WASKADA SOUR OIL BATTERY
LSD 16-03-002-26W1M

MANITOBA
BATTERY APPLICATION

PROJECT 10706

DECEMBER, 2010

December 23, 2010

Manitoba Science, Technology, Energy and Mines
Petroleum Branch
Box 1359 – 227 King Street
Virden, MB R0M 2C0

Attention Lorne Barsness :

RE: Battery Permit LSD 16-03-002-26WPM

Aurora Engineering Ltd on behalf of Surge Energy Inc., hereby submits an application for their Waskada Battery located at 16-03-002-26WPM (16-03). The application and all supporting information have been prepared according to the *Drilling & Production Regulations,* Part 7, section 75(1).

Should you have any questions please contact the undersigned or Aurora Engineering, Liliana Ramirez at (403) 974-7831.

Regards,

Najmy Ahmad
Aurora Engineering
Phone: (403) 974-7909

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ATTACHMENTS

1. BATTERY DESCRIPTION

Surge Energy Inc. is planning to install a new battery at 16-03-002-26W1M (16-03) as part of the Waskada development.

The 16-03 battery will receive oil emulsion with up to 2.5 mol/kmol H_2S content (0.25%) in the gas phase from various wells in the Waskada Area (see **Attachment 3** for complete list of wells and testing facilities). The battery components are listed in **Table 1**.

Table 1 - Battery Components

TAG	Component	Description
--	Inlet header	
V-200	Oil Treater	8' OD x 30' S/S Heated
T-600/610	Produced Water Tanks	Two 750-Bbl tanks, internally coated, insulated, heated
T-500/510 /520	Sales Oil Tanks	Two 750-Bbl tanks, internally coated up to 6 ft
T-530	Slop Oil Tank\	One 750-Bbl tank, internally coated, insulated, heated
T-560	Pop Tank	100 Bbl , to discharge treater PSV
FS-800	Flare Stack	4" x 40'
V-750	Flare Knock Out Drum	50 bbl, 5' OD x 15' S/S
B-400	Water Injection Package	- Two 60-hp triplex water injection pumps - Vertical in-line centrifugal Booster pump - Two water filters
	Oil Recycle Pump	7.5 hp
	Chemical injection pumps	
	Instrument Air Compressor	7.5 hp, Screw unit with \air dryer (22 scfm after dryer)
B-310	Office Building	With air-conditioning
B-300	MCC/PLC building	With heating/cooling
B-900	LACT Building	

The oil emulsion will be then processed in an oil treater to meet sales oil specifications (less than 0.5% BS&W). The sales oil will be stored in the oil storage tanks and then trucked out. The oil that does not meet specifications will be sent to the slop tank and then recycled back to the oil treater.

The water will be sent to the water tanks to allow further oil removal in order to meet injection water specifications (less than 100 ppm of oil). The water will be then pumped to an on-lease disposal well.

Solution gas will be metered and used as fuel gas in the treater burner and tank catadyne heaters. Any surplus gas will be burned in a flare stack designed as per the Drilling & Production Regulations.

Please refer to **Attachment 1 (**Attachment 1- PFD.pdf and Attachment 1- Plot Plan.pdf**)** for Plot Plan and the Process Flow Diagram.

2. BATTERY APPLICATION

The application and all supporting information have been prepared according to the *Drilling & Production Regulations,* Part 7, section 75(1).

a) Application Fee and Levy

A cheque for $500 payable to Minister of Finance has been attached to this application.

b) Performance Deposit

If required, a cheque will be issued to cover the performance deposit. Confirmation about payment is required from the Manitoba Science, Technology, Energy and Mines.

c) Battery Survey Plan

Two copies of the latest survey plan are included in **Attachment 1 (**Attachment 1- Battery Survey Drawing.pdf**)**.

c.1) Public Consultation within 1.5 km of the proposed battery

The complete participant involvement program including contact information is presented in **Attachment 2**. Surge received no objections about the 16-03 battery.

d) Wells to be tied in to the Battery

The oil production from the Waskada wells will be gather in testing facilities and then either pipelined or trucked to the 16-03 battery. The complete list of wells and testing facilities is included in **Attachment 3**.

e) Production Rates

The production rates including the estimated volume of gas used for fuel, flared, or vented are presented in **Table 2**.

Table 2 – Waskada Production Rates		
Item	Estimated Rate	
	m^3/d	
Produced Oil	160	1,000 BPD
Produced Water	290	1,800 BPD
Produced Gas	2.8 – 5.6 E3	100 – 200 Mscfd
H_2S Content	2.5 mol/kmol (0.25%)	
Fuel Gas Used	2.8	100 Mscfd
Flared Gas	2.8	100 Mscfd
Vented Gas	0	0

e.1) Representative Substance Analysis

The 16-03 battery will handle oil emulsion with up to 2.5 mol/kmol H_2S content (0.25%) in the gas phase. A representative substance analysis is included in **Attachment 4**.

f) Process Vessels Specifications

The information about the proposed pressure vessels is presented in **Table 3**. Any information not available at this time will be forward to Manitoba Science, Technology, Energy and Mines as soon it is available.

Table 3 – Process Vessel Specifications									
Equipment	Manufacturer	Dimensions	CRN	Flow Capacity (m_3/d)		Design Conditions		Operating Conditions	
				Max	Min	P (kPag)	T (°C)	P (kPag)	T (°C)
V-200 Treater	Fre-Flo Oil Industries Ltd	8' OD x 30' S/S	(1)	795 oil and water	-	520	98	207	60
V-750 FKOD	Fre-Flo Oil Industries Ltd	8" OD x 30"	(1)	2,356	-	520	98	207	20
V-430 Filter	Filter Solution	24" OD x 30" (H)	(1)	477 water	-	1,030	107	420	20

Note 1: Information will be available once fabrication and registration is completed.

g) Well Testing Facilities

The oil production from the Waskada wells will be gather in testing facilities and then either pipelined or trucked to the 16-03 battery. The complete list of wells and testing facilities is included in **Attachment 3**.

g.1) Flaring and Vapour Recovery Systems

Solution gas will be used as fuel gas in the treater burner and tank catadyne heaters. Any surplus gas will be burned in a flare stack designed as per the *Drilling & Production Regulations*. The flare drawings are included in **Attachment 1 (**Attachment 1- PFD.pdf**)**. The tank vents will be connected to the flare stack or to vapour recovery unit (VRU); therefore no venting is expected.

g.2) Sour Gas Venting

No venting is expected.

g.3) SO_2 Dispersion Modelling

The only source of SO_2 emissions will be the flare. The dispersion modelling presented in **Attachment 5** was conducted using Screen 3. According to the results the proposed battery meets the *Manitoba Ambient Air Quality Criteria* and *Drilling & Production Regulations, Schedule G*.

h) Plot Plan

Please find in **Attachment 1 (**Attachment 1- Plot Plan.pdf**)**.

i) Process Flow Diagram

Please find process flow diagram in **Attachment 1 (**Attachment 1- PFD.pdf**)**.

j) Repealed

k) Water Disposal

The water tanks will operate in series, whereby most of the oil will be skimmed so the water meets injection specifications (less than 100 ppm of oil). Both the water tanks will be provided with floating skimmers for skimming the oil layer. The skimmed oil will be pumped back to the treater with the oil recycle pumps.

The water will flow to the water injection package, consisting of two vertical in-line centrifugal water booster pumps that will draw water from a tank T-610 and send it to 5-bag filter. The filtered water will flow to a National Triplex water injection pump. The water from the injection pump will be sent to water disposal well at approximately 9,000 kPag. The injection pump capacity will be controlled by regulating the pump speed with a VFD.