August 1, 2018

Senator Cathy Giessel
1500 W. Benson Blvd., Rm 215
Anchorage, AK 99503

Dear Senator Giessel:

The Alaska Gasline Development Corporation (AGDC) has reviewed your letter of July 16 in which you submit questions on behalf of members of the Senate, following the Alaska LNG project update to the joint Resources Committee on July 11, 2018. To respond, I have repeated each question below followed by an AGDC response or reference to an attachment. Please note, all response language refers to the "Alaska LNG" project in contrast to the previous producer led "AKLNG" effort referenced in the questions you provided.

1. **What plan does AGDC have for expansion opportunities, i.e. natural gas from new parties not currently in negotiations on AKLNG? Will new natural gas supplies from new fields with new companies have a place in the AKLNG infrastructure?**

AGDC is the aggregator of natural gas on the North Slope in the Alaska LNG Project structure. This allows AGDC to contract with any party for current and future gas supply, including gas above current nameplate and from resource expansion outside of Prudhoe Bay Unit (PBU) and Point Thomson Unit (PTU). System expansion protocols will be included in the Alaska LNG Project governance documents. Whether AGDC owns the Alaska LNG system on its own or with partners, the current commercial structure of the project encourages expansion by providing system owners with incentive to maximize natural gas sales from the system, and therefore feedstock gas purchases. System expansions are common for pipeline and LNG infrastructure because they typically carry a lower incremental cost than greenfield developments.

The 20 MTPA Alaska LNG infrastructure components are being designed and permitted to monetize the known Alaska North Slope gas resources at maximum capital efficiency. The PBU gas offtake, as authorized by the Alaska Oil and Gas Conservation Commission (AOGCC), and PTU gas resource can maintain the plateau production to support 20 MTPA LNG exports plus in-state gas demand for 20 years; which will underpin the initial long-term LNG sales contracts and project finance. After the initial 20 years of gas offtake, PBU and PTU decline such that prospective natural gas resources that aggregate to about 7 TCF (about the size of PTU) must be developed to maintain the yearly 20 MTPA of LNG sales until year 30. Having known resources that can supply 20 years of LNG and in-state gas at plateau rates, and underpin prospective gas for another 10 years, is considered ideal from a commercial perspective. Hence the 20 MTPA LNG (plus in-state gas) forms the basis for the:

- export license,
- facilities design and cost estimates, and
- permitting basis.

The 20 MTPA LNG export design and permitting include provisions for 500 million standard cubic feet a day (MMSCF/D) in-state gas capacity. This volume is approximately double current in-state consumption.

Each of the three major Alaska LNG project subcomponents is being designed to optimize the economics of the known natural gas resources and accommodate future gas discoveries as described below:

Gas Treatment Plant (GTP): The GTP will be located within PBU surface boundaries and will have three gas processing trains designed to remove carbon dioxide (CO_2) and other impurities from a blend of PBU and PTU gas. The three-train design is sufficient to provide gas for GTP fuel, 500 MMSCF/D of in-state gas, pipeline fuel, LNG plant fuel and 20 MTPA of exported LNG. To minimize environmental impact, the GTP layout and pad area are optimized for the 3-train design. However, as part of investigating air permitting alternatives, another potential GTP location was identified nearby within PBU surface boundaries which could accommodate GTP expansion.

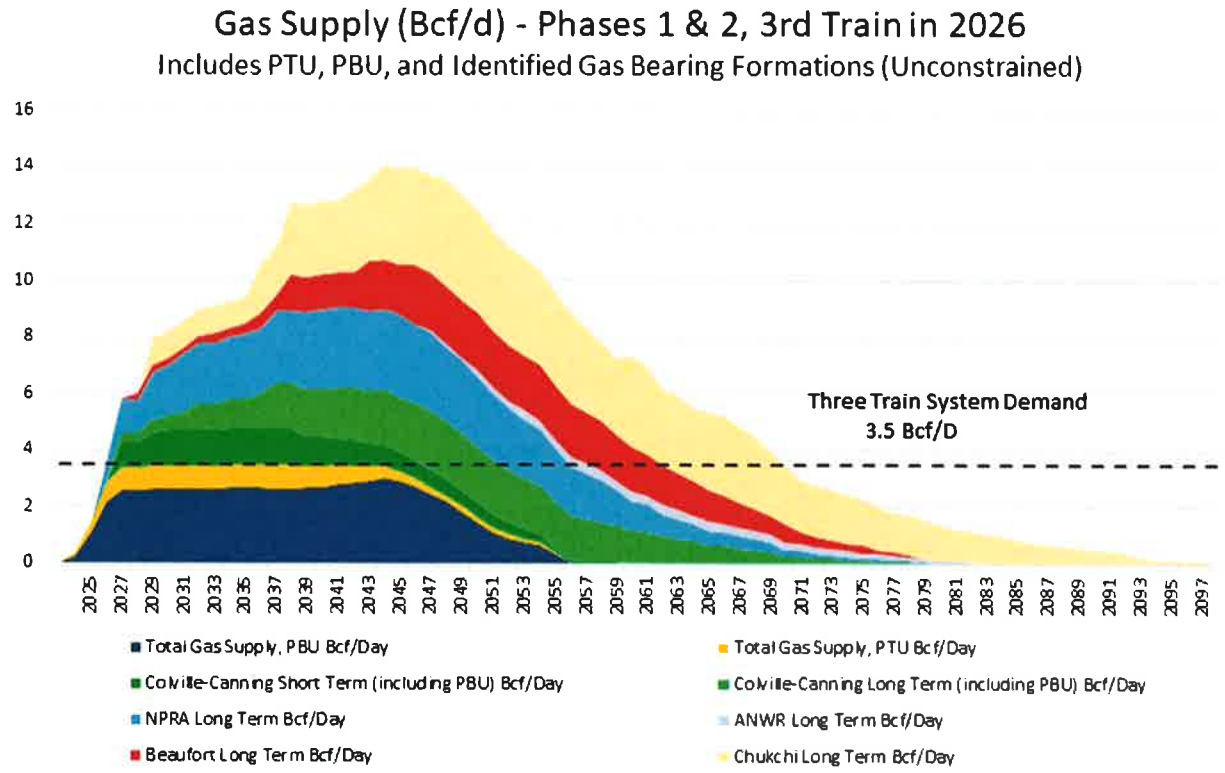
Pipeline (PL): The current PL design includes eight compressor stations; which will allow delivery of 500 MMSCF/D of in-state gas, pipeline fuel, LNG plant fuel and 20 MTPA of exported LNG. The hydraulics of the 42" pipeline and ANSI 900 pressure rating can accommodate additional volume of about 1,000 MMSCFD through the addition of ten infill compressor stations (total 18) which is a common pipeline expansion technique. The pipeline will be designed so that the expansion compressor stations can be added without shutting down the ongoing operation.

Liquid Natural Gas Plant (LNGP): The Nikiski LNGP will have three liquefaction trains designed to export a total of 20 MTPA of LNG. The pipeline expansion capability of 1,000 MMSCF/D is sufficient to supply a 4th LNG train of similar capacity to the three initial trains. The laydown area required to construct the first three trains can be used to site the 4th train.

The 4-train expansion scenario described above is intended to accommodate new North Slope gas developments. However, gas discovered along the PL corridor can be admitted if it meets Alaska LNG Project gas quality specifications. There will be multiple tie-in locations to accommodate planned and future compressor stations, mainline block valves, and in-state gas offtakes. Gas supply increases to the 3-train Alaska LNG design that do not justify a full 4th train can be accommodated by "debottlenecking" the GTP, PL, and LNGP. Expansion of the pipeline beyond the 4-train scenario can be accomplished by adding additional pipeline segments and

associated compressor stations at key locations; this system "looping" is also a common expansion technique within the pipeline industry.

The discovery of gas that will allow expansion, or extension, of the Alaska LNG project is likely. Please refer to the Graph 1 below, which was created by AGDC using information sourced from a 2009 report by the Department of Energy concerning potential Alaska North Slope gas resources. The dashed line was added by AGDC to represent the demand of the three-train 20 MTPA (plus in-state gas) Alaska LNG Project.



Graph 1

2. **In the presentation AGDC gave to the joint committee, a bullet on slide 17 stated that the wellhead gas purchase price is between $1.00 and $2.00. If that is true, what analysis has been done on the economics of the project at various points in that range? Are there agreements that envision a wellhead price in this range? Are there agreements for certain gas volumes tied to prices within this range? Is there a wellhead price within this range that makes AKLNG uneconomic?**

Due to the sensitive nature of ongoing negotiations with North Slope natural gas producers and potential LNG customers, AGDC has stated a range for the North Slope wellhead netback price.

The range of $1 to $2 per MMBtu has appeared in Semi-Monthly Reports to the Legislature as well as presentations to the public and Legislature prior to the July 2018 joint committee hearing.

AGDC economic analysis on the Alaska LNG project takes into account the range of $1 to $2 as part of its sensitivity analysis. Determining whether there are "uneconomic" alternatives depends on a combination of project costs including payments in lieu of taxes to local communities. At the end of the day, the delivered price has to be "in market." The combined cost of supply, the cost of conditioning, transporting, liquefying, and shipping the gas through the system, plus debt repayment and return on equity, cannot exceed the price the market will bear. Alaska stranded gas will follow a different price structure than Henry Hub and needs to be competitive with other stranded sources delivered into Asia.

3. **What is the probabilistic annual revenue to the SOA under AKLNG after first gas? What is the probabilistic annual net revenue to the SOA under AKLNG after first gas? What factors can erode that net revenue projection?**

The proposed business structure for the Alaska LNG bases the majority of project LNG sales on long-term contracts with limited variability. As a result, revenues will be relatively stable and probabilistic modeling will be of limited value. Probabilistic modeling may be useful in determining the potential value of uncontracted volumes that may be sold to short term or spot markets. In either case, pricing into long term or short term LNG markets does not presuppose volatility in the purchase price of supply gas from the currently stranded North Slope natural gas resources.

The ability to finally monetize North Slope natural gas will encourage additional oil development in the region, as the ability to export and commercialize gas reduces exploration risk for both oil and gas. AGDC will work closely with personnel at the Department of Revenue as they model the economic value of monetizing the North Slope natural gas resources. This effort can account for gas production related infrastructure costs as well as the potential for increased oil production.

Project development costs present risk factors that may erode projected net revenue. The risk associated with these factors will continue to be reduced through ongoing engineering and development of lump sum turnkey bids for project construction.

4. **The presentation by AGDC stated that the model the corporation is using assumes Train 1 being operational by the 4th quarter (Q4) of 2024. Between now and Q4, 2024, what is the AKLNG timeline, including a description of project critical paths, projected milestones, interdependencies, risks to due dates?**

Please see the Updated Alaska LNG Project Schedule July 27, 2018 attached to this letter.

5. **The topic of the State of Alaska (SOA) as an equity owner in AKLNG came up in the hearing. What kind of investor role does AGDC want from the SOA? Is that the role of an appropriator, as an investor through its investment vehicles (Power Cost Equalization Fund, Permanent Fund, etc.), or is there some other role AGDC envisions? Will the SOA be afforded the benefits of a Most Favorable Nations status?**

As the equity owner of the project through AGDC, the SOA will have the opportunity, but not the obligation, to continue investing in the Alaska LNG project. This can be done through direct appropriation by the Legislature or through institutions of the State that can invest utilizing their own independent due-diligence processes. AGDC believes that it is desirable for SOA/AGDC to maintain a controlling equity position and that Alaska LNG is an attractive investment opportunity for State agents to invest. Additionally, AGDC welcomes the investment of Alaska Native Corporations, individuals and municipalities as recommended in Section 76 of SB 138, SLA14.

Given the high degree of the commitment previously made by the State of Alaska to the development of this project and the potential benefits of State participation, AGDC expects that future investment in the project by the State of Alaska will be provided on terms reflective of the State's position and interests. Due to the nature of a competitive marketplace for investment, tradeoffs will likely be necessary to accommodate the State's priorities in gaining advantageous investment terms, whether that is long vs. short-term returns, decision making rights, or ownership of specific parts of the project. AGDC and its Board welcome the input of the State's lawmakers on the policy priorities in making such investment decisions.

6. **Can AGDC provide a project risk assessment overview? Specifically, is there an overview that encompasses the magnitude of money at risk, time slippages, location risks, etc.?**

AGDC is working with investment banking specialists at Goldman Sachs and Bank of China on due diligence that assesses and evaluates these risks. This effort makes use of prior project estimate work on contingent outcomes of cost and schedule, as modified for the current project commercial structure. Probabilities and risk sensitivities are part of such due diligence.

7. **Has AGDC determined whether there will be a difference in pricing for natural gas sold in-state use, versus natural gas sold to the LNG terminal?**

To clarify the question, there will be no "point of sale" to the LNG terminal, but, instead, AGDC will sell LNG directly to customers. The economics of serving in-state markets are significantly different than the economics of serving LNG customers. For example, in-state customers may have different demands throughout the season and the demand will grow over time. Further, in-

state customers do not require use of the LNG plant. AGDC has taken these factors into account and expects to negotiate gas supply agreements with in-state customers that account for these factors. AGCE expects the in-state natural gas price to be within a range of $5 to $6 per MMbtu.

8. **Has AGDC determined how natural gas balancing will be done for the state to receive the necessary in-state supply, especially in the winter months, prior to natural gas leaving Alaska as an LNG export commodity?**

Unlike the prior project concept, natural gas balancing is not an issue to be resolved to supply in-state demand. Under the proposed project structure, AGDC envisions buying all the gas on the North Slope from all the producers and DNR if the State elects to take RIK. The gas will all be combined into a single gas stream and in-state will be served from that common gas stream. Because the in-state supply is not coming from a specific producer or DNR, there is no need for gas balancing to serve in-state needs. AGDC, as in-state supply aggregator, will incorporate the necessary forecasting and scheduling agreements in the gas purchase agreements to provide for some seasonal swing for in-state customers, however underground storage in Southcentral Alaska is expected to remain a cost-effective element of seasonal gas demand balancing for local consumers.

9. **What update can AGDC provide on the scope of work Goldman Sachs and Bank of China are conducting on behalf of AKLNG? What have the respective parties achieved towards their project scope? What are the due dates for the respective parties' deliverables?**

AGDC has released a redacted version of the Goldman Sachs and Bank of China investment bank agreements. Work continues on structuring material that will be used to introduce the Alaska LNG project to international equity markets before investment is solicited ahead of pre-FID and FID decisions. This information will be shared with the Legislature when it is available.

10. **AKLNG currently is 100% owned by AGDC, which in turn is currently 100% owned and funded by the SOA. When Goldman Sachs and Bank of China speak with interested parties about equity investments in AKLNG, what are those respective parties permitted to offer on behalf of the project?**

Currently the "global capital coordinators" i.e. the investment bankers are pricing the market and assisting AGDC in determining optimum and realistic structures for potential investment. Once the structure is in place, the Global Capital Coordinators will guide AGDC in pricing equity investment. However, AGDC is the only entity able to enter into investment agreements, and the terms offered to the market will undergo AGDC management and Board approval.

11. For the potential financing by BOC: what type of collateral will BOC have to underpin any loans for AKLNG?

The LNG sales contracts will be the primary collateral with banks having "step-in" rights into the LNG contracts on default.

12. The upstream needed for natural gas production must be funded, designed, permitted, and built by the private oil & gas companies holding leases to those resources. Before any construction, air quality and wetland permits are needed. Is AGDC aware of whether the private parties have filed for air quality, wetland, or other permits associated with the upstream infrastructure for AKLNG?

AGDC is in ongoing negotiations with North Slope producers for natural supply for the Alaska LNG project. These commercial negotiations anticipate that proper design, permitting, and construction efforts will be taken to fulfill gas sale commitments. The current design, cost estimate and permitting of the Alaska LNG Project includes the two transmission pipelines required to bring PBU gas and PTU gas from Unit facilities to the Gas Treatment Plant.

Although AGDC cannot speak for the North Slope unit operators and other producers that may supply gas to the Alaska LNG project, it is well-known that PBU produces, processes, and reinjects in excess of 6 BSCF/D of natural gas. The modifications required to redirect the allowable offtake of this gas to sale can be designed, permitted, and constructed within the Alaska LNG project construction timeframe.

13. How many permits are critical to obtain before sanctioning AKLNG? How many of those critical permits does AGDC possess? What is the status of any outstanding critical permits needed before sanctioning?

Fourteen (14) major permits/approvals for the AKLNG project have been identified as critical due to their influence on siting/design or because of their long lead time. All 14 applications/requests have been submitted, and agency processing is underway. Approvals are expected no later than March of 2020 based on the schedule published by FERC earlier this year. Expected permit/approval issue dates for the 14 items are noted below by regulatory agency.

- **Federal Energy Regulatory Commission (FERC)** - FERC is the designated lead Federal agency on the project and many of the other approvals are linked to the FERC review and approval process.
    - Environmental Impact Statement (EIS) – Final EIS is scheduled 12/9/2019.
    - Natural Gas Act Section 3(a) Authorization – FERC authorization decision is scheduled 3/8/2020.
- **Alaska Department of Environmental Conservation (ADEC)**

- Two Air Quality Construction Permits (Gas Treatment Plant and Liquefaction Facility) – Permits are expected by the end of 2019.

- **Department of the Interior, Bureau of Land Management (BLM)**
  - Right-of-Way – Processing is underway and approval is expected concurrent with FERC approvals noted above.
- **U.S. Army Corps of Engineers**
  - Wetland and Waterway Permits – Processing is underway and approval is expected concurrent with FERC approvals noted above.
- **U.S. Coast Guard**
  - Water Suitability Analysis – Completed.
- **U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration**
  - Five Special Permits – Processing is underway and permits are expected to be issued at approximately the time the FERC EIS is completed.
- **U.S. Fish and Wildlife Service, National Marine Fisheries Service**
  - Petition for Incidental Take Regulations in Cook Inlet – Expected by 3/31/2019.

There are a myriad of additional Federal, Alaska and local permits and approvals required. AGDC has a systematic process for identifying, prioritizing, tracking and managing these legal requirements.

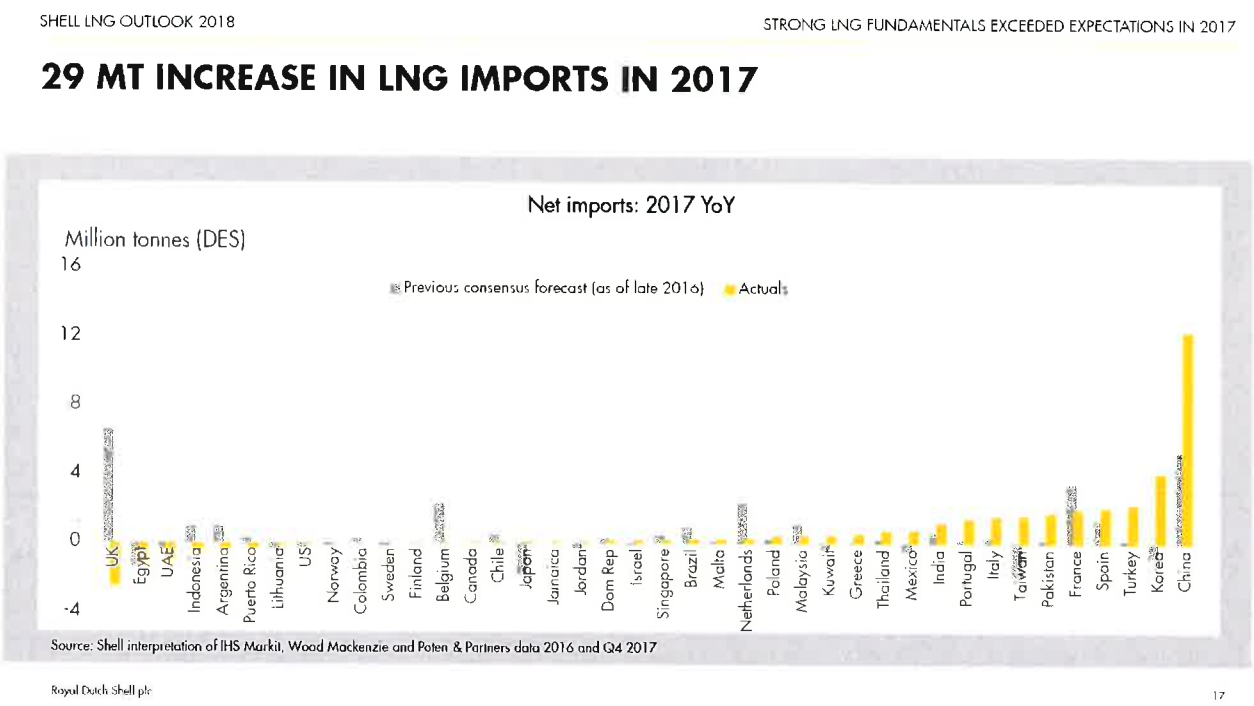
14. Given the geopolitical changes of the past year, the tariffs between the United States and China, the slowdown in the global economy, and projections of new supplies for natural gas in the next ten years, why is AKLNG considered a competitive project?

The Alaska LNG project offers Asian LNG customers a long term source of clean energy with a high degree of price stability. Most worldwide LNG prices remain connected to volatile energy commodity prices. As an infrastructure project, Alaska LNG can be priced to have little to no market volatility over the period of time necessary for project financing and enable predictable revenue for the project owners.

Despite periodic headlines warning of slower global economic growth, demand for LNG as a source of energy in Asia continues to grow dramatically, led by China's concerted effort to transition from coal to natural gas. This aggressive fuel switching is a primary driver of Chinese demand for natural gas which has tripled in the last five years. This demand does not rely solely on economic growth and represents an enormous energy demand that will be filled from numerous sources.

AGDC has a tremendous opportunity to secure China as an anchor client for the Alaska LNG project. The State is strategically situated to provide a major component Chinese and general Asian LNG supply due to its close proximity. Alaska LNG can reach Asian customers in 7 to 9 days and the shipping route is not burdened by any geographic impediment such as the Straits of

Hormuz or the Panama Canal. Alaska LNG would strengthen the United States' varied and complex geopolitical interests with respect to Asian countries that become customers. The project will export $8 to 10 billion annually from the U.S. to Asia – with this single project representing a nearly 10% increase to current U.S. exports of $115 billion annually.



Graph 2

In 2017, China surpassed South Korea as the second-largest importer of LNG; jumping up from fourth largest importer in 2016 based on a dramatic increase in actual natural gas demand. (Graph 2). Chinese demand for natural gas is projected to continue increasing substantially as the country transitions to a cleaner energy mix and has set ambitious air quality targets and shut down much of the coal-fired power plants in the country. In January 2018, the country's National Energy Administration (NEA) announced plans to cancel 103 coal-fired plants that were planned or under construction, eliminating 120 gigawatts of future coal-fired capacity.[1] As reported by the U.S. Energy Information Administration (EIA), Chinese government policies designed to reduce air pollution drove a 47% year-on-year increase in imports of LNG (1.6 Bcf/d or approximately 38 MMT) in 2017.[2]

Although potential U.S./China trade tariffs are a complicating factor, the trade discussion between the Trump Administration and the Xi Jinping Administration have been very favorable to Alaska, since the Alaska LNG project is mutually beneficial to both countries. Success of the Alaska LNG project would immediately help to ease the imbalance of trade with China by eight

[1] https://www.nytimes.com/2017/01/18/world/asia/china-coal-power-plants-pollution.html
[2] https://www.eia.gov/todayinenergy/detail.php?id=35072

to ten billion dollars per year. As a result, and despite the ongoing trade difficulties, China has currently exempted LNG from the tariffs on U.S. products.

Many project owners realize the tremendous promise of this market, and this undoubtedly creates competition for customers and capital. However, the greenfield LNG projects all require financing due to their capital intensive nature, and therefore require customer commitments. The LNG market is not a liquid market, and new LNG capacity continues to be sanctioned and constructed only with offtake agreements in hand. Therefore, the projects that continue to pursue the customers and bring agreements to conclusion are those that will ultimately secure their own success. The high level of interest from specific large customers in the Alaska LNG project after it was first introduced to the Asian market in late 2016/early 2017 demonstrates that the project can compete, and has a good opportunity to secure financing for construction.

AGDC welcomes interaction with individual legislators and has negotiated an agreement with Legislative Legal that can be signed by legislators, legislative staff and legislative consultants. This confidentiality agreement allows access to information that must remain confidential so as to not disadvantage AGDC in ongoing negotiations.

Sincerely,

Keith Meyer
President

Attachment

Updated Alaska LNG Project Schedule July 31, 2018

Updated Alaska LNG Project Schedule
July 31, 2018

Task Name	Duration	Start	Finish
Commercial		**31-Dec-17**	**28-Jan-19**
JDA Initial Definitive Agreements	90 days	1-Jun-18	29-Aug-18
JDA Definitive Agreements	152 days	30-Aug-18	28-Jan-19
GSA Precedent Agreements	169 days	15-Mar-18	30-Aug-18
GSA Definitive Agreements	122 days	31-Aug-18	30-Dec-18
Equity LNG SPA Definitive Agreements	288 days	31-Dec-17	14-Oct-19
Legal		**1-Jan-18**	**30-Apr-19**
JDA SPA Drafting	91 days	1-May-18	30-Jul-18
Definitive GSA Drafting	149 days	1-Jan-18	29-May-18
Definitive Tolling Drafting	212 days	1-Oct-18	30-Apr-19
Corporate Documentation and Formation	136 days	1-Apr-18	14-Aug-18
Equity Participation Agreement	60 days	1-Jun-18	30-Jul-18
Equity		**15-Jun-18**	**27-Feb-20**
Equity Book Preparation	623 days	15-Jun-18	27-Feb-20
Equity Road Show Offering	107 days	15-Jun-18	29-Sep-18
Strategic Investor Offering	211 days	1-Dec-18	29-Jun-19
DOR Initial Evaluation of State Equity	152 days	1-Aug-18	30-Dec-18
Post-FID Equity Raise, Including Opportunities for Investment Of State Funds	607 days	1-Jul-18	27-Feb-20
Debt		**1-Jan-19**	**29-Apr-20**
Bank of China/Syndicate Agreement	272 days	1-Jan-19	29-Sep-19
Underwriting	212 days	1-Oct-19	29-Apr-20
Government Approval		**1-Oct-18**	**19-Apr-20**
RIK/RIV Decision and Lease Modifications	0 days	1-Feb-19	1-Feb-19
PILT Decision	0 days	1-Feb-19	1-Feb-19
CFIUS Board Approval	0 days	1-Nov-18	1-Jul-19
FID		**1-May-19**	**1-May-20**
Limited NTP	0 days	1-May-19	1-May-19
Financial Close and Full NTP	0 days	1-May-20	1-May-20
Environmental, Regulatory, & Lands		**31-Dec-17**	**27-Apr-20**
FERC EIS Schedule Notice	0 days	12-Mar-18	12-Mar-18
FERC DEIS	0 days	1-Mar-19	1-Mar-19
FERC FEIS	0 days	9-Dec-19	9-Dec-19
FERC ROD	90 days	9-Dec-19	7-Mar-20
FERC Implementation Plans	50 days	8-Mar-20	26-Apr-20
FERC NTP for Construction	1 day	27-Apr-20	27-Apr-20
Other Federal Permitting	365 days	12-Mar-18	11-Mar-19
State Permitting	500 days	1-Jul-18	12-Nov-19
Land Acquisition	545 days	31-Dec-17	28-Jun-19
GTP/PBTL		**1-May-19**	**16-Nov-25**
LSTK Contract Signed	1 day	1-May-20	1-May-20
FEED/Detailed Design	1080 days	28-Jan-19	14-Apr-22
Procurement	1890 days	1-May-19	2-Jul-24
Fabrication	2025 days	2-May-20	16-Nov-25
Enabling Works/Construction/Installation	1650 days	28-Apr-20	2-Nov-24
First GTP Gas Delivery	0 days	2-Nov-24	2-Nov-24
Main Pipeline/PTTL		**1-May-19**	**29-Dec-24**
LSTK Contract Signed	1 day	1-May-20	1-May-20
FEED/Detailed Design	720 days	28-Jan-19	19-Apr-21
Procurement	2070 days	1-May-19	29-Dec-24
Enabling Works/Construction/Installation	1650 days	28-Apr-20	2-Nov-24
Line Fill/System Ready	45 days	3-Nov-24	17-Dec-24
Pipeline System Ready	1 day	18-Dec-24	18-Dec-24
LNG Plant/Marine		**1-May-17**	**12-Nov-25**
LSTK Contract Signed	1 day	1-May-20	1-May-20
FEED/Detailed Design	1035 days	28-Jan-19	28-Feb-22
Procurement	1530 days	1-May-19	8-Jul-23
Fabrication	1800 days	2-May-20	5-Apr-25
KSH Re-Route	1095 days	1-May-17	29-Apr-20
Enabling Works/Construction/Installation	1690 days	28-Apr-20	12-Dec-24
First LNG Cargo T1	1 day	13-Mar-25	13-Mar-25