

**BAKER DONELSON**  
BEARMAN, CALDWELL & BERKOWITZ, PC

BAKER DONELSON CENTER, SUITE 800  
211 COMMERCE STREET  
NASHVILLE, TENNESSEE 37201

MAILING ADDRESS:  
P.O. BOX 190613  
NASHVILLE, TENNESSEE 37219

PHONE: 615.726.5600  
FAX: 615.726.0464

www.bakerdonelson.com

KLINTON WEST ALEXANDER, OF COUNSEL  
Direct Dial: 615.726.5698  
Direct Fax: 615.744.5698  
E-Mail Address: kalexander@bakerdonelson.com

January 28, 2014

Mr. Jeff Derouen  
Kentucky Public Service Commission  
P.O. Box 615  
211 Sower Boulevard  
Frankfort, KY 40602-0615

RECEIVED

JAN 29 2014

PUBLIC SERVICE  
COMMISSION

VIA FEDERAL EXPRESS

Re: *Application of Navitas KY NG, LLC/Certificate of Public Convenience and Necessity for Its Pipeline Construction Work Plan in Clinton, County, Kentucky*

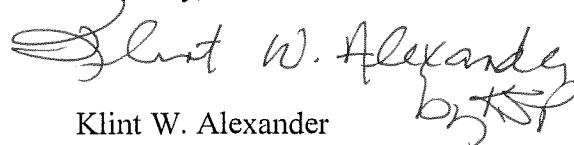
Dear Mr. Derouen:

Enclosed please find Application of Navitas KY NG, LLC for a Certificate of Public Convenience and Necessity for Its Pipeline Construction Work Plan in Clinton County, Kentucky, which we respectfully request that you file.

We request that you send a file-stamped copy back to us in the enclosed self-addressed, postage paid envelope.

Thank you in advance for your attention to this matter.

Sincerely,

  
Clint W. Alexander

KWA:ksp

Enclosures

N KWA 1012828 v1  
2927711-000001 01/28/2014

RECEIVED

JAN 29 2014

PUBLIC SERVICE  
COMMISSION

COMMONWEALTH OF KENTUCKY  
BEFORE THE PUBLIC SERVICE COMMISSION

APPLICATION OF NAVITAS KY NG, LLC )  
FOR A CERTIFICATE OF PUBLIC )  
CONVENIENCE AND NECESSITY FOR )  
ITS PIPELINE CONSTRUCTION )  
WORK PLAN IN CLINTON COUNTY, )  
KENTUCKY )

CASE NO. \_\_\_\_\_

APPLICATION

COMES NOW, Applicant Navitas KY NG, LLC, by and through counsel, and hereby requests an order by the Public Service Commission (the "Commission") granting it the issuance of a Certificate of Public Convenience and Necessity (CPCN) for the construction of a pipeline to transport natural gas from its existing Albany, Kentucky LDC natural gas pipeline to the Keystone chicken processing plant located at 2294 Ky Hwy, 90 East, Albany, Clinton County, Kentucky 42602 (hereinafter the "Keystone Pipeline Project") pursuant to KRS 278.020 and 807 KAR 5:001. In support of this Application, Navitas would show unto the Commission as follows:

1. Navitas KY NG, LLC (hereinafter referred to as "Navitas") is a Kentucky limited liability company with its principal place of business located at 3186-D Airway Avenue, Costa Mesa, California 92626. A certified copy of the Articles of Organization and Navitas' corporate structure were submitted with the Company's first Joint Application with Gasco Distribution Systems, Inc. for Approval of an Acquisition of Ownership and Control of Gas Utility Systems in 2010 (Case No. 2010-00468). Navitas is in the business of distributing and selling natural gas to residential, agricultural and industrial customers in Albany, Clinton County, Kentucky. At present, Navitas has approximately 125 customers in

Kentucky. Its utility operations and its rates, services, practices and charges in connection therewith are subject to general regulation by the Commission.

2. The Commission has jurisdiction over this matter pursuant to KRS 278.010 *et seq.*, 807 KAR 5:001.

3. In February 2011, the Commission entered an Order approving the transfer of control and authority of Gasco Distribution Systems, Inc.'s gas utility system to Navitas, including the authority to provide utility services deriving from its Certificate of Public Convenience and Necessity, in Albany, Clinton County, Kentucky.

4. This request of a new CPCN is in connection with the construction of a pipeline to transport natural gas from Navitas' existing Albany, Kentucky LDC natural gas pipeline to the Keystone chicken processing plant located at 2294 Ky Hwy, 90 East, Albany, Clinton County, Kentucky 42602.

5. In 2013, Navitas hired Bell Engineering of Lexington, Kentucky to prepare a study of the pipeline proposal and make recommendations with regard to the Keystone project. A true and exact copy of the study (Phases 1 & 2) is affixed hereto as **Exhibit A**.

6. On or about November 30, 2013, Navitas entered into a Transportation Agreement (the "Agreement") with Equity Group - Kentucky Division LLC (hereinafter referred to as "Keystone") to construct the pipeline in exchange for and in consideration of Keystone's commitment to pre-pay a portion of the costs of transporting a specified amount of natural gas along and through the pipeline. The cost of the pipeline construction project is ONE MILLION SIX HUNDRED THOUSAND DOLLARS (\$1,600,000.00). A true and exact copy of the executed Transportation Agreement is affixed hereto as **Exhibit B**.

7. The Keystone pipeline will be connected to the Keystone Plant at the Gas Delivery Point. Natural gas transported through the pipeline for delivery to the Keystone Plant shall be delivered to, and custody thereof shall be transferred to Keystone at the Gas Delivery Point, wherein Keystone will take possession, custody and control of, and be solely responsible for the handling of all such natural gas once it passes through the Gas Delivery Point. Ex. B, ¶ 3.3. A detailed description of the precise route including the construction plans, documents and specifications are being prepared by a Kentucky engineering firm in coordination with right-of-way acquisition.

8. At this time, Navitas does not foresee the need to obtain any crossing permits for railroads or waterways. Navitas anticipates the need for Kentucky Department of Transportation (KDOT) permits for highway crossings and rights-of-way. Navitas anticipates that KDOT will be supportive of the project and will approve any permit requests following its application for approval of the CPCN. Additionally, Navitas will be procuring private rights-of-way as required. Navitas seeks to secure Public Service Commission approval of the CPCN prior to expending funds on right-of-way procurement.

9. The project will be financed with a construction loan during the build out of the pipeline. Upon completion of the pipeline, an additional "take-out" loan will be consolidated with the construction loan, the terms of which are 6% interest (fixed for five years) and twenty years fully amortizing (a loan structure approved by the PSC during the Navitas acquisition of the Gasco assets in 2010). Both of these loans will be backed by the Transportation Agreement collateral which includes a \$624,000.00 cash balance to be placed at the lending institution.

10. Navitas estimates that the total cost (wages, burden, training, tooling, officing, etc.) of hiring an additional employee to operate the pipeline following the completion of construction is approximately \$100,000.00. The figure is adjusted by reducing certain costs already incurred in the area as well as a final determination of operational requirements.

11. Navitas will be the owner and operator of the pipeline and all payments required under the Agreement will be paid by Keystone to Navitas. Bidding for the construction contracts is not anticipated until after the issuance of the CPCN and will occur in two phases. Navitas will require the construction contractor to be OQ Certified as a condition of bidding on the project.

12. The potential impact of the Keystone Pipeline Project on Navitas' customers is minimal. Keystone is providing security to Navitas for the construction of the pipeline, and Navitas will operate the pipeline to provide natural gas to the Keystone Plant.

13. Approving the CPCN for the Keystone Pipeline Project is in the public interest and will enhance the rural communities in which Navitas serves by providing affordable natural gas service to one of Albany's largest employers. The cost savings to the company and the expansion of Navitas' customer base will have a positive ripple effect for the community at large by ensuring the longevity and continued operation of both companies in South Central, Kentucky. To date, there has been little or no opposition to the pipeline project, especially by those residents who may be impacted by the actual construction of the pipeline on or near their property.

14. Prior to the filing of this Application, Navitas has met with the Albany Mayor's office and county officials to discuss and obtain their approval for the pipeline

project. Navitas also has notified PSC staff of the project and it was determined that a CPCN would be required to construct the pipeline pursuant to KRS 278.020 and 807.

15. Notices and Communications regarding the Application should be sent to:


Klint W. Alexander  
BAKER, DONELSON, BEARMAN, CALDWELL & BERKOWITZ, PC  
Baker Donelson Center  
211 Commerce Street, Suite 800  
Nashville, TN 37201  
T: 615.726.5600  
kalexander@bakerdonelson.com  
*Counsel for Navitas KY NG, LLC*

**WHEREFORE**, Navitas respectfully requests the Commission to issue an Order:

1. Granting the issuance of a Certificate of Public Convenience and Necessity (CPCN) to Navitas to construct a pipeline from its existing Albany, Kentucky LDC natural gas pipeline to the Keystone plant located at 2294 Ky Hwy, 90 East, Albany, Clinton County, Kentucky 42602 pursuant to KRS 278.020 and 807 KAR 5:001; and
2. Granting such other relief as the Commission may determine to be fair, just and equitable in the premises.

Dated this the 28<sup>th</sup> day of January, 2014.

Respectfully submitted,

  
Klint W. Alexander (BPR #88343)  
BAKER, DONELSON, BEARMAN, CALDWELL  
& BERKOWITZ, PC  
Baker Donelson Center  
211 Commerce Street, Suite 800  
Nashville, TN 37201  
T: 615.726.5600  
F: 615.726.0464  
*Counsel for Navitas KY NG, LLC*

**VERIFICATION OF NAVITAS KY NG, LLC**

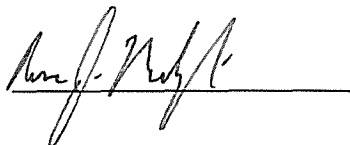
STATE OF CALIFORNIA        )  
  )  
  )        ss.  
COUNTY OF ORANGE        )

I, Thomas Hartline, Secretary of Navitas KY NG, LLC, being duly sworn according to law, makes oath and affirm that I have read the foregoing documentation, know the contents thereof, and that the same is true to the best of my knowledge, information and belief.

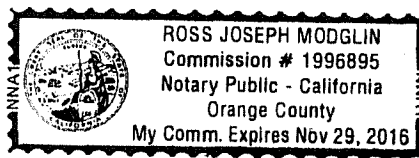
  
\_\_\_\_\_  
THOMAS HARTLINE

Subscribed and sworn to me on this the 22 day of January, 2014, by Thomas Hartline, proved to me on the basis of satisfactory evidence to be the person who appeared before me.

Notary Public Signature

  
\_\_\_\_\_

Notary Public Seal



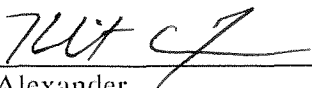
**CERTIFICATE OF SERVICE**

The undersigned hereby certifies that on the 29<sup>th</sup> day of January, 2014, a true and correct copy of the foregoing instrument was deposited in the United States Mail, with postage prepaid, and addressed to the following:

**Jennifer Hans, Esq.**  
Office of the Attorney General  
Capitol Suite 11 8  
700 Capitol Avenue  
Frankfort, Kentucky 40601-3449

**Richard Raff, Esq.**  
Division of General Counsel  
Public Service Commission  
Commonwealth of Kentucky  
21 1 Sower Blvd.  
PO Box 6 15  
Frankfort, Kentucky 40601

**Jeff Derouen, Esq.**  
Division of General Counsel  
Public Service Commission  
Commonwealth of Kentucky  
21 1 Sower Blvd.  
PO Box 6 15  
Frankfort, Kentucky 40601

  
\_\_\_\_\_  
Klint Alexander



**DRAFT  
PHASE I  
STUDY AND REPORT  
CAPABILITY ANALYSIS  
NATURAL GAS SERVICE TO KEYSTONE FOODS  
NAVITAS UTILITY CORPORATION  
ALBANY, KENTUCKY**

March, 2012

**RECEIVED**

**JAN 29 2014**

**PUBLIC SERVICE  
COMMISSION**

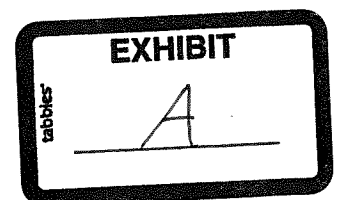
**A. PURPOSE**

On September 13, 2011, a meeting was conducted at the Keystone Foods Corporation processing plant to explore the possibilities of the Navitas Utility Corporation providing natural gas service to the Keystone Foods facility. Attendees at this meeting included members of Keystone Foods, the Cumberland Valley Area Development District, the Kentucky Economic Development Cabinet, the Mayor of Albany, Kentucky, Bell Engineering and the Navitas Utility Corporation.

At that meeting, Mr. Thomas Hartline, president of the Navitas Utility Corporation, made a presentation concerning the economics of natural gas and a method for extending service to Keystone Foods northward from the existing Albany system. As a result of that meeting, it was determined that Navitas Utility Corporation would initiate a feasibility study to determine their capability to provide natural gas service to Keystone Foods.

Subsequently, in February, 2012, Navitas Utility Corporation entered into an agreement with Bell Engineering to investigate and analyze the existing Navitas distribution system to determine its capability to provide Keystone Foods with natural gas service and to estimate the volume of natural gas which Keystone could expect to receive. The study and report is to be accomplished in two phases, the first phase being provided in this report. The goals of Phase 1 are listed as follows:

1. Prepare mapping ( 1" = 500' Scale) from the existing Navitas Utility Corporation system from Albany, Kentucky north along U.S. Route 127 to Kentucky Route 90 and then west along Kentucky Route 90 to the Keystone Foods production facility.
2. Utilize highway plans and superimpose those plans of the new U.S. Route 127 rights-of-way onto the aerial maps. Provide sufficient detail to obtain highway encroachment permits for construction.
3. Conduct preliminary flow calculations for a four (4) inch diameter gas main between the Albany system gate and Keystone Foods.



Phase II of the study and report would analyze the Energy Resources Management Company transmission main from the source of supply to the Navitas system to determine its capabilities for supplying the Navitas distribution system, including service to Keystone Foods. This phase of the study will not be started until completion of Phase 1 and the determination of the need for Phase 2.

## **B. EXISTING FACILITIES**

Navitas Utility Corporation purchases natural gas from ENREMA with their metering point for the Albany, Kentucky system north of the City of Byrdstown, Tennessee. ENREMA receives natural gas from a major pipeline supplier near Deer Lodge, Tennessee. Natural gas is transported via a 6 inch diameter polyethylene transmission main owned by ENREMA. There is also a section of 4 inch steel gas main located within the ENREMA system which is scheduled to be replaced with 6 inch PE main in the near future.

The 6 inch diameter ENREMA main, as well as the 6 inch Navitas main serving Albany, is high density polyethylene pipe, known as PE 3408, with Standard Dimension Ratio (SDR) of 11. The maximum allowable operating pressure (MAOP) of this main is 60 psi although the SDR 11 PE pipe is rated for 160 psi. The Navitas portion of the 6 inch PE main was pressure tested to 150 psi of pressure. The reason for the 60 psi MAOP for Navitas is that the pressure coming from the ENREMA system is 60 psi. Navitas could upgrade the working pressure within their system should that become necessary or desirable.

Navitas also provides natural gas service to the City of Byrdstown, Tennessee. This distribution system currently has approximately 50 customers with no major users. The Byrdstown system is metered separately from the Albany distribution system.

The Albany, Kentucky system currently has approximately 145 residential and commercial customers. There are currently no major industrial users. There are also a small number of rural residential customers along the route of the transmission main, both on the ENREMA system and the Navitas system. The 6 inch diameter PE transmission main ends at the branch to the 4 inch main feeding the Albany gate where the pressure is reduced to 30 psi.

Keystone Foods utilizes methane gas collected from a process waste anaerobic digester to power one unit of their food processing equipment. The remaining units and heat for the plant building is fired with propane gas.

## **C. PIPELINE ANALYSIS**

Item No. 3 of the required tasks in the Engineering Services Agreement calls for a preliminary analysis of the volumes of natural gas which might be provided with the construction of a 4 inch gas main from the end of the Navitas distribution system to the Keystone Foods production facility. The Engineer's instructions from Navitas were to use 60 psi at the Albany gate as an

inlet pressure. As Keystone equipment will require about 10 psi for normal operation, a delivery pressure of 30 psi at the Keystone meter would be desirable in order to allow a conservative amount of excess capacity.

The formula used to calculate the volumes that might be supplied to Keystone is the Weymouth Formula stated as:

$$Q = 18.062 \frac{T_o}{P_o} \left[ \frac{(P_1^2 - P_2^2) d^{16/3}}{GTL} \right]^{1/2}$$

Where:

- Q = Flow in cu ft of gas per hour, reduced to standard conditions, (60 F and 30 in. Mercury)
- T<sub>o</sub> = Absolute temperature to which Q is reduced, (519.6 F)
- P<sub>o</sub> = Absolute pressure to which Q is reduced (14.73 psi)
- p<sub>1</sub> = Absolute initial or inlet line pressure, psi
- p<sub>2</sub> = Absolute terminal or outlet line pressure, psi
- d = Internal diameter of pipe in inches
- G = Specific gravity of the gas ( Air – 1.0)
- T = Absolute flowing temperature, (519.6 F)
- L = Length of pipe in miles

This formula reduces the flow to the atmospheric pressure measured at sea level, 14.73 psi. As the elevation of the Albany area is in the 900 to 1,000 feet above sea level range, the volumes were corrected by the formula

$$V_m = V_s \frac{P_s}{P_m}$$

Where:

- V<sub>m</sub> = Volume under specified absolute pressure conditions
- V<sub>s</sub> = Volume under standard pressure conditions (14.73 psia)
- P<sub>m</sub> = Absolute pressure of measurement (see table for atmospheric pressure at different altitudes)
- P<sub>s</sub> = 14.73 psi

The approximate atmospheric pressure for the 900 to 1,000 feet above mean sea level is 14.2 psi. This correction yields about a 3.7% increase in the total volume of flow.

In order to verify the calculations of the above formula, which were conducted manually, KY Gas modeling software was used to calculate the predicted flows to Keystone. The flows from

the KY Gas computer run were somewhat higher than those calculated from the Weymouth Formula. However, some of the constants used in the computer formula were different from the Weymouth formula. The results of the computer run are attached as Exhibit "A". The computer analysis was conducted on Condition 1 only.

Several conditions are presented in this section of the report to show the various volumes of flow that might be expected. Several lengths of pipeline are also used, indicating the different locations of where the Keystone meter might be located. The route of the new main follows existing city streets from the end of the existing 6 inch main to existing U.S. 127, then north along existing U.S. 127 to the relocated U.S. 127 near its intersection with KY Route 558. At that point, the main would cross new U.S. 127 and follow the west right-of-way line to KY Route 3156, then west along KY Route 3156 and KY Route 90 to the Keystone Foods property. The various differing conditions are listed with each condition presented.

**CONDITION 1**

End of Existing 6 Inch Main to the East Keystone Entrance  
Inlet Pressure = 60 psi  
Outlet Pressure = 30 psi  
Distance = 7.053 Miles

Delivery Volume = 631 MCF/Day  
Corrected Volume = 655 MCF/Day

**CONDITION 2**

End of Existing 6 Inch Main to the East Keystone Entrance  
Inlet Pressure = 60 psi  
Outlet Pressure = 20 psi  
Distance = 7.053 Miles

Delivery Volume = 696 MCF/Day  
Corrected Volume = 721 MCF/Day

**CONDITION 3**

End of Existing 6 Inch Main to the East Keystone Entrance  
Inlet Pressure = 50 psi  
Outlet Pressure = 20 psi  
Distance = 7.053 Miles

Delivery Volume = 574 MCF/Day  
Corrected Volume = 595 MCF/Day

**CONDITION 4**

End of 6 Inch Main to West Keystone Entrance

Inlet Pressure = 60 psi  
Outlet Pressure = 30 psi  
Distance = 7.253 Miles

Delivery Volume = 622 MCF/Day  
Corrected Volume = 645 MCF/Day

**CONDITION 5**

End of 6 Inch Main to West Keystone Entrance  
and

Extend to Back of Keystone Building  
Inlet Pressure = 60 psi  
Outlet Pressure = 30 psi  
Distance = 7.518 Miles

Delivery Volume = 611 MCF/Day  
Corrected Volume = 634 MCF/Day

**CONDITION 6**

Same as Condition 5  
Increase Pipe Size to 6 Inch (5.372" I.D.)  
Inlet Pressure = 60 psi  
Outlet Pressure = 30 psi

Delivery Volume = 1,728 MCF/Day  
Corrected Volume = 1,792 MCF/Day

A map (1 inch = 2,000 ft.) showing the route of the proposed gas main and the beginning and end points of the various conditions is attached as Exhibit "C". Larger scale maps (1 inch = 500 ft.) were also provided, but not attached to this report, showing the same data as Exhibit "C", but providing more detail.

**D. ADDITIONAL CONSIDERATIONS**

The volumes shown in Article C of this report were calculated using the Weymouth Formula. This formula is used to calculate gas flows from "point to point". In looking at the entire 6 inch gas main, both the Navitas main and the ENREMA portion, the amount of gas available for distribution should be analyzed.

Consider a cold January day when the average daily temperature is in the 30°F range. The total number of residential customers along the ENREMA portion, the Navitas portion of the 6 inch main, the Byrdstown distribution system and the Albany distribution system approaches 250 customers. On average, a residential customer will use approximately 30 cubic feet of gas to provide heat for one degree day. An average temperature of 30°F yields 38 degree days to heat, with the ideal temperature being 68°F. Therefore, 38 dd x 30cf/dd x 250 customers means that 285,000 cubic feet (285 MCF) of natural gas per day (11.875MCF/hr.) would be drawn from the 6 inch main by the time it reaches the Albany gate. The remaining pressure to push service for another 7.5 miles to the Keystone Foods facility would likely be in the 50 psi pressure range. The volumes calculated for Condition No. 3 would be indicative of the anticipated results under the conditions defined above.

This analogy also assumes that the entire volume of natural gas required for the existing residential customers is drawn from the line at one point, which in fact, it does not. It is spread over the entire 50 mile long transmission main length.

## **E. CONCLUSION**

One of the tasks to be included in this Phase 1 study was the Engineer's Preliminary Opinion of Probable Construction Cost for extending a 4 inch main from the Albany gate to Keystone Foods. As can be seen in Exhibit "B", the Engineer's Preliminary Opinion of Probable Project Cost is \$1,234,411.00

Based on this preliminary review, it appears that Navitas can provide natural gas service to the Keystone Foods facility. Whether Navitas can supply service in such capacity to meet the total Keystone demand is not known at this time. However, as this Phase 1 evaluation provides sufficient evidence of Navitas' ability to supply natural gas to Keystone Foods, it is recommended that Phase 2 be authorized in order to determine more accurate estimates of the volume of gas that can be provided.

## **F. RECOMMENDATIONS**

In order to evaluate the complete ENREMA and Navitas transmission main, Phase 2 of the study and report should be authorized. In Phase 2, the KY Gas computer program would be used to study the capabilities of the system. This program measures both flow and pressure, based on the demand at the location where the demand occurs. Analysis completed during the Phase 2 study will allow a more complete review of the system capabilities to maintain flow to existing customers and provide a more accurate estimate of flows that may be available to Keystone Foods and other future customers. The KY Gas computer software could also be utilized to consider uprating the MAOP of both the ENREMA and Navitas systems to provide even larger volumes for use within the Navitas distribution system.

The Phase 2 analysis would require and incorporate more detailed information of the system and the components inherent with the natural gas being supplied. Things such as the chemical

properties of the natural gas being supplied, the actual specific gravity, etc., are required for the KY Gas computer analysis. The knowledge of the actual Keystone demand would also be beneficial.

Navitas Utility Corporation, Keystone Foods and ENREMA may also want to consider the replacing of the existing 4 inch steel main within the ENREMA system as a part of the extension proposed herein. The replacement of the approximate 10,000 foot long section of 4 inch steel main with 6 inch PE main (SDR 11) would likely have project costs of approximately \$400,000 to \$500,000. The economics of having the capability to provide natural gas at a higher pressure yielding much higher volumes would certainly prove to be worth looking into.

Exhibit A

\*\*\* GAS2010 Version 2.0 \*\*\*  
GAS DISTRIBUTION NETWORK ANALYSIS  
COPYRIGHT 2010 - DON J. WOOD, SRINI LINGIREDDY  
LEXINGTON, KY  
Updated March 2010

INPUT DATA FILE NAME FOR THIS SIMULATION =  
c:\MYDOCU~1\gastest.KYP\gastest.DAT

OUTPUT DATA FILE NAME FOR THIS SIMULATION =  
c:\MYDOCU~1\gastest.KYP\gastest.OT2

DATE FOR THIS COMPUTER RUN : 3-19-2012  
START TIME FOR THIS COMPUTER RUN : 17: 7:39:86

SUMMARY OF DISTRIBUTION SYSTEM CHARACTERISTICS:  
-----

NUMBER OF PIPES = 3  
NUMBER OF JUNCTION NODES = 2  
  
UNITS SPECIFIED = ENGLISH

PROPERTIES OF THE GAS FOR THIS ANALYSIS ARE:

OPERATING TEMPERATURE = 62.000 DEGREES FAHRENHEIT  
REFERENCE DENSITY (@ STD. PRESSURE) = .53E-01 POUNDS/CUBIC FOOT  
GAS MOLECULAR WEIGHT = 20.100  
GAS SPECIFIC GRAVITY = .694  
RATIO OF SPECIFIC HEATS = 1.001  
GAS CONSTANT = 76.883  
ABSOLUTE VISCOSITY = .223E-06 POUND SECONDS/SQUARE FOOT

USER SPECIFIED FLOW UNITS (USFU) = MSCF/DAY  
USER SPECIFIED PRESSURE UNITS (USPU) = PSI (ABS.)

----- SUMMARY OF PIPE NETWORK GEOMETRIC AND OPERATING DATA -----

PIPE NAME	NODE #1	NODE #2	LENGTH (FT.)	DIAM. (IN.)	ROUGHNESS (MILLIFEET)	SUM-M FACT.	PUMP ID	ELEVATION CHANGE
P-1	R-1	R-2	37240.0	3.7	.008	.0	0	.0



JUNCTION NAME	NODE TITLE	DEMAND (USFU)	FPN PRESSURE
R-1		.00	74.73
R-2		.00	44.73

=====  
===

===== RESULTS FOR THIS SIMULATION FOLLOW =====

Solution was obtained in 7 trials  
Flow Accuracy = .1316E-03 [ < .500E-02]  
RV Accuracy = .0000E+00 [ < .100E-02]

PIPE AREA RATIO	NO.	NODE #1	NODE #2	FLOW (USFU)	LOSS (USPU)	VELOCITY (FT/S)	DENSITY (#/CF)	FRICTION FACTOR
.038	P-1	R-1	R-2	678.599	30.00	26.43	.214	.0152
.000	R-1	R-1	R-1	678.599	.00	.00	.268*****	
.000	R-2	R-2	R-2	-678.599	.00	.00	.161*****	

JUNCTION DENSITY	NAME	NODE TITLE	DEMAND (USFU)	PRESSURE (USPU)	PRESSURE (PSIA)	PRESSURE (PSIG)	#/CF
.268	R-1		.00	74.73	74.73	60.03	
.161	R-2		.00	44.73	44.73	30.03	

\* This designates the use of default density in a low pressure region

THE NET SYSTEM DEMAND (USFU) = .000

SUMMARY OF INFLOWS (+) AND OUTFLOWS (-) :

NAME	FLOW (USFU)	FPN TITLE
R-1	678.6	R-1
R-2	-678.6	R-2

MAXIMUM MACH NUMBER = .03 IN LINE NO. P-1

SUMMARY OF MINIMUM.AND.MAXIMUM VELOCITIES (FT/S)

	MINIMUM		MAXIMUM
R-1	.00	P-1	26.43
R-2	.00	R-2	.00
R-2	.00	R-2	.00
R-2	.00	R-2	.00
R-2	.00	R-2	.00

SUMMARY OF MINIMUM.AND.MAXIMUM LOSS/1000. (PSI )

	MINIMUM		MAXIMUM
R-1	.04	P-1	.81
R-2	.07	R-2	.07
R-2	.07	R-2	.07
R-2	.07	R-2	.07
R-2	.07	R-2	.07

SUMMARY OF MINIMUM.AND.MAXIMUM PRESSURES (USPU)

	MINIMUM		MAXIMUM
R-2	44.73	R-1	74.73
R-2	44.73	R-1	74.73
R-2	44.73	R-1	74.73
R-2	44.73	R-1	74.73
R-2	44.73	R-1	74.73

\*\*\*\*\* END OF KYGAS SIMULATION \*\*\*\*\*

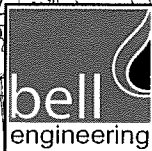
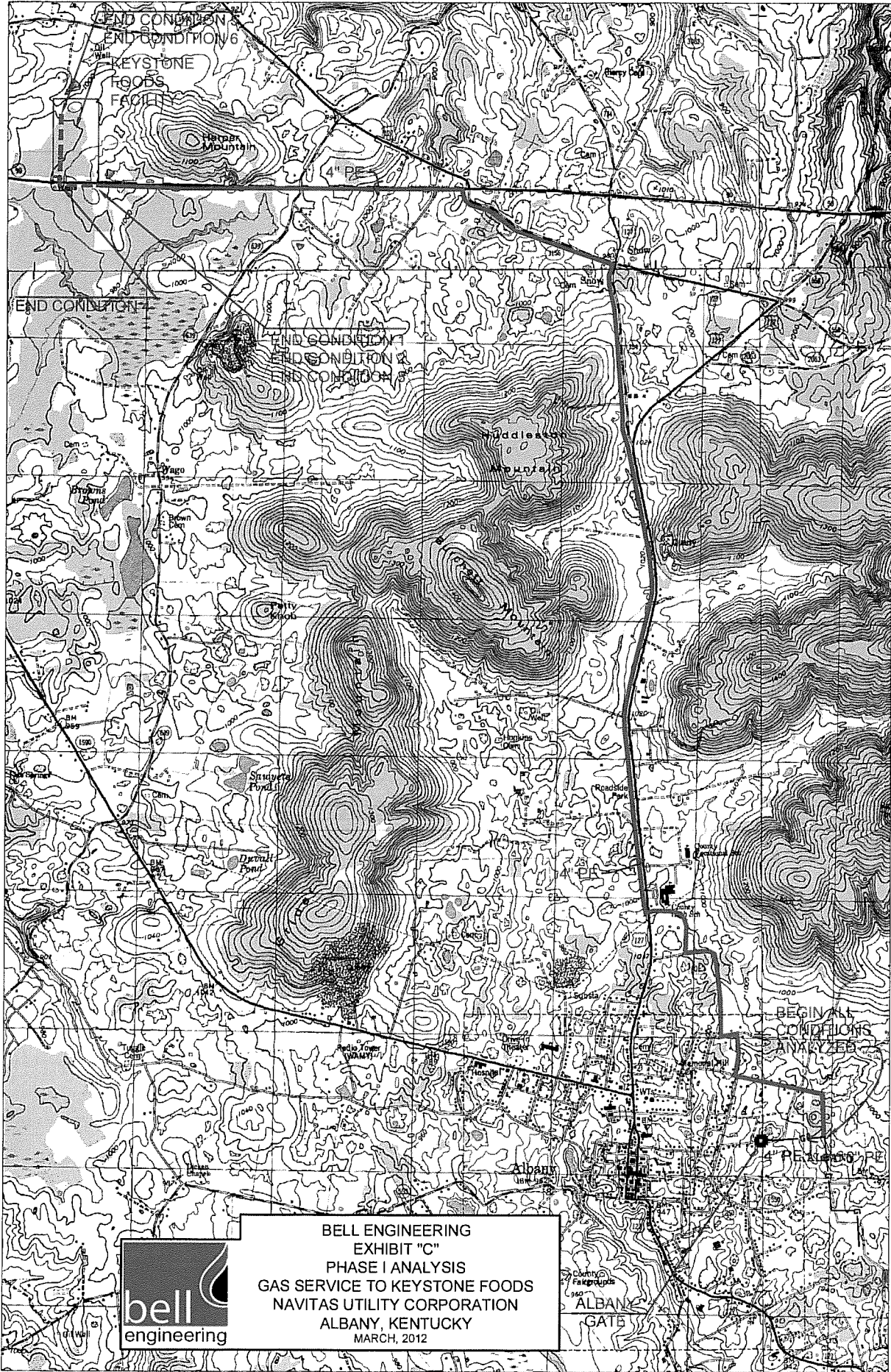
DATE FOR THIS COMPUTER RUN : 3-19-2012  
 START TIME FOR THIS COMPUTER RUN : 17: 7:39:88

**EXHIBIT "B"**  
**ENGINEER'S OPINION OF**  
**PROBABLE CONSTRUCTION AND PROJECT COST**  
**GAS MAIN EXTENSION**  
**ALBANY GATE TO KEYSTONE FOODS**  
**NAVITAS UTILITY CORPORATION**  
**ALBANY, KENTUCKY**

March, 2012

1. 4 Inch Polyethylene Gas Pipe, Furnish and Install (7.5 Miles)	39,600 L.F.	\$18.00	\$712,800.00
2. 4 Inch Polyvalve and Box, Furnish and Install	5 Each	\$ 1,000.00	\$ 5,000.00
3. 10 Inch Bore and Cover Pipe for Existing U.S. 127	50 L.F.	\$125.00	\$ 6,250.00
4. 10 Inch Bore and Cover Pipe for Relocated U.S. 127	150 L.F.	\$150.00	\$ 22,500.00
5. 10 Inch Bore and Cover Pipe for KY Route 3156	50 L.F.	\$125.00	\$ 6,250.00
6. 10 Inch Bore and Cover Pipe for KY Route 90	100 L.F.	\$150.00	\$ 15,000.00
7. 4 Inch Meter Assembly	1 Each	\$10,000.00	\$ 10,000.00
8. Tie-In to Existing 6 Inch Main	1 Each	\$1,500.00	<u>\$ 1,500.00</u>
Sub-total			\$779,300.00
9. Paving Replacement and Miscellaneous Construction Items @ 20% of Sub-total			<u>\$155,860.00</u>
Sub-total			\$935,160.00
10. Construction Contingency @ 10%			<u>\$ 93,516.00</u>
ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST			<b>\$1,028,676.00</b>
11. Project Development Costs @ 20%			<u>\$ 205,735.00</u>
ENGINEER'S OPINION OF PROBABLE PROJECT COST			<b>\$1,234,411.00</b>

J:\NAVITAS 594\594-010 KEYSTONE FOODS GAS LINE\594-TOPO MAP.dwg, 4/12/2012 10:15:40 AM, Doug



BELL ENGINEERING  
EXHIBIT "C"  
PHASE I ANALYSIS  
GAS SERVICE TO KEYSTONE FOODS  
NAVITAS UTILITY CORPORATION  
ALBANY, KENTUCKY  
MARCH, 2012

ALBANY GATE

**PHASE 2  
STUDY AND FINAL REPORT  
CAPACITY ANALYSIS  
NATURAL GAS SERVICE TO KEYSTONE FOODS  
NAVITAS UTILITY CORPORATION  
ALBANY, KENTUCKY**

**Prepared for:  
Navitas Utility Corporation**

**Prepared By:  
Bell Engineering**

**September, 2012**

**A. PURPOSE**

The purpose of this Phase 2 capacity analysis and report is to evaluate the capability of Navitas Utility Corporation natural gas distribution system to provide natural gas service to the Keystone Foods processing facility. The study will also evaluate the capability of the ENREMA transmission system to provide Navitas with the necessary pressure and volume for delivery of natural gas to Keystone Foods.

The Phase 1 analysis began at the Albany gate, where the pressure to Albany proper is reduced, and then extended along U.S. 127 and KY Route 90 to the Keystone processing facility. This analysis considered only 1) the inlet pressure, 2) the desired outlet pressure, 3) the pipe inside diameter and 4) the length of pipeline from the beginning point to the end point. The results of the Phase 1 study indicated that Navitas could supply approximately 25,000 cubic feet per hour to 30,000 cubic feet per hour of Keystone's maximum demand, which approaches 81,700 cubic feet per hour.

The Phase 2 analysis will analyze not only the Navitas distribution system but the ENREMA transmission main as well. This analysis will be accomplished using the KY Gas Distribution Network (KYGAS) computer software program for gas flow. KYGAS will provide a detailed analysis of the Navitas and ENREMA systems, taking into account the gas demands of present customers along the transmission main. Items such as specific gravity of the product transported and the physical-chemical composition of the product transported are used to calculate the required data. Completion of the analysis should provide a reasonably accurate estimate of the capabilities of both the ENREMA and Navitas systems to provide service to the Keystone Foods facility.

**B. EXISTING ENREMA SYSTEM**

The ENREMA system is supplied primarily by the Spectra Energy Corporation with connection occurring adjacent to Tennessee Route 62 near the community of Deer Lodge,

Tennessee. ENREMA also obtains natural gas from the Gemini gas fields, Arnco and other smaller suppliers. However, through May 12, 2012, approximately 69% of the total supply of natural gas to the ENREMA main came from the Spectra Energy system. Therefore, for the purposes of this analysis and report, the Spectra Energy system will be considered as the primary supplier with estimated demands and pressures emanating from this source.

At the ENREMA connection to the Spectra Energy system, the line pressure is reduced to 60 psi (pounds per square inch) and is transported north and west through Morgan, Fentress and Pickett Counties, Tennessee to reach the Albany master meter located approximately 5,000 feet south of the Kentucky/Tennessee state line. Presently, 60 psi is the Maximum Allowable Operating Pressure (MAOP) of this main which has been established by the safety regulatory agencies. It is our understanding the reason for the established MAOP is a lack of records verifying test pressures at the time of construction. Upgrading the MAOP to a higher pressure would require increasing pressure of the entire length of transmission main to the desired MAOP, followed by a gas leak survey of the upgraded portion and repair of any leaks found. The current ENREMA main has lengths of high density Class 160 PE, SDR 11 pipe. The MAOP of Class 160 PE is 100 psi and would be the highest pressure that the main could be operated after upgrading.

The ENREMA system consists of a variety of different sizes and types of pipe. Beginning at the regulator station and progressing northward to the Albany master meter, which is located approximately 5,000 feet south of the Kentucky/Tennessee state line, the pipe, size, type, inside diameter and length are shown as follows:

<u>Size</u>	<u>Type</u>	<u>Wall Thickness</u>	<u>Inside I.D.</u>	<u>Length</u>
6 Inch	HDPE	0.602 (SDR 11)	5.372 Inches	19,000 Feet
6 Inch	Steel	0.188	6.249 Inches	79,500 Feet
4 Inch	Steel	0.188	4.124 Inches	9,600 Feet
6 Inch	Steel	0.188	6.249 Inches	47,000 Feet
6 Inch	HDPE	0.602 (SDR 11)	5.372 Inches	39,000 Feet
6 Inch	Steel	0.188	6.249 Inches	34,000 Feet
8 Inch	Steel	0.188	8.249 Inches	3,400 Feet
6 Inch	HDPE	0.602 (SDR 11)	5.372 Inches	21,600 Feet

The seemingly weak section of the ENREMA system is 9,600 feet of 4 inch steel pipe located east of the community of Allardt, Tennessee. This section of pipe is reported to be in poor condition and in need of replacement. The reduced size of pipe serves as a "bottleneck" for maximum flow to all areas served by the system. Total length of the ENREMA transmission main is approximately 47 miles to the Navitas master meter.

### **C. EXISTING NAVITAS SYSTEM**

The existing Navitas transmission system begins at the Navitas master meter. This system consists of 6 Inch high density polyethylene pipe which extends from the Navitas

master meter north, generally parallel to U.S. Route 127, to what is known as the "Albany Gate" which is approximately 32,800 feet north of the Kentucky/Tennessee state line. The total length of the Navitas transmission main from the Navitas master meter to the "Albany Gate" is approximately 37,800 feet or 7.2 miles. At the "Albany Gate", the pressure is reduced to 30 psi to serve Albany proper. However, the extended main to provide service to Keystone Foods would be operated at the MAOP of 60 psi. To extend the Navitas system to the Keystone Foods processing facility would add approximately 7.5 miles to the Navitas system. The KYGAS computer analysis will take into account the entire length of both the ENREMA and Navitas mains from the source near Deer Lodge, Tennessee to the Keystone Foods facility.

#### **D. METHODOLOGY**

As mentioned previously, the KYGAS software will be used for this analysis. This software includes more detailed data, including the consideration of the existing customers along the route of the existing mains and demands for volume of gas purchased.

The extension of service to the Keystone facility requires the construction of a new gas main from the Albany Gate. The size of this main, as well as improvements to the ENREMA system, was discussed in the Phase 1 report, as well as estimates of cost for these improvements. The Phase 1 and additional scenarios will be discussed in this report, including analysis of the ENREMA main. The scenarios considered for this study are listed as follows:

- Scenario No. 1 -** Extend a 4-Inch diameter polyethylene gas main from the "Albany Gate" to Keystone Foods terminating at the existing propane metering facility. System operating pressure to be 60 psi. No changes to the ENREMA system.
- Scenario No. 2 -** Extend a 6-Inch diameter polyethylene gas main from the "Albany Gate" to Keystone Foods terminating at the existing propane metering facility. System operating pressure to be 60 psi. No changes to the ENREMA system.
- Scenario No. 3 -** Extend a 6-Inch diameter polyethylene gas main from the "Albany Gate" to Keystone Foods terminating at the existing propane metering facility. Replace the existing 4-Inch steel main in the ENREMA system with 6-Inch steel. System operating pressure to be 60 psi.
- Scenario No. 4 -** Extend a 6-Inch diameter polyethylene gas main from the "Albany Gate" to Keystone Foods terminating at the existing propane metering facility. Replace the existing 4-Inch steel main in the ENREMA system with 6-Inch steel. Uprate system operating pressure for both systems to 80 psi.

- Scenario No. 5 -** Construct an 8-Inch diameter polyethylene gas main from the Albany master meter to Keystone Foods terminating at the existing propane metering facility. Replace the entire ENREMA system with 8-Inch polyethylene pipe. Operating pressure for the entire distance to be 83 psi.
- Scenario No. 6 -** Construct a 6-Inch diameter steel main from the Albany master meter to Keystone Foods terminating at the existing propane metering facility. Replace the existing 4 Inch steel main and all of the polyethylene mains in the ENREMA system with 6-Inch steel main. Uprate the existing 6-Inch steel mains in the ENREMA system and operate both systems at 150 psi.
- Scenario No. 7 -** Extend a 6-Inch diameter polyethylene main from the "Albany Gate" to Keystone Foods terminating at the existing propane metering facility. Replace the existing 4-Inch steel main in the ENREMA system with a 6-Inch steel main. Construct an in-line compressor station near the Albany master meter. Operate the ENREMA system at the existing 60 psi. Uprate the Navitas system to 100 psi.
- Scenario No. 8 -** Extend a 6-Inch diameter polyethylene main from the "Albany Gate" to Keystone Foods terminating at the existing propane metering facility. Replace the existing 4-Inch steel main and the existing 6-Inch polyethylene mains in the ENREMA system with 6-Inch steel pipe. Uprate the existing steel mains in the ENREMA system and operate that system at 160 psi. Construct a pressure reducing station near the Albany master meter and uprate the Navitas system to 100 psi.

All of the above scenarios require the construction of a pressure regulation station at the Keystone Foods facility, reducing the pressure at Keystone to a minimum of 10 psi.

A list of the above stated scenarios showing the volume of gas delivered, the delivery pressure at the Keystone Foods facility and the Engineer's Preliminary Opinion of Probable Project Costs are shown in Table 1.



Table 1					
Option	Navitas Improvements	ENREMA Improvements	Calculated Quantity at Keystone (Btu)	Calculated Pressure (psi)	Opinion of Probable Project Cost
Scenario 1	4-inch PE from Albany Gate to Keystone	No Change	16,700,000	10.7	\$1,315,625
Scenario 2	6-inch PE from Albany Gate to Keystone	No Change	20,000,000	11.0	\$1,625,000
Scenario 3	6-inch PE from Albany Gate to Keystone	Upgrade 4-inch steel to 6-inch steel MAOP at 60 psi	21,800,000	10.9	\$2,225,000
Scenario 4	6-inch PE from Albany Gate to Keystone	Upgrade system to 6-inch steel increase MAOP at 80 psi	32,800,000	10.1	\$6,542,187
Scenario 5	8-inch PE from Albany MM to Keystone	Upgrade system to 8-inch poly increase MAOP at 83 psi	81,700,000	50.6	\$17,894,000
Scenario 6	6-inch Steel from Albany MM to Keystone	Upgrade system to 6-inch steel increase MAOP at 150 psi	81,700,000	13.8	\$12,799,438
Scenario 7	6-inch PE from Albany MM to Keystone, Construct Compressor Station near Albany MM, Operate system at 100psi	Upgrade 4-inch portions to 6-inch steel; MAOP at 60 psi	23,000,000	87.1	\$3,371,875
Scenario 8	6-inch PE from Albany MM to Keystone	Upgrade system to 6-inch steel increase MAOP at 160 psi	81,700,000	16.7	\$9,573,437

Current Conditions:

Navitas: Existing 6-inch PE from Albany MM to Albany Gate. MAOP 60psi

ENREMA: Existing transmission main from Spectra system to Navitas System at Albany MM. System varies in size from 4-inch steel to 8-inch PE. MAOP = 60 psi

Spectra: Existing feed to ENREMA from an existing 30-inch transmission main, approximately 600 psi.

## E. ANALYSIS OF SCENARIOS

Based on the computer models conducted, the primary conclusions from the Phase 1 report are confirmed. The current Navitas and ENREMA systems are not capable of transporting the maximum demand load of 81,700 cubic feet per hour to the Keystone Foods processing facility without major improvements within the systems. The only scenarios presented that will likely provide the necessary volumes are Scenarios No. 5, 6 and 8, all of which require the upgrading of both the Navitas and ENREMA systems and have substantial costs associated with the necessary improvements to those systems. The scenarios similar to those presented in the Phase 1 report show that the systems will only provide approximately one fourth to one third of the maximum flow of 81,700 cfh.

Also to be considered is the fact that of the maximum desired demand of 81,700 cfh, approximately 80% of that demand, some 66,000 cfh, is needed for processing equipment inside the Keystone facility. Therefore, during the warm summer months, when space heating is not required, the demand load to Keystone is not greatly diminished.

Another factor to be considered are the demands and operating pressures of the Albany and Byrdstown systems. Pressure at the Albany Gate is reduced to 30 psi for operation of that system. Based on the demand of the Albany system, any operational scenarios should not allow the pressure to that system to drop below 15 psi. The Byrdstown system operates at the existing transmission line pressure of 60 psi. Any operational scenarios should not allow that pressure to fall below 5 psi. The existing pressure entering the Keystone plant is 8 psi. The minimum pressure for Keystone in this report is 10 psi.

In referencing the demands and pressures of the four (4) major locations in this report, the locations shown in the computer print outs are listed as follows:

Byrdstown	-----	J-19
Albany Master Meter	-----	J-1
Albany Gate	-----	J-38
Keystone	-----	J-17

**Scenario No. 1** extends a 4 inch polyethylene main from the "Albany Gate" to Keystone with no improvements to the ENREMA system. Under this scenario, 16,700 cubic feet per hour is provided at Keystone with adequate pressures for all users. This volume could provide service to Keystone for other than process use during the winter months. This scenario is also the least expensive to implement of those analyzed.

**Scenario No. 2** extends a 6 inch polyethylene main from the "Albany Gate" to Keystone with no improvements to the ENREMA system. Under this scenario, 20,000 cubic feet per hour is provided at Keystone with adequate pressures for all users.

**Scenario No. 3** extends a 6 inch polyethylene main from the "Albany Gate" to Keystone and upgrades the existing 4 inch steel main in the ENREMA system to 6 inch steel. Under this scenario, 21,800 cubic feet per hour is provided at Keystone with adequate pressures for all users. It should be noted that substituting 6 inch polyethylene for 6 inch steel in the ENREMA system would lower the estimated project costs by approximately \$225,000.

**Scenario No. 4** extends a 6 inch polyethylene main from the "Albany Gate" to Keystone and upgrade the existing 4 inch steel main in the ENREMA system to 6 inch steel. In this scenario, the line pressure of the entire length of the ENREMA main and the Navitas main is uprated to 80 psi. Under this scenario, 32,800 cubic feet per hour is provided at Keystone with adequate pressures for all users. Also under this scenario, substituting 6 inch polyethylene pipe for 6 inch steel pipe in the ENREMA system would lower the estimated project costs by approximately \$225,000.

**Scenario No. 5** - construct an 8 inch polyethylene main from the Albany master meter to Keystone and replace the existing ENREMA system with 8 inch polyethylene pipe. Operate the entire ENREMA system and Navitas system at 83 psi. Under this scenario, 81,700 cubic feet per hour is provided at Keystone with adequate pressures for all users.

**Scenario No. 6** - construct a 6 inch steel main from the Albany master meter to Keystone and replace the 4 inch steel main and the 6 inch polyethylene mains in the ENREMA system with 6 inch steel pipe and operate both systems at 150 psi. Under this scenario, 81,700 cubic feet per hour (the maximum demand) is provided with adequate pressures for all users.

**Scenario No. 7** - extend a 6 inch polyethylene main from the "Albany Gate" to Keystone and replace the 4 inch steel in the ENREMA system with 6 inch steel. Construct an in-line compressor near the Albany Master Meter. Operate the ENREMA system at the existing rate of 60 psi. Uprate the Navitas system to operate at 100 psi. Under this scenario, 23,000 cubic feet per hour is provided at Keystone with adequate pressures for all users.

**Scenario No. 8** - extend a 6 inch polyethylene main from the "Albany Gate" to Keystone. Replace the existing 4 inch steel main in the ENREMA system and the existing 6 inch polyethylene mains in the ENREMA system with 6 inch steel pipe. Uprate the existing 6 inch steel mains in the ENREMA system and operate that system at 160 psi. Construct a pressure regulation station near the Albany Master Meter and uprate the Navitas system to operate at 100 psi. Under this scenario, 81,700 cubic feet per hour is provided at Keystone with adequate pressures for all users.

## F. CONCLUSIONS

As can be readily observed, the only three scenarios analyzed that have a remote possibility of meeting the maximum demands at Keystone are Scenarios Nos. 5, 6 and 8. These scenarios are also the most expensive to implement of all the different scenarios analyzed.

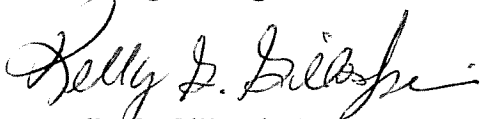
It has also been suggested that a storage tank be constructed at Keystone with a compressor to fill the tank during off-peak hours. Considering that the processing equipment inside the plant uses approximately 80% of the total demand load, there are no "off-peak" hours. Consider scenario No. 2 as an example. At a delivery rate of 20,000 cubic feet per hour with processing equipment using 66,000 cubic feet per hour for 16 hours per day, 2.2 days would be required to supply one day of processing equipment demand. Therefore, this aspect appears to not be a viable alternate solution

Calculated flow volumes from Scenarios 1, 2, 3, 4 and 7 should provide partial service to the Keystone facility. These Scenarios are estimated to require the least capital improvements and require the least amount of effort for implementation.

This study was based on the premise of providing the maximum demand loading for the Keystone facility and to estimate the required improvements necessary to both the Navitas and ENREMA systems to achieve that end. All of the Scenarios presented should be analyzed by the parties involved to ascertain which Scenario would provide the best and most economical solution for the investment required.

We trust the data contained herein provides the information necessary for use by the parties involved for the purpose for which the report has been prepared.

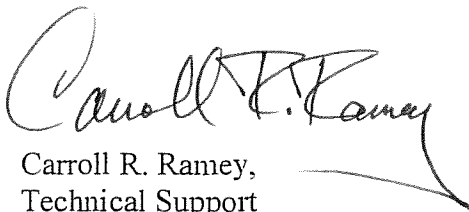
Bell Engineering



Kelly G. Gillespie, Pres.



Jamie D. Noe, P.E.  
Project Engineer



Carroll R. Ramey,  
Technical Support

**APPENDIX "A"**  
**ENGINEER'S OPINION OF PRELIMINARY**  
**PROBABLE CONSTRUCTION AND PROJECT COST**

**Scenario No. 1**

Extend 4 Inch Polyethylene Main from the "Albany Gate"  
to Keystone. No other changes.

7.5 Miles (39,600 L.F.) of 4 Inch PE Pipe @ \$20.00/L.F.	\$792,000.
1 - Pressure Regulator Station at Keystone	<u>\$ 50,000.</u>
	\$842,000.
Add Miscellaneous Construction Items @ 25%	<u>\$210,500.</u>
Preliminary Estimate of Construction Cost	\$1,052,500.
Add Project Development Costs @ 25%	<u>\$ 263,125.</u>
<b>Estimated Preliminary Project Costs</b>	<b>\$1,315,625.</b>

**Scenario No. 2**

Extend 6 Inch Polyethylene Main from the "Albany Gate"  
to Keystone. No other changes.

7.5 Miles (39,600 L.F.) of 6 Inch PE Pipe @ \$25.00/L.F.	\$990,000.
1 - Pressure Regulator Station at Keystone	<u>\$ 50,000.</u>
	\$1,040,000.
Add Miscellaneous Construction Items @ 25%	<u>\$ 260,000.</u>
Preliminary Estimate of Construction Cost	\$1,300,000.
Add Project Development Costs @ 25%	<u>\$ 325,000.</u>
<b>Estimated Preliminary Project Costs</b>	<b>\$1,625,000.</b>

### Scenario No. 3

Extend 6 Inch Polyethylene Main from the "Albany Gate" to Keystone. Replace 4 Inch Steel Main in the ENREMA system with a 6 Inch Steel Main.

7.5 Miles (39,600 L.F.) of 6 Inch PE Pipe @ \$25.00/L.F.	\$990,000.
1.82 Miles (9,600 L.F.) of 6 Inch Steel Pipe @ \$40.00/L.F.	\$384,000.
1 - Pressure Regulator Station at Keystone	<u>\$ 50,000.</u>
	\$1,424,000.
Add Miscellaneous Construction Items @ 25%	<u>\$ 356,000.</u>
Preliminary Estimate of Construction Cost	\$1,780,000.
Add Project Development Costs @ 25%	<u>\$ 445,000.</u>
<b>Estimated Preliminary Project Costs</b>	<b>\$2,225,000.</b>

\* Substituting 6 Inch Polyethylene Pipe for 6 Inch Steel Pipe in the ENREMA system should reduce Estimated Project Costs by approximately \$225,000.

### Scenario No. 4

Extend 6 Inch Polyethylene Main from the "Albany Gate" to Keystone. Replace the 4 Inch Steel Main in the ENREMA system with a 6 Inch Steel Main. Uprate the operating pressure in the ENREMA system and the Navitas system to 80 psi.

7.5 Miles (39,600 L.F.) of 6 Inch PE Pipe @ \$25.00/L.F.	\$990,000.
1.82 Miles (9,600 L.F.) of 6 Inch Steel Pipe @ \$40.00/L.F.	\$384,000.
1 - Pressure Regulator Station at Keystone	\$ 50,000.
Uprate 45.18 Miles (238,500 L.F.) ENREMA system @ \$10.00/L.F.	\$2,385,000.
Uprate 7.2 Miles (37,800 L.F.) Navitas system @ \$10.00/L.F.	<u>\$ 378,000.</u>
	\$4,187,000.
Add Miscellaneous Construction Items @ 25%	<u>\$1,046,750.</u>
Preliminary Estimate of Construction Cost	\$5,233,750.
Add Project Development Costs @ 25%	<u>\$1,308,437.</u>
<b>Estimated Preliminary Project Costs</b>	<b>\$6,542,187.</b>

\* Substituting 6 Inch Polyethylene for 6 Inch Steel Pipe in the ENREMA system

should reduce Estimated Project Costs by approximately \$225,000.

**Scenario No. 5**

Construct an 8 Inch Polyethylene Main from the Albany Master Meter to Keystone. Replace the entire ENREMA system with 8 Inch Polyethylene Pipe. Operating pressure for the entire distance to be 83 psi.

14.7 Miles (77,616 L.F.) of 8 Inch PE Pipe @ \$35.00/L.F.	\$2,716,560.
47 Miles (248,160 L.F.) of 8 Inch PE Pipe @ \$35.00/L.F.	\$8,685,600.
1 - Pressure Regulator Station at Keystone	\$ 50,000.
	<u>\$11,452,160.</u>
 Add Miscellaneous Construction Items @ 25%	 <u>\$ 2,863,040.</u>
Preliminary Estimate of Construction Cost	\$14,315,200.
 Add Project Development Costs @ 25%	 <u>\$ 3,578,800.</u>
 <b>Estimated Preliminary Project Costs</b>	 <b><u>\$17,894,000.</u></b>

**Scenario No. 6**

Construct a 6 Inch Steel Main from the Albany master meter to Keystone. Replace the existing 4 Inch Steel Main and all the Polyethylene mains in the ENREMA system. Uprate the remaining steel mains in the ENREMA system and operate the ENREMA and Navitas systems at 150 psi.

14.7 Miles (77616 L.F.) of 6 Inch Steel Pipe @ \$40.00/L.F.	\$3,104,640.
1.82 Miles (9,600 L.F.) of 6 Inch Steel Pipe @ \$40.00/L.F.	\$ 384,000.
14.13 Miles (74,600 L.F.) of 6 Inch Steel Pipe @ \$40.00/L.F.	\$2,984,000.
Uprate 31.04 Miles (163,900 L.F.) Steel Pipe to 150 psi. @ \$10.00/L.F.	\$1,639,000.
1 - Pressure Regulator Station at Keystone	\$ 50,000.
1 - Pressure Regulator Station at Byrdstown	\$ 30,000.
	<u>\$8,191,640.</u>
 Add Miscellaneous Construction Items @ 25%	 <u>\$2,047,910.</u>
Preliminary Estimate of Construction Cost	\$10,239,550.
 Add Project Development Costs @ 25%	 <u>\$ 2,559,887.</u>
 <b>Estimated Preliminary Project Costs</b>	 <b><u>\$12,799,438.</u></b>

### Scenario No. 7

Extend 6 Inch Polyethylene Main from "Albany Gate" to Keystone. Replace 4 Inch Steel Main in ENREMA system with 6 Inch Polyethylene. Construct compressor near Albany master meter. Operate ENREMA system at the existing pressure of 60 psi. Uprate the Navitas system to 100 psi.

7.5 Miles (39,600 L.F.) of 6 Inch PE Pipe @ \$25.00/L.F.	\$990,000.
1.82 Miles (9,600 L.F.) of 6 Inch PE Pipe @ \$25.00/L.F.	\$240,000.
Uprate 7.2 Miles (37,800 L.F.) PE Pipe to 100 psi (Navitas system) @ \$10.00/L.F.	\$378,000.
1 - Compressor Station at Albany master meter	\$500,000.
1 - Pressure Regulator Station at Keystone	<u>\$ 50,000.</u>
	\$2,158,000.
Add Miscellaneous Construction Items @ 25%	<u>\$ 539,500.</u>
Preliminary Estimate of Construction Cost	\$2,697,500.
Add Project Development Costs @ 25%	<u>\$ 674,375.</u>
<b>Estimated Preliminary Project Costs</b>	<b>\$3,371,875.</b>

### Scenario No. 8

Extend 6 Inch Polyethylene Main from "Albany Gate" to Keystone. Replace the existing 4 Inch Steel Main and the existing 6 Inch PE Pipe in the ENREMA system with 6 Inch Steel Pipe. Uprate existing 6 Inch Steel Pipe in the ENREMA system and operate at 160 psi. Construct pressure regulating station at the Navitas master meter and uprate the remaining Navitas system to 100 psi.

7.5 Miles (39,600 L.F.) of 6 Inch PE Pipe @ \$25.00/L.F.	\$990,000.
1.82 Miles (9,600 L.F.) of 6 Inch Steel Pipe @ \$40.00/L.F.	\$384,000.
14.13 Miles (74,600 L.F.) of 6 Inch Steel Pipe @ \$40.00/L.F.	\$2,984,000.
Uprate 31.04 Miles (163,900 L.F.) Steel Pipe to 160 psi (ENREMA system) @ \$10.00/L.F.	\$1,639,000.
1 - Pressure Regulator Station at Albany master meter	\$ 50,000.
1 - Pressure Regulator Station at Keystone	\$ 50,000.
1 - Pressure Regulator Station at Byrdstown	<u>\$ 30,000.</u>
	\$6,127,000.
Add Miscellaneous Construction Items @ 25%	<u>\$1,531,750.</u>
Preliminary Estimate of Construction Cost	\$7,658,750.
Add Project Development Costs @ 25%	<u>\$1,914,687.</u>
<b>Estimated Preliminary Project Costs</b>	<b>\$9,573,437.</b>



**APPENDIX "B"**  
**COMPUTER COMPILATIONS OF**  
**SCENARIOS ANALYZED**

(Attached on following pages)

\*\*\* GAS2010 Version 2.0 \*\*\*  
 GAS DISTRIBUTION NETWORK ANALYSIS  
 COPYRIGHT 2010 - DON J. WOOD, SRINI LINGIREDDY  
 LEXINGTON, KY  
 Updated March 2010

**Scenario 1**

INPUT DATA FILE NAME FOR THIS SIMULATION = i:\projects\594\model\SCENAR~2.KYP\scenario.DAT  
 OUTPUT DATA FILE NAME FOR THIS SIMULATION = i:\projects\594\model\SCENAR~2.KYP\scenario.OT2

DATE FOR THIS COMPUTER RUN : 8-31-2012  
 START TIME FOR THIS COMPUTER RUN : 9:42:18:74

SUMMARY OF DISTRIBUTION SYSTEM CHARACTERISTICS:  
 -----

NUMBER OF PIPES = 27  
 NUMBER OF JUNCTION NODES = 27  
 UNITS SPECIFIED = ENGLISH

PROPERTIES OF THE GAS FOR THIS ANALYSIS ARE:

OPERATING TEMPERATURE = 60.000 DEGREES FAHRENHEIT  
 REFERENCE DENSITY (@ STD. PRESSURE) = .44E-01 POUNDS/CUBIC FOOT  
 GAS MOLECULAR WEIGHT = 16.700  
 GAS SPECIFIC GRAVITY = .576  
 RATIO OF SPECIFIC HEATS = 1.310  
 GAS CONSTANT = 92.536  
 ABSOLUTE VISCOSITY = .223E-06 POUND SECONDS/SQUARE FOOT

USER SPECIFIED FLOW UNITS (USFU) = SCF / HOUR  
 USER SPECIFIED PRESSURE UNITS (USPU) = PSI (ABS.)

----- SUMMARY OF PIPE NETWORK GEOMETRIC AND OPERATING DATA -----

PIPE NAME	NODE #1	NODE #2	LENGTH (FT.)	DIAM. (IN.)	ROUGHNESS (MILLIFEET)	SUM-M FACT.	PUMP ID	ELEVATION CHANGE
P-1	J-1a	J-15	11000.0	5.4	.200	.0	0	20.0
P-2	J-4	J-16	1500.0	5.4	.200	.0	0	60.0
P-3	J-2	J-6	19000.0	6.2	.200	.0	0	-40.0
P-4	J-38	J-9	1600.0	4.0	.200	.0	0	40.0
P-5	J-22	J-3	15500.0	6.2	.200	.0	0	-290.0
P-6	Albany M	J-101	4500.0	5.4	.200	.0	0	.0
P-7	J-9	J-64	28000.0	4.0	.200	.0	0	.0
P-8	J-6	J-7	19000.0	6.2	.200	.0	0	40.0
P-9	J-7	J-14	41500.0	6.2	.200	.0	0	300.0
P-10	Byrdstow	J-1	1200.0	5.4	.200	.0	0	-80.0
P-11	J-1	Albany MM	7500.0	5.4	.200	.0	0	20.0
P-12	J-3	J-19	3400.0	8.2	.200	.0	0	.0

P-13	J-5	J-22	18500.0	6.2	.200	.0	0	-480.0
P-14	J-8	J-10	15000.0	5.4	.200	.0	0	.0
P-15	J-10	J-11	2000.0	5.4	.200	.0	0	.0
P-16	J-11	J-5	22000.0	5.4	.200	.0	0	120.0
P-17	J-12	J-8	37000.0	6.2	.200	.0	0	20.0
P-18	J-13	J-12	10000.0	6.2	.200	.0	0	340.0
P-19	J-14	J-13	9600.0	4.1	.200	.0	0	-560.0
P-20	J-15	J-2	4000.0	5.4	.200	.0	0	-80.0
P-21	J-16	J-1a	1500.0	5.4	.200	.0	0	.0
P-22	R-1	J-18	10.0	5.4	.200	.0	0	.0
P-23	J-18	J-4	1000.0	5.4	.200	.0	0	.0
P-24	J-19	Byrdstown	12900.0	5.4	.200	.0	0	30.0
P-36	J-101	J-38	33300.0	5.4	.200	.0	0	40.0
P-63	J-64	J-17	10000.0	4.0	.200	.0	0	.0

JUNCTION NAME	NODE TITLE	DEMAND (USFU)	FPN PRESSURE
Albany MM		.00	
Byrdstown		1578.00	
J-1		3.00	
J-2	Gemini MM	-1600.00	
J-3	Etter	103.00	
J-4	Spectra	.00	
J-5		.00	
J-6	Junker	199.00	
J-7	Baird / Gilliam	179.00	
J-8		.00	
J-9		.00	
J-10	Garrett	18.00	
J-11	Arnco MM	-800.00	
J-12	Williams / Madew	34.00	
J-13		.00	
J-14	Wiley	8.00	
J-15	Kreis / Wilson	182.00	
J-16		.00	
J-17	Keystone	16700.00	
J-18		-9000.00	
J-19		.00	
J-22	Moody	6.00	
J-38	Albany Gate	3683.00	
J-64		.00	
J-101		.00	
J-1a	Smith / Burns	136.00	
R-1		.00	60.00

===== RESULTS FOR THIS SIMULATION FOLLOW =====

Solution was obtained in 5 trials  
Flow Accuracy = .0000E+00[ < .500E-02]  
RV Accuracy = .0000E+00[ < .100E-02]

-----  
PIPE NODE NODE FLOW LOSS VELOCITY DENSITY FRICTION AREA

NO.	#1	#2	(USFU)	(USPU)	(FT/S)	(#/CF)	FACTOR	RATIO
P-1	J-1a	J-15	20293.000	.75	8.90	.177	.0202	.011
P-2	J-4	J-16	20429.000	.10	8.87	.179	.0202	.011
P-3	J-2	J-6	21711.000	.71	7.14	.175	.0202	.009
P-4	J-38	J-9	16700.000	.49	19.59	.120	.0206	.023
P-5	J-22	J-3	22067.000	.75	9.15	.139	.0201	.011
P-6	Albany MM	J-101	20383.000	.42	12.12	.131	.0202	.015
P-7	J-9	J-64	16700.000	9.87	22.51	.104	.0206	.027
P-8	J-6	J-7	21512.000	.70	7.16	.173	.0202	.009
P-9	J-7	J-14	21333.000	1.55	7.27	.169	.0202	.009
P-10	Byrdstown	J-1	20386.000	.11	11.86	.134	.0202	.014
P-11	J-1Albany MM		20383.000	.69	11.96	.133	.0202	.014
P-12	J-3	J-19	21964.000	.04	5.26	.138	.0206	.006
P-13	J-5	J-22	22073.000	.89	9.07	.140	.0201	.011
P-14	J-8	J-10	21291.000	1.33	11.04	.150	.0201	.013
P-15	J-10	J-11	21273.000	.18	11.20	.148	.0201	.013
P-16	J-11	J-5	22073.000	2.17	11.92	.144	.0200	.014
P-17	J-12	J-8	21291.000	1.51	7.93	.154	.0202	.010
P-18	J-13	J-12	21325.000	.40	7.77	.158	.0202	.009
P-19	J-14	J-13	21325.000	2.95	17.34	.162	.0201	.021
P-20	J-15	J-2	20111.000	.27	8.89	.176	.0202	.011
P-21	J-16	J-1a	20429.000	.10	8.89	.179	.0202	.011
P-22	R-1	J-18	11429.000	.00	4.95	.180	.0220	.006
P-23	J-18	J-4	20429.000	.07	8.85	.180	.0202	.011
P-24	J-19	Byrdstown	21964.000	1.34	12.59	.136	.0200	.015
P-36	J-101	J-38	20383.000	3.26	12.66	.125	.0202	.015
P-63	J-64	J-17	16700.000	4.43	28.26	.083	.0206	.034
R-1	R-1	R-1	11429.000	.00	.00	.180*****		.000

JUNCTION	NODE	DEMAND	PRESSURE	PRESSURE	PRESSURE	DENSITY
NAME	TITLE	(USFU)	(USPU)	(PSIA)	(PSIG)	#/CF
Albany MM		.00	43.91	43.91	29.21	.131
Byrdstown		1578.00	44.66	44.66	29.96	.134
J-1		3.00	44.62	44.62	29.93	.134
J-2	Gemini MM	-1600.00	58.70	58.70	44.00	.176
J-3	Etter	103.00	46.07	46.07	31.37	.138
J-4	Spectra	.00	59.93	59.93	45.24	.179
J-5		.00	46.96	46.96	32.26	.141
J-6	Junker	199.00	58.04	58.04	43.34	.174
J-7	Baird / Gilliam	179.00	57.29	57.29	42.59	.172
J-8		.00	50.76	50.76	36.06	.152
J-9		.00	39.67	39.67	24.98	.119
J-10	Garrett	18.00	49.43	49.43	34.73	.148
J-11	Arnco MM	-800.00	49.25	49.25	34.55	.147
J-12	Williams / Made	34.00	52.29	52.29	37.59	.157
J-13		.00	53.06	53.06	38.36	.159
J-14	Wiley	8.00	55.38	55.38	40.69	.166
J-15	Kreis / Wilson	182.00	58.87	58.87	44.18	.176
J-16		.00	59.75	59.75	45.06	.179
J-17	Keystone	16700.00	25.38	25.38	10.69	.076
J-18		-9000.00	60.00	60.00	45.30	.180
J-19		.00	46.02	46.02	31.33	.138
J-22	Moody	6.00	46.54	46.54	31.84	.139
J-38	Albany Gate	3683.00	40.20	40.20	25.50	.120
J-64		.00	29.81	29.81	15.11	.089

J-101		.00	43.49	43.49	28.79	.130
J-1a	Smith / Burns	136.00	59.65	59.65	44.95	.179
R-1		.00	60.00	60.00	45.30	.180

\* This designates the use of default density in a low pressure region

THE NET SYSTEM DEMAND (USFU) = 11429.000

SUMMARY OF INFLOWS(+) .AND. OUTFLOWS(-) :

```

-----
NAME          FLOW (USFU)          FPN TITLE
-----
R-1           11429.0                R-1

```

MAXIMUM MACH NUMBER = .03 IN LINE NO. P-63

SUMMARY OF MINIMUM .AND. MAXIMUM VELOCITIES (FT/S)

```

-----
MINIMUM          MAXIMUM
-----
R-1          .00 P-63          28.26
P-22         4.95 P-7           22.51
P-12         5.26 P-4           19.59
P-3          7.14 P-19          17.34
P-8          7.16 P-36          12.66

```

SUMMARY OF MINIMUM .AND. MAXIMUM LOSS/1000. (PSI )

```

-----
MINIMUM          MAXIMUM
-----
R-1          .00 P-63           .44
P-12         .01 P-7            .35
P-22         .02 P-19           .31
P-8          .04 P-4            .31
P-3          .04 P-24           .10

```

SUMMARY OF MINIMUM .AND. MAXIMUM PRESSURES (USPU)

```

-----
MINIMUM          MAXIMUM
-----
J-17         25.38 R-1           60.00
J-64         29.81 J-18           60.00
J-9          39.67 J-4            59.93
J-38         40.20 J-16           59.75
J-101        43.49 J-1a           59.65

```

\*\*\*\*\* END OF KYGAS SIMULATION \*\*\*\*\*  
DATE FOR THIS COMPUTER RUN : 8-31-2012  
START TIME FOR THIS COMPUTER RUN : 9:42:18:75

\*\*\* GAS2010 Version 2.0 \*\*\*  
 GAS DISTRIBUTION NETWORK ANALYSIS  
 COPYRIGHT 2010 - DON J. WOOD, SRINI LINGIREDDY  
 LEXINGTON, KY  
 Updated March 2010

**Scenario 2**

INPUT DATA FILE NAME FOR THIS SIMULATION = i:\projects\594\model\SCENAR~1.KYP\scenario.DAT  
 OUTPUT DATA FILE NAME FOR THIS SIMULATION = i:\projects\594\model\SCENAR~1.KYP\scenario.OT2

DATE FOR THIS COMPUTER RUN : 8-31-2012  
 START TIME FOR THIS COMPUTER RUN : 9:47:42:34

SUMMARY OF DISTRIBUTION SYSTEM CHARACTERISTICS:  
 -----

NUMBER OF PIPES = 27  
 NUMBER OF JUNCTION NODES = 27

UNITS SPECIFIED = ENGLISH

PROPERTIES OF THE GAS FOR THIS ANALYSIS ARE:

OPERATING TEMPERATURE = 60.000 DEGREES FAHRENHEIT  
 REFERENCE DENSITY (@ STD. PRESSURE) = .44E-01 POUNDS/CUBIC FOOT  
 GAS MOLECULAR WEIGHT = 16.700  
 GAS SPECIFIC GRAVITY = .576  
 RATIO OF SPECIFIC HEATS = 1.310  
 GAS CONSTANT = 92.536  
 ABSOLUTE VISCOSITY = .223E-06 POUND SECONDS/SQUARE FOOT

USER SPECIFIED FLOW UNITS (USFU) = SCF / HOUR  
 USER SPECIFIED PRESSURE UNITS (USPU) = PSI (ABS.)

----- SUMMARY OF PIPE NETWORK GEOMETRIC AND OPERATING DATA -----

PIPE NAME	NODE #1	NODE #2	LENGTH (FT.)	DIAM. (IN.)	ROUGHNESS (MILLIFEET)	SUM-M FACT.	PUMP ID	ELEVATION CHANGE
P-1	J-1a	J-15	11000.0	5.4	.200	.0	0	20.0
P-2	J-4	J-16	1500.0	5.4	.200	.0	0	60.0
P-3	J-2	J-6	19000.0	6.2	.200	.0	0	-40.0
P-4	J-38	J-9	1600.0	5.4	.200	.0	0	40.0
P-5	J-22	J-3	15500.0	6.2	.200	.0	0	-290.0
P-6	Albany M	J-101	4500.0	5.4	.200	.0	0	.0
P-7	J-9	J-64	28000.0	5.4	.200	.0	0	.0
P-8	J-6	J-7	19000.0	6.2	.200	.0	0	40.0
P-9	J-7	J-14	41500.0	6.2	.200	.0	0	300.0
P-10	Byrdstow	J-1	1200.0	5.4	.200	.0	0	-80.0
P-11	J-1Albany	MM	7500.0	5.4	.200	.0	0	20.0
P-12	J-3	J-19	3400.0	8.2	.200	.0	0	.0
P-13	J-5	J-22	18500.0	6.2	.200	.0	0	-480.0
P-14	J-8	J-10	15000.0	5.4	.200	.0	0	.0
P-15	J-10	J-11	2000.0	5.4	.200	.0	0	.0
P-16	J-11	J-5	22000.0	5.4	.200	.0	0	120.0

P-17	J-12	J-8	37000.0	6.2	.200	.0	0	20.0
P-18	J-13	J-12	10000.0	6.2	.200	.0	0	340.0
P-19	J-14	J-13	9600.0	4.1	.200	.0	0	-560.0
P-20	J-15	J-2	4000.0	5.4	.200	.0	0	-80.0
P-21	J-16	J-1a	1500.0	5.4	.200	.0	0	.0
P-22	R-1	J-18	10.0	5.4	.200	.0	0	.0
P-23	J-18	J-4	1000.0	5.4	.200	.0	0	.0
P-24	J-19	Byrdstown	12900.0	5.4	.200	.0	0	30.0
P-36	J-101	J-38	33300.0	5.4	.200	.0	0	40.0
P-63	J-64	J-17	10000.0	5.4	.200	.0	0	.0

JUNCTION NAME	NODE TITLE	DEMAND (USFU)	FPN PRESSURE
Albany MM		.00	
Byrdstown		1578.00	
J-1		3.00	
J-2	Gemini MM	-1600.00	
J-3	Etter	103.00	
J-4	Spectra	.00	
J-5		.00	
J-6	Junker	199.00	
J-7	Baird / Gilliam	179.00	
J-8		.00	
J-9		.00	
J-10	Garrett	18.00	
J-11	Arnco MM	-800.00	
J-12	Williams / Madew	34.00	
J-13		.00	
J-14	Wiley	8.00	
J-15	Kreis / Wilson	182.00	
J-16		.00	
J-17	Keystone	20000.00	
J-18		-9000.00	
J-19		.00	
J-22	Moody	6.00	
J-38	Albany Gate	3683.00	
J-64		.00	
J-101		.00	
J-1a	Smith / Burns	136.00	
R-1		.00	60.00

=====  
 ===== RESULTS FOR THIS SIMULATION FOLLOW =====

Solution was obtained in 6 trials  
 Flow Accuracy = .0000E+00[ < .500E-02]  
 RV Accuracy = .0000E+00[ < .100E-02]

PIPE NO.	NODE #1	NODE #2	FLOW (USFU)	LOSS (USPU)	VELOCITY (FT/S)	DENSITY (#/CF)	FRICTION FACTOR	AREA RATIO
P-1	J-1a	J-15	23593.000	1.00	10.38	.177	.0198	.012
P-2	J-4	J-16	23729.000	.14	10.31	.179	.0198	.012
P-3	J-2	J-6	25011.000	.93	8.30	.173	.0198	.010

P-4	J-38	J-9	20000.000	.20	16.70	.093	.0203	.020
P-5	J-22	J-3	25367.000	1.10	11.90	.123	.0197	.014
P-6	Albany MM	J-101	23683.000	.66	16.67	.110	.0198	.020
P-7	J-9	J-64	20000.000	3.80	17.86	.087	.0203	.021
P-8	J-6	J-7	24812.000	.93	8.37	.170	.0198	.010
P-9	J-7	J-14	24633.000	2.07	8.57	.165	.0198	.010
P-10	Byrdstown	J-1	23686.000	.17	16.04	.115	.0198	.019
P-11	J-1Albany MM		23683.000	1.08	16.29	.113	.0198	.020
P-12	J-3	J-19	25264.000	.06	6.88	.121	.0202	.008
P-13	J-5	J-22	25373.000	1.29	11.65	.125	.0197	.014
P-14	J-8	J-10	24591.000	1.87	13.70	.140	.0197	.016
P-15	J-10	J-11	24573.000	.25	14.01	.136	.0197	.017
P-16	J-11	J-5	25373.000	3.09	15.04	.131	.0197	.018
P-17	J-12	J-8	24591.000	2.09	9.71	.146	.0198	.012
P-18	J-13	J-12	24625.000	.55	9.43	.150	.0198	.011
P-19	J-14	J-13	24625.000	4.03	20.76	.157	.0198	.025
P-20	J-15	J-2	23411.000	.36	10.41	.175	.0198	.012
P-21	J-16	J-1a	23729.000	.14	10.34	.179	.0198	.012
P-22	R-1	J-18	14729.000	.00	6.38	.180	.0212	.008
P-23	J-18	J-4	23729.000	.09	10.28	.180	.0198	.012
P-24	J-19	Byrdstown	25264.000	2.00	16.64	.118	.0197	.020
P-36	J-101	J-38	23683.000	5.32	18.15	.102	.0198	.022
P-63	J-64	J-17	20000.000	1.49	19.64	.079	.0203	.024
R-1	R-1	R-1	14729.000	.00	.00	.180	*****	.000

JUNCTION	NODE	DEMAND	PRESSURE	PRESSURE	PRESSURE	DENSITY
NAME	TITLE	(USFU)	(USPU)	(PSIA)	(PSIG)	#/CF
Albany MM		.00	37.23	37.23	22.54	.111
Byrdstown		1578.00	38.43	38.43	23.73	.115
J-1		3.00	38.32	38.32	23.63	.115
J-2	Gemini MM	-1600.00	58.27	58.27	43.57	.174
J-3	Etter	103.00	40.52	40.52	25.82	.121
J-4	Spectra	.00	59.91	59.91	45.21	.179
J-5		.00	42.24	42.24	27.54	.126
J-6	Junker	199.00	57.39	57.39	42.69	.172
J-7	Baird / Gilliam	179.00	56.41	56.41	41.71	.169
J-8		.00	47.57	47.57	32.87	.142
J-9		.00	30.99	30.99	16.30	.093
J-10	Garrett	18.00	45.70	45.70	31.00	.137
J-11	Arnco MM	-800.00	45.44	45.44	30.75	.136
J-12	Williams / Made	34.00	49.67	49.67	34.98	.149
J-13		.00	50.58	50.58	35.88	.151
J-14	Wiley	8.00	54.00	54.00	39.30	.162
J-15	Kreis / Wilson	182.00	58.53	58.53	43.84	.175
J-16		.00	59.70	59.70	45.00	.179
J-17	Keystone	20000.00	25.70	25.70	11.00	.077
J-18		-9000.00	60.00	60.00	45.30	.180
J-19		.00	40.45	40.45	25.76	.121
J-22	Moody	6.00	41.37	41.37	26.67	.124
J-38	Albany Gate	3683.00	31.22	31.22	16.52	.093
J-64		.00	27.19	27.19	12.49	.081
J-101		.00	36.57	36.57	21.87	.110
J-1a	Smith / Burns	136.00	59.56	59.56	44.87	.178
R-1		.00	60.00	60.00	45.30	.180

\* This designates the use of default density in a low pressure region



THE NET SYSTEM DEMAND (USFU) = 14729.000

SUMMARY OF INFLOWS (+) AND OUTFLOWS (-) :

NAME	FLOW (USFU)	FPN TITLE
R-1	14729.0	R-1

MAXIMUM MACH NUMBER = .02 IN LINE NO. P-19

SUMMARY OF MINIMUM AND MAXIMUM VELOCITIES (FT/S)

	MINIMUM		MAXIMUM
R-1	.00	P-19	20.76
P-22	6.38	P-63	19.64
P-12	6.88	P-36	18.15
P-3	8.30	P-7	17.86
P-8	8.37	P-4	16.70

SUMMARY OF MINIMUM AND MAXIMUM LOSS/1000. (PSI)

	MINIMUM		MAXIMUM
R-1	.00	P-19	.42
P-12	.02	P-36	.16
P-22	.04	P-24	.16
P-3	.05	P-63	.15
P-8	.05	P-6	.15

SUMMARY OF MINIMUM AND MAXIMUM PRESSURES (USPU)

	MINIMUM		MAXIMUM
J-17	25.70	R-1	60.00
J-64	27.19	J-18	60.00
J-9	30.99	J-4	59.91
J-38	31.22	J-16	59.70
J-101	36.57	J-1a	59.56

\*\*\*\*\* END OF KYGAS SIMULATION \*\*\*\*\*

DATE FOR THIS COMPUTER RUN : 8-31-2012  
START TIME FOR THIS COMPUTER RUN : 9:47:42:35

\*\*\* GAS2010 Version 2.0 \*\*\*  
 GAS DISTRIBUTION NETWORK ANALYSIS  
 COPYRIGHT 2010 - DON J. WOOD, SRINI LINGIREDDY  
 LEXINGTON, KY  
 Updated March 2010

**Scenario 3**

INPUT DATA FILE NAME FOR THIS SIMULATION = i:\projects\594\model\SCENAR-3.KYP\scenario.DAT  
 OUTPUT DATA FILE NAME FOR THIS SIMULATION = i:\projects\594\model\SCENAR-3.KYP\scenario.OT2

DATE FOR THIS COMPUTER RUN : 8-31-2012  
 START TIME FOR THIS COMPUTER RUN : 9:52: 8:65

SUMMARY OF DISTRIBUTION SYSTEM CHARACTERISTICS:  
 -----

NUMBER OF PIPES = 27  
 NUMBER OF JUNCTION NODES = 27  
 UNITS SPECIFIED = ENGLISH

PROPERTIES OF THE GAS FOR THIS ANALYSIS ARE:

OPERATING TEMPERATURE = 60.000 DEGREES FAHRENHEIT  
 REFERENCE DENSITY (@ STD. PRESSURE) = .44E-01 POUNDS/CUBIC FOOT  
 GAS MOLECULAR WEIGHT = 16.700  
 GAS SPECIFIC GRAVITY = .576  
 RATIO OF SPECIFIC HEATS = 1.310  
 GAS CONSTANT = 92.536  
 ABSOLUTE VISCOSITY = .223E-06 POUND SECONDS/SQUARE FOOT

USER SPECIFIED FLOW UNITS (USFU) = SCF / HOUR  
 USER SPECIFIED PRESSURE UNITS (USPU) = PSI (ABS.)

----- SUMMARY OF PIPE NETWORK GEOMETRIC AND OPERATING DATA -----

PIPE NAME	NODE #1	NODE #2	LENGTH (FT.)	DIAM. (IN.)	ROUGHNESS (MILLIFEET)	SUM-M FACT.	PUMP ID	ELEVATION CHANGE
P-1	J-1a	J-15	11000.0	5.4	.200	.0	0	20.0
P-2	J-4	J-16	1500.0	5.4	.200	.0	0	60.0
P-3	J-2	J-6	19000.0	6.2	.200	.0	0	-40.0
P-4	J-38	J-9	1600.0	5.4	.200	.0	0	40.0
P-5	J-22	J-3	15500.0	6.2	.200	.0	0	-290.0
P-6	Albany M	J-101	4500.0	5.4	.200	.0	0	.0
P-7	J-9	J-64	28000.0	5.4	.200	.0	0	.0
P-8	J-6	J-7	19000.0	6.2	.200	.0	0	40.0
P-9	J-7	J-14	41500.0	6.2	.200	.0	0	300.0
P-10	Byrdstow	J-1	1200.0	5.4	.200	.0	0	-80.0
P-11	J-1Albany	MM	7500.0	5.4	.200	.0	0	20.0
P-12	J-3	J-19	3400.0	8.2	.200	.0	0	.0
P-13	J-5	J-22	18500.0	6.2	.200	.0	0	-480.0

P-14	J-8	J-10	15000.0	5.4	.200	.0	0	.0
P-15	J-10	J-11	2000.0	5.4	.200	.0	0	.0
P-16	J-11	J-5	22000.0	5.4	.200	.0	0	120.0
P-17	J-12	J-8	37000.0	6.2	.200	.0	0	20.0
P-18	J-13	J-12	10000.0	6.2	.200	.0	0	340.0
P-19	J-14	J-13	9600.0	6.2	.200	.0	0	-560.0
P-20	J-15	J-2	4000.0	5.4	.200	.0	0	-80.0
P-21	J-16	J-1a	1500.0	5.4	.200	.0	0	.0
P-22	R-1	J-18	10.0	5.4	.200	.0	0	.0
P-23	J-18	J-4	1000.0	5.4	.200	.0	0	.0
P-24	J-19	Byrdstown	12900.0	5.4	.200	.0	0	30.0
P-36	J-101	J-38	33300.0	5.4	.200	.0	0	40.0
P-63	J-64	J-17	10000.0	5.4	.200	.0	0	.0

JUNCTION NAME	NODE TITLE	DEMAND (USFU)	FPN PRESSURE
Albany MM		.00	
Byrdstown		1578.00	
J-1		3.00	
J-2	Gemini MM	-1600.00	
J-3	Etter	103.00	
J-4	Spectra	.00	
J-5		.00	
J-6	Junker	199.00	
J-7	Baird / Gilliam	179.00	
J-8		.00	
J-9		.00	
J-10	Garrett	18.00	
J-11	Arnco MM	-800.00	
J-12	Williams / Madew	34.00	
J-13		.00	
J-14	Wiley	8.00	
J-15	Kreis / Wilson	182.00	
J-16		.00	
J-17	Keystone	21800.00	
J-18		-9000.00	
J-19		.00	
J-22	Moody	6.00	
J-38	Albany Gate	3683.00	
J-64		.00	
J-101		.00	
J-1a	Smith / Burns	136.00	
R-1		.00	60.00

===== RESULTS FOR THIS SIMULATION FOLLOW =====

Solution was obtained in 6 trials  
Flow Accuracy = .0000E+00[ < .500E-02]  
RV Accuracy = .0000E+00[ < .100E-02]

PIPE NO.	NODE #1	NODE #2	FLOW (USFU)	LOSS VELOCITY (USPU)	DENSITY (FT/S)	FRICITION (#/CF)	AREA RATIO
-------------	------------	------------	----------------	-------------------------	-------------------	---------------------	---------------

P-1	J-1a	J-15	25393.000	1.15	11.20	.176	.0196	.013
P-2	J-4	J-16	25529.000	.16	11.10	.179	.0196	.013
P-3	J-2	J-6	26811.000	1.06	8.95	.172	.0196	.011
P-4	J-38	J-9	21800.000	.23	17.79	.095	.0200	.021
P-5	J-22	J-3	27167.000	1.20	12.21	.128	.0196	.015
P-6	Albany MM	J-101	25483.000	.73	17.30	.115	.0196	.021
P-7	J-9	J-64	21800.000	4.40	19.19	.088	.0200	.023
P-8	J-6	J-7	26612.000	1.07	9.05	.169	.0196	.011
P-9	J-7	J-14	26433.000	2.39	9.31	.163	.0196	.011
P-10	Byrdstown	J-1	25486.000	.19	16.59	.120	.0196	.020
P-11	J-1Albany MM		25483.000	1.19	16.87	.118	.0196	.020
P-12	J-3	J-19	27064.000	.07	7.06	.126	.0199	.008
P-13	J-5	J-22	27173.000	1.40	11.95	.131	.0196	.014
P-14	J-8	J-10	26391.000	2.04	14.01	.147	.0196	.017
P-15	J-10	J-11	26373.000	.28	14.34	.143	.0196	.017
P-16	J-11	J-5	27173.000	3.36	15.38	.137	.0195	.018
P-17	J-12	J-8	26391.000	2.27	9.92	.153	.0196	.012
P-18	J-13	J-12	26425.000	.59	9.62	.158	.0196	.012
P-19	J-14	J-13	26425.000	.57	9.54	.159	.0196	.011
P-20	J-15	J-2	25211.000	.42	11.26	.174	.0197	.013
P-21	J-16	J-1a	25529.000	.16	11.13	.178	.0196	.013
P-22	R-1	J-18	16529.000	.00	7.16	.180	.0208	.009
P-23	J-18	J-4	25529.000	.10	11.06	.180	.0196	.013
P-24	J-19Byrdstown		27064.000	2.19	17.12	.123	.0195	.021
P-36	J-101	J-38	25483.000	5.92	18.95	.105	.0196	.023
P-63	J-64	J-17	21800.000	1.75	21.42	.079	.0200	.026
R-1	R-1	R-1	16529.000	.00	.00	.180*****		.000

JUNCTION	NODE	DEMAND	PRESSURE	PRESSURE	PRESSURE	DENSITY
NAME	TITLE	(USFU)	(USPU)	(PSIA)	(PSIG)	#/CF
Albany MM		.00	38.65	38.65	23.95	.116
Byrdstown		1578.00	39.97	39.97	25.28	.120
J-1		3.00	39.85	39.85	25.15	.119
J-2	Gemini MM	-1600.00	58.01	58.01	43.31	.174
J-3	Etter	103.00	42.25	42.25	27.55	.127
J-4	Spectra	.00	59.90	59.90	45.20	.179
J-5		.00	44.15	44.15	29.46	.132
J-6	Junker	199.00	56.99	56.99	42.30	.171
J-7	Baird / Gilliam	179.00	55.87	55.87	41.18	.167
J-8		.00	49.94	49.94	35.25	.150
J-9		.00	31.70	31.70	17.01	.095
J-10	Garrett	18.00	47.91	47.91	33.21	.143
J-11	Arnco MM	-800.00	47.63	47.63	32.94	.143
J-12	Williams / Made	34.00	52.23	52.23	37.54	.156
J-13		.00	53.20	53.20	38.50	.159
J-14	Wiley	8.00	53.15	53.15	38.45	.159
J-15	Kreis / Wilson	182.00	58.33	58.33	43.63	.175
J-16		.00	59.66	59.66	44.97	.179
J-17	Keystone	21800.00	25.55	25.55	10.85	.076
J-18		-9000.00	60.00	60.00	45.30	.180
J-19		.00	42.18	42.18	27.49	.126
J-22	Moody	6.00	43.19	43.19	28.49	.129
J-38	Albany Gate	3683.00	31.96	31.96	17.27	.096
J-64		.00	27.30	27.30	12.60	.082
J-101		.00	37.92	37.92	23.22	.114

J-1a	Smith / Burns	136.00	59.51	59.51	44.81	.178
R-1		.00	60.00	60.00	45.30	.180

\* This designates the use of default density in a low pressure region

THE NET SYSTEM DEMAND (USFU) = 16529.000

SUMMARY OF INFLOWS(+) .AND. OUTFLOWS(-) :

NAME	FLOW (USFU)	FPN TITLE
R-1	16529.0	R-1

MAXIMUM MACH NUMBER = .02 IN LINE NO. P-63

SUMMARY OF MINIMUM .AND. MAXIMUM VELOCITIES (FT/S)

	MINIMUM		MAXIMUM
R-1	.00	P-63	21.42
P-12	7.06	P-7	19.19
P-22	7.16	P-36	18.95
P-3	8.95	P-4	17.79
P-8	9.05	P-6	17.30

SUMMARY OF MINIMUM .AND. MAXIMUM LOSS/1000. (PSI )

	MINIMUM		MAXIMUM
R-1	.00	P-36	.18
P-12	.02	P-63	.18
P-22	.05	P-24	.17
P-3	.06	P-6	.16
P-8	.06	P-11	.16

SUMMARY OF MINIMUM .AND. MAXIMUM PRESSURES (USPU)

	MINIMUM		MAXIMUM
J-17	25.55	R-1	60.00
J-64	27.30	J-18	60.00
J-9	31.70	J-4	59.90
J-38	31.96	J-16	59.66
J-101	37.92	J-1a	59.51

\*\*\*\*\* END OF KYGAS SIMULATION \*\*\*\*\*

DATE FOR THIS COMPUTER RUN : 8-31-2012  
 START TIME FOR THIS COMPUTER RUN : 9:52: 8:66

\*\*\* GAS2010 Version 2.0 \*\*\*  
 GAS DISTRIBUTION NETWORK ANALYSIS  
 COPYRIGHT 2010 - DON J. WOOD, SRINI LINGIREDDY  
 LEXINGTON, KY  
 Updated March 2010

**Scenario 4**

INPUT DATA FILE NAME FOR THIS SIMULATION = i:\projects\594\model\SCENAR~4.KYP\scenario.DAT  
 OUTPUT DATA FILE NAME FOR THIS SIMULATION = i:\projects\594\model\SCENAR~4.KYP\scenario.OT2

DATE FOR THIS COMPUTER RUN : 9-18-2012  
 START TIME FOR THIS COMPUTER RUN : 10:27:33: 4

SUMMARY OF DISTRIBUTION SYSTEM CHARACTERISTICS:  
 -----

NUMBER OF PIPES = 27  
 NUMBER OF JUNCTION NODES = 27  
 UNITS SPECIFIED = ENGLISH

PROPERTIES OF THE GAS FOR THIS ANALYSIS ARE:

OPERATING TEMPERATURE = 60.000 DEGREES FAHRENHEIT  
 REFERENCE DENSITY (@ STD. PRESSURE) = .44E-01 POUNDS/CUBIC FOOT  
 GAS MOLECULAR WEIGHT = 16.700  
 GAS SPECIFIC GRAVITY = .576  
 RATIO OF SPECIFIC HEATS = 1.310  
 GAS CONSTANT = 92.536  
 ABSOLUTE VISCOSITY = .223E-06 POUND SECONDS/SQUARE FOOT

USER SPECIFIED FLOW UNITS (USFU) = SCF / HOUR  
 USER SPECIFIED PRESSURE UNITS (USPU) = PSI (ABS.)

----- SUMMARY OF PIPE NETWORK GEOMETRIC AND OPERATING DATA -----

PIPE NAME	NODE #1	NODE #2	LENGTH (FT.)	DIAM. (IN.)	ROUGHNESS (MILLIFEET)	SUM-M FACT.	PUMP ID	ELEVATION CHANGE
P-1	J-1a	J-15	11000.0	5.4	.200	.0	0	20.0
P-2	J-4	J-16	1500.0	5.4	.200	.0	0	60.0
P-3	J-2	J-6	19000.0	6.2	.200	.0	0	-40.0
P-4	J-38	J-9	1600.0	5.4	.200	.0	0	40.0
P-5	J-22	J-3	15500.0	6.2	.200	.0	0	-290.0
P-6	Albany M	J-101	4500.0	5.4	.200	.0	0	.0
P-7	J-9	J-64	28000.0	5.4	.200	.0	0	.0
P-8	J-6	J-7	19000.0	6.2	.200	.0	0	40.0

P-9	J-7	J-14	41500.0	6.2	.200	.0	0	300.0
P-10	Byrdstow	J-1	1200.0	5.4	.200	.0	0	-80.0
P-11	J-1	Albany MM	7500.0	5.4	.200	.0	0	20.0
P-12	J-3	J-19	3400.0	8.2	.200	.0	0	.0
P-13	J-5	J-22	18500.0	6.2	.200	.0	0	-480.0
P-14	J-8	J-10	15000.0	5.4	.200	.0	0	.0
P-15	J-10	J-11	2000.0	5.4	.200	.0	0	.0
P-16	J-11	J-5	22000.0	5.4	.200	.0	0	120.0
P-17	J-12	J-8	37000.0	6.2	.200	.0	0	20.0
P-18	J-13	J-12	10000.0	6.2	.200	.0	0	340.0
P-19	J-14	J-13	9600.0	6.2	.200	.0	0	-560.0
P-20	J-15	J-2	4000.0	5.4	.200	.0	0	-80.0
P-21	J-16	J-1a	1500.0	5.4	.200	.0	0	.0
P-22	R-1	J-18	10.0	5.4	.200	.0	0	.0
P-23	J-18	J-4	1000.0	5.4	.200	.0	0	.0
P-24	J-19	Byrdstown	12900.0	5.4	.200	.0	0	30.0
P-36	J-101	J-38	33300.0	5.4	.200	.0	0	40.0
P-63	J-64	J-17	10000.0	5.4	.200	.0	0	.0

JUNCTION NAME	NODE TITLE	DEMAND (USFU)	FPN PRESSURE
Albany MM		.00	
Byrdstown		1578.00	
J-1		3.00	
J-2	Gemini MM	-1600.00	
J-3	Etter	103.00	
J-4	Spectra	.00	
J-5		.00	
J-6	Junker	199.00	
J-7	Baird / Gilliam	179.00	
J-8		.00	
J-9		.00	
J-10	Garrett	18.00	
J-11	Arnco MM	-800.00	
J-12	Williams / Madew	34.00	
J-13		.00	
J-14	Wiley	8.00	
J-15	Kreis / Wilson	182.00	
J-16		.00	
J-17	Keystone	32800.00	
J-18		-9000.00	
J-19		.00	
J-22	Moody	6.00	
J-38	Albany Gate	3683.00	
J-64		.00	
J-101		.00	
J-1a	Smith / Burns	136.00	
R-1		.00	80.00

===== RESULTS FOR THIS SIMULATION FOLLOW =====

Solution was obtained in 6 trials  
 Flow Accuracy = .0000E+00[ < .500E-02]  
 RV Accuracy = .0000E+00[ < .100E-02]

PIPE NO.	NODE #1	NODE #2	FLOW (USFU)	LOSS (USPU)	VELOCITY (FT/S)	DENSITY (#/CF)	FRICTION FACTOR	AREA RATIO
P-1	J-1a	J-15	36393.000	1.71	12.06	.235	.0189	.014
P-2	J-4	J-16	36529.000	.23	11.91	.239	.0189	.014
P-3	J-2	J-6	37811.000	1.53	9.51	.229	.0188	.011
P-4	J-38	J-9	32800.000	.43	22.82	.112	.0191	.027
P-5	J-22	J-3	38167.000	1.77	13.42	.163	.0188	.016
P-6	Albany MM	J-101	36483.000	1.15	19.84	.143	.0189	.024
P-7	J-9	J-64	32800.000	8.52	25.92	.098	.0191	.031
P-8	J-6	J-7	37612.000	1.54	9.66	.224	.0188	.012
P-9	J-7	J-14	37433.000	3.47	9.98	.216	.0188	.012
P-10	Byrdstown	J-1	36486.000	.29	18.83	.151	.0189	.023
P-11	J-1	Albany MM	36483.000	1.86	19.23	.148	.0189	.023
P-12	J-3	J-19	38064.000	.10	7.79	.161	.0189	.009
P-13	J-5	J-22	38173.000	2.06	13.07	.168	.0188	.016
P-14	J-8	J-10	37391.000	3.01	15.22	.191	.0188	.018
P-15	J-10	J-11	37373.000	.41	15.63	.186	.0188	.019
P-16	J-11	J-5	38173.000	4.94	16.71	.178	.0188	.020
P-17	J-12	J-8	37391.000	3.32	10.71	.201	.0188	.013
P-18	J-13	J-12	37425.000	.87	10.36	.208	.0188	.012
P-19	J-14	J-13	37425.000	.83	10.26	.210	.0188	.012
P-20	J-15	J-2	36211.000	.62	12.17	.231	.0189	.015
P-21	J-16	J-1a	36529.000	.23	11.95	.238	.0189	.014
P-22	R-1	J-18	27529.000	.00	8.94	.240	.0195	.011
P-23	J-18	J-4	36529.000	.15	11.87	.239	.0189	.014
P-24	J-19	Byrdstown	38064.000	3.28	18.98	.156	.0188	.023
P-36	J-101	J-38	36483.000	9.62	22.36	.127	.0189	.027
P-63	J-64	J-17	32800.000	3.73	31.78	.080	.0191	.038
R-1	R-1	R-1	27529.000	.00	.00	.240*****		.000

JUNCTION NAME	NODE TITLE	DEMAND (USFU)	PRESSURE (USPU)	PRESSURE (PSIA)	PRESSURE (PSIG)	DENSITY (#/CF)
Albany MM		.00	48.36	48.36	33.67	.145
Byrdstown		1578.00	50.45	50.45	35.76	.151
J-1		3.00	50.25	50.25	35.55	.150
J-2	Gemini MM	-1600.00	77.05	77.05	62.35	.231
J-3	Etter	103.00	53.87	53.87	39.17	.161
J-4	Spectra	.00	79.85	79.85	65.15	.239
J-5		.00	56.82	56.82	42.12	.170
J-6	Junker	199.00	75.58	75.58	60.88	.226
J-7	Baird / Gilliam	179.00	73.97	73.97	59.28	.222
J-8		.00	65.34	65.34	50.64	.196
J-9		.00	37.10	37.10	22.40	.111



J-10	Garrett	18.00	62.32	62.32	47.63	.187
J-11	Arnco MM	-800.00	61.91	61.91	47.21	.185
J-12	Williams / Made	34.00	68.68	68.68	53.99	.206
J-13		.00	70.04	70.04	55.35	.210
J-14	Wiley	8.00	70.05	70.05	55.36	.210
J-15	Kreis / Wilson	182.00	77.54	77.54	62.85	.232
J-16		.00	79.52	79.52	64.82	.238
J-17	Keystone	32800.00	24.84	24.84	10.15	.074
J-18		-9000.00	80.00	80.00	65.30	.240
J-19		.00	53.77	53.77	39.08	.161
J-22	Moody	6.00	55.32	55.32	40.62	.166
J-38	Albany Gate	3683.00	37.56	37.56	22.86	.112
J-64		.00	28.57	28.57	13.88	.086
J-101		.00	47.21	47.21	32.51	.141
J-1a	Smith / Burns	136.00	79.28	79.28	64.59	.237
R-1		.00	80.00	80.00	65.30	.240

\* This designates the use of default density in a low pressure region

THE NET SYSTEM DEMAND (USFU) = 27529.000

SUMMARY OF INFLOWS(+) AND OUTFLOWS(-) :

NAME	FLOW (USFU)	FPN TITLE
R-1	27529.0	R-1

MAXIMUM MACH NUMBER = .03 IN LINE NO. P-63

SUMMARY OF MINIMUM AND MAXIMUM VELOCITIES (FT/S)

	MINIMUM		MAXIMUM
R-1	.00	P-63	31.78
P-12	7.79	P-7	25.92
P-22	8.94	P-4	22.82
P-3	9.51	P-36	22.36
P-8	9.66	P-6	19.84

SUMMARY OF MINIMUM AND MAXIMUM LOSS/1000. (PSI )

	MINIMUM		MAXIMUM
R-1	.01	P-63	.37
P-12	.03	P-7	.30
P-3	.08	P-36	.29
P-8	.08	P-4	.27
P-9	.08	P-6	.26

SUMMARY OF MINIMUM.AND.MAXIMUM PRESSURES (USPU)

MINIMUM		MAXIMUM	
J-17	24.84	R-1	80.00
J-64	28.57	J-18	80.00
J-9	37.10	J-4	79.85
J-38	37.56	J-16	79.52
J-101	47.21	J-1a	79.28

\*\*\*\*\* END OF KYGAS SIMULATION \*\*\*\*\*

DATE FOR THIS COMPUTER RUN : 9-18-2012  
START TIME FOR THIS COMPUTER RUN : 10:27:33: 5

\*\*\* GAS2010 Version 2.0 \*\*\*  
 GAS DISTRIBUTION NETWORK ANALYSIS  
 COPYRIGHT 2010 - DON J. WOOD, SRINI LINGIREDDY  
 LEXINGTON, KY  
 Updated March 2010

**Scenario 5**

INPUT DATA FILE NAME FOR THIS SIMULATION = i:\projects\594\model\SCB11F-1.KYP\scenario.DAT  
 OUTPUT DATA FILE NAME FOR THIS SIMULATION = i:\projects\594\model\SCB11F-1.KYP\scenario.OT2

DATE FOR THIS COMPUTER RUN : 9-18-2012  
 START TIME FOR THIS COMPUTER RUN : 16: 1:36:53

SUMMARY OF DISTRIBUTION SYSTEM CHARACTERISTICS:  
 -----

NUMBER OF PIPES = 27  
 NUMBER OF JUNCTION NODES = 27  
 UNITS SPECIFIED = ENGLISH

PROPERTIES OF THE GAS FOR THIS ANALYSIS ARE:

OPERATING TEMPERATURE = 60.000 DEGREES FAHRENHEIT  
 REFERENCE DENSITY (@ STD. PRESSURE) = .44E-01 POUNDS/CUBIC FOOT  
 GAS MOLECULAR WEIGHT = 16.700  
 GAS SPECIFIC GRAVITY = .576  
 RATIO OF SPECIFIC HEATS = 1.310  
 GAS CONSTANT = 92.536  
 ABSOLUTE VISCOSITY = .223E-06 POUND SECONDS/SQUARE FOOT

USER SPECIFIED FLOW UNITS (USFU) = SCF / HOUR  
 USER SPECIFIED PRESSURE UNITS (USPU) = PSI (ABS.)

----- SUMMARY OF PIPE NETWORK GEOMETRIC AND OPERATING DATA -----

PIPE NAME	NODE #1	NODE #2	LENGTH (FT.)	DIAM. (IN.)	ROUGHNESS (MILLIFEET)	SUM-M FACT.	PUMP ID	ELEVATION CHANGE
P-1	J-1a	J-15	11000.0	8.2	.200	.0	0	20.0
P-2	J-4	J-16	1500.0	8.2	.200	.0	0	60.0
P-3	J-2	J-6	19000.0	8.2	.200	.0	0	-40.0
P-4	J-38	J-9	1600.0	7.0	.200	.0	0	40.0
P-5	J-22	J-3	15500.0	8.2	.200	.0	0	-290.0
P-6	Albany M	J-101	4500.0	7.0	.200	.0	0	.0
P-7	J-9	J-64	28000.0	7.0	.200	.0	0	.0
P-8	J-6	J-7	19000.0	8.2	.200	.0	0	40.0
P-9	J-7	J-14	41500.0	8.2	.200	.0	0	300.0
P-10	Byrdstow	J-1	1200.0	8.2	.200	.0	0	-80.0
P-11	J-1Albany	MM	7500.0	8.2	.200	.0	0	20.0
P-12	J-3	J-19	3400.0	8.2	.200	.0	0	.0
P-13	J-5	J-22	18500.0	8.2	.200	.0	0	-480.0

P-14	J-8	J-10	15000.0	8.2	.200	.0	0	.0
P-15	J-10	J-11	2000.0	8.2	.200	.0	0	.0
P-16	J-11	J-5	22000.0	8.2	.200	.0	0	120.0
P-17	J-12	J-8	37000.0	8.2	.200	.0	0	20.0
P-18	J-13	J-12	10000.0	8.2	.200	.0	0	340.0
P-19	J-14	J-13	9600.0	8.2	.200	.0	0	-560.0
P-20	J-15	J-2	4000.0	8.2	.200	.0	0	-80.0
P-21	J-16	J-1a	1500.0	8.2	.200	.0	0	.0
P-22	R-1	J-18	10.0	8.2	.200	.0	0	.0
P-23	J-18	J-4	1000.0	8.2	.200	.0	0	.0
P-24	J-19	Byrdstown	12900.0	8.2	.200	.0	0	30.0
P-36	J-101	J-38	33300.0	7.0	.200	.0	0	40.0
P-63	J-64	J-17	10000.0	7.0	.200	.0	0	.0

JUNCTION NAME	NODE TITLE	DEMAND (USFU)	FPN PRESSURE
Albany MM		.00	
Byrdstown		1578.00	
J-1		3.00	
J-2	Gemini MM	-1600.00	
J-3	Etter	103.00	
J-4	Spectra	.00	
J-5		.00	
J-6	Junker	199.00	
J-7	Baird / Gilliam	179.00	
J-8		.00	
J-9		.00	
J-10	Garrett	18.00	
J-11	Arnco MM	-800.00	
J-12	Williams / Madew	34.00	
J-13		.00	
J-14	Wiley	8.00	
J-15	Kreis / Wilson	182.00	
J-16		.00	
J-17	Keystone	81700.00	
J-18		-9000.00	
J-19		.00	
J-22	Moody	6.00	
J-38	Albany Gate	3683.00	
J-64		.00	
J-101		.00	
J-1a	Smith / Burns	136.00	
R-1		.00	83.00

===== RESULTS FOR THIS SIMULATION FOLLOW =====

Solution was obtained in 6 trials  
Flow Accuracy = .0000E+00[ < .500E-02]  
RV Accuracy = .0000E+00[ < .100E-02]

PIPE NO.	NODE #1	NODE #2	FLOW (USFU)	LOSS (USPU)	VELOCITY (FT/S)	DENSITY (#/CF)	FRICTION FACTOR	AREA RATIO
P-1	J-1a	J-15	85292.990	.96	11.45	.246	.0172	.014
P-2	J-4	J-16	85428.990	.13	11.37	.248	.0172	.014
P-3	J-2	J-6	86710.990	1.74	11.87	.241	.0171	.014
P-4	J-38	J-9	81700.000	.54	28.03	.134	.0173	.034
P-5	J-22	J-3	87067.000	1.88	15.73	.183	.0171	.019
P-6	Albany MM	J-101	85383.010	1.31	23.17	.169	.0173	.028
P-7	J-9	J-64	81700.000	10.83	32.12	.117	.0173	.038
P-8	J-6	J-7	86512.000	1.77	12.10	.236	.0171	.015
P-9	J-7	J-14	86333.000	4.01	12.58	.226	.0172	.015
P-10	Byrdstown	J-1	85386.000	.15	16.19	.174	.0172	.019
P-11	J-1	Albany MM	85383.010	.93	16.33	.173	.0172	.020
P-12	J-3	J-19	86964.000	.42	15.97	.180	.0171	.019
P-13	J-5	J-22	87073.000	2.19	15.34	.187	.0171	.018
P-14	J-8	J-10	86291.000	1.63	14.18	.201	.0172	.017
P-15	J-10	J-11	86273.000	.22	14.38	.198	.0172	.017
P-16	J-11	J-5	87073.000	2.52	14.84	.194	.0171	.018
P-17	J-12	J-8	86291.000	3.86	13.62	.209	.0172	.016
P-18	J-13	J-12	86325.000	1.01	13.12	.217	.0172	.016
P-19	J-14	J-13	86325.000	.96	12.97	.220	.0172	.016
P-20	J-15	J-2	85110.990	.35	11.51	.244	.0172	.014
P-21	J-16	J-1a	85428.990	.13	11.39	.247	.0172	.014
P-22	R-1	J-18	76428.990	.00	10.15	.249	.0174	.012
P-23	J-18	J-4	85428.990	.09	11.35	.248	.0172	.014
P-24	J-19	Byrdstown	86964.000	1.62	16.25	.177	.0171	.019
P-36	J-101	J-38	85383.010	10.84	25.97	.151	.0173	.031
P-63	J-64	J-17	81700.000	4.84	40.15	.093	.0173	.048
R-1	R-1	R-1	76428.990	.00	.00	.249*****		.000

JUNCTION NAME	NODE TITLE	DEMAND (USFU)	PRESSURE (USPU)	PRESSURE (PSIA)	PRESSURE (PSIG)	DENSITY (#/CF)
Albany MM		.00	57.15	57.15	42.45	.171
Byrdstown		1578.00	58.15	58.15	43.46	.174
J-1		3.00	58.10	58.10	43.41	.174
J-2	Gemini MM	-1600.00	81.35	81.35	66.65	.244
J-3	Etter	103.00	60.23	60.23	45.53	.180
J-4	Spectra	.00	82.91	82.91	68.22	.248
J-5		.00	63.32	63.32	48.62	.190
J-6	Junker	199.00	79.68	79.68	64.98	.239
J-7	Baird / Gilliam	179.00	77.84	77.84	63.15	.233
J-8		.00	67.85	67.85	53.16	.203
J-9		.00	44.38	44.38	29.69	.133
J-10	Garrett	18.00	66.22	66.22	51.53	.198
J-11	Arnco MM	-800.00	66.00	66.00	51.31	.198
J-12	Williams / Made	34.00	71.75	71.75	57.05	.215
J-13		.00	73.27	73.27	58.57	.219
J-14	Wiley	8.00	73.37	73.37	58.67	.220
J-15	Kreis / Wilson	182.00	81.56	81.56	66.86	.244
J-16		.00	82.68	82.68	67.98	.248
J-17	Keystone	81700.00	28.71	28.71	14.02	.086
J-18		-9000.00	83.00	83.00	68.30	.249
J-19		.00	59.81	59.81	45.11	.179
J-22	Moody	6.00	61.75	61.75	47.05	.185

J-38	Albany Gate	3683.00	44.96	44.96	30.26	.135
J-64		.00	33.55	33.55	18.85	.100
J-101		.00	55.84	55.84	41.15	.167
J-1a	Smith / Burns	136.00	82.55	82.55	67.85	.247
R-1		.00	83.00	83.00	68.30	.249

\* This designates the use of default density in a low pressure region

THE NET SYSTEM DEMAND (USFU) = 76429.000

SUMMARY OF INFLOWS(+) .AND. OUTFLOWS(-) :

NAME	FLOW (USFU)	FPN TITLE
R-1	76428.9	R-1

MAXIMUM MACH NUMBER = .04 IN LINE NO. P-63

SUMMARY OF MINIMUM .AND. MAXIMUM VELOCITIES (FT/S)

	MINIMUM		MAXIMUM
R-1	.00	P-63	40.15
P-22	10.15	P-7	32.12
P-23	11.35	P-4	28.03
P-2	11.37	P-36	25.97
P-21	11.39	P-6	23.17

SUMMARY OF MINIMUM .AND. MAXIMUM LOSS/1000. (PSI )

	MINIMUM		MAXIMUM
R-1	.04	P-63	.48
P-22	.07	P-7	.39
P-23	.09	P-4	.34
P-2	.09	P-36	.33
P-21	.09	P-6	.29

SUMMARY OF MINIMUM .AND. MAXIMUM PRESSURES (USPU)

	MINIMUM		MAXIMUM
J-17	28.71	R-1	83.00
J-64	33.55	J-18	83.00
J-9	44.38	J-4	82.91
J-38	44.96	J-16	82.68
J-101	55.84	J-1a	82.55

\*\*\*\*\* END OF KYGAS SIMULATION \*\*\*\*\*

\*\*\* GAS2010 Version 2.0 \*\*\*  
 GAS DISTRIBUTION NETWORK ANALYSIS  
 COPYRIGHT 2010 - DON J. WOOD, SRINI LINGIREDDY  
 LEXINGTON, KY  
 Updated March 2010

**Scenario 6**

INPUT DATA FILE NAME FOR THIS SIMULATION = i:\projects\594\model\SC96A6-1.KYP\scenario.DAT  
 OUTPUT DATA FILE NAME FOR THIS SIMULATION = i:\projects\594\model\SC96A6-1.KYP\scenario.OT2

DATE FOR THIS COMPUTER RUN : 8-31-2012  
 START TIME FOR THIS COMPUTER RUN : 10:11:37:30

SUMMARY OF DISTRIBUTION SYSTEM CHARACTERISTICS:  
 -----

NUMBER OF PIPES = 27  
 NUMBER OF JUNCTION NODES = 27  
 UNITS SPECIFIED = ENGLISH

PROPERTIES OF THE GAS FOR THIS ANALYSIS ARE:

OPERATING TEMPERATURE = 60.000 DEGREES FAHRENHEIT  
 REFERENCE DENSITY (@ STD. PRESSURE) = .44E-01 POUNDS/CUBIC FOOT  
 GAS MOLECULAR WEIGHT = 16.700  
 GAS SPECIFIC GRAVITY = .576  
 RATIO OF SPECIFIC HEATS = 1.310  
 GAS CONSTANT = 92.536  
 ABSOLUTE VISCOSITY = .223E-06 POUND SECONDS/SQUARE FOOT

USER SPECIFIED FLOW UNITS (USFU) = SCF / HOUR  
 USER SPECIFIED PRESSURE UNITS (USPU) = PSI (ABS.)

----- SUMMARY OF PIPE NETWORK GEOMETRIC AND OPERATING DATA -----

PIPE NAME	NODE #1	NODE #2	LENGTH (FT.)	DIAM. (IN.)	ROUGHNESS (MILLIFEET)	SUM-M FACT.	PUMP ID	ELEVATION CHANGE
P-1	J-1a	J-15	11000.0	6.2	.200	.0	0	20.0
P-2	J-4	J-16	1500.0	6.2	.200	.0	0	60.0
P-3	J-2	J-6	19000.0	6.2	.200	.0	0	-40.0
P-4	J-38	J-9	1600.0	6.2	.200	.0	0	40.0
P-5	J-22	J-3	15500.0	6.2	.200	.0	0	-290.0
P-6	Albany M	J-101	4500.0	6.2	.200	.0	0	.0
P-7	J-9	J-64	28000.0	6.2	.200	.0	0	.0
P-8	J-6	J-7	19000.0	6.2	.200	.0	0	40.0
P-9	J-7	J-14	41500.0	6.2	.200	.0	0	300.0
P-10	Byrdstow	J-1	1200.0	6.2	.200	.0	0	-80.0
P-11	J-1Albany	MM	7500.0	6.2	.200	.0	0	20.0
P-12	J-3	J-19	3400.0	8.2	.200	.0	0	.0
P-13	J-5	J-22	18500.0	6.2	.200	.0	0	-480.0
P-14	J-8	J-10	15000.0	6.2	.200	.0	0	.0
P-15	J-10	J-11	2000.0	6.2	.200	.0	0	.0

P-16	J-11	J-5	22000.0	6.2	.200	.0	0	120.0
P-17	J-12	J-8	37000.0	6.2	.200	.0	0	20.0
P-18	J-13	J-12	10000.0	6.2	.200	.0	0	340.0
P-19	J-14	J-13	9600.0	6.2	.200	.0	0	-560.0
P-20	J-15	J-2	4000.0	6.2	.200	.0	0	-80.0
P-21	J-16	J-1a	1500.0	6.2	.200	.0	0	.0
P-22	R-1	J-18	10.0	6.2	.200	.0	0	.0
P-23	J-18	J-4	1000.0	6.2	.200	.0	0	.0
P-24	J-19	Byrdstown	12900.0	6.2	.200	.0	0	30.0
P-36	J-101	J-38	33300.0	6.2	.200	.0	0	40.0
P-63	J-64	J-17	10000.0	6.2	.200	.0	0	.0

JUNCTION NAME	NODE TITLE	DEMAND (USFU)	FPN PRESSURE
Albany MM		.00	
Byrdstown		1578.00	
J-1		3.00	
J-2	Gemini MM	-1600.00	
J-3	Etter	103.00	
J-4	Spectra	.00	
J-5		.00	
J-6	Junker	199.00	
J-7	Baird / Gilliam	179.00	
J-8		.00	
J-9		.00	
J-10	Garrett	18.00	
J-11	Arnco MM	-800.00	
J-12	Williams / Madew	34.00	
J-13		.00	
J-14	Wiley	8.00	
J-15	Kreis / Wilson	182.00	
J-16		.00	
J-17	Keystone	81700.00	
J-18		-9000.00	
J-19		.00	
J-22	Moody	6.00	
J-38	Albany Gate	3683.00	
J-64		.00	
J-101		.00	
J-1a	Smith / Burns	136.00	
R-1		.00	141.00

===== RESULTS FOR THIS SIMULATION FOLLOW =====

Solution was obtained in 7 trials  
Flow Accuracy = .0000E+00[ < .500E-02]  
RV Accuracy = .0000E+00[ < .100E-02]

PIPE NO.	NODE #1	NODE #2	FLOW (USFU)	LOSS (USPU)	VELOCITY (FT/S)	DENSITY (#/CF)	FRICTION FACTOR	AREA RATIO
P-1	J-1a	J-15	85292.990	2.29	11.80	.416	.0174	.014



P-2	J-4	J-16	85428.990	.31	11.67	.421	.0174	.014
P-3	J-2	J-6	86710.990	4.21	12.33	.404	.0174	.015
P-4	J-38	J-9	81700.000	.79	29.23	.161	.0174	.035
P-5	J-22	J-3	87067.000	5.63	20.17	.248	.0174	.024
P-6	Albany MM	J-101	85383.010	1.85	23.20	.212	.0174	.028
P-7	J-9	J-64	81700.000	16.59	34.86	.135	.0174	.042
P-8	J-6	J-7	86512.000	4.32	12.71	.391	.0174	.015
P-9	J-7	J-14	86333.000	9.99	13.46	.369	.0174	.016
P-10	Byrdstown	J-1	85386.000	.47	21.93	.224	.0174	.026
P-11	J-1Albany MM		85383.010	2.98	22.43	.219	.0174	.027
P-12	J-3	J-19	86964.000	.31	11.96	.240	.0171	.014
P-13	J-5	J-22	87073.000	6.32	18.96	.264	.0174	.023
P-14	J-8	J-10	86291.000	4.40	16.42	.302	.0174	.020
P-15	J-10	J-11	86273.000	.60	16.83	.295	.0174	.020
P-16	J-11	J-5	87073.000	7.01	17.69	.283	.0174	.021
P-17	J-12	J-8	86291.000	10.12	15.31	.324	.0174	.018
P-18	J-13	J-12	86325.000	2.58	14.41	.344	.0174	.017
P-19	J-14	J-13	86325.000	2.43	14.14	.351	.0174	.017
P-20	J-15	J-2	85110.990	.84	11.90	.411	.0174	.014
P-21	J-16	J-1a	85428.990	.31	11.70	.420	.0174	.014
P-22	R-1	J-18	76428.990	.00	10.41	.422	.0175	.012
P-23	J-18	J-4	85428.990	.21	11.64	.422	.0174	.014
P-24	J-19Byrdstown		86964.000	5.01	21.56	.232	.0174	.026
P-36	J-101	J-38	85383.010	15.61	26.48	.185	.0174	.032
P-63	J-64	J-17	81700.000	8.14	47.87	.098	.0174	.057
R-1	R-1	R-1	76428.990	.00	.00	.422*****		.000

JUNCTION	NODE	DEMAND	PRESSURE	PRESSURE	PRESSURE	DENSITY
NAME	TITLE	(USFU)	(USPU)	(PSIA)	(PSIG)	#/CF
Albany MM		.00	71.59	71.59	56.89	.214
Byrdstown		1578.00	74.94	74.94	60.24	.224
J-1		3.00	74.60	74.60	59.90	.223
J-2	Gemini MM	-1600.00	137.03	137.03	122.34	.410
J-3	Etter	103.00	80.31	80.31	65.61	.240
J-4	Spectra	.00	140.79	140.79	126.10	.422
J-5		.00	90.88	90.88	76.19	.272
J-6	Junker	199.00	132.94	132.94	118.24	.398
J-7	Baird / Gilliam	179.00	128.51	128.51	113.81	.385
J-8		.00	103.13	103.13	88.44	.309
J-9		.00	53.24	53.24	38.55	.159
J-10	Garrett	18.00	98.73	98.73	84.04	.296
J-11	Arnco MM	-800.00	98.13	98.13	83.44	.294
J-12	Williams / Made	34.00	113.30	113.30	98.60	.339
J-13		.00	116.69	116.69	101.99	.349
J-14	Wiley	8.00	117.75	117.75	103.06	.353
J-15	Kreis / Wilson	182.00	137.64	137.64	122.95	.412
J-16		.00	140.31	140.31	125.61	.420
J-17	Keystone	81700.00	28.51	28.51	13.81	.085
J-18		-9000.00	141.00	141.00	126.30	.422
J-19		.00	79.99	79.99	65.30	.240
J-22	Moody	6.00	85.44	85.44	70.74	.256
J-38	Albany Gate	3683.00	54.08	54.08	39.39	.162
J-64		.00	36.65	36.65	21.96	.110
J-101		.00	69.74	69.74	55.04	.209
J-1a	Smith / Burns	136.00	140.00	140.00	125.30	.419
R-1		.00	141.00	141.00	126.30	.422

\* This designates the use of default density in a low pressure region

THE NET SYSTEM DEMAND (USFU) = 76429.000

SUMMARY OF INFLOWS(+).AND.OUTFLOWS(-) :

NAME	FLOW (USFU)	FPN TITLE
R-1	76428.9	R-1

MAXIMUM MACH NUMBER = .04 IN LINE NO. P-63

SUMMARY OF MINIMUM.AND.MAXIMUM VELOCITIES (FT/S)

	MINIMUM		MAXIMUM
R-1	.00	P-63	47.87
P-22	10.41	P-7	34.86
P-23	11.64	P-4	29.23
P-2	11.67	P-36	26.48
P-21	11.70	P-6	23.20

SUMMARY OF MINIMUM.AND.MAXIMUM LOSS/1000. (PSI )

	MINIMUM		MAXIMUM
R-1	.03	P-63	.81
P-12	.09	P-7	.59
P-22	.17	P-4	.50
P-23	.21	P-36	.47
P-2	.21	P-6	.41

SUMMARY OF MINIMUM.AND.MAXIMUM PRESSURES (USPU)

	MINIMUM		MAXIMUM
J-17	28.51	R-1	141.00
J-64	36.65	J-18	141.00
J-9	53.24	J-4	140.79
J-38	54.08	J-16	140.31
J-101	69.74	J-1a	140.00

\*\*\*\*\* END OF KYGAS SIMULATION \*\*\*\*\*

DATE FOR THIS COMPUTER RUN : 8-31-2012  
START TIME FOR THIS COMPUTER RUN : 10:11:37:31

\*\*\* GAS2010 Version 2.0 \*\*\*  
 GAS DISTRIBUTION NETWORK ANALYSIS  
 COPYRIGHT 2010 - DON J. WOOD, SRINI LINGIREDDY  
 LEXINGTON, KY  
 Updated March 2010

**Scenario 7**

INPUT DATA FILE NAME FOR THIS SIMULATION = i:\projects\594\model\SCEBDA~1.KYP\scenario.DAT  
 OUTPUT DATA FILE NAME FOR THIS SIMULATION = i:\projects\594\model\SCEBDA~1.KYP\scenario.OT2

DATE FOR THIS COMPUTER RUN : 9-18-2012  
 START TIME FOR THIS COMPUTER RUN : 12:38:50:83

SUMMARY OF DISTRIBUTION SYSTEM CHARACTERISTICS:  
 -----

NUMBER OF PIPES = 29  
 NUMBER OF JUNCTION NODES = 29  
 UNITS SPECIFIED = ENGLISH

PROPERTIES OF THE GAS FOR THIS ANALYSIS ARE:

OPERATING TEMPERATURE = 60.000 DEGREES FAHRENHEIT  
 REFERENCE DENSITY (@ STD. PRESSURE) = .44E-01 POUNDS/CUBIC FOOT  
 GAS MOLECULAR WEIGHT = 16.700  
 GAS SPECIFIC GRAVITY = .576  
 RATIO OF SPECIFIC HEATS = 1.310  
 GAS CONSTANT = 92.536  
 ABSOLUTE VISCOSITY = .223E-06 POUND SECONDS/SQUARE FOOT

USER SPECIFIED FLOW UNITS (USFU) = SCF / HOUR  
 USER SPECIFIED PRESSURE UNITS (USPU) = PSI (ABS.)

----- SUMMARY OF PIPE NETWORK GEOMETRIC AND OPERATING DATA -----

PIPE NAME	NODE #1	NODE #2	LENGTH (FT.)	DIAM. (IN.)	ROUGHNESS (MILLIFEET)	SUM-M FACT.	PUMP ID	ELEVATION CHANGE
P-1	J-1a	J-15	11000.0	5.4	.200	.0	0	20.0
P-2	J-4	J-16	1500.0	5.4	.200	.0	0	60.0
P-3	J-2	J-6	19000.0	6.2	.200	.0	0	-40.0
P-4	J-38	J-9	1600.0	5.4	.200	.0	0	40.0
P-5	J-22	J-3	15500.0	8.2	.200	.0	0	-290.0
P-6	Albany M	J-20	4500.0	5.4	.200	.0	0	.0
P-7	J-9	J-64	28000.0	5.4	.200	.0	0	.0
P-8	J-6	J-7	19000.0	6.2	.200	.0	0	40.0
P-9	J-7	J-14	41500.0	6.2	.200	.0	0	300.0
P-10	Byrdstow	J-1	1200.0	5.4	.200	.0	0	-80.0
P-11	J-1Albany MM		7500.0	5.4	.200	.0	0	20.0
P-12	J-3Byrdstown		3400.0	5.4	.200	.0	0	30.0
P-13	J-5	J-22	18500.0	8.2	.200	.0	0	-480.0
P-14	J-8	J-10	15000.0	5.4	.200	.0	0	.0

P-15	J-10	J-11	2000.0	5.4	.200	.0	0	.0
P-16	J-11	J-5	22000.0	5.4	.200	.0	0	120.0
P-17	J-12	J-8	37000.0	5.4	.200	.0	0	20.0
P-18	J-13	J-12	10000.0	5.4	.200	.0	0	340.0
P-19	J-14	J-13	9600.0	6.2	.200	.0	0	-560.0
P-20	J-15	J-2	4000.0	5.4	.200	.0	0	-80.0
P-21	J-16	J-1a	1500.0	5.4	.200	.0	0	.0
P-22	R-1	J-18	10.0	5.4	.200	.0	0	.0
P-23	J-18	J-4	10.0	5.4	.200	.0	0	.0
P-24	J-19	J-38	12900.0	5.4	.200	.0	0	40.0
P-25	J-20	I-Pump-1	10.0	5.4	.200	.0	0	.0
P-36O-Pump-1		J-19	10.0	5.4	.200	.0	0	.0
P-63	J-64	J-17	10000.0	5.4	.200	.0	0	.0

\*\*\* DATA FOR COMPRESSORS FOR THIS SYSTEM \*\*\*

COMPRESSOR ID # 1 IS DESCRIBED BY THE FOLLOWING DATA:

PRESSURE (USPU)	DISCHARGE (USFU)
71.00	.000
70.00	23000.000
69.00	50000.000

JUNCTION NAME	NODE TITLE	DEMAND (USFU)	FPN PRESSURE
Albany MM		.00	
Byrdstown		1578.00	
J-1		3.00	
J-2	Gemini MM	-1600.00	
J-3	Etter	103.00	
J-4	Spectra	.00	
J-5		.00	
J-6	Junker	199.00	
J-7	Baird / Gilliam	179.00	
J-8		.00	
J-9		.00	
J-10	Garrett	18.00	
J-11	Arnco MM	-800.00	
J-12	Williams / Madew	34.00	
J-13		.00	
J-14	Wiley	8.00	
J-15	Kreis / Wilson	182.00	
J-16		.00	
J-17	Keystone	23000.00	
J-18		-9000.00	
J-19		.00	
J-20		.00	
J-22	Moody	6.00	
J-38	Albany Gate	3683.00	
J-64		.00	
J-1a	Smith / Burns	136.00	
I-Pump-1		.00	
R-1		.00	60.00
O-Pump-1		.00	

===== RESULTS FOR THIS SIMULATION FOLLOW =====

Solution was obtained in 6 trials  
 Flow Accuracy = .0000E+00[ < .500E-02]  
 RV Accuracy = .0000E+00[ < .100E-02]

PIPE NO.	NODE #1	NODE #2	FLOW (USFU)	LOSS (USPU)	VELOCITY (FT/S)	DENSITY (#/CF)	FRICTION FACTOR	AREA RATIO
P-1	J-1a	J-15	26593.000	1.26	11.72	.176	.0195	.014
P-2	J-4	J-16	26729.000	.17	11.60	.179	.0195	.014
P-3	J-2	J-6	28011.000	1.16	9.37	.172	.0195	.011
P-4	J-38	J-9	23000.000	.08	5.76	.311	.0199	.007
P-5	J-22	J-3	28367.000	.37	8.19	.114	.0198	.010
P-6	Albany MM	J-20	26683.000	.86	19.58	.106	.0195	.023
P-7	J-9	J-64	23000.000	1.39	5.80	.309	.0199	.007
P-8	J-6	J-7	27812.000	1.17	9.50	.168	.0195	.011
P-9	J-7	J-14	27633.000	2.61	9.80	.162	.0195	.012
P-10	Byrdstown	J-1	26686.000	.22	18.58	.112	.0195	.022
P-11	J-1Albany MM		26683.000	1.39	18.98	.109	.0195	.023
P-12	J-3Byrdstown		28264.000	.68	19.46	.113	.0194	.023
P-13	J-5	J-22	28373.000	.44	8.17	.115	.0198	.010
P-14	J-8	J-10	27591.000	2.46	16.26	.132	.0195	.019
P-15	J-10	J-11	27573.000	.34	16.78	.128	.0195	.020
P-16	J-11	J-5	28373.000	4.14	18.24	.121	.0194	.022
P-17	J-12	J-8	27591.000	5.55	14.90	.144	.0195	.018
P-18	J-13	J-12	27625.000	1.40	13.86	.155	.0195	.017
P-19	J-14	J-13	27625.000	.62	10.07	.158	.0195	.012
P-20	J-15	J-2	26411.000	.46	11.81	.174	.0196	.014
P-21	J-16	J-1a	26729.000	.17	11.64	.179	.0195	.014
P-22	R-1	J-18	17729.000	.00	7.68	.180	.0206	.009
P-23	J-18	J-4	26729.000	.00	11.57	.180	.0195	.014
P-24	J-19	J-38	26683.000	.84	6.64	.313	.0195	.008
P-25	J-20	I-Pump-1	26683.000	.00	19.82	.105	.0195	.024
P-36	O-Pump-1	J-19	26683.000	.00	6.61	.314	.0195	.008
P-63	J-64	J-17	23000.000	.50	5.85	.306	.0199	.007
THE COMPRESSOR (PUMP) IN LINE Pump- OPERATES AT					69.86	(USU)		
Pump-1	I-Pump-1	O-Pump-1	26683.000	.00	.48	.314	.0226	.001
R-1	R-1	R-1	17729.000	.00	.00	.180	1.3280	.000

JUNCTION NAME	NODE TITLE	DEMAND (USFU)	PRESSURE (USPU)	PRESSURE (PSIA)	PRESSURE (PSIG)	DENSITY (#/CF)
Albany MM		.00	35.83	35.83	21.13	.107
Byrdstown		1578.00	37.39	37.39	22.69	.112
J-1		3.00	37.23	37.23	22.54	.111
J-2	Gemini MM	-1600.00	57.94	57.94	43.24	.174
J-3	Etter	103.00	38.09	38.09	23.40	.114
J-4	Spectra	.00	60.00	60.00	45.30	.180
J-5		.00	38.29	38.29	23.59	.115
J-6	Junker	199.00	56.83	56.83	42.13	.170
J-7	Baird / Gilliam	179.00	55.62	55.62	40.92	.167

J-8		.00	45.32	45.32	30.63	.136
J-9		.00	103.73	103.73	89.03	.311
J-10	Garrett	18.00	42.87	42.87	28.17	.128
J-11	Arnco MM	-800.00	42.53	42.53	27.84	.127
J-12	Williams / Made	34.00	50.90	50.90	36.20	.152
J-13		.00	52.66	52.66	37.96	.158
J-14	Wiley	8.00	52.67	52.67	37.97	.158
J-15	Kreis / Wilson	182.00	58.30	58.30	43.61	.175
J-16		.00	59.75	59.75	45.06	.179
J-17	Keystone	23000.00	101.83	101.83	87.14	.305
J-18		-9000.00	60.00	60.00	45.30	.180
J-19		.00	104.82	104.82	90.12	.314
J-20		.00	34.96	34.96	20.27	.105
J-22	Moody	6.00	38.23	38.23	23.53	.114
J-38	Albany Gate	3683.00	103.90	103.90	89.20	.311
J-64		.00	102.34	102.34	87.64	.306
J-1a	Smith / Burns	136.00	59.58	59.58	44.89	.178
I-Pump-1		.00	34.96	34.96	20.27	.105
R-1		.00	60.00	60.00	45.30	.180
O-Pump-1		.00	104.82	104.82	90.12	.314

\* This designates the use of default density in a low pressure region

THE NET SYSTEM DEMAND (USFU) = 17729.000

SUMMARY OF INFLOWS(+) AND OUTFLOWS(-) :

NAME	FLOW (USFU)	FPN TITLE
R-1	17729.0	R-1

MAXIMUM MACH NUMBER = .02 IN LINE NO. P-25

SUMMARY OF MINIMUM AND MAXIMUM VELOCITIES (FT/S)

MINIMUM		MAXIMUM	
R-1	.00	P-25	19.82
Pump-1	.48	P-6	19.58
P-4	5.76	P-12	19.46
P-7	5.80	P-11	18.98
P-63	5.85	P-10	18.58

SUMMARY OF MINIMUM AND MAXIMUM LOSS/1000. (PSI )

MINIMUM		MAXIMUM	
R-1	.00	P-12	.20
Pump-1	.00	P-25	.19
P-13	.02	P-6	.19
P-5	.02	P-16	.19
P-4	.05	P-11	.19

SUMMARY OF MINIMUM AND MAXIMUM PRESSURES (USPU)

MINIMUM		MAXIMUM	
I-Pump-1	34.96	O-Pump-1	104.82
J-20	34.96	J-19	104.82
Albany M	35.83	J-38	103.90
J-1	37.23	J-9	103.73
Byrdstow	37.39	J-64	102.34

\*\*\*\*\* END OF KYGAS SIMULATION \*\*\*\*\*

DATE FOR THIS COMPUTER RUN : 9-18-2012  
START TIME FOR THIS COMPUTER RUN : 12:38:50:84

\*\*\* GAS2010 Version 2.0 \*\*\*  
 GAS DISTRIBUTION NETWORK ANALYSIS  
 COPYRIGHT 2010 - DON J. WOOD, SRINI LINGIREDDY  
 LEXINGTON, KY  
 Updated March 2010

**Scenario 8**

INPUT DATA FILE NAME FOR THIS SIMULATION = i:\projects\594\model\SC311F-1.KYP\scenario.DAT  
 OUTPUT DATA FILE NAME FOR THIS SIMULATION = i:\projects\594\model\SC311F-1.KYP\scenario.OT2

DATE FOR THIS COMPUTER RUN : 9-18-2012  
 START TIME FOR THIS COMPUTER RUN : 12:41:59:70

SUMMARY OF DISTRIBUTION SYSTEM CHARACTERISTICS:  
 -----

NUMBER OF PIPES = 31  
 NUMBER OF JUNCTION NODES = 31  
 UNITS SPECIFIED = ENGLISH

PROPERTIES OF THE GAS FOR THIS ANALYSIS ARE:

OPERATING TEMPERATURE = 60.000 DEGREES FAHRENHEIT  
 REFERENCE DENSITY (@ STD. PRESSURE) = .44E-01 POUNDS/CUBIC FOOT  
 GAS MOLECULAR WEIGHT = 16.700  
 GAS SPECIFIC GRAVITY = .576  
 RATIO OF SPECIFIC HEATS = 1.310  
 GAS CONSTANT = 92.536  
 ABSOLUTE VISCOSITY = .223E-06 POUND SECONDS/SQUARE FOOT

USER SPECIFIED FLOW UNITS (USFU) = SCF / HOUR  
 USER SPECIFIED PRESSURE UNITS (USPU) = PSI (ABS.)

----- SUMMARY OF PIPE NETWORK GEOMETRIC AND OPERATING DATA -----

PIPE NAME	NODE #1	NODE #2	LENGTH (FT.)	DIAM. (IN.)	ROUGHNESS (MILLIFEET)	SUM-M FACT.	PUMP ID	ELEVATION CHANGE
P-1	J-1a	J-15	11000.0	6.2	.200	.0	0	20.0
P-2	J-4	J-16	1500.0	6.2	.200	.0	0	60.0
P-3	J-2	J-6	19000.0	6.2	.200	.0	0	-40.0
P-4	J-38	J-9	1600.0	5.4	.200	.0	0	40.0
P-5	J-22	J-3	15500.0	6.2	.200	.0	0	-290.0
P-6	Albany M	J-20	2200.0	5.4	.200	.0	0	.0
P-7	J-9	J-64	28000.0	5.4	.200	.0	0	.0
P-8	J-6	J-7	19000.0	6.2	.200	.0	0	40.0
P-9	J-7	J-14	41500.0	6.2	.200	.0	0	300.0
P-10	Byrdstow	J-1	1200.0	6.2	.200	.0	0	-80.0
P-11	J-1Albany	MM	7500.0	6.2	.200	.0	0	20.0
P-12	J-3	J-19	3400.0	8.2	.200	.0	0	.0
P-13	J-5	J-22	18500.0	6.2	.200	.0	0	-480.0



P-14	J-8	J-10	15000.0	6.2	.200	.0	0	.0
P-15	J-10	J-11	2000.0	6.2	.200	.0	0	.0
P-16	J-11	J-5	22000.0	6.2	.200	.0	0	120.0
P-17	J-12	J-8	37000.0	6.2	.200	.0	0	20.0
P-18	J-13	J-12	10000.0	6.2	.200	.0	0	340.0
P-19	J-14	J-13	9600.0	6.2	.200	.0	0	-560.0
P-20	J-15	J-2	4000.0	6.2	.200	.0	0	-80.0
P-21	J-16	J-1a	1500.0	6.2	.200	.0	0	.0
P-22	R-1	J-18	10.0	6.2	.200	.0	0	.0
P-23	J-18	J-4	1000.0	6.2	.200	.0	0	.0
P-24	J-19	Byrdstown	12900.0	6.2	.200	.0	0	30.0
P-25	O-RV-1	J-21	100.0	5.4	.200	.0	0	.0
P-26	J-20	I-RV-1	100.0	5.4	.200	.0	0	.0
P-27	J-21	J-101	2300.0	5.4	.200	.0	0	.0
P-36	J-101	J-38	33300.0	5.4	.200	.0	0	40.0
P-63	J-64	J-17	10000.0	5.4	.200	.0	0	.0

JUNCTION NAME	NODE TITLE	DEMAND (USFU)	FPN PRESSURE
Albany MM		.00	
Byrdstown		1578.00	
J-1		3.00	
J-2	Gemini MM	-1600.00	
J-3	Etter	103.00	
J-4	Spectra	.00	
J-5		.00	
J-6	Junker	199.00	
J-7	Baird / Gilliam	179.00	
J-8		.00	
J-9		.00	
J-10	Garrett	18.00	
J-11	Arnco MM	-800.00	
J-12	Williams / Madew	34.00	
J-13		.00	
J-14	Wiley	8.00	
J-15	Kreis / Wilson	182.00	
J-16		.00	
J-17	Keystone	81700.00	
J-18		-9000.00	
J-19		.00	
J-20		.00	
J-21		.00	
J-22	Moody	6.00	
J-38	Albany Gate	3683.00	
J-64		.00	
J-101		.00	
J-1a	Smith / Burns	136.00	
R-1		.00	160.00
O-RV-1		.00	
I-RV-1		.00	

THERE IS A PRV IN LINE RV-1 UPSTREAM NODE = I-RV-1 SET PRESSURE = 100.0

===== RESULTS FOR THIS SIMULATION FOLLOW =====

Solution was obtained in 8 trials  
 Flow Accuracy = .0000E+00[ < .500E-03]  
 RV Accuracy = .1085E-03[ < .100E-02]

PIPE NO.	NODE #1	NODE #2	FLOW (USFU)	LOSS (USPU)	VELOCITY (FT/S)	DENSITY (#/CF)	FRICTION FACTOR	AREA RATIO
P-1	J-1a	J-15	85292.990	2.01	10.36	.473	.0174	.012
P-2	J-4	J-16	85428.990	.27	10.28	.478	.0174	.012
P-3	J-2	J-6	86710.990	3.67	10.76	.463	.0174	.013
P-4	J-38	J-9	81700.000	1.25	28.84	.220	.0177	.035
P-5	J-22	J-3	87067.000	4.14	14.84	.337	.0174	.018
P-6	Albany MM	J-20	85383.010	1.32	21.30	.312	.0176	.026
P-7	J-9	J-64	81700.000	27.12	35.74	.178	.0177	.043
P-8	J-6	J-7	86512.000	3.74	11.00	.452	.0174	.013
P-9	J-7	J-14	86333.000	8.52	11.48	.432	.0174	.014
P-10	Byrdstown	J-1	85386.000	.33	15.33	.320	.0174	.018
P-11	J-1Albany MM		85383.010	2.06	15.49	.317	.0174	.019
P-12	J-3	J-19	86964.000	.23	8.65	.332	.0171	.010
P-13	J-5	J-22	87073.000	4.80	14.39	.348	.0174	.017
P-14	J-8	J-10	86291.000	3.52	13.15	.377	.0174	.016
P-15	J-10	J-11	86273.000	.48	13.36	.371	.0174	.016
P-16	J-11	J-5	87073.000	5.48	13.83	.362	.0174	.017
P-17	J-12	J-8	86291.000	8.30	12.55	.395	.0174	.015
P-18	J-13	J-12	86325.000	2.15	12.04	.412	.0174	.014
P-19	J-14	J-13	86325.000	2.04	11.88	.418	.0174	.014
P-20	J-15	J-2	85110.990	.74	10.43	.469	.0174	.012
P-21	J-16	J-1a	85428.990	.27	10.30	.477	.0174	.012
P-22	R-1	J-18	76428.990	.00	9.17	.479	.0175	.011
P-23	J-18	J-4	85428.990	.18	10.26	.479	.0174	.012
P-24	J-19Byrdstown		86964.000	3.56	15.34	.326	.0174	.018
P-25	O-RV-1	J-21	85383.010	.06	22.19	.299	.0176	.027
P-26	J-20	I-RV-1	85383.010	.06	21.44	.310	.0176	.026
P-27	J-21	J-101	85383.010	1.45	22.36	.297	.0176	.027
P-36	J-101	J-38	85383.010	24.15	25.69	.259	.0176	.031
P-63	J-64	J-17	81700.000	15.00	55.28	.115	.0177	.066
R-1	R-1	R-1	76428.990	.00	.00	.479*****		.000
RV-1	I-RV-1	O-RV-1	85383.010	.00	.00	.299	.0492	.000

JUNCTION NAME	NODE TITLE	DEMAND (USFU)	PRESSURE (USPU)	PRESSURE (PSIA)	PRESSURE (PSIG)	DENSITY (#/CF)
Albany MM		.00	104.81	104.81	90.11	.314
Byrdstown		1578.00	107.06	107.06	92.36	.321
J-1		3.00	106.91	106.91	92.21	.320
J-2	Gemini MM	-1600.00	156.52	156.52	141.82	.469
J-3	Etter	103.00	110.91	110.91	96.22	.332
J-4	Spectra	.00	159.82	159.82	145.12	.479
J-5		.00	118.01	118.01	103.32	.353
J-6	Junker	199.00	152.98	152.98	138.28	.458
J-7	Baird / Gilliam	179.00	149.11	149.11	134.41	.447
J-8		.00	127.80	127.80	113.10	.383
J-9		.00	72.95	72.95	58.26	.218
J-10	Garrett	18.00	124.27	124.27	109.58	.372
J-11	Arnco MM	-800.00	123.80	123.80	109.10	.371

J-12	Williams / Made	34.00	136.15	136.15	121.46	.408
J-13		.00	139.28	139.28	124.58	.417
J-14	Wiley	8.00	139.69	139.69	125.00	.418
J-15	Kreis / Wilson	182.00	156.99	156.99	142.29	.470
J-16		.00	159.34	159.34	144.65	.477
J-17	Keystone	81700.00	30.84	30.84	16.14	.092
J-18		-9000.00	160.00	160.00	145.30	.479
J-19		.00	110.68	110.68	95.99	.331
J-20		.00	103.49	103.49	88.79	.310
J-21		.00	99.94	99.94	85.24	.299
J-22	Moody	6.00	114.38	114.38	99.68	.343
J-38	Albany Gate	3683.00	74.27	74.27	59.57	.222
J-64		.00	45.84	45.84	31.14	.137
J-101		.00	98.49	98.49	83.79	.295
J-1a	Smith / Burns	136.00	159.07	159.07	144.38	.476
R-1		.00	160.00	160.00	145.30	.479
O-RV-1		.00	100.00	100.00	85.30	.299
I-RV-1		.00	103.43	103.43	88.73	.310

\* This designates the use of default density in a low pressure region

\*\*\*\*\* NOTE: THE PRV IN LINE RV-1 (SET PRES. = 100.00) OPERATES AT 100.00

THE NET SYSTEM DEMAND (USFU) = 76429.000

SUMMARY OF INFLOWS(+) AND OUTFLOWS(-) :

NAME	FLOW (USFU)	FPN TITLE
R-1	76428.9	R-1

MAXIMUM MACH NUMBER = .05 IN LINE NO. P-63

SUMMARY OF MINIMUM AND MAXIMUM VELOCITIES (FT/S)

	MINIMUM		MAXIMUM
R-1	.00	P-63	55.28
RV-1	.00	P-7	35.74
P-12	8.65	P-4	28.84
P-22	9.17	P-36	25.69
P-23	10.26	P-27	22.36

SUMMARY OF MINIMUM AND MAXIMUM LOSS/1000. (PSI)

	MINIMUM		MAXIMUM
RV-1	.00	P-63	1.50
R-1	.03	P-7	.97
P-12	.07	P-4	.78
P-22	.15	P-36	.73
P-23	.18	P-27	.63

SUMMARY OF MINIMUM.AND.MAXIMUM PRESSURES (USPU)

MINIMUM		MAXIMUM	
J-17	30.84	R-1	160.00
J-64	45.84	J-18	160.00
J-9	72.95	J-4	159.82
J-38	74.27	J-16	159.34
J-101	98.49	J-1a	159.07

\*\*\*\*\* END OF KYGAS SIMULATION \*\*\*\*\*

DATE FOR THIS COMPUTER RUN : 9-18-2012  
START TIME FOR THIS COMPUTER RUN : 12:41:59:71

**APPLICATION  
CONTAINS  
LARGE OR OVERSIZED  
MAP(S)**

**RECEIVED ON: January 29, 2014**

TRANSPORTATION AGREEMENT

This Transportation Agreement (this "*Agreement*") is entered into effective November \_\_, 2013 (the "*Effective Date*"), by and between Navitas KY NG, LLC, a Kentucky limited liability company ("*Navitas*"), with offices at 121 Eakly Campus Road, Eakly, Oklahoma 73033, and Equity Group – Kentucky Division LLC, a Delaware limited liability corporation ("*Keystone*"), with offices at 2294 KY Highway 90W, Albany, KY 42602. The parties to this Agreement may from time to time be referred to individually as a "*Party*" or collectively as the "*Parties*."

RECITALS

WHEREAS, Navitas is in the business of distributing natural gas by pipeline; and

WHEREAS, Keystone owns a chicken processing plant located at 2294 KY Hwy. 90 East, Albany, Kentucky 42602 (the "*Keystone Plant*"); and

WHEREAS, Keystone desires to have a pipeline connection for the transportation and delivery of natural gas to the Keystone Plant; and

WHEREAS Navitas is willing to construct a pipeline (together with any required connections, meters and safety apparatus, (the "*Pipeline*") for the purpose of transporting natural gas from its existing Albany, Kentucky LDC natural gas pipeline (the "*Existing Line*") to the Keystone Plant in accordance with the terms hereof; and

WHEREAS, as an incentive to Navitas to construct the Pipeline, Keystone has committed, in accordance with the terms hereof, to pre-pay a portion of the costs of transporting a specified amount of natural gas along and through the Pipeline;

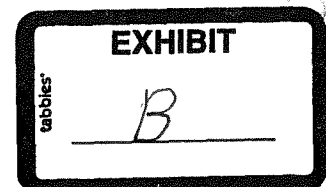
NOW THEREFORE, for and in consideration of the mutual covenants of the Parties and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties hereby agree as follows:

I. DEFINITIONS AND INTERPRETATION

1.1 Definitions. For purposes of this Agreement, including the foregoing Recitals, the following terms shall have the meanings indicated below:

"*Affiliate*" means in respect of either Party, any Person which controls, is controlled by or is under common control with that Party. For purposes of this definition, "*control*" means the power to direct, directly or indirectly, the management or policies of the Person, whether through the ownership of more than fifty percent (50%) of the ownership of voting securities, by contract or otherwise.

"*Applicable Law*" means (i) any law, statute, regulation, code, ordinance, license, decision, order, writ, injunction, decision, directive, judgment, policy or decree of



any Governmental Authority (including consent decrees and settlements) and any judicial or administrative interpretations thereof, and (ii) any applicable tariff (including the Tariff), license, permit or compliance requirement of any Governmental Authority applicable to either Party, including Environmental Laws.

**“Authorizations”** means (i) any franchise, permit, license, authorization, order, certificate, rights of ingress and egress, servitudes, patents or patent licenses, registration or other consent or approval required by any Governmental Authority, and (ii) any rights of way or easements required from any Person in order to construct, install, operate and maintain the Pipeline.

**“Bankrupt”** means a Person or entity that (i) is dissolved, other than pursuant to a consolidation, amalgamation or merger, (ii) becomes insolvent or is unable to pay its debts or fails or admits in writing its inability generally to pay its debts as they become due, (iii) makes a general assignment, arrangement or composition with or for the benefit of its creditors, (iv) institutes or has instituted against it a proceeding seeking a judgment of insolvency or bankruptcy or any other relief under any bankruptcy or insolvency law or other similar law affecting creditor's rights, or a petition is presented for its winding-up or liquidation, (v) has a resolution passed for its winding-up, official management or liquidation, other than pursuant to a consolidation, amalgamation or merger, (vi) seeks or becomes subject to the appointment of an administrator, provisional liquidator, conservator, receiver, trustee, custodian or other similar official for all or substantially all of its assets, (vii) has a secured party take possession of all or substantially all of its assets, or has a distress, execution, attachment, sequestration or other legal process levied, enforced or sued on or against all or substantially all of its assets, (viii) causes or is subject to any event which, under Applicable Law, has an analogous effect to any of the events specified in clauses (i) through (vii) above, inclusive, or (ix) takes any action in furtherance of, or indicating its consent to, approval of, or acquiescence in any of the foregoing acts.

**“Base Rate”** has the meaning set forth in Section 7.2.

**“Business Day”** means any day that banks are open for general commercial business in Oklahoma City, Oklahoma.

**“Change in Law”** means the adoption or implementation of any laws, rules or regulations by any Governmental Authority with jurisdiction subsequent to the Effective Date that causes Navitas to incur additional expenses in order to operate the Pipeline in accordance with Applicable Laws.

**“Completion Date”** has the meaning set forth in Section 3.7.

**“Compliance Costs”** means all non-Affiliate third party expenses, including non-Affiliate third party capital expenditures incurred by Navitas in connection with a

Change in Law.

***“Confidential Information”*** has the meaning set forth in Section 16.8.

***“Contract Year”*** means each twelve (12) month period beginning on the first day of the calendar month coincident with or next following the Completion Date or on an anniversary thereof during the Term, it being understood and agreed that the first Contract Year may be a period of twelve (12) full months and one (1) partial month.

***“Defaulting Party”*** has the meaning set forth in Section 15.2.

***“Environmental Law”*** means any Applicable Law or any legally binding requirement that governs or purports to govern the protection of persons, natural resources or the environment (including the protection of ambient air, surface water, groundwater, land surface or subsurface strata, endangered species or wetlands), occupational health and safety and the manufacture, processing, distribution, use, generation, handling, treatment, storage, disposal, transportation, release or management of solid waste, industrial waste or hazardous substances or materials.

***“Event of Default”*** has the meaning set forth in Section 15.1.

***“Event of Force Majeure”*** has the meaning set forth in Section 9.1.

***“Existing Line”*** has the meaning set forth in the Recitals of this Agreement.

***“First Installment”*** has the meaning set forth in Section 3.2(A).

***“Gas Delivery Point”*** means the outlet of the meter located at the terminus of the Pipeline at or near the Keystone Plant and identified as the Gas Delivery Point on Exhibit A.

***“Governmental Authority”*** means any federal, state, regional, local or municipal governmental body, agency, instrumentality, authority or entity established or controlled by a government or subdivision thereof, including any legislative, administrative or judicial body, or any Person purporting to act therefore.

***“Guaranteed Volume”*** has the meaning set forth in Section 4.3.

***“Initial Term”*** has the meaning set forth in Section 2.1.

***“Keystone”*** has the meaning set forth in the preamble to this Agreement.

***“MCF”*** means one thousand cubic feet, measured at 14.65 pounds per square inch at a temperature of 60 degrees Fahrenheit.



**“Monthly Nomination”** has the meaning set forth in Section 4.3.

**“Navitas”** has the meaning set forth in the preamble to this Agreement.

**“Nomination Period”** means the partial calendar month commencing on the Completion Date (if the Completion Date falls on a day that is not the first day of a calendar month) and otherwise means a calendar month during the Term.

**“Party(ies)”** has the meaning set forth in the preamble to this Agreement.

**“Performing Party”** has the meaning set forth in Section 15.2.

**“Person”** means an individual, corporation, partnership, limited liability company, joint venture, trust or unincorporated organization, joint stock company or any other private entity or organization, Governmental Authority, court or any other legal entity, whether acting in an individual, fiduciary or other capacity.

**“Pipeline”** means the pipeline referred to in the Recitals of this Agreement to be constructed by Navitas in accordance with the terms of this Agreement, commencing at Albany City Gate on the Existing Line and terminating at the Keystone Plant, as illustrated on Exhibit A-1. The Pipeline shall include: (i) approximately seven and one-half (7.5) miles of six-inch polyethylene pipeline, and (ii) related facilities necessary to connect the Pipeline to the Existing Line, and to the Keystone Plant.

**“Renewal Term”** has the meaning set forth in Section 2.2.

**“Rules and Regulations”** means the Rates, Rules and Regulations For Natural Gas Service issued by the Kentucky Public Service Commission (and effective) on March 1, 2011 in Case No. 2011-00044, as such may be amended, superseded or replaced from time to time.

**“Second Installment”** has the meaning set forth in Section 3.2(B).

**“Tariff”** means the base rate for the transportation of natural gas through the Pipeline chargeable to industrial customers as reflected in Rules and Regulations, as same may be amended from time to time, or any subsequent or superseding tariff filing with the Governmental Authority having jurisdiction over rates charged for natural gas transported through the Pipeline.

**“Term”** has the meaning set forth in Section 2.2.

**“Third Installment”** has the meaning set forth in Section 3.2(C).

**“Third Installment Notice”** has the meaning set forth in Section 3.2(B).

***“Total Guaranteed Volume”*** has the meaning set forth in Section 4.2.

***“Transportation Fee”*** has the meaning set forth in Article V.

***“Transportation Fee Credit”*** means an amount (calculated on a per MCF basis) equal to one-half of the Transportation Fee chargeable for the transportation of one MCF of natural gas through the Pipeline, and which (in the aggregate) shall not exceed an amount equal to the Transportation Fee Pre-Payment.

***“Transportation Fee Pre-Payment”*** means the Seven Hundred Twenty Four Thousand Dollar (\$724,000.00) payment from Keystone to Navitas, which payment is to be made in three (3) installments in accordance with the terms of this Agreement.

- 1.2 **Interpretation.** In this Agreement, unless the context indicates otherwise: (i) the singular includes the plural and the plural the singular; (ii) references to statutes are to be construed as including all statutory or regulatory provisions consolidating, amending, replacing, succeeding or supplementing the statute referred to; (iii) references to “writing” include printing, typing, lithography, facsimile reproduction and other means of reproducing words in a tangible visible form (excluding electronic transmissions (including e-mail)); (iv) the words “including”, “includes” and “include” shall be deemed to be followed by the words “without limitation” or “but not limited to” or words of similar import; (v) references to articles, sections, schedules and exhibits are to those of this Agreement unless otherwise indicated; (vi) references to this Agreement shall be deemed to include all schedules and exhibits attached hereto and all subsequent amendments and other modifications hereto; (vii) references to other agreements, instruments or documents shall be deemed to include all amendments and other modifications thereto, but only to the extent such amendments or other modifications are permitted by the terms of this Agreement; and (viii) references to a Party include its respective successors and permitted assigns.

- 1.3 The following Exhibits and Schedules are attached hereto and made a part hereof:

<u>Exhibit A</u>	The Pipeline
<u>Exhibit A-1</u>	Pipeline Map
<u>Schedule 1</u>	Indemnification
<u>Schedule 2</u>	Indemnification Procedures

## II. TERM

- 2.1 **Initial Term.** Subject to the terms and conditions otherwise set forth herein, this Agreement shall be in full force and effect on the Effective Date and shall continue (a) for a period of twenty (20) years from the Completion Date or (b) if such date is other than the last day of a calendar month, until the last day of the

calendar month in which the twentieth (20th) anniversary of the Completion Date occurs (the "*Initial Term*").

- 2.2 Renewal Term. In the event Keystone desires to maintain its priority status then this Agreement shall automatically renew annually for a period of one (1) year (the "*Renewal Term*") after the Initial Term or the then current Renewal Term, unless not less than nine (9) months before the end of the Initial Term or then current Renewal Term (as applicable) a Party gives the other Party written notice of termination of this Agreement. For purposes of this Agreement, the Initial Term and the Renewal Terms, if any, shall be collectively referred to as the "*Term*" of this Agreement.

### III. CONSTRUCTION AND INSTALLATION OF THE INFRASTRUCTURE; TRANSPORTATION FEE PRE-PAYMENT; AND AUTHORIZATIONS

- 3.1 Pipeline. Navitas shall, design, inspect, engineer, modify, construct, equip, and place into service the Pipeline. The Pipeline shall be constructed in a good and workmanlike manner and in accordance with the specifications set forth in Exhibit A and Applicable Law and shall be capable of delivering natural gas from the Existing Pipeline to the Keystone Plant in accordance with the Bell Engineering Study.
- 3.2 Transportation Fee Pre-Payment. Keystone shall pay Navitas a Transportation Fee in the total amount of Seven Hundred Twenty-Four Thousand Dollars (\$724,000.00) in three (3) installments in accordance with this Section 3.2. Each such installment shall be made to Navitas in immediately available funds, without offset or deduction, by electronic transfer to the following bank account (or such other bank account as Navitas may specify in writing):

**REDACTED**

- A. *First Installment*. Within thirty (30) days after the Effective Date, Keystone shall pay to Navitas, or cause Navitas to be paid, a first installment (the "*First Installment*") of the Transportation Fee Pre-Payment in an amount equal to One Hundred Thousand Dollars (\$100,000.00). It is understood and agreed that the First Installment is to be used by Navitas in connection with seeking Authorizations, conducting engineering, soliciting and evaluating construction bidding and other pre-construction matters; and that the First Installment shall not be refundable under any circumstances with respect to any such costs actually incurred and documented by Navitas for such services. All third party work product produced from such pre-construction matters shall be considered jointly owned by the

Parties.

- B. *Second Installment.* Within thirty (30) days after the date that Navitas receives approval from the Kentucky Public Service Commission for the construction of the Pipeline in accordance with this Agreement, Keystone shall pay to Navitas, or cause Navitas to be paid, a second installment (the "*Second Installment*") of the Transportation Fee Pre-Payment in an amount equal to Four Hundred Twenty-Four Thousand Dollars (\$424,000.00). Upon payment of the Second Installment, no part of the First Installment is refundable to Keystone. Navitas shall notify Keystone no later than thirty (30) days before the date it anticipates the work to which the second installment pertains will be substantially completed (the "*Third Installment Notice*").
- C. *Third Installment.* Within thirty (30) days after receiving the Third Installment Notice, Keystone shall pay to Navitas, or cause Navitas to be paid, a third installment (the "*Third Installment*") of the Transportation Fee Pre-Payment in an amount equal to Two Hundred Thousand Dollars (\$200,000.00), which amount shall be the final installment of the Transportation Fee Pre-Payment. Should Keystone not pay said Third Installment within thirty (30) days after receipt of the Third Installment Notice in full and otherwise in accordance with the terms hereof, (i) Navitas shall have no obligation to perform any work on or in connection with the Pipeline unless and until Keystone so pays the Third Installment, and (ii) Keystone shall INDEMNIFY AND HOLD HARMLESS Navitas from and against any and all costs, expenses and damages in any way relating to or resulting from Keystone's failure to pay the Third Installment within said thirty (30) day period. EXCEPT AS PROVIDED IN SECTION 3.6, THE TRANSPORTATION FEE PRE-PAYMENT IS AND SHALL BE NON-REFUNDABLE. However, after the Transportation Fee Pre-Payment has been made, Keystone shall be entitled to receive the Transportation Fee Credit in accordance with the terms, conditions and limitations contained in this Agreement.
- 3.3 Pipeline Connections. The Pipeline will be connected to the Keystone Plant at the Gas Delivery Point. Natural gas transported through the Pipeline for delivery to the Keystone Plant shall be delivered to, and custody thereof shall be transferred to Keystone at the Gas Delivery Point, it being understood and agreed that Keystone shall take possession, custody and control of, and be solely responsible for the handling of, all such natural gas once it passes through the Gas Delivery Point.
- 3.4 Authorizations. Navitas shall, apply for, secure, and maintain throughout the Term all Authorizations as may be required for the purpose of designing, constructing, owning and operating the Pipeline, if, as and when applicable.
- 3.5 Notice To Proceed. Within forty-five (45) days of receipt of the Second

Installment, and again within forty-five (45) days of receipt of the Third Installment, Navitas will issue a notice to proceed to the Pipeline contractor. The Pipeline contractor shall be instructed to commence (or continue, as the case may be) work within forty-five (45) days of receiving each such notice to proceed.

- 3.6 Required Start Date. If the construction of the Pipeline has not commenced within fifteen (15) months of receipt of the First Installment, Keystone shall have the right to terminate this Agreement, and Navitas's only obligation to Keystone shall be the obligation to reimburse Keystone for the Second Installment and the Third Installment, to the extent actually paid by Keystone and without interest.
- 3.7 Completion Date. Navitas expects that the construction of the Pipeline will take approximately twelve (12) months after receipt of all Authorizations required to construct and install the Pipeline. Navitas agrees to use its commercially reasonable efforts to obtain all Authorizations to construct and install the Pipeline within six (6) months after the Effective Date. Navitas shall (a) keep Keystone informed of the status of obtaining all such Authorizations, (b) promptly notify Keystone in writing in the event Navitas determines it will not obtain all such Authorizations by such date and (c) promptly notify Keystone in writing when it has obtained all such Authorizations. In the event Navitas does not obtain all such Authorizations by such date, the Parties agree to work together in good faith so that such Authorizations are obtained as promptly as reasonably possible after such date. The completion date for the Pipeline (the "**Completion Date**") shall be the first day of the first month after all construction on the Pipeline is complete and the Pipeline is placed into service. Navitas shall use reasonable commercial efforts to achieve the Completion Date within fifteen (15) months after receiving all Authorizations required to construct the Pipeline. If at any time Navitas determines that it will not complete the Pipeline by such date, it shall promptly notify Keystone in writing. In such event the Parties agree to work together in good faith so that the Pipeline is completed as promptly as reasonably possible following such date. Notwithstanding the foregoing, Navitas makes no representation or warranty with respect to when the Completion Date will actually occur and Navitas shall incur no liability to Keystone under this Agreement if the Completion Date is later than fifteen (15) months after receiving all Authorizations required to construct the Pipeline, unless such delay is due solely to Navitas's failure to comply with its obligations under this paragraph. If the Completion Date is delayed, in whole or in part, due to an event of Force Majeure, the Completion Date shall be extended on a day for day basis for each day of Force Majeure. The Parties shall execute a written acknowledgement identifying the Completion Date and the end date of the Initial Term.

#### IV. OPERATION OF THE PIPELINE

- 4.1 Operation; Compliance with Laws. Subject to the terms and conditions of this Agreement, beginning as of the Completion Date, Navitas shall at its sole cost, risk, and expense, operate and maintain the Pipeline in compliance with the Tariff

then in effect, all Applicable Laws and this Agreement.

4.2 Available Pipeline Capacity. Navitas shall make capacity on the Pipeline available to Keystone on an open access, non-discriminatory basis and otherwise in accordance with the terms and provisions of the Tariff, Applicable Law and the terms hereof. Without limiting the foregoing,

- A. For a period of four (4) years from and after the Completion Date, Navitas shall not, without Keystone's prior consent, transport natural gas through the Pipeline for any Person other than Keystone unless (i) it is able to demonstrate that there is sufficient capacity on the Pipeline to transport such other Person's natural gas without reducing Keystone's throughput below 10,833 MCF per month, or (ii) it constructs additional capacity on the Pipeline such that Keystone's throughput shall not be reduced below such monthly amount. The reference to a specific throughput volume in the preceding sentence is not intended to be or constitute, and shall not be construed to be or constitute, a representation or warranty (either express or implied) that the Pipeline will have the capacity to transport any amount of natural gas, and any such representation or warranty is expressly denied.
- B. Effective as of and for each year beginning on or after the fourth (4th) anniversary of the Completion Date, (i) the Parties shall agree in writing at least six (6) months before the anniversary of the Completion Date of the volume of natural gas, if any, Keystone will firmly and irrevocably commit and agree to transport through the Pipeline during each month of such year in addition to the Guaranteed Volume (the sum of such additional amount and the Guaranteed Volume is referred to as the "*Total Guaranteed Volume*"), it being understood and agreed that the Total Guaranteed Volume shall not exceed 10,833 MCF per month (unless the Parties agree that historical empirical data clearly indicates the capacity for a greater amount) or be less than 3,000 MCF per month without Navitas's prior written consent), and (ii) Navitas shall have the right to allocate capacity on the Pipeline in excess of the Total Guaranteed Volume to any Person or Persons as it sees fit. For clarification and the avoidance of doubt, the written agreement referenced in sub-part (i) of the preceding sentence shall constitute its irrevocable commitment and agreement by Keystone to pay Navitas an amount each month during the relevant year equal to the product of the then applicable Transportation Fee times the Total Guaranteed Volume for such month, even if it fails to transport the Total Guaranteed Volume during such month; however, any unused but paid for volume shall accrue and offset future deliveries in excess of the Guaranteed Volume during the following twelve (12) month period.

4.3 Nominations and Minimum Transportation Obligation. At least ten (10) days before each Nomination Period, Keystone shall provide Navitas a written

nomination of the amount of natural gas (expressed in MCF) it desires to have transported through the Pipeline for delivery and purchase at the Keystone Plant during the relevant Nomination Period (the "*Monthly Nomination*"). Provided there is available capacity in the Pipeline, Navitas agrees to transport the Monthly Nomination through the Pipeline to the Keystone Plant. If there is not sufficient available capacity in the Pipeline to transport all of the Monthly Nomination, Navitas agrees that Keystone's Monthly Nomination greater than the Guaranteed Volume will be reduced on a pro rata non-discriminatory basis. Any provision herein to the contrary notwithstanding, Keystone covenants, agrees and commits that (i) the total Monthly Nominations shall not be less than 3,000 MCF per month or less than 36,000 MCF per Contract Year.

- 4.4 Purchases of Natural Gas. This Agreement includes the transportation of natural gas through the Pipeline and Keystone's obligation to purchase the Guaranteed Volume and, as applicable, the Total Guaranteed Volume on a take or pay basis.
- 4.5 Meters; Location. The volumes of natural gas measured by the meters at the Gas Delivery Point shall be the conclusive measurement of all natural gas received into and transported through the Pipeline by Navitas for Keystone.
- 4.6 Ownership of the Pipeline. The Parties acknowledge and agree that Navitas shall be the owner and operator of the Pipeline and that all payments required hereunder by Keystone shall be paid to Navitas.

## V. TRANSPORTATION RATE

The base transportation fee (the "*Transportation Fee*") for all natural gas transported through the Pipeline for delivery to the Keystone Plant shall be equal to the Tariff as in effect from time to time; provided, however, and notwithstanding any provision herein to the contrary, the Transportation Fee during the Initial Term shall be the greater of (i) the Tariff and (ii) \$3.62 per MCF. On the Effective Date, the Tariff is \$3.62 per MCF; however, the Parties understand and agree that the Tariff, and thus the Transportation Fee, is subject to change from time to time, including a Compliance Cost surcharge in the event of a Change in Law. The Transportation Fee shall be in addition to and not inclusive of the cost of any natural gas delivered to and purchased by Keystone. The foregoing provision regarding the Transportation Fee notwithstanding, it is recognized and agreed that Keystone shall be entitled to receive a credit against the Transportation Fee equal to the Transportation Fee Credit (initially \$1.81 per MCF) for each MCF of natural gas transported through the Pipeline for delivery to Keystone at the Keystone Plant. At such time as the aggregate amount of the Transportation Fee Credit credited to Keystone equals the Transportation Fee Pre-Payment, Keystone shall no longer receive any Transportation Fee Credit, and it shall be required to pay the full Transportation Fee (without reduction) for natural gas transported through the Pipeline and delivered to the Keystone Plant. Thus, as an example and for purposes of clarification only, if the Transportation Fee Pre-Payment is \$724,000 and the Transportation Fee Credit is not escalated and remains a constant \$1.81 per MCF, the Transportation Fee Credit would

be extinguished after 400,000 MCF of natural gas is delivered to Keystone through the Pipeline at the Keystone Plant – (\$1.81 x 400,000 MCF = \$724,000).

## VI. THROUGHPUT RECORDS AND REPORTS

During the Term, Navitas shall maintain monthly records of all throughput of natural gas for delivery to the Keystone Plant through the Pipeline. Navitas shall promptly deliver such records to Keystone as soon as such information is final and available for distribution, but in no event later than the end of the month following the month of such activity. Navitas shall maintain all such records in a readily accessible format for a period of two (2) years after the expiration of each Contract Year under this Agreement.

## VII. PAYMENTS

- 7.1 Payment. Navitas shall invoice Keystone for all amounts due under this Agreement, including the Transportation Fee (reduced by Transportation Fee Credit if and when applicable) on or about the 7<sup>th</sup> day of each month for Keystone's usage in the immediately prior month. Keystone shall pay the amounts owed hereunder in accordance with the rules and regulations of the Kentucky Public Utilities Commission or, if such rules and regulations do not address the payment of any amounts owed hereunder, within fifteen (15) days after the date of such invoice by electronic transfer of immediately available funds to the bank account specified in Section 3.2.
- 7.2 Late Payments. If Keystone fails to pay any amount due hereunder when due which is not otherwise being disputed in good faith, then Navitas shall be entitled to collect the amount due, together with interest thereon, at a rate which is equal to the lesser of (i) the maximum, applicable non-usurious legal rate of interest allowed by Applicable Law, or (ii) a rate equal to the prime rate published by the Wall Street Journal plus two percent (2%) per annum, during the period from the date such payment was due (or such other date as may be specified in the rules and regulations of the Kentucky Public Utilities Commission) to the date of payment (said applicable rate is referred to herein as the "*Base Rate*").
- 7.3 Disputed Payments. If any amount invoiced hereunder is disputed in good faith, then Keystone shall pay the full undisputed amount when due and non-payment of such disputed amount shall not be considered an Event of Default hereunder, unless (a) it is determined that such amount was actually owed and (b) Keystone does not pay the amount determined to be owed, together with interest at the Base Rate from the date payment was originally due (or such other date as may be specified in the rules and regulations of the Kentucky Public Utilities Commission) to the date of payment, within fifteen (15) days of the determination that the disputed amount is due and owing. In the event Keystone pays Navitas amounts hereunder which are later determined not to have been owed, Navitas shall refund such amount together with interest at the Base Rate from the date of such payment until the date of such refund.



- 7.4 Termination of Services. Navitas may terminate transportation services for nonpayment upon the later of (i) ten (10) days after Keystone's receipt of written notice of late payment, and (ii) twenty-seven (27) days from the date of mailing of the original invoice, if such payment default is not cured during such periods.

## VIII. LAWS; RULES AND REGULATIONS

In performing hereunder, each Party, and their respective employees, contractors, and agents, agrees to and shall comply with all Applicable Laws, including Environmental Laws. Without limiting the foregoing, the Parties recognize and agree that the transportation and delivery of natural gas to the Keystone Plant are subject to Applicable Law, including the Rules and Regulations. Keystone acknowledges that it has read the Rules and Regulations and understands its obligations and Navitas's rights thereunder.

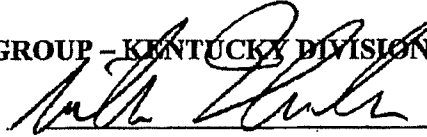
## IX. FORCE MAJEURE

- 9.1 Event of Force Majeure Defined. "*Event of Force Majeure*" means any event or occurrence beyond the reasonable control of a Party that prevents in whole or in part the performance by such Party of any obligation or condition under this Agreement, including but not limited to strikes, lockouts or other industrial disturbances, wars, sabotage, terrorism, blockades, insurrections or acts of the public enemy; epidemics, landslides, lightning, earthquakes, tornadoes, interruption of utility services, fires, explosions, storms, floods, washouts or other acts of God; arrests or restraints of governments and people; riots or civil disturbances, failures, disruptions, breakdowns or accidents to machinery, facilities or lines of pipe (whether owned, leased or rented); freezing of lines; embargoes, priorities, expropriation or condemnation by Governmental Authorities; interference by civil or military authorities. A third-party's Event of Force Majeure preventing the performance of a Party hereunder will be deemed an Event of Force Majeure for such Party to the extent that such event would be an Event of Force Majeure hereunder.
- 9.2 Notice of Event of Force Majeure. If an Event of Force Majeure renders a Party unable, in whole or in part, to carry out its obligations under this Agreement, that Party must give the other Party notice and full particulars of the Event of Force Majeure (including its known or estimated duration) in writing promptly after the occurrence of the causes relied on, or promptly give notice by telephone and follow the notice with a written confirmation within seventy-two (72) hours. The Party providing the notice shall use commercially reasonable efforts to (i) ameliorate the conditions, (ii) resume the continuation of its performance under this Agreement, and (iii) minimize the impact of the condition on the other Party. Neither Party shall be compelled to resolve any strikes, lockouts, or other industrial disputes other than as it shall determine to be in its best interests. Any provision herein to the contrary notwithstanding, an Event of Force Majeure shall not relieve a Party from any obligations to make payments or perform its indemnity obligations under this Agreement.

IN WITNESS WHEREOF, each of the Parties has caused this Agreement to be executed by its duly authorized officer as of the date first above written.

EQUITY GROUP - KENTUCKY DIVISION LLC

By:

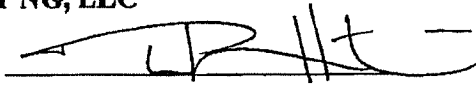


Printed Name: William Andersen

Title: Executive VP USA Proteins

NAVITAS KY NG, LLC

By:



Printed Name: THOMAS HORTLINE

Title:

SECRETARY

## **X. ASSIGNMENT; NO THIRD PARTY BENEFICIARY**

This Agreement may not be assigned or transferred directly or indirectly (including, pursuant to a stock or asset sale) by either Party without the prior written consent of the other Party, which consent will not be unreasonably withheld, delayed or conditioned; provided, however, that this Agreement may be assigned without the prior written consent of the other Party to (a) Affiliates of a Party who are under common, majority ownership with such Party, (b) wholly-owned subsidiaries of a Party, or (c) a third party in connection with the sale or other transfer of all or substantially all of a Party's assets; provided that, the transferee is at least as creditworthy as the transferor. This Agreement is binding upon and inures to the benefit of the Parties hereto and their respective successors and permitted assigns. This Agreement is not intended to confer any rights or benefits on any persons other than the Parties, it being agreed that all third-party beneficiary rights are hereby expressly denied.

## **XI. GOVERNING LAW, VENUE AND WAIVER OF JURY**

This Agreement will be governed and construed in accordance with the laws of the State of Delaware, without reference to the choice of law principles thereof, except with respect to applicable regulatory matters which are subject to the laws of the State of Kentucky. The Parties will submit any disputes arising out of this Agreement to the exclusive jurisdiction of the U.S. District Court located in Delaware if federal jurisdiction is available, and to the courts of the State of Delaware if federal jurisdiction is not available. EACH PARTY WAIVES, TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, ITS RIGHT TO A TRIAL BY JURY.

## **XII. NOTICE**

Notices will be in writing and delivered either by overnight courier to the address set forth below, by facsimile to the number set forth below confirmed within one (1) Business Day after being sent by facsimile, by certified U.S. mail, return receipt requested, or by overnight courier to the address set forth below. A Party may change its notice address or fax number upon notice to the other Party.

### If to Keystone:

Equity Group – Kentucky Division LLC  
2294 Kentucky Highway 90 West  
Albany, KY 42602  
Attn: General Manager  
Facsimile: 606-387-2335

### If to Navitas:

Navitas KY NG, LLC  
121 Eakly Campus Road

P. O. Box 183  
Eakly, Oklahoma 73033  
Attn: Thomas Hartline  
Facsimile: 714-850-0876

### **XIII. INDEMNITY; LIMITS OF LIABILITY**

- 13.1 Indemnification. The indemnification and liability obligations of the Parties shall be as specified in Schedule 1.
- 13.2 Indemnification Procedures. The indemnification procedures specified in Schedule 2 shall apply to any claim for indemnification by a Party under this Agreement.
- 13.3 Limitation of Liability. EXCEPT WITH RESPECT TO CLAIMS OF THIRD PARTIES NOT AFFILIATED WITH EITHER PARTY, IN NO EVENT WILL EITHER PARTY BE LIABLE TO THE OTHER PARTY FOR ANY INCIDENTAL, SPECIAL, INDIRECT, EXEMPLARY, PUNITIVE, CONSEQUENTIAL OR SIMILAR DAMAGES INCURRED BY THE OTHER PARTY AND RESULTING FROM OR ARISING OUT OF THIS AGREEMENT, INCLUDING, WITHOUT LIMITATION, LOSS OF PROFITS, LOST BUSINESS OPPORTUNITIES OR BUSINESS INTERRUPTIONS, REGARDLESS OF HOW THEY ARE CAUSED, INCLUDING BY THE NEGLIGENCE OF SUCH PARTY.

### **XIV. COSTS AND EXPENSES; TAXES; INSURANCE**

- 14.1 Costs and Expenses; Taxes. Except as otherwise expressly provided herein, each Party shall bear and pay its own costs and expenses, including but not limited to, attorneys' fees, incurred in connection with this transaction. Navitas shall pay or be responsible for all ad valorem taxes that may be levied on or assessed against the Pipeline. Keystone shall pay any (a) gross receipts tax, unless it is exempt from gross receipts tax and provide adequate documentation of such exemption, and (b) use taxes, use fees, or sales taxes imposed by any Governmental Authority on the transportation of natural gas through the Pipeline or in connection with the purchase of any natural gas pursuant to this Agreement.
- 14.2 Insurance and Insurance Coverages. Each Party shall procure and maintain in full force and effect throughout the Term of this Agreement insurance coverages in the types and amounts specified below and with insurance companies rated not less than A- by A.M. Best, or otherwise reasonably satisfactory to the other Party. Each Party shall cause its insurance carriers to furnish the other Party with insurance certificates, in a standard form and from a properly authorized party, evidencing the existence of the coverages and endorsements required.

- A. Workers Compensation at statutory limits and Employer's Liability Insurance in the minimum amount of One Million Dollars (\$1,000,000) each accident, One Million Dollars (\$1,000,000) disease – each employee and One Million Dollars (\$1,000,000) disease – policy limit.
- B. Commercial general liability coverage (or other liability coverage for the operations described herein), including products/completed operations, and contractual liability coverage, in the minimum amount of One Million Dollars (\$1,000,000) per occurrence and Two Million Dollars (\$2,000,000) aggregate.
- C. Commercial Automobile Liability Insurance covering all owned, non-owned, and hired vehicles with a combined single limit for bodily injury and property damage of \$1,000,000 per accident.
- D. Pollution legal liability insurance with minimum limits of Five Million Dollars (\$5,000,000) per occurrence and Five Million Dollars (\$5,000,000) aggregate. The parties agree that this requirement can be satisfied with sudden and accidental pollution liability coverage under the Commercial General Liability and Excess Liability policies.
- E. Excess liability insurance coverage in excess of the terms and limits of insurance specified in subparagraphs A (Employer's Liability), B, and C above with a combined limit of \$5,000,000. This policy will include sudden and accidental pollution legal liability coverage unless a separate, stand-alone pollution policy is carried.

14.3 Additional Insurance Requirements.

- A. The foregoing insurance policies shall (i) include an endorsement that the underwriters waive all rights of subrogation against the Keystone Indemnitees and Navitas Indemnitees (as applicable and as defined in Schedule 1), and (ii) be primary and non-contributory to any policy of any Keystone Indemnitees and Navitas Indemnitees (as applicable), in each case except (as applicable) for those claims, and to the extent of those claims, for which Keystone has an indemnity obligation to Navitas and Navitas has an indemnity obligation to Keystone pursuant to Schedule 1.
- B. All policies shall cause its insurers to name the Keystone Indemnitees and Navitas Indemnitees (as applicable) as additional insureds on its commercial general liability, pollution legal liability and excess liability insurance policies, to the extent of Navitas's and Keystone's respective indemnification obligations hereunder.
- C. The mere purchase and existence of insurance does not reduce or release a Party from any liability incurred or assumed under this Agreement.

- D. The Parties may carry insurance with deductibles and nonetheless be considered in compliance with the foregoing insurance requirements. Each Party's self-insurance claim expenses, loss and costs, deductibles, self-insurance retention costs, captive reinsurance, fronting deductibles or fronting arrangements, and similar self-funded programs applicable to the insurance policies required herein, are the sole responsibility of such Party.

## XV. EVENTS OF DEFAULT AND REMEDIES

- 15.1 Events of Default. Notwithstanding any other provision of this Agreement, an event of default ("*Event of Default*") shall be deemed to occur with respect to a Party when:
  - A. Such Party fails to make any undisputed payment when due under this Agreement, within ten (10) Business Days of a written demand therefor;
  - B. Other than an Event of Default described in Section 15.1.A, such Party fails to perform any obligation or covenant to the other Party under this Agreement and such matter is not in dispute, which failure is not cured to the reasonable and commercially acceptable satisfaction of the other Party within thirty (30) calendar days from the date that such Party receives written notice that corrective action is needed;
  - C. Such Party becomes Bankrupt; or
  - D. An assignment or purported assignment of this Agreement in violation of the provisions of Article X.
- 15.2 Remedies. Notwithstanding any other provision of this Agreement, upon the occurrence of an Event of Default with respect to either Party (the "*Defaulting Party*"), the other Party (the "*Performing Party*") shall in its reasonable discretion, in addition to all other remedies available to it and without incurring any liabilities to the Defaulting Party or to third parties, be entitled as long as such Event of Default is continuing to do one or more of the following: (a) suspend its performance under this Agreement with prior notice of five (5) Business Days to the Defaulting Party, (b) proceed against the Defaulting Party for damages occasioned by the Defaulting Party's failure to perform, and (c) upon five (5) Business Days' notice to the Defaulting Party, if the Event of Default has not been cured, terminate this Agreement. Notwithstanding the foregoing, in the case of an Event of Default described in Section 15.1.C above, no prior notice shall be required. The Defaulting Party shall reimburse the Performing Party for all costs and expenses related to the Performing Party's claim with respect to such breach, including but not limited to reasonable attorneys' fees. The remedies provided in

this provision are in addition to any and all other remedies available to the Performing Party under this Agreement and Applicable Law.

## XVI. MISCELLANEOUS

- 16.1 Recitals Incorporated; Entire Agreement; Modification of Terms. The Recitals stated above are incorporated into and made a part of this Agreement by this reference. This Agreement, and any applicable lease connection agreement between the Parties, constitutes the entire understanding between the Parties with respect to this transaction, superseding all prior negotiations, statements, representations, correspondence, offers, discussions, agreements and understandings relating to this transaction. This Agreement may not be modified or altered orally or in any manner other than by an express agreement in writing signed by all persons or entities who are parties to this Agreement at such time. This Agreement and the terms and conditions hereof apply to and are binding upon the heirs, legal representatives, successors, and permitted assigns of the Parties.
- 16.2 Titles and Headings. The titles of Articles in this Agreement are not a part of this Agreement and shall have no effect upon the construction or interpretation of any part.
- 16.3 Enforceability. Should any provision of this Agreement be invalid, illegal or unenforceable in any respect, the validity, legality and enforceability of the remaining provisions contained herein shall not in any way be affected or impaired thereby, and the invalid, illegal or unenforceable provision shall be modified so that it is no longer invalid, illegal or unenforceable while still, to the maximum extent possible, being consistent with the original intent of such provision.
- 16.4 No Partnership or Venture. Nothing contained in this Agreement shall create or be construed as creating a partnership, joint venture, or employment relationship between Navitas and Keystone.
- 16.5 Recordkeeping and Audit Rights. For a period two (2) years after the close of each Contract Year under this Agreement the Parties (and/or their duly authorized representatives) shall have the right upon delivery of prior written notice, to audit each other's records, documents, and other data pertaining to this Agreement during normal business hours. The Parties shall reasonably cooperate in furnishing the other such records, documents, and other data in connection with such audit; provided that the Party requesting such audit shall bear all costs and expenses related thereto.
- 16.6 Counterparts. This Agreement may be executed in multiple counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

- 16.7 Waiver. No waiver of a breach of or a default in any terms, covenants, or conditions of this Agreement by a Party shall be, or shall be construed to be, a waiver of any succeeding breach of or default in the same or any other term, covenant, or condition hereof; and no delay or failure by a Party to exercise or to avail itself of any right, power, or privilege that such Party has or may have under this Agreement shall operate as a waiver of any such right, power, or privilege in the same or a different circumstance.
- 16.8 Confidentiality. The Parties agree that the terms of this Agreement, and the substance of discussions and correspondence between the Parties concerning its subject matter, and all information provided by or on behalf of a Party to the other Party and designated as confidential, is confidential ("*Confidential Information*") and each Party shall, except as required by Applicable Law (i) hold the Confidential Information in confidence during the Term and for two (2) years thereafter, exercising a degree of care not less than the care used by each respective Party to protect its own proprietary or confidential information, (ii) restrict disclosure of the Confidential Information solely to those directors, officers, employees, Affiliates, contractors and consultants with a "need to know" and not to disclose it to any other person, (iii) advise those persons, to whom the Confidential Information is disclosed, of their confidentiality obligations hereunder, and (iv) use the Confidential Information for the sole purpose of meeting obligations contained herein. Confidential Information shall no longer be considered confidential and subject the non-disclosure obligations of this Section 16.8 if and to the extent it is or becomes general known to the public or otherwise a part of the public domain, other than as the result of a breach of the provisions of this Section 16.8. The Parties acknowledge that in the event of an unauthorized disclosure, the damages incurred to a Party due to the disclosure may be difficult to ascertain, and that such damaged Party may seek injunctive relief as well as monetary damages against a Party that breaches this Agreement and causes such damages. In the event of a conflict between this Section 16.8 and the other terms, conditions and provisions of this Agreement, related to confidentiality or nondisclosure, the terms of this Section 16.8 shall control.

[Signature Page to Follow]



## **EXHIBIT A**

### **The Pipeline**

Gas main from the Albany, Kentucky city gate, located at approximately the midpoint of Dawson Street between Allen Street and Dalton Road, to the Keystone Foods facility, entering on the east side of the property east of the trailer parking, and then turn west right before you reach the fence around the SBR/anaerobic area and terminating at the rear of the facility, covering approximately eight-miles.

The 6-inch diameter polyethylene pipeline shall be constructed of SDR-7 in accordance with Title 49 Pipeline Safety Act as adopted by the Kentucky Public Service Commission.

**EXHIBIT A-1**

**Pipeline Map**

See attached topographical map from

Phase I  
Study and Report  
Capability analysis  
Natural Gas Service to Keystone Foods  
Navitas Utility Corporation  
Albany, Kentucky  
March 2012  
By Bell Engineering

**SCHEDULE 1  
INDEMNIFICATION**

**I. KEYSTONE INDEMNIFICATION FOR KEYSTONE EMPLOYEES AND PROPERTY.**

TO THE FULL EXTENT PERMITTED BY LAW, KEYSTONE (i) IS LIABLE FOR, AND (ii) AGREES TO RELEASE, INDEMNIFY, AND HOLD HARMLESS, NAVITAS, AND NAVITAS'S SUBSIDIARIES, AND AFFILIATES, AND THE OFFICERS, DIRECTORS, SHAREHOLDERS, MEMBERS, PARTNERS AND EMPLOYEES OF EACH SUCH ENTITY (COLLECTIVELY, THE "*NAVITAS INDEMNITEES*"), FROM AND AGAINST:

a) ALL CLAIMS, LAWSUITS, HEARINGS, PROCEEDINGS, DEBTS, JUDGMENTS, DEMANDS, DAMAGES, INJUNCTIONS, ORDERS, AWARDS, SETTLEMENTS, LOSSES, LIABILITIES, LIENS AND ENCUMBRANCES OF EVERY KIND OR CHARACTER (COLLECTIVELY, "*CLAIMS*"), AND

b) ANY AND ALL COSTS AND EXPENSES OF EVERY KIND AND CHARACTER, INCLUDING WITHOUT LIMITATION, COURT COSTS, ATTORNEYS' FEES AND INVESTIGATIVE COSTS, AND COSTS AND EXPENSES RELATED TO ARBITRATION, MEDIATION, LITIGATION, DEFENSE AND SETTLEMENT (COLLECTIVELY, "*COSTS*"),

PERTAINING TO OR ARISING OUT OF (1) PERSONAL INJURY TO, OR DEATH OF, ANY EMPLOYEE OF KEYSTONE OR OF ANY EMPLOYEE OF ANY SUBSIDIARY, OR AFFILIATE OF KEYSTONE, OR (2) LOSS OF, OR DAMAGE TO, THE PROPERTY OF KEYSTONE OR TO THE PROPERTY OF ANY SUBSIDIARY, OR AFFILIATE OF KEYSTONE, OR OF ANY OF THEIR RESPECTIVE EMPLOYEES, ARISING OUT OF, OR IN ANYWAY CONNECTED WITH, THIS AGREEMENT, EVEN IF CAUSED IN WHOLE OR IN PART BY THE NEGLIGENCE (WHETHER SOLE, JOINT, OR CONCURRENT), OR STRICT LIABILITY, OF ANY NAVITAS INDEMNITEE; PROVIDED, HOWEVER, KEYSTONE'S LIABILITY AND DUTY TO RELEASE, INDEMNIFY AND HOLD HARMLESS THE NAVITAS INDEMNITEES DOES NOT EXTEND TO CLAIMS AND COSTS TO THE EXTENT ATTRIBUTABLE TO THE GROSS NEGLIGENCE OR WILLFUL MISCONDUCT OF ANY NAVITAS INDEMNITEE.

**II NAVITAS INDEMNIFICATION FOR NAVITAS EMPLOYEES AND PROPERTY.**

TO THE FULL EXTENT PERMITTED BY LAW, NAVITAS IS LIABLE FOR, AND AGREES TO RELEASE, INDEMNIFY, AND HOLD HARMLESS, KEYSTONE, AND KEYSTONE'S SUBSIDIARIES AND AFFILIATES, AS WELL AS THE OFFICERS, DIRECTORS, SHAREHOLDERS, MEMBERS, PARTNERS AND EMPLOYEES OF

EACH SUCH ENTITY (COLLECTIVELY, "**KEYSTONE INDEMNITEES**"), FROM AND AGAINST ANY AND ALL CLAIMS AND COSTS (AS DEFINED IN SECTION 1 OF THIS SCHEDULE),

PERTAINING TO OR ARISING OUT OF (1) PERSONAL INJURY TO, OR DEATH OF, ANY EMPLOYEE OF NAVITAS, OR OF ANY EMPLOYEE OF ANY SUBSIDIARY, OR AFFILIATE OF NAVITAS, OR (2) LOSS OF, OR DAMAGE TO, THE PROPERTY OF NAVITAS OR TO THE PROPERTY OF ANY SUBSIDIARY, OR AFFILIATE OF NAVITAS, OR OF ANY OF THEIR RESPECTIVE EMPLOYEES, ARISING OUT OF, OR IN ANYWAY CONNECTED WITH, THIS AGREEMENT, EVEN IF CAUSED IN WHOLE OR IN PART BY THE NEGLIGENCE (WHETHER SOLE, JOINT, OR CONCURRENT), OR STRICT LIABILITY, OF ANY KEYSTONE INDEMNITEE; PROVIDED, HOWEVER, NAVITAS'S LIABILITY AND DUTY TO RELEASE, INDEMNIFY AND HOLD HARMLESS THE KEYSTONE INDEMNITEES DOES NOT EXTEND TO CLAIMS AND COSTS TO THE EXTENT ATTRIBUTABLE TO THE GROSS NEGLIGENCE OR WILLFUL MISCONDUCT OF ANY KEYSTONE INDEMNITEE.

### **III. KEYSTONE INDEMNIFICATION FOR OTHER CLAIMS**

SUBJECT TO THE OBLIGATIONS SET FORTH IN SECTION I ABOVE, KEYSTONE IS LIABLE FOR AND AGREES TO RELEASE, INDEMNIFY, DEFEND, AND HOLD HARMLESS THE NAVITAS INDEMNITEES FROM ANY AND ALL CLAIMS AND COSTS ASSERTED AGAINST THE NAVITAS INDEMNITEES BY ANY THIRD PARTY (i.e. ANY PERSON OR ENTITY WHICH IS NOT ONE OF THE NAVITAS INDEMNITEES OR THE KEYSTONE INDEMNITEES) FOR (I) PERSONAL INJURY TO, OR DEATH OF, ANY PERSON, OR (II) FOR LOSS OF, OR DAMAGE TO, ANY PROPERTY, ARISING OUT OF, OR IN ANYWAY CONNECTED WITH, THIS AGREEMENT, AND RESULTING FROM, BUT ONLY TO THE EXTENT OF, THE (1) STRICT LIABILITY, (2) FAULT, (3) ANY BREACH OF THIS AGREEMENT BY THE KEYSTONE INDEMNITIES, OR (4) NEGLIGENCE, GROSS NEGLIGENCE OR WILLFUL MISCONDUCT OF THE KEYSTONE INDEMNITEES. NOTHING IN THIS SECTION III SHALL REQUIRE KEYSTONE TO INDEMNIFY ANY NAVITAS INDEMNITEE FOR THE STRICT LIABILITY, FAULT OR NEGLIGENCE OF ANY NAVITAS INDEMNITEE AND, TO THE EXTENT THE STRICT LIABILITY, FAULT OR NEGLIGENCE IS JOINT OR CONCURRENT BETWEEN THE KEYSTONE INDEMNITEES AND THE NAVITAS INDEMNITEES, THE OBLIGATION TO INDEMNIFY UNDER THIS SECTION III SHALL BE COMPARATIVE, AND KEYSTONE SHALL INDEMNIFY THE NAVITAS INDEMNITEES ONLY TO THE EXTENT THAT THE STRICT LIABILITY, FAULT OR NEGLIGENCE OF THE KEYSTONE INDEMNITEES WAS THE CAUSE OF SUCH PERSONAL INJURY, DEATH, LOSS OR DAMAGE.

#### **IV. NAVITAS INDEMNIFICATION FOR OTHER CLAIMS**

SUBJECT TO THE OBLIGATIONS SET FORTH IN SECTION II ABOVE, NAVITAS IS LIABLE FOR AND AGREES TO RELEASE, INDEMNIFY, DEFEND, AND HOLD HARMLESS THE KEYSTONE INDEMNITEES FROM ANY AND ALL CLAIMS AND COSTS ASSERTED AGAINST THE KEYSTONE INDEMNITEES BY ANY THIRD PARTY (i.e. ANY PERSON OR ENTITY WHICH IS NOT ONE OF THE NAVITAS INDEMNITEES OR THE KEYSTONE INDEMNITEES) FOR (I) PERSONAL INJURY TO, OR DEATH OF, ANY PERSON, OR (II) FOR LOSS OF, OR DAMAGE TO, ANY PROPERTY, ARISING OUT OF, OR IN ANYWAY CONNECTED WITH, THIS AGREEMENT, AND RESULTING FROM, BUT ONLY TO THE EXTENT OF, THE (1) STRICT LIABILITY, (2) FAULT, (3) ANY BREACH OF THIS AGREEMENT BY THE NAVITAS INDEMNITIES, OR (4) THE NEGLIGENCE, GROSS NEGLIGENCE OR WILLFUL MISCONDUCT OF THE NAVITAS INDEMNITEES. NOTHING IN THIS SECTION IV SHALL REQUIRE NAVITAS TO INDEMNIFY ANY KEYSTONE INDEMNITEE FOR THE STRICT LIABILITY, FAULT OR NEGLIGENCE OF ANY KEYSTONE INDEMNITEE AND, TO THE EXTENT THE STRICT LIABILITY, FAULT OR NEGLIGENCE IS JOINT OR CONCURRENT BETWEEN THE KEYSTONE INDEMNITEES AND THE NAVITAS INDEMNITEES, THE OBLIGATION TO INDEMNIFY UNDER THIS SECTION IV SHALL BE COMPARATIVE, AND NAVITAS SHALL INDEMNIFY THE KEYSTONE INDEMNITEES ONLY TO THE EXTENT THAT THE STRICT LIABILITY, FAULT OR NEGLIGENCE OF THE NAVITAS INDEMNITEES WAS THE CAUSE OF SUCH PERSONAL INJURY, DEATH, LOSS OR DAMAGE.

#### **V. INDEMNIFICATION PROCEDURES**

ANY CLAIM FOR INDEMNIFICATION PURSUANT TO THIS SCHEDULE 1 SHALL BE SUBJECT TO THE PROCEDURES SET FORTH IN SCHEDULE 2.

**SCHEDULE 2**  
**INDEMNIFICATION PROCEDURES**

1. Indemnification Notice. Each Party entitled to indemnification pursuant to Schedule 1 ("*Indemnified Party*") who determines that an event has occurred giving rise (or which may give rise) to a right of indemnification hereunder in favor of such Indemnified Party (an "*Indemnity Claim*"), shall promptly notify the Party obligated to provide indemnification or from whom indemnification is being or will be sought (the "*Indemnifying Party*") in writing of such Indemnity Claim (a "*Claim Notice*") describing in reasonable detail the facts giving rise to the claim for indemnification hereunder and shall include in such Claim Notice (if then known) the amount or the method of computation of the amount of such Indemnity Claim; provided, however, the failure of any Indemnified Party to give timely notice thereof shall not affect any of its rights to indemnification hereunder nor relieve the Indemnifying Party from any of its indemnification obligations hereunder, except to the extent the Indemnifying Party is materially prejudiced by such failure.

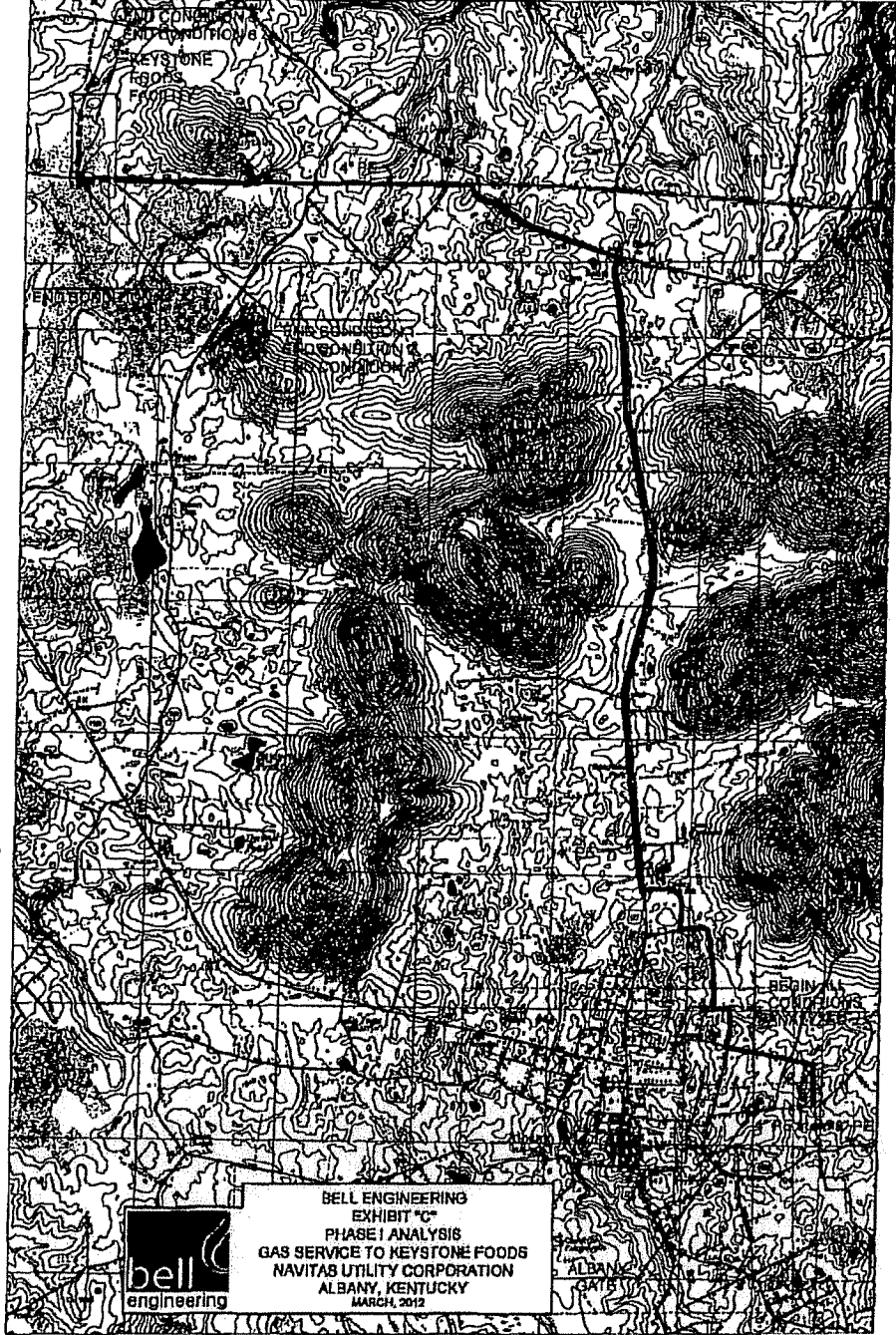
2. Indemnification Procedure. Any obligation to provide indemnification shall be subject to the following terms and conditions:

a. Upon receipt of a Claim Notice, the Indemnifying Party shall, at its cost and expense and upon notice to the Indemnified Party within thirty (30) days of its receipt of such Claim Notice (or any shorter time period as the circumstances may warrant), assume and control the defense, compromise, settlement and investigation of such Indemnity Claim, including the management of any proceeding relating thereto; provided, however, that if there exists a material conflict of interest (other than one of a monetary nature) or if the Indemnified Party has been advised by counsel that there may be one or more legal or equitable defenses available to it that are different from or additional to those available to the Indemnifying Party, which, in either case, would make it inappropriate for the same counsel to represent both the Indemnifying Party and the Indemnified Party, then the Indemnified Party shall be entitled to retain its own counsel at its cost and expense.

b. The Indemnified Party may, at its own cost and expense, participate in the defense of such Indemnity Claim and agrees to cooperate with the Indemnifying Party in such efforts and make available to the Indemnifying Party all witnesses, records, materials and information in the Indemnified Party's possession, under its control or to which it may have access as may be reasonably required by the Indemnifying Party. The Indemnifying Party will keep the Indemnified Party reasonably informed of the progress of the defense of any such Indemnity Claim. If the Indemnifying Party fails to so assume the defense and investigation of any such Indemnity Claim, (i) the Indemnified Party shall have the right to undertake the defense, compromise, settlement and investigation of such Indemnity Claim on behalf of, and at the reasonable cost and expense of and for the account and risk of the Indemnifying Party, (ii) the Indemnifying Party agrees to cooperate reasonably with the Indemnified Party in such efforts and (iii) the Indemnified

Party will keep the Indemnifying Party reasonably informed of the progress of the defense of any such Indemnity Claim.

3. Settlement of Indemnity Claims. The Indemnifying Party shall not, without the written consent of the Indemnified Party, (a) settle or compromise any Indemnity Claim or consent to the entry of any final judgment which does not include as an unconditional term thereof the delivery by the claimant or plaintiff of a written release or releases from all liability in respect of such Indemnity Claim of all Indemnified Parties affected by such Indemnity Claim, or (b) settle or compromise any Indemnity Claim if the settlement imposes equitable remedies or material obligations on the Indemnified Party other than financial obligations for which such Indemnified Party will be indemnified hereunder. No Indemnity Claim that is being defended in good faith by the Indemnifying Party shall be settled or compromised by the Indemnified Party without the written consent of the Indemnifying Party.



NAVITAS UTILITIES CORPORATION GAS SERVICE TO KEYSTONE FOODS, ALBANY, KENTUCKY

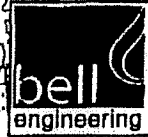
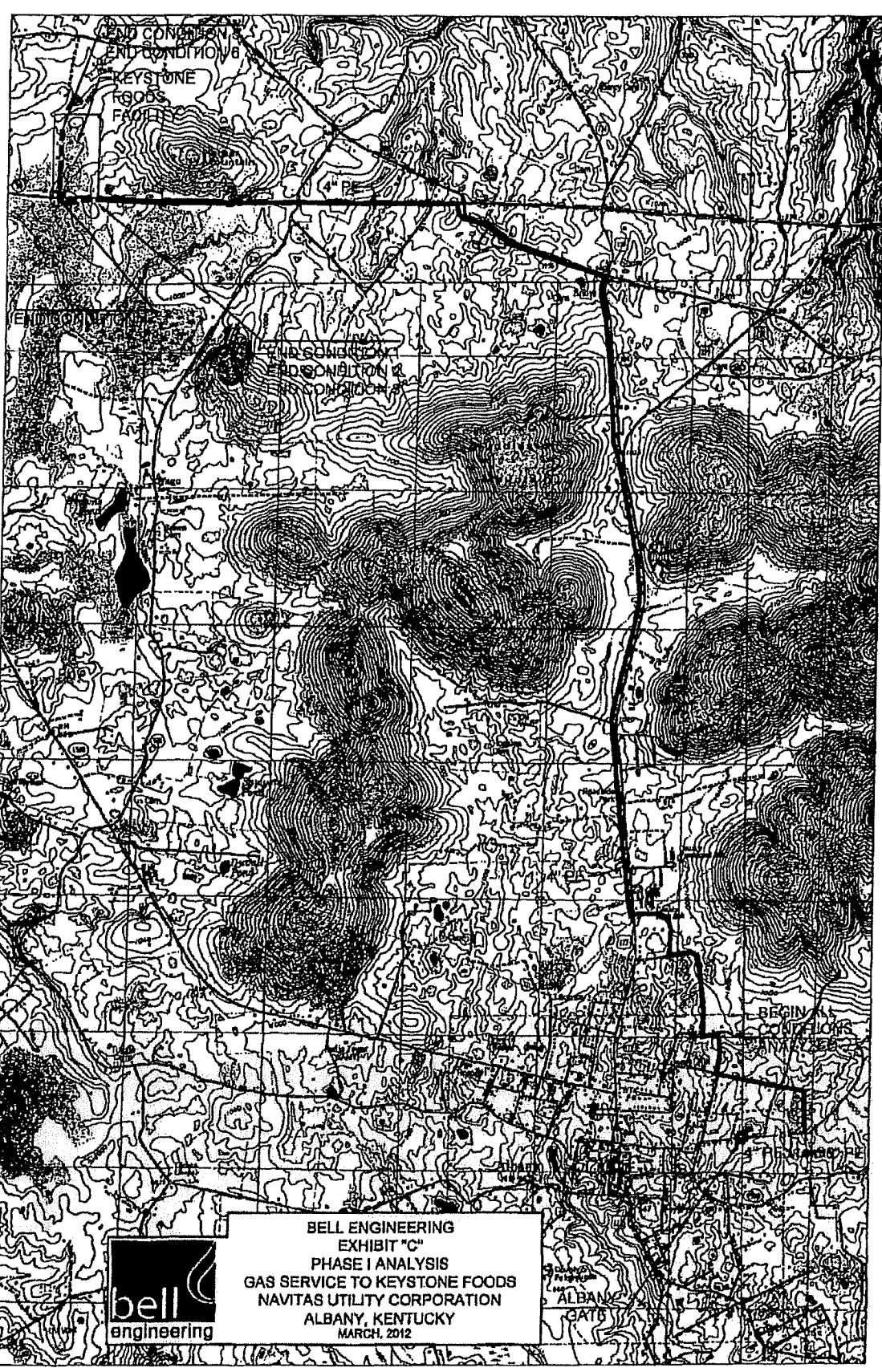


BELL ENGINEERING  
EXHIBIT "C"  
PHASE I ANALYSIS  
GAS SERVICE TO KEYSTONE FOODS  
NAVITAS UTILITIES CORPORATION  
ALBANY, KENTUCKY  
MARCH, 2012

ALBANY  
KENTUCKY



J:\NAVITAS BRASSARD\010 KEYSTONE FOODS GAS LINES\MAP\TOPO MAP.dwg, 4/25/12 11:15:40 AM, Doug



BELL ENGINEERING  
EXHIBIT "C"  
PHASE I ANALYSIS  
GAS SERVICE TO KEYSTONE FOODS  
NAVITAS UTILITY CORPORATION  
ALBANY, KENTUCKY  
MARCH, 2012

ALBANY  
GATE