

INTEGRATED PLANT SIMULATION BY PROCESS SIMULATION SOFTWARE



Simulation Report of Working Stage 6

HYSYS INTEGRATION STAGE 1, 2, 3, 4, & 5

TABLE OF CONTENTS

TABLE OF CONTENTS	i
LIST OF FIGURES	iii
LIST OF TABLES	iv
PT. LAPI ITB SIMULATION TEAM MEMBER.....	v
CHAPTER I	1
CHAPTER II.....	4
CHAPTER III	6
CHAPTER IV.....	11
IV.1 SIMULATION INTEGRATION STAGE 1	11
IV.1.1 Process Description.....	11
IV.1.2 Stream List	14
IV.1.3 Unit Operation	16
IV.1.4 Simulation Approach and Assumption	17
IV.1.5 Simulation PFD.....	19
IV.1.6 Simulation Result and Evaluation.....	19
IV.2 Simulation Integration Stage 2	23
IV.2.1 Process Description.....	23
IV.2.2 Stream List	25
IV.2.3 Unit Operation	27
IV.2.4 Simulation Approach and Assumption	28
IV.2.5 Simulation PFD.....	29
IV.2.6 Simulation Result and Evaluation.....	29
IV.3 Simulation Integration Stage 3	30
IV.3.1 Process Description.....	30
IV.3.2 Stream List	33
IV.3.3 Unit Operation	35
IV.3.4 Simulation Approach and Assumption.....	37
IV.3.5 Simulation PFD.....	39
IV.3.6 Simulation Result and Evaluation.....	39
IV.4 Simulation Integration Stage 4	40
IV.4.1 Process Description.....	40
IV.4.2 Stream List	42
IV.4.3 Unit Operation	46
IV.4.4 Simulation Approach and Assumption.....	47

Simulation Report – ECC 860 KTA
Working Stage 6

IV.4.5	Simulation PFD.....	48
IV.4.6	Simulation Result and Evaluation.....	48
IV.5	Simulation Integration Stage 5.....	52
IV.5.1	Process Description.....	52
IV.5.2	Stream List	53
IV.5.3	Unit Operation	54
IV.5.4	Simulation Approach and Assumption.....	56
IV.5.5	Simulation PFD.....	57
IV.5.6	Simulation Result and Evaluation.....	57
IV.6	Simulation Integration Stage 1-5.....	59
IV.6.1	Process Description.....	59
IV.6.2	Simulation Approach and Assumption.....	59
IV.6.3	Simulation PFD.....	60
IV.6.4	Simulation Result and Evaluation.....	60
CHAPTER V	70
V.1	Conclusion	70
V.2	Recommendation	71
APPENDIX	72
A.	Component List.....	72
A.1.	Stage 1	72
A.2.	Stage 2	142
A.5.	Stage 3	211
A.4.	Stage 4	239
A.5.	Stage 5	299
B.	PFD Simulation	342
B.1.	Integration Stage 1 to Stage 5.....	342

LIST OF FIGURES

Figure III. 1. Component of Stage 2 in Simulation	8
Figure IV. 1 Block Flow Diagram of CAP Ethylene Plant	11
Figure IV. 2. Simulation PFD of Gasoline Fractionator and PFO Stripper	19
Figure IV. 3. Profil Temperature of Column DA-101(A & B), DA-103(C), DA-102(D),	22
Figure IV. 4. PFD of Stage 2 Integration in HYSYS.....	29
Figure IV. 5. Temperature Profile of DA-201	30
Figure IV. 6 Simulation PFD of Stage 3 Integration.....	39
Figure IV. 7. Simulation PFD of Depropanizer.....	41
Figure IV. 8. Simulation PFD of Propylene Fractionation No. 3.....	41
Figure IV. 9. PFD of Debutanizer.....	42
Figure IV. 10. Simulation PFD of Stage 4.....	48
Figure IV. 11. Profil Temperature of DA-403M (A), DA-404M (B), DA-415M (C), DA-407M (D), DA-405 and DA-406 (E).....	51
Figure IV. 12. Simulation PFD of Stage 5.....	57
Figure IV. 13. Profil Temperature of DA-1202M (A) and DA-1203M (B)	58
Figure IV. 14. Simulation PFD of Stage 1-5 Integration	60
Figure IV. 15. Profil Temperature of Column DA-101(A), DA-103(B), DA-102(C),	63
Figure IV. 16. Temperature Profile of DA-201	63
Figure IV. 17. Profil Temperature of DA-403M (A), DA-404M (B), DA-405 and DA-406 (C), DA-415M (D), DA-407 (E).....	66
Figure IV. 18. Profil Temperature of DA-1202M (A) and DA-1203M (B)	67

LIST OF TABLES

Table II. 1 Description Module Unit Operations in HYSYS.....	5
Table III. 1. Simulation Components of Stage 1	6
Table III. 2. Simulation Component of Stage 2 and Stage 3	8
Table III. 3. Simulation Component of Stage 4.....	9
Table III. 4. Simulation Components of Stage 5	9
Table IV. 1. Process Stream List of Stage 1	14
Table IV. 2 Process Equipment of Stage 1	16
Table IV. 3. Simulation Component of Stage 1	17
Table IV. 4. Stream List of Stage 2.....	25
Table IV. 5. Process Equipment that used in Stage 2	27
Table IV. 6. Process Streams of Stage 3.....	33
Table IV. 7. Process Equipment Used in Stage 3.....	35
Table IV. 8. Stage 4 Stream List	42
Table IV. 9. Unit Operation in Stage 4.....	46
Table IV. 10. The Stream List of Stage 5.....	53
Table IV. 11. Unit Operation in Stage 5.....	54

CHAPTER I

INTRODUCTION

One of most efficient and accurate method for evaluating chemical process system is the simulation process. Simulation apply knowledge of chemical engineering processes such as mass balance, energy balance, thermodynamics, and chemical reaction engineering using computer assistance. There are many types of simulators on the market, namely Aspen Plus, Aspen HYSYS, CHEMCAD, PRO/II, PROMAX, etc. In this project, Aspen HYSYS will be used to simulate the process. By using this simulator process, existing systems can be modeled and evaluated easily and cheaply. In addition, the new system can be designed with easy to obtain a solution to improve the performance of a chemical plant.

Another capability of the simulation process is the evaluation of the dimensions of equipment or unit operation and evaluation of the economics of the plant can be done quickly. In addition, the optimization process is more easily done with the help of simulation models.

Olefin Plant in PT. Chandra Asri Petrochemical Tbk. (CAP) is a chemical plant that processes naphtha into the polymer raw materials such as ethylene, propylene, butadiene, and BTX. Olefin Plant began its operation in 1995 so it's been about 19 years old. The main problem of an old petrochemical plant is a decrease in the ability of the plant operation. In this project, the performance of olefins plant will be evaluated based on plant design data by making a model of the olefin plant in HYSYS process simulator. With this model the problems that occur in the plant can be better evaluated. Operating conditions can also be optimized based on the production target set.

Details of these units are as follows:

Working Stage 1

1. Gasoline Fractionator and PFO Stripper
2. Quench Tower
3. Water Stripper and Dilution Steam Generation
4. Charge Gas Compressor Stages 1, 2, & 3

Working Stage 2

1. Acid Gas Removal, Charge Gas Drying, and Dryer Regeneration Facilities
2. Spent Caustic Pretreatment
3. Charge Gas Compressor Stages 4 & 5 and Condensate Stripper
4. Cracked Gas Chilling

Working Stage 3

1. Demethanizer
2. Methane Refrigerant Compressor
3. Methanation and Hydrogen Purification
4. Deethanizer and Acetylene Hydrogenation
5. Ethylene Fractionation

Working Stage 4

1. Depropanizer
2. C3 Hydrogenation
3. Propylene Fractionation
4. Debutanizer
5. Propylene Refrigeration System

Working Stage 5

1. Ethylene Refrigeration System
2. C4/C5 Hydrogenation
3. Py-gas Hydrogenation
4. Depentanizer
5. BTX Tower

Working Stage 6

1. Simulation Stage 1
2. Simulation Stage 2
3. Simulation Stage 3
4. Simulation Stage 4
5. Simulation Stage 5

This report is the description of process simulation results of integration stage 1, integration stage 2, integration stage 3, integration stage 4, integration stage 5 and integration from stage 1 to stage 5. The integration of each stage are the combination of every unit on that stage. Moreover, the error that appears from the integration process compared to the unit simulation are calculated in the excel data and the data are attached in the appendix. The error/deviation that will be calculated including error of stream properties (mass flow) and column temperature. Furthermore, the integration data of stage 1 to stage 5 integration are compared to the unit simulation data in the stage 6 discussion including the stream properties and column temperature.

Some important parameters for simulation results evaluation are as follows:

1. Error in the process condition (temperature and pressure) and component mass is not more than 0.1% especially for key component
2. Error in %-composition of the main product including ethylene, propylene, C4 crude and pyrolysis gas is not more than 0.1%
3. Hypothetical components are represented by at least 3 components to improve the temperature profile

CHAPTER II HYSYS INTRODUCTION

Knowing and understanding the behavior processing system is desperately needed by a process engineer. By doing so, a process engineer can maintain and even improve the performance of the operating system to obtain the highest possible profit. The behavior of the operating system can be studied through several methods, namely through experiments and mathematical models approach. Today, mathematical models have been used extensively to study the influence and relevance of variables in a system because it is relatively faster, cheaper, and minimal risk compared with the experimental method. Therefore, various kinds of software have been made as a tool to facilitate iteration count mathematical model of a system, and is currently a lot of attention.


HYSYS is one device that has been widely used to model a process with exceptional ability in understanding at the perspective of the process and present the data and comprehensive calculations. HYSYS was designed by HYPROTECH for process modelling of wide range of chemical industry, especially industries engaged in oil refining and petrochemicals. HYSYS then taken over and modified further by Aspen Tech and Honeywell (also known as UNISIM Design). Compared with other simulators, HYSYS has several advantages, including:

1. HYSYS has interactive command interpretation facilities. Whatever information is entered, it will be processed immediately (without waiting for orders from the user).
2. HYSYS has the ability to flow of information back and forth (bi-directional) that can make the simulation results into a comprehensive and contains few errors numerical iteration.
3. HYSYS equipped with features that can simplify the optimization process and study the influence and interaction between variables in a process system.

These reasons make the widespread use of HYSYS simulator for a variety of purposes, both in industry and universities.

Some modules of operating units, which available in HYSYS are shown in Table II.1.

Table II. 1 Description Module Unit Operations in HYSYS

Unit Operation	Description
	Material flow. Contains a wide range of compounds with the composition and certain conditions.
	Energy flow. Contains a number of energy involved in the process.
	Two phase separator. Used to model the separator tank to separate the gas and liquid flow.
	Three phase separator. Used to model the three-phase separator. For example, separating a mixture of water, oil, and gas.
	Heat Exchanger. Modeling the heat exchanger between the two flow (flow of heat and cold flow) in the industry.
	Cooler and Heater. Modeling of heat exchangers, but this unit module only calculate the calorific needs heating or cooling a flow regardless of flow conditions heater or cooler.
	Pump models. Used to increase the pressure of the liquid flow.
	Model compressors. Used to increase the pressure of the gas flow.
	Mixer. Used to combine two or more material flow.
	Tee. Used for separating the flow of material into two or more streams.
	Distillation column. Used to model the distillation column, complete with condenser and reboiler.
	Absorber column. In principle, nearly equal to the distillation column, however, in this column is not used condenser and reboiler.
	Shortcut distillation. This module is used to determine the characteristics of the distillation of a mixture of compounds based on FUG method.
	Control module "Adjust", is used to transform a massive operation to define the magnitude of the relationship with other relevant quantities.
	Control module "Set", is used to lock the value of a quantity.
	Control module "Recycle", is used as the interface when they wanted to recycle a material flow.

CHAPTER III

SIMULATION BASIS

The first thing that must be done before making HYSYS simulation is to determine the components that are involved in the process and determining the thermodynamic fluid package. Simulation of Stage I is based on the Basic Engineering Design Case 2, in accordance with the information stated on the entire PFD each unit in Stage I. The C₆-C₈, C₉, PGO, and PFO compound is broken down into several components. Components involved in the process in the first stage are presented in Table III.1.

Table III. 1. Simulation Components of Stage 1

Design Name	Simulation Name
Hydrogen	Hydrogen
Carbon Monoxide	CO
Carbon Dioxide	CO ₂
Hydrogen Sulphide	H ₂ S
Methane	Methane
Acetylene	Acetylene
Ethylene	Ethylene
Ethane	Ethane
Propadiene/Propyne	Propadiene
Propylene	Propene
Propane	Propane
Butadienes/C ₄ Acetylenes	1,3-Butadiene
Butylenes	1-Butene
Butanes	n-Butane
C ₅ Hydrocarbons	i-Pentane
C ₆ Non-Aromatics	1-Hexyne
C ₇ Non-Aromatics	n-Heptane
C ₈ Non-Aromatics	n-Octane
Benzene	Benzene
Toluene	Toluene
Xylenes/Ethylbenzene	p-Xylene
	E-Benzene
Styrene	Styrene
C ₉ – 204°C	o-Mstyrene
	1,2,3-Mbenzene
	1-Undecene
204 – 288°C (PGO)	1-Undecyne
	Hex-M-Benz
	n-C ₁₃
	n-C ₁₄
	n-C ₁₅

Simulation Report – ECC 860 KTA
Working Stage 6

Design Name	Simulation Name
288°C Plus (PFO)	n-C ₁₇
	n-C ₂₀
	n-C ₂₃
	n-C ₂₆
	n-C ₂₈
	n-C ₃₀
Steam/Water	H ₂ O

Not all components available in Basic Engineering Design included in the HYSYS database. Therefore, some of the components used in simulation are hypothetical component, i.e. component that formed based on assumptions or certain physical properties approaches of such components. In addition, some of the components in the simulation is a representation of the components in the form of a group of compounds. Fluid package that used in Stage 1 simulation is Peng-Robinson.

Hypotetical componet or groups of representative compounds in simulation as follow:

1. Butadienes/C₄ Acetylenes in simulation represented by 1,3-Butadiene
2. Butylenes in simulation represented by 1-Butene
3. Butanes in simulation represented by n-Butane
4. C₅ Hydrocarbons in simulation represented by i-Pentane
5. C₆, C₇, and C₈ Non-Aromatics in simulation represented by 1-Hexyne, n-Heptane, n-Octane, respectively
6. Xylenes/Ethylbenzene in simulation represented by p-Xylene and E-benzene
7. C₉ – 204°C in simulation represented by o-MStyrene, 1,2,3-MBenzene, 1-Undecene
8. 204 – 288°C (PGO) in simulation represented by 1-Undecyne, Hex-M-Benz, n-C₁₃, n-C₁₄, and n-C₁₅
9. 288°C+ (PFO) in simulation represented by n-C₁₇, n-C₂₀, n-C₂₃, n-C₂₆, n-C₂₈, n-C₃₀

For stage 2 and 3, the components used in the simulation follows the list of components in the Engineering Package. Problem that appear are several components in the engineering package mentioned in the form of a range of components that need to be searched vice corresponding components in Hysys. The approach used to approximate the components in the range is considering of the molecular weight of the total flow. The closer the molecular weight of the flow with the design, simulation of the expected components should have been getting closer to reality. The following components are used in working stage 2 and working stage 3 are shown on the Figure III.1 and Table III.2.

Simulation Report – ECC 860 KTA

Working Stage 6

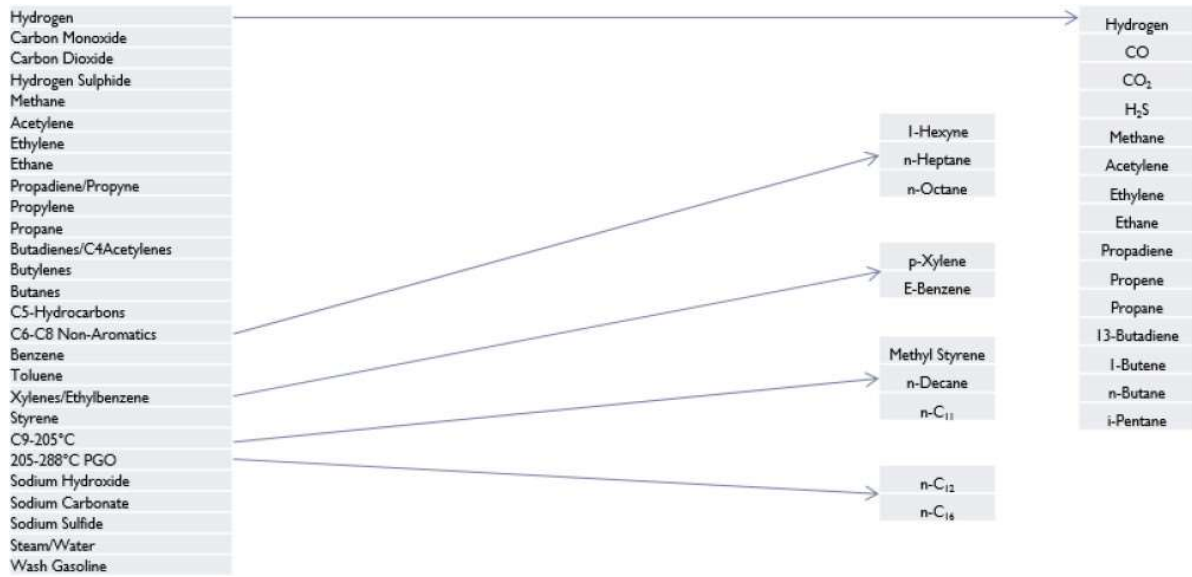


Figure III. 1. Component of Stage 2 in Simulation

Table III. 2. Simulation Component of Stage 2 and Stage 3

Simulation Component	Design Component
Hydrogen	Hydrogen
CO	Carbon Monoxide
Methane	Methane
Acetylene	Acetylene
Ethylene	Ethylene
Ethane	Ethane
Propadiene	Propadiene/Propyne
Propene	Propylene
Propane	Propane
13-Butadiene	Butadienes/C4Acetylenes
1-Butene	Butylenes
n-Butane	Butanes
i-Pentane	C5-Hydrocarbons
1-Hexyne	C6-C8 Non-Aromatics
n-Heptane	
n-Octane	
Benzene	Benzene
Toluene	Toluene
H ₂ O	Steam/Water
Nitrogen	Nitrogen

The components that used in the stage 4 are listed in the Table III.3. The fluid package used in the stage 4 simulations are Peng-Robinson, SRK-Twu, Wilson-Ideal, and UNIQUAC.

Table III. 3. Simulation Component of Stage 4

Design Component	Simulation Component
Hydrogen	Hydrogen
Methane	Methane
Ethane	Ethane
Acetylene	Acetylene
Ethylene	Ethylene
Propadiene	Propadiene
Propylene	Propylene
Propane	Propane
Butadiene	1,3-Butadiene
Butylene	1-Butene
Butane	n-Butane
C5-hydrocarbon	1-Pentyne
	1,4-Pentadiene
C6 non-aromatics	Cis3-hexene
C7 non-aromatics	n-Heptane
C8 non-aromatics	n-Octane
Benzene	Benzene
Toluene	Toluene
Xylene	p-Xylene
	E-Benzene
Styrene	Styrene
C9-205 Deg C	n-Norbornene
	n-Decane
205-288 Deg C PGO	n-C11
	n-C12
	n-C13
	n-C14

The component that used in the stage 5 simulation are listed on the table III.3. The fluid package used in this stage is Peng-Robinson.

Table III. 4. Simulation Components of Stage 5

Design Component	Simulation Component
Hydrogen	Hydrogen
Methane	Methane
Ethane	Ethane
Propadiene	Propadiene

Simulation Report – ECC 860 KTA
Working Stage 6

Propylene	Propylene
Propane	Propane
Butadiene	1,3-Butadiene
Butylene	1-Butene
Butane	n-Butane
C5-hydrocarbon	n-Pentane
	i-Pentane
	Cyclopentane
C6-C8 non aromatics	1-Hexyne
	n-Heptane
	n-Octane
Benzene	Benzene
Toluene	Toluene
Xylene	p-Xylene
	E-Benzene
Styrene	Styrene
C9-205 Deg C	n-Nonane
	n-Decane
	n-C11
205-288 Deg C PGO	n-C12
	n-C13
	n-C14

CHAPTER IV PROCESS SIMULATION

IV.1 SIMULATION INTEGRATION STAGE 1

IV.1.1 Process Description

The Block Flow Diagram of CAP Ethylene Plant of 860 KTA is presented in Figure IV.1.

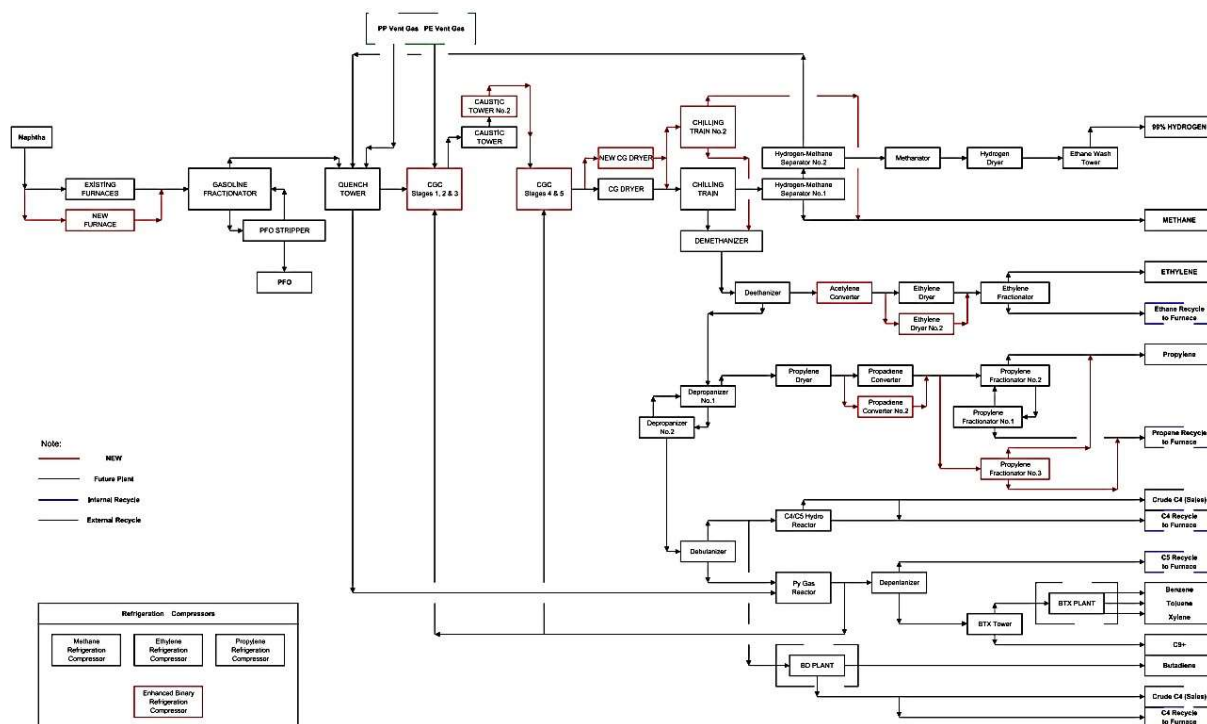


Figure IV. 1 Block Flow Diagram of CAP Ethylene Plant

The process main point that is needed to accomplish is the separation of heavy fraction (PGO and PFO) from solution of light fraction, which consider achieving heat recovery from cracking stream in Cracked Heater Unit. The light fraction that separated will be processed further in next units to produce ethane, propane, etc. On the other hand, the heavy fraction will be used as BFW heater before sold as fuel. The main units in this section are Gasoline Fractionator, PFO Stripper, and Quench Tower.

All input streams in this section are derived from eight (8) output streams unit Cracked Heater, seven of them have similar composition and physical properties and all of them goes into Gasoline fractionator column from two head stream. First head stream comes from BA-102 to BA-105, while the second comes from the head stream of BA-106 until BA-108. On the other hand, the other two head flow is the flow of recycle component of C_2 or C_3 that enter Gasoline Fractionator or PFO Stripper. All four head streams also have high

temperature (about 200°C) that contains the energy that would be recovered for steam generation from the BFW.

The first three of head feed stream entered the bottom part of the Gasoline Fractionator. The stream enters the column as a mixture of gas and liquid phase. Most of the heavy fractions are in a liquid phase, while the lighter fractions tend to be in the gas phase. Shortly after the feed stream enters the column, the separation of lightweight components and heavy components occurred. Lightweight components consisting of C₁-C₉ and most PGO evaporated to the top of the column through trays. At the upper limit of the bottom section, a side stream is used to take most of the PGO components. Meanwhile, lightweight components flow through the upper section trays and then exit as overhead product of Gasoline Fractionator heading to Quench Tower. A small amount of gasoline that is carried away by the flow of the column overhead to the quench tower is recycled back to the top of Gasoline Fractionator.

Meanwhile, the PGO that is taken as a side stream from Gasoline Fractionator flowed into the seventh tray of PFO Stripper column. In addition, heavy components, which come out as a bottom product of Gasoline Fractionator (known as a quench oil), flowed into the PFO Stripper after having done heat recovery and divided into several streams to recycle. The temperature inside the column is set by using this recycle stream. The recover heat is used to produce low-pressure steam that is used for processes in separate units. Quench oil gets into the top of PFO Stripper.

PFO Stripper serves to separate almost all the light components that are still carried in the stream of the heavy fraction (PGO and quench oil) by contacting the feed stream with low-pressure and high temperatures steam. Steam will vaporize the lighter components to be recycled back into Gasoline Fractionator. While the heavy components out as a bottom product from the column PFO Stripper (known as PFO) to be stored or sold as fuel.

Vapor stream which flows out from Gasoline Fractionator (DA-101) is cooled further and condensed partially. The process occurs through direct contact countercurrent using recirculated water in the Quench Tower (DA-102). Recirculation water that hot enough (S-2201) flows out from the DA-102. It can be used to supply heat for the process.

Feed (S-2101) from DA-101 enters the bottom of DA-102 which has four beds that separated into two parts. Four bed has a number of stages equivalent to 10 to 11 stages. The flow of liquids and gases had entered the place respectively. Cooling water (S-2235) flows into the top. Meanwhile, cooling water with higher temperature (S-2234) enters between first and second bed or around the third and fourth stage, equivalently. While the flow of other units such as S-3025, S-3041, and S-3907 enters under the fourth bed.

Hot water stream from the DA-102 is used as a heat source in the economizer. This heat can be utilized for stream heating in the feed preheater, gas heater charge, deethanizer reboiler, depropanizer side reboilers, propylene fractionation reboilers, condensate preheater (deaerator feed), MAPD converter effluent heater, heavy tail cooling, and PFO cooling. Quench water then cooled further using sea water.

Output vapour at the top of quench tower (S-2117) flows into the unit Charge Gas Compressor. Meanwhile, gasoline that condensed out at the bottom (S-2118) was pumped and separated. The liquid portion (S-2120) returns to the DA-101 as reflux. Wash gasoline that used in the spent caustic is also taken from the bottom of quench tower. The rest is then mixed with medium gasoline from gas charge compression section before being drained into Pyrolysis Gasoline Hydrogenation (DPG unit). A small proportion of medium gasoline from charge gas compression can be recycled to the bottom of quench tower as a backup for fractionator reflux.

Process Water Stripper is used to eliminate acid gasses and volatile hydrocarbons that dilute in condensation dilution steam. Separation occurred at low-pressure condition.

Upper product of Process Water Stripper is returned to the Quench Tower, whereas the bottom product is inserted into the Dilution Steam Drum and is used to reheat Process Water Stripper.

The dilution steam can be formed by using the heat from the circulating quench oil and MP steam, which passes through some heat exchangers. Hydrocarbons output of Dilution Steam Generator is then recycled to the CGC.

Charge Gas Compression (CGC) Stage 1, 2, and 3 consist of three of five stages centrifugal compressor which compresses overhead vapor of Quench Tower (DA-102) to make Chilling Train separation process becomes easier. The CGC raises pressure from $0.3 \text{ kg/cm}^2\text{g}$ into $8.63 \text{ kg/cm}^2\text{g}$. With increasing pressure, the dew point difference will be increased so that the gas charge is easily condensable. In addition, the energy required for the separation process can be reduced. Compressor is driven by a steam turbine. At every stage, there is a suction drum compression, compressor, and inter-stage cooler. Compression is done by inter-stage cooling to low the compressor discharge temperature due to increasing pressure, before flowing to the next compressor suction. This is necessary due to the lower temperature; the compressor power needed to achieve a certain compression ratio will be even lower. Suction drum is useful to ensure the absence of fog that can be entered into the compressor. Between the third and fourth stage, gas was treated with caustic wash to remove the acid content in the gas.

Once out of the Quench Tower, crack gas will go first into the suction drum. Each suction drum has a demister, which serves to capture the fog that formed in the suction drum so such liquid are not carried over to the compressor. Suction drum serves to separate the liquid phase and vapor to ensure only vapor phase are flowing into the compressor. The fluid in the flow that enters the compressor will cause damage to the compressor impeller. The liquid phase of the suction drum will be sent back to the Quench Tower. Top products of the first suction drum (FA-201) will enter the first stage compressor, while the bottom product is pumped back into the Quench Tower. Charge gas is cooled in the first inter-stage cooler (EA-201) from 81.6°C into 41°C . Gas output of the first stage compression that has a pressure of $1.48 \text{ kg/cm}^2\text{g}$ is sent into the second suction drum (FA-202). After that, the gas charge is compressed to a pressure of $4 \text{ kg/cm}^2\text{g}$. Second gas compressor output is further cooled with

Simulation Report – ECC 860 KTA
Working Stage 6

second inter-stage cooler (EA-202) from temperature of 83.4°C into 41°C. In second the suction drum, three-phase separation occurs: gas, water, and hydrocarbons (gasoline) are condensed. The medium gasoline and diesel then flowed into medium flash drum (FA-203). The upper product is then recycled to the Quench Tower, while the bottom product (in the form of medium heavy gasoline) is blended with gasoline from Quench Tower and Debutanizer bottom products, to further fed to DPG unit.

Charge gas from the second and third compressor stage are flowed into the compressor. CGC output third stage has a pressure of 8.78 kg/cm²g and temperature of 41°C. After that, the charge gases are supplied to the discharge drum of CGC third stage (FA-205) and then heated in a gas heater charge (EA-213) with a water quench. After that, it was flowed into Caustic Wash Water Tower.

IV.1.2 Stream List

Codes list and stream names involved in the proces of Stage 1 summarized in Table IV.1.

Table IV. 1. Process Stream List of Stage 1

Name	Description	Name	Description
2101	Gasoline Fractionation Overhead	2219	QW from EA-801
2117	Quench Tower Overhead	2220	QW to 2 Level Bypass
2118	Quench Tower Gasoline Bottom	2221	Quench Water to EA-424
2119	Heavy Gasoline	2222	QW from EA-424
2120	Gasoline Reflux to Gasoline Fractionator	2223	QW from EA-425
2121	Wash Gas to EA-214	2224	QW from Level 2
2122	Process Water from DA-102 Bottoms	2225	QW to EA-115
2123	Process Water Stripper Feed	2226	QW from EA-115
2201	QW from DA-102	2231	EA-116 QW Bypass
2202	Quench Water to EA-213R	2232	QW from EA-116
2203	Quench Water from EA-213R	2233	QW to Warm Return
2204	Quench Water to EA-401	2234	QW to Quench Tower (Warm)
2205	Quench Water from EA-401	2235	QW to Quench Tower (Cool)
2206	Quench Water to EA-416R	2236	QW to EA-703
2207	Quench Water from EA-416R	2237	QW from EA-703
2208	Quench Water to EA-419	2238	QW to EA-422R
2209	Quench Water from EA-419	2239	QW from EA-422R
2210	QW to 1 Level Bypass	2241	QW to EA-124
2211	QW from Level 1	2242	QW from EA-124
2212	QW to EA-110	2247	QW to EA-441
2213	QW from EA-110	2248	QW from EA-441
2214	QW to EA-112R	2249	QW to EA-451

Simulation Report – ECC 860 KTA
Working Stage 6

2215	QW from EA-112R	2250	QW from EA-451
2216	QW to EA-111	2253	QW from EA-455
2217	QW from EA-111	2501	Process Water Stripper Overhead
2218	QW to EA-801	3025	Liquid from FA-201
2227	QW to 3 Level Bypass	3038	Vapor from FA-203
2228	QW to EA-804	3041	Medium Gasoline to QT
2229	QW from EA-804	3907	Spent Gasoline from FA-902
2230	QW from Users	2501	PW Stripper Overhead
2101	Gasoline Fractionator Overhead	2502	Water to EA-121
2044	BA-109 Effluent to Gas Fractionator	2503	Return from EA-121
2016	BA-106-7 Effluent to Gas Fractionator	2504	PW Stripper Bottom
2015	BA-102-5 Effluent to Gas Fractionator	2505	Wash Water to EE-902
2031	BA-108 Effluent to Gas Fractionator	2506	Process Water to EA-114
2021	EA-113 Effluent with Purge Steam	2507	Dil. Steam Drum Feed
2120	Gasoline Reflux to Gas Fractionator	2508	Dil. Steam Drum Blow-down
2030	Liquid HTR to PFO Stripper	2509	Water to Waste Treatment
2108	Cooled Fuel Oil Product	2510	Water to EA-118
2110	Quench Oil to EA-118	2511	Return from EA-118
2111	Quench Oil from EA-118	2512	Water to EA-119
2115	Quench Oil from EA-114	2513	Return From EA-119
2102	Total Gas Fractionator Bottom to GA-101	2514	Dil. Steam Drum Overhead
2109	Gas Fraction Side Draw to PFO Stripper	2515	Dil. Steam to Users
2104	QO to PFO Stripper	2521	Stripping Steam to DA-104
2107	PFO Prod from GA-107	4138	LP CH ₄ to FA-201
2112	PFO Recycle to Gas Fractionator	2117	Quench Tower Overhead
2106	PFO Stripper to GA-107	1230	Off Gas to FA-201
2125	PFO Stripper Feed from Viscous QF	3025	Liquid from FA-201
2116	LP Steam to PFO Stripper	3001	CGC 1 st Stage Suction
2105	PFO Stripper Overhead	3002	CGC 1 st Stage Discharge
3049	Total Medium Gasoline	3003	EA-201 Outlet
3040	Medium Gasoline to B.L.	3026	CGC 2 nd Suction Drum Water
3041	Medium Gasoline to Q.T.	3004	CGC 2 nd Stage Suction
3038	Vapor from FA-203	3005	CGC 2 nd Stage Discharge
3007	CGC 3 rd Stage Suction	3006	EA-202 Outlet
3008	CGC 3 rd Stage Discharge	3027	Liquid from FA-204
3009	EA-203 Outlet	3042	Recycle Liquid to FA-202
3010	CGC 3 rd Discharge Drum Vapor	3036	CGC 2 nd Suction Drum HC Liquid
3011	CHG Gas Heater Effluent	3044	Med Gasoline to EA-215
4522	C ₃ - Vent Gas to FA-205	3037	EA-215 Outlet
3028	Liquid from FA-205	3043	Recycle Liquid to FA-204

IV.1.3 Unit Operation

Codes list and description of the operating units involved in Stage 1 are summarized in Table IV.2.

Table IV. 2 Process Equipment of Stage 1

Name	Description
FA-201	Charge Gas Compressor 1 st Stage Suction Drum
FA-202	Charge Gas Compressor 2 nd Stage Suction Drum
FA-203	Medium Gasoline Flash Drum
FA-204	Charge Gas Compressor 3 rd Stage Suction Drum
FA-205	Charge Gas Compressor 3 rd Stage Discharge Drum
GB-201	Compressor stage 1, 2, 3
GA-201 A/B	Pump
GA-209 A/B	Pump
EA-201	Heat Exchanger
EA-202	Heat Exchanger
EA-215	Heat Exchanger
EA-203	Heat Exchanger
EA-213	Heat Exchanger
DA-104	Process Water Stripper
FA-112M	Dilution Steam Drum
EA-114	Floating Head
EA-118 A/B/C/D	Floating Head
EA-119	Fixed Tube Sheet
EA-120	Fixed Tube Sheet
EA-121 A/B	Fixed Tube Sheet
EA-122	Floating Head
GA-110 A/B	Centrifuge
DA-102M	Quench Tower
EA-116 A/B/C/D	Quench Water Cooler No. 1
EA-117 A/B/C	Quench Water Cooler No. 2
GA-102 A/B	Gasoline Fractionator Reflux Pump
GA-108 A/B/C/D	Quench Water Circulation Pump
GA-109 A/B/C	Process Water Stripper Feed Pump
DA-101M	Gasoline Fractionator
DA-103M	FPO Stripper
PA-104	Quench Oil Filter Package
GA-101A/B/C/D	Pump
GA-103A/B	Pump
GA-107A/B	Pump
EA-114	Heat Exchanger
EA-118A/B/C/D/E/F	Heat Exchanger
EA-115A/B	Heat Exchanger
FD-101A/B/C/D	Strainer
FD-102A/B	Strainer
HB-110	Viscosity Control Quench Fitting

IV.1.4 Simulation Approach and Assumption

Some of the assumptions and approachment that taken in the simulation are as follows.

- a. Input components are showing in the Table IV.3.

Table IV. 3. Simulation Component of Stage 1

No.	Design Name	Simulation Name
1	Hydogen	Hydrogen
2	Carbon Monoxide	CO
3	Carbon Dioxide	CO ₂
4	Hydrogen Sulphide	H ₂ S
5	Methane	Methane
6	Acetylene	Acetylene
7	Ethylene	Ethylene
8	Ethane	Ethane
9	Propadiene/Propyne	Propadiene
10	Propylene	Propene
11	Propane	Propane
12	Butadienes/C ₄ Acetylenes	13-Butadiene
13	Butylenes	1-Butene
14	Butanes	n-Butane
15	C ₅ Hydrocarbons	i-Pentane
16	C ₆ Non-Aromatics	1-Hexyne
17	C ₇ Non-Aromatics	n-Heptane
18	C ₈ Non-Aromatics	n-Octane
19	Benzene	Benzene
20	Toluene	Toluene
21	Xylenes/Ethylbenzene	p-Xylene
		E-Benzene
22	Styrene	Styrene
23	C ₉ – 204°C	o-MStyrene
		123-MBenzene
		1-Undecene
24	204 – 288°C (PGO)	1-Undecyne
		Hex-M-Benz
		n-C ₁₃
		n-C ₁₄
		n-C ₁₅
25	288°C Plus (PFO)	n-C ₁₇
		n-C ₂₀

Simulation Report – ECC 860 KTA
Working Stage 6

		n-C ₂₃
		n-C ₂₆
		n-C ₂₈
		n-C ₃₀
26	Steam/Water	H ₂ O

Some compounds are divided into several isomers of the compounds that may be present. In addition, C₉, PGO, and PFO are divided into compounds with boiling point range which is adapted to provide an overview column profiles and appropriate operating conditions. The components used to represent all these compounds derived from components defined in HYSYS and do not use hypo that inputted manually.

- b. The simulation used Peng-Robinson as fluid package because the simulation involve hydrocarbon compounds for stage 1 unit 1 and 3. For unit 2, the fluid package used is UNIQUAC-ideal and for unit 3 is SRK. The difference of any fluid package is only in the calculation and those fluid package give the best error calculation among others.
- c. The streams data that used follow Case 2 of Basic Engineering Design.
- d. Column design data used as a basis of calculation. In addition, the efficiency of the columns used are adjusted to produce the desired product.
- e. Adiabatic efficiency of the pump is 75% (default on HYSYS)
- f. The feed preheating is not simulated because of lack of data. Heat recovery is described as the heat contained by streams.
- g. Packing in Quench Tower Column is illustrated as tray column with a ratio of real HETP and column high contained in the design.
- h. Dilution Steam Drum is simulated using separator that given duty to produce a flow rate above the desired product

IV.1.5 Simulation PFD

The simulation PFD is shown in Figure IV.2.

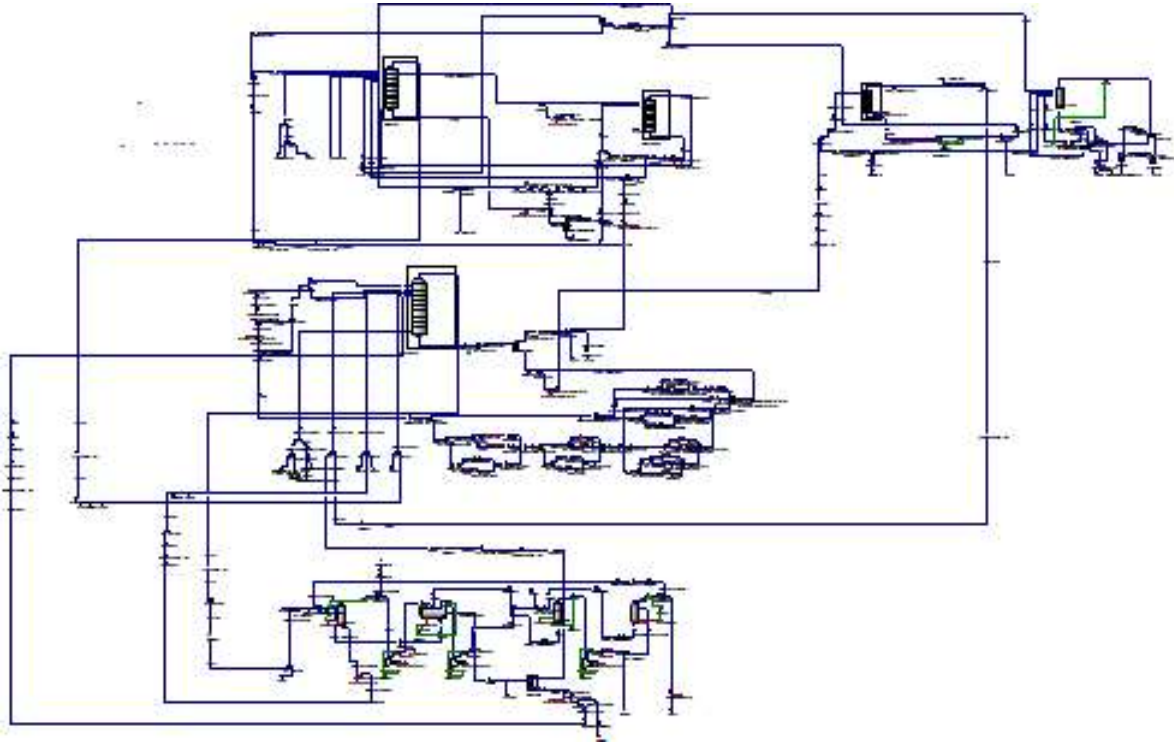


Figure IV. 2. Simulation PFD of Gasoline Fractionator and PFO Stripper

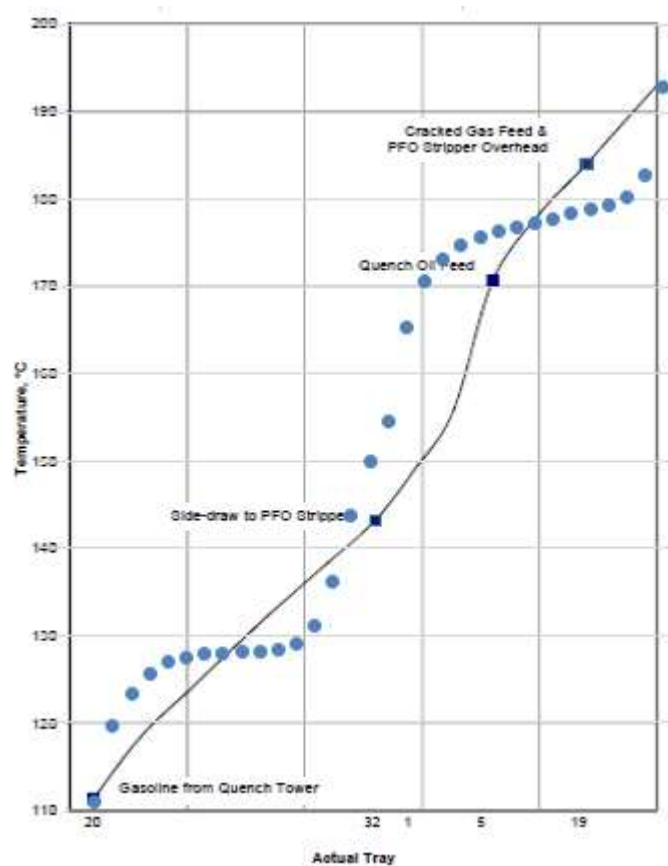
IV.1.6 Simulation Result and Evaluation

The stage simulation has achieved convergence. Result for integration stage is evaluated using data from design versus data from streams after integration. In the Stage 1, there are 5 units that already integrated into 1 simulation. The integration process uses cutter units to calculate the differences of fluid package and recycle units to recalculate streams using new data from other fluid package. The differences of fluid package can make error occur in the stream and unit operation such as columns, vessels, and reactors.

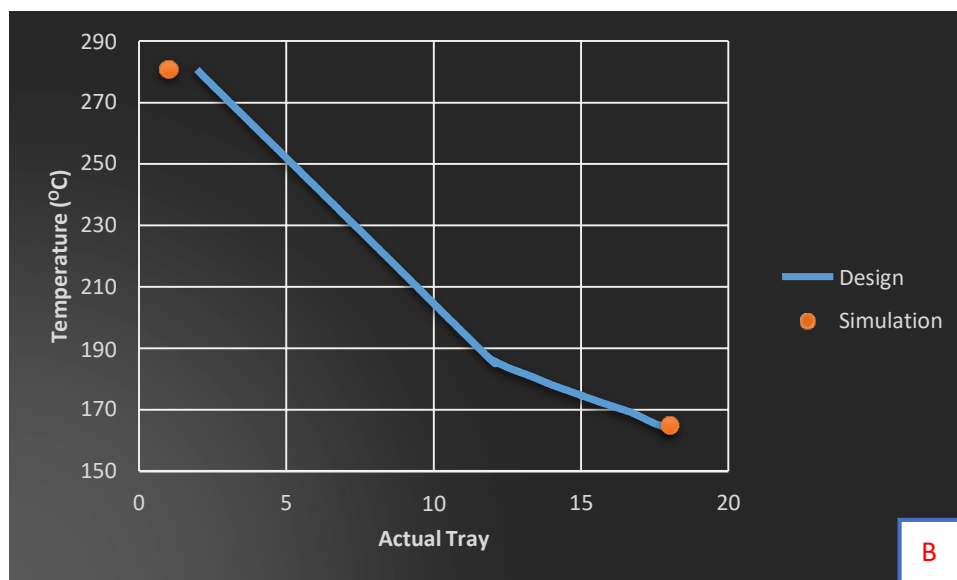
Stage 1 integration will be discussed into 2 part, there are profil temperature discussion and mass balance discussion. Figure IV.3 below show the evaluation in profil temperature between the design data compared to the integration data.

Simulation Report – ECC 860 KTA

Working Stage 6



A



B

Simulation Report – ECC 860 KTA

Working Stage 6

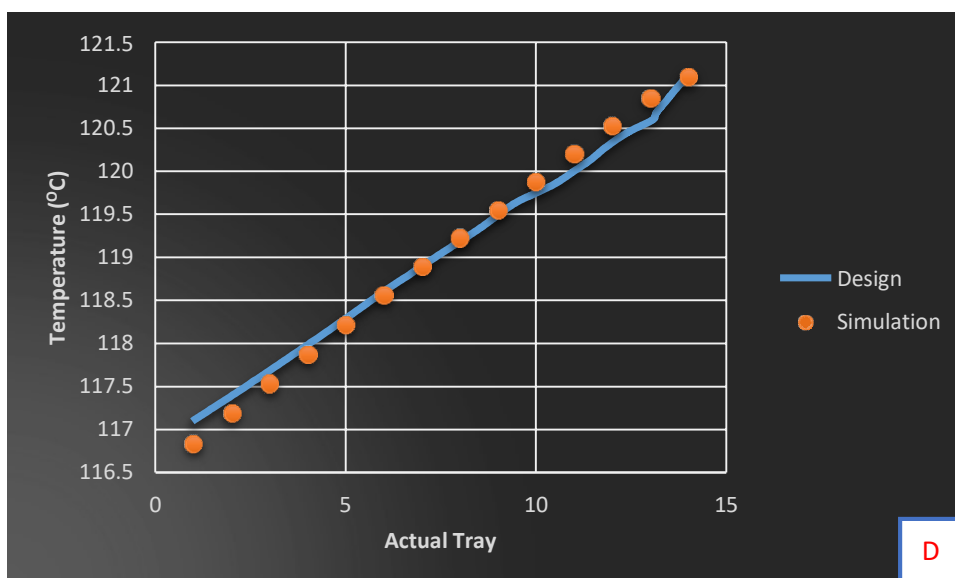
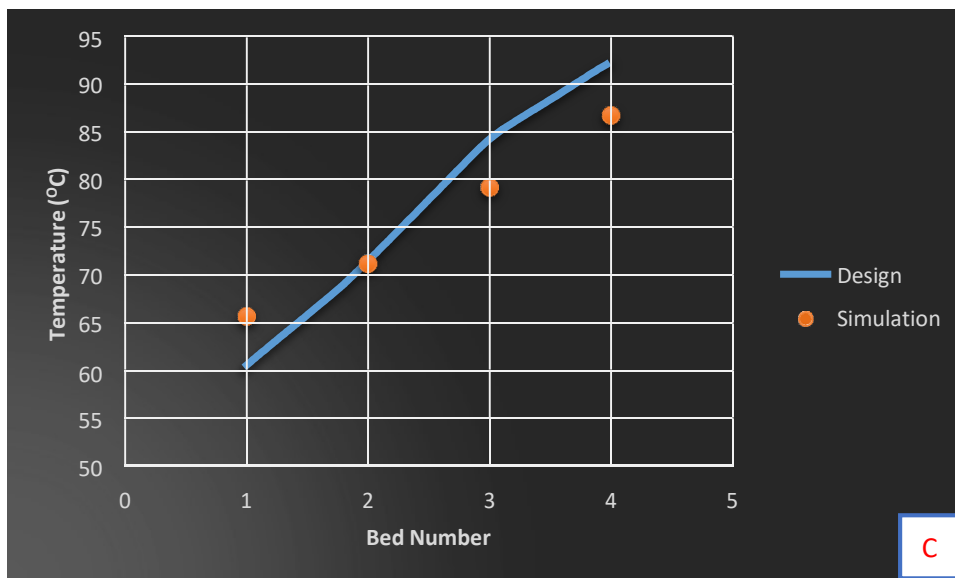
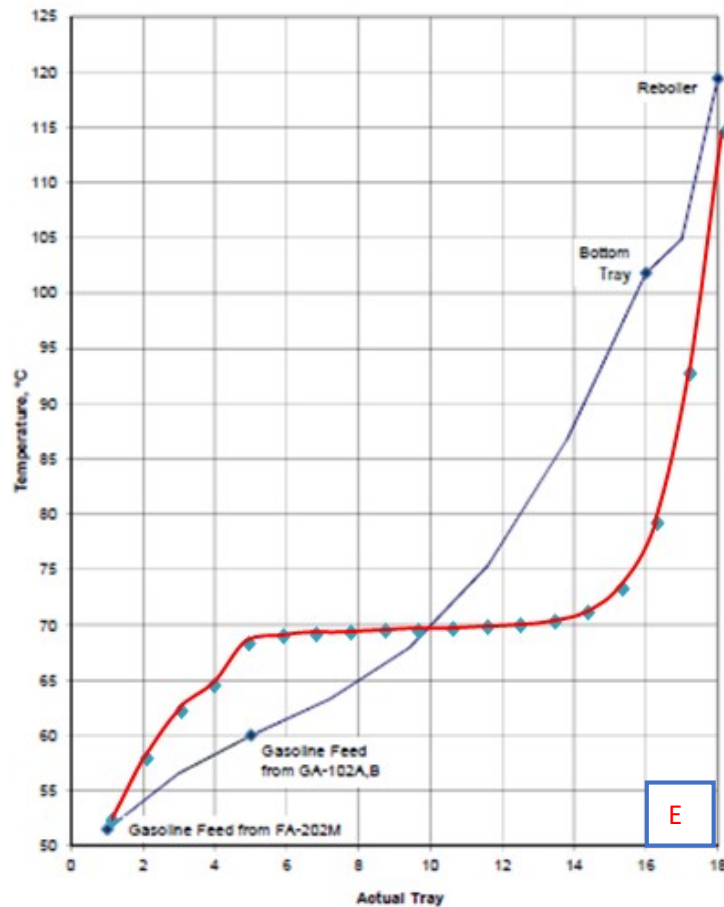


Figure 9.7
DA-204 - Gasoline Stripper
Temperature Profile - Design Case



**Figure IV. 3. Profil Temperature of Column DA-101(A), DA-103(B), DA-102(C),
DA-104(D), and DA-204(E)**

In general, Differences exist between simulation and design, in particular on temperature profile. This is due to the fact that the components listed on design specification are not clearly stated. In order to tackle this issue, it is decided to make a prediction about the identity of the component based on molecular weight. This however yield to an error on the temperature profile. However, the target composition and properties in both inlet and outlet are within the design specification. Therefore, the simulation is acceptable.

Simulation yields a satisfied result according to the design specifications that can be seen from the error value of mass balance. The largest error occurred in unit 2 on the temperature of Stream 2117 at 17.5% while The second largest process condition error of 8.5% is found in the temperature of Stream 2109. In flow 2510 unit 3, the error on temperature is 7.5%. Other than these, the error are consistent below 5% with majority below 1%.

IV.2 Simulation Integration Stage 2

IV.2.1 Process Description

Vapor outlet from discharge drum 3rd stage compressor is fed into caustic/water wash tower to strip the acid components. The components being stripped are CO₂ and H₂S. This process is necessary to keep the downstream product specification requirement.

After contacted with caustic in the tower, charge gas is washed with water to avoid any carryover into the downstream flow. Spent caustic from the tower bottom is fed into spent caustic pre-treatment to be washed with gasoline.

Changes of equipment in the new PFD for 820KTA compared to the older version of PFD are:

- Additional Caustic/water wash tower no. 2 (DA-203), work in series with D-202
- Removal of tray and mist eliminator on tower DA-202
- Dessicant replacement on K.O. Drum FF-201A,B
- Additional K.O. Drum FF-201 C parallel to FF-201A,B

Spent caustic solution from the caustic wash tower bottom cannot be directly released into the environment without further treatment. This solution contains sodium carbonate, sodium sulfide and trace sodium hydroxide. This solution may also contain a dispersed hydrocarbon.

The dispersed hydrocarbon may cause fouling in the stripping section, thus have to be removed with gasoline wash. Gasoline used comes from the quench tower. After being mixed, spent caustic solution and spent gasoline are separated with coalescer. Spent gasoline is then water washed to reduce the caustic content that may change the acidity in quench tower. Wash water is mixed with caustic solution and treated further in spent caustic oxidation.

Charge gas is being fed into 4th stage suction drum for two phase separation. The liquid phase consists of hydrocarbon and condensate and separated further in quench tower and the vapor phase is compressed in GB-201 4th stage compressor. Compressed gas mixed with steam and cooled before separated in 5th stage suction drum.

The mixed gas is being fed into 5th stage suction drum, along with HP off gas. The bottom product is recycled into 4th stage suction drum, the overhead product is compressed in 5th stage of GB-201, and the side product goes to Condensate Stripper Feed Coalescer.

The compressed gas from 5th stage of GB-201 is being cooled before separated in 5th discharge drum. The bottom product is recycled into 5th stage suction drum, and overhead product is being cooled twice before separated in Dryer Feed Drum. The bottom and side product is recycled into other drum, the overhead product, that is charge gas, goes to FF-201.

Separated hydrocarbon from Condensate Stripper Feed Coalescer is stripped in condensate stripper. The condensate is stripped of its ethane content with help of a reboiler. Bottom product is fed into depropanizer and overhead vapor is recycled into 4th stage suction drum.

Cracked gas chilling is the process of heat exchange of the various gases product. The basic principle is utilization of material streams which will in-cooled heat exchanged with the stream of material to be heated.

The hot feed streams are as follow:

- Stream 4309 Ethane
- Stream 4011 Hydrogen From FA-301 A,B
- 4107 Cracked Gas Stream From the EA-317
- Stream 4102 Charged Gas From EA-409

While the cold feed stream:

- Stream 4013 Ethane From DA-302
- Stream 4014 Hydrogen From DA-302
- Bottom stream Demethanizer 4156 Product of the GA-301 A,B
- Stream 4167 HP Methane From DA-301
- Stream 4307 Ethane From DA-402
- Ethylene Stream HP 4324 Product of the GA-1803 A,B

Charge gas from dryer is chilled using enhanced binary refrigerant (EBR) before it is sent to demethanizer. Charge gas is first fed through heat exchanger (EA-326X). The condensed gas is then sent to separator (FA-312), where the liquid stream leaving FA-312 is cooled further in EA-333X and then split into two stream that will become demethanizer (DA-301M) feed. Vapor stream from FA-312 is cooled in EA-334CX. This stream is then separated in FA-313. Liquid stream from FA-313 is sent to demethanizer (DA-301M). Vapor stream from FA-313 is cooled further in EA-334BX and then separated in FA-314. Liquid stream from FA-314 is sent to demethanizer and vapor stream is then cooled again in EA-334AX and then separated in FA-315. Liquid stream from FA-315 contain high pressure methane and vapor stream from FA-315 contain hydrogen. These streams are then heated in EA-334AX, EA-334BX, EA-334CX, EA-326X, and EA-327X. From EA-327X, high pressure methane is fed to fuel gas system and hydrogen is fed to methanator.

EBR stream is first cooled in EA-327X and then separated in FA-655. Both vapor and liquid stream from FA-655 are cooled again in EA-327X. Vapor product from FA-655 is condensed in EA-326X, and then enter FA-656. Liquid stream from FA-656 is split into two stream, stream 5250 and 5213. Stream 5250 is used to cool liquid ethane from DA-402M, while stream 5213 is used to cool charge gas in EA-334BX, EA-334CX, and EA-326X. Liquid product from FA-655 is used to cool charge gas in EA-326X only.

Other streams that are used to cool EBR in EA-327X are:

1. Ethylene recycle stream from DA-402M
2. HP Ethylene product stream from GA-1083
3. Demethanizer bottoms stream from GA-301.

Simulation Report – ECC 860 KTA
Working Stage 6

IV.2.2 Stream List

The process streams involved in the Stage 2 are tabulated as in Table IV.4.

Table IV. 4. Stream List of Stage 2

Name	Description	Name	Description
1110	HPFL Off Gas	4707	Charge Gas from EA-327 to EA-326X
1210	Hydrogen Feed to DC-1201	4708	Charge Gas from EA-326X to FA-312
3012	Caustic Tower Overhead	4809	Vapor from FA-312
3013	Charge Gas Compressor 4th Stage Suction	4710	Liquid from FA-312
3014	Charge Gas Compressor 4th Stage Discharge	4712	Charge Gas to FA-313
3015	EA-204 Outlet	4713	Vapor from FA-313
3016	Feed to FA-206	4714	Liquid from FA-313
3017	Charge Gas Compressor 5th Stage Suction	4715	Charge Gas to FA-314
3018	Charge Gas Compressor 5th Stage Discharge	4716	Vapor from FA-314
3019	EA-205 Outlet	4717	Liquid from FA-314
3020	Charge Gas Compressor 5th Discharge Drum Vapor	4718	Charge Gas to FA-315
3021	EA-206 Outlet	4719	Vapor from FA-315
3022	EA-207 Outlet	4720	Liquid from FA-315
3023	Dryer Feed Drum Vapor	4721	H ₂ Rich Letdown before CV
3029	Liquid from FA-206	4722	H ₂ Rich Letdown after CV
3030	Charge Gas Compressor 5th Suction Drum Water	4723	FA-315 Vapor to EA-334AX
3031	Liquid from FA-208	4724	FA-315 liquid to EA-334AX
3032	Dryer Feed Drum Water	4725	HP Methane to EA-334AX
3033	Dryer Feed Drum HC-Liq	4726	HP Methane from EA-334AX
3034	Charge Gas Compressor 5th Suction Drum HC-Liq	4727	HP Methane to EA-334BX
3039	Recycle Liquid to FA-207	4728	HP Methane form EA-327AX
3050	Feed to FA-208	4729	Hydrogen from EA-327X
3201	Feed to DA-201	4732	New Demeth Feed Split No.1
3202	Condensate Stripper Overhead	4733	New Demeth Feed Split No.2
3203	Condensate Stripper Bottoms	4741	New Demeth Feed No.1
3204	EA-211 Inlet	4742	New Demeth Feed No.2
3205	EA-211 Outlet	4743	New Demeth Feed No.3
3206	Outlet EA-212	4744	New Demeth Feed No.4
4202	Lower Deethanizer Feed	4767	HP Methane to EA-334BX
4237	Lower Deethanizer Feed from EA-	5208	FA-654 Vapor to EA-327X

Simulation Report – ECC 860 KTA
Working Stage 6

	208		
2121	Wash Gas to EA-214	5209	EBR from EA-327X to FA-655
2505	Wash Water to EE-902	5210	Light EBR from FA-655 to EA-327X
3306	Spent Caustic to EE-901	5211	Light EBR to EA-326X
3901	Feed to FA-901	5212	Light EBR to FA-656
3902	Spent Gasoline to FA-902	5213	Light EBR to EA-334CX
3903	Spent Caustic from FA-901	5215	Medium EBR from FA-655 to EA-327X
3904	Feed to FA-902	5216	Medium EBR to EA-327X
3905	Spent Caustic from FA-902	5217	Medium EBR to EA-326X
3906	Spent Caustic to B. L.	5218	Medium EBR from EA-326X
3907	Spent Caustic from FA-902	5219	Medium EBR to FA-651
3908	Wash Gasoline from EA-210	5220	Light EBR from EA-334BX
3301	Make-Up Caustic from FB-201	5221	Light EBR to EA-334BX after CV
3011	Charge Gas Heater Effluent	5222	Light EBR from EA-326X to FA-651
3012	Caustic Tower Overhead	5223	Enhance Binary Refrigerant to FA-651
3023	Dryer Feed Drum Vapor	5230	Heavy EBR from EA-327X to EA-653
3024	Dryer Effluent	5231	Medium EBR from EA-327X to EA-653
3302	Strong Caustic from DA-202	5232	Enhance Binary Refrigerant to EA-653
3303	Strong Caustic from GA-207	5250	Light EBR to EA-335X
3304	Weak Caustic from DA-202	5251	Light EBR from EA-335X
3305	Weak Caustic from GA-206	5252	Light EBR to EA-326X
3306	Spent Caustic to EE-901	5253	Light EBR from EA-326X
3307	Water to Water Wash	4325	C2 Product to EA-335X
3308	Make-Up from Water Wash	4326	C2 Product from EA-335X
4101	Charge Gas from EA-308	4061	Ethane Recycle to EA-330
4236	Demethanizer Bottom to Lower Deethanizer Feed	4062	Ethane to EA-330
4237	Lower Deethanizer Feed from EA-308	4063	Ethane Recycle to EA-327X
4757	Demethanizer Bottoms from EA-327X	4064	Ethane Recycle to EA-112R
4758	DA-301M BTMS to Upper DA-401M Feed	4702	Charge Gas from EA-449 to EA-330
4759	Deethanizer Upper Feed From EA-327X	4703	Charge Gas from EA-330 to EA-336
4760	DA-301M BTMS to Lower DA-401M Feed	4328	HP Ethylene Product to EA-327X
4761	Deethanizer Lower Feed to EA-	4329	HP Ethylene Product from EA-

Simulation Report – ECC 860 KTA
Working Stage 6

	327X		327X
4756	Demethanizer Bottoms to EA-327X		

IV.2.3 Unit Operation

Codes list and description of the operating units involved in Stage 2 are summarized in Table IV.5.

Table IV. 5. Process Equipment that used in Stage 2

Name	Description
FA-901	Spent Caustic Coalescer
FA-902	Spent Gasoline Coalescer
EA-214	Wash Gasoline Cooler
GA-901A,B	Spent Caustic Coalescer Gasoline Pump
GA-902	Spent Gasoline Coalescer Gasoline Pump
FB-201	Caustic Storage Tank
FA-211	Yellow Oil Drum
DA-202	Caustic/Water Wash Tower
FA-201A,B	Charge Gas Dryers
FA-209	Dryer Regeneration K.O. Drum
GA-208A,B	Caustic Make-Up Pump
GA-206	Weak Caustic Circulation Pump
GA-207A,B	Strong Caustic Circulation Pump
EA-308A,B	Dryer Effluent Chiller
EA-209	Dryer Regeneration Gas Cooler
EA-210	Dryer Regeneration Gas Heater
DA-203	Caustic/Water Wash Tower no. 2
FA-206	Charge Gas Compressor 4th Stage Suction Drum
FA-207	Charge Gas Compressor 5th Stage Suction Drum
FA-208	Charge Gas Compressor 5th Stage Discharge Drum
FA-210	Dryer Feed Drum
DA-201	Condensate Stripper
GB-201	Charge Gas Compressor
EA-204	Charge Gas Compressor 4th Stage Aftercooler
EA-205	Charge Gas Compressor 5th Stage Aftercooler
EA-206	Dryer Feed Chiller No. 1
EA-207	Dryer Feed Chiller No. 2
EA-211	Condensate Stripper Reboiler
EA-212	Condensate Stripper Bottoms Cooler
GA-205A,B	Dryer Feed Drum Pump
FA-302	Charge Gas 1 st Stage Flash Drum
FA-303	Charge Gas 2 nd Stage Flash Drum

Simulation Report – ECC 860 KTA
Working Stage 6

FA-304	Charge Gas 3 rd Stage Flash Drum
FA-305	Charge Gas 4 th Stage Flash Drum
FA-306	Charge Gas 5 th Stage Flash Drum
EA-307X	Heat Exchanger
EA-314AX	Heat Exchanger
EA-314BX	Heat Exchanger
EA-314CX	Heat Exchanger
EA-314DX	Heat Exchanger
EA-313X	Heat Exchanger
EA-309	Heat Exchanger
EA-310	Heat Exchanger
EA-311	Heat Exchanger
EA-312	Heat Exchanger
EA-315	Heat Exchanger
EA-412	Heat Exchanger
FA-312	Second Demethanizer Feed Separator No. 1
FA-313	Second Demethanizer Feed Separator No. 2
FA-314	Second Demethanizer Feed Separator No. 3
FA-315	Second Demethanizer Feed Separator No. 4
FA-655	Medium Enhanced Binary Refrigerant Accumulator
FA-656	Light Enhanced Binary Refrigerant Accumulator
FA-657X	Enhanced Binary Refrigerant Retrograde Drum
EA-327X	Heat Exchanger
EA-326X	Heat Exchanger
EA-333X	Heat Exchanger
EA-334CX	Heat Exchanger
EA-334BX	Heat Exchanger
EA-334AX	Heat Exchanger
EA-335X	Heat Exchanger
EA-330	Heat Exchanger

IV.2.4 Simulation Approach and Assumption

There are several assumption used in simulating the process with Aspen HYSYS, which are:

- a. Because HYSYS license does not include Oli Electrolyte, the caustic reaction performed using a conversion reactor.
- b. Fluid Package for Stage 2 are Peng Robinson, UNIQUAC, SRK, and Chao-Seader for any units.
- c. To adjust the temperature of each separation and simulate heat loss, every separation unit is equipped with it's own energy stream.

- d. Caustic and its reaction products components' solubility are not known. Thus, the simulator cannot perform an absorber routine calculation. The separation is performed using a component splitter as DA-202 and DA-203 tower.
- e. Each heat exchanger contained in the PDF process is simulated as a separated heater-cooler (not integrated with the flow in other units). The flow rate of each stream using the base unit kg-mole/hr.
- f. The temperature of the exit of each zone Heat Exchanger have relatively same temperature.
- g. No leaks in the material out of the Heat Exchangers.
- h. Stream material in the system Cracked Gas Chilling assumed no change in temperature during the piping flow.
- i. Stream flow in the heat exchanger in a steady state.

IV.2.5 Simulation PFD

The simulation PFD is shown in Figure IV.4.

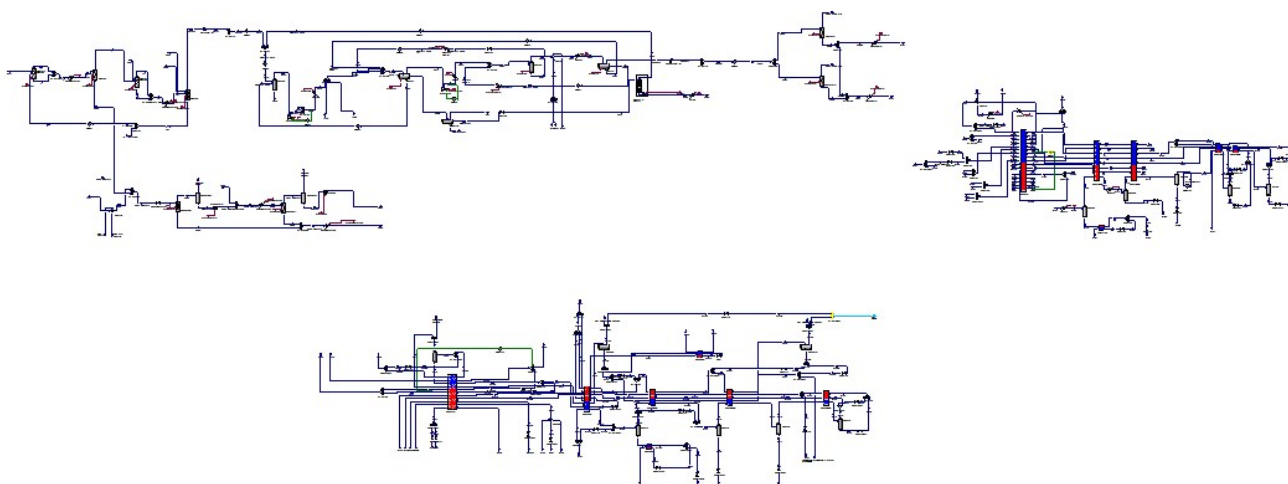


Figure IV. 4. PFD of Stage 2 Integration in HYSYS

IV.2.6 Simulation Result and Evaluation

The integration simulation has been conducted and it is convergent. Result for integration stage is evaluated using design data versus data from streams after integration. In the Stage 2, there are 5 units that already integrated into a single integrated simulation. The integration process uses cutter units to calculate the differences of fluid package and recycle units to recalculate streams using new data from other fluid package. The differences of fluid package can make error occur in the stream and unit operation such as columns, vessels, and reactors.

Stage 2 integration will be discussed into 2 part, there are profil temperature discussion and mass balance discussion. Figure IV.5 below show the evaluation in profil temperature between the units data compare to the integration data.

Figure 9.5
DA-201M - Condensate Stripper
Temperature Profile - Design Case

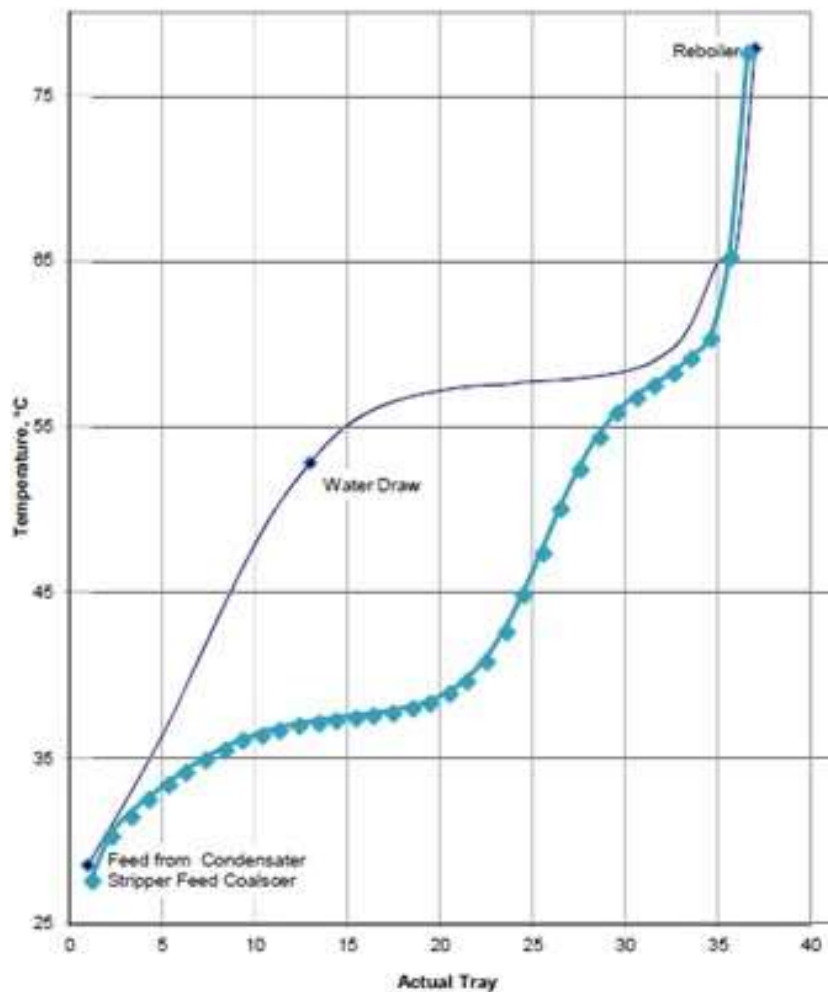


Figure IV. 5. Temperature Profile of DA-201

There are significant temperature differences between tray 1 to tray 35. The difference shows an opposite trend compared to the design data. However, the properties of the flow in the inlet and outlet of the column has been achieved. Further justification of the data is needed.

The biggest error occurred in pressure at stream 3023 which is 56.95%. Other significant error also occurred at Spent Caustic Pre-Treatment stream 3093 with error around 6.71% at the molar flow. Other than that, the errors are either lower than 3% or insignificant in terms of its respective quantity.

IV.3 Simulation Integration Stage 3

IV.3.1 Process Description

The condensed liquids from the charge gas chilling train along with the vent gas from ethylene fractionation are sent to the appropriate beds of the demethanizer. This tower is operated at a pressure just high enough to permit use of the overhead methane product for

dryer regeneration and still be at fuel gas pressure.

The demethanizer is reboiled with charge gas in the bottom and side reboiler. The bottom product passes through the cold box, and then is split into two streams. One stream is sent directly to the deethanizer as a liquid stream. The other, which is the major part, is also sent to the deethanizer, but only after vaporization by further preheat against charge gas in dryer effluent chiller and fifth stage discharge vapor in dryer feed chiller No. 1.

The overhead of the demethanizer is split into two streams, one stream is mixed with reflux drum liquid and sent to the cold box as high pressure methane refrigerant. After being reheated a portion is compressed and used as gas turbine fuel. The remainder is sent directly to the fuel gas system after being used to regenerate the charge gas dryers. The other stream is heated and compressed. The compressor discharge is chilled by demethanizer overhead vapor and condensed by ethylene refrigerant and then it is sent to the reflux drum. The vapor from the reflux drum is mixed with part of the demethanizer overhead going to the cold box. Part of the liquid from the reflux drum is mixed with part of the liquid from reflux drum is sent to the demethanizer as reflux. The remainder reflux drum liquid is mixed with demethanizer overhead as discussed above and sent to cold box as methane refrigerant.

The methanation section takes raw hydrogen (96% hydrogen) generated in the hydrogen methane separator no. 2 and prepares it for use in the downstream hydrogenation process. This involves two primary processing steps:

- Methanation is the conversion of the carbon monoxide in the hydrogen to methane and water. CO is a catalyst poison in the downstream hydrogenation reactions.
- Drying of the hydrogen is required for the C2 and C3 hydrogenation as water is a poison to these catalysts.

The hydrogen streams from two cold boxes are first mixed into one single new stream. Then, the new stream is heat interchanged with effluent from the methanator and then further heated using high pressure steam to the reaction temperature of 288°C. This temperature is required to initiate the reaction. The conversion of the CO is an exothermic reaction, therefore, the methanator temperature should be monitored closely as runaway reactions can result.

Reactor effluent is used to heat the feed and is then cooled against cooling water. The hydrogen stream is further cooled to 16°C by propylene refrigerant. Condensed water is separated in the hydrogen dryer K.O. drum. Part of the hydrogen leaving the drum goes to the hydrogen dryers. This hydrogen is ultimately used in the acetylene, MAPD, and C4/C5 hydrogenation reactors. The balance of the hydrogen is sent to the DPG hydrogenation reactors or, if not required, may be used as fuel gas. Two hydrogen dryers are provided to accommodate the periodic regenerations required. The dry hydrogen stream is split into three streams. The first stream goes to the MAPD converters, the second stream goes to C4/C5 hydrogenation, and the third stream goes to the cold box before entering the ethane wash column. In the ethane wash column 96% hydrogen is converted to 99%+ hydrogen is used in the acetylene converters and as a high purity hydrogen product.

The demethanizer bottoms product, which is split into two streams as described in the

demethanizer section, feeds the deethanizer. The deethanizer reflux is supplied by condensing the overhead vapors with propylene refrigerant. The column is reboiler either with quench water or in the spare reboiler utilizing low pressure steam.

Acetylene is removed from the net deethanizer overhead product by selective hydrogenation to ethylene and ethane in a two bed acetylene converter with intercooling. A one reactor system with three beds is provided. Two beds of the reactor remain in the service, while the third bed can be regenerated without interrupting plant operation.

The required hydrogen is added to the deethanizer overhead, and the total stream is then preheated against the converter effluent and low pressure steam, and passed over the first catalyst bed. The temperature rise is proportional to the percentage of hydrogen added to the feed. A safety monitor is provided to shut off the hydrogen in the event that the reactor temperature becomes excessive. The effluent from the first bed is cooled, mixed with more hydrogen and then passed over the second catalyst bed to complete acetylene conversion. The effluent from the second bed, containing less than 2 ppm of acetylene, in relation to ethylene, is cooled by water and by exchange with the converter feed.

During hydrogenation, a small portion of the acetylene is converted to a polymer called green oil. This material interferes with the proper drying of the ethylene fractionator feed. The drying step is essential to avoid icing problems. This green oil is removed by contacting the gas in the green oil knock-out drum with a slipstream of ethylene/ethane liquid stream taken as a side drawn from the ethylene fractionator. The green oil knock-out drum bottoms liquid, containing green oil, is recycled back to the deethanizer. The contained green oil leaves with the deethanizer bottoms to the depropanizer and ends up in the raw pyrolysis gasoline. The overhead vapor from the green oil drum passes to the ethylene fractionator through the ethylene dryer. The ethylene dryer consists of a single molecular sieve bed.

The ethylene fractionator has one bottom reboiler and two side reboilers permitting the maximum cold recuperation from this tower. The side reboilers are against charge gas and ethylene refrigeration compressor discharge. The main reboiler is against propylene refrigeration. The tower is condensed with propylene refrigeration. Vent gasses from reflux drum, consisting primarily of excess hydrogen from the acetylene converters, are recycled to the demethanizer.

Ethane is withdrawn from the ethylene fractionator bottom, vaporized against charge gas, reheated in the cold box against propylene refrigerant, and recycled to the cracking heaters. A slip stream of the ethane recycle is used in the ethane wash system as previously discussed.

Liquid ethylene product is taken as a tower side draw. The product splits into 3. One stream flows to H.P. storage and one is chilled before mixed with the last one. Before mixing, the last stream is subcooled against C2 refrigerant and goes to low temperature storage. From the H.P. storage tank, product is withdrawn with a transfer pump. A high pressure ethylene product stream, at 38.5 kg/cm²g, is pumped, vaporized against propylene refrigerant and then superheated before delivery to Battery Limits as vapor products. In addition, a steam vaporizer is installed to back-up vapor products pressure in the high pressure product stream.

Simulation Report – ECC 860 KTA
Working Stage 6

IV.3.2 Stream List

Process streams of Stage 3 are tabulated in Table IV.6.

Table IV. 6. Process Streams of Stage 3

Name	Description	Name	Description
4210	Deethanizer Reboiler Return	4104	Charge Gas from EA-310
4202	Lower Deethanizer Bottom	4105	Charge Gas from EA-316
4203	Deethanizer Gross Overhead	4106	Charge Gas from EA-311
4204	Deethanizer Condenser Outlet	4107	Charge Gas to EA-312
4205	Deethanizer Net Overhead	4143	Demethanizer Feed No. 3
4206	Deethanizer Reflux	4142	Demethanizer Feed No. 2
4097	H2 to DC-401	4144	Demethanizer Feed No. 4
4207	Deethanizer Net Bottom	4155	DA-301 Bottoms
4208	Deethanizer Bottoms to DA-403	4156	Demethanizer Bottom
4209	Deethanizer Reboiler DA-401 Feed	4162	Demethanizer Reboiler Inlet
4210	Deethanizer Reboiler Return	4163	Demethanizer Main Reboiler Outlet
4211	Deethanizer reboiler DA-401	4164	Demethanizer Feed To EA-317
4212	Deethanizer Reboiler Return	4165	Demethanizer Side Reboiler Outlet
4213	Deethanizer Net Overhead After CV	4166	DA-301 Overhead
4214	Deethanizer Net Overhead Preheat 1	4167	HP Methane to EA-314CX
4215	C2 Converter Feed to Preheat 2	4168	Demethanizer Overhead to EA-318X
4216	C2 Converter Feed to Bed 1	4169	EA-318X Warm Outlet
4217	C2 Converter Effluent from Bed 1	4170	Methane to GB-301
4218	C2 Converter Cooler Bed 1	4171	GB-301 First Stage Discharge
4219	C2 Converter Feed Bed 2	4172	GB-301 Second Stage Suction
4220	C2 Converter Effluent from Bed 2	4173	Fuel to GI-101 Before CV
4221	C2 Converter Cooler Bed 2	4175	Fuel to GI-101 After CV
4222	C2 Converter Effluent to GO Drum	4176	GB-301 Third Stage Discharge
4223	EE-401 Outlet to FA-401	4177	Methane Ref to EA-318X
4224	C2 GO KO Drum Overhead	4178	Charge Gas to EA-311
4225	C2 GO Drum Bottom to Deethanizer	4179	EA-318X Cooling Effluent
4226	C2 Frac Feed DA-402	4180	EA-319 Cooling Effluent

Simulation Report – ECC 860 KTA
Working Stage 6

4227	GO Bottom GA-402 Discharge	4181	EA-318X Cooling Effluent
4228	Deethanizer Reflux GA-401 Discharge	4182	Methane from EA-320
4229	Hydrogen Rich to Top Bed	4183	Demethanizer Overhead from EA-318X
4230	CO Rich to Top Bed	4184	Vapor from FA-307X
4231	H2 To C2 Converter Bed 1	4185	Liquid from FA-307X
4232	Hydrogen Rich to Bottom Bed	4186	Demethanizer Tower Reflux
4233	CO Rich to Bottom Bed	4187	Methane Refrigerant to EA-314CX
4234	H2 to C2 Converter Bed 2	4190	HP Methane to EA-314CX
4253	Deeth Overhead to EA-443	4193	EA-336 Feed
4254	Deeth Condenser from EA-443 to FA-402M	4194	EA-336 Effluent
4259	Deeth Reboiler EA-441 Feed	4198	EA-337 Effluent
4260	Deeth Reboiler EA-441 Effluent	4197	EA-337 Feed
4265	Acetylene Converter Effluent from Bed 2	4319	Vent Gas After CV
4266	Acetylene Converter Effluent to Intercooler 2	4706	Charge Gas from EA-336 to EA-337
4267	Acetylene Converter Feed to Bed 3	4703	Charge Gas from EA-330
4269	Hydrogen to Acetylene Converter Bed 3	4705	Charge Gas from EA-336
4270	Hydrogen with CO to Acetylene Converter Bed 3	4707	Charge Gas to EA-326X
4271	Hydrogen Comb. to Acetylene Converter Bed 3	4741	Demethanizer Feed from EA-333X
1102	Hydrogen Feed	4742	Demethanizer Feed from EA-333X
1201	Hydrogen Feed to DC-1201	4743	Demethanizer Feed from FA-313
4001	Hydrogen to Fuel	4756	Demethanizer Bottom to EA-327X
4002	Hydrogen from EA-302	4744	Demethanizer Feed from FA-313
4003	Hydrogen to DC-301	4767	High Pressure Methane to EA-334BX
4004	DC-301 Effluent	4101	Charge Gas from EA-308
4005	Hydrogen from DC-301	4102	Charge Gas to EA-310
4007	Hydrogen from EA-303	4226	Demethanizer Bottom To Lower Deethanizer Feed
4008	Hydrogen from FA-301	4301	C2 Fractionator Overhead
4009	Liquid Water from FA-301	4302	C2 Fractionator Reflux
4010	Liquid Water to DA-102	4303	C2 Fractionator Reflux Liquid

Simulation Report – ECC 860 KTA
Working Stage 6

4011	Hydrogen to EA-307X	4304	C2 Fractionator GA-405 Discharge
4012	Hydrogen to DA-302	4305	Ethylene Product
4013	Ethane to EA-314CX	4306	C2 Fractionator Bottoms
4014	Hydrogen from DA-302	4307	Ethane Recycle to EA-310
4016	Ethane to DA-302	4308	Ethane Recycle to DA-302
4017	Hydrogen to MAPD	4309	Ethane GA-404 Discharge
4018	Hydrogen to DPG	4311	C2 Fractionator Reboiler Feed
4019	Hydrogen to FF-301	4312	C2 Fractionator Draw-Off
4020	Hydrogen from FF-301	4313	Draw Off To C2 Reflux Condenser
4021	DA-302 Tower Bottoms	4314	Return from C2 Reflux Condenser
4022	Hydrogen and Water from EA-304	4315	Draw Off to Green Oil K.O. Drum
4139	Hydrogen to EA-301	4316	Draw Off to Lower Side Reboiler
4729	Hydrogen from EA-327X	4317	Return from Lower Side Reboiler
4351	C2 Fractionator Overhead to EA-450	4318	Vent Gas Recycle
4352	Ethylene Fractionator Condenser 2 Outlet	4319	Vent Gas After C.V.
4363	Ethylene Fractionator Draw-Off to EA-653	4320	Ethylene to Sub-cooling
4364	EA-653 Return to Ethylene Fractionator	4321	Ethylene to Tank
4366	Ethylene Fractionator Draw-Off to EA-449	4322	C2 Product After Subcooled
4367	EA-449 Return to Ethylene Fractionator	4323	Liquid Ethylene Product to Storage
4701	Charge Gas from EA-328	4324	HP Ethylene GA-1803 Discharge
4702	Charge Gas to EA-330	4325	Ethylene Liquid to EA-335X
4326	Ethylene Liquid from EA-335X		

IV.3.3 Unit Operation

Codes list and description of the operating units involved in Stage 3 are summarized in Table IV.7.

Table IV. 7. Process Equipment Used in Stage 3

Name	Description
DA-301	Demethanizer
EA-305	Methane Refrigerant Compressor Intercooler

Simulation Report – ECC 860 KTA
Working Stage 6

EA-306	Methane Refrigerant Compressor Intercooler
EA-311	Demethanizer Feed Chiller No. 1
EA-316	Demethanizer Reboiler 1
EA-317	Demethanizer Side Reboiler 1
EA-318X	Methane Refrigerant Compressor Feed/Effluent Exchanger
EA-319	Methane Refrigerant Chiller
EA-320	Methane Refrigerant Condenser
EA-321	Methane Refrigerant Compressor Min. Flow Cooler
EA-336	Demethanizer Reboiler 2
EA-337	Demethanizer Side Reboiler 2
FA-307	Demethanizer Reflux Drum
GA-301A,B	Demethanizer Bottom Pump
DC-301	Methanator
DA-302	Ethane Wash Tower
EA-301A,B	Methanator Feed/Effluent Exchanger
EA-302	Methanator Feed Heater
EA-303	Methanator Effluent Cooler
EA-304	Hydrogen Chiller
FA-301	Hydrogen Dryer K.O. Drum
FF-301A,B	Hydrogen Dryers
DA-401	Deethanizer
FA-402	Deethanizer Reflux Drum
FA-401	Green Oil K.O. Drum
FF-401A,B	Ethylene Dryer
DC-401A	Acetylene Converter 1
DC-401B	Acetylene Converter 2
EA-401	Deethanizer Reboiler 1
EA-402	Deethanizer Steam Reboiler
EA-403	Deethanizer Condenser 1
EA-404A,B	Acetylene Converter Feed/Effluent Exchanger
EA-405	Acetylene Converter Heater
EA-406A, B	Acetylene Converter Intercooler 1
EA-407	Acetylene Converter Aftercooler
EA-441	Deethanizer Reboiler 2
EA-443	Deethanizer Condenser 2
EA-447A, B	Acetylene Converter Intercooler 2
GA-401A,B	Deethanizer Reflux Pump
GA-	Green Oil Effluent Pump

402A,B	
DA-402	Ethylene Fractionator
EA-408	Ethylene Fractionator Reboiler
EA-409	Ethylene Fractionator Side Reboiler 1
EA-410	Ethylene Fractionator Condenser 1
EA-413	HP Ethylene Steam Vaporizer
EA-414	Ethylene Product Subcooler
EA-449	Ethylene Fractionator Side Reboiler 2
EA-450	Ethylene Fractionator Condenser 1
EA-603	Ethylene Refrigerant Condenser 1
EA-653	Ethylene Refrigerant Condenser 2
FA-403	Ethylene Fractionator Reflux Drum
GA-1803A,B	Ethylene Product Pump
GA-1806A,B	Ethylene Product Pump
GA-404A,B	Ethane Wash Tower Feed Pump
GA-405A,B,C	Ethylene Fractionator Reflux Pump

IV.3.4 Simulation Approach and Assumption

There are several assumption used in simulating the process with Aspen HYSYS, which are:

1. Reboiler EA-408 is integrated with DA-402 using the reboiled-stripper module in HYSYS.
2. Condenser section is not integrated due to the instability of DA-402 module with one additional degree of freedom.
3. There are two streams of NNF (Not Normally Function), which are NNF-1 and NNF-2. Mass flow's value of those two streams is set to 0 kg/h.
4. Reboiler EA-401 and EA-402 also EA-403 is integrated with DA-401 using the distillation module in HYSYS.
5. The three bed acetylene converter is simulated with three conversion reactors. The conversion of the first bed is 21% (ethylene product) and 23% (ethane product). The second bed conversion is 40% (ethylene product) and 40% (ethane product). The third bed conversion is 52% (ethylene product) and 48% (ethane product) These values are adjusted to match the design outcome.
6. Separation in FF-401 is simulated using component splitter
7. Separation in the hydrogen dryers (FF-301A,B) is simulated using a component splitter.
8. The methanation reaction is simulated using conversion reactor with total conversion is assumed to be 100% on CO basis.
9. A dummy energy steam is introduced to the conversion reactor to obtain the design

temperature outlet.

10. VLV-103 is added to meet the design's pressure demand, though in the PFD, there is no relieve valve shown before the stream 4001.
11. Reboiler EA-316 and EA-336 are integrated with the DA-301 tower with the reboiled-stripper unit in HYSYS and the energy steam is being input to the dummy EA-316 and EA-336 to calculate the 4178 flow temperature.
12. The heat exchanger EA-308X is splitted into three HE unit named EA-308X-1, EA-308X-2, and EA-308X-3 and trial and error is performed in the dummy flow temperature to obtain result as close as possible to the design.
13. The stream Dummy 11 is not connected to the mixer MIX-100 since it doesn't carry any materials but is able to give a significant error to the surrounding streams.

IV.3.5 Simulation PFD

The simulation PFD is shown in .

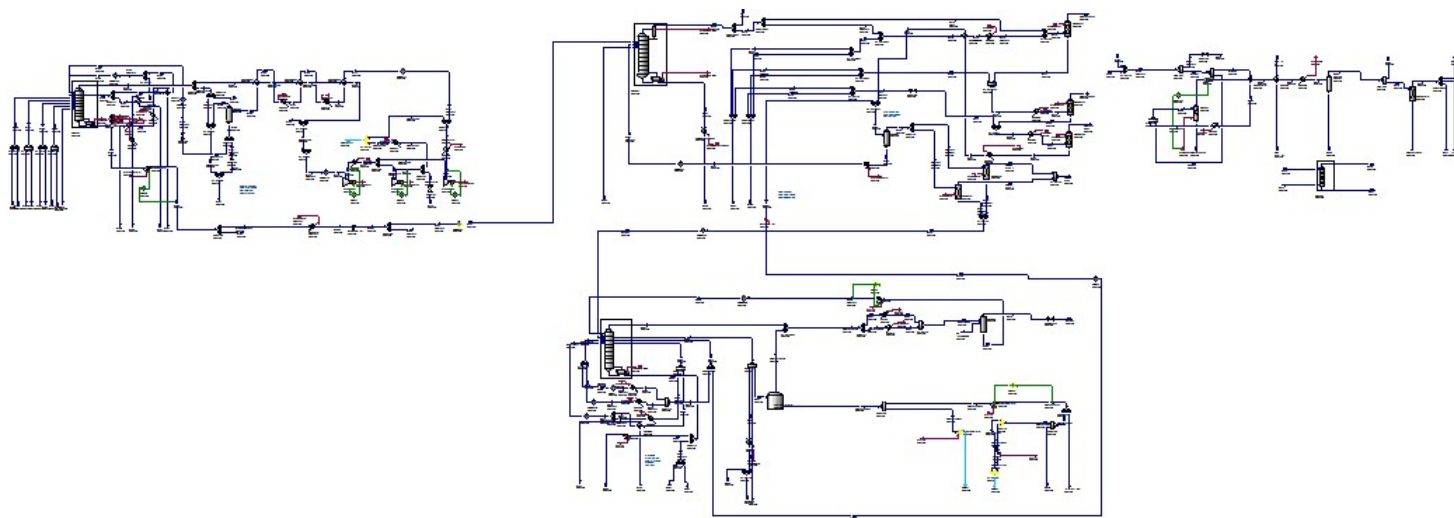


Figure IV. 6 Simulation PFD of Stage 3 Integration

IV.3.6 Simulation Result and Evaluation

Result for integration stage is evaluated using design data compared to the streams data after the integration of stage 3. In the Stage 3, there are 4 units that already integrated into 1 file. The integration process uses cutter units to calculate the differences of fluid package and recycle units to recalculate streams using new data from other fluid package. The differences of fluid package can make error occur in the stream and unit operation such as columns, vessels, and reactors.

Stage 3 integration has less error compared to other stages because from the beginning, simulation of stage 3 already made in 1 file and already integrated in all streams. There are several error still occur after many revision and already accepted.

The error average of this simulation is approximately 0.06%, mainly contributed by molar flow variable. The error sprung by molar flow variable mainly caused by the error in composition. For flow 4021, temperature raises the error average from 0.15% (calculated without considering the temperature error) to 0.23%. This huge error in the 4021 flow simulation translated to approximately 0.6°C, a relatively small number. The difference between the simulation's result and the design is also caused by normalization done by HYSYS if the sum of compositions' percentage is not exactly 100%, like it happens in the design. There is also a quite significant error emerges on the flow 4167 because of the error happens on the previous stream, the overhead 4166 which draws mass flow less by around 76 kg/h. The small error from flow 4208 indicated that separation in DA-401 is performed adequately. The same can be seen in flow 4226 error in account for DC-401 reaction simulation. The error from temperature variable, though more than 0,01%, is negligible in the

simulation. The temperature error in the stream 4307 is actually 0,4°C, a relatively small error. The error from temperature of flow 4324 happens because the pump GA-1803 is not capable of forcing the stream's temperature any lower.

The most important unit in this simulation is DA-402. It has 4 inlet flows and 5 outlet flows, and three recycle routine which makes it a very unstable unit. To obtain good results, simulation is performed by first using one inlet flow and two outlet flows (top and bottom product). Bottom temperature is specified and perform a trial and error until it converges. Addition of inlet flow is done first, one by one and wait for each flow addition to reach convergence. After all the inlet flows are attached, start adding the side draw. The degree of freedom will increase one per side draw. Same as the prior, add the side draws one by one and wait first until it converged. After all the line is attached, evaluate the composition and operating condition and change the tray efficiency value to match the design specification. Only after the error is negligible, the recycle routine can be activated (also one by one) and the whole system is converged.

IV.4 Simulation Integration Stage 4

IV.4.1 Process Description

There are several section in the stage 4 including Depropanizer, C3 Hydrogenation, Propylene Fractionation, Propylene Fractionation No. 3, Debutanizer, and Propylene Refrigeration System.

The main process of Depropanizer is to separate C3 components from deethanizer bottom product and from the condensate of stripper bottom. Moreover Depropanizer also separate C4 from cracked gas. This separation is done by using two tower system operating at different pressure. Deethanizer bottom product that contain C3 fraction in a big quantity and the recycle stream from MAPD flash drum are fed to Depropanizer No.1.

In the C3 Hydrogenation unit, Methylacetylene Propadiene (MAPD) that are contained in C3 streams are selectively hidgrohenated into propane and propylene in one stage LB-fining reactor system. The PFD for MAPD converter unit is shown in Figure IV.7. This unit consists of an online reactor and a spare reactor. In this system, there is no regeneration reactor.

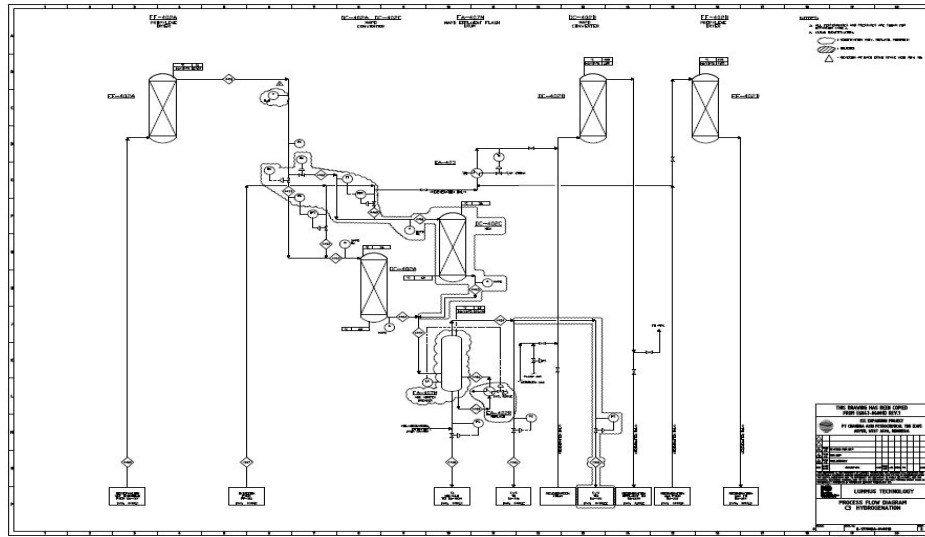


Figure IV. 7. Simulation PFD of Depropanizer

Propylene Fractionation No. 3 is used to eliminate propane from FA-407M. The column DA-415 operates at bottom temperature of 58°C and pressure 19.44 kg/cm²g while top pressure is 18.33 kg/cm² g and temperature 46°C. The propane will be removed in the bottom side of the column while a relatively low propane gas will be attained at the top of the column. Some of the distillate will be recycled back to the column as a reflux through separation in FA-424. Figure xx2 describes the process flow diagram of Propylene Fractionation No. 3.

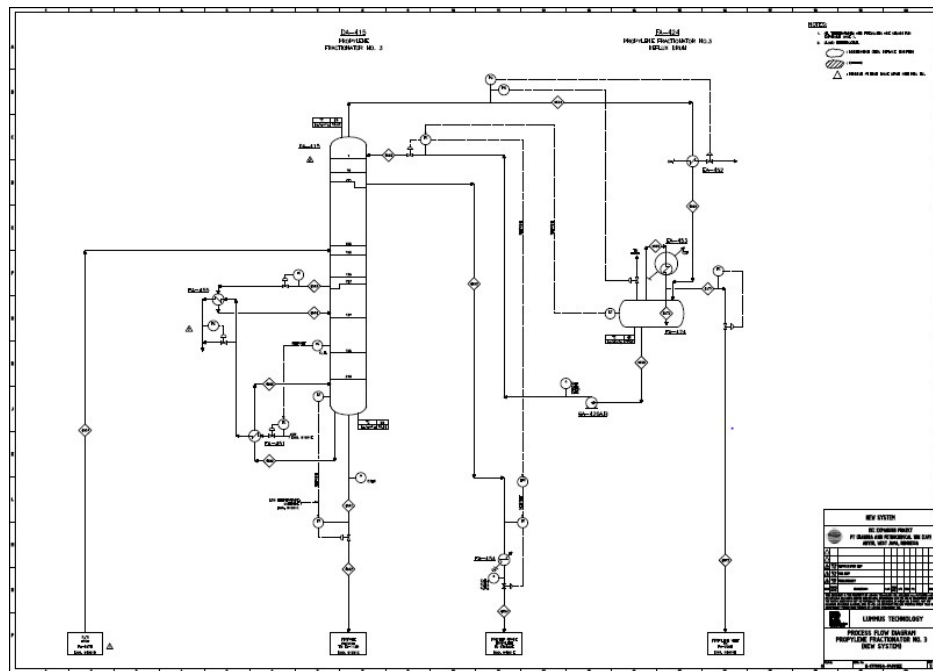


Figure IV. 8. Simulation PFD of Propylene Fractionation No. 3

Debutanizer's function is to separate the C4 compounds from other heavier components. Feed to debutanizer is depropanizer-2 bottom product. Debutanizer column equipped with cooling water condenser and reboiler with a low-pressure steam. Top products on debutanizer is a mixture of C4 which is then sent to a storage tank C4/C5. Bottom products combined

with gasoline from quench tower and MP gasoline flash drum as a makeup for untreated pyrolysis gasoline delivered to DPG unit. The PFD of Debutanizer unit are shown in the Figure IV.9.

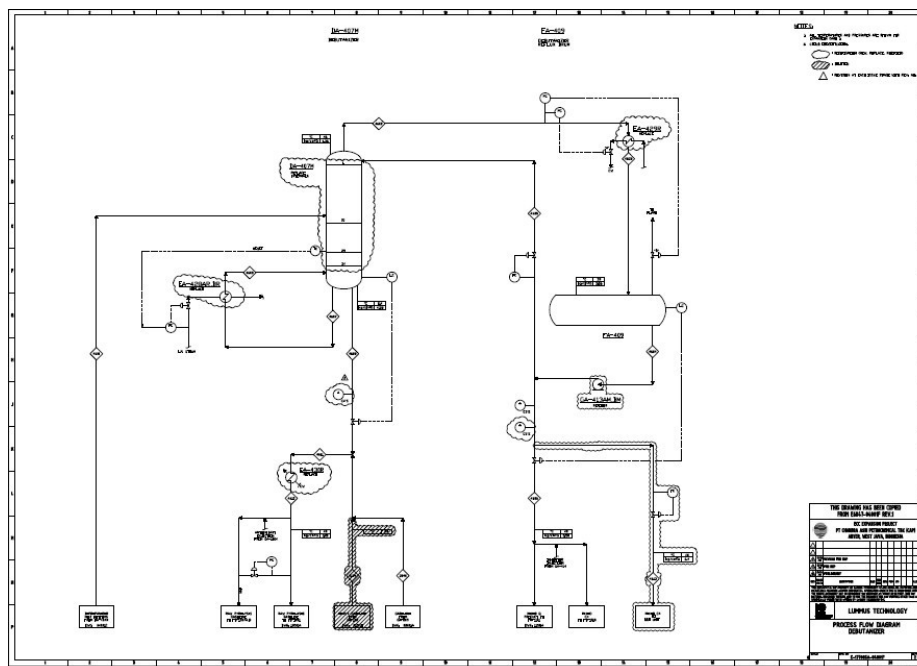


Figure IV. 9. PFD of Debutanizer

Propylene Refrigeration System in PT. Chandra Asri Petrochemical have 4 compression stage. Each compression stage operate with pressure 0,42; 4,11; 7,64; and 16,97 kg/cm² gauge. The cold fluid which is used to turn superheated propylene to saturated vapour are cooling water, deethanizer feed, offgas, and propylen product stream. After that, saturated vapour propylene is condensed to form saturated liquid. Then, this it's expanded to lower its temperature. It's expanded four times to make its temperature as low as 13; -6; -27; and -40°C. Vapour and liquid fraction from this expansion are separated by flash separator. Some fraction of vapor from flash separator is condensed and then evaporated, some other vapor is sent to compressor suction. Some liquid from flash separator is chilled and then expanded and some other are evaporated.

IV.4.2 Stream List

Stream list that exist in the stage 4 listed in the Table IV.8.

Table IV. 8. Stage 4 Stream List

Code	Description
4208	Deethanizer bottoms from DA-401
4458	Recycle from FA-407
4408	Depropanizer net overhead to FF-402A/B (Unnamed 5 split 2)

Simulation Report – ECC 860 KTA
Working Stage 6

4409	Depropanizer bottoms to EA-421
4410	Depropanizer bottoms from EA-421 to DA-404
4411	Depropanizer bottoms from EA-421 to DA-404 after control valve
3206	Condensate Stripper Bottoms from EA-212
4413	3206 + Polymerization inhibitor from PA-402
4422	DA-404 overhead to EA 421R in Shell Side
4423	DA-404 overhead from EA-421R to DA-403
4414	Depropanizer No.2 Bottoms to DA-407
4601	Feed to Debutanizer
4017	Hydrogen to MAPD Converter
4408	FF-402 inlet
4451	FF-402 outlet
4452	Hydrogen to DC-402 A
4453	DC-402A inlet
4454	FA-407M inlet
4455	EA-422R inlet
4456	EA-422R outlet
4457	FA-407M vapor
4458	C3 recycle to DA-403M
4459	C3 feed to DC-402A
4460	Hydrogen to DC-402C
4461	DC-402C inlet
4462	C3 feed to DC-402C
4463	DC-402C outlet
4464	DC-402A outlet
4501	Feed to DA-406
4551	Feed to DA-415
4501	C3's from FA-407
4502	Polymer Grade Propylene
4503	Propylene Product to Battery Limit
4504	DA-406 Gross Overhead
4505	Effluent from EA-426
4505,1	Vapour Part of 4505
4505,2	Liquid Part of 4505
4506	Reflux to GA-411
4507	Discharge from GA-411
4508	Reflux to DA-406

Simulation Report – ECC 860 KTA
Working Stage 6

4509	EA-424 Feed
4510	Effluent from EA-424
4510,1	Vapour Part of 4510
4510,2	Liquid Part of 4510
4511	C3 Fractionator No. 1 Bottoms
4512	Propane Recycle after Control Valve
4512,1	Vapour Part of 4512
4512,2	Liquid Part of 4512
4513	EA-425 Feed
4514	Effluent from EA-425
4514,1	Vapour Part of 4514
4514,2	Liquid Part of 4514
4515	Flash Drum Vapour to Vent Condenser
4518	DA-406 Net Bottoms
4519	Reflux Pump Discharge
4520	DA-405 Gross Overhead
4521	C3-Vent Gas from EA-427
4522	C3-Vent Gas to FA-205
4523	C3-Liquid from Vent Condenser
4551	Feed to DA-415
4552	DA-415 distillate product
4553	Propylene product EA-454 out
4554	DA-415 gross overhead
4555	EA-452 outlet
4556	FA-424 liquid outlet
4558	DA-415 reflux
4559	EA-451 inlet
4560	EA-451 outlet
4561	DA-415 bottoms
4562	DA-415 propane recycle
4563	EA-455 inlet
4564	EA-455 outlet
4565	EA-453 inlet
4571	EA-453 outlet
4601	Feed to DA-407
4602	DA-407 Gross Overhead
4603	EA-429 Effluent
4604	FA-409 Liquid

Simulation Report – ECC 860 KTA
Working Stage 6

4605	Reflux to DA-407
4606	Mixed C4 Product
4607	EA-428 Inlet
4608	EA-428 Outlet
4609	DA-407 Bottoms
4611	Total Gasoline Product
4612	Cooled Gasoline Product
4613	Raw Mixed C4 to BDE Unit
5001	Vapor to STG 1 (GB-501)
5002	Vapor to STG 2 (GB-501)
5003	Vapor fr STG 1 (GB-501)
5004	Vapor to STG 4 (GB-501)
5005	GB-501 Discharge
5006	EA-501 Outlet
5007	FA-505 Outlet
5008	To Liq Aft Recu to STG 4
5009	Liq to STG 4 Loads
5010	Bypass liq to FA-504
5011	Bypass Liq to STG 4 D/S CV
5012	Feed to EA-420
5013	Feed to EA-420 D/S CV
5014	EA-420 Outlet
5015	C3R to 207, 304, 427, 602
5016	Feed to EA-207
5017	Feed to EA-207 D/S CV
5018	EA-207 Outlet
5019	C3R to EA-304 & EA-602
5020	Feed to EA-602
5021	Feed to EA-602 D/S CV
5022	EA-602 Outlet
5023	Feed to EA-304
5024	Feed to EA-304 D/S CV
5025	EA-304 Outlet
5026	Total Vapor to FA-504
5027	Liq fr FA-504
5028	Liq fr FA-504 Aft Recu
5029	By liq. To STG 3 D/S CV
5030	Tot Vap from FA-504

IV.4.3 Unit Operation

Unit operations which involved in Stage 4 are listed in the Table IV.9.

Table IV. 9. Unit Operation in Stage 4

Code	Description
DA-403	Depropanizer No. 1
DA-404	Depropanizer No. 2
EA-421	HE bottom 1 – overhead 2
GA-407A/B	Pump after FA-404
GA-408A/B	Pump
FF-402A/B	Propylene Dryer
DC-402 A/C	MAPD Converter
FA-407M	MAPD Effluent Flash Drum
DA-405	Propylene Fractionator No. 1
DA-406	Propylene Fractionator No. 2
EA-424	Propylene Fractionator No. 1 Reboiler
EA-425	Propylene Fractionator No. 2 Reboiler
EA-426A,B	Propylene Fractionator Condenser
EA-427	Propylene Fractionator Vent Condenser
EA-431	Propylene Product Cooler
EA-432	Propylene Product Subcooler No. 1
EA-433	Propylene Product Subcooler No. 2
FA-408	Propylene Fractionator Reflux Drum
GA-410	Propylene Fractionator No. 1 Reflux Pump
GA-411A,B	Propylene Fractionator No. 2 Reflux Pump
DA-415	Propylene fractionator No.3
FA-424	Propylene fractionator No.3 reflux drum
EA-451	Propylene fractionator No.3 reboiler
EA-452	Propylene fractionator No.3 condenser
EA-453	Heat Exchanger
EA-454	Heat Exchanger
EA-455	Heat Exchanger
GA-426 A,B	Pump
DA-407	Tray Column
FA-409	Reflux Drum
EA-428A.B	Heat Exchanger
EA-429	Heat Exchanger
EA-430	Heat Exchanger

GA-413A.B	Pump
FA-410	Liquid Propylene Accumulator for EA-408
FA-411	Liquid Propylene Accumulator for EA-411
FA-412	Liquid Propylene Accumulator for EA-412
FA-501	Propylene Refrigerant Compressor 1st Stage Suction Drum
FA-502	Propylene Refrigerant Compressor 2nd Stage Suction Drum
FA-503	Propylene Refrigerant Compressor 3rd Stage Suction Drum
FA-504	Propylene Refrigerant Compressor 4th Stage Suction Drum
FA-505	Propylene Refrigerant Accumulator
GB-501	Propylene Refrigerant Compressor

IV.4.4 Simulation Approach and Assumption

Simulation of the stage 4 is the integration of the simulation of each section including C3 Hydrogenation, Debutanizer, Propylene Refrigeration, Propylene Fractionation No.3, Propylene Fractionation and Depropanization.

The assumptions and approaches made in this simulation are:

- a. The fluid package used in the Depropanizer is Peng-Robinson.
- b. Components, operation conditions, and composition streams are simulated based on Basic Engineering Case 1 according to the information in PFD .
- c. Design column data used as calculation basis. In addition, column efficiency used is depend on the product that is wanted.
- d. Fluid package that is used in C3 Hydrogenation unit is Peng-Robinson because the simulation involved hydrocarbon components.
- e. Influent and effluent in FF-402A unit are assumed in the same condition and component because the design data are not given.
- f. SRK-Twu is used as fluid package in the Propylene Fractionation unit because the simulation involve hydrocarbon components. This fluid package also common used for simulation in petrochemical industry. The fluid package uses Soave-Redlich-Kwong property package with Twu Equation of State Alpha Function for improved vapour pressure prediction.
- g. Stream 4501 inputted by design data and has properties comparable with designed data. All of these streams are fed to tray No. 134 and 104 DA-406.
- h. SRK is used as fluid package in the Propylene Fractionation No. 3 unit because the simulation involve hydrocarbon components. This fluid package also common used for simulation in petrochemical industry.

- i. Stream 4551 input by design data and has properties comparable with designed data.
- j. The fluid package used in the Debutanizer unit is Wilson-Ideal. The Wilson property package is used for chemical systems with highly non-ideal chemicals. It uses ideal gas equation for vapour calculation.
- k. Butadiene/C4Acetylene represented by 1,3-Butadiene.
- l. Butylenes represented by 1-Butene.
- m. C6-C8 non aromatics component represented by 1-Hexyne, n-Heptane, dan n-Octane.
- n. Fluid package which is used in the Propylene Refrigeration System is UNIQUAC-Ideal.
- o. The second and fourth compressor adiabatic efficiency is adjusted to get the right temperature (using “adjust” tool in hysys).
- p. Energy balances in FA-502 and FA-503 separator is adjusted to get the right mass flow for vapor and liquid fraction
- q. Regeneration stream is not simulated

IV.4.5 Simulation PFD

The simulation PFD of stage 5 are shown in the Figure IV.10.

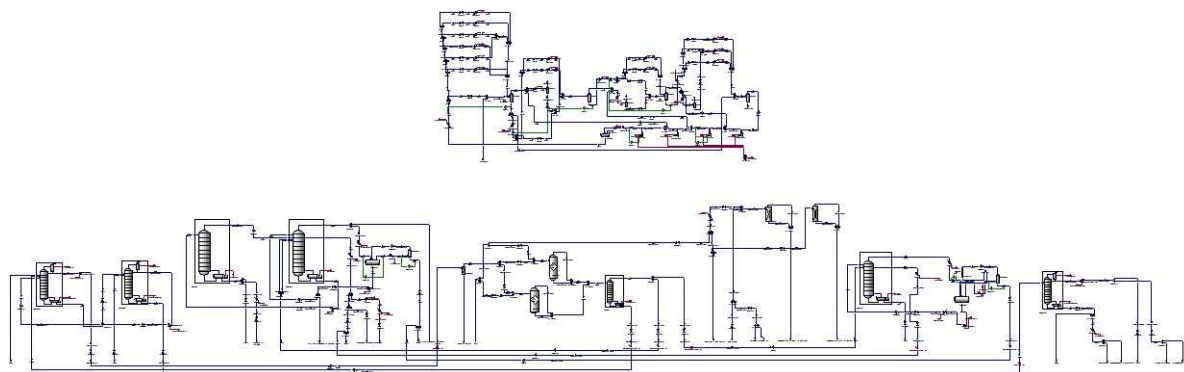


Figure IV. 10. Simulation PFD of Stage 4

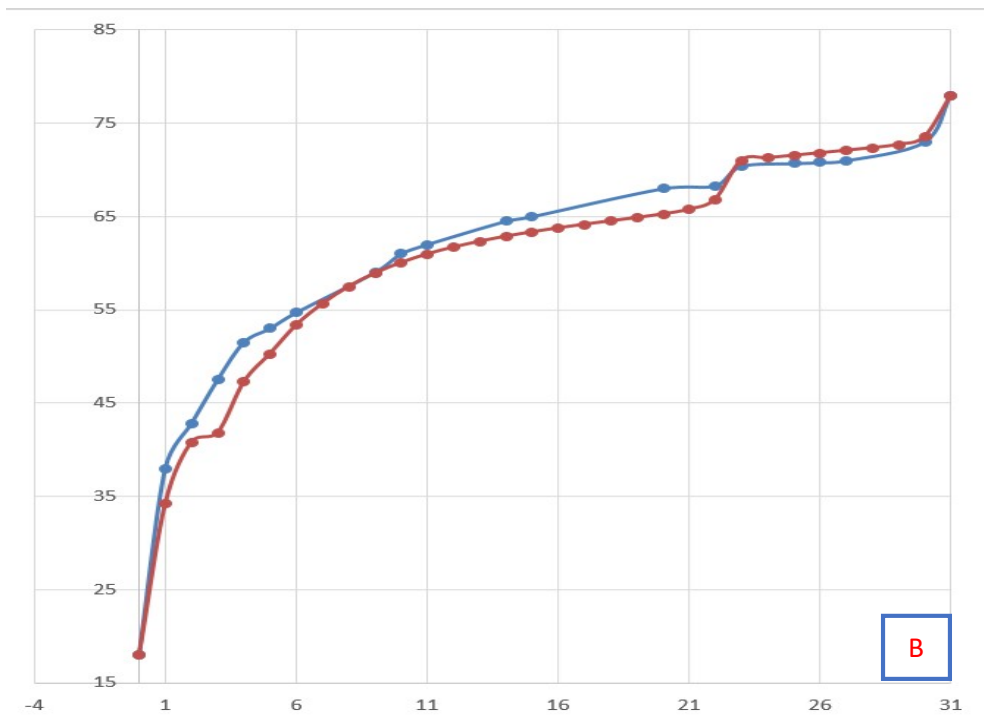
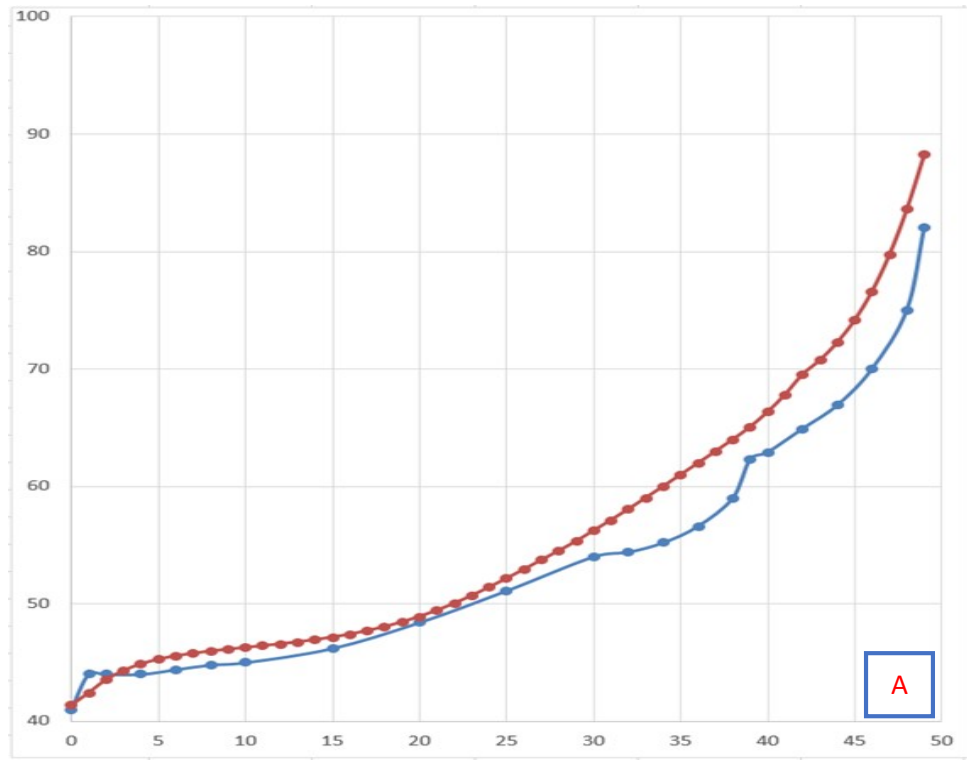
IV.4.6 Simulation Result and Evaluation

Convergence has been achieved in the integration simulation. Result for integration stage is evaluated using design versus data from streams after integration. In the Stage 4, there are 6 units that already integrated into a single simulation. The integration process uses cutter units to calculate the differences of fluid package and recycle units to recalculate streams using new data from other fluid package. The differences of fluid package can make error occur in the stream and unit operation such as columns, vessels, and reactors.

Stage 4 integration will be discussed into 2 part, there are profil temperature discussion and mass balance discussion. Figure IV.11 below show the evaluation in profil temperature between the units data compare to the integration data.

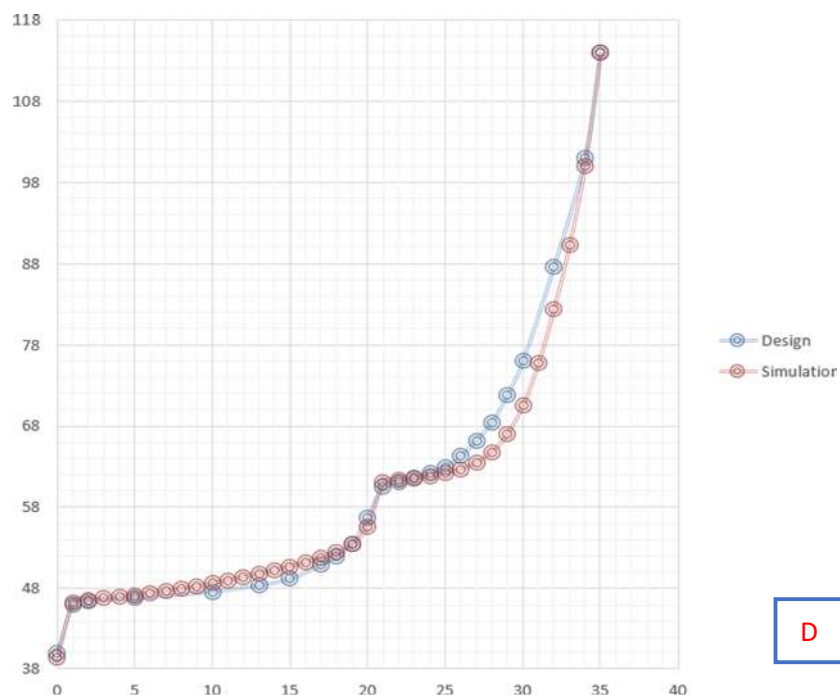
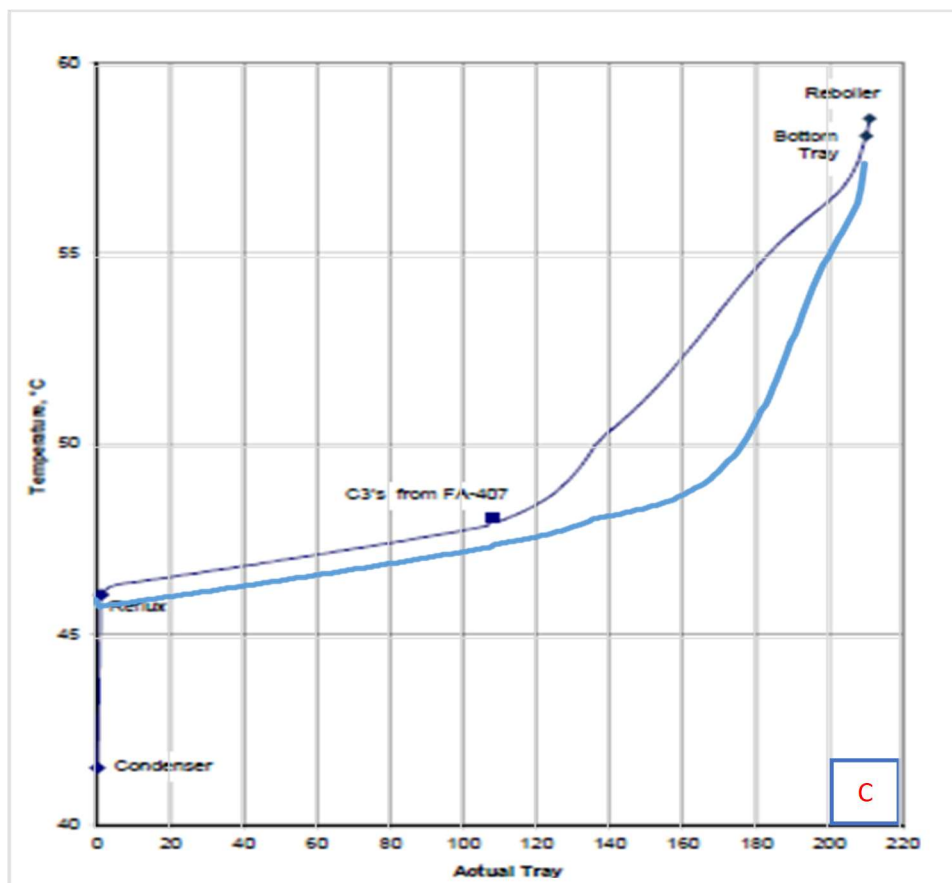
Simulation Report – ECC 860 KTA

Working Stage 6



Simulation Report – ECC 860 KTA

Working Stage 6



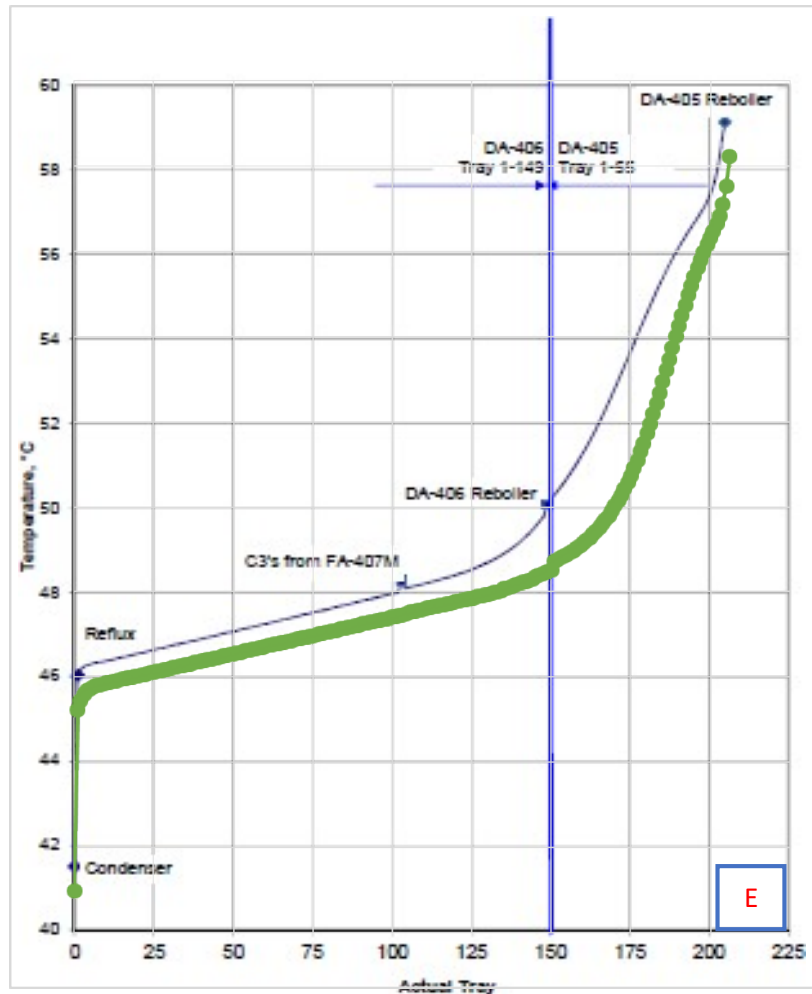


Figure IV. 11. Profil Temperature of DA-403M (A), DA-404M (B), DA-415M (C), DA-407M (D), DA-405 and DA-406 (E)

Overall, there are slight differences of stage temperature between design and integration data. The significant difference occurs in the unit DA-415M. The difference reached 3 °C at its highest gap.

For mass balance evaluation, there are several streams that change compared to design data including stream 4561, stream 4423, stream 4422, stream 4413, and stream 3206 with the number of error are 5.84%, 0.09%, 0.20%, 0.10%, and 0.11%, respectively. However, these changes will not affect the simulation. Overall the integration process force the simulation reach the design data and has less error compared to individual unit simulation.

IV.5 Simulation Integration Stage 5

IV.5.1 Process Description

There are several section in the stage 5 including Ethylene Refrigeration Section, Enhanced Binary Refrigeration (EBR) Section, C₄/C₅ Hydrogenation Section, Pyrolysis Gasoline Hydrogenation Section, and Pyrolysis Gasoline Hydrogenation Fractionation Section.

The Ethylene Refrigeration provides three levels of refrigeration at the operating temperature of -101°C, -75°C, and -63°C. This closed loop system was utilized by steam turbine to drive the centrifugal compressor. The compressor discharge vapors are cooled first against cooling water and partially de-superheated against propylene refrigerant. The discharge is further de-superheated and condensed by providing side re-boil heat to the ethylene fractionator. Refrigeration is recuperated by sub-cooling the liquid refrigerant from the accumulation against off-gases, de-ethanizer feed, and ethylene product in the chilling train.

The C₄/C₅ feedstock stream flows from storage to the surge drum and it is separated by gravity if the water exist in the stream. From the surge drum, the C₄/C₅ is pumped to the reactor and it is mixed with the bulk of the makeup hydrogen and a recycle of liquid which has been almost completely reacted. The mixture is then heated by heat exchanger using vapor that produced from the reactor between the catalyst beds. The mixed phase passes downward through the top of catalyst bed so the unsaturated feed is hydrogenated by the hydrogen makeup from the bottom of reactor. The hydrogen that is not converted in the catalyst bed leaving on the top of reactor joining the vapor phase of mixed phase feed. The reaction on the reactor is exothermic so the temperature of hydrogen leaving the reactor is high. The vapor passing from reactor preheats the reactor feed and is then further cooled and condensed in a water-cooled exchanger. Effluent from the condenser passes to the high pressure flash drum where liquid recycle is separated and returned to be mixed with fresh feed to the reactor. High pressure flash vapor passes through a refrigerated vent condenser before being returned to the ethylene unit for recovery. Liquid from the bottom of the reactor is cooled to 38°C in a water-cooled exchanger. The cooled product is sent to cracking heaters in the ethylene unit via C₄/C₅ storage system.

The pyrolysis gasoline hydrogenation operates in the high temperature reactor to maintain the product quality. When end-of-run conditions are reached, the catalyst is regenerated in-situ with steam and air. Vapor liquid separation takes place in the bottom of the reactor. Liquid flow from the reactor is split into two streams. One stream is in total recycle. It is pumped and divided, as a portion passes under reactor inlet temperature control through the reactor cooler forming the cold recycle. The remaining hot recycle liquid bypasses the recycle cooler under total recycle flow control. The two recycle streams along with the fresh feed pass to the reactor inlet as previously described. The other liquid stream from the reactor is the net first stage liquid product. It is cooled and routed under level control to the high pressure flash drum.

Hydrogen-rich vapor leaving the separation section of the reactor is cooled and partially condensed in the vapor condenser. The two-phase stream leaving the condenser is sent to the

high pressure flash drum together with cooled reactor liquid product. Vapor from the high pressure flash drum is returned to the ethylene unit for hydrogen recovery. Liquid from this drum flows to the low pressure flash drum. Vapor from the low pressure flash drum is also returned to the ethylene unit for hydrogen recovery and the liquid feeds the de-pentanizer.

Partially hydrogenated gasoline, from the reactor, is charged to the de-pentanizer where C₅ and any residual gases are removed as overhead products. The C₅ product from the de-pentanizer reflux drum is pumped to the C₄/C₅ hydrogenation via the raw C₄/C₅ storage and/or to fuel storage. Any water contained in the feed is taken overhead and withdrawn from a boot on the reflux drum. Re-boiling is by medium pressure steam and overhead condensing is by cooling water. The bottoms product from the de-pentanizer is charged to the BTX tower where C₉ and heavier compounds are removed as a bottom product, cooled, and sent to storage. The overhead product is sent to battery limits. In case the reactor is regenerated, the overhead product from BTX tower shall be sent to the storage tank. The BTX tower is operated at sub-atmospheric pressure to minimize fouling in the bottom section caused by high temperature. Re-boiling is by medium pressure steam. Overhead condensing is by cooling water and a refrigerated vent condenser is provided to minimize hydrocarbon carryover to the vacuum system.

IV.5.2 Stream List

Stream list that exist in the stage 5 listed in the Table IV.10.

Table IV. 10. The Stream List of Stage 5

Name	Description	Name	Description
5101	Vapor from FA-601	1103	H ₂ to Top Bed
5102	Vapor rom FA-602	1104	H ₂ to Bottom Bed
5103	Vapor from FA-603	1105	FDS + Recycle
5104	GB-601 Discharge	1106	Reactor FD Liquid
5105	EA-601 Outlet	1107	Reactor Vapor Effluent
5106	EA-602 Outlet	1108	EA-1101S Outlet
5107	EA-603 Outlet	1109	EA-1102S Outlet
5108	FA-604 Outlet	1110	HPFL Off Gas
5109	Liquid to 3rd Stage Loads	1111	Reactor Liquid Effluent
5110	Feed to EA-311	1112	HPFL Recycle
5111	Feed to EA-311 D/S CV	1113	EA-1104S Outlet
5112	Liquid from FA-603	1114	C ₄ -C ₅ Product
5113	Sub-cooled Liquid to 2nd Stage	1201	Hydrogen feed to DC-1201
5114	Sub-cooled Liquid to Stage 2 D/S CV	1202	Liquid Feed to DC-1201
5115	Feed to EA-312	1203	Vapor from DC-1201
5116	EA-312 Outlet	1204	Liquid from DC-1201

Simulation Report – ECC 860 KTA
Working Stage 6

5117	Bypass Liquid to 2nd Stage	1205	Recycle to DC-1201
5118	Bypass Liquid to Stage 2 D/S CV	1206	Net Liquid from DC-1201
5119	Liquid from FA-602	1207	EA-1201 Effluent to FA-1203
5120	Feed to EA-320	1208	FA-1203 Feed
5121	Feed to EA-315	1209	FA-1203 Liquid to FA-1209
5122	Feed to EA-320 D/S CV	1210	Off-gas from FA-1203
5123	EA-320 Outlet	1211	Off-gas from FA-1209
5124	Feed to EA-315 D/S CV	1212	FA-1209 Liquid to DA-1202
5125	EA-315 Outlet	4612	Cooled Gasoline Product
5126	Total Vapor to FA-601	1216	EA-1208 Effluent to FA-1206
5127	Feed to EA-312 D/S CV	1217	DA-1202 Reflux
5128	Feed to EA-319	1218	Off-gas from FA-1206
5129	Feed to EA-319 D/S CV	1219	Total C5 Product
5130	EA-319 Outlet	1220	DA-1202 Liquid to DA-1203
5131	EA-311 Outlet	1221	DA-1203 Feed
5132	Total Vapor to FA-603	1222	DA-1203 Liquid to EA-1209
5133	Bypass Liquid to 1st Stage	1223	EA-1209 Effluent to DA-1203
5134	Bypass Liquid to Stage 1 D/S CV	1224	DA-1203 Vapor to EA-1210
5135	Feed to EA-414 1st Stage	1225	EA-1210 Liquid to DA-1207
5136	EA-414 Outlet to Stage 1	1226	DA-1203 Reflux
5137	Feed to EA-414 2nd Stage	1227	C6/C8 Gasoline to Storage
5138	EA-414 Outlet to Stage 2	1228	C9+ Product to EA-1212
5139	Bypass Liquid to FA-603	1229	C9+ Product to Storage
5140	Bypass Liquid to Stage 3 D/S CV	1230	Off-gas to FA-201
5141	Feed to EA-414 3rd Stage	1231	C5 Product to Storage
5142	EA-414 Outlet 3rd Stage	1232	C5 Product to FA-1101
1101	C4 Feed	1233	DA-1202 Feed
1102	H2 Feed		

IV.5.3 Unit Operation

Unit operations which involved in Stage 5 are listed in the Table IV.11.

Table IV. 11. Unit Operation in Stage 5

Name	Description
FA-601	Ethylene Compressor 1st Stage Suction Drum
EA-307X	Off Gas Exchanger No.3 (PA-301)
EA-311	Demethanizer Feed Chiller No. 2

Simulation Report – ECC 860 KTA
Working Stage 6

EA-312	Demethanizer Feed Chiller No. 3
EA-315	Demethanizer Feed Chiller No. 4
EA-319	Methane Refrigerant Chiller
EA-320	Methane Refrigerant Condenser
EA-414	Ethylene Product Sub-cooler
EA-601	Ethylene Refrigerant Cooler
EA-602	Ethylene Refrigerant Desuperheater
EA-603	Ethylene Refrigerant Condenser
FA-602	Ethylene Compressor 2nd Stage Suction Drum
FA-603	Ethylene Compressor 3rd Stage Suction Drum
FA-604	Ethylene Refrigerant Accumulator
FA-605	Blowcase for FA-601
GB-601	Ethylene Refrigerant Compressor
DC-1101	C4/C5 Hydrogenation Reactor
EA-1101	Reactor Feed/Effluent Exchanger
EA-1102	Reactor Effluent Condenser
EA-1103	HP Flash Vent Condenser
EA-1104	C4/C5 Product Cooler
EA-1105	Preheater (For start-up)
FA-1101	C4/C5 Feed Surge Drum
FA-1102	HP Flash Drum
GA-1101A,B	C4/C5 Feed Pump
GA-1102A,B	HP Flash Recycle Pump
GA-1103A,B	Reactor Bottoms Pump
1201	Hydrogen feed to DC-1201
1202	Liquid Feed to DC-1201
1203	Vapor from DC-1201
1204	Liquid from DC-1201
1205	Recycle to DC-1201
1206	Net Liquid from DC-1201
1207	EA-1201 Effluent to FA-1203
1208	FA-1203 Feed
1209	FA-1203 Liquid to FA-1209
1210	Off-gas from FA-1203
1211	Off-gas from FA-1209
1212	FA-1209 Liquid to DA-1202
4612	Cooled Gasoline Product
DA-1202	Depentanizer

DA-1203	BTX Tower
EA-1207	Depentanizer Reboiler
EA-1208	Depentanizer Condenser
EA-1209	BTX Tower Reboiler
EA-1210	BTX Tower Condenser
EA-1211	BTX Tower Vent Condenser
EA-1212	C9+ Product Cooler
FA-1206	Depentanizer Reflux Drum
FA-1207	BTX Tower Reflux Drum
FA-1208	Ejector Hot Well
GA-1205A,B	Depentanizer Reflux Pump
GA-1207A,B	C9 Product Pump
GA-1209A,B	Ejector Hot Well Pump
PA-1202	BTX Tower Ejector System

IV.5.4 Simulation Approach and Assumption

Simulation of the stage 5 is the integration of the simulation of each section including Ethylene Refrigeration Section, Enhanced Binary Refrigeration (EBR) Section, C₄/C₅ Hydrogenation Section, Pyrolysis Gasoline Hydrogenation Section, and Pyrolysis Gasoline Hydrogenation Fractionation Section.

The fluid package using in the Ethylene Refrigeration Section is Peng-Robinson with the ethylene is the only one component used in this simulation. The process is assumed to be perfectly closed so there will no need for make-up refrigerant. There is also a slight deviation between the boiling point of ethylene from design data and HYSYS calculation. The HYSYS calculated boiling point will be used.

The fluid package using in the EBR Section is Peng-Robinson and the simulation is constructed using HYSYS Databanks. The assumptions applied in the simulation are the process is assumed to be perfectly closed (no refrigerant make-up) and the boiling point data being used is taken from HYSYS calculation.

The simulation of C₄/C₅ hydrogenation section is constructed using Peng-Robinson fluid package and HYSYS Databanks. Three components are being used to simulate the C₆-C₈ non-aromatics. The two-bed reactor in this section is simulated using two conversion reactor named DC-1101-1 and DC-1101-2 to accommodate the additional feed and side draw between the beds. The flash drum (FA-1102) on the reactor downstream is integrated with a heat exchanger (EA-1102). To simulate this unit, one cooler and component splitter is being used with the component split is calculated from design data.

The fluid packaged using in the Pyrolysis Gasoline Hydrogenation section and Pyrolysis Gasoline Hydrogenation Fractionation section are Peng Robinson because the simulation

involve hydrocarbon components. The fluid package also common used for simulation in petrochemical industry.

To build the simulation integration of stage 5, every single stream that connected between two unit in the stage 5 is united through recycle and because of the difference component used in every section, the stream are connected using cutter.

IV.5.5 Simulation PFD

The simulation PFD of stage 5 are shown on the figure xx9.

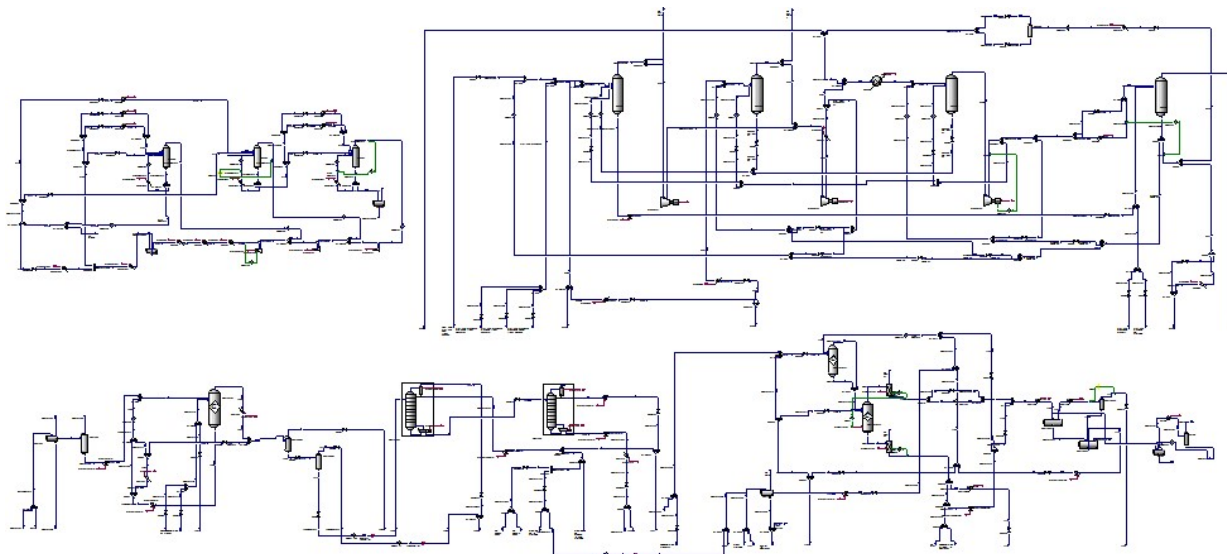


Figure IV. 12. Simulation PFD of Stage 5

IV.5.6 Simulation Result and Evaluation

Result for integration stage is evaluated using design data versus data from streams after integration. In the Stage 5, there are 5 units that already integrated into 1 file. The integration process uses cutter units to calculate the differences of fluid package and recycle units to recalculate streams using new data from other fluid package. The differences of fluid package can make error occur in the stream and unit operation such as columns, vessels, and reactors.

Stage 5 integration will be discussed into 2 part, there are profil temperature discussion and mass balance discussion. Figure IV.13 below show the evaluation in profil temperature between the units data compare to the integration data.

Simulation Report – ECC 860 KTA

Working Stage 6

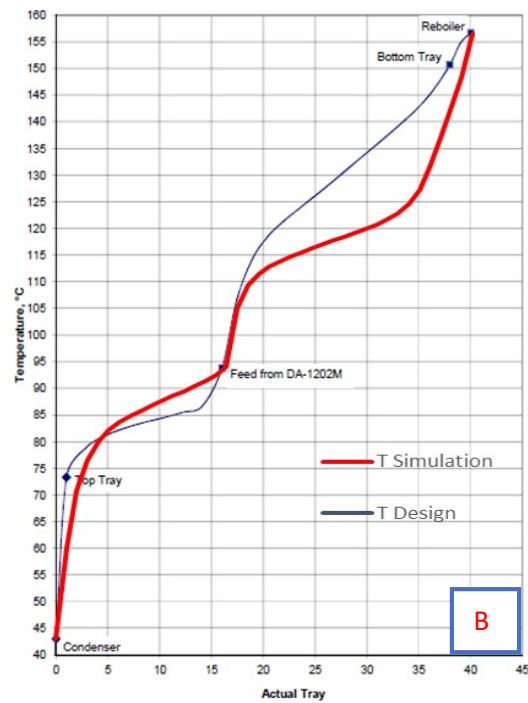
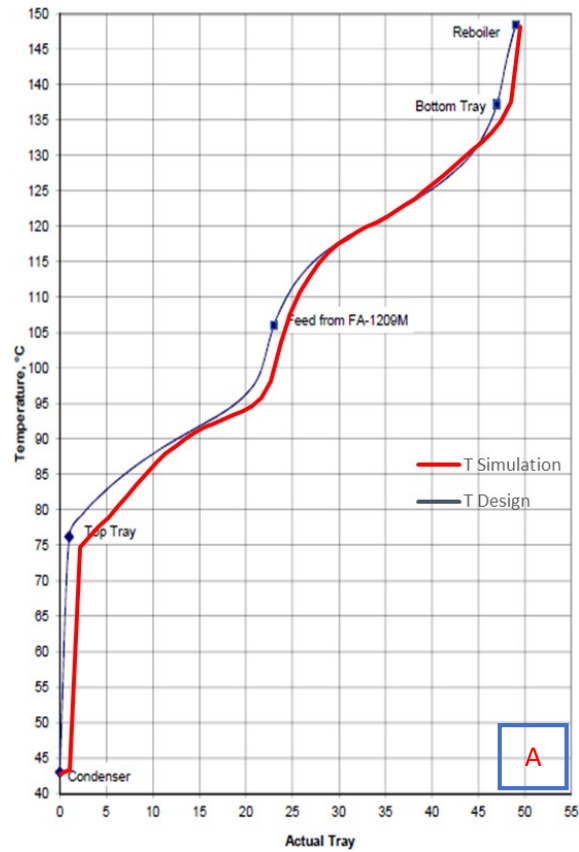


Figure IV. 13. Profil Temperature of DA-1202M (A) and DA-1203M (B)

The red line shows the stage temperature after integration while the blue line shows the stage design temperature. Overall, there are slight difference of stage temperature before and after the integration.

For mass balance evaluation, there are several streams that change compare to design data including stream 1218 and stream 1230 with the number of error are 0.06% and 0.05%, respectively. However, these changes will not affect the simulation. The change of mass balance has positive impact for the data if it is compared to the design data. Thus the integration process force the simulation reach the design data and has less error.

IV.6 Simulation Integration Stage 1-5

IV.6.1 Process Description

After the integration of stage 1, stage 2, stage 3, stage 4, and stage 5 there are the integration of all the stage including stage 1 to the stage 5. The simulation file that used for the stage 1-5 integration is similar with the file used for every stage integration. So the process happened in the integration stage 1-5 are identical with what described previously.

IV.6.2 Simulation Approach and Assumption

To integrate the process of stage 1, stage 2, stage 3, stage 4, and stage 5 the “cutter method” is used to connect from the one stage to another. All of the stage has the more than one unit with different fluid package and components. With the cutter, the difference of the stream can be connected followed by using the recycle to input the data like the design data.

Stream	Description	Stream	Description
1102	Connecting from stage 3 to stage 5	4145	Connecting from stage 3 to stage 2
1123	Connecting from stage 2 to stage 5	4167	Connecting from stage 2 to stage 3
1230	Connecting from stage 5 to stage 1	4190	Connecting from stage 3 to stage 2
1233	Interstage 5	4201	Connecting from stage 3 to stage 2
1241	Interstage 5	4202	Connecting from stage 2 to stage 3
1243	Connecting from stage 5 to stage 2	4208	Connecting from stage 3 to stage 4
1246	Interstage 5	4307	Connecting from stage 2 to stage 3
2101	Interstage 1	4315	Interstage 2
2117	Interstage 1	4319	Interstage 3
2119	Interstage 1	4324	Connecting from stage 2 to stage 3
2120	Interstage 1	4328	Interstage 2
2121	Connecting from stage 1 to stage 2	4329	Interstage 2
2123	Interstage 1	4408	Interstage 4
2501	Interstage 1	4458	Interstage 4
2505	Connecting from stage 1 to stage 2	4501	Interstage 4
3011	Connecting from stage 1 to stage 2	4532	Connecting from stage 4 to stage 1
3012	Interstage 2	4551	Interstage 4
3023	Interstage 2	4553	Interstage 4

Simulation Report – ECC 860 KTA
Working Stage 6

3025	Interstage 1	4572	Interstage 4
3038	Interstage 1	4601	Interstage 4
3040	Connecting from stage 1 to stage 4	4701	Connecting from stage 2 to stage 3
3041	Interstage 1	4707	Connecting from stage 2 to stage 3
3206	Connecting from stage 2 to stage 4	4729	Connecting from stage 2 to stage 3
4012	Interstage 3	4741	Connecting from stage 2 to stage 3
4014	Connecting from stage 1 to stage 2	4742	Connecting from stage 2 to stage 3
4016	Connecting from stage 2 to stage 1	4743	Connecting from stage 2 to stage 3
4017	Connecting from stage 3 to stage 4	4744	Connecting from stage 2 to stage 3
4061	Connecting from stage 3 to stage 2	4756	Connecting from stage 2 to stage 3
4097	Interstage 2	4759	Interstage 2
4104	Connecting from stage 3 to stage 2	4767	Connecting from stage 2 to stage 3
4107	Connecting from stage 3 to stage 2	5208	Connecting from stage 5 to stage 2
4141	Connecting from stage 3 to stage 2	5223	Connecting from stage 2 to stage 5
4142	Connecting from stage 3 to stage 2	5228	Connecting from stage 5 to stage 2
4143	Connecting from stage 3 to stage 2	5232	Connecting from stage 2 to stage 5
4144	Connecting from stage 3 to stage 2	5235	Connecting from stage 2 to stage 5

IV.6.3 Simulation PFD

The simulation of PFD of stage 1 to stage 5 are shown on the Figure IV.14. The detailed simulation PFD of stage 1-5 are attached in the Appendix.

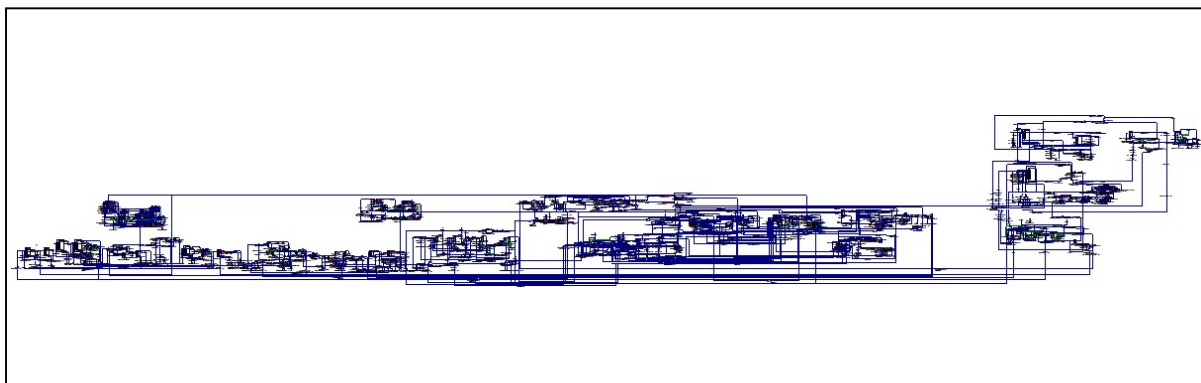


Figure IV. 14. Simulation PFD of Stage 1-5 Integration

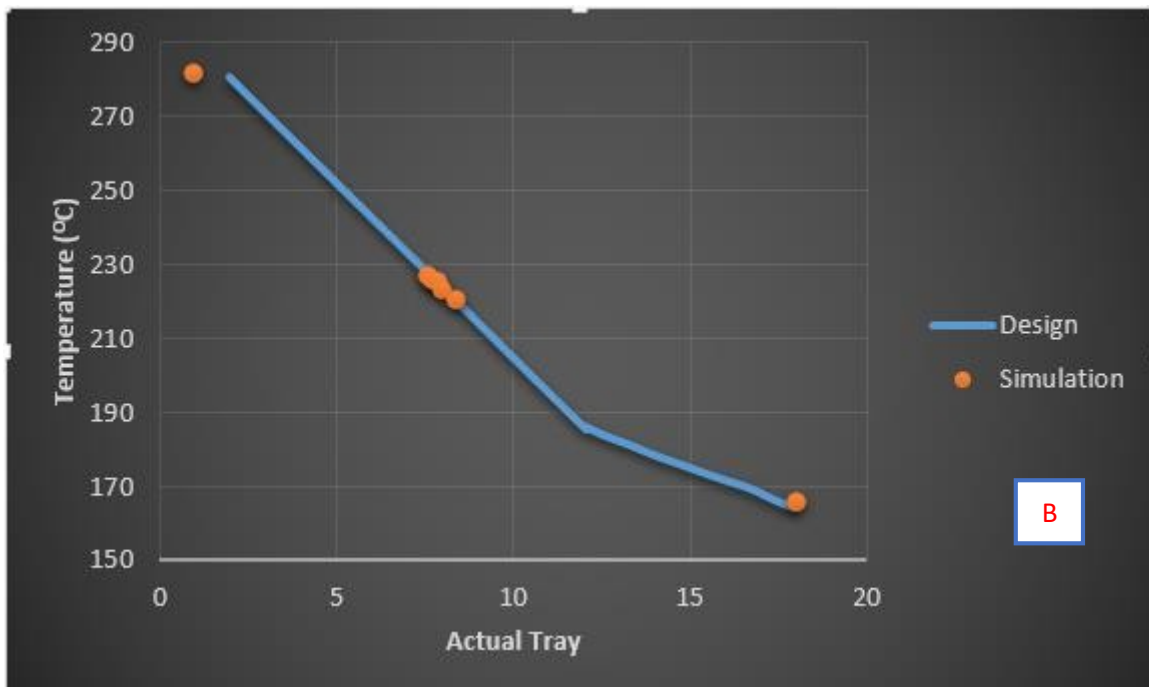
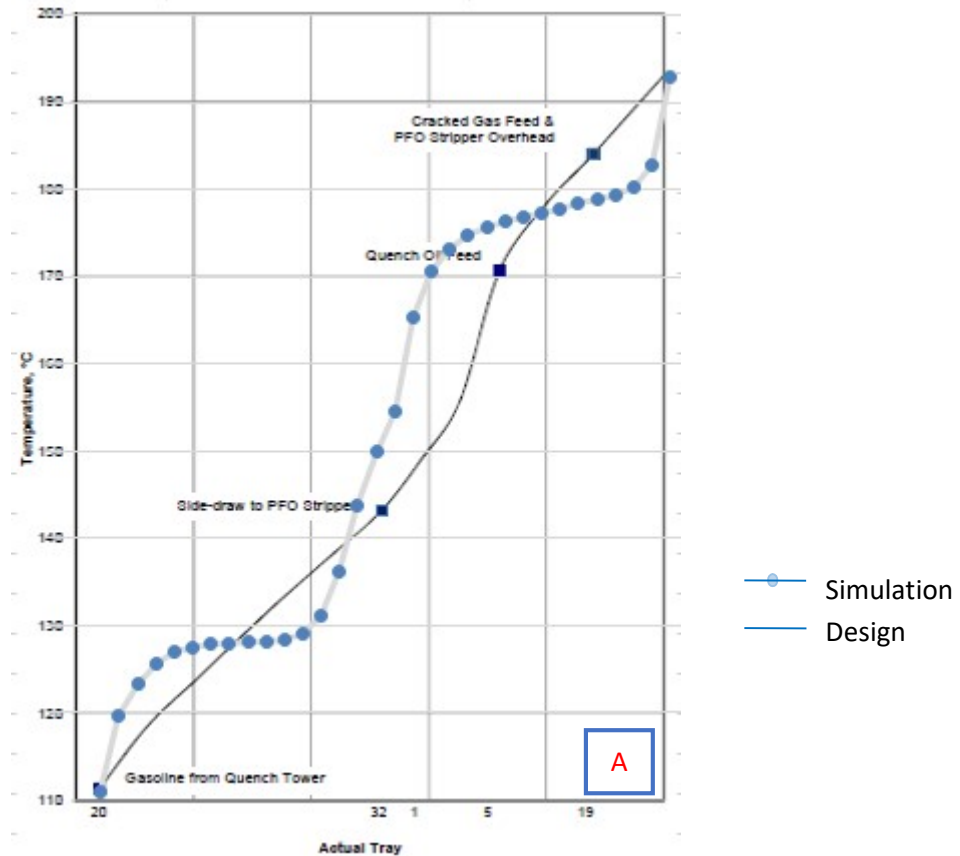
IV.6.4 Simulation Result and Evaluation

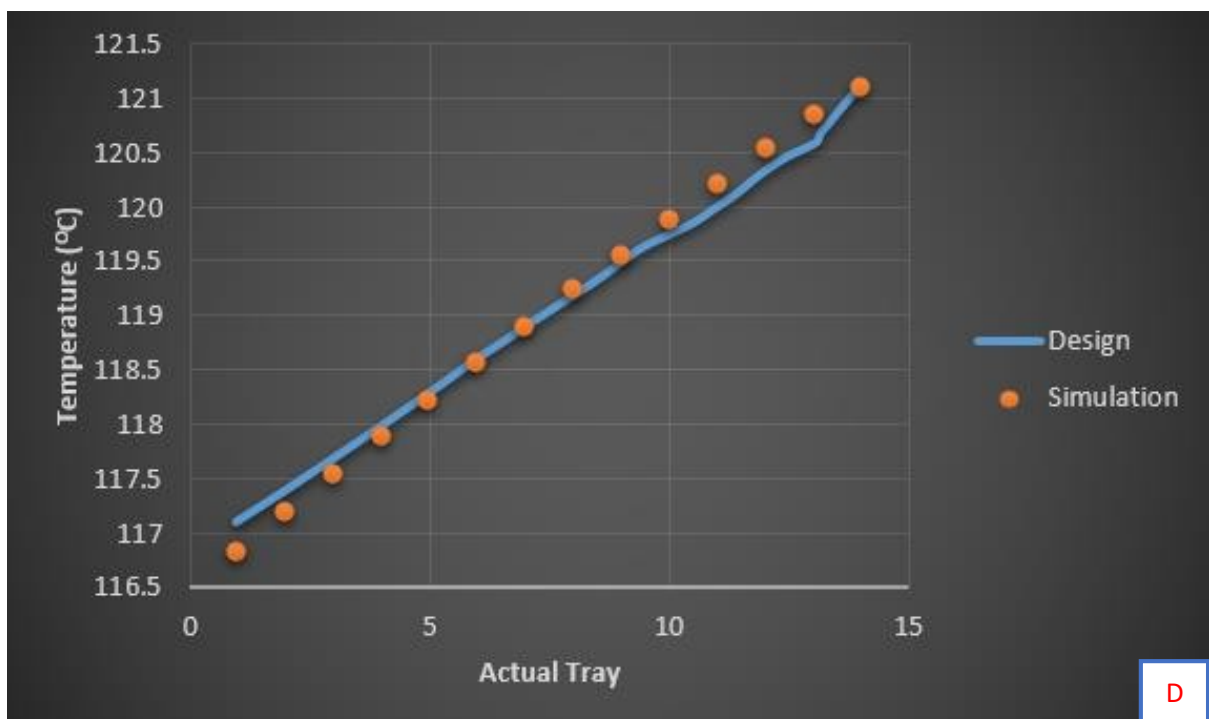
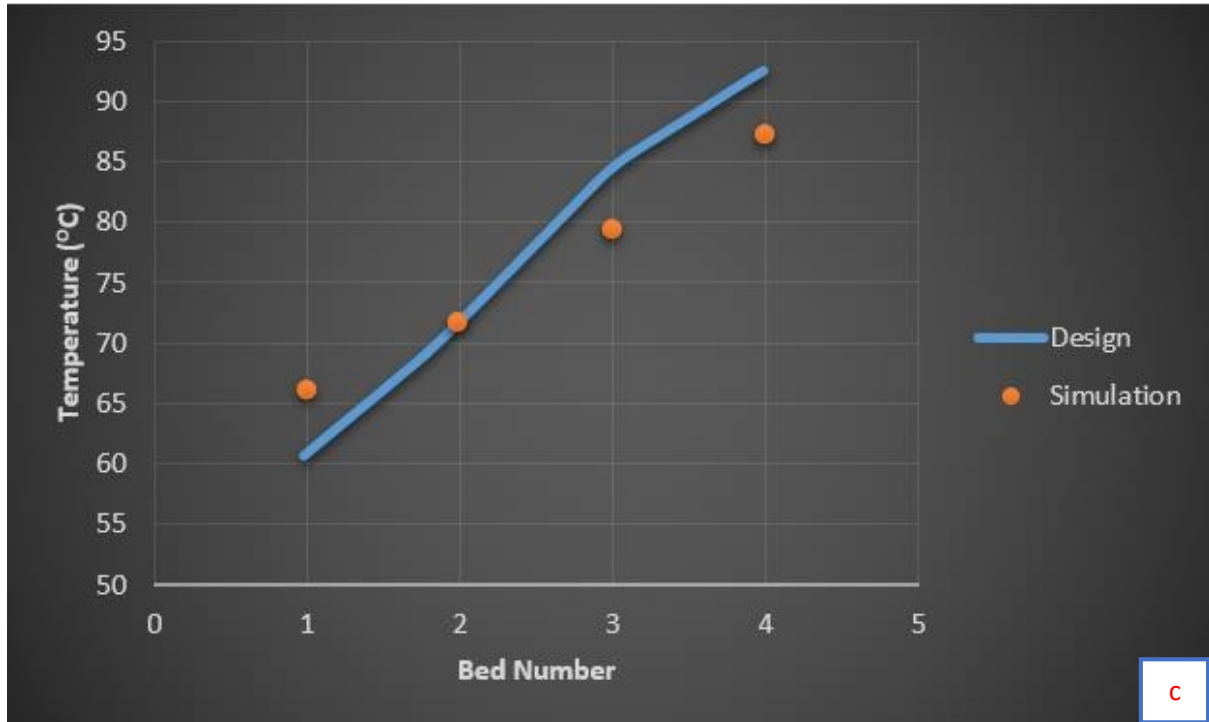
Result for integration stage is evaluated using data from streams before integration versus data from streams after integration. In the integration of stage 1-5, there are 5 stages that already integrated into 1 file. The integration process uses cutter units to calculate the differences of fluid package and recycle units to recalculate streams using new data from other fluid package. The differences of fluid package can make error occur in the stream and unit operation such as columns, vessels, and reactors.

Simulation Report – ECC 860 KTA

Working Stage 6

Stage 4 integration will be discussed into 2 part, there are profil temperature discussion and mass balance discussion. Figure IV.15, Figure IV.16, Figure IV.17, and Figure IV.18 below show the evaluation of profil temperature between the units data compare to the integration data of the unit in the stage 1, stage 2, stage 4, and stage 5, respectively.





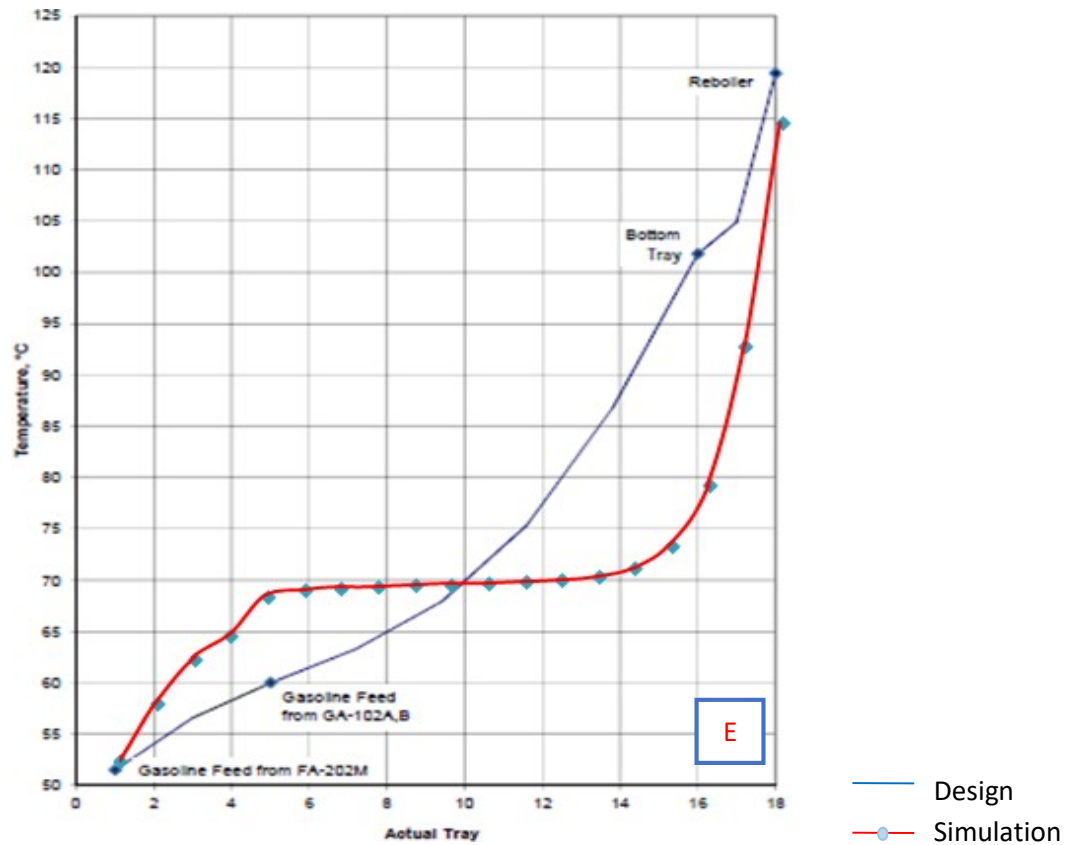


Figure IV. 15. Profil Temperature of Column DA-101(A), DA-103(B), DA-102(C), DA-104(D), and DA-204(E)

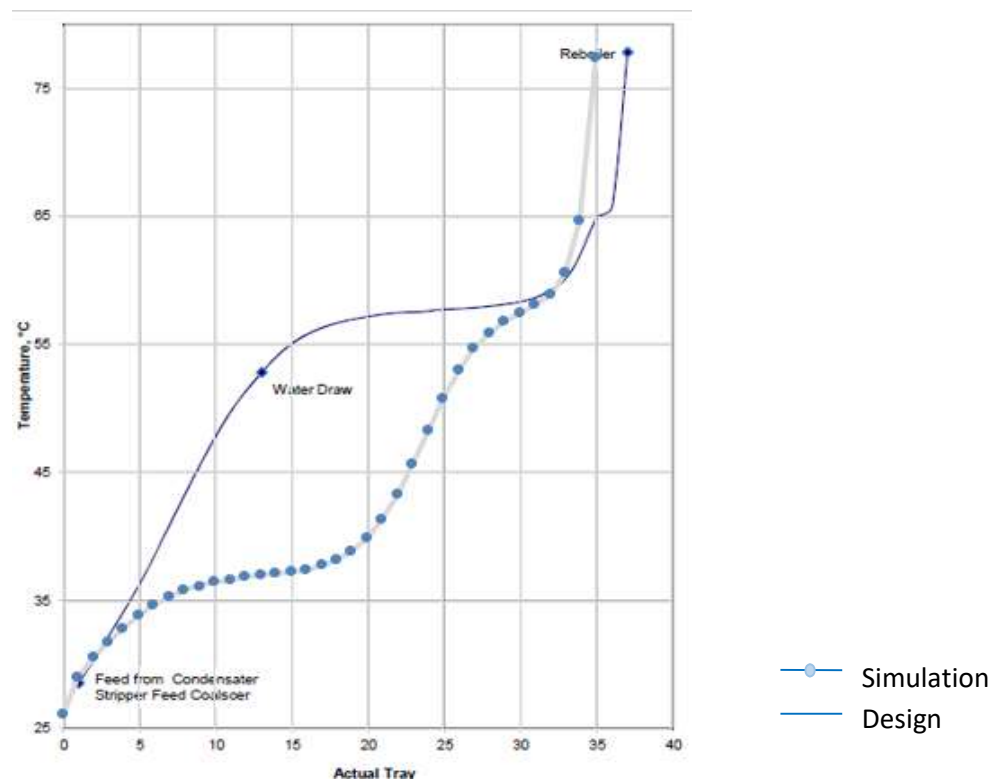
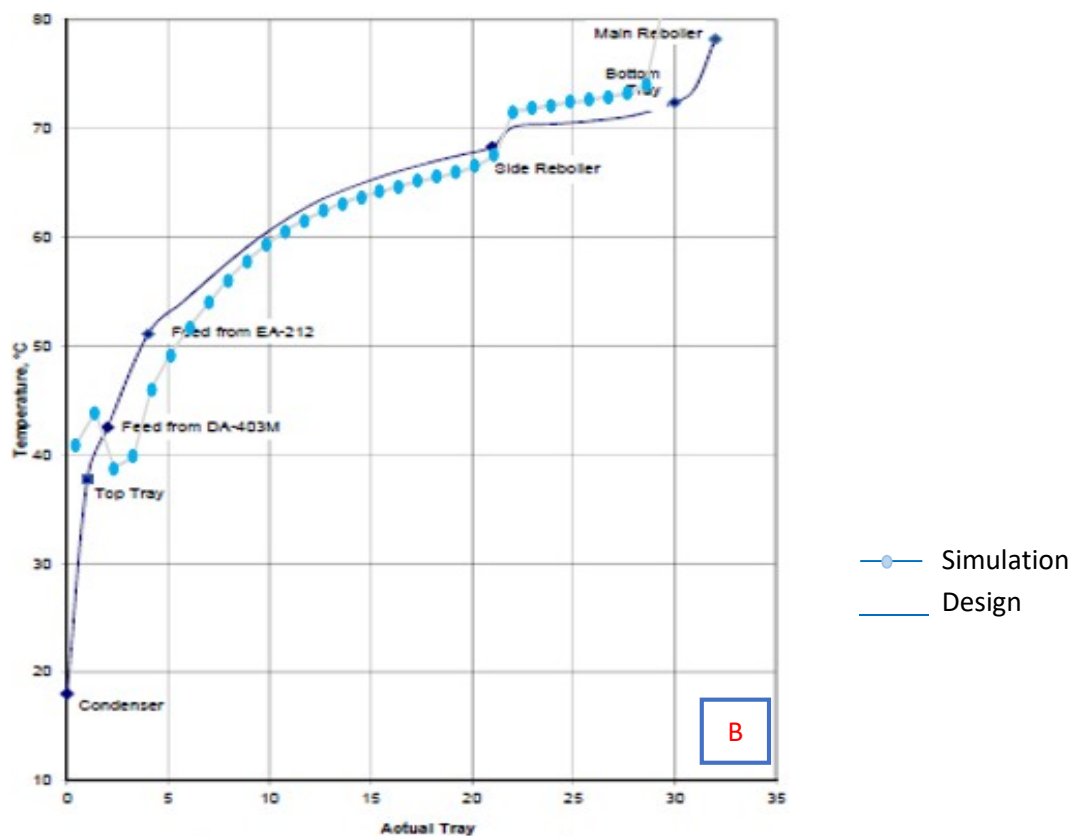
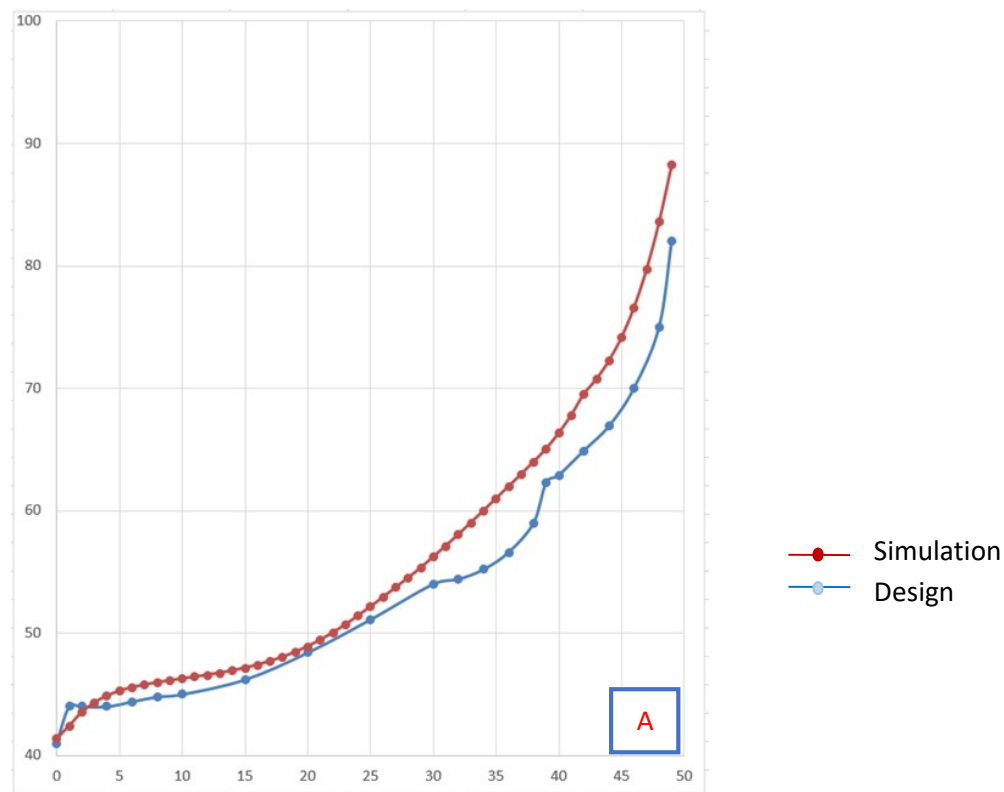


Figure IV. 16. Temperature Profile of DA-201

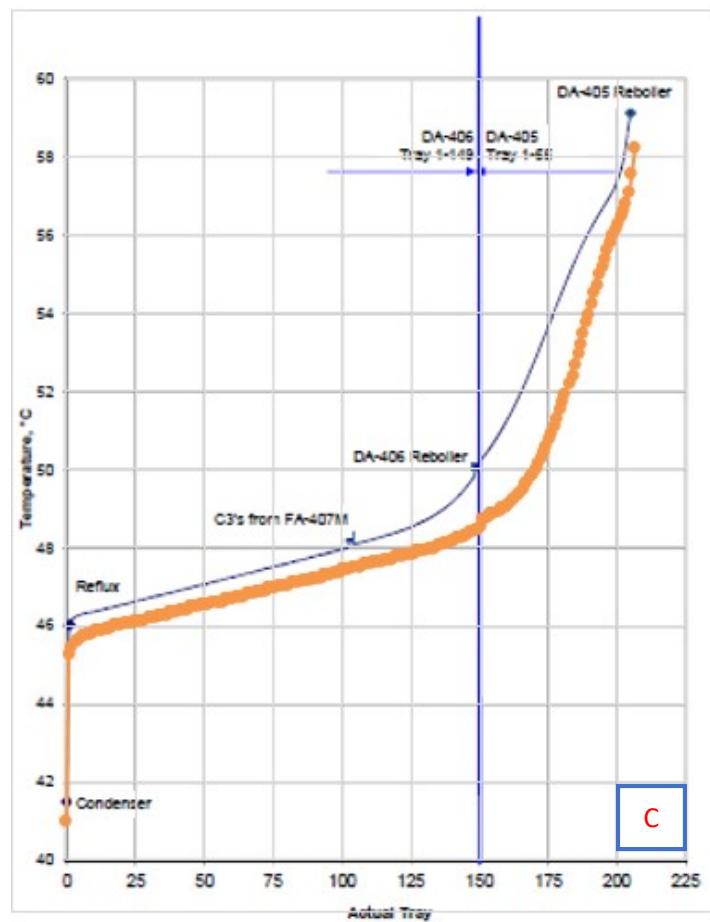
Simulation Report – ECC 860 KTA

Working Stage 6

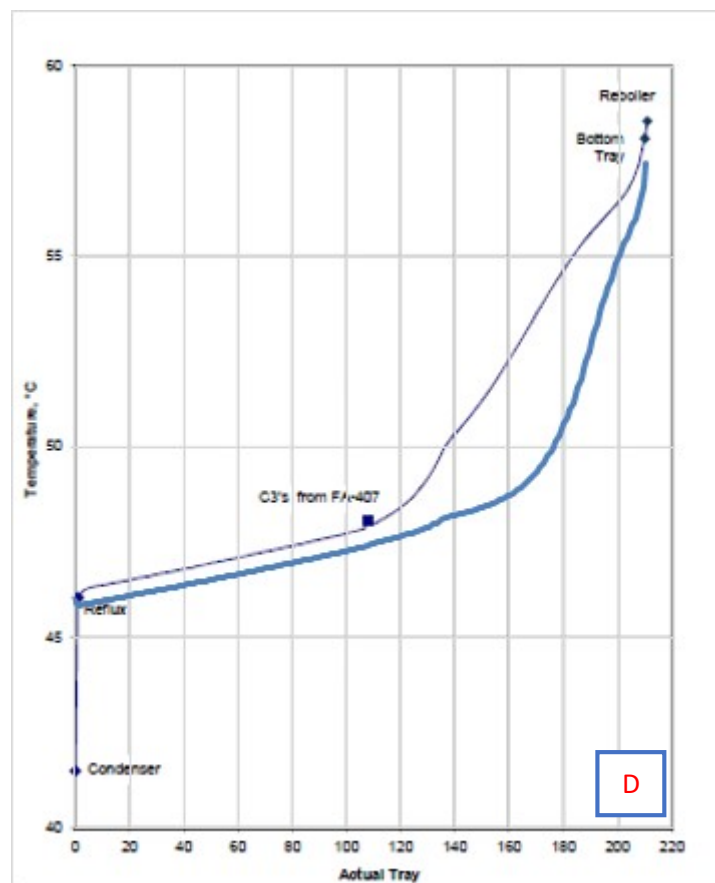


Simulation Report – ECC 860 KTA

Working Stage 6



Simulation
Design



Simulation
Design

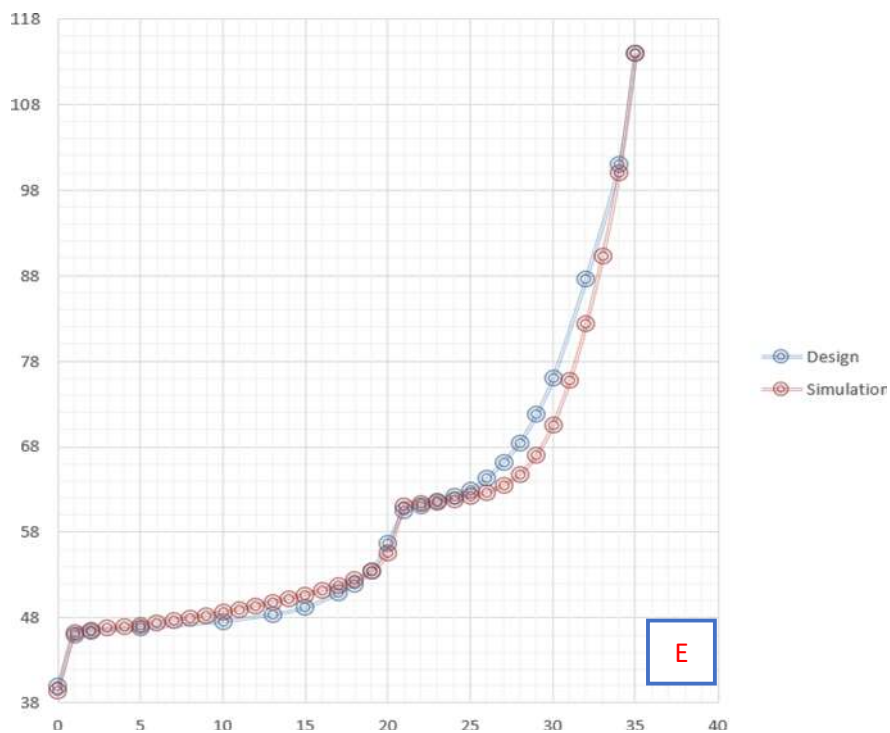
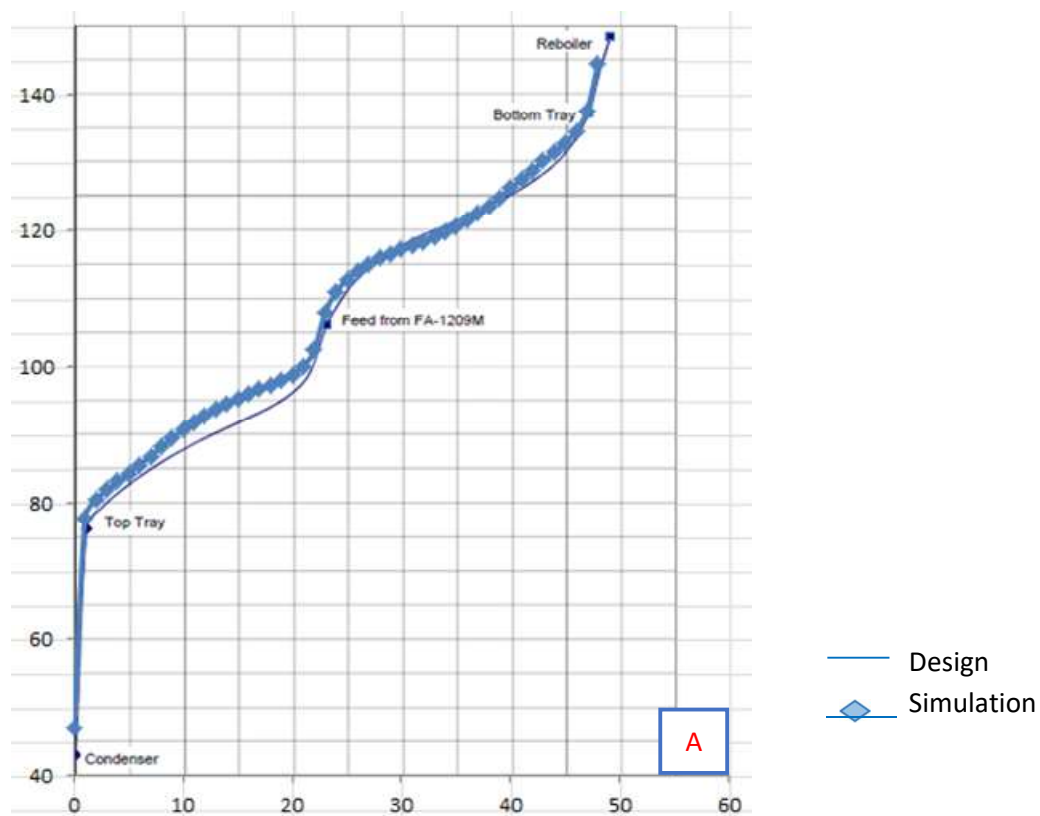


Figure IV. 17. Profil Temperature of DA-403M (A), DA-404M (B), DA-405 and DA-406 (C), DA-415M (D), DA-407 (E)



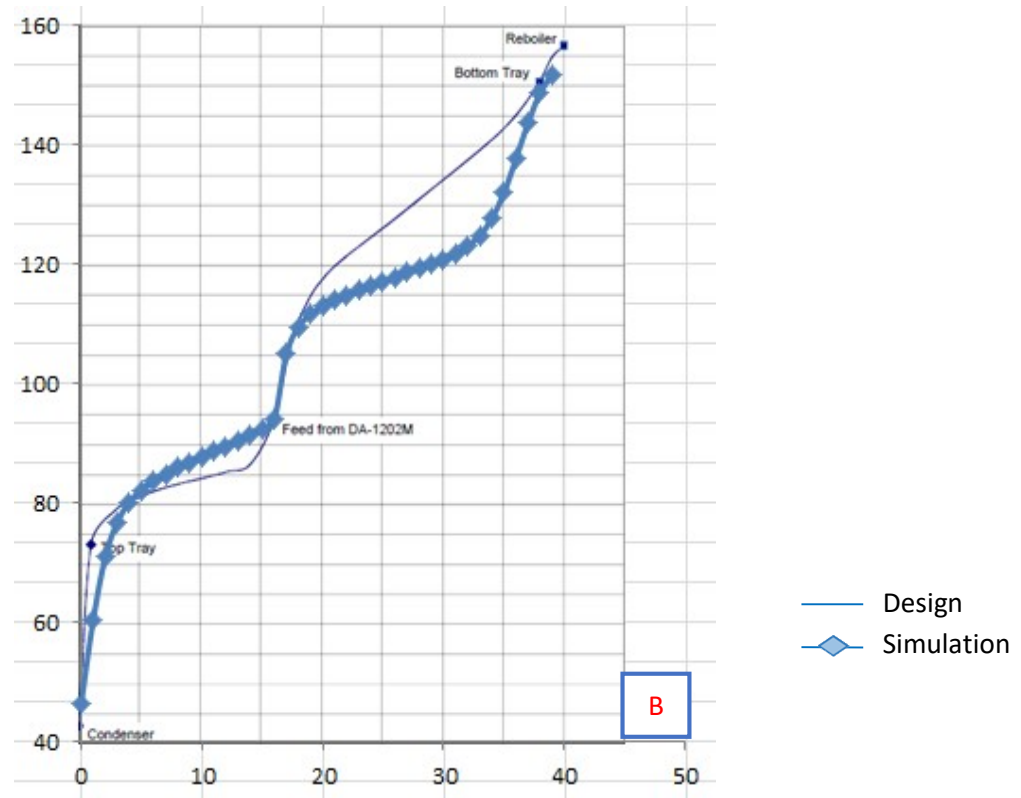


Figure IV. 18. Profil Temperature of DA-1202M (A) and DA-1203M (B)

Overall, there are no difference of stage temperature before and after the integration. The few differences occur in unit DA-404M meanwhile these differences are not significant so this temperature profile still accepted.

For mass balance evaluation, there are several streams that change compare to units data that shown on the Table IV.12. There are error in several streams with the number of not more than 4.1%. If the after-integration data are compared to the design data, there are several stream that has the closer number compared to the design data. It proved that integration produce the better data compared to the design data. Unfortunately there are several streams that has the bigger error compared to the design data. Moreover the error produced from the integration can be tolerate since the error are not affect the overall integration.

Simulation Report – ECC 860 KTA
Working Stage 6

Table IV. 12. Error of Stage 1 to Stage 5 Before and After Integration

Stage 1				
No.	Stream	% Error Integration 1-5 vs Unit Simulation	% Error Unit simulation vs Design	% Error Integration 1-5 vs Design
1	2101	2.40957	-0.00115	2.40844
Stage 2				
No.	Stream	% Error Integration 1-5 vs Unit Simulation	% Error Unit simulation vs Design	% Error Integration 1-5 vs Design
1	3023	-0.19746	0.00000	-0.19746
2	4101	-0.12186	-0.00083	-0.12270
3	4701	-0.34565	-0.00389	-0.34955
4	3063	-0.19746	0.00000	-0.19746
5	3062	-0.19746	0.00000	-0.19746
6	3064	-0.18020	-0.05635	-0.23665
7	3067	-0.12186	-0.00083	-0.12270
8	3016	-0.10112	-0.08416	-0.18537
9	3013	-0.10991	-0.06873	-0.17872
10	3015	-0.10929	-0.06865	-0.17801
11	3039	-0.12409	1.34461	1.22219
12	3014	-0.10929	-0.06865	-0.17801
13	3202	-3.04728	-2.45431	-5.57638
14	3031	-0.12512	1.34531	1.22187
15	3034	-0.36363	0.13458	-0.22856
16	3203	0.14831	0.59915	0.74657
17	3022	-0.05593	-0.20495	-0.26099
18	3033	-0.12763	-0.43610	-0.56428
19	4201	-0.20307	-0.00172	-0.20479
20	4720	-4.18177	4.74943	0.76627
21	4744	1.04992	-0.17867	0.87313
22	4715	-0.69845	1.43576	0.74734
23	4713	-0.69845	1.43576	0.74734
24	4743	1.78108	-6.63794	-4.73863
25	4714	1.78108	-6.63794	-4.73863
26	4716	-3.14418	3.60230	0.57138
27	4718	-3.14418	3.60230	0.57138
28	4717	1.04992	-0.17867	0.87313
29	4719	-1.33943	1.55105	0.23239
30	4721	-1.80232	1.80667	0.03691
31	4722	-1.80232	1.80667	0.03691
32	4725	-3.89883	4.40657	0.67954
33	4728	-0.62871	0.64929	0.02466
34	4727	-0.62871	0.64929	0.02466
35	4726	-3.89883	4.40657	0.67954

Simulation Report – ECC 860 KTA
Working Stage 6

36	4724	-4.18177	4.74943	0.76627
37	4723	-1.19744	1.47217	0.29236
38	5235	0.34910	1.74687	2.08987
39	5232	-0.36667	-1.44577	-1.07517
40	5229	-1.01463	-4.79388	-5.85716
Stage 3				
No.	Stream	% Error Integration 1-5 vs Unit Simulation	% Error Unit simulation vs Design	% Error Integration 1-5 vs Design
1	4187	0.14000	-0.02788	0.11570
2	4184	1.55000	0.29827	-1.24841
3	4166	1.54000	-0.15942	1.37814
4	4225	0.58000	0.06150	0.63841
5	4227	0.58000	0.06174	0.63841
6	4312	0.17000	-0.02061	0.15235
7	4313	0.22000	-0.04345	0.17951
8	4316	0.16000	-0.15698	0.00000
9	4317	1.53000	-0.18108	1.35181
10	4321	0.10000	-0.29039	-0.39202
11	4167	0.10942	-0.10954	0.00000
12	4155	0.34017	-0.00418	-0.34436
13	4156	34.97034	25.90965	0.00000
14	4166	1.53511	-0.15942	1.37814
15	4185	0.12240	-0.02377	0.09865
16	4187	0.14355	-0.02789	0.11570
17	4009	0.23409	0.08881	-0.14507
18	1102	0.05724	-0.05727	0.00000
19	4097	0.52632	0.52356	0.00000
20	4315	0.09235	0.00000	-0.09235
21	4225	0.57727	0.06150	0.63841
22	4227	0.57702	0.06174	0.63841
23	4315	0.09235	0.00000	-0.09235
24	4061	0.07226	0.07221	0.00000
25	4318	0.58497	-0.58841	0.00000
26	4305	0.05517	-0.15815	-0.21340
27	4316	0.15674	-0.15698	0.00000
28	4317	1.53012	-0.18108	1.35181
29	4321	0.10134	-0.29039	-0.39202
Stage 4				
No.	Stream	% Error Integration 1-5 vs Unit Simulation	% Error Unit simulation vs Design	% Error Integration 1-5 vs Design
1	4572	0.23588	15.63112	15.43164
2	4571	0.16336	15.56979	15.43164
3	4422	0.12644	-0.07841	-0.20511

CHAPTER V

CONCLUSION AND RECOMMENDATION

V.1 Conclusion

The conclusion of the integration of stage 1 to stage 5 are listed below:

1. All unit in the stage 1 to the stage 5 were simulated and evaluated
2. The integration of stage 1 to the stage 5 were successfully converged
3. Stage 1 has been simulated and convergence. There are several difference of temperature profile of tray column especially in DA-101 and DA-204 which is tolerable because the condition of inlet and outlet has been achieved. The temperature profile of some Simulation yields a satisfied result. The largest error occurred in unit 2 on the temperature of Stream 2117 at 17.5% while The second largest process condition error of 8.5% is found in the temperature of Stream 2109. In flow 2510 unit 3, the error on temperature is 7.5%. Other than these, the error are consistent below 5% with majority below 1%.
4. In Stage 2, which is successfully simulated and convergence, there are significant temperature differences between tray 1 to tray 35 in DA-201. However, the properties of the flow in the inlet and outlet of the column has been achieved. The biggest error occurred in pressure at stream 3023 which is 56.95%. Other significant error also occurred at Spent Caustic Pre-Treatment stream 3093 with error around 6.71% at the molar flow. Other than that, the errors are either lower than 3% or insignificant in terms of its respective quantity.
5. The error average of this stage 3 simulation is approximately 0.06%, mainly contributed by molar flow variable. The error sprung by molar flow variable mainly caused by the error in composition. For flow 4021, temperature raises the error average from 0.15% (calculated without considering the temperature error) to 0.23%. This huge error in the 4021. The error from temperature variable, though more than 0,01%, is negligible in the simulation.
6. There are slight error in temperature profile stage 4. The significant difference occurs in the unit DA-415M. The difference reached 3 °C at its highest gap. For mass balance evaluation, there are several streams that change compared to design data including stream 4561, stream 4423, stream 4422, stream 4413, and stream 3206 with the number of error are 5.84%, 0.09%, 0.20%, 0.10%, and 0.11%, respectively.
7. Overall, a slight difference of stage temperature before and after the integration occurred in stage 5. For mass balance evaluation, there are several streams that change compare to design data including stream 1218 and stream 1230 with the number of error are 0.06% and 0.05%, respectively. However, these changes will not affect the simulation. The change of mass balance has positive impact for the data if it is compared to the design data. Thus the integration process force the simulation reach the design data and has less error.

8. For mass balance evaluation of integration 1-5, there are several streams that change compare to units data. There are error in several streams with the number of not more than 4.1% (4572,4571, 4156). Overall, integration 1-5 produces a slightly better output in respect to the design. Temperature profile for column perfectly matches the stage integration except DA-404M

Recommendation

It is highly recommended to simulate the whole plant continuously from stage 1 to stage 5. This is important in order to ensure the accuracy of the simulation since changes between fluid package tends to diminish the accuracy.

APPENDIX

A. Component List

A.1. Stage 1

Table A.1.1. Stage 1 Stream Composition & Properties

2016		Design	%Error
Component (%mol)			
Hydrogen	0.0326	0.0326	-0.02
Carbon Monoxide	0.0002	0.0002	-0.02
Carbon Dioxide	0.0001	0.0001	-0.02
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0707	0.0707	-0.02
Acetylene	0.0014	0.0014	-0.02
Ethylene	0.0715	0.0715	-0.02
Ethane	0.0089	0.0089	-0.02
Propadiene/Propyne	0.0013	0.0013	-0.02
Propylene	0.0291	0.0291	-0.02
Propane	0.0008	0.0008	-0.02
Butadienes/C4Acetylenes	0.0058	0.0058	-0.02
Butylenes	0.0080	0.0080	-0.02
Butanes	0.0026	0.0026	-0.02
C5-Hydrocarbons	0.0048	0.0048	-0.02
C6 Non-Aromatics	0.0016	0.0016	-0.02
C7 Non-Aromatics	0.0007	0.0007	-0.02
C8 Non-Aromatics	0.0003	0.0003	-0.02
Benzene	0.0064	0.0064	-0.02
Toluene	0.0049	0.0049	-0.02
Xylenes/Ethylbenzene	0.0012	0.0012	-0.02
Styrene	0.0007	0.0007	-0.02
C9-204°C	0.0025	0.0025	-0.02
204-288°C PGO	0.1290	0.1290	-0.02
288°C plus PFO	0.3950	0.3949	-0.02
Steam/Water	0.2198	0.2198	-0.02
Operation Condition			
Temperature (°C)	193.70	193.70	0.00
Pressure (Kg/cm ² gauge)	0.83	0.83	0.00
Molar Flow (kgmole/h)	10794.37	10796.30	0.02
Mass Flow (kg/h)	1714882.00	1714882.00	0.00
Molecular Weight	158.87	158.84	-0.02
Total	1.0000	0.9998	
2031		Design	%Error

Simulation Report – ECC 860 KTA
Working Stage 6

Component (%mol)			
Hydrogen	0.0354	0.0354	0.00
Carbon Monoxide	0.0003	0.0003	0.00
Carbon Dioxide	0.0001	0.0001	0.00
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0767	0.0767	0.00
Acetylene	0.0015	0.0015	0.00
Ethylene	0.0776	0.0776	0.00
Ethane	0.0097	0.0097	0.00
Propadiene/Propyne	0.0015	0.0015	0.00
Propylene	0.0315	0.0315	0.00
Propane	0.0008	0.0008	0.00
Butadienes/C4Acetylenes	0.0063	0.0063	0.00
Butylenes	0.0087	0.0087	0.00
Butanes	0.0028	0.0028	0.00
C5-Hydrocarbons	0.0052	0.0052	0.00
C6 Non-Aromatics	0.0017	0.0017	0.00
C7 Non-Aromatics	0.0008	0.0008	0.00
C8 Non-Aromatics	0.0003	0.0003	0.00
Benzene	0.0069	0.0069	0.00
Toluene	0.0053	0.0053	0.00
Xylenes/Ethylbenzene	0.0012	0.0012	0.00
Styrene	0.0008	0.0008	0.00
C9-204°C	0.0027	0.0027	0.00
204-288°C PGO	0.1328	0.1328	0.00
288°C plus PFO	0.4065	0.4065	0.00
Steam/Water	0.1829	0.1829	0.00
Operation Condition			
Temperature (°C)	193.90	193.90	0.00
Pressure (Kg/cm ² gauge)	0.90	0.90	0.00
Molar Flow (kgmole/h)	6112.67	6113.00	0.01
Mass Flow (kg/h)	997427.00	997427.00	0.00
Molecular Weight	163.17	163.17	0.00
Total	1.0000	1.0000	
2046		Design	%Error
Component (%mol)			
Hydrogen	0.0336	0.0336	-0.05
Carbon Monoxide	0.0002	0.0003	21.27
Carbon Dioxide	0.0001	0.0001	-0.01
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0729	0.0729	0.03
Acetylene	0.0014	0.0014	-2.60
Ethylene	0.0737	0.0737	-0.02

Simulation Report – ECC 860 KTA
Working Stage 6

Ethane	0.0092	0.0092	0.10
Propadiene/Propyne	0.0014	0.0014	1.97
Propylene	0.0300	0.0300	0.10
Propane	0.0008	0.0008	-0.01
Butadienes/C4Acetylenes	0.0060	0.0060	0.31
Butylenes	0.0083	0.0083	0.55
Butanes	0.0027	0.0027	1.01
C5-Hydrocarbons	0.0049	0.0049	-0.92
C6 Non-Aromatics	0.0016	0.0017	3.74
C7 Non-Aromatics	0.0007	0.0007	-5.18
C8 Non-Aromatics	0.0003	0.0003	-0.01
Benzene	0.0066	0.0065	-1.26
Toluene	0.0050	0.0051	1.07
Xylenes/Ethylbenzene	0.0012	0.0012	-0.01
Styrene	0.0007	0.0008	7.97
C9-204°C	0.0026	0.0026	1.05
204-288°C PGO	0.1304	0.1304	0.01
288°C plus PFO	0.3991	0.3991	-0.01
Steam/Water	0.2065	0.2065	0.01
Operation Condition			
Temperature (°C)	193.73	193.80	0.03
Pressure (Kg/cm ² gauge)	0.83	0.83	0.00
Molar Flow (kgmole/h)	16907.04	16909.30	0.01
Mass Flow (kg/h)	2712309.00	2712309.00	0.00
Molecular Weight	160.42	160.40	-0.02
Total	1.0000	1.0002	

2044		Design	%Error
Component (%mol)			
Hydrogen	0.0221	0.0221	0.02
Carbon Monoxide	0.0002	0.0002	0.02
Carbon Dioxide	0.0001	0.0001	0.02
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0480	0.0480	0.02
Acetylene	0.0009	0.0009	0.02
Ethylene	0.0483	0.0483	0.02
Ethane	0.0060	0.0060	0.02
Propadiene/Propyne	0.0009	0.0009	0.02
Propylene	0.0198	0.0198	0.02
Propane	0.0005	0.0005	0.02
Butadienes/C4Acetylenes	0.0041	0.0041	0.02
Butylenes	0.0056	0.0056	0.02
Butanes	0.0018	0.0018	0.02

Simulation Report – ECC 860 KTA
Working Stage 6

C5-Hydrocarbons	0.0034	0.0034	0.02
C6 Non-Aromatics	0.0012	0.0012	0.02
C7 Non-Aromatics	0.0006	0.0006	0.02
C8 Non-Aromatics	0.0003	0.0003	0.02
Benzene	0.0049	0.0049	0.02
Toluene	0.0041	0.0041	0.02
Xylenes/Ethylbenzene	0.0010	0.0010	0.02
Styrene	0.0007	0.0007	0.02
C9-204°C	0.0026	0.0026	0.02
204-288°C PGO	0.1655	0.1655	0.02
288°C plus PFO	0.5071	0.5072	0.02
Steam/Water	0.1504	0.1504	0.02
Operation Condition			
Temperature (°C)	193.80	193.80	0.00
Pressure (Kg/cm ² gauge)	0.83	0.83	0.00
Molar Flow (kgmole/h)	10671.67	10669.50	-0.02
Mass Flow (kg/h)	2103853.00	2103853.00	0.00
Molecular Weight	197.14	197.18	0.02
Total	1.0000	1.0002	
2021		Design	%Error
Component (%mol)			
Hydrogen	0.2350	0.2350	0.00
Carbon Monoxide	0.0004	0.0004	0.00
Carbon Dioxide	0.0002	0.0002	0.00
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0556	0.0556	0.00
Acetylene	0.0022	0.0022	0.00
Ethylene	0.2374	0.2374	0.00
Ethane	0.1359	0.1359	0.00
Propadiene/Propyne	0.0004	0.0004	0.00
Propylene	0.0085	0.0085	0.00
Propane	0.0029	0.0029	0.00
Butadienes/C4Acetylenes	0.0040	0.0040	0.00
Butylenes	0.0007	0.0007	0.00
Butanes	0.0005	0.0005	0.00
C5-Hydrocarbons	0.0009	0.0009	0.00
C6 Non-Aromatics	0.0005	0.0005	0.00
C7 Non-Aromatics	0.0001	0.0001	0.00
C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0015	0.0015	0.00
Toluene	0.0003	0.0003	0.00
Xylenes/Ethylbenzene	0.0000	0.0000	
Styrene	0.0001	0.0001	0.00

Simulation Report – ECC 860 KTA
Working Stage 6

C9-204°C	0.0003	0.0003	0.00
204-288°C PGO	0.0001	0.0001	0.00
288°C plus PFO	0.0001	0.0001	0.00
Steam/Water	0.3124	0.3124	0.00
Operation Condition			
Temperature (°C)	214.60	214.60	0.00
Pressure (Kg/cm ² gauge)	0.87	0.87	0.00
Molar Flow (kgmole/h)	1141.34	1141.40	0.01
Mass Flow (kg/h)	21628.00	21628.00	0.00
Molecular Weight	18.95	18.95	0.00
Total	1.0000	1.0000	
2015		Design	%Error
Component (%mol)			
Hydrogen	0.0380	0.0380	-0.01
Carbon Monoxide	0.0002	0.0002	-0.01
Carbon Dioxide	0.0001	0.0001	-0.01
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0685	0.0685	-0.01
Acetylene	0.0014	0.0014	-0.01
Ethylene	0.0748	0.0748	-0.01
Ethane	0.0125	0.0125	-0.01
Propadiene/Propyne	0.0013	0.0013	-0.01
Propylene	0.0277	0.0277	-0.01
Propane	0.0008	0.0008	-0.01
Butadienes/C4Acetylenes	0.0056	0.0056	-0.01
Butylenes	0.0076	0.0076	-0.01
Butanes	0.0025	0.0025	-0.01
C5-Hydrocarbons	0.0045	0.0045	-0.01
C6 Non-Aromatics	0.0015	0.0015	-0.01
C7 Non-Aromatics	0.0007	0.0007	-0.01
C8 Non-Aromatics	0.0003	0.0003	-0.01
Benzene	0.0061	0.0061	-0.01
Toluene	0.0047	0.0047	-0.01
Xylenes/Ethylbenzene	0.0011	0.0011	-0.01
Styrene	0.0007	0.0007	-0.01
C9-204°C	0.0025	0.0025	-0.01
204-288°C PGO	0.1275	0.1275	-0.01
288°C plus PFO	0.3902	0.3902	-0.01
Steam/Water	0.2191	0.2191	-0.01
Operation Condition			
Temperature (°C)	193.70	193.70	0.00
Pressure (Kg/cm ² gauge)	0.83	0.83	0.00
Molar Flow (kgmole/h)	17977.87	17979.00	0.01

Simulation Report – ECC 860 KTA
Working Stage 6

Mass Flow (kg/h)	2824355.00	2824355.00	0.00
Molecular Weight	157.10	157.09	-0.01
Total	1.0000	0.9999	
2115		Design	%Error
Component (%mol)			
Hydrogen	0.0002	0.0002	-9.93
Carbon Monoxide	0.0000	0.0000	#DIV/0!
Carbon Dioxide	0.0000	0.0000	#DIV/0!
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0008	0.0008	-5.35
Acetylene	0.0000	0.0000	#DIV/0!
Ethylene	0.0016	0.0002	-717.66
Ethane	0.0003	0.0001	-245.50
Propadiene/Propyne	0.0001	0.0001	39.01
Propylene	0.0012	0.0006	-94.86
Propane	0.0000	0.0000	#DIV/0!
Butadienes/C4Acetylenes	0.0004	0.0004	-5.06
Butylenes	0.0006	0.0004	-42.92
Butanes	0.0002	0.0001	-104.38
C5-Hydrocarbons	0.0006	0.0005	-17.21
C6 Non-Aromatics	0.0004	0.0003	-20.58
C7 Non-Aromatics	0.0003	0.0002	-29.77
C8 Non-Aromatics	0.0002	0.0001	-68.16
Benzene	0.0014	0.0019	24.27
Toluene	0.0018	0.0023	19.91
Xylenes/Ethylbenzene	0.0007	0.0008	15.71
Styrene	0.0005	0.0006	24.81
C9-204°C	0.0025	0.0028	11.33
204-288°C PGO	0.2371	0.2411	1.65
288°C plus PFO	0.7446	0.7402	-0.60
Steam/Water	0.0044	0.0062	28.34
Operation Condition			
Temperature (°C)	155.00	155.0000	0.00
Pressure (Kg/cm ² gauge)	3.48	3.4800	0.00
Molar Flow (kgmole/h)	1668.48	1673.4000	0.29
Mass Flow (kg/h)	463132.00	463132.0000	0.00
Molecular Weight	277.58	276.7600	-0.29
Total	1.0000	0.9999	

2105		Design	%Error
Component (%mol)			
Hydrogen	0.0555	0.0570	2.55
Carbon Monoxide	0.0005	0.0004	-15.24

Simulation Report – ECC 860 KTA
Working Stage 6

Carbon Dioxide	0.0002	0.0002	23.10
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.1200	0.1232	2.56
Acetylene	0.0024	0.0024	0.66
Ethylene	0.1221	0.1252	2.51
Ethane	0.0152	0.0155	2.14
Propadiene/Propyne	0.0022	0.0023	2.82
Propylene	0.0492	0.0504	2.34
Propane	0.0013	0.0013	-0.80
Butadienes/C4Acetylenes	0.0096	0.0099	3.21
Butylenes	0.0134	0.0137	2.44
Butanes	0.0044	0.0045	2.08
C5-Hydrocarbons	0.0078	0.0080	2.88
C6 Non-Aromatics	0.0025	0.0026	2.94
C7 Non-Aromatics	0.0011	0.0011	4.41
C8 Non-Aromatics	0.0004	0.0004	-6.08
Benzene	0.0095	0.0097	2.18
Toluene	0.0067	0.0069	2.84
Xylenes/Ethylbenzene	0.0014	0.0014	-0.79
Styrene	0.0009	0.0009	0.62
C9-204°C	0.0109	0.0035	-210.92
204-288°C PGO	0.0493	0.0280	-75.90
288°C plus PFO	0.0118	0.0163	27.50
Steam/Water	0.5018	0.5151	2.57
Operation Condition			
Temperature (°C)	229.65	280.80	18.21
Pressure (Kg/cm ² gauge)	0.85	0.85	0.00
Molar Flow (kgmole/h)	1069.02	1039.50	-2.84
Mass Flow (kg/h)	36910.16	32122.00	-14.91
Molecular Weight	34.53	30.90	-11.74
Total	1.0000	0.9999	

2101		Design	%Error
Component (%mol)			
Hydrogen	0.0750	0.0754	0.54
Carbon Monoxide	0.0004	0.0005	11.92
Carbon Dioxide	0.0002	0.0002	-1.49
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.1304	0.1311	0.50
Acetylene	0.0026	0.0027	2.45
Ethylene	0.1438	0.1460	1.50
Ethane	0.0252	0.0256	1.62
Propadiene/Propyne	0.0024	0.0024	-0.74

Simulation Report – ECC 860 KTA
Working Stage 6

Propylene	0.0520	0.0528	1.51
Propane	0.0015	0.0016	3.65
Butadienes/C4Acetylenes	0.0106	0.0107	1.13
Butylenes	0.0142	0.0144	1.57
Butanes	0.0046	0.0047	2.03
C5-Hydrocarbons	0.0083	0.0085	2.04
C6 Non-Aromatics	0.0027	0.0029	5.74
C7 Non-Aromatics	0.0013	0.0013	1.83
C8 Non-Aromatics	0.0006	0.0007	8.22
Benzene	0.0122	0.0117	-3.93
Toluene	0.0113	0.0109	-3.81
Xylenes/Ethylbenzene	0.0047	0.0046	-2.28
Styrene	0.0044	0.0043	-1.34
C9-204°C	0.0747	0.0751	0.53
204-288°C PGO	0.0087	0.0032	-171.21
288°C plus PFO	0.0000	0.0000	
Steam/Water	0.4081	0.4087	0.15
Operation Condition			
Temperature (°C)	111.40	111.40	0.00
Pressure (Kg/cm ² gauge)	0.67	0.67	0.00
Molar Flow (kgmole/h)	23989.21	23997.50	0.03
Mass Flow (kg/h)	779645.00	779645.00	0.00
Molecular Weight	33.11	32.49	-1.92
Total	1.0000	1.0000	

2110		Design	%Error
Component (%mol)			
Hydrogen	0.0002	0.0002	-9.93
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0008	0.0008	-5.35
Acetylene	0.0000	0.0000	
Ethylene	0.0016	0.0002	-717.66
Ethane	0.0003	0.0001	-245.50
Propadiene/Propyne	0.0001	0.0001	39.01
Propylene	0.0012	0.0006	-94.86
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0004	0.0004	-5.06
Butylenes	0.0006	0.0004	-42.92
Butanes	0.0002	0.0001	-104.38
C5-Hydrocarbons	0.0006	0.0005	-17.21
C6 Non-Aromatics	0.0004	0.0003	-20.58

Simulation Report – ECC 860 KTA
Working Stage 6

C7 Non-Aromatics	0.0003	0.0002	-29.77
C8 Non-Aromatics	0.0002	0.0001	-68.17
Benzene	0.0014	0.0019	24.27
Toluene	0.0018	0.0023	19.90
Xylenes/Ethylbenzene	0.0007	0.0008	15.70
Styrene	0.0005	0.0006	24.81
C9-204°C	0.0025	0.0028	11.32
204-288°C PGO	0.2371	0.2411	1.64
288°C plus PFO	0.7446	0.7402	-0.60
Steam/Water	0.0044	0.0062	28.34
Operation Condition			
Temperature (°C)	193.28	193.30	0.01
Pressure (Kg/cm ² gauge)	12.42	11.27	-10.20
Molar Flow (kgmole/h)	27390.10	27553.30	0.59
Mass Flow (kg/h)	7602808.79	7625534.00	0.30
Molecular Weight	277.58	276.76	-0.29
Total	1.0000	0.9999	

2030		Design	%Error
Component (%mol)			
Hydrogen	0.0723	0.0723	-0.01
Carbon Monoxide	0.0006	0.0006	-0.01
Carbon Dioxide	0.0002	0.0002	-0.01
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.1562	0.1562	-0.01
Acetylene	0.0031	0.0031	-0.01
Ethylene	0.1587	0.1587	-0.01
Ethane	0.0197	0.0197	-0.01
Propadiene/Propyne	0.0029	0.0029	-0.01
Propylene	0.0639	0.0639	-0.01
Propane	0.0017	0.0017	-0.01
Butadienes/C4Acetylenes	0.0124	0.0124	-0.01
Butylenes	0.0173	0.0173	-0.01
Butanes	0.0057	0.0057	-0.01
C5-Hydrocarbons	0.0100	0.0100	-0.01
C6 Non-Aromatics	0.0032	0.0032	-0.01
C7 Non-Aromatics	0.0013	0.0013	-0.01
C8 Non-Aromatics	0.0005	0.0005	-0.01
Benzene	0.0120	0.0120	-0.01
Toluene	0.0082	0.0082	-0.01
Xylenes/Ethylbenzene	0.0016	0.0016	-0.01
Styrene	0.0010	0.0010	-0.01
C9-204°C	0.0023	0.0023	-0.01

Simulation Report – ECC 860 KTA
Working Stage 6

204-288°C PGO	0.0010	0.0012	16.66
288°C plus PFO	0.0010	0.0010	-0.01
Steam/Water	0.4431	0.4431	-0.01
Operation Condition			
Temperature (°C)	372.00	372.00	0.00
Pressure (Kg/cm ² gauge)	0.92	0.92	0.00
Molar Flow (kgmole/h)	820.93	819.80	-0.14
Mass Flow (kg/h)	20159.00	20159.00	0.00
Molecular Weight	24.56	24.59	0.14
Total	1.0000	1.0001	

2106		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0000	0.0000	
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0000	0.0000	
Butylenes	0.0000	0.0000	
Butanes	0.0000	0.0000	
C5-Hydrocarbons	0.0000	0.0000	
C6 Non-Aromatics	0.0000	0.0000	
C7 Non-Aromatics	0.0000	0.0000	
C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	0.0000	
Toluene	0.0000	0.0000	
Xylenes/Ethylbenzene	0.0000	0.0000	
Styrene	0.0000	0.0000	
C9-204°C	0.0000	0.0049	99.99
204-288°C PGO	0.0043	0.5086	99.16
288°C plus PFO	0.9844	0.4669	-110.83
Steam/Water	0.0113	0.0195	41.88
Operation Condition			
Temperature (°C)	213.83	164.70	-29.83
Pressure (Kg/cm ² gauge)	1.05	1.05	0.00
Molar Flow (kgmole/h)	33.98	62.30	45.46

Simulation Report – ECC 860 KTA
Working Stage 6

Mass Flow (kg/h)	10790.88	15557.00	30.64
Molecular Weight	317.56	249.53	-27.26
Total	1.0000	0.9999	
2112		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0000	0.0000	
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0000	0.0000	
Butylenes	0.0000	0.0000	
Butanes	0.0000	0.0000	
C5-Hydrocarbons	0.0000	0.0000	
C6 Non-Aromatics	0.0000	0.0000	
C7 Non-Aromatics	0.0000	0.0000	
C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	0.0000	
Toluene	0.0000	0.0000	
Xylenes/Ethylbenzene	0.0000	0.0000	
Styrene	0.0000	0.0000	
C9-204°C	0.0048	0.0049	2.01
204-288°C PGO	0.5087	0.5086	-0.01
288°C plus PFO	0.4670	0.4669	-0.03
Steam/Water	0.0195	0.0195	-0.03
Operation Condition			
Temperature (°C)	165.10	165.10	0.00
Pressure (Kg/cm ² gauge)	8.43	8.43	0.00
Molar Flow (kgmole/h)	20.03	20.00	-0.17
Mass Flow (kg/h)	5000.00	5000.00	0.00
Molecular Weight	249.57	249.53	-0.02
Total	1.0000	0.9999	

2130		Design	%Error
Component (%mol)			
Hydrogen	0.0001	0.0001	-38.47
Carbon Monoxide	0.0000	0.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0008	0.0007	-8.85
Acetylene	0.0000	0.0000	
Ethylene	0.0019	0.0006	-210.70
Ethane	0.0004	0.0002	-110.41
Propadiene/Propyne	0.0001	0.0001	3.51
Propylene	0.0017	0.0010	-71.96
Propane	0.0001	0.0000	
Butadienes/C4Acetylenes	0.0008	0.0006	-27.66
Butylenes	0.0010	0.0006	-70.60
Butanes	0.0004	0.0002	-88.11
C5-Hydrocarbons	0.0012	0.0008	-54.49
C6 Non-Aromatics	0.0010	0.0006	-66.25
C7 Non-Aromatics	0.0008	0.0005	-68.58
C8 Non-Aromatics	0.0007	0.0004	-69.23
Benzene	0.0042	0.0041	-2.13
Toluene	0.0066	0.0059	-12.53
Xylenes/Ethylbenzene	0.0032	0.0023	-37.65
Styrene	0.0022	0.0018	-23.16
C9-204°C	0.1986	0.0380	-422.73
204-288°C PGO	0.-7694	0.9289	17.17
288°C plus PFO	0.0000	0.0031	99.95
Steam/Water	0.0047	0.0095	50.60
Operation Condition			
Temperature (°C)	131.10	143.20	8.45
Pressure (Kg/cm ² gauge)	0.72	0.74	2.14
Molar Flow (kgmole/h)	52.90	52.70	-0.37
Mass Flow (kg/h)	8201.57	8200.00	-0.02
Molecular Weight	155.05	155.63	0.37
Total	1.0000	1.0000	

2102		Design	%Error
Component (%mol)			
Hydrogen	0.0002	0.0002	-9.93
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0008	0.0008	-5.35
Acetylene	0.0000	0.0000	
Ethylene	0.0016	0.0002	-717.66
Ethane	0.0003	0.0001	-245.50
Propadiene/Propyne	0.0001	0.0001	39.01

Simulation Report – ECC 860 KTA
Working Stage 6

Propylene	0.0012	0.0006	-94.86
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0004	0.0004	-5.06
Butylenes	0.0006	0.0004	-42.92
Butanes	0.0002	0.0001	-104.38
C5-Hydrocarbons	0.0006	0.0005	-17.21
C6 Non-Aromatics	0.0004	0.0003	-20.58
C7 Non-Aromatics	0.0003	0.0002	-29.77
C8 Non-Aromatics	0.0002	0.0001	-68.17
Benzene	0.0014	0.0019	24.27
Toluene	0.0018	0.0023	19.90
Xylenes/Ethylbenzene	0.0007	0.0008	15.70
Styrene	0.0005	0.0006	24.81
C9-204°C	0.0025	0.0028	11.32
204-288°C PGO	0.2371	0.2411	1.64
288°C plus PFO	0.7446	0.7402	-0.60
Steam/Water	0.0044	0.0062	28.34
Operation Condition			
Temperature (°C)	192.95	193.00	0.03
Pressure (Kg/cm ² gauge)	0.81	0.81	0.00
Molar Flow (kgmole/h)	27450.88	27614.30	0.59
Mass Flow (kg/h)	7619680.79	7642406.00	0.30
Molecular Weight	277.58	276.76	-0.29
Total	1.0000	0.9999	

2104		Design	%Error
Component (%mol)			
Hydrogen	0.0002	0.0002	-9.93
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0008	0.0008	-5.35
Acetylene	0.0000	0.0000	
Ethylene	0.0016	0.0002	-717.66
Ethane	0.0003	0.0001	-245.50
Propadiene/Propyne	0.0001	0.0001	39.01
Propylene	0.0012	0.0006	-94.86
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0004	0.0004	-5.06
Butylenes	0.0006	0.0004	-42.92
Butanes	0.0002	0.0001	-104.38
C5-Hydrocarbons	0.0006	0.0005	-17.21
C6 Non-Aromatics	0.0004	0.0003	-20.58

Simulation Report – ECC 860 KTA
Working Stage 6

C7 Non-Aromatics	0.0003	0.0002	-29.77
C8 Non-Aromatics	0.0002	0.0001	-68.17
Benzene	0.0014	0.0019	24.27
Toluene	0.0018	0.0023	19.90
Xylenes/Ethylbenzene	0.0007	0.0008	15.70
Styrene	0.0005	0.0006	24.81
C9-204°C	0.0025	0.0028	11.32
204-288°C PGO	0.2371	0.2411	1.64
288°C plus PFO	0.7446	0.7402	-0.60
Steam/Water	0.0044	0.0062	28.34
Operation Condition			
Temperature (°C)	193.28	193.30	0.01
Pressure (Kg/cm ² gauge)	12.42	11.27	-10.20
Molar Flow (kgmole/h)	60.78	61.00	0.35
Mass Flow (kg/h)	16872.00	16872.00	0.00
Molecular Weight	277.58	276.76	-0.29
Total	1.0000	0.9999	

2125		Design	%Error
Component (%mol)			
Hydrogen	0.0673	0.0673	-0.06
Carbon Monoxide	0.0006	0.0005	-11.76
Carbon Dioxide	0.0002	0.0002	6.82
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.1455	0.1454	-0.07
Acetylene	0.0029	0.0029	0.39
Ethylene	0.1479	0.1477	-0.13
Ethane	0.0184	0.0183	-0.37
Propadiene/Propyne	0.0027	0.0027	-0.17
Propylene	0.0596	0.0595	-0.14
Propane	0.0016	0.0016	0.90
Butadienes/C4Acetylenes	0.0116	0.0116	0.21
Butylenes	0.0161	0.0162	0.32
Butanes	0.0053	0.0053	-0.41
C5-Hydrocarbons	0.0094	0.0093	-0.56
C6 Non-Aromatics	0.0030	0.0030	-0.15
C7 Non-Aromatics	0.0012	0.0013	5.51
C8 Non-Aromatics	0.0005	0.0005	4.57
Benzene	0.0113	0.0113	0.24
Toluene	0.0078	0.0078	0.48
Xylenes/Ethylbenzene	0.0015	0.0016	3.98
Styrene	0.0010	0.0009	-6.92
C9-204°C	0.0023	0.0023	-0.56

Simulation Report – ECC 860 KTA
Working Stage 6

204-288°C PGO	0.0173	0.0178	2.93
288°C plus PFO	0.0523	0.0522	-0.12
Steam/Water	0.4129	0.4129	0.00
Operation Condition			
Temperature (°C)	258.68	273.30	5.35
Pressure (Kg/cm ² gauge)	0.92	0.91	-1.10
Molar Flow (kgmole/h)	881.72	880.80	-0.10
Mass Flow (kg/h)	37031.00	37031.00	0.00
Molecular Weight	42.00	42.05	0.12
Total	1.0000	1.0001	

2107		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0000	0.0000	
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0000	0.0000	
Butylenes	0.0000	0.0000	
Butanes	0.0000	0.0000	
C5-Hydrocarbons	0.0000	0.0000	
C6 Non-Aromatics	0.0000	0.0000	
C7 Non-Aromatics	0.0000	0.0000	
C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	0.0000	
Toluene	0.0000	0.0000	
Xylenes/Ethylbenzene	0.0000	0.0000	
Styrene	0.0000	0.0000	
C9-204°C	0.0000	0.0049	99.99
204-288°C PGO	0.0043	0.5086	99.16
288°C plus PFO	0.9844	0.4669	-110.83
Steam/Water	0.0113	0.0195	41.88
Operation Condition			
Temperature (°C)	214.03	165.10	-29.64
Pressure (Kg/cm ² gauge)	8.43	8.43	0.00
Molar Flow (kgmole/h)	33.98	62.30	45.46

Simulation Report – ECC 860 KTA
Working Stage 6

Mass Flow (kg/h)	10790.88	15557.00	30.64
Molecular Weight	317.56	249.53	-27.26
Total	1.0000	0.9999	
2120		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0006	0.0006	-0.02
Acetylene	0.0001	0.0001	-0.02
Ethylene	0.0018	0.0018	-0.02
Ethane	0.0005	0.0005	-0.02
Propadiene/Propyne	0.0004	0.0004	-0.02
Propylene	0.0030	0.0030	-0.02
Propane	0.0001	0.0001	-0.02
Butadienes/C4Acetylenes	0.0026	0.0026	-0.02
Butylenes	0.0026	0.0026	-0.02
Butanes	0.0008	0.0008	-0.02
C5-Hydrocarbons	0.0027	0.0027	-0.02
C6 Non-Aromatics	0.0021	0.0021	-0.02
C7 Non-Aromatics	0.0022	0.0022	-0.02
C8 Non-Aromatics	0.0026	0.0026	-0.02
Benzene	0.0206	0.0206	-0.02
Toluene	0.0450	0.0450	-0.02
Xylenes/Ethylbenzene	0.0355	0.0355	-0.02
Styrene	0.0375	0.0375	-0.02
C9-204°C	0.7906	0.7904	-0.02
204-288°C PGO	0.0342	0.0343	0.27
288°C plus PFO	0.0000	0.0000	
Steam/Water	0.0145	0.0145	-0.02
Operation Condition			
Temperature (°C)	85.40	85.40	0.00
Pressure (Kg/cm ² gauge)	6.70	6.70	0.00
Molar Flow (kgmole/h)	2224.22	2224.40	0.01
Mass Flow (kg/h)	267190.00	267190.00	0.00
Molecular Weight	120.13	120.12	-0.01
Total	1.0000	0.9999	

2103		Design	%Error
Component (%mol)			
Hydrogen	0.0002	0.0002	-9.93
Carbon Monoxide	0.0000	0.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0008	0.0008	-5.35
Acetylene	0.0000	0.0000	
Ethylene	0.0016	0.0002	-717.66
Ethane	0.0003	0.0001	-245.50
Propadiene/Propyne	0.0001	0.0001	39.01
Propylene	0.0012	0.0006	-94.86
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0004	0.0004	-5.06
Butylenes	0.0006	0.0004	-42.92
Butanes	0.0002	0.0001	-104.38
C5-Hydrocarbons	0.0006	0.0005	-17.21
C6 Non-Aromatics	0.0004	0.0003	-20.58
C7 Non-Aromatics	0.0003	0.0002	-29.77
C8 Non-Aromatics	0.0002	0.0001	-68.17
Benzene	0.0014	0.0019	24.27
Toluene	0.0018	0.0023	19.90
Xylenes/Ethylbenzene	0.0007	0.0008	15.70
Styrene	0.0005	0.0006	24.81
C9-204°C	0.0025	0.0028	11.32
204-288°C PGO	0.2371	0.2411	1.64
288°C plus PFO	0.7446	0.7402	-0.60
Steam/Water	0.0044	0.0062	28.34
Operation Condition			
Temperature (°C)	193.28	193.20	-0.04
Pressure (Kg/cm ² gauge)	12.42	12.42	0.00
Molar Flow (kgmole/h)	27450.88	27614.30	0.59
Mass Flow (kg/h)	7619680.79	7642406.00	0.30
Molecular Weight	277.58	276.76	-0.29
Total	1.0000	0.9999	

2109		Design	%Error
Component (%mol)			
Hydrogen	0.0001	0.0001	-38.47
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0008	0.0007	-8.85
Acetylene	0.0000	0.0000	#DIV/0!
Ethylene	0.0019	0.0006	-210.70
Ethane	0.0004	0.0002	-110.41
Propadiene/Propyne	0.0001	0.0001	3.51

Simulation Report – ECC 860 KTA
Working Stage 6

Propylene	0.0017	0.0010	-71.96
Propane	0.0001	0.0000	
Butadienes/C4Acetylenes	0.0008	0.0006	-27.66
Butylenes	0.0010	0.0006	-70.60
Butanes	0.0004	0.0002	-88.11
C5-Hydrocarbons	0.0012	0.0008	-54.49
C6 Non-Aromatics	0.0010	0.0006	-66.25
C7 Non-Aromatics	0.0008	0.0005	-68.58
C8 Non-Aromatics	0.0007	0.0004	-69.23
Benzene	0.0042	0.0041	-2.13
Toluene	0.0066	0.0059	-12.53
Xylenes/Ethylbenzene	0.0032	0.0023	-37.65
Styrene	0.0022	0.0018	-23.16
C9-204°C	0.1986	0.0380	-422.73
204-288°C PGO	0.7694	0.9289	17.17
288°C plus PFO	0.0000	0.0031	99.95
Steam/Water	0.0047	0.0095	50.60
Operation Condition			
Temperature (°C)	131.10	143.20	8.45
Pressure (Kg/cm ² gauge)	0.72	0.74	2.14
Molar Flow (kgmole/h)	48.76	48.60	-0.34
Mass Flow (kg/h)	7561.00	7561.00	0.00
Molecular Weight	155.05	155.63	0.37
Total	1.0000	1.0000	

2111		Design	%Error
Component (%mol)			
Hydrogen	0.0002	0.0002	-9.93
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0008	0.0008	-5.35
Acetylene	0.0000	0.0000	
Ethylene	0.0016	0.0002	-717.66
Ethane	0.0003	0.0001	-245.50
Propadiene/Propyne	0.0001	0.0001	39.01
Propylene	0.0012	0.0006	-94.86
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0004	0.0004	-5.06
Butylenes	0.0006	0.0004	-42.92
Butanes	0.0002	0.0001	-104.38
C5-Hydrocarbons	0.0006	0.0005	-17.21
C6 Non-Aromatics	0.0004	0.0003	-20.58

Simulation Report – ECC 860 KTA
Working Stage 6

C7 Non-Aromatics	0.0003	0.0002	-29.77
C8 Non-Aromatics	0.0002	0.0001	-68.17
Benzene	0.0014	0.0019	24.27
Toluene	0.0018	0.0023	19.90
Xylenes/Ethylbenzene	0.0007	0.0008	15.70
Styrene	0.0005	0.0006	24.81
C9-204°C	0.0025	0.0028	11.32
204-288°C PGO	0.2371	0.2411	1.64
288°C plus PFO	0.7446	0.7402	-0.60
Steam/Water	0.0044	0.0062	28.34
Operation Condition			
Temperature (°C)	178.50	178.50	0.00
Pressure (Kg/cm ² gauge)	8.92	8.92	0.00
Molar Flow (kgmole/h)	27390.10	27553.30	0.59
Mass Flow (kg/h)	7602808.79	7625534.00	0.30
Molecular Weight	277.58	276.76	-0.29
Total	1.0000	0.9999	

2116		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0000	0.0000	
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0000	0.0000	
Butylenes	0.0000	0.0000	
Butanes	0.0000	0.0000	
C5-Hydrocarbons	0.0000	0.0000	
C6 Non-Aromatics	0.0000	0.0000	
C7 Non-Aromatics	0.0000	0.0000	
C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	0.0000	
Toluene	0.0000	0.0000	
Xylenes/Ethylbenzene	0.0000	0.0000	
Styrene	0.0000	0.0000	
C9-204°C	0.0000	0.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

204-288°C PGO	0.0000	0.0000	
288°C plus PFO	0.0000	0.0000	
Steam/Water	1.0000	1.0000	0.00
Operation Condition			
Temperature (°C)	195.00	195.00	0.00
Pressure (Kg/cm ² gauge)	3.50	3.50	0.00
Molar Flow (kgmole/h)	172.58	172.60	0.01
Mass Flow (kg/h)	3109.00	3109.00	0.00
Molecular Weight	18.02	18.02	0.03
Total	1.0000	1.0000	

2108		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0000	0.0000	
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0000	0.0000	
Butylenes	0.0000	0.0000	
Butanes	0.0000	0.0000	
C5-Hydrocarbons	0.0000	0.0000	
C6 Non-Aromatics	0.0000	0.0000	
C7 Non-Aromatics	0.0000	0.0000	
C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	0.0000	
Toluene	0.0000	0.0000	
Xylenes/Ethylbenzene	0.0000	0.0000	
Styrene	0.0000	0.0000	
C9-204°C	0.0000	0.0049	99.99
204-288°C PGO	0.0043	0.5086	99.16
288°C plus PFO	0.9844	0.4669	-110.83
Steam/Water	0.0113	0.0195	41.88
Operation Condition			
Temperature (°C)	80.00	80.00	0.00
Pressure (Kg/cm ² gauge)	3.00	3.00	0.00
Molar Flow (kgmole/h)	33.24	42.30	21.41

Simulation Report – ECC 860 KTA
Working Stage 6

Mass Flow (kg/h)	10557.00	10557.00	0.00
Molecular Weight	317.56	249.53	-27.26
Total	1.0000	0.9999	
2101		Design	%Error
Component (%mol)			
Hydrogen	0.0750	0.0754	0.54
Carbon Monoxide	0.0004	0.0005	11.92
Carbon Dioxide	0.0002	0.0002	-1.49
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.1304	0.1311	0.50
Acetylene	0.0026	0.0027	2.45
Ethylene	0.1438	0.1460	1.50
Ethane	0.0252	0.0256	1.62
Propadiene/Propyne	0.0024	0.0024	-0.74
Propylene	0.0520	0.0528	1.51
Propane	0.0015	0.0016	3.65
Butadienes/C4Acetylenes	0.0106	0.0107	1.13
Butylenes	0.0142	0.0144	1.57
Butanes	0.0046	0.0047	2.03
C5-Hydrocarbons	0.0083	0.0085	2.04
C6 Non-Aromatics	0.0027	0.0029	5.74
C7 Non-Aromatics	0.0013	0.0013	1.83
C8 Non-Aromatics	0.0006	0.0007	8.22
Benzene	0.0122	0.0117	-3.93
Toluene	0.0113	0.0109	-3.81
Xylenes/Ethylbenzene	0.0047	0.0046	-2.28
Styrene	0.0044	0.0043	-1.34
C9-204°C	0.0747	0.0751	0.53
204-288°C PGO	0.0087	0.0032	-171.21
288°C plus PFO	0.0000	0.0000	
Steam/Water	0.4081	0.4087	0.15
Nitrogen	0.0000	0.0000	
Wash Gasoline	0.0000	0.0000	
Operation Condition			
Temperature (°C)	111.40	111.40	0.00
Pressure (Kg/cm ² gauge)	0.67	0.67	0.00
Molar Flow (kgmole/h)	23989.21	23997.50	0.03
Mass Flow (kg/h)	779645.00	779645.00	0.00
Molecular Weight	32.4998	32.49	-0.03
Total	1.0000	1.0000	

2231		Design	%Error
Component (%mol)			

Simulation Report – ECC 860 KTA
Working Stage 6

Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0000	0.0000	
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0000	0.0000	
Butylenes	0.0000	0.0000	
Butanes	0.0000	0.0000	
C5-Hydrocarbons	0.0000	0.0000	
C6 Non-Aromatics	0.0000	0.0000	
C7 Non-Aromatics	0.0000	0.0000	
C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	0.0000	
Toluene	0.0000	0.0000	
Xylenes/Ethylbenzene	0.0000	0.0000	
Styrene	0.0000	0.0000	
C9-204°C	0.0000	0.0000	
204-288°C PGO	0.0000	0.0000	
288°C plus PFO	0.0000	0.0000	
Steam/Water	1.0000	1.0000	0.00
Nitrogen	0.0000	0.0000	
Wash Gasoline	0.0000	0.0000	
Operation Condition			
Temperature (°C)	67.16	67.50	0.51
Pressure (Kg/cm ² gauge)	5.26	5.26	0.00
Molar Flow (kgmole/h)	90677.15	90677.70	0.00
Mass Flow (kg/h)	1633558.00	1633558.00	0.00
Molecular Weight	18.0151	18.02	0.03
Total	1.0000	1.0000	

2234		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0000	0.0000	
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0000	0.0000	
Butylenes	0.0000	0.0000	
Butanes	0.0000	0.0000	
C5-Hydrocarbons	0.0000	0.0000	
C6 Non-Aromatics	0.0000	0.0000	
C7 Non-Aromatics	0.0000	0.0000	
C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	0.0000	
Toluene	0.0000	0.0000	
Xylenes/Ethylbenzene	0.0000	0.0000	
Styrene	0.0000	0.0000	
C9-204°C	0.0000	0.0000	
204-288°C PGO	0.0000	0.0000	
288°C plus PFO	0.0000	0.0000	
Steam/Water	1.0000	1.0000	0.00
Nitrogen	0.0000	0.0000	
Wash Gasoline	0.0000	0.0000	
Operation Condition			
Temperature (°C)	56.98	57.00	0.04
Pressure (Kg/cm ² gauge)	5.26	5.26	0.00
Molar Flow (kgmole/h)	165787.47	167588.70	1.07
Mass Flow (kg/h)	2986678.00	3019110.00	1.07
Molecular Weight	18.0151	18.02	0.03
Total	1.0000	1.0000	

3907		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0000	0.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0000	0.0000	
Butylenes	0.0000	0.0000	
Butanes	0.0000	0.0000	
C5-Hydrocarbons	0.0000	0.0000	
C6 Non-Aromatics	0.0000	0.0000	
C7 Non-Aromatics	0.0000	0.0000	
C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	0.0000	
Toluene	0.0000	0.0000	
Xylenes/Ethylbenzene	0.0000	0.0000	
Styrene	0.0000	0.0000	
C9-204°C	0.0000	0.0000	
204-288°C PGO	0.0000	0.0000	
288°C plus PFO	0.0000	0.0000	
Steam/Water	0.0000	0.0000	
Nitrogen	0.0000	0.0000	
Wash Gasoline	1.0000	1.0000	0.00
Operation Condition			
Temperature (°C)	119.90	119.90	0.00
Pressure (Kg/cm ² gauge)	2.79	2.79	0.00
Molar Flow (kgmole/h)	19.54	19.50	-0.18
Mass Flow (kg/h)	2373.00	2373.00	0.00
Molecular Weight	121.4738	121.46	-0.01
Total	1.0000	1.0000	

2501		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0000	0.0000	
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0000	0.0000	
Butylenes	0.0000	0.0000	
Butanes	0.0000	0.0000	
C5-Hydrocarbons	0.0000	0.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

C6 Non-Aromatics	0.0000	0.0000	
C7 Non-Aromatics	0.0000	0.0000	
C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	0.0000	
Toluene	0.0000	0.0000	
Xylenes/Ethylbenzene	0.0000	0.0000	
Styrene	0.0000	0.0000	
C9-204°C	0.0000	0.0000	
204-288°C PGO	0.0000	0.0000	
288°C plus PFO	0.0000	0.0000	
Steam/Water	1.0000	1.0000	0.00
Nitrogen	0.0000	0.0000	
Wash Gasoline	0.0000	0.0000	
Operation Condition			
Temperature (°C)	117.10	117.10	0.00
Pressure (Kg/cm ² gauge)	0.80	0.80	0.00
Molar Flow (kgmole/h)	521.28	521.30	0.00
Mass Flow (kg/h)	9391.00	9391.00	0.00
Molecular Weight	18.0151	18.02	0.03
Total	1.0000	1.0000	

2118		Design	%Error
Component (%mol)			
Hydrogen	0.0002	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0004	0.0006	37.99
Acetylene	0.0002	0.0001	-132.12
Ethylene	0.0002	0.0018	90.88
Ethane	0.0001	0.0005	84.35
Propadiene/Propyne	0.0051	0.0004	-1178.44
Propylene	0.0639	0.0030	-2031.05
Propane	0.0026	0.0001	-2487.61
Butadienes/C4Acetylenes	0.0303	0.0026	-1064.75
Butylenes	0.0408	0.0026	-1469.38
Butanes	0.0151	0.0008	-1790.69
C5-Hydrocarbons	0.0403	0.0027	-1392.65
C6 Non-Aromatics	0.0208	0.0021	-888.72
C7 Non-Aromatics	0.0108	0.0022	-390.81
C8 Non-Aromatics	0.0062	0.0026	-138.91
Benzene	0.0024	0.0206	88.29
Toluene	0.0055	0.0450	87.69

Simulation Report – ECC 860 KTA
Working Stage 6

Xylenes/Ethylbenzene	0.0407	0.0355	-14.57
Styrene	0.0086	0.0375	76.97
C9-204°C	0.6607	0.7904	16.41
204-288°C PGO	0.0281	0.0343	18.12
288°C plus PFO	0.0000	0.0000	
Steam/Water	0.0170	0.0145	-17.12
Nitrogen	0.0000	0.0000	
Wash Gasoline	0.0000	0.0000	
Operation Condition			
Temperature (°C)	85.00	85.00	0.00
Pressure (Kg/cm ² gauge)	0.63	0.63	0.00
Molar Flow (kgmole/h)	2758.13	2279.10	-21.02
Mass Flow (kg/h)	297854.68	273763.00	-8.80
Molecular Weight	0.0000	120.12	100.00
Total	1.0000	0.9999	

2247		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0000	0.0000	
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0000	0.0000	
Butylenes	0.0000	0.0000	
Butanes	0.0000	0.0000	
C5-Hydrocarbons	0.0000	0.0000	
C6 Non-Aromatics	0.0000	0.0000	
C7 Non-Aromatics	0.0000	0.0000	
C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	0.0000	
Toluene	0.0000	0.0000	
Xylenes/Ethylbenzene	0.0000	0.0000	
Styrene	0.0000	0.0000	
C9-204°C	0.0000	0.0000	
204-288°C PGO	0.0000	0.0000	
288°C plus PFO	0.0000	0.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

Steam/Water	1.0000	1.0000	0.00
Nitrogen	0.0000	0.0000	
Wash Gasoline	0.0000	0.0000	
Operation Condition			
Temperature (°C)	84.54	85.00	0.55
Pressure (Kg/cm ² gauge)	10.96	10.96	0.00
Molar Flow (kgmole/h)	13984.66	13984.70	0.00
Mass Flow (kg/h)	251935.00	251935.00	0.00
Molecular Weight	18.0151	18.02	0.03
Total	1.0000	1.0000	
3081		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0005	0.0005	0.00
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.7314	0.7314	0.00
Propane	0.2636	0.2636	0.00
Butadienes/C4Acetylenes	0.0000	0.0000	
Butylenes	0.0000	0.0000	
Butanes	0.0000	0.0000	
C5-Hydrocarbons	0.0000	0.0000	
C6 Non-Aromatics	0.0000	0.0000	
C7 Non-Aromatics	0.0000	0.0000	
C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	0.0000	
Toluene	0.0000	0.0000	
Xylenes/Ethylbenzene	0.0000	0.0000	
Styrene	0.0000	0.0000	
C9-204°C	0.0000	0.0000	
204-288°C PGO	0.0000	0.0000	
288°C plus PFO	0.0000	0.0000	
Steam/Water	0.0000	0.0000	
Nitrogen	0.0045	0.0045	
Wash Gasoline	0.0000	0.0000	
Operation Condition			
Temperature (°C)	40.00	40.00	0.00
Pressure (Kg/cm ² gauge)	7.00	7.00	0.00

Simulation Report – ECC 860 KTA
Working Stage 6

Molar Flow (kgmole/h)	7.05	7.10	0.68
Mass Flow (kg/h)	300.00	300.00	0.00
Molecular Weight	42.5418	42.54	0.00
Total	1.0000	1.0000	

2232		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0000	0.0000	
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0000	0.0000	
Butylenes	0.0000	0.0000	
Butanes	0.0000	0.0000	
C5-Hydrocarbons	0.0000	0.0000	
C6 Non-Aromatics	0.0000	0.0000	
C7 Non-Aromatics	0.0000	0.0000	
C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	0.0000	
Toluene	0.0000	0.0000	
Xylenes/Ethylbenzene	0.0000	0.0000	
Styrene	0.0000	0.0000	
C9-204°C	0.0000	0.0000	
204-288°C PGO	0.0000	0.0000	
288°C plus PFO	0.0000	0.0000	
Steam/Water	1.0000	1.0000	0.00
Nitrogen	0.0000	0.0000	
Wash Gasoline	0.0000	0.0000	
Operation Condition			
Temperature (°C)	44.70	44.70	0.00
Pressure (Kg/cm ² gauge)	6.46	6.46	0.00
Molar Flow (kgmole/h)	133482.30	133483.00	0.00
Mass Flow (kg/h)	2404697.00	2404697.00	0.00
Molecular Weight	18.0151	18.02	0.03
Total	1.0000	1.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

2235		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0000	0.0000	
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0000	0.0000	
Butylenes	0.0000	0.0000	
Butanes	0.0000	0.0000	
C5-Hydrocarbons	0.0000	0.0000	
C6 Non-Aromatics	0.0000	0.0000	
C7 Non-Aromatics	0.0000	0.0000	
C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	0.0000	
Toluene	0.0000	0.0000	
Xylenes/Ethylbenzene	0.0000	0.0000	
Styrene	0.0000	0.0000	
C9-204°C	0.0000	0.0000	
204-288°C PGO	0.0000	0.0000	
288°C plus PFO	0.0000	0.0000	
Steam/Water	1.0000	1.0000	0.00
Nitrogen	0.0000	0.0000	
Wash Gasoline	0.0000	0.0000	
Operation Condition			
Temperature (°C)	35.00	35.00	0.00
Pressure (Kg/cm ² gauge)	1.26	1.26	0.00
Molar Flow (kgmole/h)	58371.98	56572.00	-3.18
Mass Flow (kg/h)	1051577.00	1019145.00	-3.18
Molecular Weight	18.0151	18.02	0.03
Total	1.0000	1.0000	

3025		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0001	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0002	0.0000	
Ethane	0.0001	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0004	0.0001	-315.53
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0003	0.0001	-202.40
Butylenes	0.0004	0.0001	-280.27
Butanes	0.0001	0.0000	
C5-Hydrocarbons	0.0007	0.0001	-562.55
C6 Non-Aromatics	0.0010	0.0002	-387.91
C7 Non-Aromatics	0.0010	0.0002	-402.33
C8 Non-Aromatics	0.0012	0.0003	-306.72
Benzene	0.0046	0.0018	-157.69
Toluene	0.0102	0.0039	-162.58
Xylenes/Ethylbenzene	0.0060	0.0021	-184.48
Styrene	0.0044	0.0018	-142.95
C9-204°C	0.0172	0.0041	-320.28
204-288°C PGO	0.0000	0.0000	
288°C plus PFO	0.0000	0.0000	
Steam/Water	0.9520	0.9852	3.37
Nitrogen	0.0000	0.0000	
Wash Gasoline	0.0000	0.0000	
Operation Condition			
Temperature (°C)	36.90	36.90	0.00
Pressure (Kg/cm ² gauge)	4.46	4.46	0.00
Molar Flow (kgmole/h)	410.46	410.50	0.01
Mass Flow (kg/h)	7902.00	7902.00	0.00
Molecular Weight	19.2516	19.25	-0.01
Total	1.0000	1.0000	

4010		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	
Ethane	0.0000	0.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0000	0.0000	
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0000	0.0000	
Butylenes	0.0000	0.0000	
Butanes	0.0000	0.0000	
C5-Hydrocarbons	0.0000	0.0000	
C6 Non-Aromatics	0.0000	0.0000	
C7 Non-Aromatics	0.0000	0.0000	
C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	0.0000	
Toluene	0.0000	0.0000	
Xylenes/Ethylbenzene	0.0000	0.0000	
Styrene	0.0000	0.0000	
C9-204°C	0.0000	0.0000	
204-288°C PGO	0.0000	0.0000	
288°C plus PFO	0.0000	0.0000	
Steam/Water	1.0000	1.0000	0.00
Nitrogen	0.0000	0.0000	
Wash Gasoline	0.0000	0.0000	
Operation Condition			
Temperature (°C)	16.70	16.70	0.00
Pressure (Kg/cm ² gauge)	3.81	3.81	0.00
Molar Flow (kgmole/h)	2.50	2.50	0.08
Mass Flow (kg/h)	45.00	45.00	0.00
Molecular Weight	18.0151	18.02	0.03
Total	1.0000	1.0000	

2123		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0000	0.0000	
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0000	0.0000	
Butylenes	0.0000	0.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

Butanes	0.0000	0.0000	
C5-Hydrocarbons	0.0000	0.0000	
C6 Non-Aromatics	0.0000	0.0000	
C7 Non-Aromatics	0.0000	0.0000	
C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	0.0000	
Toluene	0.0000	0.0000	
Xylenes/Ethylbenzene	0.0000	0.0000	
Styrene	0.0000	0.0000	
C9-204°C	0.0000	0.0000	
204-288°C PGO	0.0000	0.0000	
288°C plus PFO	0.0000	0.0000	
Steam/Water	1.0000	1.0000	0.00
Nitrogen	0.0000	0.0000	
Wash Gasoline	0.0000	0.0000	
Operation Condition			
Temperature (°C)	80.88	85.00	4.85
Pressure (Kg/cm ² gauge)	4.50	4.50	0.00
Molar Flow (kgmole/h)	9998.65	10426.30	4.10
Mass Flow (kg/h)	180126.76	187829.00	4.10
Molecular Weight	18.0151	18.02	0.03
Total	1.0000	1.0000	
2230		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0000	0.0000	
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0000	0.0000	
Butylenes	0.0000	0.0000	
Butanes	0.0000	0.0000	
C5-Hydrocarbons	0.0000	0.0000	
C6 Non-Aromatics	0.0000	0.0000	
C7 Non-Aromatics	0.0000	0.0000	
C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	0.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

Toluene	0.0000	0.0000	
Xylenes/Ethylbenzene	0.0000	0.0000	
Styrene	0.0000	0.0000	
C9-204°C	0.0000	0.0000	
204-288°C PGO	0.0000	0.0000	
288°C plus PFO	0.0000	0.0000	
Steam/Water	1.0000	1.0000	0.00
Nitrogen	0.0000	0.0000	
Wash Gasoline	0.0000		
Operation Condition			
Temperature (°C)	67.12	67.40	0.41
Pressure (Kg/cm ² gauge)	6.96	6.86	-1.46
Molar Flow (kgmole/h)	224159.45	224160.70	0.00
Mass Flow (kg/h)	4038255.00	4038255.00	0.00
Molecular Weight	18.0151	18.02	0.03
Total	1.0000	1.0000	

2233		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0000	0.0000	
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0000	0.0000	
Butylenes	0.0000	0.0000	
Butanes	0.0000	0.0000	
C5-Hydrocarbons	0.0000	0.0000	
C6 Non-Aromatics	0.0000	0.0000	
C7 Non-Aromatics	0.0000	0.0000	
C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	0.0000	
Toluene	0.0000	0.0000	
Xylenes/Ethylbenzene	0.0000	0.0000	
Styrene	0.0000	0.0000	
C9-204°C	0.0000	0.0000	
204-288°C PGO	0.0000	0.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

288°C plus PFO	0.0000	0.0000	
Steam/Water	1.0000	1.0000	0.00
Nitrogen	0.0000	0.0000	
Wash Gasoline	0.0000	0.0000	
Operation Condition			
Temperature (°C)	44.70	44.70	0.00
Pressure (Kg/cm ² gauge)	6.46	5.26	-22.81
Molar Flow (kgmole/h)	76865.52	76866.00	0.00
Mass Flow (kg/h)	1384740.00	1384740.00	0.00
Molecular Weight	18.0151	18.02	0.03
Total	1.0000	1.0000	

3041		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0000	0.0000	
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0018	0.0018	0.00
Butylenes	0.0001	0.0001	0.00
Butanes	0.0000	0.0000	
C5-Hydrocarbons	0.0169	0.0169	0.00
C6 Non-Aromatics	0.0216	0.0216	0.00
C7 Non-Aromatics	0.0316	0.0316	0.00
C8 Non-Aromatics	0.0272	0.0272	0.00
Benzene	0.2187	0.2187	0.00
Toluene	0.3830	0.3830	0.00
Xylenes/Ethylbenzene	0.0972	0.0972	0.00
Styrene	0.0589	0.0589	0.00
C9-204°C	0.1394	0.1394	0.00
204-288°C PGO	0.0036	0.0036	0.00
288°C plus PFO	0.0000	0.0000	
Steam/Water	0.0000	0.0000	
Nitrogen	0.0000	0.0000	
Wash Gasoline	0.0000	0.0000	
Operation Condition			

Simulation Report – ECC 860 KTA
Working Stage 6

Temperature (°C)	119.90	119.90	0.00
Pressure (Kg/cm ² gauge)	0.97	0.97	0.00
Molar Flow (kgmole/h)	10.43	10.40	-0.29
Mass Flow (kg/h)	1000.00	1000.00	0.00
Molecular Weight	95.8802	95.88	0.00
Total	1.0000	1.0000	

3038		Design	%Error
Component (%mol)			
Hydrogen	0.0059	0.0059	0.02
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0002	0.0002	0.02
Hydrogen Sulphide	0.0001	0.0001	
Methane	0.0203	0.0203	0.02
Acetylene	0.0043	0.0043	0.02
Ethylene	0.1002	0.1002	0.02
Ethane	0.0263	0.0263	0.02
Propadiene/Propyne	0.0244	0.0244	0.02
Propylene	0.1805	0.1805	0.02
Propane	0.0069	0.0069	0.02
Butadienes/C4Acetylenes	0.1659	0.1659	0.02
Butylenes	0.1865	0.1865	0.02
Butanes	0.0579	0.0579	0.02
C5-Hydrocarbons	0.0418	0.0418	0.02
C6 Non-Aromatics	0.0129	0.0129	0.02
C7 Non-Aromatics	0.0061	0.0061	0.02
C8 Non-Aromatics	0.0018	0.0018	0.02
Benzene	0.0519	0.0519	0.02
Toluene	0.0296	0.0296	0.02
Xylenes/Ethylbenzene	0.0028	0.0028	0.02
Styrene	0.0012	0.0012	0.02
C9-204°C	0.0006	0.0006	0.02
204-288°C PGO	0.0000	0.0000	
288°C plus PFO	0.0000	0.0000	
Steam/Water	0.0721	0.0721	0.02
Nitrogen	0.0000	0.0000	
Wash Gasoline	0.0000	0.0000	
Operation Condition			
Temperature (°C)	50.70	50.70	0.00
Pressure (Kg/cm ² gauge)	0.77	0.77	0.00
Molar Flow (kgmole/h)	15.20	15.20	-0.02
Mass Flow (kg/h)	748.00	748.00	0.00
Molecular Weight	49.2003	49.12	-0.16

Simulation Report – ECC 860 KTA
Working Stage 6

Total	1.0000	1.0002	
-------	--------	--------	--

2117		Design	%Error
Component (%mol)			
Hydrogen	0.1448	0.1448	-0.02
Carbon Monoxide	0.0009	0.0009	-0.02
Carbon Dioxide	0.0003	0.0003	-0.02
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.2517	0.2516	-0.02
Acetylene	0.0051	0.0051	-0.02
Ethylene	0.2803	0.2802	-0.02
Ethane	0.0492	0.0492	-0.02
Propadiene/Propyne	0.0046	0.0046	-0.02
Propylene	0.1016	0.1016	-0.02
Propane	0.0032	0.0032	-0.02
Butadienes/C4Acetylenes	0.0202	0.0202	-0.02
Butylenes	0.0274	0.0274	-0.02
Butanes	0.0090	0.0090	-0.02
C5-Hydrocarbons	0.0158	0.0158	-0.02
C6 Non-Aromatics	0.0051	0.0051	-0.02
C7 Non-Aromatics	0.0021	0.0021	-0.02
C8 Non-Aromatics	0.0009	0.0009	-0.02
Benzene	0.0191	0.0191	-0.02
Toluene	0.0132	0.0132	-0.02
Xylenes/Ethylbenzene	0.0026	0.0026	-0.02
Styrene	0.0015	0.0015	-0.02
C9-204°C	0.0016	0.0016	-0.02
204-288°C PGO	0.0000	0.0000	
288°C plus PFO	0.0000	0.0000	
Steam/Water	0.0398	0.0398	-0.02
Nitrogen	0.0000	0.0000	
Wash Gasoline	0.0000	0.0000	
Operation Condition			
Temperature (°C)	38.00	38.00	0.00
Pressure (Kg/cm ² gauge)	0.56	0.56	0.00
Molar Flow (kgmole/h)	12482.16	12497.50	0.12
Mass Flow (kg/h)	343764.00	343763.00	0.00
Molecular Weight	26.0121	27.51	5.44
Total	1.0000	0.9998	

2121		Design	%Error
Component (%mol)			
Hydrogen	0.0002	0.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0004	0.0006	37.99
Acetylene	0.0002	0.0001	-132.12
Ethylene	0.0002	0.0018	90.88
Ethane	0.0001	0.0005	84.35
Propadiene/Propyne	0.0051	0.0004	-1178.44
Propylene	0.0639	0.0030	-2031.05
Propane	0.0026	0.0001	-2487.61
Butadienes/C4Acetylenes	0.0303	0.0026	-1064.75
Butylenes	0.0408	0.0026	-1469.38
Butanes	0.0151	0.0008	-1790.69
C5-Hydrocarbons	0.0403	0.0027	-1392.65
C6 Non-Aromatics	0.0208	0.0021	-888.72
C7 Non-Aromatics	0.0108	0.0022	-390.81
C8 Non-Aromatics	0.0062	0.0026	-138.91
Benzene	0.0024	0.0206	88.29
Toluene	0.0055	0.0450	87.69
Xylenes/Ethylbenzene	0.0407	0.0355	-14.57
Styrene	0.0086	0.0375	76.97
C9-204°C	0.6607	0.7904	16.41
204-288°C PGO	0.0281	0.0343	18.12
288°C plus PFO	0.0000	0.0000	
Steam/Water	0.0170	0.0145	-17.12
Nitrogen	0.0000	0.0000	
Wash Gasoline	0.0000	0.0000	
Operation Condition			
Temperature (°C)	101.03	85.40	-18.30
Pressure (Kg/cm ² gauge)	6.70	6.70	0.00
Molar Flow (kgmole/h)	21.97	19.80	-10.98
Mass Flow (kg/h)	2373.00	2373.00	0.00
Molecular Weight	109.7000	120.12	8.67
Total	1.0000	0.9999	
2123		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0000	0.0000	
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0000	0.0000	
Butylenes	0.0000	0.0000	
Butanes	0.0000	0.0000	
C5-Hydrocarbons	0.0000	0.0000	
C6-C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	0.0000	
Toluene	0.0000	0.0000	
Xylenes/Ethylbenzene	0.0000	0.0000	
Styrene	0.0000	0.0000	
C9-205°C	0.0000	0.0000	
205-288°C PGO	0.0000	0.0000	
288°C plus PFO	0.0000	0.0000	
Steam/Water	1.0000	1.0000	0.00
Operation Condition			
Temperature (°C)	80.88	85.00	4.85
Pressure (Kg/cm ² gauge)	4.50	4.50	0.00
Molar Flow (kgmole/h)	9998.65	10426.30	4.10
Mass Flow (kg/h)	180126.76	187829.00	4.10
Molecular Weight	18.02	18.02	0.03
Total	1.0000	1.0000	

2504		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0000	0.0000	
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0000	0.0000	
Butylenes	0.0000	0.0000	
Butanes	0.0000	0.0000	
C5-Hydrocarbons	0.0000	0.0000	
C6-C8 Non-Aromatics	0.0000	0.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

Benzene	0.0000	0.0000	
Toluene	0.0000	0.0000	
Xylenes/Ethylbenzene	0.0000	0.0000	
Styrene	0.0000	0.0000	
C9-205°C*	0.0000	0.0000	
205-288°C PGO	0.0000	0.0000	
288°C plus PFO	0.0000	0.0000	
Steam/Water	1.0000	1.0000	0.00
Operation Condition			
Temperature (°C)	120.85	121.10	0.21
Pressure (Kg/cm ² gauge)	1.05	1.05	0.00
Molar Flow (kgmole/h)	9904.91	9904.90	0.00
Mass Flow (kg/h)	178438.00	178438.00	0.00
Molecular Weight	18.02	18.02	0.03
Total	1.0000	1.0000	

2507		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0000	0.0000	
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0000	0.0000	
Butylenes	0.0000	0.0000	
Butanes	0.0000	0.0000	
C5-Hydrocarbons	0.0000	0.0000	
C6-C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	0.0000	
Toluene	0.0000	0.0000	
Xylenes/Ethylbenzene	0.0000	0.0000	
Styrene	0.0000	0.0000	
C9-205°C	0.0000	0.0000	
205-288°C PGO	0.0000	0.0000	
288°C plus PFO	0.0000	0.0000	
Steam/Water	1.0000	1.0000	0.00
Operation Condition			

Simulation Report – ECC 860 KTA
Working Stage 6

Temperature (°C)	150.00	150.00	0.00
Pressure (Kg/cm ² gauge)	8.50	8.50	0.00
Molar Flow (kgmole/h)	9835.75	9835.80	0.00
Mass Flow (kg/h)	177192.00	177192.00	0.00
Molecular Weight	18.02	18.02	0.03
Total	1.0000	1.0000	

2512		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0000	0.0000	
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0000	0.0000	
Butylenes	0.0000	0.0000	
Butanes	0.0000	0.0000	
C5-Hydrocarbons	0.0000	0.0000	
C6-C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	0.0000	
Toluene	0.0000	0.0000	
Xylenes/Ethylbenzene	0.0000	0.0000	
Styrene	0.0000	0.0000	
C9-205°C	0.0000	0.0000	
205-288°C PGO	0.0000	0.0000	
288°C plus PFO	0.0000	0.0000	
Steam/Water	1.0000	1.0000	0.00
Operation Condition			
Temperature (°C)	170.89	171.00	0.06
Pressure (Kg/cm ² gauge)	7.20	7.20	0.00
Molar Flow (kgmole/h)	17630.76	17630.90	0.00
Mass Flow (kg/h)	317620.00	317620.00	0.00
Molecular Weight	18.02	18.02	0.03
Total	1.0000	1.0000	

2509		Design	%Error
Component (%mol)			

Simulation Report – ECC 860 KTA
Working Stage 6

Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0000	0.0000	
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0000	0.0000	
Butylenes	0.0000	0.0000	
Butanes	0.0000	0.0000	
C5-Hydrocarbons	0.0000	0.0000	
C6-C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	0.0000	
Toluene	0.0000	0.0000	
Xylenes/Ethylbenzene	0.0000	0.0000	
Styrene	0.0000	0.0000	
C9-205°C	0.0000	0.0000	
205-288°C PGO	0.0000	0.0000	
288°C plus PFO	0.0000	0.0000	
Steam/Water	1.0000	1.0000	0.00
Operation Condition			
Temperature (°C)	43.00	40.10	-7.23
Pressure (Kg/cm ² gauge)	3.00	3.00	0.00
Molar Flow (kgmole/h)	610.24	612.50	0.37
Mass Flow (kg/h)	10993.55	11035.00	0.38
Molecular Weight	18.02	18.02	0.03
Total	1.0000	1.0000	

2509		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

Propylene	0.0000	0.0000	
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0000	0.0000	
Butylenes	0.0000	0.0000	
Butanes	0.0000	0.0000	
C5-Hydrocarbons	0.0000	0.0000	
C6-C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	0.0000	
Toluene	0.0000	0.0000	
Xylenes/Ethylbenzene	0.0000	0.0000	
Styrene	0.0000	0.0000	
C9-205°C	0.0000	0.0000	
205-288°C PGO	0.0000	0.0000	
288°C plus PFO	0.0000	0.0000	
Steam/Water	1.0000	1.0000	0.00
Operation Condition			
Temperature (°C)	43.00	40.10	-7.23
Pressure (Kg/cm ² gauge)	3.00	3.00	0.00
Molar Flow (kgmole/h)	610.24	612.50	0.37
Mass Flow (kg/h)	10993.55	11035.00	0.38
Molecular Weight	18.02	18.02	0.03
Total	1.0000	1.0000	
2515		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0000	0.0000	
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0000	0.0000	
Butylenes	0.0000	0.0000	
Butanes	0.0000	0.0000	
C5-Hydrocarbons	0.0000	0.0000	
C6-C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	0.0000	
Toluene	0.0000	0.0000	
Xylenes/Ethylbenzene	0.0000	0.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

Styrene	0.0000	0.0000	
C9-205°C	0.0000	0.0000	
205-288°C PGO	0.0000	0.0000	
288°C plus PFO	0.0000	0.0000	
Steam/Water	1.0000	1.0000	0.00
Operation Condition			
Temperature (°C)	210.00	210.00	0.00
Pressure (Kg/cm ² gauge)	7.05	7.05	0.00
Molar Flow (kgmole/h)	9225.51	9223.30	-0.02
Mass Flow (kg/h)	166198.45	166157.00	-0.02
Molecular Weight	0.00	18.02	100.00
Total	1.0000	1.0000	

2505		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0000	0.0000	
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0000	0.0000	
Butylenes	0.0000	0.0000	
Butanes	0.0000	0.0000	
C5-Hydrocarbons	0.0000	0.0000	
C6-C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	0.0000	
Toluene	0.0000	0.0000	
Xylenes/Ethylbenzene	0.0000	0.0000	
Styrene	0.0000	0.0000	
C9-205°C	0.0000	0.0000	
205-288°C PGO	0.0000	0.0000	
288°C plus PFO	0.0000	0.0000	
Steam/Water	1.0000	1.0000	0.00
Operation Condition			
Temperature (°C)	121.30	121.30	0.00
Pressure (Kg/cm ² gauge)	10.50	10.50	0.00
Molar Flow (kgmole/h)	69.16	69.20	0.05

Simulation Report – ECC 860 KTA
Working Stage 6

Mass Flow (kg/h)	1246.00	1246.00	0.00
Molecular Weight	18.02	18.02	0.03
Total	1.0000	1.0000	

2511		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0000	0.0000	
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0000	0.0000	
Butylenes	0.0000	0.0000	
Butanes	0.0000	0.0000	
C5-Hydrocarbons	0.0000	0.0000	
C6-C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	0.0000	
Toluene	0.0000	0.0000	
Xylenes/Ethylbenzene	0.0000	0.0000	
Styrene	0.0000	0.0000	
C9-205°C	0.0000	0.0000	
205-288°C PGO	0.0000	0.0000	
288°C plus PFO	0.0000	0.0000	
Steam/Water	1.0000	1.0000	0.00
Operation Condition			
Temperature (°C)	170.89	171.00	0.06
Pressure (Kg/cm ² gauge)	7.20	7.20	0.00
Molar Flow (kgmole/h)	31365.19	31365.40	0.00
Mass Flow (kg/h)	565047.00	565047.00	0.00
Molecular Weight	18.02	18.02	0.03
Total	1.0000	1.0458	

2513		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0000	0.0000	
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0000	0.0000	
Butylenes	0.0000	0.0000	
Butanes	0.0000	0.0000	
C5-Hydrocarbons	0.0000	0.0000	
C6-C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	0.0000	
Toluene	0.0000	0.0000	
Xylenes/Ethylbenzene	0.0000	0.0000	
Styrene	0.0000	0.0000	
C9-205°C	0.0000	0.0000	
205-288°C PGO	0.0000	0.0000	
288°C plus PFO	0.0000	0.0000	
Steam/Water	1.0000	1.0000	0.00
Operation Condition			
Temperature (°C)	170.89	171.00	0.06
Pressure (Kg/cm ² gauge)	7.20	7.20	0.00
Molar Flow (kgmole/h)	17630.76	17630.90	0.00
Mass Flow (kg/h)	317620.00	317620.00	0.00
Molecular Weight	18.02	18.02	0.03
Total	1.0000	1.0000	

*2515		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0000	0.0000	
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0000	0.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

Butylenes	0.0000	0.0000	
Butanes	0.0000	0.0000	
C5-Hydrocarbons	0.0000	0.0000	
C6-C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	0.0000	
Toluene	0.0000	0.0000	
Xylenes/Ethylbenzene	0.0000	0.0000	
Styrene	0.0000	0.0000	
C9-205°C	0.0000	0.0000	
205-288°C PGO	0.0000	0.0000	
288°C plus PFO	0.0000	0.0000	
Steam/Water	1.0000	1.0000	0.00
Operation Condition			
Temperature (°C)	210.00	210.00	0.00
Pressure (Kg/cm ² gauge)	7.05	7.05	0.00
Molar Flow (kgmole/h)	9225.51	9223.30	-0.02
Mass Flow (kg/h)	166198.45	166157.00	-0.02
Molecular Weight	18.02	18.02	0.03
Total	1.0000	1.0000	
2501		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	
Acetylene	0.0000	0.0000	
Ethylene*	0.0000	0.0000	
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0000	0.0000	
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0000	0.0000	
Butylenes	0.0000	0.0000	
Butanes	0.0000	0.0000	
C5-Hydrocarbons	0.0000	0.0000	
C6-C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	0.0000	
Toluene	0.0000	0.0000	
Xylenes/Ethylbenzene	0.0000	0.0000	
Styrene	0.0000	0.0000	
C9-205°C	0.0000	0.0000	
205-288°C PGO	0.0000	0.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

288°C plus PFO	0.0000	0.0000	
Steam/Water	1.0000	1.0000	0.00
Operation Condition			
Temperature (°C)	117.10	117.10	0.00
Pressure (Kg/cm ² gauge)	0.80	0.80	0.00
Molar Flow (kgmole/h)	521.28	521.30	0.00
Mass Flow (kg/h)	9391.00	9391.00	0.00
Molecular Weight	18.02	18.02	0.03
Total	1.0000	1.0000	

2506		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0000	0.0000	
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0000	0.0000	
Butylenes	0.0000	0.0000	
Butanes	0.0000	0.0000	
C5-Hydrocarbons	0.0000	0.0000	
C6-C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	0.0000	
Toluene	0.0000	0.0000	
Xylenes/Ethylbenzene	0.0000	0.0000	
Styrene	0.0000	0.0000	
C9-205°C	0.0000	0.0000	
205-288°C PGO	0.0000	0.0000	
288°C plus PFO	0.0000	0.0000	
Steam/Water	1.0000	1.0000	0.00
Operation Condition			
Temperature (°C)	121.30	121.30	0.00
Pressure (Kg/cm ² gauge)	10.50	10.50	0.00
Molar Flow (kgmole/h)	9835.75	9835.80	0.00
Mass Flow (kg/h)	177192.00	177192.00	0.00
Molecular Weight	18.02	18.02	0.03
Total	1.0000	1.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

2510		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0000	0.0000	
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0000	0.0000	
Butylenes	0.0000	0.0000	
Butanes	0.0000	0.0000	
C5-Hydrocarbons	0.0000	0.0000	
C6-C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	0.0000	
Toluene	0.0000	0.0000	
Xylenes/Ethylbenzene	0.0000	0.0000	
Styrene	0.0000	0.0000	
C9-205°C	0.0000	0.0000	
205-288°C PGO	0.0000	0.0000	
288°C plus PFO	0.0000	0.0000	
Steam/Water	1.0000	1.0000	0.00
Operation Condition			
Temperature (°C)	170.89	171.00	0.06
Pressure (Kg/cm ² gauge)	7.20	7.20	0.00
Molar Flow (kgmole/h)	31365.19	31365.40	0.00
Mass Flow (kg/h)	565047.00	565047.00	0.00
Molecular Weight	18.02	18.02	0.03
Total	1.0000	1.0000	

2514		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0000	0.0000	
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0000	0.0000	
Butylenes	0.0000	0.0000	
Butanes	0.0000	0.0000	
C5-Hydrocarbons	0.0000	0.0000	
C6-C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	0.0000	
Toluene	0.0000	0.0000	
Xylenes/Ethylbenzene	0.0000	0.0000	
Styrene	0.0000	0.0000	
C9-205°C	0.0000	0.0000	
205-288°C PGO	0.0000	0.0000	
288°C plus PFO	0.0000	0.0000	
Steam/Water	1.0000	1.0000	0.00
Operation Condition			
Temperature (°C)	170.89	171.00	0.06
Pressure (Kg/cm ² gauge)	7.20	7.20	0.00
Molar Flow (kgmole/h)	9225.51	9223.30	-0.02
Mass Flow (kg/h)	166198.45	166157.00	-0.02
Molecular Weight	18.02	18.02	0.03
Total	1.0000	1.0000	

2508		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0000	0.0000	
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0000	0.0000	
Butylenes	0.0000	0.0000	
Butanes	0.0000	0.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

C5-Hydrocarbons	0.0000	0.0000	
C6-C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	0.0000	
Toluene	0.0000	0.0000	
Xylenes/Ethylbenzene	0.0000	0.0000	
Styrene	0.0000	0.0000	
C9-205°C	0.0000	0.0000	
205-288°C PGO	0.0000	0.0000	
288°C plus PFO	0.0000	0.0000	
Steam/Water	1.0000	1.0000	0.00
Operation Condition			
Temperature (°C)	170.89	171.00	0.06
Pressure (Kg/cm ² gauge)	7.20	7.20	0.00
Molar Flow (kgmole/h)	610.24	612.50	0.37
Mass Flow (kg/h)	10993.55	11035.00	0.38
Molecular Weight	18.02	18.02	0.03
Total	1.0000	1.0000	
4138		Design	%Error
Component (%mol)			
Hydrogen	0.2480	0.2478	-0.10
Carbon Monoxide	0.0052	0.0052	-0.10
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.7462	0.7455	-0.10
Acetylene	0.0000	0.0000	
Ethylene	0.0005	0.0005	-0.10
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0000	0.0000	
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0000	0.0000	
Butylenes	0.0000	0.0000	
Butanes	0.0000	0.0000	
C5-Hydrocarbons	0.0000	0.0000	
C6-C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	0.0000	
Toluene	0.0000	0.0000	
Xylenes/Ethylbenzene	0.0000	0.0000	
Styrene	0.0000	0.0000	
C9-205°C	0.0000	0.0000	
Steam/Water	0.0000	0.0000	
Operation Condition			
Temperature (°C)	35.00	35.00	0.00

Simulation Report – ECC 860 KTA
Working Stage 6

Pressure (Kg/cm ² gauge)	0.39	0.39	0.00
Molar Flow (kgmole/h)	232.74	232.50	-0.11
Mass Flow (kg/h)	2940.00	2940.00	0.00
Molecular Weight	13.3219	13.32	-0.01
Total	1.0000	0.9990	

3026		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0000	0.0000	
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0000	0.0000	
Butylenes	0.0000	0.0000	
Butanes	0.0000	0.0000	
C5-Hydrocarbons	0.0000	0.0000	
C6-C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	0.0000	
Toluene	0.0000	0.0000	
Xylenes/Ethylbenzene	0.0000	0.0000	
Styrene	0.0000	0.0000	
C9-205°C	0.0000	0.0000	
Steam/Water	1.0000	1.0000	0.00
Operation Condition			
Temperature (°C)	39.34	38.90	-1.12
Pressure (Kg/cm ² gauge)	1.72	1.72	0.00
Molar Flow (kgmole/h)	494.58	448.70	-10.23
Mass Flow (kg/h)	8084.00	8084.00	0.00
Molecular Weight	18.0151	18.02	0.03
Total	1.0000	1.0000	

3002		Design	%Error
Component (%mol)			
Hydrogen	0.1459	0.1466	0.48
Carbon Monoxide	0.0010	0.0010	3.04

Simulation Report – ECC 860 KTA
Working Stage 6

Carbon Dioxide	0.0003	0.0003	2.75
Hydrogen Sulphide	0.0000	0.0000	#DIV/0!
Methane	0.2586	0.2599	0.50
Acetylene	0.0050	0.0050	0.81
Ethylene	0.2725	0.2738	0.48
Ethane	0.0478	0.0480	0.32
Propadiene/Propyne	0.0045	0.0045	0.61
Propylene	0.0988	0.0993	0.51
Propane	0.0031	0.0031	-0.37
Butadienes/C4Acetylenes	0.0196	0.0197	0.31
Butylenes	0.0267	0.0268	0.38
Butanes	0.0088	0.0088	0.50
C5-Hydrocarbons	0.0157	0.0158	0.86
C6-C8 Non-Aromatics	0.0078	0.0079	1.42
Benzene	0.0184	0.0187	1.37
Toluene	0.0125	0.0128	2.13
Xylenes/Ethylbenzene	0.0023	0.0025	6.13
Styrene	0.0013	0.0015	11.63
C9-205°C	0.0010	0.0015	31.27
Steam/Water	0.0483	0.0425	-13.76
Operation Condition			
Temperature (°C)	83.48	83.40	-0.10
Pressure (Kg/cm ² gauge)	1.88	1.88	0.00
Molar Flow (kgmole/h)	12837.70	12786.30	-0.40
Mass Flow (kg/h)	347354.00	343763.00	-1.04
Molecular Weight	28.8936	29.24	1.18
Total	1.0000	1.0000	

3005		Design	%Error
Component (%mol)			
Hydrogen	0.1492	0.1492	0.01
Carbon Monoxide	0.0010	0.0010	0.85
Carbon Dioxide	0.0003	0.0003	0.50
Hydrogen Sulphide	0.0000	0.0000	#DIV/0!
Methane	0.2645	0.2646	0.05
Acetylene	0.0051	0.0051	0.46
Ethylene	0.2788	0.2790	0.06
Ethane	0.0490	0.0490	0.06
Propadiene/Propyne	0.0046	0.0046	0.11
Propylene	0.1013	0.1014	0.07
Propane	0.0032	0.0032	0.26
Butadienes/C4Acetylenes	0.0203	0.0204	0.55
Butylenes	0.0276	0.0276	0.15

Simulation Report – ECC 860 KTA
Working Stage 6

Butanes	0.0090	0.0092	1.65
C5-Hydrocarbons	0.0164	0.0166	1.12
C6-C8 Non-Aromatics	0.0086	0.0090	4.70
Benzene	0.0212	0.0210	-1.16
Toluene	0.0121	0.0115	-5.53
Xylenes/Ethylbenzene	0.0010	0.0010	-0.01
Styrene	0.0004	0.0004	-5.52
C9-205°C	0.0001	0.0003	
Steam/Water	0.0262	0.0256	-2.53
Operation Condition			
Temperature (°C)	85.86	85.90	0.05
Pressure (Kg/cm ² gauge)	4.42	4.42	0.00
Molar Flow (kgmole/h)	12554.80	12563.50	0.07
Mass Flow (kg/h)	340685.64	340689.00	0.00
Molecular Weight	28.2768	27.12	-4.27
Total	1.0000	1.0000	

3044		Design	%Error
Component (%mol)			
Hydrogen	0.0001	0.0003	55.26
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0022	0.0009	-146.47
Acetylene	0.0003	0.0002	-26.30
Ethylene	0.0097	0.0047	-105.68
Ethane	0.0023	0.0012	-94.87
Propadiene/Propyne	0.0012	0.0012	2.88
Propylene	0.0163	0.0084	-93.62
Propane	0.0005	0.0003	-78.74
Butadienes/C4Acetylenes	0.0119	0.0097	-23.06
Butylenes	0.0147	0.0089	-64.75
Butanes	0.0054	0.0028	-92.37
C5-Hydrocarbons	0.0242	0.0196	-23.36
C6-C8 Non-Aromatics	0.1081	0.0856	-26.27
Benzene	0.2199	0.2321	5.27
Toluene	0.3896	0.4025	3.19
Xylenes/Ethylbenzene	0.0952	0.0992	4.03
Styrene	0.0545	0.0593	8.01
C9-205°C	0.0429	0.0595	27.87
Steam/Water	0.0010	0.0046	
Operation Condition			
Temperature (°C)	39.11	38.80	-0.81

Simulation Report – ECC 860 KTA
Working Stage 6

Pressure (Kg/cm ² gauge)	0.95	0.95	0.00
Molar Flow (kgmole/h)	308.03	313.10	1.62
Mass Flow (kg/h)	27601.03	28392.00	2.79
Molecular Weight	87.1449	88.78	1.84
Total	1.0000	1.0010	

3049		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0000	0.0000	
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0079	0.0018	-339.67
Butylenes	0.0080	0.0001	-7906.10
Butanes	0.0037	0.0000	
C5-Hydrocarbons	0.0214	0.0169	-26.77
C6-C8 Non-Aromatics	0.1022	0.0805	-26.91
Benzene	0.2081	0.2187	4.85
Toluene	0.3723	0.3830	2.79
Xylenes/Ethylbenzene	0.0937	0.0972	3.55
Styrene	0.0555	0.0589	5.72
C9-205°C	0.1271	0.1430	11.09
Steam/Water	0.0000	0.0000	
Operation Condition			
Temperature (°C)	113.27	119.40	5.13
Pressure (Kg/cm ² gauge)	0.87	0.87	0.00
Molar Flow (kgmole/h)	325.35	332.00	2.00
Mass Flow (kg/h)	31054.11	31829.00	2.43
Molecular Weight	92.6291	0.00	#DIV/0!
Total	1.0000	1.0001	

3006		Design	%Error
Component (%mol)			
Hydrogen	0.1492	0.1492	0.01
Carbon Monoxide	0.0010	0.0010	0.85

Simulation Report – ECC 860 KTA
Working Stage 6

Carbon Dioxide	0.0003	0.0003	0.50
Hydrogen Sulphide	0.0000	0.0000	#DIV/0!
Methane	0.2645	0.2646	0.05
Acetylene	0.0051	0.0051	0.46
Ethylene	0.2788	0.2790	0.06
Ethane	0.0490	0.0490	0.06
Propadiene/Propyne	0.0046	0.0046	0.11
Propylene	0.1013	0.1014	0.07
Propane	0.0032	0.0032	0.26
Butadienes/C4Acetylenes	0.0203	0.0204	0.55
Butylenes	0.0276	0.0276	0.15
Butanes	0.0090	0.0092	1.65
C5-Hydrocarbons	0.0164	0.0166	1.12
C6-C8 Non-Aromatics	0.0086	0.0090	4.70
Benzene	0.0212	0.0210	-1.16
Toluene	0.0121	0.0115	-5.53
Xylenes/Ethylbenzene	0.0010	0.0010	-0.01
Styrene	0.0004	0.0004	-5.52
C9-205°C	0.0001	0.0003	66.83
Steam/Water	0.0262	0.0256	-2.53
Operation Condition			
Temperature (°C)	41.00	41.00	0.00
Pressure (Kg/cm ² gauge)	4.29	4.29	0.00
Molar Flow (kgmole/h)	12554.80	12563.50	0.07
Mass Flow (kg/h)	340685.64	340689.00	0.00
Molecular Weight	28.2768	27.12	-4.27
Total	1.0000	1.0000	

3008		Design	%Error
Component (%mol)			
Hydrogen	0.1512	0.1516	0.24
Carbon Monoxide	0.0010	0.0010	-0.44
Carbon Dioxide	0.0003	0.0004	24.36
Hydrogen Sulphide	0.0000	0.0000	#DIV/0!
Methane	0.2680	0.2688	0.31
Acetylene	0.0051	0.0052	1.00
Ethylene	0.2837	0.2847	0.35
Ethane	0.0497	0.0498	0.28
Propadiene/Propyne	0.0047	0.0047	0.52
Propylene	0.1030	0.1034	0.39
Propane	0.0032	0.0032	-1.37
Butadienes/C4Acetylenes	0.0207	0.0210	1.26
Butylenes	0.0282	0.0284	0.87

Simulation Report – ECC 860 KTA
Working Stage 6

Butanes	0.0093	0.0093	-0.07
C5-Hydrocarbons	0.0169	0.0173	2.21
C6-C8 Non-Aromatics	0.0080	0.0090	11.29
Benzene	0.0203	0.0201	-1.02
Toluene	0.0078	0.0075	-4.62
Xylenes/Ethylbenzene	0.0003	0.0003	2.50
Styrene	0.0001	0.0001	6.34
C9-205°C	0.0000	0.0000	
Steam/Water	0.0183	0.0142	-28.53
Operation Condition			
Temperature (°C)	88.94	88.90	-0.04
Pressure (Kg/cm ² gauge)	9.56	9.56	0.00
Molar Flow (kgmole/h)	12394.70	12371.10	-0.19
Mass Flow (kg/h)	331526.19	331534.00	0.00
Molecular Weight	27.0568	27.77	2.57
Total	0.9998	1.0000	

3028		Design	%Error
Component (%mol)			
Hydrogen	0.0005	0.0009	49.23
Carbon Monoxide	0.0000	0.0000	#DIV/0!
Carbon Dioxide	0.0000	0.0000	#DIV/0!
Hydrogen Sulphide	0.0000	0.0000	#DIV/0!
Methane	0.0066	0.0093	29.55
Acetylene	0.0006	0.0009	30.06
Ethylene	0.0253	0.0290	12.69
Ethane	0.0060	0.0071	16.14
Propadiene/Propyne	0.0026	0.0035	25.58
Propylene	0.0387	0.0385	-0.44
Propane	0.0012	0.0014	11.43
Butadienes/C4Acetylenes	0.0250	0.0306	18.35
Butylenes	0.0312	0.0319	2.18
Butanes	0.0115	0.0104	-10.35
C5-Hydrocarbons	0.0467	0.0575	18.83
C6-C8 Non-Aromatics	0.0938	0.1008	6.94
Benzene	0.2402	0.2515	4.48
Toluene	0.1650	0.1650	0.02
Xylenes/Ethylbenzene	0.0084	0.0097	13.68
Styrene	0.0028	0.0034	16.83
C9-205°C	0.0003	0.0009	69.16
Steam/Water	0.2937	0.2480	-18.44
Operation Condition			
Temperature (°C)	46.37	40.80	-13.66

Simulation Report – ECC 860 KTA
Working Stage 6

Pressure (Kg/cm ² gauge)	9.34	9.25	-0.97
Molar Flow (kgmole/h)	343.25	329.90	-4.05
Mass Flow (kg/h)	20240.37	20205.00	-0.18
Molecular Weight	60.8049	61.25	0.73
Total	1.0000	1.0003	
2117		Design	%Error
Component (%mol)			
Hydrogen	0.1448	0.1448	-0.02
Carbon Monoxide	0.0009	0.0009	-0.02
Carbon Dioxide	0.0003	0.0003	-0.02
Hydrogen Sulphide	0.0000	0.0000	#DIV/0!
Methane	0.2517	0.2516	-0.02
Acetylene	0.0051	0.0051	-0.02
Ethylene	0.2803	0.2802	-0.02
Ethane	0.0492	0.0492	-0.02
Propadiene/Propyne	0.0046	0.0046	-0.02
Propylene	0.1016	0.1016	-0.02
Propane	0.0032	0.0032	-0.02
Butadienes/C4Acetylenes	0.0202	0.0202	-0.02
Butylenes	0.0274	0.0274	-0.02
Butanes	0.0090	0.0090	-0.02
C5-Hydrocarbons	0.0158	0.0158	-0.02
C6-C8 Non-Aromatics	0.0081	0.0051	-58.86
Benzene	0.0191	0.0021	-809.71
Toluene	0.0132	0.0009	-1366.96
Xylenes/Ethylbenzene	0.0026	0.0193	86.53
Styrene	0.0015	0.0132	88.63
C9-205°C	0.0016	0.0057	71.92
Steam/Water	0.0501	0.0398	-25.88
Operation Condition			
Temperature (°C)	38.00	38.00	0.00
Pressure (Kg/cm ² gauge)	0.56	0.56	0.00
Molar Flow (kgmole/h)	12482.16	12497.00	0.12
Mass Flow (kg/h)	343763.00	343763.00	0.00
Molecular Weight	29.7010	29.69	-0.04
Total	1.0103	1.0000	

3025		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0001	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0002	0.0000	
Ethane	0.0001	0.0000	
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.0004	0.0001	
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0003	0.0001	
Butylenes	0.0004	0.0001	
Butanes	0.0001	0.0000	
C5-Hydrocarbons	0.0007	0.0001	
C6-C8 Non-Aromatics	0.0032	0.0007	-357.23
Benzene	0.0046	0.0018	-157.69
Toluene	0.0102	0.0039	-162.58
Xylenes/Ethylbenzene	0.0060	0.0021	-184.48
Styrene	0.0044	0.0018	-142.95
C9-205°C	0.0172	0.0041	-320.28
Steam/Water	0.9499	0.9852	3.59
Operation Condition			
Temperature (°C)	36.90	36.90	0.00
Pressure (Kg/cm ² gauge)	4.46	4.46	0.00
Molar Flow (kgmole/h)	410.46	410.00	-0.11
Mass Flow (kg/h)	7902.00	7902.00	0.00
Molecular Weight	26.3263	19.25	-36.76
Total	0.9979	1.0000	

3003		Design	%Error
Component (%mol)			
Hydrogen	0.1459	0.1466	0.48
Carbon Monoxide	0.0010	0.0010	3.04
Carbon Dioxide	0.0003	0.0003	2.75
Hydrogen Sulphide	0.0000	0.0000	#DIV/0!
Methane	0.2586	0.2599	0.50
Acetylene	0.0050	0.0050	0.81
Ethylene	0.2725	0.2738	0.48
Ethane	0.0478	0.0480	0.32
Propadiene/Propyne	0.0045	0.0045	0.61
Propylene	0.0988	0.0993	0.51
Propane	0.0031	0.0031	-0.37
Butadienes/C4Acetylenes	0.0196	0.0197	0.31
Butylenes	0.0267	0.0268	0.38
Butanes	0.0088	0.0088	0.50

Simulation Report – ECC 860 KTA
Working Stage 6

C5-Hydrocarbons	0.0157	0.0158	0.86
C6-C8 Non-Aromatics	0.0078	0.0079	1.42
Benzene	0.0184	0.0187	1.37
Toluene	0.0125	0.0128	2.13
Xylenes/Ethylbenzene	0.0023	0.0025	6.13
Styrene	0.0013	0.0015	11.63
C9-205°C	0.0010	0.0015	31.27
Steam/Water	0.0483	0.0425	-13.76
Operation Condition			
Temperature (°C)	41.00	41.00	0.00
Pressure (Kg/cm ² gauge)	1.80	1.80	0.00
Molar Flow (kgmole/h)	12837.70	12786.30	-0.40
Mass Flow (kg/h)	347354.00	343763.00	-1.04
Molecular Weight	28.8936	29.24	1.18
Total	1.0000	1.0000	

3042		Design	%Error
Component (%mol)			
Hydrogen	0.0002	0.0002	15.44
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0026	0.0033	21.07
Acetylene	0.0003	0.0004	31.14
Ethylene	0.0108	0.0103	-4.88
Ethane	0.0025	0.0025	-1.78
Propadiene/Propyne	0.0012	0.0015	19.17
Propylene	0.0172	0.0136	-26.46
Propane	0.0006	0.0005	-11.51
Butadienes/C4Acetylenes	0.0121	0.0126	3.98
Butylenes	0.0149	0.0122	-22.38
Butanes	0.0055	0.0038	-44.42
C5-Hydrocarbons	0.0239	0.0244	2.01
C6-C8 Non-Aromatics	0.0789	0.0708	-11.41
Benzene	0.1879	0.1821	-3.19
Toluene	0.2147	0.1988	-7.98
Xylenes/Ethylbenzene	0.0226	0.0223	-1.44
Styrene	0.0098	0.0094	-4.10
C9-205°C	0.0024	0.0048	50.46
Steam/Water	0.3920	0.4266	8.12
Operation Condition			
Temperature (°C)	43.26	38.10	-13.54
Pressure (Kg/cm ² gauge)	1.72	1.72	0.00

Simulation Report – ECC 860 KTA
Working Stage 6

Molar Flow (kgmole/h)	519.71	539.00	3.58
Mass Flow (kg/h)	29842.58	29810.00	-0.11
Molecular Weight	61.3662	61.36	-0.01
Total	1.0000	1.0001	

3037		Design	%Error
Component (%mol)			
Hydrogen	0.0001	0.0002	40.64
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0017	0.0020	12.87
Acetylene	0.0002	0.0003	29.87
Ethylene	0.0089	0.0077	-14.95
Ethane	0.0023	0.0017	-34.74
Propadiene/Propyne	0.0011	0.0015	25.85
Propylene	0.0143	0.0100	-43.00
Propane	0.0003	0.0003	-8.80
Butadienes/C4Acetylenes	0.0138	0.0107	-28.84
Butylenes	0.0129	0.0114	-13.40
Butanes	0.0089	0.0062	-44.25
C5-Hydrocarbons	0.0215	0.0181	-18.88
C6-C8 Non-Aromatics	0.1738	0.1444	-20.34
Benzene	0.2447	0.2430	-0.68
Toluene	0.3663	0.3848	4.80
Xylenes/Ethylbenzene	0.0969	0.1149	15.66
Styrene	0.0276	0.0357	22.68
C9-205°C	0.0037	0.0070	46.77
Steam/Water	0.0009	0.0000	
Operation Condition			
Temperature (°C)	107.00	107.00	0.00
Pressure (Kg/cm ² gauge)	0.36	0.36	0.00
Molar Flow (kgmole/h)	465.47	447.23	-4.08
Mass Flow (kg/h)	40563.15	39704.00	-2.16
Molecular Weight	87.1449	88.78	1.84
Total	1.0000	0.9999	

3040		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	#DIV/0!
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	#DIV/0!
Propylene	0.0000	0.0000	#DIV/0!
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0079	0.0018	-339.67
Butylenes	0.0080	0.0001	-7906.10
Butanes	0.0037	0.0000	#DIV/0!
C5-Hydrocarbons	0.0214	0.0169	-26.77
C6-C8 Non-Aromatics	0.1022	0.0805	-26.91
Benzene	0.2081	0.2187	4.85
Toluene	0.3723	0.3830	2.79
Xylenes/Ethylbenzene	0.0937	0.0972	3.55
Styrene	0.0555	0.0589	5.72
C9-205°C	0.1271	0.1430	11.09
Steam/Water	0.0000	0.0000	
Operation Condition			
Temperature (°C)	113.41	119.90	5.41
Pressure (Kg/cm ² gauge)	3.56	3.56	0.00
Molar Flow (kgmole/h)	314.88	321.60	2.09
Mass Flow (kg/h)	30054.11	30829.00	2.51
Molecular Weight	92.6040	95.88	3.42
Total	1.0000	1.0001	

3043		Design	%Error
Component (%mol)			
Hydrogen	0.0005	0.0007	34.71
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0001	77.89
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0066	0.0093	29.51
Acetylene	0.0006	0.0009	30.01
Ethylene	0.0253	0.0290	12.63
Ethane	0.0060	0.0071	16.07
Propadiene/Propyne	0.0026	0.0035	25.51
Propylene	0.0387	0.0385	-0.53
Propane	0.0012	0.0014	11.35
Butadienes/C4Acetylenes	0.0250	0.0306	18.27
Butylenes	0.0312	0.0319	2.08
Butanes	0.0115	0.0104	-10.46

Simulation Report – ECC 860 KTA
Working Stage 6

C5-Hydrocarbons	0.0467	0.0575	18.74
C6-C8 Non-Aromatics	0.0939	0.1008	6.87
Benzene	0.2404	0.2515	4.43
Toluene	0.1648	0.1650	0.11
Xylenes/Ethylbenzene	0.0084	0.0097	13.87
Styrene	0.0028	0.0034	17.04
C9-205°C	0.0003	0.0009	69.25
Steam/Water	0.2935	0.2480	-18.35
Operation Condition			
Temperature (°C)	44.08	38.10	-15.68
Pressure (Kg/cm ² gauge)	4.20	4.20	0.00
Molar Flow (kgmole/h)	343.16	329.90	-4.02
Mass Flow (kg/h)	20236.94	20205.00	-0.16
Molecular Weight	63.7403	63.74	0.00
Total	1.0000	1.0002	

3009		Design	%Error
Component (%mol)			
Hydrogen	0.1512	0.1516	0.24
Carbon Monoxide	0.0010	0.0010	-0.44
Carbon Dioxide	0.0003	0.0004	24.36
Hydrogen Sulphide	0.0000	0.0000	#DIV/0!
Methane	0.2680	0.2688	0.31
Acetylene	0.0051	0.0052	1.00
Ethylene	0.2837	0.2847	0.35
Ethane	0.0497	0.0498	0.28
Propadiene/Propyne	0.0047	0.0047	0.52
Propylene	0.1030	0.1034	0.39
Propane	0.0032	0.0032	-1.37
Butadienes/C4Acetylenes	0.0207	0.0210	1.26
Butylenes	0.0282	0.0284	0.87
Butanes	0.0093	0.0093	-0.07
C5-Hydrocarbons	0.0169	0.0173	2.21
C6-C8 Non-Aromatics	0.0080	0.0090	11.29
Benzene	0.0203	0.0201	-1.02
Toluene	0.0078	0.0075	-4.62
Xylenes/Ethylbenzene	0.0003	0.0003	2.50
Styrene	0.0001	0.0001	6.34
C9-205°C	0.0000	0.0000	
Steam/Water	0.0183	0.0142	-28.53
Operation Condition			
Temperature (°C)	41.00	41.00	0.00
Pressure (Kg/cm ² gauge)	9.34	9.34	0.00

Simulation Report – ECC 860 KTA
Working Stage 6

Molar Flow (kgmole/h)	12394.70	12371.10	-0.19
Mass Flow (kg/h)	331526.19	331534.00	0.00
Molecular Weight	27.0568	27.77	2.57
Total	0.9998	1.0000	

3010		Design	%Error
Component (%mol)			
Hydrogen	0.1558	0.1516	-2.80
Carbon Monoxide	0.0010	0.0010	-3.01
Carbon Dioxide	0.0003	0.0004	22.57
Hydrogen Sulphide	0.0000	0.0000	#DIV/0!
Methane	0.2749	0.2688	-2.28
Acetylene	0.0053	0.0052	-1.20
Ethylene	0.2903	0.2847	-1.96
Ethane	0.0508	0.0498	-1.95
Propadiene/Propyne	0.0047	0.0047	-0.47
Propylene	0.1062	0.1034	-2.73
Propane	0.0033	0.0032	-3.04
Butadienes/C4Acetylenes	0.0206	0.0210	2.09
Butylenes	0.0280	0.0284	1.44
Butanes	0.0092	0.0093	0.86
C5-Hydrocarbons	0.0160	0.0173	7.36
C6-C8 Non-Aromatics	0.0055	0.0090	38.61
Benzene	0.0140	0.0201	30.33
Toluene	0.0034	0.0075	55.17
Xylenes/Ethylbenzene	0.0001	0.0003	79.27
Styrene	0.0000	0.0001	
C9-205°C	0.0000	0.0000	
Steam/Water	0.0104	0.0142	26.92
Operation Condition			
Temperature (°C)	46.37	40.90	-13.38
Pressure (Kg/cm ² gauge)	9.25	9.25	0.00
Molar Flow (kgmole/h)	12083.65	12073.40	-0.08
Mass Flow (kg/h)	312208.82	312251.00	0.01
Molecular Weight	25.9459	26.50	2.09
Total	0.9998	1.0000	
1230		Design	%Error
Component (%mol)			
Hydrogen	0.4168	0.4178	0.25
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

Methane	0.2814	0.2821	0.25
C2-C4 Hydrocarbons	0.0533	0.0533	0.06
C5-Hydrocarbons	0.2295	0.2247	-2.15
C6-C8 Non-Aromatics	0.0059	0.0121	51.36
Benzene	0.0080	0.0005	-1496.01
Toluene	0.0017	0.0001	-1595.76
Xylenes/Ethylbenzene	0.0002	0.0076	97.37
Styrene	0.0021	0.0016	
C9-205°C	0.0000	0.0002	100.00
Steam/Water	0.0058	0.0000	
Operation Condition			
Temperature (°C)	41.80	41.40	-0.97
Pressure (Kg/cm ² gauge)	25.52	25.52	0.00
Molar Flow (kgmole/h)	17.82	18.60	4.21
Mass Flow (kg/h)	474.00	474.00	0.00
Molecular Weight	25.6205	25.62	0.00
Total	1.0046	1.0000	

3001		Design	%Error
Component (%mol)			
Hydrogen	0.1452	0.1466	0.93
Carbon Monoxide	0.0019	0.0010	-89.92
Carbon Dioxide	0.0005	0.0003	-61.59
Hydrogen Sulphide	0.0001	0.0000	#DIV/0!
Methane	0.2331	0.2599	10.31
Acetylene	0.0044	0.0050	12.74
Ethylene	0.2594	0.2738	5.27
Ethane	0.0493	0.0480	-2.61
Propadiene/Propyne	0.0047	0.0045	-3.40
Propylene	0.0920	0.0993	7.37
Propane	0.0021	0.0031	31.20
Butadienes/C4Acetylenes	0.0240	0.0197	-22.00
Butylenes	0.0248	0.0268	7.42
Butanes	0.0148	0.0088	-68.75
C5-Hydrocarbons	0.0149	0.0158	5.46

Simulation Report – ECC 860 KTA
Working Stage 6

C6-C8 Non-Aromatics	0.0182	0.0079	-129.94
Benzene	0.0252	0.0187	-34.68
Toluene	0.0209	0.0128	-63.47
Xylenes/Ethylbenzene	0.0056	0.0025	-122.15
Styrene	0.0017	0.0015	-10.01
C9-205°C	0.0003	0.0015	80.90
Steam/Water	0.0570	0.0425	-34.17
Operation Condition			
Temperature (°C)	38.01	36.80	-3.28
Pressure (Kg/cm ² gauge)	0.35	0.45	22.22
Molar Flow (kgmole/h)	12837.70	12786.30	-0.40
Mass Flow (kg/h)	347354.00	343763.00	-1.04
Molecular Weight	29.1090	29.24	0.45
Total	1.0000	1.0000	

3004		Design	%Error
Component (%mol)			
Hydrogen	0.1492	0.1492	0.01
Carbon Monoxide	0.0010	0.0010	0.85
Carbon Dioxide	0.0003	0.0003	0.50
Hydrogen Sulphide	0.0000	0.0000	#DIV/0!
Methane	0.2645	0.2646	0.05
Acetylene	0.0051	0.0051	0.46
Ethylene	0.2788	0.2790	0.06
Ethane	0.0490	0.0490	0.06
Propadiene/Propyne	0.0046	0.0046	0.11
Propylene	0.1013	0.1014	0.07
Propane	0.0032	0.0032	0.26
Butadienes/C4Acetylenes	0.0203	0.0204	0.55
Butylenes	0.0276	0.0276	0.15
Butanes	0.0090	0.0092	1.65
C5-Hydrocarbons	0.0164	0.0166	1.12
C6-C8 Non-Aromatics	0.0086	0.0090	4.70
Benzene	0.0212	0.0210	-1.16
Toluene	0.0121	0.0115	-5.53
Xylenes/Ethylbenzene	0.0010	0.0010	-0.01
Styrene	0.0004	0.0004	-5.52
C9-205°C	0.0001	0.0003	
Steam/Water	0.0262	0.0256	-2.53
Operation Condition			
Temperature (°C)	39.34	39.00	-0.86
Pressure (Kg/cm ² gauge)	1.72	1.72	0.00
Molar Flow (kgmole/h)	12554.80	12563.50	0.07

Simulation Report – ECC 860 KTA
Working Stage 6

Mass Flow (kg/h)	340685.64	340689.00	0.00
Molecular Weight	28.2768	27.12	-4.27
Total	1.0000	1.0000	

3036		Design	%Error
Component (%mol)			
Hydrogen	0.0001	0.0003	55.26
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0022	0.0009	-146.47
Acetylene	0.0003	0.0002	-26.30
Ethylene	0.0097	0.0047	-105.68
Ethane	0.0023	0.0012	-94.87
Propadiene/Propyne	0.0012	0.0012	2.88
Propylene	0.0163	0.0084	-93.62
Propane	0.0005	0.0003	-78.74
Butadienes/C4Acetylenes	0.0119	0.0097	-23.06
Butylenes	0.0147	0.0089	-64.75
Butanes	0.0054	0.0028	-92.37
C5-Hydrocarbons	0.0242	0.0196	-23.36
C6-C8 Non-Aromatics	0.1081	0.0856	-26.27
Benzene	0.2199	0.2321	5.27
Toluene	0.3896	0.4025	3.19
Xylenes/Ethylbenzene	0.0952	0.0992	4.03
Styrene	0.0545	0.0583	6.44
C9-205°C	0.0429	0.0595	27.87
Steam/Water	0.0010	0.0046	
Operation Condition			
Temperature (°C)	39.34	38.90	-1.12
Pressure (Kg/cm ² gauge)	1.72	1.72	0.00
Molar Flow (kgmole/h)	308.03	313.10	1.62
Mass Flow (kg/h)	27601.03	28392.00	2.79
Molecular Weight	87.1449	88.78	1.84
Total	1.0000	1.0000	

3038		Design	%Error
Component (%mol)			
Hydrogen	0.0059	0.0004	-1374.71
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0002	0.0001	-99.96
Hydrogen Sulphide	0.0001	0.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

Methane	0.0203	0.0043	-372.00
Acetylene	0.0043	0.0006	-616.52
Ethylene	0.1002	0.0162	-518.39
Ethane	0.0263	0.0035	-651.28
Propadiene/Propyne	0.0244	0.0030	-713.17
Propylene	0.1805	0.0206	-776.04
Propane	0.0069	0.0005	-1279.72
Butadienes/C4Acetylenes	0.1659	0.0212	-682.39
Butylenes	0.1865	0.0224	-732.42
Butanes	0.0579	0.0123	-370.64
C5-Hydrocarbons	0.0418	0.0336	-24.38
C6-C8 Non-Aromatics	0.0208	0.1780	88.32
Benzene	0.0519	0.3021	82.82
Toluene	0.0296	0.3090	90.42
Xylenes/Ethylbenzene	0.0028	0.0555	94.96
Styrene	0.0012	0.0148	91.89
C9-205°C	0.0006	0.0018	66.67
Steam/Water	0.0721	0.0000	
Operation Condition			
Temperature (°C)	50.70	50.70	0.00
Pressure (Kg/cm ² gauge)	0.77	0.77	0.00
Molar Flow (kgmole/h)	15.20	15.20	-0.02
Mass Flow (kg/h)	748.00	748.00	0.00
Molecular Weight	83.6772	83.61	-0.08
Total	1.0000	0.9999	

3041		Design	%Error
Component (%mol)			
Hydrogen	0.0000	0.0000	
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.0000	0.0000	
Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	#DIV/0!
Ethane	0.0000	0.0000	
Propadiene/Propyne	0.0000	0.0000	#DIV/0!
Propylene	0.0000	0.0000	#DIV/0!
Propane	0.0000	0.0000	
Butadienes/C4Acetylenes	0.0018	0.0018	0.00
Butylenes	0.0001	0.0001	0.00
Butanes	0.0000	0.0000	#DIV/0!
C5-Hydrocarbons	0.0169	0.0169	0.00

Simulation Report – ECC 860 KTA
Working Stage 6

C6-C8 Non-Aromatics	0.0804	0.0805	0.12
Benzene	0.2187	0.2187	0.00
Toluene	0.3830	0.3830	0.00
Xylenes/Ethylbenzene	0.0972	0.0972	0.00
Styrene	0.0589	0.0589	0.00
C9-205°C	0.1394	0.1430	2.52
Steam/Water	0.0000	0.0000	
Operation Condition			
Temperature (°C)	119.90	119.90	0.00
Pressure (Kg/cm ² gauge)	0.97	0.97	0.00
Molar Flow (kgmole/h)	10.43	10.40	-0.29
Mass Flow (kg/h)	1000.00	1000.00	0.00
Molecular Weight	92.6040	95.88	3.42
Total	0.9964	1.0001	

3007		Design	%Error
Component (%mol)			
Hydrogen	0.1512	0.1516	0.24
Carbon Monoxide	0.0010	0.0010	-0.44
Carbon Dioxide	0.0003	0.0004	24.36
Hydrogen Sulphide	0.0000	0.0000	#DIV/0!
Methane	0.2680	0.2688	0.31
Acetylene	0.0051	0.0052	1.00
Ethylene	0.2837	0.2847	0.35
Ethane	0.0497	0.0498	0.28
Propadiene/Propyne	0.0047	0.0047	0.52
Propylene	0.1030	0.1034	0.39
Propane	0.0032	0.0032	-1.37
Butadienes/C4Acetylenes	0.0207	0.0210	1.26
Butylenes	0.0282	0.0284	0.87
Butanes	0.0093	0.0093	-0.07
C5-Hydrocarbons	0.0169	0.0173	2.21
C6-C8 Non-Aromatics	0.0080	0.0090	11.29
Benzene	0.0203	0.0201	-1.02
Toluene	0.0078	0.0075	-4.62
Xylenes/Ethylbenzene	0.0003	0.0003	2.50
Styrene	0.0001	0.0001	6.34
C9-205°C	0.0000	0.0000	
Steam/Water	0.0183	0.0142	-28.53
Operation Condition			
Temperature (°C)	44.42	39.70	-11.90
Pressure (Kg/cm ² gauge)	4.20	4.20	0.00
Molar Flow (kgmole/h)	12394.70	12371.10	-0.19

Simulation Report – ECC 860 KTA
Working Stage 6

Mass Flow (kg/h)	331526.19	331534.00	0.00
Molecular Weight	26.9521	27.77	2.95
Total	0.9998	1.0000	

4522		Design	%Error
Component (%mol)			
Hydrogen	0.2723	0.2717	-0.21
Carbon Monoxide	0.0000	0.0000	
Carbon Dioxide	0.0000	0.0000	
Hydrogen Sulphide	0.0000	0.0000	
Methane	0.1241	0.0971	-27.79
Acetylene	0.0000	0.0000	
Ethylene	0.0000	0.0000	
Ethane	0.0039	0.0008	-387.45
Propadiene/Propyne	0.0000	0.0000	
Propylene	0.5984	0.6284	4.77
Propane	0.0013	0.0019	31.59
Butadienes/C4Acetylenes	0.0000	0.0000	
Butylenes	0.0000	0.0000	
Butanes	0.0000	0.0000	
C5-Hydrocarbons	0.0000	0.0000	
C6-C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	0.0000	
Toluene	0.0000	0.0000	
Xylenes/Ethylbenzene	0.0000	0.0000	
Styrene	0.0000	0.0000	
C9-205°C	0.0000	0.0000	
Steam/Water	0.0000	0.0000	
Operation Condition			
Temperature (°C)	8.20	10.00	18.00
Pressure (Kg/cm ² gauge)	9.47	9.47	0.00
Molar Flow (kgmole/h)	21.26	47.00	54.77
Mass Flow (kg/h)	593.00	632.00	6.17
Molecular Weight	27.8969	27.90	0.01
Total	1.0000	0.9999	

3011		Design	%Error
Component (%mol)			
Hydrogen	0.1558	0.1516	-2.80
Carbon Monoxide	0.0010	0.0010	-3.01
Carbon Dioxide	0.0003	0.0004	22.57
Hydrogen Sulphide	0.0000	0.0000	#DIV/0!

Simulation Report – ECC 860 KTA
Working Stage 6

Methane	0.2749	0.2688	-2.28
Acetylene	0.0053	0.0052	-1.20
Ethylene	0.2903	0.2847	-1.96
Ethane	0.0508	0.0498	-1.95
Propadiene/Propyne	0.0047	0.0047	-0.47
Propylene	0.1062	0.1034	-2.73
Propane	0.0033	0.0032	-3.04
Butadienes/C4Acetylenes	0.0206	0.0210	2.09
Butylenes	0.0280	0.0284	1.44
Butanes	0.0092	0.0093	0.86
C5-Hydrocarbons	0.0160	0.0173	7.36
C6-C8 Non-Aromatics	0.0055	0.0090	38.61
Benzene	0.0140	0.0201	30.33
Toluene	0.0034	0.0075	55.17
Xylenes/Ethylbenzene	0.0001	0.0003	79.27
Styrene	0.0000	0.0001	
C9-205°C	0.0000	0.0000	
Steam/Water	0.0104	0.0142	26.92
Operation Condition			
Temperature (°C)	46.00	46.00	0.00
Pressure (Kg/cm ² gauge)	9.11	9.11	0.00
Molar Flow (kgmole/h)	12083.65	12073.40	-0.08
Mass Flow (kg/h)	312208.82	312251.00	0.01
Molecular Weight	26.0401	26.50	1.74
Total	0.9998	1.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

A.2. Stage 2

Table A.2.1. Stage 2 Stream & Composition Properties

	3011			3306			3301		
	design	simulation	%error	design	simulation	%error	design	simulation	%error
Hydrogen	0.1561	0.1561	0.00	0	0		0	0	
Carbon-Monoxide	0.0011	0.0011	0.00	0	0		0	0	
Carbon-Dioxide	0.0004	0.0004	0.00	0	0		0	0	
Hydrogen-Sulfide	0	0		0	0		0	0	
Methane	0.2755	0.2755	0.00	0	0		0	0	
Acetylene	0.0053	0.0053	0.00	0	0		0	0	
Ethylene	0.2909	0.2909	0.00	0	0		0	0	
Ethane	0.0509	0.0509	0.00	0	0		0	0	
Propadiene	0.0048	0.0048	0.00	0	0		0	0	
Propylene	0.1066	0.1066	0.00	0	0		0	0	
Propane	0.0033	0.0033	0.00	0	0		0	0	
1,3-Butadiene	0.0206	0.0206	0.00	0	0		0	0	
1-Butene	0.0282	0.0282	0.00	0	0		0	0	
n-Butane	0.0093	0.0093	0.00	0	0		0	0	
2-Methyl-Butane	0.0162	0.0162	0.00	0	0		0	0	
1-Hexyne	0.0047	0.0047	0.00	0	0		0	0	
n-Heptane	0.0013	0.0013	0.00	0	0		0	0	
n-Octane	0.0001	0.0001	0.00	0	0		0	0	
Benzene	0.0137	0.0137	0.00	0	0		0	0	
Toluene	0.0031	0.0031	0.00	0	0		0	0	
P-Xylene	0.0001	0.0001	0.00	0	0		0	0	
Ethylbenzene	0	0		0	0		0	0	
Styrene	0	0		0	0		0	0	
M-Methyl-Styrene	0	0		0	0		0	0	
n-Decane	0	0		0	0		0	0	
n-Undecane	0	0		0	0		0	0	
n-Dodecane	0	0		0	0		0	0	
n-Hexadecane	0	0		0	0		0	0	
Sodium-Hydroxide	0	0		0.0072	0.0000	100	0.0477	0.0477	0.00
Sodium-Carbonate	0	0		0.0182	0.0079	56.76	0	0	
Sodium-Sulfide	0	0		0.0023	0.0000	100	0	0	
Water	0.0076	0.0076	0.00	0.9724	0.9921	2.03	0.9523	0.9523	0.00
Nitrogen	0.0002	0.0002	0.02	0	0		0	0	
wash gasoline									
total	1.000	1.000		1.0001	1.000		1.000	1.000	
Mass flow (kg/h)	312251	312251	0.00	4747	4747.258	0.01	4581	4581	0.00
Molar flow (kgmol/h)	12073.4	12066.046	0.06	238.5	253.761	6.40	240.3	240.3	0.00
Temperature (C)	46	46	0.00	46	46	0.00	46	46	0.00
Pressure (kg/cm2_g)	9.11	9.11	0.00	9.53	9.110	4.41	9.34	9.34	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	3307			3308			3012		
	design	simulation	%error	design	simulation	%error	design	simulation	%error
Hydrogen	0	0		0	0		0.1557	0.156	0.00
Carbon-Monoxide	0	0		0	0		0.0011	0.001	0.00
Carbon-Dioxide	0	0		0	0		0		
Hydrogen-Sulfide	0	0		0	0		0		
Methane	0	0		0	0		0.2749	0.275	0.04
Acetylene	0	0		0	0		0.0053	0.005	0.00
Ethylene	0	0		0	0		0.2902	0.290	0.00
Ethane	0	0		0	0		0.0507	0.051	0.00
Propadiene	0	0		0	0		0.0048	0.005	0.00
Propylene	0	0		0	0		0.1066	0.106	0.28
Propane	0	0		0	0		0.0033	0.003	0.00
1,3-Butadiene	0	0		0	0		0.0206	0.021	0.00
1-Butene	0	0		0	0		0.0281	0.028	0.00
n-Butane	0	0		0	0		0.0093	0.009	0.00
2-Methyl-Butane	0	0		0	0		0.0162	0.016	0.00
1-Hexyne	0	0		0	0		0.0047	0.005	0.00
n-Heptane	0	0		0	0		0.0013	0.001	0.00
n-Octane	0	0		0	0		0.0001	0.000	0.00
Benzene	0	0		0	0		0.0137	0.014	0.00
Toluene	0	0		0	0		0.0031	0.003	0.00
P-Xylene	0	0		0	0		0.0001	0.000	0.00
Ethylbenzene	0	0		0	0		0		
Styrene	0	0		0	0		0		
M-Methyl-Styrene	0	0		0	0		0		
n-Decane	0	0		0	0		0		
n-Undecane	0	0		0	0		0		
n-Dodecane	0	0		0	0		0		
n-Hexadecane	0	0		0	0		0		
Sodium-Hydroxide	0	0		0	0		0	0	
Sodium-Carbonate	0	0		0	0		0	0	
Sodium-Sulfide	0	0		0	0		0	0	
Water	1	1	0.00	1	1	0.00	0.0103	0.010	0.00
Nitrogen	0	0		0	0		0.0002	0.000	0.00
wash gasoline									
total	1.000	1.000		1.000	1.000		1.0003	1.000	
Mass flow (kg/h)	5800	5800	0.00	494	494	0.00	312644	312644.000	0.00
Molar flow (kgmol/h)	321.9	321.9	0.00	27.42	27.42	0.00	12101.9	12091.615	0.08
Temperature (C)	46	46	0.00	46	46	0.00	46	46	0.00
Pressure (kg/cm2_g)	16.04	16.04	0.00	9.34	9.34	0.00	8.85	8.85	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	3023			3062			3063		
	Design	Simulation	%error	Design	Simulation	%error	Design	Simulation	%error
Hydrogen	0.1795	0.1795	0.02	0.1795	0.1795	0.02	0.1795	0.1795	0.02
CO	0.0011	0.0011	0.02	0.0011	0.0011	0.02	0.0011	0.0011	0.02
CO2	0	0.0000		0	0.0000		0	0	
H2S	0	0.0000		0	0.0000		0	0	
Methane	0.2994	0.2995	0.02	0.2994	0.2995	0.02	0.2994	0.2995	0.02
Acetylene	0.0057	0.0057	0.02	0.0057	0.0057	0.02	0.0057	0.0057	0.02
Ethylene	0.314	0.3141	0.02	0.314	0.3141	0.02	0.314	0.3141	0.02
Ethane	0.0549	0.0549	0.02	0.0549	0.0549	0.02	0.0549	0.0549	0.02
Propadiene	0.0042	0.0042	0.02	0.0042	0.0042	0.02	0.0042	0.0042	0.02
Propene	0.1027	0.1027	0.02	0.1027	0.1027	0.02	0.1027	0.1027	0.02
Propane	0.0031	0.0031	0.02	0.0031	0.0031	0.02	0.0031	0.0031	0.02
13-Butadiene	0.0112	0.0112	0.02	0.0112	0.0112	0.02	0.0112	0.0112	0.02
1-Butene	0.016	0.0160	0.02	0.016	0.0160	0.02	0.016	0.0160	0.02
n-Butane	0.005	0.0050	0.02	0.005	0.0050	0.02	0.005	0.0050	0.02
i-Pentane	0.0018	0.0018	0.02	0.0018	0.0018	0.02	0.0018	0.0018	0.02
1-Hexyne	0	0		0	0		0	0	
n-Heptane	0	0		0	0		0	0	
n-Octane	0	0		0	0		0	0	
Benzene	0.0002	0.0002	0.02	0.0002	0.0002	0.02	0.0002	0.0002	0.02
Toluene	0	0		0	0		0	0	
p-Xylene	0	0		0	0		0	0	
E-Benzene	0	0		0	0		0	0	
Styrene	0	0		0	0		0	0	
n-Nonane	0	0		0	0		0	0	
n-Decane	0	0		0	0		0	0	
n-C11	0	0		0	0		0	0	
H2O	0.0007	0.0007	0.02	0.0007	0.0007	0.02	0.0007	0.0007	0.02
Nitrogen	0.0003	0.0003	0.02	0.0003	0.0003	0.02	0.0003	0.0003	0.02
total	0.9998	1.0000		0.9998	1.0000		0.9998	1.000	
Mass flow (kg/h)	250208	250014.322	0.08	125254	125007.161	0.20	125254	125007.161	0.20
Molar flow (kgmol/h)	11184.8	11171.171	0.12	5592.4	5585.585	0.12	5592.4	5585.585	0.12
Temperature (C)	15.9	19.682	23.79	15.9	19.682	23.79	15.9	19.682	23.79
Pressure (kg/cm2_g)	36.94	36.94	0.00	36.94	36.94	0.00	36.94	36.94	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	3024			3067			4101		
	Design	Simulation	%error	Design	Simulation	%error	Design	Simulation	%error
Hydrogen	0.1797	0.1797	0.02	0.1797	0.1797	0.02	0.1797	0.1797	0.02
CO	0.0011	0.0011	0.09	0.0011	0.0011	0.09	0.0011	0.0011	0.09
CO2	0	0.0000		0	0.0000		0	0.0000	
H2S	0	0.0000		0	0.0000		0	0.0000	
Methane	0.2996	0.2997	0.02	0.2996	0.2997	0.02	0.2996	0.2997	0.02
Acetylene	0.0058	0.0057	1.64	0.0058	0.0057	1.64	0.0058	0.0057	1.64
Ethylene	0.3142	0.3143	0.03	0.3142	0.3143	0.03	0.3142	0.3143	0.03
Ethane	0.0549	0.0549	0.09	0.0549	0.0549	0.09	0.0549	0.0549	0.09
Propadiene	0.0042	0.0042	0.09	0.0042	0.0042	0.09	0.0042	0.0042	0.09
Propene	0.1027	0.1028	0.09	0.1027	0.1028	0.09	0.1027	0.1028	0.09
Propane	0.0031	0.0031	0.09	0.0031	0.0031	0.09	0.0031	0.0031	0.09
13-Butadiene	0.0112	0.0112	0.09	0.0112	0.0112	0.09	0.0112	0.0112	0.09
1-Butene	0.016	0.0160	0.09	0.016	0.0160	0.09	0.016	0.0160	0.09
n-Butane	0.0051	0.0050	1.87	0.0051	0.0050	1.87	0.0051	0.0050	1.87
i-Pentane	0.0018	0.0018	0.09	0.0018	0.0018	0.09	0.0018	0.0018	0.09
1-Hexyne	0	0.0000		0	0		0	0	
n-Heptane	0	0.0000		0	0		0	0	
n-Octane	0	0.0000		0	0		0	0	
Benzene	0.0002	0.0002	0.09	0.0002	0.0002	0.09	0.0002	0.0002	0.09
Toluene	0	0.0000		0	0		0	0	
p-Xylene	0	0.0000		0	0		0	0	
E-Benzene	0	0.0000		0	0		0	0	
Styrene	0	0.0000		0	0		0	0	
n-Nonane	0	0.0000		0	0		0	0	
n-Decane	0	0.0000		0	0		0	0	
n-C11	0	0.0000		0	0		0	0	
H2O	0	0.0000		0	0		0	0	
Nitrogen	0.0003	0.0003	0.09	0.0003	0.0003	0.09	0.0003	0.0003	0.09
total	0.9999	1.000		0.9999	1.000		0.9999	1.000	
Mass flow (kg/h)	125186	124958.289	0.18	185000	184773.289	0.12	185000	184773.289	0.12
Molar flow (kgmol/h)	5588.6	5582.872	0.10	8258.8	8255.280	0.04	8258.8	8255.280	0.04
Temperature (C)	15.9	15.9	0.00	15.9	15.9	0.00	-5.7	-5.7	0.00
Pressure (kg/cm2_g)	36.68	36.68	0.00	36.68	36.68	0.00	36.4	36.4	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	3064			4701		
	Design	Simulation	%error	Design	Simulation	%error
Hydrogen	0.1797	0.1797	0.02	0.1797	0.1797	0.02
CO	0.0011	0.0011	0.09	0.0011	0.0011	0.09
CO2	0	0		0	0	
H2S	0	0		0	0	
Methane	0.2996	0.2997	0.02	0.2996	0.2997	0.02
Acetylene	0.0058	0.0057	1.64	0.0058	0.0057	1.64
Ethylene	0.3142	0.3143	0.03	0.3142	0.3143	0.03
Ethane	0.0549	0.0549	0.09	0.0549	0.0549	0.09
Propadiene	0.0042	0.0042	0.09	0.0042	0.0042	0.09
Propene	0.1027	0.1028	0.09	0.1027	0.1028	0.09
Propane	0.0031	0.0031	0.09	0.0031	0.0031	0.09
13-Butadiene	0.0112	0.0112	0.09	0.0112	0.0112	0.09
1-Butene	0.016	0.0160	0.09	0.016	0.0160	0.09
n-Butane	0.0051	0.0050	1.87	0.0051	0.0050	1.87
i-Pentane	0.0018	0.0018	0.09	0.0018	0.0018	0.09
1-Hexyne	0	0		0	0	
n-Heptane	0	0		0	0	
n-Octane	0	0		0	0	
Benzene	0.0002	0.0002	0.09	0.0002	0.0002	0.09
Toluene	0	0		0	0	
p-Xylene	0	0		0	0	
E-Benzene	0	0		0	0	
Styrene	0	0		0	0	
n-Nonane	0	0		0	0	
n-Decane	0	0		0	0	
n-C11	0	0		0	0	
H2O	0	0		0	0	
Nitrogen	0.0003	0.0003	0.09	0.0003	0.0003	0.09
total	0.9999	1.000		0.9999	1.000	
Mass flow (kg/h)	125186	124958.289	0.18	65371	65143.289	0.35
Molar flow (kgmol/h)	5588.6	5582.872	0.10	2918.3	2910.465	0.27
Temperature (C)	15.9	15.9	0.00	-5.7	-5.7	0.00
Pressure (kg/cm2_g)	36.68	36.68		36.12	36.12	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	3306			2121			3908		
	design	Simulation	%error	design	Simulation	%error	design	Simulation	%error
Hydrogen	0	0.0000		0	0.0000		0	0.0000	
Carbon-Monoxide	0	0.0000		0	0.0000		0	0.0000	
Carbon-Dioxide	0	0.0000		0	0.0000		0	0.0000	
Hydrogen-Sulfide	0	0.0000		0	0.0000		0	0.0000	
Methane	0	0.0000		0.0006	0.0006	0.00	0.0006	0.0006	0.00
Acetylene	0	0.0000		0.0001	0.0001	0.00	0.0001	0.0001	0.00
Ethylene	0	0.0000		0.0018	0.0018	0.00	0.0018	0.0018	0.00
Ethane	0	0.0000		0.0005	0.0005	0.00	0.0005	0.0005	0.00
Propadiene	0	0.0000		0.0004	0.0004	0.00	0.0004	0.0004	0.00
Propylene	0	0.0000		0.003	0.0030	0.00	0.003	0.0030	0.00
Propane	0	0.0000		0.0001	0.0001	0.00	0.0001	0.0001	0.00
1,3-Butadiene	0	0.0000		0.0026	0.0026	0.00	0.0026	0.0026	0.00
1-Butene	0	0.0000		0.0026	0.0026	0.00	0.0026	0.0026	0.00
n-Butane	0	0.0000		0.0008	0.0008	0.00	0.0008	0.0008	0.00
2-Methyl-Butane	0	0.0000		0.0027	0.0027	0.00	0.0027	0.0027	0.00
1-Hexyne	0	0.0000		0.0021	0.0021	0.00	0.0021	0.0021	0.00
n-Heptane	0	0.0000		0.0022	0.0022	0.00	0.0022	0.0022	0.00
n-Octane	0	0.0000		0.0026	0.0026	0.00	0.0026	0.0026	0.00
Benzene	0	0.0000		0.0206	0.0206	0.00	0.0206	0.0206	0.00
Toluene	0	0.0000		0.045	0.0450	0.00	0.045	0.0450	0.00
P-Xylene	0	0.0000		0.0355	0.0355	0.00	0.0355	0.0355	0.00
Ethylbenzene	0	0.0000		0	0.0000		0	0.0000	
Styrene	0	0.0000		0.0375	0.0375	0.00	0.0375	0.0375	0.00
M-Methyl-Styrene	0	0.0000		0.7904	0.6088		0.7904	0.6088	
n-Decane	0	0.0000			0.1816			0.1816	
n-Undecane	0	0.0000			0.0000			0.0000	
n-Dodecane	0	0.0000		0.0343	0.0343	0.00	0.0343	0.0343	0.00
n-Hexadecane	0	0.0000		0	0.0000		0	0.0000	
Sodium-Hydroxide	0.0072	0.0000	100.00	0	0.0000		0	0.0000	
Sodium-Carbonate	0.0182	0.0079	56.59	0	0.0000		0	0.0000	
Sodium-Sulfide	0.0023	0.0000	100.00	0	0.0000		0	0.0000	
Water	0.9724	0.9921	2.03	0.0145	0.0145	0.00	0.0145	0.0145	0.00
Nitrogen	0	0.0000		0	0.0000		0	0.0000	
wash gasoline									
total	1.000	1.000		0.9999	1.000		0.9999	1.000	
								2373	
Mass flow (kg/h)	4747	4747.258	0.01	2373	2373	0	2373	19.98	0
Molar flow (kgmol/h)	238.5	253.761	6.40	19.8	19.98	0.91	19.5	46	2.46
Temperature (C)	46	46	0.00	85.4	85.4	0	46	2.9	0
Pressure (kg/cm2_g)	9.53	9.110	4.41	6.7	6.7	0	2.9	1.000	0

Simulation Report – ECC 860 KTA

Working Stage 6

	3901			3902			3093		
	design	Simulation	%error	design	simulation	%error	design	simulation	%error
Hydrogen	0	0.0000		0	0.0000		0	0.0000	
Carbon-Monoxide	0	0.0000		0	0.0000		0	0.0000	
Carbon-Dioxide	0	0.0000		0	0.0000		0	0.0000	
Hydrogen-Sulfide	0	0.0000		0	0.0000		0	0.0000	
Methane	0	0.0000		0	0.0005		0	0.0000	
Acetylene	0	0.0000		0	0.0001		0	0.0000	
Ethylene	0	0.0001		0	0.0014		0	0.0000	
Ethane	0	0.0000		0	0.0004		0	0.0000	
Propadiene	0	0.0000		0	0.0003		0	0.0000	
Propylene	0	0.0002		0	0.0023		0	0.0000	
Propane	0	0.0000		0	0.0001		0	0.0000	
1,3-Butadiene	0	0.0002		0	0.0020		0	0.0000	
1-Butene	0	0.0002		0	0.0020		0	0.0000	
n-Butane	0	0.0001		0	0.0006		0	0.0000	
2-Methyl-Butane	0	0.0002		0	0.0021		0	0.0000	
1-Hexyne	0	0.0002		0	0.0016		0	0.0000	
n-Heptane	0	0.0002		0	0.0017		0	0.0000	
n-Octane	0	0.0002		0	0.0020		0	0.0000	
Benzene	0	0.0016		0	0.0161		0	0.0000	
Toluene	0	0.0035		0	0.0351		0	0.0000	
P-Xylene	0	0.0027		0	0.0277		0	0.0000	
Ethylbenzene	0	0.0000		0	0.0000		0	0.0000	
Styrene	0	0.0029		0	0.0292		0	0.0000	
M-Methyl-Styrene	0	0.0471		0	0.4748		0	0.0000	
n-Decane	0	0.0140		0	0.1416		0	0.0000	
n-Undecane	0	0.0000		0	0.0000		0	0.0000	
n-Dodecane	0	0.0027		0	0.0268		0	0.0000	
n-Hexadecane	0	0.0000		0	0.0000		0	0.0000	
Sodium-Hydroxide	0.0067	0.0066	1.49	0.0017	0.0000	100.00	0.0072	0.0000	100.00
Sodium-Carbonate	0.0168	0.0168	0.00	0.0042	0.0042	0.00	0.0182	0.0076	58.24
Sodium-Sulfide	0.0021	0.0021	0.00	0.0005	0.0000	100.00	0.0023	0.0000	100.00
Water	0.8987	0.8982	0.06	0.2273	0.2273	0.00	0.9724	0.9924	2.06
Nitrogen	0	0.0000		0	0.0000		0	0.0000	
wash gasoline	0.0757			0.7663					
total	1.000	1.000		1.000	1.000		1.000	1.000	
Mass flow (kg/h)	7120	7120	0.00	2492	2484	0.32	4628	4636	0.17
Molar flow (kgmol/h)	258	273.7	6.09	25.5	25.62	0.47	232.5	248.1	6.71
Temperature (C)	46	43.51	5.41	46	46	0.00	46	46	0.00
Pressure (kg/cm2_g)	2.1	2.1	0.00	2.1	2.1	0.00	2.1	2.1	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	2505			3904			3905		
	design	simulation	%error	design	simulation	%error	design	simulation	%error
Hydrogen	0	0.0000		0	0.0000		0	0.0000	
Carbon-Monoxide	0	0.0000		0	0.0000		0	0.0000	
Carbon-Dioxide	0	0.0000		0	0.0000		0	0.0000	
Hydrogen-Sulfide	0	0.0000		0	0.0000		0	0.0000	
Methane	0	0.0000		0	0.0001		0	0.0000	
Acetylene	0	0.0000		0	0.0000		0	0.0000	
Ethylene	0	0.0000		0	0.0004		0	0.0000	
Ethane	0	0.0000		0	0.0001		0	0.0000	
Propadiene	0	0.0000		0	0.0001		0	0.0000	
Propylene	0	0.0000		0	0.0006		0	0.0000	
Propane	0	0.0000		0	0.0000		0	0.0000	
1,3-Butadiene	0	0.0000		0	0.0005		0	0.0000	
1-Butene	0	0.0000		0	0.0005		0	0.0000	
n-Butane	0	0.0000		0	0.0002		0	0.0000	
2-Methyl-Butane	0	0.0000		0	0.0006		0	0.0000	
1-Hexyne	0	0.0000		0	0.0004		0	0.0000	
n-Heptane	0	0.0000		0	0.0005		0	0.0000	
n-Octane	0	0.0000		0	0.0005		0	0.0000	
Benzene	0	0.0000		0	0.0043		0	0.0000	
Toluene	0	0.0000		0	0.0095		0	0.0000	
P-Xylene	0	0.0000		0	0.0075		0	0.0000	
Ethylbenzene	0	0.0000		0	0.0000		0	0.0000	
Styrene	0	0.0000		0	0.0079		0	0.0000	
M-Methyl-Styrene	0	0.0000		0	0.1283		0	0.0000	
n-Decane	0	0.0000		0	0.0383		0	0.0000	
n-Undecane	0	0.0000		0	0.0000		0	0.0000	
n-Dodecane	0	0.0000		0	0.0072		0	0.0000	
n-Hexadecane	0	0.0000		0	0.0000		0	0.0000	
Sodium-Hydroxide	0	0.0000		0.0005	0.0000	100.00	0.0006	0.0000	100
Sodium-Carbonate	0	0.0000		0.0011	0.0011	0.00	0.0014	0.0014	0.00
Sodium-Sulfide	0	0.0000		0.0001	0.0000	100.00	0.0002	0.0000	100
Water	1	1.0000	0.00	0.7918	0.7911	0.09	0.9978	0.9986	0.080176
Nitrogen	0	0.0000		0	0.0000		0	0.0000	
wash gasoline				0.2064					
total	1.000	1.000		0.9999	1.000		1.000	1.000	
Mass flow (kg/h)	1246	1246	0.00	3738	3730	0.21	1365	1362	0.22
Molar flow (kgmol/h)	69.16	69.16	0.01	94.7	94.78	0.08	75.1	75.09	0.01
Temperature (C)	121.3	121.3	0.00	119.9	119.9	0.00	119.9	119.9	0.00
Pressure (kg/cm2_g)	10.5	10.5	0.00	2.85	2.85	0.00	2.1	2.1	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	3906			3907		
	design	simulation	%error	design	simulation	%error
Hydrogen	0	0.0000			0.0000	
Carbon-Monoxide	0	0.0000			0.0000	
Carbon-Dioxide	0	0.0000			0.0000	
Hydrogen-Sulfide	0	0.0000			0.0000	
Methane	0	0.0000			0.0006	
Acetylene	0	0.0000			0.0001	
Ethylene	0	0.0000			0.0018	
Ethane	0	0.0000			0.0005	
Propadiene	0	0.0000			0.0004	
Propylene	0	0.0000			0.0030	
Propane	0	0.0000			0.0001	
1,3-Butadiene	0	0.0000			0.0026	
1-Butene	0	0.0000			0.0026	
n-Butane	0	0.0000			0.0008	
2-Methyl-Butane	0	0.0000			0.0027	
1-Hexyne	0	0.0000			0.0021	
n-Heptane	0	0.0000			0.0022	
n-Octane	0	0.0000			0.0026	
Benzene	0	0.0000			0.0209	
Toluene	0	0.0000			0.0457	
P-Xylene	0	0.0000			0.0360	
Ethylbenzene	0	0.0000			0.0000	
Styrene	0	0.0000			0.0381	
M-Methyl-Styrene	0	0.0000			0.6178	
n-Decane	0	0.0000			0.1843	
n-Undecane	0	0.0000			0.0000	
n-Dodecane	0	0.0000			0.0348	
n-Hexadecane	0	0.0000			0.0000	
Sodium-Hydroxide	0.0056	0.0000	100		0.0000	
Sodium-Carbonate	0.0141	0.0062	56		0.0000	
Sodium-Sulfide	0.0018	0.0000	100		0.0000	
Water	0.9786	0.9938	2		0.0000	
Nitrogen		0.0000			0.0000	
wash gasoline						
total	1.000	1.000		1.000	1.000	
Mass flow (kg/h)	5993	5998.478	0.09	2373	2368	0.21
Molar flow (kgmol/h)	307.6	323.214	5.08	19.5	19.69	0.97
Temperature (C)	62.8	62.8	0.00	119.9	119.953	0.04
Pressure (kg/cm2_g)	1.85	1.85	0.00	2.79	2.79	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	1123			1243			3012		
	Simulation	Design	%-Error	Simulation	Design	%-Error	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	0.7613	0.7612	0.01	0.8758	0.8757	0.01	0.1557	0.1557	0.00
Comp Mole Frac (CO)	0	0	0.00	0	0	0.00	0.0011	0.0011	0.00
Comp Mole Frac (CO2)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (H2S)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (Methane)	0.1569	0.1569	0.00	0.0932	0.0932	0.00	0.2748	0.2748	0.00
Comp Mole Frac (Acetylene)	0	0	0.00	0	0	0.00	0.0053	0.0053	0.00
Comp Mole Frac (Ethylene)	0	0	0.00	0	0	0.00	0.2902	0.2902	0.00
Comp Mole Frac (Ethane)	0	0	0.00	0	0	0.00	0.0507	0.0507	0.00
Comp Mole Frac (Propadiene)	0	0	0.00	0	0	0.00	0.0048	0.0048	0.00
Comp Mole Frac (Propene)	0.0004	0.0004	0.00	0	0	0.00	0.1063	0.1063	0.00
Comp Mole Frac (Propane)	0.0013	0.0013	0.00	0	0	0.00	0.0033	0.0033	0.00
Comp Mole Frac (13-Butadiene)	0	0	0.00	0.0001	0.0001	0.00	0.0206	0.0206	0.00
Comp Mole Frac (1-Butene)	0.0019	0.0019	0.00	0.0033	0.0033	0.00	0.0281	0.0281	0.00
Comp Mole Frac (n-Butane)	0.0697	0.0697	0.00	0.0004	0.0004	0.00	0.0093	0.0093	0.00
Comp Mole Frac (i-Pentane)	0.0027	0.0027	0.00	0.0161	0.0161	0.00	0.0162	0.0162	0.00
Comp Mole Frac (1-Hexyne)	0	0	0.00	0.0016	0.0016	0.00	0.0047	0.0047	0.00
Comp Mole Frac (n-Heptane)	0	0	0.00	0.0002	0.0002	0.00	0.0013	0.0013	0.00
Comp Mole Frac (n-Octane)	0	0	0.00	0	0	0.00	0.0001	0.0001	0.00
Comp Mole Frac (Benzene)	0	0	0.00	0.0039	0.0039	0.00	0.0137	0.0137	0.00
Comp Mole Frac (Toluene)	0	0	0.00	0.0009	0.0009	0.00	0.0031	0.0031	0.00
Comp Mole Frac (p-Xylene)	0	0	0.00	0.0001	0.0001	0.00	0.0001	0.0001	0.00
Comp Mole Frac (E-Benzene)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (n-Nonane)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (Styrene)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (n-C11)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (n-Decane)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (H2O)	0.0005	0.0005	0.00	0.0001	0.0001	0.00	0.0103	0.0103	0.00
Comp Mole Frac (Nitrogen)	0.0053	0.0053	0.00	0.0043	0.0043	0.00	0.0002	0.0002	0.00
		0.9999			0.9999			0.9999	
	1123			1243			3012		
Mass Flow (kg/h)	998	998	0.00	250	250	0.00	312644	312644	0.00
Molar Flow (kgmole/h)	115.55	110.3	4.76	47.09	47.3	0.44	12091.61	12101.9	0.09
Temperature (C)	9.3	9.3	0.00	44.1	44.1	0.00	46	46	0.00
Pressure (kg/cm2_g)	18.39	18.39	0.00	18.53	18.53	0.00	8.85	8.85	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	3013			3014			3015		
	Simulation	Design	%-Error	Simulation	Design	%-Error	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	0.152	0.1518	0.13	0.1507	0.1506	0.07	0.1507	0.1506	0.07
Comp Mole Frac (CO)	0.0011	0.001	10.00	0.0011	0.0010	10.00	0.0011	0.001	10.00
Comp Mole Frac (CO2)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (H2S)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (Methane)	0.2706	0.2705	0.04	0.2684	0.2683	0.04	0.2684	0.2683	0.04
Comp Mole Frac (Acetylene)	0.0052	0.0054	3.70	0.0051	0.0053	3.77	0.0051	0.0053	3.77
Comp Mole Frac (Ethylene)	0.2933	0.2933	0.00	0.2909	0.2909	0.00	0.2909	0.2909	0.00
Comp Mole Frac (Ethane)	0.0521	0.0521	0.00	0.0516	0.0517	0.19	0.0516	0.0517	0.19
Comp Mole Frac (Propadiene)	0.0049	0.0049	0.00	0.0049	0.0048	2.08	0.0049	0.0048	2.08
Comp Mole Frac (Propene)	0.1088	0.109	0.18	0.1079	0.1081	0.19	0.1079	0.1081	0.19
Comp Mole Frac (Propane)	0.0034	0.0034	0.00	0.0034	0.0033	3.03	0.0034	0.0033	3.03
Comp Mole Frac (13-Butadiene)	0.0211	0.0211	0.00	0.021	0.0209	0.48	0.021	0.0209	0.48
Comp Mole Frac (1-Butene)	0.0289	0.0289	0.00	0.0286	0.0286	0.00	0.0286	0.0286	0.00
Comp Mole Frac (n-Butane)	0.0096	0.0096	0.00	0.0095	0.0095	0.00	0.0095	0.0095	0.00
Comp Mole Frac (i-Pentane)	0.0163	0.0162	0.62	0.0162	0.0161	0.62	0.0162	0.0161	0.62
Comp Mole Frac (1-Hexyne)	0.0046	0.0046	0.00	0.0046	0.0046	0.00	0.0046	0.0046	0.00
Comp Mole Frac (n-Heptane)	0.0013	0.0013	0.00	0.0013	0.0013	0.00	0.0013	0.0013	0.00
Comp Mole Frac (n-Octane)	0.0001	0.0001	0.00	0.0001	0.0001	0.00	0.0001	0.0001	0.00
Comp Mole Frac (Benzene)	0.0135	0.0135	0.00	0.0134	0.0134	0.00	0.0134	0.0134	0.00
Comp Mole Frac (Toluene)	0.003	0.0031	3.23	0.003	0.003	0.00	0.003	0.003	0.00
Comp Mole Frac (p-Xylene)	0.0001	0.0001	0.00	0.0001	0.0001	0.00	0.0001	0.0001	0.00
Comp Mole Frac (E-Benzene)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (n-Nonane)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (Styrene)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (n-C11)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (n-Decane)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (H2O)	0.01	0.01	0.00	0.0181	0.0181	0.00	0.0181	0.0181	0.00
Comp Mole Frac (Nitrogen)	0.0002	0.0002	0.00	0.0002	0.0002	0.00	0.0002	0.0002	0.00
		0.9999			0.9999			0.9999	
	3013			3014			3015		
Mass Flow (kg/h)	323352.1	323930	0.18	325554.502	325778	0.07	325554.502	325778	0.07
Molar Flow (kgmole/h)	12405.5	12432.2	0.21	12515.2603	12534.7	0.16	12515.2603	12534.7	0.16
Temperature (C)	45	45	0.00	89.99964268	90	0.00	41.22537917	41	0.55
Pressure (kg/cm2_g)	8.74	8.74	0.00	18.85	18.85	0.00	18.43	18.43	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	3016			3017			3018		
	Simulation	Design	%-Error	Simulation	Design	%-Error	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	0.1519	0.1518	0.07	0.1548	0.1545	0.19	0.1548	0.1545	0.19
Comp Mole Frac (CO)	0.0011	0.001	10.00	0.001	0.001	0.00	0.001	0.001	0.00
Comp Mole Frac (CO2)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (H2S)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (Methane)	0.2706	0.2705	0.04	0.2639	0.2644	0.19	0.2639	0.2644	0.19
Comp Mole Frac (Acetylene)	0.0052	0.0054	3.70	0.0049	0.0053	7.55	0.0049	0.0053	7.55
Comp Mole Frac (Ethylene)	0.2933	0.2933	0.00	0.2959	0.2961	0.07	0.2959	0.2961	0.07
Comp Mole Frac (Ethane)	0.052	0.0521	0.19	0.0536	0.0537	0.19	0.0536	0.0537	0.19
Comp Mole Frac (Propadiene)	0.0049	0.0049	0.00	0.0052	0.0055	5.45	0.0052	0.0055	5.45
Comp Mole Frac (Propene)	0.1088	0.1089	0.09	0.1225	0.1227	0.16	0.1225	0.1227	0.16
Comp Mole Frac (Propane)	0.0034	0.0034	0.00	0.0039	0.0039	0.00	0.0039	0.0039	0.00
Comp Mole Frac (13-Butadiene)	0.0211	0.0211	0.00	0.0253	0.0245	3.27	0.0253	0.0245	3.27
Comp Mole Frac (1-Butene)	0.0289	0.0289	0.00	0.035	0.0353	0.85	0.035	0.0353	0.85
Comp Mole Frac (n-Butane)	0.0096	0.0096	0.00	0.0122	0.0126	3.17	0.0122	0.0126	3.17
Comp Mole Frac (i-Pentane)	0.0163	0.0162	0.62	0.0135	0.0124	8.87	0.0135	0.0124	8.87
Comp Mole Frac (1-Hexyne)	0.0046	0.0046	0.00	0.0012	0.0014	14.29	0.0012	0.0014	14.29
Comp Mole Frac (n-Heptane)	0.0013	0.0013	0.00	0.0001	0.0001	0.00	0.0001	0.0001	0.00
Comp Mole Frac (n-Octane)	0.0001	0.0001	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (Benzene)	0.0135	0.0135	0.00	0.004	0.004	0.00	0.004	0.004	0.00
Comp Mole Frac (Toluene)	0.003	0.0031	3.23	0.0003	0.0003	0.00	0.0003	0.0003	0.00
Comp Mole Frac (p-Xylene)	0.0001	0.0001	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (E-Benzene)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (n-Nonane)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (Styrene)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (n-C11)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (n-Decane)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (H2O)	0.0101	0.0102	0.98	0.0023	0.0023	0.00	0.0023	0.0023	0.00
Comp Mole Frac (Nitrogen)	0.0002	0.0002	0.00	0.0003	0.0002	50.00	0.0003	0.0002	50.00
		1.0002			1.0002			1.0002	
	3016			3017			3018		
Mass Flow (kg/h)	323376.57	323976	0.19	335894.9412	335097	0.24	335894.9412	335097	0.24
Molar Flow (kgmole/h)	12406.86	12434.7	0.22	13085.12549	13083.1	0.02	13085.12549	13083.1	0.02
Temperature (C)	45.31	45.3	0.02	30.70000582	30.7	0.00	82.80521434	82.8	0.01
Pressure (kg/cm2_g)	8.78	8.78	0.00	18.31	18.31	0.00	38.28	38.28	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	3019			3020			3021		
	Simulation	Design	%-Error	0.27	Design	%-Error	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	0.1548	0.1545	0.19	0.00	0.1565	0.38	0.1571	0.1565	0.38
Comp Mole Frac (CO)	0.001	0.001	0.00	0.00	0.001	10.00	0.0011	0.001	10.00
Comp Mole Frac (CO2)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (H2S)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (Methane)	0.2639	0.2644	0.19	0.269	0.269	0.00	0.269	0.269	0.00
Comp Mole Frac (Acetylene)	0.0049	0.0053	7.55	0.005	0.0054	7.41	0.005	0.0054	7.41
Comp Mole Frac (Ethylene)	0.2959	0.2961	0.07	0.3054	0.3054	0.00	0.3054	0.3054	0.00
Comp Mole Frac (Ethane)	0.0536	0.0537	0.19	0.0554	0.0555	0.18	0.0554	0.0555	0.18
Comp Mole Frac (Propadiene)	0.0052	0.0055	5.45	0.0053	0.0055	3.64	0.0053	0.0055	3.64
Comp Mole Frac (Propene)	0.1225	0.1227	0.16	0.1258	0.1262	0.32	0.1258	0.1262	0.32
Comp Mole Frac (Propane)	0.0039	0.0039	0.00	0.004	0.0039	2.56	0.004	0.0039	2.56
Comp Mole Frac (13-Butadiene)	0.0253	0.0245	3.27	0.0212	0.0211	0.47	0.0212	0.0211	0.47
Comp Mole Frac (1-Butene)	0.035	0.0353	0.85	0.0298	0.0304	1.97	0.0298	0.0304	1.97
Comp Mole Frac (n-Butane)	0.0122	0.0126	3.17	0.01	0.0104	3.85	0.01	0.0104	3.85
Comp Mole Frac (i-Pentane)	0.0135	0.0124	8.87	0.0076	0.0064	18.75	0.0076	0.0064	18.75
Comp Mole Frac (1-Hexyne)	0.0012	0.0014	14.29	0.0003	0.0003	0.00	0.0003	0.0003	0.00
Comp Mole Frac (n-Heptane)	0.0001	0.0001	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (n-Octane)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (Benzene)	0.004	0.004	0.00	0.0012	0.0011	9.09	0.0012	0.0011	9.09
Comp Mole Frac (Toluene)	0.0003	0.0003	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (p-Xylene)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (E-Benzene)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (n-Nonane)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (Styrene)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (n-C11)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (n-Decane)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (H2O)	0.0023	0.0023	0.00	0.0015	0.0015	0.00	0.0015	0.0015	0.00
Comp Mole Frac (Nitrogen)	0.0003	0.0002	50.00	0.0003	0.0002	50.00	0.0003	0.0002	50.00
		1.0002			0.9998			0.9998	
	3019			3020			3021		
Mass Flow (kg/h)	335894.9412	335097	0.24	0.27	320223	0.20	319389.42	320223	0.26
Molar Flow (kgmole/h)	13085.12549	13083.1	0.02	0.00	12913	0.23	12878.16	12913	0.27
Temperature (C)	40.80639307	41	0.47	0.00	35.5	0.00	27.3	27.3	0.00
Pressure (kg/cm2_g)	37.81	37.81	0.00	37.47	37.47	0.00	37.31	37.31	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	3022			3023			3029		
	Simulation	Design	%-Error	Simulation	Design	%-Error	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	0.1571	0.1565	0.38	0.1801	0.1795	0.33	0	0	0.00
Comp Mole Frac (CO)	0.0011	0.001	10.00	0.0012	0.0011	9.09	0	0	0.00
Comp Mole Frac (CO2)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (H2S)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (Methane)	0.269	0.269	0.00	0.2994	0.2994	0.00	0	0	0.00
Comp Mole Frac (Acetylene)	0.005	0.0054	7.41	0.0057	0.0057	0.00	0	0	0.00
Comp Mole Frac (Ethylene)	0.3054	0.3054	0.00	0.3141	0.314	0.03	0	0	0.00
Comp Mole Frac (Ethane)	0.0554	0.0555	0.18	0.0549	0.0549	0.00	0	0	0.00
Comp Mole Frac (Propadiene)	0.0053	0.0055	3.64	0.0045	0.0042	7.14	0	0	0.00
Comp Mole Frac (Propene)	0.1258	0.1262	0.32	0.1025	0.1027	0.19	0	0	0.00
Comp Mole Frac (Propane)	0.004	0.0039	2.56	0.0031	0.0031	0.00	0	0	0.00
Comp Mole Frac (13-Butadiene)	0.0212	0.0211	0.47	0.0108	0.0112	3.57	0	0	0.00
Comp Mole Frac (1-Butene)	0.0298	0.0304	1.97	0.0155	0.016	3.13	0	0	0.00
Comp Mole Frac (n-Butane)	0.01	0.0104	3.85	0.0049	0.005	2.00	0	0	0.00
Comp Mole Frac (i-Pentane)	0.0076	0.0064	18.75	0.0024	0.0018	33.33	0	0	0.00
Comp Mole Frac (1-Hexyne)	0.0003	0.0003	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (n-Heptane)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (n-Octane)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (Benzene)	0.0012	0.0011	9.09	0.0002	0.0002	0.00	0	0	0.00
Comp Mole Frac (Toluene)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (p-Xylene)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (E-Benzene)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (n-Nonane)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (Styrene)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (n-C11)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (n-Decane)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (H2O)	0.0015	0.0015	0.00	0.0005	0.0007	28.57	1	1	0.00
Comp Mole Frac (Nitrogen)	0.0003	0.0002	50.00	0.0003	0.0003	0.00	0	0	0.00
		0.9998			0.9998			1	
	3022			3023			3029		
Mass Flow (kg/h)	319389.42	320223	0.26	250014.32	250508	0.20	3994.25	3934	1.53
Molar Flow (kgmole/h)	12878.16	12913	0.27	11171.17	11184.8	0.12	221.72	218.4	1.52
Temperature (C)	16	16	0.00	19.68	15.9	23.77	45.01	45	0.02
Pressure (kg/cm2_g)	37.07	37.07	0.00	36.94	36.94	0.00	8.74	8.74	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	3030			3031			3032		
	Simulation	Design	%-Error	Simulation	Design	%-Error	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	0	0	0.00	0.0069	0.0069	0.00	0	0	0.00
Comp Mole Frac (CO)	0	0	0.00	0.0001	0	0.00	0	0	0.00
Comp Mole Frac (CO2)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (H2S)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (Methane)	0	0	0.00	0.0569	0.0583	2.40	0	0	0.00
Comp Mole Frac (Acetylene)	0	0	0.00	0.0003	0.0027	88.89	0	0	0.00
Comp Mole Frac (Ethylene)	0	0	0.00	0.1909	0.1915	0.31	0	0	0.00
Comp Mole Frac (Ethane)	0	0	0.00	0.0465	0.0468	0.64	0	0	0.00
Comp Mole Frac (Propadiene)	0	0	0.00	0.0095	0.0128	25.78	0	0	0.00
Comp Mole Frac (Propene)	0	0	0.00	0.2413	0.2418	0.21	0	0	0.00
Comp Mole Frac (Propane)	0	0	0.00	0.0085	0.0085	0.00	0	0	0.00
Comp Mole Frac (13-Butadiene)	0	0	0.00	0.1108	0.1035	7.05	0	0	0.00
Comp Mole Frac (1-Butene)	0	0	0.00	0.1505	0.1497	0.53	0	0	0.00
Comp Mole Frac (n-Butane)	0	0	0.00	0.0551	0.0573	3.84	0	0	0.00
Comp Mole Frac (i-Pentane)	0	0	0.00	0.0791	0.0749	5.61	0	0	0.00
Comp Mole Frac (1-Hexyne)	0	0	0.00	0.0079	0.0093	15.05	0	0	0.00
Comp Mole Frac (n-Heptane)	0	0	0.00	0.0009	0.001	10.00	0	0	0.00
Comp Mole Frac (n-Octane)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (Benzene)	0	0	0.00	0.0264	0.0264	0.00	0	0	0.00
Comp Mole Frac (Toluene)	0	0	0.00	0.0022	0.0022	0.00	0	0	0.00
Comp Mole Frac (p-Xylene)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (E-Benzene)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (n-Nonane)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (Styrene)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (n-C11)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (n-Decane)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (H2O)	1	1	0.00	0.006	0.0063	4.76	1	1	0.00
Comp Mole Frac (Nitrogen)	0	0	0.00	0	0	0.00	0	0	0.00
		1			0.9999			1	
	3030			3031			3032		
Mass Flow (kg/h)	3969.8	3888	2.10	85437.94	84394	1.24	245.19	195	25.74
Molar Flow (kgmole/h)	220.36	215.8	2.11	1895.28	1887.5	0.41	13.61	10.8	26.02
Temperature (C)	30.7	30.7	0.00	35.5	35.5	0.00	15.9	15.9	0.00
Pressure (kg/cm2_g)	18.31	18.31	0.00	37.47	37.47	0.00	36.94	36.94	0.00

Simulation Report – ECC 860 KTA
Working Stage 6

	3033			3034			3039		
	Simulation	Design	%-Error	Simulation	Design	%-Error	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	0.0073	0.0073	0.00	0.0026	0.0026	0.00	0.0069	0.0069	0.00
Comp Mole Frac (CO)	0.0001	0	0.00	0	0	0.00	0.0001	0	0.00
Comp Mole Frac (CO2)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (H2S)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (Methane)	0.071	0.0724	1.93	0.0276	0.0292	5.48	0.0569	0.0583	2.40
Comp Mole Frac (Acetylene)	0.0005	0.0034	85.29	0.0001	0.0019	94.74	0.0003	0.0027	88.89
Comp Mole Frac (Ethylene)	0.2509	0.2509	0.00	0.1023	0.104	1.63	0.1909	0.1915	0.31
Comp Mole Frac (Ethane)	0.0598	0.0599	0.17	0.0258	0.0264	2.27	0.0465	0.0468	0.64
Comp Mole Frac (Propadiene)	0.0109	0.014	22.14	0.0081	0.0103	21.36	0.0095	0.0128	25.78
Comp Mole Frac (Propene)	0.2803	0.2804	0.04	0.1602	0.1596	0.38	0.2413	0.2418	0.21
Comp Mole Frac (Propane)	0.0097	0.0096	1.04	0.0058	0.0058	0.00	0.0085	0.0085	0.00
Comp Mole Frac (13-Butadiene)	0.09	0.0853	5.51	0.1104	0.1058	4.35	0.1108	0.1035	7.05
Comp Mole Frac (1-Butene)	0.1245	0.1246	0.08	0.1449	0.1396	3.80	0.1505	0.1497	0.53
Comp Mole Frac (n-Butane)	0.0433	0.0453	4.42	0.0562	0.0546	2.93	0.0551	0.0573	3.84
Comp Mole Frac (i-Pentane)	0.0417	0.0362	15.19	0.138	0.1414	2.40	0.0791	0.0749	5.61
Comp Mole Frac (1-Hexyne)	0.0018	0.0023	21.74	0.0445	0.0443	0.45	0.0079	0.0093	15.05
Comp Mole Frac (n-Heptane)	0.0001	0.0001	0.00	0.0123	0.0125	1.60	0.0009	0.001	10.00
Comp Mole Frac (n-Octane)	0	0	0.00	0.0009	0.0012	25.00	0	0	0.00
Comp Mole Frac (Benzene)	0.0075	0.0073	2.74	0.1291	0.1284	0.55	0.0264	0.0264	0.00
Comp Mole Frac (Toluene)	0.0003	0.0003	0.00	0.0293	0.0294	0.34	0.0022	0.0022	0.00
Comp Mole Frac (p-Xylene)	0	0	0.00	0.0009	0.0007	28.57	0	0	0.00
Comp Mole Frac (E-Benzene)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (n-Nonane)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (Styrene)	0	0	0.00	0	0.0002	100.00	0	0	0.00
Comp Mole Frac (n-C11)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (n-Decane)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (H2O)	0.0004	0.0007	42.86	0.0009	0.0023	60.87	0.006	0.0063	4.76
Comp Mole Frac (Nitrogen)	0	0	0.00	0	0	0.00	0	0	0.00
		1			1.0002			0.9999	
	3033			3034			3039		
Mass Flow (kg/h)	69129.91	69520	0.56	72463.38	72629	0.23	85438.22	84394	1.24
Molar Flow (kgmole/h)	1693.38	1717.5	1.40	1279.15	1291.7	0.97	1895.29	1887.5	0.41
Temperature (C)	15.9	15.9	0.00	30.7	30.7	0.00	25.6	25.6	0.00
Pressure (kg/cm2_g)	36.94	36.94	0.00	18.31	18.31	0.00	18.43	18.43	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	3050			3080			3201		
	Simulation	Design	%-Error	Simulation	Design	%-Error	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	0.1378	0.1374	0.29	0	0	0.00	0.0026	0.0026	0.00
Comp Mole Frac (CO)	0.0009	0.0009	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (CO2)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (H2S)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (Methane)	0.2418	0.2421	0.12	0	0	0.00	0.0276	0.0292	5.48
Comp Mole Frac (Acetylene)	0.0044	0.0051	13.73	0	0	0.00	0.0001	0.0019	94.74
Comp Mole Frac (Ethylene)	0.2907	0.2908	0.03	0	0	0.00	0.1023	0.104	1.63
Comp Mole Frac (Ethane)	0.0543	0.0544	0.18	0	0	0.00	0.0258	0.0264	2.27
Comp Mole Frac (Propadiene)	0.0059	0.0064	7.81	0	0	0.00	0.0081	0.0103	21.36
Comp Mole Frac (Propene)	0.1406	0.141	0.28	0	0	0.00	0.1602	0.1596	0.38
Comp Mole Frac (Propane)	0.0045	0.0045	0.00	0	0	0.00	0.0058	0.0058	0.00
Comp Mole Frac (13-Butadiene)	0.0327	0.0316	3.48	0	0	0.00	0.1104	0.1058	4.35
Comp Mole Frac (1-Butene)	0.0453	0.0457	0.88	0	0	0.00	0.1449	0.1396	3.80
Comp Mole Frac (n-Butane)	0.0158	0.0164	3.66	0	0	0.00	0.0562	0.0546	2.93
Comp Mole Frac (i-Pentane)	0.0167	0.0151	10.60	0	0	0.00	0.138	0.1414	2.40
Comp Mole Frac (1-Hexyne)	0.0012	0.0015	20.00	0	0	0.00	0.0445	0.0443	0.45
Comp Mole Frac (n-Heptane)	0.0001	0.0001	0.00	0	0	0.00	0.0123	0.0125	1.60
Comp Mole Frac (n-Octane)	0	0	0.00	0	0	0.00	0.0009	0.0012	25.00
Comp Mole Frac (Benzene)	0.0044	0.0044	0.00	0	0	0.00	0.1291	0.1284	0.55
Comp Mole Frac (Toluene)	0.0003	0.0003	0.00	0	0	0.00	0.0293	0.0294	0.34
Comp Mole Frac (p-Xylene)	0	0	0.00	0	0	0.00	0.0009	0.0007	28.57
Comp Mole Frac (E-Benzene)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (n-Nonane)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (Styrene)	0	0	0.00	0	0	0.00	0	0.0002	100.00
Comp Mole Frac (n-C11)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (n-Decane)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (H2O)	0.0021	0.0021	0.00	1	1	0.00	0.0009	0.0023	60.87
Comp Mole Frac (Nitrogen)	0.0002	0.0002	0.00	0	0	0.00	0	0	0.00
		1			1			1.0002	
	3050			3080			3201		
Mass Flow (kg/h)	404827.37	404617	0.05	1847	1847	0.00	72463.38	72629	0.23
Molar Flow (kgmole/h)	14773.44	14800.6	0.18	102.53	102.5	0.03	1279.15	1291.7	0.97
Temperature (C)	35.67	35.5	0.48	147	147	0.00	24.44	23.6	3.56
Pressure (kg/cm2_g)	37.51	37.51	0.00	19.47	19.47	0.00	9.27	9.27	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	3202			3203			3206		
	Simulation	Design	%-Error	Simulation	Design	%-Error	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	1.02E-02	0.01	1.70	0	0	0.00	0	0	0.00
Comp Mole Frac (CO)	1.89E-04	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (CO2)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (H2S)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (Methane)	0.110122408	0.1132	2.72	0	0	0.00	0	0	0.00
Comp Mole Frac (Acetylene)	3.86E-04	0.0073	94.71	0	0	0.00	0	0	0.00
Comp Mole Frac (Ethylene)	0.40787978	0.4035	1.09	0	0	0.00	0	0	0.00
Comp Mole Frac (Ethane)	0.102302368	0.1025	0.19	0.0002	0	0.00	0.0002	0	0.00
Comp Mole Frac (Propadiene)	8.44E-03	0.0088	4.07	0.008	0.0108	25.93	0.008	0.0108	25.93
Comp Mole Frac (Propene)	0.201834823	0.2029	0.52	0.1463	0.1448	1.04	0.1463	0.1448	1.04
Comp Mole Frac (Propane)	6.41E-03	0.0063	1.82	0.0056	0.0056	0.00	0.0056	0.0056	0.00
Comp Mole Frac (13-Butadiene)	4.16E-02	0.0388	7.25	0.1334	0.1292	3.25	0.1334	0.1292	3.25
Comp Mole Frac (1-Butene)	5.76E-02	0.0561	2.59	0.1742	0.1688	3.20	0.1742	0.1688	3.20
Comp Mole Frac (n-Butane)	1.99E-02	0.0199	0.10	0.0683	0.0667	2.40	0.0683	0.0667	2.40
Comp Mole Frac (i-Pentane)	2.13E-02	0.0186	14.69	0.1771	0.1842	3.85	0.1771	0.1842	3.85
Comp Mole Frac (1-Hexyne)	1.76E-03	0.002	12.11	0.0588	0.0591	0.51	0.0588	0.0591	0.51
Comp Mole Frac (n-Heptane)	1.80E-04	0.0002	9.95	0.0164	0.0168	2.38	0.0164	0.0168	2.38
Comp Mole Frac (n-Octane)	4.92E-06	0	0.00	0.0013	0.0016	18.75	0.0013	0.0016	18.75
Comp Mole Frac (Benzene)	5.99E-03	0.0057	5.10	0.1703	0.1713	0.58	0.1703	0.1713	0.58
Comp Mole Frac (Toluene)	4.61E-04	0.0004	15.37	0.039	0.0395	1.27	0.039	0.0395	1.27
Comp Mole Frac (p-Xylene)	5.99E-06	0	0.00	0.0013	0.0009	44.44	0.0013	0.0009	44.44
Comp Mole Frac (E-Benzene)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (n-Nonane)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (Styrene)	0	0	0.00	0	0.0003	100.00	0	0.0003	100.00
Comp Mole Frac (n-C11)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (n-Decane)	0	0	0.00	0	0	0.00	0	0	0.00
Comp Mole Frac (H2O)	3.40E-03	0.0036	5.58	0	0.0002	100.00	0	0.0002	100.00
Comp Mole Frac (Nitrogen)	4.09E-05	0	0.00	0	0	0.00	0	0	0.00
		0.9998			0.9998			0.9998	
	3202			3203			3206		
Mass Flow (kg/h)	11059.56191	11331	2.40	61730.86	61270	0.75	61730.86	61270	0.75
Molar Flow (kgmole/h)	315.24	332.8	5.28	963.91	957.4	0.68	963.91	957.4	0.68
Temperature (C)	26.15	26.7	2.06	77.41	77.8	0.50	41	41	0.00
Pressure (kg/cm2_g)	8.78	8.77	0.11	8.97	8.97	0.00	8.62	8.62	0.00

160

Simulation Report – ECC 860 KTA

Working Stage 6

	4763		
	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	0	0	0.00
Comp Mole Frac (CO)	0	0	0.00
Comp Mole Frac (CO2)	0	0	0.00
Comp Mole Frac (H2S)	0	0	0.00
Comp Mole Frac (Methane)	0.0001	0.0001	0.00
Comp Mole Frac (Acetylene)	0.0109	0.0109	0.00
Comp Mole Frac (Ethylene)	0.609	0.6091	0.02
Comp Mole Frac (Ethane)	0.1047	0.1047	0.00
Comp Mole Frac (Propadiene)	0.0081	0.0081	0.00
Comp Mole Frac (Propene)	0.1958	0.1958	0.00
Comp Mole Frac (Propane)	0.0059	0.0059	0.00
Comp Mole Frac (13-Butadiene)	0.0214	0.0214	0.00
Comp Mole Frac (1-Butene)	0.0305	0.0305	0.00
Comp Mole Frac (n-Butane)	0.0096	0.0096	0.00
Comp Mole Frac (i-Pentane)	0.0035	0.0035	0.00
Comp Mole Frac (1-Hexyne)	0.0001	0.0001	0.00
Comp Mole Frac (n-Heptane)	0	0	0.00
Comp Mole Frac (n-Octane)	0	0	0.00
Comp Mole Frac (Benzene)	0.0004	0.0004	0.00
Comp Mole Frac (Toluene)	0	0	0.00
Comp Mole Frac (p-Xylene)	0	0	0.00
Comp Mole Frac (E-Benzene)	0	0	0.00
Comp Mole Frac (n-Nonane)	0	0	0.00
Comp Mole Frac (Styrene)	0	0	0.00
Comp Mole Frac (n-C11)	0	0	0.00
Comp Mole Frac (n-Decane)	0	0	0.00
Comp Mole Frac (H2O)	0	0	0.00
Comp Mole Frac (Nitrogen)	0	0	0.00
		1.0001	
	4763		
Mass Flow (kg/h)	135671	135671	0.00
Molar Flow (kgmole/h)	4103.67	4104.8	0.03
Temperature (C)	5.4	5.4	0.00
Pressure (kg/cm2_g)	22.47	22.47	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	4011			4012			4013		
	Simulation	Design	%-Error	Simulation	Design	%-Error	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	0.9650	0.965	0.00	0.9650	0.965	0.00	0.0114	0.0114	0.00
Comp Mole Frac (CO)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Methane)	0.0341	0.0341	0.00	0.0341	0.0341	0.00	0.0379	0.0379	0.00
Comp Mole Frac (Acetylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Ethylene)	0.0000		0.00	0.0000		0.00	0.0047	0.0047	0.00
Comp Mole Frac (Ethane)	0.0000		0.00	0.0000		0.00	0.9411	0.9411	0.00
Comp Mole Frac (Propadiene)	0.0000		0.00	0.0000		0.00	0.0000	0	0.00
Comp Mole Frac (Propene)	0.0000		0.00	0.0000		0.00	0.0048	0.0048	0.00
Comp Mole Frac (Propane)	0.0000		0.00	0.0000		0.00	0.0000	0	0.00
Comp Mole Frac (13-Butadiene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (1-Butene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Butane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Pentane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Hexane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Heptane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Octane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Benzene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Toluene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (p-Xylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Styrene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (H2O)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Nitrogen)	0.0009	0.0009	0.00	0.0009	0.0009	0.00	0.0001	0.0001	0.00
Total		1			1			1	
	4011			4012			4013		
Mass Flow (kg/h)	364	364	0.00	364	364	0.00	3798	3798	0.00
Molar Flow (kgmole/h)	144.58	144.5	0.06	144.58	144.5	0.06	129.77	129.8	0.02
Temperature (C)	16	16	0.00	-132	-132	0.00	-129.7	-129.7	0.00
Pressure (kg/cm2_g)	31.07	31.07	0.00	30.71	30.71	0.00	7.29	7.29	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	4014			4015			4016		
	Simulation	Design	%-Error	Simulation	Design	%-Error	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	0.9971	0.997	0.01	0.9971	0.997	0.01	0.0000		0.00
Comp Mole Frac (CO)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Methane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Acetylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Ethylene)	0.0000		0.00	0.0000		0.00	0.0050	0.005	0.00
Comp Mole Frac (Ethane)	0.0020	0.002	0.00	0.0020	0.002	0.00	0.9899	0.9898	0.01
Comp Mole Frac (Propadiene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Propene)	0.0000		0.00	0.0000		0.00	0.0050	0.005	0.00
Comp Mole Frac (Propane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (13-Butadiene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (1-Butene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Butane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Pentane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Hexane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Heptane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Octane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Benzene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Toluene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (p-Xylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Styrene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (H2O)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Nitrogen)	0.0009	0.0009	0.00	0.0009	0.0009	0.00	0.0001	0.0001	0.00
Total		0.9999			0.9999			0.9999	
	4014			4015			4016		
Mass Flow (kg/h)	290	290	0.00	290	290	0.00	3725	3725	0.00
Molar Flow (kgmole/h)	138.39	138.3	0.07	138.39	138.3	0.07	123.67	123.7	0.02
Temperature (C)	-132.4	-132.4	0.00	35	35	0.00	-132	-132	0.00
Pressure (kg/cm2_g)	30.51	30.51	0.00	30.13	30.13	0.00	30.56	30.56	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	4097			4098			4102		
	Simulation	Design	%-Error	Simulation	Design	%-Error	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	0.9971	0.997	0.01	0.9971	0.997	0.01	0.1797	0.1797	0.00
Comp Mole Frac (CO)	0.0000		0.00	0.0000		0.00	0.0011	0.0011	0.00
Comp Mole Frac (Methane)	0.0000		0.00	0.0000		0.00	0.2996	0.2996	0.00
Comp Mole Frac (Acetylene)	0.0000		0.00	0.0000		0.00	0.0058	0.0058	0.00
Comp Mole Frac (Ethylene)	0.0000		0.00	0.0000		0.00	0.3142	0.3142	0.00
Comp Mole Frac (Ethane)	0.0020	0.002	0.00	0.0020	0.002	0.00	0.0549	0.0549	0.00
Comp Mole Frac (Propadiene)	0.0000		0.00	0.0000		0.00	0.0042	0.0042	0.00
Comp Mole Frac (Propene)	0.0000		0.00	0.0000		0.00	0.1027	0.1027	0.00
Comp Mole Frac (Propane)	0.0000		0.00	0.0000		0.00	0.0031	0.0031	0.00
Comp Mole Frac (13-Butadiene)	0.0000		0.00	0.0000		0.00	0.0112	0.0112	0.00
Comp Mole Frac (1-Butene)	0.0000		0.00	0.0000		0.00	0.0160	0.016	0.00
Comp Mole Frac (n-Butane)	0.0000		0.00	0.0000		0.00	0.0051	0.0051	0.00
Comp Mole Frac (n-Pentane)	0.0000		0.00	0.0000		0.00	0.0018	0.0018	0.00
Comp Mole Frac (n-Hexane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Heptane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Octane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Benzene)	0.0000		0.00	0.0000		0.00	0.0002	0.0002	0.00
Comp Mole Frac (Toluene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (p-Xylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Styrene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (H2O)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Nitrogen)	0.0009	0.0009	0.00	0.0009	0.0009	0.00	0.0003	0.0003	0.00
Total		0.9999			0.9999			0.9999	
	4097			4098			4102		
Mass Flow (kg/h)	190	190	0.00	100	100	0.00	185000	185000	0.00
Molar Flow (kgmole/h)	90.67	90.7	0.03	47.72	47.7	0.04	8259.42	8258.8	0.01
Temperature (C)	35	35	0.00	35	35	0.00	-18.2	-18.2	0.00
Pressure (kg/cm2_g)	30.13	30.13	0.00	30.13	30.13	0.00	36.2	36.2	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	4103			4104			4107		
	Simulation	Design	%-Error	Simulation	Design	%-Error	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	0.1797	0.1797	0.00	0.1797	0.1797	0.00	0.1797	0.1797	0.00
Comp Mole Frac (CO)	0.0011	0.0011	0.00	0.0011	0.0011	0.00	0.0011	0.0011	0.00
Comp Mole Frac (Methane)	0.2996	0.2996	0.00	0.2996	0.2996	0.00	0.2996	0.2996	0.00
Comp Mole Frac (Acetylene)	0.0058	0.0058	0.00	0.0058	0.0058	0.00	0.0058	0.0058	0.00
Comp Mole Frac (Ethylene)	0.3142	0.3142	0.00	0.3142	0.3142	0.00	0.3142	0.3142	0.00
Comp Mole Frac (Ethane)	0.0549	0.0549	0.00	0.0549	0.0549	0.00	0.0549	0.0549	0.00
Comp Mole Frac (Propadiene)	0.0042	0.0042	0.00	0.0042	0.0042	0.00	0.0042	0.0042	0.00
Comp Mole Frac (Propene)	0.1027	0.1027	0.00	0.1027	0.1027	0.00	0.1027	0.1027	0.00
Comp Mole Frac (Propane)	0.0031	0.0031	0.00	0.0031	0.0031	0.00	0.0031	0.0031	0.00
Comp Mole Frac (13-Butadiene)	0.0112	0.0112	0.00	0.0112	0.0112	0.00	0.0112	0.0112	0.00
Comp Mole Frac (1-Butene)	0.0160	0.016	0.00	0.0160	0.016	0.00	0.0160	0.016	0.00
Comp Mole Frac (n-Butane)	0.0051	0.0051	0.00	0.0051	0.0051	0.00	0.0051	0.0051	0.00
Comp Mole Frac (n-Pentane)	0.0018	0.0018	0.00	0.0018	0.0018	0.00	0.0018	0.0018	0.00
Comp Mole Frac (n-Hexane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Heptane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Octane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Benzene)	0.0002	0.0002	0.00	0.0002	0.0002	0.00	0.0002	0.0002	0.00
Comp Mole Frac (Toluene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (p-Xylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Styrene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (H2O)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Nitrogen)	0.0003	0.0003	0.00	0.0003	0.0003	0.00	0.0003	0.0003	0.00
Total		0.9999			0.9999			0.9999	
	4103			4104			4107		
Mass Flow (kg/h)	185000	185000	0.00	185000	185000	0.00	184986.2	185000	0.01
Molar Flow (kgmole/h)	8259.42	8258.8	0.01	8259.42	8258.8	0.01	8258.8	8258.8	0.00
Temperature (C)	-20.46	-23.7	-13.67	-36.5	-36.5	0.00	-65.3	-65.3	0.00
Pressure (kg/cm2_g)	35.98	35.98	0.00	35.69	35.69	0.00	34.96	34.96	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	4108			4109				4110		
	Simulation	Design	%-Error	Simulation	Design	%-Error	Simulation	Design	%-Error	
Comp Mole Frac (Hydrogen)	0.1797	0.1797	0.00	0.4703	0.4665	0.81	0.0097	0.0131	25.95	
Comp Mole Frac (CO)	0.0011	0.0011	0.00	0.0024	0.0024	0.00	0.0003	0.0004	25.00	
Comp Mole Frac (Methane)	0.2996	0.2996	0.00	0.4144	0.4167	0.55	0.2324	0.2316	0.35	
Comp Mole Frac (Acetylene)	0.0058	0.0058	0.00	0.0013	0.0017	23.53	0.0084	0.0081	3.70	
Comp Mole Frac (Ethylene)	0.3142	0.3142	0.00	0.0973	0.0981	0.82	0.4412	0.4397	0.34	
Comp Mole Frac (Ethane)	0.0549	0.0549	0.00	0.0099	0.0101	1.98	0.0812	0.081	0.30	
Comp Mole Frac (Propadiene)	0.0042	0.0042	0.00	0.0001	0.0001	0.00	0.0066	0.0066	0.00	
Comp Mole Frac (Propene)	0.1027	0.1027	0.00	0.0033	0.0036	8.33	0.1609	0.1603	0.37	
Comp Mole Frac (Propane)	0.0031	0.0031	0.00	0.0001	0.0001	0.00	0.0049	0.0048	2.08	
Comp Mole Frac (13-Butadiene)	0.0112	0.0112	0.00	0.0000	0.0001	100.00	0.0177	0.0177	0.00	
Comp Mole Frac (1-Butene)	0.0160	0.016	0.00	0.0001	0.0001	0.00	0.0253	0.0253	0.00	
Comp Mole Frac (n-Butane)	0.0051	0.0051	0.00	0.0000		0.00	0.0081	0.008	1.25	
Comp Mole Frac (n-Pentane)	0.0018	0.0018	0.00	0.0000		0.00	0.0029	0.0029	0.00	
Comp Mole Frac (n-Hexane)	0.0000		0.00	0.0000		0.00	0.0000	0.0001	100.00	
Comp Mole Frac (n-Heptane)	0.0000		0.00	0.0000		0.00	0.0000		0.00	
Comp Mole Frac (n-Octane)	0.0000		0.00	0.0000		0.00	0.0000		0.00	
Comp Mole Frac (Benzene)	0.0002	0.0002	0.00	0.0000		0.00	0.0003	0.0003	0.00	
Comp Mole Frac (Toluene)	0.0000		0.00	0.0000		0.00	0.0000		0.00	
Comp Mole Frac (p-Xylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00	
	0.0000		0.00	0.0000		0.00	0.0000		0.00	
Comp Mole Frac (Styrene)	0.0000		0.00	0.0000		0.00	0.0000		0.00	
Comp Mole Frac (H2O)	0.0000		0.00	0.0000		0.00	0.0000		0.00	
Comp Mole Frac (Nitrogen)	0.0003	0.0003	0.00	0.0007	0.0006	16.67	0.0001	0.0001	0.00	
Total		0.9999			1.0001			1		
	4108			4109				4110		
Mass Flow (kg/h)	184986.2	185000	0.01	33231.83	33301	0.21	151754.3	151699	0.04	
Molar Flow (kgmole/h)	8258.8	8258.8	0.00	3048.89	3033.4	0.51	5209.91	5225.4	0.30	
Temperature (C)	-72	-72	0.00	-70.2	-72.1	-2.64	-70.2	-72.1	-2.64	
Pressure (kg/cm2_g)	34.72	34.72	0.00	34.55	34.55	0.00	34.55	34.55	0.00	

Simulation Report – ECC 860 KTA

Working Stage 6

	4111			4112			4113		
	Simulation	Design	%-Error	Simulation	Design	%-Error	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	0.4703	0.4665	0.81	0.4703	0.4665	0.81	0.5445	0.541	0.65
Comp Mole Frac (CO)	0.0024	0.0024	0.00	0.0024	0.0024	0.00	0.0027	0.0026	3.85
Comp Mole Frac (Methane)	0.4144	0.4167	0.55	0.4144	0.4167	0.55	0.4117	0.4125	0.19
Comp Mole Frac (Acetylene)	0.0013	0.0017	23.53	0.0013	0.0017	23.53	0.0004	0.0007	42.86
Comp Mole Frac (Ethylene)	0.0973	0.0981	0.82	0.0973	0.0981	0.82	0.0375	0.0399	6.02
Comp Mole Frac (Ethane)	0.0099	0.0101	1.98	0.0099	0.0101	1.98	0.0024	0.0025	4.00
Comp Mole Frac (Propadiene)	0.0001	0.0001	0.00	0.0001	0.0001	0.00	0.0000		0.00
Comp Mole Frac (Propene)	0.0033	0.0036	8.33	0.0033	0.0036	8.33	0.0001	0.0002	50.00
Comp Mole Frac (Propane)	0.0001	0.0001	0.00	0.0001	0.0001	0.00	0.0000		0.00
Comp Mole Frac (13-Butadiene)	0.0000	0.0001	100.00	0.0000	0.0001	100.00	0.0000		0.00
Comp Mole Frac (1-Butene)	0.0001	0.0001	0.00	0.0001	0.0001	0.00	0.0000		0.00
Comp Mole Frac (n-Butane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Pentane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Hexane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Heptane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Octane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Benzene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Toluene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (p-Xylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Styrene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (H2O)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Nitrogen)	0.0007	0.0006	16.67	0.0007	0.0006	16.67	0.0008	0.0007	14.29
Total		1.0001			1.0001			1.0001	
	4111			4112			4113		
Mass Flow (kg/h)	33231.83	33301	0.21	33231.83	33301	0.21	22860.94	23449	2.51
Molar Flow (kgmole/h)	3048.89	3033.4	0.51	3048.89	3033.4	0.51	2594.47	2599.7	0.20
Temperature (C)	-86	-86	0.00	-98	-98	0.00	-98.08	-98.1	-0.02
Pressure (kg/cm2_g)	34.38	34.38	0.00	34.1	34.1	0.00	33.92	33.92	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	4114			4115			4116		
	Simulation	Design	%-Error	Simulation	Design	%-Error	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	0.0123	0.02	38.50	0.5445	0.541	0.65	0.7687	0.7629	0.76
Comp Mole Frac (CO)	0.0006	0.0007	14.29	0.0027	0.0026	3.85	0.0031	0.003	3.33
Comp Mole Frac (Methane)	0.4316	0.4421	2.38	0.4117	0.4125	0.19	0.2259	0.2314	2.38
Comp Mole Frac (Acetylene)	0.0073	0.0077	5.19	0.0004	0.0007	42.86	0.0000	0	0.00
Comp Mole Frac (Ethylene)	0.4665	0.4471	4.34	0.0375	0.0399	6.02	0.0012	0.0018	33.33
Comp Mole Frac (Ethane)	0.0566	0.0556	1.76	0.0024	0.0025	4.00	0.0000	0	0.00
Comp Mole Frac (Propadiene)	0.0005	0.0005	0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Propene)	0.0228	0.0242	5.79	0.0001	0.0002	50.00	0.0000		0.00
Comp Mole Frac (Propane)	0.0006	0.0006	0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (13-Butadiene)	0.0004	0.0005	20.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (1-Butene)	0.0006	0.0007	14.29	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Butane)	0.0003	0.0002	50.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Pentane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Hexane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Heptane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Octane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Benzene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Toluene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (p-Xylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Styrene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (H2O)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Nitrogen)	0.0001	0.0002	50.00	0.0008	0.0007	14.29	0.0010	0.0009	11.11
Total		1.0001			1.0001			1	
	4114			4115			4116		
Mass Flow (kg/h)	10370.89	9852	5.27	22860.94	23449	2.51	11940.01	9787	22.00
Molar Flow (kgmole/h)	454.42	433.8	4.75	2594.47	2599.7	0.20	1973.25	1808.7	9.10
Temperature (C)	-98.08	-98.1	-0.02	-127.59	-132	-3.34	-127.63	-132.1	-3.38
Pressure (kg/cm2_g)	33.92	33.92	0.00	33.74	33.74	0.00	33.56	33.56	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	4117			4118			4119		
	Simulation	Design	%-Error	Simulation	Design	%-Error	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	0.0200	0.0335	40.30	0.7687	0.7629	0.76	0.8626	0.8569	0.67
Comp Mole Frac (CO)	0.0017	0.0018	5.56	0.0031	0.003	3.33	0.0032	0.003	6.67
Comp Mole Frac (Methane)	0.8462	0.8265	2.38	0.2259	0.2314	2.38	0.1331	0.1391	4.31
Comp Mole Frac (Acetylene)	0.0013	0.0021	38.10	0.0000	0	0.00	0.0000		0.00
Comp Mole Frac (Ethylene)	0.1224	0.1269	3.55	0.0012	0.0018	33.33	0.0000	0.0001	100.00
Comp Mole Frac (Ethane)	0.0078	0.0081	3.70	0.0000	0	0.00	0.0000		0.00
Comp Mole Frac (Propadiene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Propene)	0.0004	0.0005	20.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Propane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (13-Butadiene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (1-Butene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Butane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Pentane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Hexane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Heptane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Octane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Benzene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Toluene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (p-Xylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Styrene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (H2O)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Nitrogen)	0.0004	0.0004	0.00	0.0010	0.0009	11.11	0.0010	0.0009	11.11
Total		0.9998			1			1	
	4117			4118			4119		
Mass Flow (kg/h)	10932.89	13662	19.98	11940.01	9787	22.00	6514.97	6520	0.08
Molar Flow (kgmole/h)	621.96	791	21.37	1973.25	1808.7	9.10	1632.27	1601.3	1.93
Temperature (C)	-127.65	-132.1	-3.37	-144.86	-145	-0.10	-145.35	-145	-0.24
Pressure (kg/cm2_g)	33.56	33.56	0.00	33.38	33.38	0.00	33.2	33.2	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	4120			4121			4122		
	Simulation	Design	%-Error	Simulation	Design	%-Error	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	0.0227	0.0372	38.98	0.8626	0.8569	0.67	0.8626	0.8569	0.67
Comp Mole Frac (CO)	0.0027	0.0029	6.90	0.0032	0.003	6.67	0.0032	0.003	6.67
Comp Mole Frac (Methane)	0.9631	0.9435	2.08	0.1331	0.1391	4.31	0.1331	0.1391	4.31
Comp Mole Frac (Acetylene)	0.0000	0.0004	100.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Ethylene)	0.0106	0.0151	29.80	0.0000	0.0001	100.00	0.0000	0.0001	100.00
Comp Mole Frac (Ethane)	0.0003	0.0004	25.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Propadiene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Propene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Propane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (13-Butadiene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (1-Butene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Butane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Pentane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Hexane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Heptane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Octane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Benzene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Toluene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (p-Xylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Styrene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (H2O)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Nitrogen)	0.0006	0.0006	0.00	0.0010	0.0009	11.11	0.0010	0.0009	11.11
Total		1.0001			1			1	
	4120			4121			4122		
Mass Flow (kg/h)	5425.04	3267	66.06	245.47	250	1.81	245.47	250	1.81
Molar Flow (kgmole/h)	340.99	207.4	64.41	61.5	61.5	0.00	61.5	61.5	0.00
Temperature (C)	-145.35	-145	-0.24	-145.35	-145	-0.24	-149.83	-150.3	-0.31
Pressure (kg/cm2_g)	33.2	33.2	0.00	33.2	33.2	0.00	5.58	5.58	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	4123			4124			4125		
	Simulation	Design	%-Error	Simulation	Design	%-Error	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	0.8626	0.8569	0.67	0.8626	0.8569	0.67	0.9697	0.9652	0.47
Comp Mole Frac (CO)	0.0032	0.003	6.67	0.0032	0.003	6.67	0.0028	0.0026	7.69
Comp Mole Frac (Methane)	0.1331	0.1391	4.31	0.1331	0.1391	4.31	0.0265	0.0313	15.34
Comp Mole Frac (Acetylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Ethylene)	0.0000	0.0001	100.00	0.0000	0.0001	100.00	0.0000		0.00
Comp Mole Frac (Ethane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Propadiene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Propene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Propane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (13-Butadiene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (1-Butene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Butane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Pentane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Hexane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Heptane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Octane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Benzene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Toluene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (p-Xylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Styrene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (H2O)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Nitrogen)	0.0010	0.0009	11.11	0.0010	0.0009	11.11	0.0010	0.0009	11.11
Total		1			1			1	
	4123			4124			4125		
Mass Flow (kg/h)	6269.5	6270	0.01	6269.5	6270	0.01	3467.2	3467	0.01
Molar Flow (kgmole/h)	1570.77	1539.8	2.01	1570.77	1539.8	2.01	1394.45	1361.1	2.45
Temperature (C)	-145.35	-145	-0.24	-168.4	-167	-0.84	-168.42	-167	-0.85
Pressure (kg/cm2_g)	33.2	33.2	0.00	33.02	33.02	0.00	32.83	32.83	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	4126			4127			4128		
	Simulation	Design	%-Error	Simulation	Design	%-Error	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	0.0173	0.0321	46.11	0.9697	0.9652	0.47	0.9697	0.9652	0.47
Comp Mole Frac (CO)	0.0062	0.006	3.33	0.0028	0.0026	7.69	0.0028	0.0026	7.69
Comp Mole Frac (Methane)	0.9750	0.9602	1.54	0.0265	0.0313	15.34	0.0265	0.0313	15.34
Comp Mole Frac (Acetylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Ethylene)	0.0003	0.0006	50.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Ethane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Propadiene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Propene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Propane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (13-Butadiene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (1-Butene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Butane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Pentane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Hexane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Heptane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Octane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Benzene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Toluene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (p-Xylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Styrene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (H2O)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Nitrogen)	0.0013	0.001	30.00	0.0010	0.0009	11.11	0.0010	0.0009	11.11
Total		0.9999			1			1	
	4126			4127			4128		
Mass Flow (kg/h)	2802.3	2803	0.02	133.77	137	2.36	134	137	2.19
Molar Flow (kgmole/h)	176.32	178.7	1.33	53.8	53.8	0.00	53.8	53.8	0.00
Temperature (C)	-168.42	-167	-0.85	-168.42	-167	-0.85	-172.35	-171	-0.79
Pressure (kg/cm2_g)	32.83	32.83	0.00	32.83	32.83	0.00	0.95	0.95	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	4129			4130			4131		
	Simulation	Design	%-Error	Simulation	Design	%-Error	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	0.9697	0.9652	0.47	0.0227	0.0372	38.98	0.2161	0.2246	3.78
Comp Mole Frac (CO)	0.0028	0.0026	7.69	0.0027	0.0029	6.90	0.0028	0.0029	3.45
Comp Mole Frac (Methane)	0.0265	0.0313	15.34	0.9631	0.9435	2.08	0.7719	0.7596	1.62
Comp Mole Frac (Acetylene)	0.0000		0.00	0.0000	0.0004	100.00	0.0000	0.0003	100.00
Comp Mole Frac (Ethylene)	0.0000		0.00	0.0106	0.0151	29.80	0.0082	0.0117	29.91
Comp Mole Frac (Ethane)	0.0000		0.00	0.0003	0.0004	25.00	0.0002	0.0003	33.33
Comp Mole Frac (Propadiene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Propene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Propane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (13-Butadiene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (1-Butene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Butane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Pentane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Hexane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Heptane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Octane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Benzene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Toluene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (p-Xylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Styrene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (H2O)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Nitrogen)	0.0010	0.0009	11.11	0.0006	0.0006	0.00	0.0007	0.0006	16.67
Total		1			1.0001			1	
	4129			4130			4131		
Mass Flow (kg/h)	3333.43	3330	0.10	5425.04	3267	66.06	5670.51	3517	61.23
Molar Flow (kgmole/h)	1340.65	1307.4	2.54	340.99	207.4	64.41	402.49	268.9	49.68
Temperature (C)	-168.42	-167	-0.85	-146.52	-147.3	-0.53	-152.36	-154	-1.06
Pressure (kg/cm2_g)	32.83	32.83	0.00	5.62	5.62	0.00	5.58	5.58	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	4132			4133			4134		
	Simulation	Design	%-Error	Simulation	Design	%-Error	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	0.2161	0.2246	3.78	0.0173	0.0321	46.11	0.2396	0.2478	3.31
Comp Mole Frac (CO)	0.0028	0.0029	3.45	0.0062	0.006	3.33	0.0054	0.0052	3.85
Comp Mole Frac (Methane)	0.7719	0.7596	1.62	0.9750	0.9602	1.54	0.7535	0.7455	1.07
Comp Mole Frac (Acetylene)	0.0000	0.0003	100.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Ethylene)	0.0082	0.0117	29.91	0.0003	0.0006	50.00	0.0002	0.0005	60.00
Comp Mole Frac (Ethane)	0.0002	0.0003	33.33	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Propadiene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Propene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Propane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (13-Butadiene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (1-Butene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Butane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Pentane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Hexane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Heptane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Octane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Benzene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Toluene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (p-Xylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Styrene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (H2O)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Nitrogen)	0.0007	0.0006	16.67	0.0013	0.001	30.00	0.0012	0.001	20.00
Total		1			0.9999			1	
	4132			4133			4134		
Mass Flow (kg/h)	5670.51	3517	61.23	2802.3	2803	0.02	2936.07	2940	0.13
Molar Flow (kgmole/h)	402.49	268.9	49.68	176.32	178.7	1.33	230.12	232.5	1.02
Temperature (C)	-135	-135.4	-0.30	-168.01	-167.5	-0.30	-174.46	-174.2	-0.15
Pressure (kg/cm2_g)	5.48	5.48	0.00	0.99	0.99	0.00	0.95	0.95	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	4135			4136			4137		
	Simulation	Design	%-Error	Simulation	Design	%-Error	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	0.0710	0.0721	1.53	0.0710	0.0721	1.53	0.0710	0.0721	1.53
Comp Mole Frac (CO)	0.0020	0.002	0.00	0.0020	0.002	0.00	0.0020	0.002	0.00
Comp Mole Frac (Methane)	0.9222	0.9208	0.15	0.9222	0.9208	0.15	0.9222	0.9208	0.15
Comp Mole Frac (Acetylene)	0.0001	0.0001	0.00	0.0001	0.0001	0.00	0.0001	0.0001	0.00
Comp Mole Frac (Ethylene)	0.0042	0.0046	8.70	0.0042	0.0046	8.70	0.0042	0.0046	8.70
Comp Mole Frac (Ethane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Propadiene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Propene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Propane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (13-Butadiene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (1-Butene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Butane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Pentane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Hexane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Heptane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Octane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Benzene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Toluene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (p-Xylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Styrene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (H2O)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Nitrogen)	0.0004	0.0004	0.00	0.0004	0.0004	0.00	0.0004	0.0004	0.00
Total		1			1			1	
	4135			4136			4137		
Mass Flow (kg/h)	38020.51	35867	6.00	38020.51	35867	6.00	28052.76	27954	0.35
Molar Flow (kgmole/h)	2506.12	2372.5	5.63	2506.12	2372.5	5.63	1849.1	1849.1	0.00
Temperature (C)	-135.17	-135.3	-0.10	35	35	0.00	35	35	0.00
Pressure (kg/cm2_g)	5.46	5.46	0.00	5.24	5.24	0.00	5.24	4.5	16.44

Simulation Report – ECC 860 KTA

Working Stage 6

	4138			4139			4140		
	Simulation	Design	%-Error	Simulation	Design	%-Error	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	0.2396	0.2478	3.31	0.9697	0.9652	0.47	0.0097	0.0131	25.95
Comp Mole Frac (CO)	0.0054	0.0052	3.85	0.0028	0.0026	7.69	0.0003	0.0004	25.00
Comp Mole Frac (Methane)	0.7535	0.7455	1.07	0.0265	0.0313	15.34	0.2324	0.2316	0.35
Comp Mole Frac (Acetylene)	0.0000		0.00	0.0000		0.00	0.0084	0.0081	3.70
Comp Mole Frac (Ethylene)	0.0002	0.0005	60.00	0.0000		0.00	0.4412	0.4397	0.34
Comp Mole Frac (Ethane)	0.0000		0.00	0.0000		0.00	0.0812	0.081	0.30
Comp Mole Frac (Propadiene)	0.0000		0.00	0.0000		0.00	0.0066	0.0066	0.00
Comp Mole Frac (Propene)	0.0000		0.00	0.0000		0.00	0.1609	0.1603	0.37
Comp Mole Frac (Propane)	0.0000		0.00	0.0000		0.00	0.0049	0.0048	2.08
Comp Mole Frac (13-Butadiene)	0.0000		0.00	0.0000		0.00	0.0177	0.0177	0.00
Comp Mole Frac (1-Butene)	0.0000		0.00	0.0000		0.00	0.0253	0.0253	0.00
Comp Mole Frac (n-Butane)	0.0000		0.00	0.0000		0.00	0.0081	0.008	1.25
Comp Mole Frac (n-Pentane)	0.0000		0.00	0.0000		0.00	0.0029	0.0029	0.00
Comp Mole Frac (n-Hexane)	0.0000		0.00	0.0000		0.00	0.0000	0.0001	100.00
Comp Mole Frac (n-Heptane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Octane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Benzene)	0.0000		0.00	0.0000		0.00	0.0003	0.0003	0.00
Comp Mole Frac (Toluene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (p-Xylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Styrene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (H2O)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Nitrogen)	0.0012	0.001	20.00	0.0010	0.0009	11.11	0.0001	0.0001	0.00
Total		1			1			1	
	4138			4139			4140		
Mass Flow (kg/h)	2936.07	2940	0.13	3317.26	3313	0.13	75877.17	75849	0.04
Molar Flow (kgmole/h)	230.12	232.5	1.02	1334.15	1300.8	2.56	2604.96	2612.7	0.30
Temperature (C)	35	35	0.00	35	35	0.00	-99	-97.4	-1.64
Pressure (kg/cm2_g)	0.39	0.39	0.00	32.22	32.22	0.00	34.07	34.07	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	4141			4142			4143		
	Simulation	Design	%-Error	Simulation	Design	%-Error	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	0.0097	0.0131	25.95	0.0097	0.0131	25.95	0.0123	0.02	38.50
Comp Mole Frac (CO)	0.0003	0.0004	25.00	0.0003	0.0004	25.00	0.0006	0.0007	14.29
Comp Mole Frac (Methane)	0.2324	0.2316	0.35	0.2324	0.2316	0.35	0.4316	0.4421	2.38
Comp Mole Frac (Acetylene)	0.0084	0.0081	3.70	0.0084	0.0081	3.70	0.0073	0.0077	5.19
Comp Mole Frac (Ethylene)	0.4412	0.4397	0.34	0.4412	0.4397	0.34	0.4665	0.4471	4.34
Comp Mole Frac (Ethane)	0.0812	0.081	0.30	0.0812	0.081	0.30	0.0566	0.0556	1.76
Comp Mole Frac (Propadiene)	0.0066	0.0066	0.00	0.0066	0.0066	0.00	0.0005	0.0005	0.00
Comp Mole Frac (Propene)	0.1609	0.1603	0.37	0.1609	0.1603	0.37	0.0228	0.0242	5.79
Comp Mole Frac (Propane)	0.0049	0.0048	2.08	0.0049	0.0048	2.08	0.0006	0.0006	0.00
Comp Mole Frac (13-Butadiene)	0.0177	0.0177	0.00	0.0177	0.0177	0.00	0.0004	0.0005	20.00
Comp Mole Frac (1-Butene)	0.0253	0.0253	0.00	0.0253	0.0253	0.00	0.0006	0.0007	14.29
Comp Mole Frac (n-Butane)	0.0081	0.008	1.25	0.0081	0.008	1.25	0.0003	0.0002	50.00
Comp Mole Frac (n-Pentane)	0.0029	0.0029	0.00	0.0029	0.0029	0.00	0.0000		0.00
Comp Mole Frac (n-Hexane)	0.0000	0.0001	100.00	0.0000	0.0001	100.00	0.0000		0.00
Comp Mole Frac (n-Heptane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Octane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Benzene)	0.0003	0.0003	0.00	0.0003	0.0003	0.00	0.0000		0.00
Comp Mole Frac (Toluene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (p-Xylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Styrene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (H2O)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Nitrogen)	0.0001	0.0001	0.00	0.0001	0.0001	0.00	0.0001	0.0002	50.00
Total		1			1			1.0001	
	4141			4142			4143		
Mass Flow (kg/h)	75877.17	75849	0.04	75877.17	75849	0.04	10370.89	9852	5.27
Molar Flow (kgmole/h)	2604.96	2612.7	0.30	2604.96	2612.7	0.30	454.42	433.8	4.75
Temperature (C)	-75.48	-77.9	-3.11	-103.313	-103.7	-0.37	-114.25	-115.5	-1.08
Pressure (kg/cm2_g)	5.61	5.61	0.00	5.57	5.57	0.00	5.55	5.55	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	4144			4145			4146		
	Simulation	Design	%-Error	Simulation	Design	%-Error	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	0.0200	0.0335	40.30	0.9697	0.9651	0.48	0.0027	0.0027	0.00
Comp Mole Frac (CO)	0.0017	0.0018	5.56	0.0028	0.0026	7.69	0.0000		0.00
Comp Mole Frac (Methane)	0.8462	0.8265	2.38	0.0265	0.0313	15.34	0.0088	0.0088	0.00
Comp Mole Frac (Acetylene)	0.0013	0.0021	38.10	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Ethylene)	0.1224	0.1269	3.55	0.0000		0.00	0.0049	0.0049	0.00
Comp Mole Frac (Ethane)	0.0078	0.0081	3.70	0.0000		0.00	0.9785	0.9785	0.00
Comp Mole Frac (Propadiene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Propene)	0.0004	0.0005	20.00	0.0000		0.00	0.0050	0.0049	2.04
Comp Mole Frac (Propane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (13-Butadiene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (1-Butene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Butane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Pentane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Hexane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Heptane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Octane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Benzene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Toluene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (p-Xylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Styrene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (H2O)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Nitrogen)	0.0004	0.0004	0.00	0.0010	0.0009	11.11	0.0001	0.0001	0.00
Total		0.9998			0.9999			0.9999	
	4144			4145			4146		
Mass Flow (kg/h)	10932.89	13662	19.98	16.16	17	4.94	16682	16682	0.00
Molar Flow (kgmole/h)	621.96	791	21.37	6.5	6.5	0.00	557.53	557.5	0.01
Temperature (C)	-135.01	-138.3	-2.38	35	35	0.00	35	35	0.00
Pressure (kg/cm2_g)	5.53	5.53	0.00	32.22	32.22	0.00	6.61	6.61	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	4147			4148			4149		
	Simulation	Design	%-Error	Simulation	Design	%-Error	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (CO)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Methane)	0.0001	0.0001	0.00	0.0001	0.0001	0.00	0.0001	0.0001	0.00
Comp Mole Frac (Acetylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Ethylene)	0.9995	0.9995	0.00	0.9995	0.9995	0.00	0.9995	0.9995	0.00
Comp Mole Frac (Ethane)	0.0004	0.0004	0.00	0.0004	0.0004	0.00	0.0004	0.0004	0.00
Comp Mole Frac (Propadiene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Propene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Propane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (13-Butadiene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (1-Butene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Butane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Pentane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Hexane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Heptane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Octane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Benzene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Toluene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (p-Xylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Styrene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (H2O)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Nitrogen)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Total		1			1			1	
	4147			4148			4149		
Mass Flow (kg/h)	53973	53973	0.00	53973	53973	0.00	53973	53973	0.00
Molar Flow (kgmole/h)	1923.94	1923.9	0.00	1923.94	1923.9	0.00	1923.94	1923.9	0.00
Temperature (C)	-12.7	-12.7	0.00	-4.2	-4.2	0.00	35	35	0.00
Pressure (kg/cm2_g)	37.3	37.3	0.00	36.2	36.2	0.00	36	36	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	4150			4151			4156		
	Simulation	Design	%-Error	Simulation	Design	%-Error	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	0.0114	0.0114	0.00	0.0027	0.0027	0.00	0.0000		0.00
Comp Mole Frac (CO)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Methane)	0.0379	0.0379	0.00	0.0088	0.0088	0.00	0.0001	0.0001	0.00
Comp Mole Frac (Acetylene)	0.0000		0.00	0.0000		0.00	0.0109	0.0109	0.00
Comp Mole Frac (Ethylene)	0.0047	0.0047	0.00	0.0049	0.0049	0.00	0.6090	0.6091	0.02
Comp Mole Frac (Ethane)	0.9411	0.9411	0.00	0.9785	0.9785	0.00	0.1047	0.1047	0.00
Comp Mole Frac (Propadiene)	0.0000		0.00	0.0000		0.00	0.0081	0.0081	0.00
Comp Mole Frac (Propene)	0.0048	0.0048	0.00	0.0050	0.0049	2.04	0.1958	0.1958	0.00
Comp Mole Frac (Propane)	0.0000		0.00	0.0000		0.00	0.0059	0.0059	0.00
Comp Mole Frac (13-Butadiene)	0.0000		0.00	0.0000		0.00	0.0214	0.0214	0.00
Comp Mole Frac (1-Butene)	0.0000		0.00	0.0000		0.00	0.0305	0.0305	0.00
Comp Mole Frac (n-Butane)	0.0000		0.00	0.0000		0.00	0.0096	0.0096	0.00
Comp Mole Frac (n-Pentane)	0.0000		0.00	0.0000		0.00	0.0035	0.0035	0.00
Comp Mole Frac (n-Hexane)	0.0000		0.00	0.0000		0.00	0.0001	0.0001	0.00
Comp Mole Frac (n-Heptane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Octane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Benzene)	0.0000		0.00	0.0000		0.00	0.0004	0.0004	0.00
Comp Mole Frac (Toluene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (p-Xylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Styrene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (H2O)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Nitrogen)	0.0001	0.0001	0.00	0.0001	0.0001	0.00	0.0000		0.00
Total		1			0.9999			1.0001	
	4150			4151			4156		
Mass Flow (kg/h)	3798	3798	0.00	16682	16682	0.00	143588	143588	0.00
Molar Flow (kgmole/h)	129.77	129.8	0.02	557.53	557.5	0.01	4343.08	4344.4	0.03
Temperature (C)	-62	-62	0.00	-41.13	-42.8	-3.90	-50.9	-50.9	0.00
Pressure (kg/cm2_g)	6.82	6.82	0.00	6.77	6.77	0.00	27.9	27.9	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	4157			4158			4159		
	Simulation	Design	%-Error	Simulation	Design	%-Error	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (CO)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Methane)	0.0001	0.0001	0.00	0.0001	0.0001	0.00	0.0001	0.0001	0.00
Comp Mole Frac (Acetylene)	0.0109	0.0109	0.00	0.0109	0.0109	0.00	0.0109	0.0109	0.00
Comp Mole Frac (Ethylene)	0.6090	0.6091	0.02	0.6090	0.6091	0.02	0.6090	0.6091	0.02
Comp Mole Frac (Ethane)	0.1047	0.1047	0.00	0.1047	0.1047	0.00	0.1047	0.1047	0.00
Comp Mole Frac (Propadiene)	0.0081	0.0081	0.00	0.0081	0.0081	0.00	0.0081	0.0081	0.00
Comp Mole Frac (Propene)	0.1958	0.1958	0.00	0.1958	0.1958	0.00	0.1958	0.1958	0.00
Comp Mole Frac (Propane)	0.0059	0.0059	0.00	0.0059	0.0059	0.00	0.0059	0.0059	0.00
Comp Mole Frac (13-Butadiene)	0.0214	0.0214	0.00	0.0214	0.0214	0.00	0.0214	0.0214	0.00
Comp Mole Frac (1-Butene)	0.0305	0.0305	0.00	0.0305	0.0305	0.00	0.0305	0.0305	0.00
Comp Mole Frac (n-Butane)	0.0096	0.0096	0.00	0.0096	0.0096	0.00	0.0096	0.0096	0.00
Comp Mole Frac (n-Pentane)	0.0035	0.0035	0.00	0.0035	0.0035	0.00	0.0035	0.0035	0.00
Comp Mole Frac (n-Hexane)	0.0001	0.0001	0.00	0.0001	0.0001	0.00	0.0001	0.0001	0.00
Comp Mole Frac (n-Heptane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Octane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Benzene)	0.0004	0.0004	0.00	0.0004	0.0004	0.00	0.0004	0.0004	0.00
Comp Mole Frac (Toluene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (p-Xylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Styrene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (H2O)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Nitrogen)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Total		1.0001			1.0001			1.0001	
	4157			4158			4159		
Mass Flow (kg/h)	143588	143588	0.00	43076	43076	0.00	100512	100512	0.00
Molar Flow (kgmole/h)	4343.08	4344.4	0.03	1302.91	1303.3	0.03	3040.17	3041.1	0.03
Temperature (C)	-14	-14	0.00	-14	-14	0.00	-14	-14	0.00
Pressure (kg/cm2_g)	27	27	0.00	27	27	0.00	27	27	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	4160			4161			4167		
	Simulation	Design	%-Error	Simulation	Design	%-Error	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	0.9697	0.9652	0.47	0.0027	0.0027	0.00	0.0526	0.0526	0.00
Comp Mole Frac (CO)	0.0028	0.0026	7.69	0.0000		0.00	0.0019	0.0019	0.00
Comp Mole Frac (Methane)	0.0265	0.0313	15.34	0.0088	0.0088	0.00	0.9413	0.9414	0.01
Comp Mole Frac (Acetylene)	0.0000		0.00	0.0000		0.00	0.0001	0.0001	0.00
Comp Mole Frac (Ethylene)	0.0000		0.00	0.0049	0.0049	0.00	0.0037	0.0037	0.00
Comp Mole Frac (Ethane)	0.0000		0.00	0.9785	0.9785	0.00	0.0000		0.00
Comp Mole Frac (Propadiene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Propene)	0.0000		0.00	0.0050	0.0049	2.04	0.0000		0.00
Comp Mole Frac (Propane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (13-Butadiene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (1-Butene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Butane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Pentane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Hexane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Heptane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Octane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Benzene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Toluene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (p-Xylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Styrene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (H2O)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Nitrogen)	0.0010	0.0009	11.11	0.0001	0.0001	0.00	0.0004	0.0004	0.00
Total		1			0.9999			1.0001	
	4160			4161			4167		
Mass Flow (kg/h)	3333.43	3330	0.10	16682	16682	0.00	32350	32350	0.00
Molar Flow (kgmole/h)	1340.65	1307.4	2.54	557.53	557.5	0.01	2103.64	2103.6	0.00
Temperature (C)	35	35	0.00	-40.5	-40.5	0.00	-134.9	-134.9	0.00
Pressure (kg/cm2_g)	32.22	32.22	0.00	6.72	6.72	0.00	5.46	5.46	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	4188			4190			4201		
	Simulation	Design	%-Error	Simulation	Design	%-Error	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	0.0097	0.0131	25.95	0.0710	0.0721	1.53	0.0000		0.00
Comp Mole Frac (CO)	0.0003	0.0004	25.00	0.0020	0.002	0.00	0.0000		0.00
Comp Mole Frac (Methane)	0.2324	0.2316	0.35	0.9222	0.9208	0.15	0.0001	0.0001	0.00
Comp Mole Frac (Acetylene)	0.0084	0.0081	3.70	0.0001	0.0001	0.00	0.0109	0.0109	0.00
Comp Mole Frac (Ethylene)	0.4412	0.4397	0.34	0.0042	0.0046	8.70	0.6090	0.6091	0.02
Comp Mole Frac (Ethane)	0.0812	0.081	0.30	0.0000		0.00	0.1047	0.1047	0.00
Comp Mole Frac (Propadiene)	0.0066	0.0066	0.00	0.0000		0.00	0.0081	0.0081	0.00
Comp Mole Frac (Propene)	0.1609	0.1603	0.37	0.0000		0.00	0.1958	0.1958	0.00
Comp Mole Frac (Propane)	0.0049	0.0048	2.08	0.0000		0.00	0.0059	0.0059	0.00
Comp Mole Frac (13-Butadiene)	0.0177	0.0177	0.00	0.0000		0.00	0.0214	0.0214	0.00
Comp Mole Frac (1-Butene)	0.0253	0.0253	0.00	0.0000		0.00	0.0305	0.0305	0.00
Comp Mole Frac (n-Butane)	0.0081	0.008	1.25	0.0000		0.00	0.0096	0.0096	0.00
Comp Mole Frac (n-Pentane)	0.0029	0.0029	0.00	0.0000		0.00	0.0035	0.0035	0.00
Comp Mole Frac (n-Hexane)	0.0000	0.0001	100.00	0.0000		0.00	0.0001	0.0001	0.00
Comp Mole Frac (n-Heptane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Octane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Benzene)	0.0003	0.0003	0.00	0.0000		0.00	0.0004	0.0004	0.00
Comp Mole Frac (Toluene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (p-Xylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Styrene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (H2O)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Nitrogen)	0.0001	0.0001	0.00	0.0004	0.0004	0.00	0.0000		0.00
Total		1			1			1.0001	
	4188			4190			4201		
Mass Flow (kg/h)	75877.17	75849	0.04	9967.75	7913	25.97	58026.17	58145	0.20
Molar Flow (kgmole/h)	2604.96	2612.7	0.30	657.02	523.4	25.53	1757.07	1759.2	0.12
Temperature (C)	-99	-97.4	-1.64	35	35	0.00	-15.81	-14	-12.93
Pressure (kg/cm2_g)	34.07	34.07	0.00	5.24	5.23	0.19	21.68	21.68	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	4236			4307			4309		
	Simulation	Design	%-Error	Simulation	Design	%-Error	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (CO)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Methane)	0.0001	0.0001	0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Acetylene)	0.0109	0.0109	0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Ethylene)	0.6090	0.6091	0.02	0.0050	0.005	0.00	0.0050	0.005	0.00
Comp Mole Frac (Ethane)	0.1047	0.1047	0.00	0.9899	0.9898	0.01	0.9899	0.9898	0.01
Comp Mole Frac (Propadiene)	0.0081	0.0081	0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Propene)	0.1958	0.1958	0.00	0.0050	0.005	0.00	0.0050	0.005	0.00
Comp Mole Frac (Propane)	0.0059	0.0059	0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (13-Butadiene)	0.0214	0.0214	0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (1-Butene)	0.0305	0.0305	0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Butane)	0.0096	0.0096	0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Pentane)	0.0035	0.0035	0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Hexane)	0.0001	0.0001	0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Heptane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Octane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Benzene)	0.0004	0.0004	0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Toluene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (p-Xylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Styrene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (H2O)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Nitrogen)	0.0000		0.00	0.0001	0.0001	0.00	0.0001	0.0001	0.00
Total		1.0001			0.9999			0.9999	
	4236			4307			4309		
Mass Flow (kg/h)	100512	100512	0.00	12884	12884	0.00	3725	3725	0.00
Molar Flow (kgmole/h)	3040.17	3041.1	0.03	427.76	427.8	0.01	123.67	123.7	0.02
Temperature (C)	-14.12	-14	-0.86	-11.4	-11.4	0.00	-9.5	-9.5	0.00
Pressure (kg/cm2_g)	22.88	22.88	0.00	17.39	17.39	0.00	31.48	31.48	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	4324			4327			4328		
	Simulation	Design	%-Error	Simulation	Design	%-Error	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (CO)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Methane)	0.0001	0.0001	0.00	0.0001	0.0001	0.00	0.0001	0.0001	0.00
Comp Mole Frac (Acetylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Ethylene)	0.9995	0.9995	0.00	0.9995	0.9995	0.00	0.9995	0.9995	0.00
Comp Mole Frac (Ethane)	0.0004	0.0004	0.00	0.0004	0.0004	0.00	0.0004	0.0004	0.00
Comp Mole Frac (Propadiene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Propene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Propane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (13-Butadiene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (1-Butene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Butane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Pentane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Hexane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Heptane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Octane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Benzene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Toluene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (p-Xylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Styrene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (H2O)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Nitrogen)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Total		1			1			1	
	4324			4327			4328		
Mass Flow (kg/h)	53973	53973	0.00	53973	53973	0.00	0	0	0.00
Molar Flow (kgmole/h)	1923.94	1923.9	0.00	1923.94	1923.9	0.00	0	0	0.00
Temperature (C)	-34.5	-34.5	0.00	-34.5	-34.5	0.00	-35.17	-34.5	-1.94
Pressure (kg/cm2_g)	38.5	38.5	0.00	38.5	38.5	0.00	38.5	38.5	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	4329			4330			4759		
	Simulation	Design	%-Error	Simulation	Design	%-Error	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (CO)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Methane)	0.0001	0.0001	0.00	0.0001	0.0001	0.00	0.0001	0.0001	0.00
Comp Mole Frac (Acetylene)	0.0000		0.00	0.0000		0.00	0.0109	0.0109	0.00
Comp Mole Frac (Ethylene)	0.9995	0.9995	0.00	0.9995	0.9995	0.00	0.6090	0.6091	0.02
Comp Mole Frac (Ethane)	0.0004	0.0004	0.00	0.0004	0.0004	0.00	0.1047	0.1047	0.00
Comp Mole Frac (Propadiene)	0.0000		0.00	0.0000		0.00	0.0081	0.0081	0.00
Comp Mole Frac (Propene)	0.0000		0.00	0.0000		0.00	0.1958	0.1958	0.00
Comp Mole Frac (Propane)	0.0000		0.00	0.0000		0.00	0.0059	0.0059	0.00
Comp Mole Frac (13-Butadiene)	0.0000		0.00	0.0000		0.00	0.0214	0.0214	0.00
Comp Mole Frac (1-Butene)	0.0000		0.00	0.0000		0.00	0.0305	0.0305	0.00
Comp Mole Frac (n-Butane)	0.0000		0.00	0.0000		0.00	0.0096	0.0096	0.00
Comp Mole Frac (n-Pentane)	0.0000		0.00	0.0000		0.00	0.0035	0.0035	0.00
Comp Mole Frac (n-Hexane)	0.0000		0.00	0.0000		0.00	0.0001	0.0001	0.00
Comp Mole Frac (n-Heptane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Octane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Benzene)	0.0000		0.00	0.0000		0.00	0.0004	0.0004	0.00
Comp Mole Frac (Toluene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (p-Xylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Styrene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (H2O)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Nitrogen)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Total		1			1			1.0001	
	4329			4330			4759		
Mass Flow (kg/h)	0	0	0.00	53973	53973	0.00	14950.17	15068	0.78
Molar Flow (kgmole/h)	0	0	0.00	1923.94	1923.9	0.00	454.15	455.9	0.38
Temperature (C)	35	35	0.00	35	35	0.00	-20.66	-14	-47.57
Pressure (kg/cm2_g)	36	36	0.00	36	36	0.00	21.68	21.68	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	5007			5008			5027		
	Simulation	Design	%-Error	Simulation	Design	%-Error	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (CO)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Methane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Acetylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Ethylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Ethane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Propadiene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Propene)	1.0000	1	0.00	1.0000	1	0.00	1.0000	1	0.00
Comp Mole Frac (Propane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (13-Butadiene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (1-Butene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Butane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Pentane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Hexane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Heptane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Octane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Benzene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Toluene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (p-Xylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Styrene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (H2O)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Nitrogen)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Total		1			1			1	
	5007			5008			5027		
Mass Flow (kg/h)	394111	394111	0.00	394111	394111	0.00	242391	242391	0.00
Molar Flow (kgmole/h)	9365.62	9365.5	0.00	9365.62	9365.5	0.00	5760.16	5760.1	0.00
Temperature (C)	41	41	0.00	33.63	34.2	1.67	13.1	13.2	0.76
Pressure (kg/cm2_g)	16.81	16.81	0.00	16.64	16.64	0.00	7.64	7.64	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	5037			5042			5049		
	Simulation	Design	%-Error	Simulation	Design	%-Error	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (CO)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Methane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Acetylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Ethylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Ethane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Propadiene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Propene)	1.0000	1	0.00	1.0000	1	0.00	1.0000	1	0.00
Comp Mole Frac (Propane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (13-Butadiene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (1-Butene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Butane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Pentane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Hexane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Heptane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Octane)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Benzene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Toluene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (p-Xylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Styrene)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (H2O)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Nitrogen)	0.0000		0.00	0.0000		0.00	0.0000		0.00
Total		1			1			1	
	5037			5042			5049		
Mass Flow (kg/h)	258973	258973	0.00	258973	258973	0.00	275738	275738	0.00
Molar Flow (kgmole/h)	6154.21	6154.2	0.00	6154.21	6154.2	0.00	6552.62	6552.5	0.00
Temperature (C)	-5.8	-5.8	0.00	-25.3	-25.3	0.00	-26.8	-26.8	0.00
Pressure (kg/cm2_g)	3.97	3.97	0.00	3.83	3.83	0.00	1.41	1.41	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	5050				5079+5028				5108		
	Simulation	Design	%-Error	Simulation	Design	%-Error	Simulation	Design	%-Error		
Comp Mole Frac (Hydrogen)	0.0000		0.00	0.0000		0.00	0.0000		0.00		
Comp Mole Frac (CO)	0.0000		0.00	0.0000		0.00	0.0000		0.00		
Comp Mole Frac (Methane)	0.0000		0.00	0.0000		0.00	0.0000		0.00		
Comp Mole Frac (Acetylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00		
Comp Mole Frac (Ethylene)	0.0000		0.00	0.0000		0.00	1.0000	1	0.00		
Comp Mole Frac (Ethane)	0.0000		0.00	0.0000		0.00	0.0000		0.00		
Comp Mole Frac (Propadiene)	0.0000		0.00	0.0000		0.00	0.0000		0.00		
Comp Mole Frac (Propene)	1.0000	1	0.00	1.0000	1	0.00	0.0000		0.00		
Comp Mole Frac (Propane)	0.0000		0.00	0.0000		0.00	0.0000		0.00		
Comp Mole Frac (13-Butadiene)	0.0000		0.00	0.0000		0.00	0.0000		0.00		
Comp Mole Frac (1-Butene)	0.0000		0.00	0.0000		0.00	0.0000		0.00		
Comp Mole Frac (n-Butane)	0.0000		0.00	0.0000		0.00	0.0000		0.00		
Comp Mole Frac (n-Pentane)	0.0000		0.00	0.0000		0.00	0.0000		0.00		
Comp Mole Frac (n-Hexane)	0.0000		0.00	0.0000		0.00	0.0000		0.00		
Comp Mole Frac (n-Heptane)	0.0000		0.00	0.0000		0.00	0.0000		0.00		
Comp Mole Frac (n-Octane)	0.0000		0.00	0.0000		0.00	0.0000		0.00		
Comp Mole Frac (Benzene)	0.0000		0.00	0.0000		0.00	0.0000		0.00		
Comp Mole Frac (Toluene)	0.0000		0.00	0.0000		0.00	0.0000		0.00		
Comp Mole Frac (p-Xylene)	0.0000		0.00	0.0000		0.00	0.0000		0.00		
	0.0000		0.00	0.0000		0.00	0.0000		0.00		
Comp Mole Frac (Styrene)	0.0000		0.00	0.0000		0.00	0.0000		0.00		
Comp Mole Frac (H2O)	0.0000		0.00	0.0000		0.00	0.0000		0.00		
Comp Mole Frac (Nitrogen)	0.0000		0.00	0.0000		0.00	0.0000		0.00		
Total		1						1			
	5050				5079+5028				5108		
Mass Flow (kg/h)	275738	275738	0.00	242391	242392	0.00	75801	75801	0.00		
Molar Flow (kgmole/h)	6552.62	6552.5	0.00	5760.16	5760.1	0.00	2701.99	2702	0.00		
Temperature (C)	-33.5	-33.5	0.00	3.6	3.6	0.00	-20	-20	0.00		
Pressure (kg/cm2_g)	1.27	1.27	0.00	7.5	7.5	0.00	25.32	25.32	0.00		

Simulation Report – ECC 860 KTA

Working Stage 6

	5109			5113		
	Simulation	Design	%-Error	Simulation	Design	%-Error
Comp Mole Frac (Hydrogen)	0.0000		0.00	0.0000		0.00
Comp Mole Frac (CO)	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Methane)	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Acetylene)	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Ethylene)	1.0000	1	0.00	1.0000	1	0.00
Comp Mole Frac (Ethane)	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Propadiene)	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Propene)	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Propane)	0.0000		0.00	0.0000		0.00
Comp Mole Frac (13-Butadiene)	0.0000		0.00	0.0000		0.00
Comp Mole Frac (1-Butene)	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Butane)	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Pentane)	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Hexane)	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Heptane)	0.0000		0.00	0.0000		0.00
Comp Mole Frac (n-Octane)	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Benzene)	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Toluene)	0.0000		0.00	0.0000		0.00
Comp Mole Frac (p-Xylene)	0.0000		0.00	0.0000		0.00
	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Styrene)	0.0000		0.00	0.0000		0.00
Comp Mole Frac (H2O)	0.0000		0.00	0.0000		0.00
Comp Mole Frac (Nitrogen)	0.0000		0.00	0.0000		0.00
Total		1			1	
	5109			5113		
Mass Flow (kg/h)	35789	35788	0.00	40012	40012	0.00
Molar Flow (kgmole/h)	1275.73	1275.7	0.00	1426.26	1426.3	0.00
Temperature (C)	-55	-55	0.00	-72	-72	0.00
Pressure (kg/cm2_g)	25.18	25.18	0.00	25.04	25.04	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

	4707			4708			4709		
Komponen (mol%)	Data	Simulasi	Galat	Data	Simulasi	Galat	Data	Simulasi	Galat
Hydrogen	17.97	17.96	0.06%	17.97	17.96	0.06%	46.64	46.72	0.18%
Carbon Monoxide	0.11	0.11	0.00%	0.11	0.11	0.00%	0.24	0.25	2.2%
Carbon Dioxide		0	0.00%		0	0.00%		0.00	0.0%
Hydrogen Sulfide		0	0.00%		0	0.00%		0.00	0.0%
Methane	29.96	29.97	0.03%	29.96	29.97	0.03%	41.67	41.95	0.7%
Acetylene	0.58	0.574	1.03%	0.58	0.574	1.03%	0.17	0.13	24.0%
Ethylene	31.42	31.42	0.00%	31.42	31.42	0.00%	9.81	9.57	2.4%
Ethane	5.49	5.49	0.00%	5.49	5.49	0.00%	1.01	0.94	6.8%
Propadiene/Methylacetylene	0.42	0.42	0.00%	0.42	0.42	0.00%	0.01	0.01	0.0%
Propylene	10.27	10.27	0.00%	10.27	10.27	0.00%	0.36	0.34	5.1%
Propane	0.31	0.31	0.00%	0.31	0.31	0.00%	0.01	0.01	0.0%
Butadiene/C4 Acetylene	1.12	1.12	0.00%	1.12	1.12	0.00%	0.01	0.0046	54.0%
Butylenes	1.6	1.6	0.00%	1.6	1.6	0.00%	0.01	0.01	0.0%
Butanes	0.51	0.51	0.00%	0.51	0.51	0.00%	0	0.00	0.0%
C5 Hydrocarbons	0.18	0.18	0.00%	0.18	0.18	0.00%			0.0%
C6 Non Aromatics	0	0	0.00%	0	0	0.00%			0.0%
C7 Non Aromatics			0.00%			0.00%			0.0%
C8 Non Aromatics			0.00%			0.00%			0.0%
Benzene	0.02	0.02	0.00%	0.02	0.02	0.00%			0.0%
Toluene			0.00%			0.00%			0.0%
Xylene/Ethylbenzene			0.00%			0.00%			0.0%
Styrene			0.00%			0.00%			0.0%
C9-204 C			0.00%			0.00%			0.0%
204 - 208 C			0.00%			0.00%			0.0%
Steam/Water			0.00%			0.00%			0.0%
Nitrogen	0.03	0.03	0.00%	0.03	0.03	0.00%	0.06	0.07	14.2%
Naphta			0.00%			0.00%			0.0%
Total Stream Mass Flow Rate (kg/h)	65371	65371	0.00%	65371	65371	0.00%	11772	11676.52	0.81%
Total Stream Molar Flow Rate (kg mol/hr)	2918.3	2917.483	0.03%	2918.3	2917.483	0.03%	1072.1	1066.06	0.56%
Stream Mol Weight ()	22.4	22.41	0.04%	22.4	22.40665	0.0%	10.98	10.95296	0.2%
Stream Temperature (°C)	-35.9	-35.9	0.0%	-72	-72	0.0%	-72	-72.0466	0.06%
Stream Pressure (kg/cm ² (g))	34.93	34.93	0.0%	34.68	34.68	0.0%	34.55	34.55	0.00%

Simulation Report – ECC 860 KTA

Working Stage 6

	4710			4732			4733		
Komponen (mol%)	Data	Simulasi	Galat	Data	Simulasi	Galat	Data	Simulasi	Galat
Hydrogen	1.31	1.40	6.53%	1.31	1.40	6.53%	1.31	1.40	6.53%
Carbon Monoxide	0.04	0.04	0.00%	0.04	0.04	0.00%	0.04	0.04	0.00%
Carbon Dioxide		0.00	0.00%		0.00	0.00%		0.00	0.00%
Hydrogen Sulfide		0.00	0.00%		0.00	0.00%		0.00	0.00%
Methane	23.16	23.07	0.39%	23.16	23.07	0.39%	23.16	23.07	0.39%
Acetylene	0.81	0.83	2.47%	0.81	0.83	2.49%	0.81	0.83	2.49%
Ethylene	43.97	44.00	0.07%	43.97	44.00	0.07%	43.97	44.00	0.07%
Ethane	8.1	8.10	0.00%	8.1	8.10	0.00%	8.1	8.10	0.00%
Propadiene/Methylacetylene	0.66	0.66	0.00%	0.66	0.66	0.00%	0.66	0.66	0.00%
Propylene	16.03	15.99	0.25%	16.03	15.99	0.24%	16.03	15.99	0.24%
Propane	0.48	0.48	0.00%	0.48	0.48	0.00%	0.48	0.48	0.00%
Butadiene/C4 Acetylene	1.77	1.77	0.00%	1.77	1.77	0.00%	1.77	1.77	0.00%
Butylenes	2.53	2.52	0.25%	2.53	2.52	0.25%	2.53	2.52	0.25%
Butanes	0.8	0.80	0.00%	0.8	0.80	0.00%	0.8	0.80	0.00%
C5 Hydrocarbons	0.29	0.29	0.00%	0.29	0.29	0.00%	0.29	0.29	0.00%
C6 Non Aromatics	0.01	0.01	0.00%	0.01	0.01	0.00%	0.01	0.01	0.00%
C7 Non Aromatics			0.00%			0.00%			0.00%
C8 Non Aromatics			0.00%			0.00%			0.00%
Benzene	0.03	0.03	0.00%	0.03	0.03	0.00%	0.03	0.03	0.00%
Toluene			0.00%			0.00%			0.00%
Xylene/Ethylbenzene			0.00%			0.00%			0.00%
Styrene			0.00%			0.00%			0.00%
C9-204 C			0.00%			0.00%			0.00%
204 - 208 C			0.00%			0.00%			0.00%
Steam/Water			0.00%			0.00%			0.00%
Nitrogen	0.01	0.01	0.00%	0.01	0.01	0.00%	0.01	0.01	0.00%
Naphta			0.00%			0.00%			0.00%
Total Stream Mass Flow Rate (kg/h)	53599	53694.48	0.18%	26800	26847.24	0.18%	26800	26847.24	0.18%
Total Stream Molar Flow Rate (kg mol/hr)	1846.2	1851.422	0.28%	923.1	925.7112	0.28%	923.1	925.7112	0.28%
Stream Mol Weight ()	29.03	29.00175	0.10%	29.03		0.00%	29.03		0.00%
Stream Temperature (°C)	-72	-72.0466	0.06%	-97.4	-97.4	0.00%	-97.4	-97.4	0.00%
Stream Pressure (kg/cm ² (g))	34.55	34.55	0.00%	34.07	34.07	0.00%	34.07	34.07	0.00%

Simulation Report – ECC 860 KTA

Working Stage 6

	4741			4742		
Komponen (mol%)	Data	Simulasi	Galat	Data	Simulasi	Galat
Hydrogen	1.31	1.40	6.53%	1.31	1.40	6.53%
Carbon Monoxide	0.04	0.04	0.00%	0.04	0.04	0.00%
Carbon Dioxide		0.00	0.00%		0.00	0.00%
Hydrogen Sulfide		0.00	0.00%		0.00	0.00%
Methane	23.16	23.07	0.39%	23.16	23.07	0.39%
Acetylene	0.81	0.83	2.49%	0.81	0.83	2.49%
Ethylene	43.97	44.00	0.07%	43.97	44.00	0.07%
Ethane	8.1	8.10	0.00%	8.1	8.10	0.00%
Propadiene/Methylacetylene	0.66	0.66	0.00%	0.66	0.66	0.00%
Propylene	16.03	15.99	0.24%	16.03	15.99	0.24%
Propane	0.48	0.48	0.00%	0.48	0.48	0.00%
Butadiene/C4 Acetylene	1.77	1.77	0.00%	1.77	1.77	0.00%
Butylenes	2.53	2.52	0.25%	2.53	2.52	0.25%
Butanes	0.8	0.80	0.00%	0.8	0.80	0.00%
C5 Hydrocarbons	0.29	0.29	0.00%	0.29	0.29	0.00%
C6 Non Aromatics	0.01	0.01	0.00%	0.01	0.01	0.00%
C7 Non Aromatics			0.00%			0.00%
C8 Non Aromatics			0.00%			0.00%
Benzene	0.03	0.03	0.00%	0.03	0.03	0.00%
Toluene			0.00%			0.00%
Xylene/Ethylbenzene			0.00%			0.00%
Styrene			0.00%			0.00%
C9-204 C			0.00%			0.00%
204 - 208 C			0.00%			0.00%
Steam/Water			0.00%			0.00%
Nitrogen	0.01	0.01	0.00%	0.01	0.01	0.00%
Naphta			0.00%			0.00%
Total Stream Mass Flow Rate (kg/h)	26800	26847.24	0.18%	26800	26847.24	0.18%
Total Stream Molar Flow Rate (kg mol/hr)	923.1	925.7112	0.28%	923.1	925.7112	0.28%
Stream Mol Weight ()	29.03		0.00%	29.03		0.00%
Stream Temperature (°C)	-77.9	-78.3365	0.56%	-103.6	-103.955	0.34%
Stream Pressure (kg/cm ² (g))	5.61	5.61	0.00%	5.57	5.57	0.00%

Simulation Report – ECC 860 KTA

Working Stage 6

	4712			4713		
Komponen (mol%)	Data	Simulasi	Galat	Data	Simulasi	Galat
Hydrogen	46.64	46.72	0.2%	54.1	53.77	0.6%
Carbon Monoxide	0.24	0.25	2.2%	0.26	0.27	5.2%
Carbon Dioxide		0.00	0.0%		0.00	0.0%
Hydrogen Sulfide		0.00	0.0%		0.00	0.0%
Methane	41.67	41.95	0.7%	41.24	41.73	1.2%
Acetylene	0.17	0.13	24.0%	0.07	0.04	47.0%
Ethylene	9.81	9.57	2.4%	3.98	3.87	2.7%
Ethane	1.01	0.94	6.8%	0.25	0.22	12.1%
Propadiene/Methylacetylene	0.01	0.01	0.0%			0.0%
Propylene	0.36	0.34	5.1%	0.02	0.01	29.0%
Propane	0.01	0.01	0.0%			0.0%
Butadiene/C4 Acetylene	0.01	0.0046	54.0%			0.0%
Butylenes	0.01	0.01	0.0%			0.0%
Butanes	0	0.00	#DIV/0!			0.0%
C5 Hydrocarbons			0.0%			0.0%
C6 Non Aromatics			0.0%			0.0%
C7 Non Aromatics			0.0%			0.0%
C8 Non Aromatics			0.0%			0.0%
Benzene			0.0%			0.0%
Toluene			0.0%			0.0%
Xylene/Ethylbenzene			0.0%			0.0%
Styrene			0.0%			0.0%
C9-204 C			0.0%			0.0%
204 - 208 C			0.0%			0.0%
Steam/Water			0.0%			0.0%
Nitrogen	0.06	0.07	14.2%	0.07	0.08	10.3%
Naphta			0.0%			0.0%
Total Stream Mass Flow Rate (kg/h)	11772	11676.52	0.81%	8283	8345.368	0.75%
Total Stream Molar Flow Rate (kg mol/hr)	1072.1	1066.06	0.56%	918.5	920.3606	0.20%
Stream Mol Weight ()	10.98		0.00%	9.02		0.00%
Stream Temperature (°C)	-98	-98	0.00%	-98.1	-98.1	0.00%
Stream Pressure (kg/cm ² (g))	34.13	34.13	0.00%	33.92	33.92	0.00%

Simulation Report – ECC 860 KTA

Working Stage 6

	4714			4743		
Komponen (mol%)	Data	Simulasi	Galat	Data	Simulasi	Galat
Hydrogen	2	1.70	14.9%	2	1.70	14.88%
Carbon Monoxide	0.07	0.06	7.3%	0.07	0.06	7.29%
Carbon Dioxide		0.00	0.0%		0.00	0.00%
Hydrogen Sulfide		0.00	0.0%		0.00	0.00%
Methane	44.24	43.33	2.1%	44.24	43.33	2.06%
Acetylene	0.77	0.72	6.9%	0.77	0.72	6.87%
Ethylene	44.69	45.97	2.9%	44.69	45.97	2.87%
Ethane	5.55	5.54	0.1%	5.55	5.54	0.10%
Propadiene/Methylacetylene	0.05	0.06	11.4%	0.05	0.06	11.40%
Propylene	2.42	2.43	0.5%	2.42	2.43	0.50%
Propane	0.06	0.05	9.2%	0.06	0.05	9.17%
Butadiene/C4 Acetylene	0.05	0.03	31.6%	0.05	0.03	31.60%
Butylenes	0.07	0.05	23.0%	0.07	0.05	23.00%
Butanes	0.02	0.03	26.5%	0.02	0.03	26.50%
C5 Hydrocarbons			0.0%			0.00%
C6 Non Aromatics			0.0%			0.00%
C7 Non Aromatics			0.0%			0.00%
C8 Non Aromatics			0.0%			0.00%
Benzene			0.0%			0.00%
Toluene			0.0%			0.00%
Xylene/Ethylbenzene			0.0%			0.00%
Styrene			0.0%			0.00%
C9-204 C			0.0%			0.00%
204 - 208 C			0.0%			0.00%
Steam/Water			0.0%			0.00%
Nitrogen	0.02	0.01	36.0%	0.02	0.01	36.00%
Naphta			0.0%			0.00%
Total Stream Mass Flow Rate (kg/h)	3489	3331.149	4.52%	3489	3331.149	4.52%
Total Stream Molar Flow Rate (kg mol/hr)	153.6	145.6997	5.14%	153.6	145.6997	5.14%
Stream Mol Weight ()	22.71		0.00%	22.71		0.00%
Stream Temperature (°C)	-98.1	-98.1	0.00%	-115.5	-115.5	0.00%
Stream Pressure (kg/cm ² (g))	33.92	33.92	0.00%	5.55	5.55	0.00%

Simulation Report – ECC 860 KTA

Working Stage 6

Komponen (mol%)	4715			4716		
	Data	Simulasi	Galat	Data	Simulasi	Galat
Hydrogen	54.1	53.77	0.6%	76.28	76.2725	0.0%
Carbon Monoxide	0.26	0.27	5.2%	0.3	0.3	0.0%
Carbon Dioxide		0.00	0.0%		0	0.0%
Hydrogen Sulfide		0.00	0.0%		0	0.0%
Methane	41.24	41.73	1.2%	23.14	23.13	0.0%
Acetylene	0.07	0.04	47.0%	0	0	0.0%
Ethylene	3.98	3.87	2.7%	0.18	0.18	0.0%
Ethane	0.25	0.22	12.1%	0	0	0.0%
Propadiene/Methylacetylene			0.0%			0.0%
Propylene	0.02	0.01	29.0%			0.0%
Propane			0.0%			0.0%
Butadiene/C4 Acetylene			0.0%			0.0%
Butylenes			0.0%			0.0%
Butanes			0.0%			0.0%
C5 Hydrocarbons			0.0%			0.0%
C6 Non Aromatics			0.0%			0.0%
C7 Non Aromatics			0.0%			0.0%
C8 Non Aromatics			0.0%			0.0%
Benzene			0.0%			0.0%
Toluene			0.0%			0.0%
Xylene/Ethylbenzene			0.0%			0.0%
Styrene			0.0%			0.0%
C9-204 C			0.0%			0.0%
204 - 208 C			0.0%			0.0%
Steam/Water			0.0%			0.0%
Nitrogen	0.07	0.08	10.3%	0.09	0.095	5.7%
Naphta			0.0%			0.0%
Total Stream Mass Flow Rate (kg/h)	8283	8345.368	0.75%	3459	3478.878	0.57%
Total Stream Molar Flow Rate (kg mol/hr)	918.5	920.3606	0.20%	639.2	639.8098	0.10%
Stream Mol Weight ()	9.02		0.00%	5.41		0.0%
Stream Temperature (°C)	-132	-132	0.00%	-132.1	-132.055	0.0%
Stream Pressure (kg/cm ² (g))	33.74	33.74	0.00%	33.56	33.56	0.0%

Simulation Report – ECC 860 KTA

Working Stage 6

	4717			4744		
Komponen (mol%)	Data	Simulasi	Galat	Data	Simulasi	Galat
Hydrogen	3.35	2.19	34.69%	3.35	2.19	34.69%
Carbon Monoxide	0.18	0.17	3.17%	0.18	0.17	3.17%
Carbon Dioxide		0.00	0.00%		0.00	0.00%
Hydrogen Sulfide		0.00	0.00%		0.00	0.00%
Methane	82.66	84.37	2.07%	82.66	84.37	2.07%
Acetylene	0.21	0.12	42.43%	0.21	0.12	42.43%
Ethylene	12.68	12.35	2.62%	12.68	12.35	2.62%
Ethane	0.81	0.72	11.49%	0.81	0.72	11.49%
Propadiene/Methylacetylene			0.00%			0.00%
Propylene	0.05	0.05	0.00%	0.05	0.05	0.00%
Propane			0.00%			0.00%
Butadiene/C4 Acetylene			0.00%			0.00%
Butylenes			0.00%			0.00%
Butanes			0.00%			0.00%
C5 Hydrocarbons			0.00%			0.00%
C6 Non Aromatics			0.00%			0.00%
C7 Non Aromatics			0.00%			0.00%
C8 Non Aromatics			0.00%			0.00%
Benzene			0.00%			0.00%
Toluene			0.00%			0.00%
Xylene/Ethylbenzene			0.00%			0.00%
Styrene			0.00%			0.00%
C9-204 C			0.00%			0.00%
204 - 208 C			0.00%			0.00%
Steam/Water			0.00%			0.00%
Nitrogen	0.04	0.04	0.00%	0.04	0.04	0.00%
Naphta			0.00%			0.00%
Total Stream Mass Flow Rate (kg/h)	4824	4866.491	0.88%	4824	4866.491	0.88%
Total Stream Molar Flow Rate (kg mol/hr)	279.3	280.5508	0.45%	279.3	280.5508	0.45%
Stream Mol Weight ()	17.27		0.00%	17.27		0.00%
Stream Temperature (°C)	-132.1	-132.055	0.03%	-138.3	-137.557	0.54%
Stream Pressure (kg/cm ² (g))	33.56	33.56	0.00%	5.53	5.53	0.00%

Simulation Report – ECC 860 KTA

Working Stage 6

	4718			4719			4720		
Komponen (mol%)	Data	Simulasi	Galat	Data	Simulasi	Galat	Data	Simulasi	Galat
Hydrogen	76.28	76.27	0.01%	96.58	96.69	0.12%	3.2	1.39	56.65%
Carbon Monoxide	0.3	0.3	0.00%	0.24	0.26	9.17%	0.53	0.52	2.25%
Carbon Dioxide			0.00%			0.00%		0.00	0.00%
Hydrogen Sulfide			0.00%			0.00%		0.00	0.00%
Methane	23.14	23.13	0.02%	3.1	2.95	4.83%	95.31	97.15	1.93%
Acetylene	0	0.00	#DIV/0!		0.00	0.00%	0.02	0.002	88.00%
Ethylene	0.18	0.18	0.00%		0.00	#DIV/0!	0.82	0.83	0.62%
Ethane	0	0.00	#DIV/0!			0.00%	0.02	0.01	28.50%
Propadiene/Methylacetylene			0.00%			0.00%			0.00%
Propylene			0.00%			0.00%			0.00%
Propane			0.00%			0.00%			0.00%
Butadiene/C4 Acetylene			0.00%			0.00%			0.00%
Butylenes			0.00%			0.00%			0.00%
Butanes			0.00%			0.00%			0.00%
C5 Hydrocarbons			0.00%			0.00%			0.00%
C6 Non Aromatics			0.00%			0.00%			0.00%
C7 Non Aromatics			0.00%			0.00%			0.00%
C8 Non Aromatics			0.00%			0.00%			0.00%
Benzene			0.00%			0.00%			0.00%
Toluene			0.00%			0.00%			0.00%
Xylene/Ethylbenzene			0.00%			0.00%			0.00%
Styrene			0.00%			0.00%			0.00%
C9-204 C			0.00%			0.00%			0.00%
204 - 208 C			0.00%			0.00%			0.00%
Steam/Water			0.00%			0.00%			0.00%
Nitrogen	0.09	0.0951	5.67%	0.08	0.09	16.25%	0.1	0.1	0.00%
Naphta			0.00%			0.00%			0.00%
Total Stream Mass Flow Rate (kg/h)	3459	3478.878	0.57%	1267	1269.951	0.23%	2192	2208.926	0.77%
Total Stream Molar Flow Rate (kg mol/hr)	639.2	639.8098	0.10%	500.2	501.7438	0.31%	138.9	138.066	0.60%
Stream Mol Weight ()	5.41		0.00%	2.53		0.00%	15.77		0.00%
Stream Temperature (°C)	-167	-167	0.00%	-167	-167.016	0.01%	-167	-167.016	0.01%
Stream Pressure (kg/cm ² (g))	33.23	33.23	0.00%	33.09	33.09	0.00%	33.09	33.09	0.00%

Simulation Report – ECC 860 KTA

Working Stage 6

	4721			4722		
Komponen (mol%)	Data	Simulasi	Galat	Data	Simulasi	Galat
Hydrogen	96.58	96.69	0.12%	96.58	96.69	0.12%
Carbon Monoxide	0.24	0.26	9.17%	0.24	0.26	9.17%
Carbon Dioxide		0.00	0.00%		0.00	0.00%
Hydrogen Sulfide		0.00	0.00%		0.00	0.00%
Methane	3.1	2.95	4.83%	3.1	2.95	4.83%
Acetylene		0.00	0.00%		0.00	0.00%
Ethylene		0.00	#DIV/0!		0.00	#DIV/0!
Ethane			0.00%			0.00%
Propadiene/Methylacetylene			0.00%			0.00%
Propylene			0.00%			0.00%
Propane			0.00%			0.00%
Butadiene/C4 Acetylene			0.00%			0.00%
Butylenes			0.00%			0.00%
Butanes			0.00%			0.00%
C5 Hydrocarbons			0.00%			0.00%
C6 Non Aromatics			0.00%			0.00%
C7 Non Aromatics			0.00%			0.00%
C8 Non Aromatics			0.00%			0.00%
Benzene			0.00%			0.00%
Toluene			0.00%			0.00%
Xylene/Ethylbenzene			0.00%			0.00%
Styrene			0.00%			0.00%
C9-204 C			0.00%			0.00%
204 - 208 C			0.00%			0.00%
Steam/Water			0.00%			0.00%
Nitrogen	0.08	0.09	16.25%	0.08	0.09	16.25%
Naphta			0.00%			0.00%
Total Stream Mass Flow Rate (kg/h)	298	298.11	0.04%	298	298.11	0.04%
Total Stream Molar Flow Rate (kg mol/hr)	117.7	117.78	0.07%	117.7	117.78	0.07%
Stream Mol Weight ()	2.53		0.00%	2.53		0.00%
Stream Temperature (°C)	-167	-167.016	0.01%	-170.4	-171.986	0.93%
Stream Pressure (kg/cm ² (g))	33.09	33.09	0.00%	4.83	4.83	0.00%

Simulation Report – ECC 860 KTA

Working Stage 6

	4723			4729		
Komponen (mol%)	Data	Simulasi	Galat	Data	Simulasi	Galat
Hydrogen	96.58	96.69	0.12%	96.58	96.69	0.12%
Carbon Monoxide	0.24	0.26	9.17%	0.24	0.26	9.17%
Carbon Dioxide		0.00	0.00%		0.00	0.00%
Hydrogen Sulfide		0.00	0.00%		0.00	0.00%
Methane	3.1	2.95	4.83%	3.1	2.95	4.83%
Acetylene		0.00	0.00%		0.00	0.00%
Ethylene		0.00	#DIV/0!		0.00	#DIV/0!
Ethane			0.00%			0.00%
Propadiene/Methylacetylene			0.00%			0.00%
Propylene			0.00%			0.00%
Propane			0.00%			0.00%
Butadiene/C4 Acetylene			0.00%			0.00%
Butylenes			0.00%			0.00%
Butanes			0.00%			0.00%
C5 Hydrocarbons			0.00%			0.00%
C6 Non Aromatics			0.00%			0.00%
C7 Non Aromatics			0.00%			0.00%
C8 Non Aromatics			0.00%			0.00%
Benzene			0.00%			0.00%
Toluene			0.00%			0.00%
Xylene/Ethylbenzene			0.00%			0.00%
Styrene			0.00%			0.00%
C9-204 C			0.00%			0.00%
204 - 208 C			0.00%			0.00%
Steam/Water			0.00%			0.00%
Nitrogen	0.08	0.09	16.25%	0.08	0.09	16.25%
Naphta			0.00%			0.00%
Total Stream Mass Flow Rate (kg/h)	969	971.8413	0.29%	969	971.8413	0.29%
Total Stream Molar Flow Rate (kg mol/hr)	382.5	383.9638	0.38%	382.5	383.9638	0.38%
Stream Mol Weight ()	2.53		0.00%	2.53		0.00%
Stream Temperature (°C)	-167	-167.016	0.01%	35	35	0.00%
Stream Pressure (kg/cm ² (g))	33.09	33.09	0.00%	32.22	32.22	0.00%

Simulation Report – ECC 860 KTA

Working Stage 6

	4724			4725			4726		
Komponen (mol%)	Data	Simulasi	Galat	Data	Simulasi	Galat	Data	Simulasi	Galat
Hydrogen	3.2	1.39	56.65%	46.02	45.36	1.44%	46.02	45.36	1.44%
Carbon Monoxide	0.53	0.52	2.25%	0.4	0.4	0.00%	0.4	0.40	0.00%
Carbon Dioxide		0.00	0.00%		0.00	0.00%		0.00	0.00%
Hydrogen Sulfide		0.00	0.00%		0.00	0.00%		0.00	0.00%
Methane	95.31	97.15	1.93%	53.02	53.69	1.27%	53.02	53.69	1.27%
Acetylene	0.02	0.002	88.00%	0.01	0.001	87.00%	0.01	0.001	87.00%
Ethylene	0.82	0.83	0.62%	0.45	0.44	1.20%	0.45	0.44	1.20%
Ethane	0.02	0.01	28.50%	0.01	0.01	0.00%	0.01	0.01	0.00%
Propadiene/Methylacetylene		0.00	0.00%			0.00%			0.00%
Propylene		0.00	#DIV/0!			0.00%			0.00%
Propane			0.00%			0.00%			0.00%
Butadiene/C4 Acetylene			0.00%			0.00%			0.00%
Butylenes			0.00%			0.00%			0.00%
Butanes			0.00%			0.00%			0.00%
C5 Hydrocarbons			0.00%			0.00%			0.00%
C6 Non Aromatics			0.00%			0.00%			0.00%
C7 Non Aromatics			0.00%			0.00%			0.00%
C8 Non Aromatics			0.00%			0.00%			0.00%
Benzene			0.00%			0.00%			0.00%
Toluene			0.00%			0.00%			0.00%
Xylene/Ethylbenzene			0.00%			0.00%			0.00%
Styrene			0.00%			0.00%			0.00%
C9-204 C			0.00%			0.00%			0.00%
204 - 208 C			0.00%			0.00%			0.00%
Steam/Water			0.00%			0.00%			0.00%
Nitrogen	0.1	0.1	0.00%	0.09	0.10	9.33%	0.09	0.10	9.33%
Naphta			0.00%			0.00%			0.00%
Total Stream Mass Flow Rate (kg/h)	2192	2208.926	0.77%	2490	2507.036	0.68%	2490	2507.036	0.68%
Total Stream Molar Flow Rate (kg mol/hr)	138.9	138.066	0.60%	256.6	255.846	0.29%	256.6	255.846	0.29%
Stream Mol Weight ()	15.77		0.00%	9.7		0.00%	9.7		0.00%
Stream Temperature (°C)	-167.2	-165.833	0.82%	-171.8	-171.986	0.11%	-137.3	-137.3	0.00%
Stream Pressure (kg/cm ² (g))	4.83	4.83	0.00%	4.83	4.83	0.00%	4.72	4.72	0.00%

Simulation Report – ECC 860 KTA

Working Stage 6

	4727			4728			4767		
Komponen (mol%)	Data	Simulasi	Galat	Data	Simulasi	Galat	Data	Simulasi	Galat
Hydrogen	14.35	14.16	1.29%	14.35	14.16	1.29%	4.73	4.73	0.00%
Carbon Monoxide	0.23	0.23	0.00%	0.23	0.23	0.00%	0.18	0.18	0.00%
Carbon Dioxide		0.00	0.00%		0.00	0.00%		0	0.00%
Hydrogen Sulfide		0.00	0.00%		0.00	0.00%		0	0.00%
Methane	84.98	85.16	0.21%	84.98	85.16	0.21%	94.68	94.68	0.00%
Acetylene	0.01	0.01	0.00%	0.01	0.01	0.00%	0.01	0.01	0.00%
Ethylene	0.38	0.38	0.00%	0.38	0.38	0.00%	0.36	0.36	0.00%
Ethane		0.00	#DIV/0!		0.00	#DIV/0!	0	0	0.00%
Propadiene/Methylacetylene			0.00%			0.00%			0.00%
Propylene			0.00%			0.00%			0.00%
Propane			0.00%			0.00%			0.00%
Butadiene/C4 Acetylene			0.00%			0.00%			0.00%
Butylenes			0.00%			0.00%			0.00%
Butanes			0.00%			0.00%			0.00%
C5 Hydrocarbons			0.00%			0.00%			0.00%
C6 Non Aromatics			0.00%			0.00%			0.00%
C7 Non Aromatics			0.00%			0.00%			0.00%
C8 Non Aromatics			0.00%			0.00%			0.00%
Benzene			0.00%			0.00%			0.00%
Toluene			0.00%			0.00%			0.00%
Xylene/Ethylbenzene			0.00%			0.00%			0.00%
Styrene			0.00%			0.00%			0.00%
C9-204 C			0.00%			0.00%			0.00%
204 - 208 C			0.00%			0.00%			0.00%
Steam/Water			0.00%			0.00%			0.00%
Nitrogen	0.05	0.05	0.00%	0.05	0.05	0.00%	0.04	0.04	0.00%
Naphta			0.00%			0.00%			0.00%
Total Stream Mass Flow Rate (kg/h)	15543	15546.83	0.02%	15543	15546.83	0.02%	13053	13039.8	0.10%
Total Stream Molar Flow Rate (kg mol/hr)	1101.4	1099.846	0.14%	1101.4	1099.846	0.14%	844.8	844	0.09%
Stream Mol Weight ()	14.11		0.00%	14.11		0.00%	15.45		0.00%
Stream Temperature (°C)	-135.1	-135.1	0.00%	35	35	0.00%	-132.7	-132.693	0.01%
Stream Pressure (kg/cm² (g))	4.72	4.72	0.00%	4.5	4.5	0.00%	5.51	5.51	0.00%

Simulation Report – ECC 860 KTA

Working Stage 6

	5208			5209			5210		
Komponen (mol%)	Data	Simulasi	Galat	Data	Simulasi	Galat	Data	Simulasi	Galat
Hydrogen	0.18	0.18	0%	0.18	0.18	0%	0.55	0.53	3.05%
Carbon Monoxide		0	0%		0.00	0%		0.00	0.00%
Carbon Dioxide		0	0%		0.00	0%		0.00	0.00%
Hydrogen Sulfide		0	0%		0.00	0%		0.00	0.00%
Methane	8.65	8.6509	0%	8.65	8.65	0%	20.21	20.44	1.16%
Acetylene		0	0%		0.00	0%		0.00	0.00%
Ethylene	26.11	26.1126	0%	26.11	26.11	0%	38.6	38.33	0.70%
Ethane		0	0%		0.00	0%		0.00	0.00%
Propadiene/Methylacetylene		0	0%		0.00	0%		0.00	0.00%
Propylene	65.05	65.0565	0%	65.05	65.06	0%	40.65	40.69	0.11%
Propane			0%			0%			0%
Butadiene/C4 Acetylene			0%			0%			0%
Butylenes			0%			0%			0%
Butanes			0%			0%			0%
C5 Hydrocarbons			0%			0%			0%
C6 Non Aromatics			0%			0%			0%
C7 Non Aromatics			0%			0%			0%
C8 Non Aromatics			0%			0%			0%
Benzene			0%			0%			0%
Toluene			0%			0%			0%
Xylene/Ethylbenzene			0%			0%			0%
Styrene			0%			0%			0%
C9-204 C			0%			0%			0%
204 - 208 C			0%			0%			0%
Steam/Water			0%			0%			0%
Nitrogen			0%			0%			0%
Naphta			0%			0%			0%
Total Stream Mass Flow Rate (kg/h)	134430	134430	0.00%	134430	134430	0.00%	36589	35550.27	2.84%
Total Stream Molar Flow Rate (kg mol/hr)	3724.7	3724.521	0.00%	3724.7	3724.521	0.00%	1173.3	1140.617	2.79%
Stream Mol Weight ()	36.09			36.09		0.00%	31.19		0.00%
Stream Temperature (°C)	37.3	37.3	0.00%	18.1	18.1	0.00%	17.9	17.98269	0.46%
Stream Pressure (kg/cm² (g))	23.45	23.45	0.00%	23.17	23.17	0.00%	23.08	23.08	0.00%

Simulation Report – ECC 860 KTA

Working Stage 6

	5211			5212			5213		
Komponen (mol%)	Data	Simulasi	Galat	Data	Simulasi	Galat	Data	Simulasi	Galat
Hydrogen	0.55	0.5332	3%	0.55	0.5332	3%	0.55	0.5332	3%
Carbon Monoxide		0	0%		0	0%		0	0%
Carbon Dioxide		0	0%		0	0%		0	0%
Hydrogen Sulfide		0	0%		0	0%		0	0%
Methane	20.21	20.4442	1%	20.21	20.4442	1%	20.21	20.4442	1%
Acetylene		0	0%		0	0%		0	0%
Ethylene	38.6	38.3283	1%	38.6	38.3283	1%	38.6	38.3283	1%
Ethane		0	0%		0	0%		0	0%
Propadiene/Methylacetylene		0	0%		0	0%		0	0%
Propylene	40.65	40.6944	0%	40.65	40.6944	0%	40.65	40.6944	0%
Propane			0%			0%			0%
Butadiene/C4 Acetylene			0%			0%			0%
Butylenes			0%			0%			0%
Butanes			0%			0%			0%
C5 Hydrocarbons			0%			0%			0%
C6 Non Aromatics			0%			0%			0%
C7 Non Aromatics			0%			0%			0%
C8 Non Aromatics			0%			0%			0%
Benzene			0%			0%			0%
Toluene			0%			0%			0%
Xylene/Ethylbenzene			0%			0%			0%
Styrene			0%			0%			0%
C9-204 C			0%			0%			0%
204 - 208 C			0%			0%			0%
Steam/Water			0%			0%			0.00%
Nitrogen			0%			0%			0.00%
Naphta			0%			0%			0.00%
Total Stream Mass Flow Rate (kg/h)	36589	35550.27	2.84%	36589	35550.27	2.84%	27534	26593.14	3.42%
Total Stream Molar Flow Rate (kg mol/hr)	1173.3	1140.617	2.79%	1173.3	1140.617	2.79%	882.9	853.2314	3.36%
Stream Mol Weight ()	31.19		0.00%	31.19		0.00%	31.19		0.00%
Stream Temperature (°C)	-30	-30	0.00%	-72	-72	0.00%	-72	-72	0.00%
Stream Pressure (kg/cm ² (g))	22.94	22.94	0.00%	22.87	22.87	0.00%	22.83	22.87	0.18%

Simulation Report – ECC 860 KTA

Working Stage 6

	5220			5221		
Komponen (mol%)	Data	Simulasi	Galat	Data	Simulasi	Galat
Hydrogen	0.55	0.5332	3%	0.55	0.5332	3%
Carbon Monoxide		0	0%		0	0%
Carbon Dioxide		0	0%		0	0%
Hydrogen Sulfide		0	0%		0	0%
Methane	20.21	20.4442	1.2%	20.21	20.4442	1%
Acetylene		0	0.0%		0	0%
Ethylene	38.6	38.3283	0.7%	38.6	38.3283	1%
Ethane		0	0%		0	0%
Propadiene/Methylacetylene		0	0%		0	0%
Propylene	40.65	40.6944	0%	40.65	40.6944	0%
Propane			0%			0%
Butadiene/C4 Acetylene			0%			0%
Butylenes			0%			0%
Butanes			0%			0%
C5 Hydrocarbons			0%			0%
C6 Non Aromatics			0%			0%
C7 Non Aromatics			0%			0%
C8 Non Aromatics			0%			0%
Benzene			0%			0%
Toluene			0%			0%
Xylene/Ethylbenzene			0%			0%
Styrene			0%			0%
C9-204 C			0%			0%
204 - 208 C			0%			0%
Steam/Water			0%			0%
Nitrogen			0%			0%
Naphta			0%			0%
Total Stream Mass Flow Rate (kg/h)	27534	26593.14	3.42%	27534	26593.14	3.42%
Total Stream Molar Flow Rate (kg mol/hr)	882.9	853.2314	3.36%	882.9	853.2314	3.36%
Stream Mol Weight ()	31.19		0.00%	31.19		0.00%
Stream Temperature (°C)	-132	-132	0.00%	-134.2	-135.45	0.93%
Stream Pressure (kg/cm ² (g))	22.66	22.66	0.00%	0.82	0.82	0.00%

Simulation Report – ECC 860 KTA

Working Stage 6

Komponen (mol%)	5222			5223		
	Data	Simulasi	Galat	Data	Simulasi	Galat
Hydrogen	0.55	0.5332	3%		0.42	
Carbon Monoxide		0	0%		0.00	0%
Carbon Dioxide		0	0%		0.00	0%
Hydrogen Sulfide		0	0%		0.00	0%
Methane	20.21	20.4442	1%		16.80	
Acetylene		0	0%		0.00	0%
Ethylene	38.6	38.3283	1%		34.55	
Ethane		0	0%		0.00	0%
Propadiene/Methylacetylene		0	0%		0.00	0%
Propylene	40.65	40.6944	0%		48.23	
Propane			0%			0%
Butadiene/C4 Acetylene			0%			0%
Butylenes			0%			0%
Butanes			0%			0%
C5 Hydrocarbons			0%			0%
C6 Non Aromatics			0%			0%
C7 Non Aromatics			0%			0%
C8 Non Aromatics			0%			0%
Benzene			0%			0%
Toluene			0%			0%
Xylene/Ethylbenzene			0%			0%
Styrene			0%			0%
C9-204 C			0%			0%
204 - 208 C			0%			0%
Steam/Water			0%			0%
Nitrogen			0%			0%
Naphta			0%			0%
Total Stream Mass Flow Rate (kg/h)	27534	26593.14	3.42%	48395	47480.6	2%
Total Stream Molar Flow Rate (kg mol/hr)	882.9	853.2314	3.36%		1452.378	
Stream Mol Weight ()	31.19		0.00%			
Stream Temperature (°C)	-43	-43	0.00%	-43.1	-43.3448	1%
Stream Pressure (kg/cm ² (g))	0.54	0.54	0.00%	0.54	0.54	0%

Simulation Report – ECC 860 KTA

Working Stage 6

	5215			5216			5217		
Komponen (mol%)	Data	Simulasi	Galat	Data	Simulasi	Galat	Data	Simulasi	Galat
Hydrogen	0.02	0.02	0.0%	0.02	0.02	0%	0.02	0.02	0%
Carbon Monoxide		0	0.0%		0	0%		0	0%
Carbon Dioxide		0	0.0%		0	0%		0	0%
Hydrogen Sulfide		0	0.0%		0	0%		0	0%
Methane	3.34	3.4449	3.1%	3.34	3.4449	3%	3.34	3.4449	3%
Acetylene		0	0.0%		0	0%		0	0%
Ethylene	20.37	20.7202	1.7%	20.37	20.7202	2%	20.37	20.7202	2%
Ethane		0	0.0%		0	0%		0	0%
Propadiene/Methylacetylene		0	0.0%		0	0%		0	0%
Propylene	76.27	75.8107	0.6%	76.27	75.8107	1%	76.27	75.8107	1%
Propane			0%			0%			0%
Butadiene/C4 Acetylene			0%			0%			0%
Butylenes			0%			0%			0%
Butanes			0%			0%			0%
C5 Hydrocarbons			0%			0%			0%
C6 Non Aromatics			0%			0%			0%
C7 Non Aromatics			0%			0%			0%
C8 Non Aromatics			0%			0%			0%
Benzene			0%			0%			0%
Toluene			0%			0%			0%
Xylene/Ethylbenzene			0%			0%			0%
Styrene			0%			0%			0%
C9-204 C			0%			0%			0.00%
204 - 208 C			0%			0%			0.00%
Steam/Water			0%			0%			0%
Nitrogen			0%			0%			0%
Naphta			0%			0.00%			0.00%
Total Stream Mass Flow Rate (kg/h)	97841	98879.73	1.06%	86036	86949.4	1.06%	11805	11930.33	1.06%
Total Stream Molar Flow Rate (kg mol/hr)	2551.4	2583.904	1.27%	2243.6	2272.143	1.27%	307.8	311.7607	1.29%
Stream Mol Weight ()	38.35		0.00%	38.35		0.00%	38.35		0.00%
Stream Temperature (°C)	17.9	17.98269	0.46%	-30	-30	0.00%	-30	-30	0.00%
Stream Pressure (kg/cm² (g))	23.08	23.08	0.00%	22.94	22.94	0.00%	22.94	22.94	0.00%

Simulation Report – ECC 860 KTA

Working Stage 6

Komponen (mol%)	5218			5219		
	Data	Simulasi	Galat	Data	Simulasi	Galat
Hydrogen	0.02	0.02	0%	0.02	0.02	0%
Carbon Monoxide		0	0%		0	0%
Carbon Dioxide		0	0%		0	0%
Hydrogen Sulfide		0	0%		0	0%
Methane	3.34	3.4449	3%	3.34	3.4449	3%
Acetylene		0	0%		0	0%
Ethylene	20.37	20.7202	2%	20.37	20.7202	2%
Ethane		0	0%		0	0%
Propadiene/Methylacetylene		0	0%		0	0%
Propylene	76.27	75.8107	1%	76.27	75.8107	1%
Propane			0%			0%
Butadiene/C4 Acetylene			0%			0%
Butylenes			0%			0%
Butanes			0%			0%
C5 Hydrocarbons			0%			0%
C6 Non Aromatics			0%			0%
C7 Non Aromatics			0%			0%
C8 Non Aromatics			0%			0%
Benzene			0%			0%
Toluene			0%			0%
Xylene/Ethylbenzene			0%			0%
Styrene			0%			0%
C9-204 C			0%			0%
204 - 208 C			0%			0%
Steam/Water			0%			0%
Nitrogen			0%			0%
Naphta			0%			0%
Total Stream Mass Flow Rate (kg/h)	11805	11930.33	1.06%	11805	11930.33	1.06%
Total Stream Molar Flow Rate (kg mol/hr)	307.8	311.7607	1.29%	307.8	311.7607	1.29%
Stream Mol Weight ()	38.35		0.00%	38.35		0.00%
Stream Temperature (°C)	-72	-72	0.00%	-43	-43	0.00%
Stream Pressure (kg/cm ² (g))	22.87	22.87	0.00%	0.54	0.54	0.00%

Simulation Report – ECC 860 KTA

Working Stage 6

	5250			5251			5252		
Komponen (mol%)	Data	Simulasi	Galat	Data	Simulasi	Galat	Data	Simulasi	Galat
Hydrogen	0.55	0.5332	3.05%	0.55	0.5332	3%	0.55	0.5332	3%
Carbon Monoxide		0	0.00%		0	0%		0	0%
Carbon Dioxide		0	0.00%		0	0%		0	0%
Hydrogen Sulfide		0	0.00%		0	0%		0	0%
Methane	20.21	20.4442	1.16%	20.21	20.4442	1%	20.21	20.4442	1%
Acetylene		0	0.00%		0	0%		0	0%
Ethylene	38.6	38.3283	0.70%	38.6	38.3283	1%	38.6	38.3283	1%
Ethane		0	0.00%		0	0%		0	0%
Propadiene/Methylacetylene		0	0.00%		0	0%		0	0%
Propylene	40.65	40.6944	0.11%	40.65	40.6944	0%	40.65	40.6944	0%
Propane			0%			0%			0%
Butadiene/C4 Acetylene			0%			0%			0%
Butylenes			0%			0%			0%
Butanes			0%			0%			0%
C5 Hydrocarbons			0%			0%			0%
C6 Non Aromatics			0%			0%			0%
C7 Non Aromatics			0%			0%			0%
C8 Non Aromatics			0%			0%			0%
Benzene			0%			0%			0%
Toluene			0%			0%			0%
Xylene/Ethylbenzene			0%			0%			0%
Styrene			0%			0%			0%
C9-204 C			0%			0%			0%
204 - 208 C			0%			0%			0%
Steam/Water			0.00%			0%			0%
Nitrogen			0%			0%			0%
Naphta			0.00%			0%			0%
Total Stream Mass Flow Rate (kg/h)	9056	8957.123	1.09%	9056	8957.123	1.09%	9056	8957.123	1.09%
Total Stream Molar Flow Rate (kg mol/hr)	290.4	287.3861	1.04%	290.4	287.3861	1.04%	290.4	287.3861	1.04%
Stream Mol Weight ()	31.19		0.00%	31.19		0.00%	31.19		0.00%
Stream Temperature (°C)	-72	-72	0.00%	-99	-99	0.00%	-44.4	-44.4	0.00%
Stream Pressure (kg/cm ² (g))	22.83	22.87	0.18%	22.55	22.55	0.00%	0.68	0.68	0.00%

Simulation Report – ECC 860 KTA

Working Stage 6

	5228			5229			5230		
Komponen (mol%)	Data	Simulasi	Galat	Data	Simulasi	Galat	Data	Simulasi	Galat
Hydrogen	0.01	0.01	0.00%	0.01	0.01	0.00%	0.01	0.01	0.00%
Carbon Monoxide		0	0.00%		0	0.00%		0	0.00%
Carbon Dioxide		0	0.00%		0	0.00%		0	0.00%
Hydrogen Sulfide		0	0.00%		0	0.00%		0	0.00%
Methane	1.39	1.39	0.00%	1.39	1.39	0.00%	1.39	1.39	0.00%
Acetylene		0	0.00%		0	0.00%		0	0.00%
Ethylene	11.48	11.4802	0.00%	11.48	11.4802	0.00%	11.48	11.4802	0.00%
Ethane		0	0.00%		0	0.00%		0	0.00%
Propadiene/Methylacetylene		0	0.00%		0	0.00%		0	0.00%
Propylene	87.12	87.1216	0.00%	87.12	87.1216	0.00%	87.12	87.1216	0.00%
Propane			0.00%			0.00%			0.00%
Butadiene/C4 Acetylene			0.00%			0.00%			0.00%
Butylenes			0.00%			0.00%			0.00%
Butanes			0.00%			0.00%			0.00%
C5 Hydrocarbons			0.00%			0.00%			0.00%
C6 Non Aromatics			0.00%			0.00%			0.00%
C7 Non Aromatics			0.00%			0.00%			0.00%
C8 Non Aromatics			0.00%			0.00%			0.00%
Benzene			0.00%			0.00%			0.00%
Toluene			0.00%			0.00%			0.00%
Xylene/Ethylbenzene			0.00%			0.00%			0.00%
Styrene			0.00%			0.00%			0.00%
C9-204 C			0.00%			0.00%			0.00%
204 - 208 C			0.00%			0.00%			0.00%
Steam/Water			0.00%			0.00%			0.00%
Nitrogen			0.00%			0.00%			0.00%
Naphta									
Total Stream Mass Flow Rate (kg/h)	192097	192097	0.00%	52084	49202.15	5.53%	52084	49202.15	5.53%
Total Stream Molar Flow Rate (kg mol/hr)	4789.7	4792.5	0.06%	1298.6	1226.83	5.53%	1298.6	1226.83	5.53%
Stream Mol Weight ()	40.11		0.00%	40.11		0.00%	40.11		0.00%
Stream Temperature (°C)	7.4	7.4	0.00%	-30	-30	0.00%	35	35	0.00%
Stream Pressure (kg/cm ² (g))	23.24	23.24	0.00%	23.1	23.1	0.00%	6.83	6.83	0.00%

Simulation Report – ECC 860 KTA

Working Stage 6

5231				5232			5235		
Komponen (mol%)	Data	Simulasi	Galat	Data	Simulasi	Galat	Data	Simulasi	Galat
Hydrogen	0.02	0.02	0.00%	0.01	0.0185	85.00%	0.01	0.01	0.00%
Carbon Monoxide		0	0.00%		0	0.00%		0	0.00%
Carbon Dioxide		0	0.00%		0	0.00%		0	0.00%
Hydrogen Sulfide		0	0.00%		0	0.00%		0	0.00%
Methane	3.34	3.4449	3.14%	2.62	2.718	3.74%	1.39	1.39	0.00%
Acetylene		0	0.00%		0	0.00%		0	0.00%
Ethylene	20.37	20.7202	1.72%	17.11	17.4516	2.00%	11.48	11.4802	0.00%
Ethane		0	0.00%		0	0.00%		0	0.00%
Propadiene/Methylacetylene		0	0.00%		0	0.00%		0	0.00%
Propylene	76.27	75.8107	0.60%	80.25	79.812	0.55%	87.12	87.1216	0.00%
Propane			0.00%			0.00%			0.00%
Butadiene/C4 Acetylene			0.00%			0.00%			0.00%
Butylenes			0.00%			0.00%			0.00%
Butanes			0.00%			0.00%			0.00%
C5 Hydrocarbons			0.00%			0.00%			0.00%
C6 Non Aromatics			0.00%			0.00%			0.00%
C7 Non Aromatics			0.00%			0.00%			0.00%
C8 Non Aromatics			0.00%			0.00%			0.00%
Benzene			0.00%			0.00%			0.00%
Toluene			0.00%			0.00%			0.00%
Xylene/Ethylbenzene			0.00%			0.00%			0.00%
Styrene			0.00%			0.00%			0.00%
C9-204 C			0.00%			0.00%			0.00%
204 - 208 C			0.00%			0.00%			0.00%
Steam/Water			0.00%			0.00%			0.00%
Nitrogen			0.00%			0.00%			0.00%
Naphta									
Total Stream Mass Flow Rate (kg/h)	86036	86949.4	1.06%	138120	136151.6	1.43%	140013	143001.5	2.13%
Total Stream Molar Flow Rate (kg mol/hr)	2243.6	2272.143	1.27%	3542.2	3498.973	1.22%	3491	3565.67	2.14%
Stream Mol Weight ()	38.35		0.00%	38.99		0.00%	40.11		0.00%
Stream Temperature (°C)	35	35	0.00%	35	34.99386	0.02%	-30	-30	0.00%
Stream Pressure (kg/cm ² (g))	6.83	6.83	0.00%	6.83	6.83	0.00%	23.1	23.1	0.00%

A.5. Stage 3

Table A.3.1. Stage 3 Stream Properties

Simulation Report – ECC 860 KTA

Working Stage 6

Component Properties	4744			4144			4143		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen	0.0335	0.0335	0	0.0335	0.0335	0	0.02	0.02	0
Carbon Monoxide	0.0018	0.0018	0	0.0018	0.0018	0	0.0007	0.0007	0
Carbon Dioxide									
Hydrogen Sulfide									
Methane	0.8268	0.8266	0.02	0.8267	0.8265	0.02	0.4421	0.4421	0
Acetylene	0.0021	0.0021	0	0.0021	0.0021	0	0.0077	0.0077	0
Ethylene	0.1268	0.1268	0	0.1269	0.1269	0	0.4471	0.4471	0
Ethane	0.0081	0.0081	0	0.0081	0.0081	0	0.0556	0.0556	0
Propadiene/Methylacetylene							0.0005	0.0005	0
Propylene	0.0005	0.0005	0	0.0005	0.0005	0	0.0242	0.0242	0
Propane							0.0006	0.0006	0
Butadiene/C4 Acetylene							0.0005	0.0005	0
Butylenes							0.0007	0.0007	0
Butanes							0.0002	0.0002	0
C5 Hydrocarbons									
C6 Non Aromatics									
C7 Non Aromatics									
C8 Non Aromatics									
Benzene									
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen	0.0004	0.0004	0	0.0004	0.0004	0	0.0002	0.0002	0
Naptha									
Mass Flow (kg/h)	4824	4824	0	13662	13662	0	9852	9852	0
Molar Flow (kmole/h)	279.3253	279.3	0.00906	791.0193	791	0.0024	433.7443	433.8	0.01
Temperature (°C)	-138.3	-138.3	0	-138.3	-138.3	0	-115.5	-115.5	0
Pressure (kg/cm ² _g)	5.53	5.53	0	5.53	5.53	0	5.55	5.55	0
Component Properties	4703			4707			4104		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen	0.1797	0.1797	0.01	0.1797	0.1797	0.01	0.1797	0.1797	0.01
Carbon Monoxide	0.0011	0.0011	0.01	0.0011	0.0011	0.01	0.0011	0.0011	0.01
Carbon Dioxide									
Hydrogen Sulfide									
Methane	0.2996	0.2996	0.01	0.2996	0.2996	0.01	0.2996	0.2996	0.01
Acetylene	0.0058	0.0058	0.01	0.0058	0.0058	0.01	0.0058	0.0058	0.01
Ethylene	0.3142	0.3142	0.01	0.3142	0.3142	0.01	0.3142	0.3142	0.01
Ethane	0.0549	0.0549	0.01	0.0549	0.0549	0.01	0.0549	0.0549	0.01
Propadiene/Methylacetylene	0.0042	0.0042	0	0.0042	0.0042	0	0.0042	0.0042	0.01
Propylene	0.1027	0.1027	0.01	0.1027	0.1027	0.01	0.1027	0.1027	0.01
Propane	0.0031	0.0031	0.01	0.0031	0.0031	0	0.0031	0.0031	0.01
Butadiene/C4 Acetylene	0.0112	0.0112	0.01	0.0112	0.0112	0	0.0112	0.0112	0.01
Butylenes	0.016	0.016	0.01	0.016	0.016	0	0.016	0.016	0.01
Butanes	0.0051	0.0051	0.01	0.0051	0.0051	0	0.0051	0.0051	0.01
C5 Hydrocarbons	0.0018	0.0018	0.01	0.0018	0.0018	0	0.0018	0.0018	0
C6 Non Aromatics									
C7 Non Aromatics									
C8 Non Aromatics									
Benzene	0.0002	0.0002	0.01	0.0002	0.0002	0	0.0002	0.0002	0
Toluene									

Simulation Report – ECC 860 KTA

Working Stage 6

Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen	0.0003	0.0003	0	0.0003	0.0003	0	0.0003	0.0003	0
Naphtha									
Mass Flow (kg/h)	65371	65371	0	65371	65371	0	185000	185000	0
Molar Flow (kmole/h)	2918.521	2918.3	0.01	2918.521	2918.3	0.0076	8259.418	8258.8	0.0075
Temperature (°C)	-21.507	-21.6	0.43	-34.7866	-35.9	3.1013	-36.5	-36.5	0
Pressure (kg/cm ² _g)	35.56	35.56	0	34.93	34.93	0	35.69	35.69	0
Component Properties	4167			4175			4756		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen	0.0526	0.0526	0.01	0.0556	0.0557	0.1547			
Carbon Monoxide	0.0019	0.0019	0.01	0.0018	0.0019	3.1437			
Carbon Dioxide									
Hydrogen Sulfide									
Methane	0.9413	0.9414	0.01	0.9259	0.938	1.2862	0.0001	0.0001	0.01
Acetylene	0.0001	0.0001	0.01	0.0001	0.0001	10.436	0.0109	0.0109	0.01
Ethylene	0.0037	0.0037	0.01	0.0158	0.0039	305.91	0.609	0.6091	0.01
Ethane							0.1047	0.1047	0.01
Propadiene/Methylacetylene							0.0081	0.0081	0.01
Propylene							0.1958	0.1958	0.01
Propane							0.0059	0.0059	0.01
Butadiene/C4 Acetylene							0.0214	0.0214	0.01
Butylenes							0.0305	0.0305	0.01
Butanes							0.0096	0.0096	0.01
C5 Hydrocarbons							0.0035	0.0035	0.01
C6 Non Aromatics							0.0001	0.0001	0.01
C7 Non Aromatics									
C8 Non Aromatics									
Benzene							0.0004	0.0004	0.01
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen	0.0004	0.0004	0	0.0004	0.0004	0			
Naphtha									
Mass Flow (kg/h)	32350	32350	0	7913	7913	0	50228	50228	0
Molar Flow (kmole/h)	2103.6383	2103.6	0	511.0234	515.9	0.95	1519.257	1519.7	0.03
Temperature (°C)	-134.9	-134.9	0	85.6435	85.7	0.07	-50.9	-50.9	0
Pressure (kg/cm ² _g)	5.46	5.46	0	21.1	21.1	0	27.9	27.9	0
Component Properties	4767			4141			4319		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen	0.05	0.05	0.68	0.0131	0.0131	0	0.0118	0.0118	0.0101
Carbon Monoxide	0	0.00	2.43	0.0004	0.0004	0	0.0002	0.0002	0.010

Simulation Report – ECC 860 KTA

Working Stage 6

									1
Carbon Dioxide									
Hydrogen Sulfide									
Methane	0.93	0.95	1.92	0.2316	0.2316	0	0.0084	0.0084	0.0001
Acetylene	0	0.00	14.84	0.0081	0.0081	0			
Ethylene	0.02	0.00	502.85	0.4397	0.4397	0	0.9794	0.9795	0.0101
Ethane				0.081	0.081	0	0.0002	0.0002	0.0001
Propadiene/Methylacetylene				0.0066	0.0066	0			
Propylene				0.1603	0.1603	0			
Propane				0.0048	0.0048	0			
Butadiene/C4 Acetylene				0.0177	0.0177	0			
Butylenes				0.0253	0.0253	0			
Butanes				0.008	0.008	0			
C5 Hydrocarbons				0.0029	0.0029	0			
C6 Non Aromatics				0.0001	0.0001	0			
C7 Non Aromatics									
C8 Non Aromatics									
Benzene				0.0003	0.0003	0			
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen	0	0.00	5.76	0.0001	0.0001	0	0	0	0
Naphtha									
Mass Flow (kg/h)	13053	13053	0	75849	75849	0	2093	2093	0
Molar Flow (kmole/h)	832.6107	844.8	1.44	2611.6807	2612.7	0.04	75.7069	75.7	0.01
Temperature (°C)	-124.1082	-132.7	6.47	-77.9	-77.9	0	-57.8	-57.8	0
Pressure (kg/cm ² _g)	5.51	5.51	0	5.61	5.61	0	5.97	5.97	0
Component Properties	4166			4168			4169		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen	0.05	0.05	0.68	0.05	0.05	0.68	0.05	0.05	0.68
Carbon Monoxide	0	0.00	2.43	0	0.00	2.43	0	0.00	2.43
Carbon Dioxide									
Hydrogen Sulfide									
Methane	0.93	0.95	1.92	0.93	0.95	1.92	0.93	0.95	1.92
Acetylene	0	0.00	14.84	0	0.00	14.84	0	0.00	14.84
Ethylene	0.02	0.00	502.85	0.02	0.00	502.85	0.02	0.00	502.85
Ethane									
Propadiene/Methylacetylene									
Propylene									
Propane									
Butadiene/C4 Acetylene									
Butylenes									
Butanes									
C5 Hydrocarbons									
C6 Non Aromatics									
C7 Non Aromatics									
C8 Non Aromatics									
Benzene									
Toluene									
Xylene/Ethylbenzene									
Styrene									

Simulation Report – ECC 860 KTA

Working Stage 6

C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen	0.04	0.04	0	0.04	0.04	0	0.04	0.04	0
Naphtha									
Mass Flow (kg/h)	48217.5058	47553	1.4	15735	15735	0	15735	15735	0
Molar Flow (kmole/h)	3075.6464	3077.8	0.07	1003.6873	1018.4	1.44	1003.687	1018.4	1.44
Temperature (°C)	-124.1082	-132.7	6.47	-124.1082	-132.7	6.47	38	38	0
Pressure (kg/cm ² _g)	5.51	5.51	0	5.51	5.51	0	5.34	5.34	0
Component Properties	4142			4742			4741		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen	0.0131	0.0131	0	0.0131	0.0131	0	0.0131	0.0131	0
Carbon Monoxide	0.0004	0.0004	0	0.0004	0.0004	0	0.0004	0.0004	0
Carbon Dioxide									
Hydrogen Sulfide									
Methane	0.2316	0.2316	0	0.2316	0.2316	0	0.2316	0.2316	0
Acetylene	0.0081	0.0081	0	0.0081	0.0081	0	0.0081	0.0081	0
Ethylene	0.4397	0.4397	0	0.4397	0.4397	0	0.4397	0.4397	0
Ethane	0.081	0.081	0	0.081	0.081	0	0.081	0.081	0
Propadiene/Methylacetylene	0.0066	0.0066	0	0.0066	0.0066	0	0.0066	0.0066	0
Propylene	0.1603	0.1603	0	0.1603	0.1603	0	0.1603	0.1603	0
Propane	0.0048	0.0048	0	0.0048	0.0048	0	0.0048	0.0048	0
Butadiene/C4 Acetylene	0.0177	0.0177	0	0.0177	0.0177	0	0.0177	0.0177	0
Butylenes	0.0253	0.0253	0	0.0253	0.0253	0	0.0253	0.0253	0
Butanes	0.008	0.008	0	0.008	0.008	0	0.008	0.008	0
C5 Hydrocarbons	0.0029	0.0029	0	0.0029	0.0029	0	0.0029	0.0029	0
C6 Non Aromatics	0.0001	0.0001	0	0.0001	0.0001	0	0.0001	0.0001	0
C7 Non Aromatics									
C8 Non Aromatics									
Benzene	0.0003	0.0003	0	0.0003	0.0003	0	0.0003	0.0003	0
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen	0.0001	0.0001	0	0.0001	0.0001	0	0.0001	0.0001	0
Naptha									
Mass Flow (kg/h)	75849	75849	0	26800	26800	0	26800	26800	0
Molar Flow (kmole/h)	2611.6807	2612.7	0.04	922.7945	923.1	0.03	922.7945	923.1	0.03
Temperature (°C)	-103.7	-103.7	0	-103.6	-103.6	0	-77.9	-77.9	0
Pressure (kg/cm ² _g)	5.57	5.57	0	5.57	5.57	0	5.61	5.61	0
Component Properties	4706			4178			4106		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen	0.1797	0.1797	0.01	0.1797	0.1797	0.01	0.1797	0.1797	0.01
Carbon Monoxide	0.0011	0.0011	0.01	0.0011	0.0011	0.01	0.0011	0.0011	0.01
Carbon Dioxide									
Hydrogen Sulfide									
Methane	0.2996	0.2996	0.01	0.2996	0.2996	0.01	0.2996	0.2996	0.01
Acetylene	0.0058	0.0058	0.01	0.0058	0.0058	0.01	0.0058	0.0058	0.01
Ethylene	0.3142	0.3142	0.01	0.3142	0.3142	0.01	0.3142	0.3142	0.01
Ethane	0.0549	0.0549	0.01	0.0549	0.0549	0.01	0.0549	0.0549	0.01
Propadiene/Methylacetylene	0.0042	0.0042	0	0.0042	0.0042	0	0.0042	0.0042	0.01
Propylene	0.1027	0.1027	0.01	0.1027	0.1027	0.01	0.1027	0.1027	0.01

Simulation Report – ECC 860 KTA

Working Stage 6

Propane	0.0031	0.0031	0.01	0.0031	0.0031	0	0.0031	0.0031	0.01
Butadiene/C4 Acetylene	0.0112	0.0112	0.01	0.0112	0.0112	0	0.0112	0.0112	0.01
Butylenes	0.016	0.016	0.01	0.016	0.016	0	0.016	0.016	0.01
Butanes	0.0051	0.0051	0.01	0.0051	0.0051	0	0.0051	0.0051	0.01
C5 Hydrocarbons	0.0018	0.0018	0.01	0.0018	0.0018	0	0.0018	0.0018	0
C6 Non Aromatics									
C7 Non Aromatics									
C8 Non Aromatics									
Benzene	0.0002	0.0002	0.01	0.0002	0.0002	0	0.0002	0.0002	0
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen	0.0003	0.0003	0	0.0003	0.0003	0	0.0003	0.0003	0
Naptha									
Mass Flow (kg/h)	65371	65371	0	185000	185000	0	185000	185000	0
Molar Flow (kmole/h)	2918.521	2918.3	0.01	8259.4175	8258.8	0.01	8259.418	8258.8	0.01
Temperature (°C)	-30.7	-30.7	0	-47.1	-47.1	0	-60.8313	-59.7	1.89
Pressure (kg/cm ² _g)	35.28	35.28	0	35.44	35.44	0	35.24	35.24	0
Component Properties	4745			4746			4747		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen	0.0131	0.0131	0	0.01	0.01	0	0.02	0.02	0.01
Carbon Monoxide	0.0004	0.0004	0	0	0.00	0	0	0.00	0.01
Carbon Dioxide									
Hydrogen Sulfide									
Methane	0.2316	0.2316	0	0.23	0.23	0	0.44	0.44	0.01
Acetylene	0.0081	0.0081	0	0.01	0.01	0	0.01	0.01	0.01
Ethylene	0.4397	0.4397	0	0.44	0.44	0	0.45	0.45	0
Ethane	0.081	0.081	0	0.08	0.08	0	0.06	0.06	0.06
Propadiene/Methylacetylene	0.0066	0.0066	0	0.01	0.01	0	0	0.00	0.01
Propylene	0.1603	0.1603	0	0.16	0.16	0	0.02	0.02	0.01
Propane	0.0048	0.0048	0	0	0.00	0	0	0.00	0.01
Butadiene/C4 Acetylene	0.0177	0.0177	0	0.02	0.02	0	0	0.00	0.01
Butylenes	0.0253	0.0253	0	0.03	0.03	0	0	0.00	0.01
Butanes	0.008	0.008	0	0.01	0.01	0	0	0.00	0.01
C5 Hydrocarbons	0.0029	0.0029	0	0	0.00				
C6 Non Aromatics	0.0001	0.0001	0	0	0.00				
C7 Non Aromatics									
C8 Non Aromatics									
Benzene	0.0003	0.0003	0	0	0.00	0			
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen	0.0001	0.0001	0.0074	0.01	0.01	0	0.02	0.02	0
Naptha									
Mass Flow (kg/h)	102649	102649	0	102649	102649	0	37.8084	13341	99.72
Molar Flow (kmole/h)	3534.4752	3535.8	0.04	3534.4752	3535.8	0.04	587.3767	587.4	0
Temperature (°C)	-77.9	-77.9	0	-103.6739	-103.7	0.03	-115.5	-115.5	0
Pressure (kg/cm ² _g)	5.61	5.61	0	5.57	5.57	0	5.55	5.55	0

Simulation Report – ECC 860 KTA

Working Stage 6

Component Properties	4748			4155			4156		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen	0.03	0.03	0.02						
Carbon Monoxide	0	0.00	0.02						
Carbon Dioxide									
Hydrogen Sulfide									
Methane	0.83	0.83	0.01	0.01	0.00	9344	0.01	0.00	9344
Acetylene	0	0.00	0.02	0.01	0.01	0.32	0.01	0.01	0.32
Ethylene	0.13	0.13	0	0.6	0.61	1.52	0.6	0.61	1.52
Ethane	0.01	0.01	0.02	0.1	0.10	0.16	0.1	0.10	0.16
Propadiene/Methylacetylene				0.01	0.01	1.12	0.01	0.01	1.12
Propylene	0	0.00	0.02	0.2	0.20	0.02	0.2	0.20	0.02
Propane				0.01	0.01	0.87	0.01	0.01	0.87
Butadiene/C4 Acetylene				0.02	0.02	0.02	0.02	0.02	0.02
Butylenes				0.03	0.03	0.27	0.03	0.03	0.27
Butanes				0.01	0.01	0.71	0.01	0.01	0.71
C5 Hydrocarbons				0	0.00	0.08	0	0.00	0.08
C6 Non Aromatics				0	0.00	20.6	0	0.00	20.6
C7 Non Aromatics									
C8 Non Aromatics									
Benzene				0	0.00	9.55	0	0.00	9.55
Toluene							0	0.00	0
Xylene/Ethylbenzene							0	0.00	0
Styrene							0	0.00	0
C9							0	0.00	0
204 288 C (PGO)							0	0.00	0
288 C Plus (PFO)							0	0.00	0
Steam/Water							0	0.00	0
Nitrogen	0.04	0.04	0				0	0.00	0
Naphtha							0	0.00	0
Mass Flow (kg/h)	18486	18486	0	193150.861	193816	0.34	193150.9	193816	0.34
Molar Flow (kmole/h)	1070.3447	1070.3	0	5861.8004	5864.1	0.04	5861.8	5864.1	0.04
Temperature (°C)	-138.3	-138.3	0	-55.6703	-52.8	5.44	-50.9	-50.9	0
Pressure (kg/cm ² _g)	5.53	5.53	0	5.73	5.73	0	27.9	27.9	0
Component Properties	4195			4196			4197		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen	0	0.01	99.37	0	0.01	99.37	0	0.01	99.37
Carbon Monoxide									
Carbon Dioxide									
Hydrogen Sulfide									
Methane	0.11	0.11	0.45	0.11	0.11	0.45	0.11	0.11	0.45
Acetylene	0.01	0.01	6.15	0.01	0.01	6.15	0.01	0.01	6.15
Ethylene	0.55	0.59	6.95	0.55	0.59	6.95	0.55	0.59	6.95
Ethane	0.09	0.09	2.59	0.09	0.09	2.59	0.09	0.09	2.59
Propadiene/Methylacetylene	0.01	0.01	22.47	0.01	0.01	22.47	0.01	0.01	22.47
Propylene	0.17	0.14	19.98	0.17	0.14	19.98	0.17	0.14	19.98
Propane	0	0.00	20.17	0	0.00	20.17	0	0.00	20.17
Butadiene/C4 Acetylene	0.02	0.01	23.76	0.02	0.01	23.76	0.02	0.01	23.76
Butylenes	0.03	0.02	23.92	0.03	0.02	23.92	0.03	0.02	23.92
Butanes	0.01	0.01	24.83	0.01	0.01	24.83	0.01	0.01	24.83
C5 Hydrocarbons	0	0.00	27.46	0	0.00	27.46	0	0.00	27.46
C6 Non Aromatics	0	0.00	1.08	0	0.00	1.08	0	0.00	1.08
C7 Non Aromatics									
C8 Non Aromatics									
Benzene	0	0.00	51.62	0	0.00	51.62	0	0.00	51.62
Toluene									

Simulation Report – ECC 860 KTA

Working Stage 6

Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen									
Naphtha									
Mass Flow (kg/h)	51817.3475	51768	0.1	51817.3475	51768	0.1	20939	20939	0
Molar Flow (kmole/h)	1675.653	1715	2.29	1675.653	1715	2.29	677.1188	693.7	2.39
Temperature (°C)	-84.5928	-87.9	3.76	-70.4	-70.4	0	-84.5928	-87.9	3.76
Pressure (kg/cm²_g)	5.62	5.59	0.54	5.66	5.66	0	5.62	5.59	0.54
Component Properties	4180			4181			4182		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen	0.06	0.06	0.15	0.06	0.06	0.15	0.06	0.06	0.15
Carbon Monoxide	0	0.00	3.14	0	0.00	3.14	0	0.00	3.14
Carbon Dioxide									
Hydrogen Sulfide									
Methane	0.93	0.94	1.29	0.93	0.94	1.29	0.93	0.94	1.29
Acetylene	0	0.00	10.44	0	0.00	10.44	0	0.00	10.44
Ethylene	0.02	0.00	305.91	0.02	0.00	305.91	0.02	0.00	305.91
Ethane									
Propadiene/Methylacetylene									
Propylene									
Propane									
Butadiene/C4 Acetylene									
Butylenes									
Butanes									
C5 Hydrocarbons									
C6 Non Aromatics									
C7 Non Aromatics									
C8 Non Aromatics									
Benzene									
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen	0.04	0.04	0	0.04	0.04	0	0.04	0.04	0
Naphtha									
Mass Flow (kg/h)	15735	15735	0	15735	15735	0	15735	15735	0
Molar Flow (kmole/h)	1016.17	1025.9	0.95	1016.17	1025.9	0.95	1016.17	1025.9	0.95
Temperature (°C)	-70	-60	16.67	-84	-84	0	-100.957	-98	3.02
Pressure (kg/cm²_g)	38.18	38.18	0	38.03	38.03	0	37.85	37.85	0
Component Properties	4184			4185			4186		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen	0.33	0.31	8.53	0.03	0.03	13.24	0.03	0.03	13.24
Carbon Monoxide	0	0.00	9.14	0	0.00	3.78	0	0.00	3.78
Carbon Dioxide									
Hydrogen Sulfide									
Methane	0.66	0.69	4.05	0.96	0.96	0.98	0.96	0.96	0.98
Acetylene	0	0.00	0	0	0.00	21.74	0	0.00	21.74
Ethylene	0	0.00	183.95	0.02	0.00	304.07	0.02	0.00	304.07

Simulation Report – ECC 860 KTA

Working Stage 6

Ethane									
Propadiene/Methylacetylene									
Propylene									
Propane									
Butadiene/C4 Acetylene									
Butylenes									
Butanes									
C5 Hydrocarbons									
C6 Non Aromatics									
C7 Non Aromatics									
C8 Non Aromatics									
Benzene									
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen	0.15	0.08	87.5	0.03	0.03	0	0.03	0.03	0
Naphtha									
Mass Flow (kg/h)	1143.7217	1158	1.23	14591.3951	14577	0.1	2150	2150	0
Molar Flow (kmole/h)	100.1383	98.4	1.77	916.0317	927.6	1.25	134.9746	136.8	1.33
Temperature (°C)	-106.6783	-105.8	0.83	-106.6783	-105.8	0.83	-134.818	-135.5	0.5
Pressure (kg/cm ² _g)	37.58	37.51	0.19	37.58	37.51	0.19	5.51	5.51	0
Component Properties	4176			4172			4173		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen	0.06	0.06	0.15	0.06	0.06	0.15	0.06	0.06	0.15
Carbon Monoxide	0	0.00	3.14	0	0.00	3.14	0	0.00	3.14
Carbon Dioxide									
Hydrogen Sulfide									
Methane	0.93	0.94	1.29	0.93	0.94	1.29	0.93	0.94	1.29
Acetylene	0	0.00	10.44	0	0.00	10.44	0	0.00	10.44
Ethylene	0.02	0.00	305.91	0.02	0.00	305.91	0.02	0.00	305.91
Ethane									
Propadiene/Methylacetylene									
Propylene									
Propane									
Butadiene/C4 Acetylene									
Butylenes									
Butanes									
C5 Hydrocarbons									
C6 Non Aromatics									
C7 Non Aromatics									
C8 Non Aromatics									
Benzene									
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen	0.04	0.04	0	0.04	0.04	0	0.04	0.04	0
Naptha									
Mass Flow (kg/h)	15735	15735	0	23648	23648	0	7913	7913	0
Molar Flow (kmole/h)	1016.17	1025.9	0.95	1527.1935	1541.9	0.95	511.0234	515.9	0.95

Simulation Report – ECC 860 KTA

Working Stage 6

Temperature (°C)	153.5	153.5	0	41	41	0	85.9	85.9	0
Pressure (kg/cm ² _g)	38.53	38.53	0	14.33	14.33	0	22.1	22.1	0
Component Properties	4198			4183			4187		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen	0	0.01	99.37	0.06	0.06	0.15	0.03	0.03	13.24
Carbon Monoxide				0	0.00	3.14	0	0.00	3.78
Carbon Dioxide									
Hydrogen Sulfide									
Methane	0.11	0.11	0.45	0.93	0.94	1.29	0.96	0.96	0.98
Acetylene	0.01	0.01	6.15	0	0.00	10.44	0	0.00	21.74
Ethylene	0.55	0.59	6.95	0.02	0.00	305.91	0.02	0.00	304.07
Ethane	0.09	0.09	2.59						
Propadiene/Methylacetylene	0.01	0.01	22.47						
Propylene	0.17	0.14	19.98						
Propane	0	0.00	20.17						
Butadiene/C4 Acetylene	0.02	0.01	23.76						
Butylenes	0.03	0.02	23.92						
Butanes	0.01	0.01	24.83						
C5 Hydrocarbons	0	0.00	27.46						
C6 Non Aromatics	0	0.00	1.08						
C7 Non Aromatics									
C8 Non Aromatics									
Benzene	0	0.00	51.62						
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen				0.04	0.04	0	0.03	0.03	0
Naphtha									
Mass Flow (kg/h)	20939	20939	0	15735	15735	0	12441.4	12427	0.12
Molar Flow (kmole/h)	677.1188	693.7	2.39	1016.17	1025.9	0.95	781.0571	790.7	1.22
Temperature (°C)	-70.4	-70.4	0	-106.6783	-105.8	0.83	-134.955	-135.5	0.4
Pressure (kg/cm ² _g)	5.66	5.66	0	37.58	37.58	0	5.46	5.51	0.91
Component Properties	4107			4743			4177		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen	0.1797	0.1797	0.01	0.02	0.02	0	0.06	0.06	0.15
Carbon Monoxide	0.0011	0.0011	0.01	0.0007	0.0007	0	0	0.00	3.14
Carbon Dioxide									
Hydrogen Sulfide									
Methane	0.2996	0.2996	0.01	0.4424	0.4424	0	0.93	0.94	1.29
Acetylene	0.0058	0.0058	0.01	0.0077	0.0077	0	0	0.00	10.44
Ethylene	0.3142	0.3142	0.01	0.4469	0.4469	0	0.02	0.00	305.91
Ethane	0.0549	0.0549	0.01	0.0555	0.0555	0			
Propadiene/Methylacetylene	0.0042	0.0042	0.01	0.0005	0.0005	0			
Propylene	0.1027	0.1027	0.01	0.0242	0.0242	0			
Propane	0.0031	0.0031	0.01	0.0006	0.0006	0			
Butadiene/C4 Acetylene	0.0112	0.0112	0.01	0.0005	0.0005	0			
Butylenes	0.016	0.016	0.01	0.0007	0.0007	0			
Butanes	0.0051	0.0051	0.01	0.0002	0.0002	0			
C5 Hydrocarbons	0.0018	0.0018	0						
C6 Non Aromatics									
C7 Non Aromatics									
C8 Non Aromatics									

Simulation Report – ECC 860 KTA

Working Stage 6

Benzene	0.0002	0.0002	0						
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen	0.0003	0.0003	0	0.0002	0.0002	0	0.04	0.04	0
Naphtha									
Mass Flow (kg/h)	185000	185000	0	3489	3489	0	15735	15735	0
Molar Flow (kmole/h)	8259.4175	8258.8	0.01	153.6325	153.6	0.0212	1016.17	1025.9	0.95
Temperature (°C)	-65.3	-65.3	0	-115.5	-115.5	0	41	41	0
Pressure (kg/cm ² _g)	34.96	34.96	0	5.55	5.55	0	38.39	38.39	0
Component Properties	4201			4190			4171		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen				0.0721	0.0721	0	0.06	0.06	0.15
Carbon Monoxide				0.002	0.002	0	0	0.00	3.14
Carbon Dioxide									
Hydrogen Sulfide									
Methane	0.0001	0.0001	8.5241	0.9208	0.9208	0	0.93	0.94	1.29
Acetylene	0.0109	0.0109	0.165	0.0001	0.0001	0.01	0	0.00	10.44
Ethylene	0.609	0.6091	0.0089	0.0046	0.0046	0	0.02	0.00	305.91
Ethane	0.1047	0.1047	0.005						
Propadiene/Methylacetylene	0.008	0.0081	1.1407						
Propylene	0.1958	0.1958	0.0072						
Propane	0.0058	0.0059	0.8919						
Butadiene/C4 Acetylene	0.0214	0.0214	0.043						
Butylenes	0.0306	0.0305	0.2429						
Butanes	0.0097	0.0096	0.6827						
C5 Hydrocarbons	0.0035	0.0035	0.0999						
C6 Non Aromatics	0.0001	0.0001	20.5691						
C7 Non Aromatics									
C8 Non Aromatics									
Benzene	0.0004	0.0004	9.5732						
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen				0.0004	0.0004	0	0.04	0.04	0
Naphtha									
Mass Flow (kg/h)	58145	58145	0	7913	7913	0	23648	23648	0
Molar Flow (kmole/h)	1758.6569	1759.2	0.03	523.4665	523.4	0.01	1527.194	1541.9	0.95
Temperature (°C)	-14	-14	0	35	35	0	133.1	133.1	0
Pressure (kg/cm ² _g)	21.68	21.68	0	5.23	5.23	0	14.5	14.5	0
Component Properties	4170			4179			4164		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen	0.06	0.06	0.15	0.06	0.06	0.15	0	0.01	99.37
Carbon Monoxide	0	0.00	3.14	0	0.00	3.14			
Carbon Dioxide									
Hydrogen Sulfide									

Simulation Report – ECC 860 KTA

Working Stage 6

Methane	0.93	0.94	1.29	0.93	0.94	1.29	0.11	0.11	0.45
Acetylene	0	0.00	10.44	0	0.00	10.44	0.01	0.01	6.15
Ethylene	0.02	0.00	305.91	0.02	0.00	305.91	0.55	0.59	6.95
Ethane							0.09	0.09	2.59
Propadiene/Methylacetylene							0.01	0.01	22.47
Propylene							0.17	0.14	19.98
Propane							0	0.00	20.17
Butadiene/C4 Acetylene							0.02	0.01	23.76
Butylenes							0.03	0.02	23.92
Butanes							0.01	0.01	24.83
C5 Hydrocarbons							0	0.00	27.46
C6 Non Aromatics							0	0.00	1.08
C7 Non Aromatics									
C8 Non Aromatics									
Benzene							0	0.00	51.62
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen	0.04	0.04	0	0.04	0.04	0			
Naptha									
Mass Flow (kg/h)	23648	23648	0	15735	15735	0	72756.35	72707	0.07
Molar Flow (kmole/h)	1527.1935	1541.9	0.95	1016.17	1025.9	0.95	2352.772	2408.7	2.32
Temperature (°C)	36.9513	36.9	0.14	-60	-46.1	30.15	-84.5928	-87.9	3.76
Pressure (kg/cm ² _g)	5.23	4.95	5.66	38.32	38.32	0	5.62	5.59	0.54

Table A.3.2. Methanation Stream Properties

Component Properties	4139			4729			4001		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen	0.9652	0.9652	0.0	0.9658	0.9658	0.0	0.9653	0.9653	0.0
Carbon Monoxide	0.0026	0.0026	0.0	0.0024	0.0024	0.0	0.0026	0.0026	0.0
Carbon Dioxide									
Hydrogen Sulfide									
Methane	0.0313	0.0313	0.0	0.031	0.031	0.0	0.0312	0.0312	0.0
Acetylene									
Ethylene									
Ethane									
Propadiene/Methylacetylene									
Propylene									
Propane									
Butadiene/C4 Acetylene									
Butylenes									
Butanes									
C5 Hydrocarbons									
C6 Non Aromatics									
C7 Non Aromatics									
C8 Non Aromatics									
Benzene									
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									

Simulation Report – ECC 860 KTA

Working Stage 6

204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen	0.0009	0.0009	0.0	0.0008	0.0008	0.0	0.0009	0.0009	0.0
Naphtha									
Mass Flow (kg/h)	3313	3313	0	969	969	0	1111	1111	0
Molar Flow (kmole/h)	1301.2436	1300.8	0.03	382.3965	382.5	0.03	436.8342	436.8	0.01
Temperature (°C)	35	35	0	35	35	0	36.1217	35.7	1.18
Pressure (kg/cm ² _g)	32.22	32.22	0	32.22	32.22	0	3.5	3.5	0
Component Properties	4012			4016			4014		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen	0.965	0.965	0.0				0.9972	0.997	0.0
Carbon Monoxide									
Carbon Dioxide									
Hydrogen Sulfide									
Methane	0.0341	0.0341	0.0						
Acetylene									
Ethylene				0.0051	0.005	2.0			
Ethane				0.9898	0.9898	0.0	0.0019	0.002	5.0
Propadiene/Methylacetylene									
Propylene				0.005	0.005	0.0			
Propane									
Butadiene/C4 Acetylene									
Butylenes									
Butanes									
C5 Hydrocarbons									
C6 Non Aromatics									
C7 Non Aromatics									
C8 Non Aromatics									
Benzene									
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen	0.0009	0.0009	0.0	0.0001	0.0001	0.0	0.0009	0.0009	0.0
Naphtha									
Mass Flow (kg/h)	363.8098	364	0.05	3725	3725	0	290.7106	290	0.25
Molar Flow (kmole/h)	144.5	144.5	0	123.6741	123.7	0.02	138.9566	138.3	0.47
Temperature (°C)	-132	-132	0	-132	-132	0	-132.1631	-132.4	0.18
Pressure (kg/cm ² _g)	30.71	30.71	0	30.56	30.56	0	30.51	30.51	0
Component Properties	4009			4011			4002		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen				0.9651	0.965	0.0	0.9653	0.9653	0.0
Carbon Monoxide							0.0026	0.0026	0.0
Carbon Dioxide									
Hydrogen Sulfide									
Methane				0.034	0.0341	0.3	0.0312	0.0312	0.0
Acetylene									
Ethylene									
Ethane									
Propadiene/Methylacetylene									
Propylene									
Propane									
Butadiene/C4 Acetylene									
Butylenes									

Simulation Report – ECC 860 KTA

Working Stage 6

Butanes									
C5 Hydrocarbons									
C6 Non Aromatics									
C7 Non Aromatics									
C8 Non Aromatics									
Benzene									
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water	1	1	0.0						
Nitrogen				0.0009	0.0009	0.0	0.0009	0.0009	0.0
Naphtha									
Mass Flow (kg/h)	44.9348	45	0.14	364	364	0	3171	3171	0
Molar Flow (kmole/h)	2.4943	2.5	0.23	144.6418	144.5	0.1	1246.8058	1246.6	0.02
Temperature (°C)	14.94	16	6.62	16	16	0	288	288	0
Pressure (kg/cm ² _g)	31.42	31.36	0.19	31.11	31.07	0.13	32.11	32.11	0
Component Properties	4021			4017			1102		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen	0.0068	0.0114	40.4	0.9651	0.965	0.0	0.9651	0.965	0.0
Carbon Monoxide									
Carbon Dioxide									
Hydrogen Sulfide									
Methane	0.0381	0.0379	0.5	0.034	0.0341	0.3	0.034	0.0341	0.3
Acetylene									
Ethylene	0.0048	0.0047	2.1						
Ethane	0.9453	0.9411	0.4						
Propadiene/Methylacetylene									
Propylene	0.0048	0.0048	0.0						
Propane									
Butadiene/C4 Acetylene									
Butylenes									
Butanes									
C5 Hydrocarbons									
C6 Non Aromatics									
C7 Non Aromatics									
C8 Non Aromatics									
Benzene									
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen	0.0001	0.0001	0.0	0.0009	0.0009	0.0	0.0009	0.0009	0.0
Naphtha									
Mass Flow (kg/h)	3798.0991	3798	0	234	234	0	1745.6311	1747	0.08
Molar Flow (kmole/h)	129.2175	129.8	0.45	92.984	92.8	0.2	693.6571	693.9	0.04
Temperature (°C)	-128.661	-129.3	0.49	16	16	0	16	16	0
Pressure (kg/cm ² _g)	30.69	30.69	0	31.11	31.07	0.13	31.11	31.07	0.13
Component Properties	4007			4022			4008		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen	0.9626	0.9626	0.0	0.9626	0.9626	0.0	0.9645	0.9645	0.0
Carbon Monoxide									
Carbon Dioxide									

Simulation Report – ECC 860 KTA

Working Stage 6

Hydrogen Sulfide									
Methane	0.034	0.034	0.0	0.034	0.034	0.0	0.034	0.034	0.0
Acetylene									
Ethylene									
Ethane									
Propadiene/Methylacetylene									
Propylene									
Propane									
Butadiene/C4 Acetylene									
Butylenes									
Butanes									
C5 Hydrocarbons									
C6 Non Aromatics									
C7 Non Aromatics									
C8 Non Aromatics									
Benzene									
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water	0.0026	0.0026	0.0	0.0026	0.0026	0.0	0.0006	0.0006	0.0
Nitrogen	0.0009	0.0009	0.0	0.0009	0.0009	0.0	0.0009	0.0009	0.0
Naphtha									
Mass Flow (kg/h)	3170.9971	3171	0	3170.9971	3171	0	3126.0646	3126	0
Molar Flow (kmole/h)	1240.4357	1240.2	0.02	1240.4357	1240.2	0.02	1237.9414	1237.7	0.02
Temperature (°C)	41	41	0	14.94	16	6.62	14.94	16	6.62
Pressure (kg/cm ² _g)	31.53	31.53	0	31.42	31.42	0	31.42	31.36	0.19
Component Properties	4003			4004			4005		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen	0.9653	0.9653	0.0	0.9626	0.9626	0.0	0.9626	0.9626	0.0
Carbon Monoxide	0.0026	0.0026	0.0						
Carbon Dioxide									
Hydrogen Sulfide									
Methane	0.0312	0.0312	0.0	0.034	0.034	0.0	0.034	0.034	0.0
Acetylene									
Ethylene									
Ethane									
Propadiene/Methylacetylene									
Propylene									
Propane									
Butadiene/C4 Acetylene									
Butylenes									
Butanes									
C5 Hydrocarbons									
C6 Non Aromatics									
C7 Non Aromatics									
C8 Non Aromatics									
Benzene									
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water				0.0026	0.0026	0.0	0.0026	0.0026	0.0
Nitrogen	0.0009	0.0009	0.0	0.0009	0.0009	0.0	0.0009	0.0009	0.0

Simulation Report – ECC 860 KTA

Working Stage 6

Naphtha									
Mass Flow (kg/h)	3171	3171	0	3170.9971	3171	0	3170.9971	3171	0
Molar Flow (kmole/h)	1246.8058	1246.6	0.02	1240.4357	1240.2	0.02	1240.4357	1240.2	0.02
Temperature (°C)	288	288	0	320.9991	321	0	68.261	67.9	0.53
Pressure (kg/cm ² _g)	32	32	0	31.75	31.75	0	31.64	31.64	0
Component Properties	4019			4020					
	Simulation	Design	%Error	Simulation	Design	%Error			
Hydrogen	0.9645	0.9645	0.0	0.9651	0.965	0.0			
Carbon Monoxide									
Carbon Dioxide									
Hydrogen Sulfide									
Methane	0.034	0.034	0.0	0.034	0.0341	0.3			
Acetylene									
Ethylene									
Ethane									
Propadiene/Methylacetylene									
Propylene									
Propane									
Butadiene/C4 Acetylene									
Butylenes									
Butanes									
C5 Hydrocarbons									
C6 Non Aromatics									
C7 Non Aromatics									
C8 Non Aromatics									
Benzene									
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water	0.0006	0.0006	0.0						
Nitrogen	0.0009	0.0009	0.0	0.0009	0.0009	0.0			
Naphtha									
Mass Flow (kg/h)	2353	2353	0	2343.6311	2344	0.02			
Molar Flow (kmole/h)	931.8029	931.6	0.02	931.2829	931.1	0.02			
Temperature (°C)	14.94	16	6.62	16	16	0			
Pressure (kg/cm ² _g)	31.42	31.36	0.19	31.11	31.11	0			

Table A.3.3. Deethanizer Stream Properties

Hydrogen							99.71	99.70	0.01
Carbon Monoxide									
Carbon Dioxide									
Hydrogen Sulfide									
Methane	0.01	0.01	0.00	0.01	0.01	0.00			
Acetylene	1.09	1.09	0.00	1.09	1.09	0.00			
Ethylene	60.90	60.91	0.02	60.9	60.91	0.02			
Ethane	10.47	10.47	0.00	10.47	10.47	0.00	0.2	0.20	0.00
Propadiene/Methylacetylene	0.80	0.81	1.23	0.81	0.81	0.00			
Propylene	19.58	19.58	0.00	19.58	19.58	0.00			
Propane	0.58	0.59	1.69	0.59	0.59	0.00			
Butadiene/C4 Acetylene	2.14	2.14	0.00	2.14	2.14	0.00			
Butylenes	3.06	3.05	0.33	3.05	3.05	0.00			
Butanes	0.97	0.96	1.04	0.96	0.96	0.00			
C5 Hydrocarbons	0.35	0.35	0.00	0.35	0.35	0.00			
C6 Non Aromatics	0.01	0.01	0.00	0.01	0.01	0.00			
C7 Non Aromatics									

Simulation Report – ECC 860 KTA

Working Stage 6

C8 Non Aromatics									
Benzene	0.04	0.04	0.00	0.04	0.04	0.00			
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen							0.09	0.09	0.00
Naphtha									
Mass Flow (kg/h)	58145	58145	0	135671	135671	0	191	190	0.53
Molar Flow (kmole/h)	1758.657	1759.2	0.03	4103.6684	4104.8	0.03	91.1423	90.7	0.49
Temperature (°C)	-14	-14	0	14.8	14.8	0	35	35	0
Pressure (kg/cm ² _g)	21.68	21.68	0	21.95	21.95	0	30.13	30.13	0
Component Properties	4205			4207			4213		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen									
Carbon Monoxide									
Carbon Dioxide									
Hydrogen Sulfide									
Methane									
Acetylene	1.45	1.42	2.11				1.45	1.42	2.11
Ethylene	83.58	83.64	0.07				83.58	83.64	0.07
Ethane	14.85	14.83	0.13				14.85	14.83	0.13
Propadiene/Methylacetylene				2.94	2.93	0.34			
Propylene	0.11	0.09	22.22	71.04	71.09	0.07	0.11	0.09	22.22
Propane				2.15	2.14	0.47			
Butadiene/C4 Acetylene				7.79	7.79	0.00			
Butylenes				11.12	11.12	0.00			
Butanes				3.50	3.50	0.00			
C5 Hydrocarbons				1.27	1.26	0.79			
C6 Non Aromatics				0.04	0.03	33.33			
C7 Non Aromatics									
C8 Non Aromatics									
Benzene				0.14	0.13	7.69			
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen									
Naphtha									
Mass Flow (kg/h)	127154.7	127117	0.03	73353.9547	73354	0	127118	127118	0
Molar Flow (kmole/h)	4487.016	4486.3	0.02	1609.6977	1610.9	0.07	4485.7225	4486.3	0.01
Temperature (°C)	-21.9599	-21.4	2.62	66.252	66.2	0.08	-21.9599	-22.7	3.26
Pressure (kg/cm ² _g)	21.31	21.31	0	22.05	22.05	0	21.31	20.59	3.5
Component Properties	4145			4315			4208		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen	96.52	96.51	0.01						
Carbon Monoxide	0.26	0.26	0.00						
Carbon Dioxide									
Hydrogen Sulfide									

Simulation Report – ECC 860 KTA

Working Stage 6

Methane	3.13	3.13	0.00						
Acetylene									
Ethylene				77.09	77.09	0.00			
Ethane				22.87	22.87	0.00	0.01	0.00	100.00
Propadiene/Methylacetylene							2.94	2.93	0.34
Propylene				0.04	0.04	0.00	71.04	71.09	0.07
Propane							2.14	2.14	0.00
Butadiene/C4 Acetylene							7.79	7.79	0.00
Butylenes							11.12	11.12	0.00
Butanes							3.5	3.50	0.00
C5 Hydrocarbons							1.27	1.26	0.79
C6 Non Aromatics							0.04	0.03	33.33
C7 Non Aromatics									
C8 Non Aromatics									
Benzene							0.14	0.13	7.69
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen	0.09	0.09	0.00						
Naphtha									
Mass Flow (kg/h)	17	17	0	18185.2062	18202	0.09	73353.9547	73354	0
Molar Flow (kmole/h)	6.6757	6.5	2.7	638.2	638.2	0	1609.6977	1610.9	0.07
Temperature (°C)	35	35	0	-29.7	-29.7	0	54.8	54.8	0
Pressure (kg/cm²_g)	32.22	32.22	0	17.38	17.13	1.46	16.96	16.96	0
Component Properties	4229			4230			4231		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen	99.71	99.70	0.01	96.52	96.52	0.00	99.51	99.49	0.02
Carbon Monoxide				0.26	0.26	0.00	0.02	0.02	0.00
Carbon Dioxide									
Hydrogen Sulfide									
Methane									
Acetylene									
Ethylene									
Ethane	0.20	0.20	0.00				0.19	0.18	5.56
Propadiene/Methylacetylene									
Propylene									
Propane									
Butadiene/C4 Acetylene									
Butylenes									
Butanes									
C5 Hydrocarbons									
C6 Non Aromatics									
C7 Non Aromatics									
C8 Non Aromatics									
Benzene									
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen	0.09	0.09	0.00	0.09	0.09	0.00	0.09	0.09	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

Naphtha									
Mass Flow (kg/h)	85	85	0	7	7	0	92	92	0
Molar Flow (kmole/h)	40.5607	40.4	0.4	2.7488	2.9	5.21	43.3095	43.3	0.02
Temperature (°C)	35	35	0	35	35	0	35.0022	35.2	0.56
Pressure (kg/cm ² _g)	30.13	29.74	1.31	32.22	31.83	1.23	30.13	20.57	46.48
Component Properties	4215			4216			4217		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen	0.95	0.95	0.00	0.95	0.95	0.00	0.00	0.01	100.00
Carbon Monoxide									
Carbon Dioxide									
Hydrogen Sulfide									
Methane	0.01	0.02	50.00	0.01	0.02	50.00	0.01	0.02	50.00
Acetylene	1.43	1.41	1.42	1.43	1.41	1.42	0.98	0.79	24.05
Ethylene	82.78	82.84	0.07	82.78	82.84	0.07	83.55	83.94	0.46
Ethane	14.71	14.69	0.14	14.71	14.69	0.14	15.34	15.15	1.25
Propadiene/Methylacetylene									
Propylene	0.11	0.09	22.22	0.11	0.09	22.22	0.11	0.09	22.22
Propane									
Butadiene/C4 Acetylene									
Butylenes									
Butanes									
C5 Hydrocarbons									
C6 Non Aromatics									
C7 Non Aromatics									
C8 Non Aromatics									
Benzene									
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen									
Naphtha									
Mass Flow (kg/h)	127210	127210	0	127210	127210	0	127209.998	127210	0
Molar Flow (kmole/h)	4529.032	4529.5	0.01	4529.032	4529.5	0.01	4485.9361	4486.9	0.02
Temperature (°C)	25.4	25.4	0	46.5	46.5	0	74	74	0
Pressure (kg/cm ² _g)	20.39	20.39	0	20.1861	20.29	0.51	19.72	19.72	0
Component Properties	4218			4219			4220		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen	0.96	0.96	0.00	0.96	0.96	0.00	0.02	0.02	0.00
Carbon Monoxide									
Carbon Dioxide									
Hydrogen Sulfide									
Methane	0.02	0.02	0.00	0.02	0.02	0.00	0.02	0.02	0.00
Acetylene	0.97	0.78	24.36	0.97	0.78	24.36			
Ethylene	82.74	83.14	0.48	82.74	83.14	0.48	83.27	84.32	1.25
Ethane	15.19	15.01	1.20	15.19	15.01	1.20	16.08	15.54	3.47
Propadiene/Methylacetylene									
Propylene	0.11	0.09	22.22	0.11	0.09	22.22	0.11	0.09	22.22
Propane									
Butadiene/C4 Acetylene									
Butylenes									
Butanes									
C5 Hydrocarbons									

Simulation Report – ECC 860 KTA

Working Stage 6

C6 Non Aromatics									
C7 Non Aromatics									
C8 Non Aromatics									
Benzene									
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen									
Naphtha									
Mass Flow (kg/h)	127303	12730 ₂	0	127302.998	12730 ₂	0	127325.9971	12732 ₄	0
Molar Flow (kmole/h)	4529.638	4530.2	0.01	4529.6382	4530.2	0.01	4486.2198	4487.7	0.03
Temperature (°C)	73.6519	73.5	0.21	46.5	46.5	0	62.6	62.6	0
Pressure (kg/cm ² _g)	19.72	19.6	0.61	19.47	19.47	0	18.02	18.02	0
Component Properties	4226			4232			4233		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen	0.02	0.02	0.00	99.71	99.70	0.01	96.52	96.52	0.00
Carbon Monoxide							0.26	0.26	0.00
Carbon Dioxide									
Hydrogen Sulfide									
Methane	0.02	0.02	0.00				3.13	3.13	0.00
Acetylene									
Ethylene	82.94	83.70	0.91						
Ethane	16.51	16.18	2.04	0.20	0.20	0.00			
Propadiene/Methylacetylene									
Propylene	0.09	0.07	28.57						
Propane									
Butadiene/C4 Acetylene									
Butylenes									
Butanes									
C5 Hydrocarbons									
C6 Non Aromatics									
C7 Non Aromatics									
C8 Non Aromatics									
Benzene									
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen				0.09	0.09	0.00	0.09	0.09	0.00
Naphtha									
Mass Flow (kg/h)	138816	13887 ₈	0.04	85	85	0	8	7	14.29
Molar Flow (kmole/h)	4889.94	4893	0.06	40.5607	40.4	0.4	3.1415	2.9	8.33
Temperature (°C)	-28.72	-28.7	0.07	35	35	0	35	35	0
Pressure (kg/cm ² _g)	17.24	17.24	0	30.13	29.74	1.31	32.22	31.83	1.23
Component Properties	4221			4222			4223		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen	0.02	0.02	0.00	0.02	0.02	0.00	0.02	0.02	0.00
Carbon Monoxide									
Carbon Dioxide									

Simulation Report – ECC 860 KTA

Working Stage 6

Hydrogen Sulfide									
Methane	0.02	0.02	0.00	0.02	0.02	0.00	0.02	0.02	0.00
Acetylene									
Ethylene	83.27	84.32	1.25	83.27	84.32	1.25	82.65	83.42	0.92
Ethane	16.08	15.54	3.47	16.08	15.54	3.47	16.78	16.46	1.94
Propadiene/Methylacetylene									
Propylene	0.11	0.09	22.22	0.11	0.09	22.22	0.10	0.08	25.00
Propane									
Butadiene/C4 Acetylene									
Butylenes									
Butanes									
C5 Hydrocarbons									
C6 Non Aromatics									
C7 Non Aromatics									
C8 Non Aromatics									
Benzene									
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen									
Naphtha									
Mass Flow (kg/h)	127326	127324	0	127325.9971	127327	0	145511.2034	145529	0.01
Molar Flow (kmole/h)	4486.22	4487.7	0.03	4486.2198	4487.8	0.04	5124.4198	5126	0.03
Temperature (°C)	40.1759	40	0.44	-12.1406	-13.6	10.73	-28.6901	-28.4	1.02
Pressure (kg/cm ² _g)	17.85	17.85	0	17.65	17.48	0.97	17.38	17.38	0
Component Properties	4224			4225			4227		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen	0.00	0.02	100.00						
Carbon Monoxide									
Carbon Dioxide									
Hydrogen Sulfide									
Methane	0.01	0.02	50.00						
Acetylene									
Ethylene	80.92	83.70	3.32	76.67	77.49	1.06	76.69	77.49	1.03
Ethane	18.60	16.18	14.96	22.47	22.18	1.31	22.45	22.18	1.22
Propadiene/Methylacetylene									
Propylene	0.10	0.07	42.86	0.40	0.32	25.00	0.40	0.32	25.00
Propane									
Butadiene/C4 Acetylene									
Butylenes									
Butanes									
C5 Hydrocarbons									
C6 Non Aromatics									
C7 Non Aromatics									
C8 Non Aromatics									
Benzene									
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									

Simulation Report – ECC 860 KTA
Working Stage 6

Steam/Water									
Nitrogen									
Naphtha									
Mass Flow (kg/h)	138818.5	138878	0.04	6692.7269	6650	0.64	6692.7269	6650	0.64
Molar Flow (kmole/h)	4890.028	4893	0.06	234.3915	233	0.6	234.3915	233	0.6
Temperature (°C)	-28.6901	-28.5	0.67	-28.6901	-28.5	0.67	-27.6568	-28.5	2.96
Pressure (kg/cm ² _g)	17.38	17.36	0.12	17.38	17.36	0.12	26.16	26.16	0
Component Properties	4234			4214					
	Simulation	Design	%Error	Simulation	Design	%Error			
Hydrogen	99.48	99.49	0.01	0.95	0.95	0.00			
Carbon Monoxide	0.02	0.02	0.00						
Carbon Dioxide									
Hydrogen Sulfide									
Methane	0.23	0.21	9.52	0.01	0.02	50.00			
Acetylene				1.43	1.41	1.42			
Ethylene				82.78	82.84	0.07			
Ethane	0.19	0.18	5.56	14.71	14.69	0.14			
Propadiene/Methylacetylene									
Propylene				0.11	0.09	22.22			
Propane									
Butadiene/C4 Acetylene									
Butylenes									
Butanes									
C5 Hydrocarbons									
C6 Non Aromatics									
C7 Non Aromatics									
C8 Non Aromatics									
Benzene									
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen	0.09	0.09	0.00						
Naphtha									
Mass Flow (kg/h)	93	92	1.09	127210	127210	0			
Molar Flow (kmole/h)	43.7022	43.3	0.93	4529.032	4529.5	0.01			
Temperature (°C)	35.0025	35.2	0.56	-22.2022	-23.3	4.71			
Pressure (kg/cm ² _g)	30.13	19.6	53.72	21.31	20.57	3.6			

Table A.3.4. Ethylene Unit Stream Properties

Component Properties	4226			4701			4702		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen	0.00	0.02	100.00	17.97	17.97	0.00	17.97	17.97	0.00
Carbon Monoxide				0.11	0.11	0.00	0.11	0.11	0.00
Carbon Dioxide									
Hydrogen Sulfide									
Methane	0.02	0.02	0.00	29.96	29.96	0.00	29.96	29.96	0.00
Acetylene				0.58	0.58	0.00	0.58	0.58	0.00
Ethylene	83.86	83.70	0.19	31.42	31.42	0.00	31.42	31.42	0.00
Ethane	16.50	16.18	1.98	5.49	5.49	0.00	5.49	5.49	0.00
Propadiene/Methylacetylene				0.42	0.42	0.00	0.42	0.42	0.00
Propylene	0.09	0.07	28.57	10.27	10.27	0.00	10.27	10.27	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

Propane				0.31	0.31	0.00	0.31	0.31	0.00
Butadiene/C4 Acetylene				1.12	1.12	0.00	1.12	1.12	0.00
Butylenes				1.60	1.60	0.00	1.60	1.60	0.00
Butanes				0.51	0.51	0.00	0.51	0.51	0.00
C5 Hydrocarbons				0.18	0.18	0.00	0.18	0.18	0.00
C6 Non Aromatics									
C7 Non Aromatics									
C8 Non Aromatics									
Benzene				0.02	0.02	0.00	0.02	0.02	0.00
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen				0.03	0.03	0.00	0.03	0.03	0.00
Naphtha									
Mass Flow (kg/h)	138816.13	138878	0.04	65371	65371	0	65371	65371	0
Molar Flow (kmole/h)	4889.9502	4893	0.06	2918.521	2918.3	0.01	2918.521	2918.3	0.01
Temperature (°C)	-28.72	-28.7	0.07	-5.7	-5.7	0	-18.9	-18.9	0
Pressure (kg/cm ² _g)	17.24	17.24	0	36.12	36.12	0	35.84	35.84	0
Component Properties	4315			4309			4061		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen									
Carbon Monoxide									
Carbon Dioxide									
Hydrogen Sulfide									
Methane									
Acetylene									
Ethylene	73.94	77.09	4.09	0.01	0.50	98.00	0.01	0.50	98.00
Ethane	25.46	22.87	11.32	98.96	98.98	0.02	98.96	98.98	0.02
Propadiene/Methylacetylene									
Propylene	0.05	0.04	25.00	0.62	0.50	24.00	0.62	0.50	24.00
Propane									
Butadiene/C4 Acetylene									
Butylenes									
Butanes									
C5 Hydrocarbons									
C6 Non Aromatics									
C7 Non Aromatics									
C8 Non Aromatics									
Benzene									
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen				0.00	0.01	100.00	0.00	0.01	100.00
Vapour Fraction	0.0018			0			0		
Mass Flow (kg/h)	18202	18202	0	3725	3725	0	3006.7761	3001	0.19
Molar Flow (kmole/h)	637.2421	638.2	0.15	123.6422	123.7	0.05	99.8025	99.6	0.2
Temperature (°C)	-29.199	-29.7	1.69	-9.4411	-9.5	0.62	-11.4725	-11.4	0.64
Pressure (kg/cm ² _g)	17.129	17.13	0.01	31.48	31.48	0	17.39	17.39	0
Component Properties	4301			4302			4303		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error

Simulation Report – ECC 860 KTA

Working Stage 6

Hydrogen	0.03	0.03	0.00	0.03	0.03	0.00	0.03	0.03	0.00
Carbon Monoxide									
Carbon Dioxide									
Hydrogen Sulfide									
Methane	0.17	0.17	0.00	0.17	0.17	0.00	0.17	0.17	0.00
Acetylene									
Ethylene	99.75	99.77	0.02	99.75	99.77	0.02	99.75	99.78	0.03
Ethane	0.01	0.02	50.00	0.01	0.02	50.00	0.01	0.02	50.00
Propadiene/Methylacetylene									
Propylene									
Propane									
Butadiene/C4 Acetylene									
Butylenes									
Butanes									
C5 Hydrocarbons									
C6 Non Aromatics									
C7 Non Aromatics									
C8 Non Aromatics									
Benzene									
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen									
Naphtha									
Mass Flow (kg/h)	425980.99	425981	0	288816.2	288813	0	425687.26	423888	0.42
Molar Flow (kmole/h)	15200.442	15199.9	0	10305.939	10305.5	0	15189.799	15124.2	0.43
Temperature (°C)	-34.7161	-34.5	0.63	-35.8723	-35.9	0.08	-35.8811	-36.5	1.7
Pressure (kg/cm ² _g)	16.48	16.48	0	16.33	16.33	0	16.33	15.88	2.83
Component Properties	4324			4318			4319		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen				1.39	1.18	17.80	1.17	1.18	0.6
Carbon Monoxide				0.00	0.02	100.00	0.01	0.02	31.0
Carbon Dioxide									
Hydrogen Sulfide									
Methane	0.00	0.01	100.00	0.75	0.84	10.71	0.84	0.84	0.0
Acetylene									
Ethylene	99.70	99.95	0.25	97.82	97.95	0.13	97.96	97.95	0.0
Ethane	0.01	0.04	75.00	0.00	0.02	100.00	0.01	0.02	32.0
Propadiene/Methylacetylene									
Propylene									
Propane									
Butadiene/C4 Acetylene									
Butylenes									
Butanes									
C5 Hydrocarbons									
C6 Non Aromatics									
C7 Non Aromatics									
C8 Non Aromatics									
Benzene									
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									

Simulation Report – ECC 860 KTA

Working Stage 6

288 C Plus (PFO)									
Steam/Water									
Nitrogen									
Naphtha	0			0.9907			0.990739		
Mass Flow (kg/h)	53972.91	53973	0	296.9425	2093	85.81	2092.8778	2093	0.0
Molar Flow (kmole/h)	1924.2858	1923.9	0.02	10.7583	75.7	85.79	75.696598	75.7	0.0
Temperature (°C)	-32.0912	-34.5	6.98	-35.8811	-36.5	1.7	-57.8	-57.8	0.0
Pressure (kg/cm ² _g)	38.5	38.5	0	16.33	15.88	2.83	5.97	5.97	0.0
Component Properties	4306			4308			4312		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen									
Carbon Monoxide									
Carbon Dioxide									
Hydrogen Sulfide									
Methane									
Acetylene									
Ethylene	0.01	0.50	98.00	0.01	0.50	98.00	73.94	77.09	4.09
Ethane	98.96	98.98	0.02	98.96	98.98	0.02	25.46	22.87	11.32
Propadiene/Methylacetylene									
Propylene	0.62	0.50	24.00	0.62	0.50	24.00	0.05	0.04	25.00
Propane									
Butadiene/C4 Acetylene									
Butylenes									
Butanes									
C5 Hydrocarbons									
C6 Non Aromatics									
C7 Non Aromatics									
C8 Non Aromatics									
Benzene									
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen	0.00	0.01	100.00	0.00	0.01	100.00			
Vapour Fraction									
Mass Flow (kg/h)	19615.776	19610	0.03	3725	3725	0	120316.21	120133	0.15
Molar Flow (kmole/h)	651.0975	651.1	0	123.6422	123.7	0.05	4212.2051	4212.2	0
Temperature (°C)	-11.4725	-11.4	0.64	-11.4725	-11.4	0.64	-29.199	-29.7	1.69
Pressure (kg/cm ² _g)	17.39	17.39	0	17.39	17.39	0	17.129	17.13	0.01
Component Properties	4325			4326			4314		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen									
Carbon Monoxide									
Carbon Dioxide									
Hydrogen Sulfide									
Methane	0.00	0.01	100.00	0.00	0.01	100.00			
Acetylene									
Ethylene	99.98	99.95	0.03	99.95	99.95	0.00	73.94	77.09	4.09
Ethane	0.01	0.04	75.00	0.01	0.04	75.00	25.46	22.87	11.32
Propadiene/Methylacetylene									
Propylene							0.05	0.04	25.00
Propane									
Butadiene/C4 Acetylene									
Butylenes									
Butanes									

Simulation Report – ECC 860 KTA

Working Stage 6

C5 Hydrocarbons									
C6 Non Aromatics									
C7 Non Aromatics									
C8 Non Aromatics									
Benzene									
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen									
Naphtha									
Mass Flow (kg/h)	25000	25000	0	25000	25000	0	82494.831	82313	0.22
Molar Flow (kmole/h)	891.3202	891.2	0.01	891.3202	891.2	0.01	2888.1052	2886.1	0.07
Temperature (°C)	-34.5537	-34.3	0.74	-95.7107	-99	3.32	-27.9	-27.9	0
Pressure (kg/cm ² _g)	16.5201	19.22	14.05	16.3801	19.08	14.15	17.32	17.32	0
Component Properties	4307			4323			4313		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen									
Carbon Monoxide									
Carbon Dioxide									
Hydrogen Sulfide									
Methane				0.00	0.01	100.00			
Acetylene									
Ethylene	0.01	0.50	98.00	99.70	99.95	0.25	73.94	77.09	4.09
Ethane	98.96	98.98	0.02	0.01	0.04	75.00	25.46	22.87	11.32
Propadiene/Methylacetylene									
Propylene	0.62	0.50	24.00				0.05	0.04	25.00
Propane									
Butadiene/C4 Acetylene									
Butylenes									
Butanes									
C5 Hydrocarbons									
C6 Non Aromatics									
C7 Non Aromatics									
C8 Non Aromatics									
Benzene									
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen	0.00	0.01	100.00						
Naphtha	0			0					
Mass Flow (kg/h)	12884	12884	0	45000	45000	0	102114.21	101931	0.18
Molar Flow (kmole/h)	427.6527	427.8	0.03	1604.3763	1604.1	0.02	3574.963	3574	0.03
Temperature (°C)	-11.4725	-11.4	0.64	-99	-99	0	-29.199	-29.7	1.69
Pressure (kg/cm ² _g)	17.39	17.39	0	3	3	0	17.129	17.13	0.01
Component Properties	4304			4305			4316		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen	0.03	0.03	0.00						
Carbon Monoxide									
Carbon Dioxide									
Hydrogen Sulfide									

Simulation Report – ECC 860 KTA

Working Stage 6

Methane	0.17	0.17	0.00	0.00	0.01	100.00			
Acetylene									
Ethylene	99.75	99.78	0.03	99.70	99.95	0.25	48.35	64.07	24.54
Ethane	0.01	0.02	50.00	0.01	0.04	75.00	50.76	35.86	41.55
Propadiene/Methylacetylene									
Propylene							0.09	0.06	50.00
Propane									
Butadiene/C4 Acetylene									
Butylenes									
Butanes									
C5 Hydrocarbons									
C6 Non Aromatics									
C7 Non Aromatics									
C8 Non Aromatics									
Benzene									
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen									
Vapour Fraction									
Mass Flow (kg/h)	425687.26	423888	0.42	98762.272	98973	0.21	55148.337	54603	1
Molar Flow (kmole/h)	15189.799	15124.2	0.43	3521.1522	3528	0.19	1896.8985	1896.9	0
Temperature (°C)	-35.1843	-36.5	3.6	-34.5537	-34.3	0.74	-24.1902	-27.3	11.39
Pressure (kg/cm ² _g)	22.55	22.53	0.09	16.5201	16.52	0	17.2026	17.2	0.02
Component Properties	4366			4367			4320		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen									
Carbon Monoxide									
Carbon Dioxide									
Hydrogen Sulfide									
Methane							0.00	0.01	100.00
Acetylene									
Ethylene	48.35	64.07	24.54	48.35	64.07	24.54	99.70	99.95	0.25
Ethane	50.76	35.86	41.55	50.76	35.86	41.55	0.01	0.04	75.00
Propadiene/Methylacetylene									
Propylene	0.09	0.06	50.00	0.09	0.06	50.00			
Propane									
Butadiene/C4 Acetylene									
Butylenes									
Butanes									
C5 Hydrocarbons									
C6 Non Aromatics									
C7 Non Aromatics									
C8 Non Aromatics									
Benzene									
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen									
Naphtha									

Simulation Report – ECC 860 KTA

Working Stage 6

Mass Flow (kg/h)	14810	14810	0	14810	14810	0	20000	20000	0
Molar Flow (kmole/h)	509.4091	514.5	0.99	509.4091	514.5	0.99	713.0561	712.9	0.02
Temperature (°C)	-24.1902	-27.3	11.39	-20.3689	-24.9	18.2	-34.5537	-34.3	0.74
Pressure (kg/cm ² _g)	17.2026	17.2	0.02	17.37	17.37	0	16.5201	19.22	14.05
Component Properties	4317			4363			4364		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen									
Carbon Monoxide									
Carbon Dioxide									
Hydrogen Sulfide									
Methane									
Acetylene									
Ethylene	48.35	64.07	24.54	73.94	77.09	4.09	73.94	77.09	4.09
Ethane	50.76	35.86	41.55	25.46	22.87	11.32	25.46	22.87	11.32
Propadiene/Methylacetylene									
Propylene	0.09	0.06	50.00	0.05	0.04	25.00	0.05	0.04	25.00
Propane									
Butadiene/C4 Acetylene									
Butylenes									
Butanes									
C5 Hydrocarbons									
C6 Non Aromatics									
C7 Non Aromatics									
C8 Non Aromatics									
Benzene									
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen									
Naphtha									
Mass Flow (kg/h)	40338.337	39793	1.37	19619	19619	0	19619	19619	0
Molar Flow (kmole/h)	1387.4893	1382.4	0.37	686.8505	687.9	0.15	686.8525	687.9	0.15
Temperature (°C)	-24.9	-24.9	0	-29.199	-29.7	1.69	-27.9	-27.9	0
Pressure (kg/cm ² _g)	17.37	17.37	0	17.129	17.13	0.01	17.32	17.32	0
Component Properties	4321			4322			4351		
	Simulation	Design	%Error	Simulation	Design	%Error	Simulation	Design	%Error
Hydrogen							0.03	0.03	0.00
Carbon Monoxide									
Carbon Dioxide									
Hydrogen Sulfide									
Methane	0.00	0.01	100.00	0.00	0.01	100.00	0.17	0.17	0.00
Acetylene									
Ethylene	99.70	99.95	0.25	99.70	99.95	0.25	99.75	99.77	0.02
Ethane	0.01	0.04	75.00	0.01	0.04	75.00	0.01	0.02	50.00
Propadiene/Methylacetylene									
Propylene									
Propane									
Butadiene/C4 Acetylene									
Butylenes									
Butanes									
C5 Hydrocarbons									
C6 Non Aromatics									
C7 Non Aromatics									
C8 Non Aromatics									

Simulation Report – ECC 860 KTA

Working Stage 6

Benzene									
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen									
Vapour Fraction									
Mass Flow (kg/h)	53762.272	53973	0.39	20000	20000	0	137168	137168	0
Molar Flow (kmole/h)	1916.7759	1923.9	0.37	713.0561	712.9	0.02	4894.6182	4894.4	0
Temperature (°C)	-34.5537	-34.3	0.74	-103.784	-99	4.83	-34.7161	-34.5	0.63
Pressure (kg/cm ² _g)	16.5201	19.22	14.05	3	19.23	84.4	16.48	16.48	0
Component Properties	4352								
	Simulation	Design	%Error						
Hydrogen	0.03	0.03	0.00						
Carbon Monoxide									
Carbon Dioxide									
Hydrogen Sulfide									
Methane	0.17	0.17	0.00						
Acetylene									
Ethylene	99.75	99.77	0.02						
Ethane	0.01	0.02	50.00						
Propadiene/Methylacetylene									
Propylene									
Propane									
Butadiene/C4 Acetylene									
Butylenes									
Butanes									
C5 Hydrocarbons									
C6 Non Aromatics									
C7 Non Aromatics									
C8 Non Aromatics									
Benzene									
Toluene									
Xylene/Ethylbenzene									
Styrene									
C9									
204 288 C (PGO)									
288 C Plus (PFO)									
Steam/Water									
Nitrogen									
Naphtha									
Mass Flow (kg/h)	137168	137168	0						
Molar Flow (kmole/h)	4894.6182	4894.4	0						
Temperature (°C)	-35.9	-35.9	0						
Pressure (kg/cm ² _g)	16.33	16.33	0						

A.4. Stage 4

Table A.4.1. C3 Hydrogenation Stream Compositions

Variable	Integration	4408		Design	Error	%Error
Component (%mol)		Component (%mol)				
Hydrogen	0.0002	Hydrogen	0.0002	0.0002	0.0000	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

Methane	0.0003	Methane	0.0003	0.0003	0.0000	0.00
Ethane	0.0000	Ethane	0.0000	0.0000	0.0000	
M-acetylene	0.0207	Propadiene/Methylacetylene	0.0207	0.0207	0.0000	0.00
Propene	0.9370	Propylene	0.9370	0.9370	0.0000	0.00
Propane	0.0395	Propane	0.0395	0.0395	0.0000	0.00
13-Butadiene	0.0007	Butadienes/C4Acetylenes	0.0007	0.0007	0.0000	0.00
1-Butene	0.0015	Butylenes	0.0015	0.0015	0.0000	0.00
n-Butane	0.0000	Butanes	0.0000	0.0000	0.0000	
i-Pentane	0.0000	C5-Hydrocarbons	0.0000	0.0000	0.0000	
1-Hexyne	0.0000	C6 Non-Aromatics	0.0000	0.0000	0.0000	
n-Heptane	0.0000	C7 Non-Aromatics	0.0000	0.0000	0.0000	
n-Octane	0.0000	C8 Non-Aromatics	0.0000	0.0000	0.0000	
Benzene	0.0000	Benzene	0.0000	0.0000	0.0000	
Toluene	0.0000	Toluene	0.0000	0.0000	0.0000	
H ₂ O	0.0001	Water/steam	0.0001	0.0001	0.0000	0.00
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	0.0000	
Operation Condition		Operation Condition				
Temperature (°C)	40.50	Temperature (°C)	40.50	40.50	0.00	0.00
Pressure (Kg/cm ² gauge)	27.72	Pressure (Kg/cm ² gauge)	27.72	27.72	0.00	0.00
Molar Flow (kgmole/h)	2582.43	Molar Flow (kgmole/h)	2582.43	2582.43	0.00	0.00
Mass Flow (kg/h)	108797.00	Mass Flow (kg/h)	108797.00	108797.00	0.00	0.00
Molecular Weight	42.1297	Molecular Weight	42.1297	42.13	0.00	0.00
Total	1.0000	Total	1.0000	1.0000		
Variable	108780.7184	4452		Design	Error	%Error
Component (%mol)		Component (%mol)				
Hydrogen	0.9650	Hydrogen	0.9650	0.9650	0.0000	0.00
Methane	0.0341	Methane	0.0341	0.0341	0.0000	0.00
Ethane	0.0000	Ethane	0.0000	0.0000		
M-acetylene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000		
Propene	0.0000	Propylene	0.0000	0.0000		
Propane	0.0000	Propane	0.0000	0.0000		
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000		
1-Butene	0.0000	Butylenes	0.0000	0.0000		
n-Butane	0.0000	Butanes	0.0000	0.0000		
i-Pentane	0.0000	C5-Hydrocarbons	0.0000	0.0000		
1-Hexyne	0.0000	C6 Non-Aromatics	0.0000	0.0000		
n-Heptane	0.0000	C7 Non-Aromatics	0.0000	0.0000		
n-Octane	0.0000	C8 Non-Aromatics	0.0000	0.0000		
Benzene	0.0000	Benzene	0.0000	0.0000		
Toluene	0.0000	Toluene	0.0000	0.0000		
H ₂ O	0.0000	Water/steam	0.0000	0.0000		
Nitrogen	0.0009	Nitrogen	0.0009	0.0009	0.0000	0.00
Operation Condition		Operation Condition				
Temperature (°C)	16.00	Temperature (°C)	16.00	16.00	0.00	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

Pressure (Kg/cm ² gauge)	26.67	Pressure (Kg/cm ² gauge)	26.67	26.67	0.00	0.00
Molar Flow (kgmole/h)	46.47	Molar Flow (kgmole/h)	46.47	46.47	0.00	0.00
Mass Flow (kg/h)	117.00	Mass Flow (kg/h)	117.00	117.00	0.00	0.00
Molecular Weight	2.5177	Molecular Weight	2.5177	2.52	0.00	0.00
Total	0.9991	Total	0.9991	0.9991		
Variable	Integration	4462		Design	Error	%Error
Component (%mol)		Component (%mol)				
Hydrogen	0.0002	Hydrogen	0.0002	0.0002	0.0000	0.00
Methane	0.0003	Methane	0.0003	0.0003	0.0000	0.00
Ethane	0.0000	Ethane	0.0000	0.0000		
M-acetylene	0.0207	Propadiene/Methylacetylene	0.0207	0.0207	0.0000	0.00
Propene	0.9371	Propylene	0.9371	0.9371	0.0000	0.00
Propane	0.0395	Propane	0.0395	0.0395	0.0000	0.00
13-Butadiene	0.0007	Butadienes/C4Acetylenes	0.0007	0.0007	0.0000	0.00
1-Butene	0.0015	Butylenes	0.0015	0.0015	0.0000	0.00
n-Butane	0.0000	Butanes	0.0000	0.0000		
i-Pentane	0.0000	C5-Hydrocarbons	0.0000	0.0000		
1-Hexyne	0.0000	C6 Non-Aromatics	0.0000	0.0000		
n-Heptane	0.0000	C7 Non-Aromatics	0.0000	0.0000		
n-Octane	0.0000	C8 Non-Aromatics	0.0000	0.0000		
Benzene	0.0000	Benzene	0.0000	0.0000		
Toluene	0.0000	Toluene	0.0000	0.0000		
H ₂ O	0.0000	Water/steam	0.0000	0.0000		
Nitrogen	0.0000	Nitrogen	0.0000	0.0000		
Operation Condition		Operation Condition				
Temperature (°C)	40.50	Temperature (°C)	40.50	40.50	0.00	0.00
Pressure (Kg/cm ² gauge)	27.37	Pressure (Kg/cm ² gauge)	27.37	27.37	0.00	0.00
Molar Flow (kgmole/h)	1291.07	Molar Flow (kgmole/h)	1291.07	1291.07	0.00	0.00
Mass Flow (kg/h)	54395.35	Mass Flow (kg/h)	54395.35	54395.35	0.00	0.00
Molecular Weight	42.1322	Molecular Weight	42.1322	42.13	0.00	0.00
Total	1.0000	Total	1.0000	1.0000		
Variable	Integration	4463		Design	Error	%Error
Component (%mol)		Component (%mol)				
Hydrogen	0.0035	Hydrogen	0.0035	0.0035	0.0000	0.00
Methane	0.0015	Methane	0.0015	0.0015	0.0000	0.00
Ethane	0.0000	Ethane	0.0000	0.0000		
M-acetylene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	0.0000	
Propene	0.9433	Propylene	0.9433	0.9433	0.0000	0.00
Propane	0.0495	Propane	0.0495	0.0495	0.0000	0.00
13-Butadiene	0.0002	Butadienes/C4Acetylenes	0.0002	0.0002	0.0000	0.00
1-Butene	0.0020	Butylenes	0.0020	0.0020	0.0000	0.00
n-Butane	0.0000	Butanes	0.0000	0.0000		
i-Pentane	0.0000	C5-Hydrocarbons	0.0000	0.0000		

Simulation Report – ECC 860 KTA

Working Stage 6

1-Hexyne	0.0000	C6 Non-Aromatics	0.0000	0.0000		
n-Heptane	0.0000	C7 Non-Aromatics	0.0000	0.0000		
n-Octane	0.0000	C8 Non-Aromatics	0.0000	0.0000		
Benzene	0.0000	Benzene	0.0000	0.0000		
Toluene	0.0000	Toluene	0.0000	0.0000		
H ₂ O	0.0000	Water/steam	0.0000	0.0000		
Nitrogen	0.0000	Nitrogen	0.0000	0.0000		
Operation Condition		Operation Condition				
Temperature (°C)	60.73	Temperature (°C)	60.73	60.73	0.00	0.00
Pressure (Kg/cm ² gauge)	25.83	Pressure (Kg/cm ² gauge)	25.83	25.83	0.00	0.00
Molar Flow (kgmole/h)	1296.97	Molar Flow (kgmole/h)	1296.97	1296.97	0.00	0.00
Mass Flow (kg/h)	54512.35	Mass Flow (kg/h)	54512.35	54512.35	0.00	0.00
Molecular Weight	42.0305	Molecular Weight	42.0305	42.03	0.00	0.00
Total	1.0000	Total	1.0000	1.0000		
Variable	Integration	4458		Design	Error	%Error
Component (%mol)		Component (%mol)				
Hydrogen	0.0005	Hydrogen	0.0005	0.0005	0.0000	0.00
Methane	0.0006	Methane	0.0006	0.0006	0.0000	0.00
Ethane	0.0000	Ethane	0.0000	0.0000	0.0000	0.00
M-acetylene	0.0002	Propadiene/Methylacetylene	0.0002	0.0002	0.0000	0.00
Propene	0.9442	Propylene	0.9442	0.9442	0.0000	0.00
Propane	0.0517	Propane	0.0517	0.0517	0.0000	0.00
13-Butadiene	0.0002	Butadienes/C4Acetylenes	0.0002	0.0002	0.0000	0.00
1-Butene	0.0026	Butylenes	0.0026	0.0026	0.0000	0.00
n-Butane	0.0000	Butanes	0.0000	0.0000		
i-Pentane	0.0000	C5-Hydrocarbons	0.0000	0.0000		
1-Hexyne	0.0000	C6 Non-Aromatics	0.0000	0.0000		
n-Heptane	0.0000	C7 Non-Aromatics	0.0000	0.0000		
n-Octane	0.0000	C8 Non-Aromatics	0.0000	0.0000		
Benzene	0.0000	Benzene	0.0000	0.0000		
Toluene	0.0000	Toluene	0.0000	0.0000		
H ₂ O	0.0000	Water/steam	0.0000	0.0000		
Nitrogen	0.0000	Nitrogen	0.0000	0.0000		
Operation Condition		Operation Condition				
Temperature (°C)	43.30	Temperature (°C)	43.3000	43.30	0.00	0.00
Pressure (Kg/cm ² gauge)	16.71	Pressure (Kg/cm ² gauge)	16.7100	16.71	0.00	0.00
Molar Flow (kgmole/h)	1203.20	Molar Flow (kgmole/h)	1203.1953	1203.20	0.00	0.00
Mass Flow (kg/h)	50760.00	Mass Flow (kg/h)	50760.0000	50760.00	0.00	0.00
Molecular Weight	42.1877	Molecular Weight	42.1877	42.19	0.00	0.01
Total	1.0000	Total	1.0000	1.0000		
Variable	Integration	4451		Design	Error	%Error
Component (%mol)		Component (%mol)				
Hydrogen	0.0002	Hydrogen	0.0002	0.0002	0.0000	-0.01

Simulation Report – ECC 860 KTA

Working Stage 6

Methane	0.0003	Methane	0.0003	0.0003	0.0000	-0.01
Ethane	0.0000	Ethane	0.0000	0.0000	0.0000	
M-acetylene	0.0207	Propadiene/Methylacetylene	0.0207	0.0207	0.0000	-0.01
Propene	0.9371	Propylene	0.9371	0.9371	0.0000	0.00
Propane	0.0395	Propane	0.0395	0.0395	0.0000	-0.01
13-Butadiene	0.0007	Butadienes/C4Acetylenes	0.0007	0.0007	0.0000	-0.01
1-Butene	0.0015	Butylenes	0.0015	0.0015	0.0000	-0.01
n-Butane	0.0000	Butanes	0.0000	0.0000		
i-Pentane	0.0000	C5-Hydrocarbons	0.0000	0.0000		
1-Hexyne	0.0000	C6 Non-Aromatics	0.0000	0.0000		
n-Heptane	0.0000	C7 Non-Aromatics	0.0000	0.0000		
n-Octane	0.0000	C8 Non-Aromatics	0.0000	0.0000		
Benzene	0.0000	Benzene	0.0000	0.0000		
Toluene	0.0000	Toluene	0.0000	0.0000		
H ₂ O	0.0000	Water/steam	0.0000	0.0000		
Nitrogen	0.0000	Nitrogen	0.0000	0.0000		
Operation Condition						
Temperature (°C)	40.51	Temperature (°C)	40.51	40.50	0.01	-0.03
Pressure (Kg/cm ² gauge)	27.37	Pressure (Kg/cm ² gauge)	27.37	27.37	0.00	0.00
Molar Flow (kgmole/h)	2582.17	Molar Flow (kgmole/h)	2582.17	2582.20	0.03	0.00
Mass Flow (kg/h)	108792.35	Mass Flow (kg/h)	108792.35	108793.00	0.65	0.00
Molecular Weight	42.1322	Molecular Weight	42.1322	42.13	0.00	-0.01
Total	0.9999	Total	0.9999	0.9999		
Variable	Integration	4459		Design	Error	%Error
Component (%mol)		Component (%mol)				
Hydrogen	0.0002	Hydrogen	0.0002	0.0002	0.0000	-0.01
Methane	0.0003	Methane	0.0003	0.0003	0.0000	-0.01
Ethane	0.0000	Ethane	0.0000	0.0000		
M-acetylene	0.0207	Propadiene/Methylacetylene	0.0207	0.0207	0.0000	-0.01
Propene	0.9371	Propylene	0.9371	0.9371	0.0000	0.00
Propane	0.0395	Propane	0.0395	0.0395	0.0000	-0.01
13-Butadiene	0.0007	Butadienes/C4Acetylenes	0.0007	0.0007	0.0000	-0.01
1-Butene	0.0015	Butylenes	0.0015	0.0015	0.0000	-0.01
n-Butane	0.0000	Butanes	0.0000	0.0000		
i-Pentane	0.0000	C5-Hydrocarbons	0.0000	0.0000		
1-Hexyne	0.0000	C6 Non-Aromatics	0.0000	0.0000		
n-Heptane	0.0000	C7 Non-Aromatics	0.0000	0.0000		
n-Octane	0.0000	C8 Non-Aromatics	0.0000	0.0000		
Benzene	0.0000	Benzene	0.0000	0.0000		
Toluene	0.0000	Toluene	0.0000	0.0000		
H ₂ O	0.0000	Water/steam	0.0000	0.0000		
Nitrogen	0.0000	Nitrogen	0.0000	0.0000		
Operation Condition		Operation Condition				

Simulation Report – ECC 860 KTA

Working Stage 6

Temperature (°C)	40.51	Temperature (°C)	40.51	40.50	0.01	-0.03
Pressure (Kg/cm ² gauge)	27.37	Pressure (Kg/cm ² gauge)	27.37	27.37	0.00	0.00
Molar Flow (kgmole/h)	1291.10	Molar Flow (kgmole/h)	1291.10	1291.10	0.00	0.00
Mass Flow (kg/h)	54397.00	Mass Flow (kg/h)	54397.00	54397.00	0.00	0.00
Molecular Weight	42.1322	Molecular Weight	42.1322	42.13	0.00	-0.01
Total	1.0000	Total	1.0000	1.0000		
Variable	Integration	4460		Design	Error	%Error
Component (%mol)		Component (%mol)				
Hydrogen	0.9650	Hydrogen	0.9650	0.9650	0.0000	0.00
Methane	0.0341	Methane	0.0341	0.0341	0.0000	0.00
Ethane	0.0000	Ethane	0.0000	0.0000		
M-acetylene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000		
Propene	0.0000	Propylene	0.0000	0.0000		
Propane	0.0000	Propane	0.0000	0.0000		
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000		
1-Butene	0.0000	Butylenes	0.0000	0.0000		
n-Butane	0.0000	Butanes	0.0000	0.0000		
i-Pentane	0.0000	C5-Hydrocarbons	0.0000	0.0000		
1-Hexyne	0.0000	C6 Non-Aromatics	0.0000	0.0000		
n-Heptane	0.0000	C7 Non-Aromatics	0.0000	0.0000		
n-Octane	0.0000	C8 Non-Aromatics	0.0000	0.0000		
Benzene	0.0000	Benzene	0.0000	0.0000		
Toluene	0.0000	Toluene	0.0000	0.0000		
H ₂ O	0.0000	Water/steam	0.0000	0.0000		
Nitrogen	0.0009	Nitrogen	0.0009	0.0009	0.0000	0.0009
Operation Condition		Operation Condition				
Temperature (°C)	15.97	Temperature (°C)	15.97	16.00	0.03	0.21
Pressure (Kg/cm ² gauge)	26.67	Pressure (Kg/cm ² gauge)	26.67	26.67	0.00	0.00
Molar Flow (kgmole/h)	46.47	Molar Flow (kgmole/h)	46.47	46.40	0.07	-0.15
Mass Flow (kg/h)	117.00	Mass Flow (kg/h)	117.00	117.00	0.00	0.00
Molecular Weight	2.5177	Molecular Weight	2.5177	2.52	0.00	0.09
Total	0.9991	Total	0.9991	0.9991		
Variable	Integration	4454		Design	Error	%Error
Component (%mol)		Component (%mol)				
Hydrogen	0.0035	Hydrogen	0.0035	0.0036	0.0001	2.81
Methane	0.0015	Methane	0.0015	0.0015	0.0000	-1.36
Ethane	0.0000	Ethane	0.0000	0.0000		
M-acetylene	0.0000	Propadiene/Methylacetylene	0.0000	0.0002	0.0002	100.00
Propene	0.9433	Propylene	0.9433	0.9430	0.0003	-0.03
Propane	0.0495	Propane	0.0495	0.0495	0.0000	-0.01
13-Butadiene	0.0002	Butadienes/C4Acetylenes	0.0002	0.0002	0.0000	-4.53
1-Butene	0.0020	Butylenes	0.0020	0.0020	0.0000	0.94
n-Butane	0.0000	Butanes	0.0000	0.0000		

Simulation Report – ECC 860 KTA

Working Stage 6

i-Pentane	0.0000	C5-Hydrocarbons	0.0000	0.0000		
1-Hexyne	0.0000	C6 Non-Aromatics	0.0000	0.0000		
n-Heptane	0.0000	C7 Non-Aromatics	0.0000	0.0000		
n-Octane	0.0000	C8 Non-Aromatics	0.0000	0.0000		
Benzene	0.0000	Benzene	0.0000	0.0000		
Toluene	0.0000	Toluene	0.0000	0.0000		
H ₂ O	0.0000	Water/steam	0.0000	0.0000		
Nitrogen	0.0000	Nitrogen	0.0000	0.0000		
Operation Condition		Operation Condition				
Temperature (°C)	60.73	Temperature (°C)	60.73	61.20	0.47	0.77
Pressure (Kg/cm ² gauge)	25.83	Pressure (Kg/cm ² gauge)	25.83	25.49	0.34	-1.33
Molar Flow (kgmole/h)	2593.98	Molar Flow (kgmole/h)	2593.98	2594.30	0.32	0.01
Mass Flow (kg/h)	109026.35	Mass Flow (kg/h)	109026.35	109027.00	0.65	0.00
Molecular Weight	42.0305	Molecular Weight	42.0305	42.03	0.00	0.00
Total	1.0000	Total	1.0000	1.0000		
Variable	Integration	4501		Design	Error	%Error
Component (%mol)		Component (%mol)				
Hydrogen	0.0063	Hydrogen	0.0063	0.0063	0.0000	-0.01
Methane	0.0023	Methane	0.0023	0.0023	0.0000	-0.01
Ethane	0.0000	Ethane	0.0000	0.0000	0.0000	#DIV/0!
M-acetylene	0.0002	Propadiene/Methylacetylene	0.0002	0.0002	0.0000	-0.01
Propene	0.9420	Propylene	0.9420	0.9419	0.0001	-0.01
Propane	0.0476	Propane	0.0476	0.0476	0.0000	-0.01
13-Butadiene	0.0001	Butadienes/C4Acetylenes	0.0001	0.0001	0.0000	-0.01
1-Butene	0.0015	Butylenes	0.0015	0.0015	0.0000	-0.01
n-Butane	0.0000	Butanes	0.0000	0.0000		
i-Pentane	0.0000	C5-Hydrocarbons	0.0000	0.0000		
1-Hexyne	0.0000	C6 Non-Aromatics	0.0000	0.0000		
n-Heptane	0.0000	C7 Non-Aromatics	0.0000	0.0000		
n-Octane	0.0000	C8 Non-Aromatics	0.0000	0.0000		
Benzene	0.0000	Benzene	0.0000	0.0000		
Toluene	0.0000	Toluene	0.0000	0.0000		
H ₂ O	0.0000	Water/steam	0.0000	0.0000		
Nitrogen	0.0000	Nitrogen	0.0000	0.0001		
Operation Condition		Operation Condition				
Temperature (°C)	50.90	Temperature (°C)	50.90	50.90	0.00	0.00
Pressure (Kg/cm ² gauge)	19.17	Pressure (Kg/cm ² gauge)	19.17	19.16	0.01	-0.05
Molar Flow (kgmole/h)	951.94	Molar Flow (kgmole/h)	951.94	951.90	0.04	0.00
Mass Flow (kg/h)	39873.00	Mass Flow (kg/h)	39873.00	39873.00	0.00	0.00
Molecular Weight	41.8861	Molecular Weight	41.8861	41.89	0.00	0.01
Total	0.9999	Total	0.9999	0.9999		
Variable	Integration	4017		Design	Error	%Error
Component (%mol)		Component (%mol)				

Simulation Report – ECC 860 KTA

Working Stage 6

Hydrogen	0.9650	Hydrogen	0.9650	0.9650	0.0000	0.00
Methane	0.0341	Methane	0.0341	0.0341	0.0000	0.00
Ethane	0.0000	Ethane	0.0000	0.0000		
M-acetylene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000		
Propene	0.0000	Propylene	0.0000	0.0000		
Propane	0.0000	Propane	0.0000	0.0000		
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000		
1-Butene	0.0000	Butylenes	0.0000	0.0000		
n-Butane	0.0000	Butanes	0.0000	0.0000		
i-Pentane	0.0000	C5-Hydrocarbons	0.0000	0.0000		
1-Hexyne	0.0000	C6 Non-Aromatics	0.0000	0.0000		
n-Heptane	0.0000	C7 Non-Aromatics	0.0000	0.0000		
n-Octane	0.0000	C8 Non-Aromatics	0.0000	0.0000		
Benzene	0.0000	Benzene	0.0000	0.0000		
Toluene	0.0000	Toluene	0.0000	0.0000		
H ₂ O	0.0000	Water/steam	0.0000	0.0000		
Nitrogen	0.0009	Nitrogen	0.0009	0.0009	0.0000	0.00
Operation Condition		Operation Condition				
Temperature (°C)	16.00	Temperature (°C)	16.00	16.00	0.00	0.00
Pressure (Kg/cm ² gauge)	31.07	Pressure (Kg/cm ² gauge)	31.07	31.07	0.00	0.00
Molar Flow (kgmole/h)	92.94	Molar Flow (kgmole/h)	92.94	92.94	0.00	0.00
Mass Flow (kg/h)	234.00	Mass Flow (kg/h)	234.00	234.00	0.00	0.00
Molecular Weight	2.5177	Molecular Weight	2.5177	2.52	0.00	0.00
Total	0.9991	Total	0.9991	0.9991		
Variable	Integration	4464		Design	Error	%Error
Component (%mol)		Component (%mol)				
Hydrogen	0.0035	Hydrogen	0.0035	0.0036	0.0000	2.82
Methane	0.0015	Methane	0.0015	0.0015	0.0000	-1.36
Ethane	0.0000	Ethane	0.0000	0.0000		
M-acetylene	0.0000	Propadiene/Methylacetylene	0.0000	0.0002	0.0000	100.00
Propene	0.9433	Propylene	0.9433	0.9430	0.0000	-0.03
Propane	0.0495	Propane	0.0495	0.0495	0.0000	-0.01
13-Butadiene	0.0002	Butadienes/C4Acetylenes	0.0002	0.0002	0.0000	-4.53
1-Butene	0.0020	Butylenes	0.0020	0.0020	0.0000	0.94
n-Butane	0.0000	Butanes	0.0000	0.0000		
i-Pentane	0.0000	C5-Hydrocarbons	0.0000	0.0000		
1-Hexyne	0.0000	C6 Non-Aromatics	0.0000	0.0000		
n-Heptane	0.0000	C7 Non-Aromatics	0.0000	0.0000		
n-Octane	0.0000	C8 Non-Aromatics	0.0000	0.0000		
Benzene	0.0000	Benzene	0.0000	0.0000		
Toluene	0.0000	Toluene	0.0000	0.0000		
H ₂ O	0.0000	Water/steam	0.0000	0.0000		
Nitrogen	0.0000	Nitrogen	0.0000	0.0000		

Simulation Report – ECC 860 KTA

Working Stage 6

Operation Condition		Operation Condition				
Temperature (°C)	60.73	Temperature (°C)	60.73	61.70	0.00	0.00
Pressure (Kg/cm ² gauge)	25.83	Pressure (Kg/cm ² gauge)	25.83	25.83	0.00	0.00
Molar Flow (kgmole/h)	1297.01	Molar Flow (kgmole/h)	1297.01	1297.10	0.00	0.00
Mass Flow (kg/h)	54514.00	Mass Flow (kg/h)	54514.00	54514.00	0.00	0.00
Molecular Weight	42.0305	Molecular Weight	42.0305	42.03	0.00	0.00
Total	1.0000	Total	1.0000	1.0000		
Variable	Integration	4461		Design	Error	%Error
Component (%mol)		Component (%mol)				
Hydrogen	0.0337	Hydrogen	0.0337	0.0337	0.0000	-0.06
Methane	0.0015	Methane	0.0015	0.0014	0.0001	-5.31
Ethane	0.0000	Ethane	0.0000	0.0000		
M-acetylene	0.0200	Propadiene/Methylacetylene	0.0200	0.0200	0.0000	0.09
Propene	0.9045	Propylene	0.9045	0.9046	0.0001	0.01
Propane	0.0381	Propane	0.0381	0.0381	0.0000	-0.08
13-Butadiene	0.0007	Butadienes/C4Acetylenes	0.0007	0.0007	0.0000	3.46
1-Butene	0.0014	Butylenes	0.0014	0.0014	0.0000	-3.43
n-Butane	0.0000	Butanes	0.0000	0.0000		
i-Pentane	0.0000	C5-Hydrocarbons	0.0000	0.0000		
1-Hexyne	0.0000	C6 Non-Aromatics	0.0000	0.0000		
n-Heptane	0.0000	C7 Non-Aromatics	0.0000	0.0000		
n-Octane	0.0000	C8 Non-Aromatics	0.0000	0.0000		
Benzene	0.0000	Benzene	0.0000	0.0000		
Toluene	0.0000	Toluene	0.0000	0.0000		
H ₂ O	0.0000	Water/steam	0.0000	0.0000		
Nitrogen	0.0000	Nitrogen	0.0000	0.0000		
Operation Condition		Operation Condition				
Temperature (°C)	35.77	Temperature (°C)	35.77	36.00	0.23	0.64
Pressure (Kg/cm ² gauge)	26.67	Pressure (Kg/cm ² gauge)	26.67	26.53	0.14	-0.53
Molar Flow (kgmole/h)	1337.54	Molar Flow (kgmole/h)	1337.54	1337.50	0.04	0.00
Mass Flow (kg/h)	54512.35	Mass Flow (kg/h)	54512.35	54514.00	1.65	0.00
Molecular Weight	40.7558	Molecular Weight	40.7558	40.76	0.00	0.01
Total	1.0000	Total	1.0000	0.9999		
Variable	Integration	4457		Design	Error	%Error
Component (%mol)		Component (%mol)				
Hydrogen	0.0064	Hydrogen	0.0064	0.0063	0.0001	-2.23
Methane	0.0027	Methane	0.0027	0.0023	0.0004	-15.85
Ethane	0.0000	Ethane	0.0000	0.0000		#DIV/0!
M-acetylene	0.0000	Propadiene/Methylacetylene	0.0000	0.0002	0.0002	100.00
Propene	0.9423	Propylene	0.9423	0.9419	0.0004	-0.04
Propane	0.0473	Propane	0.0473	0.0476	0.0003	0.67
13-Butadiene	0.0001	Butadienes/C4Acetylenes	0.0001	0.0001	0.0000	-20.23
1-Butene	0.0011	Butylenes	0.0011	0.0015	0.0004	23.50

Simulation Report – ECC 860 KTA

Working Stage 6

n-Butane	0.0000	Butanes	0.0000	0.0000		
i-Pentane	0.0000	C5-Hydrocarbons	0.0000	0.0000		
1-Hexyne	0.0000	C6 Non-Aromatics	0.0000	0.0000		
n-Heptane	0.0000	C7 Non-Aromatics	0.0000	0.0000		
n-Octane	0.0000	C8 Non-Aromatics	0.0000	0.0000		
Benzene	0.0000	Benzene	0.0000	0.0000		
Toluene	0.0000	Toluene	0.0000	0.0000		
H ₂ O	0.0000	Water/steam	0.0000	0.0000		
Nitrogen	0.0001	Nitrogen	0.0001	0.0001		
Operation Condition		Operation Condition				
Temperature (°C)	61.24	Temperature (°C)	61.24	62.10	0.86	1.39
Pressure (Kg/cm ² gauge)	25.49	Pressure (Kg/cm ² gauge)	25.49	25.49	0.00	0.00
Molar Flow (kgmole/h)	1391.74	Molar Flow (kgmole/h)	1391.74	1391.00	0.74	-0.05
Mass Flow (kg/h)	58265.33	Mass Flow (kg/h)	58265.33	58265.00	0.33	0.00
Molecular Weight	41.8652	Molecular Weight	41.87	41.89	0.02	0.06
Total	0.9999	Total	0.9999	0.9999		
Variable	Integration	4551		Design	Error	%Error
Component (%mol)		Component (%mol)				
Hydrogen	0.0063	Hydrogen	0.0063	0.0063	0.0000	0.00
Methane	0.0023	Methane	0.0023	0.0023	0.0000	0.00
Ethane	0.0000	Ethane	0.0000	0.0000	0.0000	#DIV/0!
M-acetylene	0.0002	Propadiene/Methylacetylene	0.0002	0.0002	0.0000	0.00
Propene	0.9419	Propylene	0.9419	0.9419	0.0000	0.00
Propane	0.0476	Propane	0.0476	0.0476	0.0000	0.00
13-Butadiene	0.0001	Butadienes/C4Acetylenes	0.0001	0.0001	0.0000	0.00
1-Butene	0.0015	Butylenes	0.0015	0.0015	0.0000	0.00
n-Butane	0.0000	Butanes	0.0000	0.0000		
i-Pentane	0.0000	C5-Hydrocarbons	0.0000	0.0000		
1-Hexyne	0.0000	C6 Non-Aromatics	0.0000	0.0000		
n-Heptane	0.0000	C7 Non-Aromatics	0.0000	0.0000		
n-Octane	0.0000	C8 Non-Aromatics	0.0000	0.0000		
Benzene	0.0000	Benzene	0.0000	0.0000		
Toluene	0.0000	Toluene	0.0000	0.0000		
H ₂ O	0.0000	Water/steam	0.0000	0.0000	0.0001	#DIV/0!
Nitrogen	0.0001	Nitrogen	0.0001	0.0001		
Operation Condition						
Temperature (°C)		Operation Condition				
Pressure (Kg/cm ² gauge)	50.90	Temperature (°C)	50.90	50.90	0.00	0.00
Molar Flow (kgmole/h)	19.19	Pressure (Kg/cm ² gauge)	19.19	19.19	0.00	0.00
Mass Flow (kg/h)	439.11	Molar Flow (kgmole/h)	439.11	439.10	0.01	0.00
Molecular Weight	18392.00	Mass Flow (kg/h)	18392.00	18392.00	0.00	0.00
Total	41.8847	Molecular Weight	41.8652	41.89	0.02	0.06

Simulation Report – ECC 860 KTA
Working Stage 6

Table A.4.2. Debutanizer Stream Compositions

Variable	Integration	4601		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Methane	0.0000	Methane	0.0000	0.0000	
Acetylene	0.0000	Acetylene	0.0000	0.0000	
Ethylene	0.0000	Ethylene	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0036	Propadiene/Methylacetylene	0.0036	0.0036	-0.01
Propene	0.0001	Propylene	0.0001	0.0001	-0.01
Propane	0.0000	Propane	0.0000	0.0000	
13-Butadiene	0.2064	Butadienes/C4Acetylenes	0.2064	0.2064	-0.01
i-Butene	0.2848	Butylenes	0.2848	0.2848	-0.01
n-butane	0.1006	Butanes	0.1006	0.1006	-0.01
1-Pentyne	0.0630	C5-Hydrocarbons	0.1701	0.1701	0.00
14-Pentadiene	0.1071	C6 Non-Aromatics	0.0478	0.0478	-0.01
cis3-Hexene	0.0478	C7 Non-Aromatics	0.0135	0.0135	-0.01
n-Heptane	0.0135	C8 Non-Aromatics	0.0013	0.0013	-0.01
n-Octane	0.0013	Benzene	0.1391	0.1391	-0.01
Benzene	0.1391	Toluene	0.0317	0.0317	-0.01
Toluene	0.0317	Xylenes/Ethylbenzene	0.0007	0.0007	-0.01
p-Xylene	0.0007	Styrene	0.0002	0.0002	-0.01
E-Benzene	0.0000	C9-205°C	0.0000	0.0000	
Styrene	0.0002	205-288°C PGO	0.0000	0.0000	
E-Norbornene	0.0000				
n-Decane	0.0000				
n-C ₁₁	0.0000				
n-C ₁₂	0.0000				
n-C ₁₃	0.0000				
n-C ₁₄					
Operation Condition		Operation Condition			
Temperature (°C)	63.80	Temperature (°C)	63.80	63.80	0.00
Pressure (Kg/cm ² gauge)	4.48	Pressure (Kg/cm ² gauge)	4.48	4.48	0.00
Molar Flow (kgmole/h)	1193.92	Molar Flow (kgmole/h)	1193.92	1193.90	0.00
Mass Flow (kg/h)	76576.00	Mass Flow (kg/h)	76576.00	76576.00	0.00
Molecular Weight	64.1385	Molecular Weight	64.1385	64.14	0.00
Total	1.0000	Total	1.0000	0.9999	
Variable	Integration	4611		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Methane	0.0000	Methane	0.0000	0.0000	

Simulation Report – ECC 860 KTA

Working Stage 6

Acetylene	0.0000	Acetylene	0.0000	0.0000	
Ethylene	0.0000	Ethylene	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.0000	Propylene	0.0000	0.0000	
Propane	0.0000	Propane	0.0000	0.0000	
13-Butadiene	0.0057	Butadienes/C4Acetylenes	0.0057	0.0083	31.89
i-Butene	0.0036	Butylenes	0.0036	0.0089	59.89
n-butane	0.0095	Butanes	0.0095	0.0011	-767.94
1-Pentyne	0.0987	C5-Hydrocarbons	0.2530	0.2535	0.19
14-Pentadiene	0.1544	C6 Non-Aromatics	0.0783	0.0783	-0.02
cis3-Hexene	0.0783	C7 Non-Aromatics	0.0321	0.0322	0.16
n-Heptane	0.0321	C8 Non-Aromatics	0.0126	0.0126	-0.29
n-Octane	0.0126	Benzene	0.2892	0.2892	0.00
Benzene	0.2892	Toluene	0.1970	0.1968	-0.08
Toluene	0.1970	Xylenes/Ethylbenzene	0.0393	0.0392	-0.14
p-Xylene	0.0393	Styrene	0.0235	0.0234	-0.26
E-Benzene	0.0000	C9-205°C	0.0548	0.0551	0.49
Styrene	0.0235	205-288°C PGO	0.0014	0.0014	-1.14
E-Norbornene	0.0539				
n-Decane	0.0009				
n-C ₁₁	0.0000				
n-C ₁₂	0.0014				
n-C ₁₃	0.0000				
n-C ₁₄					
Operation Condition		Operation Condition			
Temperature (°C)	116.63	Temperature (°C)	116.63	114.40	-1.95
Pressure (Kg/cm ² gauge)	3.56	Pressure (Kg/cm ² gauge)	3.56	3.56	0.00
Molar Flow (kgmole/h)	817.47	Molar Flow (kgmole/h)	817.47	817.50	0.00
Mass Flow (kg/h)	68552.99	Mass Flow (kg/h)	68552.99	68543.00	-0.01
Molecular Weight	83.8604	Molecular Weight	83.8604	83.85	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	4613		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Methane	0.0000	Methane	0.0000	0.0000	
Acetylene	0.0000	Acetylene	0.0000	0.0000	
Ethylene	0.0000	Ethylene	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0062	Propadiene/Methylacetylene	0.0062	0.0062	0.67
Propene	0.0002	Propylene	0.0002	0.0001	-71.06

Simulation Report – ECC 860 KTA

Working Stage 6

Propane	0.0000	Propane	0.0000	0.0001	
13-Butadiene	0.3473	Butadienes/C4Acetylenes	0.3473	0.3442	-0.90
i-Butene	0.4831	Butylenes	0.4831	0.4767	-1.33
n-butane	0.1609	Butanes	0.1609	0.1708	5.79
1-Pentyne	0.0000	C5-Hydrocarbons	0.0024	0.0020	-21.33
14-Pentadiene	0.0024	C6 Non-Aromatics	0.0000	0.0000	0.00
cis3-Hexene	0.0000	C7 Non-Aromatics	0.0000	0.0000	0.00
n-Heptane	0.0000	C8 Non-Aromatics	0.0000	0.0000	0.00
n-Octane	0.0000	Benzene	0.0000	0.0000	0.00
Benzene	0.0000	Toluene	0.0000	0.0000	0.00
Toluene	0.0000	Xylenes/Ethylbenzene	0.0000	0.0000	
p-Xylene	0.0000	Styrene	0.0000	0.0000	
E-Benzene	0.0000	C9-205°C	0.0000	0.0000	
Styrene	0.0000	205-288°C PGO	0.0000	0.0000	
E-Norbornene	0.0000				
n-Decane	0.0000				
n-C ₁₁	0.0000				
n-C ₁₂	0.0000				
n-C ₁₃	0.0000				
n-C ₁₄	0.0000				
Operation Condition		Operation Condition			
Temperature (°C)	39.57	Temperature (°C)	39.57	39.80	0.58
Pressure (Kg/cm ² gauge)	6.40	Pressure (Kg/cm ² gauge)	6.40	6.40	0.00
Molar Flow (kgmole/h)	538.99	Molar Flow (kgmole/h)	538.99	539.00	0.00
Mass Flow (kg/h)	30000.01	Mass Flow (kg/h)	30000.01	30000.00	0.00
Molecular Weight	55.6600	Molecular Weight	55.6600	55.66	0.00
Total	1.0000	Total	1.0000	1.0001	
Variable	Integration	3040		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Methane	0.0000	Methane	0.0000	0.0000	
Acetylene	0.0000	Acetylene	0.0000	0.0000	
Ethylene	0.0000	Ethylene	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.0000	Propylene	0.0000	0.0000	
Propane	0.0000	Propane	0.0000	0.0000	
13-Butadiene	0.0018	Butadienes/C4Acetylenes	0.0018	0.0018	0.01
i-Butene	0.0001	Butylenes	0.0001	0.0001	0.01
n-butane	0.0000	Butanes	0.0000	0.0000	
1-Pentyne	0.0169	C5-Hydrocarbons	0.0169	0.0169	0.01

Simulation Report – ECC 860 KTA

Working Stage 6

14-Pentadiene	0.0000	C6 Non-Aromatics	0.0216	0.0216	0.01
cis3-Hexene	0.0216	C7 Non-Aromatics	0.0316	0.0316	0.01
n-Heptane	0.0316	C8 Non-Aromatics	0.0273	0.0273	0.01
n-Octane	0.0273	Benzene	0.2187	0.2187	0.01
Benzene	0.2187	Toluene	0.3830	0.3830	0.01
Toluene	0.3830	Xylenes/Ethylbenzene	0.0972	0.0972	0.01
p-Xylene	0.0972	Styrene	0.0589	0.0589	0.01
E-Benzene	0.0000	C9-205°C	0.1394	0.1394	0.01
Styrene	0.0589	205-288°C PGO	0.0036	0.0036	0.01
E-Norbornene	0.1371				
n-Decane	0.0023				
n-C ₁₁	0.0000				
n-C ₁₂	0.0036				
n-C ₁₃	0.0000				
n-C ₁₄	0.0000				
Operation Condition		Operation Condition			
Temperature (°C)	119.90	Temperature (°C)	119.90	63.80	-87.93
Pressure (Kg/cm ² gauge)	3.56	Pressure (Kg/cm ² gauge)	3.56	4.48	20.54
Molar Flow (kgmole/h)	321.57	Molar Flow (kgmole/h)	321.57	1193.92	73.07
Mass Flow (kg/h)	30829.00	Mass Flow (kg/h)	30829.00	76576.00	59.74
Molecular Weight	95.8695	Molecular Weight	95.8695	64.14	-49.47
Total	1.0000	Total	1.0000	1.0001	
Variable	Integration	4612		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Methane	0.0000	Methane	0.0000	0.0000	
Acetylene	0.0000	Acetylene	0.0000	0.0000	
Ethylene	0.0000	Ethylene	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.0000	Propylene	0.0000	0.0000	
Propane	0.0000	Propane	0.0000	0.0000	
13-Butadiene	0.0057	Butadienes/C4Acetylenes	0.0057	0.0083	31.89
i-Butene	0.0036	Butylenes	0.0036	0.0089	59.89
n-butane	0.0095	Butanes	0.0095	0.0011	-767.94
1-Pentyne	0.0987	C5-Hydrocarbons	0.2530	0.2535	0.19
14-Pentadiene	0.1544	C6 Non-Aromatics	0.0783	0.0783	-0.02
cis3-Hexene	0.0783	C7 Non-Aromatics	0.0321	0.0322	0.16
n-Heptane	0.0321	C8 Non-Aromatics	0.0126	0.0126	-0.29
n-Octane	0.0126	Benzene	0.2892	0.2892	0.00
Benzene	0.2892	Toluene	0.1970	0.1968	-0.08

Simulation Report – ECC 860 KTA

Working Stage 6

Toluene	0.1970	Xylenes/Ethylbenzene	0.0393	0.0392	-0.14
p-Xylene	0.0393	Styrene	0.0235	0.0234	-0.26
E-Benzene	0.0000	C9-205°C	0.0548	0.0551	0.49
Styrene	0.0235	205-288°C PGO	0.0014	0.0014	-1.14
E-Norbornene	0.0539				
n-Decane	0.0009				
n-C ₁₁	0.0000				
n-C ₁₂	0.0014				
n-C ₁₃	0.0000				
n-C ₁₄	0.0000				
Operation Condition		Operation Condition			
Temperature (°C)	40.00	Temperature (°C)	40.00	40.00	0.00
Pressure (Kg/cm ² gauge)	3.00	Pressure (Kg/cm ² gauge)	3.00	3.00	0.00
Molar Flow (kgmole/h)	817.47	Molar Flow (kgmole/h)	817.47	817.50	0.00
Mass Flow (kg/h)	68552.99	Mass Flow (kg/h)	68552.99	68543.00	-0.01
Molecular Weight	83.8604	Molecular Weight	83.8604	83.85	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	4609		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Methane	0.0000	Methane	0.0000	0.0000	
Acetylene	0.0000	Acetylene	0.0000	0.0000	
Ethylene	0.0000	Ethylene	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.0000	Propylene	0.0000	0.0000	
Propane	0.0000	Propane	0.0000	0.0000	
13-Butadiene	0.0082	Butadienes/C4Acetylenes	0.0082	0.0124	34.26
i-Butene	0.0058	Butylenes	0.0058	0.0146	60.14
n-butane	0.0157	Butanes	0.0157	0.0017	-825.80
1-Pentyne	0.1517	C5-Hydrocarbons	0.4061	0.4067	0.14
14-Pentadiene	0.2544	C6 Non-Aromatics	0.1151	0.1151	0.00
cis3-Hexene	0.1151	C7 Non-Aromatics	0.0325	0.0325	-0.02
n-Heptane	0.0325	C8 Non-Aromatics	0.0031	0.0032	2.18
n-Octane	0.0031	Benzene	0.3349	0.3350	0.02
Benzene	0.3349	Toluene	0.0763	0.0763	-0.04
Toluene	0.0763	Xylenes/Ethylbenzene	0.0017	0.0018	6.36
p-Xylene	0.0017	Styrene	0.0005	0.0005	3.68
E-Benzene	0.0000	C9-205°C	0.0000	0.0001	100.00
Styrene	0.0005	205-288°C PGO	0.0000	0.0000	
E-Norbornene	0.0000				

Simulation Report – ECC 860 KTA

Working Stage 6

n-Decane	0.0000				
n-C ₁₁	0.0000				
n-C ₁₂	0.0000				
n-C ₁₃	0.0000				
n-C ₁₄	0.0000				
Operation Condition		Operation Condition			
Temperature (°C)	113.94	Temperature (°C)	113.94	113.90	-0.03
Pressure (Kg/cm ² gauge)	4.58	Pressure (Kg/cm ² gauge)	4.58	4.58	0.00
Molar Flow (kgmole/h)	495.89	Molar Flow (kgmole/h)	495.89	495.80	-0.02
Mass Flow (kg/h)	37723.99	Mass Flow (kg/h)	37723.99	37724.00	0.00
Molecular Weight	76.0729	Molecular Weight	76.0729	76.09	0.02
Total	1.0000	Total	1.0000	0.9999	
Variable	Integration	4606		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Methane	0.0000	Methane	0.0000	0.0000	
Acetylene	0.0000	Acetylene	0.0000	0.0000	
Ethylene	0.0000	Ethylene	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0062	Propadiene/Methylacetylene	0.0062	0.0062	0.67
Propene	0.0002	Propylene	0.0002	0.0001	-71.06
Propane	0.0000	Propane	0.0000	0.0001	
13-Butadiene	0.3473	Butadienes/C4Acetylenes	0.3473	0.3442	-0.90
i-Butene	0.4831	Butylenes	0.4831	0.4767	-1.33
n-butane	0.1609	Butanes	0.1609	0.1708	5.79
1-Pentyne	0.0000	C5-Hydrocarbons	0.0024	0.0020	-21.33
14-Pentadiene	0.0024	C6 Non-Aromatics	0.0000	0.0000	0.00
cis3-Hexene	0.0000	C7 Non-Aromatics	0.0000	0.0000	0.00
n-Heptane	0.0000	C8 Non-Aromatics	0.0000	0.0000	0.00
n-Octane	0.0000	Benzene	0.0000	0.0000	0.00
Benzene	0.0000	Toluene	0.0000	0.0000	0.00
Toluene	0.0000	Xylenes/Ethylbenzene	0.0000	0.0000	0.00
p-Xylene	0.0000	Styrene	0.0000	0.0000	
E-Benzene	0.0000	C9-205°C	0.0000	0.0000	
Styrene	0.0000	205-288°C PGO	0.0000	0.0000	
E-Norbornene	0.0000				
n-Decane	0.0000				
n-C ₁₁	0.0000				
n-C ₁₂	0.0000				
n-C ₁₃	0.0000				

Simulation Report – ECC 860 KTA
Working Stage 6

n-C ₁₄	0.0000				
Operation Condition		Operation Condition			
Temperature (°C)	39.58	Temperature (°C)	39.58	39.80	0.56
Pressure (Kg/cm ² gauge)	5.50	Pressure (Kg/cm ² gauge)	5.50	5.50	0.00
Molar Flow (kgmole/h)	159.04	Molar Flow (kgmole/h)	159.04	159.00	-0.02
Mass Flow (kg/h)	8852.00	Mass Flow (kg/h)	8852.00	8852.00	0.00
Molecular Weight	55.6600	Molecular Weight	55.6600	55.66	0.00
Total	1.0000	Total	1.0000	1.0001	

Table A.4.3. Propylene Refrigeration Stream Compositions

Variable	Simulation	5001		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-39.88	Temperature (°C)	-39.88	-40.00	0.29
Pressure (Kg/cm ² gauge)	0.42	Pressure (Kg/cm ² gauge)	0.42	0.42	0.00
Molar Flow (kgmole/h)	6551.72	Molar Flow (kgmole/h)	6666.53	6552.50	-1.74
Mass Flow (kg/h)	275700.14	Mass Flow (kg/h)	280531.71	275738.00	-1.74
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5038		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-5.67	Temperature (°C)	-5.67	-5.80	2.30
Pressure (Kg/cm ² gauge)	3.97	Pressure (Kg/cm ² gauge)	3.97	3.97	0.00
Molar Flow (kgmole/h)	488.95	Molar Flow (kgmole/h)	488.95	489.90	0.19
Mass Flow (kg/h)	20575.12	Mass Flow (kg/h)	20575.12	20616.00	0.20
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5040		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-5.80	Temperature (°C)	-5.80	-5.80	0.00
Pressure (Kg/cm ² gauge)	3.97	Pressure (Kg/cm ² gauge)	3.97	3.97	0.00
Molar Flow (kgmole/h)	1741.35	Molar Flow (kgmole/h)	1741.35	1742.30	0.05
Mass Flow (kg/h)	73277.12	Mass Flow (kg/h)	73277.12	73317.00	0.05

Simulation Report – ECC 860 KTA

Working Stage 6

Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5046		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-20.62	Temperature (°C)	-20.62	-25.30	18.49
Pressure (Kg/cm ² gauge)	3.83	Pressure (Kg/cm ² gauge)	3.83	3.83	0.00
Molar Flow (kgmole/h)	5057.79	Molar Flow (kgmole/h)	5057.79	5057.70	0.00
Mass Flow (kg/h)	212835.00	Mass Flow (kg/h)	212835.00	212835.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5043		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-20.62	Temperature (°C)	-20.62	-25.30	18.49
Pressure (Kg/cm ² gauge)	3.83	Pressure (Kg/cm ² gauge)	3.83	3.83	0.00
Molar Flow (kgmole/h)	978.33	Molar Flow (kgmole/h)	978.33	977.40	-0.10
Mass Flow (kg/h)	41168.88	Mass Flow (kg/h)	41168.88	41129.00	-0.10
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5045		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-26.75	Temperature (°C)	-26.75	-26.80	0.20
Pressure (Kg/cm ² gauge)	1.41	Pressure (Kg/cm ² gauge)	1.41	1.41	0.00
Molar Flow (kgmole/h)	978.33	Molar Flow (kgmole/h)	978.33	977.40	-0.10
Mass Flow (kg/h)	41168.88	Mass Flow (kg/h)	41168.88	41129.00	-0.10
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5050		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-33.50	Temperature (°C)	-33.50	-33.50	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

Pressure (Kg/cm ² gauge)	1.27	Pressure (Kg/cm ² gauge)	1.27	1.27	0.00
Molar Flow (kgmole/h)	6551.72	Molar Flow (kgmole/h)	6551.72	6552.50	0.01
Mass Flow (kg/h)	275700.14	Mass Flow (kg/h)	275700.14	275738.00	0.01
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5060		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-33.50	Temperature (°C)	-33.50	-33.50	0.00
Pressure (Kg/cm ² gauge)	1.27	Pressure (Kg/cm ² gauge)	1.27	1.27	0.00
Molar Flow (kgmole/h)	789.96	Molar Flow (kgmole/h)	789.96	790.00	0.01
Mass Flow (kg/h)	33242.00	Mass Flow (kg/h)	33242.00	33242.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5063		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-33.50	Temperature (°C)	-33.50	-33.50	0.00
Pressure (Kg/cm ² gauge)	1.27	Pressure (Kg/cm ² gauge)	1.27	1.27	0.00
Molar Flow (kgmole/h)	5740.25	Molar Flow (kgmole/h)	5740.25	5741.10	0.01
Mass Flow (kg/h)	241553.14	Mass Flow (kg/h)	241553.14	241590.00	0.02
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5090		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-33.50	Temperature (°C)	-33.50	-33.50	0.00
Pressure (Kg/cm ² gauge)	1.27	Pressure (Kg/cm ² gauge)	1.27	1.27	0.00
Molar Flow (kgmole/h)	21.51	Molar Flow (kgmole/h)	21.51	21.50	-0.03
Mass Flow (kg/h)	905.00	Mass Flow (kg/h)	905.00	905.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5002		Design	%Error
Component (%mol)		Component (%mol)			

Simulation Report – ECC 860 KTA
Working Stage 6

Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-26.75	Temperature (°C)	-26.75	-26.80	0.20
Pressure (Kg/cm ² gauge)	1.41	Pressure (Kg/cm ² gauge)	1.41	1.41	0.00
Molar Flow (kgmole/h)	1343.92	Molar Flow (kgmole/h)	1343.92	1343.90	0.00
Mass Flow (kg/h)	56553.00	Mass Flow (kg/h)	56553.00	56553.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5006		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	41.00	Temperature (°C)	41.00	41.00	0.00
Pressure (Kg/cm ² gauge)	16.84	Pressure (Kg/cm ² gauge)	16.84	16.84	0.00
Molar Flow (kgmole/h)	9365.62	Molar Flow (kgmole/h)	9365.62	9365.50	0.00
Mass Flow (kg/h)	394111.00	Mass Flow (kg/h)	394111.00	394111.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5009		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	34.87	Temperature (°C)	34.87	34.20	-1.95
Pressure (Kg/cm ² gauge)	16.64	Pressure (Kg/cm ² gauge)	16.64	16.64	0.00
Molar Flow (kgmole/h)	2537.68	Molar Flow (kgmole/h)	2537.68	2537.70	0.00
Mass Flow (kg/h)	106787.00	Mass Flow (kg/h)	106787.00	106787.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5012		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	34.87	Temperature (°C)	34.87	34.20	-1.95
Pressure (Kg/cm ² gauge)	16.64	Pressure (Kg/cm ² gauge)	16.64	16.64	0.00
Molar Flow (kgmole/h)	1703.14	Molar Flow (kgmole/h)	1703.14	1703.10	0.00
Mass Flow (kg/h)	71669.00	Mass Flow (kg/h)	71669.00	71669.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

Variable	Simulation	5076		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	34.87	Temperature (°C)	34.87	34.20	-1.95
Pressure (Kg/cm ² gauge)	16.64	Pressure (Kg/cm ² gauge)	16.64	16.64	0.00
Molar Flow (kgmole/h)	147.53	Molar Flow (kgmole/h)	147.53	147.50	-0.02
Mass Flow (kg/h)	6208.00	Mass Flow (kg/h)	6208.00	6208.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5056		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	34.87	Temperature (°C)	34.87	34.20	-1.95
Pressure (Kg/cm ² gauge)	16.64	Pressure (Kg/cm ² gauge)	16.64	16.64	0.00
Molar Flow (kgmole/h)	319.20	Molar Flow (kgmole/h)	319.20	319.20	0.00
Mass Flow (kg/h)	13432.00	Mass Flow (kg/h)	13432.00	13432.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5020		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	34.87	Temperature (°C)	34.87	34.20	-1.95
Pressure (Kg/cm ² gauge)	16.64	Pressure (Kg/cm ² gauge)	16.64	16.64	0.00
Molar Flow (kgmole/h)	288.11	Molar Flow (kgmole/h)	288.11	288.10	0.00
Mass Flow (kg/h)	12124.00	Mass Flow (kg/h)	12124.00	12124.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5023		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	34.87	Temperature (°C)	34.87	34.20	-1.95
Pressure (Kg/cm ² gauge)	16.64	Pressure (Kg/cm ² gauge)	16.64	16.64	0.00
Molar Flow (kgmole/h)	79.70	Molar Flow (kgmole/h)	79.70	79.70	-0.01

Simulation Report – ECC 860 KTA

Working Stage 6

Mass Flow (kg/h)	3354.00	Mass Flow (kg/h)	3354.00	3354.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5026		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	13.34	Temperature (°C)	13.34	13.20	-1.08
Pressure (Kg/cm ² gauge)	7.64	Pressure (Kg/cm ² gauge)	7.64	7.64	0.00
Molar Flow (kgmole/h)	2537.68	Molar Flow (kgmole/h)	2537.68	2537.70	0.00
Mass Flow (kg/h)	106787.00	Mass Flow (kg/h)	106787.00	106787.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5079		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	3.99	Temperature (°C)	3.99	3.60	-10.96
Pressure (Kg/cm ² gauge)	7.50	Pressure (Kg/cm ² gauge)	7.50	7.50	0.00
Molar Flow (kgmole/h)	48.50	Molar Flow (kgmole/h)	48.50	48.50	0.00
Mass Flow (kg/h)	2041.00	Mass Flow (kg/h)	2041.00	2041.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5080		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	3.99	Temperature (°C)	3.99	3.60	-10.96
Pressure (Kg/cm ² gauge)	7.50	Pressure (Kg/cm ² gauge)	7.50	7.50	0.00
Molar Flow (kgmole/h)	30.66	Molar Flow (kgmole/h)	30.66	30.60	-0.18
Mass Flow (kg/h)	1290.00	Mass Flow (kg/h)	1290.00	1290.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5085		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			

Simulation Report – ECC 860 KTA

Working Stage 6

Temperature (°C)	3.99	Temperature (°C)	3.99	3.60	-10.96
Pressure (Kg/cm ² gauge)	7.50	Pressure (Kg/cm ² gauge)	7.50	7.50	0.00
Molar Flow (kgmole/h)	17.85	Molar Flow (kgmole/h)	17.85	17.90	0.30
Mass Flow (kg/h)	751.00	Mass Flow (kg/h)	751.00	751.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5033		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	13.34	Temperature (°C)	13.34	13.20	-1.06
Pressure (Kg/cm ² gauge)	7.64	Pressure (Kg/cm ² gauge)	7.64	7.64	0.00
Molar Flow (kgmole/h)	884.04	Molar Flow (kgmole/h)	884.04	883.90	-0.02
Mass Flow (kg/h)	37200.98	Mass Flow (kg/h)	37200.98	37197.00	-0.01
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5001		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-39.88	Temperature (°C)	-39.88	-40.00	0.29
Pressure (Kg/cm ² gauge)	0.42	Pressure (Kg/cm ² gauge)	0.42	0.42	0.00
Molar Flow (kgmole/h)	6551.72	Molar Flow (kgmole/h)	6666.53	6552.50	-1.74
Mass Flow (kg/h)	275700.14	Mass Flow (kg/h)	280531.71	275738.00	-1.74
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5038		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-5.67	Temperature (°C)	-5.67	-5.80	2.30
Pressure (Kg/cm ² gauge)	3.97	Pressure (Kg/cm ² gauge)	3.97	3.97	0.00
Molar Flow (kgmole/h)	488.95	Molar Flow (kgmole/h)	488.95	489.90	0.19
Mass Flow (kg/h)	20575.12	Mass Flow (kg/h)	20575.12	20616.00	0.20
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Simulation Report – ECC 860 KTA

Working Stage 6

Variable	Simulation	5040		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-5.80	Temperature (°C)	-5.80	-5.80	0.00
Pressure (Kg/cm ² gauge)	3.97	Pressure (Kg/cm ² gauge)	3.97	3.97	0.00
Molar Flow (kgmole/h)	1741.35	Molar Flow (kgmole/h)	1741.35	1742.30	0.05
Mass Flow (kg/h)	73277.12	Mass Flow (kg/h)	73277.12	73317.00	0.05
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5046		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-20.62	Temperature (°C)	-20.62	-25.30	18.49
Pressure (Kg/cm ² gauge)	3.83	Pressure (Kg/cm ² gauge)	3.83	3.83	0.00
Molar Flow (kgmole/h)	5057.79	Molar Flow (kgmole/h)	5057.79	5057.70	0.00
Mass Flow (kg/h)	212835.00	Mass Flow (kg/h)	212835.00	212835.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5043		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-20.62	Temperature (°C)	-20.62	-25.30	18.49
Pressure (Kg/cm ² gauge)	3.83	Pressure (Kg/cm ² gauge)	3.83	3.83	0.00
Molar Flow (kgmole/h)	978.33	Molar Flow (kgmole/h)	978.33	977.40	-0.10
Mass Flow (kg/h)	41168.88	Mass Flow (kg/h)	41168.88	41129.00	-0.10
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5045		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-26.75	Temperature (°C)	-26.75	-26.80	0.20
Pressure (Kg/cm ² gauge)	1.41	Pressure (Kg/cm ² gauge)	1.41	1.41	0.00
Molar Flow (kgmole/h)	978.33	Molar Flow (kgmole/h)	978.33	977.40	-0.10
Mass Flow (kg/h)	41168.88	Mass Flow (kg/h)	41168.88	41129.00	-0.10

Simulation Report – ECC 860 KTA
Working Stage 6

Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5050		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-33.50	Temperature (°C)	-33.50	-33.50	0.00
Pressure (Kg/cm ² gauge)	1.27	Pressure (Kg/cm ² gauge)	1.27	1.27	0.00
Molar Flow (kgmole/h)	6551.72	Molar Flow (kgmole/h)	6551.72	6552.50	0.01
Mass Flow (kg/h)	275700.14	Mass Flow (kg/h)	275700.14	275738.00	0.01
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5060		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-33.50	Temperature (°C)	-33.50	-33.50	0.00
Pressure (Kg/cm ² gauge)	1.27	Pressure (Kg/cm ² gauge)	1.27	1.27	0.00
Molar Flow (kgmole/h)	789.96	Molar Flow (kgmole/h)	789.96	790.00	0.01
Mass Flow (kg/h)	33242.00	Mass Flow (kg/h)	33242.00	33242.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5063		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-33.50	Temperature (°C)	-33.50	-33.50	0.00
Pressure (Kg/cm ² gauge)	1.27	Pressure (Kg/cm ² gauge)	1.27	1.27	0.00
Molar Flow (kgmole/h)	5740.25	Molar Flow (kgmole/h)	5740.25	5741.10	0.01
Mass Flow (kg/h)	241553.14	Mass Flow (kg/h)	241553.14	241590.00	0.02
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5090		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-33.50	Temperature (°C)	-33.50	-33.50	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

Pressure (Kg/cm ² gauge)	1.27	Pressure (Kg/cm ² gauge)	1.27	1.27	0.00
Molar Flow (kgmole/h)	21.51	Molar Flow (kgmole/h)	21.51	21.50	-0.03
Mass Flow (kg/h)	905.00	Mass Flow (kg/h)	905.00	905.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5002		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-26.75	Temperature (°C)	-26.75	-26.80	0.20
Pressure (Kg/cm ² gauge)	1.41	Pressure (Kg/cm ² gauge)	1.41	1.41	0.00
Molar Flow (kgmole/h)	1343.92	Molar Flow (kgmole/h)	1343.92	1343.90	0.00
Mass Flow (kg/h)	56553.00	Mass Flow (kg/h)	56553.00	56553.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5006		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	41.00	Temperature (°C)	41.00	41.00	0.00
Pressure (Kg/cm ² gauge)	16.84	Pressure (Kg/cm ² gauge)	16.84	16.84	0.00
Molar Flow (kgmole/h)	9365.62	Molar Flow (kgmole/h)	9365.62	9365.50	0.00
Mass Flow (kg/h)	394111.00	Mass Flow (kg/h)	394111.00	394111.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5009		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	34.87	Temperature (°C)	34.87	34.20	-1.95
Pressure (Kg/cm ² gauge)	16.64	Pressure (Kg/cm ² gauge)	16.64	16.64	0.00
Molar Flow (kgmole/h)	2537.68	Molar Flow (kgmole/h)	2537.68	2537.70	0.00
Mass Flow (kg/h)	106787.00	Mass Flow (kg/h)	106787.00	106787.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5012		Design	%Error
Component (%mol)		Component (%mol)			

Simulation Report – ECC 860 KTA

Working Stage 6

Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	34.87	Temperature (°C)	34.87	34.20	-1.95
Pressure (Kg/cm ² gauge)	16.64	Pressure (Kg/cm ² gauge)	16.64	16.64	0.00
Molar Flow (kgmole/h)	1703.14	Molar Flow (kgmole/h)	1703.14	1703.10	0.00
Mass Flow (kg/h)	71669.00	Mass Flow (kg/h)	71669.00	71669.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5076		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	34.87	Temperature (°C)	34.87	34.20	-1.95
Pressure (Kg/cm ² gauge)	16.64	Pressure (Kg/cm ² gauge)	16.64	16.64	0.00
Molar Flow (kgmole/h)	147.53	Molar Flow (kgmole/h)	147.53	147.50	-0.02
Mass Flow (kg/h)	6208.00	Mass Flow (kg/h)	6208.00	6208.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5056		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	34.87	Temperature (°C)	34.87	34.20	-1.95
Pressure (Kg/cm ² gauge)	16.64	Pressure (Kg/cm ² gauge)	16.64	16.64	0.00
Molar Flow (kgmole/h)	319.20	Molar Flow (kgmole/h)	319.20	319.20	0.00
Mass Flow (kg/h)	13432.00	Mass Flow (kg/h)	13432.00	13432.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5020		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	34.87	Temperature (°C)	34.87	34.20	-1.95
Pressure (Kg/cm ² gauge)	16.64	Pressure (Kg/cm ² gauge)	16.64	16.64	0.00
Molar Flow (kgmole/h)	288.11	Molar Flow (kgmole/h)	288.11	288.10	0.00
Mass Flow (kg/h)	12124.00	Mass Flow (kg/h)	12124.00	12124.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

Variable	Simulation	5023		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	34.87	Temperature (°C)	34.87	34.20	-1.95
Pressure (Kg/cm ² gauge)	16.64	Pressure (Kg/cm ² gauge)	16.64	16.64	0.00
Molar Flow (kgmole/h)	79.70	Molar Flow (kgmole/h)	79.70	79.70	-0.01
Mass Flow (kg/h)	3354.00	Mass Flow (kg/h)	3354.00	3354.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5026		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	13.34	Temperature (°C)	13.34	13.20	-1.08
Pressure (Kg/cm ² gauge)	7.64	Pressure (Kg/cm ² gauge)	7.64	7.64	0.00
Molar Flow (kgmole/h)	2537.68	Molar Flow (kgmole/h)	2537.68	2537.70	0.00
Mass Flow (kg/h)	106787.00	Mass Flow (kg/h)	106787.00	106787.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5079		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	3.99	Temperature (°C)	3.99	3.60	-10.96
Pressure (Kg/cm ² gauge)	7.50	Pressure (Kg/cm ² gauge)	7.50	7.50	0.00
Molar Flow (kgmole/h)	48.50	Molar Flow (kgmole/h)	48.50	48.50	0.00
Mass Flow (kg/h)	2041.00	Mass Flow (kg/h)	2041.00	2041.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5080		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	3.99	Temperature (°C)	3.99	3.60	-10.96
Pressure (Kg/cm ² gauge)	7.50	Pressure (Kg/cm ² gauge)	7.50	7.50	0.00
Molar Flow (kgmole/h)	30.66	Molar Flow (kgmole/h)	30.66	30.60	-0.18

Simulation Report – ECC 860 KTA
Working Stage 6

Mass Flow (kg/h)	1290.00	Mass Flow (kg/h)	1290.00	1290.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5085		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	3.99	Temperature (°C)	3.99	3.60	-10.96
Pressure (Kg/cm ² gauge)	7.50	Pressure (Kg/cm ² gauge)	7.50	7.50	0.00
Molar Flow (kgmole/h)	17.85	Molar Flow (kgmole/h)	17.85	17.90	0.30
Mass Flow (kg/h)	751.00	Mass Flow (kg/h)	751.00	751.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5034		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	12.70	Temperature (°C)	12.70	12.70	0.00
Pressure (Kg/cm ² gauge)	7.54	Pressure (Kg/cm ² gauge)	7.54	7.54	0.00
Molar Flow (kgmole/h)	884.04	Molar Flow (kgmole/h)	884.04	883.90	-0.02
Mass Flow (kg/h)	37200.98	Mass Flow (kg/h)	37200.98	37197.00	-0.01
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5001		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-39.88	Temperature (°C)	-39.88	-40.00	0.29
Pressure (Kg/cm ² gauge)	0.42	Pressure (Kg/cm ² gauge)	0.42	0.42	0.00
Molar Flow (kgmole/h)	6551.72	Molar Flow (kgmole/h)	6666.53	6552.50	-1.74
Mass Flow (kg/h)	275700.14	Mass Flow (kg/h)	280531.71	275738.00	-1.74
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5038		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

Operation Condition		Operation Condition			
Temperature (°C)	-5.67	Temperature (°C)	-5.67	-5.80	2.30
Pressure (Kg/cm ² gauge)	3.97	Pressure (Kg/cm ² gauge)	3.97	3.97	0.00
Molar Flow (kgmole/h)	488.95	Molar Flow (kgmole/h)	488.95	489.90	0.19
Mass Flow (kg/h)	20575.12	Mass Flow (kg/h)	20575.12	20616.00	0.20
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5040		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-5.80	Temperature (°C)	-5.80	-5.80	0.00
Pressure (Kg/cm ² gauge)	3.97	Pressure (Kg/cm ² gauge)	3.97	3.97	0.00
Molar Flow (kgmole/h)	1741.35	Molar Flow (kgmole/h)	1741.35	1742.30	0.05
Mass Flow (kg/h)	73277.12	Mass Flow (kg/h)	73277.12	73317.00	0.05
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5046		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-20.62	Temperature (°C)	-20.62	-25.30	18.49
Pressure (Kg/cm ² gauge)	3.83	Pressure (Kg/cm ² gauge)	3.83	3.83	0.00
Molar Flow (kgmole/h)	5057.79	Molar Flow (kgmole/h)	5057.79	5057.70	0.00
Mass Flow (kg/h)	212835.00	Mass Flow (kg/h)	212835.00	212835.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5043		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-20.62	Temperature (°C)	-20.62	-25.30	18.49
Pressure (Kg/cm ² gauge)	3.83	Pressure (Kg/cm ² gauge)	3.83	3.83	0.00
Molar Flow (kgmole/h)	978.33	Molar Flow (kgmole/h)	978.33	977.40	-0.10
Mass Flow (kg/h)	41168.88	Mass Flow (kg/h)	41168.88	41129.00	-0.10
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

Variable	Simulation	5045		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-26.75	Temperature (°C)	-26.75	-26.80	0.20
Pressure (Kg/cm ² gauge)	1.41	Pressure (Kg/cm ² gauge)	1.41	1.41	0.00
Molar Flow (kgmole/h)	978.33	Molar Flow (kgmole/h)	978.33	977.40	-0.10
Mass Flow (kg/h)	41168.88	Mass Flow (kg/h)	41168.88	41129.00	-0.10
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5050		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-33.50	Temperature (°C)	-33.50	-33.50	0.00
Pressure (Kg/cm ² gauge)	1.27	Pressure (Kg/cm ² gauge)	1.27	1.27	0.00
Molar Flow (kgmole/h)	6551.72	Molar Flow (kgmole/h)	6551.72	6552.50	0.01
Mass Flow (kg/h)	275700.14	Mass Flow (kg/h)	275700.14	275738.00	0.01
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5060		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-33.50	Temperature (°C)	-33.50	-33.50	0.00
Pressure (Kg/cm ² gauge)	1.27	Pressure (Kg/cm ² gauge)	1.27	1.27	0.00
Molar Flow (kgmole/h)	789.96	Molar Flow (kgmole/h)	789.96	790.00	0.01
Mass Flow (kg/h)	33242.00	Mass Flow (kg/h)	33242.00	33242.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5063		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-33.50	Temperature (°C)	-33.50	-33.50	0.00
Pressure (Kg/cm ² gauge)	1.27	Pressure (Kg/cm ² gauge)	1.27	1.27	0.00
Molar Flow (kgmole/h)	5740.25	Molar Flow (kgmole/h)	5740.25	5741.10	0.01
Mass Flow (kg/h)	241553.14	Mass Flow (kg/h)	241553.14	241590.00	0.02

Simulation Report – ECC 860 KTA

Working Stage 6

Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5090		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-33.50	Temperature (°C)	-33.50	-33.50	0.00
Pressure (Kg/cm ² gauge)	1.27	Pressure (Kg/cm ² gauge)	1.27	1.27	0.00
Molar Flow (kgmole/h)	21.51	Molar Flow (kgmole/h)	21.51	21.50	-0.03
Mass Flow (kg/h)	905.00	Mass Flow (kg/h)	905.00	905.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5002		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-26.75	Temperature (°C)	-26.75	-26.80	0.20
Pressure (Kg/cm ² gauge)	1.41	Pressure (Kg/cm ² gauge)	1.41	1.41	0.00
Molar Flow (kgmole/h)	1343.92	Molar Flow (kgmole/h)	1343.92	1343.90	0.00
Mass Flow (kg/h)	56553.00	Mass Flow (kg/h)	56553.00	56553.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5006		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	41.00	Temperature (°C)	41.00	41.00	0.00
Pressure (Kg/cm ² gauge)	16.84	Pressure (Kg/cm ² gauge)	16.84	16.84	0.00
Molar Flow (kgmole/h)	9365.62	Molar Flow (kgmole/h)	9365.62	9365.50	0.00
Mass Flow (kg/h)	394111.00	Mass Flow (kg/h)	394111.00	394111.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5009		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	34.87	Temperature (°C)	34.87	34.20	-1.95

Simulation Report – ECC 860 KTA

Working Stage 6

Pressure (Kg/cm ² gauge)	16.64	Pressure (Kg/cm ² gauge)	16.64	16.64	0.00
Molar Flow (kgmole/h)	2537.68	Molar Flow (kgmole/h)	2537.68	2537.70	0.00
Mass Flow (kg/h)	106787.00	Mass Flow (kg/h)	106787.00	106787.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5012		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	34.87	Temperature (°C)	34.87	34.20	-1.95
Pressure (Kg/cm ² gauge)	16.64	Pressure (Kg/cm ² gauge)	16.64	16.64	0.00
Molar Flow (kgmole/h)	1703.14	Molar Flow (kgmole/h)	1703.14	1703.10	0.00
Mass Flow (kg/h)	71669.00	Mass Flow (kg/h)	71669.00	71669.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5076		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	34.87	Temperature (°C)	34.87	34.20	-1.95
Pressure (Kg/cm ² gauge)	16.64	Pressure (Kg/cm ² gauge)	16.64	16.64	0.00
Molar Flow (kgmole/h)	147.53	Molar Flow (kgmole/h)	147.53	147.50	-0.02
Mass Flow (kg/h)	6208.00	Mass Flow (kg/h)	6208.00	6208.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5056		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	34.87	Temperature (°C)	34.87	34.20	-1.95
Pressure (Kg/cm ² gauge)	16.64	Pressure (Kg/cm ² gauge)	16.64	16.64	0.00
Molar Flow (kgmole/h)	319.20	Molar Flow (kgmole/h)	319.20	319.20	0.00
Mass Flow (kg/h)	13432.00	Mass Flow (kg/h)	13432.00	13432.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5020		Design	%Error
Component (%mol)		Component (%mol)			

Simulation Report – ECC 860 KTA
Working Stage 6

Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	34.87	Temperature (°C)	34.87	34.20	-1.95
Pressure (Kg/cm ² gauge)	16.64	Pressure (Kg/cm ² gauge)	16.64	16.64	0.00
Molar Flow (kgmole/h)	288.11	Molar Flow (kgmole/h)	288.11	288.10	0.00
Mass Flow (kg/h)	12124.00	Mass Flow (kg/h)	12124.00	12124.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5023		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	34.87	Temperature (°C)	34.87	34.20	-1.95
Pressure (Kg/cm ² gauge)	16.64	Pressure (Kg/cm ² gauge)	16.64	16.64	0.00
Molar Flow (kgmole/h)	79.70	Molar Flow (kgmole/h)	79.70	79.70	-0.01
Mass Flow (kg/h)	3354.00	Mass Flow (kg/h)	3354.00	3354.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5026		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	13.34	Temperature (°C)	13.34	13.20	-1.08
Pressure (Kg/cm ² gauge)	7.64	Pressure (Kg/cm ² gauge)	7.64	7.64	0.00
Molar Flow (kgmole/h)	2537.68	Molar Flow (kgmole/h)	2537.68	2537.70	0.00
Mass Flow (kg/h)	106787.00	Mass Flow (kg/h)	106787.00	106787.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5079		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	3.99	Temperature (°C)	3.99	3.60	-10.96
Pressure (Kg/cm ² gauge)	7.50	Pressure (Kg/cm ² gauge)	7.50	7.50	0.00
Molar Flow (kgmole/h)	48.50	Molar Flow (kgmole/h)	48.50	48.50	0.00
Mass Flow (kg/h)	2041.00	Mass Flow (kg/h)	2041.00	2041.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

Variable	Simulation	5080		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	3.99	Temperature (°C)	3.99	3.60	-10.96
Pressure (Kg/cm ² gauge)	7.50	Pressure (Kg/cm ² gauge)	7.50	7.50	0.00
Molar Flow (kgmole/h)	30.66	Molar Flow (kgmole/h)	30.66	30.60	-0.18
Mass Flow (kg/h)	1290.00	Mass Flow (kg/h)	1290.00	1290.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5085		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	3.99	Temperature (°C)	3.99	3.60	-10.96
Pressure (Kg/cm ² gauge)	7.50	Pressure (Kg/cm ² gauge)	7.50	7.50	0.00
Molar Flow (kgmole/h)	17.85	Molar Flow (kgmole/h)	17.85	17.90	0.30
Mass Flow (kg/h)	751.00	Mass Flow (kg/h)	751.00	751.00	0.00
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Variable	Simulation	5033		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	13.34	Temperature (°C)	13.34	13.20	-1.06
Pressure (Kg/cm ² gauge)	7.64	Pressure (Kg/cm ² gauge)	7.64	7.64	0.00
Molar Flow (kgmole/h)	884.04	Molar Flow (kgmole/h)	884.04	883.90	-0.02
Mass Flow (kg/h)	37200.98	Mass Flow (kg/h)	37200.98	37197.00	-0.01
Molecular Weight	42.0806	Molecular Weight	42.0806	42.08	0.00
Total	1.0000	Total	1.0000	1.0000	

Table A.4.4. Propylene Fractionation No.3 Stream Compositions

Simulation Report – ECC 860 KTA
Working Stage 6

Variable	Integration	4551		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0063	Hydrogen	0.0063	0.0063	0.00
Methane	0.0023	Methane	0.0023	0.0023	0.00
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0002	Propadiene/Methylacetylene	0.0002	0.0002	0.00
Propene	0.9419	Propylene	0.9419	0.9419	0.00
Propane	0.0476	Propane	0.0476	0.0476	0.00
13-Butadiene	0.0001	Butadienes/C4Acetylenes	0.0001	0.0001	0.00
1-Butene	0.0015	Butylenes	0.0015	0.0015	0.00
n-Butane	0.0000	Butanes	0.0000	0.0000	
Nitrogen	0.0001	Nitrogen	0.0001	0.0001	0.00
Operation Condition		Operation Condition			
Temperature (°C)	50.90	Temperature (°C)	50.90	50.90	0.00
Pressure (Kg/cm ² gauge)	19.19	Pressure (Kg/cm ² gauge)	19.19	19.19	0.00
Molar Flow (kgmole/h)	439.11	Molar Flow (kgmole/h)	439.11	439.11	0.00
Mass Flow (kg/h)	18392.00	Mass Flow (kg/h)	18392.00	18392.00	0.00
Molecular Weight	41.8847	Molecular Weight	41.8847	41.8847	0.00
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	4552		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Methane	0.0000	Methane	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.9950	Propylene	0.9950	0.9950	0.00
Propane	0.0049	Propane	0.0049	0.0049	0.01
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000	
1-Butene	0.0000	Butylenes	0.0000	0.0000	
n-Butane	0.0000	Butanes	0.0000	0.0000	
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition		Operation Condition			
Temperature (°C)	46.60	Temperature (°C)	46.60	46.60	0.00
Pressure (Kg/cm ² gauge)	18.38	Pressure (Kg/cm ² gauge)	18.38	18.38	0.00
Molar Flow (kgmole/h)	407.51	Molar Flow (kgmole/h)	407.51	407.49	-0.01
Mass Flow (kg/h)	17151.76	Mass Flow (kg/h)	17151.76	17150.89	-0.01
Molecular Weight	42.0889	Molecular Weight	42.0889	42.0889	0.00
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	4573		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0056	Hydrogen	0.0056	0.0056	0.00
Methane	0.0104	Methane	0.0104	0.0104	0.00
Ethane	0.0004	Ethane	0.0004	0.0004	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.9804	Propylene	0.9804	0.9804	0.00
Propane	0.0031	Propane	0.0031	0.0031	0.00
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000	
1-Butene	0.0000	Butylenes	0.0000	0.0000	
n-Butane	0.0000	Butanes	0.0000	0.0000	
Nitrogen	0.0001	Nitrogen	0.0001	0.0001	0.00
Operation Condition		Operation Condition			
Temperature (°C)	29.75	Temperature (°C)	29.75	29.75	0.00
Pressure (Kg/cm ² gauge)	17.43	Pressure (Kg/cm ² gauge)	17.43	17.43	0.00
Molar Flow (kgmole/h)	120.91	Molar Flow (kgmole/h)	120.91	120.91	0.00
Mass Flow (kg/h)	5028.11	Mass Flow (kg/h)	5028.11	5028.11	0.00
Molecular Weight	41.5853	Molecular Weight	41.5853	41.5853	0.00
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	4572		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.1504	Hydrogen	0.1504	0.1503	-0.10
Methane	0.0830	Methane	0.0830	0.0829	-0.05
Ethane	0.0008	Ethane	0.0008	0.0008	0.00
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.7623	Propylene	0.7623	0.7625	0.03
Propane	0.0022	Propane	0.0022	0.0022	0.03
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000	
1-Butene	0.0000	Butylenes	0.0000	0.0000	
n-Butane	0.0000	Butanes	0.0000	0.0000	
Nitrogen	0.0013	Nitrogen	0.0013	0.0013	
Operation Condition		Operation Condition			
Temperature (°C)	20.30491642	Temperature (°C)	20.30	20.36	0.28
Pressure (Kg/cm ² gauge)	9.47	Pressure (Kg/cm ² gauge)	9.47	9.47	0.00
Molar Flow (kgmole/h)	10.19	Molar Flow (kgmole/h)	10.19	10.20	0.10
Mass Flow (kg/h)	345.28	Mass Flow (kg/h)	345.28	346.10	0.24
Molecular Weight	33.8695	Molecular Weight	33.8695	33.9172	0.14
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	4558		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0006	Hydrogen	0.0006	0.0006	0.00
Methane	0.0021	Methane	0.0021	0.0021	0.00
Ethane	0.0002	Ethane	0.0002	0.0002	0.00
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.9935	Propylene	0.9935	0.9935	0.00
Propane	0.0035	Propane	0.0035	0.0035	0.00
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000	
1-Butene	0.0000	Butylenes	0.0000	0.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

n-Butane	0.0000	Butanes	0.0000	0.0000	
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition		Operation Condition			
Temperature (°C)	41.50	Temperature (°C)	41.50	41.50	0.00
Pressure (Kg/cm ² gauge)	18.33	Pressure (Kg/cm ² gauge)	18.33	18.33	0.00
Molar Flow (kgmole/h)	6095.74	Molar Flow (kgmole/h)	6095.74	6095.74	0.00
Mass Flow (kg/h)	256060.64	Mass Flow (kg/h)	256060.64	256060.64	0.00
Molecular Weight	42.0065	Molecular Weight	42.0065	42.0065	0.00
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	4561		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Methane	0.0000	Methane	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0040	Propadiene/Methylacetylene	0.0040	0.0040	0.00
Propene	0.0430	Propylene	0.0430	0.0430	0.02
Propane	0.9208	Propane	0.9208	0.9208	0.00
13-Butadiene	0.0020	Butadienes/C4Acetylenes	0.0020	0.0020	0.00
1-Butene	0.0302	Butylenes	0.0302	0.0302	0.00
n-Butane	0.0000	Butanes	0.0000	0.0000	
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition		Operation Condition			
Temperature (°C)	58.11	Temperature (°C)	58.11	58.11	0.00
Pressure (Kg/cm ² gauge)	19.44	Pressure (Kg/cm ² gauge)	19.44	19.44	0.00
Molar Flow (kgmole/h)	21.82	Molar Flow (kgmole/h)	21.82	21.82	0.00
Mass Flow (kg/h)	968.10	Mass Flow (kg/h)	968.10	968.10	0.00
Molecular Weight	44.3768	Molecular Weight	44.3768	44.3768	0.00
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	4565		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0168	Hydrogen	0.0168	0.0168	0.00
Methane	0.0161	Methane	0.0161	0.0161	0.00
Ethane	0.0004	Ethane	0.0004	0.0004	0.00
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.9635	Propylene	0.9635	0.9635	0.00
Propane	0.0030	Propane	0.0030	0.0030	0.00
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000	
1-Butene	0.0000	Butylenes	0.0000	0.0000	
n-Butane	0.0000	Butanes	0.0000	0.0000	
Nitrogen	0.0002	Nitrogen	0.0002	0.0002	0.00
Operation Condition		Operation Condition			
Temperature (°C)	42.53	Temperature (°C)	42.53	42.53	0.00
Pressure (Kg/cm ² gauge)	17.52	Pressure (Kg/cm ² gauge)	17.52	17.52	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

Molar Flow (kgmole/h)	131.29	Molar Flow (kgmole/h)	131.29	131.29	0.00
Mass Flow (kg/h)	5381.16	Mass Flow (kg/h)	5381.16	5381.11	0.00
Molecular Weight	40.9859	Molecular Weight	40.9859	40.9859	0.00
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	4556		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0008	Hydrogen	0.0008	0.0008	0.00
Methane	0.0022	Methane	0.0022	0.0022	0.00
Ethane	0.0002	Ethane	0.0002	0.0002	0.00
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.9935	Propylene	0.9935	0.9935	0.00
Propane	0.0033	Propane	0.0033	0.0033	0.00
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000	
1-Butene	0.0000	Butylenes	0.0000	0.0000	
n-Butane	0.0000	Butanes	0.0000	0.0000	
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition		Operation Condition			
Temperature (°C)	42.53	Temperature (°C)	42.53	42.53	0.00
Pressure (Kg/cm ² gauge)	17.52	Pressure (Kg/cm ² gauge)	17.52	17.52	0.00
Molar Flow (kgmole/h)	6095.14	Molar Flow (kgmole/h)	6095.14	6095.16	0.00
Mass Flow (kg/h)	255979.72	Mass Flow (kg/h)	255979.72	255980.66	0.00
Molecular Weight	41.9974	Molecular Weight	42.00	42.00	0.00
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	4554		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0010	Hydrogen	0.0010	0.0010	0.00
Methane	0.0023	Methane	0.0023	0.0023	0.00
Ethane	0.0002	Ethane	0.0002	0.0002	0.00
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.9931	Propylene	0.9931	0.9931	0.00
Propane	0.0033	Propane	0.0033	0.0033	0.00
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000	
1-Butene	0.0000	Butylenes	0.0000	0.0000	
n-Butane	0.0000	Butanes	0.0000	0.0000	
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition		Operation Condition			
Temperature (°C)	46.30	Temperature (°C)	46.30	46.30	0.00
Pressure (Kg/cm ² gauge)	18.33	Pressure (Kg/cm ² gauge)	18.33	18.33	0.00
Molar Flow (kgmole/h)	6105.52	Molar Flow (kgmole/h)	6105.52	6105.54	0.00
Mass Flow (kg/h)	256332.77	Mass Flow (kg/h)	256332.77	256333.65	0.00
Molecular Weight	41.9838	Molecular Weight	41.9838	41.9838	0.00
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	4555		Unit Simulation	%Error

Simulation Report – ECC 860 KTA

Working Stage 6

Component (%mol)		Component (%mol)			
Hydrogen	0.0010	Hydrogen	0.0010	0.0010	0.00
Methane	0.0023	Methane	0.0023	0.0023	0.00
Ethane	0.0002	Ethane	0.0002	0.0002	0.00
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.9931	Propylene	0.9931	0.9931	0.00
Propane	0.0033	Propane	0.0033	0.0033	0.00
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000	
1-Butene	0.0000	Butylenes	0.0000	0.0000	
n-Butane	0.0000	Butanes	0.0000	0.0000	
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition		Operation Condition			
Temperature (°C)	43.65	Temperature (°C)	43.65	43.65	-0.01
Pressure (Kg/cm ² gauge)	17.98	Pressure (Kg/cm ² gauge)	17.98	17.98	0.00
Molar Flow (kgmole/h)	6105.52	Molar Flow (kgmole/h)	6105.52	6105.54	0.00
Mass Flow (kg/h)	256332.77	Mass Flow (kg/h)	256332.77	256333.65	0.00
Molecular Weight	41.9838	Molecular Weight	41.9838	41.9838	0.00
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	4571		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.1504	Hydrogen	0.1504	0.1503	-0.10
Methane	0.0830	Methane	0.0830	0.0829	-0.05
Ethane	0.0008	Ethane	0.0008	0.0008	0.00
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.7623	Propylene	0.7623	0.7625	0.03
Propane	0.0022	Propane	0.0022	0.0022	0.03
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000	
1-Butene	0.0000	Butylenes	0.0000	0.0000	
n-Butane	0.0000	Butanes	0.0000	0.0000	
Nitrogen	0.0013	Nitrogen	0.0013	0.0013	-0.09
Operation Condition		Operation Condition			
Temperature (°C)	29.73783073	Temperature (°C)	29.74	29.75	0.04
Pressure (Kg/cm ² gauge)	17.43	Pressure (Kg/cm ² gauge)	17.43	17.43	0.00
Molar Flow (kgmole/h)	10.19449519	Molar Flow (kgmole/h)	10.19	10.21	0.14
Mass Flow (kg/h)	345.2828064	Mass Flow (kg/h)	345.28	345.85	0.16
Molecular Weight	33.8768	Molecular Weight	33.8768	33.8768	0.00
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	4553		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Methane	0.0000	Methane	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

Propene	0.9951	Propylene	0.9951	0.9950	-0.01
Propane	0.0049	Propane	0.0049	0.0049	1.00
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000	
1-Butene	0.0000	Butylenes	0.0000	0.0000	
n-Butane	0.0000	Butanes	0.0000	0.0000	
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition	0	Operation Condition			
Temperature (°C)	40.00	Temperature (°C)	40.00	40.00	0.00
Pressure (Kg/cm ² gauge)	17.00	Pressure (Kg/cm ² gauge)	17.00	17.00	0.00
Molar Flow (kgmole/h)	407.5124185	Molar Flow (kgmole/h)	407.51	407.49	-0.01
Mass Flow (kg/h)	17151.76373	Mass Flow (kg/h)	17151.76	17150.89	-0.01
Molecular Weight	42.0905	Molecular Weight	42.0905	42.09	0.00
Total	1.0000	Total	1.0000	1.0000	

Table A.4.5. Propylene Fractionation Stream Compositions

Variable	Integration	4501		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0063	Hydrogen	0.0063	0.0063	0.00
Methane	0.0023	Methane	0.0023	0.0023	0.00
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0002	Propadiene/Methylacetylene	0.0002	0.0002	0.00
Propene	0.9420	Propylene	0.9420	0.9420	0.00
Propane	0.0476	Propane	0.0476	0.0476	0.00
13-Butadiene	0.0001	Butadienes/C4Acetylenes	0.0001	0.0001	0.00
1-Butene	0.0015	Butylenes	0.0015	0.0015	0.00
n-Butane	0.0000	Butanes	0.0000	0.0000	
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition	0	Operation Condition		0	
Temperature (°C)	50.90	Temperature (°C)	50.90	50.90	0.00
Pressure (Kg/cm ² gauge)	19.17	Pressure (Kg/cm ² gauge)	19.17	19.17	0.00
Molar Flow (kgmole/h)	951.94	Molar Flow (kgmole/h)	951.94	951.94	0.00
Mass Flow (kg/h)	39873.00	Mass Flow (kg/h)	39873.00	39873.00	0.00
Molecular Weight	41.8861	Molecular Weight	41.8861	41.89	0.00
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	4504		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0012	Hydrogen	0.0012	0.0012	0.00
Methane	0.0022	Methane	0.0022	0.0022	0.00
Ethane	0.0002	Ethane	0.0002	0.0002	0.00
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.9928	Propylene	0.9928	0.9928	0.00
Propane	0.0036	Propane	0.0036	0.0036	0.00
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000	

Simulation Report – ECC 860 KTA

Working Stage 6

1-Butene	0.0000	Butylenes	0.0000	0.0000	
n-Butane	0.0000	Butanes	0.0000	0.0000	
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition	0	Operation Condition		0	
Temperature (°C)	45.23	Temperature (°C)	45.23	45.23	0.00
Pressure (Kg/cm ² gauge)	18.33	Pressure (Kg/cm ² gauge)	18.33	18.33	0.00
Molar Flow (kgmole/h)	11047.88	Molar Flow (kgmole/h)	11047.88	11047.88	0.00
Mass Flow (kg/h)	463775.98	Mass Flow (kg/h)	463775.98	463775.98	0.00
Molecular Weight	41.9787	Molecular Weight	41.9787	41.98	0.00
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	4521		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.2730	Hydrogen	0.2730	0.2730	0.00
Methane	0.0921	Methane	0.0921	0.0921	0.00
Ethane	0.0007	Ethane	0.0007	0.0007	0.00
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.6324	Propylene	0.6324	0.6324	0.00
Propane	0.0019	Propane	0.0019	0.0019	0.00
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000	
1-Butene	0.0000	Butylenes	0.0000	0.0000	
n-Butane	0.0000	Butanes	0.0000	0.0000	
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition	0	Operation Condition		0	
Temperature (°C)	20.58	Temperature (°C)	20.58	20.58	0.00
Pressure (Kg/cm ² gauge)	17.43	Pressure (Kg/cm ² gauge)	17.43	17.43	0.00
Molar Flow (kgmole/h)	21.98	Molar Flow (kgmole/h)	21.98	21.98	0.00
Mass Flow (kg/h)	631.88	Mass Flow (kg/h)	631.88	631.88	0.00
Molecular Weight	28.7430	Molecular Weight	28.7430	28.74	0.00
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	4502		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Methane	0.0000	Methane	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.9950	Propylene	0.9950	0.9950	0.00
Propane	0.0049	Propane	0.0049	0.0049	0.00
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000	
1-Butene	0.0000	Butylenes	0.0000	0.0000	
n-Butane	0.0000	Butanes	0.0000	0.0000	
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition	0	Operation Condition		0	
Temperature (°C)	45.84	Temperature (°C)	45.84	45.84	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

Pressure (Kg/cm ² gauge)	18.38	Pressure (Kg/cm ² gauge)	18.38	18.38	0.00
Molar Flow (kgmole/h)	883.65	Molar Flow (kgmole/h)	883.65	883.65	0.00
Mass Flow (kg/h)	37192.20	Mass Flow (kg/h)	37192.20	37192.20	0.00
Molecular Weight	42.0891	Molecular Weight	42.0891	42.09	0.00
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	4522		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0191	Hydrogen	0.0191	0.0191	0.00
Methane	0.0514	Methane	0.0514	0.0514	0.00
Ethane	0.0007	Ethane	0.0007	0.0007	0.00
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.9259	Propylene	0.9259	0.9259	0.00
Propane	0.0029	Propane	0.0029	0.0029	0.00
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000	
1-Butene	0.0000	Butylenes	0.0000	0.0000	
n-Butane	0.0000	Butanes	0.0000	0.0000	
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition	0	Operation Condition		0	
Temperature (°C)	12.89	Temperature (°C)	12.89	12.89	0.00
Pressure (Kg/cm ² gauge)	9.47	Pressure (Kg/cm ² gauge)	9.47	9.47	0.00
Molar Flow (kgmole/h)	21.98	Molar Flow (kgmole/h)	21.98	21.98	0.00
Mass Flow (kg/h)	631.88	Mass Flow (kg/h)	631.88	631.88	0.00
Molecular Weight	28.7430	Molecular Weight	28.7430	28.74	0.00
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	4535		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Methane	0.0000	Methane	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.9950	Propylene	0.9950	0.9950	0.00
Propane	0.0049	Propane	0.0049	0.0049	0.00
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000	
1-Butene	0.0000	Butylenes	0.0000	0.0000	
n-Butane	0.0000	Butanes	0.0000	0.0000	
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition	0	Operation Condition		0	
Temperature (°C)	-24.00	Temperature (°C)	-24.00	-24.00	0.00
Pressure (Kg/cm ² gauge)	21.63	Pressure (Kg/cm ² gauge)	21.63	21.63	0.00
Molar Flow (kgmole/h)	299.36	Molar Flow (kgmole/h)	299.36	299.36	0.00
Mass Flow (kg/h)	12600.00	Mass Flow (kg/h)	12600.00	12600.00	0.00
Molecular Weight	42.0891	Molecular Weight	42.0891	42.09	0.00
Total	1.0000	Total	1.0000	1.0000	

Simulation Report – ECC 860 KTA

Working Stage 6

Variable	Integration	4503		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Methane	0.0000	Methane	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.9950	Propylene	0.9950	0.9950	0.00
Propane	0.0049	Propane	0.0049	0.0049	0.00
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000	
1-Butene	0.0000	Butylenes	0.0000	0.0000	
n-Butane	0.0000	Butanes	0.0000	0.0000	
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition	0	Operation Condition		0	
Temperature (°C)	39.68	Temperature (°C)	39.68	39.68	0.00
Pressure (Kg/cm ² gauge)	17.00	Pressure (Kg/cm ² gauge)	17.00	17.00	0.00
Molar Flow (kgmole/h)	584.29	Molar Flow (kgmole/h)	584.29	584.29	0.00
Mass Flow (kg/h)	24592.20	Mass Flow (kg/h)	24592.20	24592.20	0.00
Molecular Weight	42.0891	Molecular Weight	42.0891	42.09	0.00
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	4511		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Methane	0.0000	Methane	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0043	Propadiene/Methylacetylene	0.0043	0.0043	-0.01
Propene	0.0430	Propylene	0.0430	0.0430	0.02
Propane	0.9184	Propane	0.9184	0.9184	0.00
13-Butadiene	0.0021	Butadienes/C4Acetylenes	0.0021	0.0021	-0.01
1-Butene	0.0322	Butylenes	0.0322	0.0321	-0.01
n-Butane	0.0000	Butanes	0.0000	0.0000	
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition	0	Operation Condition		0	
Temperature (°C)	58.23	Temperature (°C)	58.23	58.23	0.00
Pressure (Kg/cm ² gauge)	19.70	Pressure (Kg/cm ² gauge)	19.70	19.70	0.00
Molar Flow (kgmole/h)	44.35	Molar Flow (kgmole/h)	44.35	44.36	0.01
Mass Flow (kg/h)	1969.24	Mass Flow (kg/h)	1969.24	1969.50	0.01
Molecular Weight	44.4006	Molecular Weight	44.4006	44.40	0.00
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	4520		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Methane	0.0000	Methane	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	

Simulation Report – ECC 860 KTA

Working Stage 6

Propadiene	0.0001	Propadiene/Methylacetylene	0.0001	0.0001	0.00
Propene	0.9019	Propylene	0.9019	0.9019	0.00
Propane	0.0978	Propane	0.0978	0.0978	0.00
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000	
1-Butene	0.0001	Butylenes	0.0001	0.0001	0.00
n-Butane	0.0000	Butanes	0.0000	0.0000	
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition	0	Operation Condition		0	
Temperature (°C)	48.73	Temperature (°C)	48.73	48.73	0.00
Pressure (Kg/cm ² gauge)	19.34	Pressure (Kg/cm ² gauge)	19.34	19.34	0.00
Molar Flow (kgmole/h)	7506.18	Molar Flow (kgmole/h)	7506.18	7506.18	0.00
Mass Flow (kg/h)	317359.06	Mass Flow (kg/h)	317359.06	317359.06	0.00
Molecular Weight	42.2797	Molecular Weight	42.2797	42.28	0.00
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	4505		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0012	Hydrogen	0.0012	0.0012	0.00
Methane	0.0022	Methane	0.0022	0.0022	0.00
Ethane	0.0002	Ethane	0.0002	0.0002	0.00
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.9928	Propylene	0.9928	0.9928	0.00
Propane	0.0036	Propane	0.0036	0.0036	0.00
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000	
1-Butene	0.0000	Butylenes	0.0000	0.0000	
n-Butane	0.0000	Butanes	0.0000	0.0000	
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition	0	Operation Condition		0	
Temperature (°C)	42.23	Temperature (°C)	42.23	42.23	0.00
Pressure (Kg/cm ² gauge)	17.98	Pressure (Kg/cm ² gauge)	17.98	17.98	0.00
Molar Flow (kgmole/h)	11047.88	Molar Flow (kgmole/h)	11047.88	11047.88	0.00
Mass Flow (kg/h)	463775.98	Mass Flow (kg/h)	463775.98	463775.98	0.00
Molecular Weight	41.9787	Molecular Weight	41.9787	41.98	0.00
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	4515		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0255	Hydrogen	0.0255	0.0255	0.00
Methane	0.0166	Methane	0.0166	0.0166	0.00
Ethane	0.0004	Ethane	0.0004	0.0004	0.00
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.9543	Propylene	0.9543	0.9543	0.00
Propane	0.0031	Propane	0.0031	0.0031	0.00
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000	
1-Butene	0.0000	Butylenes	0.0000	0.0000	

Simulation Report – ECC 860 KTA

Working Stage 6

n-Butane	0.0000	Butanes	0.0000	0.0000	
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition	0	Operation Condition		0	
Temperature (°C)	40.98	Temperature (°C)	40.98	40.98	0.00
Pressure (Kg/cm ² gauge)	17.43	Pressure (Kg/cm ² gauge)	17.43	17.43	0.00
Molar Flow (kgmole/h)	284.45	Molar Flow (kgmole/h)	284.45	284.45	0.00
Mass Flow (kg/h)	11556.22	Mass Flow (kg/h)	11556.22	11556.22	0.00
Molecular Weight	40.6259	Molecular Weight	40.6259	40.63	0.00
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	4518		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Methane	0.0000	Methane	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0001	Propadiene/Methylacetylene	0.0001	0.0001	0.00
Propene	0.8969	Propylene	0.8969	0.8969	0.00
Propane	0.1026	Propane	0.1026	0.1026	0.00
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000	
1-Butene	0.0003	Butylenes	0.0003	0.0003	0.00
n-Butane	0.0000	Butanes	0.0000	0.0000	
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition	0	Operation Condition		0	
Temperature (°C)	48.53	Temperature (°C)	48.53	48.53	0.00
Pressure (Kg/cm ² gauge)	19.26	Pressure (Kg/cm ² gauge)	19.26	19.26	0.00
Molar Flow (kgmole/h)	7552.79	Molar Flow (kgmole/h)	7552.79	7552.79	0.00
Mass Flow (kg/h)	319423.78	Mass Flow (kg/h)	319423.78	319423.78	0.00
Molecular Weight	42.2922	Molecular Weight	42.2922	42.29	0.00
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	4532		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.2725	Hydrogen	0.2725	0.2725	0.00
Methane	0.0937	Methane	0.0937	0.0937	0.00
Ethane	0.0007	Ethane	0.0007	0.0007	0.00
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.6312	Propylene	0.6312	0.6312	0.00
Propane	0.0019	Propane	0.0019	0.0019	0.00
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000	
1-Butene	0.0000	Butylenes	0.0000	0.0000	
n-Butane	0.0000	Butanes	0.0000	0.0000	
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition	0	Operation Condition		0	
Temperature (°C)	11.97	Temperature (°C)	11.97	11.97	0.00
Pressure (Kg/cm ² gauge)	9.47	Pressure (Kg/cm ² gauge)	9.47	9.47	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

Molar Flow (kgmole/h)	32.17	Molar Flow (kgmole/h)	32.17	32.17	0.00
Mass Flow (kg/h)	923.88	Mass Flow (kg/h)	923.88	923.88	0.00
Molecular Weight	28.7171	Molecular Weight	28.7171	28.72	0.00
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	4536		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Methane	0.0000	Methane	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.9950	Propylene	0.9950	0.9950	0.00
Propane	0.0049	Propane	0.0049	0.0049	0.00
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000	
1-Butene	0.0000	Butylenes	0.0000	0.0000	
n-Butane	0.0000	Butanes	0.0000	0.0000	
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition	0	Operation Condition		0	
Temperature (°C)	-37.00	Temperature (°C)	-37.00	-37.00	0.00
Pressure (Kg/cm ² gauge)	5.00	Pressure (Kg/cm ² gauge)	5.00	5.00	0.00
Molar Flow (kgmole/h)	299.36	Molar Flow (kgmole/h)	299.36	299.36	0.00
Mass Flow (kg/h)	12600.00	Mass Flow (kg/h)	12600.00	12600.00	0.00
Molecular Weight	42.0891	Molecular Weight	42.0891	42.09	0.00
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	4533		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Methane	0.0000	Methane	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.9950	Propylene	0.9950	0.9950	0.00
Propane	0.0049	Propane	0.0049	0.0049	0.00
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000	
1-Butene	0.0000	Butylenes	0.0000	0.0000	
n-Butane	0.0000	Butanes	0.0000	0.0000	
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition	0	Operation Condition		0	
Temperature (°C)	39.81	Temperature (°C)	39.81	39.81	0.00
Pressure (Kg/cm ² gauge)	17.00	Pressure (Kg/cm ² gauge)	17.00	17.00	0.00
Molar Flow (kgmole/h)	992.62	Molar Flow (kgmole/h)	992.62	992.62	0.00
Mass Flow (kg/h)	41779.20	Mass Flow (kg/h)	41779.20	41779.20	0.00
Molecular Weight	42.0897	Molecular Weight	42.0897	42.09	0.00
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	4520		Unit Simulation	%Error

Simulation Report – ECC 860 KTA

Working Stage 6

Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Methane	0.0000	Methane	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0001	Propadiene/Methylacetylene	0.0001	0.0001	0.00
Propene	0.9019	Propylene	0.9019	0.9019	0.00
Propane	0.0978	Propane	0.0978	0.0978	0.00
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000	
1-Butene	0.0001	Butylenes	0.0001	0.0001	0.00
n-Butane	0.0000	Butanes	0.0000	0.0000	
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition	0	Operation Condition		0	
Temperature (°C)	48.73	Temperature (°C)	48.73	48.73	0.00
Pressure (Kg/cm ² gauge)	19.34	Pressure (Kg/cm ² gauge)	19.34	19.34	0.00
Molar Flow (kgmole/h)	7508.431664	Molar Flow (kgmole/h)	7508.43	7506.18	-0.03
Mass Flow (kg/h)	317454.2829	Mass Flow (kg/h)	317454.28	317359.06	-0.03
Molecular Weight	42.2797	Molecular Weight	42.2797	42.28	0.00
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	4508		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0007	Hydrogen	0.0007	0.0007	0.00
Methane	0.0020	Methane	0.0020	0.0020	0.00
Ethane	0.0002	Ethane	0.0002	0.0002	0.00
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.9935	Propylene	0.9935	0.9935	0.00
Propane	0.0036	Propane	0.0036	0.0036	0.00
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000	
1-Butene	0.0000	Butylenes	0.0000	0.0000	
n-Butane	0.0000	Butanes	0.0000	0.0000	
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition	0	Operation Condition		0	
Temperature (°C)	41.27	Temperature (°C)	41.27	41.27	0.00
Pressure (Kg/cm ² gauge)	18.33	Pressure (Kg/cm ² gauge)	18.33	18.33	0.00
Molar Flow (kgmole/h)	11026.21	Molar Flow (kgmole/h)	11026.21	11026.21	0.00
Mass Flow (kg/h)	463159.92	Mass Flow (kg/h)	463159.92	463159.92	0.00
Molecular Weight	42.0053	Molecular Weight	42.0053	42.01	0.00
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	4523		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0048	Hydrogen	0.0048	0.0048	0.00
Methane	0.0103	Methane	0.0103	0.0103	0.00
Ethane	0.0004	Ethane	0.0004	0.0004	0.00
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	

Simulation Report – ECC 860 KTA

Working Stage 6

Propene	0.9812	Propylene	0.9812	0.9812	0.00
Propane	0.0032	Propane	0.0032	0.0032	0.00
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000	
1-Butene	0.0000	Butylenes	0.0000	0.0000	
n-Butane	0.0000	Butanes	0.0000	0.0000	
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition	0	Operation Condition		0	
Temperature (°C)	20.51	Temperature (°C)	20.51	20.51	0.00
Pressure (Kg/cm ² gauge)	17.43	Pressure (Kg/cm ² gauge)	17.43	17.43	0.00
Molar Flow (kgmole/h)	262.06	Molar Flow (kgmole/h)	262.06	262.06	0.00
Mass Flow (kg/h)	10906.97	Mass Flow (kg/h)	10906.97	10906.97	0.00
Molecular Weight	41.6204	Molecular Weight	41.6204	41.62	0.00
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	4506		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0007	Hydrogen	0.0007	0.0007	0.00
Methane	0.0020	Methane	0.0020	0.0020	0.00
Ethane	0.0002	Ethane	0.0002	0.0002	0.00
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.9935	Propylene	0.9935	0.9935	0.00
Propane	0.0036	Propane	0.0036	0.0036	0.00
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000	
1-Butene	0.0000	Butylenes	0.0000	0.0000	
n-Butane	0.0000	Butanes	0.0000	0.0000	
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition	0	Operation Condition		0	
Temperature (°C)	40.98	Temperature (°C)	40.98	40.98	0.00
Pressure (Kg/cm ² gauge)	17.43	Pressure (Kg/cm ² gauge)	17.43	17.43	0.00
Molar Flow (kgmole/h)	11025.49	Molar Flow (kgmole/h)	11025.49	11025.49	0.00
Mass Flow (kg/h)	463126.73	Mass Flow (kg/h)	463126.73	463126.73	0.00
Molecular Weight	42.0051	Molecular Weight	42.0051	42.01	0.00
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	4572		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.2716	Hydrogen	0.2716	0.2716	0.00
Methane	0.0972	Methane	0.0972	0.0972	0.00
Ethane	0.0008	Ethane	0.0008	0.0008	0.00
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.6285	Propylene	0.6285	0.6285	0.00
Propane	0.0019	Propane	0.0019	0.0019	0.00
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000	
1-Butene	0.0000	Butylenes	0.0000	0.0000	
n-Butane	0.0000	Butanes	0.0000	0.0000	

Simulation Report – ECC 860 KTA

Working Stage 6

Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition	0	Operation Condition		0	
Temperature (°C)	10.00	Temperature (°C)	10.00	10.00	0.00
Pressure (Kg/cm ² gauge)	9.47	Pressure (Kg/cm ² gauge)	9.47	9.47	0.00
Molar Flow (kgmole/h)	10.19	Molar Flow (kgmole/h)	10.19	10.19	0.00
Mass Flow (kg/h)	292.00	Mass Flow (kg/h)	292.00	292.00	0.00
Molecular Weight	28.6611	Molecular Weight	28.6611	28.66	0.00
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	4534		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Methane	0.0000	Methane	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.9950	Propylene	0.9950	0.9950	0.00
Propane	0.0049	Propane	0.0049	0.0049	0.00
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000	
1-Butene	0.0000	Butylenes	0.0000	0.0000	
n-Butane	0.0000	Butanes	0.0000	0.0000	
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition	0	Operation Condition		0	
Temperature (°C)	40.00	Temperature (°C)	40.00	40.00	0.00
Pressure (Kg/cm ² gauge)	22.04	Pressure (Kg/cm ² gauge)	22.04	22.04	0.00
Molar Flow (kgmole/h)	299.36	Molar Flow (kgmole/h)	299.36	299.36	0.00
Mass Flow (kg/h)	12600.00	Mass Flow (kg/h)	12600.00	12600.00	0.00
Molecular Weight	42.0891	Molecular Weight	42.0891	42.09	0.00
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	4553		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Methane	0.0000	Methane	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.9951	Propylene	0.9951	0.9951	0.00
Propane	0.0049	Propane	0.0049	0.0049	0.00
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000	
1-Butene	0.0000	Butylenes	0.0000	0.0000	
n-Butane	0.0000	Butanes	0.0000	0.0000	
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition	0	Operation Condition		0	
Temperature (°C)	40.00	Temperature (°C)	40.00	40.00	0.00
Pressure (Kg/cm ² gauge)	17.00	Pressure (Kg/cm ² gauge)	17.00	17.00	0.00
Molar Flow (kgmole/h)	408.33	Molar Flow (kgmole/h)	408.33	408.33	0.00

Simulation Report – ECC 860 KTA
Working Stage 6

Mass Flow (kg/h)	17187.00	Mass Flow (kg/h)	17187.00	17187.00	0.00
Molecular Weight	42.0905	Molecular Weight	42.0905	42.09	0.00
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	4519		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Methane	0.0000	Methane	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0001	Propadiene/Methylacetylene	0.0001	0.0001	0.00
Propene	0.8969	Propylene	0.8969	0.8969	0.00
Propane	0.1026	Propane	0.1026	0.1026	0.00
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000	
1-Butene	0.0003	Butylenes	0.0003	0.0003	0.00
n-Butane	0.0000	Butanes	0.0000	0.0000	
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition	0	Operation Condition		0	
Temperature (°C)	48.62	Temperature (°C)	48.62	48.62	0.00
Pressure (Kg/cm ² gauge)	19.34	Pressure (Kg/cm ² gauge)	19.34	19.34	0.00
Molar Flow (kgmole/h)	7552.79	Molar Flow (kgmole/h)	7552.79	7552.79	0.00
Mass Flow (kg/h)	319423.78	Mass Flow (kg/h)	319423.78	319423.78	0.00
Molecular Weight	42.2922	Molecular Weight	42.2922	42.29	0.00
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	4512		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Methane	0.0000	Methane	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0043	Propadiene/Methylacetylene	0.0043	0.0043	-0.01
Propene	0.0430	Propylene	0.0430	0.0430	0.02
Propane	0.9184	Propane	0.9184	0.9184	0.00
13-Butadiene	0.0021	Butadienes/C4Acetylenes	0.0021	0.0021	-0.01
1-Butene	0.0322	Butylenes	0.0322	0.0321	-0.01
n-Butane	0.0000	Butanes	0.0000	0.0000	
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition	0	Operation Condition		0	
Temperature (°C)	16.49	Temperature (°C)	16.49	16.49	0.00
Pressure (Kg/cm ² gauge)	6.61	Pressure (Kg/cm ² gauge)	6.61	6.61	0.00
Molar Flow (kgmole/h)	44.357586	Molar Flow (kgmole/h)	44.36	44.36	0.00
Mass Flow (kg/h)	1969.50209	Mass Flow (kg/h)	1969.50	1969.50	0.00
Molecular Weight	44.4006	Molecular Weight	44.4006	44.40	0.00
Total	1.0000	Total	1.0000	1.0000	

Table A.4.6. Depropanation No.3 Stream Compositions

Simulation Report – ECC 860 KTA
Working Stage 6

Variable	Integration	4208		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Methane	0.0000	Methane	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0293	Propadiene	0.0293	0.0293	0.00
M-Acetylene	0.0000	M-Acetylene	0.0000	0.0000	
Propene	0.7110	Propene	0.7110	0.7110	0.00
Cyclopropane	0.0000	Cyclopropane	0.0000	0.0000	
Propane	0.0214	Propane	0.0214	0.0214	0.00
13-Butadiene	0.0779	13-Butadiene	0.0779	0.0779	0.00
1-Butene	0.1112	1-Butene	0.1112	0.1112	0.00
i-Butene	0.0000	i-Butene	0.0000	0.0000	
n-Butane	0.0350	n-Butane	0.0350	0.0350	0.00
i-Pentane	0.0126	i-Pentane	0.0126	0.0126	0.00
1-Hexyne	0.0003	1-Hexyne	0.0003	0.0003	0.00
1-Heptyne	0.0000	1-Heptyne	0.0000	0.0000	
1-Octyne	0.0000	1-Octyne	0.0000	0.0000	
Benzene	0.0013	Benzene	0.0013	0.0013	0.00
Toluene	0.0000	Toluene	0.0000	0.0000	
p-Xylene	0.0000	p-Xylene	0.0000	0.0000	
E-Benzene	0.0000	E-Benzene	0.0000	0.0000	
Styrene	0.0000	Styrene	0.0000	0.0000	
n-Nonane	0.0000	n-Nonane	0.0000	0.0000	
H2O	0.0000	H2O	0.0000	0.0000	
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition	0	Operation Condition			
Temperature (°C)	54.80	Temperature (°C)	54.80	54.80	0.00
Pressure (Kg/cm ² gauge)	16.96	Pressure (Kg/cm ² gauge)	16.96	16.96	0.00
Molar Flow (kgmole/h)	1610.06	Molar Flow (kgmole/h)	1610.06	1610.06	0.00
Mass Flow (kg/h)	73354.00	Mass Flow (kg/h)	73354.00	73354.00	0.00
Molecular Weight	45.5598	Molecular Weight	45.56	45.56	0.00
Total		Total	1.0000	1.0000	
Variable	Integration	4408		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0002	Hydrogen	0.0002	0.0002	0.00
Methane	0.0003	Methane	0.0003	0.0003	0.00
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0197	Propadiene	0.0197	0.0197	0.00
M-Acetylene	0.0000	M-Acetylene	0.0000	0.0000	
Propene	0.9389	Propene	0.9389	0.9389	0.00
Cyclopropane	0.0000	Cyclopropane	0.0000	0.0000	
Propane	0.0399	Propane	0.0399	0.0399	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

13-Butadiene	0.0001	13-Butadiene	0.0001	0.0001	0.00
1-Butene	0.0008	1-Butene	0.0008	0.0008	0.00
i-Butene	0.0000	i-Butene	0.0000	0.0000	
n-Butane	0.0000	n-Butane	0.0000	0.0000	
i-Pentane	0.0000	i-Pentane	0.0000	0.0000	
1-Hexyne	0.0000	1-Hexyne	0.0000	0.0000	
1-Heptyne	0.0000	1-Heptyne	0.0000	0.0000	
1-Octyne	0.0000	1-Octyne	0.0000	0.0000	
Benzene	0.0000	Benzene	0.0000	0.0000	
Toluene	0.0000	Toluene	0.0000	0.0000	
p-Xylene	0.0000	p-Xylene	0.0000	0.0000	
E-Benzene	0.0000	E-Benzene	0.0000	0.0000	
Styrene	0.0000	Styrene	0.0000	0.0000	
n-Nonane	0.0000	n-Nonane	0.0000	0.0000	
H2O	0.0001	H2O	0.0001	0.0001	0.00
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition	0	Operation Condition			
Temperature (°C)	41.79	Temperature (°C)	41.79	41.79	0.00
Pressure (Kg/cm ² gauge)	27.72	Pressure (Kg/cm ² gauge)	27.72	27.72	0.00
Molar Flow (kgmole/h)	2582.98	Molar Flow (kgmole/h)	2582.98	2582.98	0.00
Mass Flow (kg/h)	108781.64	Mass Flow (kg/h)	108781.64	108781.60	0.00
Molecular Weight	42.1148	Molecular Weight	42.11	42.11	0.00
Total		Total	0.9999	0.9999	
Variable	Integration	4411		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Methane	0.0000	Methane	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0666	Propadiene	0.0666	0.0666	0.00
M-Acetylene	0.0000	M-Acetylene	0.0000	0.0000	
Propene	0.1911	Propene	0.1911	0.1911	0.00
Cyclopropane	0.0000	Cyclopropane	0.0000	0.0000	
Propane	0.0201	Propane	0.0201	0.0201	0.00
13-Butadiene	0.2410	13-Butadiene	0.2410	0.2410	0.00
1-Butene	0.3570	1-Butene	0.3570	0.3570	0.00
i-Butene	0.0000	i-Butene	0.0000	0.0000	
n-Butane	0.0966	n-Butane	0.0966	0.0966	0.00
i-Pentane	0.0248	i-Pentane	0.0248	0.0248	0.00
1-Hexyne	0.0006	1-Hexyne	0.0006	0.0006	0.00
1-Heptyne	0.0000	1-Heptyne	0.0000	0.0000	0.00
1-Octyne	0.0000	1-Octyne	0.0000	0.0000	0.00
Benzene	0.0023	Benzene	0.0023	0.0023	0.00
Toluene	0.0000	Toluene	0.0000	0.0000	0.00
p-Xylene	0.0000	p-Xylene	0.0000	0.0000	

Simulation Report – ECC 860 KTA

Working Stage 6

E-Benzene	0.0000	E-Benzene	0.0000	0.0000	
Styrene	0.0000	Styrene	0.0000	0.0000	0.00
n-Nonane	0.0000	n-Nonane	0.0000	0.0000	
H2O	0.0000	H2O	0.0000	0.0000	0.00
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition	0	Operation Condition			
Temperature (°C)	41.64	Temperature (°C)	41.64	41.64	0.00
Pressure (Kg/cm ² gauge)	6.10	Pressure (Kg/cm ² gauge)	6.10	6.10	0.00
Molar Flow (kgmole/h)	1018.09	Molar Flow (kgmole/h)	1018.09	1018.09	0.00
Mass Flow (kg/h)	53236.70	Mass Flow (kg/h)	53236.70	53236.75	0.00
Molecular Weight	52.2906	Molecular Weight	52.29	52.29	0.00
Total		Total	1.0000	1.0000	
Variable	Integration	4422		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Hydrogen	0.0000	Methane	0.0000	0.0000	
Methane	0.0000	Ethane	0.0000	0.0000	
Ethane	0.0903	Propadiene	0.0903	0.0906	0.33
Propadiene	0.0000	M-Acetylene	0.0000	0.0000	
M-Acetylene	0.4309	Propene	0.4309	0.4303	-0.13
Propene	0.0000	Cyclopropane	0.0000	0.0000	
Cyclopropane	0.0339	Propane	0.0339	0.0339	-0.09
Propane	0.1518	13-Butadiene	0.1518	0.1521	0.20
13-Butadiene	0.2318	1-Butene	0.2318	0.2332	0.59
1-Butene	0.0000	i-Butene	0.0000	0.0000	
i-Butene	0.0538	n-Butane	0.0538	0.0529	-1.68
n-Butane	0.0068	i-Pentane	0.0068	0.0063	-7.34
i-Pentane	0.0001	1-Hexyne	0.0001	0.0001	-4.22
1-Hexyne	0.0000	1-Heptyne	0.0000	0.0000	
1-Heptyne	0.0000	1-Octyne	0.0000	0.0000	
1-Octyne	0.0003	Benzene	0.0003	0.0003	-4.34
Benzene	0.0000	Toluene	0.0000	0.0000	
Toluene	0.0000	p-Xylene	0.0000	0.0000	
p-Xylene	0.0000	E-Benzene	0.0000	0.0000	
E-Benzene	0.0000	Styrene	0.0000	0.0000	
Styrene	0.0000	n-Nonane	0.0000	0.0000	
n-Nonane	0.0002	H2O	0.0002	0.0002	-0.14
H2O	0.0000	Nitrogen	0.0000	0.0000	
Nitrogen	0	Operation Condition			
Temperature (°C)	19.13	Temperature (°C)	19.13	19.13	0.00
Pressure (Kg/cm ² gauge)	18.35	Pressure (Kg/cm ² gauge)	18.35	18.35	0.00
Molar Flow (kgmole/h)	786.833546	Molar Flow (kgmole/h)	786.83	787.94	0.14
Mass Flow (kg/h)	37862.34177	Mass Flow (kg/h)	37862.34	37910.28	0.13

Simulation Report – ECC 860 KTA
Working Stage 6

Molecular Weight	48.1200	Molecular Weight	48.12	48.11	-0.01
Total		Total	0.9998	0.9998	
Variable	Integration	4458		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0005	Hydrogen	0.0005	0.0005	0.00
Methane	0.0006	Methane	0.0006	0.0006	0.00
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0002	Propadiene	0.0002	0.0002	0.00
M-Acetylene	0.0000	M-Acetylene	0.0000	0.0000	
Propene	0.9442	Propene	0.9442	0.9442	0.00
Cyclopropane	0.0000	Cyclopropane	0.0000	0.0000	
Propane	0.0517	Propane	0.0517	0.0517	0.00
13-Butadiene	0.0002	13-Butadiene	0.0002	0.0002	0.00
1-Butene	0.0026	1-Butene	0.0026	0.0026	0.00
i-Butene	0.0000	i-Butene	0.0000	0.0000	
n-Butane	0.0000	n-Butane	0.0000	0.0000	
i-Pentane	0.0000	i-Pentane	0.0000	0.0000	
1-Hexyne	0.0000	1-Hexyne	0.0000	0.0000	
1-Heptyne	0.0000	1-Heptyne	0.0000	0.0000	
1-Octyne	0.0000	1-Octyne	0.0000	0.0000	
Benzene	0.0000	Benzene	0.0000	0.0000	
Toluene	0.0000	Toluene	0.0000	0.0000	
p-Xylene	0.0000	p-Xylene	0.0000	0.0000	
E-Benzene	0.0000	E-Benzene	0.0000	0.0000	
Styrene	0.0000	Styrene	0.0000	0.0000	
n-Nonane	0.0000	n-Nonane	0.0000	0.0000	
H2O	0.0000	H2O	0.0000	0.0000	
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition	0	Operation Condition		0	
Temperature (°C)	43.30	Temperature (°C)	43.30	43.30	0.00
Pressure (Kg/cm ² gauge)	16.71	Pressure (Kg/cm ² gauge)	16.71	16.71	0.00
Molar Flow (kgmole/h)	1203.20	Molar Flow (kgmole/h)	1203.20	1203.20	0.00
Mass Flow (kg/h)	50760.00	Mass Flow (kg/h)	50760.00	50760.00	0.00
Molecular Weight	42.1877	Molecular Weight	42.19	42.19	0.00
Total		Total	1.0000	1.0000	
Variable	Integration	4409		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Methane	0.0000	Methane	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0666	Propadiene	0.0666	0.0666	0.00
M-Acetylene	0.0000	M-Acetylene	0.0000	0.0000	
Propene	0.1911	Propene	0.1911	0.1911	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

Cyclopropane	0.0000	Cyclopropane	0.0000	0.0000	
Propane	0.0201	Propane	0.0201	0.0201	0.00
13-Butadiene	0.2410	13-Butadiene	0.2410	0.2410	0.00
1-Butene	0.3570	1-Butene	0.3570	0.3570	0.00
i-Butene	0.0000	i-Butene	0.0000	0.0000	
n-Butane	0.0966	n-Butane	0.0966	0.0966	0.00
i-Pentane	0.0248	i-Pentane	0.0248	0.0248	0.00
1-Hexyne	0.0006	1-Hexyne	0.0006	0.0006	0.00
1-Heptyne	0.0000	1-Heptyne	0.0000	0.0000	0.00
1-Octyne	0.0000	1-Octyne	0.0000	0.0000	0.00
Benzene	0.0023	Benzene	0.0023	0.0023	0.00
Toluene	0.0000	Toluene	0.0000	0.0000	0.00
p-Xylene	0.0000	p-Xylene	0.0000	0.0000	
E-Benzene	0.0000	E-Benzene	0.0000	0.0000	#DIV/0!
Styrene	0.0000	Styrene	0.0000	0.0000	0.00
n-Nonane	0.0000	n-Nonane	0.0000	0.0000	
H2O	0.0000	H2O	0.0000	0.0000	0.00
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition	0	Operation Condition		0	
Temperature (°C)	82.83	Temperature (°C)	82.83	82.83	0.00
Pressure (Kg/cm ² gauge)	17.12	Pressure (Kg/cm ² gauge)	17.12	17.12	0.00
Molar Flow (kgmole/h)	1018.115416	Molar Flow (kgmole/h)	1018.12	1018.09	0.00
Mass Flow (kg/h)	53236.70	Mass Flow (kg/h)	53236.70	53236.75	0.00
Molecular Weight	52.2906	Molecular Weight	52.29	52.29	0.00
Total		Total	1.0000	1.0000	
Variable	Integration	3206		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Methane	0.0000	Methane	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	3.5900	Propadiene	3.5900	3.5900	0.00
M-Acetylene	0.0000	M-Acetylene	0.0000	0.0000	
Propene	144.5200	Propene	144.5200	144.5200	0.00
Cyclopropane	0.0000	Cyclopropane	0.0000	0.0000	
Propane	6.3000	Propane	6.3000	6.3000	0.00
13-Butadiene	121.0000	13-Butadiene	121.0000	121.0000	0.00
1-Butene	157.0000	1-Butene	157.0000	157.0000	0.00
i-Butene	0.0000	i-Butene	0.0000	0.0000	
n-Butane	68.0000	n-Butane	68.0000	68.0000	0.00
i-Pentane	175.7784	i-Pentane	175.7784	175.7784	0.00
1-Hexyne	56.3979	1-Hexyne	56.3979	56.3979	0.00
1-Heptyne	16.0319	1-Heptyne	16.0319	16.0319	0.00
1-Octyne	1.5268	1-Octyne	1.5268	1.5268	0.00
Benzene	163.4682	Benzene	163.4682	163.4682	0.00

Simulation Report – ECC 860 KTA
Working Stage 6

Toluene	37.6941	Toluene	37.6941	37.6941	0.00
p-Xylene	0.8589	p-Xylene	0.8589	0.8589	0.00
E-Benzene	0.0000	E-Benzene	0.0000	0.0000	
Styrene	0.2863	Styrene	0.2863	0.2863	0.00
n-Nonane	0.0000	n-Nonane	0.0000	0.0000	
H2O	0.1909	H2O	0.1909	0.1909	0.00
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition	0	Nitrogen		0	
Temperature (°C)	41.00	Temperature (°C)	41.00	41.00	0.00
Pressure (Kg/cm ² gauge)	8.62	Pressure (Kg/cm ² gauge)	8.62	8.62	0.00
Molar Flow (kgmole/h)	952.64	Molar Flow (kgmole/h)	952.64	952.64	0.00
Mass Flow (kg/h)	61201.39	Mass Flow (kg/h)	61201.39	61201.39	0.00
Molecular Weight	64.2438	Molecular Weight	64.24	64.24	0.00
Total		Total	952.4524	952.6433	
Variable	Integration	4414		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Hydrogen	0.0000	Methane	0.0000	0.0000	
Methane	0.0000	Ethane	0.0000	0.0000	
Ethane	0.0003	Propadiene	0.0003	0.0000	
Propadiene	0.0000	M-Acetylene	0.0000	0.0000	
M-Acetylene	0.0000	Propene	0.0000	0.0000	
Propene	0.0000	Cyclopropane	0.0000	0.0000	
Cyclopropane	0.0000	Propane	0.0000	0.0000	
Propane	0.2085	13-Butadiene	0.2085	0.2084	-0.07
13-Butadiene	0.2855	1-Butene	0.2855	0.2847	-0.30
1-Butene	0.0000	i-Butene	0.0000	0.0000	
i-Butene	0.1048	n-Butane	0.1048	0.1054	0.61
n-Butane	0.1653	i-Pentane	0.1653	0.1658	0.28
i-Pentane	0.0480	1-Hexyne	0.0480	0.0481	0.10
1-Hexyne	0.0135	1-Heptyne	0.0135	0.0136	0.10
1-Heptyne	0.0013	1-Octyne	0.0013	0.0013	0.10
1-Octyne	0.1398	Benzene	0.1398	0.1400	0.10
Benzene	0.0318	Toluene	0.0318	0.0319	0.10
Toluene	0.0007	p-Xylene	0.0007	0.0007	0.10
p-Xylene	0.0000	E-Benzene	0.0000	0.0000	
E-Benzene	0.0002	Styrene	0.0002	0.0002	0.10
Styrene	0.0000	n-Nonane	0.0000	0.0000	
n-Nonane	0.0000	H2O	0.0000	0.0000	
H2O	0.0000	Nitrogen	0.0000	0.0000	
Nitrogen	0	Operation Condition		0	
Temperature (°C)	77.90	Temperature (°C)	77.90	77.97	0.09
Pressure (Kg/cm ² gauge)	6.50	Pressure (Kg/cm ² gauge)	6.50	6.50	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

Molar Flow (kgmole/h)	1183.93	Molar Flow (kgmole/h)	1183.93	1182.80	-0.10
Mass Flow (kg/h)	76576.85	Mass Flow (kg/h)	76576.85	76527.86	-0.06
Molecular Weight	64.6803	Molecular Weight	64.68	64.70	0.03
Total		Total	1.0000	1.0000	
Variable	Integration	4423		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Methane	0.0000	Methane	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0906	Propadiene	0.0906	0.0906	0.00
M-Acetylene	0.0000	M-Acetylene	0.0000	0.0000	
Propene	0.4304	Propene	0.4304	0.4304	0.00
Cyclopropane	0.0000	Cyclopropane	0.0000	0.0000	
Propane	0.0339	Propane	0.0339	0.0339	0.00
13-Butadiene	0.1521	13-Butadiene	0.1521	0.1521	0.00
1-Butene	0.2327	1-Butene	0.2327	0.2327	0.00
i-Butene	0.0000	i-Butene	0.0000	0.0000	
n-Butane	0.0533	n-Butane	0.0533	0.0533	0.00
i-Pentane	0.0063	i-Pentane	0.0063	0.0063	0.00
1-Hexyne	0.0001	1-Hexyne	0.0001	0.0001	0.00
1-Heptyne	0.0000	1-Heptyne	0.0000	0.0000	0.00
1-Octyne	0.0000	1-Octyne	0.0000	0.0000	0.00
Benzene	0.0003	Benzene	0.0003	0.0003	0.00
Toluene	0.0000	Toluene	0.0000	0.0000	0.00
p-Xylene	0.0000	p-Xylene	0.0000	0.0000	0.00
E-Benzene	0.0000	E-Benzene	0.0000	0.0000	
Styrene	0.0000	Styrene	0.0000	0.0000	0.00
n-Nonane	0.0000	n-Nonane	0.0000	0.0000	
H2O	0.0002	H2O	0.0002	0.0002	0.00
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition	0	Operation Condition			
Temperature (°C)	57.02	Temperature (°C)	57.02	57.02	0.00
Pressure (Kg/cm ² gauge)	17.85	Pressure (Kg/cm ² gauge)	17.85	17.85	0.00
Molar Flow (kgmole/h)	787.82	Molar Flow (kgmole/h)	787.82	787.82	0.00
Mass Flow (kg/h)	37904.35	Mass Flow (kg/h)	37904.35	37904.35	0.00
Molecular Weight	48.1131	Molecular Weight	48.11	48.11	0.00
Total		Total	0.9998	0.9998	
Variable	Integration	4410		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Methane	0.0000	Methane	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0666	Propadiene	0.0666	0.0666	0.00

Simulation Report – ECC 860 KTA

Working Stage 6

M-Acetylene	0.0000	M-Acetylene	0.0000	0.0000	
Propene	0.1911	Propene	0.1911	0.1911	0.00
Cyclopropane	0.0000	Cyclopropane	0.0000	0.0000	
Propane	0.0201	Propane	0.0201	0.0201	0.00
13-Butadiene	0.2410	13-Butadiene	0.2410	0.2410	0.00
1-Butene	0.3570	1-Butene	0.3570	0.3570	0.00
i-Butene	0.0000	i-Butene	0.0000	0.0000	
n-Butane	0.0966	n-Butane	0.0966	0.0966	0.00
i-Pentane	0.0248	i-Pentane	0.0248	0.0248	0.00
1-Hexyne	0.0006	1-Hexyne	0.0006	0.0006	0.00
1-Heptyne	0.0000	1-Heptyne	0.0000	0.0000	0.00
1-Octyne	0.0000	1-Octyne	0.0000	0.0000	0.00
Benzene	0.0023	Benzene	0.0023	0.0023	0.00
Toluene	0.0000	Toluene	0.0000	0.0000	0.00
p-Xylene	0.0000	p-Xylene	0.0000	0.0000	0.00
E-Benzene	0.0000	E-Benzene	0.0000	0.0000	
Styrene	0.0000	Styrene	0.0000	0.0000	0.00
n-Nonane	0.0000	n-Nonane	0.0000	0.0000	
H2O	0.0000	H2O	0.0000	0.0000	0.00
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition	0	Operation Condition			
Temperature (°C)	58.40	Temperature (°C)	58.40	58.40	0.00
Pressure (Kg/cm ² gauge)	15.69	Pressure (Kg/cm ² gauge)	15.69	15.69	0.00
Molar Flow (kgmole/h)	1018.09	Molar Flow (kgmole/h)	1018.09	1018.09	0.00
Mass Flow (kg/h)	53236.70	Mass Flow (kg/h)	53236.70	53236.75	0.00
Molecular Weight	52.2906	Molecular Weight	52.29	52.29	0.00
Total		Total	1.0000	1.0000	
Variable	Integration	4413	Unit Simulation	%Error	
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Methane	0.0000	Methane	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0038	Propadiene	0.0038	0.0038	0.00
M-Acetylene	0.0000	M-Acetylene	0.0000	0.0000	
Propene	0.1517	Propene	0.1517	0.1517	0.00
Cyclopropane	0.0000	Cyclopropane	0.0000	0.0000	
Propane	0.0066	Propane	0.0066	0.0066	0.00
13-Butadiene	0.1270	13-Butadiene	0.1270	0.1270	0.00
1-Butene	0.1648	1-Butene	0.1648	0.1648	0.00
i-Butene	0.0000	i-Butene	0.0000	0.0000	
n-Butane	0.0714	n-Butane	0.0714	0.0714	0.00
i-Pentane	0.1845	i-Pentane	0.1845	0.1845	0.00
1-Hexyne	0.0592	1-Hexyne	0.0592	0.0592	0.00

Simulation Report – ECC 860 KTA
Working Stage 6

1-Heptyne	0.0168	1-Heptyne	0.0168	0.0168	0.00
1-Octyne	0.0016	1-Octyne	0.0016	0.0016	0.00
Benzene	0.1716	Benzene	0.1716	0.1716	0.00
Toluene	0.0396	Toluene	0.0396	0.0396	0.00
p-Xylene	0.0009	p-Xylene	0.0009	0.0009	0.00
E-Benzene	0.0000	E-Benzene	0.0000	0.0000	
Styrene	0.0003	Styrene	0.0003	0.0003	0.00
n-Nonane	0.0000	n-Nonane	0.0000	0.0000	
H2O	0.0002	H2O	0.0002	0.0002	0.00
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition	0	Operation Condition			
Temperature (°C)	41.07	Temperature (°C)	41.07	41.07	0.00
Pressure (Kg/cm ² gauge)	6.13	Pressure (Kg/cm ² gauge)	6.13	6.13	0.00
Molar Flow (kgmole/h)	952.64	Molar Flow (kgmole/h)	952.64	952.64	0.00
Mass Flow (kg/h)	61201.39	Mass Flow (kg/h)	61201.39	61201.39	0.00
Molecular Weight	64.2438	Molecular Weight	64.24	64.24	0.00
Total		Total	0.9998	0.9998	
Variable	Integration	4601		Unit Simulation	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Hydrogen	0.0000	Methane	0.0000	0.0000	
Methane	0.0000	Ethane	0.0000	0.0000	
Ethane	0.0003	Propadiene	0.0003	0.0000	
Propadiene	0.0000	M-Acetylene	0.0000	0.0000	
M-Acetylene	0.0000	Propene	0.0000	0.0000	
Propene	0.0000	Cyclopropane	0.0000	0.0000	
Cyclopropane	0.0000	Propane	0.0000	0.0000	
Propane	0.2085	13-Butadiene	0.2085	0.2084	-0.07
13-Butadiene	0.2855	1-Butene	0.2855	0.2847	-0.30
1-Butene	0.0000	i-Butene	0.0000	0.0000	
i-Butene	0.1048	n-Butane	0.1048	0.1054	0.61
n-Butane	0.1653	i-Pentane	0.1653	0.1658	0.28
i-Pentane	0.0480	1-Hexyne	0.0480	0.0481	0.10
1-Hexyne	0.0135	1-Heptyne	0.0135	0.0136	0.10
1-Heptyne	0.0013	1-Octyne	0.0013	0.0013	0.10
1-Octyne	0.1398	Benzene	0.1398	0.1400	0.10
Benzene	0.0318	Toluene	0.0318	0.0319	0.10
Toluene	0.0007	p-Xylene	0.0007	0.0007	0.10
p-Xylene	0.0000	E-Benzene	0.0000	0.0000	#DIV/0!
E-Benzene	0.0002	Styrene	0.0002	0.0002	0.10
Styrene	0.0000	n-Nonane	0.0000	0.0000	
n-Nonane	0.0000	H2O	0.0000	0.0000	
H2O	0.0000	Nitrogen	0.0000	0.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

Nitrogen	0	Operation Condition			
Temperature (°C)	65.60	Temperature (°C)	65.60	65.67	0.10
Pressure (Kg/cm ² gauge)	4.48	Pressure (Kg/cm ² gauge)	4.48	4.48	0.00
Molar Flow (kgmole/h)	1183.93	Molar Flow (kgmole/h)	1183.93	1182.80	-0.10
Mass Flow (kg/h)	76576.85	Mass Flow (kg/h)	76576.85	76527.86	-0.06
Molecular Weight	64.6803	Molecular Weight	64.68	64.70	0.03
Total		Total	1.0000	1.0000	

A.5. Stage 5

Table A.5.1. Ethylene Refrigeration Stream Compositions

Variable	Integration	5126		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-101.10	Temperature (°C)	-101.10	-101.1	0.00
Pressure (Kg/cm ² gauge)	0.18	Pressure (Kg/cm ² gauge)	0.18	0.18	0.00
Molar Flow (kgmole/h)	632.96	Molar Flow (kgmole/h)	632.96	633.2	0.04
Mass Flow (kg/h)	17756.95	Mass Flow (kg/h)	17756.95	17,764	0.04
Molecular Weight	28.0538	Molecular Weight	28.0538	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5134		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-101.43	Temperature (°C)	-101.43	-101.3	-0.12
Pressure (Kg/cm ² gauge)	0.17	Pressure (Kg/cm ² gauge)	0.17	0.17	0.00
Molar Flow (kgmole/h)	277.89	Molar Flow (kgmole/h)	277.89	277.9	0.00
Mass Flow (kg/h)	7796.00	Mass Flow (kg/h)	7796.00	7,796	0.00
Molecular Weight	28.0538	Molecular Weight	28.0538	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5118		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-75.10	Temperature (°C)	-75.10	-75.1	0.01
Pressure (Kg/cm ² gauge)	3.26	Pressure (Kg/cm ² gauge)	3.26	3.26	0.00
Molar Flow (kgmole/h)	978.83	Molar Flow (kgmole/h)	978.83	978.8	0.00
Mass Flow (kg/h)	27460.00	Mass Flow (kg/h)	27460.00	27,460	0.00

Simulation Report – ECC 860 KTA
Working Stage 6

Molecular Weight	28.0538	Molecular Weight	28.0538	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5104		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	77.20	Temperature (°C)	77.20	77.2	0.00
Pressure (Kg/cm ² gauge)	25.97	Pressure (Kg/cm ² gauge)	25.97	25.97	0.00
Molar Flow (kgmole/h)	2701.72	Molar Flow (kgmole/h)	2701.72	2,702.00	0.01
Mass Flow (kg/h)	75793.38	Mass Flow (kg/h)	75793.38	75,801	0.01
Molecular Weight	28.0538	Molecular Weight	28.0538	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5107		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-20.00	Temperature (°C)	-20.00	-20	0.00
Pressure (Kg/cm ² gauge)	25.35	Pressure (Kg/cm ² gauge)	25.35	25.35	0.00
Molar Flow (kgmole/h)	2701.72	Molar Flow (kgmole/h)	2701.72	2,702.00	0.01
Mass Flow (kg/h)	75793.38	Mass Flow (kg/h)	75793.38	75,801	0.01
Molecular Weight	28.0538	Molecular Weight	28.05	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5113		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-72.00	Temperature (°C)	-72.00	-72	0.00
Pressure (Kg/cm ² gauge)	25.04	Pressure (Kg/cm ² gauge)	25.04	25.04	0.00
Molar Flow (kgmole/h)	1426.02	Molar Flow (kgmole/h)	1426.02	1,426.30	0.02
Mass Flow (kg/h)	40005.38	Mass Flow (kg/h)	40005.38	40,012	0.02
Molecular Weight	28.0538	Molecular Weight	28.0538	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5140		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-62.80	Temperature (°C)	-62.80	-62.8	-0.01
Pressure (Kg/cm ² gauge)	5.91	Pressure (Kg/cm ² gauge)	5.91	5.91	0.00
Molar Flow (kgmole/h)	136.31	Molar Flow (kgmole/h)	136.31	136.3	-0.01

Simulation Report – ECC 860 KTA
Working Stage 6

Mass Flow (kg/h)	3824.00	Mass Flow (kg/h)	3824.00	3824	0.00
Molecular Weight	28.0538	Molecular Weight	28.0538	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5111		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-62.80	Temperature (°C)	-62.80	-62.8	-0.01
Pressure (Kg/cm ² gauge)	5.91	Pressure (Kg/cm ² gauge)	5.91	5.91	0.00
Molar Flow (kgmole/h)	1078.11	Molar Flow (kgmole/h)	1078.11	1,078.10	0.00
Mass Flow (kg/h)	30245.00	Mass Flow (kg/h)	30245.00	30,246	0.00
Molecular Weight	28.0538	Molecular Weight	28.0538	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5130		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-62.80	Temperature (°C)	-62.80	-62.8	0.00
Pressure (Kg/cm ² gauge)	5.91	Pressure (Kg/cm ² gauge)	5.91	5.91	0.00
Molar Flow (kgmole/h)	61.28	Molar Flow (kgmole/h)	61.28	61.3	0.04
Mass Flow (kg/h)	1719.00	Mass Flow (kg/h)	1719.00	1,719	0.00
Molecular Weight	28.0538	Molecular Weight	28.0538	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5103		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-62.80	Temperature (°C)	-62.80	-62.8	0.00
Pressure (Kg/cm ² gauge)	5.91	Pressure (Kg/cm ² gauge)	5.91	5.91	0.00
Molar Flow (kgmole/h)	1265.07	Molar Flow (kgmole/h)	1265.07	1,265.10	0.00
Mass Flow (kg/h)	35490.00	Mass Flow (kg/h)	35490.00	35,490	0.00
Molecular Weight	28.0538	Molecular Weight	28.05	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5117		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-71.58	Temperature (°C)	-71.58	-71.9	0.45
Pressure (Kg/cm ² gauge)	5.91	Pressure (Kg/cm ² gauge)	5.91	5.91	0.00
Molar Flow	978.83	Molar Flow (kgmole/h)	978.83	978.8	0.00

Simulation Report – ECC 860 KTA
Working Stage 6

(kgmole/h)					
Mass Flow (kg/h)	27460.00	Mass Flow (kg/h)	27460.00	27,460	0.00
Molecular Weight	28.0538	Molecular Weight	28.0538	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5127		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-75.10	Temperature (°C)	-75.10	-75.1	0.01
Pressure (Kg/cm ² gauge)	3.26	Pressure (Kg/cm ² gauge)	3.26	3.26	0.00
Molar Flow (kgmole/h)	457.81	Molar Flow (kgmole/h)	457.81	458.1	0.06
Mass Flow (kg/h)	12843.38	Mass Flow (kg/h)	12843.38	12,850	0.05
Molecular Weight	28.0538	Molecular Weight	28.0538	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5119		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-75.10	Temperature (°C)	-75.10	-75.1	0.01
Pressure (Kg/cm ² gauge)	3.26	Pressure (Kg/cm ² gauge)	3.26	3.26	0.00
Molar Flow (kgmole/h)	910.86	Molar Flow (kgmole/h)	910.86	911.1	0.03
Mass Flow (kg/h)	25552.95	Mass Flow (kg/h)	25552.95	25,560	0.03
Molecular Weight	28.0538	Molecular Weight	28.0538	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5120		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-75.10	Temperature (°C)	-75.10	-75.1	0.01
Pressure (Kg/cm ² gauge)	3.26	Pressure (Kg/cm ² gauge)	3.26	3.26	0.00
Molar Flow (kgmole/h)	340.34	Molar Flow (kgmole/h)	340.34	340.6	0.08
Mass Flow (kg/h)	9547.95	Mass Flow (kg/h)	9547.95	9,556	0.08
Molecular Weight	28.0538	Molecular Weight	28.0538	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5123		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-101.10	Temperature (°C)	-101.10	-101.1	0.00
Pressure (Kg/cm ² gauge)	0.18	Pressure (Kg/cm ² gauge)	0.18	0.18	0.00

Simulation Report – ECC 860 KTA
Working Stage 6

Molar Flow (kgmole/h)	340.34	Molar Flow (kgmole/h)	340.34	340.6	0.08
Mass Flow (kg/h)	9547.95	Mass Flow (kg/h)	9547.95	9,556	0.08
Molecular Weight	28.0538	Molecular Weight	28.0538	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5135		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-101.42	Temperature (°C)	-101.42	-101.3	-0.12
Pressure (Kg/cm ² gauge)	0.17	Pressure (Kg/cm ² gauge)	0.17	0.17	0.00
Molar Flow (kgmole/h)	240.33	Molar Flow (kgmole/h)	240.33	240.1	-0.10
Mass Flow (kg/h)	6742.21	Mass Flow (kg/h)	6742.21	6,736	-0.09
Molecular Weight	28.0538	Molecular Weight	28.0538	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5101		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-101.42	Temperature (°C)	-101.42	-101.3	-0.12
Pressure (Kg/cm ² gauge)	0.17	Pressure (Kg/cm ² gauge)	0.17	0.17	0.00
Molar Flow (kgmole/h)	910.87	Molar Flow (kgmole/h)	910.87	911.1	0.03
Mass Flow (kg/h)	25553.38	Mass Flow (kg/h)	25553.38	25560	0.03
Molecular Weight	28.0538	Molecular Weight	28.0538	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5102		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-75.10	Temperature (°C)	-75.10	-75.1	0.01
Pressure (Kg/cm ² gauge)	3.26	Pressure (Kg/cm ² gauge)	3.26	3.26	0.00
Molar Flow (kgmole/h)	525.78	Molar Flow (kgmole/h)	525.78	525.8	0.00
Mass Flow (kg/h)	14750.00	Mass Flow (kg/h)	14750.00	14750	0.00
Molecular Weight	28.0538	Molecular Weight	28.0538	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5105		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	41.00	Temperature (°C)	41.00	41	0.00
Pressure (Kg/cm ²	25.73	Pressure (Kg/cm ² gauge)	25.73	25.73	0.00

Simulation Report – ECC 860 KTA
Working Stage 6

gauge)					
Molar Flow (kgmole/h)	2701.72	Molar Flow (kgmole/h)	2701.72	2,702.00	0.01
Mass Flow (kg/h)	75793.38	Mass Flow (kg/h)	75793.38	75,801	0.01
Molecular Weight	28.0538	Molecular Weight	28.0538	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5108		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-20.00	Temperature (°C)	-20.00	-20	-0.02
Pressure (Kg/cm ² gauge)	25.32	Pressure (Kg/cm ² gauge)	25.32	25.32	0.00
Molar Flow (kgmole/h)	2701.72	Molar Flow (kgmole/h)	2701.72	2,702.00	0.01
Mass Flow (kg/h)	75793.38	Mass Flow (kg/h)	75793.38	75,801	0.01
Molecular Weight	28.0538	Molecular Weight	28.0538	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5109		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-55.00	Temperature (°C)	-55.00	-55	0.00
Pressure (Kg/cm ² gauge)	25.18	Pressure (Kg/cm ² gauge)	25.18	25.18	0.00
Molar Flow (kgmole/h)	1275.69	Molar Flow (kgmole/h)	1275.69	1,275.70	0.00
Mass Flow (kg/h)	35788.00	Mass Flow (kg/h)	35788.00	35,788	0.00
Molecular Weight	28.0538	Molecular Weight	28.0538	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5128		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-55.00	Temperature (°C)	-55.00	-55	0.00
Pressure (Kg/cm ² gauge)	25.18	Pressure (Kg/cm ² gauge)	25.18	25.18	0.00
Molar Flow (kgmole/h)	61.28	Molar Flow (kgmole/h)	61.28	61.3	0.04
Mass Flow (kg/h)	1719.00	Mass Flow (kg/h)	1719.00	1,719	0.00
Molecular Weight	28.0538	Molecular Weight	28.0538	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5129		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-62.80	Temperature (°C)	-62.80	-62.8	-0.01

Simulation Report – ECC 860 KTA
Working Stage 6

Pressure (Kg/cm ² gauge)	5.91	Pressure (Kg/cm ² gauge)	5.91	5.91	0.00
Molar Flow (kgmole/h)	61.28	Molar Flow (kgmole/h)	61.28	61.3	0.04
Mass Flow (kg/h)	1719.00	Mass Flow (kg/h)	1719.00	1,719	0.00
Molecular Weight	28.0538	Molecular Weight	28.0538	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5132		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-62.80	Temperature (°C)	-62.80	-62.8	0.00
Pressure (Kg/cm ² gauge)	5.91	Pressure (Kg/cm ² gauge)	5.91	5.91	0.00
Molar Flow (kgmole/h)	1139.38	Molar Flow (kgmole/h)	1139.38	1,139.40	0.00
Mass Flow (kg/h)	31964.00	Mass Flow (kg/h)	31964.00	31,965	0.00
Molecular Weight	28.0538	Molecular Weight	28.0538	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5141		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-62.80	Temperature (°C)	-62.80	-62.8	0.00
Pressure (Kg/cm ² gauge)	5.91	Pressure (Kg/cm ² gauge)	5.91	5.91	0.00
Molar Flow (kgmole/h)	237.65	Molar Flow (kgmole/h)	237.65	237.6	-0.02
Mass Flow (kg/h)	6667.00	Mass Flow (kg/h)	6667.00	6667	0.00
Molecular Weight	28.0538	Molecular Weight	28.0538	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5116		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-75.10	Temperature (°C)	-75.10	-75.1	0.01
Pressure (Kg/cm ² gauge)	3.26	Pressure (Kg/cm ² gauge)	3.26	3.26	0.00
Molar Flow (kgmole/h)	457.81	Molar Flow (kgmole/h)	457.81	458.1	0.06
Mass Flow (kg/h)	12843.38	Mass Flow (kg/h)	12843.38	12,850	0.05
Molecular Weight	28.0538	Molecular Weight	28.0538	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5137		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			

Simulation Report – ECC 860 KTA
Working Stage 6

Temperature (°C)	-75.10	Temperature (°C)	-75.10	-75.1	0.01
Pressure (Kg/cm ² gauge)	3.26	Pressure (Kg/cm ² gauge)	3.26	3.26	0.00
Molar Flow (kgmole/h)	99.70	Molar Flow (kgmole/h)	99.70	99.7	0.00
Mass Flow (kg/h)	2797.00	Mass Flow (kg/h)	2797.00	2,797	0.00
Molecular Weight	28.0538	Molecular Weight	28.0538	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5133		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-75.10	Temperature (°C)	-75.10	-75.1	0.01
Pressure (Kg/cm ² gauge)	3.26	Pressure (Kg/cm ² gauge)	3.26	3.26	0.00
Molar Flow (kgmole/h)	277.89	Molar Flow (kgmole/h)	277.89	277.9	0.00
Mass Flow (kg/h)	7796.00	Mass Flow (kg/h)	7796.00	7,796	0.00
Molecular Weight	28.0538	Molecular Weight	28.0538	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5122		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-101.28	Temperature (°C)	-101.28	-101.1	-0.17
Pressure (Kg/cm ² gauge)	0.18	Pressure (Kg/cm ² gauge)	0.18	0.18	0.00
Molar Flow (kgmole/h)	340.34	Molar Flow (kgmole/h)	340.34	340.6	0.08
Mass Flow (kg/h)	9547.95	Mass Flow (kg/h)	9547.95	9,556	0.08
Molecular Weight	28.0538	Molecular Weight	28.0538	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5125		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-101.10	Temperature (°C)	-101.10	-101.1	0.00
Pressure (Kg/cm ² gauge)	0.18	Pressure (Kg/cm ² gauge)	0.18	0.18	0.00
Molar Flow (kgmole/h)	292.62	Molar Flow (kgmole/h)	292.62	292.6	-0.01
Mass Flow (kg/h)	8209.00	Mass Flow (kg/h)	8209.00	8,209	0.00
Molecular Weight	28.0538	Molecular Weight	28.0538	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5136		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00

Simulation Report – ECC 860 KTA
Working Stage 6

Operation Condition		Operation Condition			
Temperature (°C)	-101.42	Temperature (°C)	-101.42	-101.3	-0.12
Pressure (Kg/cm ² gauge)	0.17	Pressure (Kg/cm ² gauge)	0.17	0.17	0.00
Molar Flow (kgmole/h)	240.11	Molar Flow (kgmole/h)	240.11	240.1	0.00
Mass Flow (kg/h)	6736.00	Mass Flow (kg/h)	6736.00	6,736	0.00
Molecular Weight	28.0538	Molecular Weight	28.05	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5116		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-75.10	Temperature (°C)	-75.10	-75.1	0.01
Pressure (Kg/cm ² gauge)	3.26	Pressure (Kg/cm ² gauge)	3.26	3.26	0.00
Molar Flow (kgmole/h)	457.81	Molar Flow (kgmole/h)	457.81	458.1	0.06
Mass Flow (kg/h)	12843.38	Mass Flow (kg/h)	12843.38	12,850	0.05
Molecular Weight	28.0538	Molecular Weight	28.05	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5103		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-62.80	Temperature (°C)	-62.80	-62.8	0.00
Pressure (Kg/cm ² gauge)	5.91	Pressure (Kg/cm ² gauge)	5.91	5.91	0.00
Molar Flow (kgmole/h)	1265.07	Molar Flow (kgmole/h)	1265.07	1,265.10	0.00
Mass Flow (kg/h)	35490.00	Mass Flow (kg/h)	35490.00	35,490	0.00
Molecular Weight	28.0538	Molecular Weight	28.05	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5106		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	41.00	Temperature (°C)	41.00	41	0.00
Pressure (Kg/cm ² gauge)	25.73	Pressure (Kg/cm ² gauge)	25.73	25.73	0.00
Molar Flow (kgmole/h)	2701.72	Molar Flow (kgmole/h)	2701.72	2,702.00	0.01
Mass Flow (kg/h)	75793.38	Mass Flow (kg/h)	75793.38	75,801	0.01
Molecular Weight	28.0538	Molecular Weight	28.0538	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5109		Design	%Error
Component (%mol)		Component (%mol)			

Simulation Report – ECC 860 KTA
Working Stage 6

Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-55.00	Temperature (°C)	-55.00	-55	0.00
Pressure (Kg/cm ² gauge)	25.18	Pressure (Kg/cm ² gauge)	25.18	25.18	0.00
Molar Flow (kgmole/h)	1275.69	Molar Flow (kgmole/h)	1275.69	1,275.70	0.00
Mass Flow (kg/h)	35788.00	Mass Flow (kg/h)	35788.00	35,788	0.00
Molecular Weight	28.0538	Molecular Weight	28.05	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5139		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-55.00	Temperature (°C)	-55.00	-55	0.00
Pressure (Kg/cm ² gauge)	25.18	Pressure (Kg/cm ² gauge)	25.18	25.18	0.00
Molar Flow (kgmole/h)	136.31	Molar Flow (kgmole/h)	136.31	136.3	-0.01
Mass Flow (kg/h)	3824.00	Mass Flow (kg/h)	3824.00	3824	0.00
Molecular Weight	28.0538	Molecular Weight	28.0538	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5110		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-55.00	Temperature (°C)	-55.00	-55	0.00
Pressure (Kg/cm ² gauge)	25.18	Pressure (Kg/cm ² gauge)	25.18	25.18	0.00
Molar Flow (kgmole/h)	1078.11	Molar Flow (kgmole/h)	1078.11	1,078.10	0.00
Mass Flow (kg/h)	30245.00	Mass Flow (kg/h)	30245.00	30,246	0.00
Molecular Weight	28.0538	Molecular Weight	28.05	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5131		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-62.80	Temperature (°C)	-62.80	-62.8	0.00
Pressure (Kg/cm ² gauge)	5.91	Pressure (Kg/cm ² gauge)	5.91	5.91	0.00
Molar Flow (kgmole/h)	1078.11	Molar Flow (kgmole/h)	1078.11	1,078.10	0.00
Mass Flow (kg/h)	30245.00	Mass Flow (kg/h)	30245.00	30,246	0.00
Molecular Weight	28.0538	Molecular Weight	28.05	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5142		Design	%Error

Simulation Report – ECC 860 KTA
Working Stage 6

Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-62.80	Temperature (°C)	-62.80	-62.8	0.00
Pressure (Kg/cm ² gauge)	5.91	Pressure (Kg/cm ² gauge)	5.91	5.91	0.00
Molar Flow (kgmole/h)	237.65	Molar Flow (kgmole/h)	237.65	237.6	-0.02
Mass Flow (kg/h)	6667.00	Mass Flow (kg/h)	6667.00	6667	0.00
Molecular Weight	28.0538	Molecular Weight	28.05	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5114		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-71.64	Temperature (°C)	-71.64	-72	0.49
Pressure (Kg/cm ² gauge)	5.91	Pressure (Kg/cm ² gauge)	5.91	5.91	0.00
Molar Flow (kgmole/h)	1426.02	Molar Flow (kgmole/h)	1426.02	1,426.30	0.02
Mass Flow (kg/h)	40005.38	Mass Flow (kg/h)	40005.38	40,012	0.02
Molecular Weight	28.0538	Molecular Weight	28.0538	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5138		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-75.10	Temperature (°C)	-75.10	-75.1	0.00
Pressure (Kg/cm ² gauge)	3.26	Pressure (Kg/cm ² gauge)	3.26	3.26	0.00
Molar Flow (kgmole/h)	99.70	Molar Flow (kgmole/h)	99.70	99.7	0.00
Mass Flow (kg/h)	2797.00	Mass Flow (kg/h)	2797.00	2,797	0.00
Molecular Weight	28.0538	Molecular Weight	28.0538	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5115		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-71.58	Temperature (°C)	-71.58	-71.9	0.45
Pressure (Kg/cm ² gauge)	5.91	Pressure (Kg/cm ² gauge)	5.91	5.91	0.00
Molar Flow (kgmole/h)	457.81	Molar Flow (kgmole/h)	457.81	458.1	0.06
Mass Flow (kg/h)	12843.38	Mass Flow (kg/h)	12843.38	12,850	0.05
Molecular Weight	28.0538	Molecular Weight	28.0538	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

Variable	Integration	5121		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-75.10	Temperature (°C)	-75.10	-75.1	0.00
Pressure (Kg/cm ² gauge)	3.26	Pressure (Kg/cm ² gauge)	3.26	3.26	0.00
Molar Flow (kgmole/h)	292.62	Molar Flow (kgmole/h)	292.62	292.6	-0.01
Mass Flow (kg/h)	8209.00	Mass Flow (kg/h)	8209.00	8,209	0.00
Molecular Weight	28.0538	Molecular Weight	28.0538	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5124		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-101.28	Temperature (°C)	-101.28	-101.1	-0.17
Pressure (Kg/cm ² gauge)	0.18	Pressure (Kg/cm ² gauge)	0.18	0.18	0.00
Molar Flow (kgmole/h)	292.62	Molar Flow (kgmole/h)	292.62	292.6	-0.01
Mass Flow (kg/h)	8209.00	Mass Flow (kg/h)	8209.00	8,209	0.00
Molecular Weight	28.0538	Molecular Weight	28.0538	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5112		Design	%Error
Component (%mol)		Component (%mol)			
Propene	1.0000	Propylene	1.0000	1.0000	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-62.80	Temperature (°C)	-62.80	-62.8	-0.01
Pressure (Kg/cm ² gauge)	5.91	Pressure (Kg/cm ² gauge)	5.91	5.91	0.00
Molar Flow (kgmole/h)	10.62	Molar Flow (kgmole/h)	10.62	10.6	-0.21
Mass Flow (kg/h)	298.00	Mass Flow (kg/h)	298.00	298	0.00
Molecular Weight	28.0538	Molecular Weight	28.0538	28.05	-0.01
Total	1.0000	Total	1.0000	1.0000	

Table A.5.2. C4C5 Hydrogenation Stream Compositions

Variable	Integration	1241		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0008	Hydrogen	0.0008	0.0008	0.00
Methane	0.0044	Methane	0.0044	0.0044	0.00
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.0000	Propylene	0.0000	0.0000	
Propane	0.0000	Propane	0.0000	0.0000	
13-Butadiene	0.0036	Butadiene/C4 Acetylene	0.0036	0.0036	0.00

Simulation Report – ECC 860 KTA
Working Stage 6

1-Butene	0.0557	Butylenes	0.0557	0.0557	0.00
n-Butane	0.0067	Butanes	0.0067	0.0067	0.00
1-Pentene	0.8997	C5-Hydrocarbons	0.8997	0.8997	0.00
Cyclohexane	0.0259	C6 Non-Aromatics	0.0259	0.0259	0.00
n-Heptane	0.0000	C7 Non-Aromatics	0.0000	0.0000	
n-Octane	0.0000	C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0027	Benzene	0.0027	0.0027	0.00
Water	0.0005	Steam/Water	0.0005	0.0005	0.00
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition		Operation Condition			
Temperature (°C)	43.00	Temperature (°C)	43.00	43.0000	0.00
Pressure (Kg/cm ² gauge)	5.50	Pressure (Kg/cm ² gauge)	5.50	5.5000	0.00
Molar Flow (kgmole/h)	215.87	Molar Flow (kgmole/h)	215.87	216.6000	0.34
Mass Flow (kg/h)	14956.00	Mass Flow (kg/h)	14956.00	14956.0000	0.00
Molecular Weight	69.2817	Molecular Weight	69.28	69.0400	-0.35
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	1121		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0002	Hydrogen	0.0002	0.0002	-20.51
Methane	0.0013	Methane	0.0013	0.0013	-1.97
Propadiene	0.0029	Propadiene/Methylacetylene	0.0029	0.0029	-0.09
Propene	0.0001	Propylene	0.0001	0.0001	-17.64
Propane	0.0008	Propane	0.0008	0.0008	1.77
13-Butadiene	0.0779	Butadiene/C4 Acetylene	0.0779	0.0771	-1.06
1-Butene	0.4741	Butylenes	0.4741	0.4735	-0.13
n-Butane	0.1600	Butanes	0.1600	0.1598	-0.15
1-Pentene	0.2729	C5-Hydrocarbons	0.2729	0.2741	0.44
Cyclohexane	0.0078	C6 Non-Aromatics	0.0078	0.0078	-0.04
n-Heptane	0.0000	C7 Non-Aromatics	0.0000	0.0000	
n-Octane	0.0000	C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0008	Benzene	0.0008	0.0008	-1.68
Water	0.0011	Steam/Water	0.0011	0.0015	29.68
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition		Operation Condition			
Temperature (°C)	41.89	Temperature (°C)	41.89	42.1000	0.49
Pressure (Kg/cm ² gauge)	5.49	Pressure (Kg/cm ² gauge)	5.49	5.4900	0.00
Molar Flow (kgmole/h)	716.53	Molar Flow (kgmole/h)	716.53	717.7000	0.16
Mass Flow (kg/h)	43116.42	Mass Flow (kg/h)	43116.42	43122.0000	0.01
Molecular Weight	60.1740	Molecular Weight	60.17	60.0800	-0.16
Total	1.0000	Total	1.0000	0.9999	

Simulation Report – ECC 860 KTA
Working Stage 6

Variable	Integration	1125		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0069	Hydrogen	0.0069	0.0071	2.53
Methane	0.0084	Methane	0.0084	0.0085	1.61
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.0001	Propylene	0.0001	0.0007	85.00
Propane	0.0034	Propane	0.0034	0.0027	-24.94
13-Butadiene	0.0000	Butadiene/C4 Acetylene	0.0000	0.0000	
1-Butene	0.0197	Butylenes	0.0197	0.0201	2.08
n-Butane	0.6801	Butanes	0.6801	0.6786	-0.21
1-Pentene	0.2719	C5-Hydrocarbons	0.2719	0.2723	0.14
Cyclohexane	0.0078	C6 Non-Aromatics	0.0078	0.0078	0.08
n-Heptane	0.0000	C7 Non-Aromatics	0.0000	0.0000	
n-Octane	0.0000	C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0008	Benzene	0.0008	0.0008	-1.56
Water	0.0009	Steam/Water	0.0009	0.0014	35.00
Nitrogen	0.0001	Nitrogen	0.0001	0.0001	23.18
Operation Condition		Operation Condition			
Temperature (°C)	123.61	Temperature (°C)	123.61	123.7000	0.07
Pressure (Kg/cm ² gauge)	28.00	Pressure (Kg/cm ² gauge)	28.00	28.0000	0.00
Molar Flow (kgmole/h)	661.91	Molar Flow (kgmole/h)	661.91	658.8000	-0.47
Mass Flow (kg/h)	40205.00	Mass Flow (kg/h)	40205.00	40205.0000	0.00
Molecular Weight	60.7413	Molecular Weight	60.74	61.0300	0.47
Total	1.0000	Total	1.0000	1.0001	
Variable	Integration	1103		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.9650	Hydrogen	0.9650	0.9650	0.00
Methane	0.0341	Methane	0.0341	0.0341	0.00
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.0000	Propylene	0.0000	0.0000	
Propane	0.0000	Propane	0.0000	0.0000	
13-Butadiene	0.0000	Butadiene/C4 Acetylene	0.0000	0.0000	
1-Butene	0.0000	Butylenes	0.0000	0.0000	
n-Butane	0.0000	Butanes	0.0000	0.0000	
1-Pentene	0.0000	C5-Hydrocarbons	0.0000	0.0000	
Cyclohexane	0.0000	C6 Non-Aromatics	0.0000	0.0000	
n-Heptane	0.0000	C7 Non-Aromatics	0.0000	0.0000	
n-Octane	0.0000	C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	Benzene	0.0000	0.0000	
Water	0.0000	Steam/Water	0.0000	0.0000	
Nitrogen	0.0009	Nitrogen	0.0009	0.0009	0.00
Operation Condition		Operation Condition			

Simulation Report – ECC 860 KTA
Working Stage 6

Temperature (°C)	15.99	Temperature (°C)	15.99	16.0000	0.04
Pressure (Kg/cm ² gauge)	30.28	Pressure (Kg/cm ² gauge)	30.28	30.2800	0.00
Molar Flow (kgmole/h)	666.08	Molar Flow (kgmole/h)	666.08	666.1000	0.00
Mass Flow (kg/h)	1677.00	Mass Flow (kg/h)	1677.00	1677.0000	0.00
Molecular Weight	2.5177	Molecular Weight	2.52	2.5200	0.09
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	4606		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Methane	0.0000	Methane	0.0000	0.0000	
Propadiene	0.0062	Propadiene/Methylacetylene	0.0062	0.0062	0.01
Propene	0.0001	Propylene	0.0001	0.0001	0.01
Propane	0.0001	Propane	0.0001	0.0001	0.01
13-Butadiene	0.3442	Butadiene/C4 Acetylene	0.3442	0.3442	0.01
1-Butene	0.4767	Butylenes	0.4767	0.4767	0.01
n-Butane	0.1708	Butanes	0.1708	0.1708	0.01
1-Pentene	0.0020	C5-Hydrocarbons	0.0020	0.0020	0.01
Cyclohexane	0.0000	C6 Non-Aromatics	0.0000	0.0000	
n-Heptane	0.0000	C7 Non-Aromatics	0.0000	0.0000	
n-Octane	0.0000	C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	Benzene	0.0000	0.0000	
Water	0.0000	Steam/Water	0.0000	0.0000	
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition		Operation Condition			
Temperature (°C)	39.80	Temperature (°C)	39.80	39.8000	0.00
Pressure (Kg/cm ² gauge)	5.50	Pressure (Kg/cm ² gauge)	5.50	5.5000	0.00
Molar Flow (kgmole/h)	158.97	Molar Flow (kgmole/h)	158.97	159.0000	0.02
Mass Flow (kg/h)	8852.00	Mass Flow (kg/h)	8852.00	8852.0000	0.00
Molecular Weight	55.6842	Molecular Weight	55.68	55.6600	-0.04
Total	1.0000	Total	1.0000	1.0001	
Variable	Integration	1105		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0163	Hydrogen	0.0163	0.0160	-2.06
Methane	0.0201	Methane	0.0201	0.0185	-8.79
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.0001	Propylene	0.0001	0.0009	84.87
Propane	0.0042	Propane	0.0042	0.0033	-27.75
13-Butadiene	0.0000	Butadiene/C4 Acetylene	0.0000	0.0000	
1-Butene	0.0205	Butylenes	0.0205	0.0205	0.15
n-Butane	0.6867	Butanes	0.6867	0.6932	0.93
1-Pentene	0.2431	C5-Hydrocarbons	0.2431	0.2373	-2.43

Simulation Report – ECC 860 KTA
Working Stage 6

Cyclohexane	0.0061	C6 Non-Aromatics	0.0061	0.0062	1.44
n-Heptane	0.0000	C7 Non-Aromatics	0.0000	0.0000	
n-Octane	0.0000	C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0006	Benzene	0.0006	0.0007	7.65
Water	0.0019	Steam/Water	0.0019	0.0031	37.17
Nitrogen	0.0002	Nitrogen	0.0002	0.0002	-9.22
Operation Condition		Operation Condition			
Temperature (°C)	43.41	Temperature (°C)	43.41	43.3000	-0.25
Pressure (Kg/cm ² gauge)	29.10	Pressure (Kg/cm ² gauge)	29.10	29.1000	0.00
Molar Flow (kgmole/h)	4388.20	Molar Flow (kgmole/h)	4388.20	4372.2000	-0.37
Mass Flow (kg/h)	260067.38	Mass Flow (kg/h)	260067.38	260236.0000	0.06
Molecular Weight	59.2651	Molecular Weight	59.27	59.5200	0.43
Total	1.0000	Total	1.0000	0.9999	
Variable	Integration	1102		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.9650	Hydrogen	0.9650	0.9650	0.00
Methane	0.0341	Methane	0.0341	0.0341	0.00
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.0000	Propylene	0.0000	0.0000	
Propane	0.0000	Propane	0.0000	0.0000	
n-Heptane	0.0000	C7 Non-Aromatics	0.0000	0.0000	
n-Octane	0.0000	C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	Benzene	0.0000	0.0000	
Water	0.0000	Steam/Water	0.0000	0.0000	
Nitrogen	0.0009	Nitrogen	0.0009	0.0009	0.00
Operation Condition		Operation Condition			
Temperature (°C)	16.00	Temperature (°C)	16.00	16.0000	0.00
Pressure (Kg/cm ² gauge)	31.07	Pressure (Kg/cm ² gauge)	31.07	31.0700	0.00
Molar Flow (kgmole/h)	693.88	Molar Flow (kgmole/h)	693.88	693.9000	0.00
Mass Flow (kg/h)	1747.00	Mass Flow (kg/h)	1747.00	1747.0000	0.00
Molecular Weight	2.5177	Molecular Weight	2.52	2.5200	0.09
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	1111		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0069	Hydrogen	0.0069	0.0071	2.53
Methane	0.0084	Methane	0.0084	0.0085	1.61
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.0001	Propylene	0.0001	0.0007	85.00
Propane	0.0034	Propane	0.0034	0.0027	-24.94
13-Butadiene	0.0000	Butadiene/C4 Acetylene	0.0000	0.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

1-Butene	0.0197	Butylenes	0.0197	0.0201	2.08
n-Butane	0.6801	Butanes	0.6801	0.6786	-0.21
1-Pentene	0.2719	C5-Hydrocarbons	0.2719	0.2723	0.14
Cyclohexane	0.0078	C6 Non-Aromatics	0.0078	0.0078	0.08
n-Heptane	0.0000	C7 Non-Aromatics	0.0000	0.0000	
n-Octane	0.0000	C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0008	Benzene	0.0008	0.0008	-1.56
Water	0.0009	Steam/Water	0.0009	0.0014	35.00
Nitrogen	0.0001	Nitrogen	0.0001	0.0001	23.18
Operation Condition		Operation Condition			
Temperature (°C)	123.20	Temperature (°C)	123.20	123.2000	0.00
Pressure (Kg/cm ² gauge)	26.00	Pressure (Kg/cm ² gauge)	26.00	26.0000	0.00
Molar Flow (kgmole/h)	4412.49	Molar Flow (kgmole/h)	4412.49	4386.1000	-0.60
Mass Flow (kg/h)	268020.37	Mass Flow (kg/h)	268020.37	267686.0000	-0.12
Molecular Weight	60.7413	Molecular Weight	60.74	61.0300	0.47
Total	1.0000	Total	1.0000	1.0001	
Variable	Integration	1127		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Methane	0.0000	Methane	0.0000	0.0000	
Propadiene	0.0032	Propadiene/Methylacetylene	0.0032	0.0032	0.00
Propene	0.0002	Propylene	0.0002	0.0002	0.00
Propane	0.0016	Propane	0.0016	0.0016	0.00
13-Butadiene	0.0010	Butadiene/C4 Acetylene	0.0010	0.0010	0.00
1-Butene	0.7366	Butylenes	0.7366	0.7366	0.00
n-Butane	0.2517	Butanes	0.2517	0.2517	0.00
1-Pentene	0.0029	C5-Hydrocarbons	0.0029	0.0029	0.00
Cyclohexane	0.0000	C6 Non-Aromatics	0.0000	0.0000	
n-Heptane	0.0000	C7 Non-Aromatics	0.0000	0.0000	
n-Octane	0.0000	C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	Benzene	0.0000	0.0000	
Water	0.0028	Steam/Water	0.0028	0.0028	0.00
Nitrogen	0.0000	Nitrogen	0.0000	0.0000	
Operation Condition		Operation Condition			
Temperature (°C)	42.00	Temperature (°C)	42.00	42.0000	0.00
Pressure (Kg/cm ² gauge)	10.97	Pressure (Kg/cm ² gauge)	10.97	10.9700	0.00
Molar Flow (kgmole/h)	342.00	Molar Flow (kgmole/h)	342.00	342.0000	0.00
Mass Flow (kg/h)	19314.00	Mass Flow (kg/h)	19314.00	19314.0000	0.00
Molecular Weight	56.4738	Molecular Weight	56.47	56.4700	-0.01
Total	1.0000	Total	1.0000	1.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

Variable	Integration	1106		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0133	Hydrogen	0.0133	0.0130	-1.96
Methane	0.0164	Methane	0.0164	0.0152	-8.07
Propadiene	0.0004	Propadiene/Methylacetylene	0.0004	0.0004	9.96
Propene	0.0001	Propylene	0.0001	0.0008	83.74
Propane	0.0037	Propane	0.0037	0.0030	-23.00
13-Butadiene	0.0097	Butadiene/C4 Acetylene	0.0097	0.0096	-0.71
1-Butene	0.0767	Butylenes	0.0767	0.0770	0.45
n-Butane	0.6205	Butanes	0.6205	0.6249	0.70
1-Pentene	0.2502	C5-Hydrocarbons	0.2502	0.2459	-1.75
Cyclohexane	0.0065	C6 Non-Aromatics	0.0065	0.0066	1.23
n-Heptane	0.0000	C7 Non-Aromatics	0.0000	0.0000	
n-Octane	0.0000	C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0007	Benzene	0.0007	0.0007	1.89
Water	0.0017	Steam/Water	0.0017	0.0027	36.71
Nitrogen	0.0002	Nitrogen	0.0002	0.0001	-75.27
Operation Condition		Operation Condition			
Temperature (°C)	72.38	Temperature (°C)	72.38	73.2000	1.12
Pressure (Kg/cm ² gauge)	28.00	Pressure (Kg/cm ² gauge)	28.00	28.0000	0.00
Molar Flow (kgmole/h)	5774.75	Molar Flow (kgmole/h)	5774.75	5748.6000	-0.45
Mass Flow (kg/h)	343887.11	Mass Flow (kg/h)	343887.11	343561.0000	-0.09
Molecular Weight	59.5501	Molecular Weight	59.55	59.7600	0.35
Total	1.0000	Total	1.0000	0.9999	
Variable	Integration	1104		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.9650	Hydrogen	0.9650	0.9650	0.00
Methane	0.0341	Methane	0.0341	0.0341	0.00
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.0000	Propylene	0.0000	0.0000	
Propane	0.0000	Propane	0.0000	0.0000	
13-Butadiene	0.0000	Butadiene/C4 Acetylene	0.0000	0.0000	
1-Butene	0.0000	Butylenes	0.0000	0.0000	
n-Butane	0.0000	Butanes	0.0000	0.0000	
1-Pentene	0.0000	C5-Hydrocarbons	0.0000	0.0000	
Cyclohexane	0.0000	C6 Non-Aromatics	0.0000	0.0000	
n-Heptane	0.0000	C7 Non-Aromatics	0.0000	0.0000	
n-Octane	0.0000	C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0000	Benzene	0.0000	0.0000	
Water	0.0000	Steam/Water	0.0000	0.0000	
Nitrogen	0.0009	Nitrogen	0.0009	0.0009	0.00
Operation Condition		Operation Condition			

Simulation Report – ECC 860 KTA
Working Stage 6

Temperature (°C)	15.99	Temperature (°C)	15.99	16.0000	0.04
Pressure (Kg/cm ² gauge)	30.28	Pressure (Kg/cm ² gauge)	30.28	30.2800	0.00
Molar Flow (kgmole/h)	27.80	Molar Flow (kgmole/h)	27.80	27.8000	-0.01
Mass Flow (kg/h)	70.00	Mass Flow (kg/h)	70.00	70.0000	0.00
Molecular Weight	2.5177	Molecular Weight	2.52	2.5200	0.09
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	1107		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0893	Hydrogen	0.0893	0.0890	-0.30
Methane	0.0554	Methane	0.0554	0.0500	-10.89
Propadiene	0.0000	Propadiene/Methylacetylene	0.0000	0.0000	
Propene	0.0002	Propylene	0.0002	0.0013	84.95
Propane	0.0058	Propane	0.0058	0.0044	-31.31
13-Butadiene	0.0000	Butadiene/C4 Acetylene	0.0000	0.0000	
1-Butene	0.0208	Butylenes	0.0208	0.0200	-3.81
n-Butane	0.6547	Butanes	0.6547	0.6768	3.27
1-Pentene	0.1665	C5-Hydrocarbons	0.1665	0.1484	-12.22
Cyclohexane	0.0022	C6 Non-Aromatics	0.0022	0.0025	11.49
n-Heptane	0.0000	C7 Non-Aromatics	0.0000	0.0000	
n-Octane	0.0000	C8 Non-Aromatics	0.0000	0.0000	
Benzene	0.0003	Benzene	0.0003	0.0003	13.79
Water	0.0040	Steam/Water	0.0040	0.0065	38.83
Nitrogen	0.0009	Nitrogen	0.0009	0.0007	-25.94
Operation Condition		Operation Condition			
Temperature (°C)	123.20	Temperature (°C)	123.20	123.2000	0.00
Pressure (Kg/cm ² gauge)	26.00	Pressure (Kg/cm ² gauge)	26.00	26.0000	0.00
Molar Flow (kgmole/h)	1471.93	Molar Flow (kgmole/h)	1471.93	1474.0000	0.14
Mass Flow (kg/h)	77325.30	Mass Flow (kg/h)	77325.30	77623.0000	0.38
Molecular Weight	52.5332	Molecular Weight	52.53	52.6600	0.24
Total	1.0000	Total	1.0000	0.9999	

Table A.5.3. EBR Stream Compositions

Variable	Integration	5223 NEW		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0043	Hydrogen	0.0043	0.0041	-3.97
Methane	0.1670	Methane	0.1670	0.1585	-5.38
Ethylene	0.3482	Ethylene	0.3482	0.3388	-2.77
Propylene	0.4805	Propylene	0.4805	0.4986	3.62
Operation Condition		Operation Condition			
Temperature (°C)	-43.36	Temperature (°C)	-43.36	-43.1000	-0.61
Pressure (Kg/cm ² gauge)	0.54	Pressure (Kg/cm ² gauge)	0.54	0.5400	0.00

Simulation Report – ECC 860 KTA
Working Stage 6

Molar Flow (kgmole/h)	1481.54	Molar Flow (kgmole/h)	1481.54	1190.8000	-24.42
Mass Flow (kg/h)	48412.62	Mass Flow (kg/h)	48412.62	39339.0000	-23.07
Molecular Weight	32.6772	Molecular Weight	32.68	33.0400	1.10
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5238		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0001	Hydrogen	0.0001	0.0001	0.00
Methane	0.0139	Methane	0.0139	0.0139	0.00
Ethylene	0.1148	Ethylene	0.1148	0.1148	0.00
Propylene	0.8712	Propylene	0.8712	0.8712	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-30.00	Temperature (°C)	-30.00	-30.0000	0.00
Pressure (Kg/cm ² gauge)	23.10	Pressure (Kg/cm ² gauge)	23.10	23.1000	0.00
Molar Flow (kgmole/h)	2924.14	Molar Flow (kgmole/h)	2924.14	2924.0000	0.00
Mass Flow (kg/h)	117271.00	Mass Flow (kg/h)	117271.00	117271.0000	0.00
Molecular Weight	40.1044	Molecular Weight	40.10	40.1100	0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5237		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0001	Hydrogen	0.0001	0.0001	0.00
Methane	0.0139	Methane	0.0139	0.0139	0.00
Ethylene	0.1148	Ethylene	0.1148	0.1148	0.00
Propylene	0.8712	Propylene	0.8712	0.8712	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-22.90	Temperature (°C)	-22.90	-22.9000	0.00
Pressure (Kg/cm ² gauge)	1.76	Pressure (Kg/cm ² gauge)	1.76	1.7600	0.00
Molar Flow (kgmole/h)	567.07	Molar Flow (kgmole/h)	567.07	567.1000	0.01
Mass Flow (kg/h)	22742.00	Mass Flow (kg/h)	22742.00	22743.0000	0.00
Molecular Weight	40.1044	Molecular Weight	40.10	40.1100	0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5203		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0013	Hydrogen	0.0013	0.0014	4.27
Methane	0.0595	Methane	0.0595	0.0595	-0.03
Ethylene	0.1843	Ethylene	0.1843	0.1843	-0.02
Propylene	0.7548	Propylene	0.7548	0.7548	0.00
Operation Condition		Operation Condition			
Temperature (°C)	47.10	Temperature (°C)	47.10	47.1000	0.00
Pressure (Kg/cm ² gauge)	7.04	Pressure (Kg/cm ² gauge)	7.04	7.0400	0.00
Molar Flow (kgmole/h)	4972.75	Molar Flow (kgmole/h)	4972.75	4972.2000	-0.01
Mass Flow (kg/h)	188425.62	Mass Flow (kg/h)	188425.62	188407.0000	-0.01
Molecular Weight	37.8916	Molecular Weight	37.89	37.8900	0.00
Total	1.0000	Total	1.0000	1.0000	

Simulation Report – ECC 860 KTA

Working Stage 6

Variable	Integration	5243		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0007	Hydrogen	0.0007	0.0007	0.21
Methane	0.0403	Methane	0.0403	0.0402	-0.17
Ethylene	0.1682	Ethylene	0.1682	0.1678	-0.26
Propylene	0.7908	Propylene	0.7908	0.7914	0.08
Operation Condition		Operation Condition			
Temperature (°C)	21.60	Temperature (°C)	21.60	21.6000	0.00
Pressure (Kg/cm ² gauge)	6.69	Pressure (Kg/cm ² gauge)	6.69	6.6900	0.00
Molar Flow (kgmole/h)	10298.95	Molar Flow (kgmole/h)	10298.95	10295.9000	-0.03
Mass Flow (kg/h)	397996.62	Mass Flow (kg/h)	397996.62	397978.0000	0.00
Molecular Weight	38.6444	Molecular Weight	38.64	38.6500	0.01
Total	1.0000	Total	1.0000	1.0001	
Variable	Integration	5207		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0001	Hydrogen	0.0001	0.0001	1.77
Methane	0.0146	Methane	0.0146	0.0139	-4.76
Ethylene	0.1180	Ethylene	0.1180	0.1148	-2.78
Propylene	0.8673	Propylene	0.8673	0.8712	0.44
Operation Condition		Operation Condition			
Temperature (°C)	37.34	Temperature (°C)	37.34	37.3000	-0.10
Pressure (Kg/cm ² gauge)	23.45	Pressure (Kg/cm ² gauge)	23.45	23.4500	0.00
Molar Flow (kgmole/h)	6580.54	Molar Flow (kgmole/h)	6580.54	6571.2000	-0.14
Mass Flow (kg/h)	263500.70	Mass Flow (kg/h)	263500.70	263548.0000	0.02
Molecular Weight	40.0424	Molecular Weight	40.04	40.1100	0.17
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5226		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0001	Hydrogen	0.0001	0.0001	1.64
Methane	0.0145	Methane	0.0145	0.0139	-4.51
Ethylene	0.1176	Ethylene	0.1176	0.1148	-2.47
Propylene	0.8677	Propylene	0.8677	0.8712	0.40
Operation Condition		Operation Condition			
Temperature (°C)	10.00	Temperature (°C)	10.00	10.0000	0.00
Pressure (Kg/cm ² gauge)	7.83	Pressure (Kg/cm ² gauge)	7.83	7.8300	0.00
Molar Flow (kgmole/h)	1784.12	Molar Flow (kgmole/h)	1784.12	1781.5000	-0.15
Mass Flow (kg/h)	71451.00	Mass Flow (kg/h)	71451.00	71451.0000	0.00
Molecular Weight	40.0483	Molecular Weight	40.05	40.1100	0.15
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5208		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0018	Hydrogen	0.0018	0.0018	2.17
Methane	0.0858	Methane	0.0858	0.0865	0.86

Simulation Report – ECC 860 KTA
Working Stage 6

Ethylene	0.2571	Ethylene	0.2571	0.2611	1.52
Propylene	0.6553	Propylene	0.6553	0.6505	-0.74
Operation Condition		Operation Condition			
Temperature (°C)	37.34	Temperature (°C)	37.34	37.3000	-0.10
Pressure (Kg/cm ² gauge)	23.45	Pressure (Kg/cm ² gauge)	23.45	23.4500	0.00
Molar Flow (kgmole/h)	3718.40	Molar Flow (kgmole/h)	3718.40	3724.7000	0.17
Mass Flow (kg/h)	134495.91	Mass Flow (kg/h)	134495.91	134430.0000	-0.05
Molecular Weight	36.1703	Molecular Weight	36.17	36.0900	-0.22
Total	1.0000	Total	1.0000	0.9999	
Variable	Integration	5239		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0001	Hydrogen	0.0001	0.0001	0.00
Methane	0.0139	Methane	0.0139	0.0139	0.00
Ethylene	0.1148	Ethylene	0.1148	0.1148	0.00
Propylene	0.8712	Propylene	0.8712	0.8712	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-37.50	Temperature (°C)	-37.50	-37.5000	0.00
Pressure (Kg/cm ² gauge)	0.54	Pressure (Kg/cm ² gauge)	0.54	0.5400	0.00
Molar Flow (kgmole/h)	2924.14	Molar Flow (kgmole/h)	2924.14	2924.0000	0.00
Mass Flow (kg/h)	117271.00	Mass Flow (kg/h)	117271.00	117271.0000	0.00
Molecular Weight	40.1044	Molecular Weight	40.10	40.1100	0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5236		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0001	Hydrogen	0.0001	0.0001	0.00
Methane	0.0139	Methane	0.0139	0.0139	0.00
Ethylene	0.1148	Ethylene	0.1148	0.1148	0.00
Propylene	0.8712	Propylene	0.8712	0.8712	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-30.00	Temperature (°C)	-30.00	-30.0000	0.00
Pressure (Kg/cm ² gauge)	23.10	Pressure (Kg/cm ² gauge)	23.10	23.1000	0.00
Molar Flow (kgmole/h)	567.07	Molar Flow (kgmole/h)	567.07	567.1000	0.01
Mass Flow (kg/h)	22742.00	Mass Flow (kg/h)	22742.00	22743.0000	0.00
Molecular Weight	40.1044	Molecular Weight	40.10	40.1100	0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5201		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0015	Hydrogen	0.0015	0.0015	0.01
Methane	0.0654	Methane	0.0654	0.0654	0.01
Ethylene	0.1933	Ethylene	0.1933	0.1933	0.01
Propylene	0.7398	Propylene	0.7398	0.7399	0.01
Operation Condition		Operation Condition			
Temperature (°C)	-39.54	Temperature (°C)	-39.54	-39.5000	-0.09

Simulation Report – ECC 860 KTA

Working Stage 6

Pressure (Kg/cm ² gauge)	0.45	Pressure (Kg/cm ² gauge)	0.45	0.4500	0.00
Molar Flow (kgmole/h)	4405.68	Molar Flow (kgmole/h)	4405.68	4405.1000	-0.01
Mass Flow (kg/h)	165683.62	Mass Flow (kg/h)	165683.62	165665.0000	-0.01
Molecular Weight	37.6068	Molecular Weight	37.61	37.6100	0.01
Total	1.0000	Total	1.0000	1.0001	
Variable	Integration	5241		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0013	Hydrogen	0.0013	0.0014	4.27
Methane	0.0595	Methane	0.0595	0.0595	-0.03
Ethylene	0.1843	Ethylene	0.1843	0.1843	-0.02
Propylene	0.7548	Propylene	0.7548	0.7548	0.00
Operation Condition		Operation Condition			
Temperature (°C)	38.00	Temperature (°C)	38.00	38.0000	0.00
Pressure (Kg/cm ² gauge)	6.83	Pressure (Kg/cm ² gauge)	6.83	6.8300	0.00
Molar Flow (kgmole/h)	4972.75	Molar Flow (kgmole/h)	4972.75	4972.2000	-0.01
Mass Flow (kg/h)	188425.62	Mass Flow (kg/h)	188425.62	188407.0000	-0.01
Molecular Weight	37.8916	Molecular Weight	37.89	37.8900	0.00
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5205		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0007	Hydrogen	0.0007	0.0007	0.21
Methane	0.0403	Methane	0.0403	0.0402	-0.17
Ethylene	0.1682	Ethylene	0.1682	0.1678	-0.26
Propylene	0.7908	Propylene	0.7908	0.7914	0.08
Operation Condition		Operation Condition			
Temperature (°C)	90.21	Temperature (°C)	90.21	90.2000	-0.01
Pressure (Kg/cm ² gauge)	24.14	Pressure (Kg/cm ² gauge)	24.14	24.1400	0.00
Molar Flow (kgmole/h)	10298.95	Molar Flow (kgmole/h)	10298.95	10295.9000	-0.03
Mass Flow (kg/h)	397996.62	Mass Flow (kg/h)	397996.62	397978.0000	0.00
Molecular Weight	38.6444	Molecular Weight	38.64	38.6500	0.01
Total	1.0000	Total	1.0000	1.0001	
Variable	Integration	5227		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0001	Hydrogen	0.0001	0.0001	1.77
Methane	0.0146	Methane	0.0146	0.0139	-4.76
Ethylene	0.1180	Ethylene	0.1180	0.1148	-2.78
Propylene	0.8673	Propylene	0.8673	0.8712	0.44
Operation Condition		Operation Condition			
Temperature (°C)	37.34	Temperature (°C)	37.34	37.2000	-0.37
Pressure (Kg/cm ² gauge)	23.45	Pressure (Kg/cm ² gauge)	23.45	23.3800	-0.30
Molar Flow (kgmole/h)	4796.16	Molar Flow (kgmole/h)	4796.16	4789.7000	-0.13
Mass Flow (kg/h)	192049.70	Mass Flow (kg/h)	192049.70	192097.0000	0.02
Molecular Weight	40.0424	Molecular Weight	40.04	40.1100	0.17

Simulation Report – ECC 860 KTA
Working Stage 6

Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5242		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0007	Hydrogen	0.0007	0.0007	0.21
Methane	0.0403	Methane	0.0403	0.0402	-0.17
Ethylene	0.1682	Ethylene	0.1682	0.1678	-0.26
Propylene	0.7908	Propylene	0.7908	0.7914	0.08
Operation Condition		Operation Condition			
Temperature (°C)	31.70	Temperature (°C)	31.70	31.6000	-0.32
Pressure (Kg/cm ² gauge)	6.83	Pressure (Kg/cm ² gauge)	6.83	6.8300	0.00
Molar Flow (kgmole/h)	10298.95	Molar Flow (kgmole/h)	10298.95	10295.9000	-0.03
Mass Flow (kg/h)	397996.62	Mass Flow (kg/h)	397996.62	397978.0000	0.00
Molecular Weight	38.6444	Molecular Weight	38.64	38.6500	0.01
Total	1.0000	Total	1.0000	1.0001	
Variable	Integration	5225		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0001	Hydrogen	0.0001	0.0001	1.77
Methane	0.0146	Methane	0.0146	0.0139	-4.76
Ethylene	0.1180	Ethylene	0.1180	0.1148	-2.78
Propylene	0.8673	Propylene	0.8673	0.8712	0.44
Operation Condition		Operation Condition			
Temperature (°C)	37.34	Temperature (°C)	37.34	37.2000	-0.37
Pressure (Kg/cm ² gauge)	23.45	Pressure (Kg/cm ² gauge)	23.45	23.3800	-0.30
Molar Flow (kgmole/h)	1784.38	Molar Flow (kgmole/h)	1784.38	1781.5000	-0.16
Mass Flow (kg/h)	71451.00	Mass Flow (kg/h)	71451.00	71451.0000	0.00
Molecular Weight	40.0424	Molecular Weight	40.04	40.1100	0.17
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5235		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0001	Hydrogen	0.0001	0.0001	0.00
Methane	0.0139	Methane	0.0139	0.0139	0.00
Ethylene	0.1148	Ethylene	0.1148	0.1148	0.00
Propylene	0.8712	Propylene	0.8712	0.8712	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-30.00	Temperature (°C)	-30.00	-30.0000	0.00
Pressure (Kg/cm ² gauge)	23.10	Pressure (Kg/cm ² gauge)	23.10	23.1000	0.00
Molar Flow (kgmole/h)	3491.21	Molar Flow (kgmole/h)	3491.21	3491.0000	-0.01
Mass Flow (kg/h)	140013.00	Mass Flow (kg/h)	140013.00	140013.0000	0.00
Molecular Weight	40.1044	Molecular Weight	40.10	40.1100	0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5240		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0015	Hydrogen	0.0015	0.0015	0.01

Simulation Report – ECC 860 KTA
Working Stage 6

Methane	0.0654	Methane	0.0654	0.0654	0.01
Ethylene	0.1933	Ethylene	0.1933	0.1933	0.01
Propylene	0.7398	Propylene	0.7398	0.7399	0.01
Operation Condition		Operation Condition			
Temperature (°C)	-39.33	Temperature (°C)	-39.33	-39.3000	-0.07
Pressure (Kg/cm ² gauge)	0.54	Pressure (Kg/cm ² gauge)	0.54	0.5400	0.00
Molar Flow (kgmole/h)	4405.68	Molar Flow (kgmole/h)	4405.68	4405.1000	-0.01
Mass Flow (kg/h)	165683.62	Mass Flow (kg/h)	165683.62	165665.0000	-0.01
Molecular Weight	37.6068	Molecular Weight	37.61	37.6100	0.01
Total	1.0000	Total	1.0000	1.0001	
Variable	Integration	5202		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0001	Hydrogen	0.0001	0.0001	0.00
Methane	0.0139	Methane	0.0139	0.0139	0.00
Ethylene	0.1148	Ethylene	0.1148	0.1148	0.00
Propylene	0.8712	Propylene	0.8712	0.8712	0.00
Operation Condition		Operation Condition			
Temperature (°C)	-23.10	Temperature (°C)	-23.10	-23.2000	0.42
Pressure (Kg/cm ² gauge)	1.67	Pressure (Kg/cm ² gauge)	1.67	1.6700	0.00
Molar Flow (kgmole/h)	567.07	Molar Flow (kgmole/h)	567.07	567.1000	0.01
Mass Flow (kg/h)	22742.00	Mass Flow (kg/h)	22742.00	22743.0000	0.00
Molecular Weight	40.1044	Molecular Weight	40.10	40.1100	0.01
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5232		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0001	Hydrogen	0.0001	0.0001	-0.01
Methane	0.0262	Methane	0.0262	0.0262	-0.01
Ethylene	0.1711	Ethylene	0.1711	0.1711	-0.01
Propylene	0.8026	Propylene	0.8026	0.8025	-0.01
Operation Condition		Operation Condition			
Temperature (°C)	35.00	Temperature (°C)	35.00	35.0000	0.00
Pressure (Kg/cm ² gauge)	6.83	Pressure (Kg/cm ² gauge)	6.83	6.8300	0.00
Molar Flow (kgmole/h)	3542.07	Molar Flow (kgmole/h)	3542.07	3542.2000	0.00
Mass Flow (kg/h)	138120.00	Mass Flow (kg/h)	138120.00	138120.0000	0.00
Molecular Weight	38.9941	Molecular Weight	38.99	38.9900	-0.01
Total	1.0000	Total	1.0000	0.9999	
Variable	Integration	5206		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0007	Hydrogen	0.0007	0.0007	0.21
Methane	0.0403	Methane	0.0403	0.0402	-0.17
Ethylene	0.1682	Ethylene	0.1682	0.1678	-0.26
Propylene	0.7908	Propylene	0.7908	0.7914	0.08
Operation Condition		Operation Condition			

Simulation Report – ECC 860 KTA

Working Stage 6

Temperature (°C)	38.01	Temperature (°C)	38.01	38.0000	-0.01
Pressure (Kg/cm ² gauge)	23.88	Pressure (Kg/cm ² gauge)	23.88	23.8800	0.00
Molar Flow (kgmole/h)	10298.95	Molar Flow (kgmole/h)	10298.95	10295.9000	-0.03
Mass Flow (kg/h)	397996.62	Mass Flow (kg/h)	397996.62	397978.0000	0.00
Molecular Weight	38.6444	Molecular Weight	38.64	38.6500	0.01
Total	1.0000	Total	1.0000	1.0001	
Variable	Integration	5228		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0001	Hydrogen	0.0001	0.0001	1.77
Methane	0.0146	Methane	0.0146	0.0139	-4.76
Ethylene	0.1180	Ethylene	0.1180	0.1148	-2.78
Propylene	0.8673	Propylene	0.8673	0.8712	0.44
Operation Condition		Operation Condition			
Temperature (°C)	7.40	Temperature (°C)	7.40	7.4000	0.00
Pressure (Kg/cm ² gauge)	23.24	Pressure (Kg/cm ² gauge)	23.24	23.2400	0.00
Molar Flow (kgmole/h)	4796.16	Molar Flow (kgmole/h)	4796.16	4789.7000	-0.13
Mass Flow (kg/h)	192049.70	Mass Flow (kg/h)	192049.70	192097.0000	0.02
Molecular Weight	40.0424	Molecular Weight	40.04	40.1100	0.17
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	5204		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0007	Hydrogen	0.0007	0.0007	0.21
Methane	0.0403	Methane	0.0403	0.0402	-0.17
Ethylene	0.1682	Ethylene	0.1682	0.1678	-0.26
Propylene	0.7908	Propylene	0.7908	0.7914	0.08
Operation Condition		Operation Condition			
Temperature (°C)	21.46	Temperature (°C)	21.46	21.5000	0.19
Pressure (Kg/cm ² gauge)	6.60	Pressure (Kg/cm ² gauge)	6.60	6.6000	0.00
Molar Flow (kgmole/h)	10298.95	Molar Flow (kgmole/h)	10298.95	10295.9000	-0.03
Mass Flow (kg/h)	397996.62	Mass Flow (kg/h)	397996.62	397978.0000	0.00
Molecular Weight	38.6444	Molecular Weight	38.64	38.6500	0.01
Total	1.0000	Total	1.0000	1.0001	

Table A.5.4. Py-Gas Hydrogenation Stream Compositions

Variable	Integration	4612		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Methane	0.0000	Methane	0.0000	0.0000	
Acetylene	0.0000	Acetylene	0.0000	0.0000	
Ethylene	0.0000	Ethylene	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0000	Propadiene/Propyne	0.0000	0.0000	
Propene	0.0000	Propylene	0.0000	0.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

Propane	0.0000	Propane	0.0000	0.0000	
13-Butadiene	0.0083	Butadienes/C4Acetylenes	0.0083	0.0083	0.00
1-Butene	0.0089	Butylenes	0.0089	0.0089	0.00
n-Butane	0.0011	Butanes	0.0011	0.0011	0.00
Cyclopentane	0.2535	C5-Hydrocarbons	0.2535	0.2535	0.00
1-Hexyne	0.0783	C6 Non-Aromatics	0.0783	0.0783	0.00
n-Hexane	0.0000	C7 Non-Aromatics	0.0322	0.0322	
1-Heptyne	0.0322	C8 Non-Aromatics	0.0126	0.0126	0.00
n-Heptane	0.0000	Benzene	0.2892	0.2892	
1-Octyne	0.0126	Toluene	0.1968	0.1968	0.00
n-Octane	0.0000	Xylenes/Ethylbenzene	0.0392	0.0392	
Benzene	0.2892	Styrene	0.0234	0.0234	0.00
Toluene	0.1968	C9-205°C	0.0551	0.0551	0.00
p-Xylene	0.0392	205-288°C PGO	0.0014	0.0014	0.00
E-Benzene	0.0000	Steam/Water	0.0000	0.0000	
Styrene	0.0234	Nitrogen	0.0000	0.0000	#DIV/0!
m-MStyrene	0.0522				
n-Nonane	0.0000				
n-Decane	0.0029				
n-C ₁₁	0.0000				
n-C ₁₂	0.0014				
n-C ₁₃	0.0000				
n-C ₁₄	0.0000				
Steam/Water	0.0000				
Nitrogen	0.0000				
Operation Condition		Operation Condition			
Temperature (°C)	40.00	Temperature (°C)	40.00	40	0.00
Pressure (Kg/cm ² gauge)	3.00	Pressure (Kg/cm ² gauge)	3.00	3	0.00
Molar Flow (kgmole/h)	817.44	Molar Flow (kgmole/h)	817.44	817.5	0.01
Mass Flow (kg/h)	68543.00	Mass Flow (kg/h)	68543.00	68543	0.00
Molecular Weight	83.8506	Molecular Weight	83.8506	83.85	0.00
Total	0.9957	Total	1.0000	1.0000	
Variable	Integration	1201		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.9645	Hydrogen	0.9645	0.9645	0.00
Methane	0.0340	Methane	0.0340	0.0340	0.00
Acetylene	0.0000	Acetylene	0.0000	0.0000	#DIV/0!
Ethylene	0.0000	Ethylene	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0000	Propadiene/Propyne	0.0000	0.0000	
Propene	0.0000	Propylene	0.0000	0.0000	
Propane	0.0000	Propane	0.0000	0.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000	
1-Butene	0.0000	Butylenes	0.0000	0.0000	
n-Butane	0.0000	Butanes	0.0000	0.0000	
Cyclopentane	0.0000	C5-Hydrocarbons	0.0000	0.0000	
1-Hexyne	0.0000	C6 Non-Aromatics	0.0000	0.0000	
n-Hexane	0.0000	C7 Non-Aromatics	0.0000	0.0000	
1-Heptyne	0.0000	C8 Non-Aromatics	0.0000	0.0000	
n-Heptane	0.0000	Benzene	0.0000	0.0000	
1-Octyne	0.0000	Toluene	0.0000	0.0000	
n-Octane	0.0000	Xylenes/Ethylbenzene	0.0000	0.0000	
Benzene	0.0000	Styrene	0.0000	0.0000	
Toluene	0.0000	C9+ Hydrocarbons	0.0000	0.0000	
p-Xylene		Steam/Water	0.0000	0.0006	
E-Benzene	0.0000	Nitrogen	0.0000	0.0009	
Styrene	0.0000				
m-MStyrene	0.0000				
n-Nonane	0.0000				
n-Decane	0.0000				
n-C ₁₁	0.0000				
n-C ₁₂	0.0000				
n-C ₁₃	0.0000				
n-C ₁₄	0.0000				
Steam/Water	0.0006				
Nitrogen	0.0009				
Operation Condition		Operation Condition			
Temperature (°C)	16.00	Temperature (°C)	16.00	16	0.00
Pressure (Kg/cm ² gauge)	31.36	Pressure (Kg/cm ² gauge)	31.36	31.36	0.00
Molar Flow (kgmole/h)	306.03	Molar Flow (kgmole/h)	306.03	306.1	0.02
Mass Flow (kg/h)	773.00	Mass Flow (kg/h)	773.00	773	0.00
Molecular Weight	2.5259	Molecular Weight	2.5259	2.53	0.16
Total	0.9985	Total	0.9985	1.0000	
Variable	Integration	1233	Design	%Error	
Component (%mol)		Component (%mol)			
Hydrogen	0.0017	Hydrogen	0.0017	0.0018	2.86
Methane	0.0067	Methane	0.0067	0.0047	-41.81
Acetylene	0.0000	Acetylene	0.0000	0.0000	
Ethylene	0.0000	Ethylene	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0000	Propadiene/Propyne	0.0000	0.0000	
Propene	0.0000	Propylene	0.0000	0.0000	
Propane	0.0000	Propane	0.0000	0.0000	
13-Butadiene	0.0013	Butadienes/C4Acetylenes	0.0013	0.0010	-32.92

Simulation Report – ECC 860 KTA
Working Stage 6

1-Butene	0.0154	Butylenes	0.0154	0.0156	1.03
n-Butane	0.0011	Butanes	0.0011	0.0019	43.43
Cyclopentane	0.2508	C5-Hydrocarbons	0.2508	0.2498	-0.42
1-Hexyne	0.0611	C6 Non-Aromatics	0.0611	0.0790	22.60
n-Hexane	0.0165	C7 Non-Aromatics	0.0165	0.0323	49.02
1-Heptyne	0.0072	C8 Non-Aromatics	0.0072	0.0126	42.56
n-Heptane	0.0247	Benzene	0.0247	0.2871	91.39
1-Octyne	0.0099	Toluene	0.0099	0.1956	94.96
n-Octane	0.0027	Xylenes/Ethylbenzene	0.0027	0.0616	95.68
Benzene	0.2868	Styrene	0.2868	0.0007	- 40876.44
Toluene	0.1954	C9+ Hydrocarbons	0.1954	0.0561	-248.33
p-Xylene	0.0389	Steam/Water	0.0389	0.0002	- 19371.40
E-Benzene	0.0224	Nitrogen	0.0224	0.0000	#DIV/0!
Styrene	0.0008				
m-MStyrene	0.0069				
n-Nonane	0.0450				
n-Decane	0.0029				
n-C ₁₁	0.0000				
n-C ₁₂	0.0014				
n-C ₁₃	0.0000				
n-C ₁₄	0.0000				
Steam/Water	0.0002				
Nitrogen	0.0001				
Operation Condition		Operation Condition			
Temperature (°C)	45.06	Temperature (°C)	45.06	45.2	0.32
Pressure (Kg/cm ² gauge)	2.61	Pressure (Kg/cm ² gauge)	2.61	2.61	0.00
Molar Flow (kgmole/h)	822.43	Molar Flow (kgmole/h)	822.43	822.1	-0.04
Mass Flow (kg/h)	69045.88	Mass Flow (kg/h)	69045.88	68950	-0.14
Molecular Weight	83.9539	Molecular Weight	83.9539	83.87	-0.10
Total	0.9955	Total	0.9428	1.0000	
Variable	Integration	1205		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0143	Hydrogen	0.0143	0.0144	0.82
Methane	0.0117	Methane	0.0117	0.0057	-105.36
Acetylene	0.0000	Acetylene	0.0000	0.0000	
Ethylene	0.0000	Ethylene	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0000	Propadiene/Propyne	0.0000	0.0000	
Propene	0.0000	Propylene	0.0000	0.0000	
Propane	0.0000	Propane	0.0000	0.0000	
13-Butadiene	0.0013	Butadienes/C4Acetylenes	0.0013	0.0009	-46.59

Simulation Report – ECC 860 KTA
Working Stage 6

1-Butene	0.0153	Butylenes	0.0153	0.0140	-9.46
n-Butane	0.0011	Butanes	0.0011	0.0017	37.35
Cyclopentane	0.2465	C5-Hydrocarbons	0.2465	0.2380	-3.57
1-Hexyne	0.0600	C6 Non-Aromatics	0.0600	0.0778	22.83
n-Hexane	0.0162	C7 Non-Aromatics	0.0162	0.0323	49.94
1-Heptyne	0.0071	C8 Non-Aromatics	0.0071	0.0128	44.51
n-Heptane	0.0243	Benzene	0.0243	0.2845	91.47
1-Octyne	0.0097	Toluene	0.0097	0.1970	95.09
n-Octane	0.0026	Xylenes/Ethylbenzene	0.0026	0.0626	95.83
Benzene	0.2816	Styrene	0.2816	0.0007	- 40123.94
Toluene	0.1918	C9+ Hydrocarbons	0.1918	0.0574	-234.08
p-Xylene	0.0382	Steam/Water	0.0382	0.0002	- 19006.85
E-Benzene	0.0220	Nitrogen	0.0220	0.0001	- 21893.55
Styrene	0.0008				
m-MStyrene	0.0068				
n-Nonane	0.0441				
n-Decane	0.0028				
n-C ₁₁	0.0000				
n-C ₁₂	0.0014				
n-C ₁₃	0.0000				
n-C ₁₄	0.0000				
Steam/Water	0.0002				
Nitrogen	0.0003				
Operation Condition		Operation Condition			
Temperature (°C)	159.04	Temperature (°C)	159.04	159.8	0.47
Pressure (Kg/cm ² gauge)	30.50	Pressure (Kg/cm ² gauge)	30.50	29.53	-3.28
Molar Flow (kgmole/h)	3461.86	Molar Flow (kgmole/h)	3461.86	3299.8	-4.91
Mass Flow (kg/h)	285765.71	Mass Flow (kg/h)	285765.71	274172	-4.23
Molecular Weight	82.5469	Molecular Weight	82.5469	83.09	0.65
Total	0.9512	Total	0.9436	1.0001	
Variable	Integration	1208		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0148	Hydrogen	0.0148	0.0558	73.42
Methane	0.0119	Methane	0.0119	0.0119	-0.12
Acetylene	0.0000	Acetylene	0.0000	0.0000	
Ethylene	0.0000	Ethylene	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0000	Propadiene/Propyne	0.0000	0.0000	
Propene	0.0000	Propylene	0.0000	0.0000	
Propane	0.0000	Propane	0.0000	0.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

13-Butadiene	0.0013	Butadienes/C4Acetylenes	0.0013	0.0009	-46.60
1-Butene	0.0153	Butylenes	0.0153	0.0149	-2.97
n-Butane	0.0011	Butanes	0.0011	0.0018	40.78
Cyclopentane	0.2464	C5-Hydrocarbons	0.2464	0.2352	-4.76
1-Hexyne	0.0600	C6 Non-Aromatics	0.0600	0.0741	19.04
n-Hexane	0.0162	C7 Non-Aromatics	0.0162	0.0303	46.66
1-Heptyne	0.0071	C8 Non-Aromatics	0.0071	0.0118	39.87
n-Heptane	0.0242	Benzene	0.0242	0.2690	90.99
1-Octyne	0.0097	Toluene	0.0097	0.1831	94.72
n-Octane	0.0026	Xylenes/Ethylbenzene	0.0026	0.0576	95.48
Benzene	0.2813	Styrene	0.2813	0.0007	- 40090.73
Toluene	0.1916	C9+ Hydrocarbons	0.1916	0.0525	-264.87
p-Xylene	0.0382	Steam/Water	0.0382	0.0002	- 18983.51
E-Benzene	0.0220	Nitrogen	0.0220	0.0003	-7222.33
Styrene	0.0008				
m-MStyrene	0.0068				
n-Nonane	0.0441				
n-Decane	0.0028				
n-C ₁₁	0.0000				
n-C ₁₂	0.0014				
n-C ₁₃	0.0000				
n-C ₁₄	0.0000				
Steam/Water	0.0002				
Nitrogen	0.0003				
Operation Condition		Operation Condition			
Temperature (°C)	44.15	Temperature (°C)	44.15	44.2	0.12
Pressure (Kg/cm ² gauge)	25.10	Pressure (Kg/cm ² gauge)	25.10	25.1	0.00
Molar Flow (kgmole/h)	839.22	Molar Flow (kgmole/h)	839.22	878.7	4.49
Mass Flow (kg/h)	69221.09	Mass Flow (kg/h)	69221.09	69316	0.14
Molecular Weight	82.4824	Molecular Weight	82.4824	78.89	-4.55
Total	0.9953	Total	0.9437	1.0001	
Variable	Integration	1246		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.5791	Hydrogen	0.5791	0.6604	12.31
Methane	0.3263	Methane	0.3263	0.2328	-40.17
Acetylene	0.0000	Acetylene	0.0000	0.0000	
Ethylene	0.0000	Ethylene	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0000	Propadiene/Propyne	0.0000	0.0000	
Propene	0.0000	Propylene	0.0000	0.0000	
Propane	0.0000	Propane	0.0000	0.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

13-Butadiene	0.0011	Butadienes/C4Acetylenes	0.0011	0.0005	-116.44
1-Butene	0.0137	Butylenes	0.0137	0.0125	-9.78
n-Butane	0.0008	Butanes	0.0008	0.0015	45.40
Cyclopentane	0.0372	C5-Hydrocarbons	0.0372	0.0606	38.60
1-Hexyne	0.0045	C6 Non-Aromatics	0.0045	0.0059	23.74
n-Hexane	0.0015	C7 Non-Aromatics	0.0015	0.0009	-67.64
1-Heptyne	0.0002	C8 Non-Aromatics	0.0002	0.0001	-94.65
n-Heptane	0.0008	Benzene	0.0008	0.0152	94.52
1-Octyne	0.0001	Toluene	0.0001	0.0034	96.88
n-Octane	0.0000	Xylenes/Ethylbenzene	0.0000	0.0004	91.25
Benzene	0.0156	Styrene	0.0156	0.0000	#DIV/0!
Toluene	0.0036	C9+ Hydrocarbons	0.0036	0.0001	-3463.67
p-Xylene	0.0002	Steam/Water	0.0002	0.0006	61.06
E-Benzene	0.0002	Nitrogen	0.0002	0.0052	96.98
Styrene	0.0000				
m-MStyrene	0.0000				
n-Nonane	0.0002				
n-Decane	0.0000				
n-C ₁₁	0.0000				
n-C ₁₂	0.0000				
n-C ₁₃	0.0000				
n-C ₁₄	0.0000				
Steam/Water	0.0025				
Nitrogen	0.0123				
Operation Condition		Operation Condition			
Temperature (°C)	43.92	Temperature (°C)	43.92	44.3	0.86
Pressure (Kg/cm ² gauge)	0.47	Pressure (Kg/cm ² gauge)	0.47	0.47	0.00
Molar Flow (kgmole/h)	11.61	Molar Flow (kgmole/h)	11.61	9.3	-24.81
Mass Flow (kg/h)	145.24	Mass Flow (kg/h)	145.24	115	-26.30
Molecular Weight	12.5128	Molecular Weight	12.5128	12.43	-0.67
Total	0.9852	Total	0.9849	1.0001	
Variable	Integration	1202	Design	%Error	
Component (%mol)		Component (%mol)			
Hydrogen	0.0116	Hydrogen	0.0116	0.0115	-0.47
Methane	0.0095	Methane	0.0095	0.0045	-110.43
Acetylene	0.0000	Acetylene	0.0000	0.0000	
Ethylene	0.0000	Ethylene	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0000	Propadiene/Propyne	0.0000	0.0000	
Propene	0.0000	Propylene	0.0000	0.0000	
Propane	0.0000	Propane	0.0000	0.0000	
13-Butadiene	0.0027	Butadienes/C4Acetylenes	0.0027	0.0025	-6.11

Simulation Report – ECC 860 KTA
Working Stage 6

1-Butene	0.0141	Butylenes	0.0141	0.0130	-8.44
n-Butane	0.0011	Butanes	0.0011	0.0016	33.02
Cyclopentane	0.2478	C5-Hydrocarbons	0.2478	0.2409	-2.88
1-Hexyne	0.0635	C6 Non-Aromatics	0.0635	0.0808	21.38
n-Hexane	0.0131	C7 Non-Aromatics	0.0131	0.0296	55.81
1-Heptyne	0.0119	C8 Non-Aromatics	0.0119	0.0128	7.05
n-Heptane	0.0196	Benzene	0.0196	0.2853	93.12
1-Octyne	0.0102	Toluene	0.0102	0.1969	94.80
n-Octane	0.0021	Xylenes/Ethylbenzene	0.0021	0.0579	96.35
Benzene	0.2830	Styrene	0.2830	0.0052	-5342.80
Toluene	0.1927	C9+ Hydrocarbons	0.1927	0.0572	-236.93
p-Xylene	0.0384	Steam/Water	0.0384	0.0001	- 38302.11
E-Benzene	0.0178	Nitrogen	0.0178	0.0001	- 17692.29
Styrene	0.0051				
m-MStyrene	0.0155				
n-Nonane	0.0357				
n-Decane	0.0028				
n-C ₁₁	0.0000				
n-C ₁₂	0.0014				
n-C ₁₃	0.0000				
n-C ₁₄	0.0000				
Steam/Water	0.0002				
Nitrogen	0.0002				
Operation Condition					
Temperature (°C)	139.54	Temperature (°C)	139.54	139.1	-0.31
Pressure (Kg/cm ² gauge)	28.00	Pressure (Kg/cm ² gauge)	28.00	28	0.00
Molar Flow (kgmole/h)	4279.30	Molar Flow (kgmole/h)	4279.30	4118.6	-3.90
Mass Flow (kg/h)	354308.71	Mass Flow (kg/h)	354308.71	342715	-3.38
Molecular Weight	82.7960	Molecular Weight	82.7960	83.21	0.50
Total	0.9597	Total	0.9391	0.9999	
Variable	Integration	1210		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.8263	Hydrogen	0.8263	0.8757	5.64
Methane	0.1405	Methane	0.1405	0.0932	-50.79
Acetylene	0.0000	Acetylene	0.0000	0.0000	
Ethylene	0.0000	Ethylene	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0000	Propadiene/Propyne	0.0000	0.0000	
Propene	0.0000	Propylene	0.0000	0.0000	
Propane	0.0000	Propane	0.0000	0.0000	
13-Butadiene	0.0003	Butadienes/C4Acetylenes	0.0003	0.0001	-187.56

Simulation Report – ECC 860 KTA
Working Stage 6

1-Butene	0.0037	Butylenes	0.0037	0.0033	-10.78
n-Butane	0.0002	Butanes	0.0002	0.0004	45.02
Cyclopentane	0.0099	C5-Hydrocarbons	0.0099	0.0161	38.41
1-Hexyne	0.0012	C6 Non-Aromatics	0.0012	0.0016	24.27
n-Hexane	0.0004	C7 Non-Aromatics	0.0004	0.0002	-104.31
1-Heptyne	0.0001	C8 Non-Aromatics	0.0001	0.0000	#DIV/0!
n-Heptane	0.0002	Benzene	0.0002	0.0039	93.86
1-Octyne	0.0000	Toluene	0.0000	0.0009	96.75
n-Octane	0.0000	Xylenes/Ethylbenzene	0.0000	0.0001	90.29
Benzene	0.0042	Styrene	0.0042	0.0000	#DIV/0!
Toluene	0.0010	C9+ Hydrocarbons	0.0010	0.0000	#DIV/0!
p-Xylene	0.0001	Steam/Water	0.0001	0.0001	35.96
E-Benzene	0.0000	Nitrogen	0.0000	0.0043	99.00
Styrene	0.0000				
m-MStyrene	0.0000				
n-Nonane	0.0001				
n-Decane	0.0000				
n-C ₁₁	0.0000				
n-C ₁₂	0.0000				
n-C ₁₃	0.0000				
n-C ₁₄	0.0000				
Steam/Water	0.0008				
Nitrogen	0.0110				
Operation Condition		Operation Condition			
Temperature (°C)	44.15	Temperature (°C)	44.15	44.2	0.12
Pressure (Kg/cm ² gauge)	25.10	Pressure (Kg/cm ² gauge)	25.10	25.1	0.00
Molar Flow (kgmole/h)	5.19	Molar Flow (kgmole/h)	5.19	47.3	89.03
Mass Flow (kg/h)	29.97	Mass Flow (kg/h)	29.97	250	88.01
Molecular Weight	5.7754	Molecular Weight	5.7754	5.29	-9.18
Total	0.9882	Total	0.9881	0.9999	
Variable	Integration	1243		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.8263	Hydrogen	0.8263	0.8757	5.64
Methane	0.1405	Methane	0.1405	0.0932	-50.79
Acetylene	0.0000	Acetylene	0.0000	0.0000	
Ethylene	0.0000	Ethylene	0.0000	0.0000	
Ethane	0.0000	Ethane	0.0000	0.0000	
Propadiene	0.0000	Propadiene/Propyne	0.0000	0.0000	
Propene	0.0000	Propylene	0.0000	0.0000	
Propane	0.0000	Propane	0.0000	0.0000	
13-Butadiene	0.0003	Butadienes/C4Acetylenes	0.0003	0.0001	-187.56
1-Butene	0.0037	Butylenes	0.0037	0.0033	-10.78

Simulation Report – ECC 860 KTA
Working Stage 6

n-Butane	0.0002	Butanes	0.0002	0.0004	45.02
Cyclopentane	0.0099	C5-Hydrocarbons	0.0099	0.0161	38.41
1-Hexyne	0.0012	C6 Non-Aromatics	0.0012	0.0016	24.27
n-Hexane	0.0004	C7 Non-Aromatics	0.0004	0.0002	-104.31
1-Heptyne	0.0001	C8 Non-Aromatics	0.0001	0.0000	#DIV/0!
n-Heptane	0.0002	Benzene	0.0002	0.0039	93.86
1-Octyne	0.0000	Toluene	0.0000	0.0009	96.75
n-Octane	0.0000	Xylenes/Ethylbenzene	0.0000	0.0001	90.29
Benzene	0.0042	Styrene	0.0042	0.0000	#DIV/0!
Toluene	0.0010	C9+ Hydrocarbons	0.0010	0.0000	#DIV/0!
p-Xylene	0.0001	Steam/Water	0.0001	0.0001	35.96
E-Benzene	0.0000	Nitrogen	0.0000	0.0043	99.00
Styrene	0.0000				
m-MStyrene	0.0000				
n-Nonane	0.0001				
n-Decane	0.0000				
n-C ₁₁	0.0000				
n-C ₁₂	0.0000				
n-C ₁₃	0.0000				
n-C ₁₄	0.0000				
Steam/Water	0.0008				
Nitrogen	0.0110				
Operation Condition		Operation Condition			
Temperature (°C)	43.85	Temperature (°C)	43.85	44.1	0.57
Pressure (Kg/cm ² gauge)	18.53	Pressure (Kg/cm ² gauge)	18.53	18.53	0.00
Molar Flow (kgmole/h)	5.19	Molar Flow (kgmole/h)	5.19	47.3	89.03
Mass Flow (kg/h)	29.97	Mass Flow (kg/h)	29.97	250	88.01
Molecular Weight	5.7754	Molecular Weight	5.7754	5.29	-9.18
Total	0.9882	Total	0.9881	0.9999	

Table A.5.5. BTX Stream Compositions

Variable	Integration	1233		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0018	Hydrogen	0.0018	0.0018	0.00
Methane	0.0047	Methane	0.0047	0.0047	0.00
13-Butadiene	0.0010	Butadienes/C4Acetylenes	0.0010	0.0010	0.00
1-Butene	0.0156	Butylenes	0.0156	0.0156	0.00
n-Butane	0.0019	Butanes	0.0019	0.0019	0.00
n-Pentane	0.1200	C5-Hydrocarbons	0.2498	0.2498	0.00
i-Pentane	0.0600	C6 Non-Aromatics	0.0790	0.0790	0.00
Cyclopentane	0.0698	C7 Non-Aromatics	0.0323	0.0323	0.00
1-Hexyne	0.0790	C8 Non-Aromatics	0.0126	0.0126	0.00

Simulation Report – ECC 860 KTA
Working Stage 6

n-Hexane	0.0000	Benzene	0.2871	0.2871	
1-Heptyne	0.0323	Toluene	0.1956	0.1956	0.00
n-Heptane	0.0000	Xylenes/Ethylbenzene	0.0616	0.0616	
1-Octyne	0.0126	Styrene	0.0007	0.0007	0.00
n-Octane	0.0000	C9-205°C	0.0561	0.0561	
Benzene	0.2871	205-288°C PGO	0.0000	0.0000	0.00
Toluene	0.1956	Steam/Water	0.0002	0.0002	0.00
p-Xylene	0.0616	Nitrogen	0.0000	0.0000	0.00
E-Benzene	0.0000				
Styrene	0.0007				
m-MStyrene	0.0541				
n-Decane	0.0020				
n-C ₁₁	0.0000				
n-C ₁₂	0.0000				
n-C ₁₃	0.0000				
n-C ₁₄	0.0000				
Steam/Water	0.0002				
Nitrogen	0.0000				
Operation Condition		Operation Condition			
Temperature (°C)	45.20	Temperature (°C)	45.2000	45.2	0.00
Pressure (Kg/cm ² gauge)	2.61	Pressure (Kg/cm ² gauge)	2.6100	2.61	0.00
Molar Flow (kgmole/h)	823.49	Molar Flow (kgmole/h)	823.4945	822.1	-0.17
Mass Flow (kg/h)	68950.00	Mass Flow (kg/h)	68950.0000	68950	0.00
Molecular Weight	83.7286	Molecular Weight	83.7286	83.87	0.17
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	1246		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.6603	Hydrogen	0.6603	0.6604	0.01
Methane	0.2328	Methane	0.2328	0.2328	0.01
13-Butadiene	0.0005	Butadienes/C4Acetylenes	0.0005	0.0005	0.01
1-Butene	0.0125	Butylenes	0.0125	0.0125	0.01
n-Butane	0.0015	Butanes	0.0015	0.0015	0.01
n-Pentane	0.0606	C5-Hydrocarbons	0.0606	0.0606	0.01
i-Pentane	0.0000	C6 Non-Aromatics	0.0059	0.0059	
Cyclopentane	0.0000	C7 Non-Aromatics	0.0009	0.0009	
1-Hexyne	0.0048	C8 Non-Aromatics	0.0001	0.0001	0.01
n-Hexane	0.0011	Benzene	0.0152	0.0152	0.01
1-Heptyne	0.0009	Toluene	0.0034	0.0034	0.01
n-Heptane	0.0000	Xylenes/Ethylbenzene	0.0004	0.0004	
1-Octyne	0.0001	Styrene	0.0000	0.0000	#DIV/0!
n-Octane	0.0000	C9-205°C	0.0001	0.0001	
Benzene	0.0152	205-288°C PGO	0.0000	0.0000	#DIV/0!

Simulation Report – ECC 860 KTA
Working Stage 6

Toluene	0.0034	Steam/Water	0.0006	0.0006	0.01
p-Xylene	0.0004	Nitrogen	0.0052	0.0052	0.01
E-Benzene	0.0000				
Styrene	0.0000				
m-MStyrene	0.0001				
n-Decane	0.0000				
n-C ₁₁	0.0000				
n-C ₁₂	0.0000				
n-C ₁₃	0.0000				
n-C ₁₄	0.0000				
Steam/Water	0.0006				
Nitrogen	0.0052				
Operation Condition		Operation Condition			
Temperature (°C)	44.30	Temperature (°C)	44.3	44.3000	0.00
Pressure (Kg/cm ² gauge)	0.47	Pressure (Kg/cm ² gauge)	0.47	0.4700	0.00
Molar Flow (kgmole/h)	9.16	Molar Flow (kgmole/h)	9.3	9.1627	-1.50
Mass Flow (kg/h)	115.00	Mass Flow (kg/h)	115	115.0000	0.00
Molecular Weight	12.5508	Molecular Weight	12.43	12.5508	0.96
Total	0.9948	Total	1.0000	1.0001	
Variable	Integration	1228		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Methane	0.0000	Methane	0.0000	0.0000	
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000	
1-Butene	0.0000	Butylenes	0.0000	0.0000	
n-Butane	0.0000	Butanes	0.0000	0.0000	
n-Pentane	0.0000	C5-Hydrocarbons	0.0000	0.0000	
i-Pentane	0.0000	C6 Non-Aromatics	0.0000	0.0000	
Cyclopentane	0.0000	C7 Non-Aromatics	0.0000	0.0000	
1-Hexyne	0.0000	C8 Non-Aromatics	0.0000	0.0258	
n-Hexane	0.0000	Benzene	0.0000	0.0000	
1-Heptyne	0.0000	Toluene	0.0000	0.0000	
n-Heptane	0.0000	Xylenes/Ethylbenzene	0.0636	0.0132	
1-Octyne	0.0000	Styrene	0.0107	0.0010	
n-Octane	0.0000	C9-205°C	0.9257	0.9600	
Benzene	0.0000	205-288°C PGO	0.0000	0.0001	
Toluene	0.0000	Steam/Water	0.0000	0.0000	
p-Xylene	0.0636	Nitrogen	0.0000	0.0000	#DIV/0!
E-Benzene	0.0000				
Styrene	0.0107				
m-MStyrene	0.8927				
n-Decane	0.0330				

Simulation Report – ECC 860 KTA
Working Stage 6

n-C ₁₁	0.0000				
n-C ₁₂	0.0000				
n-C ₁₃	0.0000				
n-C ₁₄	0.0000				
Steam/Water	0.0000				
Nitrogen	0.0000				
Operation Condition		Operation Condition			
Temperature (°C)	151.56	Temperature (°C)	151.5566	154.7	2.03
Pressure (Kg/cm ² gauge)	-0.36	Pressure (Kg/cm ² gauge)	-0.3600	-0.36	0.00
Molar Flow (kgmole/h)	49.91	Molar Flow (kgmole/h)	49.9067	47.3	-5.51
Mass Flow (kg/h)	5892.00	Mass Flow (kg/h)	5892.0001	5893	0.02
Molecular Weight	118.0603	Molecular Weight	118.0603	124.7	5.32
Total	1.0000	Total	1.0000	1.0001	
Variable	Integration	1218		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.1603	Hydrogen	0.1603	0.1474	-8.75
Methane	0.3243	Methane	0.3243	0.3320	2.33
13-Butadiene	0.0054	Butadienes/C4Acetylenes	0.0054	0.0039	-39.56
1-Butene	0.0884	Butylenes	0.0884	0.0827	-6.86
n-Butane	0.0091	Butanes	0.0091	0.0103	11.47
n-Pentane	0.1991	C5-Hydrocarbons	0.4016	0.4102	2.11
i-Pentane	0.1285	C6 Non-Aromatics	0.0009	0.0046	79.80
Cyclopentane	0.0740	C7 Non-Aromatics	0.0000	0.0000	#DIV/0!
1-Hexyne	0.0009	C8 Non-Aromatics	0.0000	0.0000	#DIV/0!
n-Hexane	0.0000	Benzene	0.0003	0.0004	
1-Heptyne	0.0000	Toluene	0.0000	0.0000	
n-Heptane	0.0000	Xylenes/Ethylbenzene	0.0000	0.0000	
1-Octyne	0.0000	Styrene	0.0000	0.0000	
n-Octane	0.0000	C9-205°C	0.0000	0.0000	
Benzene	0.0003	205-288°C PGO	0.0000	0.0000	#DIV/0!
Toluene	0.0000	Steam/Water	0.0097	0.0061	
p-Xylene	0.0000	Nitrogen	0.0000	0.0023	
E-Benzene	0.0000				
Styrene	0.0000				
m-MStyrene	0.0000				
n-Decane	0.0000				
n-C ₁₁	0.0000				
n-C ₁₂	0.0000				
n-C ₁₃	0.0000				
n-C ₁₄	0.0000				
Steam/Water	0.0097				

Simulation Report – ECC 860 KTA
Working Stage 6

Nitrogen	0.0000				
Operation Condition		Operation Condition			
Temperature (°C)	42.99	Temperature (°C)	42.9936	43	0.01
Pressure (Kg/cm ² gauge)	2.10	Pressure (Kg/cm ² gauge)	2.1000	2.1	0.00
Molar Flow (kgmole/h)	8.74	Molar Flow (kgmole/h)	8.7364	8.7	-0.42
Mass Flow (kg/h)	352.99	Mass Flow (kg/h)	352.9929	353	0.00
Molecular Weight	40.4049	Molecular Weight	40.4049	40.4	-0.01
Total	1.0000	Total	1.0000	0.9999	
Variable	Integration	1230		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.4163	Hydrogen	0.4163	0.4117	-1.11
Methane	0.2774	Methane	0.2774	0.2809	1.24
13-Butadiene	0.0029	Butadienes/C4Acetylenes	0.0029	0.0021	-38.69
1-Butene	0.0495	Butylenes	0.0495	0.0465	-6.52
n-Butane	0.0052	Butanes	0.0052	0.0058	10.02
n-Pentane	0.1282	C5-Hydrocarbons	0.2270	0.2301	1.34
i-Pentane	0.0627	C6 Non-Aromatics	0.0035	0.0053	34.46
Cyclopentane	0.0361	C7 Non-Aromatics	0.0005	0.0005	7.87
1-Hexyne	0.0029	C8 Non-Aromatics	0.0001	0.0001	48.81
n-Hexane	0.0006	Benzene	0.0079	0.0080	1.09
1-Heptyne	0.0005	Toluene	0.0017	0.0017	-2.37
n-Heptane	0.0000	Xylenes/Ethylbenzene	0.0002	0.0002	
1-Octyne	0.0001	Styrene	0.0000	0.0000	#DIV/0!
n-Octane	0.0000	C9-205°C	0.0001	0.0000	
Benzene	0.0079	205-288°C PGO	0.0000	0.0000	#DIV/0!
Toluene	0.0017	Steam/Water	0.0051	0.0033	-53.41
p-Xylene	0.0002	Nitrogen	0.0027	0.0038	29.96
E-Benzene	0.0000				
Styrene	0.0000				
m-MStyrene	0.0001				
n-Decane	0.0000				
n-C ₁₁	0.0000				
n-C ₁₂	0.0000				
n-C ₁₃	0.0000				
n-C ₁₄	0.0000				
Steam/Water	0.0051				
Nitrogen	0.0027				
Operation Condition		Operation Condition			
Temperature (°C)	42.08	Temperature (°C)	42.0818	42.1	0.04
Pressure (Kg/cm ² gauge)	0.47	Pressure (Kg/cm ² gauge)	0.4700	0.47	0.00
Molar Flow (kgmole/h)	17.90	Molar Flow (kgmole/h)	17.8991	18	0.56

Simulation Report – ECC 860 KTA
Working Stage 6

Mass Flow (kg/h)	467.99	Mass Flow (kg/h)	467.9929	468	0.00
Molecular Weight	26.1461	Molecular Weight	26.1461	25.99	-0.60
Total	0.9973	Total	1.0000	1.0000	
Variable	Integration	1227		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Methane	0.0000	Methane	0.0000	0.0000	
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000	
1-Butene	0.0000	Butylenes	0.0000	0.0000	
n-Butane	0.0000	Butanes	0.0000	0.0000	
n-Pentane	0.0000	C5-Hydrocarbons	0.0125	0.0125	
i-Pentane	0.0000	C6 Non-Aromatics	0.1153	0.1079	
Cyclopentane	0.0125	C7 Non-Aromatics	0.0482	0.0483	0.29
1-Hexyne	0.1153	C8 Non-Aromatics	0.0188	0.0167	-12.50
n-Hexane	0.0000	Benzene	0.4274	0.4285	
1-Heptyne	0.0482	Toluene	0.2917	0.2927	0.36
n-Heptane	0.0000	Xylenes/Ethylbenzene	0.0861	0.0910	
1-Octyne	0.0188	Styrene	0.0001	0.0010	92.06
n-Octane	0.0000	C9-205°C	0.0000	0.0014	
Benzene	0.4274	205-288°C PGO	0.0000	0.0000	#DIV/0!
Toluene	0.2917	Steam/Water	0.0000	0.0000	#DIV/0!
p-Xylene	0.0861	Nitrogen	0.0000	0.0000	#DIV/0!
E-Benzene	0.0000				
Styrene	0.0001				
m-MStyrene	0.0000				
n-Decane	0.0000				
n-C ₁₁	0.0000				
n-C ₁₂	0.0000				
n-C ₁₃	0.0000				
n-C ₁₄	0.0000				
Steam/Water	0.0000				
Nitrogen	0.0000				
Operation Condition		Operation Condition			
Temperature (°C)	46.21	Temperature (°C)	46.2099	43.5	-6.23
Pressure (Kg/cm ² gauge)	3.00	Pressure (Kg/cm ² gauge)	3.0000	3	0.00
Molar Flow (kgmole/h)	552.29	Molar Flow (kgmole/h)	552.2890	549.5	-0.51
Mass Flow (kg/h)	47749.96	Mass Flow (kg/h)	47749.9588	47749	0.00
Molecular Weight	86.4583	Molecular Weight	86.4583	86.89	0.50
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	1220		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

Methane	0.0000	Methane	0.0000	0.0000	
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000	
1-Butene	0.0000	Butylenes	0.0000	0.0000	
n-Butane	0.0000	Butanes	0.0000	0.0000	
n-Pentane	0.0000	C5-Hydrocarbons	0.0115	0.0115	
i-Pentane	0.0000	C6 Non-Aromatics	0.0993	0.0993	
Cyclopentane	0.0115	C7 Non-Aromatics	0.0445	0.0445	0.00
1-Hexyne	0.1058	C8 Non-Aromatics	0.0174	0.0174	0.00
n-Hexane	0.0000	Benzene	0.3946	0.3946	
1-Heptyne	0.0442	Toluene	0.2695	0.2695	0.00
n-Heptane	0.0000	Xylenes/Ethylbenzene	0.0849	0.0849	
1-Octyne	0.0172	Styrene	0.0010	0.0010	0.00
n-Octane	0.0000	C9-205°C	0.0773	0.0773	
Benzene	0.3919	205-288°C PGO	0.0000	0.0000	#DIV/0!
Toluene	0.2675	Steam/Water	0.0000	0.0000	#DIV/0!
p-Xylene	0.0842	Nitrogen	0.0000	0.0000	#DIV/0!
E-Benzene	0.0000				
Styrene	0.0010				
m-MStyrene	0.0740				
n-Decane	0.0027				
n-C ₁₁	0.0000				
n-C ₁₂	0.0000				
n-C ₁₃	0.0000				
n-C ₁₄	0.0000				
Steam/Water	0.0000				
Nitrogen	0.0000				
Operation Condition		Operation Condition			
Temperature (°C)	144.60	Temperature (°C)	144.6017	143.3	-0.91
Pressure (Kg/cm ² gauge)	2.81	Pressure (Kg/cm ² gauge)	2.8100	2.81	0.00
Molar Flow (kgmole/h)	602.20	Molar Flow (kgmole/h)	602.1957	596.8	-0.90
Mass Flow (kg/h)	53641.96	Mass Flow (kg/h)	53641.9591	53642	0.00
Molecular Weight	89.0773	Molecular Weight	89.0773	89.89	0.90
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	1221		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0000	Hydrogen	0.0000	0.0000	
Methane	0.0000	Methane	0.0000	0.0000	
13-Butadiene	0.0000	Butadienes/C4Acetylenes	0.0000	0.0000	
1-Butene	0.0000	Butylenes	0.0000	0.0000	
n-Butane	0.0000	Butanes	0.0000	0.0000	
n-Pentane	0.0000	C5-Hydrocarbons	0.0115	0.0115	
i-Pentane	0.0000	C6 Non-Aromatics	0.1058	0.0993	

Simulation Report – ECC 860 KTA
Working Stage 6

Cyclopentane	0.0115	C7 Non-Aromatics	0.0442	0.0445	0.74
1-Hexyne	0.1058	C8 Non-Aromatics	0.0172	0.0174	0.98
n-Hexane	0.0000	Benzene	0.3919	0.3946	
1-Heptyne	0.0442	Toluene	0.2675	0.2695	0.75
n-Heptane	0.0000	Xylenes/Ethylbenzene	0.0842	0.0849	
1-Octyne	0.0172	Styrene	0.0010	0.0010	4.28
n-Octane	0.0000	C9-205°C	0.0767	0.0773	
Benzene	0.3919	205-288°C PGO	0.0000	0.0000	#DIV/0!
Toluene	0.2675	Steam/Water	0.0000	0.0000	#DIV/0!
p-Xylene	0.0842	Nitrogen	0.0000	0.0000	#DIV/0!
E-Benzene	0.0000				
Styrene	0.0010				
m-MStyrene	0.0740				
n-Decane	0.0027				
n-C ₁₁	0.0000				
n-C ₁₂	0.0000				
n-C ₁₃	0.0000				
n-C ₁₄	0.0000				
Steam/Water	0.0000				
Nitrogen	0.0000				
Operation Condition		Operation Condition			
Temperature (°C)	73.70	Temperature (°C)	73.6978	74.2	0.68
Pressure (Kg/cm ² gauge)	-0.53	Pressure (Kg/cm ² gauge)	-0.5300	-0.53	0.00
Molar Flow (kgmole/h)	602.20	Molar Flow (kgmole/h)	602.1957	596.8	-0.90
Mass Flow (kg/h)	53641.96	Mass Flow (kg/h)	53641.9591	53642	0.00
Molecular Weight	89.0773	Molecular Weight	89.0773	89.89	0.90
Total	1.0000	Total	1.0000	1.0000	
Variable	Integration	1241		Design	%Error
Component (%mol)		Component (%mol)			
Hydrogen	0.0004	Hydrogen	0.0004	0.0008	50.01
Methane	0.0049	Methane	0.0049	0.0044	-11.34
13-Butadiene	0.0037	Butadienes/C4Acetylenes	0.0037	0.0036	-2.76
1-Butene	0.0568	Butylenes	0.0568	0.0557	-1.95
n-Butane	0.0070	Butanes	0.0070	0.0067	-4.46
n-Pentane	0.4566	C5-Hydrocarbons	0.9185	0.8997	-2.09
i-Pentane	0.2272	C6 Non-Aromatics	0.0064	0.0259	75.29
Cyclopentane	0.2348	C7 Non-Aromatics	0.0000	0.0000	#DIV/0!
1-Hexyne	0.0064	C8 Non-Aromatics	0.0000	0.0000	#DIV/0!
n-Hexane	0.0000	Benzene	0.0019	0.0027	
1-Heptyne	0.0000	Toluene	0.0000	0.0000	
n-Heptane	0.0000	Xylenes/Ethylbenzene	0.0000	0.0000	
1-Octyne	0.0000	Styrene	0.0000	0.0000	

Simulation Report – ECC 860 KTA
Working Stage 6

n-Octane	0.0000	C9-205°C	0.0000	0.0000	
Benzene	0.0019	205-288°C PGO	0.0000	0.0000	#DIV/0!
Toluene	0.0000	Steam/Water	0.0004	0.0005	
p-Xylene	0.0000	Nitrogen	0.0000	0.0000	
E-Benzene	0.0000				
Styrene	0.0000				
m-MStyrene	0.0000				
n-Decane	0.0000				
n-C ₁₁	0.0000				
n-C ₁₂	0.0000				
n-C ₁₃	0.0000				
n-C ₁₄	0.0000				
Steam/Water	0.0004				
Nitrogen	0.0000				
Operation Condition		Operation Condition			
Temperature (°C)	43.26	Temperature (°C)	43.2600	43	-0.60
Pressure (Kg/cm ² gauge)	5.50	Pressure (Kg/cm ² gauge)	5.5000	5.5	0.00
Molar Flow (kgmole/h)	212.60	Molar Flow (kgmole/h)	212.6000	216.6	1.85
Mass Flow (kg/h)	14956.92	Mass Flow (kg/h)	14956.9233	14956	-0.01
Molecular Weight	70.3524	Molecular Weight	70.3524	69.04	-1.90
Total	1.0000	Total	1.0000	1.0000	

B. PFD Simulation

B.1. Integration Stage 1 to Stage 5

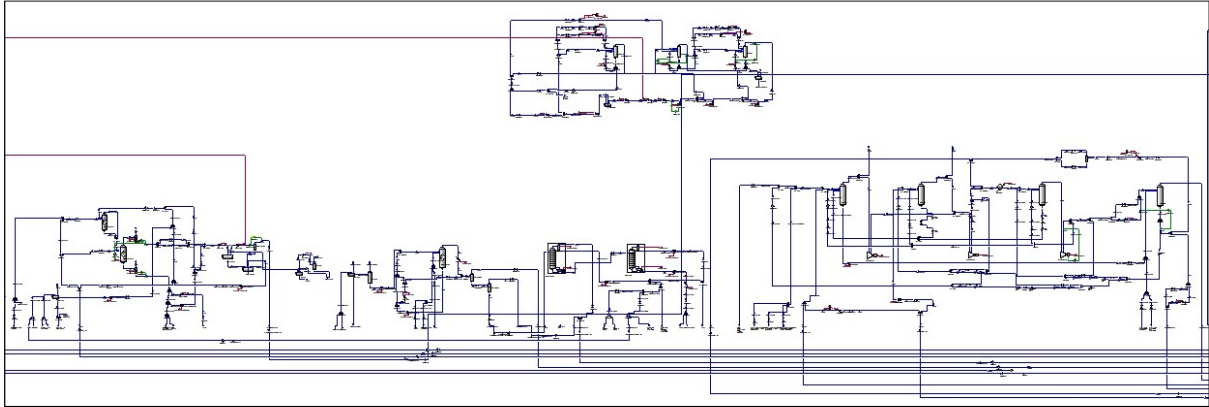


Figure B.1.1. Stage 1 Integration on the Integration of Stage 1-Stage 5

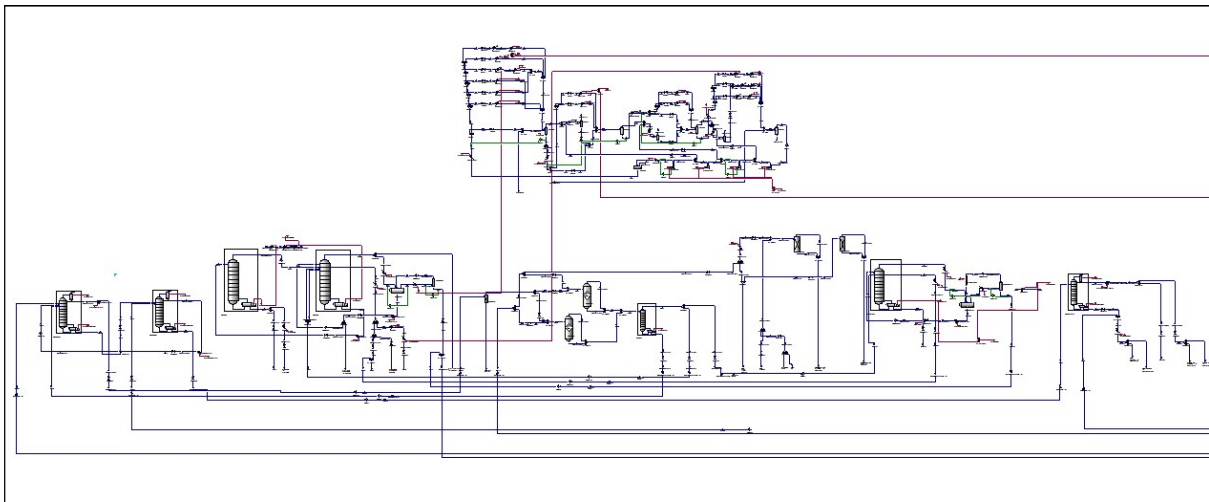


Figure B.1.2. Stage 2 Integration on the Integration of Stage 1-Stage 5

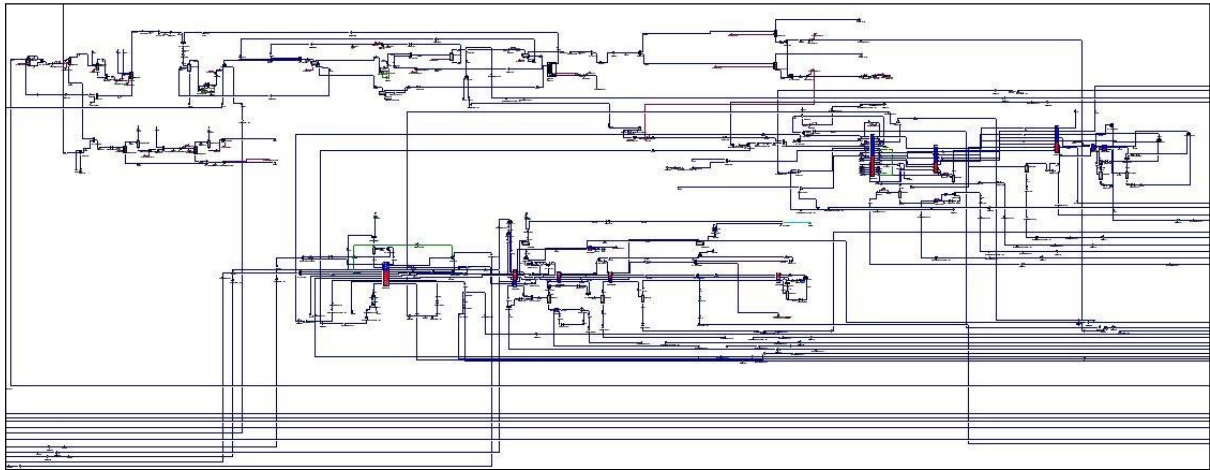


Figure B.1.3. Stage 3 Integration on the Integration of Stage 1-Stage 5

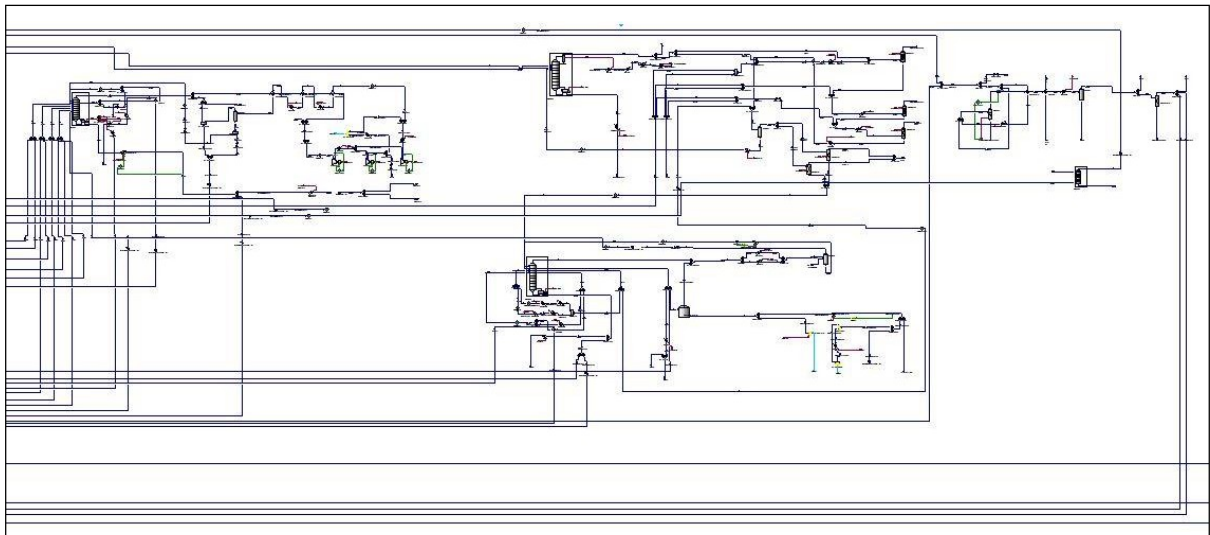


Figure B.1.4. Stage 4 Integration on the Integration of Stage 1-Stage 5

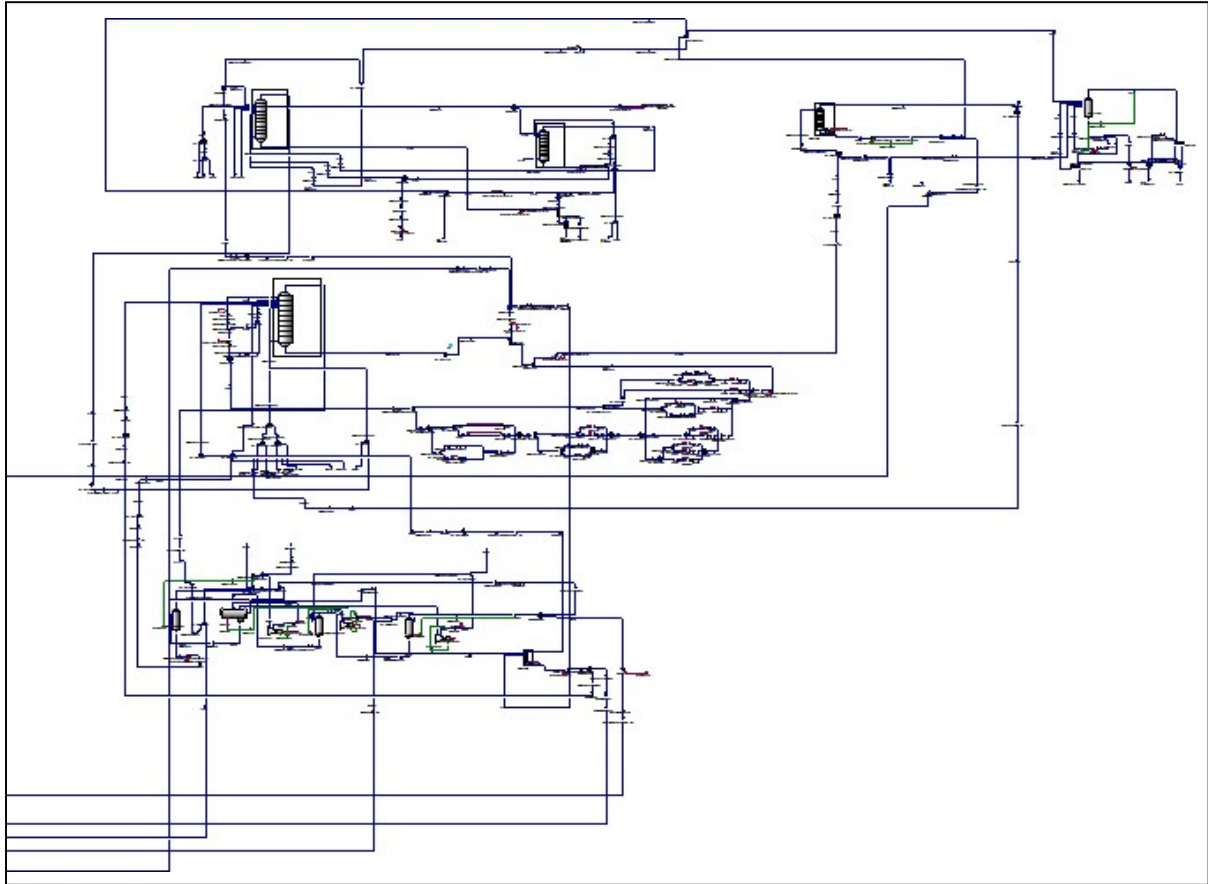


Figure B.1.5. Stage 5 Integration on the Integration of Stage 1-Stage 5