MANITOBA BATTERY APPLICATION - Drilling and Production Regulations
Section 75(1)

Molopo Pierson Oil Battery 09-32-0001-28 W1M

75(1) An application under section 111 of the Act for a battery operating permit must be submitted to an inspector at least 30 days before the date on which it is planned to commence construction and must include:

(a) the application fee and levy set out in Schedule A;

1. Fee of $500 is attached.

(b) the performance deposit required under section 10;

2. Performance deposit is not required. (Molopo has reached the max as specified in the Drilling and Production Regulations.)

(c) two copies of a survey plan of the battery location in a form acceptable to an inspector;

3. Copies of the Survey are included in Appendix A.

(c.1) the names and addresses of all landowners and occupants within 1.5 km of the proposed site of the battery and a description of the applicant's consultations with those landowners and occupants, including a summary of any concerns raised during the consultation process and all actions taken or proposed to be taken by the applicant to address the concerns of the landowners and occupants;

4. Copies of the Contact List & Land Letter and Letter Regarding Land Owner Concerns are included in Appendix B.

(d) a list of the wells to be tied in to the battery;

5. List of Wells is below:

The following wells will immediately be tied-in to the proposed battery at 9-32-1-28 W1:	
•	5-27-1-28 W1
•	12-27-1-28 W1
•	5-28-1-28 W1
•	3-27-1-28W1
•	4-27-1-28 W1
•	16-21-1-28W1
•	14-22-1-28W1
•	15-21-1-28 W1
•	13-22-1-28 W1
•	1-29-1-28 W1

In future, several sites will act as satellites and will gather additional production to the battery. There are an additional sixty (60) wells that are to be drilled in Q3 & Q4 / 2010 and it is anticipated that these sites will be tied into this facility eventually. In addition the company anticipates being active in drilling additional development wells in the area of and around the central site.

(e) an estimate of the production rates of oil, water and gas for the battery, including the estimated volume of gas.
(i) used for fuel,
(ii) flared, or
(iii) vented;

6. The following table shows the estimate production rates for the battery:

	Emulsion m3/d (bbl/d)	Oil m3/d (bbl/d)	Water m3/d (bbl/d)	Gas m3/d (SCFD)			
				Total	Flared (HP+LP)	Fuel Gas	Vented
At Start-Up	159 (1,000)	80 (500)	80 (500)	3,713 (131,111)	3,555 (125,531)	158 (5,580)	0
50% Capacity	398 (2,500)	199 (1250)	199 (1,250)	9,282 (327,777)	8,917 (314,781)	365 (12,996)	0
100% Capacity	795 (5,000)	398 (2,500)	398 (2,500)	18,563 (655,555)	17,950 (633,907)	613 (21,648)	0
Max Equip Capacity	1033 (6,500)	517 (3,250)	517 (3,250)	24,130 (852,139)	23,167 (818,131)	963 (34,008)	0
FUTURE DESIGN CASES							
2 x 100%	1,590 (10,000)	795 (5,000)	795 (5,000)	37,122 (1,310,945)	35,896 (1,267,649)	1,226 (43,296)	0
2 x Max Equip Capacity	2,066 (13,000)	1,033 (6,500)	1,033 (6,500)	48,260 (1,704,278)	46,333 (1,636,227)	1,927 (68,051)	0

The Reservoir Fluid Study for Molopo Pierson 12-27-001-28 W1M was used for estimating the production rates. The well fluid analysis showed a GOR of 46.7. This is the highest GOR expected from the field. However, using this value for the dispersion model will provide a conservative estimation of the battery emissions.

The anticipated water cut for the facility is 50%.

The anticipated capacity at start-up is 159 m^3/d (1,000 bbl/d). For design, the maximum production rate for the facility was 795 m^3/d (5,000 bbl/d). Once the nominal size of process equipment was selected the design rate was optimized for the commercially available size of equipment available. This design rate was found to be approx. 1,033 m^3/d (6,500 bbl/d). Future design cases for adding a second process train, effectively doubling the battery production, were included to ensure the flare system was adequately sized.

The GOR method (From the Reservoir Fluid Study for Molopo Pierson 12-27-001-28 W1M) of estimating gas flow rates was used to determine the flare rates for the HP Flare System. The LP Flare System rates were calculated by the Vasquez & Beggs Correlation as recommended in the CAPP Guideline for Estimation of Flaring and Venting Volumes from Upstream Oil & Gas Facilities. The fuel gas rates for the Treater burner were estimated from published values from Sivalls for oil treaters.

The calculations for all production cases are provided in Appendix C.

(e.1) copy of a representative gas analysis for the battery in a form acceptable to an inspector;

7. Gas analyses are provided in Appendix D.

(f) the specifications of any process vessel to be used, including the name of the manufacturer, dimensions, Canadian Registration Number (CRN), minimum and maximum flow capacity and design and estimated operating pressure and temperature;

8. The following table Includes list of process vessels included at the proposed battery:

Equipment Description	Manufacturer	Dimensions	CRN	Flow Capacity		Design Conditions		Operating Conditions	
				Max	Min	Press (kPag)	Temp (°C)	Press (kPag)	Temp (°C)
FWKO	TBC (note 1)	2430mm x 9149mm (8' x 30')	TBC (note 1)	Note 3	Note 3	517	-29 / 65	240	5 – 15
Treater	TBC (note 1)	2430mm x 9149mm (8' x 30')	TBC (note 1)	Note 3	Note 3	517	-29 / 65	175	40 – 55
Fuel Gas Scrubber	TBC (note 1)	219mm x 914mm (NPS 8 x 3')	TBC (note 1)	Note 3	Note 3	517	-29 / 65	175 - 240	5 – 55
HP KO Drum	TBC (note 1)	7.9 m^3 (50 bbl)	Note 2	Note 4	Note 4	103	-29 / 65	5 – 51	5 - 55
LP KO Drum	TBC (note 1)	4.0 m^3 (25 bbl)	Note 2	Note 4	Note 4	103	-29 / 65	0 – 0.5	5 -15

Notes:

1. To be confirmed once equipment selection / purchasing is finalized.
2. Unregistered vessels, no CRN required; built to 345 kPag but design pressure is a maximum of 103 kPag.
3. See Section 6 above and Appendix C for detailed discussion of equipment / facility capacities.
4. See Section 12 below and Appendix E for detailed discussion of the HP and LP flare systems.

(g) details of well testing facilities associated with the battery, including the method, frequency, and duration of well testing;

9. Test satellites will be located in the field on the gathering system. Each well will be tested for 3 days duration on a monthly basis.

(g.1) details of the flare and vapour recovery systems for the battery;

10. The radius of exposure calculation set out in Manitoba Informational Notice 02-1 was completed; the battery will be Class 1. The calculation is provided in Appendix E.

    Gas vapour will be liberated at three (3) areas of the battery: FWKO, Treater and Tank Farm.

    The gas liberated at the FWKO and Treater is captured into a High Pressure (HP) Flare System. The gas pressure will be let down via a Back Pressure Control Valve (BPV) at each vessel into the HP Flare System. The HP Flare System will consist of a KO drum, flame arrestor and flare stack complete with a constant sparking ignitor. Fuel gas for the Treater, Flare Stack pilot and Tank Farm make-up gas will be taken off upstream of the Back Pressure Control Valve.

The gas liberated at the Tank Farm is collected into a Low Pressure (LP) Flare System. The gas from each tank enters a low pressure collection header where the gas pressure will be let down via a Back Pressure Control Valve (BPV). The LP Flare System will consist of a KO drum, flame arrestor and flare stack complete with a constant sparking ignitor.

All raw gas will be flared.

(g.2) where the applicant proposes to vent gas containing hydrogen sulphide,

11. No hydrogen sulphide will be vented at this battery. All vapours are recovered via the HP and LP Flare Systems as described in Section 10.

(i) reasons why the gas cannot be flared,

(ii) specific actions to be taken to minimize the volume of gas vented, and

(iii) the method of controlling off-lease odours;

(g.3) where gas production will contain hydrogen sulphide, a copy of air dispersion modelling results in a form acceptable to the director demonstrating that the battery will comply with the requirements of subsection 85.2(1);

12. There are two sources of SO_2 emissions considered for the dispersion modeling: the HP and LP Flare Stacks and the Treater burner stack. The Flare Stacks were modeled individually and then added together to get the overlapping maximum concentration. The Treater burner stack was modeled separately due to the distance from the Flare Stacks. All production flow cases described in Section 6 above and detailed in Appendix C were modeled.

    The combined HP/LP Flare Stack maximum 1-hr concentration of SO_2 was 0.5058µg/m^3. The Treater burner stack had a maximum 1-hr concentration of SO_2 of 49.29µg/m^3. These emission rates are both well below the Manitoba Ambient Air Quality Criteria of a 1-hr maximum concentration of 900µg/m^3 for SO_2.

    A summary table of all of the modeling results together with the Screen3 model Input / Output and Graphs of the output, for all of the production cases are included in Appendix E.

(h) two copies of a plot drawing on a scale of not less than 1:125 and showing the location of:

(i) each process vessel, tank, and salt water disposal facility;

(ii) any pit, dyke, flare line, or pop tank and its size; and

(iii) any other equipment;

13. Two copies of the Plot Plan are included in Appendix F.

(i) two copies of a schematic process flow diagram showing:

(i) process vessels, meters, tanks, and salt water disposal equipment;

(ii) valves, pumps, and piping;

(iii) pressure relief valves and settings, emergency shut down systems, and any other equipment intended to prevent a spill or to mitigate the amount of a spill;

14. Two copies of the Process Flow Diagrams are included in Appendix G.

(j) repealed

(k) if there are no facilities for the disposal of water, plans for the disposal of produced water; and

15. The battery includes a disposal pump train to re-inject produced water into a proposed injection well at LSD 09-32-001-28 W1M. All produced water will be disposed of into the Mississippian formation.

(l) any other information that an inspector or the director may require.

16. N/A

Appendix A – Surveys

Appendix B - Contact List / Land Letter / Letter Regarding Land Owner Concerns

Appendix C – Calculations for Flared Gas Volumes / Fuel Gas Usage

Appendix D – Gas Analysis

Appendix E – Dispersion Analysis

Appendix F – Plot Plan

Appendix G – Process Flow Diagrams

Appendix A – Surveys

Appendix B - Contact List / Land Letter / Letter Regarding Land Owner Concerns

Appendix C – Calculations for Flared Gas Volumes / Fuel Gas Usage

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Appendix F – Plot Plan

Appendix G – Process Flow Diagrams