Canadian Natural

Feb 4, 2014

Alberta Energy Regulator
Suite 1000, 250 – 5 Street SW
Calgary, Alberta T2P 0R4

Attention: **Andrew MacPherson**
Via e-mail: Andrew.MacPherson@aer.ca

Re: Canadian Natural Primrose and Wolf Lake Project – AER Scheme Approval No. 9140
Phase 23,24 Modified Steaming, Risk Assessment, and Mitigation
Location: 067, 068-04 W4

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1. Introduction:

Pursuant to the letter dated July 17, 2013, "Steaming Restrictions and Regulatory Requirements," Canadian Natural Resources Limited (CNRL) is requesting the Alberta Energy Regulator (AER) to approve the proposed modified high pressure steam strategy, including mitigation plan, for Primrose South Phases 23-24. The objective of the modified steam strategy is to mitigate any potential risk associated with High Pressure Cyclic Steam Stimulation (HPCSS) in the area. All wellbores without isolation within the Colorado Group will be abandoned or monitored for pressure deviations.

Phases 23-24 are HPCSS projects within CNRL's Primrose South development. These phases are currently in the production stage of the third cycle. The first cycle for these phases commenced in March 2012 and they have been cycled between steam and production since then. Analysis of the past cycles along with the detailed wellbore integrity assessment, follow up mitigations, and enhancements to the surveillance systems would indicate that pads 23-24 can receive its fourth cycle of steam.

1.1. Request for Approval

CNRL is requesting approval to commence cycle four high pressure steam injection into Phases 23-24. Steam will be transitioned out of future steaming operations in Phases 25-26 upon approval. A wellbore risk assessment along with mitigation action plan has been completed for all wells within 1000 meters of proposed steaming operations. The investigation radius can be seen in Figure 1.1a. This study includes any adjacent High Pressure Cyclic Steam Stimulation (HPCSS) wells. Modified steam injection operations will be adopted and utilized throughout the entire cycle. These modified steam injection operations include fracture steam volumes for this cycle to be equal to or less than those of the previous cycle. Cycle steam volumes will be tapered towards the edges of the phase as a wave steam strategy will be initiated from the North to South of the phases. An enhanced monitoring and reporting protocol will also be implemented for all observation systems within 1000 meters of steaming operations. All conditions set forth within the "Steaming Restrictions and Regulatory Requirements" letter dated July 17, 2013 will be complied with.

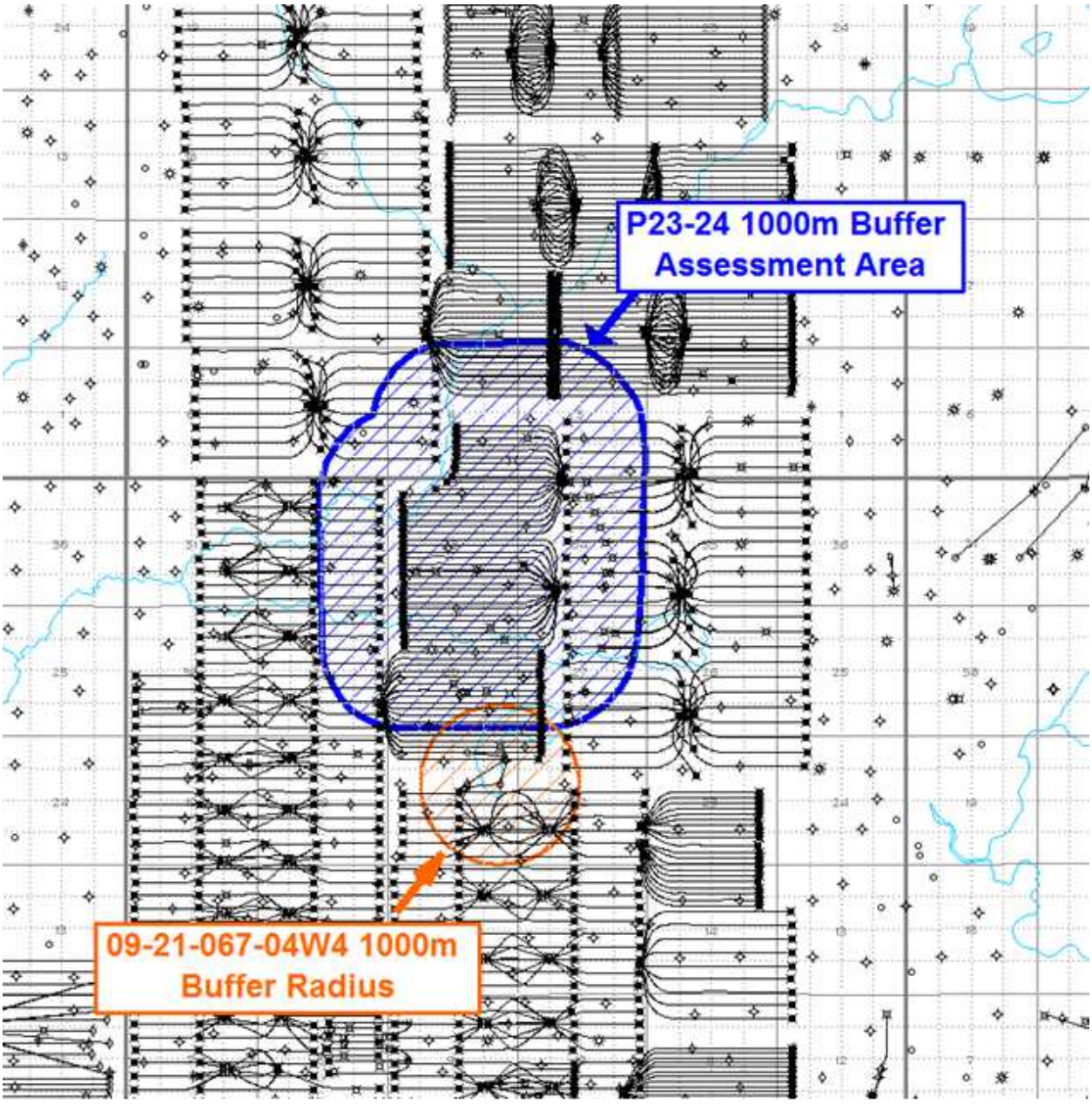


Figure 1.1a: Phases 23-24 1000m wellbore risk assessment radius

2. Geological and Reservoir Data

The geology of the PAW region and the Primrose South Area is summarized in this section. An overview of the Blue Valley Sand with the overlain Grand Rapids B12 Sand interval is presented in Figure 2.1

2.1. Clearwater Geology

The Clearwater formation in Primrose and Wolf Lake consists of a number of distinct valley systems incised into regional strata and one another (Figure 2.1). Primrose South (Blue Sand) is one such incised valley system. Phases 31 wellbores are all placed in the Blue Valley Sand within the Clearwater zone.

2.2. Grand Rapids Geology

The Clearwater is overlain by a thick succession of Grand Rapids strata. It consists of a stacked sequence of prograding shoreface strata cut at various levels by channel incisions. The lower Grand Rapids (B10, B12) is water saturated and is CNRL's main monitoring zone to ensure Clearwater HPCSS isolation.

2.3. Colorado Geology

The Colorado Group is a thick succession of marine shale deposits approximately 165 -180 m thick. Data from the PAW project indicates that this interval is competent (not fractured) in the lower portions, but becomes more fractured near the top. All abandoned, or unmonitored, wellbores that do not have isolation within the Colorado interval have been scrutinized in this study. Mitigation methods will be used to ensure all wells penetrating this formation have isolation between the Colorado group and lower formations and/or pressure monitoring daily.

2.4. Salt Dissolution

Recent mapping of the Prairie Evaporite across the PAW region from 3-D seismic shows that thinning of this unit begins to the East of Burnt Lake in Range 3W4. Any structural effects to uphole units will be confined to the Primrose East area.

2.5. Seismic

The Clearwater Shale Top Depth Map (Figure 2.5) shows the approximate structure of the reservoir cap-rock. This depth surface map was created by picking a time horizon along the Clearwater Shale Top via the use of 3D seismic. The geophysical time horizon was converted to depth by building a velocity model incorporating the geologist's 'picks' for the Clearwater Shale Top.

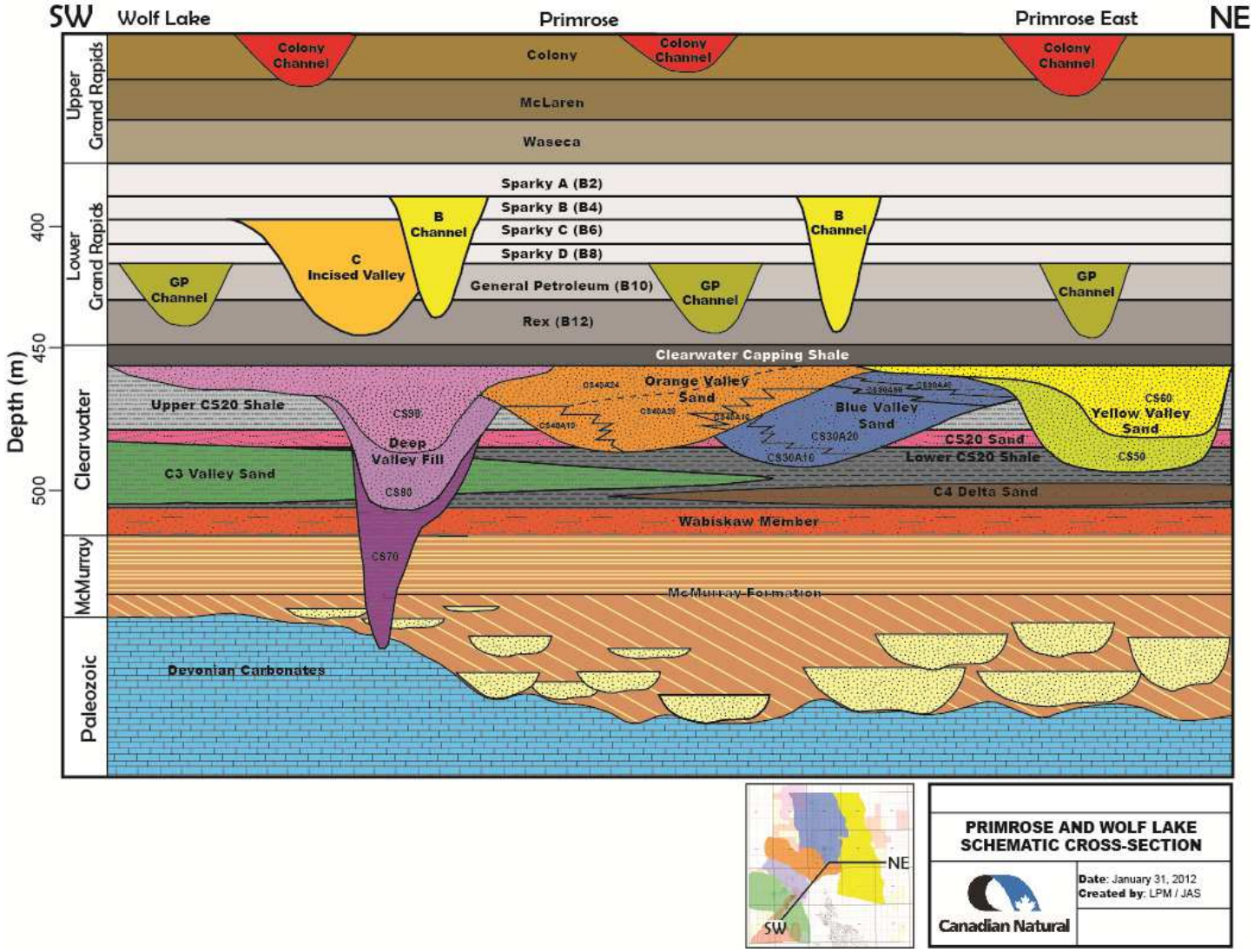
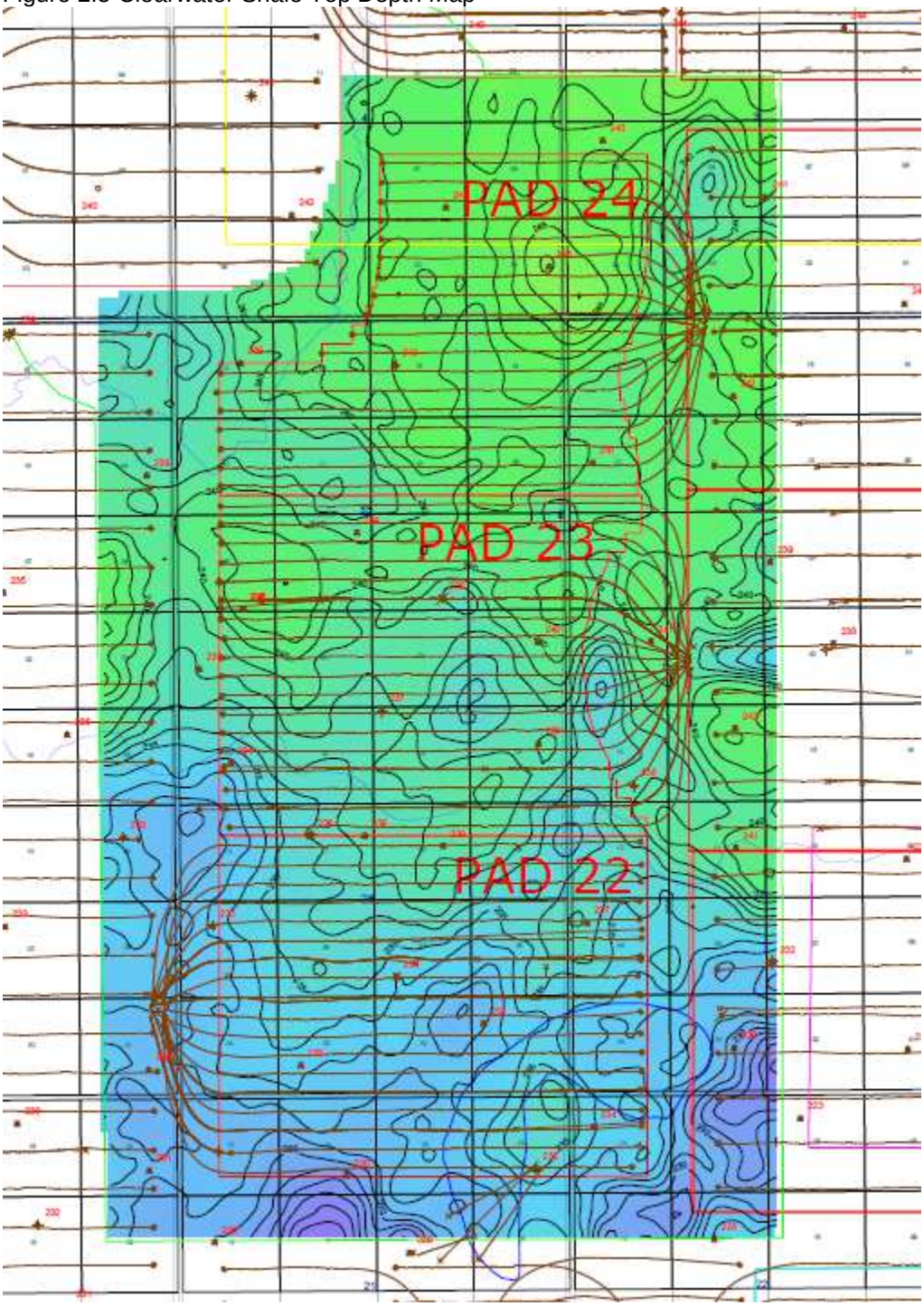


Figure 2.1 Geological Cross Section of the Primrose and Wolf Lake Area

Figure 2.5 Clearwater Shale Top Depth Map



3. Wellbore Integrity Investigation

A thorough investigation has been completed of all wellbores within 1000 meters of steaming operations. This investigation includes casing and cement integrity reviews of the wellbores. The following sections will detail that work and any associated mitigation actions necessary to prepare the area for steam.

A complete list of these wells, risk assessment, and mitigation actions will be detailed in this section. To ensure consistency in how wellbores are evaluated in all areas the criteria below is used to determine if wells are Thermally Compliant and/or Compatible and assign risk.

Thermally Compliant

Cased Well – a cased well complies with AER requirements for thermal operations if the following criterion is met:

- A thermal grade casing is used
- Premium or semi premium connections are used; and
- Casing has been cemented with thermal cement

Open Hole – an open hole well complies with the regulations for open hole abandonment in an oil sands area if the well was plugged with thermal cement such that the thermal cement plug extends from at least 15 m below the lowest oil sands zone or total depth (TD) if shallower, to at least 15 m above the uppermost oil sands zone.

Thermally Compatible

The objective of the wellbore risk classification is to ensure wellbores are compatible with steaming operations in each area prior to the introduction of a steam cycle. A thermally compatible well is defined as a well that does not require any remedial work before commencing steam operations in the area. The following are the most common types of wells encountered.

Well Type 1 – Oil Sands Exploration (OSE) well, plugged and abandoned

- If the well was plugged with thermal cement such that the thermal cement covers all the oil sands zones from 15 m below (or TD) to 15 m above, then it is thermally compliant and also thermally compatible.
- If the well was plugged with non-thermal cement, or in a manner that did not cover the oil sands zones with thermal cement as above, then the well is thermally non-compliant. However, the well is considered thermally compatible because temperatures within the steam chamber may degrade the cement in the heated interval but cement in the strata above and below the heated interval will remain intact and the reservoir will remain isolated from those strata. Experience and discussions with other operators to date have indicated that this approach is current industry practice and has not resulted in loss of steam containment due to degradation of non-thermal cement in this type of well.

Well Type 2 - Shallow gas well or water source well

- If the well does not penetrate the oil sands zone(s) to be steamed, then it would be deemed thermally compatible. No work will be required before steaming in the area. For example; a well may be cased with J55 casing, have non-premium threads, be cemented with non-thermal cement, and therefore be non-compliant for steam injection. However, as the well does not penetrate the target oil sands reservoir to be steamed, it is not necessary to make the well thermally compliant as the well is thermally compatible.

Well Type 3 – Well drilled into oil sands zone to be steamed

- If the well was drilled into the oil sands interval to be steamed and is thermally non-compliant, then it would also be deemed non-compatible. Required action to make the well thermally compatible would be to zonally abandon the well by plugging to at least 15 m above the target zone with thermal cement, to fully abandon the well, or to install continuous monitoring on the well.
- If the well drilled into the target reservoir is thermally compliant, the well would also be deemed thermally compatible.

The following criteria has been used to determine the risk level of each well:

LOW RISK:

- Thermally compatible wells abandoned in accordance with Directive 20 (Thermal Relevant sections of DIR 20 include all of Section 4 along with Section 5.4)
- All other thermally compatible wells with open intervals in an oil sands zone that have continuous monitoring
- Low risk wells have been confirmed to have no uncontrollable lost circulation issues during drilling and no significant anomalies identified during cementing operations. Examples of anomalies are no cement returns to surface, inability to pump primary volume of cement, and lost movement of pipe before returns have reached surface. If these events occur the CBL must be reviewed to confirm zonal isolation of the oil sands zone(s), the Colorado group, and the water table. If no concerns are identified during the CBL review, the well is considered low risk. If no CBL is available and no other data indicates hydraulic isolation across key intervals the well is considered medium risk.

MEDIUM RISK:

- A well is thermally compatible, is open into the top of an oil sands zone, but does not have continuous monitoring in place
- Any wells that have remediated out of zone casing failures, have been classified as producer only wells (POW's), and are expected to see wellbore pressures above hydrostatic head due to steaming
- OSE wells that have been abandoned, but have unconfirmed cement tops above the Grand Rapids and significant open intervals across the Colorado Group
- Wellbores that have had uncontrollable lost circulation issues during drilling or significant anomalies identified during cementing operations that are not alleviated with CBL review

HIGH RISK:

- Wellbores that have pre-existing paths which do not provide Clearwater containment during steaming operations.

3.1 Area of Investigation

The area of investigation includes all wellbores within the "Wellbore Risk Assessment Area for Phases 23-24". All wells within the highlighted area of the map below will be included in the next section of this document as a means of detailing why a mitigation strategy is or is not needed. All of the wells within the area of investigation have been checked by reviewing AccuMap data and well files including drilling and completion tour sheets. Figure 3.1a identifies the area of investigation and all wellbores requiring mitigation or monitoring. The wellbores requiring augmented isolation, or monitoring, include abandoned stratigraphic wells, and HPCSS wells. The specifics regarding all wellbores within 1000 meters of steaming operations are outlined in Tables 3.1a-3.1g. Additionally, specific information regarding the Phase 23-24 wells can be found in Table 3.1h 3.1i

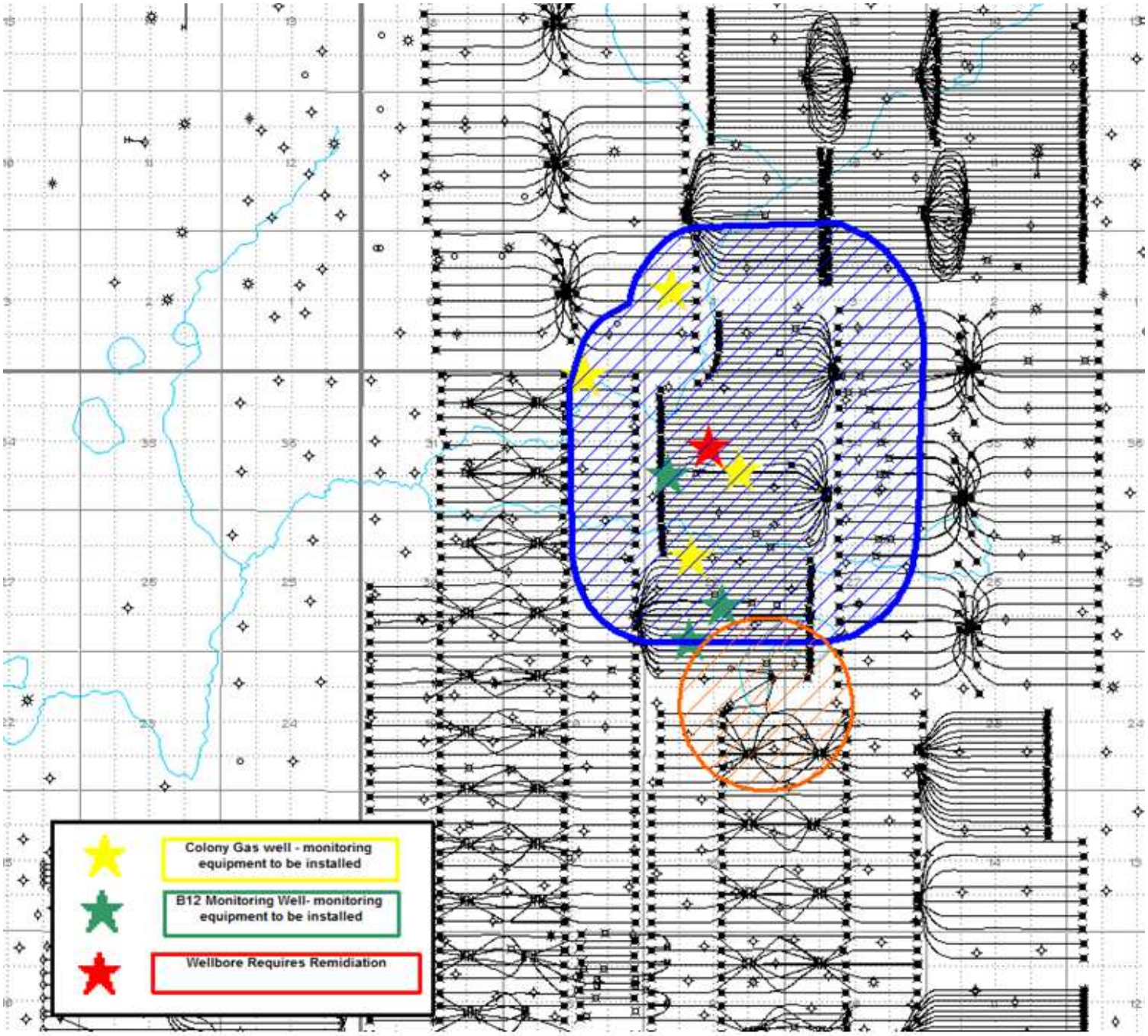


Figure 3.1a: Wells requiring mitigation or monitoring

Table 3.1a Off Pad Non-HPCSS Wellbores Within Area of Investigation

UWI	License #	Spud Date	Current Licensee	Mode	Well Name	TV Depth (m)	Surface Casing Depth m	Prod Casing Depth m	Prod Casing Size mm	Prod Casing Grade	Prod Casing Connect. Type	Cement Type Behind Prod Casing	Cement Top mKb	Cement Returns to Surface m3	Tour Sheet Review Cementing Comments	Perf Interval mKB	Cement Squeeze Depth	Cement Plug Depth mKB	Cement Plug/Squeeze Composition	Thermally Compliant (Yes/No)	Thermal Compatability (Yes/No)	Risk Level	Risk Rationale
100/11-28-067-04W4/0	0088444	2/7/1981	CENOVUS ENERGY INC.	Flowing	CVE MOORE 11-28-67-4	576	141.7	576	114	K-55	STC	14.7T 1:1 Pozmix +35% Silica + 5.6 T Fondu	Surface	0.5	No lost of circ while drilling/ cementing.	351.5-354.0	No Squeeze	372.5-575.8 mKB	Unknown	No	Yes	Medium	Clearwater oil discovered in surface piping. Investigative workover underway. Well will be left as Grand Rapids monitoring well
100/12-04-068-04W4/0	0198165	2/21/1997	CANADIAN NATURAL RESOURCES LIMITED	Flowing	AMOCO FISHER 12-4-68-4	516	114	515	114.3	J-55	ST&C	7T (9.6m3) Class C + 40%SSA-1	Surface	2.7	No lost of circ while drilling/cementing	342.0-344.0	No Squeeze	No info	No Remedial	No	Yes	Low	Producing Colony Gas Well - Equipped with daily surface pressure monitoring to be installed
103/07-28-067-04W4/0	0458248	9/9/2013	CANADIAN NATURAL RESOURCES LIMITED	N/A	CNRL OB3 MOORE 7-28-67-4	524.4	184	540	177.8	L-80	Tenaris Blue	12.3 T (14.1 m3) ThermaCem 1775 + 1% CaCl2	3.8	5	No lost of circulation during drilling or cementing and casing reciprocated throughout entire cement job.	Not Noted	No Squeeze	533.5-450.0 mKB	1.90 m3(2.53T Thermal 40)	Yes	Yes	Low	Daily downhole Temperature and Pressure monitoring of GR
104/07-28-067-04W4/2	0184205	N/A	CANADIAN NATURAL RESOURCES LIMITED	N/A	CNRL OBS RE MOORE 7-28-67-4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Well was never drilled
100/01-04-068-04W4/0	0429111	3/8/2011	CANADIAN NATURAL RESOURCES LIMITED	Observation	CNRL OBS MOORE 1-4-68-4	511	151	478.4	139.7	L-80	Hydril 563	23.3 T Proteus Core	4	3	No lost of circulation during drilling or cementing and casing reciprocated and rotated throughout entire cement job.	460.5-462.5 (FAE) PBTD tagged 474.62	None	N/A	No Remedial	Yes	Yes	Low	Daily downhole Temperature and Pressure monitoring of CLWR
100/08-28-067-04W4/0	0428513	3/4/2011	CANADIAN NATURAL RESOURCES LIMITED	Observation	CNRL OBS MOORE 8-28-67-4	511.8	157	513.59	139.7	J-55	LTC	23.5 T Proteus Core	4	3	No lost of circulation during drilling or cementing and casing reciprocated and rotated throughout entire cement job.	461-465 (GR, B12 open), 480-484 (GR B12)	461-465 (GR, B12 squeezed previously, but reperf'd), 480-484 (GR B12)	513.18-504.2, 504.2-467	T-40	No	Yes	Low	Daily downhole Temperature and Pressure monitoring ofB12
100/05-33-067-04W4/0	0416671	2/11/2010	CANADIAN NATURAL RESOURCES LIMITED	Observation	CNRL OBS MOORE 5-33-67-4	505	143	475.5	139.7	L-80	LTC	15m3 (18T) Proterus Core, 3.0 m3 Proteus Core Plug	4	1.5 m3 Plug, 3.0 PC	No lost of circ while drilling/ cementing.	433.0-437.0, 457.80-459.80, 460.0-462.50, 463.0 465.0		498-475m	3m3(2.4T) Proteus Core Plug 433.0-437.0 (2.4 T Halad Thermal) Squeeze 433.0-437.0 (2.66T T-40) Squeeze 463.0-465.0 (2.0 m3 Thermacem) 460.0-462.50 (3.0 m3 T40) Squeeze Squeeze 457.8-459.8 (2.5m3 ThermaCem) Squeeze 457.8-459.8 (2.0m3 ThermaCem) Squeeze 460.0-462.50 (3.0 m3 T40) Squeeze 463.0-465.0 (1.0 m3 HalCem C + 30% SSA) Squeeze 460.0-462.50 (1.0 m3SqueezeCRETE) Squeeze	No	Yes	Medium	Currently performing work on well. Will be left as B12 observation well with daily downhole Temperature and Pressure Monitoring.
100/07-34-067-04W4/0	0208968	12/4/1997	CANADIAN NATURAL RESOURCES LIMITED	Standing	AMOCO MOORE 7-34-67-4	530	119	521	114.3	J-55	STC	Class C + 40% Silica Flour + 1%CaCl2	3.4	3 PC, Spot returns (Plug)	Minor losses at 270mkb due to mud ring. No lost circ during cementing.	369-371 (GR-Open, not flowing)	None	Cement Plug 430-502.7 (4 barrels), Perm BP 366.75-367.2	Thermal 40	No	Yes	Low	Producing Colony Gas Well - Daily surface pressure monitoring are installed
104/13-33-067-04W4/0	0416672	1/15/2010	CANADIAN NATURAL RESOURCES LIMITED	Observation	CNRL OBS MOORE 13-33-67-4	498	157	465	139.7	L-80	LTC	17m3 (20T) Proteus Core PC, 3.0 m3 Proteus Core Plug	4	3 PC, 1.5 Plugs	No lost of circ while drilling/ cementing.	395.0-399.0, 412.0-414.0, 440.0-444.0	No Squeeze	498-465m	3m3 Proteus Core Plug 440.-444.0 (2.0 m3 T-40) Squeeze 440.-444.0 (1.0 m3 Microcem) Squeeze 412.0-414.0 (2.0 m3 T-40) Squeeze	No	Yes	Low	Daily downhole Temperature and Pressure monitoring of GR
100/07-33-067-04W4/0	0094024	1/17/1982	CENOVUS ENERGY INC.	Suspended	CVE MOORE 7-33-67-4	577	121.7	577	114.3	K-55	STC 8rnd	Stage 1: 8.9T Pozmix, Stage 2: 2.5T Cement Fondu + 35% silica flour	Surface	0.25	No lost circ while drilling/ cementing.	351.0-353.0	No Squeeze	Cement top at 415 mKB	No Remedial	No	Yes	Medium	Producing Colony Gas Well - Daily surface pressure monitoring to be installed
100/15-32-067-04W4/0	0304568	3/3/2004	CENOVUS ENERGY INC.	Suspended	CVE MOORE 15-32-67-4	387	164	387	114.3	J-55 / L-80	Boss	9.3T (7m3) Thermal 40	Surface	1	No lost circ while drilling/cementing. Reciprocated	335.0-337.0 PBTD tagged 376 mKB	No Squeeze	No Plug	No Remedial	No	Yes	Medium	Suspended Colony Gas Well -Daily surface pressure monitoring to be installed
100/03-28-067-04W4/0	459341	9/28/2013	CANADIAN NATURAL RESOURCES LIMITED	Standing	CNRL OBS MOORE 3-28-67-4	454	206	454	177.8	J-55	LT&C	ThermalCem 1775 + 1% Halad 447	3.8	10.5	No lost circulation during cementing or drilling	No Perfs	No Squeeze	No Plug	No Remedial	No	Yes	Medium	Currently performing work on well.Well will be suspended as per Dir 51 with confirmed cement top 15m above Grand Rapids top.

Table 3.1b Abandoned Evaluation Wellbores within area of investigation Part 1

UWI	License #	Spud Date	Current Licensee	Mode	Well Name	TV Depth (m)	Surface Casing Depth m	Prod Casing Depth m	Prod Casing Size mm	Prod Casing Grade	Prod Casing Connect. Type	Cement Type Behind Prod Casing	Cement Top mKb	Cement Returns to Surface m3	Tour Sheet Review Cementing Comments	Perf Interval mKB	Cement Squeeze Depth	Cement Plug Depth mKB	Cement Plug/Squeeze Composition	Thermally Compliant (Yes/No)	Thermal Compatability (Yes/No)	Risk Level	Risk Rationale
1AA/01-03-068-04W4/0	0264348	1/12/2002	CANADIAN NATURAL RESOURCES LIMITED	Abandoned	CNRES PRIMROSE 1-3-68-4	520	141.9	None	None	None	None	None	0	No Comments	No lost circ while drilling/ cementing.	No Perfs	No Squeeze	0-250 (7.5T), 250-520 (6.3T) + 1.5T top up	T-Mix TS +1.5%CaCl2 + 0.4%CFL2	Yes	Yes	Low	Abandoned to surface no action required
1AA/01-28-067-04W4/0	0199303	11/23/1997	CANADIAN NATURAL RESOURCES LIMITED	Abandoned	AMOCO PRIMROSE 1-28-67-4	535	121	None	None	None	None	None	1	2	No lost circ while drilling/ cementing.	No Perfs	No Squeeze	535-275 (5.5T), 275-1 (5.7T) + 3.1 T top up	Class G +40% Silica +1% Halad 322 + 2% CaCl2	Yes	Yes	Low	Abandoned to surface no action required
1AA/01-33-067-04W4/0	0208077	1/1/1998	CANADIAN NATURAL RESOURCES LIMITED	Abandoned	AMOCO PRIMROSE 1-33-67-4	530	111	None	None	None	None	None	Surface	1.4	Lost 30m3 in gravel ~120mkb when drilling. Circulation regained and no other issues noted	No Perfs	No Squeeze	530-275, 275-Surface, Top up (12Tons)	Class G +40% Silica +1% Halad 322 + 2% CaCl2	Yes	Yes	Low	Abandoned to surface no action required
1AA/03-27-067-04W4/0	0208009	2/27/1998	CANADIAN NATURAL RESOURCES LIMITED	Abandoned	AMOCO PRIMROSE 3-27-67-4	535	114	None	None	None	None	None	Surface	2.5	No lost circ while drilling/cementing.	No Perfs	No Squeeze	535-275 (5.5T), 275-Surface (6.1T), Top up (1.4T)	Class G Thermal	Yes	Yes	Low	Abandoned to surface no action required
1AA/03-28-067-04W4/0	0199304	11/19/1997	CANADIAN NATURAL RESOURCES LIMITED	Abandoned	AMOCO PRIMROSE 3-28-67-4	535	117	None	None	None	None	None	Surface	Not noted	No lost circ while drilling/ cementing.	No Perfs	No Squeeze	535-275, 275-surface	Class G + 40% SSA-1	Yes	Yes	Low	Abandoned to surface no action required
1AA/04-33-067-04W4/0	0184208	3/23/1996	CANADIAN NATURAL RESOURCES LIMITED	Abandoned	AMOCO PRIMROSE 4-33-67-4	522	133	None	None	None	None	None	Surface	1	No lost circ while drilling/ cementing.	No Perfs	No Squeeze	520-260, 260-surface	Class G + 40% SSA-1	Yes	Yes	Low	Abandoned to surface no action required
1AA/04-34-067-04W4/0	0208582	12/29/1997	CANADIAN NATURAL RESOURCES LIMITED	Abandoned	AMOCO PRIMROSE 4-34-67-4	525	24	None	None	None	None	None	Surface	Surface returns after each stage. (Circulated out)	No lost circ while drilling/ cementing.	No Perfs	No Squeeze	Plug 525-275, 275-sfc, (6+7tons) + 2tons top up	Class G + 40% SSA-1 +1%Halad 322 + 2%CaCl2 +7.5l/m3 howco suds	Yes	Yes	Low	Abandoned to surface no action required
1AA/05-03-068-04W4/0	0406758	1/12/2009	CANADIAN NATURAL RESOURCES LIMITED	Abandoned	CNRL PRIMROSE 5-3-68-4	573	123.07	None	None	None	None	None	4	4	Mud Rings. No lost circ while drilling/ cementing.	No Perfs	No Squeeze	573 - Surface (28.9T)	Proteus Core +1%CFR-2 +1%CaCl2	Yes	Yes	Low	Abandoned to surface no action required
1AA/05-27-067-04W4/0	0207963	11/27/1997	CANADIAN NATURAL RESOURCES LIMITED	Abandoned	AMOCO PRIMROSE 5-27-67-4	535	118.59	None	None	None	None	None	1	0.5	No lost circ while drilling/ cementing.	No Perfs	No Squeeze	275-535 (5.7 T) 275-Surface (7.3 T) Top up (1 T)	Thermal Cement "G"	Yes	Yes	Low	Abandoned to surface no action required
1AA/06-04-068-04W4/0	0264351	1/22/2002	CANADIAN NATURAL RESOURCES LIMITED	Abandoned	CNRES PRIMROSE 6-4-68-4	565	150	None	None	None	None	None	Surface	2.1	No lost circ while drilling/ cementing.	No Perfs	No Squeeze	510-250 (8T), 250-surface (5.2T), Top Up (1.1T)	T-Mix TS+1.5%CaCl2+0.4% CFL-2	Yes	Yes	Low	Abandoned to surface no action required
1AA/06-33-067-04W4/0	0208078	12/9/1997	CANADIAN NATURAL RESOURCES LIMITED	Abandoned	AMOCO PRIMROSE 6-33-67-4	520	132	206-522 (casing problems-chem cut at 206, open hole above)	114.3	J-55	STC	8T Class C + 40% SSA-1	Surface	0	Casing parted during initial cement job. Decision was made to chem cut casing at 206 mKB and abandon well. Initial Production Casing cement (8.0T) Class C +40%SSA-1 no returns drill out casing to 460mKB	No Perfs	No Squeeze	Cement Plugs inside casing and open hole from 206 to surface Plug#1 460-300mKB (1.6T) OWG + 40%SSA Plug#2 300-150mKB (2.6T) OWG + 40%SSA Plug#3 150-Surface mKB (4.0T) OWG + 40%SSA Top Up (1.0T) OWG + 40%SSA	Class G + 40% SSA-1	No	Yes	Medium	Poor cement behind casing from 206-395 mKb. Well will required remediation
1AA/07-03-068-04W4/0	0199091	3/18/1997	CANADIAN NATURAL RESOURCES LIMITED	Abandoned	AMOCO PRIMROSE 7-3-68-4	533	106	None	None	None	None	None	Surface	0	No lost circ while drilling/ cementing.	No Perfs	No Squeeze	Plug 533-255, 255-surf (7.4 +6.6tons) + 0.5m3 top up	Class G + 40% SSA-1 +1%Halad 322 + 2%CaCl2 +7.5l/m3 howco suds	Yes	Yes	Low	Abandoned to surface no action required
1AA/07-28-067-04W4/0	0184205	3/22/1996	CANADIAN NATURAL RESOURCES LIMITED	Abandoned	AMOCO PRIMROSE 7-28-67-4	527	133.5	None	None	None	None	None	Surface	0.5	No lost circ while drilling/ cementing.	No Perfs	No Squeeze	527-250, 250-surface (14.5T)	Class G + 40% SSA-1	Yes	Yes	Low	Abandoned to surface no action required
1AA/07-32-067-04W4/0	0183031	12/20/1995	CANADIAN NATURAL RESOURCES LIMITED	Abandoned	AMOCO PRIMROSE 7-32-67-4	516	133	None	None	None	None	None	Surface	13.5	No lost circ while drilling/ cementing.	No Perfs	No Squeeze	516-260 (6.0T), 260-surface (6.5T)	Class G + 40% SSA-1	Yes	Yes	Low	Abandoned to surface no action required
1AA/08-05-068-04W4/0	264355	2/25/2002	CANADIAN NATURAL RESOURCES LIMITED	Abandoned	CNRES PRIMROSE 8-5-68-4	585	150	None	None	None	None	None	Surface	2.8	No lost circ while drilling/ cementing.	No Perfs	No Squeeze	585-290 (8.5T), 290-surface (6.8T)	T-Mix TS	Yes	Yes	Low	Abandoned to surface no action required
1AA/09-27-067-04W4/0	0208172	2/23/1998	CANADIAN NATURAL RESOURCES LIMITED	Abandoned	AMOCO PRIMROSE 9-27-67-4	525	120.2	None	None	None	None	None	4	1.5	No lost circ during drilling or cementing	No Perfs	No Squeeze	525-275, 275-Surface (13.6T) Top up (1.5 T)	Class G Thermal Thicksotropic w 40%SSA + 2%CaCl2	Yes	Yes	Low	Abandoned to surface no action required
1AA/09-32-067-04W4/0	0186777	3/21/1996	CANADIAN NATURAL RESOURCES LIMITED	Abandoned	AMOCO PRIMROSE 9-32-67-4	515	132	None	None	None	None	None	14	1.5	No lost circ while drilling/cementing.	No Perfs	No Squeeze	515-260 mKB (6.5T/6.m3), 260-Surface (7.5T/7.7m3), Top Up (1T/1m3). Tagged cement top at 14mKB	Class G 40%SSA-1 + Halad 322 1% + 2%CaCl2	Yes	Yes	Low	Abandoned to surface no action required

Table 3.1c Abandoned Evaluation Wellbores within area of investigation Part 2

UWI	License #	Spud Date	Current Licensee	Mode	Well Name	TV Depth (m)	Surface Casing Depth m	Prod Casing Depth m	Prod Casing Size mm	Prod Casing Grade	Prod Casing Connect. Type	Cement Type Behind Prod Casing	Cement Top mKb	Cement Returns to Surface m3	Tour Sheet Review Cementing Comments	Perf Interval mKB	Cement Squeeze Depth	Cement Plug Depth mKB	Cement Plug/Squeeze Composition	Thermally Compliant (Yes/No)	Thermal Compatability (Yes/No)	Risk Level	Risk Rationale
1AA/10-03-068-04W4/0	0264349	1/13/2002	CANADIAN NATURAL RESOURCES LIMITED	Abandoned	CNRES PRIMROSE 10-3-68-4	589	126.69	None	None	None	None	None	0	No comments	No lost circ while drilling/ cementing.	No Perfs	No Squeeze	Plug 589-340, 340-0 (7.7m3 + 6.5m3) + 1.3m3 top up	T-Mix +1.5%CaCl2+ 0.4%CFL2	Yes	Yes	Low	Abandoned to surface no action required
1AA/10-04-068-04W4/0	0264353	1/11/2002	CANADIAN NATURAL RESOURCES LIMITED	Abandoned	CNRES PRIMROSE 10-4-68-4	571	136.5	None	None	None	None	None	Surface	1.5	No lost circ while drilling/ cementing.	No Perfs	No Squeeze	570-285 (8T), 285-surface (6.2T), top up (0.8T)	T-Mix TS	Yes	Yes	Low	Abandoned to surface no action required
1AA/10-28-067-04W4/0	0208116	12/1/1997	CANADIAN NATURAL RESOURCES LIMITED	Abandoned	AMOCO PRIMROSE 10-28-67-4	523	24	None	None	None	None	None	Surface	Not noted	No lost circ while drilling/ cementing.	No Perfs	No Squeeze	523-275 (5.4T), 275-surface (11.8T), Top Up (1.0T)	Class G + 40% SSA-1	Yes	Yes	Low	Abandoned to surface no action required
1AA/11-03-068-04W4/0	0264350	1/14/2002	CANADIAN NATURAL RESOURCES LIMITED	Abandoned	CNRES PRIMROSE 11-3-68-4	499	131.26	None	None	None	None	None	0	No comments	No lost circ while drilling/ cementing.	No Perfs	No Squeeze	Plug 499-250 (5m3), 250-surface (5.8m3) + 0.75m3 top up	T-Mix TS	Yes	Yes	Low	Abandoned to surface no action required
1AA/11-27-067-04W4/0	0207962	12/7/1997	CANADIAN NATURAL RESOURCES LIMITED	Abandoned	AMOCO PRIMROSE 11-27-67-4	520	120.42	None	None	None	None	0	1	1	No lost circ while drilling/ cementing.	No Perfs	No Squeeze	275-520 (5.3 T), 1-275 (6.45 T) + 1m3 of top up	Thermal 'G' Class	Yes	Yes	Low	Abandoned to surface no action required
1AA/11-28-067-04W4/0	0406744	1/7/2009	CANADIAN NATURAL RESOURCES LIMITED	Abandoned	CNRL PRIMROSE 11-28-67-4	502	120.6	None	None	None	None	None	4	3	No lost circ while drilling/ cementing.	No Perfs	No Squeeze	502-Surface (24.4T)	22m3 (24.4T) Proteus Core 1700	Yes	Yes	Low	Abandoned to surface no action required
1AA/12-34-067-04W4/0	0264270	2/27/2002	CANADIAN NATURAL RESOURCES LIMITED	Abandoned	CNRES PRIMROSE 12-34-67-4	510	135.82	None	None	None	None	None	0	No comments	No lost circ while drilling/ cementing.	No Perfs	No Squeeze	Plug 510-250, 250-0. (6.8m3 + 5.4m3) + 0.9m3 top off	T-Mix TS	Yes	Yes	Low	Abandoned to surface no action required
1AA/13-28-067-04W4/0	0207965	3/2/1998	CANADIAN NATURAL RESOURCES LIMITED	Abandoned	AMOCO PRIMROSE 13-28-67-4	518	120	None	None	None	None	None	Surface	2	No lost circ while drilling/ cementing.	No Perfs	No Squeeze	518-275 (5.1T), 275-surface (5.6T), Top Up (1T)	Class G + 40% SSA-1	Yes	Yes	Low	Abandoned to surface no action required
1AA/14-27-067-04W4/0	0184715	3/10/1996	CANADIAN NATURAL RESOURCES LIMITED	Abandoned	AMOCO PRIMROSE 14-27-67-4	528	133	None	None	None	None	None	Surface	0.5	No lost circ while drilling/cementing.	No Perfs	No Squeeze	528-264 (6.5T), 264-Surface (6.5T), Top up (0.1T)	Class G + 40% SSA-1 +1%Halad 322 + 2%CaCl2	Yes	Yes	Low	Abandoned to surface no action required
1AA/14-34-067-04W4/0	0184967	2/18/1996	CANADIAN NATURAL RESOURCES LIMITED	Abandoned	AMOCO PRIMROSE 14-34-67-4	523	137.3	None	None	None	None	None	0	0.5	No lost circ while drilling/ cementing.	No Perfs	No Squeeze	523-265 (6T), 265-0 (6T) +2T top up	Class G + 40% SSA-1 +1%Halad 322 + 2%CaCl2 +7.5l/m3 howco suds	Yes	Yes	Low	Abandoned to surface no action required
1AA/15-29-067-04W4/0	0185919	3/5/1996	CANADIAN NATURAL RESOURCES LIMITED	Abandoned	AMOCO PRIMROSE 15-29-67-4	510	24	None	None	None	None	None	Surface	Good returns each stage	No lost circ while drilling/cementing.	No Perfs	No Squeeze	510-255mKB (6.0T), 250-0 (9.0T), top up (1.0T)	Class G 40%SSA-1 + Halad 322 1% + 2%CaCl2	Yes	Yes	Low	Abandoned to surface no action required
1AA/15-32-067-04W4/0	0185914	3/13/1996	CANADIAN NATURAL RESOURCES LIMITED	Abandoned	AMOCO PRIMROSE 15-32-67-4	505	133	None	None	None	None	None	Surface	"Full returns"	No lost circ while drilling/cementing.	No Perfs	No Squeeze	2 Stages + Top up (14T)	0:1:0 + 40% SSA + 1% HALAD 322 + 2%CaCl2	Yes	Yes	Low	Abandoned to surface no action required
1AA/16-28-067-04W4/0	0184206	3/13/1996	CANADIAN NATURAL RESOURCES LIMITED	Abandoned	AMOCO PRIMROSE 16-28-67-4	525	132.3	None	None	None	None	None	Surface	0.5	No lost circ while drilling/cementing.	No Perfs	No Squeeze	525-260 (6.5T), 260-0 (6.0T), Top Up (1T)	Class G + 40% SSA-1 +1%Halad 322 + 2%CaCl2	Yes	Yes	Low	Abandoned to surface no action required
1AB/08-05-068-04W4/0	0429112	N/A	CANADIAN NATURAL RESOURCES LIMITED	Canceled	CNRL 1AB PRIMROSE 8-5-68-4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Well Cancelled

Table 3.1d Abandoned Non-CSS wells

UWI	License #	Spud Date	Current Licensee	Mode	Well Name	TV Depth (m)	Surface Casing Depth m	Prod Casing Depth m	Prod Casing Size mm	Prod Casing Grade	Prod Casing Connect. Type	Cement Type Behind Prod Casing	Cement Top mKb	Cement Returns to Surface m3	Tour Sheet Review Cementing Comments	Perf Interval mKB	Cement Squeeze Depth	Cement Plug Depth mKB	Cement Plug/Squeeze Composition	Thermally Compliant (Yes/No)	Thermal Compatability (Yes/No)	Risk Level	Risk Rationale
100/05-28-067-04W4/0	0207846	2/13/1998	CANADIAN NATURAL RESOURCES LIMITED	Abandoned	AMOCO PRIMROSE 5-28-67-4	515	116	None	None	None	None	No Prod Casing	Surface	3	No lost circ while drilling/ cementing.	N/A	No Squeeze	515-260, 260-surface, 1.0 m3 top-up	Class G + 3% CaCl2 (No silica noted)	No	Yes	Low	Cement plug to surface no action required.
100/07-27-067-04W4/2	0185552	2/19/1996	CANADIAN NATURAL RESOURCES LIMITED	Abandoned	AMOCO MOORE 7-27-67-4	526	130	526	114.3	J-55	STC	Class C + 40% SSA-1 +0.5% CFR-3 +0.2% Halad 344 + 1% CaCl3	6	3	No lost circ while drilling/cementing.	359-362 (Colony, abandoned), 365-366.5 (colony, abandoned)	None	526-494.3, 494.3-385, 385-366.5, BP:365.1-364.8, 364.8-358.8, BP: 352.3-352, 352-322	Thermal 40	No	Yes	Low	Abandoned well with cement 15m above GR. No action required
100/07-27-067-04W4/0	0185552	2/19/1996	CANADIAN NATURAL RESOURCES LIMITED	Abandoned Zone	AMOCO MOORE 7-27-67-4	526	130	526	114.3	J-55	STC	Class C + 40% SSA-1 +0.5% CFR-3 +0.2% Halad 344 + 1% CaCl2	6	4.5	No lost circ while drilling/cementing.	359-362 (Colony, abandoned), 365-366.5 (colony, abandoned)	None	526-494.3, 494.3-385, 385-366.5, BP:365.1-364.8, 364.8-358.8, BP: 352.3-352, 352-322	Thermal	No	Yes	Low	Abandoned well with cement 15m above GR. No action required
100/09-29-067-04W4/0	0185491	3/14/1996	CANADIAN NATURAL RESOURCES LIMITED	Abandoned	AMOCO PRIMROSE 9-29-67-4	518	24	None	None	None	None	None	Surface	1	No lost circ while drilling/ cementing.	N/A	No Squeeze	518-257, 257-surface (14.1 T)	Class G + 40% SSA-1	Yes	Yes	Low	Cement plug to surface no action required.
100/13-27-067-04W4/0	0208084	12/5/1997	CANADIAN NATURAL RESOURCES LIMITED	Abandoned	AMOCO PRIMROSE 13-27-67-4	520	20	None	None	None	None	None	Surface	1.5	No lost circ while drilling/ cementing.	None	None	520-275 (5.9T), 275-surface (8.5T), 1.6T top fill	Class G +40% Silica +1% Halad 322 + 2% CaCl2	Yes	Yes	Low	Cement plug to surface no action required.
100/15-28-067-04W4/0	0207843	12/16/1997	CANADIAN NATURAL RESOURCES LIMITED	Abandoned	AMOCO PRIMROSE 15-28-67-4	525	119	None	None	None	None	None	Surface	1.5	No lost circ while drilling/ cementing.	N/A	No Squeeze	525-275 (5.7m3), 275-surface (6.5 m3), Top Up 1m3	Class G + 40% SSA-1	Yes	Yes	Low	Cement plug to surface no action required.
100/15-33-067-04W4/0	0184787	3/16/1996	PLAINS MIDSTREAM CANADA ULC	Abandoned	AMOCO PRIMROSE 15-33-67-4	510	133	None	None	None	None	None	Surface	Not noted	No lost circ during drilling or cementing.	N/A	None	2 Stages + Top up (no specifics)	0:1:0 + 40%SSA + 1%HALAD 322 + 2%CaCl2	Yes	Yes	Low	Cement plug to surface no action required.

Table 3.1e Offsetting Phases HPCSS wells Part 1

UWI	License #	Spud Date	Current Licensee	Mode	Well Name	TV Depth (m)	Surface Casing Depth m	Prod Casing Depth m	Prod Casing Size mm	Prod Casing Grade	Prod Casing Connect. Type	Cement Type Behind Prod Casing	Cement Top mKb	Cement Returns to Surface m3	Tour Sheet Review Cementing Comments	Perf Interval mKB	Cement Squeeze Depth	Cement Plug Depth mKB	Cement Plug/Squeeze Composition	Thermally Compliant (Yes/No)	Thermal Compatability (Yes/No)	Risk Level	Risk Rationale
102/09-29-067-04W4/0	0190183	10/11/1996	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	AMOCO 1D12 PRIMROSE 9-29-67-4	481.5	23	879	244.5	L-80	Boss	35.4T Class C + 40%SSA-1 + 0.5% CFR-3 + 0.2%Halad344 + 0.5%CaCl2	Surface	10	No lost circ while drilling/cementing.	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
103/09-29-067-04W4/0	0190180	10/7/1996	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	AMOCO 2D12 PRIMROSE 9-29-67-4	482.6	24	802	244.5	L-80	Boss	32.34T Class C + 40%SSA-1 + 0.5% CFR-3 + 0.2%Halad344 + 1%CaCl2	Surface	12	No lost circ while drilling/cementing.	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
100/16-29-067-04W4/0	0190178	10/3/1996	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	AMOCO 3D12 PRIMROSE 16-29-67-4	474.5	24	773	244.5	L-80	Boss	31.2T Class C + 40%SSA-1 + 0.5% CFR-3 + 0.2%Halad344 + 1%CaCl2	Surface	9	No lost circ while drilling/cementing.	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
100/08-32-067-04W4/0	0192082	11/27/1996	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	AMOCO 3D13 PRIMROSE 8-32-67-4	474.1	20	777	244.5	L-80	Boss	31.43T Class C + 40%SSA-1 + 0.5% CFR-3 + 0.2%Halad344 + 1%CaCl2	Surface	8	No lost circ while drilling/cementing.	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
100/16-32-067-04W4/0	0192360	1/2/1997	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	AMOCO 3D14 PRIMROSE 16-32-67-4	470.5	20	769	244.5	L-80	Boss	31.1T Class C + 40%SSA-1 + 0.5% CFR-3 + 0.2%Halad344 + 0.5%CaCl2	Surface	10	No lost circ while drilling/cementing.	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
102/16-29-067-04W4/0	0190175	9/28/1996	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	AMOCO 4D12 PRIMROSE 16-29-67-4	478.7	20	802	244.5	L-80	Boss	32.3T Class C + 40%SSA-1 + 0.5% CFR-3 + 0.2%Halad344 + 0.5%CaCl2	Surface	9	No lost circ while drilling/cementing.	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
102/08-32-067-04W4/0	0192083	11/23/1996	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	AMOCO 4D13 PRIMROSE 8-32-67-4	475.8	20	801	244.5	L-80	Boss	32.5T Class C + 40%SSA-1 + 0.5% CFR-3 + 0.2%Halad344 + 1%CaCl2	Surface	11	No lost circ while drilling/cementing.	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
102/16-32-067-04W4/0	0192374	12/29/1996	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	AMOCO 4D14 PRIMROSE 16-32-67-4	469.8	20	812	244.5	L-80	Boss	32.8T Class C + 40%SSA-1 + 0.5% CFR-3 + 0.2%Halad344 + 0.5%CaCl2	Surface	20	No lost circ while drilling/cementing.	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
103/16-29-067-04W4/0	0190184	9/22/1996	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	AMOCO 5D12 PRIMROSE 16-29-67-4	473.8	20	871	244.5	L-80	Boss	35.23T Class C + 40%SSA-1 + 0.5% CFR-3 + 0.2%Halad344 + 0.5%CaCl2	Surface	7	No lost circ while drilling/cementing.	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
103/08-32-067-04W4/0	0192084	11/18/1996	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	AMOCO 5D13 PRIMROSE 8-32-67-4	478.1	20	864	244.5	L-80	Boss	34.6T Class C + 40%SSA-1 + 0.5% CFR-3 + 0.2%Halad344 + 1%CaCl2	Surface	8	No lost circ while drilling/cementing.	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
103/16-32-067-04W4/0	0192372	12/17/1996	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	AMOCO 5D14 PRIMROSE 16-32-67-4	469.4	20	867	244.5	L-80	Boss	34T Class C + 40%SSA-1 + 0.5% CFR-3 + 0.2%Halad344 + 0.5%CaCl2	Surface	8	No lost circ while drilling/cementing.	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
100/11-03-068-04W4/0	0396747	6/28/2008	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 1A58 PRIMROSE 11-3-68-4	478.9	114	1204	244.5	L-80	Hydril 563	65.6 T RFC Thermal +1%CaCl	4	15	No lost circulation during drilling or cementing and casing rotated until cement to surface.	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
100/03-04-068-04W4/0	0305713	8/3/2004	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 1C51 PRIMROSE 3-4-68-4	478.8	120	902	244.5	L-80	Hydril 563	68.68T (52m3) Versablock TS-5 + 1% CaCl2 + 0.4% FL-5	5.1	14	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
102/11-03-068-04W4/0	0396748	6/28/2008	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 2A58 PRIMROSE 11-3-68-4	473.8	119	1145	244.5	L-80	Hydril 563	62.2 T RFC Thermal +1%CaCl	4	13	No lost circulation during drilling or cementing and no rotation or reciprocation	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
103/06-04-068-04W4/0	0309861	8/5/2004	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 2C51 PRIMROSE 6-4-68-4	478.6	127.5	741.3	244.5	L-80	Hydril 563	50.68T (38.46m3) Versablock TS-5 + 1% CaCl2 + 0.4% FL-5	5.1	9	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
103/11-03-068-04W4/0	0396749	6/27/2008	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 3A58 PRIMROSE 11-3-68-4	475.2	119	1047	244.5	L-80	Hydril 563	55.2 T RFC Thermal +1%CaCl	4	8	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
100/14-03-068-04W4/2	0396750	5/12/2011	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 4A58 RE PRIMROSE 14-3-68-4	473.2	118	1025 (window milled at 988.24 mKB)	244.5	L-80	Hydril 563	54.3 T RFC Thermal +1%CaCl	4	12	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
100/14-03-068-04W4/0	0396750	6/29/2008	CANADIAN NATURAL RESOURCES LIMITED	Abandoned Cyclic	CNRL 4A58 PRIMROSE 14-3-68-4	474.5	118	1025	244.5	L-80	Hydril 563	54.3 T RFC Thermal +1%CaCl	4	12	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
102/14-03-068-04W4/0	0396751	6/26/2008	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 5A58 PRIMROSE 14-3-68-4	474.7	116.5	936	244.5	L-80	Hydril 563	49.24 T RFC Thermal +1%CaCl	4	8	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate

Table 3.1f Offsetting Phases HPCSS wells Part 2

UWI	License #	Spud Date	Current Licensee	Mode	Well Name	TV Depth (m)	Surface Casing Depth m	Prod Casing Depth m	Prod Casing Size mm	Prod Casing Grade	Prod Casing Connect. Type	Cement Type Behind Prod Casing	Cement Top mKb	Cement Returns to Surface m3	Tour Sheet Review Cementing Comments	Perf Interval mKB	Cement Squeeze Depth	Cement Plug Depth mKB	Cement Plug/Squeeze Composition	Thermally Compliant (Yes/No)	Thermal Compatability (Yes/No)	Risk Level	Risk Rationale
103/14-03-068-04W4/0	0396752	6/30/2008	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 6A58 PRIMROSE 14-3-68-4	471.7	119	929	244.5	L-80	Hydril 563	49.9 T RFC Thermal +1%CaCl	4	12	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
104/14-03-068-04W4/2	0396753	5/20/2011	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 7A58 RE PRIMROSE 14-3-68-4	474.1	117.5	840 (window milled at 811.41 mKB)	244.5	L-80	Hydril 563	43.9 T RFC Thermal +1%CaCl	4	12	No lost circ during drilling or cementing. Rotated until 5m3 water discplacement volume remaining	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
104/14-03-068-04W4/0	0396753	6/25/2008	CANADIAN NATURAL RESOURCES LIMITED	Abandoned Cyclic	CNRL 7A58 PRIMROSE 14-3-68-4	475.1	117.5	840	244.5	L-80	Hydril 563	43.9 T RFC Thermal +1%CaCl	4	12	No lost circ during drilling or cementing. Rotated until 5m3 water discplacement volume remaining	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
105/14-03-068-04W4/0	0396754	6/30/2008	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 8A58 PRIMROSE 14-3-68-4	473	119	820	244.5	L-80	Hydril 563	45.6 T RFC Thermal +1%CaCl	4	8	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate

Table 3.1g Offsetting Phase 22 HPCSS Wells

UWI	License #	Spud Date	Current Licensee	Mode	Well Name	TV Depth (m)	Surface Casing Depth m	Prod Casing Depth m	Prod Casing Size mm	Prod Casing Grade	Prod Casing Connect. Type	Cement Type Behind Prod Casing	Cement Top mKb	Cement Returns to Surface m3	Tour Sheet Review Cementing Comments	Perf Interval mKB	Cement Squeeze Depth	Cement Plug Depth mKB	Cement Plug/Squeeze Composition	Thermally Compliant (Yes/No)	Thermal Compatability (Yes/No)	Risk Level	Risk Rationale
106/04-27-067-04W4/0	0424752	12/11/2010	CANADIAN NATURAL RESOURCES LIMITED	Drain	CNRL 10A22 PRIMROSE 4-27-67-4	482	132	705	244.5	L-80	Hydril 563	50.4T Primrose thermal 3 + 0.5% CaCl2	5	10	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
106/05-27-067-04W4/2	0424752	12/11/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 10A22 PRIMROSE 5-27-67-4	482	132	705	244.5	L-80	Hydril 563	50.4T Primrose thermal 3 + 0.5% CaCl2	5	10	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
100/05-27-067-04W4/0	0424784	12/9/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 11A22 PRIMROSE 5-27-67-4	480.4	130	675	244.5	L-80	Hydril 563	54T Primrose thermal 3 + 0.5% CaCl2	4.1	8	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
102/05-27-067-04W4/3	0424785	12/12/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 12A22 PRIMROSE 5-27-67-4	482.3	137	754	244.5	L-80	Hydril 563	51T Primrose Thermal 3 + 0.5% CaCl2 (yield .84m3/T)	6.1	6	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
100/07-28-067-04W4/0	0424785	12/12/2010	CANADIAN NATURAL RESOURCES LIMITED	Drain	CNRL 12A22 PRIMROSE 7-28-67-4	482.3	137	754	244.5	L-80	Hydril 563	51T Primrose Thermal 3 + 0.5% CaCl2 (yield .84m3/T)	6.1	6	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
102/08-28-067-04W4/2	0424785	12/12/2010	CANADIAN NATURAL RESOURCES LIMITED	Drain	CNRL 12A22 PRIMROSE 8-28-67-4	482.3	137	754	244.5	L-80	Hydril 563	51T Primrose Thermal 3 + 0.5% CaCl2 (yield .84m3/T)	6.1	6	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Ported Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
103/05-27-067-04W4/2	0424786	12/10/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 13A22 PRIMROSE 5-27-67-4	478.3	128	758	244.5	L-80	Hydril 563	55T Primrose thermal 3 + 0.5% CaCl2	4.1	8	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
102/07-28-067-04W4/0	0424786	12/10/2010	CANADIAN NATURAL RESOURCES LIMITED	Drain	CNRL 13A22 PRIMROSE 7-28-67-4	484.4	128	758	244.5	L-80	Hydril 563	55T Primrose thermal 3 + 0.5% CaCl2	4.1	8	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
104/05-27-067-04W4/0	0424787	12/13/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 14A22 PRIMROSE 5-27-67-4	480.8	130	838	244.5	L-80	Hydril 563	58T Primrose thermal 3 + 0.5% CaCl2	6.1	10	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
105/05-27-067-04W4/0	0424788	12/10/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 15A22 PRIMROSE 5-27-67-4	480.6	130	880	244.5	L-80	Hydril 563	64.3T Primrose thermal 3 + 0.5% CaCl2	4.1	10	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
100/12-27-067-04W4/0	0424789	12/14/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 16A22 PRIMROSE 12-27-67-4	484.3	133	968	244.5	L-80	Hydril 563	71.0 T Primrose Thermal 3 + 0.5% CaCl2	6.1	10	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
102/12-27-067-04W4/0	0424790	12/11/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 17A22 PRIMROSE 12-27-67-4	483.6	130	1007	244.5	L-80	Hydril 563	75.5 Primrose Thermal 3 + 0.5% CaCl2	7.1	14	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
103/12-27-067-04W4/0	0424791	12/15/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 18A22 PRIMROSE 12-27-67-4	485.1	134	1093	244.5	L-80	Hydril 563	83.0 Primrose Thermal 3 + 0.5% CaCl2	6.1	15	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
103/04-27-067-04W4/0	0424749	12/8/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 7A22 PRIMROSE 4-27-67-4	482.8	130	712	244.5	L-80	Hydril 563	45.8T Primrose thermal 2 +0.5% CaCl2	5	10	No lost circulation during drilling or cementing operations. Casing rotated until Scav returns to surface	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
104/04-27-067-04W4/0	0424750	12/9/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 8A22 PRIMROSE 4-27-67-4	481.1	132	721	244.5	L-80	Hydril 563	51T Primrose thermal 3 + 0.5% CaCl2	6.1	14	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
105/04-27-067-04W4/0	0424751	12/8/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 9A22 PRIMROSE 4-27-67-4	482.4	130	657	244.5	L-80	Hydril 563	51.7T Primrose thermal 3 + 0.5% CaCl2	6.5	9	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	No Plug	No Remedial	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
103/01-29-067-04W4/0	424657	14/02/2010	CANADIAN NATURAL RESOURCES LIMITED	Observation	CNRL OBS PS 22 MOORE 1-29-67-4	455	180	455.5	114.3	J-55	ST&C	25T Primrose Thermal-3	4.1	4	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	None	No Remedial	Surface to PBTD (Geophones) Good returns	Thermal G	Yes	Yes	Low	Monitor Passive Seismic
104/08-29-067-04W4	424658	5/30/2011	CANADIAN NATURAL RESOURCES LIMITED	Observation	CNRL OBS TF 22 MOORE 8-29-67-4	456	176	456	139.7	J-55	LTE	22m3 Primrose Thermal 3	5.1	5 m3	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	448.10-452.10	No Remedial	None	None	No	Yes	Low	Monitor Pressure and Temperature

Table 3.1h Phase 23 HPCSS Wells

UWI	License #	Spud Date	Current Licensee	Mode	Well Name	TV Depth (m)	Surface Casing Depth m	Prod Casing Depth m	Prod Casing Size mm	Prod Casing Grade	Prod Casing Connect. Type	Cement Type Behind Prod Casing	Cement Top mKb	Cement Returns to Surface m3	Tour Sheet Review Cementing Comments	Perf Interval mKB	Cement Squeeze Depth	Cement Plug Depth mKB	Cement Plug/Squeeze Composition	Thermally Compliant (Yes/No)	Thermal Compatability (Yes/No)	Risk Level	Risk Rationale
100/12-28-067-04W4/0	0424426	11/7/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 1A23 PRIMROSE 12-28-67-4	491.7	140	1094.5	244.5	L-80	Hydril 563	71.4T Primrose Thermal 3 + 0,1% OBP + 0.5% CaCl2 lead	5	18	No lost circulation during drilling or cementing and casing rotated until cement returns at surface	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
102/12-28-067-04W4/2	0424427	11/29/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 2A23 PRIMROSE 12-28-67-4	496.7	142	1033.5	244.5	L-80	Hydril 563	84.5T Primrose Thermal 3 + 0.5% CaCl2	5.79	18	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
100/09-28-067-04W4/0	0424427	11/29/2010	CANADIAN NATURAL RESOURCES LIMITED	Drain	CNRL 2A23 PRIMROSE 9-28-67-4	501.6	142	1033.5	244.5	L-80	Hydril 563	84.5T Primrose Thermal 3 + 0.5% CaCl2	5.79	18	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
100/13-28-067-04W4/0	0424428	11/8/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 3A23 PRIMROSE 13-28-67-4	496.8	126.5	999.5	244.5	L-80	Hydril 563	81T Primrose Thermal 3 + 0.5% CaCl2	5.29	14	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
102/13-28-067-04W4/2	0424429	11/28/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 4A23 PRIMROSE 13-28-67-4	493.3	143	930	244.5	L-80	Hydril 563	70.0T Primrose Thermal 3 + 0.5% CaCl2	6.29	10	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
100/16-28-067-04W4/0	0424429	11/28/2010	CANADIAN NATURAL RESOURCES LIMITED	Drain	CNRL 4A23 PRIMROSE 16-28-67-4	495.9	143	930	244.5	L-80	Hydril 563	70.0T Primrose Thermal 3 + 0.5% CaCl2	6.29	10	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
103/13-28-067-04W4/0	0424430	11/9/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 5A23 PRIMROSE 13-28-67-4	493.7	124	907	244.5	L-80	Hydril 563	72T (60.3 m3)Primrose Thermal 3 + 0.5% CaCl2 + 0.1% OBM	5	15	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
104/13-28-067-04W4/0	0424431	11/28/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 6A23 PRIMROSE 13-28-67-4	492.7	137	868	244.5	L-80	Hydril 563	62.72 T Primrose Thermal 3 + 0.5% CaCl2	6.29	12	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
105/13-28-067-04W4/0	0424432	11/9/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 7A23 PRIMROSE 13-28-67-4	494.6	133	885	244.5	L-80	Hydril 563	68.1 TPrimrose Thermal 3	5	0	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
100/04-33-067-04W4/0	0424433	11/27/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 8A23 PRIMROSE 4-33-67-4	491.1	136	820	244.5	L-80	Hydril 563	57.8 T Primrose Thermal 3	6.29	7	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
102/04-33-067-04W4/0	0424434	11/9/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 9A23 PRIMROSE 4-33-67-4	492.7	126	885	244.5	L-80	Hydril 563	67.0 Primrose Thermal 3	5	0	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
103/04-33-067-04W4/0	0424435	11/27/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 10A23 PRIMROSE 4-33-67-4	494.6	135	831	244.5	L-80	Hydril 563	57.2 Primrose Thermal 3	6.29	12	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
104/04-33-067-04W4/0	0424436	11/10/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 11A23 PRIMROSE 4-33-67-4	496.9	136.99	874.5	244.5	L-80	Hydril 563	63.3 T Primrose Thermal 3	5	8	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
105/04-33-067-04W4/0	0424437	11/26/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 12A23 PRIMROSE 4-33-67-4	492.1	136	828.5	244.5	L-80	Hydril 563	59.5 T Primrose Thermal 3	5.79	10.5	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
102/05-33-067-04W4/3	0424438	11/11/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 13A23 PRIMROSE 5-33-67-4	494.1	132.5	908	244.5	L-80	Hydril 563	66.0 T Primrose Thermal 3 + 0.5% CaCl2	6.5	12	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
102/05-33-067-04W4/0	0424438	11/11/2010	CANADIAN NATURAL RESOURCES LIMITED	Drain	CNRL 13A23 PRIMROSE 5-33-67-4	493.3	132.5	908	244.5	L-80	Hydril 563	66.0 T Primrose Thermal 3 + 0.5% CaCl2	6.5	12	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
100/06-33-067-04W4/2	0424438	11/11/2010	CANADIAN NATURAL RESOURCES LIMITED	Drain	CNRL 13A23 PRIMROSE 6-33-67-4	495.3	132.5	908	244.5	L-80	Hydril 563	66.0 T Primrose Thermal 3 + 0.5% CaCl2	6.5	12	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
103/05-33-067-04W4/0	0424439	11/25/2010	CANADIAN NATURAL RESOURCES LIMITED	Drain	CNRL 14A23 PRIMROSE 5-33-67-4	494.3	135	875	244.5	L-80	Hydril 563	63.5 T Primrose Thermal 3 + 0.5% CaCl2	5.79	15	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
103/05-33-067-04W4/2	0424439	11/25/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 14A23 PRIMROSE 5-33-67-4	494.3	135	875	244.5	L-80	Hydril 563	63.5 T Primrose Thermal 3 + 0.5% CaCl2	5.79	15	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
104/05-33-067-04W4/0	0424440	11/12/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 15A23 PRIMROSE 5-33-67-4	492.4	134.5	941	244.5	L-80	Hydril 563	72.0 T Primrose Thermal 3 + 0.5% CaCl2	6.5	12	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
105/05-33-067-04W4/0	0424441	11/25/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 16A23 PRIMROSE 5-33-67-4	490.8	139	966	244.5	L-80	Hydril 563	67.0 T Primrose Thermal 3 + 0.5% CaCl2	5.79	16	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
106/05-33-067-04W4/0	0424442	11/13/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 17A23 PRIMROSE 5-33-67-4	491.6	132	995	244.5	L-80	Hydril 563	73.3 T Primrose Thermal 3 + 0.5% CaCl2	5	10	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
100/12-33-067-04W4/0	0424443	11/23/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 18A23 PRIMROSE 12-33-67-4	492.6	140	1074.5	244.5	L-80	Hydril 563	69.0 T Primrose Thermal 3 + 0.5% CaCl2	5.29	12	No lost circulation during drilling or cementing and casing rotated until cement returns to surface	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
104/03-34-067-04W4/0	0424244	11/15/2010	CANADIAN NATURAL RESOURCES LIMITED	Observation	CNRL OBS PS 23 MOORE 3-34-67-4	462.5	133.5	462.5	114.3	J-55	LTC	23.8 T Primrose Thermal 3 +1% OBP	5	6.5 PC, 0.3 Plug	No lost circulation during drilling or cementing and casing reciprocated during cementing	None	No Remedial	5-460, 0.3m3 returns (Cement PS geophones)	Thermal G	Yes	Yes	Low	Monitor Passive Seismic
103/03-34-067-04W4/0	0424233	11/14/2010	CANADIAN NATURAL RESOURCES LIMITED	Observation	CNRL OBS TF 23 MOORE 3-34-67-4	462	165	462	139.7	J-55	Unknown	91.2 T Primrose Thermal (690% excess)	5.1	0 PC	No lost circulation durinv drilling. Lost cement during PC. Pumped 690% excess cement. CBL reviewed good isolation.	456-460 PKR 457.92	No Remedial	None	None	No	Yes	Low	Monitor Pressure and Temperature

Table 3.1i Phase 24 HPCSS Wells

UWI	License #	Spud Date	Current Licensee	Mode	Well Name	TV Depth (m)	Surface Casing Depth m	Prod Casing Depth m	Prod Casing Size mm	Prod Casing Grade	Prod Casing Connect. Type	Cement Type Behind Prod Casing	Cement Top mKb	Cement Returns to Surface m3	Tour Sheet Review Cementing Comments	Perf Interval mKB	Cement Squeeze Depth	Cement Plug Depth mKB	Cement Plug/Squeeze Composition	Thermally Compliant (Yes/No)	Thermal Compatability (Yes/No)	Risk Level	Risk Rationale
102/12-33-067-04W4/0	0424509	11/11/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 1A24 PRIMROSE 12-33-67-4	490.3	120	1102	244.5	L-80	Hydril 563	69.0 T Primrose Thermal 3 +0.5% CaCl2	4.1	10	No lost circulation during drilling or cementing. Casing rotated until 5m3 Scav returns.	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
103/12-33-067-04W4/0	0424510	11/23/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 2A24 PRIMROSE 12-33-67-4	490.8	128	1009	244.5	L-80	Hydril 563	72.5 T Primrose Thermal 3 +0.5% CaCl2	6.1	14	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
104/12-33-067-04W4/0	0424511	11/12/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 3A24 PRIMROSE 12-33-67-4	491.9	132	971	244.5	L-80	Hydril 563	70.0 T Primrose Thermal 3 +0.5% CaCl2	6.1	13	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
105/12-33-067-04W4/0	0424512	11/23/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 4A24 PRIMROSE 12-33-67-4	490.9	128	906	244.5	L-80	Hydril 563	72.5 T Primrose Thermal 3 +0.5% CaCl2	6.1	14	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
100/13-33-067-04W4/0	0424513	11/13/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 5A24 PRIMROSE 13-33-67-4	493	132	891	244.5	L-80	Hydril 563	66.0 T Primrose Thermal 3 +0.5% CaCl2	4.1	18	No lost circ during drilling or cementing. Rotated until 3m3 discplacement pumped.	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
102/13-33-067-04W4/0	0424514	11/22/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 6A24 PRIMROSE 13-33-67-4	488.8	129	815	244.5	L-80	Hydril 563	52.6 T Primrose Thermal 3 +0.5% CaCl2	5.6	15	No lost circulation during drilling or cementing. Casing rotated through 54.6 m3 cement volume	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
103/13-33-067-04W4/0	0424561	11/13/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 7A24 PRIMROSE 13-33-67-4	490.5	133	832	244.5	L-80	Hydril 563	61.0 T Primrose Thermal 3 +0.5% CaCl2	6.1	15	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
100/14-33-067-04W4/0	0424562	11/22/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 8A24 PRIMROSE 14-33-67-4	491.2	130	729.5	244.5	L-80	Hydril 563	47.0 T Primrose Thermal 3 +0.5% CaCl2	5.1	10	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
102/14-33-067-04W4/0	0424563	11/14/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 9A24 PRIMROSE 14-33-67-4	489.9	133	746	244.5	L-80	Hydril 563	54.0 T Primrose Thermal 3 +0.5% CaCl2	6.1	2	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
150/03-04-068-04W4/0	0424564	11/21/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 10A24 PRIMROSE 3-4-68-4	487.9	128	686	244.5	L-80	Hydril 563	48.0 T Primrose Thermal 3 +0.5% CaCl2	6.79	8	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
102/02-04-068-04W4/0	0424565	11/14/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 11A24 PRIMROSE 2-4-68-4	490.7	130	723	244.5	L-80	Hydril 563	51.1 T Primrose Thermal 3 +0.5% CaCl2	4.1	0	No lost circulation during drilling or cementing and casing rotated throughout entire cement job. No returns to surface. CBL shows good bond	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
103/02-04-068-04W4/0	0424566	11/20/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 12A24 PRIMROSE 2-4-68-4	487.8	128	725.5	244.5	L-80	Hydril 563	46.7 T Primrose Thermal 3 +0.5% CaCl2	5.6	12	No lost circulation during drilling or cementing. Casing rotated through 41 m3 of cement volume. CBL shows good bond.	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
104/02-04-068-04W4/0	0424667	11/15/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 13A24 PRIMROSE 2-4-68-4	488	128	802	244.5	L-80	Hydril 563	57.1 T Primrose Thermal 3 +0.5% CaCl2	4.1	2	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
105/02-04-068-04W4/0	0424668	11/19/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 14A24 PRIMROSE 2-4-68-4	486.7	129	832	244.5	L-80	Hydril 563	46.6 T Primrose Thermal 3 +0.5% CaCl2	5.1	5	No lost circ during drilling, lost circulation after 5 m3 of good cement returns, continued to pump 11 m3. Casing rotated throughout. CBL shows good bond	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
106/02-04-068-04W4/0	0424669	11/15/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 15A24 PRIMROSE 2-4-68-4	487.9	129	928	244.5	L-80	Hydril 563	66.7 T Primrose Thermal 3 +0.5% CaCl2	4.1	3	No lost circulation during drilling or cementing and casing rotated throughout entire cement job.	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
100/07-04-068-04W4/2	0424670	11/19/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 16A24 PRIMROSE 7-4-68-4	488.9	128	954	244.5	L-80	Hydril 563	54.0 T Primrose Thermal 3 +0.5% CaCl2	4.1	17	No lost circulation during drilling or cementing and casing rotated until Scav returns. CBL shows good bond	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
100/05-03-068-04W4/0	0424670	11/19/2010	CANADIAN NATURAL RESOURCES LIMITED	Drain	CNRL 16A24 PRIMROSE 5-3-68-4	491.6	128	954	244.5	L-80	Hydril 563	54.0 T Primrose Thermal 3 +0.5% CaCl2	4.1	17	No lost circulation during drilling or cementing and casing rotated until Scav returns. CBL shows good bond	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
103/07-04-068-04W4/0	0424733	11/16/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 17A24 PRIMROSE 7-4-68-4	487.9	129	1049	244.5	L-80	Hydril 563	69.3 T Primrose Thermal 3 +0.5% CaCl2	4.1	4	No lost circulation during drilling or cementing and casing rotated until plug was dropped.	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
102/07-04-068-04W4/0	0424734	11/18/2010	CANADIAN NATURAL RESOURCES LIMITED	Cyclical	CNRL 18A24 PRIMROSE 7-4-68-4	488	128	1099	244.5	L-80	Hydril 563	67.8 T Primrose Thermal 3 +0.5% CaCl2	5.1	15	No lost circulation during drilling or cementing and casing rotated until cement returns at surface	Slotted Liner	No Remedial	None	None	Yes	Yes	Low	Monitor Producing Pressure,temperature, and rate
103/14-34-067-04W4/0	0424253	11/24/2010	CANADIAN NATURAL RESOURCES LIMITED	Observation	CNRL OBS PS 24 MOORE 14-34-67-4	460.4	145	460	114.3	J-55	STC	Primrose Thermal 3 +1% OBP	4.1	6 PC, 0.2 Plug	No lost circulation during drilling or cementing and casing reciprocated during cementing	None	No Remedial	4.1-459	Thermal G	Yes	Yes	Low	Monitor Passive Seismic
103/03-03-068-04W4/0	0424248	11/17/2010	CANADIAN NATURAL RESOURCES LIMITED	Observation	CNRL OBS TF 24 FISHER 3-3-68-4	461	170	461	139.7	J-55	STC	13.4Primrose Thermal 3 +1% OBP (16Tons)	4.1	4	No lost circulation during drilling or cementing and casing reciprocated until plug drop	453-457 (Open, not flowing)	No Remedial	None	None	No	Yes	Low	Monitor Pressure and Temperature

3.2 Risk Assessment

The investigation results from the evaluation of the "Risk Assessment Area for Phases 23-24" are detailed in the tables below. These wells were highlighted on Figure 3.1a as wellbores requiring mitigation or monitoring. Table 3.2a below identifies these wellbores along with risk rational.

UWI	Current Licensee	Well Type	Production Casing depth mKB	Cement Top mKB	Risk Level	Risk Rationale
1AA/06-33-067-04W4/0	CANADIAN NATURAL RESOURCES LIMITED	Abandoned	206-522	Surface	Medium	Poor cement behind casing identified from 206-395 mKB with CBL.
100/11-28-067-04W4/0	CENOVUS ENERGY INC.	Flowing	576	Surface	Medium	Oil was found in surface piping. Investigative workover underway. Well will be left as a Grand Rapids Observation well
100/07-33-067-04W4/0	CENOVUS ENERGY INC.	Suspended	577	Surface	Medium	Producing Colony Gas Well - Daily surface pressure monitoring to be installed
100/15-32-067-04W4/0	CENOVUS ENERGY INC.	Suspended	387	Surface	Medium	Suspended Colony Gas Well -Daily surface pressure monitoring to be installed
100/05-33-067-04W4/0	CANADIAN NATURAL RESOURCES LIMITED	Standing	476	4	Medium	Currently performing work on well. Will be left as B12 observation well with daily downhole Temperature and Pressure Monitoring.
100/03-28-067-04W4/0	CANADIAN NATURAL RESOURCES LIMITED	Standing	454	3.8	Medium	Currently performing work on well.Well will be suspended as per Dir 51 with confirmed cement top 15m above Grand Rapids top.

Table 3.2a Summary table of Medium Risk wells identified in the wellbore investigation

3.3 Mitigation Plan

Wellbores identified as requiring mitigation within the area of investigation are currently in the process of being mitigated through well servicing action or the installation of surface pressure and temperature surveillance equipment. The Colony gas wells identified above will be monitored through daily reviews of dynamic pressures for discrepancies. Deviations in this data will be scrutinized and responded to within 12 hours. The wells described as B12 monitoring wells currently have service rig operations ongoing. Upon completion of this work the wells will all be equipment with continuous downhole pressure and temperature monitoring of the B12.

In the event of a wellbore integrity issue in any of the wells, the well will be shut in, steam will be moved out of the area, and steaming wells will be depressurized. The steaming wellbores will be placed on emergency flow back, during which, access approvals will be obtained in order to remediate the well as soon as pressures have fallen below hydrostatic.

The AER will be notified within 24 hours and steam will be moved out of the area immediately if pressure anomalies are observed and verified. All wellbores requiring remediation or monitoring will be completed prior to achieving pressures in excess of hydrostatic head on Phases 23-24. These wellbores requiring action within the area of investigation are described below and any mitigation actions needed.

3.3.1 1AA/06-33-067-04W4/0

This well was D&A by Amoco in 1997. The decision was made to case the well in attempt to capture promising gas shows in the Manville. When cementing the well, the casing was parted at 202 mKB and all of the cement was circulated out of the hole from 202mKB to surface. The casing was threaded back together and was drilled out with a 60.3mm bit to 460 mKB. Green cement was experienced from 202-370mKB with good cement from 370-460 mKB. A CBL was performed on the well by Computalog indicating that the cement behind pipe was good from PBTD to 395mKB with some cement indications before that. While logging the well another casing part was experienced at 143mKB. Due to the potentially poor condition of the casing the decision was made to chemically cut the casing and abandon the well open hole above the casing. The casing was free pointed at 206mKB and cut. The production casing is still in the hole from 206-522 mKB and is cemented in place with 8.0 T Class C +40%SSA-1. The inside of the casing and open hole portion from 206mKB to surface was cemented with 9.0T OWG + 40%SSA-1. This well will be re-entered and re-abandoned prior to steaming operations to ensure hydraulic isolation above the Grand Rapids Formation.

3.3.2 100/11-28-067-04W4/0
Wellbore is a flowing Cenovus Colony gas well. Oil was identified in the surface piping and an investigative workover is currently underway to determine the source. When the workover is complete the well will be left as an observation well with continuous pressure and temperature monitoring of the Grand Rapids formation.

3.3.3 100/07-33-067-04W4/0
Wellbore is a suspended Cenovus Colony gas well. Daily surface pressure monitoring will be installed and monitored for deviations.

3.3.4 100/15-32-067-04W4/0
Wellbore is a suspended Cenovus Colony gas well. Daily surface pressure monitoring will be installed and monitored for deviations.

3.3.5 100/05-33-067-04W4/0
CNRL is performing ongoing well servicing operations on this wellbore at this time. When complete the well will be left as a B12 monitoring well with continuous downhole temperature and pressure monitoring.

3.3.6 100/03-28-067-04W4/0
CNRL is performing ongoing well servicing operations on this wellbore at this time. When complete the well will be suspended as per DIR 51 with a thermal cement plug confirmed 15m above the Grand Rapids top.

4. Abandoned Evaluation Wells

The cement plug volumetric calculations have been completed and compared to the volumes reported in the tour sheets for each respective wellbore. The calculation was completed using the lowest plug set depth and the hole size of the evaluation well. As can be seen in the table below, differential volumes between calculated volumes and pumped volumes remain reasonable.

Cement to surface has been indicated on most tour reports listed in this table. The return of cement to surface, combined with no mention of lost circulation results in a properly cemented well. A certain volume of “above fill-up” is due to sloughing, wash-out and slight leak off to permeable formations. These differentials are within “above fill-up” volumes. Excess volumes of cement represent contingencies from CNRL and cement providers to ensure more than enough is brought to location in the event of unforeseen hole conditions.

Table 4a Cement Volumes Pumped vs. Calculated Hole Volume

UWI	Hole Volume (m3)	Cement Returns to Surface (m3)	Total Volume Pumped (m3)	Differential(m3)
1AA/01-03-068-04W4/0	10.58	0.00	11.63	1.05
1AA/01-28-067-04W4/0	10.84	2.00	14.28	1.44
1AA/01-33-067-04W4/0	10.72	1.40	12.24	0.12
1AA/03-27-067-04W4/0	10.83	2.50	13.26	0.07
1AA/03-28-067-04W4/0	13.16	1.00	13.70	0.46
1AA/04-33-067-04W4/0	13.25	1.00	13.70	0.55
1AA/04-34-067-04W4/0	10.75	2.00	15.30	2.55
1AA/05-03-068-04W4/0	18.23	4.00	26.00	3.77
1AA/05-27-067-04W4/0	10.84	0.50	14.28	2.94
1AA/06-04-068-04W4/0	14.47	1.00	15.03	0.43
1AA/06-33-067-04W4/0	6.50	0.80	9.20	1.90
1AA/07-03-068-04W4/0	12.88	Not Noted	13.96	1.09
1AA/07-28-067-04W4/0	13.36	0.50	14.70	0.84
1AA/07-32-067-04W4/0	13.13	1.00	14.10	0.03
1AA/08-05-068-04W4/0	14.87	2.80	17.33	0.34
1AA/09-27-067-04W4/0	10.64	1.50	13.26	1.12
1AA/09-32-067-04W4/0	13.09	1.50	14.80	0.21
1AA/10-03-068-04W4/0	14.44	Not Noted	16.28	1.83
1AA/10-04-068-04W4/0	14.30	1.50	17.16	1.37
1AA/10-28-067-04W4/0	11.18	0.75	17.50	5.57
1AA/11-03-068-04W4/0	12.75	Not Noted	11.60	1.15
1AA/11-27-067-04W4/0	10.54	1.00	11.99	0.44
1AA/11-28-067-04W4/0	19.78	3.00	22.00	0.78
1AA/12-34-067-04W4/0	10.37	Not Noted	11.53	1.16
1AA/13-28-067-04W4/0	12.89	2.00	11.90	2.99
1AA/14-27-067-04W4/0	10.72	0.50	13.36	2.14
1AA/14-34-067-04W4/0	10.63	0.50	16.66	5.53
1AA/15-29-067-04W4/0	10.92	1.50	16.30	3.88
1AA/15-32-067-04W4/0	12.91	"Full returns"	14.70	1.79
1AA/16-28-067-04W4/0	10.66	0.50	13.77	2.61

5. Surveillance

The Primrose South surveillance system within 1000m of Phase 23-24 operation consists of four B12 Grand Rapids monitoring wells equipped to monitor downhole pressure and temperature, three Thermal Fiber wells monitoring both Grand Rapids temperature/pressure along with a temperature profile through the entire wellbore, three Passive Seismic wells equipped with five geophones at Phases 22, 23, 24 which monitor the shale zones above the Grand Rapids, and One Colony Pressure monitoring well. In addition to these wellbores there are three Colony gas wells and three B12 monitoring wells that will be equipped with pressure monitoring equipment before the Clearwater interval bottom hole pressure exceeds hydrostatic.

Increased sensitivity with the current surveillance system will ensure any abnormal Grand Rapids pressure responses and Clearwater injectivity events will be responded to immediately. Current alarm logic set to detect a 200kPa/d pressure increase within the Grand Rapids Formation will identify potential events of concern and will be reported to the AER within 24 hours of the event occurrence. CNRL will ensure all pressure responses due to heave within the Grand Rapids Formation will not exceed 10.2 kPa/m, or 60% of the expected 17 kPa/m fracture pressure.

CNRL will continue to impose the following response to a multi-well injectivity event. In the event of a multi-well injectivity event, steam rates will be reduced to trickle rates and the AER will be notified with 24 hours of the event occurrence. If the pressure in the Clearwater Formation of the affected wellbores does not stabilize within 2 days, steam will be withdrawn from the affected area and production will be initiated to depressurize the Clearwater. This will limit any volumes lost to the Grand Rapids Formation and provide further risk mitigation throughout Primrose and Wolf Lake.

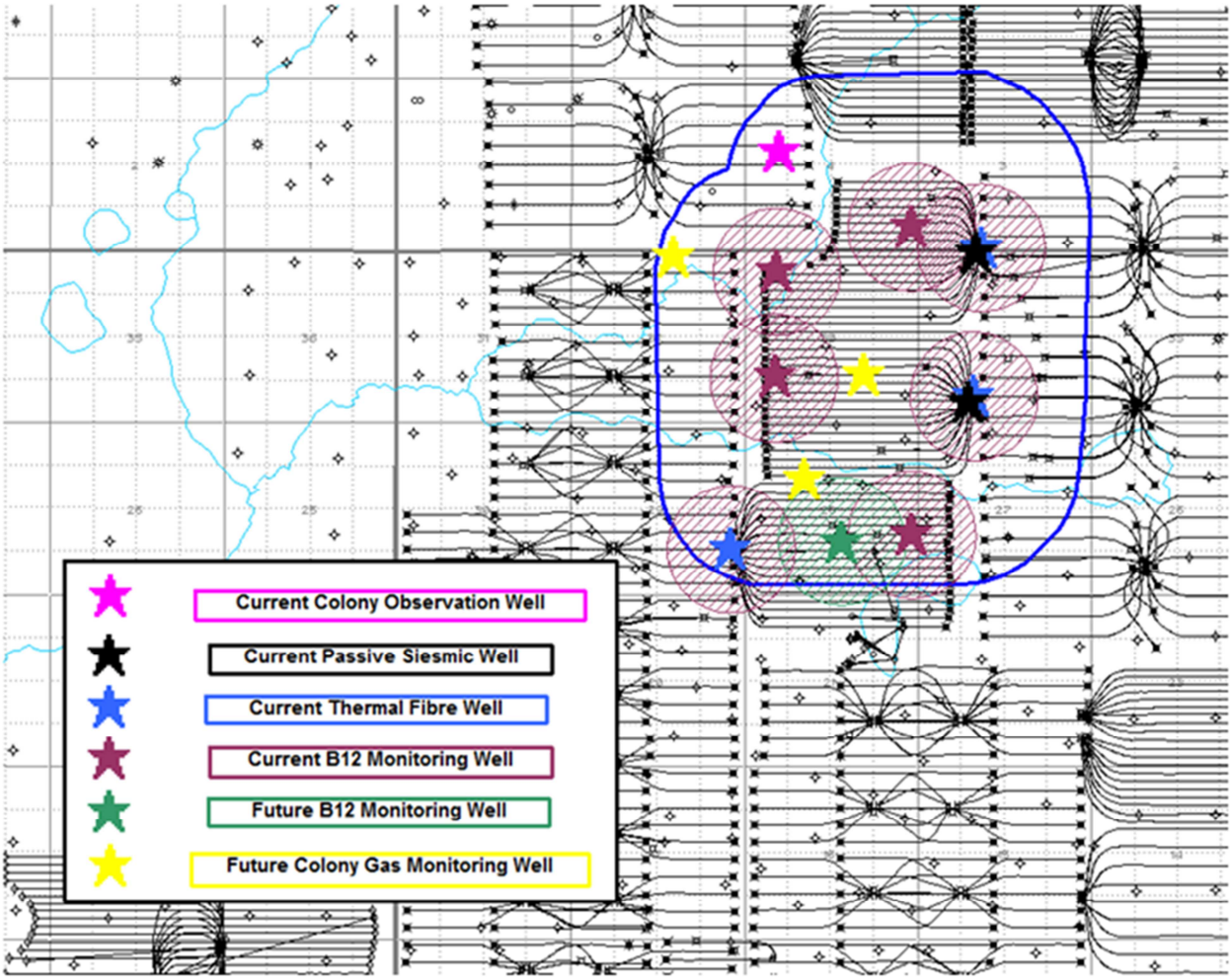


Figure 5a Phase 23-24 Surveillance Locations

6. Depletion Planning

The depletion plan for Phase 24-23 is to utilize HPCSS to safely and efficiently extract the bitumen resource in accordance with the AER's July 17, 2013 letter. In order to comply with the restriction set forth by the AER, the average Cycle 4 steam volume will not exceed the volume from Cycle 3. This would result in a reduction of fracture steam volumes during this cycle in comparison to last cycle. These steam volume reductions would result in a decrease of shale cap stress and a reduction in risk. The steam schedule would incorporate the AER's request to taper steam volumes toward the edges of the steamed area. This would also mitigate risk as fracture steaming operations within the Clearwater would be contained within the Phase 24-23 drainage box. Table 6a, below, indicates the previous cycle and the forecasted volumes for Cycle 4.

Well	Cycle 3 Steam Volume (m3)	Cycle 4 Steam Volume (m3)
18A24	63,913	60,000
17A24	64,784	62,000
16A24	67,115	63,000
15A24	65,348	65,000
14A24	70,667	65,000
13A24	64,784	64,000
12A24	67,115	65,000
11A24	65,348	65,000
10A24	70,667	70,000
9A24	86,328	85,000
8A24	89,866	85,000
7A24	96,421	95,000
6A24	100,974	100,000
5A24	107,853	100,000
4A24	100,555	100,000
3A24	104,308	100,000
2A24	102,495	100,000
1A24	102,792	100,000
18A23	103,872	100,000
17A23	106,774	100,000
16A23	100,311	100,000
15A23	122,556	100,000
14A23	122,327	100,000
13A23	120,064	100,000
12A23	122,136	100,000
11A23	121,895	100,000
10A23	124,293	100,000
9A23	112,385	100,000
8A23	121,092	100,000
7A23	117,290	100,000
6A23	133,447	100,000
5A23	138,276	100,000
4A23	123,873	100,000
3A23	114,490	95,000
2A23	117,240	90,000
1A23	110,268	85,000

Table 6a Phase 24-23 Steam Volumes

Table 6b catalogs the pre-dilation steam injected and post fracture steam volume. Also note that fracture steam volumes show for Cycle 4 are based CNRL's current forecast. CNRL may plan on changing these volumes in Cycle 4, however they will not exceed historical Cycle 3 total steam volumes. Cycle 4 average volumes are 85% lower than Cycle 3 post fracture steam volumes.

	Fillup Steam Volume (m3)				Post Fracture Steam Volume (m3)			
	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 1	Cycle 2	Cycle 3	Cycle 4
18A24	1,029	5,509	11,288	12,982	25,666	30,152	52,625	47,018
17A24	2,564	7,320	13,403	15,413	24,519	29,048	51,381	46,587
16A24	2,594	8,830	14,403	16,563	26,225	27,930	52,712	46,437
15A24	3,646	6,513	12,389	14,247	25,221	29,457	52,959	50,753
14A24	3,492	7,291	10,953	12,596	24,518	28,530	59,714	52,404
13A24	3,445	7,637	10,361	11,915	26,032	27,934	54,423	52,085
12A24	4,983	8,988	13,621	15,664	24,303	26,558	53,494	49,336
11A24	3,273	7,021	10,084	11,596	26,378	27,932	55,264	53,404
10A24	3,273	6,246	7,489	8,612	26,316	26,850	63,178	61,388
9A24	3,272	8,118	9,586	11,024	26,843	25,131	76,742	73,976
8A24	3,747	5,283	15,252	17,540	26,040	29,442	74,614	67,460
7A24	3,495	5,485	14,760	16,974	31,999	34,152	81,661	78,026
6A24	3,770	5,565	21,420	24,633	35,113	43,239	79,554	75,367
5A24	3,740	4,690	18,679	21,481	30,876	47,363	89,174	78,519
4A24	2,931	4,318	16,854	19,382	30,427	49,408	83,701	80,618
3A24	2,895	5,713	17,521	20,149	30,974	44,873	86,787	79,851
2A24	2,284	5,848	17,662	20,311	32,644	49,962	84,833	79,689
1A24	2,902	5,079	14,467	16,637	33,572	46,462	88,325	83,363
18A23	2,127	5,731	12,515	14,392	33,987	47,412	91,357	85,608
17A23	3,188	6,036	18,451	21,219	32,664	43,775	88,323	78,781
16A23	2,185	7,660	16,281	18,723	34,162	44,600	84,030	81,277
15A23	1,778	9,165	18,042	20,748	34,281	45,312	104,514	79,252
14A23	2,064	7,888	17,661	20,310	35,454	43,297	104,666	79,690
13A23	1,513	7,719	17,828	20,502	36,689	43,958	102,236	79,498
12A23	2,016	8,046	19,851	22,829	36,125	43,226	102,285	77,171
11A23	1,547	7,979	8,152	9,374	36,765	30,631	113,743	90,626
10A23	496	5,516	18,324	21,072	37,731	47,144	105,969	78,928
9A23	4,467	7,917	21,585	24,822	35,490	44,682	90,800	75,178
8A23	2,700	5,199	16,386	18,844	36,381	47,517	104,706	81,156
7A23	1,423	8,172	24,014	27,616	38,042	45,980	93,276	72,384
6A23	4,534	9,176	16,659	19,158	35,551	44,447	116,788	80,842
5A23	2,852	5,314	19,660	22,609	37,042	42,010	118,616	77,391
4A23	1,271	5,715	17,471	20,091	36,452	41,580	106,402	79,909
3A23	25	1,483	13,387	15,395	36,583	50,509	101,103	79,605
2A23	1,575	4,661	22,010	25,312	47,836	45,252	95,230	64,688
1A23	4,049	4,879	20,807	23,928	41,886	43,845	89,461	61,072

Table 6b Phase 24-23 Pre-Dilation Steam Injected and Post Fracture Steam Volumes

6.1. Steam Schedule

Phase 24-23 will be steamed as a wave moving from north to south, tapering volumes at the beginning and end of the wave. If during the steaming of Phase 24-23 events are seen in the form of pressure anomalies within the lower Grand Rapids and/or multi-well injection events, CNRL will notify the AER within 12 hours. Figure 6.1a provides details regarding which rows are scheduled to receive tapered volumes on Phase 24-23.

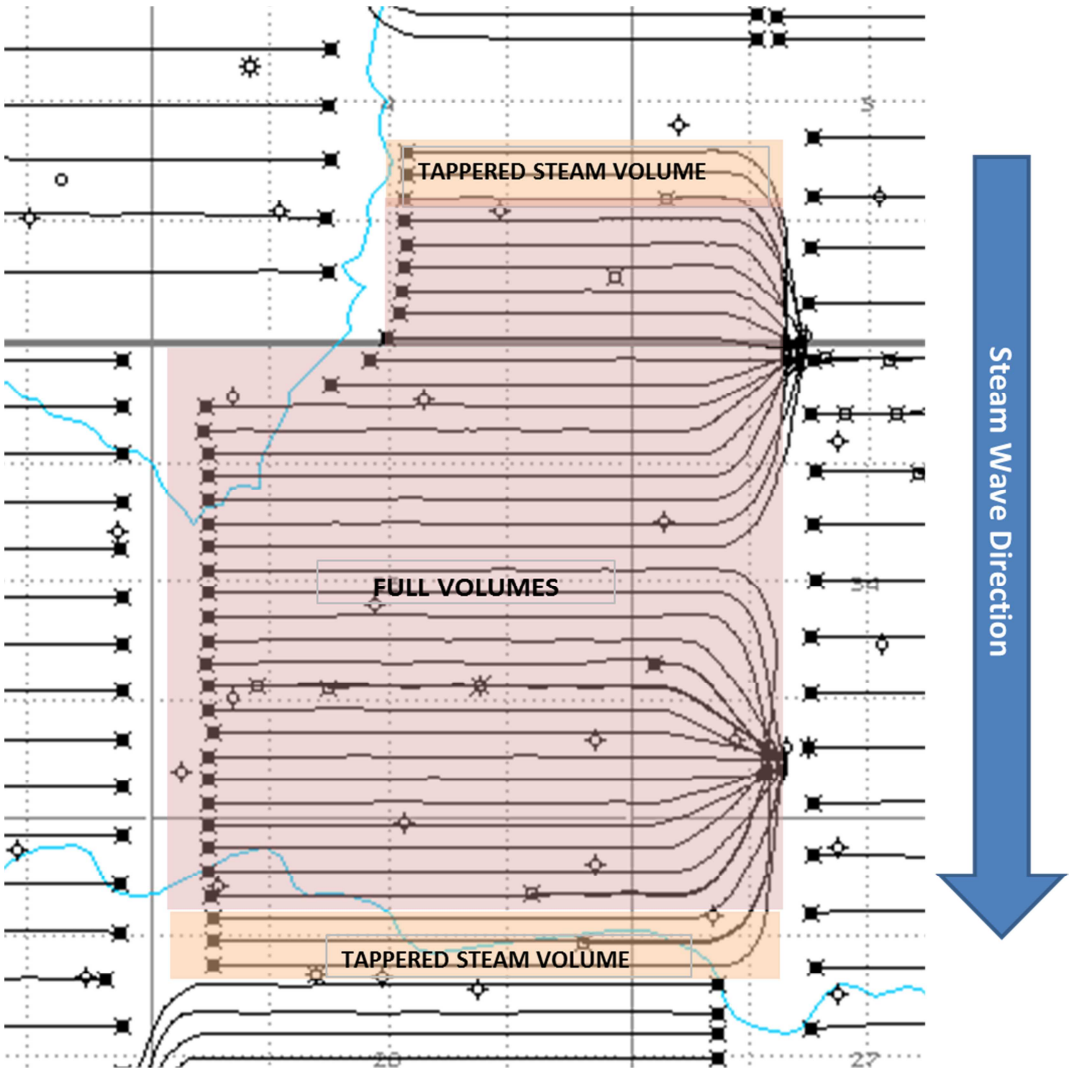


Figure 6.1a Steam block and designated rows with tapered volumes

6.2. Cycle Volumes

As stated previously, the steam volumes in Cycle 4 will not grow above those from Cycle 3. This is in accordance to Clause 2 of the “Steaming Restriction and Regulatory Requirements” letter. The steam volumes are also tapered at the edges of Phase 24-23. Figure 6.2a below details the scheduled volumes for Phase 24-23 in comparison to last cycle.

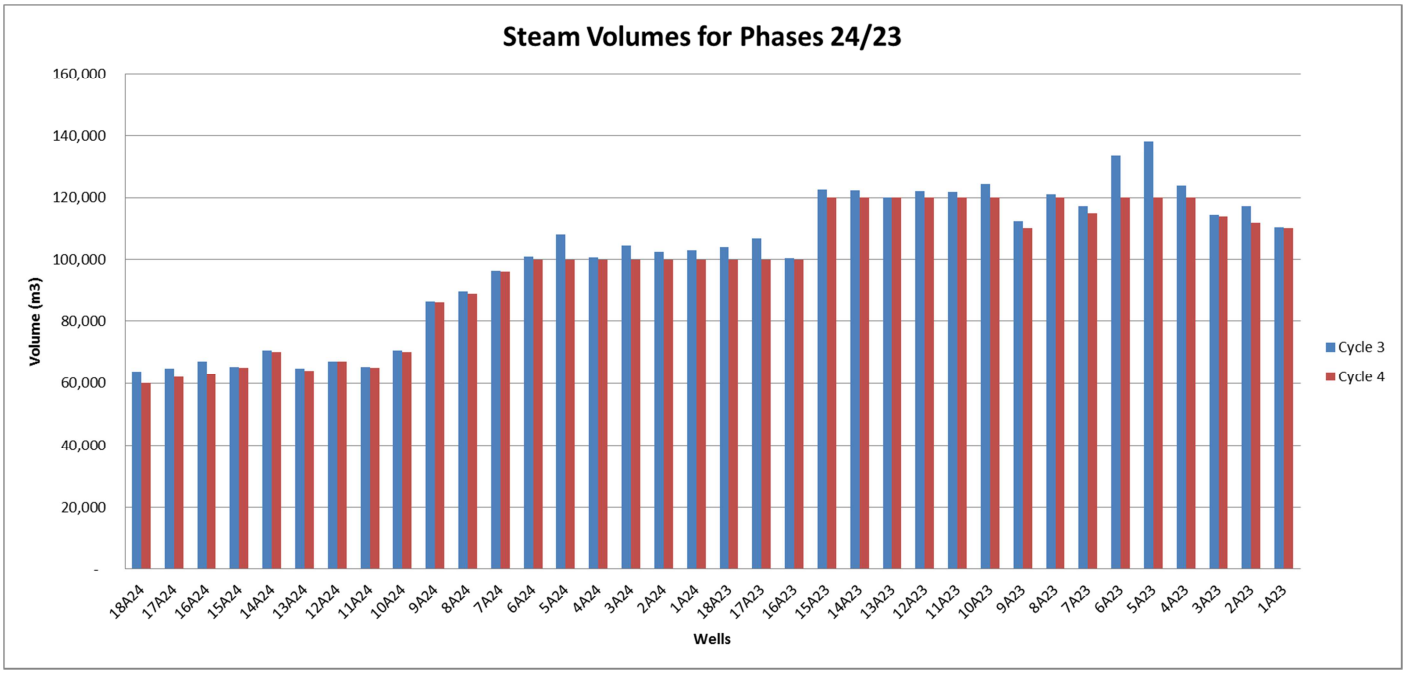


Figure 6.2a Restricting Cycle Growth in Phase 31

6.3. Remaining Rig Work

Pressure Integrity Tests (PIT's) will be completed on a minimum of 25% of the wells on Pads 23 and 24. This is an internal requirement to ensure the casing integrity in the wellbores after three cycles of steam and confirm wellbore integrity. Passive seismic arrays are installed on both Pad 23 and 24 and have been operational and recently confirmed to be accurately collecting data. To date no casing failure events have been recorded on the passive seismic system. Additional PIT's will also be added on any well that requires production tubing to be removed from the well during wellbore operations prior to the upcoming steam cycle. Currently the following wells will have PIT's performed prior to steaming operations.

Well	Operation	Status	Estimated Completion
13A24	PIT	Complete	Complete
1A24	PIT	Scheduled	1-Feb-14
18A24	PIT	Scheduled	6-Feb-14
14A24	PIT	Scheduled	10-Feb-14
14A23	PIT	Scheduled	15-Feb-14
11A23	PIT	Scheduled	25-Feb-14
16A23	PIT	Scheduled	3-Mar-14
12A23	PIT	Scheduled	11-Mar-14
15A23	PIT	Scheduled	15-Mar-14

Table 6.3 PIT Schedule

7. Conclusion

Steaming on Phase 24-23 will pose little risk to changing the socioeconomic and/or environmental impact assessment from the original application regarding Directive 78. All wellbores requiring mitigation will be augmented prior to pressures in excess of hydrostatic head being achieved. The mitigation strategy will ensure surface monitoring of pressures on suspect wellbores. Combined with the observation network already surrounding Phase 24-23, CNRL believes that all risks will be mitigated to allow for the next HPCSS cycle of Phase 24-23

If you have any questions or concerns please contact me at 403-540-4801 or email at Dan.Lowe@cnrl.com.

Regards,

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