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Operational Alternatives: (Re-)Configuring the Landscape of Alberta's Athabasca Oil Sands

Syncrude Mine, 2007. View inside active oil sands mine

The Province of Alberta is selling off its natural resources. Increasingly, the provincial government is ceding enormous tracts of Crown Lands over to the interests of the oil industry. Since 1997, Alberta has leased over 26,000 square kilometers of boreal forest for oil sands development, an area equal to the state of Florida. This has spurred the enormous economic investment, infrastructural construction and internal migration front-ending an industrial expansion that has fundamentally shifted the focus of Canada's resource economy to the Athabasca oil sands.

Oil companies, initially dependant on the town of Fort McMurray for labor, housing, civic services and logistics, have begun to distance themselves from the much-publicized negative effects associated with the boomtown atmosphere in this northern-Albertan community. Those, coupled with the ever-expanding geographical extents of the region's resource-extraction activities, have created the perfect conditions for developing privately run industrial enclaves.

Too far from Fort McMurray, the increasingly outlying oil companies have effectively adopted their own private urban planning regimes, constructing their own housing, recreational facilities, field hospitals and private airstrips to service themselves. Extremely remote, secure and often behind concrete Jersey barriers created at the end of isolated gravel roads, multinational oil companies are increasingly in complete control of vast expanses of the Canadian landscape.

But arguably, the companies have always been in control. Canada can be understood as a corporate construct—where land exploration and settlement has largely been dependent upon the activities of industrial interests. Historically, the federal government has ceded its jurisdiction and landscape to private companies (e.g. Hudson's Bay Company, Canadian Pacific, INCO or Imperial Oil) in exchange for modern infrastructure (e.g. charted rivers, railways, reliable gravel roads, secure pipelines) and urbanization (e.g. forts, towns, ports, elevators, bases).

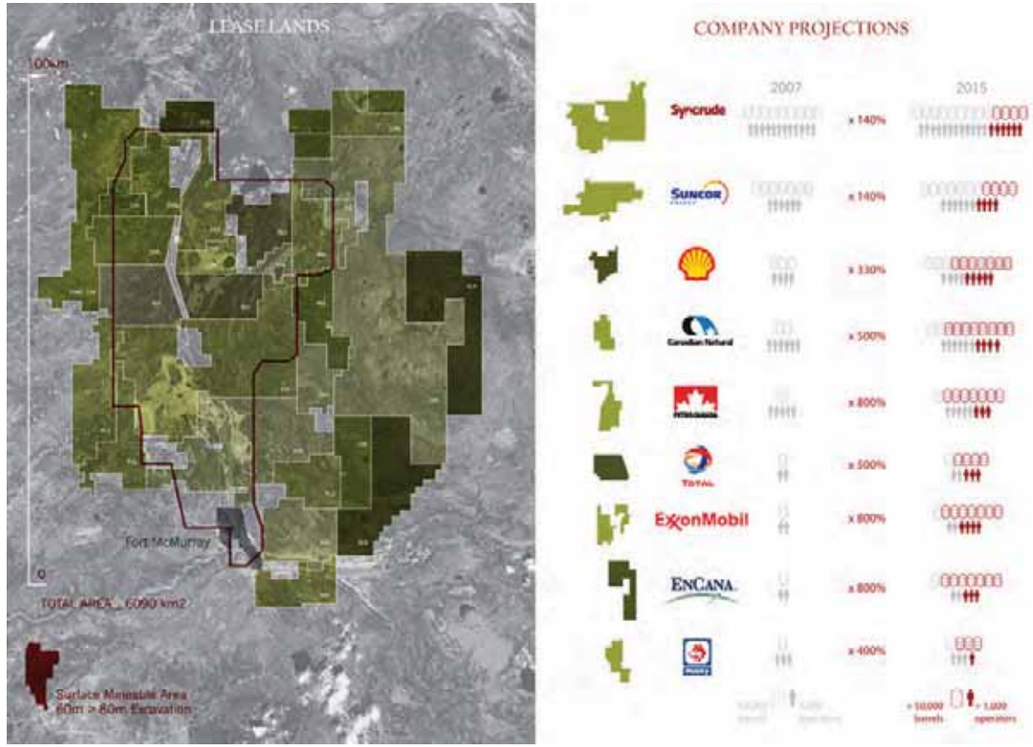
Understanding the wholesale leasing of the oil sands as an extension of this continued exchange, Canadians should begin asking more about the artifacts that these companies will inevitably leave behind. What form will the residual landscape emerging from the excavation and terra-forming of an entire region take on? How will infrastructures, associated with the extraction and transport of a finite resource, transition themselves for a post-oil economy? What forms of urbanization will the industrialization of the oil sands region generate?

To begin addressing these questions, it is necessary to understand the operational activities of the industrial process itself. Oil sands companies have developed an orchestrated set of actions on their landscape based on emerging hydrological, logistical, technological and legal parameters. Initially, while constructing the massive upgrading facilities required to separate bitumen from sand, the primarily forested land is gridded off; its land deforested and cleared; its soil drenched, drained and dried; and its roughly 10-meter-thick layer of overburden (muskeg soil, gravels, rock) removed and stockpiled, before any mining can occur. Simultaneously, massive holding and tailings pond embankments are located adjacent to the future mines to provide the necessary fluids to lubricate the transportation of the crushed sand, which will then have steam pumped into it to separate the oil. Any unfortunate byproducts of the process will be stored in these ponds indefinitely.

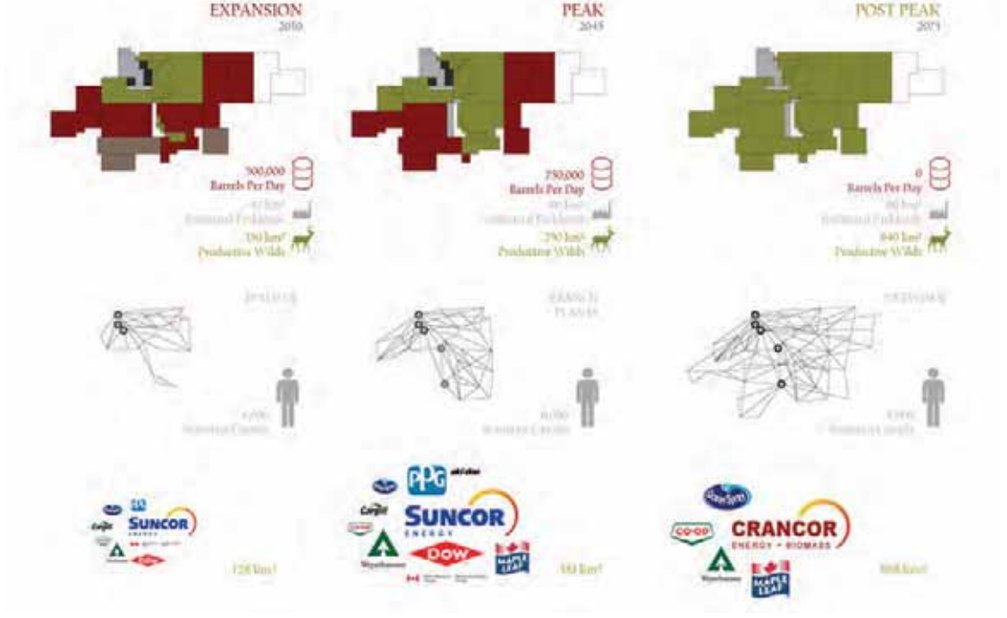
It is important to understand that all of the leasable land can be mined, and any particular parcel of land will eventually morph from a holding pond, to an 80 meter-deep surface mine, to a tailings pond which will potentially be replanted and reclaimed when it is no longer spatially required. The orchestration of this process responds to adjacencies; holding ponds locate near water sources, tailings ponds and stockpiles near upgrading locations, surface mining constantly following clear cutting towards the extending edges of development, with landscape reclamation in its wake.

As evidenced in ExxonMobil's Kearl Lake lease evolution plan, mining marches across the lease by outflanking the original watershed to create a landscape of total hydrological control. Initially a landscape of creeks, rivers and a solitary lake, the lease is programmed to morph into a quarantined landscape of water management areas and the loosely defined reclaimed areas expected to somehow regain the ecological characteristics they initially contained. The basic principles of the process are thus clear; oil sands companies will completely transform the ecologic, topologic and hydrologic character of their entire lease holding.

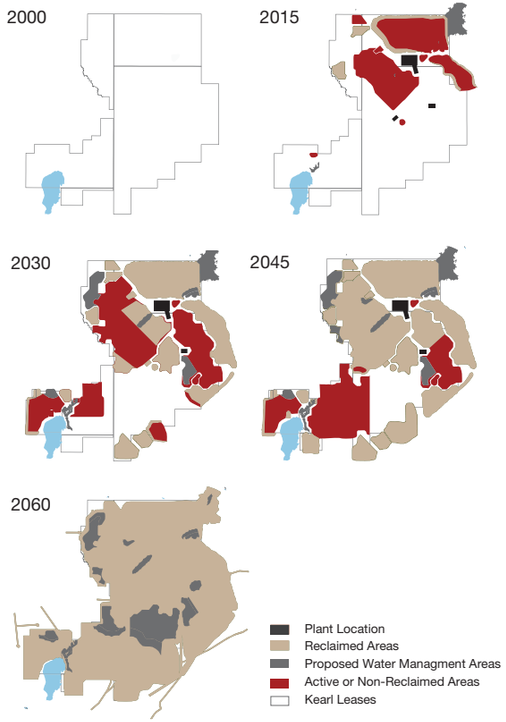
Multiply this transformation by the number of lease holdings and it becomes clear the entire region is undergoing an irreversible change. The breadth of this long-term reality, unfortunately, is seldom discussed, as



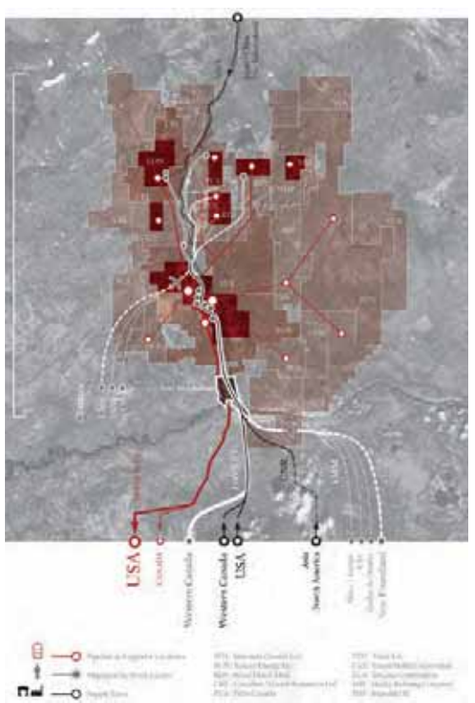
Athabasca Oil Sands Lease Map, 2008. Ownership map and employment projections of oil companies



Proposed Lease Phasing, 2008. Proposed lease transformation and tertiary industrial occupations



Kearl Lake Lease Evolution, 2007. Exxon Mobil's proposed remediation phasing plan



Regional Plan, 2007. Existing regional conditions

more immediate and readily visible ecological, social, infrastructural and governmental issues are at the forefront of the current discourse on the region. Well founded ecological concerns about the long-term effects of industrial water consumption and contamination, wildlife habitat protection, green house gas emissions and suspect reclamation practices are beginning to inform and organize the dirty realities of the oil sands industry.

The complex socio-economic problems associated with the obscenely high wages, rental rates and costs of living resulting in a rapid influx of international labor are only just beginning to be addressed by an overwhelmed municipality's civil services and oil company protocols. For infrastructure, the region is completely dependent upon the narrow band of Highway 63, a pipeline right-of-way and the Athabasca River for the transportation of all heavy equipment, construction supplies, hazardous goods and labor to an expanding archipelago of upgraders. Finally, the failure of the federal and provincial governments to effectively co-ordinate their management of the region has permitted a rate of expansion that has exacerbated all of the previously mentioned issues. Somehow the region needs to begin addressing its short- and long-term futures simultaneously.

A systemic reluctance to adopt or enforce an effective framework has permitted this collection of self-interested companies to set the terms and pace of development to the provincial government. The province's Regional Sustainable Development Strategy and Cumulative Environmental Management Association's have "failed to protect Alberta's environment from rapidly expanding oil sands interests."[1] Fortunately, oil sands companies are structured to enable decisions free from four-year terms; they plan on digging in for another 60 years. Given that they'll be around much longer than any sitting government; it is about time the province transfers the burden of planning back into industrial hands.

Albertans should begin demanding much more, not from their representation, but from the companies that occupy and profit off their public holdings. The historical relationship, where industries acting in self-interest invest into the construction of public landscapes, infrastructures and architectures, needs to be reconstructed. The public, increasingly conscious of the brevity and economy of this development, needs to begin demanding more than watered down royalties to ensure a sustained future for their lands.

Likewise, companies in the business of energy ought to begin viewing their current activities as an opportunity to situate future, alternative productions. The perception of the oil sand industry's enormous abilities to manufacture the landscape, rapidly lay infrastructure and erect architecture, must transition from destruction and catastrophe towards construction and creation. Both spheres, public and private, need to begin recognizing the immense potentials implicit in industrialization of this landscape.

The operations of these companies need revision; the industry has increasingly recognized the need to begin coordinating mine planning, tailings storage, surface water modeling, watershed management, landscape design, reclamation and end land uses across their lease boundaries. Kearl Lake's lease evolution will require multiple modifications to adapt to evolving neighboring

Suncor Voyageur Lease, 2007. Aerial view of Suncor Voyageur Lease, 2007. Image courtesy George Gilks

activities and evolving ecological and legal requirements. The volatility of market forces, currently in retreat, can help create the conditions necessary to allow the questioning, recalibration and modification of ongoing operations. The illustrated fluidity of the mine's orchestral process allows for the adaptation and augmentation of operations to occur easily while maintaining production levels. A coordinated control over an entire region could produce a self-constructing, bottom-up, infrastructural landscape capable of breeding post-oil economies.

Fort Suncor

"Suncor is a unique and sustainable energy company dedicated to vigorous growth in worldwide markets through meeting or exceeding the changing expectations of our current and future stakeholders."[2]

Over 30 years of surface mining and upgrading by Suncor has produced an active landscape containing the range of distinctive occupations, topographies and residues of the oil sands operations. On the verge of doubling its production capacities with the completion of the Voyageur South upgrading facility, Suncor's operations will soon straddle the highway-pipeline corridor; thus doubling its public edge. As mining moves away from this corridor towards the periphery of the lease, these exhausted, well serviced edges are suited to take on future occupations. As a publicly traded, relatively transparent and highly visible occupant (due primarily to its immediacy to Fort McMurray, Highway 63 and the Athabasca river) of the oil sands, Suncor is positioned to implement new sets of behaviors and invite satellite industries into its field of operations.

The shadow economy of the oil sands extraction process; the importation, creation, usage and storage of chemical lubricants and byproducts, could become an integral and visible part of the occupation and reformation of the landscape. Concurrently, leveraging the value of waste streams; deforested organic material, soil and overburden stockpiles, tailings, sludge, emissions and heat, to that of a resource could attract parasitic productions capable of capitalizing on an otherwise dirty reality. Finally, the creative capacities implicit in the replacement of an 80m-deep hole, permits an unprecedented ability to specify landscapes tailored for particular modes of production. Suncor, armed with an immense ability to transform and service a landscape, could customize its waste and reclamation streams to permit parasitic occupations, via a set of Industrial Parklands and Productive Wilds.

Parklands, each tailored to fit into the rounded embankment geometries of exhausted mining parcels, are constructed at the pace of excavation further afield. Annual yields of cleaned sand, at volumes with corollary barrels per day, are dumped into pre-determined figures intended to maximize exposures, hydrological gains and byproduct flows. The resultant variations of slopes and soil strata are re-enforced with periodic sheet steel piles, which act to stabilize the sands and provide footings for future architectures. With the range of organic materials, sands, gravels, sulphates, nitrates, etc, stockpiled on the lease; soil cocktails can be mixed to predict species.

Water, the region's scarce resource, is ponded and provided for via ditches, dykes and banded snow fencing intended to entrap all surface waters into an interior pond. Compacted silts, a natural product of sludge, act as pool liners to encase and prevent water from percolating in an otherwise porous landscape. This water, at various

Landscape design parameters, 2008. Set of parameters for the refilling of exhausted strip mines to yield other productions

View of Industrial Parkland, 2027

Aerial view of Suncor Voyageur Lease, 2027

levels of toxicity, is treated through phytoremediation and settlement, to allow for future agricultural uses. Finally, the infrastructures of the upgrader are extended into the Parklands to provide district heat, steam and chemical compounds to new occupants. These new enclaves, each highly programmed and specific, are dually serviced by the ongoing activities of the lease and an immediate adjacency to Highway 63.

Outlying areas, serviced only by Suncor's interior roadway network and increasingly distant from the highway and upgrader as mining activities extend towards the lease's periphery, are similarly constructed but re-programmed as satellite colonies to parkland occupants. Each Productive Wild can serve as an eco-industrial Petri dish, test sites for an alchemic ecology capable of adapting to the quarantined landscape. Companies set up along the highway can buy-up test sites as they become available across the lease, competing for an ever expanding set of specific landscape. Bison ranches, corn plantations, hybrid boreals, glass plants, greenhouses, cranberry bogs and algae farms begin to occupy the lease. Productive Wilds, capable of transforming waste streams into crops, energy and capital, could proliferate to support future regional and northern development.

Suncor, an energy company, will begin to reform itself. As energy reliance shifts from carbon to carbo-hydrate, oil companies will become biofuel, biomass, bio-energy companies. The arduous, energy intensive development of the finite oil sands could be designed to suit new methods of infinite production and conversion. The homogenous, destructive extraction of oil from sand can produce emerging cyclical, heterogeneous as a means to ensure future stakeholders. Existing pipeline infrastructures, easily transformed to transport other fluids, would service an expanding demand for cleaner energy. In short, the unfortunate realities of "dirty oil" could easily begin to inform and reform the oil industry. The Athabasca oil sands simultaneously represent the effects of peak oil, and the possible of futures without it.

References

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2. Suncor Energy homepage, http://www.suncor.com/ (Accessed November 3, 2008)

Kelly Nelson Doran *was born in Winnipeg and grew up observing the economic, industrial and infrastructural transformation of the Canadian landscape. He holds a Master of Architecture degree from the University of Toronto where he was the recipient of the RAIC Medal, the AIA medal and the 2007 Cohos Evamy Travelling Scholarship which funded his research travel to Northern Canada. His work has been published by the MIT Press and by* Canadian Architect *and has been exhibited at the Harvard Graduate School of Design. Kelly has worked with WilliamsonWilliamson Inc (Toronto), Eisenman Architects (New York), 70'N Arkitektur AS (Norway) and is currently working with the Organization for Landscape Infrastructure (Rotterdam).*