U.S. DEPARTMENT OF TRANSPORTATION
PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION
Mainline Block Valve Spacing
Special Permit Analysis and Findings

Special Permit Information:

Docket Number:	PHMSA-2017-0045
Requested By:	Alaska Gasline Development Corporation
Operator ID#:	40015
Original Date Requested:	April 14, 2017
Original Issuance Date:	September 9, 2019
Effective Dates:	September 9, 2029
Code Section(s):	49 CFR 192.179(a)(4)

Purpose:

The Pipeline and Hazardous Materials Safety Administration (PHMSA)[1] provides information to describe the facts of the subject special permit application submitted by the Alaska Gasline Development Corporation (AGDC), owner and operator of the Alaska LNG Pipeline,[2] to discuss any relevant public comments received with respect to the application for a special permit, to present the engineering/safety analysis, and to make public the findings regarding whether the requested special permit should be granted and if so under what conditions. AGDC requested a special permit for the Alaska LNG Pipeline to waive compliance from 49 Code of Federal Regulations (CFR) 192.179(a)(4) for sectionalizing mainline block valve spacing in Class 1 locations in Alaska.

[1] Throughout this special permit the usage of "PHMSA" or "PHMSA OPS" means the U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration Office of Pipeline Safety.

[2] Alaska LNG Pipeline refers to the approximately 807 miles of 42-inch natural gas transmission pipeline and not to any potential owners, operators, or entities associated with the Alaska LNG Pipeline. The special permit owner, operator, and applicant/permittee is Alaska Gasline Development Corporation. Please note that this pipeline does not transport liquefied natural gas (LNG). It will supply natural gas to a LNG facility for further transportation as LNG.

Pipeline System Affected:

The Alaska LNG Pipeline will be approximately 807 miles of 42-inch-diameter steel pipe for transporting natural gas from AGDC's gas treatment plant (GTP) on Alaska's North Slope to the liquefaction facility on the eastern shore of the Cook Inlet near Nikiski, Alaska. The pipeline will be mostly onshore, with a segment of offshore pipeline crossing the Cook Inlet. The onshore portion of the pipeline will be a buried pipeline except for short, above-ground special design segments, such as aerial water crossings and aboveground fault crossings. The Alaska LNG Pipeline's design has a maximum allowable operating pressure (MAOP) of 2,075 pounds per square inch gauge (psig).

AGDC is requesting a waiver of compliance of 49 CFR 192.179(a)(4) for remote, sparsely populated segments along the 42-inch pipeline route. AGDC's special permit request is specifically for the Class 1 location segments.[3]

Federal pipeline safety regulations require natural gas transmission pipeline operators to have sectionalizing block valves within 10 miles of each point on the pipeline (or no more than 20 miles between sectionalizing mainline valves) in a Class 1 location. AGDC's request allows for a valve spacing greater than 20 miles in Class 1 locations but requires all mainline block valves to be either remote controlled valves (RCVs) or automatic shut-off valves (ASVs).

Special Permit Request:

AGDC requested increased spacing of sectionalizing mainline block valves along the ***special permit segment*** as follows:

> **Transmission Line Valves:** Sectionalizing block valves along the ***special permit segment*** must be spaced as shown in Tables 1 and 2[4] and as follows for class location segments:
>
> a) Class 1 locations north of Fairbanks from Mile Post 0.00 to Mile Post 422 must have a 50-mile maximum sectionalizing block valve spacing between block valves (each point on the pipeline must be within 25 miles of a sectionalizing block valve).

[3] 49 CFR 192.5 defines Class location units and class 1, 2, 3, and 4 locations.

[4] If AGDC determines that the sectionalizing block valve spacing or operational controls (RCV or ASV) as shown in Table 1 need to be modified, AGDC must submit proposed changes to the conditions and Table 1 to PHMSA's Western Region Director or PHMSA Project Designee for review, and a "no objection" letter must be received prior to the change by AGDC.

b) Class 1 locations south of Fairbanks from Mile Post 422 to Mile Post 807 must have a 30-mile maximum sectionalizing block valve spacing between block valves (each point on the pipeline must be within 15 miles of a sectionalizing block valve).
c) Class 2, 3, and 4 locations between Mile Post 0.00 to Mile Post 807 must comply with the requirements of 49 CFR 192.179.
d) High consequence areas (as defined in 49 CFR 192.903 and 192.905) located in Class 1 and 2 locations, must comply with the requirements of 49 CFR 192.179.

PHMSA designed a comprehensive set of special permit conditions that AGDC is required to implement in order to operate the 42-inch diameter pipeline with an increased mainline block valve spacing. An overview of the special permit condition topics is in the Operational Integrity Compliance section of this document. The special permit conditions were based upon pipeline safety considerations for the 49 CFR Part 192 sections that AGDC was seeking relief for an alternative mainline block valve spacing.

The usage of remote controlled valves (RCVs) and automatic shut-off valves (ACVs) will reduce the time to isolate a pipeline segment should there be a rupture on the pipeline. In remote locations where it could take over 1 hour to isolate a pipeline segment, the Alaska LNG Pipeline will be able to isolate a pipeline segment in less than 35 minutes. The time to isolate a mainline block valve (MLBV) along the special permit segment is shown in Table 2 - MLBV Locations with Approximate Valve Closure Time and Gas Released.

Special Permit Segment:

State of Alaska

The Alaska LNG Pipeline ***special permit segmen***t is defined as: approximately 807 miles of 42-inch diameter pipeline originating in the North Slope Borough, traversing the Yukon-Koyukuk Census Area, the Fairbanks North Star Borough, the Denali Borough, the Matanuska-Susitna Borough, and the Kenai Peninsula Borough. The ***special permit segment*** terminates at the liquefaction facility on the shore of the Cook Inlet near Nikiski, Alaska.

The special permit allows alternative mainline valve placement in Class 1 locations on the 42-inch ***special permit segmen***t with the implementation of the special permit conditions.

Public Notice:

On May 28, 2019, PHMSA published a special permit request in the Federal Register (84 FR 24594) for public comment. The public comment period ended on July 29, 2019, and PHMSA reviewed and considered all comments received through July 29, 2019. The special permit application from AGDC, pipeline route maps, public comments, final environmental assessment and finding of no significant impact, and special permit conditions are available in Docket No. PHMSA-2017-0045 at: www.regulations.gov.

PHMSA Overall Response and Considerations of Public Safety Concerns:

PHMSA published a Notice of Availability in the Federal Register on May 28, 2019, for four (4) special permit requests for the line pipe of the Alaska LNG Pipeline. (84 FR 24594, Docket Nos.: PHMSA-2017-0046, Usage of 3LPE Coating; PHMSA-2017-0044, Usage of Strain Based Design; PHMSA-2017-0045, Alternative Mainline Block Valve Spacing; and PHMSA-2017-0047, Usage of Crack Arrestor Spacing at www.Regulations.gov.) PHMSA requested comment on the special permit applications, the draft permit conditions, and the draft environmental analyses. The public notice comment period ended on July 29, 2019, and PHMSA reviewed and considered all comments received through July 29, 2019. PHMSA received a public comment concerning usage of fossil fuels, the building of the Alaska LNG Pipeline, and the building of a liquified natural gas (LNG) facility. PHMSA does not have siting authority over pipeline facilities. The public comment received did not submit concerns directed towards the special permit, the environmental assessment, or the special permit conditions, which were the issues within PHMSA's decision making authority and the intent of the public notice.

Operational Integrity Compliance:

PHMSA has reviewed this special permit request to ensure that integrity threats to the pipeline in the ***special permit segment*** are addressed in the operator's operations and management plan (O&M Procedures and specifications). PHMSA carefully designed a comprehensive set of conditions that AGDC is required to implement in order to operate the Alaska LNG Pipeline with increased mainline block valve spacing in Class 1 locations.

The special permit conditions are summarized by topic in the below list. The full conditions can be reviewed in their entirety in the special permit, which can be reviewed on Docket PHMSA-2017-0045 at www.regulations.gov.

1) Applicable Regulations
2) Maximum Allowable Operating Pressure
3) Transmission Line Valves
4) Valve Monitoring, Control and Closure
5) Mainline Valve Locations
6) Emergency Operations
7) Emergency Training and Planning
8) Annual Reports
9) Notifications
10) Certification
11) Changes to Special Permit Conditions
12) Limitations

Past Enforcement History:

AGDC has no gas transmission pipeline operating history or enforcement history with PHMSA.

Findings:

Based on the information submitted by AGDC and PHMSA's analysis of technical, operational, and safety issues, and given the conditions that will be imposed in the special permit, PHMSA finds that granting this special permit to AGDC to operate the Alaska LNG Pipeline ***special permit segment*** at increased mainline block valve spacing intervals and with either RCVs or ASVs will not be inconsistent with pipeline safety.

Completed in Washington DC on: September 9, 2019

Prepared By: PHMSA – Engineering and Research Division

Figure 1: ALASKA LNG Pipeline Route

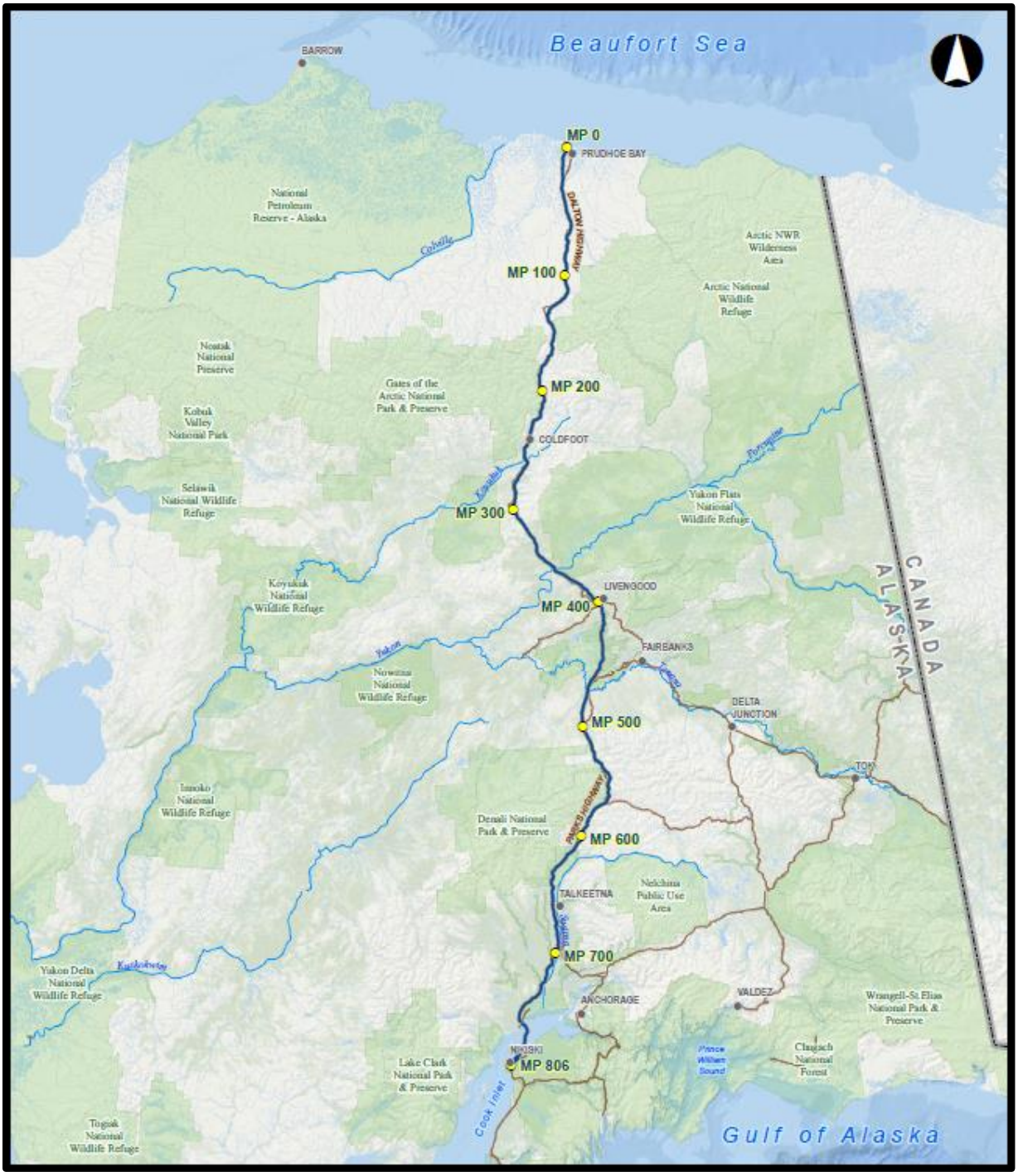

Table 1: Mainline Valve Locations for Alaska LNG Pipeline with High Consequence Areas (HCAs), Bridges, and Railroad Locations

MLBV #	MP	Δ MP, miles	Location Description	Valve Type	Class Location(s)	HCA Yes/No
1	0.00		GTP Meter Station	RCV	1	No
2	36.74	36.74	Stand-alone MLBV - Potential Station	ASV	1	No
3	75.97	39.23	Compressor Station - Sagwon	RCV	1	No
4	112.04	36.07	Stand-alone MLBV - Potential Station	ASV	1	No
5	148.51	36.47	Compressor Station - Galbriath Lake	RCV	1	No
6	194.09	45.58	Stand-alone MLBV - Potential Station	ASV	1	No
6	194.09	45.58	Stand-alone MLBV - Potential Station	ASV	1	No
	236.08 to 237.33	1.25	HCA – Marion Campground – 1.25 miles		1	Yes
7	240.10	46.01	Compressor Station - Coldfoot	RCV	1	No
8	286.05	45.95	Stand-alone MLBV - Potential Station	ASV	1	No
9	332.64	46.59	Compressor Station - Ray River	RCV	1	No
	352.21 to 353.35	1.14	HCA - Hotspot Café		1	Yes
9a	356.22	23.58	Added for potential “Hotspot Café” HCA	ASV	1	No
10	377.95	21.73	Stand-alone MLBV - Potential Station	ASV	1	No
11	421.56	43.61	Compressor Station - Minto	RCV	1	No
12	444.90	23.34	Stand-alone MLBV	ASV	1	No
13	467.10	22.20	Stand-alone MLBV - Potential Station	ASV	1	No
14	492.96	25.86	Stand-alone MLBV	ASV	1	No
15	517.62	24.66	Compressor Station - Healy	RCV	1	No
	529.21 to 530.44	1.23	HCA – RV Park and Hotel – 1.23 miles		1	Yes
	532.07		Alaska Railroad Crossing		1	No
	532.13		Nenana River Bridge Crossing		1	No
16	534.79	17.17	Upstream of Class 3 Location - Nenana Canyon	ASV	1	No
	535.54 to 535.99	0.45	HCA - Denali Riverside RV Park, McKinley Chalet Resort, Denali Rainbow Village and RV, Denali Princess Wilderness Lodge, Denali Crows Nest Cabins, Grand Denali Lodge, and Denali Bluffs Hotel – 2.20 miles		1	Yes
	535.99 to 536.49	0.50	HCA - Denali Riverside RV Park, McKinley Chalet Resort, Denali Rainbow Village and RV, Denali Princess Wilderness Lodge, Denali Crows Nest Cabins, Grand Denali Lodge, and Denali Bluffs Hotel – 2.20 miles		3	Yes

Table 1: Mainline Valve Locations for Alaska LNG Pipeline with High Consequence Areas (HCAs), Bridges, and Railroad Locations

MLBV #	MP	Δ MP, miles	Location Description	Valve Type	Class Location(s)	HCA Yes/No
	536.49 to 537.74	1.25	HCA - Denali Riverside RV Park, McKinley Chalet Resort, Denali Rainbow Village and RV, Denali Princess Wilderness Lodge, Denali Crows Nest Cabins, Grand Denali Lodge, and Denali Bluffs Hotel – 2.20 miles		1	Yes
	537.79		Lynx Creek Bridge Crossing		1	Yes
17	538.79	4.00	Downstream of Class 3 Location - Nenana Canyon	ASV	1	No
18	546.50	7.71	Stand-alone MLBV - Potential Station	ASV	1	No
	551.34 to 552.27	0.93	HCA – Denali Perch Resort – 0.93 miles		1	Yes
	565.77 to 567.23	1.46	HCA – DOT/PF Cantwell Station – 1.46 miles		1	Yes
19	572.23	25.73	Stand-alone MLBV	ASV	1	No
	572.79		Alaska Railroad Crossing		1	No
	588.07		Alaska Railroad Crossing		1	No
20	597.35	25.12	Compressor Station - Honolulu Creek	RCV	1	No
	609.02		Alaska Railroad Crossing		1	No
21	625.83	28.48	Stand-alone MLBV	ASV	1	No
	629.75 to 631.35	1.60	HCA – Byers Lake Campground (73 units) – 1.60 miles		1	Yes
	633.75 to 634.50	0.75	HCA – Trappers Creek Pizza Club – 0.75 miles		1	Yes
22	648.16	22.33	Stand-alone MLBV - Potential Station	ASV	1	No
23	675.24	27.08	Compressor Station - Rabideux Creek	RCV	1	No
24	703.67	28.43	Stand-alone MLBV - Potential Station	ASV	1	No
25	725.93	22.26	Stand-alone MLBV - Potential Station	ASV	1	No
26	749.11	23.18	Heater Station - Theodore River	RCV	1	No
27	766.01	16.90	Upstream of Cook Inlet crossing	ASV	1	No
28	793.34	27.33	Downstream of Cook Inlet crossing	RCV	1	No
	797.71 to 798.65	0.94	HCA – Nikiski Middle/High School, Kenai Heliport, Commercial Buildings, and Industrial Sites – 1.57 miles		1	Yes
	798.65 to 799.28	0.63	HCA – Nikiski Middle/High School, Kenai Heliport, Commercial Buildings, and Industrial Sites – 1.57 miles		2	Yes
	799.28 to 801.27	1.99			2	No
29	799.85	6.51	Stand-alone MLBV - Potential Class 2 Location	RCV	2	No
	803.39 to 803.78	0.39	HCA – Conoco Phillips Property and Tesoro Kenai Refinery – 2.66 miles		1	Yes

Table 1: Mainline Valve Locations for Alaska LNG Pipeline with High Consequence Areas (HCAs), Bridges, and Railroad Locations						
MLBV #	**MP**	**Δ MP, miles**	**Location Description**	**Valve Type**	**Class Location(s)**	**HCA Yes/No**
	803.78 to 806.05	2.27	HCA – Conoco Phillips Property and Tesoro Kenai Refinery – 2.66 miles		2	Yes
	806.05 to 806.25	0.20			2	No
30	806.57	6.72	LNG Meter Station	RCV	1	No

Table 2 - MLBV Locations with Approximate Valve Closure Time and Gas Released						
MLBV #	**MP**	**ΔMP**	**Location Description**	**Valve Type**	**Approximate Closure Time (minutes)[5]**	**Approximate Mass of Gas Released (tons)[6]**
1	0.00		GTP Meter Station	RCV	10.7	14,600
2	36.74	36.74	Stand-alone MLBV - Potential Station	ASV	28.6	14,600
					29.9	15,300
3	75.97	39.23	Compressor Station - Sagwon	RCV	10.7	15,300
					10.7	14,400
4	112.04	36.07	Stand-alone MLBV - Potential Station	ASV	28.3	14,400
					28.5	14,500
5	148.51	36.47	Compressor Station - Galbriath Lake	RCV	10.7	14,500
					10.7	17,000
6	194.09	45.58	Stand-alone MLBV - Potential Station	ASV	33.1	17,000
					33.3	14,600
7	240.10	46.01	Compressor Station - Coldfoot	RCV	10.7	14,600
					10.7	17,100
8	286.05	45.95	Stand-alone MLBV - Potential Station	ASV	33.3	17,100
					33.6	17,200
9	332.64	46.59	Compressor Station - Ray River	RCV	10.7	17,200
					10.7	16,900
9A	356.22	23.58	Added for potential "Hotspot Café" HCA	ASV	20.5	11,300
					23.7	11,500
10	377.95	21.78	Stand-alone MLBV - Potential Station	ASV	32.9	16,900
					32.1	16,500

[5] Closure time is the total time measured from leak detection to complete valve closure and full interruption of flow.

[6] The mass of gas released is based on a rupture occurring between the adjacent valves using the closure times of the upstream and downstream valves. Based on the Alaska LNG Pipeline gas composition, there are 45,148 cubic feet per ton.

Table 2 - MLBV Locations with Approximate Valve Closure Time and Gas Released						
MLBV #	**MP**	**ΔMP**	**Location Description**	**Valve Type**	**Approximate Closure Time (minutes)[5]**	**Approximate Mass of Gas Released (tons)[6]**
11	421.56	43.61	Compressor Station - Minto	RCV	10.7	16,500
					10.7	10,200
12	444.90	23.34	Stand-alone MLBV	ASV	21.8	10,200
					20.4	11,200
13	467.10	22.20	Stand-alone MLBV - Potential Station	ASV	20.4	11,200
					22.7	12,700
14	492.96	25.86	Stand-alone MLBV	ASV	22.7	12,700
					22.5	10,700
15	517.62	24.66	Compressor Station - Healy	RCV	10.7	10,700
					10.7	7,800
16	534.79	17.17	Upstream of Class 3 Location - Nenana Canyon	ASV	18.7	7,800
					9.3	2,300
17	538.79	4.00	Downstream of Class 3 Location - Nenana Canyon	ASV	9.3	2,300
					11.6	4,400
18	546.50	7.71	Stand-alone MLBV - Potential Station	ASV	11.6	4,400
					22.6	12,700
19	572.23	25.73	Stand-alone MLBV	ASV	22.6	12,700
					22.7	10,800
20	597.35	25.12	Compressor Station - Honolulu Creek	RCV	10.7	10,800
					10.7	12,000
21	625.83	28.48	Stand-alone MLBV	ASV	24.4	12,000
					20.5	11,300
22	648.16	22.33	Stand-alone MLBV - Potential Station	ASV	20.5	11,300
					23.7	11,500
23	675.24	27.08	Compressor Station - Rabideux Creek	RCV	10.7	11,500
					10.7	12,000
24	703.67	28.43	Stand-alone MLBV - Potential Station	ASV	24.4	12,000
					20.5	11,300
25	725.93	22.26	Stand-alone MLBV - Potential Station	ASV	20.5	11,300
					21.8	10,100
26	749.11	23.18	Heater Station - Theodore River	RCV	10.7	10,100
					10.7	7,700
27	766.01	16.90	Upstream of Cook Inlet crossing	ASV	18.6	7,700
					23.6	13,300
28	793.34	27.33	Downstream of Cook Inlet crossing	RCV	23.6	13,300
					10.9	3,700
29	799.85	6.51		RCV	10.9	3,700

Table 2 - MLBV Locations with Approximate Valve Closure Time and Gas Released						
MLBV #	**MP**	**ΔMP**	**Location Description**	**Valve Type**	**Approximate Closure Time (minutes)[5]**	**Approximate Mass of Gas Released (tons)[6]**
			Stand-alone MLBV - Potential Class 2 Location		13.4	3,300
30	806.57	6.72	LNG Meter Station	RCV	10.7	3,300