

Spectrum Alaska's Small Scale LNG Project Description

Small scale LNG is defined as LNG that is transported by truck versus large scale which is transported by ships. A truck carries about 1 MMscf of natural gas but in liquid form (about 12,000 gallons) and a ship carries about 3,000 MMscf.

Small scale LNG is now growing into a large scale business. This growth is driven by the large price differential between natural gas and distillate fuels worldwide. A significantly larger differential exists in the US due to the glut of gas production in recent years from the shale gas boom that has depressed gas prices.

Alaska's North Slope has an even greater price differential due to the added cost of diesel transportation. While the Lower-48 states may see \$4 diesel, Prudhoe Bay may be looking at \$5/gallon fuel costs. Couple this diesel price with an ample supply of stranded gas, and sufficient motivation for LNG development exists.

LNG can be substituted for diesel fuel in many applications. Since the economic driver is the price differential, the larger the user of fuel, the greater the benefit from converting that user to LNG.

LNG works well in locomotives, drilling rigs, mining trucks, power generation, heavy trucks and off pipeline distribution. Today, LNG is being used in all of these applications.

Spectrum Alaska, LLC is wholly owned by Spectrum LNG, LLC. Its purpose is to construct own and operate an LNG plant on the North Slope. This plant will provide LNG for use in any market that chooses to convert. Drilling rigs, mines, trucks, power plants, small gas distribution systems, are all potential users. Virtually anything that uses diesel can be converted to use LNG. Further, LNG can be easily converted to CNG which is becoming a very popular motor fuel for smaller vehicles.

Spectrum LNG, LLC also owns and operates another LNG plant located on the Arizona California border called Desert Gas, LP. This plant supplies about 50,000 gallons per day of LNG to the Los Angeles and Phoenix markets, mostly trucks and busses.

Spectrum's management developed another LNG plant in Alaska that they sold as part of the sale of Fairbanks Natural Gas, Co. This is an example of an "off pipeline distribution" project.

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Spectrum is led by industry veteran Ray Latchem, a self-proclaimed member of the group formally known as the “lunatic fringe” of the natural gas industry. LNG is now becoming very, very cool. Ray also led the development of two of Alaska’s natural gas distribution companies, Norgasco and FNG, and is still the largest shareholder in Norgasco.

After providing the brawn to build Colville, Inc. into the leading diesel distributor on the North Slope, Jeff Helmericks sold his interest to his partner. Jeff presided over and actually delivered much of the 20 million gallons per year they sold. After selling his interest in Colville, Jeff joined the effort to construct the Desert Gas plant in Arizona. Subsequent to that effort, he purchased an interest in Spectrum LNG and took on the role of Vice President of Engineering and Operations.

Mark Ploen began his career in the oil pollution cleanup industry on the North Slope and just offshore, monitoring the storage and handling of diesel fuel at remote drilling sites and providing clean up services to those that needed it. Mark built his consulting and equipment sales company, Qualitech Environmental, into an international response organization. He has held key roles in oil spill responses beginning with the Tanker Glacier Bay spill in the Cook Inlet in 1987 through BP’s Macondo MC252 spill in the Gulf of Mexico in 2010.

The three partners share a background in building successful businesses that deal with the delivery of gas and liquid fuels. They have also been involved with the developments at Prudhoe Bay since the 1970’s. Together, they make an excellent team to lead the North Slope’s conversion from diesel to LNG.

The company has a very versatile and capable staff that built and operates the Arizona plant. This team will be expanded as needed to support the development and operation of the Alaska plant. In addition the company employs several outside technical consultants that have all worked together with the company’s management in the past. Each consultant specializes in a particular aspect of the design, construction, and operation of the project.

A site within the Prudhoe Bay Unit, just south of Flow Station #3 has been selected for the LNG plant. The State of Alaska owns the land and Spectrum has filed a lease application with the State Pipeline Coordinator’s Office, a division of the Department of Natural Resources. Spectrum has also filed an application with the Regulatory Commission of Alaska for a Common Carrier Certificate for its short gas supply pipeline.

Numerous other permits are needed and are being or will be applied for in a timely manner.

Plant site selection was based on several criteria. Proximity to market and gas supply, and safe distances from neighbors are some of the key considerations.



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The site is within 1,100 feet of a large gas supply. It is 1,550 feet away from the closest structure and it is a normally unmanned flare manifold building. Natural boundaries of roads, lakes, power lines, and pipelines will likely preclude additional development in the immediate area.

While there is an ample supply of gas at Prudhoe Bay, it is of a very poor quality. Most gas sales agreements contain the phrase “as produced” in the Gas Quality section of the agreement. It does not meet the quality standards for any gas transmission pipeline system. While it does burn well, it will not liquefy well. A significant investment in gas treating upstream of the LNG process is required. The Spectrum plant will employ CO₂, H₂S, NGL, and water removal processes upstream of the LNG production process. This adds to both the CAPEX and OPEX of the project.

The plant will be built in phases. The first phase will include:

1. A tie in connection, pipeline, and metering facility that can deliver the gas needed to produce up to 400,000 gallons per day of LNG.
2. The front end treatment equipment for a 400,000 gallon per day plant.
3. A single LNG storage tank and truck loading bay.
4. A single LNG “train” that can liquefy up to 100,000 gallons per day.
5. Space for more tanks, truck loading bays, and 3 more LNG trains on a 15 acre site.
6. A maintenance shop.
7. Office and man camp building.

The estimated cost for the first phase is \$30 million. The schedule is to lay gravel in the summer of 2013 and construct phase one of the plant in either the Fall of 2013 or the Spring/Summer of 2014. Aside from the field erected camp, shop, and control room, the majority of the processing equipment will be pre-assembled in truckable modules. Some of the processing equipment has already been purchased. The build out schedule will be market driven, as demand increases, additions will be made to the plant to accommodate the demand.

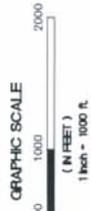
Attached are three drawings showing the plant site, conceptual facility layout for the first phase of development and a layout for the built out plant.



PAD POINT TABLE NAD27 ASP ZONE 4			
POINT	NORTH	EAST	ITEM
1	5942226.27	677112.69	Pad Cor
2	5942499.75	677864.50	Pad Cor
3	5941747.94	678137.97	Pad Cor
4	5941474.47	677386.17	Pad Cor

SECTION CORNER TABLE NAD27 ASP ZONE 4			
POINT	NORTH	EAST	ITEM
NE	5945771.93	681583.63	SEC. COR.
SE	5940494.36	681718.31	SEC. COR.
SW	5940368.93	676440.13	SEC. COR.
NW	5945646.51	676305.48	SEC. COR.

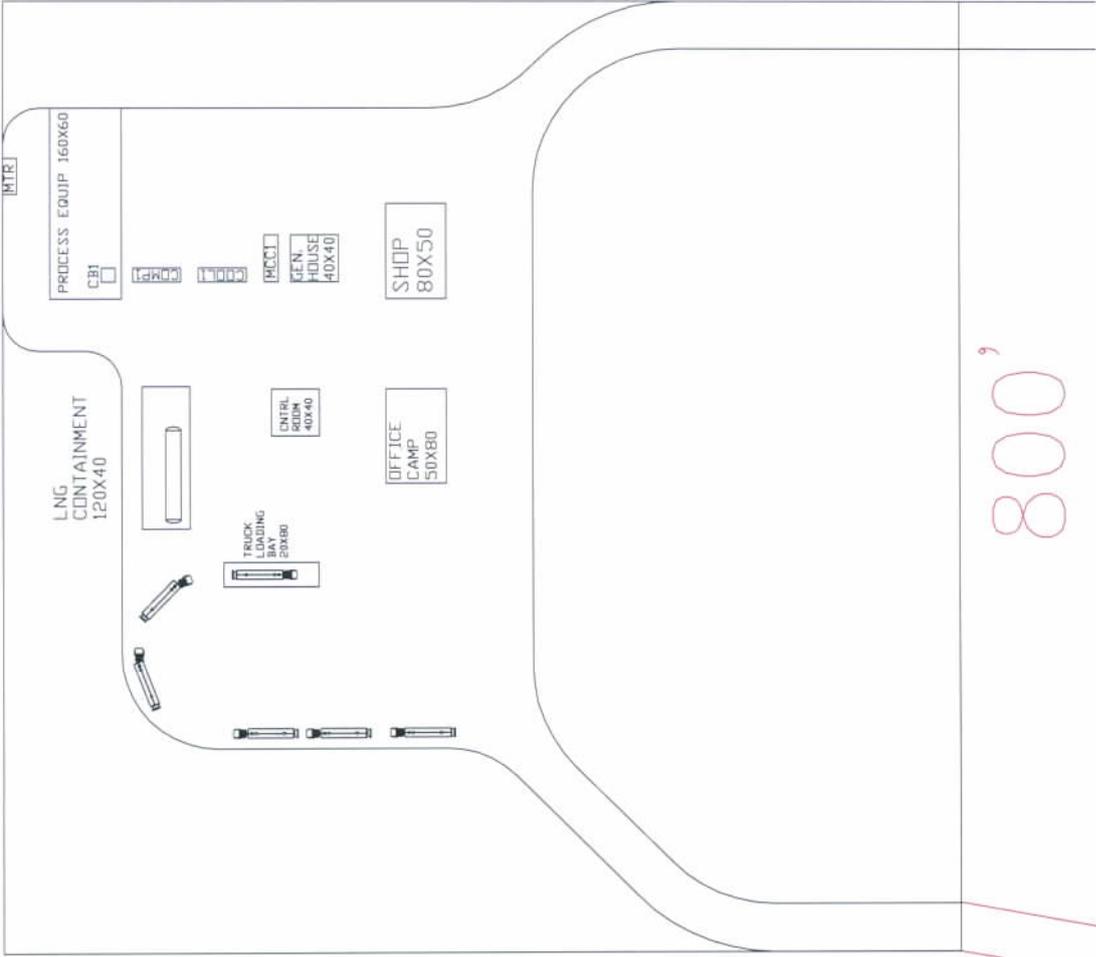
NOTES:
 1. PHOTOGRAPHY FROM GOOGLE EARTH.
 2. THE PROPOSED PAD AND PIPELINE ARE LOCATED WITHIN THE WEST HALF (1/2) OF SECTION 3, TOWNSHIP 10 NORTH, RANGE 14 EAST, U.M.



REV	DATE	ISSUED FOR INFORMATION	REVISION	BY	DATE															
00	07/27/21																			
01	07/27/21	ADDED COORDINATES	CS5																	
02	07/27/21	ADDED GAS SUPPLY LINE	CS5																	
03	07/27/21	ADDED GAS SUPPLY LINE & END PNT COORDS	CS5																	
04	07/27/21	ADDED SECTION, TOWNSHIP & RANGE INFO	CS5																	

ENGINEERING REVISION	DATE	BY	DATE
CS5	07/27/21		

TITLE OF DRAWING	SPECTRUM ALASKA LNG PLANT
PROJECT	PRUDHOE BAY SITE
WORK PACKAGE	FRB12 EMISC 08 04
SCALE	1" = 1000'
DESIGNER	SPECTRUM ALASKA, LLC
CHECKER	SPECTRUM ALASKA, LLC
DATE	08/04/21
PROJECT NO.	FRB12 EMISC 08 04
DRAWING NO.	001
TOTAL SHEETS	001



PROCESS EQUIP 160X60
C.B.T.
MTR

LNG CONTAINMENT 120X40

TRUCK LOADING BAY 20X80

ENTRAL HOUSE 40X40

OFFICE CAMP 50X80

SHOP 80X50

GEN HOUSE 40X40

MCC

800'

800'

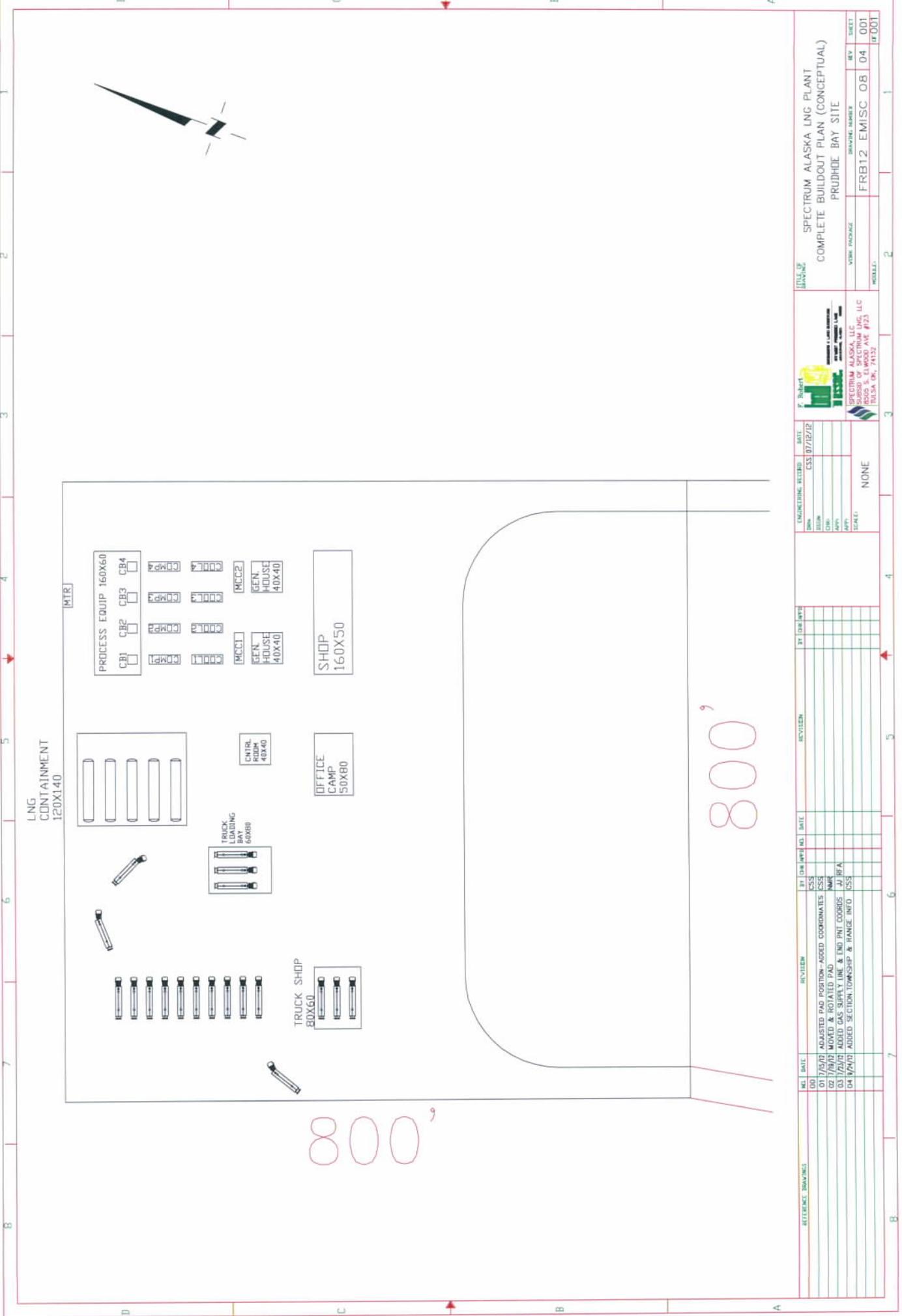


REV	DATE	REVISION	BY	CHK	DATE	REVISION	BY	CHK	DATE
01	7/10/17	ADJUSTED PAD POSITION-ADDED COORDINATES	CS						
02	7/10/17	MOVED & ROTATED PAD	CS						
03	7/20/17	ADDED GAS SUPPLY LINE & END PNT COORDS	JJ	IRA					
04	7/20/17	ADDED SECTION TOWNSHIP & RANGE INFO	CS						

ENGINEERING RECORD	DATE	SCALE	APP.
CS	07/27/17		
NONE			

TITLE OF DRAWING	SHEET
SPECTRUM ALASKA LNG PLANT PHASE 1 BUILDOUT PLAN (CONCEPTUAL) PRUJHJE BAY SITE	04
VERSION	REV
FRB12	EMISC 08
NO. OF SHEETS	TOTAL SHEETS
1	1

PROJECT NAME	PROJECT NO.
SPECTRUM ALASKA, LLC	FRB12
CLIENT	DATE
SURFACE OF SPECTRUM LNG, LLC	08/14/17
ADDRESS	
1000 S. T. WOOD AVE #123	
CITY	
INDIANA, IN 46132	



REV.	DATE	BY	CHK	DATE	BY	CHK	DATE	BY	CHK	DATE	BY	CHK
01	12/15/20	ADJUSTED PAD POSITION-ADDED COORDINATES	SSS									
02	1/15/21	ADDED PAD MODEL & ROTATED PAD	SSS									
03	1/20/21	ADDED GAS SUPPLY LINE & END PNT COORDS	JJ RFA									
04	2/24/21	ADDED SECTION TOWNSHIP & RANGE INFO	SSS									

ENGINEERING REVIEWED	DATE	SCALE
SSS	07/12/21	NONE
CHK		
APP		
SEAL		

TITLE OF DRAWING	DATE	SCALE
SPECTRUM ALASKA LNG PLANT COMPLETE BUILDOUT PLAN (CONCEPTUAL) PRUDHUE BAY SITE		

NO.	DATE	BY	CHK
FRB12	EMISC	08	04

NO.	DATE	BY	CHK
001			

SPECTRUM ALASKA, LLC
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