PetroNeft Resources plc
Licence 61
Tomsk Oblast, Russian Federation
Analyst Field Visit
September 20-21, 2010
**Regional Location Map**

**West Siberian Oil & Gas Basin**
- Discovered Reserves
  - 144 billion bbls of oil
  - 1,300 TCF gas

**Urengoy Gas Field**
- 350 TCF
- Original reserves

**Samotlor Oil Field**
- 27 Billion Bbls
- Original reserves

**Licence 61 (Ryder Scott Evaluation)**
- Proved and Probable reserves: 70 million bbls
- Possible reserves: 460 million bbls
- Exploration resources: 75 million bbls

**Licence 67 (Russian State Reserve Committee)**
- C3 (Possible) reserves: 55 million bbls

**Source – USGS**
Tomsk Oblast Very Active Region
Rosneft, Imperial Energy, TNK-BP, Gazprom, Gazpromneft, local companies
**Licence 61 Major Activities**

**Acquired via 2004 State Auction:**
- 4,991 square kilometers
- 14 prior wells drilled in the Soviet era
- 2,654 kms of vintage 2D seismic data
- 2 discovered fields at Lineynoye and Tungolskoye

**Since acquisition, PetroNeft has:**
- Reprocessed 2,654 kms of vintage 2D seismic data
- Reprocessed 14 Soviet era wells
- Acquired 1,055 line kms of new 2D seismic data
- Drilled 3 Delineation and 3 Exploration wells
- New fields at West Lineynoye & Kondrashevskoye
- Over 25 identified Prospects
- RS Reserves – 70 million bbls 2P
- Russian GKZ Reserves – C1+C2 – 95 million bbls
- Board Sanctioned Lineynoye Phase 1 Project – June 2008
- Raised $27.5 million for Phase 1 Project – Sept 2009
- Commenced production drilling operations – March 2010
- Signed $30 million Macquarie Bank Facility – May 2010
- Completed pipeline construction – July 2010
- Commenced year round production – August 2010
## Oil Fields / Prospects / Potential Prospects

<table>
<thead>
<tr>
<th>Map ref.</th>
<th>Field/Prospect</th>
<th>Horizon(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil fields</td>
<td></td>
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</tr>
<tr>
<td>1</td>
<td>Lineynoye Oil Field</td>
<td>UJ</td>
</tr>
<tr>
<td>2</td>
<td>Tungolskoye Oil Field</td>
<td>UJ</td>
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<tr>
<td>3</td>
<td>West Lineynoye Oil Field</td>
<td>UJ</td>
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<tr>
<td>4</td>
<td>Kondrashevskoye Oil Field</td>
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<td>Prospects</td>
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<td>UJ</td>
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<td>Lineynoye Lower</td>
<td>UJ</td>
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<td>6</td>
<td>West Korchevskaya</td>
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<td>7</td>
<td>Arbuzovskaya (Varyakhskaya)</td>
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<td>Arbuzovskaya North &amp; Upper (2)</td>
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<td>Emtorskaya</td>
<td>UJ</td>
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<td>10</td>
<td>Emtorskaya Crown</td>
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<td>11</td>
<td>Sigayevskaya</td>
<td>UJ</td>
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<td>Sigayevskaya East</td>
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<td>13</td>
<td>Kulikovskaya Group (2)</td>
<td>UJ</td>
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<td>14</td>
<td>Kusinskiy Group (2)</td>
<td>C, UJ, LJ</td>
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<td>Tuganskaya Group (3)</td>
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<td>Kirillovskaya (4)</td>
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<td>North Balkinskaya</td>
<td>UJ, LJ</td>
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<td>18</td>
<td>Traverskaya</td>
<td>C, UJ, LJ</td>
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<td>19</td>
<td>Tungolskoye East</td>
<td>UJ</td>
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<td>20</td>
<td>Sibkrayevskaya Crown &amp; North</td>
<td>UJ</td>
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<td>Potential Prospects (Leads)</td>
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<td>Emtorskaya North</td>
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<td>Sobachya</td>
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<td>24</td>
<td>West Balkinskaya</td>
<td>UJ</td>
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</table>

**Horizons Key:**
- Cretaceous (C)
- Upper Jurassic (UJ)
- Middle/Lower Jurassic (LJ)
Vasyugan Suite Correlation in Lineynoye Field
Structure Map at Top Reservoir showing area where Main Oil Sandstone is underlain by Shale
Vasyugan Fm. Correlation in Lineynoye Field

Bazhenov Fm.
Georgievskaya Fm.

Vasyugan Fm.
**DATE SHEET**

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<th>Item</th>
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<td>Water tank</td>
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<tr>
<td>Boiler</td>
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<tr>
<td>Oil tank site</td>
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<td>Pipe stalls</td>
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<td>Drawworks unit</td>
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<td>Tank park</td>
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<tr>
<td>Pump block</td>
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<tr>
<td>Compressor block</td>
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<td>Power generation train</td>
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<td>Crew camp</td>
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<tr>
<td>Flare site</td>
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<tr>
<td>Pad bund</td>
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<tr>
<td>Cement site</td>
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<td>Water well</td>
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<td>Energy Complex</td>
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<tr>
<td>Plank foundation</td>
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<td>Mud pit</td>
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<td>Main entrance road</td>
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<tr>
<td>Fire dangerous area contour</td>
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<tr>
<td>Fire extinction basin</td>
<td>1</td>
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<tr>
<td>Boiler pit</td>
<td>1</td>
</tr>
<tr>
<td>Fuel Storage</td>
<td></td>
</tr>
</tbody>
</table>
Well Design

Deviation, m

Vertical section
R=382 m (i=1,5° per 10 m)

Angle build

Conductor shoe Ø 245 mm, 800 m

Vertical Depth, m

Angle hold section

24°

1800 m

Pump set up section

Production string shoe Ø 168 mm, 2650

Angle decrease section

Source SNIIGGMS
<table>
<thead>
<tr>
<th>Casing/hole size</th>
<th>Cement Type</th>
<th>Mud Type</th>
</tr>
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<tbody>
<tr>
<td>Conductor Ø 324 mm</td>
<td>Cement, density 1.83</td>
<td>Clay mud, density 1.18</td>
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<td></td>
<td>Bentonite cement, density 1.48 up to surface</td>
<td></td>
</tr>
<tr>
<td>Surface casing Ø 245 mm</td>
<td>Cement, density 1.83</td>
<td>Polymer clay</td>
</tr>
<tr>
<td>Production casing Ø 168 mm</td>
<td>Bentonite cement, density 1.48 up to 150 m over surface casing shoe</td>
<td>Polymer clay mud, density 1.1</td>
</tr>
<tr>
<td></td>
<td>Cement, density 1.83</td>
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</tbody>
</table>

Reservoir
Schematic of a Water Flood System

- **Source of Water**
- **Storage Tank**
- **Wellhead Source**
- **Wells**
- **Reservoir**
- **Treat Plant**
- **Injection Plant**
- **Control Manifold**
- **Separator**
- **Treater**
- **Lact**
- **Fuel Gas**
- **Water Disposal**
- **Production Well**
- **Conversion Well**

Key Facts:
- **Cenomanian Water Sands at ± 1,850 m**
- **Upper Jurassic Oil Reservoir at ± 2,400 m**
- Convert ~ 1/3 Existing Wells
Hydraulic Fracturing

What is Hydraulic Fracturing?
- Pumping of viscous fluids and sand under high pressure into the formation to create a high permeable fracture into the reservoir.

Why Hydraulically Stimulate (Fracture) a well?
1. Remove Formation Damage caused by Drilling/Completion activities (near wellbore damage).
2. Extends a conductive channel into the reservoir:
   a. Increases the natural productivity of the well with a high permeability channel,
   b. Increases the drainage area of the well to contact isolated reservoir sands.

How is Ground Water & Drinking Water protected?
2. Casing and Cement protects and isolates both Water Zones and Productive Zones.
3. Impervious Shale layer above productive zone.
4. Thick interval between Ground Water and Productive Zones.
Almost all Siberian oil wells fall into the intermediate permeability segment (1 mD > k < 50 mD). These wells produce well enough if completed and produced with customary practices. However, they can often be converted into excellent high volume producers by applying effective fracturing technology matched with a lift system to take advantage of the enhanced productivity.

<table>
<thead>
<tr>
<th>Siberian Oil Well Data</th>
<th>Typical Well</th>
<th>Lineynoye Field</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pr, average reservoir pressure</td>
<td>200</td>
<td>262</td>
<td>atmospheres</td>
</tr>
<tr>
<td>Pb, bubble point pressure</td>
<td>120</td>
<td>83</td>
<td>atmospheres</td>
</tr>
<tr>
<td>Ko, permeability to oil (liquid)</td>
<td>5</td>
<td>3 to 40+</td>
<td>millidarcies</td>
</tr>
<tr>
<td>h, formation thickness</td>
<td>15</td>
<td>2 to 15</td>
<td>meters</td>
</tr>
<tr>
<td>Vo, oil viscosity (liquid)</td>
<td>1.5</td>
<td>0.5</td>
<td>centipoise</td>
</tr>
<tr>
<td>Bo, formation volume factor</td>
<td>1.2</td>
<td>1.286</td>
<td></td>
</tr>
<tr>
<td>Ct, total compressibility</td>
<td>2.94E-04</td>
<td>2.00E-05</td>
<td>atm⁻¹</td>
</tr>
<tr>
<td>Re, drainage radius</td>
<td>250</td>
<td>500 to 700</td>
<td>meters</td>
</tr>
<tr>
<td>Rw, well bore radius</td>
<td>0.1</td>
<td>0.1</td>
<td>meters</td>
</tr>
</tbody>
</table>

While a typical Siberian well: 5 mD, 15 metres, with a moderate skin damage produces ~ **20 m³/day (125 bopd)**,

the same well stimulated effectively will produce up to **175 m³/day (1,100 bopd)**, depending on the flowing bottom hole pressure created by the lift system

Each frac job should be designed individually using specific well parameters so that proper stimulation will occur. Effective fracture geometry is very sensitive to permeability changes in intermediate permeability reservoirs

*Joe Mach, et. al*
1. Lineynoye Well inflow performance for a 10 mD, 15 metre thick reservoir
2. Vertical Well assumes zero and -2 skin
3. Experience shows that in prediction mode a fixed BHP of 1500 psi is a reasonable approximation for continued ESP use
**FRACTURE PROPAGATION SOLUTION**

*Calculated Values*

- Slurry Volume Injected: 185.24 m$^3$
- Liquid Volume Injected: 167.83 m$^3$
- Fluid Loss Volume: 106.81 m$^3$
- Frac Fluid Efficiency: 0.42026
- Net Frac Pressure: 6516.1 kPa
- Length (one wing): 81.103 m
- Upper Frac Height: 13.451 m
- Lower Frac Height: 22.969 m
- Upper Frac Height (TVD): 2497.2 m
- Lower Frac Height (TVD): 2533.6 m
- Total Frac Height: 36.42 m
- Max. Frac Width at Perfs: 2.2444 cm
- Avg. Hydraulic Frac Width: 1.3223 cm

**PROPPANT DESIGN SUMMARY**

- Frac Length – Created: 81.103 m
- Frac Length – Propped: 80.7 m
- Frac Height - Avg.: 29.955 m
- Propped Height (Pay Zone) - Avg.: 15.408 m
- Max Width at Perfs – EOJ: 2.2444 cm
- Propped Width (Well) - Avg.: 0.85899 cm
- Propped Width (Pay Zone) - Avg.: 0.69615 cm
- Conc./Area (Frac) - Avg. at EOJ: 10.949 kg/m$^3$
- Conc./Area (Pay Zone) - Avg. at Closure: 13.249 kg/m$^3$
- Frac Conductivity (Pay Zone) - Avg. at Closure: 2077.6 md-m
- Dimensionless Frac Conductivity (Pay Zone): 3.218
- Total Sand Mass Pump: 55.00 tons

**FLOW PROFILE**

Example design – each well will have individual design
**Central Processing Facility Schematic**

**Design Capacity**
- 370,000 tons/year
- 7,400 bopd

**Notes**
1. No gas dehydration
2. Oil stabilization
3. Oil storage 2 days
4. Pumping 2 X 50%
5. No gas compression
6. Power supply - gas piston engine generators

**Future Expansion**
- 1,000 KW
- 370,000 tons/year

**Units**
- Gas Piston Generators
- Resources
- Power
- Generators
- Boiler (heater)
- Gas Separator
- Heater
- Secondary Separator
- Oil Storage Tanks
- Water Storage Tanks
- Slug Catcher
- Primary Separator
- Future Expansion
- Meter

**Flares**
- High Pressure Flare
- Low Pressure Flare

**Pipelines**
- To Water Injection Stations
- 60 m³/hr
- 9,000 bpd
- Pipeline
Sanctioned in June 2008

First Phase

- Development of Lineynoye and West Lineynoye
- Construction of 60 km production pipeline to Imperial Kiev-Eganskoye pipeline in Q1 2010
- 25 year transportation agreement with Imperial includes use of storage, measuring and testing facilities
- First pipeline oil production in August 2010
- Production - 4,000 bopd end of 2010, 12,000 bopd in 2012

Additional Phases

- Incremental addition of Kondrashevskoye, Tungolshkoye and other discoveries
**Pipeline Infrastructure**

- Length 60 km, Diameter 273 mm
- Capacity ~20,000 bopd
- Burial depth ~1 metre (5 m below rivers)
- 9 pipeline isolation valves
- 3 helicopter pads
- 2 pipeline T’s for future connections

**Pipeline Monitoring Procedure**

- The Company has an Emergency Response Plan in place and approved by the Russian authorities in event of an emergency.
- There is a pipeline inspection monitoring programme in place that includes ongoing monitoring of and control of oil flow and pressure changes in the pipeline. There is also a weekly visible inspection programme of the entire pipeline route.
- In the event of an shut-down there are 9 isolation valves located along the pipeline to mitigate any emergency.
The Lineynoye Oil Field

Oil PBC-1000

Water

Oil PBC-2000

Pump

Oil recording point

Oil Pipe Line
Lineynoye - Kiev Eganskoye

60 km

Zavyalovo settlement

Oil recording point

Pump

Oil PBC-3000

Oil Pipe Line
Kiev Eganskoye - Zavyalovo settlement

152 km

The Kiev Eganskoye oil field

Oil PBC-3000

Oil Pipe Line of “Transneft” corporation