IVANHOE RISK ASSESSMENT

THE RISKS ASSOCIATED WITH IVANHOE ENERGY'S OPERATIONS IN ECUADOR

This Risk Assessment highlights the controversial history of Canadian-based Ivanhoe Energy and the significant risk facing the company and investors over its Pungarayacu venture in Ecuador's rainforests. The Assessment includes current financial information, company background and legacy issues, speculation of stock 'pump and dump' schemes, and extensive in-country investigation of the Pungarayacu project, including contract controversies, Ivanhoe's questionable HTL technology, and opposition of the Kichwa indigenous peoples on whose land Ivanhoe seeks to drill.

Ivanhoe Energy (IVAN) Stock Price YTD (source: finance.yahoo.com)

Legacy Liabilities

Current Ivanhoe Co-Chairman and CEO Robert Friedland was previously CEO of the now bankrupt Galactic Mines, responsible for one of the worst mining disasters and Superfund sites in the U.S. The Summitville mine disaster was the largest cyanide and lead release into fresh water river systems in U.S. history. The toxic spill earned Friedland the dubious nickname 'Toxic Bob' and 'The Ugly Canadian' by affected communities, NGOs, and disgruntled investors whom were displeased by his handling of the events and the bankruptcy of Galactic Mines[1].

Company Controversies

Ivanhoe Energy was formed in 1999 by a merger of two unsuccessful Robert Friedland companies — Black Sea Energy Ltd, and Sunwing[2].

Since its new incarnation as one company, Ivanhoe Energy has raised eyebrows over its oft-touted mega-deals in the works, proprietary but untested technologies to recover untraditional oil and gas deposits, and a stock scandal over the company's questionable collusion with CBS MarketWatch reporter Thom Calandra — a company shareholder who provided favorable stock recommendations that fueled the company's rallies in share price despite little justification from quarterly reports, earnings statements, or project advances[3].

Large spikes in Ivanhoe stock price can be traced to a potential major Qatar gas play, exploration progress in China, a possible Iraq venture, advancements in unique gas-to-liquid and heavy-to-light oil technology, or an uptick in reserves. All were heavily publicized and hyped, but few actually happened[4]. Others fell far short of ex-

COMPANY BACKGROUND

NASDAQ:IVAN/TSX:IE/www.ivanhoeenergy.com

Ivanhoe Energy is an international heavy-oil development and production company. Core operations are in Canada, Ecuador, China and Mongolia, with business development activities worldwide.

Ivanhoe seeks to deploy technologically innovative methods and proprietary technologies in the development and recovery of heavy-oil and other oil and gas assets. This includes the application of a patented, HTL (Heavy-to-Light) heavy-oil upgrading process.

Ivanhoe Energy Inc. is the parent company of the group and is responsible for Canadian and U.S. operations. Operations outside the U.S. and Canada are carried out through subsidiary companies: Latin American projects through Ivanhoe Energy Latin America Inc., China and Southeast Asia projects through Sunwing Energy Ltd., and projects in the Middle East and North Africa through Ivanhoe Energy MENA Inc.

Sector Oil and Gas Exploration and Production

Key Officers
Executive Co-Chairman and Chief Executive Officer: Robert Friedland
President and Chief Operating Officer: David Dyck
Chairman, Ivanhoe Latin America Inc.: David Martin

Financials
S & P Quality Ranking: C
S & P Investability Quotient Percentile: 36%
Relative Strength Rank: Weak*
Share Price: $1.17†
Market Capitalization: 402.81M
Avg. Vol (m^3): 746,827

* Standard and Poor's Quantitative Stock Report, September 3, 2011
† NASDAQ, Wed. Nov. 9, 2011, 11:22AM EST

RISKY BUSINESS

As indicated in the following excerpt from Ivanhoe's own 2010 10-K, the company faces risk factors far beyond that of its competitors:

- Our ability to continue as a going concern may be adversely affected by inadequate funding. We have a history of operating losses and cash flow from operating activities will not be sufficient to meet our current obligations and fund future capital projects. Historically, we have relied upon equity capital as our principal source of funding. Continuation of the Company is dependent upon our ability to obtain additional capital to preserve our interests in current projects and to meet obligations associated with future projects.
- We may not be able to fund our substantial capital requirements.
- We may not successfully commercialize our HTL™ technology.
- Technological advances could render our HTL™ technology obsolete.
- Efforts to commercialize our HTL™ technology may give rise to claims of infringement upon the patents or other proprietary rights of others.
- A breach of confidentiality obligations could put us at competitive risk and potentially damage our business.
- Our heavy oil project in Canada may be exposed to title risks and aboriginal claims.
- Our investment in Ecuador may be at risk if the agreement through which we hold our interest in the Block 20 project is challenged or cannot be enforced.
- Our principal shareholder may significantly influence our business.

pectations after the fact, leaving some to question the level of truth contained in the company's forward looking statements at the time they were written. The fallout from deals gone awry, dry wells, technology yet to be commercialized, or a downward adjustment of reserve size, took its toll on Ivanhoe's stock.

According to a Calgary money manager, "This is a company that has used up a lot of the Street's money, and the Street has a long memory[5]."

This pattern of project promises unmet and its ensuing stock roller coaster — from a $6 high in 2000 to a low of 32¢ in February 2003, to the current $1.17[6] — casts doubt on whether Ivanhoe is indeed an oil development and production company or a shadow company merely manipulating markets and misleading shareholders by exaggerating forward-looking statements and technological advances that serve to boost stock price and raise capital.

International Oil Daily reports, "Some equity analysts view Ivanhoe as a promotional play, saying that it has little financial or operational performance to justify its grand plans or past inflated stock value[7]."

Forced to defend the company in the face of analyst doubts and investor criticism, John MacDonald, vice president for investor relations emphasized, "I work for a legitimate company[8]."

After a shake up in 2009 and divestment of U.S. assets, Ivanhoe is doubling down on its patented Heavy to Light (HTL) technology to recover sands and heavy crude with an API[9] of 10° or lower. However, given its past, many are wary of the company's claims. Oil Daily explains, "[M]any observers are taking a wait-and-see stance as to whether the company will be able to proceed to full-scale commercial application of the technology. They note that Ivanhoe had previously banged the drum loudly about the potential for developing gas-to-liquids (GTL) projects but that it has little to show in the way of results," and referred to the company's efforts as, "its quest to build a better mousetrap[10]."

Ivanhoe has a Standard and Poor's Quality Ranking of 'C', an S & P Investability Quotient Percentile of 36% — lower than 64% of all companies for which S & P Report is available — and a Relative Strength Rank of 21, or 'Weak'[11].

The current financial health of the company does not bode well for the environment or the indigenous communities of Ecuador where Ivanhoe is planning up to 40 wells in some of the country's most fragile and culturally sensitive areas, using commercially untested technology that is both capital and resource intensive. And given the Ecuador Pungarayacu project accounts for roughly a quarter of Ivanhoe's geographic portfolio, the environmental, social, political, and financial risks the company faces present a serious threat to the overall solvency of the company.

Project Summary

Ecuador's state oil company drilled exploratory wells in what is now known as the Pungarayacu Field in the 1970s and found oil, but did not have the technology at the time to extract it. The crude in the underground Hollin formations is estimated at 9° API[12] – extremely heavy crude. According to the Ecuadorian government, it granted the concession to Canada's Ivanhoe Energy due to its patented technology to convert the region's

PROJECT SNAPSHOT: BLOCK 20 – PUNGARAYACU FIELD

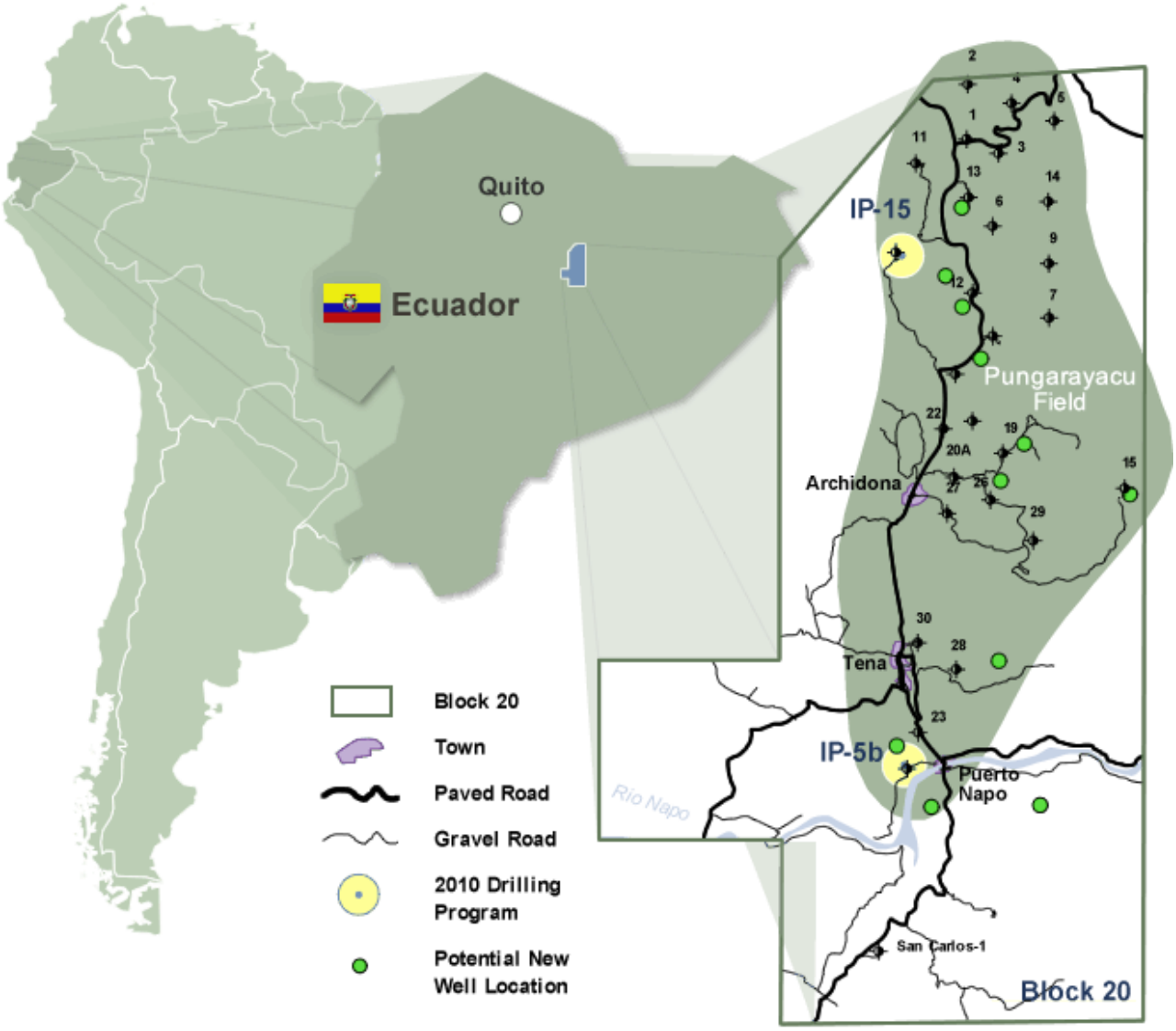
Company: Ivanhoe Energy Ecuador leads development. Corporate parent Ivanhoe Energy Latin America provides contract guarantees and all financing.

Contract: 30-year Specific Services Contract, signed in 2008, extendable for up to 10 years, with 4 initial exploratory wells planned. EIA approved 2009.

Oil Concession: Block 20, Province of Napo, approximately 125 miles southeast of Quito. Concession is 400 square miles, and includes major Amazonian tributaries and watersheds, a major city, town, and significant ancestral and titled indigenous lands.

Field History: In the 1980s, state run Petroecuador drilled and cored 26 wells, finding substantial amounts of heavy crude oil. But recovery and development was impossible at the time due to the technological challenges of extracting the estimated 9-10° API heavy crude.

Status: Testing at the company's first exploratory well in Nueva Esperanza (IP-15) was suspended in mid-2010 without recovering oil. An October 2010 release reported successful follow up samples from a second well (IP-5b). In June 2011 the Company announced that heavy crude oil extracted from its IP-5B well was successfully upgraded to lighter crude at a facility in San Antonio, TX, which could meet local pipeline specifications if it can successfully be upgraded on site. Ivanhoe has begun a program of extensive seismic testing in the southern half of the Block. The first phase of this program was reported complete in August 2011.




Members of Rukullacta march against Ivanhoe's project
© Amazon Watch

heavy oil into light oil (HTL technology), though many other companies still consider this to be a mining project, similar to the tar sands of western Canada. Given the extreme viscosity of the crude, the extraction process requires massive amounts of water, gas, and heat to extract it out of the rock and get it to flow in a pipeline.

The first well site on lands adjacent to the Kichwa Community of Rukullacta, known as IP-15 in Nuevo Esperanza (New Hope), was riddled with technical problems, though Ivanhoe press releases reported good community relations. Ground reports from local communities, Amazon Watch field staff, and even some workers for Ivanhoe say that the company has had difficulty getting the tar-like sludge out of the ground, is short on capital, and is currently looking for an investment partner. The company's 2010 Annual Report states that after cementing and completion problems, testing at the IP-15 well was suspended in mid-2010 without recovering oil[13].

Ivanhoe's second test well in Puerto Napo (IP-5b) was drilled in 2010 and an October 2010 press release announced that the Company had successfully produced oil at IP-5b. In June 2011 the Company announced that heavy crude oil extracted from its IP-5b well was successfully upgraded to 17° API, which meets local pipeline specifications, using the Company's proprietary HTL upgrading process at its feedstock test facility in San Antonio, Texas[14].

Ivanhoe is conducting seismic exploration in the southern part of the Pungarayacu field. In August 2011 it announced the completion of the first phase of this program. Ivanhoe has cut trails for seismic work within the territory of the Kichwa Community of Rukullacta despite a lack of consent from the community or its leadership.

Political Risk

Ecuador is perhaps South America's most politically tumultuous country. It has had seven presidents and two constitutions between 1996 and 2006. In 2007, Rafael Correa Delgado, a U.S. trained economist was inaugurated, and led the drive for yet another magna carta in September 2008. In December, Correa sent shock waves through the financial world by defaulting on the nation's Brady Bonds. The firebrand leftist president has enacted major reforms in the hydrocarbon sector, passing sweeping legislation that increases state control by restructuring oil contracts from profit sharing agreements to fee for service.

Ivanhoe's no bid contract, signed in 2008, has been wrought with controversy from the outset, and a target of litigation both in Ecuador and in the United States. The contract was procured with the help of the President's older brother Fabricio Correa. It is among many contracts that the elder Correa orchestrated under questionable circumstances between the government and the private sector. Accusations of nepotism and corruption ensued, forcing Rafael Correa to sever all administration ties with his older sibling.

At the expense of the government, Ivanhoe received a sweetheart deal, netting a fixed rate of $37 for every barrel of crude extracted[15]. The deal has been widely criticized by Ecuadorian industry insiders, opinion makers, and legislators, as a 'gangster[16]' contract, which is 'the most unethical contract in the history of oil extraction in Ecuador[17]". According to Ecuador oil analyst Luis Calero, "The national interests are not being protected [under the state's contract] with a small company that lacks the technical and economic credentials that the Pungarayacu project demands[18]."

The scandalous contract terms were a focus of the best-selling Ecuadorian book "Big Brother" about Fabricio Correa's dealings with the private sector and relationship with his younger brother's administration. Marta Roldos, a former Presidential candidate, filed a petition with the District Attorney's office calling for an investigation into irregularities in the contract model signed between the government and Ivanhoe[19].

But that's not the only set of brothers that is garnering charges of nepotism and corruption. The Vice President of Operations for Ivanhoe Ecuador is none other than Santiago Pastor, brother of Wilson Pastor, current Minister of Non Renewable Resources charged with regulating Ecuador's oil sector and Ivanhoe's contract[20].

While some may see the deal as a coup for Ivanhoe, Ecuador has a long history of upending oil contracts, and seizing oil fields assets and infrastructure. Occidental Petroleum, Alberta Energy (Encana), Petrobras, among others, have all faced contractual disputes with, and seizures by, the Ecuadorian government that forced them out of the country.

The political outrage at Ivanhoe's generous contract terms, and efforts by President Correa to distance himself from his brother, may negatively impact the company's contract and operations, and increases the risk of unfavorable political intervention by the executive or legislative branch related to Ivanhoe's venture.

Additionally, Ivanhoe was granted the Block 20 concession due to its patented HTL technology. If that technology cannot be implemented, or it in turn proves to have been a ruse to access more profitable, lighter crude reserves within Block 20, Ivanhoe could have its contract revoked and its operations could face seizure by the Ecuadorian government.

Environmental Risk

The region that encompasses Block 20 is comprised of many fragile ecosystems, with several watersheds critical to local communities for sustenance and economic activity such as tourism. The watershed of the Misahualli River, which bisects the block, has been declared a "Valle Sagrado" (sacred valley) by Ecuador's National Institute for Culture and Patrimony. No doubt due to its warm climate, abundance of water, and fertile soil, the area has been home to indigenous peoples for thousands of years — some of whose cultural remnants are still seen today on dozens of petro-glyphs that date back to 10,000 years BC.

Part of Block 20 is located in the Sumaco Biosphere Reserve, a UNESCO (United Nations Educational, Scientific and Cultural Organization) site and one of the most pristine ecological protected areas in Ecuador. The Sumaco Reserve is thought to be a hotspot for endemism due to its wide range of altitudes and microclimates and its inaccessibility by road, resulting in an unusually high number of unique species.

The watershed that surrounds the city of Tena is a well-known destination for some of the world's best whitewater rafting and is a major boon for the local economy and communities. Kichwa indigenous communities in the region have developed a number of community-based ecotourism projects in the past decade. This important aspect of the local economy could well be threatened by large-scale oil development, which could make the area

Ivanhoe road to Nueva Esperanza wellsite

less desirable to tourists even in the absence of severe contamination impacts.

The environmental impacts of Ivanhoe's project are highly uncertain. Ivanhoe's HTL technology has not been applied commercially or tested in an environment anything like the Amazon. Ivanhoe's demonstration facility is small and located in San Antonio, Texas, which has a far less humid climate.[21] In addition to the risk of spills and leakages that accompanies all oil extraction, the particular extraction process used by Ivanhoe for heavy oil (called SAGD, or steam-assisted gravity drainage) requires the injection of vast amounts of steam into the well. Depletion of surface water and contamination of groundwater are documented issues with existing heavy oil production.[22] However, Ivanhoe's Environmental Impact Assessment for its test wells does not address these issues.[23] With regard to deforestation and noise impacts from seismic testing, the Ivanhoe EIA asserts without evidence that fauna driven away will return to areas once the seismic phase is concluded.[24] This is of major concern to indigenous communities that frequently engage in hunting and fishing.

Social Risk

On the eastern side of the Sacred Valley reside thousands of Kichwa indigenous people who still very much depend on the land and rivers for their daily survival. Grouped into seventeen communities are some 8,000 people who hold collective lands rights to thousands of acres of land known as Rukullacta, which means tierra antigua, or ancient land.

On April 16th 2010, the communities held a massive, extra-ordinary assembly to reach consensus on their position regarding the oil project. The communities rejected all oil extraction in their territories and called for the can-

Ivanhoe contract workers illegally cut seismic trails in Rukullacta territory

celation of Ivanhoe's contract[25]. Rukullacta communities marched some 5 km to the nearest town of Archidona, where an impromptu public hearing took place between the Mayor, Rukullacta leaders, and national level indigenous leaders including Ecuador's all powerful national indigenous organization CONAIE and Amazonian confederation CONFENIAE. Their opposition to Ivanhoe, and all other oil, mining, and logging in the area was adamant. The Mayor of Archidona also publicly went on record against the Block 20 drilling project.

According to Ivanhoe's corporate presentation, the company envisions at least a dozen wells inside Block 20, many which are slated for Rukullacta territory[26]. In the face of this threat, Rukullacta held dozens of workshops and strategic meetings with leaders and allies. The communities filed a legal injunction to attempt to stop the project from moving forward[28].

But in November 2010, Ivanhoe acted against the decision of the Rukullacta Assembly, violating Ecuadorian and international law, and the emerging indigenous rights standards embraced in the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) which guarantees a right to free, prior, informed, consent (consultation in Ecuador's constitution). The company subverted the tribal governance structure and negotiated directly with the Rukullacta president-who was bound by the resolutions of the tribal assembly against the project. However, enticed by Ivanhoe's offer, he signed over a parcel of land where the company could conduct activities in return for unknown gifts[29]. Given that Rukullacta holds collective land title to their territory, this was highly illegal. When the under the table contract surfaced, the communities were outraged, calling an emergency assembly, which striped Rukullacta's leader of his title and any role in the tribal government. Rukullacta has filed suit locally to nullify the agreement, which is now pending before the local court. Meanwhile, company activity on the illegally seized land parcel has been stopped.

Ivanhoe continues to attempt to operate within titled Rukullacta territory despite its lack of local consent. On May 27, 2011, several members of the Rukullacta community confronted Ivanhoe workers cutting a trail through the forest and demanded that they leave. The workers complied with this request, only to return later and continue cutting seismic trails. According to Rukullacta President Rene Chimbo, the company "never sleeps[30]," constantly harassing, surveying, and intimidating community members and leaders.

Legal Risk

Ivanhoe's concession for Block 20 has been riddled with controversy since its inception, marred by lawsuits, bribery allegations, and the involvement of Ecuadorian President Rafael Correa's older brother. Jack Grynberg of Grynberg Energy and Cotundo Minerals sued the company in a dispute over drilling rights. According to the suit, Grynberg and Cotundo had secured extraction rights to the block from Ecuador's Ministry of Mines. Given the heavy API levels of the crude and in-situ bitumen, the company considered Block 20 to be a mining concession. After sharing promising results and attempting to bring Ivanhoe into the project, Grynberg and Cotundo accused Ivanhoe Energy of stealing the shared proprietary information regarding the block, and using it to privately bid for its own drilling rights from the Hydrocarbon Ministry. The lawsuit accuses Ivanhoe of offering bribes to Correa's brother in order to gain favor and an exclusive bidding option. Ivanhoe maintains that it is the company's patented HTL technology to convert heavy crude into lighter, higher-grade oil that allowed it to gain exclusive access to the block, despite the lack of evidence the technology is both technologically and commercially viable on a large scale[31]. The case was dismissed on jurisdictional grounds, and an appeal is currently pending before the United States Court of Appeals for the Tenth Circuit.

Rukullacta leaders and Ecuadorian human rights lawyers have filed a now-pending petition in the Inter-Amer-

THE RISKS OF IGNORING SOCIAL AND ENVIRONMENTAL ISSUES

From Herbertson et al. 2009[27]

Financing Risk – Financial institutions and investors may delay their financing, require more conditions, or decide not to participate.

Construction Risk – The proponent may not be able to complete the project on time or on budget.

Operational Risk – The proponent may not be able to access necessary inputs, produce sufficient output or sell at a sufficient price, which can disrupt operations.

Reputational Risk – The project may harm the proponent's or financial institutions' brand identity, which can translate into loss of market value.

Credit/Corporate Risk – Delays or interruptions to a project may reduce the proponent's profitability and asset values, decreasing the proponent's stock value, lowering its credit rating, and raising the cost of borrowing.

Host Government Risk – The host government may withdraw permits and licenses, commence enforcement actions, impose civil or criminal penalties on the proponent, or tighten requirements.

Host Country Political Risk – Political forces in the host country may threaten the project.

ican Commission of Human Rights of the Organization of American States. The petition holds that Rukullacta's territorial rights and rights to prior consent under Ecuador's constitution and international agreements have been violated.[32] It calls on Ecuador to halt the project and revoke Ivanhoe's contract.

Much like obtaining an environmental license, there is ample evidence that failing to obtain a 'social license' to operate from local communities can often delay or derail a project. According to the World Resources Institute report, "Development Without Conflict: The Business Case for Community Consent," obtaining the consent of local communities is not just common sense, but also good business[33] (see box). "The business risks of imposing a large-scale project on a host community without its consent are multiple and profound, and can potentially threaten the project's financial viability," concludes the report.

Ivanhoe's failure to obtain the consent of Rukullacta — nor properly consult the community — and its efforts to subvert traditional tribal government decision making structures is not only in violation of national and international law, but is creating animosity towards the company which only ensures a tough road ahead and raises doubts whether Ivanhoe will ever be able to obtain the community's consent.

Rukullacta has already shown its propensity for protest, and possible roadblocks, or well site and infrastructure seizures could occur. Ivanhoe also runs the risk that community opposition and related activities could yield unfavorable press attention and tarnish the company's brand. The community also has close ties to CONAIE (Confederation of Indigenous Nationalities of Ecuador), one of the continent's most powerful and well organized indigenous movements that is responsible for deposing numerous presidents and derailing free trade pacts and structural adjustment reforms.

Financial Risk

Drilling in a fragile ecosystem where local indigenous communities are opposed presents significant project risk, and exposes the company to greater financial risk if the project is not successful. Risk to reputational capital is also a factor if the already controversial project becomes more deeply mired in contentious litigation or political disputes, resulting in unfavorable mass media attention.

With significant environmental and social risk, the project has already faced delays and work slippage. Pending legal efforts are underway that may further affect the project, including the local lawsuit against Ivanhoe and the complaint at the Inter-American Commission on Human Rights.

The type of heavy crude drilling necessary for Block 20 is very capital intensive particularly in the first phase. This has raised questions regarding the company's cash on hand and access to capital for the project. The company admits in its 2010 Annual Report that its current cash flows are insufficient to fully fund the project.[34] This poses major risk if results are weaker than expected or costs are higher. It also calls into question the company's ability to adequately cover its environmental and social liabilities in the event of a major spill or other unforeseen accident.

As noted, there is also major financial risk if proper consultation does not occur and consent is not obtained in Rukullacta, and if project delays, work slippages, or a state of force majeure occurs due to community opposition.

A New Standard?

Ivanhoe has signed a memorandum of understanding with Equitable Origins, a new company working to establish a voluntary certification system for oil and gas exploration and production[35]. Modeled after fair trade coffee and chocolate, the standard would theoretically provide added product value for companies that have complied with higher environmental and social standards in the oil patch.

However, as illustrated by Ivanhoe's activities to date, the standard has not led to greater environmental or social practice in Rukullacta. The company's failure to properly consult the community, its controversial "community relations" tactics, and illegal intrusions into Rukullacta territory to cut seismic lines, leaves Equitable Origins' standard with little credibility in changing upstream industry behavior, and far short of the projected value added to the company's brand.

Conclusion

Ivanhoe Energy's checkered past, controversial technology, and lack of capital all raise red flags about the financial health of the company. Ivanhoe's own disclosures, analyst opinions, and industry experts raise questions about the company's legitimacy, while its improper relationship with Fabricio Correa and ties to current Minister Wilson Pastor leave the company vulnerable to changes in the political tide and legal charges of corruption and nepotism.

The company's Ecuador venture involving major drilling plans in a UN Biosphere Reserve and the traditional territory of the Kichwa indigenous people of Rukullacta — who are adamantly opposed to the project — faces substantial political, environmental, social, legal, and financial risk. While senior management has downplayed the company's financial troubles and the project complications in Ecuador, both present major exposure and risk to shareholders.

References

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2. *Ibid.*.
3. *Ibid.*. Energy Compass put it, "Controversial Canadian junior Ivanhoe Energy has fallen from grace for a second time, after one of its chief supporters, prominent US stock market pundit Thom Calandra, resigned amid probes into his personal share trading."
4. "It's gone from bad to worse," said one Calgary-based analyst of the company's plans. "First, Syntroleum fell apart, then drilling in East Lost Hills [in California's San Joaquin Valley] didn't pan out, and now Qatar GTL disappears. It takes three legs to hold up a stool, and they don't have a leg to stand on." International Oil Daily, May 29, 2003.
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9. American Petroleum Institute (API) scale for crude oil density, in degrees of viscosity. The lower the degree, the higher the viscosity. Average crude hovers around 25°, while more expensive lighter crude averages in thirties. Heavy, more viscous crude is categorized in the teens, with heavy crude under 10° being heavier than water. Most of Ecuador's crude is heavy and discounted below the standard U.S. per barrel West Texas Intermediate (WTI) price.
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23. http://www.thechocolatelife.com/group/tenadiaries/forum/topics/how-does-sagd-affect-local . See also Ivanhoe, Environmental Impact Study (EIA) and Environmental Management Plan (EMP) for the Appraisal Drilling and Production Tests in Block 20 for the Wells IP-13, IP-16, IP-5A and IP-5B , http://www.ivanhoe-energy.com/i/pdf/ecuador/en/chapter04.pdf
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221 Pine Street, 4th Floor
SAN FRANCISCO, CA 94104
Tel: 415.487.9600 Fax: 415.487.9601

amazon@amazonwatch.org
www.amazonwatch.org

1350 Connecticut Ave. NW #1100
WASHINGTON, DC 20036
Tel: 202.785.3962