

## **Final Well Report**

<b>Revision:</b>	<b>Version 0</b>
<b>Operating Company:</b>	<b>Vulcan Minerals Inc. (Investcan Energy Corp.)</b>
<b>Hole Name:</b>	<b>Flat Bay Test Hole #3</b>
<b>Rig:</b>	<b>Duralite 800</b>
<b>Field:</b>	<b>Flat Bay</b>
<b>Location:</b>	<b>Western Newfoundland, Canada</b>
<b>Date:</b>	<b>June 25, 2009</b>
<b>Revised On:</b>	<b>N/A</b>

<b>Prepared by:</b> <b>David Walsh</b> <b>Vulcan Minerals</b>	<b>Reviewed by:</b> <b>Patrick Laracy, P.Geo.</b> <b>Vulcan Minerals</b>
<b>Date:</b>	<b>Date:</b>



## Table of Contents

1.0	<b>Introduction</b>	5
2.0	<b>General Information</b>	5
2.1	Map	5
2.2	Difficulties and Delays	7
3.0	<b>Drilling Operations</b>	9
3.1	Elevation	9
3.2	Total Depth	9
3.3	Spud Date	9
3.4	Date Drilling Completed	9
3.5	Rig Release Date	9
3.6	Well Status	9
3.7	Hole Sizes and Depth	9
3.8	Bit Records	10
3.9	Casing and Cementing Record	10
3.10	Side-tracked Hole	10
3.11	Drilling Fluid	10
3.12	Fluid Disposal	10
3.13	Fishing Operations	10
3.14	Well Kicks	10
3.15	Formation Leak – Off Tests	11
3.16	Time Distribution	11
3.17	Deviation Plot	11
3.18	Suspension Program	11
3.19	Well Schematic	11
3.20	Fluid Samples	13
3.21	Composite Well Record	13
4.0	<b>Geology</b>	15
4.1	Drill Cuttings	15
4.2	Cores	15
4.3	Lithology	15
4.4	Stratigraphic Column	15
4.5	Biostratigraphic Data	15
5.0	<b>Well Evaluation</b>	17

5.1	Down Hole Logs.....	17
5.2	Synthetic Seismogram .....	17
5.3	Vertical Seismic Profile .....	17
5.4	Velocity Surveys.....	17
5.5	Formation Stimulation .....	17
5.6	Formation Flow Tests .....	17
6.0	<b>Other Data</b> .....	19
6.1	Mud Loggers Report .....	19
6.2	Directional and Deviation Survey .....	19
6.3	Final Legal Survey .....	19
6.4	Core Photos .....	19
6.5	Core Analysis Report .....	19
6.6	Fluid Analysis Report(s).....	19
6.7	Oil, Gas and Water Analysis Report(s).....	19
6.8	Geochemical, Biostratigraphic, Petrological, Palynological Paleontological Reports ...	19
6.9	Well Termination Report.....	19

## Appendices

Appendix I	Authority to Drill Well .....	20
Appendix II	Daily Reports .....	28
Appendix III	Bit Record .....	34
Appendix IV	Composite Well Record.....	36
Appendix V	Stratigraphic Column .....	38
Appendix VI	Core Box Depths .....	40
Appendix VII	Lithological Descriptions .....	42
Appendix VIII	Legal Survey .....	48
Appendix IX	Core Photos .....	51
Appendix X	Core Analysis Report.....	58
Appendix XI	Well Termination Record.....	60

## List of Figures

Figure 1.	Location Map. ....	6
Figure 2.	Deviation Plot.....	12



## **1.0 Introduction**

Flat Bay Test Hole #3 was operated by Vulcan Minerals Inc. - Investcan Energy Corp. Joint Venture and drilled by Logan Drilling Limited utilizing a Duralite 800 Core Drilling Rig. The test hole was spudded on February 22, 2009 and the rig was subsequently released February 27, 2009 upon completion of the hole.

The purpose of the hole was to acquire reservoir information in regards to the commercial viability of a hydrocarbon bearing formation identified in the Flat Bay area from the previous drilling at Flat Bay #1 and Flat Bay #3 wells. In particular, oriented and preserved core is desired to measure and/or determine reservoir parameters such as in-situ fluid contents and physical properties, rock properties such as porosity, permeability and any related information available from laboratory analysis regarding reservoir properties of the cored interval. Other wells drilled within the basin by Vulcan Minerals Inc. (i.e. Flat Bay #1) had encountered significant oil in a relatively thick sequence of sandstone and conglomerate (Fischells Brook Formation).

As predicted the hole penetrated a thin interval of gypsum, a thick sequence of anhydrite and into the target reservoir formation, a thin interval of Ship Cove limestone followed by conglomerate and sandstone of the Anguille Group. Hydrocarbon shows, varying from excellent to minor, were detected throughout the entire reservoir section. Live oil was observed weeping out around clast boundaries and some sections of coarse grained matrix. Because of the relatively low porosity/permeability of the core, oil would weep from the core many hours after the core was retrieved. Some core had no obvious oil shows when taken from the core barrel but wept oil later. As a result the reservoir sections may contain more significant oil than originally described upon core retrieval.

## **2.0 General Information**

The drill site is located within the former gypsum quarry located 6.8 km west on route 403. The hole is located on the east side of the tailings pile approximately 140 m southeast of Well FB#3. Stephenville, the regional service center for the area is approximately 30 km from the site.

### **2.1 Map**

Figure 1.

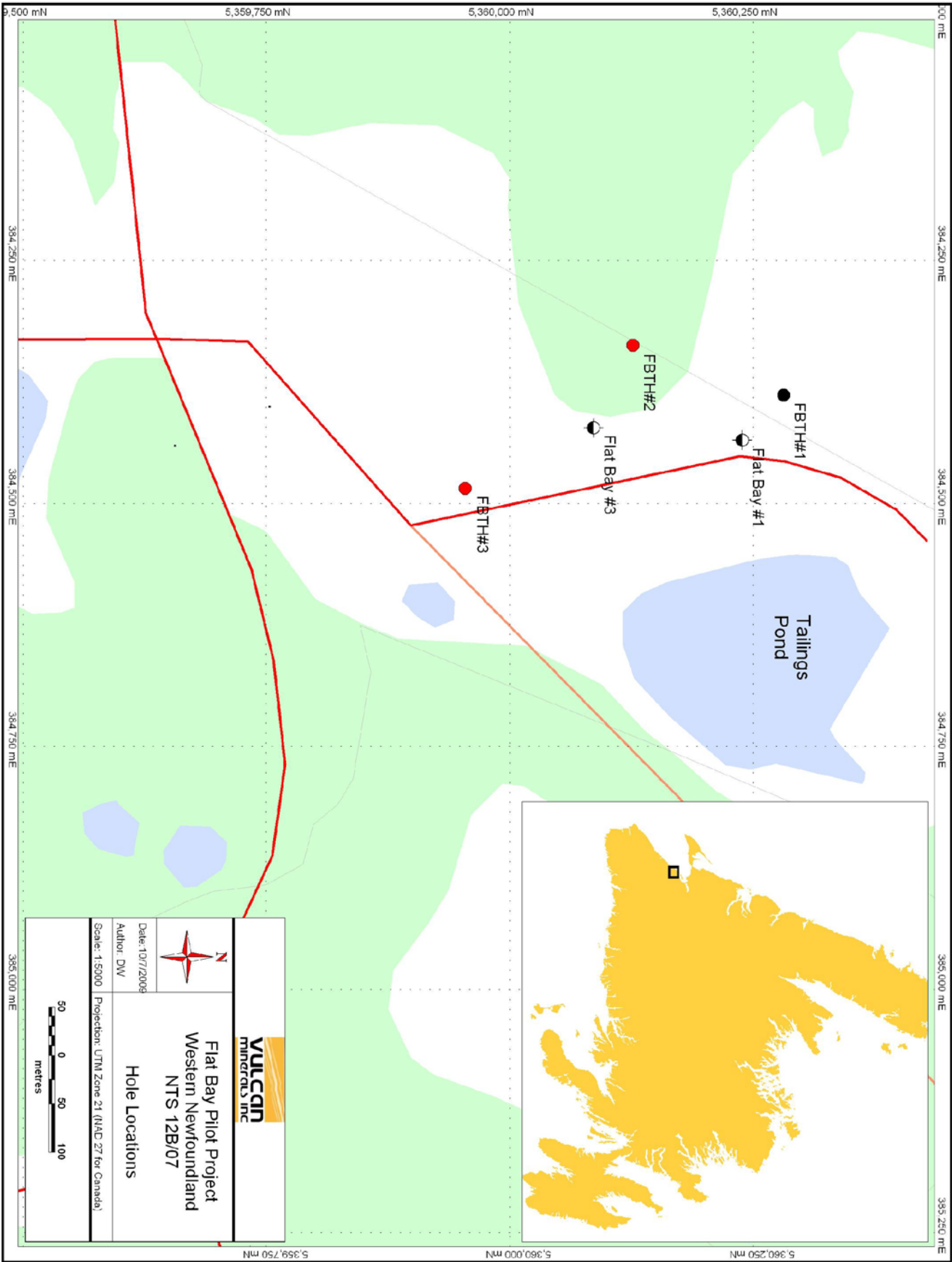


Figure 1. Location Map.

**Well Name**

Vulcan - Investcan Flat Bay Test Hole #3

**Exploration Permit**

The well was drilled on exploration Permit 03 - 106 under the authority of Drilling Program Approval (DPA) # 2009-116-01 and Authority to Drill a Well (ADW) # 2009-116-01-01, both issued on February 10, 2009 (Appendix I).

**Location Co-ordinates**

The NAD 27 UTM co-ordinates of the well are as follows:

    Northing:    5359954.120 m N  
    Easting:    384484.551 m E  
    Elevation:    46.89 m

The survey was carried out by R. Davis Surveys Ltd. of Stephenville Crossing using differential GPS surveying equipment and techniques (Appendix VIII).

**2.2 Difficulties and Delays**

No difficulties or delays were encountered while drilling

Vulcan Minerals Inc.  
Flat Bay Test Hole #3

## **Drilling Operations**

**3.0**

### **3.0 Drilling Operations**

A summary of the daily drilling operations are contained in Appendix II – Daily Drilling Reports.

#### **3.1 Elevation**

Elevations for the entire hole were measured from the bottom edge of the surface casing and are above mean sea level as follows:

Ground – 46.74 m

Casing – 46.89 m

#### **3.2 Total Depth**

The following depths are measured from the top of casing:

Total drilled depth – 249 m

Total Vertical Depth – 176.07 m

#### **3.3 Spud Date**

The well was spudded February 22, 2009 at 14:00 hrs.

#### **3.4 Date Drilling Completed**

The well ceased drilling on February 26, 2009 at 22:30 hrs.

#### **3.5 Rig Release Date**

The drilling rig was released on February 27, 2009 @ 00:30 hrs.

#### **3.6 Well Status**

The well was abandoned at 249 m. The hole was completely filled with cement while the rods were pulled out of the hole from 249 to surface (Appendix XI). The casing was cut 1 m below ground level. The well head was then marked by a large boulder. A location rod will be emplaced at the site.

#### **3.7 Hole Sizes and Depth**

The following depths are measured from top of surface casing and hole sizes are outside diameters (O.D. (mm)).

<u>Hole Section</u>	<u>Size (mm)</u>	<u>Depth (m)</u>
Surface	91.7 (NW)	24
Main	75.7 (NQ)	249

### **3.8 Bit Records**

The surface hole was drilled with one 91.7 mm (NW) diamond casing shoe bits. The main hole was drilled with one 75.7 mm (NQ) diamond-drilling bits. Depths in and out of each bit as well as type and serial # are outlined in Appendix III.

### **3.9 Casing and Cementing Record**

The overburden was cored with 75.7 mm NQ core bit and reamed open with 91.7 mm NW casing shoe. The casing used for the surface/conductor pipe was NW casing, 88.9 mm – 12.8 kg/m<sup>3</sup> with a NW shoe placed at 24 m. Twenty-four meters (8 joints) of NW casing set in hole (Appendix XI).

The NW casing was cemented with 0.1 m<sup>3</sup> of Class A Portland Cement at a density of 1820 kg/m<sup>3</sup>, no cement returns were observed at surface, additional cement was poured from surface to stabilize the top of the casing. Cement was tagged in the casing at 21 m.

### **3.10 Side-tracked Hole**

Not applicable (N/A)

### **3.11 Drilling Fluid**

The drilling fluids consisted of fresh water and drilling polymers (PolyPlus). Entirety of the hole was drilled with fluid densities approximately equal to fresh water 1000 kg/m<sup>3</sup>.

### **3.12 Fluid Disposal**

Approximately 2300 L of drilling fluid contained in mud tanks following drilling completion were transported to Pasedena for processing and disposal at Pardy's Waste Management and Industrial Services in compliance with government regulations.

### **3.13 Fishing Operations**

No fishing operations were conducted on this particular well.

### 3.14 Well Kicks

There were no kicks encountered during drilling of test hole.

### 3.15 Formation Leak – Off Tests

There was no Formation Leak – Off Tests performed during drilling of hole.

### 3.16 Time Distribution

<u>Activity</u>	<u>Total Hours</u>
Drilling	64
Rig Up / Down	14
Rig Repairs	0
Circulating	3
Tripping	3
Cementing	5
Wait on Cement	24
Drill Out Cement	2
Survey	2
Casing Preparation	2
BOP Rig Up / Tests	2
Wait on Parts	0
Stand By	0

### 3.17 Deviation Plot

Two directional / deviation surveys were conducted at various intervals in the well utilizing a conventional down hole magnetic survey compass - reflex instrument. All surveys measured within 2 degrees of -45 degrees of deviation – straight hole (Figure 2).

<u>Depth (meters)</u>	<u>Deviation (degrees)</u>	<u>Azimuth (degrees)</u>
108	-45.7	202.8
249	-47.0	206.7

### 3.18 Suspension Program

Not applicable

### 3.19 Well Schematic

A detailed well schematic containing pertinent well bore information is attached in Appendix XI.

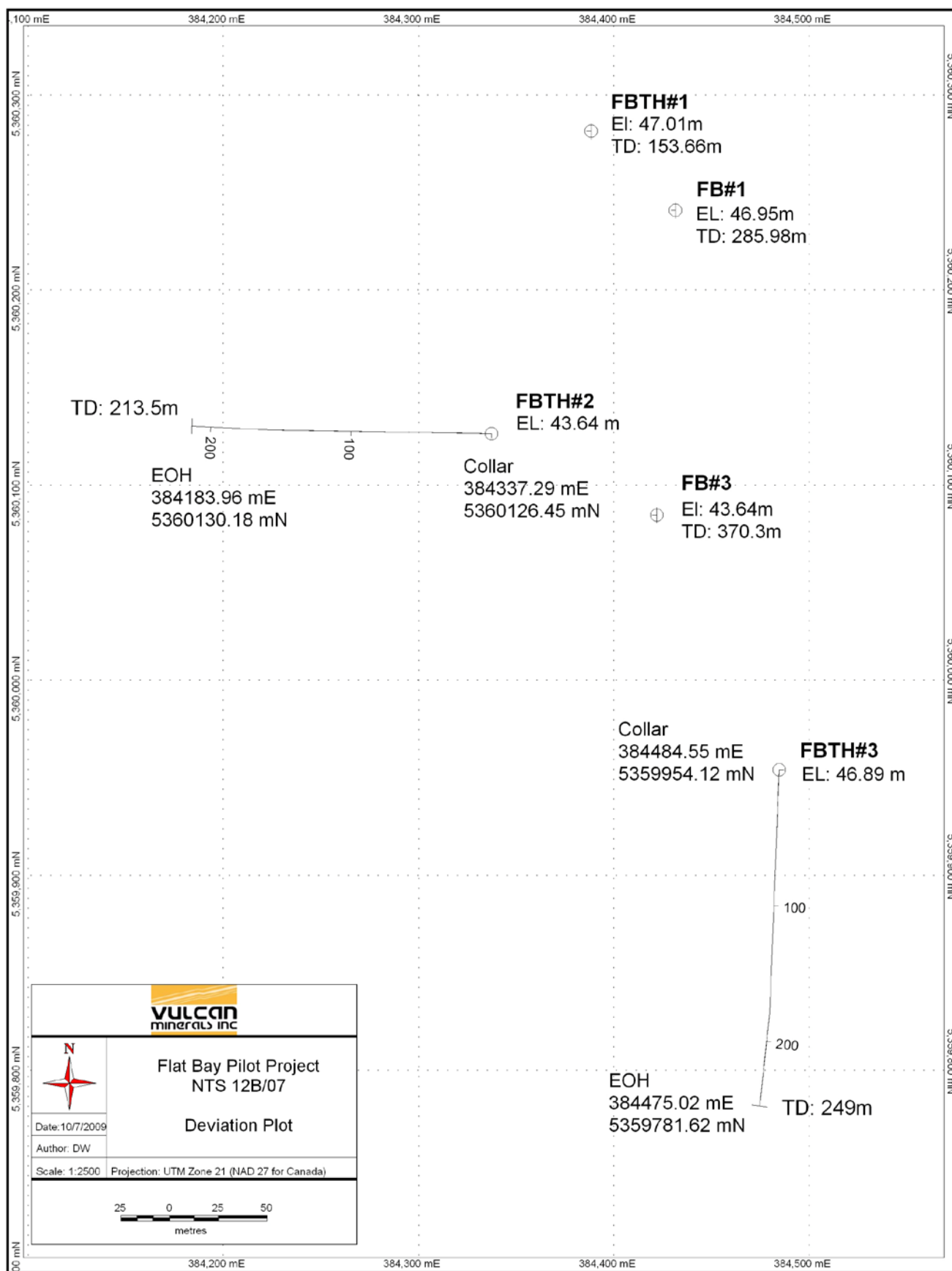


Figure 2. Deviation Plot.



### **3.20 Fluid Samples**

No formation fluid samples were taken.

### **3.21 Composite Well Record**

A composite Well Record is included as Appendix IV.

Vulcan Minerals Inc.  
Flat Bay Test Hole #3

## **Geology**

**4.0**

## **4.0     Geology**

### **4.1     Drill Cuttings**

No cuttings were taken because entire hole from bedrock surface to total depth was cored.

### **4.2     Cores**

The entire hole from bedrock surface to total depth was cored. Practically one hundred percent core recovery was achieved. All drill core is stored at Vulcan Minerals Inc. storage warehouse in Stephenville, Newfoundland and Labrador. All core boxes are numbered sequentially and marked with respective depth intervals (Appendix VI).

### **4.3     Lithology**

A detailed description of drill core was compiled and is included in Appendix VII. Robert Cuthbert and David Walsh of Vulcan Minerals Inc. provided geological descriptions of all drill cores.

### **4.4     Stratigraphic Column**

A stratigraphic column chart is attached as Appendix V.

### **4.5     Biostratigraphic Data**

No biostratigraphic analysis has been carried out on core samples.

Vulcan Minerals Inc.  
Flat Bay Test Hole #3

## **Well Evaluation**

**5.0**

## **5.0 Well Evaluation**

### **5.1 Down Hole Logs**

There were no down hole logging operations conducted.

### **5.2 Synthetic Seismogram**

Not applicable

### **5.3 Vertical Seismic Profile**

Not applicable

### **5.4 Velocity Surveys**

Not applicable

### **5.5 Formation Stimulation**

Not applicable

### **5.6 Formation Flow Tests**

Not applicable

Vulcan Minerals Inc.  
Flat Bay Test Hole #3

## **Other Data**

**6.0**

## **6.0 Other Data**

### **6.1 Mud Loggers Report**

Not applicable

### **6.2 Directional and Deviation Survey**

See 3.17.

### **6.3 Final Legal Survey**

The final legal survey as carried out by R. Davis Surveys Ltd. is contained in Appendix VIII.

### **6.4 Core Photos**

Core photos are contained in Appendix IX.

### **6.5 Core Analysis Report**

Core analysis report is contained in Appendix X.

### **6.6 Fluid Analysis Report(s)**

Not Applicable.

### **6.7 Oil, Gas and Water Analysis Report(s)**

Not Applicable

### **6.8 Geochemical, Biostratigraphic, Petrological, Palynological Paleontological Reports**

The stratigraphic control of this well is considered excellent with 100% core recovery and geological descriptions of lithologies intersected paired with known petrological and geochemical data from offset wells.

### **6.9 Well Termination Report**

A hole termination program is included in Appendix XI of this report.

## **Appendix I**

### **Authority to Drill Well**





Government of Newfoundland and Labrador  
Department of Natural Resources

February 10<sup>th</sup>, 2009

Mr. Patrick Laracy, President  
Vulcan Minerals Inc.  
333 Duckworth Street  
St. John's, NL, A1C 1G9

Dear Mr. Laracy:

**RE: Drilling Program Approval and Authority to Drill a Well for  
Vulcan Minerals – Flat Bay Test Hole #2 and Flat Bay Test Hole #3**

---

Please find attached the following executed documents:

- (1) Drilling Program Approval (DPA 2009-116-01);
- (2) Authority to Drill a Well (ADW 2006-116-01-01); and
- (3) Authority to Drill a Well (ADW 2006- 116-01-02).

These documents contain attached conditions. Please ensure that they are prominently displayed at the wellsite at all times.

Thank you for your interest in western Newfoundland and good luck with your exploration efforts.

Yours sincerely,

A handwritten signature in dark ink, appearing to read "Keith Hynes".

**Keith Hynes, P. Eng.**  
Director  
Petroleum Engineering





Government of Newfoundland and Labrador  
Department of Natural Resources  
Energy Branch

### DRILLING PROGRAM APPROVAL - APPLICATION

Pursuant to sections 8 and 9 of the *Petroleum and Natural Gas Act*(1), Vulcan Minerals Inc.  
as operator on behalf of \_\_\_\_\_, holding a  
subsisting licence, permit or lease issued pursuant to the *Petroleum Regulations*(2), namely; 96-105 & 03-106  
(licence, permit, or lease #)

hereby applies for approval to conduct a drilling program using the drilling rig Logan Drilling Limited, Duralite 800  
and equipment and procedures described in the detailed program dated January 14, 2009

The undersigned operator's Representative hereby declares that, to the best of the operator's knowledge, the information contained herein and in the attached detailed program is true, accurate and complete.

Signed: [Signature]  
Operator's Representative

Date: January 19/09

### APPROVAL

Pursuant to sections 8 and 9 of the *Petroleum and Natural Gas Act*, the operator named in the Application is hereby authorized to conduct the proposed drilling program subject to the following conditions:

1. This Drilling Program Approval shall, unless otherwise extended or terminated, expire upon the 28 day of Feb, 2011
2. This Authorization shall be prominently displayed at the well site at all times during which operations are being conducted;
3. Evidence of financial responsibility, as required pursuant to Section 14 of the *Petroleum Drilling Regulations* (3), shall be provided by the operator to the Minister of Natural Resources;
4. The operator shall use the equipment and procedures described in the detailed program dated 2 February 2009 unless a change in the equipment or procedures is approved in writing by the Director; and
5. The operator shall comply with such other conditions as are appended to this Approval.

Signed: [Signature]

Effective Date: 2009-02-10

Drilling Program Approved No. 2009-116-01

(1) - (R.S.N.L. 1990, c. P-10)

(2) - CNR 1151/96

(3) - CNR 1150/96



**SCHEDULE "A"**  
**TO**  
**DRILLING PROGRAM APPROVAL #2009-116-01**  
**OTHER CONDITIONS**

1. Notwithstanding condition # 4 of the Approval (see previous page), the Operator shall comply with the requirements of the *Petroleum Drilling Regulations* (the Regulations) unless the Operator has received written approval from the Director to deviate from the Regulations.
2. It is a condition of approval of this DPA, that the Operator ensure that the insurance policy No. AMWCA099363 is in effect for the duration of these operations. Upon receipt of the attachments to the Certificate of Insurance which detail the Amount of Coverage, the Policy Conditions and Policy Exclusions, the Operator will supply same to the Director without delay.
3. Pursuant to Section 154 of the Regulations, the director shall release to the public, general information including the name, classification, location, identity of the drilling contractor and rig used by the Operator, depth and operational status of the drilling program.
4. It is a condition of approval of this DPA that the Operator, pursuant to Section 52(2)(a) of the *Petroleum Regulations*, (CNR1151/96) provide to the director on a weekly basis a benefits monitoring report as well as a cost summary report showing AFE costs, costs to date and variances for all major cost categories.
5. Prior to commencement of any drilling operations, the Operator must have on site a finalized Contingency / Emergency Response Plan meeting the requirements of Section 11 of the Regulations. As per communications regarding this plan, all leaks are reportable and all spills in excess of 70 liters are reportable.
6. The core acquired under this DPA shall be submitted to the Director upon expiration of Exploration Permit 96-105.
7. The detailed program referenced in Approval condition #4 attached consists of the following documents supplied by the Operator:

Title	Date Issued	Date Revised	Revision
Authority to Drill Test Holes	14 January 2009	2 February 2009	Version 1.1
Emergency Response Plan	5 September 2006	10 February 2009	N/A

February 10th, 2009





Government of Newfoundland and Labrador  
Department of Natural Resources  
Energy Branch

### AUTHORITY TO DRILL A WELL - APPLICATION

Pursuant to sections 8 and 9 of the *Petroleum and Natural Gas Act (R.S.N.L. 1990, c. P-10)* and in compliance with section 29 of the *Petroleum Drilling Regulations, (CNR 1150/96)* Vulcan Minerals Inc., as operator, hereby applies for Authority to Drill a Well to be known as Flat Bay Test Holes #2 using the equipment and procedures described in the well program dated January 14, 2009. Permit, Licence or Lease to which this Program applies: 96-105 & 03-106

Area: Bay St. George	<b>CO-ORDINATES</b>	
Field/Pool: Flay Bay	Long:	<b>UTM (N A D 27)</b>
Drilling Rig: Duralite 800	Lat:	Northing: 5 360 103
Rig Type: Diamond Core Exploration Rig		Easting: 384 283
Drilling Contractor: Logan Drilling Limited	<b>ELEVATION</b>	<b>DEPTH</b>
	<input type="checkbox"/> RT <input type="checkbox"/> KB <input type="checkbox"/> RF <input type="checkbox"/> m	T.D.: 200 m
	G.L.:	TVD: 150 m
<b>ESTIMATES</b>		<b>TARGET HORIZONS</b>
Spud Date: February 1, 2009	Well Cost: \$100 000	Spout Falls Formation, Fischell's Brook Conglomerate
Days on Location: 7		

### EVALUATION PROGRAM

Ten-metre sample intervals:	Conventional cores at: Continuous Core
Five-metre sample intervals:	Logs and Tests: Oriented core, detailed core and formation fluid analysis
Canned sample intervals:	

### CASING AND CEMENTING PROGRAM

O.D. (mm)	Weight (kg/m)	Grade	Setting Depth (m)	Cementing Program
88.9	12.8	NW	40	Type G cement

Other Equipment:

The undersigned operator's Representative hereby declares that, to the best of the Representative's knowledge, the information contained herein and in the attached detailed program is true, accurate and complete.

Signed: [Signature]

Date: Jan 19/09

Operator's Representative [Signature]

AUTHORIZATION

Whereas the Minister of Natural Resources has jurisdiction under the *Petroleum Drilling Regulations*, ("the Regulations").

In accordance with section 32 of the Regulations, the operator named in the Application is authorized to undertake the proposed well program described above subject to the following conditions:

1. This Authorization shall be prominently displayed at the well site at all times during which operations are being conducted;
2. Copies of all logs and well test data shall be submitted to the director by the operator promptly after their acquisition;
3. The operator shall comply with all conditions of the Drilling Program Approval No. 2009-116-01 under which the above well is to be drilled;
4. No change in the well program hereby approved may be made unless it is first approved by the director in writing;
5. This Authorization is conditional on the operator commencing drilling within 120 days of the effective Authorization date; and
6. The operator shall comply with such other conditions as are appended to this Authorization.

Signed: [Signature]

Effective Date: 2009-02-10

Authority to Drill a Well No. 2009-116-01-01

Revised: March, 2008 FRM-63



**SCHEDULE "A" TO**  
**AUTHORITY TO DRILL A WELL #2009-116-01-01**  
**OTHER CONDITIONS**

1. The Operator shall, prior to commencement of major site operations, ensure that an approved Operator's representative is on site to supervise all site operations.
2. Notwithstanding condition #3 of the Authorization (see previous page), the Operator shall comply with the requirements of the *Petroleum Drilling Regulations, (CNR 1150/96)* (the Regulations) unless the Operator has received written approval from the Director to deviate from the Regulations.
3. The Operator shall ensure that the test hole is drilled in a prudent and reasonable manner, consistent with good oilfield practices and with due consideration for the safety of personnel, property and the environment.
4. The Operator shall be liable for its actions and the actions of its agents, contractors, employees and any others acting under the Operator's authority in drilling the test hole.
5. The Operator's liability for the actions of its agents, contractors, employees and any others acting under the Operator's authority in drilling the test hole does not limit any liability that those agents, contractors, employees or others acting under the Operator's authority may have to the Operator.
6. The Operator shall ensure that all necessary approvals have been acquired from other government agencies and other rights holders, in respect of access to and use of land for the purpose of the drilling operations, and disposal of all materials.
7. The Operator shall attorn to the jurisdiction of the courts of the Province of Newfoundland and Labrador.
8. As per section 142(b) of the Regulations, 24 hour notice shall be provided to the Director prior to spud-in.
9. A summary report of all operations performed during drilling (daily drilling report and daily geological report) shall be submitted on a daily basis via email to [mikestoyles@gov.nl.ca](mailto:mikestoyles@gov.nl.ca).
10. A termination record signed by the operator's representative must be submitted within 21 days of the rig release date. Down-hole schematic and digital images showing the final condition of the site are to be included.
11. Prior to the end of drilling operations, the Operator shall provide a legal survey of the site acceptable to the Director to confirm the location of the well.

Feb 10<sup>th</sup>, 2009





Government of Newfoundland and Labrador  
Department of Natural Resources  
Energy Branch

### AUTHORITY TO DRILL A WELL - APPLICATION

Pursuant to sections 8 and 9 of the *Petroleum and Natural Gas Act (R.S.N.L. 1990, c. P-10)* and in compliance with section 29 of the *Petroleum Drilling Regulations, (CNR 1150/96)* Vulcan Minerals Inc., as operator, hereby applies for Authority to Drill a Well to be known as Flat Bay Test Holes #3 using the equipment and procedures described in the well program dated January 14, 2009.  
Permit, Licence or Lease to which this Program applies: 96-105 & 03-106

Area: Bay St. George	<b>CO-ORDINATES</b>	
Field/Pool: Flat Bay	Long:	<b>UTM (N A D 27)</b>
Drilling Rig: Duralite 800	Lat:	Northing: 5 360 001
Rig Type: Diamond Core Exploration Rig		Easting: 384 425
Drilling Contractor: Logan Drilling Limited	<input type="checkbox"/> RT <input type="checkbox"/> KB <input type="checkbox"/> RF <input type="checkbox"/> m	T.D.: 200 m
	G.L.:	TVD: 150 m
<b>ESTIMATES</b>		<b>TARGET HORIZONS</b>
Spud Date: February 1, 2009	Well Cost: \$100 000	Spout Falls Formation, Fischell's Brook Conglomerate
Days on Location: 7		

### EVALUATION PROGRAM

Ten-metre sample intervals:	Conventional cores at: Continuous Core
Five-metre sample intervals:	Logs and Tests: Oriented core, detailed core and formation fluid analysis
Canned sample intervals:	

### CASING AND CEMENTING PROGRAM

O.D. (mm)	Weight (kg/m)	Grade	Setting Depth (m)	Cementing Program
88.9	12.8	NW	40	Type G cement

Other Equipment:

The undersigned operator's Representative hereby declares that, to the best of the Representative's knowledge, the information contained herein and in the attached detailed program is true, accurate and complete.

Signed: [Signature]

Operator's Representative

Date: Jan 19 / 09

### AUTHORIZATION

Whereas the Minister of Natural Resources has jurisdiction under the *Petroleum Drilling Regulations*, ("the Regulations").

In accordance with section 32 of the Regulations, the operator named in the Application is authorized to undertake the proposed well program described above subject to the following conditions:

1. This Authorization shall be prominently displayed at the well site at all times during which operations are being conducted;
2. Copies of all logs and well test data shall be submitted to the director by the operator promptly after their acquisition;
3. The operator shall comply with all conditions of the Drilling Program Approval No. 2009-116-01 under which the above well is to be drilled;
4. No change in the well program hereby approved may be made unless it is first approved by the director in writing;
5. This Authorization is conditional on the operator commencing drilling within 120 days of the effective Authorization date; and
6. The operator shall comply with such other conditions as are appended to this Authorization.

Signed: [Signature]

Effective Date: 2009-02-10

Authority to Drill a Well No. 2009-116-01-02

Revised: March, 2008 FRM-63



**SCHEDULE "A" TO**  
**AUTHORITY TO DRILL A WELL #2009-116-01-02**  
**OTHER CONDITIONS**

1. The Operator shall, prior to commencement of major site operations, ensure that an approved Operator's representative is on site to supervise all site operations.
2. Notwithstanding condition #3 of the Authorization (see previous page), the Operator shall comply with the requirements of the *Petroleum Drilling Regulations, (CNR 1150/96)* (the Regulations) unless the Operator has received written approval from the Director to deviate from the Regulations.
3. The Operator shall ensure that the test hole is drilled in a prudent and reasonable manner, consistent with good oilfield practices and with due consideration for the safety of personnel, property and the environment.
4. The Operator shall be liable for its actions and the actions of its agents, contractors, employees and any others acting under the Operator's authority in drilling the test hole.
5. The Operator's liability for the actions of its agents, contractors, employees and any others acting under the Operator's authority in drilling the test hole does not limit any liability that those agents, contractors, employees or others acting under the Operator's authority may have to the Operator.
6. The Operator shall ensure that all necessary approvals have been acquired from other government agencies and other rights holders, in respect of access to and use of land for the purpose of the drilling operations, and disposal of all materials.
7. The Operator shall attorn to the jurisdiction of the courts of the Province of Newfoundland and Labrador.
8. As per section 142(b) of the Regulations, 24 hour notice shall be provided to the Director prior to spud-in.
9. A summary report of all operations performed during drilling (daily drilling report and daily geological report) shall be submitted on a daily basis via email to [mikestoyles@gov.nl.ca](mailto:mikestoyles@gov.nl.ca).
10. A termination record signed by the operator's representative must be submitted within 21 days of the rig release date. Down-hole schematic and digital images showing the final condition of the site are to be included.
11. Prior to the end of drilling operations, the Operator shall provide a legal survey of the site acceptable to the Director to confirm the location of the well.

Feb 10<sup>th</sup>, 2009

## **Appendix II**

### **Daily Reports**





**Daily Report:** 1

**Date:** Sunday 22, February 2009 (0000 hrs – 24000 hrs)

**Hole Number:** Flat Bay Test Hole #3 (FBTH#5)

UTM Nad 27 Zone 21

5359971 m N, 0384451 m E

**Azimuth:** 180 degrees

**Inclination:** 45 degrees

**Elevation:** Surface (approximately) 51 m (asl)

Casing (approximately) 51.1 m (asl)

**Weather:** Overcast, high wind (60km/hr), temperature -5°C

**Depth Start:** 0 m

**Depth End:** 21 m                      **TVD:** 14.8 m

**Drilling Fluid:** Water with some water based polymer for increased viscosity and hole stability.

**Bit:** Casing Shoe (Fordia CN-ST-5-1C4, serial # 77503-09)

NQ Core Bit (Longyear, AlphaBit 7, serial # 144345-7)

**Survey:** N/A

**Lithology:** 0 - 19 m Overburden, tailings and some cobbles of various lithology, silty-sand matrix.

19 - 21 m Gypsum, white to light grey, nodular, some thin, light to medium grey, calcareous mud surrounding nodules.

**Formation:** Codroy Road Formation (Gypsum)

**Operations:** NQ size core to casing point, ream hole open. Prepare to install NW casing to 21 m and cement casing in hole

**Comments:** Moved drill to new location (FBTH#3). Drill rig set up and levelled, water lines run, site trailer, generator, porta-potty and remote heater moved and installed. Prepare to install casing and cement in the hole.



**Daily Report:** 2

**Date:** Monday 23, February 2009 (0000 hrs – 24000 hrs)

**Hole Number:** Flat Bay Test Hole #3 (FBTH#5)

UTM Nad 27 Zone 21

5359971 m N, 0384451 m E

**Azimuth:** 180 degrees

**Inclination:** 45 degrees

**Elevation:** Surface (approximately) 51 m (asl)

Casing (approximately) 51.1 m (asl)

**Weather:** Overcast, snow flurries, light wind (10km/hr), temperature -2°C

**Depth Start:** 21 m

**Depth End:** 24 m **TVD:** 16.9 m

**Drilling Fluid:** Water with some water based polymer for increased viscosity and hole stability.

**Bit:** Casing Shoe (Fordia CN-ST-5-1C4, serial # 77503-09)

NQ Core Bit (Longyear, AlphaBit 7, serial # 144345-7)

**Survey:** N/A

**Lithology:** 0 - 19 m Overburden, tailings and some cobbles of various lithology, silty-sand matrix.

19 - 24 m Gypsum, white to light grey, nodular, light to medium grey, calcareous mud surrounding nodules.

**Formation:** Codroy Road Formation (Gypsum)

**Operations:** Cement casing in hole at 24 m. 3 bags of cement mixed to 1821 kg/m<sup>3</sup>, including 50% excess.  
Cement job finished at 2200 hrs.

Waiting on cement

**Comments:** Cored ahead to 24 m to confirm bedrock, reamed hole open and installed NW casing to 24 m. 8 lengths of NW casing installed in hole. Cement pumped through casing, no returns to surface. Cement poured from surface around surface casing. Cement settled and setup just below grade



**Daily Report:** 3

**Date:** Tuesday 24, February 2009 (0000 hrs – 24000 hrs)

**Hole Number:** Flat Bay Test Hole #3 (FBTH#5)

UTM Nad 27 Zone 21

5359971 m N, 0384451 m E

**Azimuth:** 180 degrees

**Inclination:** 45 degrees

**Elevation:** Surface (approximately) 51 m (asl)

Casing (approximately) 51.1 m (asl)

**Weather:** Sunny with cloudy periods, moderate wind (30km/hr), temperature -8°C

**Depth Start:** 24 m

**Depth End:** 41 m **TVD:** 29 m

**Drilling Fluid:** Water with some water based polymer for increased viscosity and hole stability.

**Bit:** NQ Core Bit (Longyear, AlphaBit 7, serial # 144345-7)

**Survey:** N/A

**Lithology:** 24 -41 m Gypsum, white to light grey, nodular, light to medium grey, calcareous mud surrounding nodules. Thin beds of anhydrite at base.

**Formation:** Codroy Road Formation (Gypsum)

**Operations:** Coring NQ

**Comments:** Tagged cement in casing at 21 m. Pressure test casing at 1000 kPa for 5 minutes. Drill out cement and start coring NQ.



**Daily Report:** 4

**Date:** Wednesday 25, February 2009 (0000 hrs – 24000 hrs)

**Hole Number:** Flat Bay Test Hole #3 (FBTH#5)

UTM Nad 27 Zone 21

5359971 m N, 0384451 m E

**Azimuth:** 180 degrees

**Inclination:** 45 degrees

**Elevation:** Surface (approximately) 51 m (asl)

Casing (approximately) 51.1 m (asl)

**Weather:** Overcast, moderate wind (20km/hr), temperature -10°C

**Depth Start:** 41 m

**Depth End:** 165 m **TVD:** 116.7 m

**Drilling Fluid:** Water with some water based polymer for increased viscosity and hole stability.

**Bit:** NQ Core Bit (Longyear, AlphaBit 7, serial # 144345-7)

**Survey:** Depth: 108 m

Azimuth: 202.8 degrees (corrected 181.8 degrees)

Inclination: 45.7 degrees

**Lithology:** 41 – 46.5 m Gypsum; white to light grey, nodular, light to medium grey, calcareous mud surrounding nodules, thin beds of anhydrite.

46.5 – 165 m Anhydrite; steel blue, massive, sugary texture, laminated limestone beds up to 5 m thick at 110.3 m, 125.6 m, and 150.4 m.

**Formation:** Codroy Road Formation (Anhydrite)

**Operations:** Coring NQ

**Comments:**



**Daily Report:** 5

**Date:** Thursday 26, February 2009 (0000 hrs – 24000 hrs)

**Hole Number:** Flat Bay Test Hole #3 (FBTH#5)

UTM Nad 27 Zone 21

**Azimuth:** 180 degrees

5359971 m N, 0384451 m E

**Inclination:** 45 degrees

**Elevation:** Surface (approximately) 51 m (asl)

Casing (approximately) 51.1 m (asl)

**Weather:** Overcast, moderate wind (20km/hr), temperature -10°C

**Depth Start:** 165 m

**Depth End:** 249 m **TVD:** 176 m

**Drilling Fluid:** Water with some water based polymer for increased viscosity and hole stability.

**Bit:** NQ Core Bit (Longyear, AlphaBit 7, serial # 144345-7)

**Survey:** Depth: 249 m

Azimuth: 206.7 degrees (corrected 185.7 degrees)

Inclination: 47 degrees

**Lithology:** 165 – 196 m Anhydrite; steel blue, massive, sugary texture, calcareous mudstone bed 3 m thick at 186 m.

196 – 201 m Limestone (Ship Cove) light brown, wavy laminations, some oil weeping out along bedding planes

201 – 249 m Conglomerate (Fischell's Brook), pebble to cobble sized, sub-rounded, clasts; supported in a medium to coarse sand matrix. Oil weeping out around clast boundaries and matrix, various intervals throughout section.

**Formation:** Spout Falls Formation, Fischell's Brook Conglomerate

**Operations:** Abandon hole

**Comments:** Cored hole to 249 m, total depth. Survey; fill hole with cement on way out of hole. Topped up cement when all rods out of hole. Start to demobilize drill rig.

## **Appendix III**

### **Bit Record**



## Bit Record Flat Bay Test Hole #3

Bit Number	Size (mm)	Type (Serial #)	Depth In (mRC)	Depth Out (mRC)	Meterage (m)	Hours (h)	ROP (m/hr)	Pulled Condition
1	91.7	Fordia CN-ST-5-1C4	0	24	24	11	2.2	Stayed in hole
2	75.7	RR AlphaBit 7 (144345-7)	0	249	249 (+49.5)	45	5	75% worn

**Appendix IV**  
**Composite Well Record**

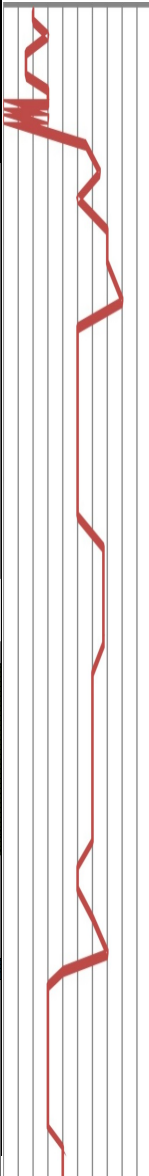
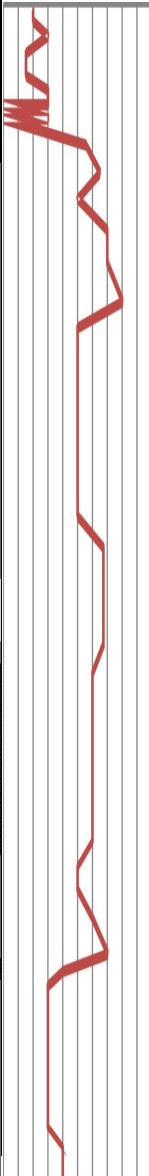
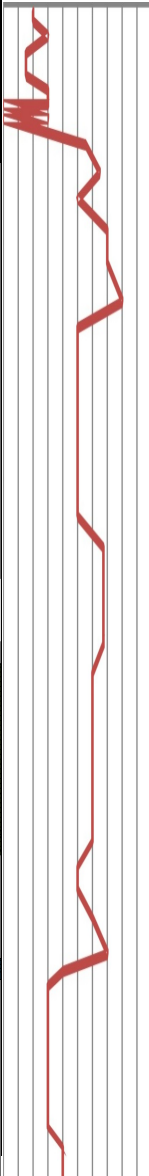
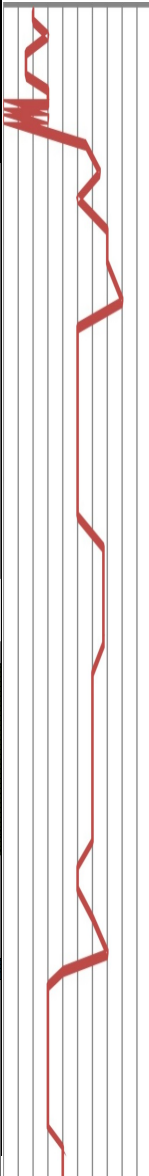




## Flat Bay Test Hole #3, February 2009

Position projection NAD 27: 384484.551-mE, 5359954.120-mN, Casing + 46.89-m

All depths are MD Casing

Depth	Lithology Description	Lithology Column	ROP		Casing Scheme	Drilling Data			DF & Cementing			Remarks
			0	ROP (m/hr) 10		Deviation:	Bit:	Comments:	Drilling Fluid:	Cement:	Comments:	
0	Overburden 0m to 19.2m				88.9-mm 12.8-kg/m @ 24-m		#1. 0 m to 24 m 91.7 mm NW Casing Shoe: Fordia CN-ST-5-1C4; meterage: 24 m; 11 hrs; ROP: 2.2 m/h		Type: Water based polymer (Poly Plus); MW ~1000-kg/m3	One stage cement job. Pump 0.3-m <sup>3</sup> H <sub>2</sub> O preflush. Pump 0.1-m <sup>3</sup> Class A 1820 kg/m <sup>3</sup> cement slurry.	* 50% open hole excess * 0.03-m <sup>3</sup> cement topped up at surface * Tag TOC at 21-m	
25	Gypsum 19.2m to 46.5m						#2. 0 m to 24 m 75.5 mm NQ Core: RR AlphaBit 7 (s/n 144345-7); meterage: 21 m; 8 hrs; ROP: 2.6 m/hr					
50	Codroy Road Formation, Anhydrite 46.5m to 195.86m				88.9-mm 12.8-kg/m @ 24-m		#2. 24 m to 249 m 75.5 mm NQ Core: RR AlphaBit 7 (s/n 144345-7); meterage: 225 m; 45 hrs; ROP: 5 m/hr		Type: Water based polymer (Poly Plus); MW ~1000-kg/m3			
75												
100						Deviation -45.7 degrees Azimuth 202.8 degrees @ 108 m Reflex						
125												
150					88.9-mm 12.8-kg/m @ 24-m							
175												
200	Ship Cove 195.86m to 201m											
225	Spout Falls Formation Conglomerate 201 to 249 m					Deviation -47.0 degrees Azimuth 206.7 degrees @ 249 m Reflex				Abandonment Cement, 3 stages from 249 m to surface; pump 1.13 m3 class A, 1820 kg/m3; topped up at surface	Reach TD; intersect 48 m of Spout Fall's Formation, Fischell's Brook Conglomerate	
250					88.9-mm 12.8-kg/m @ 24-m							

MARKS: Licence 03-106

Spud Date: Feb 22, 2009 @ 14:00 Rig Release: Feb 27, 2009 @ 00:30

Rig: Logan Drilling Inc. Duralite 800

Total Operational Hours: 120.00 Percentage Operational NPT: 50.0%

## **Appendix V**

### **Stratigraphic Column**

### Flat Bay Test Hole #3

Age	Depth (m)	Lithology	Description	Unit	Oil Show	Porosity
Visean	0.0		Overburden: Glacial till or fill material, consisting of gypsum tailings, cobbles, boulders with a matrix of sand and clay.	Codroy Road Formation		
	25.0		Gypsum: White, chalky to sugary texture, nodular with thin irregular wisps of calcareous mudstone (micrite) surrounding nodules; increasing amounts of calcareous clay and some bands of anhydrite toward base of unit.			
	50.0		Anhydrite: Steel blue, massive with sugary texture with thin (cm) irregular, light brown wisps to laminations of micrite.			
Tournaisian	75.0			Spout Falls Formation -		
	100.0					
	125.0		Limestone: Light brown, thin beds; dark grey laminations of calcareous/organic rich mud at 45° to Core Axis (CA); displacive anhydrite nodules between beds; some vuggy porosity with calcite crystal growth; no hydrocarbon odour.			
	150.0		Anhydrite: Steel blue, massive with sugary texture with thin (cm) irregular light brown wisps to laminations of micrite with depth.			
	175.0			Spout Falls Formation -		
	200.0		Limestone: Light gray beds (1 cm thick) with thin medium to dark gray organic rich laminations at 50° to CA; small (mm) nodules of anhydrite along organic laminations; slump or fold at 198.4 m; oil weeping out along bedding planes from 198 - 201 m, grades back into micrite at base.			
	225.0		Conglomerate: Rounded to sub-rounded, point to matrix supported, dominantly pebble sized clasts with some cobble sized zones, clasts of limestone, dolostone and igneous; medium to coarse graind sand matrix; porosity visually extimated at 3-5%; oil weeping out of matrix and pebble conglomerate zones.			
	250.0					

## **Appendix VI Core Box Depths**



## Core Box Depths

## Flat Bay Test Hole #3

Box #	Start depth	End Depth (m)
1	19.20	23.44
2	23.44	27.77
3	27.77	32.30
4	32.30	36.73
5	36.73	41.33
6	41.33	45.62
7	45.62	49.96
8	49.96	54.42
9	54.42	58.75
10	58.75	63.16
11	63.16	67.63
12	67.63	72.00
13	72.00	76.51
14	76.51	80.94
15	80.94	85.25
16	85.25	89.65
17	89.65	94.01
18	94.01	98.44
19	98.44	102.70
20	102.70	106.96
21	106.96	111.28
22	111.28	115.45
23	115.45	120.00
24	120.00	124.33
25	124.33	128.70
26	128.70	133.03
27	133.03	137.42
28	137.42	141.80
29	141.80	146.30
30	146.30	150.73
31	150.73	155.04
32	155.04	159.56
33	159.56	163.88
34	163.88	168.33
35	168.33	172.80
36	172.80	177.08
37	177.08	181.55
38	181.55	185.88
39	185.88	190.35
40	190.35	194.78
41	194.78	199.10
42	199.10	203.35
43	203.35	207.66
44	207.66	212.00
45	212.00	216.00
46	216.00	220.24
47	220.24	224.72
48	224.72	229.00
49	229.00	233.20
50	233.20	237.27
51	237.27	241.61
52	241.61	246.00
53	246.00	249.00

## **Appendix VII**

### **Lithological Descriptions**



Depth (m)		Thickness (m)	Description	Lineations	Porosity	Oil/gas show	Rock quality
From	To						
0	19.2	19.2	Overburden: Glacial till or fill material, consisting of gypsum tailings, cobbles, boulders with a matrix of sand and clay.				
<b>19.2 - 46.5 m, Codroy Road Formation, Gypsum Unit</b>							
19.2	46.5	27.3	Gypsum: White, chalky to sugary texture, nodular with thin irregular wisps of calcareous mudstone (micrite) surrounding nodules; increasing amounts of calcareous clay and some bands of anhydrite toward base of unit.				Consolidated
<b>46.5 - 195.86 m, Codroy Road Formation, Anhydrite Unit</b>							
46.5	110.34	63.84	Anhydrite: Steel blue, massive with sugary texture with thin (cm) irregular, light brown wisps to laminations of micrite.				Consolidated
110.34	111.7	1.36	Limestone: Light brown, thin beds; dark grey laminations of calcareous/organic rich mud at 40° to Core Axis (CA); displacive anhydrite nodules between beds; some vuggy porosity; no hydrocarbon odour; gradational upper and lower contacts into anhydrite.	40° CA			Consolidated
111.7	125.65	13.95	Anhydrite: Steel blue, massive with sugary texture with thin (cm) irregular, light brown wisps to laminations of micrite.				Consolidated
125.65	130.5	4.85	Limestone: Light brown, thin beds; dark grey laminations of calcareous/organic rich mud at 45° to Core Axis (CA); displacive anhydrite nodules between beds; some vuggy porosity with calcite crystal growth; no hydrocarbon odour.	45° CA			Consolidated
130.5	173.3	42.8	Anhydrite: Steel blue, massive with sugary texture with thin (cm) irregular light brown wisps to laminations of micrite with depth.				Consolidated

173.3	195.86	22.56	Anhydrite: Steel blue, massive to nodular/chicken wire texture; increasing amount of irregular to laminated micrite and thin beds of light brown limestone at 60° to CA; light petroliferous odour and rare oil staining below 189 m.	60° CA			Consolidated
<b>195.86 - 201 m, Ship Cove Formation</b>							
195.86	196.11	0.25	Micrite: bluish to greenish grey, laminated to thin bedded at 55° to CA, with anhydrite nodules along dark gray "organic" beds; no hydrocarbon odour.	55° CA			Consolidated
196.11	201	4.89	Limestone: Light gray beds (1 cm thick) with thin medium to dark gray organic rich laminations at 50° to CA; small (mm) nodules of anhydrite along organic laminations; slump or fold at 198.4 m; oil weeping out along bedding planes from 198 - 201 m, grades back into micrite at base.	50° CA			Consolidated
<b>201 - , Spout Falls Formation, Fischell's Brook Conglomerate</b>							
201	213	12	Conglomerate: Rounded to sub-rounded, point to matrix supported, dominantly pebble sized clasts with some cobble sized zones, clasts of limestone, dolostone and igneous; medium to coarse graind sand matrix; porosity visually extimated at 3-5%; oil weeping out of matrix and pebble conglomerate zones.		3-5%	Good oil show, oil weeping from matrix and clast boundaries in pebble cgl.	Consolidated
213	216.2	3.2	Conglomerate: Rounded to sub-rounded, point to matrix supported, increasing size and abundance of clasts from pebble to cobble; medium to coarse graind sand matrix; porosity visually extimated at 3-5%; some oil weeping around clast boundaries; core is competent with breaks along clast boundaries.		3-5%	very minor oil show, oil weeping around clast boundaries	Consolidated

216.2	216.4	0.2	Conglomerate: Pebble conglomerate, matrix to point supported; coarse grained sand matrix with calcareous cement, consolidated; moderate oil show weeping from matrix and clast boundaries with moderate oil show; 1 cm quartz rimmed vug; porosity visually estimated at 4-6%.		4-6%	moderate oil show	Consolidated
216.4	217.6	1.2	Conglomerate: Rounded to sub-rounded, point to matrix supported, increasing size and abundance of clasts dominantly cobbles; medium to coarse graind sand matrix; some oil weeping around clast boundaries; porosity estimated between 3-5%; core is competent with breaks along clast boundaries.		3-5%	very minor oil show around some clast boundaries	Consolidated
217.6	217.85	0.25	Conglomerate: Pebble conglomerate, matrix to point supported; coarse grained sand matrix with calcareous cement, consolidated; moderate oil show weeping from matrix and clast boundaries; porosity visually estimated at 4-6%.		4-6%	moderate oil show	
217.85	219.54	1.69	Conglomerate: Rounded to sub-rounded, point to matrix supported, increasing size and abundance of clasts dominantly cobbles; medium to coarse graind sand matrix; some oil weeping around clast boundaries; porosity estimated between 3-5%; core is competent with breaks along clast boundaries.		3-5%	Very minor	Consolidated
219.54	219.62	0.08	Sandstone: Coarse to very coarse grained sand, thinly bedded; porosity visually estimated at 7-10%; good oil show throughout section.	60° CA	7-10%	Good oil show, oil bleeding out of sandstone.	Consolidated

219.62	221.36	1.74	Conglomerate: Cobble conglomerate, point to matrix supported, sub-rounded clasts; coarse grained sand matrix with bed of very coarse grained sandstone from 220.12 - 220.34 m; Unit grades into a pebble conglomerate with oil weeping out at matrix and clast boundaries along the transition zone; porosity is estimated at 3-5%; compentent core with breaks along clast boundaries.		3-5%	very minor	Consolidated
221.36	224.5	3.14	Conglomerate: Pebble to cobble conglomerate, matrix to point supported; coarse grained sand matrix with calcareous cement, consolidated; moderate oil show weeping from matrix and clast boundaries; porosity visually estimated at 4-6%.		4-6%	moderate oil show	Consolidated
224.5	232.62	8.12	Conglomerate: Cobble conglomerate, point to matrix supported, sub-rounded clasts, thin zones of pebble conglomerate; coarse grained sand matrix; some oil weeping out at matrix and clast boundaries; porosity is estimated at 3-5%; compentent core with breaks along clast boundaries.		3-5%	minor	Consolidated
232.62	232.88	0.26	Conglomerate: Cobble to pebble conglomerate, point to matrix supported, sub-rounded clasts; coarse grained sand matrix; quartz rimmed vugs up to 5 cm in diameter, good oil show; porosity estimated at 10-12%.		10-12%	good oil show	Consolidated

232.88	246.5	13.62	Conglomerate: Cobble conglomerate, point to matrix supported, sub-rounded clasts, thin zones of pebble conglomerate; coarse grained sand matrix; some oil weeping out at matrix and clast boundaries; porosity is estimated at 3-5%; competent core with breaks along clast boundaries.		5-7%	minor oil show	Consolidated
246.5	246.65	0.15	Sandstone: Bluish grey; coarse to very coarse grained sand, thinly bedded; porosity visually estimated at 6-8%; minor oil show.		6-8%	minor oil show	Consolidated
246.65	249	2.35	Conglomerate: Pebble to cobble conglomerate, matrix to point supported; coarse grained sand matrix with calcareous cement, blocky core at 247.3 m; good oil show weeping from matrix and clast boundaries; porosity visually estimated at 7-10%.		7-10%	good oil show, oil weeping out of matrix and around clast boundaries	Blocky from 247.3 - 247.35 m
249 m End of Hole							

## **Appendix VIII**

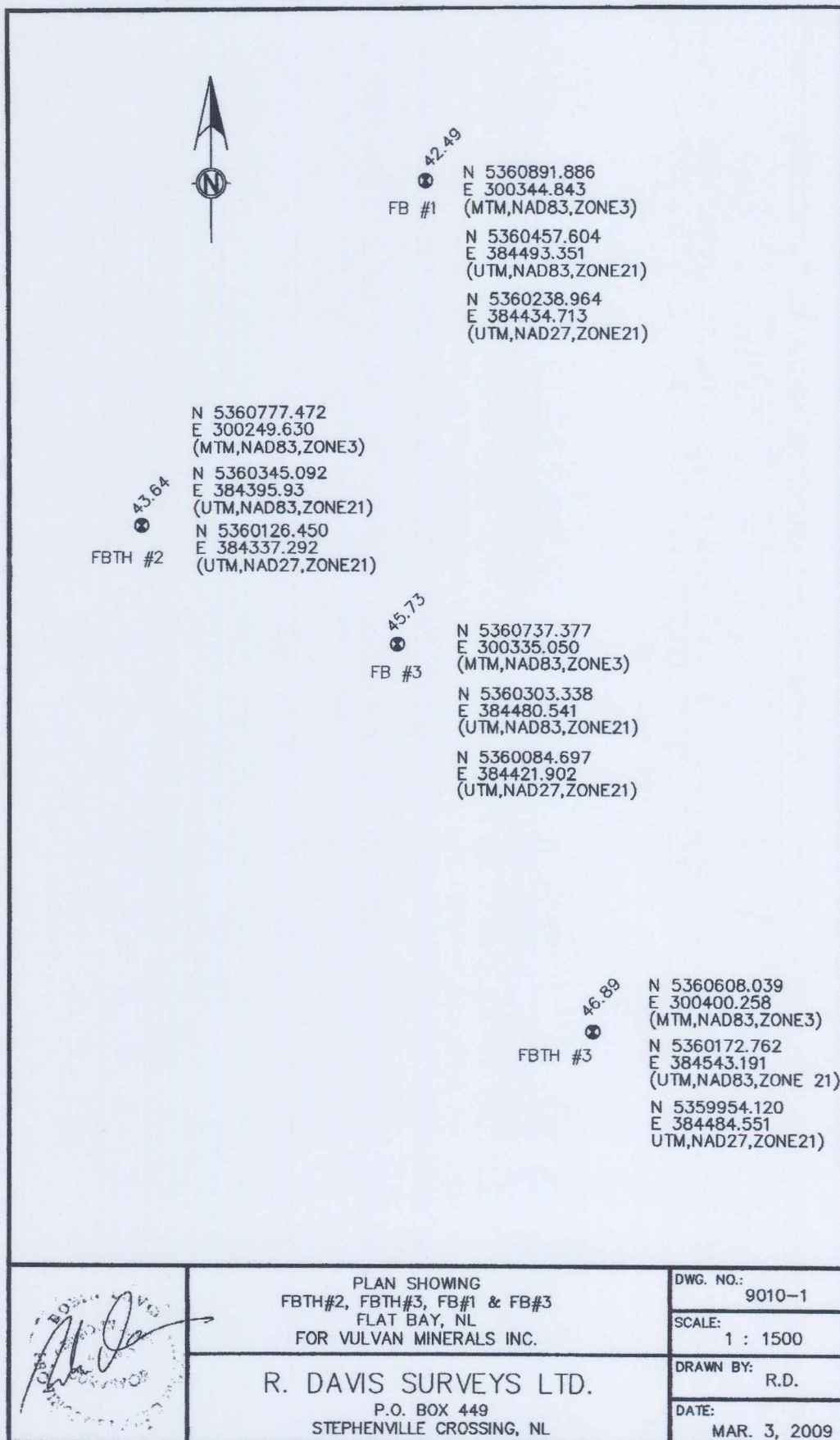
### **Legal Survey**



Confidential

MTM, NAD83, ZONE 3				UTM, NAD83, ZONE 21				UTM, NAD27, ZONE 21			
POINT #	NORTHING	EASTING	ELEV.	DESC.	NORTHING	EASTING	ELEV	NORTHING	EASTING	ELEV	
1	5362261.793	298354.05	25.87	CM84G4148	5361866.032	382530.02	25.87	5361647.393	382471.398	25.87	
4	5360608.033	300400.255	46.89	FBTH#3	5360172.762	384543.191	46.89	5359954.12	384484.551	46.89	
6	5360737.377	300335.05	45.73	FB#3	5360303.338	384480.541	45.73	5360084.697	384421.902	45.73	
8	5360777.474	300249.629	43.64	FBTH#2	5360345.092	384395.93	43.64	5360126.45	384337.292	43.64	
10	5360891.886	300344.843	42.49	FB#1	5360457.604	384493.351	42.482	5360238.964	384434.713	42.49	

Confidential



**Appendix IX**  
**Core Photos**





Plate 1. 19.2 - 41.3 metres.



Plate 2. 41.3 - 63.2 metres.





Plate 3. 63.2 - 85.3 metres.



Plate 4. 85.3 - 106.9 metres.





Plate 5. 106.9 - 128.7 metres.



Plate 6. 128.7 - 150.7 metres.





Plate 7. 150.7 - 172.8 metres.



Plate 8. 172.8 - 194.8 metres .





Plate 9. 194.8 - 216.0 metres.



Plate 10. 216.0 - 237.3 metres.



Plate 11. 237.3 - 249.0 metres.

## **Appendix X**

### **Core Analysis Report**



**TABLE 1**  
**WELLS: FLAT BAY TEST HOLE # 2; FLAT BAY TEST HOLE # 3**  
**FLAT BAY AREA, SHIP COVE / SPOUT FALLS FORMATION**  
**SUMMARY OF MAIN PARAMETERS OF CORE SAMPLES SELECTED**

Sample ID	Depth (m)	Depth (ft)	Grain Density (kg/m)	Porosity (fraction)	Air Permeability (mD)	Water Saturation (fraction)	Oil Saturation (fraction)	Gas Saturation (fraction)	Comments
<b>Well: Flat Bay Test Hole #2</b>									
1	140.10	459.65	2700	0.033	0.003	0.353	0.440	0.208	crystalline limestone
2	140.78	461.88	2700	0.065	0.002	0.117	0.383	0.500	crystalline limestone
3	143.30	470.14	2850	0.009	0.001	0.072	0.214	0.714	calcite dolomite , Hg Bulk
4	145.30	476.71	2620	0.004	0.000	0.130	0.210	0.661	Hg Bulk
5	148.77	488.09	2620	0.027	0.039	0.040	0.763	0.197	irregular size grains calcite
6	153.35	503.12	2670	0.071	0.112	0.290	0.386	0.324	irregular size grains
7	153.65	504.10	2680	0.045	0.118	0.376	0.201	0.423	irregular size grains
8	154.75	507.71	2680	0.030	0.123	0.711	0.289	0.000	irregular size grains
9	175.00	574.15	2660	0.137	3.73	0.298	0.148	0.554	fine grains
10	175.25	574.97	2660	0.097	2.44	0.415	0.140	0.446	fine grains
11	175.40	575.46	2670	0.083	0.456	0.450	0.117	0.433	fine to medium grains
12	176.10	577.76	2630	0.011	0.430	0.503	0.013	0.484	very fine sandstone / infill frags
13	200.77	658.69	2640	0.009	0.024	0.860	0.008	0.133	from individual meters
14	210.16	689.50	2730	0.080	0.100	0.563	0.047	0.389	from individual meters
16	163.08	535.04	2670	0.111	0.539	0.386	0.101	0.513	fine to medium grains, from individual meters
<b>Well: Flat Bay Test Hole #3</b>									
1	198.62	651.64	2710	0.038	0.002	0.144	0.294	0.562	limestone
2	199.55	654.69	2700	0.039	0.050	0.319	0.423	0.258	limestone bedded
3	200.00	656.17	2700	0.015	0.001	0.145	0.248	0.607	Hg bulk
4	200.88	659.06	2710	0.010	0.000	0.595	0.184	0.221	limestone
5	201.68	661.68	2680	0.059	0.037	0.346	0.346	0.309	calcite sandstone
6	202.59	664.67	2840	0.016	0.000	0.214	0.280	0.506	calcite dolomite
7	202.69	664.99	2700	0.046	0.067	0.188	0.452	0.361	mix sandstone /calcite nodule
8	207.48	680.71	2700	0.047	0.067	0.301	0.321	0.378	mix sandstone /calcite nodule
9	209.32	686.75	2710	0.032	0.064	0.407	0.301	0.292	mix sandstone /calcite nodule
10	209.66	687.86	2670	0.069	0.129	0.281	0.292	0.427	mix sandstone /calcite nodule
11	211.92	695.28	2640	0.008	0.000	0.256	0.526	0.218	sandstone
12	246.64	809.19	2670	0.149	4.74	0.339	0.131	0.529	fine sandstone
13	248.08	813.91	2660	0.103	1.28	0.363	0.233	0.404	fine calcite nodule
14	248.36	814.83	2670	0.095	0.768	0.317	0.194	0.489	fine calcite nodule
15	239.15	784.61	2660	0.061	0.100	0.481	0.051	0.469	from individual meters

**Appendix XI Well  
Termination Record**



Government of Newfoundland and Labrador  
Department of Natural Resources  
Energy Branch

## WELL TERMINATION RECORD

### WELL DATA

<b>Well Name:</b>	Flat Bay Test Hole #3	<b>CO-ORDINATES</b>	
<b>Operator:</b>	Vulcan Minerals Inc.	<b>Long :</b>	<b>UTM (NAD 27)</b>
<b>Drilling Rig :</b>	Duralite 800	<b>Lat. :</b>	<b>Northing:</b> 5359954.120
<b>Rig Type :</b>	Core Drill	<b>ELEVATION</b>	<b>DEPTH</b>
<b>Drilling Contractor:</b>	Logan Drilling Limited	<input type="checkbox"/> RT <input type="checkbox"/> KB <input type="checkbox"/> RF m	<b>M.D.:</b> 249
		<b>G.L.:</b> 46.89	<b>T.V.D.:</b> 176
<b>FOR INTERNAL USE ONLY</b>			
<b>Spud Date:</b>	February 22, 2009	For the purpose of interpreting subsection 154 (5) of the Petroleum Drilling Regulations, the rig release date is deemed to be:	
<b>T.D. Date:</b>	February 26, 2009		
<b>Rig Release Date:</b>	February 27, 2009	Feb 27, 2009	
<b>Well Termination Date:</b>	February 27, 2009		
<b>Purpose of Termination:</b>	<input type="checkbox"/> Suspension <input checked="" type="checkbox"/> Abandonment <input type="checkbox"/> Completion <input type="checkbox"/> Other:		

### CASING AND CEMENTING PROGRAM

O.D. (mm)	WEIGHT (kg/m)	GRADE	SETTING DEPTH (m)	CEMENTING DETAILS
88.9	12.8	NW	24	0.1 m3, 1820 kg/m3, Type A

### PLUGGING PROGRAM

Approval of the following program was obtained by (person) Robert Cuthbert  
from (person) \_\_\_\_\_ of the Department of Natural Resources by means of  
as per Authority to Drill a Well Application \_\_\_\_\_ dated 2009-02-10

Type of Plug	Interval	Felt/Pressure Tested	Cement and Additives
Cement	0-249 m	observed at surface	1.13 m3, 1820 kg/m3, Type A

**Lost Circulation/Overpressure Zones:** None encountered

### Downhole Completion/Suspension Equipment (Describe Below and Attach Sketch of Wellbore)

Cement from surface to TD - see attached sketch  
Casing cut off 1 m below grade, sign to be erected once weather improves.

### DECLARATION

The undersigned **OPERATOR'S REPRESENTATIVE** hereby declares that on the basis of personal knowledge of operations undertaken at the above named well, the above information is true, accurate and complete.

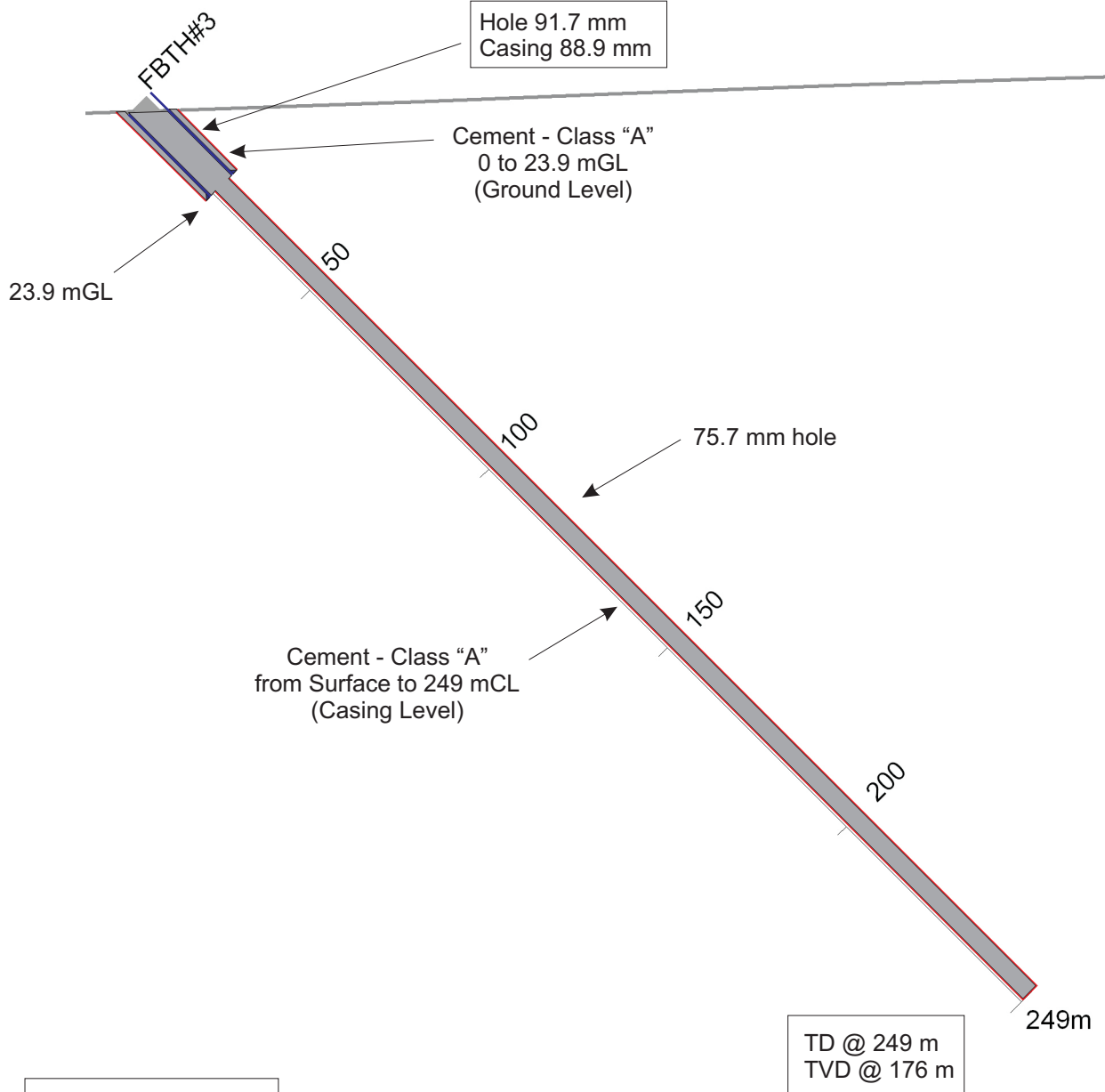
**Name** Robert Cuthbert **Title** Geologist (Vulcan Minerals Inc.)  
**Signed** [Signature] **Date** March 20, 2009

### ACKNOWLEDGEMENT

Acknowledged by: Kirk Dymis Date: April 2, 2009

Director

UTM NAD 27 Zone 21 Coordinates  
 N 5359954.120 m  
 E 0384484.551 m  
 Casing Elevation: 46.89 m  
 Azimuth: 270 degrees  
 Inclination: -45 degrees



Abandonment  
 Operations  
 February 26, 2009



**Vulcan Minerals Inc.**  
**Flat Bay Test Hole #3**  
**Abandonment Configuration**

**Scale:** Not to Scale

**Drawn By:** R. Cuthbert  
**Date:** March 12, 2009

**Drawing #:** FBTH#3 Abandon  
**Revision:** 0