Fracking in Colorado: There is an opportunity in Adams County, Colorado to obtain rights to develop a number of oil and gas wells on private land, approximately one mile from the nearest town. The price of the leases is fair and should support a solid return on investment. The oil and gas deposits are in a shale formation 8,000' below the surface and are separated from any useable aquifers by nearly 5,000' of impermeable shale. Hydraulic fracturing will be necessary to produce any appreciable amounts of oil or gas, and normal surface operations will also be required. Oil and gas production would be assessed property taxes, bringing a new source of revenue that the county would use to fund school programs and road repairs. Several Colorado cities have recently enacted fracking bans, but the nearby town has not. Nonetheless, there is a small but growing group of local residents who are opposed to fracking so close to the town.

CONFIDENTIAL

TO THE COLORADO OIL & GAS CORPORATION

We are submitting for your consideration this proposed WORK PLAN for a comprehensive evaluation of your plan to develop using FRACKING technology a number of oil and gas wells on a private land in Adams County, Colorado. We trust this will merit your approval so we can commence the complete feasibility study as soon as possible (Please note SWOT Analysis in Annex).

1. THE FIRST STEP IS CONFIRMATION OF THE OIL AND GAS RESERVES: We shall conduct seismic study of target area, if no such seismic study has been conducted yet. If seismic study available, our technical team shall double check results of seismic study. This is important to ensure that expected revenue from shale oil and gas to be extracted will justify cost of operation and result in reasonable profits both in the medium and long term.

The two products expected from the project, OIL and NATURAL GAS, must be studied separately because of differences in markets, technology, transportation and end use.

2. OIL:

a. Assess transportation prospects to target areas which are the refineries in the US. This can be gleaned from the “Map of refining capacity around the US: There are lots of refining capacity in areas where there is production, to minimize cost of transport: Texas and Oklahoma, Gulf Coast region. We also see some refining in major population centers, and also in major transport centers, like along the Mississippi River and other major waterways. The refineries are configured to deal with specific types of crude. So it’s important to examine compatibility of the oil to be produced from this project with target refineries.” (Source: World Bank course on Fundamentals of Global Energy Business by Michael J. Orlando, University of Colorado – Denver.)

b. The identification of the target market or refineries will be also heavily influenced by the availability of transportation to those markets and this will be primarily by pipeline and/or tankers.

c. Another possibility is to market the oil to the global market. But this is more challenging considering the distances to be traversed by the product by pipeline to the port of embarkation.

d. Of course, the refineries will use the crude oil from the project for: Refining: transforming crude oil into an energy source appropriate to various end-use technologies such as Transport Fuel and Petrochemical Manufacture: paint, plastics, fibers, etc

e. The study must also consider competition from the other oil producing areas of the U.S. and these are primarily the top oil producing states, namely:

(1) Texas

(2) North Dakota - huge growth because of the shale oil revolution

(3) California

(4) Alaska

(5) Oklahoma

f. In studying the marketability of the oil from this project, it must be stressed that refineries are not only configured to deal with specific kinds of crude. “Another factor about refineries is that it can be highly fragmented nationally by seasons, at certain parts of the year. Products refined in certain parts of the country cannot be sold in other parts. if there’s shutdown in a refinery during the summer, you might see a spike in the price in that region. You won’t see that much of a problem during winter time. Some of the

restrictions are seasonal, happening during the summer." (Source: University of Colorado – Denver lecture)

g. The market study shall also consider price volatility due to Middle East intervention in the market and political developments in places like Venezuela. Fortunately, the market has become more stable since the 2000s. "Now OPEC cannot manipulate, Their spare production is only about 2%."

h. The study shall include growth and decline trends due to population. "All of those factors, reasons for decline, growth, are derivatives of the fact that population is increasing and economic fortunes growing so fast, so demand is also growing so fast." (University of Colorado – Denver lecture)

i. Availability of labor is crucial. The study shall include the Employment Outlook. This is made more critical by the fact that Colorado is not one of the top oil producers in the US. Employment in the oil and gas industry is expected to grow much faster than average. Industry wages are 1.5 to 2 times average. Workforce retention is a major issue for many oil companies, as large percentages of their skilled staff are expected to retire in the next 5-10 years. There are many Jobs categories in the oil industry sectors such as Engineers (petroleum, mechanical, electrical, civil chemical), skilled maintenance technicians & helpers (mechanical, electrical, instrumentation), Services (safety, finance, supply, IT, hr, ETC), Managers, geologist/ geophysicist an associated technicians, Landmen and commercial: arrange land contracts, right of way, property rights, "no lease no grease", Drillers, derrick hands and assistants, and many more. We shall survey the area for labor availability and if found inadequate, study feasibility of attracting out of state personnel.

3. NATURAL GAS: In studying the operating requirements and market requirements of natural gas, it must be emphasized that "Natural gas is similar in many ways to oil industry. But natural gas is the most dynamic end of the petroleum business right now…. It's important to understand the tremendous technological developments in the field of natural gas."

a. **Technical Feasibility and the Cost of Gathering & Processing (Midstream):** The Work Plan shall include the assessment of the Technical Feasibility and the Cost of Gathering & Processing (Midstream): gathering the gas, requires a network of small lines to transport the gas from the wells to some central processing facility. In the central processing facility, the objective is to clean up the gas of any impurities. Transmission (Midstream): this refers to the bulk moving of the gas to the point of end use either at the household or industrial uses. Transmission tends to be in the form of pipelines. but sometimes it is transported as LNG or liquid natural gas. It is

done by cooling the gas to minus 260 F and that will liquefy the gas, and will be moved on LNG tankers. This is how gas is traded across international boundaries.

b. **MARKETING:** The study shall consider this issue: “when it comes to natural gas, you are mostly self-sourcing at least regionally your consumption. that’s why when one considers developing a natural gas project, a key consideration is: how will I get rid of this? Is there a local market? With oil, that is not usually the case. You can count on getting it into the global market. But not in the case of natural gas.” (University of Colorado – Denver lecture)

(1) Local Market: The Work Plan shall include whether the project should go into End use and/or Manufacturing (Downstream): One of the primary end uses is for electrical generation, the other is for heating and cooking. What remains is for use in manufacturing: petrochemicals, production of fertilizers.

The Work Plan shall answer then question: Should the project include connecting to the pipelines or actually constructing pipelines connected to electric generating plants in the area? “

The Work Plan shall evaluate this input: “And recently we’ve had a lot of development in the Mountain West region (where Colorado belongs), connecting these new areas to existing interstate transmission infrastructures, some going back to the Pacific Northwest. that’s the challenge with natural gas. With a new find, one has to figure out how to get it somewhere. The ability to move it around is not as easy as oil.” (University of Colorado – Denver lecture)

(2) Export Market: We shall study the export market which has a potential for big profits. There is a big disparity between US price and price abroad of natural gas, such as in Japan. The market study must answer the question: “How can we deliver natural gas to Japan, where in the US its $3 per mcf and sell at $18 across the Pacific. That represents a huge opportunity.”

(3) Future market prospects: This being a long term project, the study must look far into the future and consider this: “US natural gas exports and imports by location: Up to late 2000s, US actually importing natural gas from Canada. Also importing LNG from Canada. And very limited exports to Mexico. By now, we are importing very little LNG. Our exports to Canada have increased. And exports to Mexico. Take a look at electricity: Electricity generation from coal started decreasing in 2005, generation from gas increased. **Natural gas had a huge impact on the coal sector. Electrical generation by gas will equal coal by 2035**.” Transport fuel: The Work Plan shall also study positive trends in the use of natural gas as transportation fuel. (University of Colorado – Denver lecture)

4. **ISSUES ON FRACKING**: While natural gas is considered vastly cleaner than oil and other hydrocarbons, there are still huge environmental and social issues to be hurdled. This is one of the most critical parts of the Work Plan and could be a make or break issue.

a. **FRACKING FEARS**. Natural gas production activities are happening in areas not familiar with hydrocarbon production, generating concerns, some legitimate. There has been significant political action pushing back against expansion of this industry. Much of it is coming in the form of proposals for limitations on this technology fracking because of concerns about effect on groundwater.

The study must prepare a **Communications Plan** addressed to the various stakeholders to tackle the issue of water:

(1) water acquisition

(2) chemical mixing

(3) well injection

(4) flowback and produced water (wastewater)

The **Communications Plan** shall assure the stakeholders that the activity cannot connect to the aquifer since the oil and gas deposits "are separated from any useable aquifers by nearly 5,000' of impermeable shale." And that the cement wall to be used is solidly sealed.

b. The study shall answer this question: What is moving this sector? How would the following Growth factors affect the business?

population growth

increased economic activity across the board

increasing demand for LNG in Asia/pacific and Africa

coal replacement in power generation to lower COs

complementary with renewables

natural gas as transportation fuel

drive for energy independence

technological innovation

As well as the following Decline factors

low price for dry gas

energy efficiency

technology improvements for renewables

long-term climate consideration

political resistance to unconventional production. It must be stressed that political resistance is one of the most difficult headwinds that the industry will encounter.

5. POLITICAL FACTORS – This is the most crucial element in the feasibility of the project because of the imponderables of political dynamics. The Work Plan shall include the formulation of a Social Engineering Plan based on the political matrix below to be able to negotiate the potentially explosive and costly political minefield.

Please note the attached Matrix of Stakeholders showing our initial estimate of their issues and positions on the various issues confronting the Fracking sector:

Matrix of Stakeholders Colorado Oil & Gas May 2, 2014

Note: Very confidential: Politicians normally have low level of resolve, looking for compromise. (University of Colorado – Denver lecture) This will be a vital input in the needed Social Engineering.

National Lobby Against Fracking: The lead national organization against Fracking is the AMERICANS AGAINST FRACKING, a movement and coalition that claims the following: “As a movement to ban fracking, we have collectively achieved a tremendous amount. In the past year, we have stopped plans to open the Delaware River Basin to fracking, prevented fracking from coming to New York, passed legislation to ban fracking and fracking waste imports in New Jersey, achieved a long term moratorium in Vermont, and passed over 200 local measures to prevent fracking or to support statewide bans from California to Ohio, Colorado to North Carolina

and elsewhere. And we're just getting started." Its activities, which look formidable, consist of the following:

• Coordinate national support for state and local campaigns
• Provide a mechanism for communicating the strong national message and movement for a ban to the national media, federal regulatory agencies, and Congress
• Create a website that will feature key information and the organizations that have joined the coalition (for examples see Global Frackdown and New Yorkers Against Fracking)

There are other national anti fracking organizations that appear very strong and well funded: " Working hand-in-glove with Artists Against Fracking and Water Defense is Food & Water Watch, a Washington, D.C.-based lobby group with annual revenues of almost $12 million. According to the Colorado Statesman, Food & Water Watch is one of the "major players behind the anti-fracking movement" and "played a key role in supporting initiatives to ban or delay fracking in local communities" at the ballot box in November 2013.

In fact, Food & Water Watch has quietly – but very firmly – taken credit for orchestrating the anti-fracking campaign in Colorado for years.

Local lobby against Fracking: At the local State level, there is also a very strong anti-Fracking movement. A May 2, 2014 statement published by ***The Energy Collective*** calls this: **Colorado Anti-Fracking Activism: A Game for Millionaires and Billionaires.** News article specifically mentioned an anti-fracking billionaire: "San Francisco billionaire Tom Steyer is reportedly interested in bankrolling "ban fracking" activists in Colorado. This is just the latest evidence of national environmental groups and the ultra-rich playing extreme political games with our economy, state budget and the livelihoods of working families."

Local State Politics: The Governor of Colorado is a strong supporter of fracking. From Huff Post Denver is this story: "Colorado Governor John Hickenlooper has made no secret of his support for hydraulic fracturing, but on Tuesday he went one big step further and testified that he actually drank fracking fluid." However, he faces stiff resistance in his reelection with tracking as the major issue. If he is defeated, State support shall be in big jeopardy.

Thus, the Work Plan shall include a plan on how to deal with two strong, well funded lobby groups: National and Local and how to secure the full support of the incumbent Governor and beyond, citing how the State's and town's share of the revenue would help the local economy, generate jobs and help

fund various infrastructure projects like more school buildings in the entire State of Colorado. The Plan shall include dealing with the anti-fracking lobby groups in the court of public opinion, legislative (National and State), Executive and Judicial (courts).

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Annex: SWOT ANALYSIS

SWOT

STRENGTHS

Cheaper, profitable technology

Tremendous technological developments achieved and still continuing

Competitive advantage

Natural gas is the cleanest petroleum product, less carbon dioxide emissions

Many electric generating plants being transformed from coal to gas. Electrical generation by gas will equal coal by 2035.

Gas can be sold to nearby regions by connecting to existing pipelines to major consuming centers

Shale gas projected to dominate all of the growth in gas

US gas prices much cheaper than natural gas from sources outside US

There are now shale gas basins traditional petroleum producing States like Texas, New Mexico and Oklahoma. Also in the Appalachians, which was not a traditional oil producing area, there's a big shale gas basin. Also in Montana and North Dakota, and Pennsylvania, so you have large areas distributed all around the country with opportunities for gas development in the form of shale gas

Exports increasing to Canada and Mexico

Very positive growth factors such as population growth

• increased economic activity across the board

• increasing demand for LNG in Asia/pacific and Africa

• coal replacement in power generation to lower COs

• complementary with renewables

• natural gas as transportation fuel

• drive for energy independence

• technological innovation

Labor available like in oil sector

Strong support of Colorado Governor

WEAKNESSES

Fracking fears on effect on groundwater

Fracking requires massive amounts of water, added with some chemicals

Significant political action pushing back against expansion of this industry. Very strong well founded anti fracking national and Colorado based lobby groupsRequires massive amounts

political resistance is one of the most difficult headwinds that the industry will encounter

Getting around the contracting risk, figuring out who exactly will bear the risks associated with this technology is probably even more formidable than the technical challenges.

Decline factors

• low price for dry gas

• energy efficiency

• technology improvements for renewables

• long-term climate consideration

• political resistance to unconventional production

OPPORTUNITIES

Coal replacement in power generation to lower COs. Electrical generation by gas, will equal coal by 2035.

Increasing demand for LNG in Asia/Pacific and Africa

complementary with renewables

natural gas as transportation fuel

technological innovation

Very positive growth factors such as population growth

Export: The big challenge is now to physically arbitrage the price differences. How can we deliver natural gas to Japan, where in the US its $3 in mcf and sell at $18 across the Pacific. That represents a huge opportunity.

THREATS

Killer threats: Very strong national and local lobby groups against fracking which can influence adverse executive, legislative and court action

Governor might lose in the next election since fracking will surely be a dominant election issue.

Actual accident affecting groundwater to prove the point raised by the anti fracking groups.