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GEOLOGY, POTENTIALITY, SPECULATION: On the Indeterminacy of First Oil

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In December 2011, Televisão Santomense, the state-run TV channel of São Tomé and Príncipe, dedicated its chat show *Portas Abertas* to the topic of petroleum. One of the stylish young hosts posed the following question to the experts who had been invited to discuss the issue: “How can we, the Santomean people, the *palaiês* [women fish vendors], fishermen, journalists, lawyers, and taxi drivers who are not part of the State, benefit from petroleum?” She continued: “How can people know whether São Tomé and Príncipe *has* any petroleum?” The first expert to reply was the chemical engineer Osvaldo Abreu, whom I knew well from my fieldwork in the African Atlantic island state. Osvaldo had previously been a technical director at São Tomé and Príncipe’s National Oil Agency, but he had since moved to work for an international company offering scientific data services for the oil industry. Now Osvaldo summed up the riddle of fifteen years or more of inconclusive oil exploration:

We are dealing with a scientific matter that is complicated because it happens out of our sight. We are dealing with a geological matter that is found in the subsoil while we are here, above ground. We are dealing with petroleum in an imagined form. And people keep imagining, predicting, and hoping that what we hold in our minds or in our imagination or in the results of the studies we have done is true.

What can this quotidian instance of television entertainment tell us about the nature of petroleum exploration on the periphery of established zones of extraction and global markets? Osvaldo's response reflects a vibrant concern with the potentiality of matter that lies at the heart of petroleum production. But realizing this potential has been touch and go.

My research in São Tomé and Príncipe (STP) started in 2007, a decade after the Santomean government had signed an ill-conceived agreement for petroleum exploration with the U.S.-based Environment Remediation Holding Company (ERHC). During extended fieldwork and follow-up visits, I talked to ordinary Santomeans, international advisors, industry representatives, and the mid-level bureaucrats of STP's National Oil Agency, including Osvaldo. At a time when the Gulf of Guinea was consolidated as Africa's petroleum frontier and global oil prices peaked, there was much bafflement that STP's oil exploration had not taken off as initially expected. This article seeks to work out a partial answer to this apparent contradiction by drawing on ethnographic observations and archival research. But rather than asking why there is no oil in STP, I query the persistent notion that there might be. I use what the oil industry calls "first oil" as a heuristic to examine how a notion of petroleum potential is generated and sustained in the face of the contradictory dynamics of contemporary oil exploration. I show that first oil is a protracted and precarious achievement based on a speculative epistemology and reliant on specific technical, legal, and commercial practices and devices with surprisingly incongruous effects. Instruments that aim to facilitate petroleum production—such as contracts, exploration zones, and test wells—thus become gestures of resource potentiality without compelling a predetermined outcome. They give shape to a dispersed matter whose existence, in STP, has continued to be doubted.

FIRST OIL

The phenomenon of first oil makes the notion of indeterminate potential readily apparent. First oil barely needs defining. In the jargon of petro-industry experts, first oil refers to the initial oil pumped from a newly commercialized exploration well. It acts on forms of speculative knowledge—knowledge that is necessarily incomplete, based on uncertain and partially obscured evidence, and that occasionally makes "less than rational connections between means and ends" (Comaroff and Comaroff 2000, 310). It signifies the transformation of zigzags of geophysical measurements, fuzzy stratigraphies of seismic surveys, well logs, and drilling cores into economic value. It engages one or more capital-, technology-,

and knowledge-intensive investment projects that are the indispensable but inherently risky “motor[s] of capitalist wealth creation” (Røyrvik 2011, 5). Its associated myths of serendipity, sweaty labor, and persistence provide a measure of the high risk involved and the abundant capacity for failure.

Significantly, a growing number of discoveries of conventional hydrocarbons are now made in deepwater offshore reserves, such as those presumed in the maritime zones surrounding STP, at depths between 1,500 and 4,000 meters (IEA 2013).¹ Offshore oil, as Hannah Appel (2012) argues, promises to render profit “frictionless” through the deployment of specialist personnel, infrastructures, and contractual regimes that, however imperfectly, seek to disentangle industry operations from local ecologies, social inequalities, and violent conflicts (see Ferguson 2005). However, current deepwater offshore success rates lie anywhere between 10 and 15 percent (Nelson et al. 2013). Buried deep under the ocean floor and humanly accessible only with costly technologies, the precise location, size, and quality of oil prospects are notoriously difficult to pin down. Many wells end up as dry holes (that is, technical but not commercial discoveries), as indeed they have in STP, where nearly two decades of oil exploration by both small independent companies and multinationals such as Chevron Texaco have not yielded any significant results. In engaging the “concrete specificity of the industry” (Appel 2012, 693), my analysis is therefore concerned with how offshore can imply loss as much as profit.

Oil’s successful valorization has been largely taken for granted in the interdisciplinary literature on hydrocarbons, despite an increasingly pervasive sense of their uncertain future. The anticipated lack of hydrocarbons, or indeed their carefully concealed abundance, has given rise to anxious projections in the industry (Labban 2010). In addition, scholars have highlighted oil’s illusory effects, that is, the mirage of prosperity oil may generate in the economies of producer states, where fantasies of progress are displaced by deception and violence (Apter 2005; Coronil 1997; Watts 2009). These effects have often been associated with oil’s ready transubstantiation into monetary wealth. Oil rents, alongside oil extraction’s low requirement for labor and its marked separation from other domestic economic activity, may create the impression that “riches reside directly in nature” (Coronil 1997, 389). This quality of oil appears to have intensified as petroleum markets and global financial markets become fused ever more tightly (Appel 2012; Labban 2010). From this perspective, oil now supports national and global economies less as an artifact of productive labor than as rents, petrodollars, and spec-

ulative gain, and as a result has “ceased to be identified as a material substance” (Coronil 1997, 390).

First oil, however, complicates this view. A central aim of this article is to demonstrate that oil is both a measure of value in a globalized economy and a geologic matter that can defy precision prior to, and even during, its extraction (Barry 2014; Mitchell 2009; Watts 2009). It is an industry truth that oil reserves are composites of economic probabilities, technological feasibilities, and geological potentials (Mitchell et al. 2012): an imaginary of complexly distributed agencies folded into each other. Future oil demand, engineering advances, and geoscientific assessments of rock porosity, viscosity, and temperatures come together in industry practices, such as the so-called risking of reserves, which estimates the probability of success. My analysis registers these multiple types of materials, calculations, and modes of speculation mobilized here and how they can generate, prolong, and obstruct petroleum’s potential. Specifically, first oil adds an understanding of resource exploration as an uneven and hazardous project. I trace this unevenness through the long periods of dormancy characteristic of the industry and their specific temporal regimes, which have rarely been the sustained focus of social scientific analysis.

In an opinion piece written for a Santomean newspaper, Osvaldo analyzed the winding road to first oil (Abreu 2012). A look at some of the country’s oil-rich neighbors, he explained, showed that the type of risky investment that characterizes STP today could bring spectacular success. However, in many cases, including Equatorial Guinea and Ghana, large-scale commercial production had been preceded by decades of work by exploration companies willing to take a gamble, a multitude of dry holes, and lost (though eventually regained) capital. Later I will examine STP’s own protracted quest for oil, starting in the nineteenth century. Here it is important to note that first oil constitutes an *expansive moment* in which the circulation of hydrocarbons gets readily overtaken by the circulation of facts about them.

The story of STP is not unique. From Somaliland to the Arctic, notionally recoverable oil is being explored at massive expense and with uncertain results, leaving entire populations in a state of expectation. Insufficient capital, labor, and expertise, political and institutional weakness, geological and ecological conditions, as well as burst commodities bubbles rank among the factors that historically have hindered or halted resource booms (Dean 1987; Nolan and Thurber 2010). Because oil prices are so volatile, all investment in petroleum production is also speculation. Finding oil anywhere makes for a protracted undertaking, but this

holds especially true in areas without prior exploration and infrastructural investment. So-called wildcatters, often the first to open new exploration zones, may take years to attract financial backing or larger companies willing to share the risk. Meanwhile, suitable drilling sites need to be identified, concessions demarcated, land cleared, roads built, drilling barges hired, and exploratory wells dug. Geological knowledge has to be recalibrated with seismic surveys, well logs, and core sample analyses. Blockages and delay, as I will show, threaten at multiple points, from the negotiation of contractual terms to the delineation of concessions and the actual drilling. Oilfields whose so-called prospectivity is only inadequately known or that are too small to warrant investment may be left orphaned or stranded. Achieving first oil may take years, decades, or might even face indefinite postponement.²

First oil's dramatic suspense recalls what Karl Marx, in volume 2 of *Capital*, analyzing the circuits of productive capital, referred to as an "excess of time" or "pauses" integral to certain industrial processes. Time, translated as human labor in capital's historical ontology, would ordinarily function as a measure of value (Osborne 2008). Marx demonstrated the obstruction posed to capitalist value expansion and accumulation, for example, by laborers' need for rest, by seeds sprouting in the soil, or by a shortage of necessary tools in the market. As a result, productive capital is held "in readiness" but remains fallow, although this fallowness "is a requirement for the uninterrupted flow of the process of production" (Marx 2013, 647). The pause thus is the tacit driver of an accelerating capitalist temporality: a problem to be avoided through managerial and technological change as well as credit systems in the interest of higher turnover rates and profits. Yet from another perspective, as a type of temporal deferral, pauses are partly generated by the multiple contradictions inherent in the dynamics of capitalist production (Harvey 1989, 181–83; Labban 2010). I am interested here in how we might open up the pause's analytic possibilities ethnographically. Instead of charting capital's inexorable progress, I ask how the pause reorients our gaze toward the technologies of speculation, contingencies, obstructions, and material specificities intrinsic to the capitalist project.

Arguably, first oil does not constitute a Marxian pause in any straightforward sense. Its time is not empty, not devoid of labor per se, even if the material transformations this labor generates can remain somewhat invisible. For example, they may be about ascertaining potentialities, thus constituting geologic substances as a resource. What's more, the growing financialization of oil markets has led to a steady emancipation of value creation from material production and the

circulation of substances in physical space, observable, for example, in the dissociation of oil availability and global oil prices, or the privileging of short-term returns over trade and investment in corporate decision-making (Labban 2010).³ Yet these developments have not made the pause analytically obsolete. First oil's long lead-up time and decades of dormancy are still experienced as a rupture of ordinary productive processes.⁴ They, too, can hold capital investment in suspense—sometimes for a given period a company might spend on the waiting list for a sought-after drilling barge, sometimes indefinitely. At the very least, an analysis of first oil underscores the persistent “intimate relationship . . . between productive enterprises or assets” and the creation of speculative and promissory value (Ho 2009, 181; see also Appel 2012; Guyer 2009; Labban 2010, 2013; Røyrvik 2011).

I argue that first oil's Marxian pause is filled with what I call gestures. Industry-specific instruments intended to realize petroleum become gestural in the absence of significant commercial discoveries. I take my cue from Giorgio Agamben (2000), who provides one of the most compelling discussions of the gesture as a philosophical concept.⁵ He points to a subtle distinction between the gesture's Latin root, *gerere*, meaning to carry, manage, or conduct, and related action verbs, including *facere* (making, creating) and *agere* (acting, performing). The gesture, Agamben (2000, 57–58) notes, is where “nothing is being produced or acted, but rather something is being endured and supported.” It is “means as such.” In the case of first oil, gestures keep the pause prised open by materializing an absent potential and promising future gain. They partake of capitalism's generalized speculative epistemology, which can be retrospectively justified by reference to profitability (Harvey 1989, 344). By thus anticipating future value, they provide reassurance and maintain the confidence that prevents investments from turning into outright failure. This article will examine a series of such gestures: the contract, the exploration zone, and the test well. Looking at the precise nature of these instruments of first oil makes my inquiry into the pause a somewhat more tractable project. But the necessary preliminary task is to explore how first oil becomes a possibility in the first place, based on the observation of resource potential. I begin by sketching two historical junctures—first, in the Portuguese colonial empire and, subsequently, in the newly independent Santomean state—at which oil's potentiality was envisaged through the speculative techniques of entrepreneurs, scientists, and state officials.

THE SUBSTANCE OF SPECULATION

For the philosopher [Graham Harman \(2010\)](#), potentiality is a somewhat lazy objectification of a propensity, that is, the not-yet-actualized capacities of things. Harman, and others before him, have challenged us to pinpoint more precisely the ontological status, say, of the lethality of a piece of plutonium lying in the desert, or indeed the capacity of crude oil to be a resource. In what ways, Harman asks, can potentiality be said to be animated by the possible relations in which things are entangled and yet to exist independently of them? To approach potentiality empirically and ethnographically differs quite markedly from contemplating it philosophically. Ethnography leads me to explore how potentiality, specifically the potentiality implied by first oil, is constituted historically and implicated in social praxis ([Fortun 2008](#); [Mazzarella 2010](#); [Svendsen 2011](#)). I will focus on a specific set of techniques, the speculations of entrepreneurs, scientists, and state officials that, from the nineteenth century onward, summoned a notion of petroleum potential. Since its inception, petroleum exploration has combined the bold assessments of oilmen with the speculative fantasies of urban financiers and the hypothetical inferences of a new breed of geoscientists in what an oil executive of the time called “the gamble of drilling for oil” ([Zimmermann 1933](#), 500; [Lucier 2008](#)). Speculation, in this sense, exceeds its narrower, contemporary definition of a type of behavior pertaining exclusively to the domain of finance ([de Goede 2005](#); [Ho 2009](#); [Ouroussoff 2010](#); [Zaloom 2004](#)). Instead, it comprises a heterogeneous set of practices that suggest possible modes of existence for the geological matter observed while it excludes others. Speculation, here, is an observation of potentiality, both in the sense of remarking on potentiality’s existence and of producing new facts about it. In the following, I will examine the successive speculations of a Portuguese colonial financier, a daring South African entrepreneur, state officials, and industry geologists. I highlight, first, the historical depth to their acquisitive guesswork, and, second, the way that liquid samples, drilling cores, and other geophysical materials gave it substance.

“A NEW SOURCE OF WEALTH”

In one of our first interviews, I asked Luís dos Prazeres, then the director of STP’s National Petroleum Agency, to run me through the beginnings of oil in STP. Prazeres, or Kapala as he is widely known, had been the agency’s director since its founding in 2004. Originally trained as a pilot, Kapala became the country’s first minister of natural resources in 1999 and had worked in the oil administration ever since. His response to my routine question surprised me. Instead

of pointing to the year 1997, which is often taken as the birth date of STP's *era do petróleo* when the government signed its fateful contract with ERHC, Kapala claimed that oil had already been identified as one of the islands' hidden treasures in the late nineteenth century. He pulled a pen drive from his pocket, stuck it into his computer, and clicked open a document that turned out to be his manuscript of a chronicle of STP's oil. "I am writing a history of these developments," he told me.

Kapala's account embeds the Santomean quest for first oil in a local history of things where the conjuring of resources out of "wild nature," so deftly analyzed by [Anna Tsing \(2005\)](#), had long been a condition of being. Alongside the other eastern Atlantic islands colonized by the Portuguese from the late fifteenth century onwards, São Tomé and Príncipe played a dual role in Portugal's colonial project, first, as entrepôts for the flourishing cross-Atlantic slave trade and, second, as prototypes for the agro-economic exploitation of tropical nature in the form of sugar, coffee, and cocoa ([Mintz 1985](#)). Diverse resource potentialities were routinely envisioned, exploited, and just as quickly dissolved or moved elsewhere in ways that tied the archipelago into a globalizing economic system.

Oil surged into this extractive environment when older forms of land-based potential seemed increasingly untenable. In his manuscript, Kapala referred to a letter sent to the Portuguese Ministry for Maritime and Overseas Trade by [Francisco de Oliveira Chamiço \(1876\)](#), the founder and governor of the Banco Nacional Ultramarino (BNU), Portugal's first colonial bank. In sprawling handwriting, blue ink on thin paper, Chamiço claimed that analyses of water samples taken from a brook in Água Izé, one of São Tomé's struggling agricultural properties, contained 70 percent *óleo*. The letter requested the ministry's support in investigating this petroleum mine. "Opening for exploitation a new source of wealth of this order," the governor asserted, would be crucial for maintaining the prosperity of the colonial state. The BNU would be covering the costs of such an investigation.

The governor's letter documents the "conjuring aspect of finance" ([Tsing 2005](#), 57), where enterprising actors stake out claims from material possibilities, summoning new commodities in a process of market making. Yet it also underlines the precariousness of this project and, thus, of value realization on the capitalist periphery. Chamiço's conjectures were steeped in uncertainty about the future of Portugal's colonies. The BNU was a private bank aiming to foster economic activity in Portugal's overseas territories. Following Brazil's independence, the profitability of the remaining colonies had become a central concern



Figure 1. Portrait of Francisco de Oliveira Chamiço, founder and governor of the Banco Nacional Ultramarino. Image courtesy of the Arquivo Histórico da Caixa Geral de Depósitos.

of the Portuguese government. More those of a colonial company than of a commercial bank, the BNU's operations already merged finance with productivity. The bank furnished vital services and infrastructures, in addition to providing loans to the ailing landed estates in São Tomé and Príncipe (Nunes et al. 2010, 7). Accusations of embezzlement in the BNU's own ranks and a Portuguese banking panic aggravated its predicament. Most significantly, one year prior to Chamiço's letter, a slave-led revolt resulted in the hasty, if long-promised, abolition of an increasingly indefensible labor system, thus threatening Portugal's plans to revive its island territories with capital injections (Clarence-Smith 2000; Eyzaguirre 1986, 181–82).

In this context, new geological observations, though as yet unproven, were intended to mobilize both state resources and capital investments with the expectation to counteract colonial deficits. Chamiço's letter invoked a vision of verticality that, as Bruce Braun (2000) has shown, helped re-site economic value from the surface (land) to the subsoil. From Baku to Pennsylvania, a novel sci-

entific epistemics inferred geological relationships and promised commercial opportunity. Água Izé's muddy specimens similarly gave visible and olfactory evidence of *óleo* as an absent presence that could be indexed to hidden geological strata and source rock formations. A BNU envoy was sent to São Tomé to pursue the matter, his findings now lost from Lisbon archives. Yet within two years, [Chamiço \(1878\)](#) concluded: "Petroleum is a myth." Shifting global tastes and skillful political maneuvering had rather diminished the appeal of obscure subterranean potential. Land owned by the Portuguese Crown and leased to so-called *forro* (native creole) families, often without title, was sold to colonists for export-crop production ([Eyzaguirre 1986](#), 151; [Seibert 2006](#), 40–41). Ever larger numbers of imported contract labor subsidized by the Portuguese state provided a way around abolition. Once again, the lush rain forest that Santomeans call *ôbô* fell victim to sharp-edged machetes wielded by former slave traders and other investors in search of new profit bases, and a cocoa boom catapulted São Tomé and Príncipe, in spite of themselves, into the twentieth century.

"GETTING WARM?!"

Aside from Chamiço's letter, the dusty box files in Lisbon's Arquivo Histórico Ultramarino also shelter the expectant applications for petroleum exploration filed by Portuguese and foreign entrepreneurs in the 1920s, 1940s, 1950s, 1960s, and beyond independence in 1975. They constitute an extended meanwhile in which potentiality is reassured—first oil paused rather than wound up. On long evenings in one of São Tomé's popular snack bars, Aíto Bonfim, a respected lawyer, would relate to me fragmented memories about his teenage self offering budding English skills and local knowledge to Ball & Collins, a British company engaged in onshore prospecting a few years before the Portuguese Empire's demise. Fifteen years or so later, now freshly returned from Portugal with a law degree in hand, Aíto landed the job of reviewing future exploration plans for the newly independent socialist state in which nationalization and shifting markets had brought the cocoa plantations to near collapse.

In the late 1980s, drilling concessions were granted to Christian Hellinger, a South African entrepreneur with existing business interests in the island. I met with Hellinger in São Tomé in 2007. Now in his sixties, he came across as somewhat supercilious and intimidating with stories of his African exploits. Hellinger had owned diamond mines in Angola and, during the civil war, used STP as an evacuation platform for his staff. How did he get into oil, I inquired. The geologists from his mines had nothing to do while on evacuation, Hellinger ex-

plained. He kept them busy with investigations of the petroleum hidden in STP's rain forest. Flicking through Hellinger's archives, I picture him chatting over a glass of whiskey with the men that claimed to govern STP, beckoning oil riches buried deep under layers of volcanic rock, and promising perhaps a hotel or two for foreign tourists, or an improvement of the president's villa. I find among telefaxes, contracts, and maps a clipping from an industry magazine dated April 1990 and reporting on an upcoming sale of offshore oil licenses in nearby Equatorial Guinea. A scribble in the margin—"Getting warm?!"—indicated that the quest for Santomean oil may have been more than a pastime for underworked staff. Hellinger commissioned various surveys and, with technology shipped in from South Africa, drilled two wildcat wells. When the drilling shafts collapsed, Hellinger had run out of money.

By the mid-1990s, structural adjustment and privatization, instead of reviving the plantation legacy, had tied Santomeans into new bonds of both debt and profit. The Santomean state had entered a financial crisis and increasingly embraced risky investment proposals. The islands' no-longer wild nature was up for grabs. Land was distributed to former plantation workers, but a self-consolidating political and business elite snatched up the best plots in collaboration with investors (Seibert 2006, 348), partly curtailing the reach of the reform. The country's governors and leaders were envisioning new resources to exploit. The ".st" Internet domain was made commercially available, and companies marketing adult content were given access to the country's +239 telephone code. There were plans to establish a Free Trade Zone. Meanwhile, the Atlantic sea could be remade as an extractive space, beyond the islands' narrow littoral fringe, beyond the habitat of scalloped hammerheads, snappers, and flying gurnards, and beyond where fishermen from STP had ever ventured.

In sum, speculation about resource potential thrives at historical junctures characterized by the foreclosing of previous material possibilities while it opens up others alongside new markets (see Tsing 2005). It comprises a tangle of things, including economic crises, ideological struggles, epistemic and technical shifts, but also human actors sensing new commercial opportunities. The abolition of slavery prompted a brief search for less labor-intensive alternatives; the oil crisis and the decline of established oil fields led to a move into unexplored territory; technologies such as 3-D seismic, floating production facilities and ultradeepwater drilling units, as I discuss below, improved the quest for oil offshore. Successive



Figure 2. Pedro inspecting the remains of Hellinger's exploratory well, Ubabudu-1, near Vila Celeste, São Tomé. Pedro helped construct the well in 1990. Photo by Gisa Weszkalnys.

speculations about petroleum, though not overdetermined by its geophysical and geochemical qualities, were not unsubstantiated. They were observations based on what people know, and on what they know they do not know (Walsh 2004), summoning fragmented knowledge and bits of partially obscured geological matter. Data, cores, and samples of muddy water have been the stuff that held out promise and gave substance to the possibility of first oil. For those involved, it is what separates risky investment from mere wagering. It is the stuff from which material potential is manufactured, engaging “vast faculties of anticipation, creation, innovation . . . and technology” (Royrvik 2011, 95, 129; see also Bowker 1994).



Figure 3. Hellinger's drilling equipment, which is being stored in a warehouse in São Tomé.
Photo by Gisa Weszkalnys.

As an observation of potentiality, speculation offers a mode of participation in the opportunities that obscured matter portends. It goes along with a distinctive temporal disposition that creatively contemplates possibilities, while excluding others, temporarily suspending a need for certitude in the desire for disproportionate gain. In STP, speculation about future resources generated fresh alliances between public and private actors. From Chamiço's proposal to salvage an ailing colonial territory to the wildcatter Hellinger's ambitious venture, which appealed to cash-strapped officials unversed in either petroleum geology or global markets, different expectations readily converged on an idea of oil and its enabling capacities, both collective and individual. In the face of mounting debt, oil has promised to give a recognizable, sovereign shape to a weak postcolonial state struggling to fulfill its functions. However, the developmentalist vision of oil offers only a deceptive alternative to other, increasingly prominent types of speculative planning, such as the financial speculations of public deficits that have restructured state-society relations in India (Bear 2011). Oil provides a powerful but risky form of economic integration, marred by the disjunctive temporalities of state, science, geology, and markets. It ties collective hopes to the "ethics of probability" of corporate actors (Appadurai 2013, 295), whose capacity to tolerate market

volatilities, interruptions, and pauses so common to the first oil process is, usually, vastly superior to that of a struggling African nation.

GESTURES

Many things have sustained the expansive moment of STP's first oil since the collapse of Hellinger's venture. Kapala's chronicle teems with a range of legal, commercial, and technical devices that have thus filled the Marxian pause (Przeres 2008). Since the late 1990s, maritime boundaries have circumscribed the new national asset, now located principally offshore; three licensing rounds allocated access to it;⁶ mechanisms for good governance and transparency have been implemented; and a series of agreements have defined the obligations of the country's various industry partners. The National Oil Agency, directed by Kapala, formed part of this effort as the body charged with managing the technical aspects of future hydrocarbon exploration (Weszkalnys 2011, 2014). These largely standardized devices constitute a composite sociomaterial arrangement of measurement, connection, and qualification characteristic of the global oil industry (Barry 2006). They reflect a double logic of contemporary capitalist expansion, which in addition to creating new sites of investment speculates as to their inherent problems and failures.

In the context of first oil, such devices and the epistemic practices associated with them acquire complex salience. First, they supply the tangible scaffolding to the drama that attracts investment to what is largely a speculative endeavor (Tsing 2005, 63; see also Fortun 2008). Second, they thus provide an "informational enrichment" (Barry 2014, 141) of geological matter, making it amenable to the exploitative fantasies of states and their economic partners (Braun 2000). Third, in the face of a sluggish exploration process, they become gestural. Like measurements of a fetal heartbeat, they furnish hope by signaling dormancy, not death, thus preventing first oil's pause from turning into a failure or loss. Doubtless, the industry instruments I examine here—the contract, the exploration zone, and the test well—have been implemented at huge cost and with the specific aim of generating real productive value. They are neither unintentional nor insignificant ("just a gesture"). As noted earlier, what I seek to emphasize is the gesture's sustaining, rather than performative or creative, force (Agamben 2000). The instruments I describe may well contribute to an experience of blockage and deferral in the exploration process, and to date, they have failed to fulfill their stated aims of transforming prospectivity into economic assets. All the while, they have continued to signal things to come.

The Contract

“Volcaniclastic rocks, igneous rocks, supermature rocks . . . Rocks uplifted and intruded in the Neogene by the growth of those volcanic islands . . . Sandstones, shales, deep marine sediments deposited from the late Cretaceous to the Oligocene . . . Oil-prone source beds lying deeper, away from the islands with their modest porosity and poor permeability . . . Traps found in tilted fault blocks surrounding the islands, requiring further seismic survey.” And finally: “conditions that are likely to result in the presence of oil accumulations in the Lower Tertiary in the offshore areas of both islands, although their possible size, and to some extent reservoir quality, are at present speculative.” These are renderings of the earth’s subsurface gleaned from the report of a British geologist hired by Hellinger, which mediate between profit expectations, national interests, and the analysis of geological structures and processes (Barry 2014, 142). They are speculative because they reference imperfect empirical proxies, unfit for scientific publication, but providing a baseline for calculated risk. To geologists, they speak of petroleum potential, maybe not on the island itself but certainly offshore. To risk-taking entrepreneurs, they provide an encouraging base for estimations of likely gain.

On May 27, 1997, the Santomean government signed a Memorandum of Agreement (MoA) with the little known oil company ERHC, which had no experience in offshore drilling but had acquired Hellinger’s geophysical data, drilling cores, and claims that STP’s crude was of the desirable Bonny Light grade.⁷ The MoA accompanied a contract between the two parties, with a validity of twenty-five years and renewable thereafter. The contract underscored oil’s divisibility, as financial asset and physical substance (Labban 2010). Rather than providing a course for action, it established a promissory value, shaped by assumptions of finitude and competition over access. The MoA granted ERHC some extraordinary allowances in the exploitation of STP’s hydrocarbon resources. For a fee of US\$5 million, it assigned the company 40 percent of the revenues from future oil. ERHC promised to raise the funds necessary to kick-start exploration activities. It would act as negotiator with any other company wishing to explore Santomean oil, and earn a 5 percent fee from any payable bonuses.

The double obscurity of STP’s oil—both geologically obscured and its worth not yet revealed by the market—thus allowed ERHC to adopt multiple roles vis-à-vis the Santomean state. Despite the company’s limited expertise and financial resources, ERHC staff convinced the Santomean officials of their ability to carry the project through. The company’s chief operating officer sported a Stetson hat and cowboy boots on his visit to the islands when promising the Santomean

government to raise US\$100 million in seven months. Gestural moves supplemented these promises: a maritime boundary claim was filed, diplomatic passports were issued to the supposed owners of a Montenegro bank, and in 1998 another contract was signed with Mobil, later ExxonMobil. It granted the multinational concessions in return for initiating seismic research in offshore territory, where the key prospects were now expected to be located (Seibert 2006, 372). In addition, ERHC and the Santomean government established a joint-venture oil company to manage the upcoming petroleum activities. During the following few years, ERHC and the Santomean government broke off, revised, and entered into new agreements. Accusations of bribery and corruption flew through the air. In 2001, the company was acquired by the Nigerian businessman Emeka Offor, a close ally of Nigeria's president Olusegun Obasanjo.⁸

ERHC's new Nigerian identity has added to the company's reputation as a dubious collaborator. More established multinationals have allegedly refrained from bidding for oil blocks in STP's offshore territory to avoid forcible cooperation with ERHC, which still holds preferential rights in several Santomean oil blocks. Imperfectly quantified oil potential began to produce some value for the company.⁹ But for the Santomean state, ERHC's involvement is deemed responsible for a substantial loss of possible earnings, and critics now view it as a liability. However, such argument benefits from hindsight, I was reminded by Afonso Varela, the National Oil Agency's former legal director. After all, he argued, ERHC had effectively turned STP into a petroleum frontier at a time when nobody paid attention. It had indirectly generated 2,723 kilometers of 2-D seismic data of STP's oil prospects, which proved indispensable in attracting additional investors (see Seibert 2006, 372).

The Zone

Petroleum geologists have a special way of inferring oil. They call it a seismic survey. Such surveys involve a large boat towing air guns and a set of microphones across the seabed. As they explosively void their air chambers, bubbles of energy are sent out, propagating outward, hitting the seabed, bouncing up again, and producing noisy traces. "Boom—boom," Osvaldo aped the sound of the air gun when recounting his experience of interning on such a mission conducted by Petroleum Geo-Services (PGS), a Norwegian oil services company.¹⁰ Some energy penetrates the seabed and returns, and some goes down and is never heard of again. "Boom—boom." The echo's force vibrates through the vessel's body twenty-four hours a day, registered by Osvaldo's skin, ears, organs, making it

difficult to sleep. Physical encounters and measurements of time lapsed become images at the geologist's hand, like cut scans of a human body, slices through the earth's crust. They are images of temporality, density, porosity, latency, and odds that may reveal themselves to the discerning eye. "They are at most like photographs of the moon," explained a Scottish geologist, who had once advised the Santomean government. No perceptible features, only light and dark. You can de-risk prospects by interpreting seismic probabilities. But until you take a sample, you cannot know what you have.

When ERHC took STP's Prime Minister Raul Bragança to the United Nations Law of the Sea Commission in New York City to file a request for the establishment of maritime boundaries, it was a nontrivial piece of technical assistance. Filing boundary claims, as a legislative act, has important consequences for the demarcation of new resource frontiers, as well as for the identification of owners and their legitimate partners. Since the mid-twentieth century, the delineation of exclusive economic zones (EEZs) has become an urgent undertaking to control national "aquariums" of exploitable nature (Pálsson 1998). Here, the transformation of nature into economic value depended on the capital of corporate partners, but promised the extraction of rents and revenue by the state (Coronil 1997; Labban 2008, 41). Law No. 1/98, the outcome of the New York trip, inscribed STP's sovereignty over a series of living and non-living things down to the exact geographical minute and second. Fish, metals, and hydrocarbons found above, on, and under the seabed were recast as national assets to be cared for and mined.

Dreams of sovereign substances and petroleum-based national self-sufficiency soon met with challenges. While Equatorial Guinea and Gabon readily accepted the suggested boundary of a Santomean EEZ based on a principle of equidistance, Nigeria proved recalcitrant. It questioned the principle's appropriateness on the basis of its much larger coastline. Seismic surveys of STP's offshore hydrocarbon potential, carried out by a subsidiary of the global petroleum-services provider Schlumberger (paid for by ExxonMobil), had located the most valuable prospects in areas bordering Nigerian waters (Seibert 2006, 372–73). Three years of protracted negotiations ensued. A first, second, and third meeting between the parties was scheduled to put the technical arguments on the table. However, as Kapala recounted, by May 2000, the negotiations reached deadlock. Illustrious U.S. lawyers specializing in boundary disputes were called on to prepare a proposal that they hoped would bring a truce. More legal research, more discussions, more cups of coffee, and a final long meeting lasting from morning till midnight

led to a critical item of bilateral jurisdiction: a zone managed jointly, but unevenly split between the two states, with Nigeria receiving 60 and STP 40 percent of any revenues possibly generated from it.

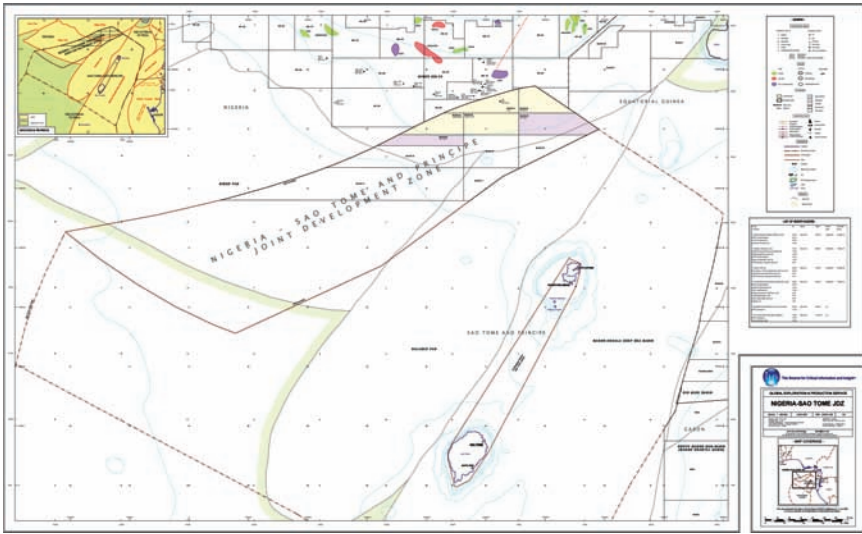


Figure 4. Map of the Nigeria-São Tomé and Príncipe joint development zone, 2007. Image courtesy of IHS.

The delineation of the joint development zone (JDZ), covering 34,450 square kilometers, proved a critical gesture, sustaining a notion of exploitable potential and opening up possibilities for anticipatory gain from substances not yet extracted. Now, exploration blocks could be delineated and allocated in more transparent licensing rounds. The proximity of Nigeria's rich oil fields seemed to reflect well on its prospects. Some people saw benefit in Nigeria's own vast experience of oil, with 2.2 million barrels per day extracted from more than 1,400 wells located in around 150 oil fields. Staggering and impressive numbers that cannot conceal what many Santomeans know about their big neighbor. Seemingly lopsided and deceitful, the partnership has fed into a broader cultural perception of Nigerians as worldly but cunning business operators. The auctions for exploration rights in the JDZ provided empirical fodder for this truth. Especially the second licensing round held in 2004 turned farcical the conventional wisdom that auctions are foolproof instruments for establishing a fair and real price. Instead, it resulted in a report by STP's attorney general—a document that is probably STP's most public embodiment of transparency to date ([Procuradoria](#)

Geral 2005). The report alleged, among other things, clandestine decision-making involving Nigerian and Santomean government figures and their advisors, as well as the awarding of contracts to a series of Nigerian-owned companies without credentials, and called for the annulment of the licensing round.¹¹

Yet it would be wrong to think that the JDZ has rendered the Santomean state completely inoperative. Rather, it has plotted out fresh networks of trans-boundary relations. The authority managing the zone, the JDA, which has its headquarters in Abuja, is the go-to agency for anyone wishing to invest in the JDZ. It is a fitting enactment of STP's absent oil—an inflated bureaucratic apparatus with a budget of several million dollars per year, eating into STP's limited petroleum revenues.¹²

The Well

“To find oil, you have to drill,” runs the slogan on the website of Schlumberger, the oil-exploration technology pioneer. Tearing and chipping away at the rock, the reserve is spudded, pressure released, and, with luck, crude emerges in a great surge. Schlumberger perfected this prospecting technique in the first few decades of the twentieth century, thus giving scientific backing to what had previously been a fairly intuitive endeavor. Test wells made the world into a laboratory, creating order out of unruly terrain whose “space and time could then form the x and y axes of Schlumberger logs” (Bowker 1994, 109). Wells can increase companies' stock-market value by turning possible and probable into proven reserves; but the geological conditions they reveal may also disrupt a project previously deemed technologically feasible and economically sound.¹³

At the start of 2006, encouraging early signs from Obo-1, the first exploration well in Block 1 of the JDZ drilled by Chevron Texaco and the lowest-risk target according to the company's technical expertise, made ERHC share prices shoot up.¹⁴ Thousands of feet of steel had been lowered to perforate the icy-cold sea floor, a drilling riser bringing up the mud, people busy operating the equipment, measuring, analyzing, and ascertaining that the technology remained stably connected in this floating environment. A press release broke the news. At 1,720 meters, Obo-1 “logged a cumulative total of at least 150 feet (45 meters) of hydrocarbon pay in multiple reservoirs and provided important reservoir rock and liquid samples, which need to be evaluated and integrated into the interpretation of the Obo area” (Chevron 2006). Chevron's expat representative, Tim Parsons, recommended caution before commercial viability was proven: “It is too soon to speculate about a date for the first barrels” (Macauhub 2007). With data

so insufficiently analyzed and confidential, it would be unethical for company reps to even start guessing what they might reveal. For the moment, the reservoirs were deemed not to “justify economic development on their own” (*Maccahub 2007*).

Geological facts are easily drowned out by the cacophony of voices that say otherwise. Tim, Chevron’s representative, was notably exasperated when we talked in 2007 just after yet another article in a local paper quoted a Santomean official at the JDA disputing Chevron’s assessment of its drill results. Yet for Tim, the people to blame were not just irresponsible politicians trying to capture votes and stave off International Monetary Fund (IMF) technocrats with myths of impending wealth. Only recently, IMF economists themselves had published what was, in his view, an equally irresponsible study that predicted millions of barrels of oil in STP’s water (*Segura 2006*).¹⁵ They forgot about the geology.

Any announcement of “no oil” has been swiftly rephrased as “no oil yet.” In 2010, Chevron withdrew from the JDZ for reasons likely to have included a careful balancing of geological prospects, technological possibilities, assessments of future oil markets, and the company’s need to satisfy both shareholder expectations and long-term crude supply for an integrated business. Hundreds of millions of dollars can be written off when corporate portfolio management and financial markets seem to demand it (*Labban 2013; Nolan and Thurber 2010*). The disappointment was temporarily relieved when the French multinational Total promised a US\$200 million investment to explore Block 1 of the JDZ in conjunction with its adjacent Nigerian projects. A changed constellation of technology, economy, and science was expected to entail a new ability to create commerciality.

Oswaldo, Kapala, and others shared the hopeful news with me in late 2012. An IMF representative I talked to during this time felt confident that the country would start producing oil within the coming five years. Only a few months lay between my listening to these reassurances and Total’s eventual abandonment of its JDZ acreage. Some observers suggest that Total’s withdrawal, alongside that of other companies, might spell the end of Santomean oil hopes (*Seibert 2013*). By contrast, Oswaldo was unabashedly optimistic when speaking, in a more recent capacity as STP’s minister of natural resources, to a local newspaper in September 2013: “Companies have their politics, their profit margins and other [considerations], and they act in accordance with their expectations. . . . We have confirmed reserves [of hydrocarbons] in sufficient quantities to make [Block 1] viable” (*Veiga 2013*).

CONCLUSION

First oil is a highly uneven phenomenon forged from contingent associations of state, capital, science, and nature. To understand its unevenness, I have looked to the periods of dormancy, what I call pauses, characteristic of petroleum exploration, especially in frontier regions where scientific knowledge is incomplete, geological conditions challenging, and local regulatory frameworks and know-how limited. Instead of portraying STP as a fait accompli overdetermined by models derived from established oil producer states, I highlighted the indeterminacy at the heart of petroleum production. Full-blown oil nations like Nigeria or Venezuela and their historical idiosyncrasies would make poor analytical lenses for understanding the goings-on here. Despite first oil's apparent suspension in a vast sociospatial assemblage of hydrocarbon production, each instance of it remains, like all capitalist production, a highly localized phenomenon (Braun 2006, 214; Watts 2009, 83).

One aim of this account has been to show that first oil's unevenness in part results from specific material constraints posed by geologic matter whose precise contours remain largely opaque. In part, it results from the incongruous effects of a distinctive speculative epistemology. State and corporate actors, independent entrepreneurs and technical consultants, global legislators and financiers have gathered around diverse yet interrelated modes of framing the sort of potentialities required by capital's desired expansion (Harvey 1989, 343). They include conjectures about exploration precedents, seismic measurements, and other "immeasurable uncertainties" that have been a historical condition of corporate profit (Ouroussoff 2010). A dispersed sociotechnical arrangement of instruments designed to determine oil's political, economic, and geoscientific parameters seeks to reduce such uncertainties, for example, by establishing obligations between contractual partners, geopolitical jurisdictions, and productive capacities. Yet these instruments may inadvertently upend their stated goal of realizing hydrocarbon potential and, instead, turn into gestures of absent oil. Such gestures are unlike the "white elephants" that have come to embody the ambivalences of petroleum economies as the purveyors of "a 'sensing-is-believing' ontology that disguise[s] the absence of a productive base" (Apter 2005, 14). They also differ from the spectacle of fraudulent evidence that props up the economy of appearances (Tsing 2005). Neither purely symbolic nor instrumental, gestures rather show a specific temporal ethics that attenuates or postpones failure. Importantly, for all its tangible effects, STP's first oil has also threatened to remain unrealized. Contracts have created unsubstantiated value in lieu of liquidity. Maritime eco-

conomic zones inscribe not sovereignty but geopolitical power play. Wells reveal not resources but a lack of viability. The outcome, however, has not been the collapse of STP's first oil, but its continuing suspension, in other words, a sustained pause.

Disruptions and deferred achievement color not just stories of resource exploitation in distant times and places, inhibited, for example, by geographical inaccessibility and complex local colonial relations. The contemporary entanglement of productive and financial capital in the extractive sector has made the pause an ever more relevant analytical consideration (Laban 2010, 551). The recent slump in oil prices translated, almost instantaneously, into extensive cost-cutting, sell-offs, reduced exploration budgets, and the postponement of production across the sector (Adams 2015), affecting both established oil-producing zones and hopeful new producers in Africa, where governments and ordinary people continue to build their hopes on hydrocarbons. It has also had ripple effects for copper, gold, and other minerals, where the huge capitalization required for operations, along with the depletion of existing mines, typically long and uncertain project lead times, and intensified price volatility in commodity markets already anticipated such developments (Lee et al. 2012).

No doubt similar instances of pausing and gesturing can be traced beyond the extractive sector. A quite different case in point comes from my earlier research about an attenuated development project for a central square in post-unification Berlin (Weszkalns 2010). Nearly twenty years after the project was first proposed, the square still lingers in a sustained pause. The primary gesture, here, is the legally binding construction plan—a key bureaucratic artifact in the development process. First formalized in the late 1990s, the plan was soon deemed unfit for Berlin's underwhelming real-estate market, and there were calls to adjust it to present expectations. Yet developers seem desperate to cling to it while constructing halfhearted proxies of the original. In a similar way, a host of conceptual aids give shape to an envisaged aluminum plant, although the project's success cannot be judged until the plant has reached full production (Røyrvik 2011, 122). Special Economic Zones—proliferating from India to the Philippines and STP—have been preceded by the erection of billboards, the dispossession of local landowners, and the bulldozing and fencing of plots, which may or may not achieve their potential in the future (cf. Cross 2014). And biomedical data is collected, marketed, and mined in anticipation of future health benefits and financial value (Fortun 2008). One might examine such processes of gesturing for their material consequences, including the ways in which they bring substances

and money into circulation, conjure novel institutions, and reorder access to a wide variety of resources. They may also generate a new politics feared, by investors, for producing its own disruptions and delays by spotlighting shortcomings of development projects or their unstable embeddedness in networks of global finance. If as anthropologists we want to contribute to a more refined understanding of how the ethics of possibility become caught up in the ethics of probability (Appadurai 2013, 298), the pause is not a bad place to start.

I end here still in the midst of that expansive (and expensive) pause of STP's first oil. I am mindful that the moment I have described marks only the briefest episode in its long existence. It is a moment when stuff, not yet extracted and largely cut off from human interference, finds its many possible modes of being (including its geochemical versatility, high-energy density, and ready transubstantiation into monetary form) already anticipated by social practice. This is not to essentialize the geologic matter. It is to distinguish the expansive moment of first oil from discovery or invention as a moment of transformation (Harman 2010). Whether STP's oil is a speculative entity, primary commodity, or corrupt currency is not encoded in hydrocarbons per se, but suggests a complex encounter of geologic matter with technoscientific, economic, and legal arrangements through which resources are made (Richardson and Weszkalnys 2014). Potentiality, here, presents itself both as "futures fold[ed] into presents" (Fortun 2008, 285) and as something stymied, marked by blockages and setbacks (Royrvik 2011). It is the result of a process simultaneously ethically charged, materially grounded, and temporally extended into an uncertain future (Svendsen 2011). Recent efforts to open up STP's exclusive economic zone to commercial exploitation with seismic research, a licensing round, and production-sharing agreements continue to act as gestures of the prospect of oil. In lieu of productive value, they too hold out the promise of a profitable future. They invite us to critically re-examine contemporary capitalism's persistent claims to boundless creativity. Instead, they highlight a multiplicity of speculative forms and temporal-material realignments that emerge when things slow down while everything else keeps moving.

ABSTRACT

This article uses what the petroleum industry calls first oil to examine the uneven process of resource making on the margins of global zones of extraction. It explores how the double obscurity of hydrocarbon prospects—both geologically obscured and their worth not yet revealed by the market—generates particular material constraints,

pauses, and setbacks characteristic of petroleum production. The article draws on ethnographic and archival material from São Tomé and Príncipe (STP), where repeated attempts to explore offshore oil have yet to transform geological potential into an economic asset. It highlights the incongruous effects of certain epistemic practices and devices (contract, zone, and well) aimed at facilitating first oil by managing uncertainty. As a result, they work as gestures of an indeterminate matter whose existence continues to be doubted. [extraction; speculation; knowledge; materiality; value; São Tomé and Príncipe]

NOTES

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1. More than half of new discoveries globally between 2000 and 2009 were deepwater offshore (IEA 2013).
2. The production sharing contracts (PSCs) governing STP's joint development zone with Nigeria stipulate between eight and sixteen years of research and evaluation.
3. Oil also challenges conventional accounts of financialization. First, aspects of what is now labeled the logic of finance—including, for instance, a dominance of joint-stock companies (Lucier 2008)—have been constitutive of the oil industry from the start, thus unsettling narratives of linear economic evolution. Second, oil constitutes a raw material that remains fundamental to a vast number of life processes, while it simultaneously presents itself as a finite substance whose non-renewability seems to place it beyond the capabilities of productive capital (Huber 2008; Labban 2010, 542; Mitchell 2009). Third, like industrial investment projects more generally, oil exploration has also necessarily sought to resist subsumption by a financial logic (Nolan and Thurber 2010). One might even argue that oil, in the form of material assets and the labor needed to produce, continues to be the irreducible bedrock of corporate financial value expansion (Labban 2013).
4. Pauses extend to processes of extraction, transportation, refining, and so on.
5. The “formless” gesture constitutes a critical element of Agamben's ethics of encounter (ten Bos 2005). I develop the concept quite differently from Agamben's philosophical project.
6. The first two licensing rounds in 2003 and 2004 pertained to the JDZ with Nigeria; a third round was held in 2010 for STP's EEZ.
7. A third party, the South African Procura Financial Consultants, which had previously investigated opportunities to establish a Free Trade Zone in STP, later withdrew following disputes over contractual terms (Brümmer 2007).
8. ERHC was battling bankruptcy and an investigation by the U.S. Securities and Exchange Commission (SEC) regarding its role in a bribery case involving Congressman William Jefferson (Brümmer 2007). Proceedings regarding ERHC were formally closed in April 2012.

9. Though overall a loss-making operation, ERHC sold some of its participating interests in Santomean oil blocks in 2006, making US\$45.9 million. It also received US\$51.8 million from JDZ signature bonuses.
10. The mission resulted from a contentious 1999 agreement granting PGS exclusive rights to conduct seismic research in STP's EEZ during a ten-year period (Seibert 2006, 375).
11. Still, several PSCs regarding blocks 2, 3, and 4 were signed in 2005.
12. Signature bonuses from the JDZ licensing rounds have amounted to US\$324 million, of which STP received approximately 40 percent. The JDZ's total budget from 2004 to 2013 has been US\$92,464,297, of which STP's nominal contribution has been a little more than a third. However, US\$22 million of this amount has been loaned to STP by Nigeria (EITI 2014).
13. The SEC defines proved reserves as those "which geological and engineering information [obtained usually by drilling] indicates with reasonable certainty can be recovered from known reservoirs under existing economic and operating conditions" (Mitchell et al. 2012, 30). Possible and probable reserves are calculated to exist with some reduced probability.
14. This development coincided with ERHC's sale of assets to Addax and Sinopec and the signing of PSCs indicating future plans for test drills in the JDZ.
15. The report estimated oil production to start in 2012, with a future production of 70,000 barrels per day for twenty years, and annual receipts of up to US\$396 million.

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