

ELCANO EXPLORATION INC.



1600, 521 – 3rd Avenue SW Calgary, Alberta T2P T3T Tel: (403) 460 - 4188 Fax: (403) 460 - 4965

August 1, 2019

**Manitoba Growth, Enterprise and Trade
Petroleum Branch
Box 1359, 590 Wellington Street East
Virden, MB R0M 2C0**

Attention: Petroleum Inspectors

RE: Application for an Oil Battery Permit 02-27-012-27WPM

Elcano Exploration Inc. (Elcano) respectfully submits an application for an oil battery permit under Part 7, section 111(2) of *The Oil and Gas Act* and Part 7, section 75(1) of the *Drilling and Production Regulation*.

As per the section 75(1) of the Drilling and Production Regulation, the following information is provided as part of this application:

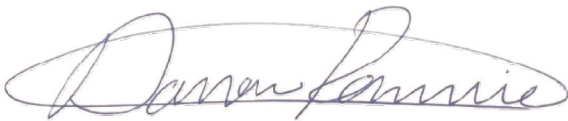
- a. the application fee and levy;
- b. the performance deposit;
- c. a survey plan of the battery location;
- d. the names and addresses of all landowners and occupants within 1.5 km of the proposed site of the battery and the applicant's consultations with those landowners and occupants, any concerns 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;
- 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;
- f. a representative gas analysis for the battery;
- g. the specifications of any process vessel to be used;
- h. details of well testing facilities associated with the battery;

- i. details of the flare and vapour recovery systems for the battery;
- j. proposal to vent gas containing hydrogen sulphide,
 - 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;
- k. where gas production will contain hydrogen sulphide, a copy of air dispersion modelling results demonstrating that the battery will comply with;
- l. 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;
- m. 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;
- n. plans for the disposal of produced water; and
- o. any other information that an inspector or the director may require.

Should you have any questions or concerns, please contact me at 403.930.7681

Sincerely,

ELCANO EXPLORATION INC.

A handwritten signature in blue ink, appearing to read "Darren Rennie", written in a cursive style.

Darren Rennie, P. Eng
Vice President Engineering & COO

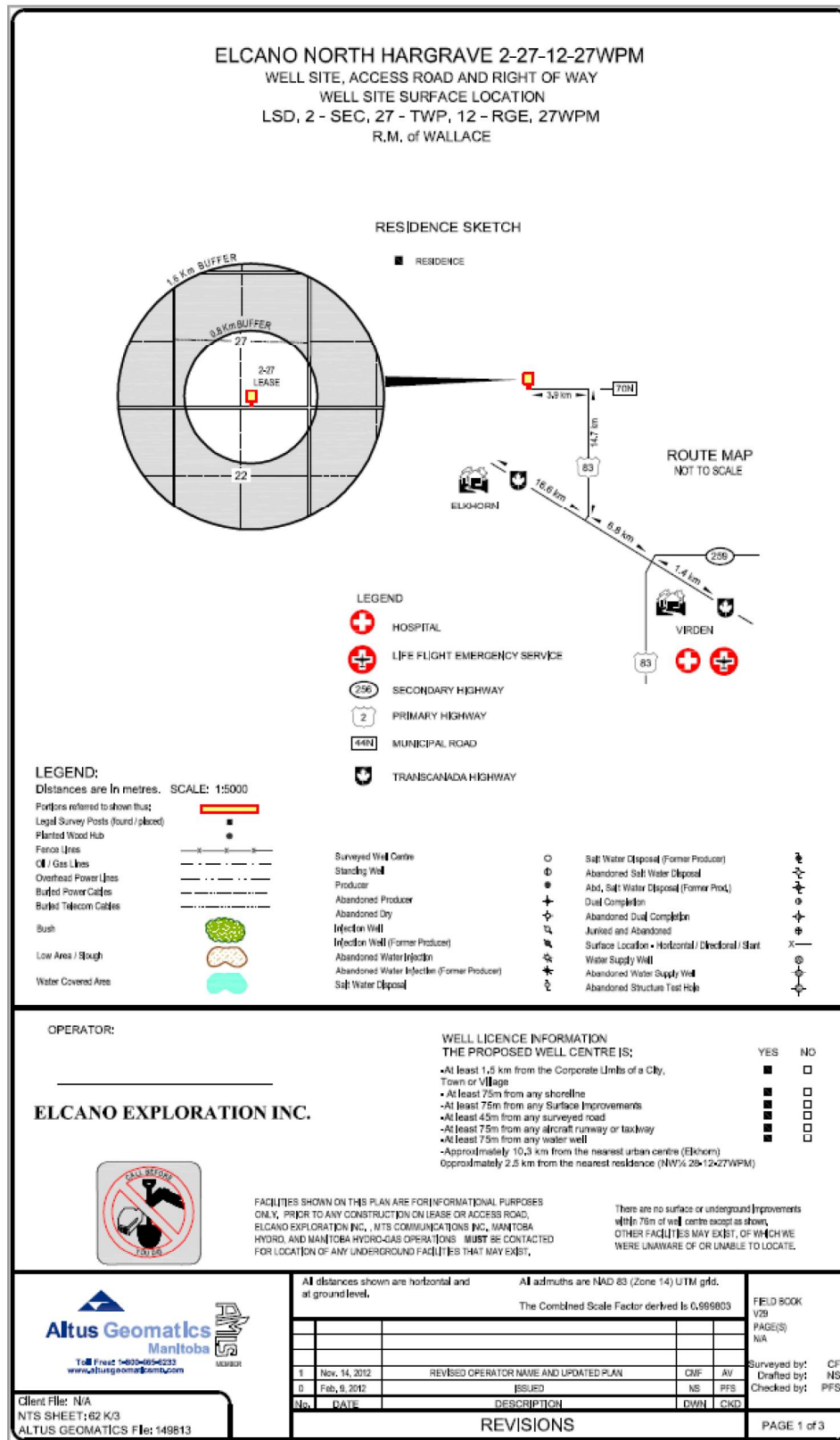
a. Application fee and levy

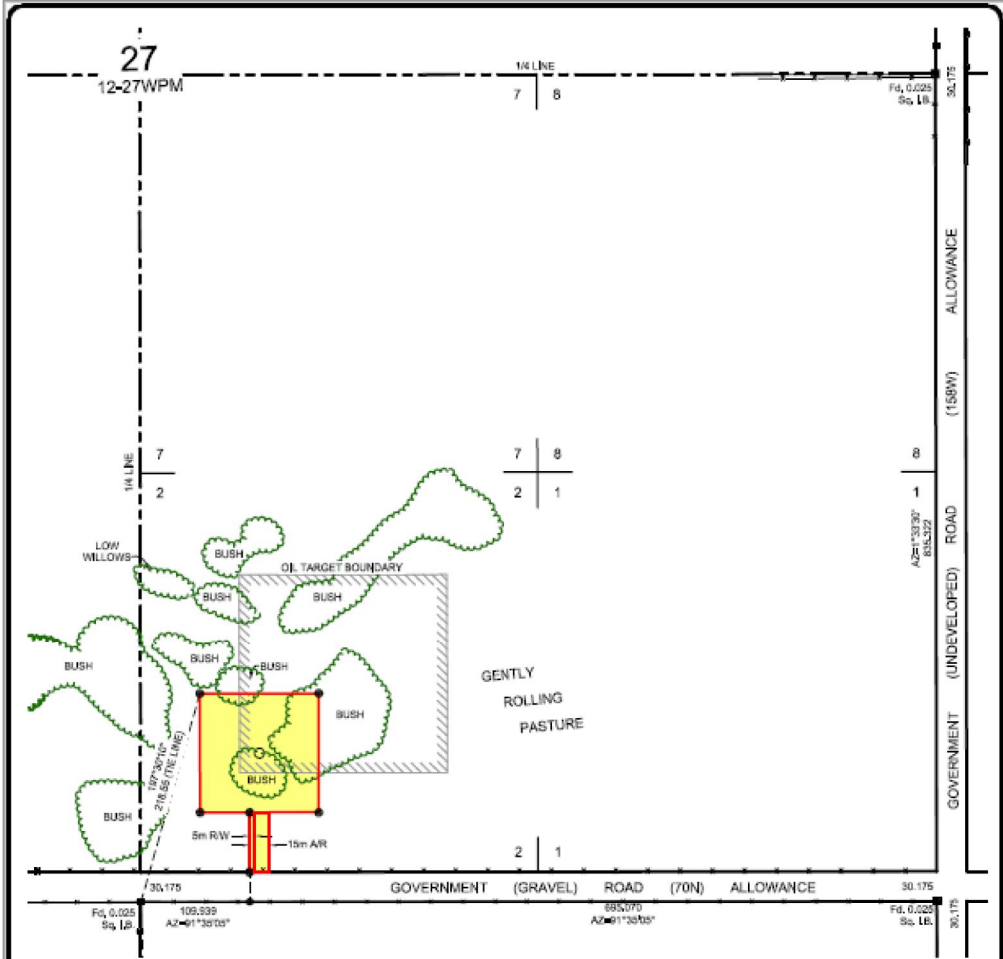
The application fee (\$750) and levy (\$250) has been mailed in the form of a cheque, payable to the Minister of Finance.

b. Performance deposit

No additional performance deposit is required to obtain this battery operating permit

c. Survey plan of battery location





**TARGET CO-ORDINATES;
WELL CENTRE IS:**
20,00 North
20,00 East of SW Corner Oil Target Boundary

GIVEN CO-ORDINATES:
120,00 North
700,00 West
SURVEYED CO-ORDINATES:
120,00 North
685,00 West
REASON FOR MOVEMENT:
TO BE IN TARGET



LOCAL CO-ORDINATES
120,00 N of S } Sec 27
685,00 W of E }
UTM CO-ORDINATES (NAD 83)
5544663,841 N } CSRS
350314,695 E }
UTM CO-ORDINATES (NAD 27)
5544443,716 N } CSRS
350343,064 E }
LATITUDE / LONGITUDE(LL83)
50°02'07,573\" } CSRS
101°05'24,856\" }
LATITUDE / LONGITUDE(LL27)
50°02'07,561\" } CSRS
101°05'23,182\" }

WELL CENTRE ELEVATION; 476,38
Elevations shown are in Geodetic Datum from the Province of Manitoba Mon, #82R748

CERTIFICATE OF TITLE
SE¼ 27-12-27WPM CT No. 1444809/2
OWNERS ALLAN ROBERT SODER
JO-ANNE MARY SODER

I certify that the survey represented by this plan is correct to the best of my knowledge and was completed on the 20 day of February, 2012,
Ken K. Boley
MANITOBA LAND SURVEYOR
Witness *[Signature]*

AREAS:

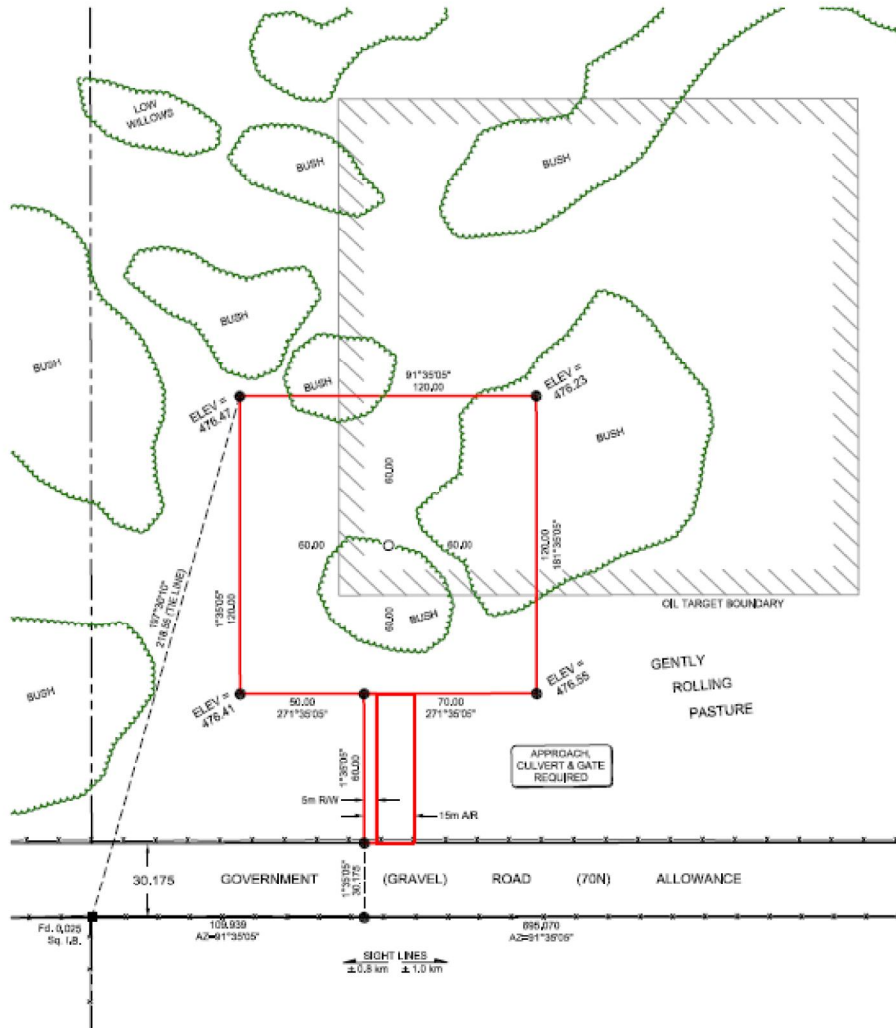
WELL SITE	1,440 ha	3,56 ac
ACCESS ROAD	0,090 ha	0,22 ac
RIGHT OF WAY	0,030 ha	0,07 ac
TOTAL	1,560 ha	3,85 ac

ELCANO NORTH HARGRAVE 2-27-12-27WPM
WELL SITE, ACCESS ROAD AND RIGHT OF WAY

Altus Geomatics Manitoba

 REVISION

149813
PAGE 2 of 3



DETAIL AT 2-27
SCALE 1:2000

ELCANO NORTH HARGRAVE 2-27-12-27WPM
WELL SITE, ACCESS ROAD AND RIGHT OF WAY



149813
PAGE 3 of 3

e. An estimate of the production rates of oil, water and gas for the battery, including the estimated volume of gas used for fuel, flared or vented

The anticipated daily volumes entering the proposed 02-27 battery:

Oil:	60 m ³ /d
Water:	3000 m ³ /d
Gas:	300 m ³ /d (GOR at 5 m ³ /m ³)

The above gas rate is used to create the dispersion modelling. All of the gas on site will be gathered through a vapour recovery unit and flared through flare stack.

f. [A copy of a representative gas analysis for the battery](#)



GAS ANALYSIS

TB1A				16GS074435A	
<i>Container Identification</i>	<i>Sample Point Code</i>	<i>Meter Code</i>	<i>AGAT WDMS Number</i>	<i>Previous Number</i>	<i>Laboratory Number</i>
ELCANO EXPLORATION LTD			FLARE STACK		03-34-012-27W1
<i>Operator Name</i>			<i>Sampling Point</i>		<i>Unique Well Identifier</i>
NORTH HARGRAVE 3-34 BATTERY					
<i>Well Name</i>		<i>Well License</i>	<i>Well Status</i>	<i>Well Fluid Status</i>	<i> LSD</i>
NORTH HARGRAVE		NOT APPLICABLE		AGAT/ESTEVAN	JS/JV
<i>Field or Area</i>		<i>Pool or Zone</i>		<i>Sampler's Company</i>	<i>Name of Sampler</i>
<i>Test Interval (mKB)</i>		<i>Elevation (m)</i>		<i>Pressure (kPa)</i>	
<i>From</i> <i>To</i>		<i>KB</i> <i>GRD</i>		<i>Temperature (°C)</i>	
				1 2 21	
				<i>Source</i> <i>Received</i>	
Mar 07, 2016		Mar 09, 2016		Mar 17, 2016	
<i>Date Sampled</i>		<i>Date Received</i>		<i>Date Analyzed</i>	
Other		FIELD H2S BY TUT = 7.88%		Calgary - Gerry Ecker - Reporter	
<i>Information</i>				<i>Location - Approved By - Title</i>	

COMPOSITION				
Component	Mole Fraction		Liquid Volume mL / m ³	Mole Fraction of Previous Analysis
	Air Free As Received	Air & Acid Gas Free As Received		
H ₂	TRACE	TRACE		
He	0.0010	0.0012		
N ₂	0.1182	0.1453		
CO ₂	0.1079	0.0000		
H ₂ S	0.0788	0.0000		
C ₁	0.0309	0.0380		
C ₂	0.2277	0.2800	809.2	
C ₃	0.2607	0.3205	958.0	
iC ₄	0.0539	0.0663	235.4	
nC ₄	0.0788	0.0969	331.5	
iC ₅	0.0218	0.0268	106.4	
nC ₅	0.0086	0.0106	41.6	
C ₆	0.0069	0.0085	37.9	
C ₇₊	0.0048	0.0059	30.4	
TOTAL	1.0000	1.0000	2550.4	

PROPERTIES				
— Calculated Heating Value @15 °C & 101.325 kPa (MJ/m ³) —				
Gross		Net		
66.13	78.97	1.02	60.24	71.95
<i>Air Free as Received</i>	<i>Moisture & Acid Gas Free</i>	<i>C₇₊ Moisture Free</i>	<i>Air Free as Received</i>	<i>Moisture & Acid Gas Free</i>
Calculated Density				
Relative		Absolute		
1.401	1.407	3.571	692.6	1.716
<i>Moisture Free As Received</i>	<i>Moisture & Acid Gas Free</i>	<i>C₇₊ Moisture Free</i>	<i>C₇₊ Density (kg/m³)</i>	<i>Total Sample Density (kg/m³)</i>
Calculated Pseudo Critical Properties				
As Sampled		Acid Gas Free		
4897.6	324.7	4171.3	322.7	
<i>pPc (kPa)</i>	<i>pTc (K)</i>	<i>pPc (kPa)</i>	<i>pTc (K)</i>	
Hydrogen Sulfide (H ₂ S) (ppm)				
Field Value		Laboratory Value		g/m ³
78800				113.36
<i>Stain Tube</i>	<i>Tutweiler</i>	<i>Other</i>	<i>GC-SCD</i>	
Calculated Molecular Weight (Moisture Free as Received) (g/mol)				
40.6		103.4		
<i>Total Sample</i>		<i>C₇₊ Fraction</i>		
Calculated Vapour Pressure			Gas Compressibility	
101.62			0.9819	
<i>C₇₊ (kPa)</i>			<i>@15 °C & 101.325 kPa</i>	

WDMS Data Verification Check Exceeds normal limits :IC5, N2

g. The specifications of any process vessel to be used

The configuration of the battery will be such that only atmospheric tanks will be used for processing emulsion. No vessels operating above atmospheric pressure will be used in any part of the proposed 02-27 facility.

h. Details of well testing facilities associated with the battery

Each well is to be tested by a mobile production test unit on a monthly basis. The production testing unit will be deployed to each wellsite to conduct a minimum 24 hour production test. Well head samples will be taken during the test period to determine representative oil and water cuts.

i. Details of the flare and vapour recovery systems for the battery

All gas flashed off within the processing tanks will be collected through a vapour recovery system and directed to a flare system. Any atmospheric vents will be fitted with H₂S scrubbers.

j. Proposal to vent gas containing hydrogen sulphide

Since all gas collected will be directed to a flare system, there will be no intentional venting of gas to the atmosphere. As well, H₂S scrubbers will be installed where necessary to further prevent any off lease odours.

k. Air dispersion modelling

Using the Screen3 Emissions Modelling software, the maximum 1 hour concentration from flaring emissions for SO₂ flare is 100.2 µg/m³ at 260 m. This meets the requirements as defined in Subsection 85.2(1), Schedule G in the Manitoba Drilling and Production Regulations is within the defined limits. The Screen3 model inputs and outputs are below

Air dispersion modelling inputs:

Company: Elcano Exploraiton Inc.
 Facility: Battery 02-27-012-27W1M

Gas Stream	To Flare	
Flow Rate	0.300	10 ³ m ³ /d
Percentage	100.0	%
Reference Temp	15	°C

Flare Gas Stream	Mole Fraction
H ₂	0.0000
He	0.0010
N ₂	0.1182
CO ₂	0.1079
H ₂ S	0.0788
C ₁	0.0309
C ₂	0.2277
C ₃	0.2607
i C ₄	0.0539
n C ₄	0.0788
i C ₅	0.0218
n C ₅	0.0086
C ₆	0.0069
C ₇ +	0.0048
Total	1.0000

Gas Stream Properties		
Molecular Mass	40.5852	g/mole
Net Heating Value	66.1300	MJ/m ³
Net Heat Release Rate	54880	cal/s

Stack Parameters		
Flare Stack Height	12.2000	m
Flare Stack Diameter	0.0760	m
Actual Exit Velocity	0.7654	m/s
Length of Flame	0.8402	m
Conversion Efficiency	100.00%	%

Model Input Parameters		
Gas Flow Rate	0.0035	m ³ /s
Effective Stack Height	13.0402	m
Exit Temperature	1273	K
Ambient Temperature	273	K

Emissions		
SO ₂ Emissions	0.741267	g/s
H ₂ S Emissions	0.000000	g/s

Air dispersion modelling outputs:

08/01/19
15:53:12

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 13043 ***

C:\Users\drennie\Documents\Engineering\Screen3 View\Models\02-27 Battery - 0716

SIMPLE TERRAIN INPUTS:

SOURCE TYPE = FLARE
EMISSION RATE (G/S) = 0.741267
FLARE STACK HEIGHT (M) = 12.2000
TOT HEAT RLS (CAL/S) = 54880.0
RECEPTOR HEIGHT (M) = 0.0000
URBAN/RURAL OPTION = RURAL
EFF RELEASE HEIGHT (M) = 13.0402
BUILDING HEIGHT (M) = 0.0000
MIN HORIZ BLDG DIM (M) = 0.0000
MAX HORIZ BLDG DIM (M) = 0.0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

BUOY. FLUX = 0.910 M**4/S**3; MOM. FLUX = 0.555 M**4/S**2.

*** FULL METEOROLOGY ***

*** SCREEN AUTOMATED DISTANCES ***

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
5.	0.000	1	1.0	1.0	320.0	32.63	2.20	1.51	NO
100.	83.12	1	2.0	2.0	640.0	22.84	27.00	14.23	NO
200.	95.21	3	2.0	2.1	640.0	22.76	23.78	14.30	NO
300.	97.39	3	1.5	1.5	480.0	26.00	34.49	20.66	NO
400.	91.78	3	1.0	1.0	320.0	32.48	44.99	27.02	NO
500.	85.55	4	1.5	1.6	480.0	25.83	36.33	18.66	NO
600.	81.48	4	1.0	1.0	320.0	32.22	43.07	21.91	NO
700.	79.10	4	1.0	1.0	320.0	32.22	49.49	24.65	NO
800.	74.15	4	1.0	1.0	320.0	32.22	55.84	27.34	NO
900.	68.32	4	1.0	1.0	320.0	32.22	62.13	29.97	NO
1000.	62.44	4	1.0	1.0	320.0	32.22	68.35	32.56	NO
1100.	57.01	4	1.0	1.0	320.0	32.22	74.51	34.56	NO
1200.	52.18	4	1.0	1.0	320.0	32.22	80.63	36.51	NO
1300.	47.90	4	1.0	1.0	320.0	32.22	86.69	38.39	NO
1400.	44.11	4	1.0	1.0	320.0	32.22	92.71	40.23	NO
1500.	40.74	4	1.0	1.0	320.0	32.22	98.69	42.03	NO
1600.	38.64	6	1.0	1.2	10000.0	35.81	52.40	19.88	NO
1700.	39.39	6	1.0	1.2	10000.0	35.81	55.32	20.57	NO
1800.	39.86	6	1.0	1.2	10000.0	35.81	58.23	21.25	NO

1900.	40.10	6	1.0	1.2	10000.0	35.81	61.13	21.92	NO
2000.	40.14	6	1.0	1.2	10000.0	35.81	64.01	22.58	NO
2100.	39.81	6	1.0	1.2	10000.0	35.81	66.87	23.14	NO
2200.	39.39	6	1.0	1.2	10000.0	35.81	69.73	23.69	NO
2300.	38.91	6	1.0	1.2	10000.0	35.81	72.57	24.23	NO
2400.	38.38	6	1.0	1.2	10000.0	35.81	75.40	24.76	NO
2500.	37.81	6	1.0	1.2	10000.0	35.81	78.22	25.28	NO
2600.	37.22	6	1.0	1.2	10000.0	35.81	81.03	25.79	NO
2700.	36.60	6	1.0	1.2	10000.0	35.81	83.82	26.29	NO
2800.	35.97	6	1.0	1.2	10000.0	35.81	86.61	26.78	NO
2900.	35.33	6	1.0	1.2	10000.0	35.81	89.39	27.27	NO
3000.	34.68	6	1.0	1.2	10000.0	35.81	92.15	27.75	NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 5. M:
 260. 100.2 3 1.5 1.5 480.0 26.00 30.40 18.28 NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
 DWASH=NO MEANS NO BUILDING DOWNWASH USED
 DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
 DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
 DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

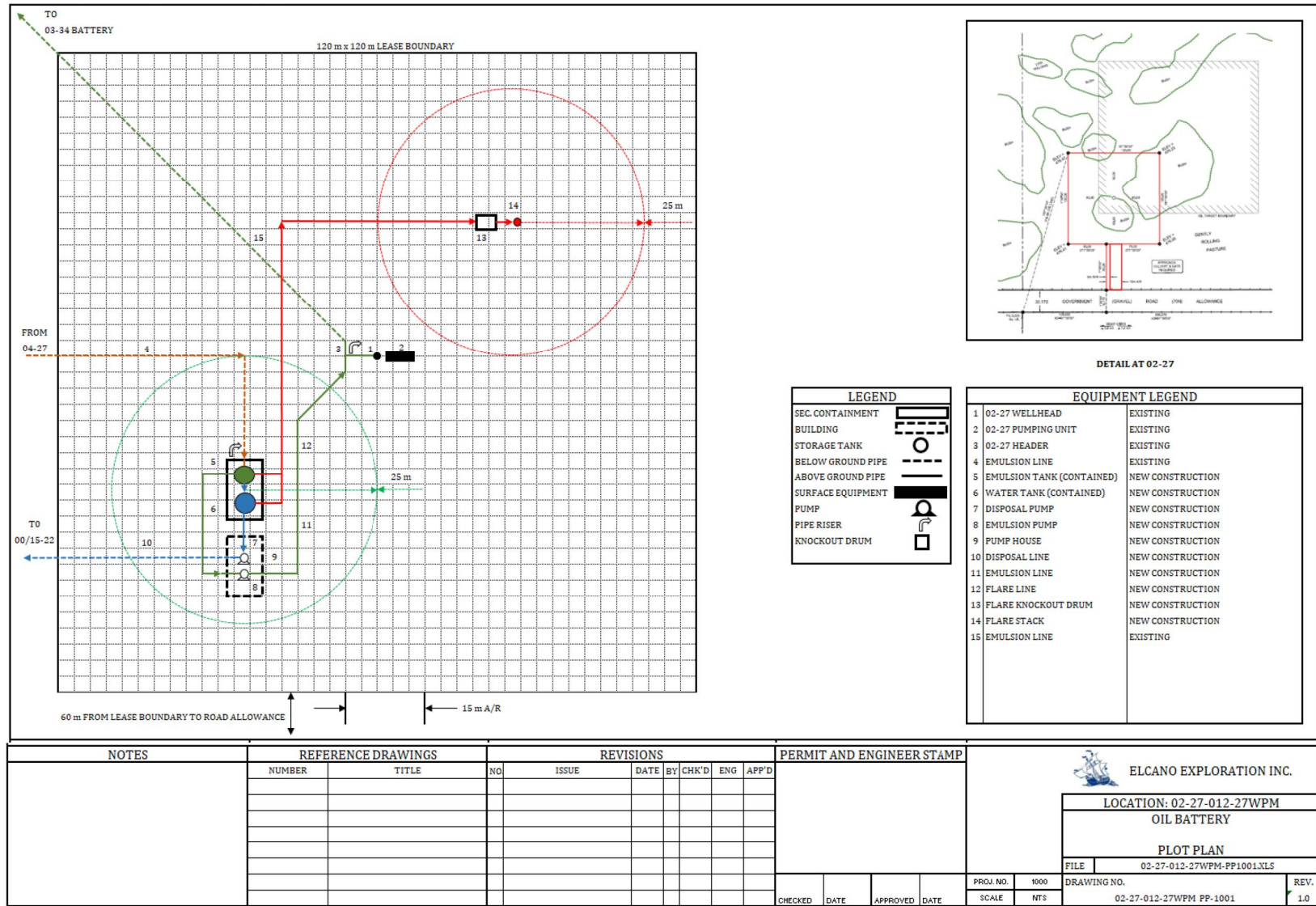
 *** SUMMARY OF SCREEN MODEL RESULTS ***

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	100.2	260.	0.

 ** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **

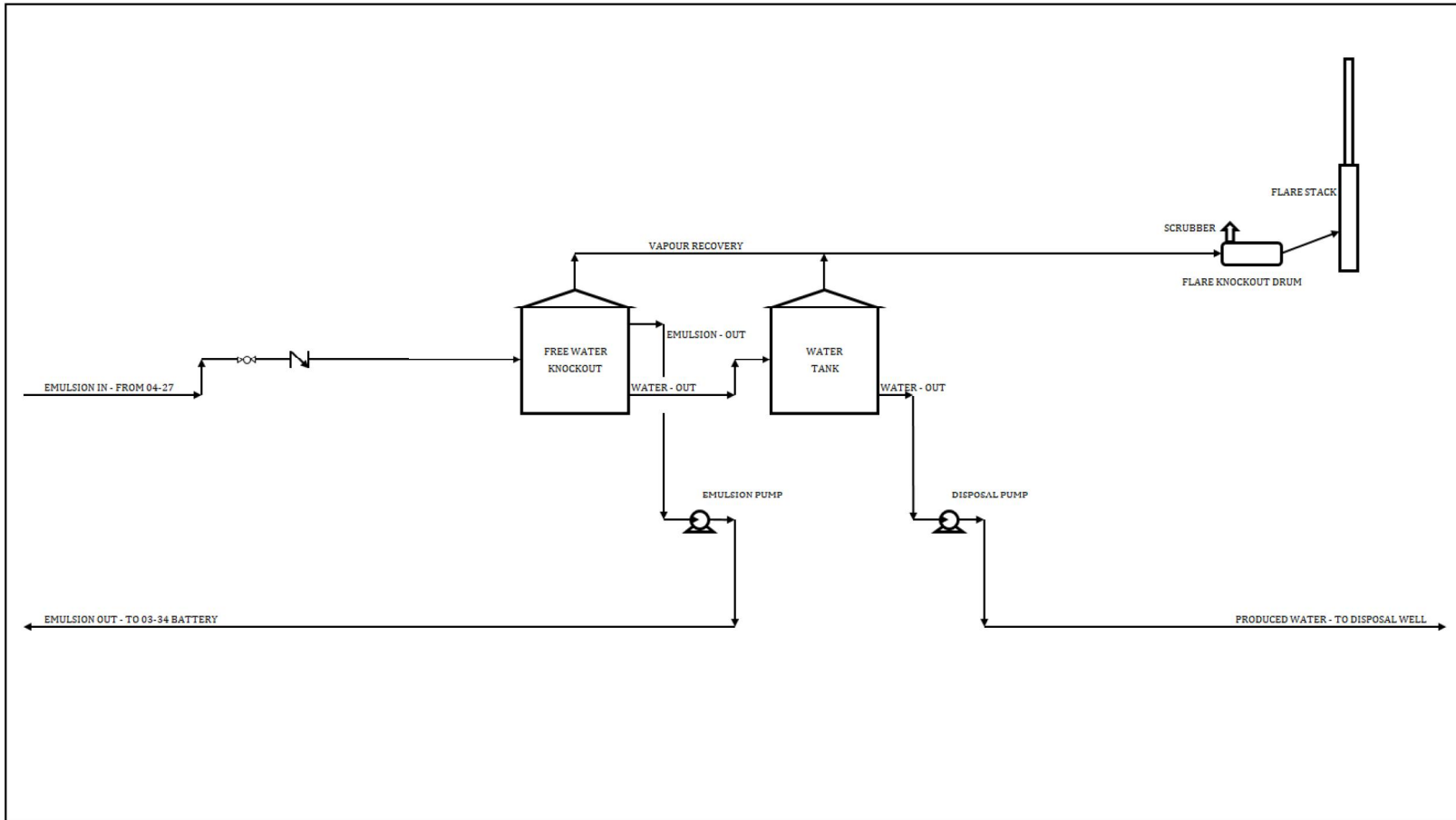
I. A plot drawing showing the location of

- (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;



m. 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



NOTES	REFERENCE DRAWINGS		REVISIONS							PERMIT AND ENGINEER STAMP				ELCANO EXPLORATION INC.			
	NUMBER	TITLE	NO	ISSUE	DATE	BY	CHK'D	ENG.	APP'D	CHECKED	DATE	APPROVED	DATE	PROJ. NO.	1000	DRAWING NO.	REV.
														02-27-012-27WPM	1000	02-27-012-27WPM-PP1001.XLS	1.0
														02-27-012-27WPM	1000	02-27-012-27WPM-PP-1001	1.0

n. Plans for the disposal of produced water

The produced water from the battery will be disposed of in the proposed 100/15-22-012-27WPM. A flowline will be constructed from the 02-27 battery to the 15-22 disposal well.

o. Any other information that an inspector or the director may require

Elcano Exploration Inc. is planning to construct a new battery at 02-27-012-27 WPM as part of the continued development in the North Hargrave area.

The proposed battery at 02-27-012-27 WPM will allow Elcano to continue exploitation of existing wells and potential for economic development of new wells in the area. Elcano has reach water handling limitations at its existing 03-34-012-27WPM battery. Careful analysis indicates that a second 'satellite' battery designed to remove and dispose of a majority of water, prior to the 03-34 battery, is the best solution. Remaining emulsion from the 02-27 battery will still be processed for sales quality oil at the 03-34 facility.

The 02-27 facility will be designed to initially process approximately 3,060 m³/d of emulsion (3,000 m³/d water; 60 m³/d oil) assuming the inlet stream is approximately 98% water. Approximately 95% of the water will be removed and the remaining emulsion volume will be transported to the 03-34 facility via existing flowlines for processing to sales quality oil. No fluids will be routinely trucked from this facility. GOR is estimated at 5 m³/m³, all gas will be recovered through a vapour recovery unit and flared.