	1,824	55%	2,350	71%
B 16-08 (D)	509,272	27.7	7.0	29%	73%	3,025	1,476	49%	1,985	66%
B 13-09 (E)	439,063	25.8	7.0	30%	78%	2,671	1,329	50%	1,899	71%
B 08-17 (G)	516,558	36.0	7.0	30%	72%	4,024	1,809	45%	2,343	58%
B 05-16 (H)	525,048	31.7	7.0	33%	77%	4,248	1,685	40%	2,481	58%
B 16-17 (L)	466,358	24.8	7.0	32%	77%	2,844	1,462	51%	2,048	72%
B 13-16 (M)	494,030	30.9	7.0	33%	75%	3,814	1,759	46%	2,285	60%
B 15-16 (N)	527,106	39.7	7.0	31%	78%	4,932	2,169	44%	2,988	61%
B 05-21 (P)	644,335	32.6	7.0	31%	66%	4,414	1,027	23%	1,580	36%
B 06-21 (Q)	664,767	36.2	7.0	30%	70%	5,143	957	19%	2,253	44%
B 13-16 (R)	386,487	18.8	7.0	33%	78%	1,898	542	29%	1,212	64%
Total SR	6,232,871	30.9	7.0	31%	74%	44,578	18,325	41%	26,321	59%

NOTE: PBIP is calculated from 2m below Producer Grid to SAGD Pay Top and aligned with Cenovus Energy Inc. methodology.

NOTE: In Sunrise, PBIP = OBIP

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Co-Injection Map

Section 4.4.7.a

- November 8, 2019 Non-Condensable Gas (NCG) Pilot started on Pad B13-09 (E)
- Injecting ~40 E³m³/d NCG (Methane) with steam into all six injector wells on Pad B13-09 (E)

Non-Condensable Gas (NCG) Co-Injection Performance

Section 4.2.7

Pad B13-09 (E) NCG Co-Injection Pilot

- Type of Gas Injected is Methane
- NCG Co-Injection Pilot started November 8, 2019, with injection into all six injection wells
 - Stage 1: 15 E³m³/d NCG (0.6 volume % or 0.5 mol%) for 6 months
 - Stage 2: 19 E³m³/d NCG (0.9 volume % or 0.8 mol%) for 6 months
- Cumulative gas injection (December 31, 2022) = 32,098 E³m³
- Cumulative gas production (December 31, 2022) = 9,473 E³m³
- Baseline gas production (assuming pre-NCG GOR) = 3 E³m³/d
- Net gas retained = 22,624 E³m³
- Current recycle ratio = 39% (Current Recycle ratio does not account for thief zone influence)
- Cumulative Recycle Ratio (December 31, 2022) = 30%

Pilot Results

- Able to reduce SOR without decreases in well pad bottom hole pressure (BHP)
- NCG Co-Injection Pilot showed decreased SOR, while maintaining pre-NCG oil forecast
- Recycle ratio of 39% indicating gas is staying within reservoir
- There has been no observed impact of NCG co-injection on aquifers or wellbore integrity

Operational Issues

- Low temperatures in injection gas header
- Potential for gas handling constraint of surface facilities with field wide implementation
- In 2022, NCG was shut off for approximately three (3) months to evaluate if pump efficiencies improved. There was minimal impact to the NCG injection shut off period; NCG co-injection resumed in July 2022

Non-Condensable Gas Co-Injection Performance

Section 4.2.7

E-Pad: Injection and Prod Gas History

2022 Redevelopment Projects

Subsection 4.3 8 Surface

Central Processing Facility – Plot Plan

Section 4.3.8.a

Central Processing Facility 1A – Plot Plan

CONTINUED ON DRAWING SR1-44-PLT-96-0009-001 MATCHLINE N. 1180.500 C ROAL Section 4.3.8.a PIPERACK TO PLANT 18 50-STR-01 0.STD.011 80-V-71 80-E-71 50-TXP-401A 50-BU SCERCE AREA LIMIT N. 1025.000 70-QAH-90 ١g 70-QAH-902 70-QAH-903 70-S-8 in. LIMIT 30-P-200 70-QU FUTURE AREA LIMIT N. 950.000 BUY BACK AREA CONTINUED ON DRAWING SNRS-01-30-P-PP-00001-1 UTURE CO. CAPTURE 7 -1. 1777 99 <u>, k</u>_ <u>Erer</u> հեհեն C SECONDARY ROAD N 873.500 80-PL-48 10 ·*···*··· 1111111111 1111111111111111 80-K-459 AREA LIMIT N. 800.000 PLANT 1A SCALE 1:1000

Central Processing Facility 1B – Plot Plan

PLANT 1B SCALE 1:1000

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Central Process Facility Modifications

Section 4.3.8.b

- Regenerative Thermal Oxidizer (RTO) Unit installation completed in Q3 2022
 - Commissioning/troubleshooting occurred throughout the remainder of the reporting period
- There were no other CPF modifications completed during the reporting period

Annual and Design Throughput Comparison

Section 4.3.8.c

Steam

- System capacity 35,292 m³/d of steam
- January 2022 to December 2022 average flowrate of 21,328 m³/d | 60% of capacity

Bitumen

- System capacity 11,305 m³/d of oil winter (71,107 bbl/d)
- January 2022 to December 2022 average flowrate of 7,560 m³/d (47,550 bbl/d) | 67% of capacity
- Approved bitumen capacity is 11,765 m³/d of oil (74,000 bbl/d)

Subsection 4.4 9-12 Historical and Upcoming Activity

Pad Abandonments

• No pad abandonments are currently planned in the next 5 years.

Regulatory Approvals

Section 4.4.10.a

АСТ	Application No.	Application Description	Approval Issue Date
OSCA	1937729	Temporary MOP Exceedance on Deepened Wells	2022-05-30
OSCA	1939276	Proposing a new well pair at Pad B13-09 (E) and a new outfill producer well at Pad B13-08 (B)	2022-09-30
OSCA/EPEA	1938539/018-206355	West Cooling Gas Equipment (including flare)	2022-10-19
EPEA	00206355-019	Amendment to modify Sulphur Recovery Unit (SRU) downtime	2022-11-22
OSCA	1939284	Proposing two new Pads B14-11 (V01) and B10-11 (V02) in Development Areas 3 (DA3)	2022-12-01
OSCA	1938846	Proposing a new Pad B11-15 (T01 pad) in Development Areas 2 and 3	2022-12-16
OSCA	1939200	Temporary MOP Exceedance on Deepened Producers (8 wells)	2022-12-16

Material Changes to Performance or Operations

Section 4.4.10.b

• There were no other material changes to the performance, material balance, or energy balance during the reporting period

Lessons, Successes and Failures

Section 4.4.10.c

Oil Treating

• No downtime or other concerns were observed that limited the ability to operate during the reporting period

De-Oiling

• No downtime or other concerns were observed that limited the ability to operate during the reporting period

Water Treatment

• No downtime or other concerns were observed that limited the ability to operate during the reporting period

Lessons, Successes and Failures

Section 4.4.10.c

Steam Generation

• Two boilers experienced boiler external piping elbow failures - one in June 2022 and one in December 2022

Sulphur Recovery Unit (SRU) & Utilities

• Regenerative Thermal Oxidizer (RTO) installed Q3 2022. Commissioning/troubleshooting occurred throughout the remainder of the reporting period. Troubleshooting is ongoing

Update on Pilots or Technical Innovations

Section 4.4.10.d

Non-Condensable Gas (NCG) Pilot

• NCG Pilot on Pad B13-09 (E) was on-going during the reporting period

Compliance History

Section 4.4.11

Reportable Incidents

• Please see slides 33-35 for reportable non compliances during the reporting period

Voluntary Self-Disclosures (VSD)

• No VSD's during the reporting period

2019-2020 Non-Compliance Summary – AER

Section 4.4.11

Incident Date	AER/CIC Reference no.	Nature of Non- Compliance (Spill exceedance, management issue, etc.)	Product	Volume (m3)	Description
1/1/2022	387957	Approval Contravention	n/a	n/a	The variance filed under file no# 4101-00206355-02-0202 for the Sulphur Recovery Unit (SRU) expired on December 31, 2021. Since another variance was not applied for, the regulatory requirements defaulted back to the EPEA approval 206355 which were not able to be met due to technical issues.
5/4/2022	389320	Approval Contravention	Fresh water	n/a	On April 5, 2022, Well pad berm breach was identified on a newly constructed berm wall at Pad Q, allowing (clean) surface water runoff to flow off lease prior to testing
5/7/2022	400971	AAAQG exceedance	PM 2.5 (air)	n/a	On July 4th, 2021, the Wapasu air monitoring station registered a 1-hour PM2.5 Alberta Ambient Air Quality Guideline (AAAQG) exceedance of 81 ug/m3. The AAAQG is 80ug/m ³ .
10/06/2022	400024	SO2 limit exceedance	SO2	n/a	On June 6, 2022, preliminary signs of issues with the SRU were identified. Routine Draeger tube samples indicated higher H2S results than normal. Operations started assessing and investigating the SRU operation immediately after this discovery. The SRU chemical provider was engaged as well to help troubleshooting the performance of the SRU. On June 9 and 13, 2023, as a result of the poor performance of the SRU SO2 limit was exceeded.

Incident Date	AER/CIC Reference no.	Nature of Non- Compliance (Spill exceedance, management issue, etc.)	Product	Volume (m3)	Description
1/10/2022	405040	Approval contravention	n/a	n/a	In August 2022, due to maintenance on the Phase 1A CEMS unit which exceeded 120 hours of operational downtime, a method 4 calculation had to be completed for backfill data to complete CEMS data reporting. Approval of the backfill data was not obtained prior to October 1, 2022, to be able to use the backfill data to complete and submit CEMS data prior to the end of September resulting in late reporting.
7/11/2022	406627	Approval contravention	TSS	n/a	In October 2022, two of the membranes at the Wastewater Treatment Plant (WWTP) fouled leaving only one membrane operating. When daily lab results were received in early November (for the end of October), the lab results confirmed that the monthly rolling average of Total Suspended Solids (TSS) of the WWTP effluent stream was exceeded.
20/8/2022	402951	Approval contravention	90% monthly operational time	n/a	During scheduled maintenance on the Phase 1B CEMS Analyzer (change out spectrometer and the swivel element) and after installation in the field, when checking the measurement reflection back to the end of the probe, there was not a valid signal. SICK tech support recommended changing out the lamp control board (PCB). Due to the length of time required to troubleshoot, the analyzer did not meet the 90% uptime for the month of August.

Incident Date	AER/CIC Reference no.	Nature of Non- Compliance (Spill exceedance, management issue, etc.)	Product	Volume (m3)	Description
22/12/2022	407598	Approval contravention	Ammonia Nitrogen	n/a	In October 2022, two of the membranes at the Wastewater Treatment Plant (WWTP) fouled leaving only one membrane operating. Repairs to these membranes were not able to be conducted until December due to supply chain challenges and the repair time. The lab results confirmed that the monthly average of Ammonia Nitrogen of the WWTP effluent stream was exceeded.

Future Plans

Section 4.4.12

Expected Changes to Performance or Operations

- Regenerative Thermal Oxidizer (RTO) commissioning to be completed Q2 2023
- Sludge centrifuge installation Q3 2023
- NCG co-injection planned to increase in the field in 2023
- Cooling facility for the additional gas is expected to be installed Q4 2023
- West field inlet degasser expected to be installed in Q3 2024
- Compression facility for casing gas reinjection is expected to be installed in Q3 2024

Anticipated AER Applications

- East cooling and separation facility
- Pad T
- Pads V01/V02
- Produced Water and regen waste disposal (AER Directive 065/Directive 051) submission to re-license current observation wells to disposal wells (09-03-095-07W4 & 103/04-22-097-07W4), target submission Q3 2023

Planned Development

Section 4.4.12

- Pads S01, U01, T01, V01, and V02 are the next pads to be developed
- Evaluating development options for DA3

