### **Yields**

Coke & liquid yields may be related to wt% CCR of feed (scaled 0 to 100)

Coke Yield (wt%) = 
$$1.6 \times (wt\% CCR)$$
  
Gas (C4-) (wt%) =  $7.8 + 0.144 \times (wt\% CCR)$   
Gasoline (wt%) =  $11.29 + 0.343 \times (wt\% CCR)$   
Gas Oil (wt%) =  $100 - (wt\% Coke) - (wt\% Gas) - (wt\% Gasoline)$ 

Coker gasoline & gas oil splits between light & heavy

- Light & heavy gasoline split: 33.22/66.78 wt/wt @ 65° & 50°API, respectively
- Light & heavy gas oil split: 64.5/35.5 wt/wt @ 30° & 13°API, respectively

Vol% yields for total coker gasoline & gas oil fractions

Gasoline (vol%) = 
$$\frac{186.5}{131.5 + \text{`API}} \times \text{(wt\% Gasoline)}$$
Gas Oil (vol%) = 
$$\frac{155.5}{131.5 + \text{`API}} \times \text{(wt\% Gas Oil)}$$



## **Product Light Ends & Sulfur Distribution**

### Estimated product distribution — Tables 5.8 & 5.9

Typical Gas (	Composition
Component	Mole%
Methane	51.4
Ethene	1.5
Ethane	15.9
Propene	3.1
Propane	8.2
Butenes	2.4
I-Butane	1.0
N-Butane	2.6
H2	13.7
CO2	0.2
Total	100.0

Ту	Typical Distributions								
	Sulfur (%)	Nitrogen (%)							
Gas	30	_							
Light Naphtha	1.7								
Heavy Naphtha	3.3	1							
LCGO	15.4	2							
HCGO	19.6	22							
Coke	30	75							
Total	100	100							

Updated: July 5, 2017 Copyright © 2017 John Jechura (jjechura@mines.edu)



### Coker Calculations Using Gary et. al. Correlations

						CCR	Sulfur	Nickel	Vanadium	Yield	Yield
	bbl/day	lb/day	SpGr	lb/gal	°API	wt%	wt%	ppm	ppm	wt%	vol%
Vac Resid Feed	40,000				1.0	29.3	6.47	60	160		
Coker Gas											
Light Coker Gasoline											
Heavy Coker Gasoline											
Light Coker Gas Oil											
Heavy Coker Gas Oil											
Coke											
Coker Total											
Coker Gasoline											
Coker Gas Oil											

#### **Sulfur Distribution**

	Sulfur (%)	lb/day	mol/day
Gas			
Light Naphtha			
Heavy Naphtha			
LCGO			
HCGO			
Coke			
Total			

#### Coker Gas Composition

				Corrected	Corrected	Corrected
Component	Mol%	Mol Wt	mol/day	mol/day	Mol%	lb/day
Methane						
Ethene						
Ethane						
Propene						
Propane						
Butenes						
I-Butane						
N-Butane						
H2						
CO2						
H2S						
Sulfur						
Total						
w/o Sulfur						
	Corrected					

Updated: July 5, 2017



### Coker Calculations Using Gary et. al. Correlations

							- 10				
						CCR	Sulfur	Nickel	Vanadium	Yield	Yield
					'API		wt%	ppm	ppm	wt%	vol%
Vac Resid Feed	40,000	14,957,881	1.0679	8.904	1.0	29.	6.47	60	160		
Coker Gas				• • • • • • • • • •		*					
Light Coker Gasoline											
Heavy Coker Gasoline											
Light Coker Gas Oil											
Heavy Coker Gas Oil											
Coke											
Coker Total											
Coker Gasoline											
Coker Gas Oil							1	•	nass fee		
Sulfur Distribution	Sulfur (%)	lb/day	mol/day		Coker Gas Con		densi	ty of va	icuum r	esid.	
Gas			, ,		Component	Mol%		-, -			
Light Naphtha					Methane						
Heavy Naphtha					Ethene						1
LCGO					Ethane						
HCGO					Propene						
Coke					Propane						
Total					Butenes						
					I-Butane						
					N-Butane						
					H2						
					CO2						
					H2S						
					Sulfur						
					Total						<u> </u>
					w/o Sulfur						
						Correcte	d in units of	MMscf/day			

Updated: July 5, 2017



### Coker Calculations Using Gary et. al. Correlations

	bbl/day	lb/day	SpGr	lb/gal	°API	CCR wt%	ulfur wt%	Nickel ppm	Vanadium ppm	Yield wt%	Yield vol%	
Vac Resid Feed	40,000	14,957,881		8.904	1.0		6.4		160			
Coker Gas									ب حانم نام نام	L: f	f .	
Light Coker Gasoline							□ ;	Set the o	istribu	tion rac	ctors to	r
Heavy Coker Gasoline									0			
Light Coker Gas Oil					/			the sulfu	ır & the	gas co	mposit	ion
Heavy Coker Gas Oil												
Coke								of the no	วท-sulfน	ır porti	on of th	he
Coker Total										•		
Coker Gasoline								coker ga	S.			
Coker Gas Oil												

Coker Gas Composition

Sulfur Distribution		•••	
	Sulfur (%)	lb/day	mol/day
Gas	30.0		
Light Naphtha	1.7	•	
Heavy Naphtha	3.3		
LCGO	15.4		
HCGO	19.6		
Coke	30.0		
Total	100.0		

COKET GUS COTT	iposition					
				Corrected	Corrected	Corrected
Component	Mol%	Mol Wt	mol/day	mol/day	Mol%	lb/day
Methane	51.4	16.043				
Ethene	1.5	28.054	•			
Ethane :	15.9	30.070				
Propene	3.1	42.081				
Propane	8.2	44.097				
Butenes	2.4	56.108				
I-Butane	1.0	58.123				
N-Butane	2.6	58.123				
H2	13.7	2.016	•			
CO2	0.2	44.010				
H2S		34.080				
Sulfur		32.064				
Total	100.0					
w/o Sulfur		22.171	•			
7=	Corrected	in units of	MMscf/day			

Updated: July 5, 2017 Copyright © 2017 John Jechura (jjechura@mines.edu)



### Coker Calculations Using Gary et. al. Correlations

						CCR	Sulfur	Nickel	Vanadium	Yield	Yield
	bbl/day	lb/day	SpGr	lb/gal	°API	wt%	wt%	ppm	ppm	wt%	vol%
Vac Resid Feed	40,000	14,957,881	1.0679	8.904	1.0	29.3	6.47	60	160		
Coker Gas		: : : : : : : : : : : : : : : : : : : :			• • • • • • • • • • • •	15					
Light Coker Gasoline			0.7201	6.004	65.0						
Heavy Coker Gasoline			0.7796	6.500	50.0						
Light Coker Gas Oil			0.8762	7.305	30.0	-					
Heavy Coker Gas Oil			0.9792	8.164	13.0						
Coke											
Coker Total											
Coker Gasoline											
Coker Gas Oil			·								

#### **Sulfur Distribution**

	Sulfur (%)	lb/day	mol/day
Gas	30.0		
Light Naphtha	1.7		
Heavy Naphtha	3.3		
LCGO	15.4		
HCGO	19.6		
Coke	30.0		
Total	100.0		

Coker Gas Con	nposition			
Component	Mol%	N	lol	Set the expected gravities for the
Methane	51.4		16	
Ethene	1.5		28	light & heavy gasoline & gas oil
Ethane	15.9		30	, 5
Propene	3.1		42	fractions.
Propane	8.2		44	
Butenes	2.4		56	

Butenes	2.4	56			
I-Butane	1.0	58.123			
N-Butane	2.6	58.123			
H2	13.7	2.016			
CO2	0.2	44.010			
H2S		34.080			
Sulfur		32.064			
Total	100.0				
w/o Sulfur		22.171			
	Corrected	in units of	MMscf/day		

Updated: July 5, 2017



### Coker Calculations Using Gary et. al. Correlations

					CCR	Sulfur	Nickel	Vanadium	Yield	Yield
bbl/day	lb/day	SpGr	lb/gal	°API	wt%	wt%	ppm	ppm	wt%	vol%
40,000	14,957,881	1.0679	8.904	1.0	29.3	6.47	60	160		•••••
									12.02	
		0.7201	6.004	65.0					7.09	
		0.7796	6.500	50.0					14.25	
		0.8762	7.305	30.0					12.75	
		0.9792	8.164	13.0					7.02	
									46.88	
									100.00	
								/	21.34	30.04
									19.76	23.19
			40,000 14,957,881 1.0679 0.7201 0.7796 0.8762	40,000 14,957,881 1.0679 8.904 0.7201 6.004 0.7796 6.500 0.8762 7.305	40,000     14,957,881     1.0679     8.904     1.0       0.7201     6.004     65.0       0.7796     6.500     50.0       0.8762     7.305     30.0	bbl/day lb/day SpGr lb/gal *API wt% 40,000 14,957,881 1.0679 8.904 1.0 29.3  0.7201 6.004 65.0 0.7796 6.500 50.0 0.8762 7.305 30.0	bbl/day lb/day SpGr lb/gal *API wt% wt% 40,000 14,957,881 1.0679 8.904 1.0 29.3 6.47  0.7201 6.004 65.0 0.7796 6.500 50.0 0.8762 7.305 30.0	bbl/day lb/day SpGr lb/gal *API wt% wt% ppm 40,000 14,957,881 1.0679 8.904 1.0 29.3 6.47 60 0.7201 6.004 65.0 0.7796 6.500 50.0 0.8762 7.305 30.0	bbl/day lb/day SpGr lb/gal *API wt% wt% ppm ppm 40,000 14,957,881 1.0679 8.904 1.0 29.3 6.47 60 160 160 160 160 160 160 160 160 160	bbl/day         lb/day         SpGr         lb/gal         *API         wt%         wt%         ppm         ppm         wt%           40,000         14,957,881         1.0679         8.904         1.0         29.3         6.47         60         160           0.7201         6.004         65.0         7.09         7.09           0.7796         6.500         50.0         14.25           0.8762         7.305         30.0         12.75           0.9792         8.164         13.0         7.02           46.88         100.00           21.34

#### **Sulfur Distribution**

	Sulfur (%)	lb/day	mol/day
Gas	30.0		
Light Naphtha	1.7		
Heavy Naphtha	3.3		
LCGO	15.4		
HCGO	19.6		
Coke	30.0		
Total	100.0		

Determine yield percentages based on formulas. Gas Oil Yield is calculated by difference from 100%.

Coker Gas Composition

CONC. Gus Con						
				Corrected	Corrected	Corrected
Component	Mol%	Mol Wt	m/ //day	mol/day	Mol%	lb/day
Methane	51.4	16.043				
Ethene	1.5	28.054				
Ethane	15.9	30.070				
Propene	3.1	42.081				
Propane	8.2	44.097				
Butenes	2.4	56.108				
I-Butane	1.0	58.123				
N-Butane	2.6	58.123				
H2	13.7	2.016				
CO2	0.2	44.010				
H2S		34.080				
Sulfur		32.064				
Total	100.0					
w/o Sulfur		22.171				
	Corrected	in units of	MMscf/day			

Updated: July 5, 2017



### Coker Calculations Using Gary et. al. Correlations

						CCR	Sulfur	Nickel	Vanadium	Yield	Yield
	bbl/day	lb/day	SpGr	lb/gal	°API	wt%	wt%	ppm	ppm	wt%	vol%
Vac Resid Feed	40,000	14,957,881	1.0679	8.904	1.0	29.3	6.47	60	160		
Coker Gas		1,797,818								12.02	
Light Coker Gasoline		1,060,381	0.7201	6.004	65.0					7.09	
Heavy Coker Gasoline		2,131,615	0.7796	6.500	50.0					14.25	
Light Coker Gas Oil		1,906,499	0.8762	7.305	30.0					12.75	
Heavy Coker Gas Oil		1,049,313	0.9792	8.164	13.0					7.02	
Coke		7,012,254								46.88	
Coker Total		14,957,881	\							100.00	
Coker Gasoline	12,015	3,191,997								21.34	30.04
Coker Gas Oil	9,276	2,955,812								19.76	23.19

#### **Sulfur Distribution**

	Sulfur (%)	lb/day	mol/day
Gas	30.0		
Light Naphtha	1.7		
Heavy Naphtha	3.3		
LCGO	15.4		
HCGO	19.6		
Coke	30.0		
Tota	100.0		

#### Coker Gas Composition

Component	Mol%	Mol W	/t	mol/day	Corrected mol/day	Corrected Mol%	Corrected lb/day
Methane	51.4	16.0	)43				
Ethene	1.5	28.0	)54				
Ethane	15.9	30.0	70				
Propene	3.1	42.0	81				
Propane	8.2	44.0	97				
Buttenes	2.4	56					
I-Butane	1.0	58					
N-Butane	2.6	58					
H2	13.7	2	D	etermii	ne amo	unts ba	ised on
CO2	0.2	44					
H2S		34	νi	eld ner	centage	ے د	
Sulfur		32	y ı	cia pci	cerrug	<b>CJ.</b>	
Total	100.0						
w/o Sulfur		22					
	Corrected	in units	of	MMscf/day			

Updated: July 5, 2017



### Coker Calculations Using Gary et. al. Correlations

							CCR	Sulfur	Nickel	Vanadium	Yield	Yield
		bbl/day	lb/day	SpGr	lb/gal	°API	wt%	wt%	ppm	ppm	wt%	vol%
	Vac Resid Feed	40,000	14,957,881	1.0679	8.904	1.0	29.3	6.47	60	160		
•	Coker Gas		1,797,818	***********							12.02	
	Light Coker Gasoline	4,205	1,060,381	0.7201	6.004	65.0					7.09	
	Heavy Coker Gasoline	7,808	2,131,615	0.7796	6.500	50.0					14.25	
	Light Coker Gas Oil	6,214	1,906,499	0.8762	7.305	30.0					12.75	
	Heavy Coker Gas Oil	3,060	1,049,313	0.9792	8.164	13.0					7.02	
•	Coke		7,012,254		•••••		•••				46.88	
	Coker Total	21,288	14,957,881								100.00	
	Coker Gasoline	12,015	3,191,997								21.34	30.04
	Coker Gas Oil	9,276	2,955,812					·			19.76	23.19

#### **Sulfur Distribution**

	Sulfur (%)	lb/day	mcI/day
Gas	30.0		
Light Naphtha	1.7		
Heavy Naphtha	3.3		
LCGO	15.4		
HCGO	19.6		
Coke	30.0		
Total	100.0		

#### Coker Gas Composition

Component	Мо	l%	Mol Wt	mol/day	Corrected mol/day	Corrected Mol%	Corrected lb/day
Methane		51.4	16.043				
Ethene		1.5	28.054				
Ethane		15.9	30.070				
Propene		3.1	42.081				
Propane							
Butenes							
I-Butane							
N-Butane		ПΓ	)eterm	ine vol	umetrio	rate	
H2		1			G		
CO2		Πŀ	nased c	n mac	s rate &	dancit	\ <i>\</i>
H2S		П `	ascu c	)	rate &	uciisit	у.
Sulfur							
Total	1	О					
w/o Sulfur			22.171				
	Corr	ected	in units of	MMscf/day			

Updated: July 5, 2017 Copyright © 2017 John Jechura (jjechura@mines.edu)



### Coker Calculations Using Gary et. al. Correlations

	bbl/day	lb/day	SpGr	lb/gal	°API	CCR wt%	Sulfur wt%	Nickel	Vanadium	Yield wt%	Yield vol%
Vac Resid Feed	40,000	14,957,881	1.0679	8.904	1.0	29.3		ppm 60	ppm 160	W178	VO178
Coker Gas		1,797,818								12.02	
Light Coker Gasoline	4,205	1,060,381	0.7201	6.004	65.0					7.09	10.51
Heavy Coker Gasoline	7,808	2,131,615	0.7796	6.500	50.0					14.25	19.52
Light Coker Gas Oil	6,214	1,906,499	0.8762	7.305	30.0					12.75	15.54
Heavy Coker Gas Oil	3,060	1,049,313	0.9792	8.164	13.0					7.02	7.65
Coke		7,012,254								46.88	
Coker Total	21,288	14,957,881								100.00	
Coker Gasoline	12,015	3,191,997								21.34	30.04
Coker Gas Oil	9,276	2,955,812								19.76	23.19

#### **Sulfur Distribution**

	Sulfur (%)	lb/day	mol/day
Gas	30.0		
Light Naphtha	1.7		
Heavy Naphtha	3.3		
LCGO	15.4		
HCGO	19.6		
Coke	30.0		
Total	100.0		

Determine vol yieldt% based on mass & volume rates.

Coker Gas Composition

				Corrected	Corrected	Corrected
Component	Mol%	Mol Wt	mol/d≥	mol/day	Mol%	lb/day
Methane	51.4	16.043				
Ethene	1.5	28.054				
Ethane	15.9	30.070				
Propene	3.1	92.081				
Propane	8.2	44.097				
Butenes	2.4	56.108				
I-Butane	1.0	58.123				
N-Butane	2.6	58.123				
H2	13.7	2.016				
CO2	0.2	44.010				
H2S		34.080				
Sulfur		32.064				
Total	100.0					
w/o Sulfur		22.171				
	Corrected	in units of	MMscf/day			

Updated: July 5, 2017



### Coker Calculations Using Gary et. al. Correlations

						CCR	Sulfur	Nickel	Vanadium	Yield	Yield
	bbl/day	lb/day	SpGr	lb/gal	°API	wt%	wt%	ppm	ppm	wt%	vol%
Vac Resid Feed	40,000	14,957,881	1.0679	8.904	1.0	29.3	6.47	60	160		
Coker Gas		1,797,818								12.02	
Light Coker Gasoline	4,205	1,060,381	0.7201	6.004	65.0					7.09	10.51
Heavy Coker Gasoline	7,808	2,131,615	0.7796	6.500	50.0					14.25	19.52
Light Coker Gas Oil	6,214	1,906,499	0.8762	7.305	30.0					12.75	15.54
Heavy Coker Gas Oil	3,060	1,049,313	0.9792	8.164	13.0					7.02	7.65
Coke		7,012,254								46.88	
Coker Total	21,288	14,957,881				o,				100.00	
Coker Gasoline	12,015	3,191,997	0.7587	6.326	55.0					21.34	30.04
Coker Gas Oil	9,276	2,955,812	0.9100	7.587	24.0					19.76	23.19

#### **Sulfur Distribution**

	Sulfur (%)	lb/day	mol/day
Gas	30.0		
Light Naphtha	1.7		
Heavy Naphtha	3.3		
LCGO	15.4		
HCGO	19.6		
Coke	30.0		
Total	100.0		

#### Coker Gas Composition

Component	Mol%	Mol Wt	mol/day	Corrected mol/day	Corrected Mol%	Corrected lb/day
Methane	51.4	16.043				
Ethene	1.5	28.054				
Ethane	15.9	30.070				
Propene	3.1	42.081				
Propane	8.2	44.097				
Butenes	2.4	56.108				
I-Butane	1.0	58.123				·

I-Butane	1.0	
N-Butane	2.6	
H2	13.7	
CO2	0.2	
H2S		
Sulfur		
Total	100.0	
w/o Sulfur		
	Corrected	in

Determine densities based on volumes & mass produced.

Updated: July 5, 2017



### Coker Calculations Using Gary et. al. Correlations

						CCR	Sulfur	Nickel	Vanadium	Yield	Yield
	bbl/day	lb/day	SpGr	lb/gal	°API	wt%	wt%	ppm	ppm	wt%	vol%
Vac Resid Feed	40,000	14,957,881	1.0679	8.904	1.0	29.3	6.47	60	160		
Coker Gas		1,797,818				***				12.02	
Light Coker Gasoline	4,205	1,060,381	0.7201	6.004	65.0					7.09	10.51
Heavy Coker Gasoline	7,808	2,131,615	0.7796	6.500	50.0					14.25	19.52
Light Coker Gas Oil	6,214	1,906,499	0.8762	7.305	30.0					12.75	15.54
Heavy Coker Gas Oil	3,060	1,049,313	0.9792	8.164	13.0					7.02	7.65
Coke		7,012,254								46.88	
Coker Total	21,288	14,957,881								100.00	
Coker Gasoline	12,015	3,191,997	0.7587	6.326	55.0					21.34	30.04
Coker Gas Oil	9,276	2,955,812	0.9100	7.587	24.0					19.76	23.19

Sulfur Distribution			
	Sulfur (%)	lb/day	mol/day
Gas	30.0	290,332	9,055
Light Naphtha	1.7	16,452	
Heavy Naphtha	3.3	31,937	
LCGO	15.4	149,037	
HCGO	19.6	189,684	
Coke	30.0	290,332	
Total	100.0	967,775	

#### Coker Gas Composition

Component	Mol%	IV	/lol Wt	mol/day	Corrected mol/day	Corrected Mol%	Corrected lb/day				
Methane	51.4		16.043								
Ethene	1.5		28.054								
Ethane	15.9		30.070								
Propene	3.1		42.081								
Propane	8.2		44 097								
Butenes	2.4	87									
I-Butane	1.0	П	D - T	!	منام ماند	. نــد حا نـم ـــد	£				
N-Butane	2.6	П	Det	ermine	the dis	tributio	on ot				
H2	13.7										
CO2	0.2	П	Sult	ur base	ed on th	ie typic	al				
H2S		П									
Sulfur		П	fact	ors.							
Total	100.0	П									
w/o Sulfur		П	22.1/1			ı					
	Corrected	in	units of	MMscf/day							

Updated: July 5, 2017



### Coker Calculations Using Gary et. al. Correlations

						CCR	Sulfur	Nickel	Vanadium	Yield	Yield
	bbl/day	lb/day	SpGr	lb/gal	°API	wt%	wt%	ppm	ppm	wt%	vol%
Vac Resid Feed	40,000	14,957,881	1.0679	8.904	1.0	29.3	6.47	·. 60	160		
Coker Gas		1,797,818					16.15			12.02	
Light Coker Gasoline	4,205	1,060,381	0.7201	6.004	65.0		1.55			7.09	10.51
Heavy Coker Gasoline	7,808	2,131,615	0.7796	6.500	50.0		1.50			14.25	19.52
Light Coker Gas Oil	6,214	1,906,499	0.8762	7.305	30.0		7.82			12.75	15.54
Heavy Coker Gas Oil	3,060	1,049,313	0.9792	8.164	13.0	:	18.08			7.02	7.65
Coke		7,012,254					4.14			46.88	
Coker Total	21,288	14,957,881								100.00	
Coker Gasoline	12,015	3,191,997	0.7587	6.326	55.0		1.52			21.34	30.04
Coker Gas Oil	9,276	2,955,812	0.9100	7.587	24.0		11.46	•		19.76	23.19
								_			

Sulfur Distribution			
	Sulfur (%)	lb/day	nol/day
Gas	30.0	290,332	9,055
Light Naphtha	1.7	16,452	
Heavy Naphtha	3.3	31,937	
LCGO	15.4	149,037	
HCGO	19.6	189,684	
Coke	30.0	290,332	

967,775

Coker Gas Composition

Component	Mol%	Mol Wt	mol/day	Corrected mol/day	Corrected Mol%	Corrected lb/day
Methane	5/1.4	16.043				
Ethene	1.5	28.054				
Ethane	15.9	30.070				
Propene	3.1	42.081				
Propane	8.2	44.097				
Butenes	2.4	56.108				
I-Butane	1.0	58.123				
N-Butane	2.6	58.123				
112	13.7	2.016				
CO2	0.2	44.010				
H2S		34.080				
Sulfur		32.064				
Total	100.0					
w/o Sulfur		22.171				
	Corrected	in units of	MMscf/day			

Scale the sulfur content of the products as wt%.

Total

Updated: July 5, 2017



Coker Calculations Using Gary et. al. Correlations

Split up the non-sulfur portion of the coker gas according to the typical composition.

ı					CCR	Sulfur	Nickel	Vanadium	Yield	Yield
3	pGr	lb/gal		°API	wt%	wt%	ppm	ppm	wt%	vol%
Ľ	1.0679	8.904		1.0	29.3	6.47	60	160		
Ī						16.15			12.02	
Г	0.7201	6.004	\	65.0		1.55			7.09	10.51
Г	0.7796	6.500		50.0		1.50			14.25	19.52
	0.8762	7.305		30.0		7.82			12.75	15.54
L	0.9792	8.164		13.0		18.08			7.02	7.65
						4.14			46.88	
									100.00	
	0.7587	6.326		55.0		1.52			21.34	30.04
	0.9100	7.587		24.0	·	11.46			19.76	23.19

#### **Sulfur Distribution**

Coker Total
Coker Gasoline

Coker Gas Oil

	Sulfur (%)	lb/day	mol/day
Gas	30.0	290,332	9,055
Light Naphtha	1.7	16,452	
Heavy Naphtha	3.3	31,937	
LCGO	15.4	149,037	
HCGO	19.6	189,684	
Coke	30.0	290,332	
Total	100.0	967,775	

21,288

12,015

9,276

14,957,881

3,191,997

2,955,812

#### **Coker Gas Composition**

				Corrected	Corrected	Corrected
Component	Mol%	Mol Wt	mol/day	mol/day	Mol%	lb/day
Methane	51.4	16.043	34,948			
Ethene	1.5	28.054	1,020			
Ethane	15.9	30.070	10,811			
Propene	3.1	42.081	2,108			
Propane	8.2	44.097	5,575	•		
Butenes	2.4	56.108	1,632			
I-Butane	1.0	58.123	680			
N-Butane	2.6	58.123	1,768			
H2	13.7	2.016	9,315			
CO2	0.2	44.010	136	•		
H2S		34.080				
Sulfur		32.064	9,055	••		
Total	100.0		77,047			
w/o Sulfur		22.171	67,992			
	Corrected	in units of	MMscf/day			

Updated: July 5, 2017



### Coker Calculations Using Gary et. al. Correlations

						CCR	Sulfur	Nickel	Vanadium	Yield	Yield
	bbl/day	lb/day	SpGr	lb/gal	°API	wt%	wt%	ppm	ppm	wt%	vol%
Vac Resid Feed	40,000	14,957,881	1.0679	8.904	1.0	29.3	6.47	60	160		
Coker Gas		1,797,818					16.15			12.02	
Light Coker Gasoline	4,205	1,060,381	0.7201	6.004	65.0		1.55			7.09	10.51
Heavy Coker Gasoline	7,808	2,131,615	0.7796	6.500	50.0		1.50			14.25	19.52
Light Coker Gas Oil	6,214	1,906,499	0.8762	7.305	30.0		7.82			12.75	15.54
Heavy Coker Gas Oil	3,060	1,049,313	0.9792	8.164	13.0		18.08			7.02	7.65
Coke		7,012,254					4.14			46.88	
Coker Total	21,288	14,957,881								100.00	
Coker Gasoline	12,015	3,191,997	0.7587	6.326	55.0		1.52			21.34	30.04
Coker Gas Oil	9,276	2,955,812	0.9100	7.587	24.0		11.46			19.76	23.19

#### **Sulfur Distribution**

	Sulfur (%)	lb/day	mol/day
Gas	30.0	290,332	9,055
Light Naphtha	1.7	16,452	
Heavy Naphtha	3.3	31,937	
LCGO	15.4	149,037	
HCGO	19.6	189,684	
Coke	30.0	290,332	
Coke	30.0	290,332	

Correct for presence of sulfur. Reduce moles of  $H_2$  & replace with appropriate amount of  $H_2$ S.

Coker Gas Composition

				Corrected	Corrected	Corrected
Component	Mol%	Mol Wt	mol/day	mol/day	Mol%	lb/day
Methane	51.4	16.043	34,948	34,948	51.4	560,661
Ethene	1.5	28.054	1,020	1,020	1.5	28,611
Ethane	15.9	30.070	10,811	10,811	15.9	325,075
Propene	3.1	42.081	2,108	2,108	3.1	88,696
Propane	8.2	44.097	5,575	5,575	8.2	245,853
Butenes	2.4	56.108	1,632	1,632	2.4	91,557
I-Butane	1.0	58.123	680	680	1.0	39,519
N-Butane	2.6	58.123	1,768	1,768	2.6	102,750
H2	13.7	2.016	9,315	260	0.4	524
CO2	0.2	44.010	136	136	0.2	5,985
H2S		34.080		9,055	13.3	308,586
Sulfur		32.064	9,055			
Total	100.0		77,047	67,992	100.0	1,797,818
w/o Sulfur		22.171	67,992			1,507,485
	Corrected	in units of	MMscf/day	25.80		

Updated: July 5, 2017



### Coker Calculations Using Gary et. al. Correlations

						CCR	Sulfur	Nickel	Vanadium	Yield	Yield
	bbl/day	lb/day	SpGr	lb/gal	°API	wt%	wt%	ppm	ppm	wt%	vol%
Vac Resid Feed	40,000	14,957,881	1.0679	8.904	1.0	29.3	6.47	60	160		
Coker Gas		1,797,818					16.15			12.02	
Light Coker Gasoline	4,205	1,060,381	0.7201	6.004	65.0		1.55			7.09	10.51
Heavy Coker Gasoline	7,808	2,131,615	0.7796	6.500	50.0		1.50			14.25	19.52
Light Coker Gas Oil	6,214	1,906,499	0.8762	7.305	30.0		7.82			12.75	15.54
Heavy Coker Gas Oil	3,060	1,049,313	0.9792	8.164	13.0		18.08			7.02	7.65
Coke		7,012,254					4.14	128	341	46.88	
Coker Total	21,288	14,957,881					•	***********		100.00	
Coker Gasoline	12,015	3,191,997	0.7587	6.326	55.0		1.52			21.34	30.04
Coker Gas Oil	9,276	2,955,812	0.9100	7.587	24.0		11.46			19.76	23.19

#### **Sulfur Distribution**

	Sulfur (%)	lb/day	mol/day
Gas	30.0	290,332	9,055
Light Naphtha	1.7	16,452	
Heavy Naphtha	3.3	31,937	
LCGO	15.4	149,037	
HCGO	19.6	189,684	
Coke	30.0	290,332	

Scale metals assuming all go to the coke.

Coker Gas Composition

CONCI GUS COII						
				Corrected	Corrected	Corrected
Component	Mol%	Mal Wt	mol/day	mol/day	Mol%	lb/day
Methane	51.4	16.043	34,948	34,948	51.4	560,661
Ethene	1.5	28.054	1,020	1,020	1.5	28,611
Ethane	1/5.9	30.070	10,811	10,811	15.9	325,075
Propene	3.1	42.081	2,108	2,108	3.1	88,696
Propane	8.2	44.097	5,575	5,575	8.2	245,853
Butenes	2.4	56.108	1,632	1,632	2.4	91,557
I-Butane	1.0	58.123	680	680	1.0	39,519
N-Butane	2.6	58.123	1,768	1,768	2.6	102,750
H2	13.7	2.016	9,315	260	0.4	524
CO2	0.2	44.010	136	136	0.2	5,985
H2S		34.080		9,055	13.3	308,586
Sulfur		32.064	9,055			
Total	100.0		77,047	67,992	100.0	1,797,818
w/o Sulfur		22.171	67,992			1,507,485
	Corrected	in units of	MMscf/day	25.80		

Updated: July 5, 2017



### Coker Calculations Using Gary et. al. Correlations

						CCR	Sulfur	Nickel	Vanadium	Yield	Yield
	bbl/day	lb/day	SpGr	lb/gal	°API	wt%	wt%	ppm	ppm	wt%	vol%
Vac Resid Feed	40,000	14,957,881	1.0679	8.904	1.0	29.3	6.47	60	160		
Coker Gas		1,797,818					16.15			12.02	
Light Coker Gasoline	4,205	1,060,381	0.7201	6.004	65.0		1.55			7.09	10.51
Heavy Coker Gasoline	7,808	2,131,615	0.7796	6.500	50.0		1.50			14.25	19.52
Light Coker Gas Oil	6,214	1,906,499	0.8762	7.305	30.0		7.82			12.75	15.54
Heavy Coker Gas Oil	3,060	1,049,313	0.9792	8.164	13.0		18.08			7.02	7.65
Coke		7,012,254					4.14	128	341	46.88	
Coker Total	21,288	14,957,881								100.00	
Coker Gasoline	12,015	3,191,997	0.7587	6.326	55.0		1.52			21.34	30.04
Coker Gas Oil	9,276	2,955,812	0.9100	7.587	24.0		11.46			19.76	23.19

#### **Sulfur Distribution**

	Sulfur (%)	lb/day	mol/day
Gas	30.0	290,332	9,055
Light Naphtha	1.7	16,452	
Heavy Naphtha	3.3	31,937	
LCGO	15.4	149,037	
HCGO	19.6	189,684	
Coke	30.0	290,332	
Total	100.0	967,775	

#### Coker Gas Composition

				Corrected	Corrected	Corrected
Component	Mol%	Mol Wt	mol/day	mol/day	Mol%	lb/day
Methane	51.4	16.043	34,948	34,948	51.4	560,661
Ethene	1.5	28.054	1,020	1,020	1.5	28,611
Ethane	15.9	30.070	10,811	10,811	15.9	325,075
Propene	3.1	42.081	2,108	2,108	3.1	88,696
Propane	8.2	44.097	5,575	5,575	8.2	245,853
Butenes	2.4	56.108	1,632	1,632	2.4	91,557
I-Butane	1.0	58.123	680	680	1.0	39,519
N-Butane	2.6	58.123	1,768	1,768	2.6	102,750
H2	13.7	2.016	9,315	260	0.4	524
CO2	0.2	44.010	136	136	0.2	5,985
H2S		34.080		9,055	13.3	308,586
Sulfur		32.064	9,055			
Total	100.0		77,047	67,992	100.0	1,797,818
w/o Sulfur		22.171	67,992			1,507,485
	Corrected	in units of	MMscf/day	25.80		

Updated: July 5, 2017

