Petroworth Resources Inc.
Petroworth West Ainslie No.1
West Lake Ainslie, Inverness County, Nova Scotia, Canada

Technical Report

To accompany

Application for An Authority to Drill

(NSDE Exploration Agreement No. 04-07-15-03)

Submitted to: Nova Scotia Department of Energy

Canadian Petroleum Engineering Inc. Calgary, Alberta, Canada

W.G. Shaw & Associates Ltd. Antigonish, Nova Scotia, Canada

September 21, 2010

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1.0 Well Information

1.1 Introduction

Petroworth Resources Inc. is planning to drill a conventional petroleum exploration well (Drill Site) in southwestern Inverness County, Nova Scotia for the purpose of evaluating the petroleum potential of a prospect that has been outlined by previous exploration work, including a reflection seismic program conducted in the summer of 2009. The proposed Drill Site is immediately east of the West Lake Ainslie Road on a property owned by Mr. Ken MacDonald of the village of West Lake Ainslie (Surface Lease is presented in Appendix A). The Drill Site is located at Easting: 640,155 m (NAD 83), Northing: 5,106,602 m (NAD 83) and ground elevation is 85 metres (amsl).

Petroworth is a junior oil and gas company, committed to safeguarding
the welfare of on-site, personnel, the public and the environment through the application of best practices in their operations and by meeting or exceeding regulatory guidelines.

Figure #1 Location of proposed well site on map of Cape Breton Island, Nova Scotia

Petroworth Resources Inc. has held a Petroleum Exploration Agreement (No. 04-07-15-03) in southern Inverness County, Cape Breton Island since 2004 (Figure #1). Over the past several years, Petroworth has conducted geological mapping, a soil gas survey, a gravity survey and in Year 2009 collected 90 kilometres of reflection seismic data in the agreement area.

Drilling is scheduled to begin at the West Lake Ainslie No.1 drill site in mid-November of 2010, with completion in about 14 to 20 days. It is expected that the well will be terminated at a depths of from 1,200 to 1,500 meters.

Drilling services have been contracted to Nabors Drilling Ltd. (Drill Rig #112) under the direction of Canadian Petroleum Engineers Inc. (Appendix A).
1.2 **The Drill Site**

The Petroworth West Ainslie drill site will consist of the following:

An access road will be constructed from the West Lake Ainslie Road to the drill pad which will be located 200 metres to the east of the road.

A 100 metres by 75 metres drill pad will be constructed by removing the topsoil, leveling, laying a liner and built-up using locally-sourced gravel followed by leveling and compacting. The access road and pad will be constructed on land currently used as a hay field. Surface drainage is by overland flow toward the northeast.

The Nabors #112 drill rig will be constructed on the pad with the wellhead located near the center of the pad. An emergency flare system (pipes will be located south of the wellhead. A cement pit (approximately 3x3x3 m in size) for handling the cement returns during drilling will also be constructed near the wellhead. The site trailer and four or five support shacks will be lined up along one side of the pad. There will also be a freight van for drilling mud storage. A septic holding tank (plastic) for wastewater (grey and black) will be located behind the trailers.
In the event of an unsuccessful exploration well, demobilization of equipment and site abandonment and reclamation will occur immediately after completion of the well. Petroworth will consult the Nova Scotia Departments of Energy and Environment and utilize good oilfield practices to plan abandonment of the well bore and reclamation of the lease site.
1.3 Geologic Prognosis

Petroworth West Ainslie No.1 will be spud in the Ainslie Formation which is the upper part of the Horton Group. The Ainslie Formation is dominated by greyish-green and reddish-grey, fine grained sandstones that are interbedded with reddish-brown coloured siltstones. At approximately 300 metres depth, the well is expected to enter the Strathlorne Formation which is dominated by grey and dark grey coloured shales, mudstones and siltstones with lesser amounts of interbedded, grey coloured sandstones and minor, thin carbonate beds. At approximately 800 metres the well may enter the Creignish Formation which is dominated by reddish-brown and grey coloured conglomerate and pebbly sandstone with lesser amounts of reddish-brown coloured, fine grained sandstone and minor siltstone.

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<tr>
<th>Formation Name</th>
<th>Depth (m)</th>
<th>Stratigraphy</th>
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<tbody>
<tr>
<td>top</td>
<td>below ground surface (metres)</td>
<td>subsea</td>
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<td>Surficial Sediments</td>
<td>0</td>
<td>85</td>
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<td>Ainslie Formation</td>
<td>15</td>
<td>70</td>
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<td>(top of bedrock)</td>
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<tr>
<td>Strathlorne Formation</td>
<td>300</td>
<td>-215</td>
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<td>Creignish Formation</td>
<td>800</td>
<td>-715</td>
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<tr>
<td>TD</td>
<td>1,200</td>
<td>-1,115</td>
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1 List of Contacts
2 Evaluation Program (Logs, Cores, Tests)
<table>
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<tr>
<th>Contractors Name</th>
<th>Function</th>
<th>Address and Phone Numbers</th>
<th>Personnel</th>
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<tr>
<td>Cameron</td>
<td>Wellhead Equipment</td>
<td></td>
<td>Dwayne Rentz: Cell (902) 461-4444</td>
</tr>
<tr>
<td>Canadian Petroleum Engineering Inc.</td>
<td>Drilling Engineers</td>
<td>1900, 717 - 7th Avenue, SW</td>
<td>Ed Forche: Cell (403) 860-6318</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Calgary, Alberta T2P 0Z3</td>
<td>(Project Manager)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Telephone: (403) 741-9269</td>
<td>Lone Hamer: Cell (403) 833-9716</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(Drilling Manager)</td>
</tr>
<tr>
<td>MacInnis, Duncan</td>
<td>Well Site Geologist</td>
<td>Doctor's Brook, Antigonish County</td>
<td>Darren Kebdychuk</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nova Scotia</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Telephone: (902) 563-0360</td>
<td></td>
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<tr>
<td>Mi Swaco Ltd.</td>
<td>Provision of Drilling Fluids</td>
<td>55 Mosher Drive</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dartmouth, Nova Scotia</td>
<td>Darren Kebdychuk</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B33 1E5</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Telephone: (902) 463-8015</td>
<td></td>
</tr>
<tr>
<td>Nabors Drilling Ltd.</td>
<td>Drilling Contractor</td>
<td>2800, 500 - 4th Avenue, SW</td>
<td>Ed Forche</td>
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<tr>
<td></td>
<td></td>
<td>Calgary, Alberta T2P 2V6</td>
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<tr>
<td></td>
<td></td>
<td>Telephone: (403) 263-6777</td>
<td></td>
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<tr>
<td>Schlumberger</td>
<td>Borehole Geophysical Logging</td>
<td>33 Thornhill Drive</td>
<td>Patrick Leahy</td>
</tr>
<tr>
<td></td>
<td>Cement</td>
<td>Dartmouth, Nova Scotia</td>
<td></td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Telephone: (902) 468-6474</td>
<td></td>
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<tr>
<td>Weatherford Canada</td>
<td>Casing/Power Tracing/Fishing</td>
<td>121 Thornhill Drive</td>
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<tr>
<td></td>
<td>Tools</td>
<td>Dartmouth, Nova Scotia</td>
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<tr>
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<td>B33 1B2</td>
<td>(902) 468-8006</td>
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<tr>
<td></td>
<td></td>
<td>Telephone: (902) 663-1903</td>
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</table>

Schlumberger Logging has been contracted to conduct borehole geophysical logging after completion of the well. Petroworth plans to run
Schlumberger’s “Platform Express + Sonic” suite of logs (compensated sonic, induction electrical conductivity, compensated density and neutron density).

No cores are planned for this well.

Formation testing may be conducted after completion of the borehole logging program if favourable intervals are identified by petrophysical analysis.

### 3.0
#### 3.1

**Drilling and Casing Program**

**Introduction**

**Casing Design**

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Size (mm)</th>
<th>Weight (kg/m)</th>
<th>Grade</th>
<th>Couplings</th>
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<td>Surface</td>
<td>175</td>
<td>219.1</td>
<td>35.7</td>
<td>J-55</td>
</tr>
<tr>
<td>Intermediate (Contingency)</td>
<td>1400</td>
<td>139.7</td>
<td>25.30</td>
<td>L-80</td>
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</table>

**Summary of Operations**

1. Notify Contractors of date of anticipated rig move.
2. Hold Pre-Spud safety meeting with all involved personnel.
3. Drill and set +/-15 meters of 340 mm conductor prior to MIRU.
5. MIRU and drill 175 meters of 269.8 mm surface hole with floc water. Mud up with gel/chemical mud as per mud program if required.
6. Double strap out of hole on wiper trip before logging.
7. Logging program for surface hole will be provided.
8. Run 175 meters of 219.1 mm 35.7 kg /m surface casing and cement to surface.
9. WOC; RIH and drill out shoe with water.
10. Displace the well to clay free polymer mud system as recommended in Mud program.
11. Drill 200 mm hole with mud to drill from the surface casing shoe to TD. Be vigilant through this section.
12. Survey from beneath the surface casing shoe at intervals not to exceed 100 m. More frequent surveys may be taken if the hole shows any indication of building angle.
13. POOH, condition mud and log as per logging program. Double strap on this
trip.
13    Conduct clean out trip prior to running casing.
14    Depending on the results of the well logging, up to 2 DST's may be run. This will be determined after logging is completed.
15    RIH with 139.7 mm, 25.30 kg/m L-80 production casing. Torque monitoring of each connection will be required.
16    Cement casing to surface as per regulatory requirements. Cement program may be a two (2) stage (i.e. fill/tail) cement job to ensure good cement bond to surface.
17    Install wellhead if well is to be left suspended.
18    Circulate wellbore to inhibited water after cementing so that no contaminants are left in the wellbore long term.
19    Close all wellhead valves, chain and lock.
20    Rig out drilling rig.

**Potential Problems**

1    Minor water flows in the surface hole section.
2    Lost circulation is possible if rocks, gravel or boulders are encountered.
3    Deviation could be a problem on surface hole if unconsolidated formations are encountered.
CANADIAN PETROLEUM ENGINEERING LTD.

STICK DIAGRAM – POST IN DOGHOUSE

Well Name: PetroWorth West Ainslie #1  License No. ____________

Operator: PETROWORTH RESOURCES INC.

Wellsite Supervisor:

Surface Hole
Drill 269 ½ mm hole to 175 m
Survey 1 ½ Kelly's then 30 m max
Dummy trip at 160 m
Double Snap at 175 m

Potential Problems: lost circulation
Use sawdust
Ainslie: 100m, water flows
keep hole full, do flow checks

Main Hole
Drill 200 mm hole to 1400 m
Mud up at approx. 175 m
Cut core at __________ m
Lost Circulation at _______ Zone_________

Sample requirements:
Every 5 m below surface casing

Potential Problems:
Survey 15 m below surface casing shoe
Survey every 100 m in upper section
Survey every 100 m in bottom 200 m
Sour Zones (%)

High Pressure Formations
Pressure: __________
Low Pressure Formations
Pressure: __________

Primary Target Formation Pressure
Bottom Hole Pressure
Pressure: 15100 kPa
Sour Zones

Wellhead/BOP's
_259_mm_21_Mpa
Casing Bowl
219.1 mm 21 Mpa
BOP Stack
ERCB Class III

Surface Casing
Depth: 175
Description:
219.1 mm, 33.7 kg/m
J-55, ST&C
Main Hole Mud
Upper Section
PHPA Clay Free

Formation Tops (m)
Ainslie 15
Strathmore 300
Creignish 700
TD 1400
Intermediate Casing
N/A

Properties
viscosity: __________ g/l
water loss: __________
ph: __________
solids: __________ %
mudweight: __________

Drill to 1400 m
Properties
viscosity: __________ g/l
water loss: __________
ph: __________
solids: __________ %
mudweight: __________

Production Casing
Depth: 1400 m
Description:
139.7 mm, 25.30 kg/m
L80, NK3SB
Mud Weight to control
TD 1400 m __________ kg/m³

Logging Program: Platform Express, BHC Sonic

Drill Stem Tests: __________ Possible

General Comments: __________
3.2 Surface Hole Procedures and Policies

1. Drill a minimum of 10 m of conductor hole. Set and cement in place a 340 mm conductor pipe with a 50 mm drain value installed below ground level. Install a cribbed cellar and a 203 mm cellar drain to sump.

2. Rig up rig as per Nova Scotia Department of Energy rig layout requirements and Rig Inspection manual. Conduct a thorough rig inspection prior to beginning operations and record in tour book.

3. Spud with water and build viscosity to 40 to 60 s/l with gel to reduce washing and subsequent sloughing of surface sands. Drill ahead 269 mm hole.

4. Watch for lost circulation problems on surface hole. If severe lost circulation occurs, consult with Calgary office.

5. Survey first 9, 18 and 27 m and every 30 m thereafter or as required to maintain surface deviation at or below 1.0 degree. If deviation becomes a problem and exceeds 1.0 degree per 30 meters, contact Calgary office Drilling Manager.

6. Raise viscosity to 65+ s/l ten meters before T.D. Trip out of hole.

7. Measure and check tally out of hole. If over 0.6 m out, measure back in.

8. Drill to surface T.D. at 175 m KB +/- 1.0 m.

9. Measure kelly to assure total depth is correct.

10. Circulate hole clean, working pipe at T.D. at least two full circulations or until the hole is clean as indicated by the cuttings coming over the shaker. Hoist to run 219.7 mm casing.

11. Ensure proper tripping practices are performed, all trip records are complete and hole fill and return volumes are monitored correctly.

Deviation

Deviation is not to exceed 1°. Surveys to be taken every 30 m and recorded. Ensure hole is drilled below any gravel or boulders to ensure a good casing seat. If lost circulation does not occur solids control equipment may be used.

Mud

If lost circulation occurs, build viscosity to 100+ and add LCM. Pump down at reduced rate until circulation is established.

Options

If circulation cannot be established, and water supply is good and well conditions permit, drill blind while mixing up lost circulation pills.

If complete circulation is lost, Calcium Carbonate LCM plugs should be tried as they have been successful in regaining circulation and they are acid soluble.

If above fails a cement or diesel gel plug may be considered.

If gravel has been a problem, reducing mud properties may compromise the hole. Cement with mud properties required in drilling.
Hydraulics

Run mud pump, as required, to maintain adequate annular velocity to clean hole. A pump rate of 1.75 to 2.50 m$^3$/minute should provide sufficient annular velocity for hole cleaning. Drill to within 10 m of casing setting depth, circulate hole clean, double strap out, check tally against strap. Drill to casing setting depth, circulate and wiper trip to achieve good hole conditions for casing.

Surface Casing Program

1. Run 219.10 mm, 35.7 kg/m, J-55, ST&C surface casing from bottom up as follows:
   i. 219.10 mm guide shoe
   ii. one joint 219.0 mm, 35.7 kg/m, J-55, ST&C casing
   iii. 219.1 mm float collar
   iv. X joints 219.10 mm, 35.7 kg/m, J-55, ST&C casing to surface.

2. Running procedures to be followed:
   i. Visually inspect all joints of casing for thread and tube damage.
   ii. Tally and drift casing with API drift.
   iii. Threadlok float shoe, first joint of casing, and float collar.
   iv. Install centralizers, one on shoe joint and one each casing collar for minimum 3 joints above float collar then every third collar to surface.
   v. Use API modified thread compound on all casing strings.
   vi. Set casing 150 to 200 cm (6”) off bottom. Tie down casing while cementing. Note: If severe lost circulation occurs, discuss installation of cement baskets above loss zone with Calgary office.

Surface Casing Properties

Casing 219.1 mm, 35.7 kg/m, J-55 ST&C

General Information:

<table>
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<th>Inside Diameter (mm)</th>
<th>206.66</th>
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<tr>
<td>Drift Diameter (mm)</td>
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<td>Capacity (m$^3$/m)</td>
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<td>Collapse Resistance (MPa)</td>
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<tr>
<td>Internal Yield Pressure (MPa)</td>
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<td>Pipe Body Yield Strength (1000 N)</td>
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</table>
Joint Strength (1000 N) 1085

### Make-Up Torque Kg-m (ft-lb)

<table>
<thead>
<tr>
<th>Casing</th>
<th>Minimum Kg-m (ft-lb)</th>
<th>Optimum Kg-m (ft-lb)</th>
<th>Maximum Kg-m (ft-lb)</th>
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</thead>
<tbody>
<tr>
<td>219.1mm, 35.7 kg/m, J-55 ST&amp;C</td>
<td>250 (1830)</td>
<td>340 (2440)</td>
<td>420 (3050)</td>
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</table>

### BOP Rig Up and Pressure Testing

Cut and trim casing and weld on Cameron ‘IC-2’ 219.1 x 228.6 mm, 21 MPa series slip on casing bowl. Let bowl cool and pressure test welds to 10,000 kPa. Ensure casing bowl is set above ground elevation.

**BOP Stack Up**

The BOP stack to be used on this well will be a double gate 21,000 kPa, 228.6 mm full opening stack.

Nipple up BOP’s as per Nova Scotia Department of Energy regulations. Perform blowout drill prior to drilling out and record results in tour sheet. Each remaining crew to perform and record BOP drill as soon as possible after drilling out.

Tank level monitors must be hooked up and operational prior to drill out. A daily visual rig inspection must be done with time and results noted in tour book.

**BOP Pressure Test**

Pressure test blind rams and manifold valves individually to 1,400 kPa low and 14,000 kPa high for 10 minutes with no more than a 10% pressure decline. Check motor shutoffs and remote controls. Pressure test pipe ram and annular preventer and HCR to 1,400 kPa low and 14,000 kPa high for 10 minutes with not more 10% pressure decline.

A BOP Drill shall be held prior to drilling out the surface casing shoe.

BOP drill to be performed by crew on tour and by each crew as they come on tour and recorded. After drilling out, BOP’s must be function tested and recorded daily.

A two page Pre-Drill out, weekly Rig Inspection Report and Daily Rig
Inspection report to be completely filled out.

**Gas Detection System**

PetroWorth Resources Inc. proposes the installation of the following Gas Detection System on the Nabors 112 Drilling Rig. The gas detection system will be a Rig Rat H₂S / LEL Hardwire Multipoint system. The Rig Rat system consists of the following:

1. A four or eight channel continuous monitoring system used most commonly to detect LEL and / or H₂S levels.

2. The system uses 110 volt power and includes 150 to 300 feet sensor cables.

3. The rig rat system allows for the installation of other sensors which detect carbon dioxide (CO₂), Sulphur dioxide (SO₂), carbon monoxide (CO) and ammonia, as well as oxygen deficiencies. Some of these sensors may be installed dependent on perceived need.

4. Low and High alarm values can be reset as required for the required gas detection with configurable alarm points.

5. Low and High alarm visual bars can be coordinated to each of four sensors.

6. The system has a response time of less than 10 seconds to full alarm.

**3.3 Main Hole Procedures and Policies**

**Drill Out**

Drill out casing with water using 200 mm bit and low weight and rpm. Drill 5 m of new hole. Conduct P.I.T. and post in doghouse and manifold shack. If M.A.C.P. is estimated use 18 kPa/m for casing set to 250 m; 22 kPa/m for deeper setting depths.

Drill ahead to approximately 1400 m K.B. or as stipulated by the wellsite geologist.

**Deviation/Direction**

A survey will be taken 15 meters below the surface casing shoe. Survey again 30 meters, 60 meters and 120 meters below surface casing shoe. Survey every 100 m or as required to TD, deviation not to exceed 3°.

**Mud**
The main hole section will be drilled with a PHPA clay free polymer system. Drill out casing shoe with water. Have mud tanks full of premixed mud to displace hole as soon as cement is drilled out. Displace hole to PHPA mud system as per mud program.

Note: Evaluate whether mud system can be watered back with use of the centrifuge and dilution prior to drilling out in order to minimize amount of waste mud to be discarded.

Make up water properties are very important as excessive salt or hardness in the make up water will interfere with the hydration and reduce the effectiveness of the polymers.

Maintain the fluid loss at less than 20 cm$^3$/30 min initially and then decrease water loss to 12 cm$^3$/30 min for the entire hole interval to reduce spurt loss and flushing around the borehole. It is very important that all the solids control equipment perform effectively for the main hole section. This includes the King Cobra shale shaker, all mud mixing equipment and the rental centrifuge.

**Lost Circulation**

The potential for lost circulation is unknown in the main hole section; however it is always possible. Refer to Mud Program for the treatment plans.

**Hydraulics**

Standard parameters for hydraulics are as follows:

Flow rate 4.6-7.6 1pm/mm of bit diameter  
Bit pressure drop 50-65% of surface pressure  
HHP/in$^2$ 2.5-5

Every attempt should be made to ensure an annular velocity of 3540m/min. to provide sufficient hold cleaning. Actual hydraulics to be calculated at well site.

**General Guidelines**

Production Casing will be 139.7 mm, 25.30 kg/m NK3SB set at approximately 1400m K.B. as per Program.

Inspect and clean threads, drift and tally casing. Ensure count matches manifest and joints are undamaged. Inspect float equipment to ensure threads are compatible, undamaged and valves are operable and junk free. Number running order of casing with yellow chalk. Review running order, torque requirements and centralizer placement with power tong contractor and with casing pressure testing.
personnel.

Run with a float shoe on bottom and a float collar one joint above the shoe. Threadlock the first two or three joints. Each joint of the casing will be internally pressure tested as it is made up to ensure the sealing integrity of the casing string.

3.4 Production Casing Program

**General Guidelines**

Production Casing will be 139.7 mm, 25.30 kg/m NK3SB set at approximately 1400m K.B. as per Program.

Inspect and clean threads, drift and tally casing. Ensure count matches manifest and joints are undamaged. Inspect float equipment to ensure threads are compatible, undamaged and valves are operable and junk free. Number running order of casing with yellow chalk. Review running order, torque requirements and centralizer placement with power tong contractor and with casing pressure testing personnel.

Run with a float shoe on bottom and a float collar one joint above the shoe. Threadlock the first two or three joints. Each joint of the casing will be internally pressure tested as it is made up to ensure the sealing integrity of the casing string.

**Procedures**

Run 139.70 mm, 25.30 kg/m, L-80, NK3SB production casing from bottom up as follows:

139.70 mm guide shoe • one joint 139.70 mm, 25.30 kg/m, L-80, NK3SB casing
139.1 mm float collar
X joints 139.70 mm, 25.30 kg/m, L-80, NK3SB casing to surface.
Running procedures to be followed:
Visually inspect all joints of casing for thread and tube damage.
Tally and drift casing with API drift.
Threadlok float shoe, first joint of casing, and float collar.
Install centralizers, one on shoe joint and one each casing collar for minimum 3 joints above float collar then every third collar to surface.
Use API modified thread compound on all casing strings.

**Production Casing Properties**
Casing 139.70 mm, 25.3 kg/m, L-80, NK3SB

General Information:

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<thead>
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<th>Inside Diameter (mm)</th>
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<td>Joint Strength (1000 N)</td>
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**Make-Up Torque Kg-m (ft-lb)**

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<tr>
<th>Casing</th>
<th>Minimum Kg-m (ft-lb)</th>
<th>Optimum Kg-m (ft-lb)</th>
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<td>410 (3000)</td>
<td>480 (3500)</td>
<td>690 (5000)</td>
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**Circulating**

Circulate casing at least three complete circulations, at same annular velocity as hole was drilled, until shakers are clean. Lower PV and YP to minimum safe values prior to cementing. Reciprocate casing 2 to 4 m while circulating at 1 cycle/min. Reciprocate casing 13 to 14 meters every 3rd cycle so that the collars overlap travel in open hole.

**4.0 Cementing Program**

**Surface Cementing Program**

1. Ensure that the mix water is between 15°C and 30°C to prevent viscous cement slurries.
2. Circulate casing at least three complete circulations, at same annular velocity as hole was drilled, until shakers are clean. Lower PV and YP to minimum safe values with water prior to cementing. Reciprocate casing 2 to 3 m while circulating at 1 cycle/min. On every 3rd cycle, reciprocate casing 13 to 14 meters to ensure collars travel over location of next collar.
3. Pressure test surface lines to 21 mPa prior to proceeding with cementing.
operation.

4 Precede cement job with 5.0 m$^3$ of water preflush.

5 Cement with 50% excess using Class “G” + 3% CaCl$_2$ or with 20% over caliper, whichever is greater. Ensure at least one dry sample, and three cement slurry cement samples are caught during the cementing operation and a minimum of 2 samples of final returns at the surface in the event there are complications with the job. See attached cementing program for specific details. (excess may change due to drilling conditions, lost circulation, consult with the drilling department prior to ordering out surface cement)

6 Use wooden plug to displace cement.

7 Measure displacement while cementing. Slow pump rate near the end of displacement and bump the plug using 3500 kPa (500 psi) over final pumping pressure. Hold pressure for 2 minutes, then bleed back casing pressure to ensure float is holding.

8 Record cement returns, KB to ground in tour book and on Canadian Petroleum Engineering Inc. daily drilling reports (note: take into account any cut or fill during construction that would change the pin elevation).

9 If cement returns are not obtained, immediately re-cement with 25.4 mm pipe behind casing. Note: Have a supply of 25.4 mm pipe available on surface. In all cases, catch samples of last returns.

10 Check cement quality before slack off. Slack off, cut casing and head up in 8 hours. Wait on cement a minimum of 12 hours prior to drilling out. At all times, ensure casing is centered within the rotary table.

11 Provide Service Company with a sample of water at the time of surface cement job for compatibility testing with production cement blends.

If lost circulation occurs while drilling surface hole, consideration should be given to:

Add LCM (gel flake) to cement slurry.
Increase excess cement to 100%.
Pump a light scavenger slurry rather than water ahead of cement
Slow down displacement rate.
Run cement baskets at selected intervals.

*Production Cementing Program*

Ensure that the mix water is between 15$^\circ$C and 30$^\circ$C to prevent viscous cement slurries.

1 Circulate casing at least three complete circulations, at same annular velocity as hole was drilled, until shakers are clean. Lower PV and YP to minimum safe values with water prior to cementing. Reciprocate casing 2 to 3 m while circulating at 1 cycle/min.
2 Pressure test surface lines to 21 mPa prior to proceeding with cementing operation.
3 Precede cement job with 4.0 m$^3$ of water preflush.
4 Follow with 3.00 m$^3$ (2.27 tonnes) of Fill-Lite 2-100 as a scavenger. Scavenger should be mixed at a density of 1518 kg/m$^3$. Scavenger should contain 0.90% FL-5, 2.00% A-11 and 2.00% A-9.
5 Cement with 30% excess using Fill-Lite 2-100 + 0.90%FL5-5+2.00%A-11 + 2.00% A-9 Accelerator. Ensure at least one dry sample, and three cement slurry cement samples are caught during the cementing operation and a minimum of 2 samples of final returns @ the surface in the event there are complications with the job. See attached cementing program for specific details. (excess may change due to drilling conditions, lost circulation, consult with the drilling department prior to ordering out production cement)
6 Use rubber plug to displace cement. Slow pump rate near the end of displacement and bump the plug using 3500 kPa (500 psi) over final pumping pressure. Hold pressure for 2 minutes, then bleed back casing pressure to ensure float is holding.
7 Record cement returns, KB to ground in tour book and on Canadian Petroleum Engineering Inc. daily drilling reports (note: take into account any cut or fill during construction that would change the pin elevation).
8 Check cement quality before slack off. Slack off and head up in 9 hours. At all times, ensure casing is centered within the rotary table.
9 Provide Service Company with a sample of water at the time of surface casing cement job for compatibility testing with production cement blends.

If lost circulation occurs while drilling main hole section, consideration should be given to:

Add LCM (gel flake) to cement slurry
Increase excess cement to 100%.
Pump a light scavenger slurry rather than water ahead. of cement
Slow down displacement rate.

5.0 *Special Terms and Conditions*

Special terms and conditions are provided by the Nova Scotia Department of Energy and the Nova Scotia Department of Environment.

1 **Authorization**
2 Liability

6 Authorization

1. This Authorization includes all information submitted with the application and approved by the Administrator. The approved information shall form part of the terms and conditions of this authorization.

2. This Authorization is subject to all other laws of general application, including the Petroleum Resources Act, the Environment Act and the Occupational Health and Safety Act.

3. This Authorization shall be posted as prescribed in the Regulations.

Name: ___________________________ Company: ___________________________

Signature: ________________________ Date: ________________________________

Petroworth Resources Inc. will conduct all operations are conducted in a prudent and reasonable manner, consistent with good petroleum exploration practices. Petroworth indemnifies and saves harmless the Province from any and all claims, demands, losses or damages from death, actions or suites that may arise out of or as a result of anything done in the carrying out of exploration conducted under the Authority to Drill a Well.

8.0 Attachments Required

8.1 Financial Security

8.2 Proof of Consent to Drill on Land

A copy of the signed surface lease agreement with Mr. Ken MacDonald is provided in Appendix A.

Appendix B

Nabors Rig #112 - Specifications
**NABORS DRILLING**

**Rig Inventory and Specifications**

**Rig No.: 112 CT**

**Effective Date of Inventory:** September 2006

| Rig depth rating 2,200m using 102 mm Range 2 Drill Pipe |
| Rig depth rating 2,200m using 89 mm Coiled Tubing |
| Number of loads (w/o boiler & 600m of Drill Pipe) 10 |
| Number of loads (w/o boiler & 1,800m of Drill Pipe) 12 |

| A. Drawworks: | Make | Pacific Pipi |
| Drawworks Capacity | 83,984 daN |
| Number of Holding Speeds | Low/High |
| Auxiliary Brake Type | NA |

| B. Rig Power: | Make | 2 e.a. Caterpillar C18 |
| Peak Power | 2 @ 545 kW | 1800 rpm |

| C. Derrick: | Make | Foremost |
| Derrick Height | | 18.5 m |
| Normal Number of Lines Strung | 9 |
| Maximum Allowable Working Load (API rating) | 83,984 daN |
| Contractor's Allowable Working Load | 60,000 daN |

| D. Substructure: | Make | Foremost |
| Substructure Type | 24 Wheel Coll / Top Drive Carrier |
| Maximum Load Capacity (set back) | N/A |
| Maximum Load Capacity (rotary) | 83,984 daN |
| Ground clearance | 6.4 m |
| Vertical clearance for BOP | 8.2 m |
| Overall BOP handling system | 5.8 m |

| E. Rotary Table: | Make | Eild Drill Systems Inc. |
| Type | 200,000 lb Superbowl |
| Opening | 415.1 mm |
| Contractor's Operating RPM | Max | 70 |

| F. Travelling Equipment: | Make/Model | Manufacturer's Maximum Allowable Load |
| Bulls | K.O.T. | 83,984 daN |
| Elevator | A.O.T. | 60,000 daN |
| Catless Elev. | A.O.T. | 60,000 daN |

| G. Drilling Line: | Line Size | 24 |
| Single Line Breaking Strength | 51,764 daN |

NABORS Rig 112 CT Inventory
H. Drill Pipe:

<table>
<thead>
<tr>
<th>OD (mm)</th>
<th>Grade</th>
<th>Length (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>102</td>
<td>S95</td>
<td>23.36</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2137</td>
</tr>
</tbody>
</table>

O/w 3 hydraulic pipe plugs

I. Drill Collars:

<table>
<thead>
<tr>
<th>OD (mm)</th>
<th>ID (mm)</th>
<th>Connection</th>
<th>Joints Available</th>
</tr>
</thead>
<tbody>
<tr>
<td>121</td>
<td>57</td>
<td>3 1/2 IF</td>
<td>17</td>
</tr>
<tr>
<td>159</td>
<td></td>
<td>4 1/2 XH</td>
<td>5</td>
</tr>
</tbody>
</table>

J. Mud Pump:

- Make & Model: Gardner Denver P29
- Stroke: 229 mm
- Pump powered by: 880 kW WEG
- 1150 Hp

<table>
<thead>
<tr>
<th>Liner Sizes (mm)</th>
<th>Maximum Strokes/min.</th>
<th>Minimum Strokes/min.</th>
<th>Manufacturer’s Maximum Pump Pressure (kPa)</th>
<th>Contractor’s Maximum Pump Pressure (kPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>127</td>
<td>130</td>
<td>1</td>
<td>21,000</td>
<td>21,000</td>
</tr>
<tr>
<td>140</td>
<td>130</td>
<td>1</td>
<td>21,000</td>
<td>21,000</td>
</tr>
<tr>
<td>159</td>
<td>130</td>
<td>1</td>
<td>16,000</td>
<td>16,000</td>
</tr>
</tbody>
</table>

K. Mud Tanks:

- Total Volume: 55.1 m³
- Active (Useable) Volume: 49.7 m³
- Pill Tank Volume: N/A m³
- Trip Tank Volume: 3.9 m³

<table>
<thead>
<tr>
<th>Independent Mud Mixing System</th>
<th>Pump 1 Type</th>
<th>Mission Size</th>
<th>Pump 2 Type</th>
<th>Mission Size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>152 x 127 x 356 mm</td>
<td></td>
<td>152 x 127 x 356 mm</td>
</tr>
</tbody>
</table>

L. Shale Shaker:

- Make: King Cobra - Branvet
- Number: 1
- Vibrating Speed: 1,800 Cycles/min.

M. Mud Gas Separator:

- Location: Shaker Tank
- Height Above Mud Level: 1.88 m (Mud level to top of vessel)
- Vessel Diameter: 610 mm
- Liquid Inlet Line Size: 76 mm
- Gas Outlet Size: 152.4 mm
- Open Bottom: Yes
- Internal Baffles: Yes
- NACE Certified: Yes

NABORS Rig 112 CT Inventory
N. Blowout Prevention:

<table>
<thead>
<tr>
<th>BOP</th>
<th>Make</th>
<th>Type</th>
<th>Size (mm)</th>
<th>Pressure Rating (kPa)</th>
<th>Nace Trim</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annular</td>
<td>Townsend</td>
<td>T90</td>
<td>226.6</td>
<td>21,000</td>
<td>Yes</td>
</tr>
<tr>
<td>Pipe Ram</td>
<td>Townsend</td>
<td>T81</td>
<td>226.6</td>
<td>21,000</td>
<td>Yes</td>
</tr>
<tr>
<td>Blind Ram</td>
<td>Townsend</td>
<td>T61</td>
<td>226.6</td>
<td>21,000</td>
<td>Yes</td>
</tr>
<tr>
<td>HCR Valve</td>
<td>79.4mm Hi-Kalibre</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kill Line valves</td>
<td>51mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accumulator</td>
<td>Academy Services Model G250 B42/408-21</td>
<td>Size 249.8 litres</td>
<td>Rating 21,000 kPa</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

O. Manifold:

a) The Master BOP controls are located at the accumulator and remote controls located at the driller’s station

b) Pressure Rating 21,000 kPa

Choke Line Size 76 mm

Valve Type Hi-Kalibre

Size 76 x 52 mm

c) Nace Trim Yes

P. Light Plants:

<table>
<thead>
<tr>
<th>Number</th>
<th>Powered by</th>
<th>Output kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>2</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

R. Instrumentation:

Pason

S. Boiler:

Make William Davis Type 100 HP Output 74.5 kW

T. Top Drive

Make Foremost Type RC240

U. Lubricator / Stripper

Make Progressive Type Hydraulic

V. Fuel Storage:

10,000 litres Boiler 5,200 litres

W. Water Storage:

48,000 litres Boiler 21,000 litres

X. Injector

Make Fluid Design Systems

Max Pull 55,378 daN

Max tube size 65mm

Y. Tubing Storage

Reel

Make Foremost

<table>
<thead>
<tr>
<th>OD</th>
<th>ID</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.81m</td>
<td>2.79m</td>
<td>1300m of 88mm tubing</td>
</tr>
</tbody>
</table>

Please note that due to routine changes in equipment such as BOPs, pump liners, overhead equipment and drill pipe, this inventory serves as a guideline only. Please contact our office to verify existing equipment.

NABORS Rig112 CT Inventory

Appendix C
**Introduction**

The Petroworth Emergency Response Plan (ERP) has been developed to address specific conditions related to the drilling of an exploration well in the vicinity of the Community of West Lake Ainslie, Cape Breton Island, Nova Scotia.

The Petroworth ERP is designed to compliment the ERPs put in place by the drilling contractor and subcontractors to ensure the interests of the public are protected and the public and regulatory agencies are properly informed of events in an accurate and timely manner. Therefore, this document is an extension of and an integral part of any site specific drilling, completion, facility or Area Emergency Response Plan.

With the development of this Nova Scotia Operations Emergency Response Plan, the Company is prepared to:

- Ensure immediate, competent responses and handling of an emergency
- Minimize danger to the public, Company employees or Contractors
- Maintain effective communications with all parties in an emergency
- Make maximum use of the combined resources of the Company, the Government and other services

**Emergencies**

An “Emergency” is defined as any unplanned occurrence resulting in, or having the potential to result in: death, critical injury, a threat to the safety of public and/or Company/Contractor personnel, major or significant damage to Company property and operations, or pose a potential impact to the environment. Examples include:
Oil or Chemical Releases – the potential for, or actual hydrocarbon or chemical spill, or other emissions affecting company operations and/or threatening adjoining property.

Critical Injury / Fatality – any event that results or could result in loss of life, critical injury, or missing personnel (OHSA critical injury defined)

High / Low Vapour Release – the potential for, or uncontrolled flow of hydrocarbon gases or LPG’s from a well, pipeline, tank or other facility affecting Company operations and/or adjoining property

Explosions or Fires – a potential explosion / fire or actual explosion / fire that cannot be extinguished or controlled by readily available means and which is affecting Company operations and/or threatening adjoining property

H₂S Release – the potential for, or uncontrolled flow of sour gas or liquids from a well, pipeline, tank or other facility affecting Company operations and/or threatening adjoining property (only relevant to operations involving H₂S or the potential to encounter H₂S)

Security Breach – A threatening telephone call, note or other form of communication involving such issues as extortion, bomb threats or acts of terrorism

**Stages of Emergency**

The following stages of emergency and their respective examples are for illustrative purposes only and are NOT to be construed as a definitive listing.

**Level #1 Emergency (Potential Emergency)**

**Definition**

Any situation which is limited to the boundaries of Company property, and the personnel on-site have the ability to regain control. No danger to the general public exists.

- No danger outside company property
- Immediate control of hazard/source
- No immediate danger to public exists
- Minimal environmental impact
Situation controlled entirely by company personnel

**Response Actions**

- Senior Onsite Supervisor and/or alternate field personnel are dispatched to the emergency site to evaluate the situation;
- A Level #1 – Potential Emergency is declared, and control procedures are initiated;
- Company Emergency Response Members, appropriate field personnel, the MNR, RCMP and local authorities (if warranted) are advised that a Level #1 Emergency has been declared;
- Depending on severity of potential escalation, specialized equipment & personnel, air quality monitoring, emergency shutdown procedures, etc. may be put on standby.
- All response team members maintain 24 hour availability.

**Level #2 Emergency**

**Definition**

Any situation where the event extends beyond the boundaries of Company property, and/or control cannot be quickly accomplished. Some danger to the general public exists.

- No immediate danger outside company property, potential exists for emergency to extend beyond company property
- Outside services and Provincial Government agencies must be alerted
- Imminent control of hazard is probable
- Moderate environmental impact

**Response Actions**

- Senior Onsite Supervisor and/or alternate field personnel are dispatched to the emergency site to evaluate situation;
- A Level #2 – Emergency is declared, and well/emergency control procedures are ongoing;
- Company Emergency Response Members, appropriate field personnel, the MNR, RCMP, and local authorities are advised that a Level #2 Emergency has been declared;
- Specialized equipment & personnel, air monitoring equipment, road block teams, and additional safety equipment and personnel are mobilized, as warranted;
- Residents, transients and industry operators in the affected area
surrounding the emergency site, “the Emergency Hazard Area” are contacted and may be evacuated;
  . The Emergency Advisory Team is assembled;
  . All response team members maintain 24 hour availability

**Level #3 Emergency**

**Definition**

Any situation where the event extends beyond the boundaries of Company property, and there is a major uncontrolled release. Danger to the public exists and a complete evacuation of the Emergency Hazard Area is initiated, and/or the emission is ignited.

. Emergency extends beyond company property
. Public safety is jeopardized
. Uncontrolled hazard
. Significant and ongoing environmental impacts
. Immediate multi-government involvement

**Response Actions**

. Senior Onsite Supervisor and/or alternate field personnel are dispatched to the emergency site to evaluate situation;
. A Level #3 – Major Emergency is declared, and well/emergency control procedures are ongoing;
. Company Emergency Response Members, appropriate field personnel, the MNR, RCMP and local authorities are advised that a Level #3 – Major Emergency has been declared;
. Road blocks, air quality monitoring and full public evacuation of Emergency Hazard Area are in effect;
. Non-essential wellsite personnel are released from site;
. All response team members maintain 24 hour availability.

**Return to Normal**

Once the emergency situation has been resolved, the personnel on-site have regained control and no danger to the public remains, the level of alert is downgraded to normal status. Only a Senior Management Employee or Senior
Supervisor may call down a Level of Emergency, when warranted.

- All emergency response activities are properly deactivated;
- Company Emergency Response Members, appropriate field personnel, MNR, RCMP and local authorities are advised of the call down;
- Response team members are taken off 24 hour alert;
- Necessary clean-up and repair operations are initiated;
- All incident reports and other Company forms utilized are collected and compiled;
- Debriefing meetings are held for involved personnel.

**Onsite Command Post**

The Onsite Command Post will be established at a convenient location on or very near the emergency site. This will be the headquarters for all outside or support personnel required to be onsite, as well as the primary headquarters for the Emergency Site Response Team and Senior Onsite Supervisor. The Onsite Command Post will be equipped with the same supplies as the Emergency Operations Centre. All field offices should have these supplies available and an accessible state for emergency dispatch.

**Agency and Personnel Contact List (subject to additions and changes)**

**Petroworth Senior Management Employee**

Neal Mednick: Office (416) 214-1551 President of Petroworth Res. Cell (416) 432-0362

Colman O’Brien: Office (416) 214-1551 Chair of Petroworth Cell (416) 568-1606

Amy Stephenson: Office (416) 214-155 Senior Staff at Petroworth Cell (416) 417-0127

**Canadian Petroleum Engineers Ltd.**
Appendix D

Environmental Management Plan

Petroworth Resources Inc.

Petroworth West Ainslie No.1

Petroleum Exploration Well

West Lake Ainslie, Inverness County, Nova Scotia
1.0 Introduction

Petroworth Resources Inc. is planning to drill a conventional petroleum exploration well in southwestern Inverness County, Nova Scotia for the purpose of evaluating the conventional petroleum potential (oil and gas in sandstone reservoirs) of a prospect that has been outlined by previous exploration work, including a reflection seismic program conducted in the summer of 2009. The well is named “Petroworth West Ainslie No.1”

Petroworth is a junior oil and gas company, committed to safeguarding the environment through the application of best practices in their operations and by meeting or exceeding regulatory guidelines. To demonstrate this commitment, they
have retained W.G. Shaw & Associates Ltd. (WGSL) to develop an Environmental Management Plan (EMP). The overall purpose of this plan is to:

- Document site conditions at the prior to the drilling program.
- Identify receptors that could potentially be affected from the operations.
- Establish a means of monitoring potential environmental effects associated with the drilling operations.
- Establish a procedure for continued review and modification of the monitoring program in accordance with changing conditions.
- Establish a mechanism for communication between Petroworth and the regulatory agency, specifically Nova Scotia Department of Environment.

Figure #1 Location of proposed well site on map of Cape Breton Island, Nova Scotia

Figure #2 Location of proposed well site on map of southern Inverness County, Cape Breton Island, Nova Scotia

2.0 Program Description

Drilling is scheduled to begin at the West Lake Ainslie drill site in early-to
mid-November 2010, with completion in about 14 to 20 days. It is expected that the well will be terminated at depths of approximately 1,200 meters. Activities associated with the drilling program include:

- A legal site survey
- Pre-assessment to identify sensitive areas (i.e. wetlands) and collect baseline soil and water samples
- Private water well surveys of all wells within 800 metres
- Removal of surface soil (stored on the property for future reclamation)
- Road and drill pad construction
- Establishment of secure areas for the storage of support equipment and materials
- Construction of ditching and berms to control the surface water drainage
- Drill support equipment mob-demob.

Drilling services have been contracted to Nabors Drilling Ltd. (Drill Rig #112) under the direction of Canadian Petroleum Engineers Ltd. of Calgary, Alberta.

Demobilization of equipment and site abandonment-reclamation will occur if wells are determined not to be productive. Petroworth will consult the NSEL and NSNR and utilize good oilfield practices to plan abandonment of the well bore and reclamation of the lease sites.
3.0 Environmental Considerations

3.1 Introduction

In accordance to provincial and federal regulations, Petroworth commits to conducting business in a manner such that there is negligible effect to the environment. The following sections address:

- Local drinking water supplies.
- Protection of wetlands and surface water.
- Potential noise/air quality concerns.
- Water withdrawal.
- Waste management.
- Hazardous material storage/handling.
- Potential contaminant releases.

3.2 Surface Water and Control Measures

The closest watercourse to the Drill Site is an un-named watercourse located 100 metres to the northeast. This watercourse is ephemeral in character and flows northwestward for 1.5 kilometres at which point it discharges in Lake Ainslie. The western shore of Lake Ainslie is located 800 metres northeast of the Drill Site.

The drill pad will be cleared and leveled creating a berm at the northeast side to prevent any fluids from entering the watercourse to the northeast. Lower south end of both sites. If possible, top soil will be separated to assist in reclamation.

Sediment and erosion control will be implemented on the access road to minimize sediment entering downstream watercourses. Site drainage will be inspected during storm flow and sediment fences and similar erosion control features such as straw bale check dams will be available for use if conditions warrant.

3.3 Private Water Supplies

There are four (4) residences located within 800 metres of the Drill Site. All of these properties have a private wells for water supply. A private well survey will be conducted on all of these wells prior to spud.

The Drill Site will include the installation of surface casing (cemented
back to the surface) to approximately 280 metres which will eliminate or at least greatly reduce any potential of impacting potable water supplies and/or local surface water bodies.

3.4 Noise and Air Quality Control

Potential noise problems may occur from the operation of the drilling rig and support equipment during the drilling of the well. The drilling rig is equipped with standard noise abatement equipment (mufflers), it is unlikely that the noise levels will be an issue. In any event, Petroworth will complete a baseline noise survey Petroworth will also comply with NSEL Guidelines (Appendix A) which specifies the following limits at the site boundaries.

Water will be sprayed on the access road or construction site if needed during extensive periods of dry weather. The maximum acceptable dust concentration 120um/m over 24-hour period will be followed.

3.5 Water Requirements

It is anticipated that approximately 200 m (200,000L) of water will be required to drill the exploration well (average of 13,500 L per day over the 15 day period). Petroworth has made arrangements with the local water hauler to provide these services.

3.6 Waste Generation & Management

Waste management includes miscellaneous garbage generated by field personal, waste generated from drilling operations; septic/grey water; and, drill cuttings and fluids. Petroworth will follow the guidance provided in ____ Environmental Best Management Practices for Drilling Wastes including reducing and reusing materials where possible.

Domestic Waste & IDW

Domestic type waste will be taken to the Kenlock Waste Transfer Station which is located 5 kilometres north of the drill site. IDW will be properly contained and disposed of by a qualified contractor.

Septic Waste and Grey Water

Applications for an on-site holding tank to contain septic waste and grey
water have been submitted to the Nova Scotia Department of Environment for approval. As per the requirements, the applications were prepared by a Qualified Person (QP) 1 under the Waste Water NS Regulations. Waste will be transferred off-site for disposal at an acceptable facility.

**Drill Cuttings**

Petroworth will retain the services of a qualified private contractor to remove rock cuttings and mud for appropriate off-site disposal. The material will be sampled for parameters listed in Nova Scotia Department of Environment Guidelines for Disposal of Contaminated Solids in Landfills. These guidelines provide acceptable levels for inorganic and organic parameters. If the concentrations of the specified parameters are exceeded, a leachate extraction analysis (Canadian General Standards Board (CGSB 164 GP-IMP) is required. If the concentrations of the specified parameters in either of these analysis are less than or equal to the guidelines, the material is designated as hazardous waste and is not acceptable at the municipal sold waste landfill. Dewatering to reduce the volume of material and/or mixture with fly ash, sawdust, cement or some other substance to help solidify the material and/or reduce the leachability of earth metals may be warranted.

**Drill Fluids**

Environmental considerations associated with drilling and gas production testing are related to water requirements for drilling and disposal of water/liquid from two sources: 1) water that is introduced during drilling; and, 2) formation waters generated during testing. Water requirements were discussed under Section 3.4.

During the drilling, all water will be disposed of at an appropriate offsite location (qualified contractor). Water quality samples will be collected and analyzed at a minimum for general chemistry and metals parameters (particularly chlorides, iron, barium, ammonia and ph). Total Suspended Solids (TSS) and oxygen demand (COD and BOD). Depending on disposal method analysis may include toxicity testing. The disposal water for the testing phase has not yet been determined and will be developed in consultation with Nova Scotia Department of Environment and their requirements for Onshore Exploration, Options, such as re-injection etc., will depend on both the quantity and quality of the water. Use of filters (to reduce iron concentrations), floating aerators (to provide oxidation) and setting ponds (to reduce sedimentation levels) will be considered.
3.7 **Hazardous Material Storage & Handling**

Diesel fuel will be stored in a double walled certified above ground tank. Smaller quantities of chemicals (i.e. lubricants and anti-freeze) and fuel products (i.e. rock drill and thread lubricant and miscellaneous oils and other liquids such as engine, transmission, hydraulic and compressor oil) will be stored in a truck on-site.

As stipulated in the NSDoE Requirements for Onshore Exploration, Petroworth will seek an approval for the storage of chemicals if the amount is determined to be in excess of 2000 kg. They will also comply with the Dangerous Goods Management Regulations - including Schedule "A" - Environment Act.

Applicable MSDS sheets for the various chemicals and fuel products will be maintained on-site.

3.8 **General Contaminant Releases**

Contaminants may potentially be released on the ground surface during fuel and/or chemical handling and storage. A spill response kit containing a limited quantity of absorbents (i.e. oil soak, kitty litter) will be kept on-site. Small spills will be contained and collected immediately. Recovered fluids will be temporarily contained in drums or other sealed units. Materials used in spill response will be labeled as IDW and disposed of appropriately.

Designated fuel handling and re-fueling areas will be located away from surface drainage courses and containment provided. Site personnel will be made aware of spill response procedures and appropriate regulatory contacts. Spills will be immediately reported to a supervisor, NSDoE will be notified of any significant spills (>100 L or near a watercourse).

4.0 **Monitoring**

Monitoring is part of the pre-assessment to establish a baseline for comparison to both operational and post-operational conditions, the following samples will be collected:

1) Two baseline soil samples from the Drill Site one representing the upper organic layer and the other, the underlying C-horizon material. The samples will be submitted to an accredited laboratory for quantitative chemical analysis.

2) Two surface water samples will be collected: one from the un-named watercourse located 50 metres to the northeast of the Drill Site and one
from the west shore of Lake Ainslie.

5.0 **Post-Operations Environmental Components**

Post operational activities include, but may not necessarily be limited to the following:

- Disposal of water and fluids associated with drilling and production testing.
- Disposal of solids associated with drilling.
- Removal and/or securement of infrastructure.
- Collection of post operational samples of comparison of results to baseline.
- Post operational report to NSEL addressing environmental aspects if the project.
- Reclamation of site as required.

**Appendix E**

Canadian Petroleum Engineers – Safety And Environmental Plan
**CANADIAN PETROLEUM ENGINEERING INC.**

**Safety & Environment Policy**

Canadian Petroleum Engineering Inc. is committed to ensuring a safe and healthy workplace and the protection of the environment. We believe that safety and protecting the environment is good business and that all work related injuries, illnesses, property losses and adverse environmental impacts are preventable.

To fulfill this commitment, Canadian Petroleum Engineering Inc. will:

- Give health, safety and environmental considerations equal status with the Company’s other business objectives and integrate them into all aspects of its work.
- Work actively to continuously improve safety and environmental protection.
- Only start work after confirming that essential safety and environmental protection systems are in place, and willingly suspend operations if safety or the protection of the environment would be compromised.
- Encourage personnel to be individually responsible for identifying and eliminating hazards, preventing injury to themselves and others, and preventing adverse environmental impacts.
- Provide personnel with sufficient training, resources and systems.
Provide and maintain properly engineered facilities, plants and equipment
Minimize from its activities waste generation, air emissions and other discharges to the environment
Actively monitor, audit and review to improve systems, processes, environmental and safety performances
As a minimum, ensure regulatory compliance at all times
Hold contractors and third parties accountable for adhering to Canadian Petroleum Engineering Inc’s safety and environment policy and audit contractor systems and procedures to ensure satisfactory safety and environmental protection
Hold supervisory management accountable for ensuring and promoting a safe and healthy workplace and the protection of the environment within their area of responsibility

Responsibility for the application of this policy rests with all employees.

Ed Fercho, President
Lorne Hammer, Vice President

Drilling Supervisor’s Responsibilities:

Company Requirements
The Drilling Supervisor is responsible to ensure Contract personnel comply with relevant policies, guidelines and procedures while working on company property.

Personnel Minimum Training Requirements

Any person directly involved in drilling, completions, workovers and servicing operations shall have a valid H2S Alive and Standard First Aid or Class “A” certification.

The Site Supervisor shall have valid H2S Alive, First Aid, WHMIS, TDG and B.O.P. certification with experience of overall rig supervision (drilling, workovers, completions, recompletions, servicing). Knowledge of the industry recommended practices is required.

• The Rig Manager (Toolpush) shall have valid H2S Alive, First Aid, WHMIS, TDG and B.O.P. certification with experience of overall rig supervision (drilling, workovers, completions, recompletions, servicing). Knowledge of the industry recommended practices is required.

The Driller shall have valid H2S Alive, First Aid, WHMIS, TDG and B.O.P. certification with experience as a Driller on drilling and/or service rigs.

The Derrick hand shall have valid H2S Alive, First Aid, WHMIS, TDG and B.O.P. certification with experience as a Derrick hand on drilling and/or service rigs.

The Floorman shall have valid H2S Alive, First Aid, WHMIS, TDG and B.O.P. certification with experience as a Floorman on drilling and/or service rigs.

The Safety Supervisor shall have valid H2S Rescue, First Aid, WHMIS, TDG and CPR certification with three (3) years experience as a Safety Supervisor on drilling and/or service rigs.

Training Verification
The Rig Manager (Toolpush) is responsible to verify the training, qualifications and competency of the crew prior to work commencement in writing.

**Safety Meetings**

Safety Meetings are required on all projects to pass on important information to the people doing the work and to hear the concerns of the workers. The Drill Supervisor is required to hold a formal, recorded safety meeting for all persons working on the lease. It may be necessary to hold more than one meeting if crews are working shifts, the following subjects will be discussed and recorded at this meeting.

- General outline of the project and any special safety concerns, i.e. H₂S zones, etc.
- Emergency procedures and information, i.e. what to do and phone numbers to call if an injury occurs, etc.
- Go over the Material Safety Data Sheets for all hazardous materials on the project and then post the sheets on the bulletin board (See WHMIS section).

Besides this formal meeting, the crews should be holding their own OH&S safety meetings and meetings should be held at the beginning of each special job, i.e. running casing, DST, etc. These meeting should be noted on the morning report.

Joint Hazard Assessments (JHA’s) are to be completed for each specific job conducted and when operations change or new operations are undertaken.

**Environmental Operations Guidelines:**

**Housekeeping -**

The Drilling Supervisor is responsible to ensure:

- All drain and bleed valves, capable of releasing system product to the atmosphere, are plugged or capped when not in use.
- Any fitting leaks are repaired as soon as practically possible.
- Product spills are contained and cleaned up minimizing environmental damage.
- Materials storage is kept clean, neat and orderly.
- Flare pit levels are closely monitored and pumped out minimizing product spills and environmental contamination.
- Liquid sample points shall be equipped with a metal container grounded to the system.
- Containers shall be emptied after each sampling activity.
- Truck Drivers are aware of and responsible for cleaning up any product spill they create.
- Costs will be born by the Trucking Company.
- Containment dikes are maintained and liquids kept to a minimum.
Sour products are contained in closed systems. System components are monitored for leaks minimizing release to the environment.

**Waste Disposal**

The Site Representative is responsible to ensure:

Requirements and restrictions for disposing of waste materials and products in the local landfill site are available to all personnel.

Filters from engines, glycol and fuel systems shall be placed in a covered container allowing proper drainage before disposal at an approved facility.

Spilled produced fluids are cleaned up. Under no circumstances shall produced fluids be disposed of on roads, leases or fields without prior approval in writing from the appropriate government agency.

Soil, gravel and vegetation contaminated with produced fluids shall be contained and hauled to a designated area at the facility. Written approval from the appropriate government agency shall be obtained for appropriate disposal.

Used lubricating oils shall be contained. Under no circumstances shall used lubricating oil be disposed of on road, leases or fields. Disposal may be injecting the oil into a crude oil process stream; or written approval shall be obtained from the appropriate government agency for disposal.

Chemical, surplus, out dated, or no longer used in full or partially full containers shall be stored in a designated area at the facility. Containers shall be sealed. Disposal arrangements shall be made either with the manufacturer, supplier, or transport by approved couriers to government approved disposal facilities. Empty containers shall be returned to the supplier, manufacturer, or transported by approved couriers to government approved disposal facilities.

Uncontaminated daily garbage (paper, food stuff) shall be stored in covered containers to deter predators. Disposal shall be arranged at the approved landfill site or incinerated.

**Emergency Procedures**

The Drilling Supervisor shall maintain a current copy of the Corporate Emergency Response Plan at the location.

At the beginning of all projects the Field Drilling Supervisor will collect and post the following information:

Location and number of the nearest
- Hospital
- R.C.M.P.
- Ambulance
- office

Forestry office in green areas
The nearest helicopter service in remote areas where there may be restricted access due to road conditions.
These numbers should be posted in the doghouse and/or the project office and/or the Supervisor’s quarters and at the project camp. All personnel on the project should be made aware of the numbers and what they should do in an emergency.

In addition to the above numbers, the Supervisor should post a copy of the Drilling Department “Emergency Contact List” and the Emergency Response Plan flowchart.

In very remote areas, on large projects and on critical wells the above information will be supplemented with a detailed, site specific emergency response plan.

REPORTING PROCEDURES

1. DAILY DRILLING REPORTS

This report time period is 0000 - 2400 hours.
This report is to be filled out completely and transmitted to the Calgary office by phone and email by 0730 hours each morning.
All reports are to be submitted to the Calgary office at the completion of the well.

2. CASING AND CEMENTING REPORTS

This report is to be filled out completely after each casing and cement job. It is to be submitted to the Calgary office at the completion of the well.

Note: The Pipe Tally is to be attached to this report.

3. MATERIAL TRANSFERS

Is to be completed when applicable and submitted to the Calgary office.

4. EVALUATION OF DRILLING/SERVICING OPERATIONS

This report is to be filled out in as much detail as possible (see instructions at top of form). It is submitted to the Calgary office at the completion of the well.

5. TEST REPORTS

This report is to be filled out after each drillstem / formation test and transmitted to the Calgary office by phone.
These reports are to be submitted to the Calgary office at the completion of the well.
6. **TOUR SHEETS (CAODC DAILY DRILLING REPORT)/WELL DATA SUMMARY**

In addition to the normal information recorded by the Drilling Contractor, the following information is to be accurately recorded by the wellsite supervisor (in compliance with governmental regulations):

- **Casing Details**: size, weight, grade, thread, tally, landed depth, float collar depth and wellhead equipment installed.
- **Cementing Details**: type, amount of dry blend, additives, volumes of cement returns (if applicable), plug down time, type of fluid used to displace and whether float(s) held.
- **Pressure Test Details**: test pressure and duration for each BOP including manifold.
- **Leak off Test Details**: as well as entering details in tour book, submit form to Nova Scotia Dept of Energy if required.
- **BOP Drills**: date and time along with comments regarding drill. (Drills to be conducted a minimum of once per week.)
- **Drill Stem Test Details**: interval, zone, type of test, times, pressures, details of flow and recovery.
- **Coring Details**: interval, zone, size and recovery.
- **Logging Details**: type and interval.
- **Abandonment Details**: interval, amount and type of cement, top of plug and time felt.
- **Rig Release Details**: date, time and signature.