EVALUACIÓN DE LAS FACILIDADES DE LA ESTACION DE REGULACIÓN DE COGUA PARA EL INCREMENTO DE LA CAPACIDAD DE TRANSPORTE DESDE 100 MMSCFD HASTA 270 MMSCFD

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Trabajo de Grado para optar al Título de Especialista en Ingeniería del Gas

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DEDICATORIA

A Dios

Fuente Suprema de Sabiduría,

A mi Madre Rosalba y mi Padre Laureano

Causa, motivo y razón de mis actos,

Por Acompañarme, por escucharme, por su amor, compresión, su cariño, su ejemplo, enseñanzas y apoyo en todas la etapas de mi vida,

A mi hermana Tatiana

Por su apoyo, preocupación e impulso.

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Al ingeniero Cesar Quiroz, profesional de experiencia y gran conocimiento.

A todos aquellos que de una u otra forma están presentes en la consecución del presente logro.

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RESUMEN

TITULO: EVALUACIÓN DE LAS FACILIDADES DE LA ESTACION DE REGULACIÓN DE COGUA PARA EL INCREMENTO DE LA CAPACIDAD DE TRANSPORTE DESDE 100 MMSCFD HASTA 270 MMSCFD[*]. *

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PALABRAS CLAVES: Gas Natural, Estación, Regulación, Simulación, Capacidad, Filtración y Medición.

En los últimos años, las necesidades de gas de las diferentes poblaciones del Departamento de Cundinamarca han incrementado progresivamente como resultado principalmente de la sustitución por fuentes de energías menos costosas y más amigables ambientalmente. Cundinamarca, uno de los departamentos de mayor consumo de gas natural; su demanda y creciente consumo energético debido a su zona industrial, vivienda entre otros; se proyecta grandes requerimientos a futuro, lo que implica considerar el incremento de la capacidad de transporte actualmente instalado, la cual llega hoy en día a su límite.

Este documento evalúa las alternativas técnicamente viables para superar las actuales restricciones en donde se realiza la evaluación y diagnóstico de las facilidades de la estación de regulación de Cogua propiedad de TGI S.A. ESP para el aumento de la capacidad del gasoducto de La Sabana, este trabajo incluye los sistemas de Trampa de recibo, Filtración, Regulación, y Medición y la evaluación del sistema de calentamiento de propiedad de Gas Natural, que suministra gas y entrega en el punto de interconexión donde abastece al Departamento de Cundinamarca. El análisis de los escenarios evaluados, pretende la entrega eficiente a futuro de 270 MMSCFD.

Una de las soluciones más conveniente a proponer es implementar los requerimientos técnicos y logísticos de ejecución de manera que se pueda realizar esta ampliación.

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SUMMARY

TITLE: EVALUATION OF COGUA REGULATION STATION FACILITIES FOR THE INCREASE OF TRANSPORT CAPACITY FROM 100 MMSCFD TO 270 MMSCFD.*

AUTHOR: NATHALIA MERCEDES GÓMEZ COBOS. **

KEYWORDS: Natural Gas, Regulation Station, Simulation, Capacity, receipt Trap, Filtration, Regulation and Measurement.

In recent years, the gas needs of different populations of Cundinamarca Department have progressively increased due mainly to less expensive and environmentally friendly energy sources substitution. Cundinamarca is one of the higher natural gas consumption department; its demand and growing energy consumption are due to its industrial sector and housing among others; it is projecting long term requirements, which means to consider an increasing in the currently installed transportation capacity, which nowadays is about to reach its limit.

This document evaluates the technically feasible alternatives to overcome the current restrictions where the assessments and diagnostic of Cogua regulation station (owned by TGI S.A. ESP) takes place for increasing La Sabana pipeline capacity, this work includes the receipt trap systems, filtration, regulation, measurement, and the heating system evaluation owned by Gas Natural, which supplies gas and delivery to the interconnection point where provides to Cundinamarca Department. The evaluated scenarios analysis aims the efficient future delivery of 270 MMSCFD.

One of the best solutions to propose is to implement technical and logistical requirements for implementation so that this extension can be performed

* Specialization Degree Work

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INTRODUCCIÓN

El objetivo de las facilidades para el manejo del gas natural es, separarlo de sus condensados, crudo y agua, además de prepararlo, de tal manera, que se encuentre apto para su disposición, transporte y venta, contemplando los escenarios: ambiental, operacional y de producción, entre otros. El manejo del gas natural requiere un gran trabajo multidisciplinario, el cual, abarca todas las áreas de posibles aspectos e impactos que este puede llegar a generar.

A causa del aumento en la demanda de Gas Natural, es deseo de las compañías de hidrocarburos, introducir gas proveniente de pozo al sistema nacional de transporte y con ello contribuir a los proyectos de expansión que se están desarrollando actualmente en el país, por lo tanto, es menester un estudio minucioso de las posibilidades y facilidades existentes para hacer realidad este proyecto y, responder oportunamente en un futuro a la proyección creciente de consumo. Por tanto, se hace indispensable, dadas las intensiones de la nación, la pronta ampliación de la estación de regulación de Cogua.

Actualmente la estación de regulación de Cogua propiedad de TGI S.A. ESP, recibe 110 MMSCFD de gas a presiones que oscilan entre los 600 y 1000 psig de presión, el cual, es regulado a una presión constante de 500 psig, sin embargo, debido al aumento de la demanda de gas contratada por TGI S.A. ESP para los próximos años, la cual asciende a cerca de 215 MMSCFD promedio y se esperan picos de consumo de 270 MMSCFD, por consiguiente, en este documento se desarrolla la evaluación de las facilidades presentes en la estación, de manera que se puedan establecer los requerimientos técnicos para esta ampliación.

1. INFORMACIÓN GENERAL

1.1 OBJETIVOS DEL PROYECTO

1.1.1. Objetivo General

Evaluar la capacidad de las facilidades existentes en la estación de regulación de Cogua para el aumento de la capacidad de transporte del gasoducto de la sabana desde un flujo de 140 MMSCFD hasta 270 MMSCFD.

1.1.2. Objetivos Específicos

- Verificar la capacidad actual de las facilidades de la estación de regulación de Cogua propiedad de TGI S.A. ESP para el aumento de la capacidad del gasoducto de La Sabana.
- Diagnosticar el estado de las facilidades de la estación de regulación de Cogua propiedad de TGI S.A. ESP para el aumento de la capacidad del gasoducto de La Sabana.
- Simular la estación de regulación de Cogua en AspenHYSYS v.7.2, considerando los escenarios de mínimo flujo (140 MMSCFD) y máximo flujo (270 MMSCFD).
- Determinar si se requiere un sistema de calentamiento adicional para evitar formación de hidratos por el efecto Joule Thompson de la regulación.

1.2. DESCRIPCIÓN DEL PROBLEMA

Actualmente la estación de regulación de Cogua propiedad de TGI S.A. ESP, recibe 110 MMSCFD de gas a presiones que oscilan entre los 600 y 1000 psig de presión, el cual, es regulado a una presión constante de 500 psig, sin embargo, debido al aumento de la demanda de gas contratada por TGI S.A. ESP para los

próximos años, la cual asciende a cerca de 215 MMSCFD promedio y se esperan picos de consumo de 270 MMSCFD, se hace necesario la evaluación de las facilidades presentes en la estación, de manera que se puedan establecer los requerimientos técnicos para esta ampliación.

1.3. ALCANCE DEL ESTUDIO

El alcance de la monografía se limita a la evaluación y diagnóstico de las facilidades de la estación de regulación de Cogua propiedad de TGI S.A. ESP para el aumento de la capacidad del gasoducto de La Sabana, este trabajo incluye los sistemas de Trampa de recibo, Filtración, Regulación, y Medición y la evaluación del sistema de calentamiento de propiedad de Gas Natural.

1.4. JUSTIFICACIÓN

Debido al aumento en la demanda de Gas Natural, las compañías de hidrocarburos desean ingresar gas proveniente de pozo al sistema nacional de transporte y con ello contribuir en los proyectos de expansión que se están desarrollando actualmente en el país, lo que hace necesario un estudio minucioso de las posibilidades y facilidades existentes para hacer realidad este proyecto y, responder en un futuro a la proyección creciente de consumo. Por tanto, se hace indispensable, dadas las directrices de la nación, la pronta ampliación de la estación de regulación de Cogua.

2. CONTEXTO TEÓRICO

2.1 GAS NATURAL

El Gas natural se define como el gas que se obtiene de reservas subterráneas naturales, ya sea como gas libre o gas asociado con crudo. Casi siempre contiene una gran cantidad de metano acompañado de hidrocarburos más pesados como etano, propano, isobutano (i-butano), butano normal (n-butano), etc. En su estado natural a menudo contiene una cantidad considerable de sustancias que no son hidrocarburos como el nitrógeno, dióxido de carbono y sulfuro de hidrógeno; en ocasiones también puede contener trazas de compuestos como el helio, sulfuro de carbonilo y varios mercaptanos. En su estado natural casi siempre está saturado con agua.

El gas que se entrega para consumo final como combustible o materia prima tiene una composición diferente a la presente en el yacimiento o en boca de pozo. Composición que debe definirse mediante una calidad específica que requiere ser cumplida por todos los productores que comercializan gas natural, que para efectos de nuestra nación, esta calidad se especifica en el RUT (Registro Único de Transporte) que se observa en la tabla 2.1. La composición del gas natural a transportar, se indica en la tabla 2.2.

Tabla 2.1. Especificaciones de calidad del gas natural.

ESPECIFICACIONES DE CALIDAD DEL GAS NATURAL		
Poder Calorífico bruto mínimo, en MJ/m^3 (BTU/ft^3)	35.4	950 (Nota 1)
Poder Calorífico bruto máximo, en MJ/m^3 (BTU/ft^3)	42.8	1150
Contenido de Líquido (Nota 2)	Libre de Líquidos	
Contenido total de H_2S máximo mgr/m^3 ($granos/100ft^3$)	6	0.25
Contenido total de azufre máximo, mgr/m^3 ($granos/100ft^3$)	23	1.0
Contenido de CO_2 máximo, %Vol.	2	2
Contenido de N_2 máximo, %Vol.	3	3
Contenido de inertes máximo, %Vol. ($CO_2 + N_2 + O_2$) (Nota 3)	5	5

Contenido de Oxigeno máximo, %Vol.	0.1	0.1
Contenido de agua máximo, mg / m^3 (lb / MMSCF)	97	6.0
Temperatura de entrada máxima, ºC (ºF)	49	120
Temperatura de entrada mínima, ºC (ºF)	7.2	45
Contenido máximo de polvos y material en suspensión, mg / m^3 (granos/1000 scf) (Nota 4)	1.6	0.7
Libre de Gomas	Sí	Sí

Nota 1: Todos los datos sobre metro cúbico o pie cúbico de gas están referidos a Condiciones Estándar.
Nota 2: Los líquidos pueden ser: hidrocarburos, agua y otros contaminantes en estado líquido.
Nota 3: Se considera como contenido de inertes la suma de los contenidos de CO2, nitrógeno y oxígeno.
Nota 4: El máximo tamaño de las partículas debe ser 15 micrones.

Salvo acuerdo entre las partes, el Productor-comercializador y el Remitente están en la obligación de entregar Gas Natural a la presión de operación del gasoducto en el Punto de Entrada hasta las 1.200 Psig, de acuerdo con los requerimientos del Transportador. El Agente que entrega el gas no será responsable por una disminución en la presión de entrega debido a un evento atribuible al Transportador o a otro Agente usuario del Sistema de Transporte correspondiente.

Si el Gas Natural entregado por el Agente no se ajusta a alguna de las especificaciones establecidas en este RUT, el Transportador podrá rehusar aceptar el gas en el Punto de Entrada.

Fuente: CREG

Tabla 2.2. Composición del gas natural a transportar.

COMPOSICIÓN DEL GAS (Porcentaje Molar)	
N2	0.62
CO2	1.77
C1	82.93
C2	9.87
C3	3.58
iC4	0.53
nC4	0.54
iC5	0.10
nC5	0.08
nC6	0.03
H2O	6 lb/MMscf
Peso Molecular	19.57
Gravedad Especifica	0.67

Fuente: CREG

2.2. TIPOS DE GAS NATURAL

El gas natural se puede presentar mediante diferentes medios dentro de un yacimiento, entre estos tipos de gas natural, se tienen los siguientes:

- ✓ **Gas Libre.** Cuando se habla de contenido de gas en un yacimiento de petróleo, por lo general cierta cantidad se encuentra en solución en el aceite y cierta cantidad como gas. El gas que existe como tal en el yacimiento, es denominado gas libre. Esto ocurre, por consiguiente, cuando los yacimientos se encuentran saturados, es decir, su presión permanece por debajo de la presión del punto de burbuja y la saturación de gas asciende de tal manera que supera la saturación critica y permite la formación de la capa de gas.

- ✓ **Gas Asociado.** Son aquellos hidrocarburos gaseosos que ocurren como gas libre en un yacimiento a condiciones iniciales, en contacto con petróleo crudo comercialmente explotable. Al igual que el gas libre, esto ocurre, cuando los yacimientos de aceite se encuentran saturados.

- ✓ **Gas Rico.** Este tipo de gas, es el que contiene una cantidad de compuestos más pesados que el etano, alrededor de 0,7 galones de $C3^+$ (componentes por encima del C3) por 1000 pies cúbicos estándar de alimento a una torre absorbedora.

- ✓ **Gas Acido o Agrio.** Es el tipo de gas que contiene más de 1 gramo de H2S por 100 pies cúbicos estándar de gas, casi siempre es mucho mayor. Por tanto, la acidez de un gas se determina a partir de la cantidad de Acido Sulfúrico presente en el mismo.

- ✓ **Gas Dulce.** Es el gas que contiene menos de 1 gramo de H_2S por 100 pies cúbicos estándar de gas o cantidades bajas de CO_2.

- ✓ **Gas Natural Seco.** Son hidrocarburos en estado gaseoso compuestos casi exclusivamente por metano (generalmente más del 90%). Puede provenir directamente de yacimientos de gas, caso en el cual se le denomina también Gas no asociado, o hidrocarburos gaseosos que ocurren como gas libre en el yacimiento, o también puede provenir de plantas de gasolina natural, donde el gas húmedo ha sido despojado de sus productos más pesados en forma líquida (condensado de gas).

- ✓ **Gas Húmedo.** Son hidrocarburos en estado gaseoso, en cuya composición aún predomina un alto porcentaje de metano (generalmente de 75 a 90 %), aunque las cantidades relativas de los componentes más pesados son mayores que en el caso de gas seco. El gas húmedo es aproximadamente equivalente a condensado de gas, fluido existente en yacimientos denominados yacimientos de condensado de gas. El fluido en el yacimiento (condensado de gas) se encuentra en estado gaseoso en el momento de su descubrimiento. Con posterioridad, generalmente exhiben el fenómeno denominado condensación retrógrada, ósea la formación de condensado en el yacimiento debido a reducción en presión y temperatura. Si la temperatura es constante, se denomina condensación retrógrada isotérmica.

- ✓ **Gas Saturado.** Es el gas que contiene la máxima cantidad de vapor de agua a una presión y temperatura específica. En la industria del gas normalmente se expresa en libras de agua por millón de pie cúbico de gas despachado o transportado (lb H_2O/MMPCS). El poder calorífico calculado sobre base de gas saturado es menor que el correspondiente para gas seco o parcialmente saturado, debido al desplazamiento en volumen de gas

combustible por vapor de agua en el sistema de medición. Igualmente, el poder calorífico a condiciones de saturación y una misma temperatura, será mayor en la medida en que la presión aumente.

2.3. SUB-PRODUCTOS DEL GAS NATURAL

El gas natural contiene elementos orgánicos importantes como materias primas para la industria petrolera y química. Antes de emplear el gas natural como combustible se extraen los hidrocarburos livianos como el etano y el etileno, y los pesados, como el butano y el propano. El gas que queda, llamado gas seco, compuesto principalmente por metano, se distribuye a usuarios domésticos e industriales como combustible. A continuación se describe brevemente los principales sub-productos y su uso más frecuente respectivamente.

- ✓ **Metano.** El metano es apreciado como combustible y para producir cloruro de hidrógeno, amoníaco, etino y formaldehído. También para fabricar plásticos, fármacos y tintes.

- ✓ **Etano.** Fundamental para la industria petroquímica. El etano es un hidrocarburo alifático alcano con dos átomos de carbono, de fórmula C_2H_6. A condiciones normales es gaseoso y un excelente combustible.

- ✓ **Eteno o Etileno.** Se produce comercialmente mediante la destilación fraccionada del gas natural. Es muy reactivo y forma fácilmente numerosos productos como el bromoetano, el etilenglicol y el polietileno. En agricultura se utiliza como colorante y agente madurador de muchas frutas.

- ✓ **Propano.** Utilizado como combustible industrial y doméstico, el propano se separa de sus compuestos afines: el butano, etano y propeno, ya que

rebaja la velocidad de evaporación de la mezcla líquida. El propano forma un hidrato sólido a baja temperatura, lo que constituye un inconveniente cuando se produce una obstrucción en las tuberías de gas natural. También se emplea en el llamado GLP, como combustible para motores, como refrigerante, como disolvente a baja temperatura y como fuente de obtención del propeno y etileno.

- ✓ **Butano.** A menudo se les añade propano en la elaboración del GLP. No obstante, la mayoría de n-butano se transforma en butadieno, que se utiliza para fabricar caucho sintético y pinturas de látex.

- ✓ **Benceno.** El benceno es un disolvente eficaz para ciertos elementos como el azufre, el fósforo y el yodo, también para gomas, ceras, grasas y resinas, y para los productos orgánicos más simples. Es uno de los disolventes más empleados en los laboratorios de química orgánica. Son conocidos sus efectos cancerígenos, y puede resultar venenoso si se inhala en grandes cantidades. A partir del benceno se obtienen numerosos compuestos, como el nitrobenceno. También es empleado en la producción de medicinas y otros derivados importantes como la anilina y el fenol.

- ✓ **Ciclohexano.** Se usa principalmente como disolvente para pinturas, resinas, barnices y aceites, así como intermedio en la fabricación de otros productos químicos industriales y fibras de nylon.

- ✓ **Gases licuados del petróleo.** Comúnmente en inglés se denomina GLP. Son productos de hidrocarburos primordialmente de alta presión de vapor (especialmente butano, propano, etano), obtenidos por equipos especiales en plantas de gasolina, y mantenidos en estado líquido a altas presiones.

- ✓ **GTL (Gas to liquid).** Una de las alternativas que se presentan para la utilización y monetización de las reservas de gas natural es un sistema de transformación del gas en líquidos, es decir en diesel y gasolinas altamente refinados y con un nivel de pureza superior a los derivados del petróleo. 15 La transformación de gases en líquidos se remonta a principios del siglo 20 cuando los alemanes Franz Fischer y Hans Tropsch transformaron algunos gases. Después de muchos años y con los cambios tecnológicos, además de la proliferación de las reservas de gas, el sistema se aplica a través del nombre de GTL, de gas a líquidos.

  Actualmente hay algunos proyectos de prueba en el mundo pero no se realizan aún en gran escala porque en todos los países donde se pretende implementar, el costo del líquido final para el consumidor es muy elevado debido a la inversión que se necesita para lograr el proceso. Si bien la idea tecnológica data de 20 años atrás, hasta hoy son contados los proyectos que están en marcha y funcionando a escalas económicamente rentables.
  El costo de un proyecto se evalúa de acuerdo a la cantidad de barriles que se procesen diariamente y de acuerdo al tamaño de la planta.

  Un proyecto GTL tiene tres etapas en el proceso de transformación del gas en líquidos combustibles, las cuales son:

  Primera etapa: Gas natural (metano) es mezclado con oxígeno y da como resultado gas sintético.
  Segunda etapa: Al gas sintético se le hace una reacción Fisher/Tropsch (apellidos de los alemanes pioneros en transformar gas en líquidos, principios del siglo XX), y se obtiene petróleo sintético.
  Tercera etapa: Al petróleo sintético se lo somete a refinación standard y se obtiene, finalmente, diesel de alta calidad y ecológico, gasolinas de alto nivel de parafina, y otros líquidos menores.

Los principales objetivos del GTL es que es un combustible más limpio, que se utiliza el gas como materia prima para obtener líquidos, genera valor agregado al gas natural, ayuda a cubrir la demanda insatisfecha de diesel, representa un ahorro en divisas, el excedente puede ser destinado al mercado internacional.

- ✓ **GNL (Gas natural licuado).** Es gas natural que ha sido procesado para ser transportado en forma líquida. Es la mejor alternativa para establecer reservas en sitios apartados, donde no es económico llevar el gas al mercado directamente ya sea por gasoducto o por generación de electricidad. El gas natural es transportado como líquido a presión atmosférica y a -161 °C donde la licuefacción reduce en 600 veces el volumen de gas transportado.

3. DESCRIPCIÓN ACTUAL DE LA ESTACIÓN DE COGUA

Actualmente el centro Operacional de Gas Cogua (COGC), recibe 110 MMSCFD, regulando las presiones de entre 600 y 1000 psig hasta una presión constante aguas abajo de 500 psig. Esto genera caídas de temperatura después de la etapa de regulación.

3.1. EQUIPOS ENCONTRADOS ACTUALMENTE EN LA ESTACIÓN

3.1.1. Sistema de Recibo de Raspadores

Este sistema cuenta con una trampa de recibo de raspador de 24 in x 20 in ANSI 600 con estampe ASME. En este sistema se encuentra la llegada del gas a 800 psig en una tubería de 22 in, la cual, se prolonga hasta la entrada de los filtros de succión. El bypass de la estación se encuentra en tubería de 10 in. En la figura 3.1 se encuentra una vista panorámica de la estación.

Figura 3.1. Sistema de recibo de raspadores.

Fuente: TGI S.A.

3.1.2. Sistema de Filtración

El sistema de filtración cuenta con dos equipos de filtrado, uno en stand by y el otro en operación, como se observa en la figura 3.2; ambos filtros cuentan con entradas y salidas de 12 in en ANSI 600. El sistema de control se encuentra bien configurado, aunque se evidencia una gran cantidad de condesados (ver figura 3.3).

Figura 3.2. Sistema de filtración.

Fuente: TGI S.A.

Figura 3.3. Indicador de nivel del filtro en operación

Fuente: TGI S.A.

3.1.3. Sistema de Regulación

Este sistema cuenta con un cabezal de entrada de 12 in antes de regulación, al cual se conectan dos brazos de regulación de 8 in ANSI 600 y un bypass con su correspondiente válvula de bola de 8 in. Aguas debajo de la regulación, se encuentra un cabezal de 16 in, al cual se conectan los brazos de regulación y el bypass. En la figura 3.4 se observa el sistema de regulación.

Figura 3.4. Sistema de regulación.

Fuente: TGI S.A.

3.1.4. Sistema de Medición y Entrega

En la figura 3.5 se muestra el sistema de medición y transferencia de custodia. La medición de gas se realiza con un medidor ultrasónico de 16 in. Después de la medición, el gas pasa a ser propiedad de Gas Natural SA ESP, el cual es recibido y calentado en un intercambiador de calor con las siguientes características (ver figura 3.6):

- Calentador de gas indirecto (Tubo Fuego) de 7.5 MMBTU/h.
- 6 años desde su construcción.
- Combustible: Gas Natural.
- Capacidad de agua de 8000 litros.
- 2 Quemadores internos.
- 2 etapas de regulación de gas combustible uno a 60 psig y otro 3 oz/pulg2.
- El consumo de gas combustible oscila entre 200 y 350 m3/h reales.
- Necesita inyección de químicos para el tratamiento del agua.

- El mantenimiento se debe hacer cada 4 años por fábrica y aun no se ha hecho.
- Se manifiesta que después de 2 km en el gasoducto vuelve a la misma temperatura.

Figura 3.5. Sistema de medición y transferencia de custodia.

Fuente: TGI S.A.

Figura 3.6. Intercambiador de calor de Gas Natural SA ESP.

Fuente: TGI S.A.

4. SIMULACIÓN Y ANÁLISIS DE LA SIMULACIÓN DE LA ERM DE COGUA

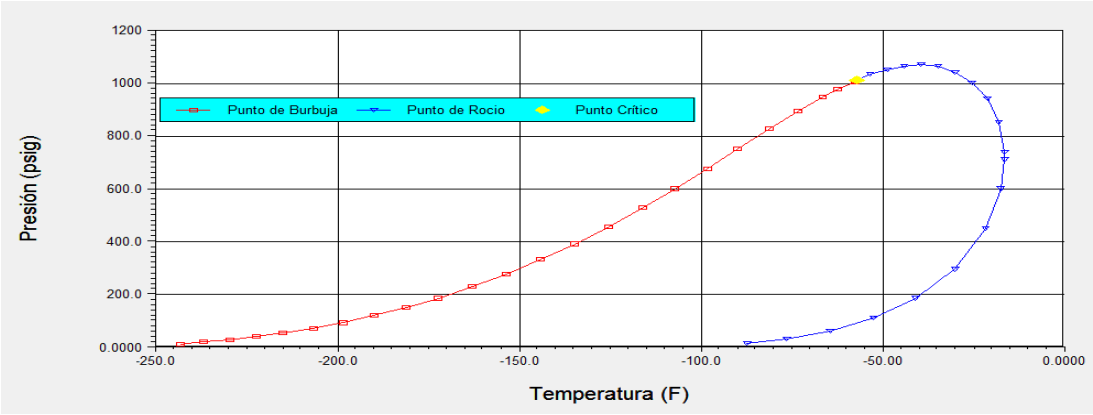
4.1. COMPOSICIÓN Y CARACTERIZACIÓN DEL GAS

Previo al desarrollo de las simulaciones, se consideraron dos tipos gas, uno con la composición descrita en la tabla 2.1 (cromatografía dada para el gas de cusiana con una cantidad de agua correspondiente a las condiciones RUT) y otro un gas completamente saturado con agua. El objeto de esto, es analizar los diagramas de fases y de formación de hidratos, con el fin de delimitar las condiciones de operación.

En la figura 4.2 se encuentra el diagrama de fases y en la figura 4.3 se encuentra el diagrama de formación de hidratos, calculados en el simulador, del gas cusiana. A partir del diagrama de hidratos se concluye que se deben evitar temperaturas por debajo de los 30 °F, para evitar la formación de hidratos.

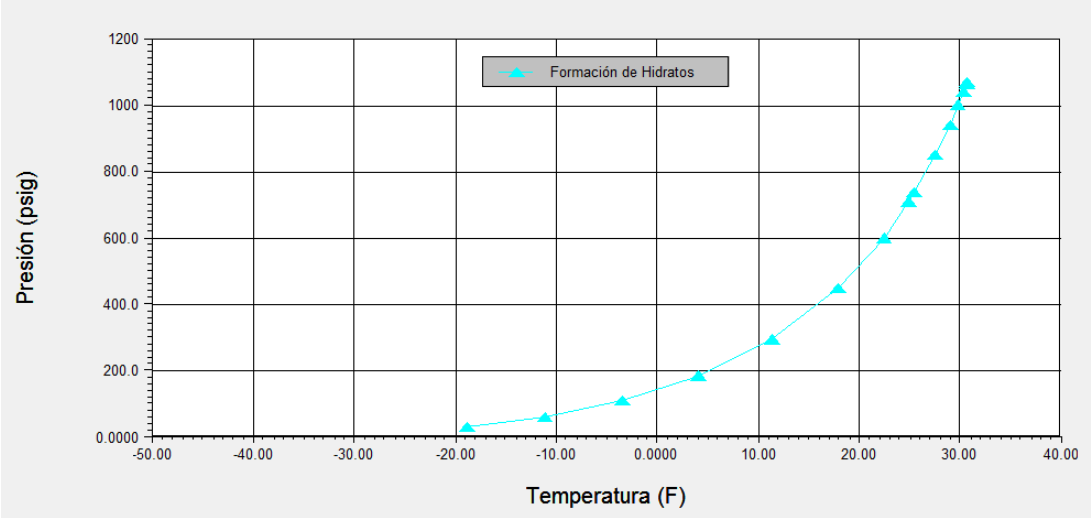
En las figuras 4.4 y 4.5 se encuentran los diagramas de fases y de formación de hidratos, respectivamente, para el gas cusiana saturado de agua, se observa que la formación de hidratos tiene lugar a temperaturas cercanas a los 70 °F.

Figura 4.1. Diagrama de fases del gas cusiana.



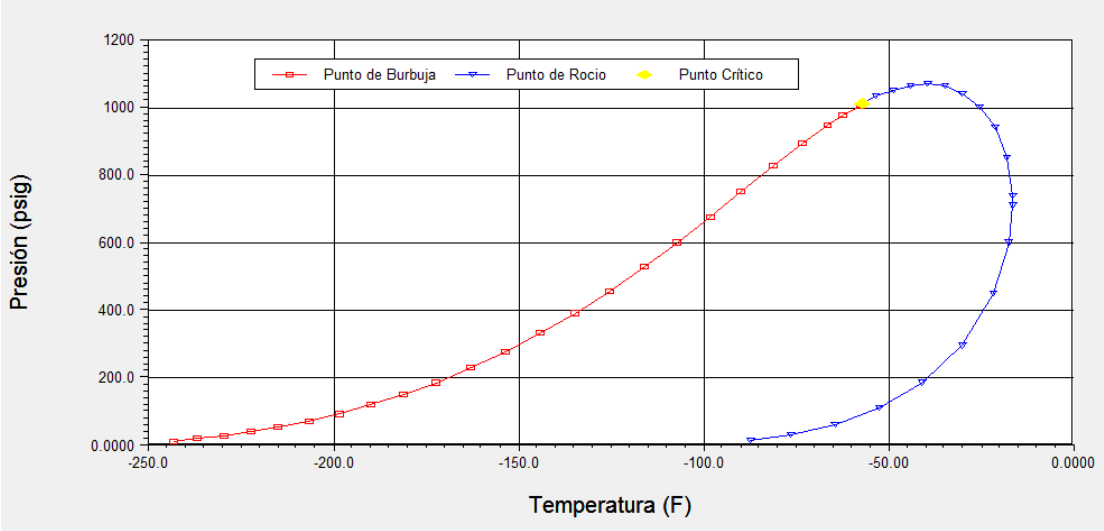
Fuente: El autor

Figura 4.2. Diagrama de formación de hidratos del gas cusiana.



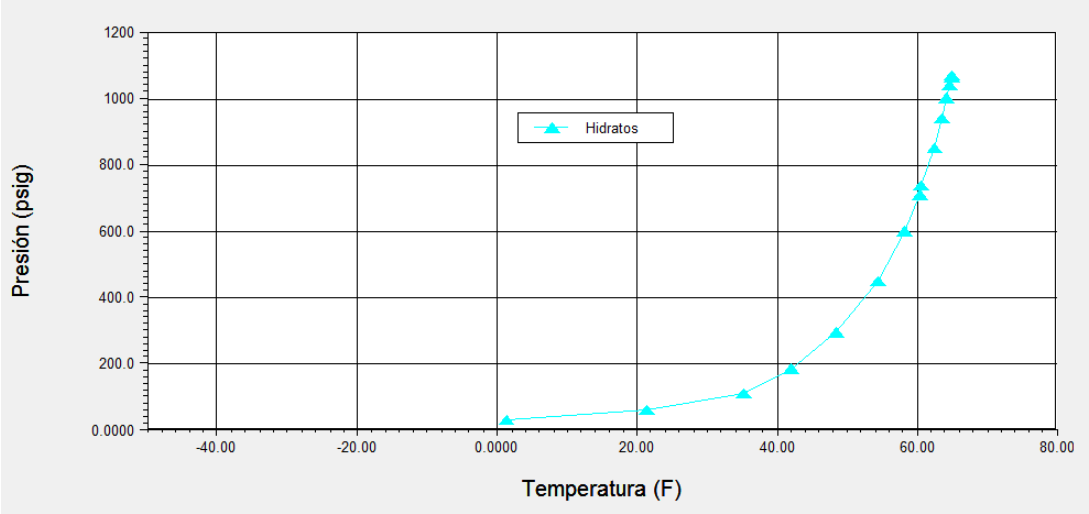
Fuente: El autor

Figura 4.3. Diagrama de fases del gas cusiana saturado con agua.



Fuente: El autor

Figura 4.4. Diagrama de formación de hidratos del gas cusiana saturado con agua



Fuente: El autor

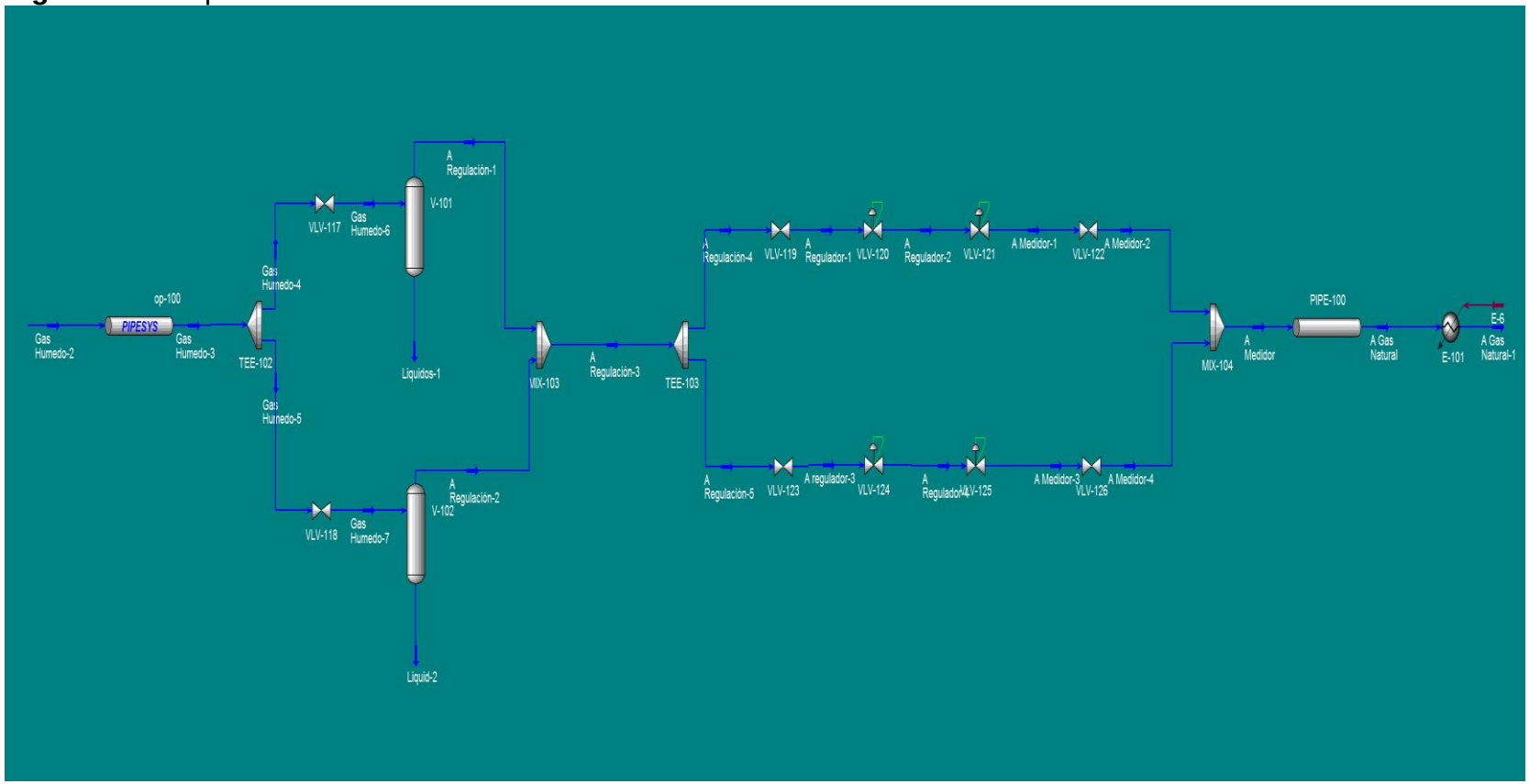
Cabe anotar que el gas utilizado para el desarrollo de las simulaciones es aquel que corresponde al mencionado en la tabla 2.1 y que el análisis con gas saturado se desarrolló con la intención de estimar condensados.

4.2. SIMULACIÓN DEL CASO BASE (FLUJO DE 140 MMSCFD)

En la figura 4.6 se muestra el esquema general de la simulación en HYSYS v 7.2 de la estación de regulación y medición de Cogua. En primer lugar, se encuentra un segmento de tubería (PIPESYS) que representa el tramo que va desde la estación de compresión de Puente Guillermo hasta la entrada de la ERM de Cogua. Los 140 MMSCFD de gas se comprimen en Puente Guillermo a una presión de 900 psi con una temperatura de 90 °F. Cuando el gas arriba a la ERM de cogua, llega con una presión de 730 psig y 47 °F de temperatura, lo cual indica que hay una caída de presión por efectos de fricción, equivalente a 170 psig. Al llegar a la estación de Cogua, el gas se hace pasar por una etapa de filtración

para retirar los líquidos remanentes, la cual cuenta con dos filtros coalescentes, uno en stand-by y el otro en operación; después, el gas entra a la etapa de regulación, en donde se disminuye la presión del gas hasta 500 psig, gracias a la acción de dos válvulas reguladoras en serie. La temperatura después de la etapa de regulación cae, por efecto Joule-Thomson, hasta 29 °F, indicando una fuerte tendencia a la producción de hidratos (ver figura 4.3). Una vez el gas sale de la etapa de regulación, este se hace pasar por un medidor, que para el caso de la simulación, este se representa con un segmento de tubería que calcula la caída de presión por efectos de la medición. Después de la medición, se realiza la transferencia de custodia a Gas Natural ESP S.A. que recibe el gas y lo calienta con un intercambiador de calor hasta una temperatura de 62 °F y cuyo duty constante es de 5.5 MMBTU/h.

Figura 4.5. Esquema de la simulación.



Fuente: El autor

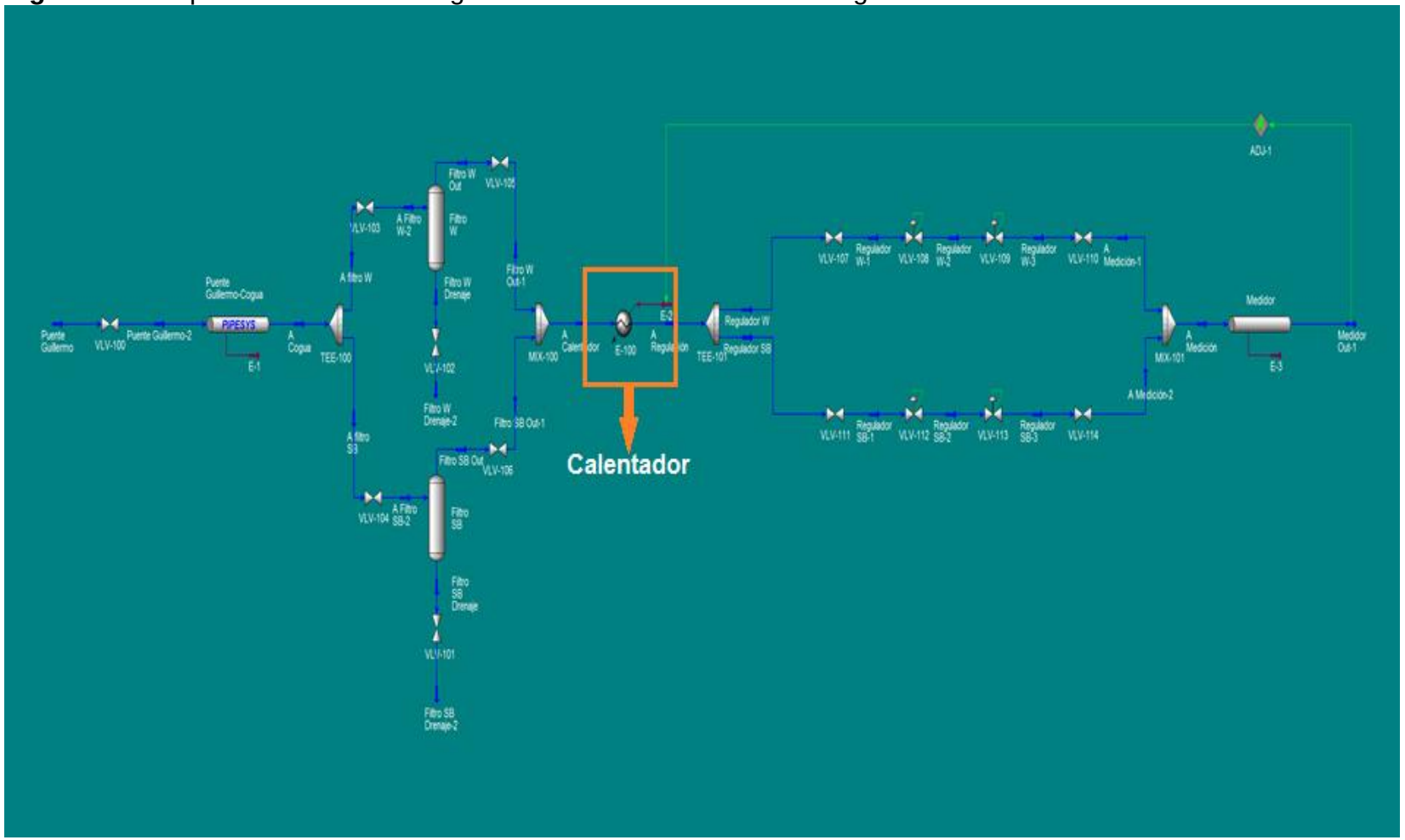
4.3. SIMULACIÓN DEL CASO FUTURO (FLUJO DE 270 MMSCFD)

El diagrama de proceso para este caso es el mismo que para el caso base, por lo tanto, en la figura 4.6, se muestra el diagrama del caso a analizar. A diferencia del caso base, se bombean 270 MMSCFD de gas desde Puente Guillermo hasta la ERM de Cogua, a 1100 psi y 110 °F. Cuando el gas arriba a la ERM de Cogua, llega a una presión de 546 psig y 41 °F, indicando una fuerte caída de presión y de temperatura (616 psi y 69 °F respectivamente), debido a la fricción y al perfil de elevación de la tubería. Al llegar el gas a la etapa de regulación, lo hace a una temperatura de 41 °F, la cual, se encuentra por debajo de la recomendada (45 °F, temperatura mínima recomendada para el ingreso al sistema de regulación según la CREG). Después de la regulación y medición el gas se entrega a una temperatura de 36 °F y una presión de 492 psig. Ya en propiedad de Gas Natural ESP S.A., el gas se calienta en su intercambiador de calor hasta una temperatura de 53 °F, con un duty constante de 5.5 MMBTU/h.

4.4. SIMULACIÓN DEL CASO FUTURO CON CALENTADOR ANTES DE LA REGULACIÓN

Dado que la temperatura del gas a la entrada de la etapa de regulación es más baja que la recomendada (ver tabla 2.1), se decidió implementar un calentador aguas arriba de la regulación con intención de aumentar la temperatura por encima de los 45 °F y evitar la posible formación de hidratos. El esquema de la simulación se observa en la figura 4.7, en donde se indica la posición del calentador.

Figura 4.6. Esquema de ERM de Cogua con calentador antes de la regulación



Fuente: El autor

En este esquema, el gas se calienta a una temperatura de 70 °F antes de la regulación, resultando que la cantidad de energía consumida durante la operación es de 9.4 MMBTU/h. Finalmente el gas se entrega a Gas Natural ESP S.A. a una temperatura de 67 °F y a una presión de 492 psig.

4.5. ANÁLISIS DE LAS FACILIDADES EXISTENTES EN LA ERM COGUA PARA EL CASO FUTURO (270 MMSCFD)

En la figura 4.8 se encuentra el pfd utilizado para desarrollar los análisis de las facilidades existentes en la ERM Cogua. Se observa que este pfd es similar al pfd ilustrado en la figura 4.7, sin embargo, se han adicionado unas unidades de operaciones, las cuales corresponden a la extensión de PIPESYS, para la simulación y análisis de flujo de fluidos en ductos; cabe mencionar que en la etapa de regulación, las válvulas de regulación fueron remplazadas por extensiones de PIPESYS, ya que estas permiten agregar diversos elementos de análisis y simulación de flujo de fluidos, como son, a saber: tuberías, compresores, bombas, válvulas reguladoras, entre otros. Estas unidades de operación PIPESYS, fueron agregadas en las etapas de filtración, regulación y medición. A continuación se indican los análisis desarrollados etapa por etapa:

4.5.1. Sistema de Filtración

- **Caso Actual (140 MMSCFD)**

En este caso solo uno de los filtros esta en funcionamiento y el otro en stand-by, sin embargo, ambos filtros tienen una entrada de 12 in que para efectos de las condiciones actuales (140 MMSCFD) funciona, ya que la velocidad del gas a la entrada del filtro es de 10 m/s (33 ft/s), la cual se encuentra por debajo del rango permisible de 20 m/s.

- **Caso Futuro (270 MMSCFD)**

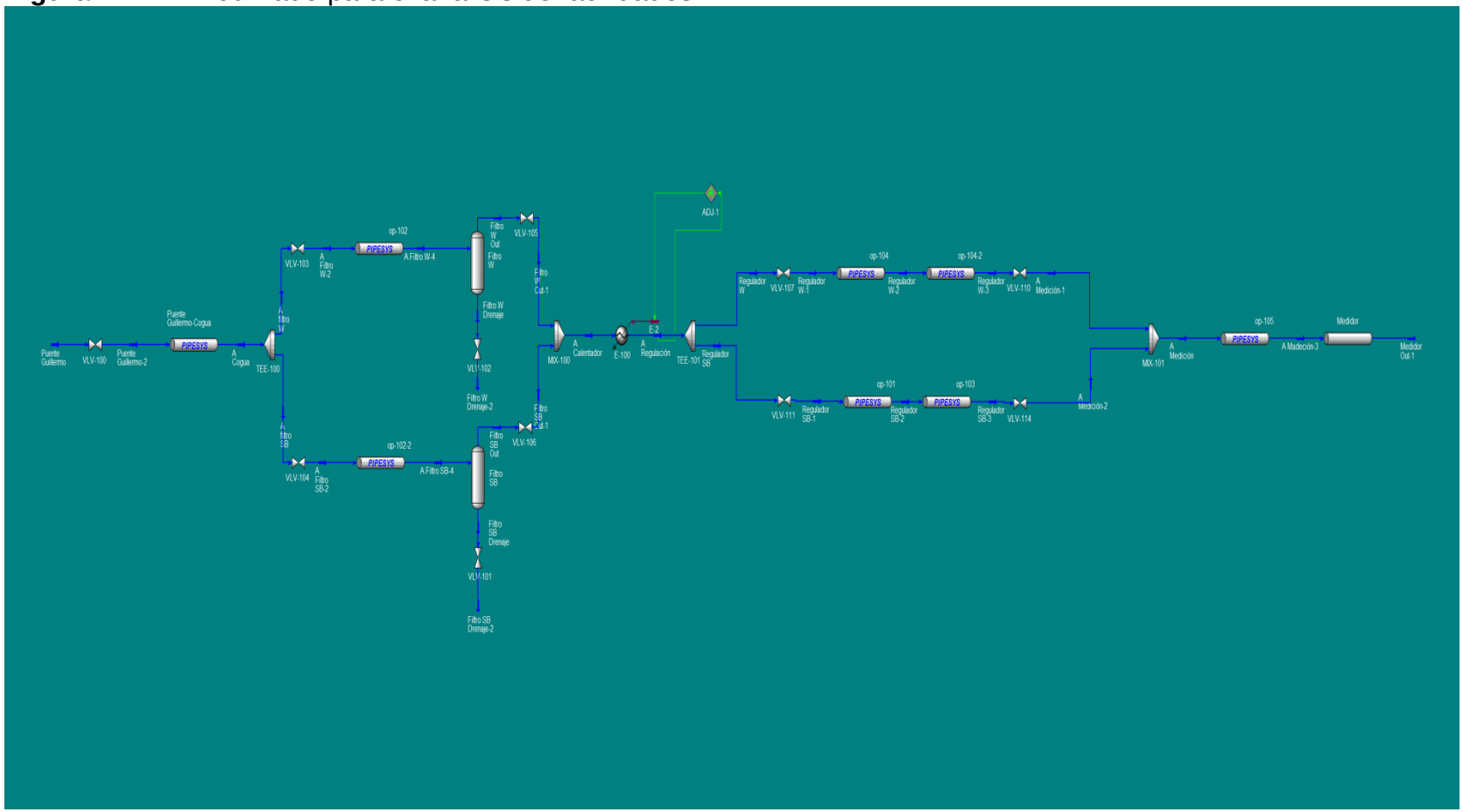
Inicialmente, se evaluó si las circunstancias actuales de la estación soportarían el nuevo flujo, más aún, se encontró que la velocidad del gas a la entrada del filtro en operación era de 26 m/s (87 ft/s), lo cual indica que esta por encima del limite permitido por la norma (20 m/s); de acuerdo a lo mencionado, se probó una alternativa que consiste en operar los dos filtros al mismo tiempo, revelando que de esta manera se logra disminuir la velocidad del gas a la entrada de los filtros, la cual alcanza el valor 13 m/s (43 ft/s). Es preciso aclarar que a los dos filtros les debe llegar la misma cantidad de gas, lo cual se asegura abriendo las válvulas de ingreso en igual porcentaje. Sin embargo, la utilización simultánea de los dos filtros implica la necesidad de implementar un tercer filtro en stand-by, de manera que, cuando uno de los dos (o los dos) filtros en uso esté en mantenimiento, el gas pueda seguir siendo filtrado mediante el uso de este tercer filtro.

4.5.2. Sistema de Regulación

- **Caso Actual (140 MMSCFD)**

Actualmente la estación de Cogua cuenta con dos brazos de regulación en paralelo de 8 in cada uno, en donde la velocidad del gas es de 12 m/s (40 ft/s), inferior a la velocidad sugerida (20 m/s).En cuanto a las válvulas de regulación, el simulador señala un Cv de 275 para la primera válvula y 339 para la segunda.

Figura 4.7. PFD utilizado para el análisis de facilidades.



Fuente: El autor

- **Caso Futuro (270 MMSCFD)**

En primer lugar, se analizaron las repercusiones del nuevo flujo en el sistema existente, resultando que para cada brazo de regulación de 8 in (transportando cada uno 135 MMSCFD) la velocidad del fluido esta en el orden de 33 m/s (107.5 ft/s), evidenciando que es preciso cambiar los brazos regulación. Con base a lo anterior, se modeló cambiar el diámetro de los brazos de regulación a 10 in, más aún, la velocidad, la cual fue de 21 m/s (68 ft/s), continuaba por encima de lo recomendado; sin embargo, al cambiar el diámetro de la tubería a 12 in, los resultados indican que la velocidad se disminuye por debajo del valor recomendado (20 m/s) hasta llegar a los 14.5 m/s (47.6 ft/s). Por otro lado, se evidencia que las válvulas existentes no sirven ya que tiene un Cv muy bajo (275 y 339 para la primera y segunda, respectivamente), por tanto es necesario remplazar estas válvulas que, según resultados del simulador para un tamaño de 12 in, se requiere un Cv de 1394 para la primera válvula de regulación y 1453 para la segunda.

4.5.3. Sistema de Medición

- **Caso Actual (140 MMSCFD)**

La estación, actualmente cuenta con un medidor ultrasónico instalado en una línea de 16 in de diámetro, en la cual la velocidad de flujo de gas es de 9.6 m/s (32 ft/s), indicando que es inferior a la recomendada (20 m/s).

- **Caso Futuro (270 MMSCFD)**

Al desarrollar la simulación para el nuevo flujo se encontró que la velocidad de flujo de gas que se encuentra en derredor de 19.5 m/s (63,7 ft/s) esta muy cerca del limite recomendado (20 m/s), por tanto es necesario remplazar la línea de

regulación por una de diámetro mayor, que según la simulación puede ser de 18 in ya que con este diámetro se logra disminuir la velocidad a 15 m/s (50 ft/s).por otra parte, el medidor actual de 16 in de diámetro podría ofrecer una mayor incertidumbre en la medición del flujo futuro de gas, ya que este fue seleccionado para medir un rango diferente de flujo.

5. CONCLUSIONES

Después del análisis desarrollado a través de la simulación en HYSYS V. 7.2, se encontraron los siguientes aspectos a saber y que para efectos de orden, se agruparon en concordancia con los diferentes sistemas encontrados en la estación:

- **Sistema de Filtración**

  En este sistema se encontró que los filtros existentes podrían ser utilizados simultáneamente para el nuevo caudal (270 MMSCFD), sin embargo, es preciso que por ambos filtros pase la misma cantidad de flujo, equivalente a la mitad del nuevo caudal (es decir: 135 MMSCFD por cada filtro), para que se cumpla la norma de la velocidad en ductos. Por otro lado, la utilización simultánea de los dos filtros induce la necesidad de utilizar un tercer filtro en stand-by, que se habilitaría durante el mantenimiento de los dos filtros existentes.

- **Sistema de Regulación**

  En primer lugar, se encontró que es necesario instalar un calentador antes de la regulación, ya que el gas disminuye su temperatura por efectos del transporte lo que puede provocar la formación de hidratos antes y después de la regulación. En segundo lugar, se evidenció que las facilidades existentes no cumplen con los requerimientos del nuevo flujo a tratar, pues las dimensiones actuales de los ductos y válvulas no ofrecen el tamaño apropiado para el flujo seguro del gas. Los resultados revelan que para el nuevo flujo las líneas y válvulas de regulación se podrían cambiar de 8 a 12 in, de tal manera que se cumpla con lo establecido en la norma.

- **Sistema de Medición**

  Actualmente, el tramo de medición cuenta con un medidor de flujo ultrasónico de 16 in de diámetro instalado en una línea de igual dimensión, que par efectos del flujo actual funciona bien, sin embargo, al simular el nuevo flujo se encontró que la velocidad estaba cerca del límite permitido, por lo que se ensayó con una línea de 18 in, para la cual, los resultados fueron apropiados. Cabe anotar, que el medidor de flujo ultrasónico actual ofrecería una mayor incertidumbre durante la medición del nuevo caudal (270 MMSCFD), ya que este fue seleccionado considerando el caudal actual (140 MMSCFD).

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7. ANEXOS

Anexo A. Reportes de Simulaciones

aspentech

LEGENDS
Burlington, MA
USA

Case Name: FLUJO MAXIMO 270-1100-110.HSC
Unit Set: Field1
Date/Time: Fri Apr 13 12:13:26 2012

Material Stream: Puente Guillermo-1-2

Fluid Package: Basis-1
Property Package: Peng Robinson

CONDITIONS

	Overall	Vapour Phase			
Vapour / Phase Fraction	1.0000	1.0000			
Temperature: (F)	109.7	109.7			
Pressure: (psig)	1095	1095			
Molar Flow (MMSCFD)	270.0	270.0			
Mass Flow (lb/hr)	5.680e+005	5.680e+005			
Std Ideal Liq Vol Flow (barrel/day)	1.174e+005	1.174e+005			
Molar Enthalpy (Btu/lbmole)	-3.603e+004	-3.603e+004			
Molar Entropy (Btu/lbmole-F)	36.10	36.10			
Heat Flow (Btu/hr)	-1.068e+009	-1.068e+009			
Liq Vol Flow @Std Cond (barrel/day)	---	---			

PROPERTIES

	Overall	Vapour Phase			
Molecular Weight	19.15	19.15			
Molar Density (lbmole/ft3)	0.2170	0.2170			
Mass Density (lb/ft3)	4.156	4.156			
Act. Volume Flow (barrel/day)	5.841e+005	5.841e+005			
Mass Enthalpy (Btu/lb)	-1881	-1881			
Mass Entropy (Btu/lb-F)	1.885	1.885			
Heat Capacity (Btu/lbmole-F)	12.26	12.26			
Mass Heat Capacity (Btu/lb-F)	0.6403	0.6403			
LHV Vol Basis (Std) (Btu/lbmole)	3.844e+005	3.844e+005			
LHV Mass Basis (Std) (Btu/lb)	2.007e+004	2.007e+004			
Phase Fraction [Vol. Basis]	1.000	1.000			
Phase Fraction [Mass Basis]	1.000	1.000			
Partial Pressure of CO2 (psig)	6.578	---			
Cost Based on Flow (Cost/s)	4.118	4.118			
Act. Gas Flow (ACFM)	2278	2278			
Avg. Liq. Density (lbmole/ft3)	1.080	1.080			
Specific Heat (Btu/lbmole-F)	12.26	12.26			
Std. Gas Flow (MMSCFD)	270.0	270.0			
Std. Ideal Liq. Mass Density (lb/ft3)	20.68	20.68			
Act. Liq. Flow (USGPM)	---	---			
Z Factor	0.8369	0.8369			
Watson K	18.38	18.38			
User Property	---	---			
Partial Pressure of H2S (psig)	-14.70	---			
Cp/(Cp - R)	1.193	1.193			
Cp/Cv	1.557	1.557			
Heat of Vap. (Btu/lbmole)	2234	---			
Kinematic Viscosity (cSt)	0.2122	0.2122			
Liq. Mass Density (Std. Cond) (lb/ft3)	---	---			
Liq. Vol. Flow (Std. Cond) (barrel/day)	---	---			
Liquid Fraction	0.0000	0.0000			
Molar Volume (ft3/lbmole)	4.609	4.609			
Mass Heat of Vap. (Btu/lb)	116.7	---			
Phase Fraction [Molar Basis]	1.0000	1.0000			
Surface Tension (dyne/cm)	---	---			
Thermal Conductivity (Btu/hr-ft-F)	2.379e-002	2.379e-002			
Viscosity (cP)	1.413e-002	1.413e-002			
Cv (Semi-Ideal) (Btu/lbmole-F)	10.28	10.28			

aspentech

LEGENDS
Burlington, MA
USA

Case Name: FLUJO MAXIMO 270-1100-110.HSC
Unit Set: Field1
Date/Time: Fri Apr 13 12:13:26 2012

Material Stream: Puente Guillermo-1-2 (contin

Fluid Package: Basis-1
Property Package: Peng Robinson

PROPERTIES

		Overall	Vapour Phase			
Mass Cv (Semi-Ideal)	(Btu/lb-F)	0.5366	0.5366			
Cv	(Btu/lbmole-F)	7.876	7.876			
Mass Cv	(Btu/lb-F)	0.4112	0.4112			
Cv (Ent. Method)	(Btu/lbmole-F)	---	---			
Mass Cv (Ent. Method)	(Btu/lb-F)	---	---			
Cp/Cv (Ent. Method)		---	---			
Reid VP at 37.8 C	(psig)	---	---			
True VP at 37.8 C	(psig)	---	---			
Liq. Vol. Flow - Sum(Std. Cond)	(barrel/day)	0.0000	0.0000			
Viscosity Index		-53.10	-53.10			

COMPOSITION

Overall Phase

Vapour Fraction 1.0000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	166.6846	0.0056	4669.3365	0.0082	396.4943	0.0034
CO2	568.4451	0.0192	25017.0989	0.0440	2075.5106	0.0177
Methane	24941.5438	0.8412	400134.6951	0.7045	91512.7011	0.7796
Ethane	2837.9440	0.0957	85336.6934	0.1503	16428.2370	0.1400
Propane	963.9173	0.0325	42505.8603	0.0748	5744.2725	0.0489
i-Butane	130.1726	0.0044	7566.1514	0.0133	921.8988	0.0079
n-Butane	11.6685	0.0004	678.2193	0.0012	79.6258	0.0007
i-Pentane	20.8717	0.0007	1505.9126	0.0027	165.3948	0.0014
n-Pentane	3.3073	0.0001	238.6227	0.0004	25.9463	0.0002
n-Hexane	2.7124	0.0001	233.7511	0.0004	24.1534	0.0002
H2O	3.7464	0.0001	67.4918	0.0001	4.6307	0.0000
Total	29651.0136	1.0000	567953.8331	1.0000	117378.8653	1.0000

Vapour Phase

Phase Fraction 1.000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	166.6846	0.0056	4669.3365	0.0082	396.4943	0.0034
CO2	568.4451	0.0192	25017.0989	0.0440	2075.5106	0.0177
Methane	24941.5438	0.8412	400134.6951	0.7045	91512.7011	0.7796
Ethane	2837.9440	0.0957	85336.6934	0.1503	16428.2370	0.1400
Propane	963.9173	0.0325	42505.8603	0.0748	5744.2725	0.0489
i-Butane	130.1726	0.0044	7566.1514	0.0133	921.8988	0.0079
n-Butane	11.6685	0.0004	678.2193	0.0012	79.6258	0.0007
i-Pentane	20.8717	0.0007	1505.9126	0.0027	165.3948	0.0014
n-Pentane	3.3073	0.0001	238.6227	0.0004	25.9463	0.0002
n-Hexane	2.7124	0.0001	233.7511	0.0004	24.1534	0.0002
H2O	3.7464	0.0001	67.4918	0.0001	4.6307	0.0000
Total	29651.0136	1.0000	567953.8331	1.0000	117378.8653	1.0000

UNIT OPERATIONS

FEED TO		PRODUCT FROM		LOGICAL CONNECTION
PIPESYS Extension:	'uente Guillermo-Cogua-2	Valve:	VLV-Puente Guillermo-2	

UTILITIES

(No utilities reference this stream)

aspentech

LEGENDS
Burlington, MA
USA

Case Name:	FLUJO MAXIMO 270-1100-110.HSC
Unit Set:	Field1
Date/Time:	Fri Apr 13 12:13:26 2012

Material Stream: Puente Guillermo-1-2 (contin

Fluid Package: Basis-1
Property Package: Peng Robinson

PROCESS UTILITY

Material Stream: A Cogua-2

Fluid Package: Basis-1
Property Package: Peng Robinson

CONDITIONS

		Overall	Vapour Phase			
Vapour / Phase Fraction		1.0000	1.0000			
Temperature:	(F)	40.32	40.32			
Pressure:	(psig)	535.1	535.1			
Molar Flow	(MMSCFD)	270.0	270.0			
Mass Flow	(lb/hr)	5.680e+005	5.680e+005			
Std Ideal Liq Vol Flow	(barrel/day)	1.174e+005	1.174e+005			
Molar Enthalpy	(Btu/lbmole)	-3.641e+004	-3.641e+004			
Molar Entropy	(Btu/lbmole-F)	36.56	36.56			
Heat Flow	(Btu/hr)	-1.080e+009	-1.080e+009			
Liq Vol Flow @Std Cond	(barrel/day)	---	---			

PROPERTIES

		Overall	Vapour Phase			
Molecular Weight		19.15	19.15			
Molar Density	(lbmole/ft3)	0.1192	0.1192			
Mass Density	(lb/ft3)	2.282	2.282			
Act. Volume Flow	(barrel/day)	1.064e+006	1.064e+006			
Mass Enthalpy	(Btu/lb)	-1901	-1901			
Mass Entropy	(Btu/lb-F)	1.908	1.908			
Heat Capacity	(Btu/lbmole-F)	10.91	10.91			
Mass Heat Capacity	(Btu/lb-F)	0.5696	0.5696			
LHV Vol Basis (Std)	(Btu/lbmole)	3.844e+005	3.844e+005			
LHV Mass Basis (Std)	(Btu/lb)	2.007e+004	2.007e+004			
Phase Fraction [Vol. Basis]		1.000	1.000			
Phase Fraction [Mass Basis]		1.000	1.000			
Partial Pressure of CO2	(psig)	-4.156	---			
Cost Based on Flow	(Cost/s)	0.0000	0.0000			
Act. Gas Flow	(ACFM)	4147	4147			
Avg. Liq. Density	(lbmole/ft3)	1.080	1.080			
Specific Heat	(Btu/lbmole-F)	10.91	10.91			
Std. Gas Flow	(MMSCFD)	270.0	270.0			
Std. Ideal Liq. Mass Density	(lb/ft3)	20.68	20.68			
Act. Liq. Flow	(USGPM)	---	---			
Z Factor		0.8599	0.8599			
Watson K		18.38	18.38			
User Property		---	---			
Partial Pressure of H2S	(psig)	-14.70	---			
Cp/(Cp - R)		1.222	1.222			
Cp/Cv		1.494	1.494			
Heat of Vap.	(Btu/lbmole)	3799	---			
Kinematic Viscosity	(cSt)	0.3161	0.3161			
Liq. Mass Density (Std. Cond)	(lb/ft3)	---	---			
Liq. Vol. Flow (Std. Cond)	(barrel/day)	---	---			
Liquid Fraction		0.0000	0.0000			
Molar Volume	(ft3/lbmole)	8.392	8.392			

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LEGENDS
Burlington, MA
USA

Case Name: FLUJO MAXIMO 270-1100-110.HSC

Unit Set: Field1

Date/Time: Fri Apr 13 12:13:26 2012

Material Stream: A Cogua-2 (continued)

Fluid Package: Basis-1

Property Package: Peng Robinson

PROPERTIES

		Overall	Vapour Phase			
Mass Heat of Vap.	(Btu/lb)	198.3	---			
Phase Fraction [Molar Basis]		1.0000	1.0000			
Surface Tension	(dyne/cm)	---	---			
Thermal Conductivity	(Btu/hr-ft-F)	1.858e-002	1.858e-002			
Viscosity	(cP)	1.156e-002	1.156e-002			
Cv (Semi-Ideal)	(Btu/lbmole-F)	8.925	8.925			
Mass Cv (Semi-Ideal)	(Btu/lb-F)	0.4660	0.4660			
Cv	(Btu/lbmole-F)	7.304	7.304			
Mass Cv	(Btu/lb-F)	0.3813	0.3813			
Cv (Ent. Method)	(Btu/lbmole-F)	---	---			
Mass Cv (Ent. Method)	(Btu/lb-F)	---	---			
Cp/Cv (Ent. Method)		---	---			
Reid VP at 37.8 C	(psig)	---	---			
True VP at 37.8 C	(psig)	---	---			
Liq. Vol. Flow - Sum(Std. Cond)	(barrel/day)	0.0000	0.0000			
Viscosity Index		-21.13	-21.13			

COMPOSITION

Overall Phase

Vapour Fraction 1.0000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	166.6846	0.0056	4669.3365	0.0082	396.4943	0.0034
CO2	568.4451	0.0192	25017.0989	0.0440	2075.5106	0.0177
Methane	24941.5438	0.8412	400134.6951	0.7045	91512.7011	0.7796
Ethane	2837.9440	0.0957	85336.6934	0.1503	16428.2370	0.1400
Propane	963.9173	0.0325	42505.8603	0.0748	5744.2725	0.0489
i-Butane	130.1726	0.0044	7566.1514	0.0133	921.8988	0.0079
n-Butane	11.6685	0.0004	678.2193	0.0012	79.6258	0.0007
i-Pentane	20.8717	0.0007	1505.9126	0.0027	165.3948	0.0014
n-Pentane	3.3073	0.0001	238.6227	0.0004	25.9463	0.0002
n-Hexane	2.7124	0.0001	233.7511	0.0004	24.1534	0.0002
H2O	3.7464	0.0001	67.4918	0.0001	4.6307	0.0000
Total	29651.0136	1.0000	567953.8331	1.0000	117378.8653	1.0000

Vapour Phase

Phase Fraction 1.000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	166.6846	0.0056	4669.3365	0.0082	396.4943	0.0034
CO2	568.4451	0.0192	25017.0989	0.0440	2075.5106	0.0177
Methane	24941.5438	0.8412	400134.6951	0.7045	91512.7011	0.7796
Ethane	2837.9440	0.0957	85336.6934	0.1503	16428.2370	0.1400
Propane	963.9173	0.0325	42505.8603	0.0748	5744.2725	0.0489
i-Butane	130.1726	0.0044	7566.1514	0.0133	921.8988	0.0079
n-Butane	11.6685	0.0004	678.2193	0.0012	79.6258	0.0007
i-Pentane	20.8717	0.0007	1505.9126	0.0027	165.3948	0.0014
n-Pentane	3.3073	0.0001	238.6227	0.0004	25.9463	0.0002
n-Hexane	2.7124	0.0001	233.7511	0.0004	24.1534	0.0002
H2O	3.7464	0.0001	67.4918	0.0001	4.6307	0.0000
Total	29651.0136	1.0000	567953.8331	1.0000	117378.8653	1.0000

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LEGENDS
Burlington, MA
USA

Case Name: FLUJO MAXIMO 270-1100-110.HSC

Unit Set: Field1

Date/Time: Fri Apr 13 12:13:26 2012

Material Stream: A Cogua-2 (continued)

Fluid Package: Basis-1

Property Package: Peng Robinson

UNIT OPERATIONS

FEED TO		PRODUCT FROM		LOGICAL CONNECTION
Separator:	FS-101-2	PIPESYS Extension:	'uente Guillermo-Cogua-2	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

Material Stream: A regulación-2

Fluid Package: Basis-1

Property Package: Peng Robinson

CONDITIONS

		Overall	Vapour Phase	Aqueous Phase		
Vapour / Phase Fraction		1.0000	1.0000	0.0000		
Temperature:	(F)	40.32	40.32	40.32		
Pressure:	(psig)	535.1	535.1	535.1		
Molar Flow	(MMSCFD)	270.0	270.0	0.0000		
Mass Flow	(lb/hr)	5.680e+005	5.680e+005	0.0000		
Std Ideal Liq Vol Flow	(barrel/day)	1.174e+005	1.174e+005	0.0000		
Molar Enthalpy	(Btu/lbmole)	-3.641e+004	-3.641e+004	-1.238e+005		
Molar Entropy	(Btu/lbmole-F)	36.56	36.56	11.53		
Heat Flow	(Btu/hr)	-1.080e+009	-1.080e+009	0.0000		
Liq Vol Flow @Std Cond	(barrel/day)	---	---	0.0000		

PROPERTIES

		Overall	Vapour Phase	Aqueous Phase		
Molecular Weight		19.15	19.15	18.04		
Molar Density	(lbmole/ft3)	0.1192	0.1192	2.980		
Mass Density	(lb/ft3)	2.282	2.282	53.76		
Act. Volume Flow	(barrel/day)	1.064e+006	1.064e+006	0.0000		
Mass Enthalpy	(Btu/lb)	-1901	-1901	-6860		
Mass Entropy	(Btu/lb-F)	1.908	1.908	0.6389		
Heat Capacity	(Btu/lbmole-F)	10.91	10.91	18.58		
Mass Heat Capacity	(Btu/lb-F)	0.5696	0.5696	1.030		
LHV Vol Basis (Std)	(Btu/lbmole)	3.844e+005	3.844e+005	2.903e-002		
LHV Mass Basis (Std)	(Btu/lb)	2.007e+004	2.007e+004	1.609e-003		
Phase Fraction [Vol. Basis]		1.000	1.000	---		
Phase Fraction [Mass Basis]		1.000	1.000	0.0000		
Partial Pressure of CO2	(psig)	-4.156	---	---		
Cost Based on Flow	(Cost/s)	0.0000	0.0000	0.0000		
Act. Gas Flow	(ACFM)	4147	4147	---		
Avg. Liq. Density	(lbmole/ft3)	1.080	1.080	3.452		
Specific Heat	(Btu/lbmole-F)	10.91	10.91	18.58		
Std. Gas Flow	(MMSCFD)	270.0	270.0	0.0000		
Std. Ideal Liq. Mass Density	(lb/ft3)	20.68	20.68	62.27		
Act. Liq. Flow	(USGPM)	0.0000	---	0.0000		
Z Factor		---	0.8599	3.438e-002		
Watson K		18.38	18.38	8.512		
User Property		---	---	---		
Partial Pressure of H2S	(psig)	-14.70	---	---		
Cp/(Cp - R)		1.222	1.222	1.120		

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LEGENDS
Burlington, MA
USA

Case Name: FLUJO MAXIMO 270-1100-110.HSC
Unit Set: Field1
Date/Time: Fri Apr 13 12:13:26 2012

Material Stream: A regulación-2 (continued)

Fluid Package: Basis-1
Property Package: Peng Robinson

PROPERTIES

		Overall	Vapour Phase	Aqueous Phase		
Cp/Cv		1.494	1.494	1.133		
Heat of Vap.	(Btu/lbmole)	3799	---	---		
Kinematic Viscosity	(cSt)	0.3161	0.3161	1.441		
Liq. Mass Density (Std. Cond)	(lb/ft3)	---	---	63.38		
Liq. Vol. Flow (Std. Cond)	(barrel/day)	---	---	0.0000		
Liquid Fraction		0.0000	0.0000	1.000		
Molar Volume	(ft3/lbmole)	8.392	8.392	0.3356		
Mass Heat of Vap.	(Btu/lb)	198.3	---	---		
Phase Fraction [Molar Basis]		1.0000	1.0000	0.0000		
Surface Tension	(dyne/cm)	---	---	75.53		
Thermal Conductivity	(Btu/hr-ft-F)	1.858e-002	1.858e-002	0.3344		
Viscosity	(cP)	1.156e-002	1.156e-002	1.241		
Cv (Semi-Ideal)	(Btu/lbmole-F)	8.925	8.925	16.60		
Mass Cv (Semi-Ideal)	(Btu/lb-F)	0.4660	0.4660	0.9199		
Cv	(Btu/lbmole-F)	7.304	7.304	16.41		
Mass Cv	(Btu/lb-F)	0.3813	0.3813	0.9094		
Cv (Ent. Method)	(Btu/lbmole-F)	---	---	---		
Mass Cv (Ent. Method)	(Btu/lb-F)	---	---	---		
Cp/Cv (Ent. Method)		---	---	---		
Reid VP at 37.8 C	(psig)	---	---	---		
True VP at 37.8 C	(psig)	---	---	42.65		
Liq. Vol. Flow - Sum(Std. Cond)	(barrel/day)	0.0000	0.0000	0.0000		
Viscosity Index		-21.13	-21.13	7.855		

COMPOSITION

Overall Phase

Vapour Fraction 1.0000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	166.6846	0.0056	4669.3365	0.0082	396.4943	0.0034
CO2	568.4451	0.0192	25017.0989	0.0440	2075.5106	0.0177
Methane	24941.5438	0.8412	400134.6951	0.7045	91512.7011	0.7796
Ethane	2837.9440	0.0957	85336.6934	0.1503	16428.2370	0.1400
Propane	963.9173	0.0325	42505.8603	0.0748	5744.2725	0.0489
i-Butane	130.1726	0.0044	7566.1514	0.0133	921.8988	0.0079
n-Butane	11.6685	0.0004	678.2193	0.0012	79.6258	0.0007
i-Pentane	20.8717	0.0007	1505.9126	0.0027	185.3948	0.0014
n-Pentane	3.3073	0.0001	238.6227	0.0004	25.9463	0.0002
n-Hexane	2.7124	0.0001	233.7511	0.0004	24.1534	0.0002
H2O	3.7484	0.0001	67.4918	0.0001	4.6307	0.0000
Total	29651.0136	1.0000	567953.8331	1.0000	117378.8653	1.0000

Vapour Phase

Phase Fraction 1.000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	166.6846	0.0056	4669.3365	0.0082	396.4943	0.0034
CO2	568.4451	0.0192	25017.0989	0.0440	2075.5106	0.0177
Methane	24941.5438	0.8412	400134.6951	0.7045	91512.7011	0.7796
Ethane	2837.9440	0.0957	85336.6934	0.1503	16428.2370	0.1400
Propane	963.9173	0.0325	42505.8603	0.0748	5744.2725	0.0489
i-Butane	130.1726	0.0044	7566.1514	0.0133	921.8988	0.0079

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LEGENDS
Burlington, MA
USA

Case Name: FLUJO MAXIMO 270-1100-110.HSC
Unit Set: Field1
Date/Time: Fri Apr 13 12:13:26 2012

Material Stream: A regulación-2 (continued)

Fluid Package: Basis-1
Property Package: Peng Robinson

COMPOSITION

Vapour Phase (continued)

Phase Fraction 1.000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
n-Butane	11.6685	0.0004	678.2193	0.0012	79.6258	0.0007
i-Pentane	20.8717	0.0007	1505.9126	0.0027	165.3948	0.0014
n-Pentane	3.3073	0.0001	238.6227	0.0004	25.9463	0.0002
n-Hexane	2.7124	0.0001	233.7511	0.0004	24.1534	0.0002
H2O	3.7464	0.0001	67.4918	0.0001	4.6307	0.0000
Total	29651.0136	1.0000	567953.8331	1.0000	117378.8653	1.0000

Aqueous Phase

Phase Fraction 0.0000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0010	0.0000	0.0024	0.0000	0.0029
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.9990	0.0000	0.9975	0.0000	0.9970
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

UNIT OPERATIONS

FEED TO		PRODUCT FROM		LOGICAL CONNECTION
Tee:	TEE-100-2	Separator:	FS-101-2	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

Material Stream: A drenaje-2

Fluid Package: Basis-1
Property Package: Peng Robinson

CONDITIONS

		Overall	Vapour Phase	Aqueous Phase		
Vapour / Phase Fraction		0.0000	0.0000	1.0000		
Temperature:	(F)	40.32	40.32	40.32		
Pressure:	(psig)	535.1	535.1	535.1		
Molar Flow	(MMSCFD)	0.0000	0.0000	0.0000		
Mass Flow	(lb/hr)	0.0000	0.0000	0.0000		
Std Ideal Liq Vol Flow	(barrel/day)	0.0000	0.0000	0.0000		
Molar Enthalpy	(Btu/lbmole)	-1.238e+005	-3.641e+004	-1.238e+005		
Molar Entropy	(Btu/lbmole-F)	11.53	36.56	11.53		
Heat Flow	(Btu/hr)	0.0000	0.0000	0.0000		
Liq Vol Flow @Std Cond	(barrel/day)	0.0000 *	0.0000	0.0000		

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LEGENDS
Burlington, MA
USA

Case Name:	FLUJO MAXIMO 270-1100-110.HSC
Unit Set:	Field1
Date/Time:	Fri Apr 13 12:13:26 2012

Material Stream: A drenaje-2 (continued)

Fluid Package: Basis-1
Property Package: Peng Robinson

PROPERTIES

	Overall	Vapour Phase	Aqueous Phase		
Molecular Weight	18.04	19.15	18.04		
Molar Density (lbmole/ft3)	2.980	0.1192	2.980		
Mass Density (lb/ft3)	53.76	2.282	53.76		
Act. Volume Flow (barrel/day)	0.0000	0.0000	0.0000		
Mass Enthalpy (Btu/lb)	-6860	-1901	-6860		
Mass Entropy (Btu/lb-F)	0.6389	1.908	0.6389		
Heat Capacity (Btu/lbmole-F)	18.58	10.91	18.58		
Mass Heat Capacity (Btu/lb-F)	1.030	0.5696	1.030		
LHV Vol Basis (Std) (Btu/lbmole)	2.903e-002	3.844e+005	2.903e-002		
LHV Mass Basis (Std) (Btu/lb)	1.609e-003	2.007e+004	1.609e-003		
Phase Fraction [Vol. Basis]	---	---	1.000		
Phase Fraction [Mass Basis]	0.0000	0.0000	1.000		
Partial Pressure of CO2 (psig)	-14.70	---	---		
Cost Based on Flow (Cost/s)	0.0000	0.0000	0.0000		
Act. Gas Flow (ACFM)	---	---	---		
Avg. Liq. Density (lbmole/ft3)	---	---	---		
Specific Heat (Btu/lbmole-F)	18.58	10.91	18.58		
Std. Gas Flow (MMSCFD)	0.0000	0.0000	0.0000		
Std. Ideal Liq. Mass Density (lb/ft3)	62.27	20.68	62.27		
Act. Liq. Flow (USGPM)	0.0000	---	0.0000		
Z Factor	---	0.8599	3.438e-002		
Watson K	8.512	18.38	8.512		
User Property	---	---	---		
Partial Pressure of H2S (psig)	-14.70	---	---		
Cp/(Cp - R)	1.120	1.222	1.120		
Cp/Cv	1.133	1.494	1.133		
Heat of Vap. (Btu/lbmole)	1.404e+004	---	---		
Kinematic Viscosity (cSt)	1.441	0.3161	1.441		
Liq. Mass Density (Std. Cond) (lb/ft3)	63.38	---	63.38		
Liq. Vol. Flow (Std. Cond) (barrel/day)	0.0000	0.0000	0.0000		
Liquid Fraction	1.000	0.0000	1.000		
Molar Volume (ft3/lbmole)	0.3356	8.392	0.3356		
Mass Heat of Vap. (Btu/lb)	778.1	---	---		
Phase Fraction [Molar Basis]	0.0000	0.0000	1.0000		
Surface Tension (dyne/cm)	75.53	---	75.53		
Thermal Conductivity (Btu/hr-ft-F)	0.3344	1.858e-002	0.3344		
Viscosity (cP)	1.241	1.156e-002	1.241		
Cv (Semi-Ideal) (Btu/lbmole-F)	16.60	8.925	16.60		
Mass Cv (Semi-Ideal) (Btu/lb-F)	0.9199	0.4660	0.9199		
Cv (Btu/lbmole-F)	16.41	7.304	16.41		
Mass Cv (Btu/lb-F)	0.9094	0.3813	0.9094		
Cv (Ent. Method) (Btu/lbmole-F)	---	---	---		
Mass Cv (Ent. Method) (Btu/lb-F)	---	---	---		
Cp/Cv (Ent. Method)	---	---	---		
Reid VP at 37.8 C (psig)	---	---	---		
True VP at 37.8 C (psig)	42.65	---	42.65		
Liq. Vol. Flow - Sum(Std. Cond) (barrel/day)	0.0000	0.0000	0.0000		
Viscosity Index	7.178	-16.18	7.178		

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LEGENDS
Burlington, MA
USA

Case Name:	FLUJO MAXIMO 270-1100-110.HSC
Unit Set:	Field1
Date/Time:	Fri Apr 13 12:13:26 2012

Material Stream: A drenaje-2 (continued)

Fluid Package: Basis-1
Property Package: Peng Robinson

COMPOSITION

Overall Phase

Vapour Fraction 0.0000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0010	0.0000	0.0024	0.0000	0.0029
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.9990	0.0000	0.9975	0.0000	0.9970
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

Vapour Phase

Phase Fraction 0.0000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	0.0000	0.0056	0.0000	0.0082	0.0000	0.0034
CO2	0.0000	0.0192	0.0000	0.0440	0.0000	0.0177
Methane	0.0000	0.8412	0.0000	0.7045	0.0000	0.7796
Ethane	0.0000	0.0957	0.0000	0.1503	0.0000	0.1400
Propane	0.0000	0.0325	0.0000	0.0748	0.0000	0.0489
i-Butane	0.0000	0.0044	0.0000	0.0133	0.0000	0.0079
n-Butane	0.0000	0.0004	0.0000	0.0012	0.0000	0.0007
i-Pentane	0.0000	0.0007	0.0000	0.0027	0.0000	0.0014
n-Pentane	0.0000	0.0001	0.0000	0.0004	0.0000	0.0002
n-Hexane	0.0000	0.0001	0.0000	0.0004	0.0000	0.0002
H2O	0.0000	0.0001	0.0000	0.0001	0.0000	0.0000
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

Aqueous Phase

Phase Fraction 1.000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0010	0.0000	0.0024	0.0000	0.0029
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.9990	0.0000	0.9975	0.0000	0.9970
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
	Separator: FS-101-2	

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LEGENDS
Burlington, MA
USA

Case Name:	FLUJO MAXIMO 270-1100-110.HSC
Unit Set:	Field1
Date/Time:	Fri Apr 13 12:13:26 2012

Material Stream: A drenaje-2 (continued)

Fluid Package: Basis-1
Property Package: Peng Robinson

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

Material Stream: A Segunda Regulación-3

Fluid Package: Basis-1
Property Package: Peng Robinson

CONDITIONS

		Overall	Vapour Phase			
Vapour / Phase Fraction		1.0000	1.0000			
Temperature:	(F)	49.27	49.27			
Pressure:	(psig)	650.0 *	650.0			
Molar Flow	(MMSCFD)	135.0	135.0			
Mass Flow	(lb/hr)	2.840e+005	2.840e+005			
Std Ideal Liq Vol Flow	(barrel/day)	5.869e+004	5.869e+004			
Molar Enthalpy	(Btu/lbmole)	-3.641e+004	-3.641e+004			
Molar Entropy	(Btu/lbmole-F)	36.24	36.24			
Heat Flow	(Btu/hr)	-5.398e+008	-5.398e+008			
Liq Vol Flow @Std Cond	(barrel/day)	---	---			

PROPERTIES

		Overall	Vapour Phase			
Molecular Weight		19.15	19.15			
Molar Density	(lbmole/ft3)	0.1446	0.1446			
Mass Density	(lb/ft3)	2.769	2.769			
Act. Volume Flow	(barrel/day)	4.384e+005	4.384e+005			
Mass Enthalpy	(Btu/lb)	-1901	-1901			
Mass Entropy	(Btu/lb-F)	1.892	1.892			
Heat Capacity	(Btu/lbmole-F)	11.34	11.34			
Mass Heat Capacity	(Btu/lb-F)	0.5920	0.5920			
LHV Vol Basis (Std)	(Btu/lbmole)	3.844e+005	3.844e+005			
LHV Mass Basis (Std)	(Btu/lb)	2.007e+004	2.007e+004			
Phase Fraction [Vol. Basis]		1.000	1.000			
Phase Fraction [Mass Basis]		1.000	1.000			
Partial Pressure of CO2	(psig)	-1.953	---			
Cost Based on Flow	(Cost/s)	0.0000	0.0000			
Act. Gas Flow	(ACFM)	1709	1709			
Avg. Liq. Density	(lbmole/ft3)	1.080	1.080			
Specific Heat	(Btu/lbmole-F)	11.34	11.34			
Std. Gas Flow	(MMSCFD)	135.0	135.0			
Std. Ideal Liq. Mass Density	(lb/ft3)	20.68	20.68			
Act. Liq. Flow	(USGPM)	---	---			
Z Factor		0.8419	0.8419			
Watson K		18.38	18.38			
User Property		---	---			
Partial Pressure of H2S	(psig)	-14.70	---			
Cp/(Cp - R)		1.212	1.212			
Cp/Cv		1.534	1.534			
Heat of Vap.	(Btu/lbmole)	3432	---			
Kinematic Viscosity	(cSt)	0.2710	0.2710			
Liq. Mass Density (Std. Cond)	(lb/ft3)	---	---			

* Specified by user.

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LEGENDS
Burlington, MA
USA

Case Name: FLUJO MAXIMO 270-1100-110.HSC
Unit Set: Field1
Date/Time: Fri Apr 13 12:13:26 2012

Material Stream: A Segunda Regulación-3 (co

Fluid Package: Basis-1
Property Package: Peng Robinson

PROPERTIES

		Overall	Vapour Phase
Liq. Vol. Flow (Std. Cond)	(barrel/day)	---	---
Liquid Fraction		0.0000	0.0000
Molar Volume	(ft3/lbmole)	6.918	6.918
Mass Heat of Vap.	(Btu/lb)	179.2	---
Phase Fraction [Molar Basis]		1.0000	1.0000
Surface Tension	(dyne/cm)	---	---
Thermal Conductivity	(Btu/hr-ft-F)	1.950e-002	1.950e-002
Viscosity	(cP)	1.202e-002	1.202e-002
Cv (Semi-Ideal)	(Btu/lbmole-F)	9.354	9.354
Mass Cv (Semi-Ideal)	(Btu/lb-F)	0.4884	0.4884
Cv	(Btu/lbmole-F)	7.392	7.392
Mass Cv	(Btu/lb-F)	0.3859	0.3859
Cv (Ent. Method)	(Btu/lbmole-F)	---	---
Mass Cv (Ent. Method)	(Btu/lb-F)	---	---
Cp/Cv (Ent. Method)		---	---
Reid VP at 37.8 C	(psig)	---	---
True VP at 37.8 C	(psig)	---	---
Liq. Vol. Flow - Sum(Std. Cond)	(barrel/day)	0.0000	0.0000
Viscosity Index		-27.97	-27.97

COMPOSITION

Overall Phase

Vapour Fraction 1.0000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	83.3423	0.0056	2334.6683	0.0082	198.2471	0.0034
CO2	284.2226	0.0192	12508.5494	0.0440	1037.7553	0.0177
Methane	12470.7719	0.8412	200067.3476	0.7045	45756.3505	0.7796
Ethane	1418.9720	0.0957	42668.3467	0.1503	8214.1185	0.1400
Propane	481.9586	0.0325	21252.9302	0.0748	2872.1362	0.0489
i-Butane	65.0863	0.0044	3783.0757	0.0133	460.9494	0.0079
n-Butane	5.8342	0.0004	339.1096	0.0012	39.8129	0.0007
i-Pentane	10.4358	0.0007	752.9563	0.0027	82.6974	0.0014
n-Pentane	1.6536	0.0001	119.3113	0.0004	12.9732	0.0002
n-Hexane	1.3562	0.0001	116.8756	0.0004	12.0767	0.0002
H2O	1.8732	0.0001	33.7459	0.0001	2.3153	0.0000
Total	14825.5068	1.0000	283976.9165	1.0000	58689.4327	1.0000

Vapour Phase

Phase Fraction 1.000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	83.3423	0.0056	2334.6683	0.0082	198.2471	0.0034
CO2	284.2226	0.0192	12508.5494	0.0440	1037.7553	0.0177
Methane	12470.7719	0.8412	200067.3476	0.7045	45756.3505	0.7796
Ethane	1418.9720	0.0957	42668.3467	0.1503	8214.1185	0.1400
Propane	481.9586	0.0325	21252.9302	0.0748	2872.1362	0.0489
i-Butane	65.0863	0.0044	3783.0757	0.0133	460.9494	0.0079
n-Butane	5.8342	0.0004	339.1096	0.0012	39.8129	0.0007
i-Pentane	10.4358	0.0007	752.9563	0.0027	82.6974	0.0014
n-Pentane	1.6536	0.0001	119.3113	0.0004	12.9732	0.0002
n-Hexane	1.3562	0.0001	116.8756	0.0004	12.0767	0.0002

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LEGENDS
Burlington, MA
USA

Case Name: FLUJO MAXIMO 270-1100-110.HSC

Unit Set: Field1

Date/Time: Fri Apr 13 12:13:26 2012

Material Stream: A Segunda Regulación-3 (co

Fluid Package: Basis-1

Property Package: Peng Robinson

COMPOSITION

Vapour Phase (continued) Phase Fraction 1.000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
H2O	1.8732	0.0001	33.7459	0.0001	2.3153	0.0000
Total	14825.5068	1.0000	283976.9165	1.0000	58689.4327	1.0000

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Valve: PCV-102-3	Valve: PCV-101-3	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

Material Stream: A Medición-3

Fluid Package: Basis-1

Property Package: Peng Robinson

CONDITIONS

		Overall	Vapour Phase			
Vapour / Phase Fraction		1.0000	1.0000			
Temperature:	(F)	37.48	37.48			
Pressure:	(psig)	500.0 *	500.0			
Molar Flow	(MMSCFD)	135.0	135.0			
Mass Flow	(lb/hr)	2.840e+005	2.840e+005			
Std Ideal Liq Vol Flow	(barrel/day)	5.869e+004	5.869e+004			
Molar Enthalpy	(Btu/lbmole)	-3.641e+004	-3.641e+004			
Molar Entropy	(Btu/lbmole-F)	36.67	36.67			
Heat Flow	(Btu/hr)	-5.398e+008	-5.398e+008			
Liq Vol Flow @Std Cond	(barrel/day)	---	---			

PROPERTIES

		Overall	Vapour Phase			
Molecular Weight		19.15	19.15			
Molar Density	(lbmole/ft3)	0.1114	0.1114			
Mass Density	(lb/ft3)	2.134	2.134			
Act. Volume Flow	(barrel/day)	5.689e+005	5.689e+005			
Mass Enthalpy	(Btu/lb)	-1901	-1901			
Mass Entropy	(Btu/lb-F)	1.914	1.914			
Heat Capacity	(Btu/lbmole-F)	10.78	10.78			
Mass Heat Capacity	(Btu/lb-F)	0.5627	0.5627			
LHV Vol Basis (Std)	(Btu/lbmole)	3.844e+005	3.844e+005			
LHV Mass Basis (Std)	(Btu/lb)	2.007e+004	2.007e+004			
Phase Fraction [Vol. Basis]		1.000	1.000			
Phase Fraction [Mass Basis]		1.000	1.000			
Partial Pressure of CO2	(psig)	-4.829	---			
Cost Based on Flow	(Cost/s)	0.0000	0.0000			
Act. Gas Flow	(ACFM)	2218	2218			
Avg. Liq. Density	(lbmole/ft3)	1.080	1.080			
Specific Heat	(Btu/lbmole-F)	10.78	10.78			

* Specified by user.

Material Stream: A Medición-3 (continued)

Fluid Package: Basis-1
Property Package: Peng Robinson

PROPERTIES

		Overall	Vapour Phase			
Std. Gas Flow	(MMSCFD)	135.0	135.0			
Std. Ideal Liq. Mass Density	(lb/ft3)	20.68	20.68			
Act. Liq. Flow	(USGPM)	---	---			
Z Factor		0.8660	0.8660			
Watson K		18.38	18.38			
User Property		---	---			
Partial Pressure of H2S	(psig)	-14.70	---			
Cp/(Cp - R)		1.226	1.226			
Cp/Cv		1.481	1.481			
Heat of Vap.	(Btu/lbmole)	3910	---			
Kinematic Viscosity	(cSt)	0.3340	0.3340			
Liq. Mass Density (Std. Cond)	(lb/ft3)	---	---			
Liq. Vol. Flow (Std. Cond)	(barrel/day)	---	---			
Liquid Fraction		0.0000	0.0000			
Molar Volume	(ft3/lbmole)	8.976	8.976			
Mass Heat of Vap.	(Btu/lb)	204.1	---			
Phase Fraction [Molar Basis]		1.0000	1.0000			
Surface Tension	(dyne/cm)	---	---			
Thermal Conductivity	(Btu/hr-ft-F)	1.830e-002	1.830e-002			
Viscosity	(cP)	1.142e-002	1.142e-002			
Cv (Semi-Ideal)	(Btu/lbmole-F)	8.792	8.792			
Mass Cv (Semi-Ideal)	(Btu/lb-F)	0.4590	0.4590			
Cv	(Btu/lbmole-F)	7.277	7.277			
Mass Cv	(Btu/lb-F)	0.3799	0.3799			
Cv (Ent. Method)	(Btu/lbmole-F)	---	---			
Mass Cv (Ent. Method)	(Btu/lb-F)	---	---			
Cp/Cv (Ent. Method)		---	---			
Reid VP at 37.8 C	(psig)	---	---			
True VP at 37.8 C	(psig)	---	---			
Liq. Vol. Flow - Sum(Std. Cond)	(barrel/day)	0.0000	0.0000			
Viscosity Index		-19.16	-19.16			

COMPOSITION

Overall Phase

Vapour Fraction 1.0000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	83.3423	0.0056	2334.6683	0.0082	198.2471	0.0034
CO2	284.2226	0.0192	12508.5494	0.0440	1037.7553	0.0177
Methane	12470.7719	0.8412	200067.3476	0.7045	45756.3505	0.7796
Ethane	1418.9720	0.0957	42668.3467	0.1503	8214.1185	0.1400
Propane	481.9586	0.0325	21252.9302	0.0748	2872.1362	0.0489
i-Butane	65.0863	0.0044	3783.0757	0.0133	460.9494	0.0079
n-Butane	5.8342	0.0004	339.1096	0.0012	39.8129	0.0007
i-Pentane	10.4358	0.0007	752.9563	0.0027	82.6974	0.0014
n-Pentane	1.6536	0.0001	119.3113	0.0004	12.9732	0.0002
n-Hexane	1.3562	0.0001	116.8756	0.0004	12.0767	0.0002
H2O	1.8732	0.0001	33.7459	0.0001	2.3153	0.0000
Total	14825.5068	1.0000	283976.9165	1.0000	58689.4327	1.0000

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LEGENDS
Burlington, MA
USA

Case Name: FLUJO MAXIMO 270-1100-110.HSC

Unit Set: Field1

Date/Time: Fri Apr 13 12:13:26 2012

Material Stream: A Medición-3 (continued)

Fluid Package: Basis-1

Property Package: Peng Robinson

COMPOSITION

Vapour Phase — Phase Fraction 1.000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	83.3423	0.0056	2334.6683	0.0082	198.2471	0.0034
CO2	284.2226	0.0192	12508.5494	0.0440	1037.7553	0.0177
Methane	12470.7719	0.8412	200067.3476	0.7045	45756.3505	0.7796
Ethane	1418.9720	0.0957	42668.3467	0.1503	8214.1185	0.1400
Propane	481.9586	0.0325	21252.9302	0.0748	2872.1362	0.0489
i-Butane	65.0863	0.0044	3783.0757	0.0133	460.9494	0.0079
n-Butane	5.8342	0.0004	339.1096	0.0012	39.8129	0.0007
i-Pentane	10.4358	0.0007	752.9563	0.0027	82.6974	0.0014
n-Pentane	1.6536	0.0001	119.3113	0.0004	12.9732	0.0002
n-Hexane	1.3562	0.0001	116.8756	0.0004	12.0767	0.0002
H2O	1.8732	0.0001	33.7459	0.0001	2.3153	0.0000
Total	14825.5068	1.0000	283976.9165	1.0000	58689.4327	1.0000

UNIT OPERATIONS

FEED TO		PRODUCT FROM		LOGICAL CONNECTION
Mixer:	MIX-101-2	Valve:	PCV-102-3	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

Material Stream: A ECGSB-2

Fluid Package: Basis-1

Property Package: Peng Robinson

CONDITIONS

		Overall	Vapour Phase			
Vapour / Phase Fraction		1.0000	1.0000			
Temperature:	(F)	38.06 *	38.06			
Pressure:	(psig)	500.0	500.0			
Molar Flow	(MMSCFD)	270.0	270.0			
Mass Flow	(lb/hr)	5.680e+005	5.680e+005			
Std Ideal Liq Vol Flow	(barrel/day)	1.174e+005	1.174e+005			
Molar Enthalpy	(Btu/lbmole)	-3.641e+004	-3.641e+004			
Molar Entropy	(Btu/lbmole-F)	36.68	36.68			
Heat Flow	(Btu/hr)	-1.080e+009	-1.080e+009			
Liq Vol Flow @Std Cond	(barrel/day)	---	---			

PROPERTIES

		Overall	Vapour Phase			
Molecular Weight		19.15	19.15			
Molar Density	(lbmole/ft3)	0.1112	0.1112			
Mass Density	(lb/ft3)	2.130	2.130			
Act. Volume Flow	(barrel/day)	1.140e+006	1.140e+006			
Mass Enthalpy	(Btu/lb)	-1901	-1901			
Mass Entropy	(Btu/lb-F)	1.915	1.915			
Heat Capacity	(Btu/lbmole-F)	10.77	10.77			

LEGENDS
Burlington, MA
USA

Case Name: FLUJO MAXIMO 270-1100-110.HSC
Unit Set: Field1
Date/Time: Fri Apr 13 12:13:26 2012

Material Stream: A ECGSB-2 (continued)

Fluid Package: Basis-1
Property Package: Peng Robinson

PROPERTIES

		Overall	Vapour Phase			
Mass Heat Capacity	(Btu/lb-F)	0.5625	0.5625			
LHV Vol Basis (Std)	(Btu/lbmole)	3.844e+005	3.844e+005			
LHV Mass Basis (Std)	(Btu/lb)	2.007e+004	2.007e+004			
Phase Fraction [Vol. Basis]		1.000	1.000			
Phase Fraction [Mass Basis]		1.000	1.000			
Partial Pressure of CO2	(psig)	-4.829	---			
Cost Based on Flow	(Cost/s)	0.0000	0.0000			
Act. Gas Flow	(ACFM)	4444	4444			
Avg. Liq. Density	(lbmole/ft3)	1.080	1.080			
Specific Heat	(Btu/lbmole-F)	10.77	10.77			
Std. Gas Flow	(MMSCFD)	270.0	270.0			
Std. Ideal Liq. Mass Density	(lb/ft3)	20.68	20.68			
Act. Liq. Flow	(USGPM)	---	---			
Z Factor		0.8665	0.8665			
Watson K		18.38	18.38			
User Property		---	---			
Partial Pressure of H2S	(psig)	-14.70	---			
Cp/(Cp - R)		1.226	1.226			
Cp/Cv		1.480	1.480			
Heat of Vap.	(Btu/lbmole)	3910	---			
Kinematic Viscosity	(cSt)	0.3349	0.3349			
Liq. Mass Density (Std. Cond)	(lb/ft3)	---	---			
Liq. Vol. Flow (Std. Cond)	(barrel/day)	---	---			
Liquid Fraction		0.0000	0.0000			
Molar Volume	(ft3/lbmole)	8.993	8.993			
Mass Heat of Vap.	(Btu/lb)	204.1	---			
Phase Fraction [Molar Basis]		1.0000	1.0000			
Surface Tension	(dyne/cm)	---	---			
Thermal Conductivity	(Btu/hr-ft-F)	1.832e-002	1.832e-002			
Viscosity	(cP)	1.143e-002	1.143e-002			
Cv (Semi-Ideal)	(Btu/lbmole-F)	8.788	8.788			
Mass Cv (Semi-Ideal)	(Btu/lb-F)	0.4588	0.4588			
Cv	(Btu/lbmole-F)	7.280	7.280			
Mass Cv	(Btu/lb-F)	0.3801	0.3801			
Cv (Ent. Method)	(Btu/lbmole-F)	---	---			
Mass Cv (Ent. Method)	(Btu/lb-F)	---	---			
Cp/Cv (Ent. Method)		---	---			
Reid VP at 37.8 C	(psig)	---	---			
True VP at 37.8 C	(psig)	---	---			
Liq. Vol. Flow - Sum(Std. Cond)	(barrel/day)	0.0000	0.0000			
Viscosity Index		-19.07	-19.07			

COMPOSITION

Overall Phase

Vapour Fraction 1.0000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	166.6846	0.0056	4669.3365	0.0082	396.4943	0.0034
CO2	568.4451	0.0192	25017.0989	0.0440	2075.5106	0.0177
Methane	24941.5438	0.8412	400134.6951	0.7045	91512.7011	0.7796
Ethane	2837.9440	0.0957	85336.6934	0.1503	16428.2370	0.1400

aspentech LEGENDS Burlington, MA USA

Case Name: FLUJO MAXIMO 270-1100-110.HSC
Unit Set: Field1
Date/Time: Fri Apr 13 12:13:26 2012

Material Stream: A ECGSB-2 (continued)

Fluid Package: Basis-1
Property Package: Peng Robinson

COMPOSITION

Overall Phase (continued)

Vapour Fraction 1.0000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Propane	963.9173	0.0325	42505.8603	0.0748	5744.2725	0.0489
i-Butane	130.1726	0.0044	7566.1514	0.0133	921.8988	0.0079
n-Butane	11.6685	0.0004	678.2193	0.0012	79.6258	0.0007
i-Pentane	20.8717	0.0007	1505.9126	0.0027	165.3948	0.0014
n-Pentane	3.3073	0.0001	238.6227	0.0004	25.9463	0.0002
n-Hexane	2.7124	0.0001	233.7511	0.0004	24.1534	0.0002
H2O	3.7464	0.0001	67.4918	0.0001	4.6307	0.0000
Total	29651.0136	1.0000	567953.8331	1.0000	117378.8653	1.0000

Vapour Phase

Phase Fraction 1.000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	166.6846	0.0056	4669.3365	0.0082	396.4943	0.0034
CO2	568.4451	0.0192	25017.0989	0.0440	2075.5106	0.0177
Methane	24941.5438	0.8412	400134.6951	0.7045	91512.7011	0.7796
Ethane	2837.9440	0.0957	85336.6934	0.1503	16428.2370	0.1400
Propane	963.9173	0.0325	42505.8603	0.0748	5744.2725	0.0489
i-Butane	130.1726	0.0044	7566.1514	0.0133	921.8988	0.0079
n-Butane	11.6685	0.0004	678.2193	0.0012	79.6258	0.0007
i-Pentane	20.8717	0.0007	1505.9126	0.0027	165.3948	0.0014
n-Pentane	3.3073	0.0001	238.6227	0.0004	25.9463	0.0002
n-Hexane	2.7124	0.0001	233.7511	0.0004	24.1534	0.0002
H2O	3.7464	0.0001	67.4918	0.0001	4.6307	0.0000
Total	29651.0136	1.0000	567953.8331	1.0000	117378.8653	1.0000

UNIT OPERATIONS

FEED TO		PRODUCT FROM		LOGICAL CONNECTION
PIPESYS Extension:	Cogua-ECGSB-2	Heater:	E-101-2	

UTILITIES

Envelope Utility: Envelope Utility-1

PROCESS UTILITY

Material Stream: A Succión-2

Fluid Package: Basis-1
Property Package: Peng Robinson

CONDITIONS

		Overall	Vapour Phase			
Vapour / Phase Fraction		1.0000	1.0000			
Temperature:	(F)	30.88	30.88			
Pressure:	(psig)	337.5	337.5			
Molar Flow	(MMSCFD)	270.0	270.0			
Mass Flow	(lb/hr)	5.680e+005	5.680e+005			
Std Ideal Liq Vol Flow	(barrel/day)	1.174e+005	1.174e+005			
Molar Enthalpy	(Btu/lbmole)	-3.634e+004	-3.634e+004			
Molar Entropy	(Btu/lbmole-F)	37.49	37.49			

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LEGENDS
Burlington, MA
USA

Case Name:	FLUJO MAXIMO 270-1100-110.HSC
Unit Set:	Field1
Date/Time:	Fri Apr 13 12:13:26 2012

Material Stream: A Succión-2 (continued)

Fluid Package: Basis-1
Property Package: Peng Robinson

CONDITIONS

		Overall	Vapour Phase			
Heat Flow	(Btu/hr)	-1.077e+009	-1.077e+009			
Liq Vol Flow @Std Cond	(barrel/day)	---	---			

PROPERTIES

		Overall	Vapour Phase			
Molecular Weight		19.15	19.15			
Molar Density	(lbmole/ft3)	7.404e-002	7.404e-002			
Mass Density	(lb/ft3)	1.418	1.418			
Act. Volume Flow	(barrel/day)	1.712e+006	1.712e+006			
Mass Enthalpy	(Btu/lb)	-1897	-1897			
Mass Entropy	(Btu/lb-F)	1.957	1.957			
Heat Capacity	(Btu/lbmole-F)	10.14	10.14			
Mass Heat Capacity	(Btu/lb-F)	0.5295	0.5295			
LHV Vol Basis (Std)	(Btu/lbmole)	3.844e+005	3.844e+005			
LHV Mass Basis (Std)	(Btu/lb)	2.007e+004	2.007e+004			
Phase Fraction [Vol. Basis]		1.000	1.000			
Phase Fraction [Mass Basis]		1.000	1.000			
Partial Pressure of CO2	(psig)	-7.943	---			
Cost Based on Flow	(Cost/s)	0.0000	0.0000			
Act. Gas Flow	(ACFM)	6675	6675			
Avg. Liq. Density	(lbmole/ft3)	1.080	1.080			
Specific Heat	(Btu/lbmole-F)	10.14	10.14			
Std. Gas Flow	(MMSCFD)	270.0	270.0			
Std. Ideal Liq. Mass Density	(lb/ft3)	20.68	20.68			
Act. Liq. Flow	(USGPM)	---	---			
Z Factor		0.9037	0.9037			
Watson K		18.38	18.38			
User Property		---	---			
Partial Pressure of H2S	(psig)	-14.70	---			
Cp/(Cp - R)		1.243	1.243			
Cp/Cv		1.411	1.411			
Heat of Vap.	(Btu/lbmole)	4429	---			
Kinematic Viscosity	(cSt)	0.4802	0.4802			
Liq. Mass Density (Std. Cond)	(lb/ft3)	---	---			
Liq. Vol. Flow (Std. Cond)	(barrel/day)	---	---			
Liquid Fraction		0.0000	0.0000			
Molar Volume	(ft3/lbmole)	13.51	13.51			
Mass Heat of Vap.	(Btu/lb)	231.2	---			
Phase Fraction [Molar Basis]		1.0000	1.0000			
Surface Tension	(dyne/cm)	---	---			
Thermal Conductivity	(Btu/hr-ft-F)	1.727e-002	1.727e-002			
Viscosity	(cP)	1.091e-002	1.091e-002			
Cv (Semi-Ideal)	(Btu/lbmole-F)	8.156	8.156			
Mass Cv (Semi-Ideal)	(Btu/lb-F)	0.4258	0.4258			
Cv	(Btu/lbmole-F)	7.187	7.187			
Mass Cv	(Btu/lb-F)	0.3752	0.3752			
Cv (Ent. Method)	(Btu/lbmole-F)	---	---			
Mass Cv (Ent. Method)	(Btu/lb-F)	---	---			
Cp/Cv (Ent. Method)		---	---			
Reid VP at 37.8 C	(psig)	---	---			
True VP at 37.8 C	(psig)	---	---			

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LEGENDS
Burlington, MA
USA

Case Name: FLUJO MAXIMO 270-1100-110.HSC
Unit Set: Field1
Date/Time: Fri Apr 13 12:13:26 2012

Material Stream: A Succión-2 (continued)

Fluid Package: Basis-1
Property Package: Peng Robinson

PROPERTIES

	Overall	Vapour Phase			
Liq. Vol. Flow - Sum(Std. Cond) (barrel/day)	0.0000	0.0000			
Viscosity Index	-9.352	-9.352			

COMPOSITION

Overall Phase

Vapour Fraction 1.0000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	166.6846	0.0056	4669.3365	0.0082	396.4943	0.0034
CO2	568.4451	0.0192	25017.0989	0.0440	2075.5106	0.0177
Methane	24941.5438	0.8412	400134.6951	0.7045	91512.7011	0.7796
Ethane	2837.9440	0.0957	85336.6934	0.1503	16428.2370	0.1400
Propane	963.9173	0.0325	42505.8603	0.0748	5744.2725	0.0489
i-Butane	130.1726	0.0044	7566.1514	0.0133	921.8988	0.0079
n-Butane	11.6685	0.0004	678.2193	0.0012	79.6258	0.0007
i-Pentane	20.8717	0.0007	1505.9126	0.0027	165.3948	0.0014
n-Pentane	3.3073	0.0001	238.6227	0.0004	25.9463	0.0002
n-Hexane	2.7124	0.0001	233.7511	0.0004	24.1534	0.0002
H2O	3.7464	0.0001	67.4918	0.0001	4.6307	0.0000
Total	29651.0136	1.0000	567953.8331	1.0000	117378.8653	1.0000

Vapour Phase

Phase Fraction 1.000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	166.6846	0.0056	4669.3365	0.0082	396.4943	0.0034
CO2	568.4451	0.0192	25017.0989	0.0440	2075.5106	0.0177
Methane	24941.5438	0.8412	400134.6951	0.7045	91512.7011	0.7796
Ethane	2837.9440	0.0957	85336.6934	0.1503	16428.2370	0.1400
Propane	963.9173	0.0325	42505.8603	0.0748	5744.2725	0.0489
i-Butane	130.1726	0.0044	7566.1514	0.0133	921.8988	0.0079
n-Butane	11.6685	0.0004	678.2193	0.0012	79.6258	0.0007
i-Pentane	20.8717	0.0007	1505.9126	0.0027	165.3948	0.0014
n-Pentane	3.3073	0.0001	238.6227	0.0004	25.9463	0.0002
n-Hexane	2.7124	0.0001	233.7511	0.0004	24.1534	0.0002
H2O	3.7464	0.0001	67.4918	0.0001	4.6307	0.0000
Total	29651.0136	1.0000	567953.8331	1.0000	117378.8653	1.0000

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Valve: VLV-A Succión-2	PIPESYS Extension: Cogua-ECGSB-2	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

aspentech

LEGENDS
Burlington, MA
USA

Case Name: FLUJO MAXIMO 270-1100-110.HSC

Unit Set: Field1

Date/Time: Fri Apr 13 12:13:26 2012

Material Stream: A Segunda Regulación-2-2

Fluid Package: Basis-1

Property Package: Peng Robinson

CONDITIONS

	Overall	Vapour Phase			
Vapour / Phase Fraction	1.0000	1.0000			
Temperature: (F)	49.27	49.27			
Pressure: (psig)	650.0 *	650.0			
Molar Flow (MMSCFD)	135.0	135.0			
Mass Flow (lb/hr)	2.840e+005	2.840e+005			
Std Ideal Liq Vol Flow (barrel/day)	5.869e+004	5.869e+004			
Molar Enthalpy (Btu/lbmole)	-3.641e+004	-3.641e+004			
Molar Entropy (Btu/lbmole-F)	36.24	36.24			
Heat Flow (Btu/hr)	-5.398e+008	-5.398e+008			
Liq Vol Flow @Std Cond (barrel/day)	---	---			

PROPERTIES

	Overall	Vapour Phase			
Molecular Weight	19.15	19.15			
Molar Density (lbmole/ft3)	0.1446	0.1446			
Mass Density (lb/ft3)	2.769	2.769			
Act. Volume Flow (barrel/day)	4.384e+005	4.384e+005			
Mass Enthalpy (Btu/lb)	-1901	-1901			
Mass Entropy (Btu/lb-F)	1.892	1.892			
Heat Capacity (Btu/lbmole-F)	11.34	11.34			
Mass Heat Capacity (Btu/lb-F)	0.5920	0.5920			
LHV Vol Basis (Std) (Btu/lbmole)	3.844e+005	3.844e+005			
LHV Mass Basis (Std) (Btu/lb)	2.007e+004	2.007e+004			
Phase Fraction [Vol. Basis]	1.000	1.000			
Phase Fraction [Mass Basis]	1.000	1.000			
Partial Pressure of CO2 (psig)	-1.953	---			
Cost Based on Flow (Cost/s)	0.0000	0.0000			
Act. Gas Flow (ACFM)	1709	1709			
Avg. Liq. Density (lbmole/ft3)	1.080	1.080			
Specific Heat (Btu/lbmole-F)	11.34	11.34			
Std. Gas Flow (MMSCFD)	135.0	135.0			
Std. Ideal Liq. Mass Density (lb/ft3)	20.68	20.68			
Act. Liq. Flow (USGPM)	---	---			
Z Factor	0.8419	0.8419			
Watson K	18.38	18.38			
User Property	---	---			
Partial Pressure of H2S (psig)	-14.70	---			
Cp/(Cp - R)	1.212	1.212			
Cp/Cv	1.534	1.534			
Heat of Vap. (Btu/lbmole)	3432	---			
Kinematic Viscosity (cSt)	0.2710	0.2710			
Liq. Mass Density (Std. Cond) (lb/ft3)	---	---			
Liq. Vol. Flow (Std. Cond) (barrel/day)	---	---			
Liquid Fraction	0.0000	0.0000			
Molar Volume (ft3/lbmole)	6.918	6.918			
Mass Heat of Vap. (Btu/lb)	179.2	---			
Phase Fraction [Molar Basis]	1.0000	1.0000			
Surface Tension (dyne/cm)	---	---			
Thermal Conductivity (Btu/hr-ft-F)	1.950e-002	1.950e-002			
Viscosity (cP)	1.202e-002	1.202e-002			
Cv (Semi-Ideal) (Btu/lbmole-F)	9.354	9.354			

* Specified by user.

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LEGENDS
Burlington, MA
USA

Case Name: FLUJO MAXIMO 270-1100-110.HSC
Unit Set: Field1
Date/Time: Fri Apr 13 12:13:26 2012

Material Stream: A Segunda Regulación-2-2 (

Fluid Package: Basis-1
Property Package: Peng Robinson

PROPERTIES

		Overall	Vapour Phase			
Mass Cv (Semi-Ideal)	(Btu/lb-F)	0.4884	0.4884			
Cv	(Btu/lbmole-F)	7.392	7.392			
Mass Cv	(Btu/lb-F)	0.3859	0.3859			
Cv (Ent. Method)	(Btu/lbmole-F)	---	---			
Mass Cv (Ent. Method)	(Btu/lb-F)	---	---			
Cp/Cv (Ent. Method)		---	---			
Reid VP at 37.8 C	(psig)	---	---			
True VP at 37.8 C	(psig)	---	---			
Liq. Vol. Flow - Sum(Std. Cond)	(barrel/day)	0.0000	0.0000			
Viscosity Index		-27.97	-27.97			

COMPOSITION

Overall Phase

Vapour Fraction 1.0000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	83.3423	0.0056	2334.6683	0.0082	198.2471	0.0034
CO2	284.2226	0.0192	12508.5494	0.0440	1037.7553	0.0177
Methane	12470.7719	0.8412	200067.3476	0.7045	45756.3505	0.7796
Ethane	1418.9720	0.0957	42668.3467	0.1503	8214.1185	0.1400
Propane	481.9586	0.0325	21252.9302	0.0748	2872.1362	0.0489
i-Butane	65.0863	0.0044	3783.0757	0.0133	460.9494	0.0079
n-Butane	5.8342	0.0004	339.1096	0.0012	39.8129	0.0007
i-Pentane	10.4358	0.0007	752.9563	0.0027	82.6974	0.0014
n-Pentane	1.6536	0.0001	119.3113	0.0004	12.9732	0.0002
n-Hexane	1.3562	0.0001	116.8756	0.0004	12.0767	0.0002
H2O	1.8732	0.0001	33.7459	0.0001	2.3153	0.0000
Total	14825.5068	1.0000	283976.9165	1.0000	58689.4327	1.0000

Vapour Phase

Phase Fraction 1.000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	83.3423	0.0056	2334.6683	0.0082	198.2471	0.0034
CO2	284.2226	0.0192	12508.5494	0.0440	1037.7553	0.0177
Methane	12470.7719	0.8412	200067.3476	0.7045	45756.3505	0.7796
Ethane	1418.9720	0.0957	42668.3467	0.1503	8214.1185	0.1400
Propane	481.9586	0.0325	21252.9302	0.0748	2872.1362	0.0489
i-Butane	65.0863	0.0044	3783.0757	0.0133	460.9494	0.0079
n-Butane	5.8342	0.0004	339.1096	0.0012	39.8129	0.0007
i-Pentane	10.4358	0.0007	752.9563	0.0027	82.6974	0.0014
n-Pentane	1.6536	0.0001	119.3113	0.0004	12.9732	0.0002
n-Hexane	1.3562	0.0001	116.8756	0.0004	12.0767	0.0002
H2O	1.8732	0.0001	33.7459	0.0001	2.3153	0.0000
Total	14825.5068	1.0000	283976.9165	1.0000	58689.4327	1.0000

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Valve: PCV-102-2-2	Valve: PCV-101-2-2	

UTILITIES

(No utilities reference this stream)

aspentech	LEGENDS Burlington, MA USA	Case Name:	FLUJO MAXIMO 270-1100-110.HSC
		Unit Set:	Field1
		Date/Time:	Fri Apr 13 12:13:26 2012

Material Stream: A Segunda Regulación-2-2 (

Fluid Package: Basis-1
Property Package: Peng Robinson

PROCESS UTILITY

Material Stream: A Medición-2-2

Fluid Package: Basis-1
Property Package: Peng Robinson

CONDITIONS

	Overall	Vapour Phase			
Vapour / Phase Fraction	1.0000	1.0000			
Temperature: (F)	37.48	37.48			
Pressure: (psig)	500.0 *	500.0			
Molar Flow (MMSCFD)	135.0	135.0			
Mass Flow (lb/hr)	2.840e+005	2.840e+005			
Std Ideal Liq Vol Flow (barrel/day)	5.869e+004	5.869e+004			
Molar Enthalpy (Btu/lbmole)	-3.641e+004	-3.641e+004			
Molar Entropy (Btu/lbmole-F)	36.67	36.67			
Heat Flow (Btu/hr)	-5.398e+008	-5.398e+008			
Liq Vol Flow @Std Cond (barrel/day)	---	---			

PROPERTIES

	Overall	Vapour Phase			
Molecular Weight	19.15	19.15			
Molar Density (lbmole/ft3)	0.1114	0.1114			
Mass Density (lb/ft3)	2.134	2.134			
Act. Volume Flow (barrel/day)	5.689e+005	5.689e+005			
Mass Enthalpy (Btu/lb)	-1901	-1901			
Mass Entropy (Btu/lb-F)	1.914	1.914			
Heat Capacity (Btu/lbmole-F)	10.78	10.78			
Mass Heat Capacity (Btu/lb-F)	0.5627	0.5627			
LHV Vol Basis (Std) (Btu/lbmole)	3.844e+005	3.844e+005			
LHV Mass Basis (Std) (Btu/lb)	2.007e+004	2.007e+004			
Phase Fraction [Vol. Basis]	1.000	1.000			
Phase Fraction [Mass Basis]	1.000	1.000			
Partial Pressure of CO2 (psig)	-4.829	---			
Cost Based on Flow (Cost/s)	0.0000	0.0000			
Act. Gas Flow (ACFM)	2218	2218			
Avg. Liq. Density (lbmole/ft3)	1.080	1.080			
Specific Heat (Btu/lbmole-F)	10.78	10.78			
Std. Gas Flow (MMSCFD)	135.0	135.0			
Std. Ideal Liq. Mass Density (lb/ft3)	20.68	20.68			
Act. Liq. Flow (USGPM)	---	---			
Z Factor	0.8660	0.8660			
Watson K	18.38	18.38			
User Property	---	---			
Partial Pressure of H2S (psig)	-14.70	---			
Cp/(Cp - R)	1.226	1.226			
Cp/Cv	1.481	1.481			
Heat of Vap. (Btu/lbmole)	3910	---			
Kinematic Viscosity (cSt)	0.3340	0.3340			
Liq. Mass Density (Std. Cond) (lb/ft3)	---	---			
Liq. Vol. Flow (Std. Cond) (barrel/day)	---	---			
Liquid Fraction	0.0000	0.0000			
Molar Volume (ft3/lbmole)	8.976	8.976			

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LEGENDS
Burlington, MA
USA

Case Name: FLUJO MAXIMO 270-1100-110.HSC

Unit Set: Field1

Date/Time: Fri Apr 13 12:13:26 2012

Material Stream: A Medición-2-2 (continued)

Fluid Package: Basis-1

Property Package: Peng Robinson

PROPERTIES

		Overall	Vapour Phase			
Mass Heat of Vap.	(Btu/lb)	204.1	---			
Phase Fraction [Molar Basis]		1.0000	1.0000			
Surface Tension	(dyne/cm)	---	---			
Thermal Conductivity	(Btu/hr-ft-F)	1.830e-002	1.830e-002			
Viscosity	(cP)	1.142e-002	1.142e-002			
Cv (Semi-Ideal)	(Btu/lbmole-F)	8.792	8.792			
Mass Cv (Semi-Ideal)	(Btu/lb-F)	0.4590	0.4590			
Cv	(Btu/lbmole-F)	7.277	7.277			
Mass Cv	(Btu/lb-F)	0.3799	0.3799			
Cv (Ent. Method)	(Btu/lbmole-F)	---	---			
Mass Cv (Ent. Method)	(Btu/lb-F)	---	---			
Cp/Cv (Ent. Method)		---	---			
Reid VP at 37.8 C	(psig)	---	---			
True VP at 37.8 C	(psig)	---	---			
Liq. Vol. Flow - Sum(Std. Cond)	(barrel/day)	0.0000	0.0000			
Viscosity Index		-19.16	-19.16			

COMPOSITION

Overall Phase

Vapour Fraction 1.0000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	83.3423	0.0056	2334.6683	0.0082	198.2471	0.0034
CO2	284.2226	0.0192	12508.5494	0.0440	1037.7553	0.0177
Methane	12470.7719	0.8412	200067.3476	0.7045	45756.3505	0.7796
Ethane	1418.9720	0.0957	42668.3467	0.1503	8214.1185	0.1400
Propane	481.9586	0.0325	21252.9302	0.0748	2872.1362	0.0489
i-Butane	65.0863	0.0044	3783.0757	0.0133	460.9494	0.0079
n-Butane	5.8342	0.0004	339.1096	0.0012	39.8129	0.0007
i-Pentane	10.4358	0.0007	752.9563	0.0027	82.6974	0.0014
n-Pentane	1.6536	0.0001	119.3113	0.0004	12.9732	0.0002
n-Hexane	1.3562	0.0001	116.8756	0.0004	12.0767	0.0002
H2O	1.8732	0.0001	33.7459	0.0001	2.3153	0.0000
Total	14825.5068	1.0000	283976.9165	1.0000	58689.4327	1.0000

Vapour Phase

Phase Fraction 1.000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	83.3423	0.0056	2334.6683	0.0082	198.2471	0.0034
CO2	284.2226	0.0192	12508.5494	0.0440	1037.7553	0.0177
Methane	12470.7719	0.8412	200067.3476	0.7045	45756.3505	0.7796
Ethane	1418.9720	0.0957	42668.3467	0.1503	8214.1185	0.1400
Propane	481.9586	0.0325	21252.9302	0.0748	2872.1362	0.0489
i-Butane	65.0863	0.0044	3783.0757	0.0133	460.9494	0.0079
n-Butane	5.8342	0.0004	339.1096	0.0012	39.8129	0.0007
i-Pentane	10.4358	0.0007	752.9563	0.0027	82.6974	0.0014
n-Pentane	1.6536	0.0001	119.3113	0.0004	12.9732	0.0002
n-Hexane	1.3562	0.0001	116.8756	0.0004	12.0767	0.0002
H2O	1.8732	0.0001	33.7459	0.0001	2.3153	0.0000
Total	14825.5068	1.0000	283976.9165	1.0000	58689.4327	1.0000

aspentech	LEGENDS Burlington, MA USA	Case Name:	FLUJO MAXIMO 270-1100-110.HSC
		Unit Set:	Field1
		Date/Time:	Fri Apr 13 12:13:26 2012

Material Stream: A Medición-2-2 (continued)

Fluid Package: Basis-1
Property Package: Peng Robinson

UNIT OPERATIONS

FEED TO		PRODUCT FROM		LOGICAL CONNECTION
Mixer:	MIX-101-2	Valve:	PCV-102-2-2	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

Material Stream: A Brazo 1-2

Fluid Package: Basis-1
Property Package: Peng Robinson

CONDITIONS

		Overall	Vapour Phase	Aqueous Phase		
Vapour / Phase Fraction		1.0000	1.0000	0.0000		
Temperature:	(F)	40.32	40.32	40.32		
Pressure:	(psig)	535.1	535.1	535.1		
Molar Flow	(MMSCFD)	135.0	135.0	0.0000		
Mass Flow	(lb/hr)	2.840e+005	2.840e+005	0.0000		
Std Ideal Liq Vol Flow	(barrel/day)	5.869e+004	5.869e+004	0.0000		
Molar Enthalpy	(Btu/lbmole)	-3.641e+004	-3.641e+004	-1.238e+005		
Molar Entropy	(Btu/lbmole-F)	36.56	36.56	11.53		
Heat Flow	(Btu/hr)	-5.398e+008	-5.398e+008	0.0000		
Liq Vol Flow @Std Cond	(barrel/day)	---	---	0.0000		

PROPERTIES

		Overall	Vapour Phase	Aqueous Phase		
Molecular Weight		19.15	19.15	18.04		
Molar Density	(lbmole/ft3)	0.1192	0.1192	2.980		
Mass Density	(lb/ft3)	2.282	2.282	53.76		
Act. Volume Flow	(barrel/day)	5.318e+005	5.318e+005	0.0000		
Mass Enthalpy	(Btu/lb)	-1901	-1901	-6860		
Mass Entropy	(Btu/lb-F)	1.908	1.908	0.6389		
Heat Capacity	(Btu/lbmole-F)	10.91	10.91	18.58		
Mass Heat Capacity	(Btu/lb-F)	0.5696	0.5696	1.030		
LHV Vol Basis (Std)	(Btu/lbmole)	3.844e+005	3.844e+005	2.903e-002		
LHV Mass Basis (Std)	(Btu/lb)	2.007e+004	2.007e+004	1.609e-003		
Phase Fraction [Vol. Basis]		1.000	1.000	---		
Phase Fraction [Mass Basis]		1.000	1.000	0.0000		
Partial Pressure of CO2	(psig)	-4.156	---	---		
Cost Based on Flow	(Cost/s)	0.0000	0.0000	0.0000		
Act. Gas Flow	(ACFM)	2074	2074	---		
Avg. Liq. Density	(lbmole/ft3)	1.080	1.080	3.452		
Specific Heat	(Btu/lbmole-F)	10.91	10.91	18.58		
Std. Gas Flow	(MMSCFD)	135.0	135.0	0.0000		
Std. Ideal Liq. Mass Density	(lb/ft3)	20.68	20.68	62.27		
Act. Liq. Flow	(USGPM)	0.0000	---	0.0000		
Z Factor		---	0.8599	3.438e-002		
Watson K		18.38	18.38	8.512		
User Property		---	---	---		
Partial Pressure of H2S	(psig)	-14.70	---	---		
Cp/(Cp - R)		1.222	1.222	1.120		

aspentech

LEGENDS
Burlington, MA
USA

Case Name: FLUJO MAXIMO 270-1100-110.HSC
Unit Set: Field1
Date/Time: Fri Apr 13 12:13:26 2012

Material Stream: A Brazo 1-2 (continued)

Fluid Package: Basis-1
Property Package: Peng Robinson

PROPERTIES

		Overall	Vapour Phase	Aqueous Phase		
Cp/Cv		1.494	1.494	1.133		
Heat of Vap.	(Btu/lbmole)	3799	---	---		
Kinematic Viscosity	(cSt)	0.3161	0.3161	1.441		
Liq. Mass Density (Std. Cond)	(lb/ft3)	---	---	63.38		
Liq. Vol. Flow (Std. Cond)	(barrel/day)	---	---	0.0000		
Liquid Fraction		0.0000	0.0000	1.000		
Molar Volume	(ft3/lbmole)	8.392	8.392	0.3356		
Mass Heat of Vap.	(Btu/lb)	198.3	---	---		
Phase Fraction [Molar Basis]		1.0000	1.0000	0.0000		
Surface Tension	(dyne/cm)	---	---	75.53		
Thermal Conductivity	(Btu/hr-ft-F)	1.858e-002	1.858e-002	0.3344		
Viscosity	(cP)	1.156e-002	1.156e-002	1.241		
Cv (Semi-Ideal)	(Btu/lbmole-F)	8.925	8.925	16.60		
Mass Cv (Semi-Ideal)	(Btu/lb-F)	0.4660	0.4660	0.9199		
Cv	(Btu/lbmole-F)	7.304	7.304	16.41		
Mass Cv	(Btu/lb-F)	0.3813	0.3813	0.9094		
Cv (Ent. Method)	(Btu/lbmole-F)	---	---	---		
Mass Cv (Ent. Method)	(Btu/lb-F)	---	---	---		
Cp/Cv (Ent. Method)		---	---	---		
Reid VP at 37.8 C	(psig)	---	---	---		
True VP at 37.8 C	(psig)	---	---	42.65		
Liq. Vol. Flow - Sum(Std. Cond)	(barrel/day)	0.0000	0.0000	0.0000		
Viscosity Index		-21.13	-21.13	7.855		

COMPOSITION

Overall Phase

Vapour Fraction 1.0000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	83.3423	0.0056	2334.6683	0.0082	198.2471	0.0034
CO2	284.2226	0.0192	12508.5494	0.0440	1037.7553	0.0177
Methane	12470.7719	0.8412	200067.3476	0.7045	45756.3505	0.7796
Ethane	1418.9720	0.0957	42668.3467	0.1503	8214.1185	0.1400
Propane	481.9586	0.0325	21252.9302	0.0748	2872.1362	0.0489
i-Butane	65.0863	0.0044	3783.0757	0.0133	460.9494	0.0079
n-Butane	5.8342	0.0004	339.1096	0.0012	39.8129	0.0007
i-Pentane	10.4358	0.0007	752.9563	0.0027	82.6974	0.0014
n-Pentane	1.6536	0.0001	119.3113	0.0004	12.9732	0.0002
n-Hexane	1.3562	0.0001	116.8756	0.0004	12.0767	0.0002
H2O	1.8732	0.0001	33.7459	0.0001	2.3153	0.0000
Total	14825.5088	1.0000	283976.9165	1.0000	58689.4327	1.0000

Vapour Phase

Phase Fraction 1.000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	83.3423	0.0056	2334.6683	0.0082	198.2471	0.0034
CO2	284.2226	0.0192	12508.5494	0.0440	1037.7553	0.0177
Methane	12470.7719	0.8412	200067.3476	0.7045	45756.3505	0.7796
Ethane	1418.9720	0.0957	42668.3467	0.1503	8214.1185	0.1400
Propane	481.9586	0.0325	21252.9302	0.0748	2872.1362	0.0489
i-Butane	65.0863	0.0044	3783.0757	0.0133	460.9494	0.0079

Material Stream: A Brazo 1-2 (continued)

Fluid Package: Basis-1
Property Package: Peng Robinson

COMPOSITION

Vapour Phase (continued)

Phase Fraction 1.000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
n-Butane	5.8342	0.0004	339.1096	0.0012	39.8129	0.0007
i-Pentane	10.4358	0.0007	752.9563	0.0027	82.6974	0.0014
n-Pentane	1.6536	0.0001	119.3113	0.0004	12.9732	0.0002
n-Hexane	1.3562	0.0001	116.8756	0.0004	12.0767	0.0002
H2O	1.8732	0.0001	33.7459	0.0001	2.3153	0.0000
Total	14825.5068	1.0000	283976.9165	1.0000	58689.4327	1.0000

Aqueous Phase

Phase Fraction 0.0000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0010	0.0000	0.0024	0.0000	0.0029
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.9990	0.0000	0.9975	0.0000	0.9970
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

UNIT OPERATIONS

FEED TO		PRODUCT FROM		LOGICAL CONNECTION
Valve:	PCV-101-3	Tee:	TEE-100-2	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

Material Stream: A Brazo 2-2

Fluid Package: Basis-1
Property Package: Peng Robinson

CONDITIONS

		Overall	Vapour Phase	Aqueous Phase		
Vapour / Phase Fraction		1.0000	1.0000	0.0000		
Temperature:	(F)	40.32	40.32	40.32		
Pressure:	(psig)	535.1	535.1	535.1		
Molar Flow	(MMSCFD)	135.0	135.0	0.0000		
Mass Flow	(lb/hr)	2.840e+005	2.840e+005	0.0000		
Std Ideal Liq Vol Flow	(barrel/day)	5.869e+004	5.869e+004	0.0000		
Molar Enthalpy	(Btu/lbmole)	-3.641e+004	-3.641e+004	-1.238e+005		
Molar Entropy	(Btu/lbmole-F)	36.56	36.56	11.53		
Heat Flow	(Btu/hr)	-5.398e+008	-5.398e+008	0.0000		
Liq Vol Flow @Std Cond	(barrel/day)	---	---	0.0000		

Material Stream: A Brazo 2-2 (continued)

Fluid Package: Basis-1
Property Package: Peng Robinson

PROPERTIES

	Overall	Vapour Phase	Aqueous Phase		
Molecular Weight	19.15	19.15	18.04		
Molar Density (lbmole/ft3)	0.1192	0.1192	2.980		
Mass Density (lb/ft3)	2.282	2.282	53.76		
Act. Volume Flow (barrel/day)	5.318e+005	5.318e+005	0.0000		
Mass Enthalpy (Btu/lb)	-1901	-1901	-8860		
Mass Entropy (Btu/lb-F)	1.908	1.908	0.6389		
Heat Capacity (Btu/lbmole-F)	10.91	10.91	18.58		
Mass Heat Capacity (Btu/lb-F)	0.5696	0.5696	1.030		
LHV Vol Basis (Std) (Btu/lbmole)	3.844e+005	3.844e+005	2.903e-002		
LHV Mass Basis (Std) (Btu/lb)	2.007e+004	2.007e+004	1.609e-003		
Phase Fraction [Vol. Basis]	1.000	1.000	---		
Phase Fraction [Mass Basis]	1.000	1.000	0.0000		
Partial Pressure of CO2 (psig)	-4.156	---	---		
Cost Based on Flow (Cost/s)	0.0000	0.0000	0.0000		
Act. Gas Flow (ACFM)	2074	2074	---		
Avg. Liq. Density (lbmole/ft3)	1.080	1.080	3.452		
Specific Heat (Btu/lbmole-F)	10.91	10.91	18.58		
Std. Gas Flow (MMSCFD)	135.0	135.0	0.0000		
Std. Ideal Liq. Mass Density (lb/ft3)	20.68	20.68	62.27		
Act. Liq. Flow (USGPM)	0.0000	---	0.0000		
Z Factor	---	0.8599	3.438e-002		
Watson K	18.38	18.38	8.512		
User Property	---	---	---		
Partial Pressure of H2S (psig)	-14.70	---	---		
Cp/(Cp - R)	1.222	1.222	1.120		
Cp/Cv	1.494	1.494	1.133		
Heat of Vap. (Btu/lbmole)	3799	---	---		
Kinematic Viscosity (cSt)	0.3161	0.3161	1.441		
Liq. Mass Density (Std. Cond) (lb/ft3)	---	---	63.38		
Liq. Vol. Flow (Std. Cond) (barrel/day)	---	---	0.0000		
Liquid Fraction	0.0000	0.0000	1.000		
Molar Volume (ft3/lbmole)	8.392	8.392	0.3356		
Mass Heat of Vap. (Btu/lb)	198.3	---	---		
Phase Fraction [Molar Basis]	1.0000	1.0000	0.0000		
Surface Tension (dyne/cm)	---	---	75.53		
Thermal Conductivity (Btu/hr-ft-F)	1.858e-002	1.858e-002	0.3344		
Viscosity (cP)	1.156e-002	1.156e-002	1.241		
Cv (Semi-Ideal) (Btu/lbmole-F)	8.925	8.925	16.60		
Mass Cv (Semi-Ideal) (Btu/lb-F)	0.4660	0.4660	0.9199		
Cv (Btu/lbmole-F)	7.304	7.304	16.41		
Mass Cv (Btu/lb-F)	0.3813	0.3813	0.9094		
Cv (Ent. Method) (Btu/lbmole-F)	---	---	---		
Mass Cv (Ent. Method) (Btu/lb-F)	---	---	---		
Cp/Cv (Ent. Method)	---	---	---		
Reid VP at 37.8 C (psig)	---	---	---		
True VP at 37.8 C (psig)	---	---	42.65		
Liq. Vol. Flow - Sum(Std. Cond) (barrel/day)	0.0000	0.0000	0.0000		
Viscosity Index	-21.13	-21.13	7.855		

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LEGENDS
Burlington, MA
USA

Case Name: FLUJO MAXIMO 270-1100-110.HSC
Unit Set: Field1
Date/Time: Fri Apr 13 12:13:26 2012

Material Stream: A Brazo 2-2 (continued)

Fluid Package: Basis-1
Property Package: Peng Robinson

COMPOSITION

Overall Phase

Vapour Fraction 1.0000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	83.3423	0.0056	2334.6683	0.0082	198.2471	0.0034
CO2	284.2226	0.0192	12508.5494	0.0440	1037.7553	0.0177
Methane	12470.7719	0.8412	200067.3476	0.7045	45756.3505	0.7796
Ethane	1418.9720	0.0957	42668.3467	0.1503	8214.1185	0.1400
Propane	481.9586	0.0325	21252.9302	0.0748	2872.1362	0.0489
i-Butane	65.0863	0.0044	3783.0757	0.0133	460.9494	0.0079
n-Butane	5.8342	0.0004	339.1096	0.0012	39.8129	0.0007
i-Pentane	10.4358	0.0007	752.9563	0.0027	82.6974	0.0014
n-Pentane	1.6536	0.0001	119.3113	0.0004	12.9732	0.0002
n-Hexane	1.3562	0.0001	116.8756	0.0004	12.0767	0.0002
H2O	1.8732	0.0001	33.7459	0.0001	2.3153	0.0000
Total	14825.5068	1.0000	283976.9165	1.0000	58689.4327	1.0000

Vapour Phase

Phase Fraction 1.000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	83.3423	0.0056	2334.6683	0.0082	198.2471	0.0034
CO2	284.2226	0.0192	12508.5494	0.0440	1037.7553	0.0177
Methane	12470.7719	0.8412	200067.3476	0.7045	45756.3505	0.7796
Ethane	1418.9720	0.0957	42668.3467	0.1503	8214.1185	0.1400
Propane	481.9586	0.0325	21252.9302	0.0748	2872.1362	0.0489
i-Butane	65.0863	0.0044	3783.0757	0.0133	460.9494	0.0079
n-Butane	5.8342	0.0004	339.1096	0.0012	39.8129	0.0007
i-Pentane	10.4358	0.0007	752.9563	0.0027	82.6974	0.0014
n-Pentane	1.6536	0.0001	119.3113	0.0004	12.9732	0.0002
n-Hexane	1.3562	0.0001	116.8756	0.0004	12.0767	0.0002
H2O	1.8732	0.0001	33.7459	0.0001	2.3153	0.0000
Total	14825.5068	1.0000	283976.9165	1.0000	58689.4327	1.0000

Aqueous Phase

Phase Fraction 0.0000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0010	0.0000	0.0024	0.0000	0.0029
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.9990	0.0000	0.9975	0.0000	0.9970
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Valve: PCV-101-2-2	Tee: TEE-100-2	

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LEGENDS
Burlington, MA
USA

Case Name: FLUJO MAXIMO 270-1100-110.HSC

Unit Set: Field1

Date/Time: Fri Apr 13 12:13:26 2012

Material Stream: A Brazo 2-2 (continued)

Fluid Package: Basis-1

Property Package: Peng Robinson

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

Material Stream: A Calentador-2

Fluid Package: Basis-1

Property Package: Peng Robinson

CONDITIONS

		Overall	Vapour Phase			
Vapour / Phase Fraction		1.0000	1.0000			
Temperature:	(F)	37.48	37.48			
Pressure:	(psig)	500.0	500.0			
Molar Flow	(MMSCFD)	270.0	270.0			
Mass Flow	(lb/hr)	5.680e+005	5.680e+005			
Std Ideal Liq Vol Flow	(barrel/day)	1.174e+005	1.174e+005			
Molar Enthalpy	(Btu/lbmole)	-3.641e+004	-3.641e+004			
Molar Entropy	(Btu/lbmole-F)	36.67	36.67			
Heat Flow	(Btu/hr)	-1.080e+009	-1.080e+009			
Liq Vol Flow @Std Cond	(barrel/day)	---	---			

PROPERTIES

		Overall	Vapour Phase			
Molecular Weight		19.15	19.15			
Molar Density	(lbmole/ft3)	0.1114	0.1114			
Mass Density	(lb/ft3)	2.134	2.134			
Act. Volume Flow	(barrel/day)	1.138e+006	1.138e+006			
Mass Enthalpy	(Btu/lb)	-1901	-1901			
Mass Entropy	(Btu/lb-F)	1.914	1.914			
Heat Capacity	(Btu/lbmole-F)	10.78	10.78			
Mass Heat Capacity	(Btu/lb-F)	0.5627	0.5627			
LHV Vol Basis (Std)	(Btu/lbmole)	3.844e+005	3.844e+005			
LHV Mass Basis (Std)	(Btu/lb)	2.007e+004	2.007e+004			
Phase Fraction [Vol. Basis]		1.000	1.000			
Phase Fraction [Mass Basis]		1.000	1.000			
Partial Pressure of CO2	(psig)	-4.829	---			
Cost Based on Flow	(Cost/s)	0.0000	0.0000			
Act. Gas Flow	(ACFM)	4436	4436			
Avg. Liq. Density	(lbmole/ft3)	1.080	1.080			
Specific Heat	(Btu/lbmole-F)	10.78	10.78			
Std. Gas Flow	(MMSCFD)	270.0	270.0			
Std. Ideal Liq. Mass Density	(lb/ft3)	20.68	20.68			
Act. Liq. Flow	(USGPM)	---	---			
Z Factor		0.8660	0.8660			
Watson K		18.38	18.38			
User Property		---	---			
Partial Pressure of H2S	(psig)	-14.70	---			
Cp/(Cp - R)		1.226	1.226			
Cp/Cv		1.481	1.481			
Heat of Vap.	(Btu/lbmole)	3910	---			
Kinematic Viscosity	(cSt)	0.3340	0.3340			
Liq. Mass Density (Std. Cond)	(lb/ft3)	---	---			

Material Stream: A Calentador-2 (continued)

Fluid Package: Basis-1
Property Package: Peng Robinson

PROPERTIES

		Overall	Vapour Phase
Liq. Vol. Flow (Std. Cond)	(barrel/day)	---	---
Liquid Fraction		0.0000	0.0000
Molar Volume	(ft3/lbmole)	8.976	8.976
Mass Heat of Vap.	(Btu/lb)	204.1	---
Phase Fraction [Molar Basis]		1.0000	1.0000
Surface Tension	(dyne/cm)	---	---
Thermal Conductivity	(Btu/hr-ft-F)	1.830e-002	1.830e-002
Viscosity	(cP)	1.142e-002	1.142e-002
Cv (Semi-Ideal)	(Btu/lbmole-F)	8.792	8.792
Mass Cv (Semi-Ideal)	(Btu/lb-F)	0.4590	0.4590
Cv	(Btu/lbmole-F)	7.277	7.277
Mass Cv	(Btu/lb-F)	0.3799	0.3799
Cv (Ent. Method)	(Btu/lbmole-F)	---	---
Mass Cv (Ent. Method)	(Btu/lb-F)	---	---
Cp/Cv (Ent. Method)		---	---
Reid VP at 37.8 C	(psig)	---	---
True VP at 37.8 C	(psig)	---	---
Liq. Vol. Flow - Sum(Std. Cond)	(barrel/day)	0.0000	0.0000
Viscosity Index		-19.16	-19.16

COMPOSITION

Overall Phase

Vapour Fraction 1.0000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	166.6846	0.0056	4669.3365	0.0082	396.4943	0.0034
CO2	568.4451	0.0192	25017.0989	0.0440	2075.5106	0.0177
Methane	24941.5438	0.8412	400134.6951	0.7045	91512.7011	0.7796
Ethane	2837.9440	0.0957	85336.6934	0.1503	16428.2370	0.1400
Propane	963.9173	0.0325	42505.8603	0.0748	5744.2725	0.0489
i-Butane	130.1726	0.0044	7566.1514	0.0133	921.8988	0.0079
n-Butane	11.6685	0.0004	678.2193	0.0012	79.6258	0.0007
i-Pentane	20.8717	0.0007	1505.9126	0.0027	165.3948	0.0014
n-Pentane	3.3073	0.0001	238.6227	0.0004	25.9463	0.0002
n-Hexane	2.7124	0.0001	233.7511	0.0004	24.1534	0.0002
H2O	3.7464	0.0001	67.4918	0.0001	4.6307	0.0000
Total	29651.0136	1.0000	567953.8331	1.0000	117378.8653	1.0000

Vapour Phase

Phase Fraction 1.000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	166.6846	0.0056	4669.3365	0.0082	396.4943	0.0034
CO2	568.4451	0.0192	25017.0989	0.0440	2075.5106	0.0177
Methane	24941.5438	0.8412	400134.6951	0.7045	91512.7011	0.7796
Ethane	2837.9440	0.0957	85336.6934	0.1503	16428.2370	0.1400
Propane	963.9173	0.0325	42505.8603	0.0748	5744.2725	0.0489
i-Butane	130.1726	0.0044	7566.1514	0.0133	921.8988	0.0079
n-Butane	11.6685	0.0004	678.2193	0.0012	79.6258	0.0007
i-Pentane	20.8717	0.0007	1505.9126	0.0027	165.3948	0.0014
n-Pentane	3.3073	0.0001	238.6227	0.0004	25.9463	0.0002
n-Hexane	2.7124	0.0001	233.7511	0.0004	24.1534	0.0002

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LEGENDS
Burlington, MA
USA

Case Name: FLUJO MAXIMO 270-1100-110.HSC

Unit Set: Field1

Date/Time: Fri Apr 13 12:13:26 2012

Material Stream: A Calentador-2 (continued)

Fluid Package: Basis-1

Property Package: Peng Robinson

COMPOSITION

Vapour Phase (continued) Phase Fraction 1.000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
H2O	3.7464	0.0001	67.4918	0.0001	4.6307	0.0000
Total	29651.0136	1.0000	567953.8331	1.0000	117378.8653	1.0000

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Heater: E-101-2	Mixer: MIX-101-2	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

Material Stream: A Succión-1-2

Fluid Package: Basis-1

Property Package: Peng Robinson

CONDITIONS

		Overall	Vapour Phase			
Vapour / Phase Fraction		1.0000	1.0000			
Temperature:	(F)	30.45	30.45			
Pressure:	(psig)	332.5	332.5			
Molar Flow	(MMSCFD)	270.0	270.0			
Mass Flow	(lb/hr)	5.680e+005	5.680e+005			
Std Ideal Liq Vol Flow	(barrel/day)	1.174e+005	1.174e+005			
Molar Enthalpy	(Btu/lbmole)	-3.634e+004	-3.634e+004			
Molar Entropy	(Btu/lbmole-F)	37.51	37.51			
Heat Flow	(Btu/hr)	-1.077e+009	-1.077e+009			
Liq Vol Flow @Std Cond	(barrel/day)	---	---			

PROPERTIES

		Overall	Vapour Phase			
Molecular Weight		19.15	19.15			
Molar Density	(lbmole/ft3)	7.296e-002	7.296e-002			
Mass Density	(lb/ft3)	1.398	1.398			
Act. Volume Flow	(barrel/day)	1.737e+006	1.737e+006			
Mass Enthalpy	(Btu/lb)	-1897	-1897			
Mass Entropy	(Btu/lb-F)	1.958	1.958			
Heat Capacity	(Btu/lbmole-F)	10.12	10.12			
Mass Heat Capacity	(Btu/lb-F)	0.5285	0.5285			
LHV Vol Basis (Std)	(Btu/lbmole)	3.844e+005	3.844e+005			
LHV Mass Basis (Std)	(Btu/lb)	2.007e+004	2.007e+004			
Phase Fraction [Vol. Basis]		1.000	1.000			
Phase Fraction [Mass Basis]		1.000	1.000			
Partial Pressure of CO2	(psig)	-8.039	---			
Cost Based on Flow	(Cost/s)	0.0000	0.0000			
Act. Gas Flow	(ACFM)	6773	6773			
Avg. Liq. Density	(lbmole/ft3)	1.080	1.080			
Specific Heat	(Btu/lbmole-F)	10.12	10.12			

Material Stream: A Succión-1-2 (continued)

Fluid Package: Basis-1
Property Package: Peng Robinson

PROPERTIES

		Overall	Vapour Phase			
Std. Gas Flow	(MMSCFD)	270.0	270.0			
Std. Ideal Liq. Mass Density	(lb/ft3)	20.68	20.68			
Act. Liq. Flow	(USGPM)	---	---			
Z Factor		0.9048	0.9048			
Watson K		18.38	18.38			
User Property		---	---			
Partial Pressure of H2S	(psig)	-14.70	---			
Cp/(Cp - R)		1.244	1.244			
Cp/Cv		1.409	1.409			
Heat of Vap.	(Btu/lbmole)	4445	---			
Kinematic Viscosity	(cSt)	0.4864	0.4864			
Liq. Mass Density (Std. Cond)	(lb/ft3)	---	---			
Liq. Vol. Flow (Std. Cond)	(barrel/day)	---	---			
Liquid Fraction		0.0000	0.0000			
Molar Volume	(ft3/lbmole)	13.71	13.71			
Mass Heat of Vap.	(Btu/lb)	232.1	---			
Phase Fraction [Molar Basis]		1.0000	1.0000			
Surface Tension	(dyne/cm)	---	---			
Thermal Conductivity	(Btu/hr-ft-F)	1.723e-002	1.723e-002			
Viscosity	(cP)	1.089e-002	1.089e-002			
Cv (Semi-Ideal)	(Btu/lbmole-F)	8.138	8.138			
Mass Cv (Semi-Ideal)	(Btu/lb-F)	0.4249	0.4249			
Cv	(Btu/lbmole-F)	7.183	7.183			
Mass Cv	(Btu/lb-F)	0.3750	0.3750			
Cv (Ent. Method)	(Btu/lbmole-F)	---	---			
Mass Cv (Ent. Method)	(Btu/lb-F)	---	---			
Cp/Cv (Ent. Method)		---	---			
Reid VP at 37.8 C	(psig)	---	---			
True VP at 37.8 C	(psig)	---	---			
Liq. Vol. Flow - Sum(Std. Cond)	(barrel/day)	0.0000	0.0000			
Viscosity Index		-9.069	-9.069			

COMPOSITION

Overall Phase

Vapour Fraction 1.0000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	166.6846	0.0056	4669.3365	0.0082	396.4943	0.0034
CO2	568.4451	0.0192	25017.0989	0.0440	2075.5106	0.0177
Methane	24941.5438	0.8412	400134.6951	0.7045	91512.7011	0.7796
Ethane	2837.9440	0.0957	85336.6934	0.1503	16428.2370	0.1400
Propane	963.9173	0.0325	42505.8603	0.0748	5744.2725	0.0489
i-Butane	130.1726	0.0044	7566.1514	0.0133	921.8988	0.0079
n-Butane	11.6685	0.0004	678.2193	0.0012	79.6258	0.0007
i-Pentane	20.8717	0.0007	1505.9126	0.0027	165.3948	0.0014
n-Pentane	3.3073	0.0001	238.6227	0.0004	25.9463	0.0002
n-Hexane	2.7124	0.0001	233.7511	0.0004	24.1534	0.0002
H2O	3.7464	0.0001	67.4918	0.0001	4.6307	0.0000
Total	29651.0136	1.0000	567953.8331	1.0000	117378.8653	1.0000

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LEGENDS
Burlington, MA
USA

Case Name: FLUJO MAXIMO 270-1100-110.HSC
Unit Set: Field1
Date/Time: Fri Apr 13 12:13:26 2012

Material Stream: A Succión-1-2 (continued)

Fluid Package: Basis-1
Property Package: Peng Robinson

COMPOSITION

Vapour Phase

Phase Fraction 1.000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	166.6846	0.0056	4669.3365	0.0082	396.4943	0.0034
CO2	568.4451	0.0192	25017.0989	0.0440	2075.5106	0.0177
Methane	24941.5438	0.8412	400134.6951	0.7045	91512.7011	0.7796
Ethane	2837.9440	0.0957	85336.6934	0.1503	16428.2370	0.1400
Propane	963.9173	0.0325	42505.8603	0.0748	5744.2725	0.0489
i-Butane	130.1726	0.0044	7566.1514	0.0133	921.8988	0.0079
n-Butane	11.6685	0.0004	678.2193	0.0012	79.6258	0.0007
i-Pentane	20.8717	0.0007	1505.9126	0.0027	165.3948	0.0014
n-Pentane	3.3073	0.0001	238.6227	0.0004	25.9463	0.0002
n-Hexane	2.7124	0.0001	233.7511	0.0004	24.1534	0.0002
H2O	3.7464	0.0001	67.4918	0.0001	4.6307	0.0000
Total	29651.0136	1.0000	567953.8331	1.0000	117378.8653	1.0000

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Compressor: MOPICO-01	Valve: VLV-A Succión-2	

UTILITIES

Envelope Utility: Envelope Utility-2

PROCESS UTILITY

Material Stream: Puente Guillermo-2

Fluid Package: Basis-1
Property Package: Peng Robinson

CONDITIONS

		Overall	Vapour Phase			
Vapour / Phase Fraction		1.0000	1.0000			
Temperature:	(F)	110.0 *	110.0			
Pressure:	(psig)	1100 *	1100			
Molar Flow	(MMSCFD)	270.0 *	270.0			
Mass Flow	(lb/hr)	5.680e+005	5.680e+005			
Std Ideal Liq Vol Flow	(barrel/day)	1.174e+005	1.174e+005			
Molar Enthalpy	(Btu/lbmole)	-3.603e+004	-3.603e+004			
Molar Entropy	(Btu/lbmole-F)	36.09	36.09			
Heat Flow	(Btu/hr)	-1.068e+009	-1.068e+009			
Liq Vol Flow @Std Cond	(barrel/day)	---	---			

PROPERTIES

		Overall	Vapour Phase			
Molecular Weight		19.15	19.15			
Molar Density	(lbmole/ft3)	0.2179	0.2179			
Mass Density	(lb/ft3)	4.174	4.174			
Act. Volume Flow	(barrel/day)	5.816e+005	5.816e+005			
Mass Enthalpy	(Btu/lb)	-1881	-1881			
Mass Entropy	(Btu/lb-F)	1.884	1.884			
Heat Capacity	(Btu/lbmole-F)	12.28	12.28			

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LEGENDS
Burlington, MA
USA

Case Name: FLUJO MAXIMO 270-1100-110.HSC
Unit Set: Field1
Date/Time: Fri Apr 13 12:13:26 2012

Material Stream: Puente Guillermo-2 (continu

Fluid Package: Basis-1
Property Package: Peng Robinson

PROPERTIES

		Overall	Vapour Phase			
Mass Heat Capacity	(Btu/lb-F)	0.6409	0.6409			
LHV Vol Basis (Std)	(Btu/lbmole)	3.844e+005	3.844e+005			
LHV Mass Basis (Std)	(Btu/lb)	2.007e+004	2.007e+004			
Phase Fraction [Vol. Basis]		1.000	1.000			
Phase Fraction [Mass Basis]		1.000	1.000			
Partial Pressure of CO2	(psig)	6.674	---			
Cost Based on Flow	(Cost/s)	0.0000	0.0000			
Act. Gas Flow	(ACFM)	2268	2268			
Avg. Liq. Density	(lbmole/ft3)	1.080	1.080			
Specific Heat	(Btu/lbmole-F)	12.28	12.28			
Std. Gas Flow	(MMSCFD)	270.0	270.0			
Std. Ideal Liq. Mass Density	(lb/ft3)	20.68	20.68			
Act. Liq. Flow	(USGPM)	---	---			
Z Factor		0.8367	0.8367			
Watson K		18.38	18.38			
User Property		---	---			
Partial Pressure of H2S	(psig)	-14.70	---			
Cp/(Cp - R)		1.193	1.193			
Cp/Cv		1.558	1.558			
Heat of Vap.	(Btu/lbmole)	2227	---			
Kinematic Viscosity	(cSt)	0.2116	0.2116			
Liq. Mass Density (Std. Cond)	(lb/ft3)	---	---			
Liq. Vol. Flow (Std. Cond)	(barrel/day)	---	---			
Liquid Fraction		0.0000	0.0000			
Molar Volume	(ft3/lbmole)	4.589	4.589			
Mass Heat of Vap.	(Btu/lb)	116.3	---			
Phase Fraction [Molar Basis]		1.0000	1.0000			
Surface Tension	(dyne/cm)	---	---			
Thermal Conductivity	(Btu/hr-ft-F)	2.382e-002	2.382e-002			
Viscosity	(cP)	1.415e-002	1.415e-002			
Cv (Semi-Ideal)	(Btu/lbmole-F)	10.29	10.29			
Mass Cv (Semi-Ideal)	(Btu/lb-F)	0.5372	0.5372			
Cv	(Btu/lbmole-F)	7.879	7.879			
Mass Cv	(Btu/lb-F)	0.4113	0.4113			
Cv (Ent. Method)	(Btu/lbmole-F)	---	---			
Mass Cv (Ent. Method)	(Btu/lb-F)	---	---			
Cp/Cv (Ent. Method)		---	---			
Reid VP at 37.8 C	(psig)	---	---			
True VP at 37.8 C	(psig)	---	---			
Liq. Vol. Flow - Sum(Std. Cond)	(barrel/day)	0.0000	0.0000			
Viscosity Index		-53.90	-53.90			

COMPOSITION

Overall Phase Vapour Fraction 1.0000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	166.6846 *	0.0056 *	4669.3365 *	0.0082 *	396.4943 *	0.0034 *
CO2	568.4451 *	0.0192 *	25017.0989 *	0.0440 *	2075.5106 *	0.0177 *
Methane	24941.5438 *	0.8412 *	400134.6951 *	0.7045 *	91512.7011 *	0.7796 *
Ethane	2837.9440 *	0.0957 *	85336.6934 *	0.1503 *	16428.2370 *	0.1400 *

Material Stream: Puente Guillermo-2 (continu

Fluid Package: Basis-1
Property Package: Peng Robinson

COMPOSITION

Overall Phase (continued)

Vapour Fraction 1.0000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Propane	963.9173 *	0.0325 *	42505.8603 *	0.0748 *	5744.2725 *	0.0489 *
i-Butane	130.1726 *	0.0044 *	7566.1514 *	0.0133 *	921.8988 *	0.0079 *
n-Butane	11.6685 *	0.0004 *	678.2193 *	0.0012 *	79.6258 *	0.0007 *
i-Pentane	20.8717 *	0.0007 *	1505.9126 *	0.0027 *	185.3948 *	0.0014 *
n-Pentane	3.3073 *	0.0001 *	238.6227 *	0.0004 *	25.9463 *	0.0002 *
n-Hexane	2.7124 *	0.0001 *	233.7511 *	0.0004 *	24.1534 *	0.0002 *
H2O	3.7464 *	0.0001 *	67.4918 *	0.0001 *	4.6307 *	0.0000 *
Total	29651.0136	1.0000	567953.8331	1.0000	117378.8653	1.0000

Vapour Phase

Phase Fraction 1.000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	166.6846	0.0056	4669.3365	0.0082	396.4943	0.0034
CO2	568.4451	0.0192	25017.0989	0.0440	2075.5106	0.0177
Methane	24941.5438	0.8412	400134.6951	0.7045	91512.7011	0.7796
Ethane	2837.9440	0.0957	85336.6934	0.1503	16428.2370	0.1400
Propane	963.9173	0.0325	42505.8603	0.0748	5744.2725	0.0489
i-Butane	130.1726	0.0044	7566.1514	0.0133	921.8988	0.0079
n-Butane	11.6685	0.0004	678.2193	0.0012	79.6258	0.0007
i-Pentane	20.8717	0.0007	1505.9126	0.0027	185.3948	0.0014
n-Pentane	3.3073	0.0001	238.6227	0.0004	25.9463	0.0002
n-Hexane	2.7124	0.0001	233.7511	0.0004	24.1534	0.0002
H2O	3.7464	0.0001	67.4918	0.0001	4.6307	0.0000
Total	29651.0136	1.0000	567953.8331	1.0000	117378.8653	1.0000

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Valve: VLV-Puente Guillermo-2		

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

Material Stream: A Cooler

Fluid Package: Basis-1
Property Package: Peng Robinson

CONDITIONS

		Overall	Vapour Phase			
Vapour / Phase Fraction		1.0000	1.0000			
Temperature:	(F)	89.52	89.52			
Pressure:	(psig)	500.0 *	500.0			
Molar Flow	(MMSCFD)	270.0	270.0			
Mass Flow	(lb/hr)	5.680e+005	5.680e+005			
Std Ideal Liq Vol Flow	(barrel/day)	1.174e+005	1.174e+005			
Molar Enthalpy	(Btu/lbmole)	-3.586e+004	-3.586e+004			
Molar Entropy	(Btu/lbmole-F)	37.73	37.73			

aspentech

LEGENDS
Burlington, MA
USA

Case Name: FLUJO MAXIMO 270-1100-110.HSC

Unit Set: Field1

Date/Time: Fri Apr 13 12:13:26 2012

Material Stream: A Cooler (continued)

Fluid Package: Basis-1

Property Package: Peng Robinson

CONDITIONS

		Overall	Vapour Phase			
Heat Flow	(Btu/hr)	-1.063e+009	-1.063e+009			
Liq Vol Flow @Std Cond	(barrel/day)	---	---			

PROPERTIES

		Overall	Vapour Phase			
Molecular Weight		19.15	19.15			
Molar Density	(lbmole/ft3)	9.650e-002	9.650e-002			
Mass Density	(lb/ft3)	1.848	1.848			
Act. Volume Flow	(barrel/day)	1.313e+006	1.313e+006			
Mass Enthalpy	(Btu/lb)	-1872	-1872			
Mass Entropy	(Btu/lb-F)	1.970	1.970			
Heat Capacity	(Btu/lbmole-F)	10.65	10.65			
Mass Heat Capacity	(Btu/lb-F)	0.5560	0.5560			
LHV Vol Basis (Std)	(Btu/lbmole)	3.844e+005	3.844e+005			
LHV Mass Basis (Std)	(Btu/lb)	2.007e+004	2.007e+004			
Phase Fraction [Vol. Basis]		1.000	1.000			
Phase Fraction [Mass Basis]		1.000	1.000			
Partial Pressure of CO2	(psig)	-4.829	---			
Cost Based on Flow	(Cost/s)	0.0000	0.0000			
Act. Gas Flow	(ACFM)	5121	5121			
Avg. Liq. Density	(lbmole/ft3)	1.080	1.080			
Specific Heat	(Btu/lbmole-F)	10.65	10.65			
Std. Gas Flow	(MMSCFD)	270.0	270.0			
Std. Ideal Liq. Mass Density	(lb/ft3)	20.68	20.68			
Act. Liq. Flow	(USGPM)	---	---			
Z Factor		0.9050	0.9050			
Watson K		18.38	18.38			
User Property		---	---			
Partial Pressure of H2S	(psig)	-14.70	---			
Cp/(Cp - R)		1.229	1.229			
Cp/Cv		1.402	1.402			
Heat of Vap.	(Btu/lbmole)	3910	---			
Kinematic Viscosity	(cSt)	0.4146	0.4146			
Liq. Mass Density (Std. Cond)	(lb/ft3)	---	---			
Liq. Vol. Flow (Std. Cond)	(barrel/day)	---	---			
Liquid Fraction		0.0000	0.0000			
Molar Volume	(ft3/lbmole)	10.36	10.36			
Mass Heat of Vap.	(Btu/lb)	204.1	---			
Phase Fraction [Molar Basis]		1.0000	1.0000			
Surface Tension	(dyne/cm)	---	---			
Thermal Conductivity	(Btu/hr-ft-F)	2.030e-002	2.030e-002			
Viscosity	(cP)	1.228e-002	1.228e-002			
Cv (Semi-Ideal)	(Btu/lbmole-F)	8.663	8.663			
Mass Cv (Semi-Ideal)	(Btu/lb-F)	0.4523	0.4523			
Cv	(Btu/lbmole-F)	7.594	7.594			
Mass Cv	(Btu/lb-F)	0.3965	0.3965			
Cv (Ent. Method)	(Btu/lbmole-F)	---	---			
Mass Cv (Ent. Method)	(Btu/lb-F)	---	---			
Cp/Cv (Ent. Method)		---	---			
Reid VP at 37.8 C	(psig)	---	---			
True VP at 37.8 C	(psig)	---	---			

Material Stream: A Cooler (continued)

Fluid Package: Basis-1
Property Package: Peng Robinson

PROPERTIES

	Overall	Vapour Phase			
Liq. Vol. Flow - Sum(Std. Cond) (barrel/day)	0.0000	0.0000			
Viscosity Index	-12.83	-12.83			

COMPOSITION

Overall Phase

Vapour Fraction 1.0000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	166.6846	0.0056	4669.3365	0.0082	396.4943	0.0034
CO2	568.4451	0.0192	25017.0989	0.0440	2075.5106	0.0177
Methane	24941.5438	0.8412	400134.6951	0.7045	91512.7011	0.7796
Ethane	2837.9440	0.0957	85336.6934	0.1503	16428.2370	0.1400
Propane	963.9173	0.0325	42505.8603	0.0748	5744.2725	0.0489
i-Butane	130.1726	0.0044	7566.1514	0.0133	921.8988	0.0079
n-Butane	11.6685	0.0004	678.2193	0.0012	79.6258	0.0007
i-Pentane	20.8717	0.0007	1505.9126	0.0027	165.3948	0.0014
n-Pentane	3.3073	0.0001	238.6227	0.0004	25.9463	0.0002
n-Hexane	2.7124	0.0001	233.7511	0.0004	24.1534	0.0002
H2O	3.7464	0.0001	67.4918	0.0001	4.6307	0.0000
Total	29651.0136	1.0000	567953.8331	1.0000	117378.8653	1.0000

Vapour Phase

Phase Fraction 1.000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	166.6846	0.0056	4669.3365	0.0082	396.4943	0.0034
CO2	568.4451	0.0192	25017.0989	0.0440	2075.5106	0.0177
Methane	24941.5438	0.8412	400134.6951	0.7045	91512.7011	0.7796
Ethane	2837.9440	0.0957	85336.6934	0.1503	16428.2370	0.1400
Propane	963.9173	0.0325	42505.8603	0.0748	5744.2725	0.0489
i-Butane	130.1726	0.0044	7566.1514	0.0133	921.8988	0.0079
n-Butane	11.6685	0.0004	678.2193	0.0012	79.6258	0.0007
i-Pentane	20.8717	0.0007	1505.9126	0.0027	165.3948	0.0014
n-Pentane	3.3073	0.0001	238.6227	0.0004	25.9463	0.0002
n-Hexane	2.7124	0.0001	233.7511	0.0004	24.1534	0.0002
H2O	3.7464	0.0001	67.4918	0.0001	4.6307	0.0000
Total	29651.0136	1.0000	567953.8331	1.0000	117378.8653	1.0000

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Cooler: E-102	Compressor: MOPICO-01	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

aspentech	LEGENDS Burlington, MA USA	Case Name:	FLUJO MAXIMO 270-1100-110.HSC
		Unit Set:	Field1
		Date/Time:	Fri Apr 13 12:13:26 2012

Material Stream: A Descarga

Fluid Package: Basis-1

Property Package: Peng Robinson

CONDITIONS

		Overall	Vapour Phase			
Vapour / Phase Fraction		1.0000	1.0000			
Temperature:	(F)	120.0 *	120.0			
Pressure:	(psig)	497.0	497.0			
Molar Flow	(MMSCFD)	270.0	270.0			
Mass Flow	(lb/hr)	5.680e+005	5.680e+005			
Std Ideal Liq Vol Flow	(barrel/day)	1.174e+005	1.174e+005			
Molar Enthalpy	(Btu/lbmole)	-3.553e+004	-3.553e+004			
Molar Entropy	(Btu/lbmole-F)	38.32	38.32			
Heat Flow	(Btu/hr)	-1.054e+009	-1.054e+009			
Liq Vol Flow @Std Cond	(barrel/day)	---	---			

PROPERTIES

		Overall	Vapour Phase			
Molecular Weight		19.15	19.15			
Molar Density	(lbmole/ft3)	8.922e-002	8.922e-002			
Mass Density	(lb/ft3)	1.709	1.709			
Act. Volume Flow	(barrel/day)	1.421e+006	1.421e+006			
Mass Enthalpy	(Btu/lb)	-1855	-1855			
Mass Entropy	(Btu/lb-F)	2.001	2.001			
Heat Capacity	(Btu/lbmole-F)	10.68	10.68			
Mass Heat Capacity	(Btu/lb-F)	0.5575	0.5575			
LHV Vol Basis (Std)	(Btu/lbmole)	3.844e+005	3.844e+005			
LHV Mass Basis (Std)	(Btu/lb)	2.007e+004	2.007e+004			
Phase Fraction [Vol. Basis]		1.000	1.000			
Phase Fraction [Mass Basis]		1.000	1.000			
Partial Pressure of CO2	(psig)	-4.886	---			
Cost Based on Flow	(Cost/s)	0.0000	0.0000			
Act. Gas Flow	(ACFM)	5539	5539			
Avg. Liq. Density	(lbmole/ft3)	1.080	1.080			
Specific Heat	(Btu/lbmole-F)	10.68	10.68			
Std. Gas Flow	(MMSCFD)	270.0	270.0			
Std. Ideal Liq. Mass Density	(lb/ft3)	20.68	20.68			
Act. Liq. Flow	(USGPM)	---	---			
Z Factor		0.9219	0.9219			
Watson K		18.38	18.38			
User Property		---	---			
Partial Pressure of H2S	(psig)	-14.70	---			
Cp/(Cp - R)		1.228	1.228			
Cp/Cv		1.369	1.369			
Heat of Vap.	(Btu/lbmole)	3919	---			
Kinematic Viscosity	(cSt)	0.4667	0.4667			
Liq. Mass Density (Std. Cond)	(lb/ft3)	---	---			
Liq. Vol. Flow (Std. Cond)	(barrel/day)	---	---			
Liquid Fraction		0.0000	0.0000			
Molar Volume	(ft3/lbmole)	11.21	11.21			
Mass Heat of Vap.	(Btu/lb)	204.6	---			
Phase Fraction [Molar Basis]		1.0000	1.0000			
Surface Tension	(dyne/cm)	---	---			
Thermal Conductivity	(Btu/hr-ft-F)	2.154e-002	2.154e-002			
Viscosity	(cP)	1.278e-002	1.278e-002			
Cv (Semi-Ideal)	(Btu/lbmole-F)	8.693	8.693			

* Specified by user.

aspentech

LEGENDS
Burlington, MA
USA

Case Name: FLUJO MAXIMO 270-1100-110.HSC
Unit Set: Field1
Date/Time: Fri Apr 13 12:13:26 2012

Material Stream: A Descarga (continued)

Fluid Package: Basis-1
Property Package: Peng Robinson

PROPERTIES

		Overall	Vapour Phase			
Mass Cv (Semi-Ideal)	(Btu/lb-F)	0.4538	0.4538			
Cv	(Btu/lbmole-F)	7.799	7.799			
Mass Cv	(Btu/lb-F)	0.4071	0.4071			
Cv (Ent. Method)	(Btu/lbmole-F)	---	---			
Mass Cv (Ent. Method)	(Btu/lb-F)	---	---			
Cp/Cv (Ent. Method)		---	---			
Reid VP at 37.8 C	(psig)	---	---			
True VP at 37.8 C	(psig)	---	---			
Liq. Vol. Flow - Sum(Std. Cond)	(barrel/day)	0.0000	0.0000			
Viscosity Index		-9.986	-9.986			

COMPOSITION

Overall Phase

Vapour Fraction 1.0000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	166.6846	0.0056	4669.3365	0.0082	396.4943	0.0034
CO2	568.4451	0.0192	25017.0989	0.0440	2075.5106	0.0177
Methane	24941.5438	0.8412	400134.6951	0.7045	91512.7011	0.7796
Ethane	2837.9440	0.0957	85336.6934	0.1503	16428.2370	0.1400
Propane	963.9173	0.0325	42505.8603	0.0748	5744.2725	0.0489
i-Butane	130.1726	0.0044	7566.1514	0.0133	921.8988	0.0079
n-Butane	11.6685	0.0004	678.2193	0.0012	79.6258	0.0007
i-Pentane	20.8717	0.0007	1505.9126	0.0027	165.3948	0.0014
n-Pentane	3.3073	0.0001	238.6227	0.0004	25.9463	0.0002
n-Hexane	2.7124	0.0001	233.7511	0.0004	24.1534	0.0002
H2O	3.7464	0.0001	67.4918	0.0001	4.6307	0.0000
Total	29651.0136	1.0000	567953.8331	1.0000	117378.8653	1.0000

Vapour Phase

Phase Fraction 1.000

COMPONENTS	MOLAR FLOW (lbmole/hr)	MOLE FRACTION	MASS FLOW (lb/hr)	MASS FRACTION	LIQUID VOLUME FLOW (barrel/day)	LIQUID VOLUME FRACTION
Nitrogen	166.6846	0.0056	4669.3365	0.0082	396.4943	0.0034
CO2	568.4451	0.0192	25017.0989	0.0440	2075.5106	0.0177
Methane	24941.5438	0.8412	400134.6951	0.7045	91512.7011	0.7796
Ethane	2837.9440	0.0957	85336.6934	0.1503	16428.2370	0.1400
Propane	963.9173	0.0325	42505.8603	0.0748	5744.2725	0.0489
i-Butane	130.1726	0.0044	7566.1514	0.0133	921.8988	0.0079
n-Butane	11.6685	0.0004	678.2193	0.0012	79.6258	0.0007
i-Pentane	20.8717	0.0007	1505.9126	0.0027	165.3948	0.0014
n-Pentane	3.3073	0.0001	238.6227	0.0004	25.9463	0.0002
n-Hexane	2.7124	0.0001	233.7511	0.0004	24.1534	0.0002
H2O	3.7464	0.0001	67.4918	0.0001	4.6307	0.0000
Total	29651.0136	1.0000	567953.8331	1.0000	117378.8653	1.0000

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
	Cooler: E-102	

UTILITIES

(No utilities reference this stream)

Material Stream: A Descarga (continued)

Fluid Package: Basis-1
Property Package: Peng Robinson

PROCESS UTILITY

Energy Stream: Duty heater-2

Fluid Package: Refinery
Property Package: Peng Robinson

CONDITIONS

Duty Type:	Direct Q	Duty Calculation Operation:	E-101-2		
Duty SP:	1.867e+005 Btu/hr	Minimum Available Duty:	---	Maximum Available Duty:	---

COMPOSITION

(Not a material stream - No compositions exist)

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Heater: E-101-2		

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

DYNAMICS

Pressure Specification	(Inactive)	---					
Flow Specification	(Inactive)	Molar:	---	Mass:	---	Std Ideal Liq Volume:	---

User Variables

NOTES

Description

Energy Stream: q1-2-5

Fluid Package: Refinery
Property Package: Peng Robinson

CONDITIONS

Duty Type:	Direct Q	Duty Calculation Operation:	uente Guillermo-Cogua-2		
Duty SP:	1.048e+007 Btu/hr	Minimum Available Duty:	---	Maximum Available Duty:	---

COMPOSITION

(Not a material stream - No compositions exist)

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
	PIPESYS Extension: uente Guillermo-Cogua-2	

UTILITIES

(No utilities reference this stream)

Energy Stream: q1-2-5 (continued)

Fluid Package: Refinery
Property Package: Peng Robinson

PROCESS UTILITY

DYNAMICS

Pressure Specification	(Inactive)	---					
Flow Specification	(Inactive)	Molar:	---	Mass:	---	Std Ideal Liq Volume:	---

User Variables

NOTES

Description

Energy Stream: q1-2-4-2

Fluid Package: Refinery
Property Package: Peng Robinson

CONDITIONS

Duty Type:	Direct Q	Duty Calculation Operation:	Cogua-ECGSB-2		
Duty SP:	-2.921e+006 Btu/hr	Minimum Available Duty:	---	Maximum Available Duty:	---

COMPOSITION

(Not a material stream - No compositions exist)

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
	PIPESYS Extension: Cogua-ECGSB-2	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

DYNAMICS

Pressure Specification	(Inactive)	---					
Flow Specification	(Inactive)	Molar:	---	Mass:	---	Std Ideal Liq Volume:	---

User Variables

NOTES

Description

Energy Stream: Potencia

Fluid Package: Refinery
Property Package: Peng Robinson

CONDITIONS

Duty Type:	Direct Q	Duty Calculation Operation:	MOPICO-01		
Duty SP:	1.430e+007 Btu/hr	Minimum Available Duty:	---	Maximum Available Duty:	---

Energy Stream: Potencia (continued)

Fluid Package: Refinery
Property Package: Peng Robinson

COMPOSITION

(Not a material stream - No compositions exist)

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Compressor: MOPICO-01		

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

DYNAMICS

Pressure Specification	(Inactive)	---					
Flow Specification	(Inactive)	Molar:	---	Mass:	---	Std Ideal Liq Volume:	---

User Variables

NOTES

Description

Energy Stream: Duty Cooler

Fluid Package: Refinery
Property Package: Peng Robinson

CONDITIONS

Duty Type:	Direct Q	Duty Calculation Operation:	E-102	
Duty SP:	-9.692e+006 Btu/hr	Minimum Available Duty:	---	Maximum Available Duty: ---

COMPOSITION

(Not a material stream - No compositions exist)

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
	Cooler: E-102	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

DYNAMICS

Pressure Specification	(Inactive)	---					
Flow Specification	(Inactive)	Molar:	---	Mass:	---	Std Ideal Liq Volume:	---

User Variables

NOTES

Energy Stream: Duty Cooler (continued)

Fluid Package: Refinery
Property Package: Peng Robinson

Description

Compressor: MOPICO-01

DESIGN

Connections

Inlet Stream

STREAM NAME	FROM UNIT OPERATION	
A Succión-1-2	Valve	VLV-A Succión-2

Outlet Stream

STREAM NAME	TO UNIT OPERATION	
A Cooler	Cooler	E-102

Energy Stream

STREAM NAME	FROM UNIT OPERATION
Potencia	

Parameters

Speed:	---		Duty:	5.6215e+03 hp	
Adiabatic Eff.:	75.00		PolyTropic Eff.:	76.10	
Adiabatic Head:	4.480 km		Polytropic Head:	4.546 km	
Adiabatic Fluid Head:	1.470e+004 lbf-ft/lbm		Polytropic Fluid Head:	1.491e+004 lbf-ft/lbm	
Polytropic Exp.:	1.408	Isentropic Exp.	1.276	Poly Head Factor	1.000

User Variables

RATING

Curves

Compressor Speed: ---		Efficiency:	Adiabatic	Curves Enabled:	Yes
Head Offset:	0.0000 km		Efficiency Offset:		0.0000

Speed:

Flow	Head	Efficiency (%)

Flow Limits

Surge Curve: Inactive

Speed	Flow	Speed	Flow	Speed	Flow

Stone Wall Curve: Inactive

Speed	Flow	Speed	Flow	Speed	Flow

Surge Flow Rate	---	Field Flow Rate	6773 ACFM	Stone Wall Flow	---	Compressor Volume	0.0000 ft3

Nozzle Paramaters

Base Elevation Relative to Ground Level				0.0000 km *
		A Succión-1-2	A Cooler	
Diameter	(km)	5.000e-005	5.000e-005	
Elevation (Base)	(km)	0.0000	0.0000	
Elevation (Ground)	(km)	0.0000	0.0000	

Inertia

Compressor: MOPICO-01 (continued)

Inertia

Rotational inertia (lb-ft2)	142.4	Radius of gyration (km)	2.000e-004
Mass (lb)	330.7	Friction loss factor (rad/min) (lb-ft2/s)	0.1424

WORKSHEET

Conditions

Name	A Succión-1-2	A Cooler	Potencia	
Vapour	1.0000	1.0000	---	
Temperature (F)	30.4525	89.5198	---	
Pressure (psig)	332.5453	500.0000 *	---	
Molar Flow (MMSCFD)	270.0341	270.0341	---	
Mass Flow (lb/hr)	567953.8331	567953.8331	---	
Std Ideal Liq Vol Flow (barrel/day)	117378.8653	117378.8653	---	
Molar Enthalpy (Btu/lbmole)	-3.634e+004	-3.586e+004	---	
Molar Entropy (Btu/lbmole-F)	37.51	37.73	---	
Heat Flow (Btu/hr)	-1.0775e+09	-1.0632e+09	1.4304e+07	

Properties

Name	A Succión-1-2	A Cooler			
Molecular Weight	19.15	19.15			
Molar Density (lbmole/ft3)	7.296e-002	9.650e-002			
Mass Density (lb/ft3)	1.398	1.848			
Act. Volume Flow (barrel/day)	1.737e+006	1.313e+006			
Mass Enthalpy (Btu/lb)	-1897	-1872			
Mass Entropy (Btu/lb-F)	1.958	1.970			
Heat Capacity (Btu/lbmole-F)	10.12	10.65			
Mass Heat Capacity (Btu/lb-F)	0.5285	0.5560			
LHV Vol Basis (Std) (Btu/lbmole)	3.844e+005	3.844e+005			
LHV Mass Basis (Std) (Btu/lb)	2.007e+004	2.007e+004			
Phase Fraction [Vol. Basis]	1.000	1.000			
Phase Fraction [Mass Basis]	1.000	1.000			
Partial Pressure of CO2 (psig)	-8.039	-4.829			
Cost Based on Flow (Cost/s)	0.0000	0.0000			
Act. Gas Flow (ACFM)	6773	5121			
Avg. Liq. Density (lbmole/ft3)	1.080	1.080			
Specific Heat (Btu/lbmole-F)	10.12	10.65			
Std. Gas Flow (MMSCFD)	270.0	270.0			
Std. Ideal Liq. Mass Density (lb/ft3)	20.68	20.68			
Act. Liq. Flow (USGPM)	---	---			
Z Factor	0.9048	0.9050			
Watson K	18.38	18.38			
User Property	---	---			
Partial Pressure of H2S (psig)	-14.70	-14.70			
Cp/(Cp - R)	1.244	1.229			
Cp/Cv	1.409	1.402			
Heat of Vap. (Btu/lbmole)	4445	3910			
Kinematic Viscosity (cSt)	0.4864	0.4146			
Liq. Mass Density (Std. Cond) (lb/ft3)	---	---			
Liq. Vol. Flow (Std. Cond) (barrel/day)	---	---			
Liquid Fraction	0.0000	0.0000			
Molar Volume (ft3/lbmole)	13.71	10.36			
Mass Heat of Vap. (Btu/lb)	232.1	204.1			
Phase Fraction [Molar Basis]	1.0000	1.0000			

* Specified by user.

Compressor: MOPICO-01 (continued)

Properties

Name		A Succión-1-2	A Cooler			
Surface Tension	(dyne/cm)	---	---			
Thermal Conductivity	(Btu/hr-ft-F)	1.723e-002	2.030e-002			
Viscosity	(cP)	1.089e-002	1.228e-002			
Cv (Semi-Ideal)	(Btu/lbmole-F)	8.138	8.663			
Mass Cv (Semi-Ideal)	(Btu/lb-F)	0.4249	0.4523			
Cv	(Btu/lbmole-F)	7.183	7.594			
Mass Cv	(Btu/lb-F)	0.3750	0.3965			
Cv (Ent. Method)	(Btu/lbmole-F)	---	---			
Mass Cv (Ent. Method)	(Btu/lb-F)	---	---			
Cp/Cv (Ent. Method)		---	---			
Reid VP at 37.8 C	(psig)	---	---			
True VP at 37.8 C	(psig)	---	---			
Liq. Vol. Flow - Sum(Std. Cond)	(barrel/day)	0.0000	0.0000			
Viscosity Index		-9.069	-12.83			

PERFORMANCE

Results

Adiabatic Head	(km)	4.480	Power Consumed	(hp)	5622
Polytropic Head	(km)	4.546	Polytropic Head Factor		1.000
Adiabatic Fluid Head	(lbf-ft/lbm)	1.470e+004	Polytropic Exponent		1.408
Polytropic Fluid Head	(lbf-ft/lbm)	1.491e+004	Isentropic Exponent		1.276
Adiabatic Efficiency		75	Speed	(rpm)	---
Polytropic Efficiency		76			---

Power/Torque

Total Rotor Power	(hp)	5622	Total Rotor Torque	(lbf-ft)	---
Transient Rotor Power	(hp)	0.0000	Transient Rotor Torque	(lbf-ft)	---
Friction Power Loss	(hp)	0.0000	Friction Torque Loss	(lbf-ft)	---
Fluid Power	(hp)	5622	Fluid Torque	(lbf-ft)	---

DYNAMICS

Dynamic Specifications

Duty	(Btu/hr)	1.430e+007	Active	Head	(km)	4.546	Not Active
Adiabatic Efficiency		75	Not Active	Fluid Head	(lbf-ft/lbm)	1.491e+004	Not Active
Polytropic Efficiency		76	Active	Capacity	(ACFM)	6773	Not Active
Pressure Increase	(psi)	167.5	Not Active	Speed	(rpm)	---	Not Active
		---		Use Characteristic Curves			No

Holdup Details

Phase	Accumulation (MMSCFD)	Moles (lbmole)		Volume (ft3)
Vapour	0.0000	0.0000	*	0.0000
Liquid	0.0000	0.0000	*	0.0000
Aqueous	0.0000	0.0000	*	0.0000
Total	**0.0000**	**0.0000**		**0.0000**

NOTES

aspentech

LEGENDS
Burlington, MA
USA

Case Name:	FLUJO MAXIMO 270-1100-110.HSC
Unit Set:	Field1
Date/Time:	Fri Apr 13 12:13:26 2012

Cooler: E-102

CONNECTIONS

Inlet Stream

STREAM NAME	FROM UNIT OPERATION	
A Cooler	Compressor	MOPICO-01

Outlet Stream

STREAM NAME	TO UNIT OPERATION
A Descarga	

Energy Stream

STREAM NAME	TO UNIT OPERATION
Duty Cooler	

PARAMETERS

Pressure Drop:	3.000 psi *	Duty:	-9.692e+006 Btu/hr	Volume:	3.531 ft3
Function:	Not Selected	Zones:	1		

User Variables

NOZZLE PARAMETERS

Base Elevation Relative to Ground Level 0.0000 km *

		A Cooler	A Descarga	
Diameter	(km)	5.000e-005	5.000e-005	
Elevation (Base)	(km)	0.0000	0.0000	
Elevation (Ground)	(km)	0.0000	0.0000	

CONDITIONS

Name		A Cooler	A Descarga	Duty Cooler	
Vapour		1.0000	1.0000	---	
Temperature	(F)	89.5198	120.0000 *	---	
Pressure	(psig)	500.0000 *	497.0000	---	
Molar Flow	(MMSCFD)	270.0341	270.0341	---	
Mass Flow	(lb/hr)	567953.8331	567953.8331	---	
Std Ideal Liq Vol Flow	(barrel/day)	117378.8653	117378.8653	---	
Molar Enthalpy	(Btu/lbmole)	-3.586e+004	-3.553e+004	---	
Molar Entropy	(Btu/lbmole-F)	37.73	38.32	---	
Heat Flow	(Btu/hr)	-1.0632e+09	-1.0535e+09	-9.6921e+06	

PROPERTIES

Name		A Cooler	A Descarga			
Molecular Weight		19.15	19.15			
Molar Density	(lbmole/ft3)	9.650e-002	8.922e-002			
Mass Density	(lb/ft3)	1.848	1.709			
Act. Volume Flow	(barrel/day)	1.313e+006	1.421e+006			
Mass Enthalpy	(Btu/lb)	-1872	-1855			
Mass Entropy	(Btu/lb-F)	1.970	2.001			
Heat Capacity	(Btu/lbmole-F)	10.65	10.68			
Mass Heat Capacity	(Btu/lb-F)	0.5560	0.5575			
LHV Vol Basis (Std)	(Btu/lbmole)	3.844e+005	3.844e+005			
LHV Mass Basis (Std)	(Btu/lb)	2.007e+004	2.007e+004			
Phase Fraction [Vol. Basis]		1.000	1.000			
Phase Fraction [Mass Basis]		1.000	1.000			

Cooler: E-102 (continued)

PROPERTIES

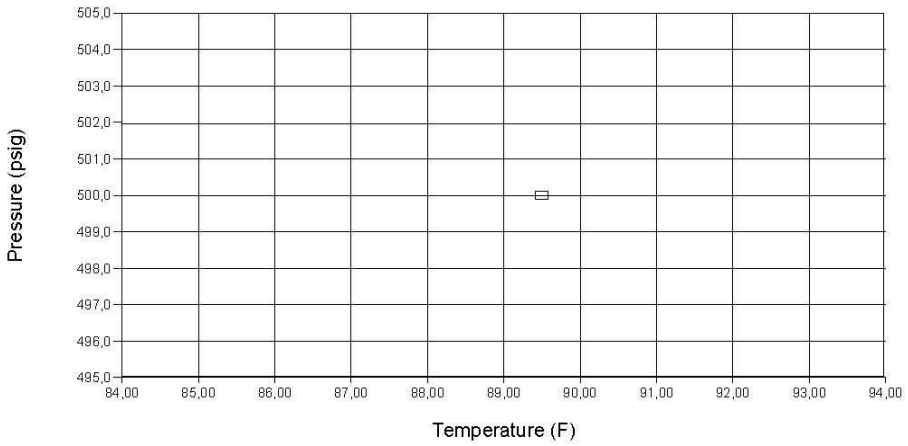
Name	A Cooler	A Descarga			
Partial Pressure of CO2 (psig)	-4.829	-4.886			
Cost Based on Flow (Cost/s)	0.0000	0.0000			
Act. Gas Flow (ACFM)	5121	5539			
Avg. Liq. Density (lbmole/ft3)	1.080	1.080			
Specific Heat (Btu/lbmole-F)	10.65	10.68			
Std. Gas Flow (MMSCFD)	270.0	270.0			
Std. Ideal Liq. Mass Density (lb/ft3)	20.68	20.68			
Act. Liq. Flow (USGPM)	---	---			
Z Factor	0.9050	0.9219			
Watson K	18.38	18.38			
User Property	---	---			
Partial Pressure of H2S (psig)	-14.70	-14.70			
Cp/(Cp - R)	1.229	1.228			
Cp/Cv	1.402	1.369			
Heat of Vap. (Btu/lbmole)	3910	3919			
Kinematic Viscosity (cSt)	0.4146	0.4667			
Liq. Mass Density (Std. Cond) (lb/ft3)	---	---			
Liq. Vol. Flow (Std. Cond) (barrel/day)	---	---			
Liquid Fraction	0.0000	0.0000			
Molar Volume (ft3/lbmole)	10.36	11.21			
Mass Heat of Vap. (Btu/lb)	204.1	204.6			
Phase Fraction [Molar Basis]	1.0000	1.0000			
Surface Tension (dyne/cm)	---	---			
Thermal Conductivity (Btu/hr-ft-F)	2.030e-002	2.154e-002			
Viscosity (cP)	1.228e-002	1.278e-002			
Cv (Semi-Ideal) (Btu/lbmole-F)	8.663	8.693			
Mass Cv (Semi-Ideal) (Btu/lb-F)	0.4523	0.4538			
Cv (Btu/lbmole-F)	7.594	7.799			
Mass Cv (Btu/lb-F)	0.3965	0.4071			
Cv (Ent. Method) (Btu/lbmole-F)	---	---			
Mass Cv (Ent. Method) (Btu/lb-F)	---	---			
Cp/Cv (Ent. Method)	---	---			
Reid VP at 37.8 C (psig)	---	---			
True VP at 37.8 C (psig)	---	---			
Liq. Vol. Flow - Sum(Std. Cond) (barrel/day)	0.0000	0.0000			
Viscosity Index	-12.83	-9.986			

PERFORMANCE PROFILES

Zone	Pressure (psig)	Temperature (F)	Vapour Fraction	Enthalpy (Btu/lbmole)
Inlet	500.00	89.52	1.0000	-35856.63
0	497.00	120.00	1.0000	-35529.76

PERFORMANCE PLOT

Cooler: E-102 (continued)



PERFORMANCE TABLE

Overall Phase

Temperature (F)	Pressure (psig)	Heat Flow (Btu/hr)	Enthalpy (Btu/lbmole)	Vapour Fraction
89.52	500.00	0.00	-35856.63	1.0000
89.52	500.00	-0.00	-35856.63	1.0000

Vapour Phase

Mass Flow (lb/hr)	Molecular Weight	Density (lb/ft3)	Mass Specific Heat (Btu/lb-F)	Viscosity (cP)	Thermal Conductivity (Btu/hr-ft-F)
567953.83	19.15	1.85	0.56	---	---
567953.83	19.15	1.85	0.56	0.01	0.02

Light Liquid Phase

Mass Flow (lb/hr)	Density (lb/ft3)	Mass Specific Heat (Btu/lb-F)	Viscosity (cP)	Thermal Conductivity (Btu/hr-ft-F)	Surface Tension (dyne/cm)
---	---	---	---	---	---
---	---	---	---	---	---

Heavy Liquid Phase

Mass Flow (lb/hr)	Density (lb/ft3)	Mass Specific Heat (Btu/lb-F)	Viscosity (cP)	Thermal Conductivity (Btu/hr-ft-F)	Surface Tension (dyne/cm)
---	---	---	---	---	---
---	---	---	---	---	---

DYNAMICS

Model Details: Supplied Duty

Zone	1 *	Delta P	(psi)	3.000 *

Cooler: E-102 (continued)

Volume (ft3)	3.531 *	Overall K (lb/hr/sqrt(psia-lb/ft3))	2.417e+005 *
Duty (Btu/hr)	-9.692e+006		

Holdup Details

Phase	Accumulation (MMSCFD)	Moles (lbmole)	Volume (ft3)
Vapour	0.0000	0.0000	0.0000
Liquid	0.0000	0.0000	0.0000
Aqueous	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**

Individual Zone Holdups: Zone 0

Delta P Specs and Duties

Zone	dP Value (psi)	dP Option	Duty (Btu/hr)
0 *	3.000 *	not specified	-4.358e+007 *

Zone Conductance Specifications

Zone	k (lb/hr/sqrt(psia-lb/ft3))	Specification
0 *	2.417e+005	Disabled

NOTES

Heater: E-101-2

CONNECTIONS

Inlet Stream

STREAM NAME	FROM UNIT OPERATION	
A Calentador-2	Mixer	MIX-101-2

Outlet Stream

STREAM NAME	TO UNIT OPERATION	
A ECGSB-2	PIPESYS Extension	Cogua-ECGSB-2

Energy Stream

STREAM NAME	FROM UNIT OPERATION
Duty heater-2	

PARAMETERS

Pressure Drop:	0.0000 psi *	Duty:	1.867e+005 Btu/hr	Volume:	3.531 ft3
Function:	Not Selected	Zones:	1		

User Variables

RATING

NOZZLE PARAMETERS

Base Elevation Relative to Ground Level			0.0000 km *
	A Calentador-2	A ECGSB-2	

Heater: E-101-2 (continued)

Diameter (km)	5.000e-005	5.000e-005	
Elevation (Base) (km)	0.0000	0.0000	
Elevation (Ground) (km)	0.0000	0.0000	

CONDITIONS

Name	A Calentador-2	A ECGSB-2	Duty heater-2	
Vapour	1.0000	1.0000	---	
Temperature (F)	37.4758	38.0600 *	---	
Pressure (psig)	500.0000	500.0000	---	
Molar Flow (MMSCFD)	270.0341	270.0341	---	
Mass Flow (lb/hr)	567953.8331	567953.8331	---	
Std Ideal Liq Vol Flow (barrel/day)	117378.8653	117378.8653	---	
Molar Enthalpy (Btu/lbmole)	-3.641e+004	-3.641e+004	---	
Molar Entropy (Btu/lbmole-F)	36.67	36.68	---	
Heat Flow (Btu/hr)	-1.0797e+09	-1.0795e+09	1.8667e+05	

PROPERTIES

Name	A Calentador-2	A ECGSB-2			
Molecular Weight	19.15	19.15			
Molar Density (lbmole/ft3)	0.1114	0.1112			
Mass Density (lb/ft3)	2.134	2.130			
Act. Volume Flow (barrel/day)	1.138e+006	1.140e+006			
Mass Enthalpy (Btu/lb)	-1901	-1901			
Mass Entropy (Btu/lb-F)	1.914	1.915			
Heat Capacity (Btu/lbmole-F)	10.78	10.77			
Mass Heat Capacity (Btu/lb-F)	0.5627	0.5625			
LHV Vol Basis (Std) (Btu/lbmole)	3.844e+005	3.844e+005			
LHV Mass Basis (Std) (Btu/lb)	2.007e+004	2.007e+004			
Phase Fraction [Vol. Basis]	1.000	1.000			
Phase Fraction [Mass Basis]	1.000	1.000			
Partial Pressure of CO2 (psig)	-4.829	-4.829			
Cost Based on Flow (Cost/s)	0.0000	0.0000			
Act. Gas Flow (ACFM)	4436	4444			
Avg. Liq. Density (lbmole/ft3)	1.080	1.080			
Specific Heat (Btu/lbmole-F)	10.78	10.77			
Std. Gas Flow (MMSCFD)	270.0	270.0			
Std. Ideal Liq. Mass Density (lb/ft3)	20.68	20.68			
Act. Liq. Flow (USGPM)	---	---			
Z Factor	0.8660	0.8665			
Watson K	18.38	18.38			
User Property	---	---			
Partial Pressure of H2S (psig)	-14.70	-14.70			
Cp/(Cp - R)	1.226	1.226			
Cp/Cv	1.481	1.480			
Heat of Vap. (Btu/lbmole)	3910	3910			
Kinematic Viscosity (cSt)	0.3340	0.3349			
Liq. Mass Density (Std. Cond) (lb/ft3)	---	---			
Liq. Vol. Flow (Std. Cond) (barrel/day)	---	---			
Liquid Fraction	0.0000	0.0000			
Molar Volume (ft3/lbmole)	8.976	8.993			
Mass Heat of Vap. (Btu/lb)	204.1	204.1			
Phase Fraction [Molar Basis]	1.0000	1.0000			
Surface Tension (dyne/cm)	---	---			
Thermal Conductivity (Btu/hr-ft-F)	1.830e-002	1.832e-002			

Heater: E-101-2 (continued)

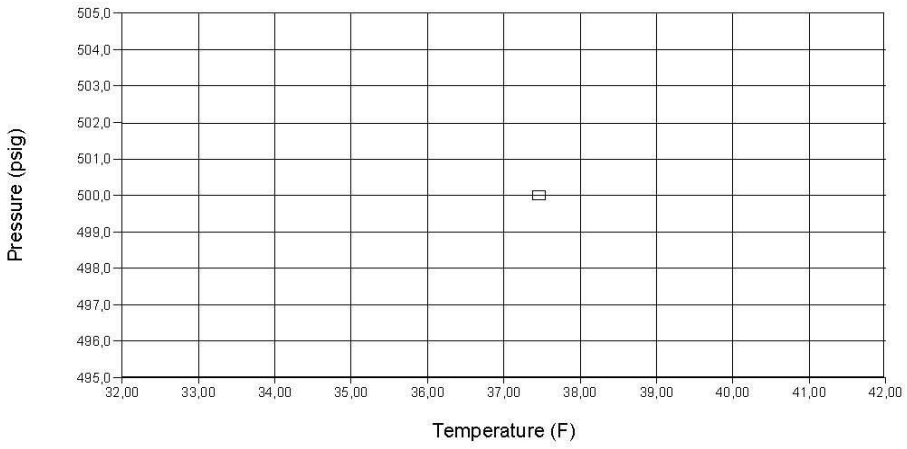
PROPERTIES

Name		A Calentador-2	A ECGSB-2			
Viscosity	(cP)	1.142e-002	1.143e-002			
Cv (Semi-Ideal)	(Btu/lbmole-F)	8.792	8.788			
Mass Cv (Semi-Ideal)	(Btu/lb-F)	0.4590	0.4588			
Cv	(Btu/lbmole-F)	7.277	7.280			
Mass Cv	(Btu/lb-F)	0.3799	0.3801			
Cv (Ent. Method)	(Btu/lbmole-F)	---	---			
Mass Cv (Ent. Method)	(Btu/lb-F)	---	---			
Cp/Cv (Ent. Method)		---	---			
Reid VP at 37.8 C	(psig)	---	---			
True VP at 37.8 C	(psig)	---	---			
Liq. Vol. Flow - Sum(Std. Cond)	(barrel/day)	0.0000	0.0000			
Viscosity Index		-19.16	-19.07			

PERFORMANCE PROFILES

Zone	Pressure (psig)	Temperature (F)	Vapour Fraction	Enthalpy (Btu/lbmole)
Inlet	500.00	37.48	1.0000	-36412.87
0	500.00	38.06	1.0000	-36406.57

PERFORMANCE PLOT



PERFORMANCE TABLE

Overall Phase

Temperature (F)	Pressure (psig)	Heat Flow (Btu/hr)	Enthalpy (Btu/lbmole)	Vapour Fraction
37.48	500.00	0.00	-36412.87	1.0000
37.48	500.00	0.00	-36412.87	1.0000

Heater: E-101-2 (continued)

PERFORMANCE TABLE

Vapour Phase

Mass Flow (lb/hr)	Molecular Weight	Density (lb/ft3)	Mass Specific Heat (Btu/lb-F)	Viscosity (cP)	Thermal Conductivity (Btu/hr-ft-F)
567953.83	19.15	2.13	0.56	---	---
567953.83	19.15	2.13	0.56	0.01	0.02

Light Liquid Phase

Mass Flow (lb/hr)	Density (lb/ft3)	Mass Specific Heat (Btu/lb-F)	Viscosity (cP)	Thermal Conductivity (Btu/hr-ft-F)	Surface Tension (dyne/cm)
---	---	---	---	---	---
---	---	---	---	---	---

Heavy Liquid Phase

Mass Flow (lb/hr)	Density (lb/ft3)	Mass Specific Heat (Btu/lb-F)	Viscosity (cP)	Thermal Conductivity (Btu/hr-ft-F)	Surface Tension (dyne/cm)
---	---	---	---	---	---
---	---	---	---	---	---

DYNAMICS

Model Details: Supplied Duty

Zone		1 *	Delta P	(psi)	0.0000 *
Volume	(ft3)	3.531 *	Overall K	(lb/hr/sqrt(psia-lb/ft3))	2.249e+005 *
Duty	(Btu/hr)	1.867e+005			

Holdup Details

Phase	Accumulation (MMSCFD)	Moles (lbmole)	Volume (ft3)
Vapour	0.0000	0.0000	0.0000
Liquid	0.0000	0.0000	0.0000
Aqueous	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**

Individual Zone Holdups: Zone 0

Delta P Specs and Duties

Zone	dP Value (psi)	dP Option	Duty (Btu/hr)
0 *	0.0000 *	not specified	0.0000 *

Zone Conductance Specifications

Zone	k (lb/hr/sqrt(psia-lb/ft3))	Specification
0 *	2.249e+005 *	Enabled

NOTES

aspentech	LEGENDS Burlington, MA USA	Case Name:	FLUJO MAXIMO 270-1100-110.HSC
		Unit Set:	Field1
		Date/Time:	Fri Apr 13 12:13:26 2012

Mixer: MIX-101-2

CONNECTIONS

Inlet Stream

STREAM NAME	FROM UNIT OPERATION	
A Medición-3	Valve	PCV-102-3
A Medición-2-2	Valve	PCV-102-2-2

Outlet Stream

STREAM NAME	TO UNIT OPERATION	
A Calentador-2	Heater	E-101-2

PARAMETERS

User Variables

NOZZLE PARAMETERS

Base Elevation Relative to Ground Level 0.0000 km *

		A Medición-3	A Medición-2-2	A Calentador-2
Diameter	(km)	5.000e-005	5.000e-005	5.000e-005
Elevation (Base)	(km)	0.0000	0.0000	0.0000
Elevation (Ground)	(km)	0.0000	0.0000	0.0000

CONDITIONS

Name		A Medición-3	A Medición-2-2	A Calentador-2	
Vapour		1.0000	1.0000	1.0000	
Temperature	(F)	37.4758	37.4758	37.4758	
Pressure	(psig)	500.0000 *	500.0000 *	500.0000	
Molar Flow	(MMSCFD)	135.0171	135.0171	270.0341	
Mass Flow	(lb/hr)	283976.9165	283976.9165	567953.8331	
Std Ideal Liq Vol Flow	(barrel/day)	58689.4327	58689.4327	117378.8653	
Molar Enthalpy	(Btu/lbmole)	-3.641e+004	-3.641e+004	-3.641e+004	
Molar Entropy	(Btu/lbmole-F)	36.67	36.67	36.67	
Heat Flow	(Btu/hr)	-5.3984e+08	-5.3984e+08	-1.0797e+09	

PROPERTIES

Name		A Medición-3	A Medición-2-2	A Calentador-2		
Molecular Weight		19.15	19.15	19.15		
Molar Density	(lbmole/ft3)	0.1114	0.1114	0.1114		
Mass Density	(lb/ft3)	2.134	2.134	2.134		
Act. Volume Flow	(barrel/day)	5.689e+005	5.689e+005	1.138e+006		
Mass Enthalpy	(Btu/lb)	-1901	-1901	-1901		
Mass Entropy	(Btu/lb-F)	1.914	1.914	1.914		
Heat Capacity	(Btu/lbmole-F)	10.78	10.78	10.78		
Mass Heat Capacity	(Btu/lb-F)	0.5627	0.5627	0.5627		
LHV Vol Basis (Std)	(Btu/lbmole)	3.844e+005	3.844e+005	3.844e+005		
LHV Mass Basis (Std)	(Btu/lb)	2.007e+004	2.007e+004	2.007e+004		
Phase Fraction [Vol. Basis]		1.000	1.000	1.000		
Phase Fraction [Mass Basis]		1.000	1.000	1.000		
Partial Pressure of CO2	(psig)	-4.829	-4.829	-4.829		
Cost Based on Flow	(Cost/s)	0.0000	0.0000	0.0000		
Act. Gas Flow	(ACFM)	2218	2218	4436		
Avg. Liq. Density	(lbmole/ft3)	1.080	1.080	1.080		
Specific Heat	(Btu/lbmole-F)	10.78	10.78	10.78		

Mixer: MIX-101-2 (continued)

PROPERTIES

Name	A Medición-3	A Medición-2-2	A Calentador-2		
Std. Gas Flow (MMSCFD)	135.0	135.0	270.0		
Std. Ideal Liq. Mass Density (lb/ft3)	20.68	20.68	20.68		
Act. Liq. Flow (USGPM)	---	---	---		
Z Factor	0.8660	0.8660	0.8660		
Watson K	18.38	18.38	18.38		
User Property	---	---	---		
Partial Pressure of H2S (psig)	-14.70	-14.70	-14.70		
Cp/(Cp - R)	1.226	1.226	1.226		
Cp/Cv	1.481	1.481	1.481		
Heat of Vap. (Btu/lbmole)	3910	3910	3910		
Kinematic Viscosity (cSt)	0.3340	0.3340	0.3340		
Liq. Mass Density (Std. Cond) (lb/ft3)	---	---	---		
Liq. Vol. Flow (Std. Cond) (barrel/day)	---	---	---		
Liquid Fraction	0.0000	0.0000	0.0000		
Molar Volume (ft3/lbmole)	8.976	8.976	8.976		
Mass Heat of Vap. (Btu/lb)	204.1	204.1	204.1		
Phase Fraction [Molar Basis]	1.0000	1.0000	1.0000		
Surface Tension (dyne/cm)	---	---	---		
Thermal Conductivity (Btu/hr-ft-F)	1.830e-002	1.830e-002	1.830e-002		
Viscosity (cP)	1.142e-002	1.142e-002	1.142e-002		
Cv (Semi-Ideal) (Btu/lbmole-F)	8.792	8.792	8.792		
Mass Cv (Semi-Ideal) (Btu/lb-F)	0.4590	0.4590	0.4590		
Cv (Btu/lbmole-F)	7.277	7.277	7.277		
Mass Cv (Btu/lb-F)	0.3799	0.3799	0.3799		
Cv (Ent. Method) (Btu/lbmole-F)	---	---	---		
Mass Cv (Ent. Method) (Btu/lb-F)	---	---	---		
Cp/Cv (Ent. Method)	---	---	---		
Reid VP at 37.8 C (psig)	---	---	---		
True VP at 37.8 C (psig)	---	---	---		
Liq. Vol. Flow - Sum(Std. Cond) (barrel/day)	0.0000	0.0000	0.0000		
Viscosity Index	-19.16	-19.16	-19.16		

DYNAMICS

Pressure Specification: Equalize All

Holdup Details

Phase	Accumulation (MMSCFD)	Moles (lbmole)		Volume (ft3)
Vapour	0.0000	0.0000	*	0.0000
Liquid	0.0000	0.0000	*	0.0000
Aqueous	0.0000	0.0000	*	0.0000
Total	**0.0000**	**0.0000**		**0.0000**

NOTES

* Specified by user.

aspentech	LEGENDS Burlington, MA USA	Case Name:	FLUJO MAXIMO 270-1100-110.HSC
		Unit Set:	Field1
		Date/Time:	Fri Apr 13 12:13:26 2012

NeotecPIPESYS v2.5.77.0: FLUJO MAXIMO 270-1100-110.HSC

Puente Guillermo-Cogua-2

Connections

Inlet		Outlet		Energy	
NAME	FROM OPER	NAME	TO OPER	NAME	TO OPER
Puente Guillermo-1-2	Valve-LV-Puente Guillermo-2	A Cogua-2	Separator: FS-101-2	g1-2-5	

Calculation Procedures

Multiphase Horizontal Flow

Overall Selection:	Gas based default	*
Flow Regime Prediction :	Taitel and Dukler	*
Liquid Holdup:	Eaton et al	*
Frictional Pressure Loss:	Oliemans	*
Uphill Correction:	No Correction	*
Downhill Recovery:	Recovery Based on Gas Density	*

Single Phase Flow

Overall Selection:	Fanning Equation	

Multiphase Vertical Upflow

Overall Selection:	Gas based default	*
Flow Regime Prediction:	Govier, and Aziz	*
Liquid Holdup:	Aziz, Govier, and Fogarasi	*
Frictional Pressure Loss:	Aziz, Govier and Fogarasi	*

Multiphase Vertical Downflow

Overall Selection:	Gas based default	*
Flow Regime Prediction:	Beggs and Brill Revised	*
Liquid Holdup:	Beggs and Brill Revised	*
Frictional Pressure Loss:	Beggs and Brill	*

Stepsizes and Tolerances

Pipe Lengths

Intial stepsize:	0.03 km	*
Minimum stepsize:	0.000 km	*
Maximum stepsize:	---	

Pressure Convergence

Initial dP Guess:	-10.00 psi	*
Minimum dP/step:	3.00 psi	*
Maximum dP/step:	10.00 psi	*
Convergence Tolerance:	0.010 psi	*

Temperature Convergence

Initial dT Guess:	-2.00 F	*
Minimum dT/step:	1.50 F	*
Maximum dT/step:	5.00 F	*
Convergence Tolerance:	0.050 F	*

Enthalpy Convergence

Minimum dH/step:	0.60 Btu/lb	*
Maximum dH/step:	2.00 Btu/lb	*
Convergence Tolerance:	0.010 Btu/lb	*

Overall Settings

Stepsize and Tolerances:	Set to Program Defaults	*

Overall Pipeline Pressure Convergence

Minimum allowed pressure:	-0.046 psig	*

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LEGENDS
Burlington, MA
USA

Case Name:	FLUJO MAXIMO 270-1100-110.HSC
Unit Set:	Field1
Date/Time:	Fri Apr 13 12:13:26 2012

NeotecPIPESYS v2.5.77.0: FLUJO MAXIMO 270-1100-110.HSC

Puente Guillermo-Cogua-2

Stepsizes and Tolerances

Overall Settings			Overall Pipeline Pressure Convergence		
Force Enthalpy Convergence:	Disabled	*	Downstream press. conv. tolerance:	0.010 psi	*
Optimize Stepsize:	Enabled	*			

Emulsion

Emulsion Viscosity Option: Normal blended viscosity calculation

Pipeline Units Profile

Distance at Pipeline Origin: 0.00 km * Elevation at Pipeline Origin: 2.20 km *

Pipeline unit	Distance (km)	Elevation (km)	Run (km)	Rise (km)	Length (km)	Angle (deg)	Label
Pipe *	8.00 *	2.30 *	8.00	0.10	8.00	0.716	Pipe #1 *
Pipe *	18.00 *	2.40 *	10.00	0.10	10.00	0.573	Pipe #2 *
Pipe *	27.00 *	2.50 *	9.00	0.10	9.00	0.637	Pipe #3 *
Pipe *	35.00 *	2.60 *	8.00	0.10	8.00	0.716	Pipe #4 *
Pipe *	37.50 *	2.65 *	2.50	0.05	2.50	1.146	Pipe #5 *
Pipe *	50.00 *	2.70 *	12.50	0.05	12.50	0.229	Pipe #6 *
Pipe *	70.00 *	2.80 *	20.00	0.10	20.00	0.286	Pipe #7 *
Pipe *	92.20 *	2.92 *	22.20	0.12	22.20	0.310	Pipe #8 *
Pipe *	98.00 *	2.80 *	5.80	-0.12	5.80	-1.185	Pipe #9 *
Pipe *	103.00 *	2.70 *	5.00	-0.10	5.00	-1.146	Pipe #10 *
Pipe *	105.75 *	2.62 *	2.75	-0.09	2.75	-1.770	Pipe #11 *
Pipe *	105.82 *	2.62 *	0.07	0.00	0.07	0.000	Pipe #17 *

Surroundings Temperature Profile

Surroundings Temperature at Pipeline Origin: 68.00 F *

Distance (km)	Elevation (km)	Cum. Length (km)	Label	Surroundings T (F)	Surroundings Type
8.00	2.30	8.00	Pipe #1	50.00 *	Buried
18.00	2.40	18.00	Pipe #2	49.35 *	Buried
27.00	2.50	27.00	Pipe #3	48.70 *	Buried
35.00	2.60	35.00	Pipe #4	48.00 *	Buried
37.50	2.65	37.50	Pipe #5	47.73 *	Buried
50.00	2.70	50.00	Pipe #6	47.41 *	Buried
70.00	2.80	70.00	Pipe #7	46.74 *	Buried
92.20	2.92	92.20	Pipe #8	46.09 *	Buried
98.00	2.80	98.00	Pipe #9	46.74 *	Buried
103.00	2.70	103.01	Pipe #10	47.41 *	Buried
105.75	2.61	105.76	Pipe #11	48.09 *	Buried

NeotecPIPESYS v2.5.77.0: FLUJO MAXIMO 270-1100-110.HSC

Puente Guillermo-Cogua-2

Surroundings Temperature Profile

Distance (km)	Elevation (km)	Cum. Length (km)	Label	Surroundings T (F)	Surroundings Type
105.82	2.61	105.83	Pipe #17	48.09 *	Buried

Pipe Dimensions at Pipeline Origin

Name: Pipe #1

Unit Location

Distance: 0.00 km Elevation: 2.20 km Distance From Origin: 0.00 km

Nominal Diameter: 20 Inches *
Pipe Schedule: Standard *

Outside Diameter: 20.000 in
Wall Thickness: 0.375 in
Inside Diameter: 19.250 in

Default Roughnesses: Default: Steel (bare, average field conditions) *

Absolute Roughness: 0.00180 in Relative Roughness: 0.000094

NeotecPIPESYS v2.5.77.0: FLUJO MAXIMO 270-1100-110.HSC

Puente Guillermo-Cogua-2

Heat Transfer Data at Pipeline Origin

Name: Pipe #1

Unit Location

Distance: 0.00 km Elevation: 2.20 km Distance From Origin: 0.00 km

Heat Transfer Environment

Buried *

Overall Heat Transfer Coefficient

Specified Coefficient: ---

Inside Film Coefficient

Type: Calculated *
SpecifiedCoefficient: ---

Pipe Parameters

Default Conductivities: Default: Steel *
Pipe Conductivity: 28.000 Btu/hr-ft-F

Soil Parameters

Centre Line Depth: 0.001 km *
Buried Fraction: ---
Type: Default *
Conductivity: 0.500 Btu/hr-ft-F

Water Parameters

Density: ---
Viscosity: ---
Conductivity: ---
Velocity: ---
Heat Capacity: ---

Air Parameters

Density: ---
Viscosity: ---
Conductivity: ---
Velocity: ---

Pipe Coatings Data at Pipeline Origin

Name: Pipe #1

Unit Location

Distance: 0.00 km Elevation: 2.20 km Distance From Origin: 0.00 km

Layer	Coating	Thickness (in)	Conductivity (Btu/hr-ft-F)
---	<empty> *	---	---

NeotecPIPESYS v2.5.77.0: FLUJO MAXIMO 270-1100-110.HSC

Puente Guillermo-Cogua-2

Calculation Messages

Error Messages

No calculation errors encountered, PIPESYS has converged.

Warning Messages

No calculation warnings encountered.

Pressure Temperature Summary

Pipeline Unit	Cum. Length (km)	Pressure (psig)	Temperature (F)	DeltaP (psi)	DeltaT (F)	Label
Pipe	8.00	1054.30	101.52	40.70	-8.22	Pipe #1
Pipe	18.00	1005.20	91.37	49.10	-10.15	Pipe #2
Pipe	27.00	959.42	83.04	45.77	-8.32	Pipe #3
Pipe	35.00	917.06	76.15	42.37	-6.90	Pipe #4
Pipe	37.50	902.05	73.88	15.01	-2.27	Pipe #5
Pipe	50.00	842.59	65.61	59.46	-8.26	Pipe #6
Pipe	70.00	739.02	53.98	103.57	-11.63	Pipe #7
Pipe	92.20	607.58	42.63	131.44	-11.35	Pipe #8
Pipe	98.00	577.94	41.57	29.64	-1.07	Pipe #9
Pipe	103.01	550.16	40.57	27.78	-1.00	Pipe #10
Pipe	105.76	535.56	40.35	14.60	-0.22	Pipe #11
Pipe	105.83	535.06	40.32	0.49	-0.03	Pipe #17

Pressure Temperature Profile

Cumulative Length (km)	Inside Diameter (in)	Pressure (psig)	Temperature (F)	DeltaP Friction (psi)	DeltaP Head (psi)	Liquid Volume Fraction	Pressure Gradient (inH2O/ft)
0.03	19.250	1094.85	109.71	0.12	0.04	0.0000	-0.0427
0.81	19.250	1090.89	108.97	3.03	0.92	0.0000	-0.0427
1.59	19.250	1086.93	108.21	3.04	0.92	0.0000	-0.0428
2.37	19.250	1082.96	107.44	3.04	0.92	0.0000	-0.0428
3.16	19.250	1079.00	106.65	3.05	0.92	0.0000	-0.0429
3.94	19.250	1075.02	105.86	3.05	0.92	0.0000	-0.0429
4.72	19.250	1071.05	105.05	3.06	0.92	0.0000	-0.0429
5.50	19.250	1067.07	104.23	3.06	0.91	0.0000	-0.0430
6.28	19.250	1063.09	103.40	3.07	0.91	0.0000	-0.0430
7.06	19.250	1059.10	102.55	3.07	0.91	0.0000	-0.0431
7.84	19.250	1055.11	101.70	3.08	0.91	0.0000	-0.0431
8.00	19.250	1054.30	101.52	0.63	0.18	0.0000	-0.0431
8.78	19.250	1050.49	100.69	3.08	0.73	0.0000	-0.0412

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LEGENDS
Burlington, MA
USA

Case Name: FLUJO MAXIMO 270-1100-110.HSC
Unit Set: Field1
Date/Time: Fri Apr 13 12:13:26 2012

NeotecPIPESYS v2.5.77.0: FLUJO MAXIMO 270-1100-110.HSC

Puente Guillermo-Cogua-2

Pressure Temperature Profile

Cumulative Length (km)	Inside Diameter (in)	Pressure (psig)	Temperature (F)	DeltaP Friction (psi)	DeltaP Head (psi)	Liquid Volume Fraction	Pressure Gradient (inH2O/ft)
9.56	19.250	1046.67	99.86	3.09	0.73	0.0000	-0.0412
10.34	19.250	1042.85	99.04	3.09	0.72	0.0000	-0.0413
11.13	19.250	1039.03	98.22	3.10	0.72	0.0000	-0.0413
11.91	19.250	1035.20	97.42	3.10	0.72	0.0000	-0.0413
12.69	19.250	1031.37	96.62	3.11	0.72	0.0000	-0.0414
13.47	19.250	1027.54	95.83	3.11	0.72	0.0000	-0.0414
14.25	19.250	1023.70	95.04	3.12	0.72	0.0000	-0.0415
15.03	19.250	1019.85	94.26	3.13	0.72	0.0000	-0.0415
15.81	19.250	1016.00	93.49	3.13	0.72	0.0000	-0.0416
16.59	19.250	1012.15	92.73	3.14	0.71	0.0000	-0.0416
17.37	19.250	1008.29	91.97	3.14	0.71	0.0000	-0.0417
18.00	19.250	1005.20	91.37	2.53	0.57	0.0000	-0.0417
18.78	19.250	1001.25	90.61	3.15	0.79	0.0000	-0.0426
19.56	19.250	997.30	89.86	3.16	0.79	0.0000	-0.0427
20.34	19.250	993.35	89.12	3.17	0.79	0.0000	-0.0427
21.13	19.250	989.39	88.39	3.17	0.78	0.0000	-0.0428
21.91	19.250	985.42	87.66	3.18	0.78	0.0000	-0.0428
22.69	19.250	981.45	86.93	3.19	0.78	0.0000	-0.0429
23.47	19.250	977.48	86.21	3.20	0.78	0.0000	-0.0429
24.25	19.250	973.49	85.50	3.20	0.78	0.0000	-0.0430
25.03	19.250	969.51	84.80	3.21	0.77	0.0000	-0.0431
25.81	19.250	965.51	84.10	3.22	0.77	0.0000	-0.0431
26.59	19.250	961.51	83.40	3.23	0.77	0.0000	-0.0432
27.00	19.250	959.42	83.04	1.69	0.40	0.0000	-0.0433
27.78	19.250	955.32	82.35	3.24	0.86	0.0000	-0.0443
28.56	19.250	951.21	81.65	3.25	0.86	0.0000	-0.0444
29.35	19.250	947.09	80.97	3.26	0.86	0.0000	-0.0445
30.13	19.250	942.96	80.28	3.27	0.86	0.0000	-0.0446
30.91	19.250	938.83	79.61	3.28	0.85	0.0000	-0.0446
31.69	19.250	934.69	78.94	3.29	0.85	0.0000	-0.0447
32.47	19.250	930.55	78.27	3.29	0.85	0.0000	-0.0448
33.25	19.250	926.39	77.61	3.30	0.85	0.0000	-0.0449
34.03	19.250	922.23	76.95	3.31	0.84	0.0000	-0.0449
34.81	19.250	918.07	76.30	3.32	0.84	0.0000	-0.0450
35.00	19.250	917.06	76.15	0.81	0.20	0.0000	-0.0451
35.78	19.250	912.38	75.43	3.34	1.34	0.0000	-0.0506
36.56	19.250	907.69	74.72	3.35	1.34	0.0000	-0.0506
37.35	19.250	902.99	74.02	3.36	1.33	0.0000	-0.0507
37.50	19.250	902.05	73.88	0.68	0.27	0.0000	-0.0508
38.28	19.250	898.41	73.33	3.38	0.27	0.0000	-0.0393
39.07	19.250	894.76	72.78	3.39	0.26	0.0000	-0.0394
39.85	19.250	891.10	72.24	3.39	0.26	0.0000	-0.0395
40.63	19.250	887.43	71.71	3.41	0.26	0.0000	-0.0396
41.41	19.250	883.75	71.18	3.42	0.26	0.0000	-0.0397
42.19	19.250	880.06	70.65	3.43	0.26	0.0000	-0.0398

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LEGENDS
Burlington, MA
USA

Case Name:	FLUJO MAXIMO 270-1100-110.HSC
Unit Set:	Field1
Date/Time:	Fri Apr 13 12:13:26 2012

NeotecPIPESYS v2.5.77.0: FLUJO MAXIMO 270-1100-110.HSC

Puente Guillermo-Cogua-2

Pressure Temperature Profile

Cumulative Length (km)	Inside Diameter (in)	Pressure (psig)	Temperature (F)	DeltaP Friction (psi)	DeltaP Head (psi)	Liquid Volume Fraction	Pressure Gradient (inH2O/ft)
42.97	19.250	876.36	70.13	3.44	0.26	0.0000	-0.0399
43.75	19.250	872.65	69.61	3.45	0.26	0.0000	-0.0401
44.53	19.250	868.93	69.10	3.46	0.26	0.0000	-0.0402
45.31	19.250	865.20	68.59	3.47	0.26	0.0000	-0.0403
46.10	19.250	861.46	68.08	3.48	0.26	0.0000	-0.0404
46.88	19.250	857.71	67.58	3.49	0.26	0.0000	-0.0405
47.66	19.250	853.95	67.08	3.50	0.26	0.0000	-0.0406
48.44	19.250	850.18	66.59	3.52	0.25	0.0000	-0.0408
49.22	19.250	846.39	66.10	3.53	0.25	0.0000	-0.0409
50.00	19.250	842.60	65.61	3.54	0.25	0.0000	-0.0410
50.00	19.250	842.59	65.61	0.01	0.00	0.0000	-0.0411
50.78	19.250	838.72	65.12	3.55	0.31	0.0000	-0.0418
51.57	19.250	834.84	64.63	3.57	0.31	0.0000	-0.0419
52.35	19.250	830.94	64.14	3.58	0.31	0.0000	-0.0421
53.13	19.250	827.03	63.66	3.60	0.31	0.0000	-0.0422
53.91	19.250	823.11	63.18	3.61	0.31	0.0000	-0.0423
54.69	19.250	819.18	62.71	3.62	0.31	0.0000	-0.0425
55.47	19.250	815.23	62.23	3.64	0.31	0.0000	-0.0426
56.25	19.250	811.27	61.77	3.65	0.31	0.0000	-0.0428
57.03	19.250	807.30	61.30	3.67	0.31	0.0000	-0.0429
57.81	19.250	803.31	60.84	3.68	0.30	0.0000	-0.0431
58.60	19.250	799.30	60.38	3.70	0.30	0.0000	-0.0432
59.38	19.250	795.29	59.92	3.71	0.30	0.0000	-0.0434
60.16	19.250	791.25	59.47	3.73	0.30	0.0000	-0.0436
60.94	19.250	787.21	59.02	3.75	0.30	0.0000	-0.0437
61.72	19.250	783.14	58.57	3.76	0.30	0.0000	-0.0439
62.50	19.250	779.06	58.12	3.78	0.30	0.0000	-0.0441
63.28	19.250	774.97	57.68	3.80	0.29	0.0000	-0.0442
64.06	19.250	770.86	57.24	3.82	0.29	0.0000	-0.0444
64.85	19.250	766.73	56.80	3.83	0.29	0.0000	-0.0446
65.63	19.250	762.58	56.37	3.85	0.29	0.0000	-0.0448
66.41	19.250	758.42	55.94	3.87	0.29	0.0000	-0.0450
67.19	19.250	754.24	55.51	3.89	0.29	0.0000	-0.0452
67.97	19.250	750.04	55.08	3.91	0.29	0.0000	-0.0454
68.75	19.250	745.82	54.66	3.93	0.28	0.0000	-0.0456
69.53	19.250	741.59	54.23	3.95	0.28	0.0000	-0.0458
70.00	19.250	739.02	53.98	2.39	0.17	0.0000	-0.0459
70.78	19.250	734.73	53.56	3.98	0.30	0.0000	-0.0463
71.57	19.250	730.42	53.14	4.01	0.30	0.0000	-0.0466
72.35	19.250	726.09	52.72	4.03	0.30	0.0000	-0.0468
73.13	19.250	721.74	52.30	4.05	0.30	0.0000	-0.0470
73.91	19.250	717.37	51.89	4.07	0.30	0.0000	-0.0472
74.69	19.250	712.97	51.48	4.10	0.30	0.0000	-0.0475
75.47	19.250	708.56	51.07	4.12	0.29	0.0000	-0.0477
76.25	19.250	704.12	50.66	4.14	0.29	0.0000	-0.0479

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LEGENDS
Burlington, MA
USA

Case Name:	FLUJO MAXIMO 270-1100-110.HSC
Unit Set:	Field1
Date/Time:	Fri Apr 13 12:13:26 2012

NeotecPIPESYS v2.5.77.0: FLUJO MAXIMO 270-1100-110.HSC

Puente Guillermo-Cogua-2

Pressure Temperature Profile

Cumulative Length (km)	Inside Diameter (in)	Pressure (psig)	Temperature (F)	DeltaP Friction (psi)	DeltaP Head (psi)	Liquid Volume Fraction	Pressure Gradient (inH2O/ft)
77.03	19.250	699.66	50.25	4.17	0.29	0.0000	-0.0482
77.81	19.250	695.17	49.85	4.19	0.29	0.0000	-0.0484
78.60	19.250	690.66	49.44	4.22	0.29	0.0000	-0.0487
79.38	19.250	686.13	49.04	4.25	0.28	0.0000	-0.0490
80.16	19.250	681.57	48.64	4.27	0.28	0.0000	-0.0492
80.94	19.250	676.98	48.24	4.30	0.28	0.0000	-0.0495
81.72	19.250	672.37	47.85	4.33	0.28	0.0000	-0.0498
82.50	19.250	667.73	47.45	4.36	0.28	0.0000	-0.0501
83.28	19.250	663.06	47.06	4.39	0.28	0.0000	-0.0504
84.06	19.250	658.37	46.67	4.42	0.27	0.0000	-0.0507
84.85	19.250	653.64	46.27	4.45	0.27	0.0000	-0.0510
85.63	19.250	648.89	45.88	4.48	0.27	0.0000	-0.0513
86.41	19.250	644.11	45.49	4.51	0.27	0.0000	-0.0517
87.19	19.250	639.29	45.11	4.55	0.27	0.0000	-0.0520
87.97	19.250	634.44	44.72	4.58	0.26	0.0000	-0.0524
88.75	19.250	629.56	44.33	4.61	0.26	0.0000	-0.0527
89.53	19.250	624.65	43.95	4.65	0.26	0.0000	-0.0531
90.31	19.250	619.70	43.56	4.69	0.26	0.0000	-0.0534
91.09	19.250	614.72	43.18	4.72	0.26	0.0000	-0.0538
91.88	19.250	609.70	42.79	4.76	0.25	0.0000	-0.0542
92.20	19.250	607.58	42.63	2.01	0.11	0.0000	-0.0545
92.98	19.250	603.72	42.49	4.81	-0.96	0.0000	-0.0417
93.77	19.250	599.83	42.35	4.85	-0.95	0.0000	-0.0421
94.55	19.250	595.89	42.21	4.88	-0.95	0.0000	-0.0425
95.33	19.250	591.91	42.06	4.92	-0.94	0.0000	-0.0430
96.11	19.250	587.89	41.92	4.95	-0.93	0.0000	-0.0434
96.89	19.250	583.82	41.77	4.99	-0.93	0.0000	-0.0439
97.67	19.250	579.71	41.63	5.03	-0.92	0.0000	-0.0444
98.00	19.250	577.94	41.57	2.16	-0.39	0.0000	-0.0448
98.79	19.250	573.73	41.41	5.08	-0.88	0.0000	-0.0454
99.57	19.250	569.48	41.26	5.12	-0.87	0.0000	-0.0460
100.35	19.250	565.18	41.10	5.16	-0.87	0.0000	-0.0465
101.13	19.250	560.82	40.95	5.21	-0.86	0.0000	-0.0470
101.91	19.250	556.42	40.79	5.25	-0.85	0.0000	-0.0476
102.69	19.250	551.96	40.63	5.30	-0.84	0.0000	-0.0481
103.01	19.250	550.16	40.57	2.14	-0.34	0.0000	-0.0485
103.79	19.250	546.08	40.51	5.36	-1.29	0.0000	-0.0440
104.57	19.250	541.95	40.45	5.40	-1.28	0.0000	-0.0446
105.35	19.250	537.77	40.38	5.45	-1.27	0.0000	-0.0452
105.76	19.250	535.56	40.35	2.86	-0.66	0.0000	-0.0457
105.83	19.250	535.06	40.32	0.49	0.00	0.0000	-0.0595

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LEGENDS
Burlington, MA
USA

Case Name:	FLUJO MAXIMO 270-1100-110.HSC
Unit Set:	Field1
Date/Time:	Fri Apr 13 12:13:26 2012

NeotecPIPESYS v2.5.77.0: FLUJO MAXIMO 270-1100-110.HSC

Puente Guillermo-Cogua-2

Fluid Transport Properties

Cumulative Length (km)	Iterations	Gas Density (lb/ft3)	Liquid Density (lb/ft3)	Gas Viscosity (cP)	Liquid Viscosity (cP)	Vsg (ft/s)	Vsl (ft/s)	Flow Pattern	Surface Tension (dyne/cm)
0.03	4	4.156	---	0.014	---	18.782	---	SP-Turbulent	---
0.81	3	4.152	---	0.014	---	18.800	---	SP-Turbulent	---
1.59	3	4.145	---	0.014	---	18.834	---	SP-Turbulent	---
2.37	3	4.137	---	0.014	---	18.867	---	SP-Turbulent	---
3.16	3	4.130	---	0.014	---	18.901	---	SP-Turbulent	---
3.94	3	4.123	---	0.014	---	18.934	---	SP-Turbulent	---
4.72	3	4.116	---	0.014	---	18.966	---	SP-Turbulent	---
5.50	3	4.109	---	0.014	---	18.999	---	SP-Turbulent	---
6.28	3	4.102	---	0.014	---	19.030	---	SP-Turbulent	---
7.06	3	4.095	---	0.014	---	19.062	---	SP-Turbulent	---
7.84	3	4.088	---	0.014	---	19.093	---	SP-Turbulent	---
8.00	3	4.084	---	0.014	---	19.112	---	SP-Turbulent	---
8.78	3	4.081	---	0.014	---	19.130	---	SP-Turbulent	---
9.56	3	4.074	---	0.014	---	19.159	---	SP-Turbulent	---
10.34	3	4.068	---	0.014	---	19.189	---	SP-Turbulent	---
11.13	3	4.061	---	0.014	---	19.220	---	SP-Turbulent	---
11.91	3	4.055	---	0.014	---	19.252	---	SP-Turbulent	---
12.69	3	4.048	---	0.014	---	19.284	---	SP-Turbulent	---
13.47	3	4.041	---	0.014	---	19.317	---	SP-Turbulent	---
14.25	3	4.034	---	0.014	---	19.352	---	SP-Turbulent	---
15.03	3	4.026	---	0.014	---	19.387	---	SP-Turbulent	---
15.81	3	4.019	---	0.014	---	19.422	---	SP-Turbulent	---
16.59	3	4.011	---	0.014	---	19.459	---	SP-Turbulent	---
17.37	3	4.004	---	0.014	---	19.497	---	SP-Turbulent	---
18.00	3	3.997	---	0.014	---	19.531	---	SP-Turbulent	---
18.78	3	3.989	---	0.014	---	19.567	---	SP-Turbulent	---
19.56	3	3.981	---	0.014	---	19.608	---	SP-Turbulent	---
20.34	3	3.972	---	0.014	---	19.651	---	SP-Turbulent	---
21.13	3	3.964	---	0.014	---	19.694	---	SP-Turbulent	---
21.91	3	3.955	---	0.014	---	19.738	---	SP-Turbulent	---
22.69	3	3.946	---	0.014	---	19.783	---	SP-Turbulent	---
23.47	3	3.937	---	0.014	---	19.829	---	SP-Turbulent	---
24.25	3	3.927	---	0.014	---	19.875	---	SP-Turbulent	---
25.03	3	3.918	---	0.013	---	19.923	---	SP-Turbulent	---
25.81	3	3.908	---	0.013	---	19.972	---	SP-Turbulent	---
26.59	3	3.899	---	0.013	---	20.022	---	SP-Turbulent	---
27.00	3	3.891	---	0.013	---	20.061	---	SP-Turbulent	---
27.78	3	3.883	---	0.013	---	20.101	---	SP-Turbulent	---
28.56	3	3.873	---	0.013	---	20.155	---	SP-Turbulent	---
29.35	3	3.862	---	0.013	---	20.210	---	SP-Turbulent	---
30.13	3	3.852	---	0.013	---	20.266	---	SP-Turbulent	---
30.91	3	3.841	---	0.013	---	20.323	---	SP-Turbulent	---
31.69	3	3.830	---	0.013	---	20.382	---	SP-Turbulent	---
32.47	3	3.819	---	0.013	---	20.441	---	SP-Turbulent	---
33.25	3	3.807	---	0.013	---	20.502	---	SP-Turbulent	---

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Case Name:	FLUJO MAXIMO 270-1100-110.HSC
Unit Set:	Field1
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Puente Guillermo-Cogua-2

Fluid Transport Properties

Cumulative Length (km)	Iterations	Gas Density (lb/ft3)	Liquid Density (lb/ft3)	Gas Viscosity (cP)	Liquid Viscosity (cP)	Vsg (ft/s)	Vsl (ft/s)	Flow Pattern	Surface Tension (dyne/cm)
34.03	3	3.796	---	0.013	---	20.564	---	SP-Turbulent	---
34.81	3	3.784	---	0.013	---	20.627	---	SP-Turbulent	---
35.00	3	3.777	---	0.013	---	20.667	---	SP-Turbulent	---
35.78	4	3.769	---	0.013	---	20.711	---	SP-Turbulent	---
36.56	3	3.755	---	0.013	---	20.786	---	SP-Turbulent	---
37.35	3	3.742	---	0.013	---	20.862	---	SP-Turbulent	---
37.50	3	3.734	---	0.013	---	20.908	---	SP-Turbulent	---
38.28	4	3.727	---	0.013	---	20.945	---	SP-Turbulent	---
39.07	3	3.716	---	0.013	---	21.006	---	SP-Turbulent	---
39.85	3	3.705	---	0.013	---	21.068	---	SP-Turbulent	---
40.63	3	3.694	---	0.013	---	21.131	---	SP-Turbulent	---
41.41	3	3.683	---	0.013	---	21.195	---	SP-Turbulent	---
42.19	3	3.672	---	0.013	---	21.260	---	SP-Turbulent	---
42.97	3	3.660	---	0.013	---	21.327	---	SP-Turbulent	---
43.75	3	3.649	---	0.013	---	21.395	---	SP-Turbulent	---
44.53	3	3.637	---	0.013	---	21.464	---	SP-Turbulent	---
45.31	3	3.625	---	0.013	---	21.534	---	SP-Turbulent	---
46.10	3	3.613	---	0.013	---	21.605	---	SP-Turbulent	---
46.88	3	3.601	---	0.013	---	21.678	---	SP-Turbulent	---
47.66	3	3.589	---	0.013	---	21.753	---	SP-Turbulent	---
48.44	3	3.576	---	0.013	---	21.828	---	SP-Turbulent	---
49.22	3	3.564	---	0.013	---	21.905	---	SP-Turbulent	---
50.00	3	3.551	---	0.013	---	21.984	---	SP-Turbulent	---
50.00	3	3.544	---	0.013	---	22.023	---	SP-Turbulent	---
50.78	3	3.538	---	0.013	---	22.064	---	SP-Turbulent	---
51.57	3	3.525	---	0.013	---	22.147	---	SP-Turbulent	---
52.35	3	3.511	---	0.013	---	22.231	---	SP-Turbulent	---
53.13	3	3.498	---	0.013	---	22.316	---	SP-Turbulent	---
53.91	3	3.484	---	0.013	---	22.404	---	SP-Turbulent	---
54.69	3	3.470	---	0.013	---	22.492	---	SP-Turbulent	---
55.47	3	3.457	---	0.013	---	22.583	---	SP-Turbulent	---
56.25	3	3.443	---	0.013	---	22.675	---	SP-Turbulent	---
57.03	3	3.428	---	0.013	---	22.769	---	SP-Turbulent	---
57.81	3	3.414	---	0.013	---	22.864	---	SP-Turbulent	---
58.60	3	3.400	---	0.013	---	22.962	---	SP-Turbulent	---
59.38	3	3.385	---	0.013	---	23.061	---	SP-Turbulent	---
60.16	3	3.370	---	0.013	---	23.162	---	SP-Turbulent	---
60.94	3	3.355	---	0.013	---	23.265	---	SP-Turbulent	---
61.72	3	3.340	---	0.013	---	23.369	---	SP-Turbulent	---
62.50	3	3.325	---	0.013	---	23.476	---	SP-Turbulent	---
63.28	3	3.310	---	0.013	---	23.585	---	SP-Turbulent	---
64.06	3	3.294	---	0.013	---	23.696	---	SP-Turbulent	---
64.85	3	3.279	---	0.012	---	23.809	---	SP-Turbulent	---
65.63	3	3.263	---	0.012	---	23.924	---	SP-Turbulent	---
66.41	3	3.247	---	0.012	---	24.041	---	SP-Turbulent	---

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Puente Guillermo-Cogua-2

Fluid Transport Properties

Cumulative Length (km)	Iterations	Gas Density (lb/ft3)	Liquid Density (lb/ft3)	Gas Viscosity (cP)	Liquid Viscosity (cP)	Vsg (ft/s)	Vsl (ft/s)	Flow Pattern	Surface Tension (dyne/cm)
67.19	3	3.231	---	0.012	---	24.161	---	SP-Turbulent	---
67.97	3	3.215	---	0.012	---	24.283	---	SP-Turbulent	---
68.75	3	3.198	---	0.012	---	24.407	---	SP-Turbulent	---
69.53	3	3.182	---	0.012	---	24.534	---	SP-Turbulent	---
70.00	3	3.168	---	0.012	---	24.637	---	SP-Turbulent	---
70.78	3	3.155	---	0.012	---	24.743	---	SP-Turbulent	---
71.57	3	3.138	---	0.012	---	24.877	---	SP-Turbulent	---
72.35	3	3.121	---	0.012	---	25.013	---	SP-Turbulent	---
73.13	3	3.103	---	0.012	---	25.153	---	SP-Turbulent	---
73.91	3	3.086	---	0.012	---	25.295	---	SP-Turbulent	---
74.69	3	3.068	---	0.012	---	25.440	---	SP-Turbulent	---
75.47	3	3.051	---	0.012	---	25.589	---	SP-Turbulent	---
76.25	3	3.033	---	0.012	---	25.740	---	SP-Turbulent	---
77.03	3	3.015	---	0.012	---	25.895	---	SP-Turbulent	---
77.81	3	2.996	---	0.012	---	26.052	---	SP-Turbulent	---
78.60	3	2.978	---	0.012	---	26.214	---	SP-Turbulent	---
79.38	3	2.959	---	0.012	---	26.378	---	SP-Turbulent	---
80.16	3	2.941	---	0.012	---	26.546	---	SP-Turbulent	---
80.94	3	2.922	---	0.012	---	26.718	---	SP-Turbulent	---
81.72	3	2.902	---	0.012	---	26.894	---	SP-Turbulent	---
82.50	3	2.883	---	0.012	---	27.074	---	SP-Turbulent	---
83.28	3	2.864	---	0.012	---	27.257	---	SP-Turbulent	---
84.06	3	2.844	---	0.012	---	27.445	---	SP-Turbulent	---
84.85	3	2.824	---	0.012	---	27.637	---	SP-Turbulent	---
85.63	3	2.804	---	0.012	---	27.834	---	SP-Turbulent	---
86.41	3	2.784	---	0.012	---	28.035	---	SP-Turbulent	---
87.19	3	2.764	---	0.012	---	28.241	---	SP-Turbulent	---
87.97	3	2.744	---	0.012	---	28.452	---	SP-Turbulent	---
88.75	3	2.723	---	0.012	---	28.668	---	SP-Turbulent	---
89.53	3	2.702	---	0.012	---	28.890	---	SP-Turbulent	---
90.31	3	2.681	---	0.012	---	29.117	---	SP-Turbulent	---
91.09	3	2.660	---	0.012	---	29.349	---	SP-Turbulent	---
91.88	3	2.638	---	0.012	---	29.588	---	SP-Turbulent	---
92.20	3	2.623	---	0.012	---	29.761	---	SP-Turbulent	---
92.98	4	2.609	---	0.012	---	29.915	---	SP-Turbulent	---
93.77	3	2.591	---	0.012	---	30.122	---	SP-Turbulent	---
94.55	3	2.573	---	0.012	---	30.335	---	SP-Turbulent	---
95.33	3	2.555	---	0.012	---	30.552	---	SP-Turbulent	---
96.11	3	2.536	---	0.012	---	30.775	---	SP-Turbulent	---
96.89	3	2.518	---	0.012	---	31.004	---	SP-Turbulent	---
97.67	3	2.499	---	0.012	---	31.238	---	SP-Turbulent	---
98.00	3	2.485	---	0.012	---	31.409	---	SP-Turbulent	---
98.79	3	2.471	---	0.012	---	31.584	---	SP-Turbulent	---
99.57	3	2.452	---	0.012	---	31.835	---	SP-Turbulent	---
100.35	3	2.432	---	0.012	---	32.092	---	SP-Turbulent	---

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Puente Guillermo-Cogua-2

Fluid Transport Properties

Cumulative Length (km)	Iterations	Gas Density (lb/ft3)	Liquid Density (lb/ft3)	Gas Viscosity (cP)	Liquid Viscosity (cP)	Vsg (ft/s)	Vsl (ft/s)	Flow Pattern	Surface Tension (dyne/cm)
101.13	3	2.412	---	0.012	---	32.357	---	SP-Turbulent	---
101.91	3	2.392	---	0.012	---	32.629	---	SP-Turbulent	---
102.69	3	2.372	---	0.012	---	32.909	---	SP-Turbulent	---
103.01	3	2.358	---	0.012	---	33.109	---	SP-Turbulent	---
103.79	4	2.344	---	0.012	---	33.304	---	SP-Turbulent	---
104.57	3	2.324	---	0.012	---	33.581	---	SP-Turbulent	---
105.35	3	2.305	---	0.012	---	33.867	---	SP-Turbulent	---
105.76	3	2.290	---	0.012	---	34.090	---	SP-Turbulent	---
105.83	3	2.284	---	0.012	---	34.184	---	SP-Turbulent	---

Miscellaneous

Cumulative Length (km)	Cumulative Liquid Holdup (ft3)	Cumulative Liquid Transit Time (hours)	Cumulative Line Pack @STD (ft3)	Cumulative Gas Transit Time (hours)
0.00	0.0	0.000	0.0	0.000
8.00	0.0	0.000	4328233.3	0.385
18.00	0.0	0.000	9635258.7	0.857
27.00	0.0	0.000	14295807.5	1.271
35.00	0.0	0.000	18323975.2	1.629
37.50	0.0	0.000	19556824.6	1.738
50.00	0.0	0.000	25534713.7	2.270
70.00	0.0	0.000	34365276.6	3.055
92.20	0.0	0.000	42827641.4	3.807
98.00	0.0	0.000	44770980.0	3.980
103.01	0.0	0.000	46359196.8	4.121
105.76	0.0	0.000	47197263.2	4.196
105.83	0.0	0.000	47218257.0	4.197

Heat Transfer

Cumulative Length (km)	Superficial Gas Reynold's Number	Superficial Liquid Reynold's Number	Mixture Reynold's Number	Inside Film Coefficient (Btu/hr-ft2-F)	Overall Heat Transfer Coefficient (Btu/hr-ft2-F)
0.03	13187844	---	13187844	164.7771	0.3063
0.81	13197496	---	13197496	164.7238	0.3063
1.59	13216206	---	13216206	164.6209	0.3063
2.37	13235124	---	13235124	164.5172	0.3063
3.16	13254256	---	13254256	164.4129	0.3063
3.94	13273602	---	13273602	164.3079	0.3063
4.72	13293162	---	13293162	164.2024	0.3063
5.50	13312939	---	13312939	164.0962	0.3063
6.28	13332929	---	13332929	163.9894	0.3063
7.06	13353138	---	13353138	163.8820	0.3063
7.84	13373566	---	13373566	163.7741	0.3063

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Heat Transfer

Cumulative Length (km)	Superficial Gas Reynold's Number	Superficial Liquid Reynold's Number	Mixture Reynold's Number	Inside Film Coefficient (Btu/hr-ft2-F)	Overall Heat Transfer Coefficient (Btu/hr-ft2-F)
8.00	13385943	---	13385943	163.7090	0.3063
8.78	13397991	---	13397991	163.6460	0.3063
9.56	13417928	---	13417928	163.5419	0.3063
10.34	13437894	---	13437894	163.4379	0.3063
11.13	13457884	---	13457884	163.3340	0.3063
11.91	13477904	---	13477904	163.2300	0.3063
12.69	13497953	---	13497953	163.1261	0.3063
13.47	13518034	---	13518034	163.0221	0.3063
14.25	13538145	---	13538145	162.9181	0.3063
15.03	13558290	---	13558290	162.8140	0.3063
15.81	13578469	---	13578469	162.7098	0.3063
16.59	13598683	---	13598683	162.6055	0.3063
17.37	13618934	---	13618934	162.5011	0.3063
18.00	13637213	---	13637213	162.4068	0.3063
18.78	13655701	---	13655701	162.3115	0.3063
19.56	13676423	---	13676423	162.2045	0.3063
20.34	13697192	---	13697192	162.0973	0.3063
21.13	13718004	---	13718004	161.9899	0.3063
21.91	13738860	---	13738860	161.8823	0.3063
22.69	13759764	---	13759764	161.7743	0.3063
23.47	13780718	---	13780718	161.6661	0.3063
24.25	13801717	---	13801717	161.5575	0.3063
25.03	13822770	---	13822770	161.4486	0.3063
25.81	13843870	---	13843870	161.3394	0.3063
26.59	13865024	---	13865024	161.2298	0.3063
27.00	13881162	---	13881162	161.1461	0.3063
27.78	13897558	---	13897558	161.0609	0.3063
28.56	13919323	---	13919323	160.9477	0.3063
29.35	13941147	---	13941147	160.8341	0.3063
30.13	13963035	---	13963035	160.7199	0.3063
30.91	13984982	---	13984982	160.6053	0.3063
31.69	14006995	---	14006995	160.4902	0.3063
32.47	14029071	---	14029071	160.3746	0.3063
33.25	14051214	---	14051214	160.2584	0.3063
34.03	14073423	---	14073423	160.1417	0.3063
34.81	14095700	---	14095700	160.0244	0.3063
35.00	14109571	---	14109571	159.9513	0.3063
35.78	14124770	---	14124770	159.8709	0.3063
36.56	14149829	---	14149829	159.7380	0.3063
37.35	14174978	---	14174978	159.6045	0.3063
37.50	14190128	---	14190128	159.5239	0.3063
38.28	14202490	---	14202490	159.4582	0.3063
39.07	14222183	---	14222183	159.3535	0.3063
39.85	14241929	---	14241929	159.2483	0.3063
40.63	14261730	---	14261730	159.1424	0.3063

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Heat Transfer

Cumulative Length (km)	Superficial Gas Reynold's Number	Superficial Liquid Reynold's Number	Mixture Reynold's Number	Inside Film Coefficient (Btu/hr-ft2-F)	Overall Heat Transfer Coefficient (Btu/hr-ft2-F)
41.41	14281583	---	14281583	159.0360	0.3063
42.19	14301496	---	14301496	158.9290	0.3063
42.97	14321463	---	14321463	158.8214	0.3063
43.75	14341491	---	14341491	158.7132	0.3063
44.53	14361579	---	14361579	158.6043	0.3063
45.31	14381726	---	14381726	158.4948	0.3063
46.10	14401937	---	14401937	158.3847	0.3063
46.88	14422208	---	14422208	158.2739	0.3063
47.66	14442544	---	14442544	158.1624	0.3063
48.44	14462947	---	14462947	158.0503	0.3063
49.22	14483413	---	14483413	157.9374	0.3063
50.00	14503947	---	14503947	157.8238	0.3063
50.00	14514260	---	14514260	157.7667	0.3063
50.78	14524769	---	14524769	157.7084	0.3063
51.57	14545806	---	14545806	157.5914	0.3063
52.35	14566912	---	14566912	157.4737	0.3063
53.13	14588097	---	14588097	157.3552	0.3063
53.91	14609357	---	14609357	157.2359	0.3063
54.69	14630692	---	14630692	157.1158	0.3063
55.47	14652107	---	14652107	156.9949	0.3063
56.25	14673600	---	14673600	156.8732	0.3063
57.03	14695173	---	14695173	156.7507	0.3063
57.81	14716827	---	14716827	156.6273	0.3063
58.60	14738564	---	14738564	156.5031	0.3063
59.38	14760387	---	14760387	156.3780	0.3063
60.16	14782296	---	14782296	156.2520	0.3063
60.94	14804290	---	14804290	156.1251	0.3063
61.72	14826373	---	14826373	155.9974	0.3063
62.50	14848549	---	14848549	155.8687	0.3063
63.28	14870815	---	14870815	155.7391	0.3063
64.06	14893170	---	14893170	155.6085	0.3063
64.85	14915625	---	14915625	155.4771	0.3063
65.63	14938173	---	14938173	155.3446	0.3063
66.41	14960817	---	14960817	155.2112	0.3063
67.19	14983563	---	14983563	155.0768	0.3063
67.97	15006409	---	15006409	154.9414	0.3063
68.75	15029357	---	15029357	154.8049	0.3063
69.53	15052411	---	15052411	154.6675	0.3063
70.00	15070962	---	15070962	154.5566	0.3063
70.78	15089660	---	15089660	154.4446	0.3063
71.57	15113143	---	15113143	154.3036	0.3063
72.35	15136738	---	15136738	154.1616	0.3063
73.13	15160444	---	15160444	154.0184	0.3063
73.91	15184264	---	15184264	153.8742	0.3063
74.69	15208203	---	15208203	153.7288	0.3063

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LEGENDS
Burlington, MA
USA

Case Name:	FLUJO MAXIMO 270-1100-110.HSC
Unit Set:	Field1
Date/Time:	Fri Apr 13 12:13:26 2012

NeotecPIPESYS v2.5.77.0: FLUJO MAXIMO 270-1100-110.HSC

Puente Guillermo-Cogua-2

Heat Transfer

Cumulative Length (km)	Superficial Gas Reynold's Number	Superficial Liquid Reynold's Number	Mixture Reynold's Number	Inside Film Coefficient (Btu/hr-ft2-F)	Overall Heat Transfer Coefficient (Btu/hr-ft2-F)
75.47	15232259	---	15232259	153.5823	0.3063
76.25	15256438	---	15256438	153.4347	0.3063
77.03	15280740	---	15280740	153.2858	0.3063
77.81	15305168	---	15305168	153.1358	0.3063
78.60	15329725	---	15329725	152.9846	0.3063
79.38	15354412	---	15354412	152.8322	0.3063
80.16	15379233	---	15379233	152.6786	0.3063
80.94	15404189	---	15404189	152.5236	0.3063
81.72	15429284	---	15429284	152.3675	0.3063
82.50	15454521	---	15454521	152.2100	0.3063
83.28	15479904	---	15479904	152.0512	0.3063
84.06	15505433	---	15505433	151.8911	0.3063
84.85	15531114	---	15531114	151.7297	0.3063
85.63	15556948	---	15556948	151.5669	0.3063
86.41	15582940	---	15582940	151.4027	0.3063
87.19	15609095	---	15609095	151.2370	0.3063
87.97	15635414	---	15635414	151.0700	0.3063
88.75	15661902	---	15661902	150.9015	0.3063
89.53	15688561	---	15688561	150.7314	0.3063
90.31	15715400	---	15715400	150.5599	0.3063
91.09	15742418	---	15742418	150.3868	0.3063
91.88	15769624	---	15769624	150.2122	0.3063
92.20	15789031	---	15789031	150.0874	0.3063
92.98	15803770	---	15803770	149.9864	0.3063
93.77	15821816	---	15821816	149.8579	0.3063
94.55	15840020	---	15840020	149.7280	0.3063
95.33	15858394	---	15858394	149.5967	0.3063
96.11	15876941	---	15876941	149.4641	0.3063
96.89	15895667	---	15895667	149.3301	0.3063
97.67	15914574	---	15914574	149.1947	0.3063
98.00	15928152	---	15928152	149.0974	0.3063
98.79	15941992	---	15941992	148.9984	0.3063
99.57	15961608	---	15961608	148.8581	0.3063
100.35	15981418	---	15981418	148.7162	0.3063
101.13	16001430	---	16001430	148.5728	0.3063
101.91	16021647	---	16021647	148.4278	0.3063
102.69	16042079	---	16042079	148.2811	0.3063
103.01	16056504	---	16056504	148.1774	0.3063
103.79	16069142	---	16069142	148.0827	0.3063
104.57	16086187	---	16086187	147.9521	0.3063
105.35	16103437	---	16103437	147.8200	0.3063
105.76	16116688	---	16116688	147.7185	0.3063
105.83	16122540	---	16122540	147.6749	0.3063

aspentech	LEGENDS Burlington, MA USA	Case Name:	FLUJO MAXIMO 270-1100-110.HSC
		Unit Set:	Field1
		Date/Time:	Fri Apr 13 12:13:26 2012

NeotecPIPESYS v2.5.77.0: FLUJO MAXIMO 270-1100-110.HSC

Puente Guillermo-Cogua-2

Cooldown

Option

No pipeline fluid cooldown calculations will be performed

Basis

n/a

Thermal Conductivity of Fluid

n/a

Heat Transfer Parameters		Transient Cooldown Parameters	
Overall Heat Transfer Coefficient:	---	Maximum Time Since Shutdown:	---
Inside Film Coefficient:	---	First Intermediate Time:	---
Thermal Conductivity of Fluid:	---	Second Intermediate Time:	---
Heat Capacity of Pipe Material:	---	Third Intermediate Time:	---
Density of Pipe Material:	---	Minimum Cooldown Temperature:	---
		Calculation Time Step:	---

Results

Cumulative Length (km)	Overall Heat Transfer Coefficient (Btu/hr-ft2-F)	Inside Film Coefficient (Btu/hr-ft2-F)	Fluid Thermal Conductivity (Btu/hr-ft-F)	First Intermediate Temperature (F)	Second Intermediate Temperature (F)	Third Intermediate Temperature (F)	Temperature for Max Time Since Shutdown (F)	Time to Reach Min Cooldown Temperature (hours)

Inlet Properties : Puente Guillermo-1-2

		Overall	Vapour Phase			
Vapour/Phase Fraction		1.0000	1.0000			
Temperature:	(F)	109.74	109.74			
Pressure:	(psig)	1095.00	1095.00			
Molar Flow	(MMSCFD)	270.03	270.03			
Mass Flow	(lb/hr)	567953.83	567953.83			
Liquid Volume Flow	(barrel/day)	117378.87	117378.87			
Std Gas Flow	(MMSCFD)	269.53	269.53			
Molar Enthalpy	(Btu/lbmole)	-3.603e+004	-3.603e+004			
Mass Enthalpy	(Btu/lb)	-1881	-1881			
Heat Flow	(Btu/hr)	-1.068e+009	-1.068e+009			
Molar Density	(lbmole/ft3)	0.2170	0.2170			
Mass Density	(lb/ft3)	4.156	4.156			
Std Liquid Mass Density	(lb/ft3)	---	---			
Molar Heat Capacity	(Btu/lbmole-F)	12.265	12.265			
Mass Heat Capacity	(Btu/lb-F)	0.640	0.640			
Molar Entropy	(Btu/lbmole-F)	36.101	36.101			
Mass Entropy	(Btu/lb-F)	1.885	1.885			

aspentech	LEGENDS Burlington, MA USA	Case Name:	FLUJO MAXIMO 270-1100-110.HSC
		Unit Set:	Field1
		Date/Time:	Fri Apr 13 12:13:26 2012

NeotecPIPESYS v2.5.77.0: FLUJO MAXIMO 270-1100-110.HSC

Puente Guillermo-Cogua-2

Inlet Properties : Puente Guillermo-1-2

		Overall	Vapour Phase			
ThermalConductivity	(Btu/hr-ft-F)	0.024	0.024			
Viscosity	(cP)	0.014	0.014			
Surface Tension	(dyne/cm)	---	---			
Molecular Weight		19.155	19.155			
Z Factor		0.837	0.837			

Outlet Properties : A Cogua-2

		Overall	Vapour Phase			
Vapour/Phase Fraction		1.0000	1.0000			
Temperature:	(F)	40.32	40.32			
Pressure:	(psig)	535.06	535.06			
Molar Flow	(MMSCFD)	270.03	270.03			
Mass Flow	(lb/hr)	567953.83	567953.83			
Liquid Volume Flow	(barrel/day)	117378.87	117378.87			
Std Gas Flow	(MMSCFD)	269.53	269.53			
Molar Enthalpy	(Btu/lbmole)	-3.641e+004	-3.641e+004			
Mass Enthalpy	(Btu/lb)	-1901	-1901			
Heat Flow	(Btu/hr)	-1.080e+009	-1.080e+009			
Molar Density	(lbmole/ft3)	0.1192	0.1192			
Mass Density	(lb/ft3)	2.282	2.282			
Std Liquid Mass Density	(lb/ft3)	---	---			
Molar Heat Capacity	(Btu/lbmole-F)	10.911	10.911			
Mass Heat Capacity		0.570	0.570			
Molar Entropy	(Btu/lbmole-F)	36.556	36.556			
Mass Entropy	(Btu/lb-F)	1.908	1.908			
ThermalConductivity	(Btu/hr-ft-F)	0.019	0.019			
Viscosity	(cP)	0.012	0.012			
Surface Tension	(dyne/cm)	---	---			
Molecular Weight		19.155	19.155			
Z Factor		0.860	0.860			

Stream Compositions

Component	Inlet Mole Fraction	Outlet Mole Fraction
Methane	0.00562	0.00562
Ethane	0.01917	0.01917
Propane	0.84117	0.84117
i-Butane	0.09571	0.09571
n-Butane	0.03251	0.03251
i-Pentane	0.00439	0.00439
n-Pentane	0.00039	0.00039
n-Hexane	0.00070	0.00070
C7+*	0.00011	0.00011
n-Heptane	0.00009	0.00009
H2O	0.00013	0.00013
Nitrogen		

NeotecPIPESYS v2.5.77.0: FLUJO MAXIMO 270-1100-110.HSC

Puente Guillermo-Cogua-2

Stream Compositions

Component	Inlet Mole Fraction	Outlet Mole Fraction
CO2		
H2S		

Summary

Upstream Pressure:	1095.00 psig
Upstream Temperature:	109.74 F
Downstream Pressure:	535.06 psig
Downstream Temperature:	40.32 F
Predicted Pressure Loss:	559.94 psi
Friction Loss:	516.29 psi
Hydrostatic Loss:	43.35 psi
Kinetic Loss:	0.293 psi
Inline Facilities Loss:	0.00 psi
Average Pressure Gradient:	-0.0446 inH2O/ft
Total Liquid Holdup:	0.0 ft3
Total Line Pack @STD:	47218257.0 ft3
Pipe Volume:	701730.9 ft3
Net Heat Loss to the Surroundings:	1.048e+007 Btu/hr

NeotecPIPESYS v2.5.77.0: FLUJO MAXIMO 270-1100-110.HSC

Cogua-ECGSB-2

Connections

Inlet		Outlet		Energy	
NAME	FROM OPER	NAME	TO OPER	NAME	TO OPER
A ECGSB-2	Heater: E-101-2	A Succión-2	Valve: VLV-A Succión-2	q1-2-4-2	

NeotecPIPESYS v2.5.77.0: FLUJO MAXIMO 270-1100-110.HSC

Cogua-ECGSB-2

Calculation Procedures

Multiphase Horizontal Flow

Overall Selection:	Gas based default	*
Flow Regime Prediction :	Taitel and Dukler	*
Liquid Holdup:	Eaton et al	*
Frictional Pressure Loss:	Oliemans	*
Uphill Correction:	No Correction	*
Downhill Recovery:	Recovery Based on Gas Density	*

Single Phase Flow

Overall Selection:	Fanning Equation	

Multiphase Vertical Upflow

Overall Selection:	Gas based default	*
Flow Regime Prediction:	Govier, and Aziz	*
Liquid Holdup:	Aziz, Govier, and Fogarasi	*
Frictional Pressure Loss:	Aziz, Govier and Fogarasi	*

Multiphase Vertical Downflow

Overall Selection:	Gas based default	*
Flow Regime Prediction:	Beggs and Brill Revised	*
Liquid Holdup:	Beggs and Brill Revised	*
Frictional Pressure Loss:	Beggs and Brill	*

Stepsizes and Tolerances

Pipe Lengths

Intial stepsize:	0.03 km	*
Minimum stepsize:	0.000 km	*
Maximum stepsize:	---	

Pressure Convergence

Initial dP Guess:	-10.00 psi	*
Minimum dP/step:	3.00 psi	*
Maximum dP/step:	10.00 psi	*
Convergence Tolerance:	0.010 psi	*

Temperature Convergence

Initial dT Guess:	-2.00 F	*
Minimum dT/step:	1.50 F	*
Maximum dT/step:	5.00 F	*
Convergence Tolerance:	0.050 F	*

Enthalpy Convergence

Minimum dH/step:	0.60 Btu/lb	*
Maximum dH/step:	2.00 Btu/lb	*
Convergence Tolerance:	0.010 Btu/lb	*

Overall Settings

Stepsize and Tolerances:	Set to Program Defaults	*
Force Enthalpy Convergence:	Disabled	*
Optimize Stepsize:	Enabled	*

Overall Pipeline Pressure Convergence

Minimum allowed pressure:	-0.046 psig	*
Downstream press. conv. tolerance:	0.010 psi	*

Emulsion

Emulsion Viscosity Option: Normal blended viscosity calculation

NeotecPIPESYS v2.5.77.0: FLUJO MAXIMO 270-1100-110.HSC

Cogua-ECGSB-2

Emulsion

Emulsion Viscosity Option: Normal blended viscosity calculation

Pipeline Units Profile

Distance at Pipeline Origin: 109.00 km * Elevation at Pipeline Origin: 2.20 km *

Pipeline unit	Distance (km)	Elevation (km)	Run (km)	Rise (km)	Length (km)	Angle (deg)	Label
Pipe *	109.00 *	2.65 *	0.00	0.45	0.45	90.000	Pipe #12 *
Pipe *	114.00 *	2.68 *	5.00	0.03	5.00	0.344	Pipe #13 *
Pipe *	120.00 *	2.60 *	6.00	-0.08	6.00	-0.764	Pipe #14 *
Pipe *	124.00 *	2.58 *	4.00	-0.02	4.00	-0.286	Pipe #15 *
Erosion Velocity C	124.00	2.58	0.00	0.00	0.00	0.000	ErosionVelocityCheck #1 *

Surroundings Temperature Profile

Surroundings Temperature at Pipeline Origin: 68.00 F *

Distance (km)	Elevation (km)	Cum. Length (km)	Label	Surroundings T (F)	Surroundings Type
109.00	2.65	0.45	Pipe #12	68.00 *	Buried
114.00	2.68	5.45	Pipe #13	68.00 *	Buried
120.00	2.60	11.45	Pipe #14	68.00 *	Buried
124.00	2.58	15.45	Pipe #15	68.00 *	Buried

Pipe Dimensions at Pipeline Origin

Name: Pipe #12

Unit Location

Distance: 109.00 km Elevation: 2.20 km Distance From Origin: 0.00 km

Nominal Diameter: 20 Inches * Outside Diameter: 20.000 in
Pipe Schedule: Standard * Wall Thickness: 0.375 in
Inside Diameter: 19.250 in

Default Roughnesses: Default: Steel (bare, average field conditions) *

Absolute Roughness: 0.00180 in Relative Roughness: 0.000094

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Cogua-ECGSB-2

Heat Transfer Data at Pipeline Origin

Name: Pipe #12

Unit Location

Distance: 109.00 km Elevation: 2.20 km Distance From Origin: 0.00 km

Heat Transfer Environment		Soil Parameters	
Buried	*	Centre Line Depth: 0.001 km	*
Overall Heat Transfer Coefficient		Buried Fraction: ---	
		Type: Default	*
Specified Coefficient: ---		Conductivity: 0.500 Btu/hr-ft-F	
		Water Parameters	
Inside Film Coefficient		Density: ---	
Type: Calculated	*	Viscosity: ---	
SpecifiedCoefficient: ---		Conductivity: ---	
		Velocity: ---	
Pipe Parameters		Heat Capacity: ---	
		Air Parameters	
Default Conductivities: Default: Steel	*		
Pipe Conductivity: 28.000 Btu/hr-ft-F		Density: ---	
		Viscosity: ---	
		Conductivity: ---	
		Velocity: ---	

Pipe Coatings Data at Pipeline Origin

Name: Pipe #12

Unit Location

Distance: 109.00 km Elevation: 2.20 km Distance From Origin: 0.00 km

Layer	Coating	Thickness (in)	Conductivity (Btu/hr-ft-F)
---	<empty> *	---	---

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LEGENDS
Burlington, MA
USA

Case Name:	FLUJO MAXIMO 270-1100-110.HSC
Unit Set:	Field1
Date/Time:	Fri Apr 13 12:13:26 2012

NeotecPIPESYS v2.5.77.0: FLUJO MAXIMO 270-1100-110.HSC

Cogua-ECGSB-2

Calculation Messages

Error Messages

No calculation errors encountered, PIPESYS has converged.

Warning Messages

No calculation warnings encountered.

Pressure Temperature Summary

Pipeline Unit	Cum. Length (km)	Pressure (psig)	Temperature (F)	DeltaP (psi)	DeltaT (F)	Label
Pipe	0.45	475.10	32.85	24.90	-5.21	Pipe #12
Pipe	5.45	432.39	31.99	42.71	-0.86	Pipe #13
Pipe	11.45	379.51	31.79	52.87	-0.20	Pipe #14
Pipe	15.45	337.54	30.88	41.97	-0.91	Pipe #15
Erosion Velocity C	15.45	337.54	30.88	0.00	0.00	ErosionVelocityCheck #1

Pressure Temperature Profile

Cumulative Length (km)	Inside Diameter (in)	Pressure (psig)	Temperature (F)	DeltaP Friction (psi)	DeltaP Head (psi)	Liquid Volume Fraction	Pressure Gradient (inH2O/ft)
0.03	19.250	498.29	37.71	0.23	1.48	0.0000	-0.4732
0.10	19.250	494.46	36.91	0.52	3.31	0.0000	-0.4717
0.17	19.250	490.64	36.12	0.52	3.29	0.0000	-0.4696
0.24	19.250	486.84	35.32	0.53	3.27	0.0000	-0.4675
0.30	19.250	483.06	34.53	0.53	3.25	0.0000	-0.4654
0.37	19.250	479.29	33.74	0.53	3.23	0.0000	-0.4633
0.44	19.250	475.54	32.95	0.54	3.21	0.0000	-0.4612
0.45	19.250	475.10	32.85	0.06	0.37	0.0000	-0.4601
0.52	19.250	474.54	32.84	0.54	0.02	0.0000	-0.0688
1.04	19.250	470.27	32.76	4.12	0.14	0.0000	-0.0692
1.56	19.250	465.96	32.68	4.16	0.14	0.0000	-0.0698
2.08	19.250	461.61	32.60	4.20	0.14	0.0000	-0.0705
2.60	19.250	457.22	32.51	4.25	0.14	0.0000	-0.0712
3.12	19.250	452.78	32.43	4.29	0.14	0.0000	-0.0719
3.64	19.250	448.30	32.33	4.34	0.14	0.0000	-0.0726
4.16	19.250	443.77	32.24	4.38	0.14	0.0000	-0.0733
4.68	19.250	439.20	32.14	4.43	0.13	0.0000	-0.0741
5.21	19.250	434.58	32.04	4.48	0.13	0.0000	-0.0749
5.45	19.250	432.39	31.99	2.12	0.06	0.0000	-0.0755
5.97	19.250	428.12	32.00	4.56	-0.29	0.0000	-0.0692

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Burlington, MA
USA

Case Name:	FLUJO MAXIMO 270-1100-110.HSC
Unit Set:	Field1
Date/Time:	Fri Apr 13 12:13:26 2012

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Cogua-ECGSB-2

Pressure Temperature Profile

Cumulative Length (km)	Inside Diameter (in)	Pressure (psig)	Temperature (F)	DeltaP Friction (psi)	DeltaP Head (psi)	Liquid Volume Fraction	Pressure Gradient (inH2O/ft)
6.49	19.250	423.79	32.00	4.61	-0.29	0.0000	-0.0701
7.01	19.250	419.40	32.00	4.66	-0.28	0.0000	-0.0710
7.53	19.250	414.96	32.00	4.71	-0.28	0.0000	-0.0719
8.05	19.250	410.46	31.99	4.77	-0.28	0.0000	-0.0729
8.57	19.250	405.90	31.97	4.83	-0.27	0.0000	-0.0739
9.10	19.250	401.28	31.95	4.89	-0.27	0.0000	-0.0749
9.62	19.250	396.59	31.92	4.95	-0.27	0.0000	-0.0760
10.14	19.250	391.83	31.89	5.01	-0.26	0.0000	-0.0771
10.66	19.250	387.00	31.86	5.08	-0.26	0.0000	-0.0782
11.18	19.250	382.10	31.82	5.15	-0.26	0.0000	-0.0794
11.45	19.250	379.51	31.79	2.72	-0.13	0.0000	-0.0803
11.97	19.250	374.34	31.70	5.26	-0.09	0.0000	-0.0838
12.49	19.250	369.09	31.59	5.34	-0.09	0.0000	-0.0851
13.01	19.250	363.75	31.48	5.42	-0.09	0.0000	-0.0865
13.53	19.250	358.32	31.37	5.50	-0.09	0.0000	-0.0879
14.05	19.250	352.81	31.25	5.59	-0.09	0.0000	-0.0893
14.58	19.250	347.20	31.12	5.68	-0.09	0.0000	-0.0909
15.10	19.250	341.49	30.98	5.78	-0.09	0.0000	-0.0925
15.45	19.250	337.54	30.88	3.99	-0.06	0.0000	-0.0939

Fluid Transport Properties

Cumulative Length (km)	Iterations	Gas Density (lb/ft3)	Liquid Density (lb/ft3)	Gas Viscosity (cP)	Liquid Viscosity (cP)	Vsg (ft/s)	Vsl (ft/s)	Flow Pattern	Surface Tension (dyne/cm)
0.03	4	2.127	---	0.011	---	36.697	---	SP-Turbulent	---
0.10	3	2.118	---	0.011	---	36.861	---	SP-Turbulent	---
0.17	3	2.105	---	0.011	---	37.091	---	SP-Turbulent	---
0.24	3	2.091	---	0.011	---	37.322	---	SP-Turbulent	---
0.30	3	2.078	---	0.011	---	37.557	---	SP-Turbulent	---
0.37	3	2.065	---	0.011	---	37.793	---	SP-Turbulent	---
0.44	3	2.052	---	0.011	---	38.032	---	SP-Turbulent	---
0.45	3	2.045	---	0.011	---	38.167	---	SP-Turbulent	---
0.52	4	2.043	---	0.011	---	38.206	---	SP-Turbulent	---
1.04	3	2.032	---	0.011	---	38.418	---	SP-Turbulent	---
1.56	3	2.012	---	0.011	---	38.801	---	SP-Turbulent	---
2.08	3	1.992	---	0.011	---	39.194	---	SP-Turbulent	---
2.60	3	1.971	---	0.011	---	39.599	---	SP-Turbulent	---
3.12	3	1.951	---	0.011	---	40.014	---	SP-Turbulent	---
3.64	3	1.930	---	0.011	---	40.442	---	SP-Turbulent	---
4.16	3	1.909	---	0.011	---	40.882	---	SP-Turbulent	---
4.68	3	1.888	---	0.011	---	41.335	---	SP-Turbulent	---
5.21	3	1.867	---	0.011	---	41.802	---	SP-Turbulent	---
5.45	3	1.852	---	0.011	---	42.154	---	SP-Turbulent	---
5.97	4	1.837	---	0.011	---	42.500	---	SP-Turbulent	---

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LEGENDS
Burlington, MA
USA

Case Name:	FLUJO MAXIMO 270-1100-110.HSC
Unit Set:	Field1
Date/Time:	Fri Apr 13 12:13:26 2012

NeotecPIPESYS v2.5.77.0: FLUJO MAXIMO 270-1100-110.HSC

Cogua-ECGSB-2

Fluid Transport Properties

Cumulative Length (km)	Iterations	Gas Density (lb/ft3)	Liquid Density (lb/ft3)	Gas Viscosity (cP)	Liquid Viscosity (cP)	Vsg (ft/s)	Vsl (ft/s)	Flow Pattern	Surface Tension (dyne/cm)
6.49	3	1.817	---	0.011	---	42.972	---	SP-Turbulent	---
7.01	3	1.796	---	0.011	---	43.458	---	SP-Turbulent	---
7.53	3	1.776	---	0.011	---	43.961	---	SP-Turbulent	---
8.05	3	1.755	---	0.011	---	44.480	---	SP-Turbulent	---
8.57	3	1.734	---	0.011	---	45.017	---	SP-Turbulent	---
9.10	3	1.713	---	0.011	---	45.572	---	SP-Turbulent	---
9.62	3	1.692	---	0.011	---	46.148	---	SP-Turbulent	---
10.14	3	1.670	---	0.011	---	46.744	---	SP-Turbulent	---
10.66	3	1.648	---	0.011	---	47.362	---	SP-Turbulent	---
11.18	3	1.626	---	0.011	---	48.005	---	SP-Turbulent	---
11.45	3	1.609	---	0.011	---	48.510	---	SP-Turbulent	---
11.97	3	1.592	---	0.011	---	49.040	---	SP-Turbulent	---
12.49	3	1.569	---	0.011	---	49.766	---	SP-Turbulent	---
13.01	3	1.545	---	0.011	---	50.523	---	SP-Turbulent	---
13.53	3	1.521	---	0.011	---	51.313	---	SP-Turbulent	---
14.05	3	1.497	---	0.011	---	52.140	---	SP-Turbulent	---
14.58	3	1.473	---	0.011	---	53.006	---	SP-Turbulent	---
15.10	3	1.448	---	0.011	---	53.913	---	SP-Turbulent	---
15.45	3	1.427	---	0.011	---	54.710	---	SP-Turbulent	---

Miscellaneous

Cumulative Length (km)	Cumulative Liquid Holdup (ft3)	Cumulative Liquid Transit Time (hours)	Cumulative Line Pack @STD (ft3)	Cumulative Gas Transit Time (hours)
0.00	0.0	0.000	0.0	0.000
0.45	0.0	0.000	123354.0	0.011
5.45	0.0	0.000	1401774.0	0.125
11.45	0.0	0.000	2763079.8	0.246
15.45	0.0	0.000	3557564.9	0.316

LEGENDS
Burlington, MA
USA

Case Name:	FLUJO MAXIMO 270-1100-110.HSC
Unit Set:	Field1
Date/Time:	Fri Apr 13 12:13:26 2012

NeotecPIPESYS v2.5.77.0: FLUJO MAXIMO 270-1100-110.HSC

Cogua-ECGSB-2

Erosion Velocity Checks

Name: ErosionVelocityCheck #1

Unit Location

Distance: 124.00 km Elevation: 2.58 km Distance From Origin: 15.45 km

Fluid Conditions

Actual Gas Velocity: 54.71 ft/s
Mixture Velocity: 54.71 ft/s
Mixture Density: 1.427 lb/ft3

Effective C Value: 65.4

Allowable Velocity

Sand Production (lb/month)	C = 100 (ft/s)	C = 300 (ft/s)
0.0	---	---
500.0	105.86	105.86
1000.0	74.85	74.85
2000.0	52.93	52.93
5000.0	33.48	33.48
10000.0	23.67	23.67

Heat Transfer

Cumulative Length (km)	Superficial Gas Reynold's Number	Superficial Liquid Reynold's Number	Mixture Reynold's Number	Inside Film Coefficient (Btu/hr-ft2-F)	Overall Heat Transfer Coefficient (Btu/hr-ft2-F)
0.03	16315283	---	16315283	146.3990	0.3063
0.10	16339124	---	16339124	146.2732	0.3063
0.17	16372216	---	16372216	146.0989	0.3063
0.24	16405390	---	16405390	145.9244	0.3063
0.30	16438648	---	16438648	145.7499	0.3063
0.37	16471989	---	16471989	145.5752	0.3063
0.44	16505415	---	16505415	145.4005	0.3063
0.45	16524131	---	16524131	145.3028	0.3063
0.52	16527297	---	16527297	145.2834	0.3063
1.04	16537664	---	16537664	145.2043	0.3063
1.56	16556080	---	16556080	145.0639	0.3063
2.08	16574680	---	16574680	144.9223	0.3062
2.60	16593472	---	16593472	144.7794	0.3062
3.12	16612458	---	16612458	144.6352	0.3062
3.64	16631647	---	16631647	144.4897	0.3062
4.16	16651044	---	16651044	144.3428	0.3062
4.68	16670659	---	16670659	144.1945	0.3062
5.21	16690499	---	16690499	144.0447	0.3062
5.45	16705197	---	16705197	143.9339	0.3062
5.97	16717852	---	16717852	143.8330	0.3062
6.49	16733825	---	16733825	143.7017	0.3062
7.01	16750048	---	16750048	143.5688	0.3062
7.53	16766540	---	16766540	143.4342	0.3062
8.05	16783311	---	16783311	143.2979	0.3062
8.57	16800366	---	16800366	143.1598	0.3062
9.10	16817719	---	16817719	143.0198	0.3062
9.62	16835381	---	16835381	142.8779	0.3062

NeotecPIPESYS v2.5.77.0: FLUJO MAXIMO 270-1100-110.HSC

Cogua-ECGSB-2

Heat Transfer

Cumulative Length (km)	Superficial Gas Reynold's Number	Superficial Liquid Reynold's Number	Mixture Reynold's Number	Inside Film Coefficient (Btu/hr-ft2-F)	Overall Heat Transfer Coefficient (Btu/hr-ft2-F)
10.14	16853358	---	16853358	142.7339	0.3062
10.66	16871671	---	16871671	142.5878	0.3062
11.18	16890328	---	16890328	142.4395	0.3062
11.45	16904730	---	16904730	142.3254	0.3062
11.97	16920348	---	16920348	142.2048	0.3062
12.49	16941789	---	16941789	142.0413	0.3062
13.01	16963629	---	16963629	141.8752	0.3062
13.53	16985888	---	16985888	141.7064	0.3062
14.05	17008585	---	17008585	141.5347	0.3062
14.58	17031744	---	17031744	141.3601	0.3062
15.10	17055390	---	17055390	141.1822	0.3062
15.45	17075618	---	17075618	141.0305	0.3062

Cooldown

Option

No pipeline fluid cooldown calculations will be performed

Basis

n/a

Thermal Conductivity of Fluid

n/a

Heat Transfer Parameters		Transient Cooldown Parameters	
Overall Heat Transfer Coefficient:	---	Maximum Time Since Shutdown:	---
Inside Film Coefficient:	---	First Intermediate Time:	---
Thermal Conductivity of Fluid:	---	Second Intermediate Time:	---
Heat Capacity of Pipe Material:	---	Third Intermediate Time:	---
Density of Pipe Material:	---	Minimum Cooldown Temperature:	---
		Calculation Time Step:	---

Results

Cumulative Length (km)	Overall Heat Transfer Coefficient (Btu/hr-ft2-F)	Inside Film Coefficient (Btu/hr-ft2-F)	Fluid Thermal Conductivity (Btu/hr-ft-F)	First Intermediate Temperature (F)	Second Intermediate Temperature (F)	Third Intermediate Temperature (F)	Temperature for Max Time Since Shutdown (F)	Time to Reach Min Cooldown Temperature (hours)

aspentech	LEGENDS Burlington, MA USA	Case Name:	FLUJO MAXIMO 270-1100-110.HSC
		Unit Set:	Field1
		Date/Time:	Fri Apr 13 12:13:26 2012

NeotecPIPESYS v2.5.77.0: FLUJO MAXIMO 270-1100-110.HSC

Cogua-ECGSB-2

Inlet Properties : A ECGSB-2

	Overall	Vapour Phase			
Vapour/Phase Fraction	1.0000	1.0000			
Temperature: (F)	38.06 *	38.06			
Pressure: (psig)	500.00	500.00			
Molar Flow (MMSCFD)	270.03	270.03			
Mass Flow (lb/hr)	567953.83	567953.83			
Liquid Volume Flow (barrel/day)	117378.87	117378.87			
Std Gas Flow (MMSCFD)	269.53	269.53			
Molar Enthalpy (Btu/lbmole)	-3.641e+004	-3.641e+004			
Mass Enthalpy (Btu/lb)	-1901	-1901			
Heat Flow (Btu/hr)	-1.080e+009	-1.080e+009			
Molar Density (lbmole/ft3)	0.1112	0.1112			
Mass Density (lb/ft3)	2.130	2.130			
Std Liquid Mass Density (lb/ft3)	---	---			
Molar Heat Capacity (Btu/lbmole-F)	10.774	10.774			
Mass Heat Capacity (Btu/lb-F)	0.562	0.562			
Molar Entropy (Btu/lbmole-F)	36.682	36.682			
Mass Entropy (Btu/lb-F)	1.915	1.915			
ThermalConductivity (Btu/hr-ft-F)	0.018	0.018			
Viscosity (cP)	0.011	0.011			
Surface Tension (dyne/cm)	---	---			
Molecular Weight	19.155	19.155			
Z Factor	0.867	0.867			

Outlet Properties : A Succión-2

	Overall	Vapour Phase			
Vapour/Phase Fraction	1.0000	1.0000			
Temperature: (F)	30.88	30.88			
Pressure: (psig)	337.54	337.54			
Molar Flow (MMSCFD)	270.03	270.03			
Mass Flow (lb/hr)	567953.83	567953.83			
Liquid Volume Flow (barrel/day)	117378.87	117378.87			
Std Gas Flow (MMSCFD)	269.53	269.53			
Molar Enthalpy (Btu/lbmole)	-3.634e+004	-3.634e+004			
Mass Enthalpy (Btu/lb)	-1897	-1897			
Heat Flow (Btu/hr)	-1.077e+009	-1.077e+009			
Molar Density (lbmole/ft3)	0.0740	0.0740			
Mass Density (lb/ft3)	1.418	1.418			
Std Liquid Mass Density (lb/ft3)	---	---			
Molar Heat Capacity (Btu/lbmole-F)	10.142	10.142			
Mass Heat Capacity	0.529	0.529			
Molar Entropy (Btu/lbmole-F)	37.486	37.486			
Mass Entropy (Btu/lb-F)	1.957	1.957			
ThermalConductivity (Btu/hr-ft-F)	0.017	0.017			
Viscosity (cP)	0.011	0.011			
Surface Tension (dyne/cm)	---	---			
Molecular Weight	19.155	19.155			

* Specified by user.

NeotecPIPESYS v2.5.77.0: FLUJO MAXIMO 270-1100-110.HSC

Cogua-ECGSB-2

Outlet Properties : A Succión-2

	Overall	Vapour Phase			
Z Factor	0.904	0.904			

Stream Compositions

Component	Inlet Mole Fraction	Outlet Mole Fraction
Methane	0.00562	0.00562
Ethane	0.01917	0.01917
Propane	0.84117	0.84117
i-Butane	0.09571	0.09571
n-Butane	0.03251	0.03251
i-Pentane	0.00439	0.00439
n-Pentane	0.00039	0.00039
n-Hexane	0.00070	0.00070
C7+*	0.00011	0.00011
n-Heptane	0.00009	0.00009
H2O	0.00013	0.00013
Nitrogen		
CO2		
H2S		

Summary

Upstream Pressure:	500.00 psig
Upstream Temperature:	38.06 F
Downstream Pressure:	337.54 psig
Downstream Temperature:	30.88 F
Predicted Pressure Loss:	162.46 psi
Friction Loss:	143.28 psi
Hydrostatic Loss:	18.89 psi
Kinetic Loss:	0.288 psi
Inline Facilities Loss:	0.00 psi
Average Pressure Gradient:	-0.0887 inH2O/ft
Total Liquid Holdup:	0.0 ft3
Total Line Pack @STD:	3557564.9 ft3
Pipe Volume:	102452.2 ft3
Net Heat Loss to the Surroundings:	-2.921e+006 Btu/hr

aspentech	LEGENDS Burlington, MA USA	Case Name:	FLUJO MAXIMO 270-1100-110.HSC
		Unit Set:	Field1
		Date/Time:	Fri Apr 13 12:13:26 2012

Separator: FS-101-2

CONNECTIONS

Inlet Stream

Stream Name	From Unit Operation	
A Cogua-2	PIPESYS Extension:	Puente Guillermo-Cogua-2

Outlet Stream

Stream Name	To Unit Operation	
A regulación-2	Tee:	TEE-100-2
A drenaje-2		

Energy Stream

Stream Name	From Unit Operation

PARAMETERS

Vessel Volume:	4175 ft3 *	Level SP:	50.00 %	Liquid Volume:	2087 ft3		
Vessel Pressure:	535.1 psig	Pressure Drop:	0.0000 psi	Duty:	0.0000 Btu/hr	Heat Transfer Mode:	Heating

User Variables

RATING

Sizing

Cylinder		Vertical		Separator has a Boot:	No
Volume:	4175 ft3 *	Diameter:	4.647e-003 km	Height:	6.971e-003 km

Nozzles

Base Elevation Relative to Ground Level	0.0000 km *	Diameter	4.647e-003 km	Height	6.971e-003

		A Cogua-2	A regulación-2	A drenaje-2
Diameter	(km)	3.485e-004	3.485e-004	3.485e-004
Elevation (Base)	(km)	3.485e-003	6.971e-003	0.0000
Elevation (Ground)	(km)	3.485e-003	6.971e-003	0.0000
Elevation (% of Height)	(%)	50.00	100.00	0.00

Level Taps: Level Tap Specification

Level Tap	PV High	PV Low	OP High	OP Low

Level Taps: Calculated Level Tap Values

Level Tap	Liquid Level	Aqueous Level

Options

PV Work Term Contribution	(%)	100.00 *		

CONDITIONS

Name		A Cogua-2	A drenaje-2	A regulación-2	
Vapour		1.0000	0.0000	1.0000	
Temperature	(F)	40.3199	40.3199	40.3199	
Pressure	(psig)	535.0646	535.0646	535.0646	
Molar Flow	(MMSCFD)	270.0341	0.0000	270.0341	
Mass Flow	(lb/hr)	567953.8331	0.0000	567953.8331	
Std Ideal Liq Vol Flow	(barrel/day)	117378.8653	0.0000	117378.8653	
Molar Enthalpy	(Btu/lbmole)	-3.641e+004	-1.238e+005	-3.641e+004	

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LEGENDS
Burlington, MA
USA

Case Name:	FLUJO MAXIMO 270-1100-110.HSC
Unit Set:	Field1
Date/Time:	Fri Apr 13 12:13:26 2012

Separator: FS-101-2 (continued)

CONDITIONS

Molar Entropy	(Btu/lbmole-F)	36.56	11.53	36.56	
Heat Flow	(Btu/hr)	-1.0797e+09	0.0000e-01	-1.0797e+09	

PROPERTIES

Name		A Cogua-2	A drenaje-2	A regulación-2		
Molecular Weight		19.15	18.04	19.15		
Molar Density	(lbmole/ft3)	0.1192	2.980	0.1192		
Mass Density	(lb/ft3)	2.282	53.76	2.282		
Act. Volume Flow	(barrel/day)	1.064e+006	0.0000	1.064e+006		
Mass Enthalpy	(Btu/lb)	-1901	-6860	-1901		
Mass Entropy	(Btu/lb-F)	1.908	0.6389	1.908		
Heat Capacity	(Btu/lbmole-F)	10.91	18.58	10.91		
Mass Heat Capacity	(Btu/lb-F)	0.5696	1.030	0.5696		
LHV Vol Basis (Std)	(Btu/lbmole)	3.844e+005	2.903e-002	3.844e+005		
LHV Mass Basis (Std)	(Btu/lb)	2.007e+004	1.609e-003	2.007e+004		
Phase Fraction [Vol. Basis]		1.000	---	1.000		
Phase Fraction [Mass Basis]		1.000	0.0000	1.000		
Partial Pressure of CO2	(psig)	-4.156	-14.70	-4.156		
Cost Based on Flow	(Cost/s)	0.0000	0.0000	0.0000		
Act. Gas Flow	(ACFM)	4147	---	4147		
Avg. Liq. Density	(lbmole/ft3)	1.080	---	1.080		
Specific Heat	(Btu/lbmole-F)	10.91	18.58	10.91		
Std. Gas Flow	(MMSCFD)	270.0	0.0000	270.0		
Std. Ideal Liq. Mass Density	(lb/ft3)	20.68	62.27	20.68		
Act. Liq. Flow	(USGPM)	---	0.0000	0.0000		
Z Factor		0.8599	---	---		
Watson K		18.38	8.512	18.38		
User Property		---	---	---		
Partial Pressure of H2S	(psig)	-14.70	-14.70	-14.70		
Cp/(Cp - R)		1.222	1.120	1.222		
Cp/Cv		1.494	1.133	1.494		
Heat of Vap.	(Btu/lbmole)	3799	1.404e+004	3799		
Kinematic Viscosity	(cSt)	0.3161	1.441	0.3161		
Liq. Mass Density (Std. Cond)	(lb/ft3)	---	63.38	---		
Liq. Vol. Flow (Std. Cond)	(barrel/day)	---	0.0000	---		
Liquid Fraction		0.0000	1.000	0.0000		
Molar Volume	(ft3/lbmole)	8.392	0.3356	8.392		
Mass Heat of Vap.	(Btu/lb)	198.3	778.1	198.3		
Phase Fraction [Molar Basis]		1.0000	0.0000	1.0000		
Surface Tension	(dyne/cm)	---	75.53	---		
Thermal Conductivity	(Btu/hr-ft-F)	1.858e-002	0.3344	1.858e-002		
Viscosity	(cP)	1.156e-002	1.241	1.156e-002		
Cv (Semi-Ideal)	(Btu/lbmole-F)	8.925	16.60	8.925		
Mass Cv (Semi-Ideal)	(Btu/lb-F)	0.4660	0.9199	0.4660		
Cv	(Btu/lbmole-F)	7.304	16.41	7.304		
Mass Cv	(Btu/lb-F)	0.3813	0.9094	0.3813		
Cv (Ent. Method)	(Btu/lbmole-F)	---	---	---		
Mass Cv (Ent. Method)	(Btu/lb-F)	---	---	---		
Cp/Cv (Ent. Method)		---	---	---		
Reid VP at 37.8 C	(psig)	---	---	---		
True VP at 37.8 C	(psig)	---	42.65	---		
Liq. Vol. Flow - Sum(Std. Cond)	(barrel/day)	0.0000	0.0000	0.0000		

Separator: FS-101-2 (continued)

PROPERTIES

Name	A Cogua-2	A drenaje-2	A regulación-2		
Viscosity Index	-21.13	7.178	-21.13		

DYNAMICS

Vessel Parameters: Initialize from Product

Vessel Volume	(ft3)	4175 *	Level Calculator		Vertical cylinder
Vessel Diameter	(km)	4.647e-003	Fraction Calculator		Use levels and nozzles
Vessel Height	(km)	6.971e-003	Feed Delta P	(psi)	0.0000
Liquid Level Percent	(%)	50.00	Vessel Pressure	(psig)	535.1

Holdup: Vessel Levels

Phase	Level (km)	Percent (%)	Volume (ft3)
Vapour	---	---	0.0000
Liquid	---	---	0.0000
Aqueous	---	---	0.0000

Holdup: Details

Phase	Accumulation (MMSCFD)	Moles (lbmole)	Volume (ft3)
Vapour	0.0000	0.0000 *	0.0000
Liquid	0.0000	0.0000 *	0.0000
Aqueous	0.0000	0.0000 *	0.0000
Total	**0.0000**	**0.0000**	**0.0000**

NOTES

Tee: TEE-100-2

CONNECTIONS

Inlet Stream

STREAM NAME	FROM UNIT OPERATION	
A regulación-2	Separator	FS-101-2

Outlet Stream

STREAM NAME	TO UNIT OPERATION	
A Brazo 1-2	Valve	PCV-101-3
A Brazo 2-2	Valve	PCV-101-2-2

PARAMETERS

	Flow Ratios	Dynamic Valve Openings
A Brazo 1-2	0.5000 *	50.00
A Brazo 2-2	0.5000	50.00

Valve Control: Multiple Stream

User Variables

RATING

Tee: TEE-100-2 (continued)

RATING

Nozzle Parameters

Base Elevation Relative to Ground Level 0.0000 km *

		A regulación-2	A Brazo 1-2	A Brazo 2-2
Diameter	(km)	5.000e-005	5.000e-005	5.000e-005
Elevation (Base)	(km)	0.0000	0.0000	0.0000
Elevation (Ground)	(km)	0.0000	0.0000	0.0000

CONDITIONS

Name		A regulación-2	A Brazo 1-2	A Brazo 2-2	
Vapour		1.0000	1.0000	1.0000	
Temperature	(F)	40.3199	40.3199	40.3199	
Pressure	(psig)	535.0646	535.0646	535.0646	
Molar Flow	(MMSCFD)	270.0341	135.0171	135.0171	
Mass Flow	(lb/hr)	567953.8331	283976.9165	283976.9165	
Std Ideal Liq Vol Flow	(barrel/day)	117378.8653	58689.4327	58689.4327	
Molar Enthalpy	(Btu/lbmole)	-3.641e+004	-3.641e+004	-3.641e+004	
Molar Entropy	(Btu/lbmole-F)	36.56	36.56	36.56	
Heat Flow	(Btu/hr)	-1.0797e+09	-5.3984e+08	-5.3984e+08	

PROPERTIES

Name		A regulación-2	A Brazo 1-2	A Brazo 2-2		
Molecular Weight		19.15	19.15	19.15		
Molar Density	(lbmole/ft3)	0.1192	0.1192	0.1192		
Mass Density	(lb/ft3)	2.282	2.282	2.282		
Act. Volume Flow	(barrel/day)	1.064e+006	5.318e+005	5.318e+005		
Mass Enthalpy	(Btu/lb)	-1901	-1901	-1901		
Mass Entropy	(Btu/lb-F)	1.908	1.908	1.908		
Heat Capacity	(Btu/lbmole-F)	10.91	10.91	10.91		
Mass Heat Capacity	(Btu/lb-F)	0.5696	0.5696	0.5696		
LHV Vol Basis (Std)	(Btu/lbmole)	3.844e+005	3.844e+005	3.844e+005		
LHV Mass Basis (Std)	(Btu/lb)	2.007e+004	2.007e+004	2.007e+004		
Phase Fraction [Vol. Basis]		1.000	1.000	1.000		
Phase Fraction [Mass Basis]		1.000	1.000	1.000		
Partial Pressure of CO2	(psig)	-4.156	-4.156	-4.156		
Cost Based on Flow	(Cost/s)	0.0000	0.0000	0.0000		
Act. Gas Flow	(ACFM)	4147	2074	2074		
Avg. Liq. Density	(lbmole/ft3)	1.080	1.080	1.080		
Specific Heat	(Btu/lbmole-F)	10.91	10.91	10.91		
Std. Gas Flow	(MMSCFD)	270.0	135.0	135.0		
Std. Ideal Liq. Mass Density	(lb/ft3)	20.68	20.68	20.68		
Act. Liq. Flow	(USGPM)	0.0000	0.0000	0.0000		
Z Factor		---	---	---		
Watson K		18.38	18.38	18.38		
User Property		---	---	---		
Partial Pressure of H2S	(psig)	-14.70	-14.70	-14.70		
Cp/(Cp - R)		1.222	1.222	1.222		
Cp/Cv		1.494	1.494	1.494		
Heat of Vap.	(Btu/lbmole)	3799	3799	3799		
Kinematic Viscosity	(cSt)	0.3161	0.3161	0.3161		
Liq. Mass Density (Std. Cond)	(lb/ft3)	---	---	---		
Liq. Vol. Flow (Std. Cond)	(barrel/day)	---	---	---		
Liquid Fraction		0.0000	0.0000	0.0000		

Tee: TEE-100-2 (continued)

PROPERTIES

Name		A regulación-2	A Brazo 1-2	A Brazo 2-2		
Molar Volume	(ft3/lbmole)	8.392	8.392	8.392		
Mass Heat of Vap.	(Btu/lb)	198.3	198.3	198.3		
Phase Fraction [Molar Basis]		1.0000	1.0000	1.0000		
Surface Tension	(dyne/cm)	---	---	---		
Thermal Conductivity	(Btu/hr-ft-F)	1.858e-002	1.858e-002	1.858e-002		
Viscosity	(cP)	1.156e-002	1.156e-002	1.156e-002		
Cv (Semi-Ideal)	(Btu/lbmole-F)	8.925	8.925	8.925		
Mass Cv (Semi-Ideal)	(Btu/lb-F)	0.4660	0.4660	0.4660		
Cv	(Btu/lbmole-F)	7.304	7.304	7.304		
Mass Cv	(Btu/lb-F)	0.3813	0.3813	0.3813		
Cv (Ent. Method)	(Btu/lbmole-F)	---	---	---		
Mass Cv (Ent. Method)	(Btu/lb-F)	---	---	---		
Cp/Cv (Ent. Method)		---	---	---		
Reid VP at 37.8 C	(psig)	---	---	---		
True VP at 37.8 C	(psig)	---	---	---		
Liq. Vol. Flow - Sum(Std. Cond)	(barrel/day)	0.0000	0.0000	0.0000		
Viscosity Index		-21.13	-21.13	-21.13		

DYNAMICS

Holdup Details

Phase	Accumulation (MMSCFD)	Moles (lbmole)		Volume (ft3)
Vapour	0.0000	0.0000	*	0.0000
Liquid	0.0000	0.0000	*	0.0000
Aqueous	0.0000	0.0000	*	0.0000
Total	**0.0000**	**0.0000**		**0.0000**

NOTES

Valve: PCV-101-3

CONNECTIONS

Inlet Stream

STREAM NAME	FROM UNIT OPERATION	
A Brazo 1-2	Tee	TEE-100-2

Outlet Stream

STREAM NAME	TO UNIT OPERATION	
A Segunda Regulación-3	Valve	PCV-102-3

PARAMETERS

Physical Properties

Pressure Drop:	-114.9 psi	

User Variables

RATING

aspentech	LEGENDS Burlington, MA USA	Case Name:	FLUJO MAXIMO 270-1100-110.HSC
		Unit Set:	Field1
		Date/Time:	Fri Apr 13 12:13:26 2012

Valve: PCV-101-3 (continued)

RATING

Sizing

Sizing Conditions					
Inlet Pressure	535.1 psig	Molecular Weight	19.15	Current	
Valve Opening	50.00 % *	Delta P	-114.9 psi	Flow Rate	2.840e+005 lb/hr

Valve Manufacturer and Valve Type					
Manufacturer:	Universal Gas Sizing			Type:	---

Valve Operating Characteristic and Sizing Method							
Linear				Sizing Method:	Cv (standard) cal/min.sqrt(psi)		
C1	25.00	Km	0.9000	Cv	USGPM(60F,1psi) *	Cg	3399

Nozzle Parameters

Base Elevation Relative to Ground Level				0.0000 km *
		A Brazo 1-2	A Segunda Regulación-3	
Diameter	(km)	5.000e-005	2.032e-004 *	
Elevation (Base)	(km)	0.0000	0.0000	
Elevation (Ground)	(km)	0.0000	0.0000	
Elevation (% of Height)	(%)			

CONDITIONS

Name		A Brazo 1-2	A Segunda Regulación-3		
Vapour		1.0000	1.0000		
Temperature	(F)	40.3199	49.2700		
Pressure	(psig)	535.0646	650.0000 *		
Molar Flow	(MMSCFD)	135.0171	135.0171		
Mass Flow	(lb/hr)	283976.9165	283976.9165		
Std Ideal Liq Vol Flow	(barrel/day)	58689.4327	58689.4327		
Molar Enthalpy	(Btu/lbmole)	-3.641e+004	-3.641e+004		
Molar Entropy	(Btu/lbmole-F)	36.56	36.24		
Heat Flow	(Btu/hr)	-5.3984e+08	-5.3984e+08		

PROPERTIES

Name		A Brazo 1-2	A Segunda Regulación-3			
Molecular Weight		19.15	19.15			
Molar Density	(lbmole/ft3)	0.1192	0.1446			
Mass Density	(lb/ft3)	2.282	2.769			
Act. Volume Flow	(barrel/day)	5.318e+005	4.384e+005			
Mass Enthalpy	(Btu/lb)	-1901	-1901			
Mass Entropy	(Btu/lb-F)	1.908	1.892			
Heat Capacity	(Btu/lbmole-F)	10.91	11.34			
Mass Heat Capacity	(Btu/lb-F)	0.5696	0.5920			
LHV Vol Basis (Std)	(Btu/lbmole)	3.844e+005	3.844e+005			
LHV Mass Basis (Std)	(Btu/lb)	2.007e+004	2.007e+004			
Phase Fraction [Vol. Basis]		1.000	1.000			
Phase Fraction [Mass Basis]		1.000	1.000			
Partial Pressure of CO2	(psig)	-4.156	-1.953			
Cost Based on Flow	(Cost/s)	0.0000	0.0000			
Act. Gas Flow	(ACFM)	2074	1709			
Avg. Liq. Density	(lbmole/ft3)	1.080	1.080			
Specific Heat	(Btu/lbmole-F)	10.91	11.34			
Std. Gas Flow	(MMSCFD)	135.0	135.0			
Std. Ideal Liq. Mass Density	(lb/ft3)	20.68	20.68			
Act. Liq. Flow	(USGPM)	0.0000	---			

Valve: PCV-101-3 (continued)

PROPERTIES

Name	A Brazo 1-2	A Segunda Regulación-3
Z Factor	---	0.8419
Watson K	18.38	18.38
User Property	---	---
Partial Pressure of H2S (psig)	-14.70	-14.70
Cp/(Cp - R)	1.222	1.212
Cp/Cv	1.494	1.534
Heat of Vap. (Btu/lbmole)	3799	3432
Kinematic Viscosity (cSt)	0.3161	0.2710
Liq. Mass Density (Std. Cond) (lb/ft3)	---	---
Liq. Vol. Flow (Std. Cond) (barrel/day)	---	---
Liquid Fraction	0.0000	0.0000
Molar Volume (ft3/lbmole)	8.392	6.918
Mass Heat of Vap. (Btu/lb)	198.3	179.2
Phase Fraction [Molar Basis]	1.0000	1.0000
Surface Tension (dyne/cm)	---	---
Thermal Conductivity (Btu/hr-ft-F)	1.858e-002	1.950e-002
Viscosity (cP)	1.156e-002	1.202e-002
Cv (Semi-Ideal) (Btu/lbmole-F)	8.925	9.354
Mass Cv (Semi-Ideal) (Btu/lb-F)	0.4660	0.4884
Cv (Btu/lbmole-F)	7.304	7.392
Mass Cv (Btu/lb-F)	0.3813	0.3859
Cv (Ent. Method) (Btu/lbmole-F)	---	---
Mass Cv (Ent. Method) (Btu/lb-F)	---	---
Cp/Cv (Ent. Method)	---	---
Reid VP at 37.8 C (psig)	---	---
True VP at 37.8 C (psig)	---	---
Liq. Vol. Flow - Sum(Std. Cond) (barrel/day)	0.0000	0.0000
Viscosity Index	-21.13	-27.97

DYNAMICS

Dynamic Specifications

Total Delta P (psi)	-114.9	Not Active
Pressure Flow Relation		Active

Dynamic Parameters

Valve Opening (%)	50.00 *	Mass Flow (lb/hr)	2.840e+005
Conductance (USGPM(60F,1psi))	135.9 *	Friction Delta P (psi)	239.5

Pipe Model Parameters

Material	Cast Iron	Darcy Friction Factor	---
Roughness (km)	2.590e-007	Pipe k (lb/hr/sqrt(psia-lb/ft3))	0.0000
Pipe Length (km)	0.0000 *	Velocity (ft/s)	1635 *
Feed Diameter (km)	5.000e-005	Reynolds Number	7.884e+007 *

Hold-Up Volume: 0.0000 ft3 *

Phase	Accumulation (MMSCFD)	Moles (lbmole)	Volume (ft3)
Vapour	0.0000	0.0000 *	0.0000
Liquid	0.0000	0.0000 *	0.0000
Aqueous	0.0000	0.0000 *	0.0000

Valve: PCV-101-3 (continued)

Total	0.0000	0.0000	0.0000

Actuator Parameters

Parameters Mode: Instantaneous

Actuator Time Constant (seconds)	1.000 *	Actuator Linear Rate	1.000e-002 *
Valve Stickiness Time Constant (seconds)	---		

Activator Position

Fail Position: None

	Min (%)	Max (%)	Current (%)	Desired (%)	Offset (%)
Valve	0.00 *	100.00 *	50.00 *	---	0.00 *
Actuator	0.00 *	100.00 *	50.00 *	50.00 *	---

Valve: PCV-102-3

CONNECTIONS

Inlet Stream

STREAM NAME	FROM UNIT OPERATION
A Segunda Regulación-3	Valve PCV-101-3

Outlet Stream

STREAM NAME	TO UNIT OPERATION
A Medición-3	Mixer MIX-101-2

PARAMETERS

Physical Properties

Pressure Drop:	150.0 psi

User Variables

RATING

Sizing

Sizing Conditions

Inlet Pressure	650.0 psig *	Molecular Weight	19.15	Current	
Valve Opening	50.00 % *	Delta P	150.0 psi	Flow Rate	2.840e+005 lb/hr

Valve Manufacturer and Valve Type

Manufacturer: Universal Gas Sizing	Type: ---

Valve Operating Characteristic and Sizing Method

Linear				Sizing Method:	Cv (standard) cal/min.sqrt(psi)		
C1	25.00	Km	0.9000	Cv	USGPM(60F,1psi) *	Cg	4791

Nozzle Parameters

Base Elevation Relative to Ground Level			0.0000 km *
	A Segunda Regulación-3	A Medición-3	
Diameter (km)	2.032e-004 *	2.032e-004 *	
Elevation (Base) (km)	0.0000	0.0000	

Valve: PCV-102-3 (continued)

Elevation (Ground)	(km)	0.0000	0.0000	
Elevation (% of Height)	(%)			

CONDITIONS

Name		A Segunda Regulación-3	A Medición-3		
Vapour		1.0000	1.0000		
Temperature	(F)	49.2700	37.4758		
Pressure	(psig)	650.0000 *	500.0000 *		
Molar Flow	(MMSCFD)	135.0171	135.0171		
Mass Flow	(lb/hr)	283976.9165	283976.9165		
Std Ideal Liq Vol Flow	(barrel/day)	58689.4327	58689.4327		
Molar Enthalpy	(Btu/lbmole)	-3.641e+004	-3.641e+004		
Molar Entropy	(Btu/lbmole-F)	36.24	36.67		
Heat Flow	(Btu/hr)	-5.3984e+08	-5.3984e+08		

PROPERTIES

Name		A Segunda Regulación-3	A Medición-3			
Molecular Weight		19.15	19.15			
Molar Density	(lbmole/ft3)	0.1446	0.1114			
Mass Density	(lb/ft3)	2.769	2.134			
Act. Volume Flow	(barrel/day)	4.384e+005	5.689e+005			
Mass Enthalpy	(Btu/lb)	-1901	-1901			
Mass Entropy	(Btu/lb-F)	1.892	1.914			
Heat Capacity	(Btu/lbmole-F)	11.34	10.78			
Mass Heat Capacity	(Btu/lb-F)	0.5920	0.5627			
LHV Vol Basis (Std)	(Btu/lbmole)	3.844e+005	3.844e+005			
LHV Mass Basis (Std)	(Btu/lb)	2.007e+004	2.007e+004			
Phase Fraction [Vol. Basis]		1.000	1.000			
Phase Fraction [Mass Basis]		1.000	1.000			
Partial Pressure of CO2	(psig)	-1.953	-4.829			
Cost Based on Flow	(Cost/s)	0.0000	0.0000			
Act. Gas Flow	(ACFM)	1709	2218			
Avg. Liq. Density	(lbmole/ft3)	1.080	1.080			
Specific Heat	(Btu/lbmole-F)	11.34	10.78			
Std. Gas Flow	(MMSCFD)	135.0	135.0			
Std. Ideal Liq. Mass Density	(lb/ft3)	20.68	20.68			
Act. Liq. Flow	(USGPM)	---	---			
Z Factor		0.8419	0.8660			
Watson K		18.38	18.38			
User Property		---	---			
Partial Pressure of H2S	(psig)	-14.70	-14.70			
Cp/(Cp - R)		1.212	1.226			
Cp/Cv		1.534	1.481			
Heat of Vap.	(Btu/lbmole)	3432	3910			
Kinematic Viscosity	(cSt)	0.2710	0.3340			
Liq. Mass Density (Std. Cond)	(lb/ft3)	---	---			
Liq. Vol. Flow (Std. Cond)	(barrel/day)	---	---			
Liquid Fraction		0.0000	0.0000			
Molar Volume	(ft3/lbmole)	6.918	8.976			
Mass Heat of Vap.	(Btu/lb)	179.2	204.1			
Phase Fraction [Molar Basis]		1.0000	1.0000			
Surface Tension	(dyne/cm)	---	---			
Thermal Conductivity	(Btu/hr-ft-F)	1.950e-002	1.830e-002			
Viscosity	(cP)	1.202e-002	1.142e-002			

Valve: PCV-102-3 (continued)

PROPERTIES

Name	A Segunda Regulación-3	A Medición-3			
Cv (Semi-Ideal) (Btu/lbmole-F)	9.354	8.792			
Mass Cv (Semi-Ideal) (Btu/lb-F)	0.4884	0.4590			
Cv (Btu/lbmole-F)	7.392	7.277			
Mass Cv (Btu/lb-F)	0.3859	0.3799			
Cv (Ent. Method) (Btu/lbmole-F)	---	---			
Mass Cv (Ent. Method) (Btu/lb-F)	---	---			
Cp/Cv (Ent. Method)	---	---			
Reid VP at 37.8 C (psig)	---	---			
True VP at 37.8 C (psig)	---	---			
Liq. Vol. Flow - Sum(Std. Cond) (barrel/day)	0.0000	0.0000			
Viscosity Index	-27.97	-19.16			

DYNAMICS

Dynamic Specifications

Total Delta P (psi)	150.0	Not Active	
Pressure Flow Relation		Active	

Dynamic Parameters

Valve Opening (%)	50.00 *	Mass Flow (lb/hr)	2.840e+005
Conductance (USGPM(60F,1psi))	191.6 *	Friction Delta P (psi)	150.0

Pipe Model Parameters

Material	Cast Iron	Darcy Friction Factor	---
Roughness (km)	2.590e-007	Pipe k (lb/hr/sqrt(psia-lb/ft3))	0.0000
Pipe Length (km)	0.0000 *	Velocity (ft/s)	81.62 *
Feed Diameter (km)	2.032e-004 *	Reynolds Number	1.865e+007 *

Hold-Up Volume: 0.0000 ft3 *

Phase	Accumulation (MMSCFD)	Moles (lbmole)	Volume (ft3)
Vapour	0.0000	0.0000 *	0.0000
Liquid	0.0000	0.0000 *	0.0000
Aqueous	0.0000	0.0000 *	0.0000
Total	**0.0000**	**0.0000**	**0.0000**

Actuator Parameters

Parameters Mode: Instantaneous

Actuator Time Constant (seconds)	1.000 *	Actuator Linear Rate	1.000e-002 *
Valve Stickiness Time Constant (seconds)	---		

Activator Position

Fail Position: None

	Min (%)	Max (%)	Current (%)	Desired (%)	Offset (%)
Valve	0.00 *	100.00 *	50.00 *	---	0.00 *
Actuator	0.00 *	100.00 *	50.00 *	50.00 *	---

aspentech	LEGENDS Burlington, MA USA	Case Name:	FLUJO MAXIMO 270-1100-110.HSC
		Unit Set:	Field1
		Date/Time:	Fri Apr 13 12:13:26 2012

Valve: PCV-101-2-2

CONNECTIONS

Inlet Stream

STREAM NAME	FROM UNIT OPERATION	
A Brazo 2-2	Tee	TEE-100-2

Outlet Stream

STREAM NAME	TO UNIT OPERATION	
A Segunda Regulación-2-2	Valve	PCV-102-2-2

PARAMETERS

Physical Properties

Pressure Drop:	-114.9 psi		

User Variables

RATING

Sizing

Sizing Conditions					
Inlet Pressure	535.1 psig	Molecular Weight	19.15	Current	
Valve Opening	50.00 % *	Delta P	-114.9 psi	Flow Rate	2.840e+005 lb/hr

Valve Manufacturer and Valve Type			
Manufacturer:	Universal Gas Sizing	Type:	---

Valve Operating Characteristic and Sizing Method							
Linear				Sizing Method:	Cv (standard) cal/min.sqrt(psi)		
C1	25.00	Km	0.9000	Cv	USGPM(60F,1psi) *	Cg	3399

Nozzle Parameters

Base Elevation Relative to Ground Level				0.0000 km *
		A Brazo 2-2	A Segunda Regulación-2-2	
Diameter	(km)	5.000e-005	2.032e-004 *	
Elevation (Base)	(km)	0.0000	0.0000	
Elevation (Ground)	(km)	0.0000	0.0000	
Elevation (% of Height)	(%)			

CONDITIONS

Name		A Brazo 2-2	Segunda Regulación-2-2		
Vapour		1.0000	1.0000		
Temperature	(F)	40.3199	49.2700		
Pressure	(psig)	535.0646	650.0000 *		
Molar Flow	(MMSCFD)	135.0171	135.0171		
Mass Flow	(lb/hr)	283976.9165	283976.9165		
Std Ideal Liq Vol Flow	(barrel/day)	58689.4327	58689.4327		
Molar Enthalpy	(Btu/lbmole)	-3.641e+004	-3.641e+004		
Molar Entropy	(Btu/lbmole-F)	36.56	36.24		
Heat Flow	(Btu/hr)	-5.3984e+08	-5.3984e+08		

PROPERTIES

Name		A Brazo 2-2	Segunda Regulación-2-			
Molecular Weight		19.15	19.15			
Molar Density	(lbmole/ft3)	0.1192	0.1446			

Valve: PCV-101-2-2 (continued)

PROPERTIES

Name		A Brazo 2-2	Segunda Regulación-2-			
Mass Density	(lb/ft3)	2.282	2.769			
Act. Volume Flow	(barrel/day)	5.318e+005	4.384e+005			
Mass Enthalpy	(Btu/lb)	-1901	-1901			
Mass Entropy	(Btu/lb-F)	1.908	1.892			
Heat Capacity	(Btu/lbmole-F)	10.91	11.34			
Mass Heat Capacity	(Btu/lb-F)	0.5696	0.5920			
LHV Vol Basis (Std)	(Btu/lbmole)	3.844e+005	3.844e+005			
LHV Mass Basis (Std)	(Btu/lb)	2.007e+004	2.007e+004			
Phase Fraction [Vol. Basis]		1.000	1.000			
Phase Fraction [Mass Basis]		1.000	1.000			
Partial Pressure of CO2	(psig)	-4.156	-1.953			
Cost Based on Flow	(Cost/s)	0.0000	0.0000			
Act. Gas Flow	(ACFM)	2074	1709			
Avg. Liq. Density	(lbmole/ft3)	1.080	1.080			
Specific Heat	(Btu/lbmole-F)	10.91	11.34			
Std. Gas Flow	(MMSCFD)	135.0	135.0			
Std. Ideal Liq. Mass Density	(lb/ft3)	20.68	20.68			
Act. Liq. Flow	(USGPM)	0.0000	---			
Z Factor		---	0.8419			
Watson K		18.38	18.38			
User Property		---	---			
Partial Pressure of H2S	(psig)	-14.70	-14.70			
Cp/(Cp - R)		1.222	1.212			
Cp/Cv		1.494	1.534			
Heat of Vap.	(Btu/lbmole)	3799	3432			
Kinematic Viscosity	(cSt)	0.3161	0.2710			
Liq. Mass Density (Std. Cond)	(lb/ft3)	---	---			
Liq. Vol. Flow (Std. Cond)	(barrel/day)	---	---			
Liquid Fraction		0.0000	0.0000			
Molar Volume	(ft3/lbmole)	8.392	6.918			
Mass Heat of Vap.	(Btu/lb)	198.3	179.2			
Phase Fraction [Molar Basis]		1.0000	1.0000			
Surface Tension	(dyne/cm)	---	---			
Thermal Conductivity	(Btu/hr-ft-F)	1.858e-002	1.950e-002			
Viscosity	(cP)	1.156e-002	1.202e-002			
Cv (Semi-Ideal)	(Btu/lbmole-F)	8.925	9.354			
Mass Cv (Semi-Ideal)	(Btu/lb-F)	0.4660	0.4884			
Cv	(Btu/lbmole-F)	7.304	7.392			
Mass Cv	(Btu/lb-F)	0.3813	0.3859			
Cv (Ent. Method)	(Btu/lbmole-F)	---	---			
Mass Cv (Ent. Method)	(Btu/lb-F)	---	---			
Cp/Cv (Ent. Method)		---	---			
Reid VP at 37.8 C	(psig)	---	---			
True VP at 37.8 C	(psig)	---	---			
Liq. Vol. Flow - Sum(Std. Cond)	(barrel/day)	0.0000	0.0000			
Viscosity Index		-21.13	-27.97			

DYNAMICS

Dynamic Specifications

Total Delta P	(psi)	-114.9	Not Active

Valve: PCV-101-2-2 (continued)

Pressure Flow Relation	Active

Dynamic Parameters

Valve Opening	(%)	50.00 *	Mass Flow	(lb/hr)	2.840e+005
Conductance	(USGPM(60F,1psi))	135.9 *	Friction Delta P	(psi)	239.5

Pipe Model Parameters

Material		Cast Iron	Darcy Friction Factor		---
Roughness	(km)	2.590e-007	Pipe k	(lb/hr/sqrt(psia-lb/ft3))	0.0000
Pipe Length	(km)	0.0000 *	Velocity	(ft/s)	1635 *
Feed Diameter	(km)	5.000e-005	Reynolds Number		7.884e+007 *

Hold-Up Volume: 0.0000 ft3 *

Phase	Accumulation (MMSCFD)	Moles (lbmole)	Volume (ft3)
Vapour	0.0000	0.0000 *	0.0000
Liquid	0.0000	0.0000 *	0.0000
Aqueous	0.0000	0.0000 *	0.0000
Total	**0.0000**	**0.0000**	**0.0000**

Actuator Parameters

Parameters Mode: Instantaneous

Actuator Time Constant	(seconds)	1.000 *	Actuator Linear Rate	1.000e-002 *
Valve Stickiness Time Constant	(seconds)	---		

Activator Position

Fail Position: None

	Min (%)	Max (%)	Current (%)	Desired (%)	Offset (%)
Valve	0.00 *	100.00 *	50.00 *	---	0.00 *
Actuator	0.00 *	100.00 *	50.00 *	50.00 *	---

Valve: PCV-102-2-2

CONNECTIONS

Inlet Stream

STREAM NAME	FROM UNIT OPERATION	
A Segunda Regulación-2-2	Valve	PCV-101-2-2

Outlet Stream

STREAM NAME	TO UNIT OPERATION	
A Medición-2-2	Mixer	MIX-101-2

PARAMETERS

Physical Properties

Pressure Drop:	150.0 psi	

User Variables

aspentech	LEGENDS Burlington, MA USA	Case Name:	FLUJO MAXIMO 270-1100-110.HSC
		Unit Set:	Field1
		Date/Time:	Fri Apr 13 12:13:26 2012

Valve: PCV-102-2-2 (continued)

RATING

Sizing

Sizing Conditions					
Inlet Pressure	650.0 psig *	Molecular Weight	19.15	Current	
Valve Opening	50.00 % *	Delta P	150.0 psi	Flow Rate	2.840e+005 lb/hr

Valve Manufacturer and Valve Type			
Manufacturer:	Universal Gas Sizing	Type:	---

Valve Operating Characteristic and Sizing Method							
Linear				Sizing Method:	Cv (standard) cal/min.sqrt(psi)		
C1	25.00	Km	0.9000	Cv	USGPM(60F,1psi) *	Cg	4791

Nozzle Parameters

Base Elevation Relative to Ground Level				0.0000 km *
		A Segunda Regulación-2-2	A Medición-2-2	
Diameter	(km)	2.032e-004 *	2.032e-004 *	
Elevation (Base)	(km)	0.0000	0.0000	
Elevation (Ground)	(km)	0.0000	0.0000	
Elevation (% of Height)	(%)			

CONDITIONS

Name		Segunda Regulación-2-2	A Medición-2-2		
Vapour		1.0000	1.0000		
Temperature	(F)	49.2700	37.4758		
Pressure	(psig)	650.0000 *	500.0000 *		
Molar Flow	(MMSCFD)	135.0171	135.0171		
Mass Flow	(lb/hr)	283976.9165	283976.9165		
Std Ideal Liq Vol Flow	(barrel/day)	58689.4327	58689.4327		
Molar Enthalpy	(Btu/lbmole)	-3.641e+004	-3.641e+004		
Molar Entropy	(Btu/lbmole-F)	36.24	36.67		
Heat Flow	(Btu/hr)	-5.3984e+08	-5.3984e+08		

PROPERTIES

Name		Segunda Regulación-2-	A Medición-2-2			
Molecular Weight		19.15	19.15			
Molar Density	(lbmole/ft3)	0.1446	0.1114			
Mass Density	(lb/ft3)	2.769	2.134			
Act. Volume Flow	(barrel/day)	4.384e+005	5.689e+005			
Mass Enthalpy	(Btu/lb)	-1901	-1901			
Mass Entropy	(Btu/lb-F)	1.892	1.914			
Heat Capacity	(Btu/lbmole-F)	11.34	10.78			
Mass Heat Capacity	(Btu/lb-F)	0.5920	0.5627			
LHV Vol Basis (Std)	(Btu/lbmole)	3.844e+005	3.844e+005			
LHV Mass Basis (Std)	(Btu/lb)	2.007e+004	2.007e+004			
Phase Fraction [Vol. Basis]		1.000	1.000			
Phase Fraction [Mass Basis]		1.000	1.000			
Partial Pressure of CO2	(psig)	-1.953	-4.829			
Cost Based on Flow	(Cost/s)	0.0000	0.0000			
Act. Gas Flow	(ACFM)	1709	2218			
Avg. Liq. Density	(lbmole/ft3)	1.080	1.080			
Specific Heat	(Btu/lbmole-F)	11.34	10.78			
Std. Gas Flow	(MMSCFD)	135.0	135.0			
Std. Ideal Liq. Mass Density	(lb/ft3)	20.68	20.68			

Valve: PCV-102-2-2 (continued)

PROPERTIES

Name	Segunda Regulación-2-	A Medición-2-2
Act. Liq. Flow (USGPM)	---	---
Z Factor	0.8419	0.8660
Watson K	18.38	18.38
User Property	---	---
Partial Pressure of H2S (psig)	-14.70	-14.70
Cp/(Cp - R)	1.212	1.226
Cp/Cv	1.534	1.481
Heat of Vap. (Btu/lbmole)	3432	3910
Kinematic Viscosity (cSt)	0.2710	0.3340
Liq. Mass Density (Std. Cond) (lb/ft3)	---	---
Liq. Vol. Flow (Std. Cond) (barrel/day)	---	---
Liquid Fraction	0.0000	0.0000
Molar Volume (ft3/lbmole)	6.918	8.976
Mass Heat of Vap. (Btu/lb)	179.2	204.1
Phase Fraction [Molar Basis]	1.0000	1.0000
Surface Tension (dyne/cm)	---	---
Thermal Conductivity (Btu/hr-ft-F)	1.950e-002	1.830e-002
Viscosity (cP)	1.202e-002	1.142e-002
Cv (Semi-Ideal) (Btu/lbmole-F)	9.354	8.792
Mass Cv (Semi-Ideal) (Btu/lb-F)	0.4884	0.4590
Cv (Btu/lbmole-F)	7.392	7.277
Mass Cv (Btu/lb-F)	0.3859	0.3799
Cv (Ent. Method) (Btu/lbmole-F)	---	---
Mass Cv (Ent. Method) (Btu/lb-F)	---	---
Cp/Cv (Ent. Method)	---	---
Reid VP at 37.8 C (psig)	---	---
True VP at 37.8 C (psig)	---	---
Liq. Vol. Flow - Sum(Std. Cond) (barrel/day)	0.0000	0.0000
Viscosity Index	-27.97	-19.16

DYNAMICS

Dynamic Specifications

Total Delta P (psi)	150.0	Not Active
Pressure Flow Relation		Active

Dynamic Parameters

Valve Opening (%)	50.00 *	Mass Flow (lb/hr)	2.840e+005
Conductance (USGPM(60F,1psi))	191.6 *	Friction Delta P (psi)	150.0

Pipe Model Parameters

Material	Cast Iron	Darcy Friction Factor	---
Roughness (km)	2.590e-007	Pipe k (lb/hr/sqrt(psia-lb/ft3))	0.0000
Pipe Length (km)	0.0000 *	Velocity (ft/s)	81.62 *
Feed Diameter (km)	2.032e-004 *	Reynolds Number	1.865e+007 *

Hold-Up Volume: 0.0000 ft3 *

Phase	Accumulation (MMSCFD)	Moles (lbmole)	Volume (ft3)
Vapour	0.0000	0.0000 *	0.0000
Liquid	0.0000	0.0000 *	0.0000

Valve: PCV-102-2-2 (continued)

Phase	Accumulation (MMSCFD)	Moles (lbmole)	Volume (ft3)
Aqueous	0.0000	0.0000 *	0.0000
Total	**0.0000**	**0.0000**	**0.0000**

Actuator Parameters

Parameters Mode: Instantaneous

Actuator Time Constant (seconds)	1.000 *	Actuator Linear Rate	1.000e-002 *
Valve Stickiness Time Constant (seconds)	---		

Activator Position

Fail Position: None

	Min (%)	Max (%)	Current (%)	Desired (%)	Offset (%)
Valve	0.00 *	100.00 *	50.00 *	---	0.00 *
Actuator	0.00 *	100.00 *	50.00 *	50.00 *	---

Valve: VLV-A Succión-2

CONNECTIONS

Inlet Stream

STREAM NAME	FROM UNIT OPERATION	
A Succión-2	PIPESYS Extension	Cogua-ECGSB-2

Outlet Stream

STREAM NAME	TO UNIT OPERATION	
A Succión-1-2	Compressor	MOPICO-01

PARAMETERS

Physical Properties

Pressure Drop:	4.999 psi *		

User Variables

RATING

Sizing

Sizing Conditions

Inlet Pressure	337.5 psig	Molecular Weight	19.15	Current	
Valve Opening	50.00 % *	Delta P	4.999 psi *	Flow Rate	5.680e+005 lb/hr

Valve Manufacturer and Valve Type

Manufacturer: Universal Gas Sizing	Type: ---

Valve Operating Characteristic and Sizing Method

Linear				Sizing Method:	Cv (standard) cal/min.sqrt(psi)		
C1	25.00	Km	0.9000	Cv	USGPM(60F,1psi) *	Cg	5.900e+004

Nozzle Parameters

Base Elevation Relative to Ground Level	0.0000 km *

Valve: VLV-A Succión-2 (continued)

		A Succión-2	A Succión-1-2	
Diameter	(km)	5.000e-005	5.000e-005	
Elevation (Base)	(km)	0.0000	0.0000	
Elevation (Ground)	(km)	0.0000	0.0000	
Elevation (% of Height)	(%)			

CONDITIONS

Name		A Succión-2	A Succión-1-2		
Vapour		1.0000	1.0000		
Temperature	(F)	30.8837	30.4525		
Pressure	(psig)	337.5447	332.5453		
Molar Flow	(MMSCFD)	270.0341	270.0341		
Mass Flow	(lb/hr)	567953.8331	567953.8331		
Std Ideal Liq Vol Flow	(barrel/day)	117378.8653	117378.8653		
Molar Enthalpy	(Btu/lbmole)	-3.634e+004	-3.634e+004		
Molar Entropy	(Btu/lbmole-F)	37.49	37.51		
Heat Flow	(Btu/hr)	-1.0775e+09	-1.0775e+09		

PROPERTIES

Name		A Succión-2	A Succión-1-2			
Molecular Weight		19.15	19.15			
Molar Density	(lbmole/ft3)	7.404e-002	7.296e-002			
Mass Density	(lb/ft3)	1.418	1.398			
Act. Volume Flow	(barrel/day)	1.712e+006	1.737e+006			
Mass Enthalpy	(Btu/lb)	-1897	-1897			
Mass Entropy	(Btu/lb-F)	1.957	1.958			
Heat Capacity	(Btu/lbmole-F)	10.14	10.12			
Mass Heat Capacity	(Btu/lb-F)	0.5295	0.5285			
LHV Vol Basis (Std)	(Btu/lbmole)	3.844e+005	3.844e+005			
LHV Mass Basis (Std)	(Btu/lb)	2.007e+004	2.007e+004			
Phase Fraction [Vol. Basis]		1.000	1.000			
Phase Fraction [Mass Basis]		1.000	1.000			
Partial Pressure of CO2	(psig)	-7.943	-8.039			
Cost Based on Flow	(Cost/s)	0.0000	0.0000			
Act. Gas Flow	(ACFM)	6675	6773			
Avg. Liq. Density	(lbmole/ft3)	1.080	1.080			
Specific Heat	(Btu/lbmole-F)	10.14	10.12			
Std. Gas Flow	(MMSCFD)	270.0	270.0			
Std. Ideal Liq. Mass Density	(lb/ft3)	20.68	20.68			
Act. Liq. Flow	(USGPM)	---	---			
Z Factor		0.9037	0.9048			
Watson K		18.38	18.38			
User Property		---	---			
Partial Pressure of H2S	(psig)	-14.70	-14.70			
Cp/(Cp - R)		1.243	1.244			
Cp/Cv		1.411	1.409			
Heat of Vap.	(Btu/lbmole)	4429	4445			
Kinematic Viscosity	(cSt)	0.4802	0.4864			
Liq. Mass Density (Std. Cond)	(lb/ft3)	---	---			
Liq. Vol. Flow (Std. Cond)	(barrel/day)	---	---			
Liquid Fraction		0.0000	0.0000			
Molar Volume	(ft3/lbmole)	13.51	13.71			
Mass Heat of Vap.	(Btu/lb)	231.2	232.1			
Phase Fraction [Molar Basis]		1.0000	1.0000			

Valve: VLV-A Succión-2 (continued)

PROPERTIES

Name		A Succión-2	A Succión-1-2			
Surface Tension	(dyne/cm)	---	---			
Thermal Conductivity	(Btu/hr-ft-F)	1.727e-002	1.723e-002			
Viscosity	(cP)	1.091e-002	1.089e-002			
Cv (Semi-Ideal)	(Btu/lbmole-F)	8.156	8.138			
Mass Cv (Semi-Ideal)	(Btu/lb-F)	0.4258	0.4249			
Cv	(Btu/lbmole-F)	7.187	7.183			
Mass Cv	(Btu/lb-F)	0.3752	0.3750			
Cv (Ent. Method)	(Btu/lbmole-F)	---	---			
Mass Cv (Ent. Method)	(Btu/lb-F)	---	---			
Cp/Cv (Ent. Method)		---	---			
Reid VP at 37.8 C	(psig)	---	---			
True VP at 37.8 C	(psig)	---	---			
Liq. Vol. Flow - Sum(Std. Cond)	(barrel/day)	0.0000	0.0000			
Viscosity Index		-9.352	-9.069			

DYNAMICS

Dynamic Specifications

Total Delta P	(psi)	4.999 *	Not Active
Pressure Flow Relation			Active

Dynamic Parameters

Valve Opening	(%)	50.00 *	Mass Flow	(lb/hr)	5.680e+005
Conductance	(USGPM(60F,1psi))	2360 *	Friction Delta P	(psi)	4.999

Pipe Model Parameters

Material		Cast Iron	Darcy Friction Factor		---
Roughness	(km)	2.590e-007	Pipe k	(lb/hr/sqrt(psia-lb/ft3))	0.0000
Pipe Length	(km)	0.0000 *	Velocity	(ft/s)	5264 *
Feed Diameter	(km)	5.000e-005	Reynolds Number		1.671e+008 *

Hold-Up Volume: 0.0000 ft3 *

Phase	Accumulation (MMSCFD)	Moles (lbmole)	Volume (ft3)
Vapour	0.0000	0.0000 *	0.0000
Liquid	0.0000	0.0000 *	0.0000
Aqueous	0.0000	0.0000 *	0.0000
Total	**0.0000**	**0.0000**	**0.0000**

Actuator Parameters

Parameters Mode: Instantaneous

Actuator Time Constant	(seconds)	1.000 *	Actuator Linear Rate		1.000e-002 *
Valve Stickiness Time Constant	(seconds)	---			

Activator Position

Fail Position: None

	Min (%)	Max (%)	Current (%)	Desired (%)	Offset (%)
Valve	0.00 *	100.00 *	50.00 *	---	0.00 *

Valve: VLV-A Succión-2 (continued)

Actuator	0.00 *	100.00 *	50.00 *	50.00 *	---

Valve: VLV-Puente Guillermo-2

CONNECTIONS

Inlet Stream

STREAM NAME	FROM UNIT OPERATION
Puente Guillermo-2	

Outlet Stream

STREAM NAME	TO UNIT OPERATION	
Puente Guillermo-1-2	PIPESYS Extension	Puente Guillermo-Cogua-2

PARAMETERS

Physical Properties

Pressure Drop:	4.999 psi *

User Variables

RATING

Sizing

Sizing Conditions					
Inlet Pressure	1100 psig *	Molecular Weight	19.15	Current	
Valve Opening	50.00 % *	Delta P	4.999 psi *	Flow Rate	5.680e+005 lb/hr

Valve Manufacturer and Valve Type			
Manufacturer: Universal Gas Sizing		Type: ---	

Valve Operating Characteristic and Sizing Method					
Linear			Sizing Method: Cg		
C1	25.00	Km	0.9000	Cv USGPM(60F,1psi)	Cg 3.530e+004 *

Nozzle Parameters

Base Elevation Relative to Ground Level				0.0000 km *
		Puente Guillermo-2	Puente Guillermo-1-2	
Diameter	(km)	5.000e-005	5.000e-005	
Elevation (Base)	(km)	0.0000	0.0000	
Elevation (Ground)	(km)	0.0000	0.0000	
Elevation (% of Height)	(%)			

CONDITIONS

Name		Puente Guillermo-2	Puente Guillermo-1-2		
Vapour		1.0000	1.0000		
Temperature	(F)	110.0000 *	109.7426		
Pressure	(psig)	1100.0000 *	1095.0006		
Molar Flow	(MMSCFD)	270.0341 *	270.0341		
Mass Flow	(lb/hr)	567953.8331	567953.8331		
Std Ideal Liq Vol Flow	(barrel/day)	117378.8653	117378.8653		
Molar Enthalpy	(Btu/lbmole)	-3.603e+004	-3.603e+004		
Molar Entropy	(Btu/lbmole-F)	36.09	36.10		
Heat Flow	(Btu/hr)	-1.0682e+09	-1.0682e+09		

Valve: VLV-Puente Guillermo-2 (continued)

PROPERTIES

Name	Puente Guillermo-2	Puente Guillermo-1-2			
Molecular Weight	19.15	19.15			
Molar Density (lbmole/ft3)	0.2179	0.2170			
Mass Density (lb/ft3)	4.174	4.156			
Act. Volume Flow (barrel/day)	5.816e+005	5.841e+005			
Mass Enthalpy (Btu/lb)	-1881	-1881			
Mass Entropy (Btu/lb-F)	1.884	1.885			
Heat Capacity (Btu/lbmole-F)	12.28	12.26			
Mass Heat Capacity (Btu/lb-F)	0.6409	0.6403			
LHV Vol Basis (Std) (Btu/lbmole)	3.844e+005	3.844e+005			
LHV Mass Basis (Std) (Btu/lb)	2.007e+004	2.007e+004			
Phase Fraction [Vol. Basis]	1.000	1.000			
Phase Fraction [Mass Basis]	1.000	1.000			
Partial Pressure of CO2 (psig)	6.674	6.578			
Cost Based on Flow (Cost/s)	0.0000	4.118			
Act. Gas Flow (ACFM)	2288	2278			
Avg. Liq. Density (lbmole/ft3)	1.080	1.080			
Specific Heat (Btu/lbmole-F)	12.28	12.26			
Std. Gas Flow (MMSCFD)	270.0	270.0			
Std. Ideal Liq. Mass Density (lb/ft3)	20.68	20.68			
Act. Liq. Flow (USGPM)	---	---			
Z Factor	0.8367	0.8369			
Watson K	18.38	18.38			
User Property	---	---			
Partial Pressure of H2S (psig)	-14.70	-14.70			
Cp/(Cp - R)	1.193	1.193			
Cp/Cv	1.558	1.557			
Heat of Vap. (Btu/lbmole)	2227	2234			
Kinematic Viscosity (cSt)	0.2116	0.2122			
Liq. Mass Density (Std. Cond) (lb/ft3)	---	---			
Liq. Vol. Flow (Std. Cond) (barrel/day)	---	---			
Liquid Fraction	0.0000	0.0000			
Molar Volume (ft3/lbmole)	4.589	4.609			
Mass Heat of Vap. (Btu/lb)	116.3	116.7			
Phase Fraction [Molar Basis]	1.0000	1.0000			
Surface Tension (dyne/cm)	---	---			
Thermal Conductivity (Btu/hr-ft-F)	2.382e-002	2.379e-002			
Viscosity (cP)	1.415e-002	1.413e-002			
Cv (Semi-Ideal) (Btu/lbmole-F)	10.29	10.28			
Mass Cv (Semi-Ideal) (Btu/lb-F)	0.5372	0.5366			
Cv (Btu/lbmole-F)	7.879	7.876			
Mass Cv (Btu/lb-F)	0.4113	0.4112			
Cv (Ent. Method) (Btu/lbmole-F)	---	---			
Mass Cv (Ent. Method) (Btu/lb-F)	---	---			
Cp/Cv (Ent. Method)	---	---			
Reid VP at 37.8 C (psig)	---	---			
True VP at 37.8 C (psig)	---	---			
Liq. Vol. Flow - Sum(Std. Cond) (barrel/day)	0.0000	0.0000			
Viscosity Index	-53.90	-53.10			

DYNAMICS

Dynamic Specifications

Valve: VLV-Puente Guillermo-2 (continued)

Dynamic Specifications

Total Delta P (psi)	4.999 *		Not Active
Pressure Flow Relation			Active

Dynamic Parameters

Valve Opening (%)	50.00 *	Mass Flow (lb/hr)	5.680e+005
Conductance (USGPM(60F,1psi))	1412	Friction Delta P (psi)	4.999

Pipe Model Parameters

Material	Cast Iron	Darcy Friction Factor	---
Roughness (km)	2.590e-007	Pipe k (lb/hr/sqrt(psia-lb/ft3))	0.0000
Pipe Length (km)	0.0000 *	Velocity (ft/s)	1788 *
Feed Diameter (km)	5.000e-005	Reynolds Number	1.288e+008 *

Hold-Up Volume: 0.0000 ft3 *

Phase	Accumulation (MMSCFD)	Moles (lbmole)	Volume (ft3)
Vapour	0.0000	0.0000 *	0.0000
Liquid	0.0000	0.0000 *	0.0000
Aqueous	0.0000	0.0000 *	0.0000
Total	**0.0000**	**0.0000**	**0.0000**

Actuator Parameters

Parameters Mode: Instantaneous

Actuator Time Constant (seconds)	1.000 *	Actuator Linear Rate	1.000e-002 *
Valve Stickiness Time Constant (seconds)	---		

Activator Position

Fail Position: Fail Shut

	Min (%)	Max (%)	Current (%)	Desired (%)	Offset (%)
Valve	0.00 *	100.00 *	50.00 *	---	0.00 *
Actuator	0.00 *	100.00 *	50.00 *	50.00 *	---