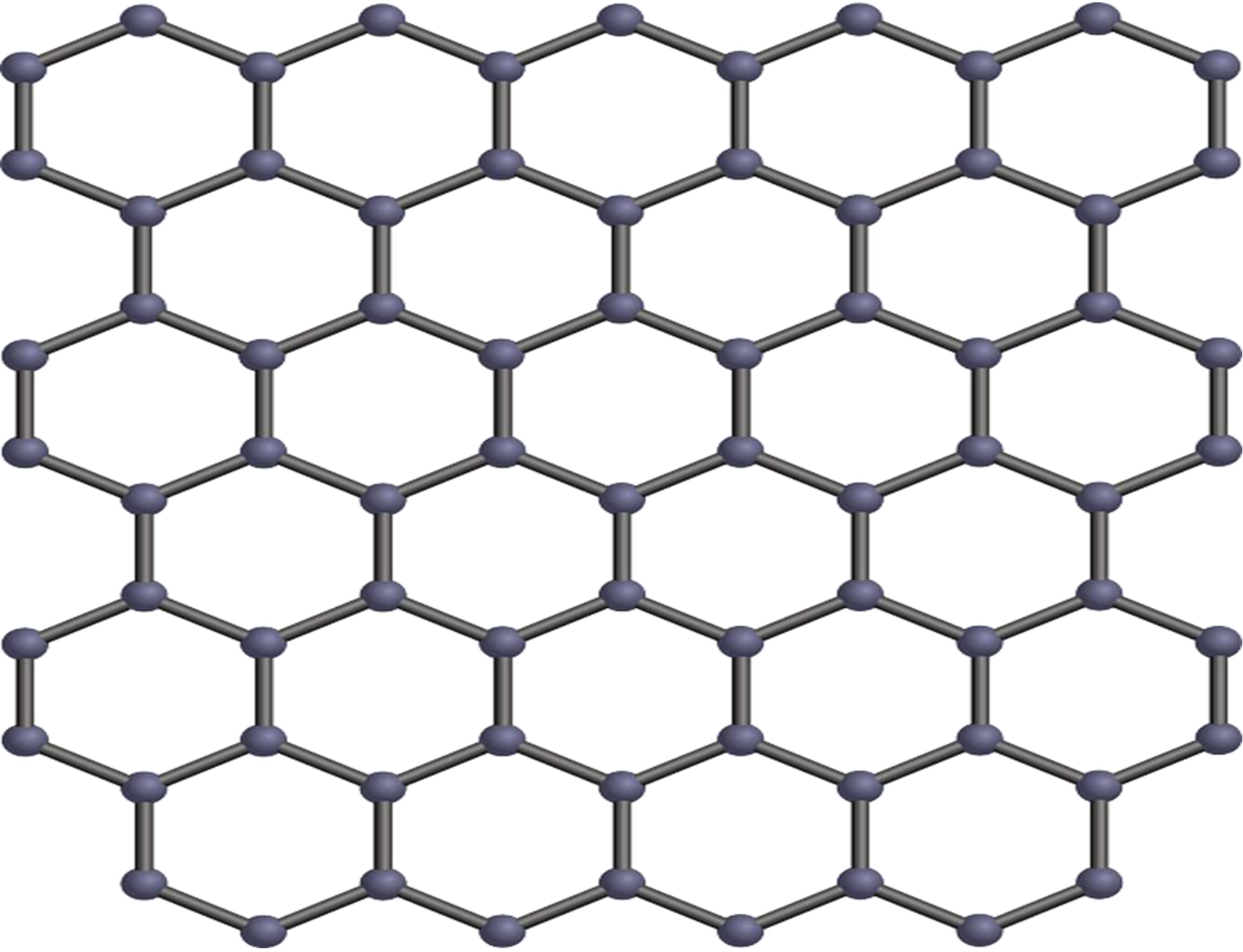

Alaska Graphite Refinery Site Location Report

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Graphite One Resources - Alaska Refinery Site Location Report

Purpose

On February 7, 2017, the Alaska Industrial Development and Export Authority (AIDEA) signed a Memorandum of Understanding with Graphite One Resources, Inc. (Graphite One) to evaluate potential sites within Alaska away from the Graphite Creek property at which facilities might be developed for further processing of graphite from the Graphite Creek property.

In cooperation with the Alaska Department of Commerce, Community and Economic Development and the Department of Natural Resources, AIDEA prepared a preliminary list of communities that meet more than one of the site location criteria. These communities formed the basis for a more thorough evaluation, the results of which are included in this report. The communities and sites under consideration are:

- Ketchikan
    - Gravina Island Industrial Complex
    - Ward Cove
- Sitka
- Kodiak
- Unalaska
- Homer
- Kenai
- Seward
- Port Mackenzie

Location Criteria

The location criteria provided by Graphite One included the following:

Real Estate

1-2 acres of available industrial land, where the building structures will occupying an area of approximately 70 m x 70 m (4,900 m^2 – 1.2 acres). Including:

- concentrate storage silos
- purification section
- Spherical Graphite (SPG) manufacturing areas
- control room and offices
- product bagging
- warehouse facilities

Power

Thermal purification is performed in high temperature electrical furnaces, for which the estimated annual power requirements at design capacity is 60,500 MWh

- Phase I covers years one through five of the project, with the annual power requirement being estimated at approximately 30,000 MWh
- Phase II begins in year six and continues through the life of the project. Phase II requires a doubling of the Phase I power requirements, i.e. an additional 30,000 MWh per year.
- For spherical graphite production, the power requirement is estimated at 3,300 MWh
- Estimated total annual power requirement, for Phases I and II combined: 63,800 MWh.
- Competitive cost per MWh – Washington can probably provide $0.04 kWh power

Supporting Infrastructure

- Port/dock facilities
- Shallow-draft barge access
- Potential access for larger vessels handling process materials, e.g., nitrogen
- Proximal rail and road access
- Electrical infrastructure
- Storage silos on-site for incoming material, as well as for finished product.

Methodology

AIDEA staff divided the location criteria between itself, the Division of Economic Development (DED), and the Kenai Peninsula Economic Development District (KPEDD). The location criteria was listed in a spreadsheet and was used by the evaluators in identifying which of those criteria was present in each location. The spreadsheet is attached to this report.

In addition to the data review above, additional or clarifying information was sought to provide a better assessment of any given community. Additional information on the communities located on the Kenai Peninsula was provided by KPEDD directly from the communities (see attached).

The Alaska Energy Authority (AEA) evaluated current and potential power generation capacity in the nine target locations based on the average load required by the refinery. The requirements that were used for the analysis was an average load of 61 MW, expected to be over 252 days, and a total consumption of 372,435 MWh per year (see attached).

After the data were collected for each location, a priority list of criteria was developed in order to evaluate each location as a viable candidate:

1. Current power generation capacity
2. Power cost
3. Marine infrastructure:
    a. barge landing
    b. container handling
    c. access to markets in Lower 48 and Asia
4. Surface infrastructure:
    a. road
    b. rail
    c. airports
5. Workforce
6. Land availability
7. Tax Treatment and Abatements

Results

1. Power Capacity

When the data were compared against the priority criterion, current power capacity, it was clear that only four of the nine locations have the capacity in-place to meet the refinery's power needs. These four communities are Homer, Kenai, Seward, and Port Mackenzie. It was decided at this point to cease

evaluation of locations that did not meet the power requirements. The rationale for this is that the Lower 48, specifically Washington State, has a significant cost advantage over Alaska on a per kWh basis, therefore, if additional capacity is needed to meet the refinery's power needs, it would be deleterious to these efforts. Although, should any of these communities, or the State of Alaska, determine that the siting of the refinery is important to them, further consideration could be made, if it can be demonstrated how they would meet the refinery's energy needs.

2. Power Cost

While these locations all have the capacity to power the refinery, can they do so at a cost that is economically viable for Graphite One? Posted prices in these locations are listed below:

Locations	Current large industrial retail price ($/kWh)	Demand charges for large industrial ($/kW)
Homer & Kenai	$0.17	$20.00
Port MacKenzie	$0.16	$6.47
Seward	$0.12	$23.45

Although these posted prices appear uneconomic, there may be room for negotiating a project specific industrial rate that will reduce them to a more feasible level. While Alaska can't directly compete on power generation costs, there are potential accumulated benefits to the location criteria will help balance the overall capital and operating costs of the project.

3. Marine Infrastructure

Of the four locations that currently can meet power requirements, all have the marine infrastructure required to accommodate the concentrate arriving from the mine site to shipping the final product to market. All of the ports provide year-round service with barge landings, docks, and container handling capacity. One question that remains unanswered, is there timely and efficient shipping access to Asian markets from these ports that meet the production schedule of the refinery. This will depend on the volume and frequency of the shipments and the transit time required. Further exploration of this with shipping companies servicing these ports will provide the required information, once a schedule is determined. All ports have regular, direct access to the Lower 48, generally the Ports of Seattle and Tacoma.

4. Surface Infrastructure

All four locations are connected by the road system to Anchorage, and the Lower 48 via Canada. These roads are sealed, two-lane, public carriageways, maintained on a year-round basis by the Alaska Department of Transportation and Public Facilities. There are no toll roads.

Seward is the only location that is located on the Alaska Railroad network. Seward has long history of coal shipments through its port via the Alaska Railroad's coal loading facility, which includes coal storage, handling and loading equipment, as well as a large dock. Port Mackenzie, is located at the end of an incomplete 32-mile rail spur that connects to the main line just south of Houston. The Matanuska-Susitna Borough and the State of Alaska continue to explore funding avenues to complete the extension, though there is currently no expected completion date.

5. Workforce

All of the communities have workforces that are well educated and skilled. These communities have a history of commercial and industrial activity; well serviced by educational and vocational institutions in-place. Each community has plentiful seasonal employment opportunities, but often lacks year-round work. These opportunities will be welcomed, providing a measure of stability and resiliency to the local and regional economy.

While very little relevant research is conducted in these communities, they are not far removed from the major research centers of Anchorage and Fairbanks. The University of Alaska system has significant research capability at its Anchorage and Fairbanks campuses, providing an opportunity for Graphite One to partner with an in-state institution of higher learning. Relevant research centers include UAF's Mineral Industries Research Laboratory (MIRL), Institute of Northern Engineering, Alaska Center for Power and Energy (ACEP), and UAA's Environment and Natural Resources Institute (ENRI). In addition, there are three schools in the UA system that may also provide a source of future employees, interns, and partnering opportunities and they are the UAF College of Engineering and Mines, the UAA College of Engineering, and the Associate Degree in Power Technology for Mine Mechanics at the UAS campus in Juneau.

6. Land Availability

Each of the four communities has an abundance of available industrial zoned land for the project. The industrial lands available are accessible by sealed roads and all are within existing utility service areas with water, sewer, gas, and electricity either on-site or in close proximity.

The amount of acreage zoned Industrial, Light Industrial, and Heavy Industrial is different in each location, ranging from a couple of hundred acres to well over 9,000 acres. The minimum lot size within each zone meets the property size requirements for the project.

7. Taxes and Abatements

All of the communities levy a combination of real property, personal property, and sales taxes. In many cases there are exemptions for an initial amount of real property, and the personal property and sales taxes generally have a number of exempt items and upper limits on total taxes due.

Under state law, a municipality may partially or totally exempt all or some types of economic development property from taxation for up to five years. Pending legislation could allow for a longer timeframe though it does not have an expected passage date. Whether an individual community will offer a deferral or exemption to any of the taxes it levies will be determined by that specific jurisdiction.

At the state level there are few exemptions for industrial activity, but there are current incentives available that Graphite One may seek to apply to the refinery. One in particular is related to the manufacture of urea, ammonia, or gas to liquids (HB100 – 2016), and may be an opportunity to add graphite and/or any mineral added-value processing, or to develop a new bill all together (see attached bill).

Summary

This report is a high-level overview, and not a final recommendation, in an effort to assist Graphite One's decision making and analysis going forward. It is clear from the location criteria that the

availability and cost of power are the two critical factors in siting the refinery. Based on that, it was determined to only consider further those locations that have the energy capacity in-place. This cut-off mark pushed five locations out of current consideration, regarding energy capacity, but not their other attributes, which met most of the other location criteria. Should any of these locations determine that they have a plan to meet the energy needs of the refinery in the near future, then further consideration may be given to them.

While Seward, Kenai, Homer, and Port Mackenzie all have ample power capacity, they are disadvantaged by the cost of that power. In other respects, these locations have all of the components required for the refinery, and can be competitive with sites in the Lower 48, based on accumulated benefits. These benefits will be better quantified as the specifications for the facility become available.

Most of the locations reviewed reached out to AIDEA to ensure they were on the evaluation list, and in particular, the four best-suited locations are very interested in discussing this project with Graphite One management. Each of them are highly motivated to site the refinery in Alaska. While Outside locations may provide cheaper power costs, Alaska is a mining and industrial friendly state that supports the development of value-added activities, and has a regulatory regime that supports responsible development while being less costly than other potential Northwest locations.

Recommendation

It is recommended that if Graphite One has an interest in any of the sites in this report, that AIDEA and other State agencies, in collaboration with the communities themselves, can provide assistance with familiarization tours of those sites of interest. Meetings can be scheduled with the Mayors, Managers, Assembly and Council members, and other civic and business leaders to discuss specific needs, and to assess how each community can help meet those needs.

Compiled by:

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