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Houston Plant Energy Initiatives

DOE Steam BestPractices Meeting
21 May 2008

Fred Fendt

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Agenda

- Plant Overview
- Results of 2006 ESA
- Current Energy Activities

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Houston Plant Overview

- 888 Acres

- 772 Rohm and Haas Texas Employees
410 hourly, 59 foremen, 303 salaried
(includes 115 in Engineering Division)
- 250 Maintenance/Construction contractors
(shutdown peak load of 1700 contractors)
- PACE Local 4 Union

- $67M payroll; $17 M Property Taxes
- > $100M Purchased Energy

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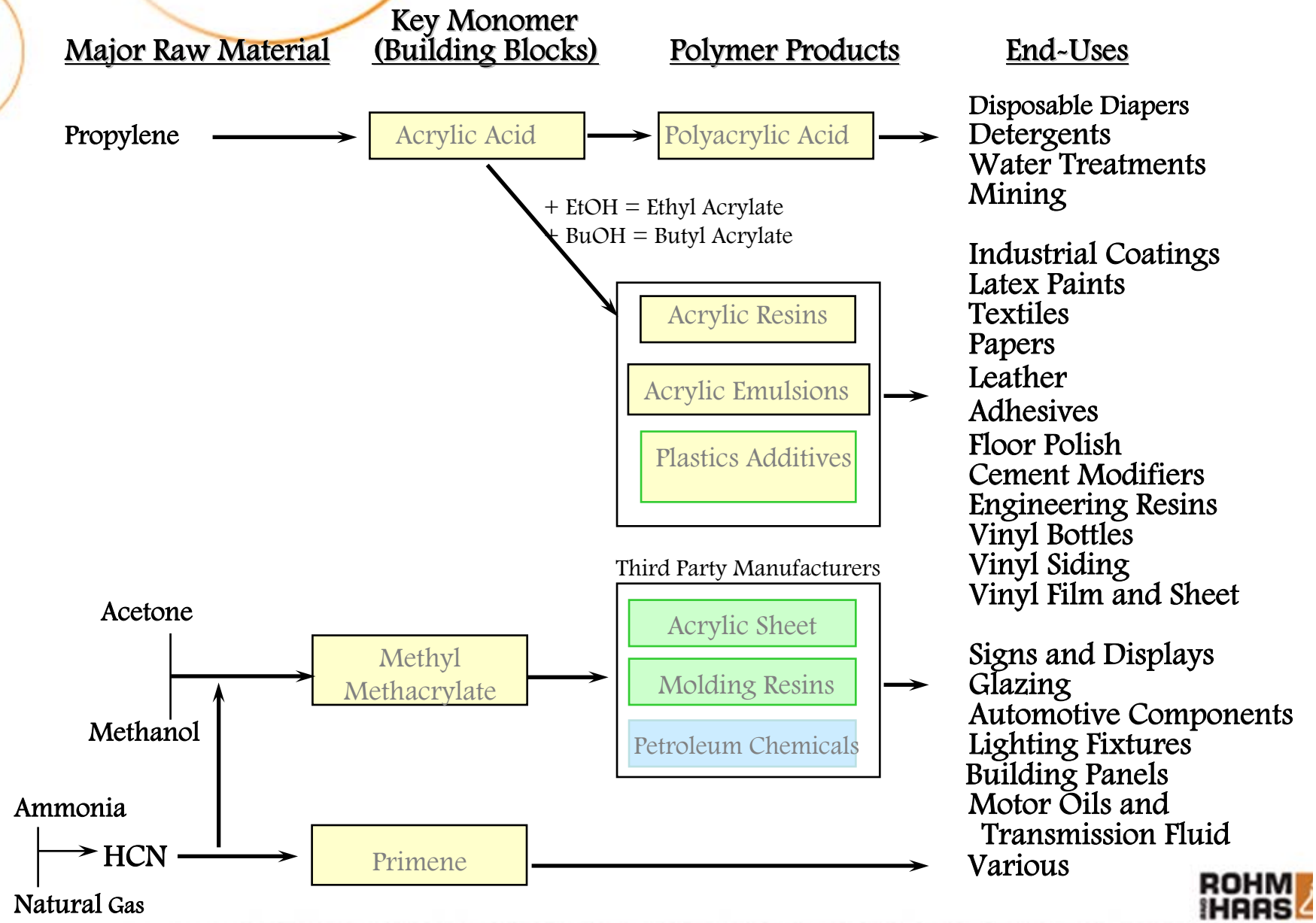

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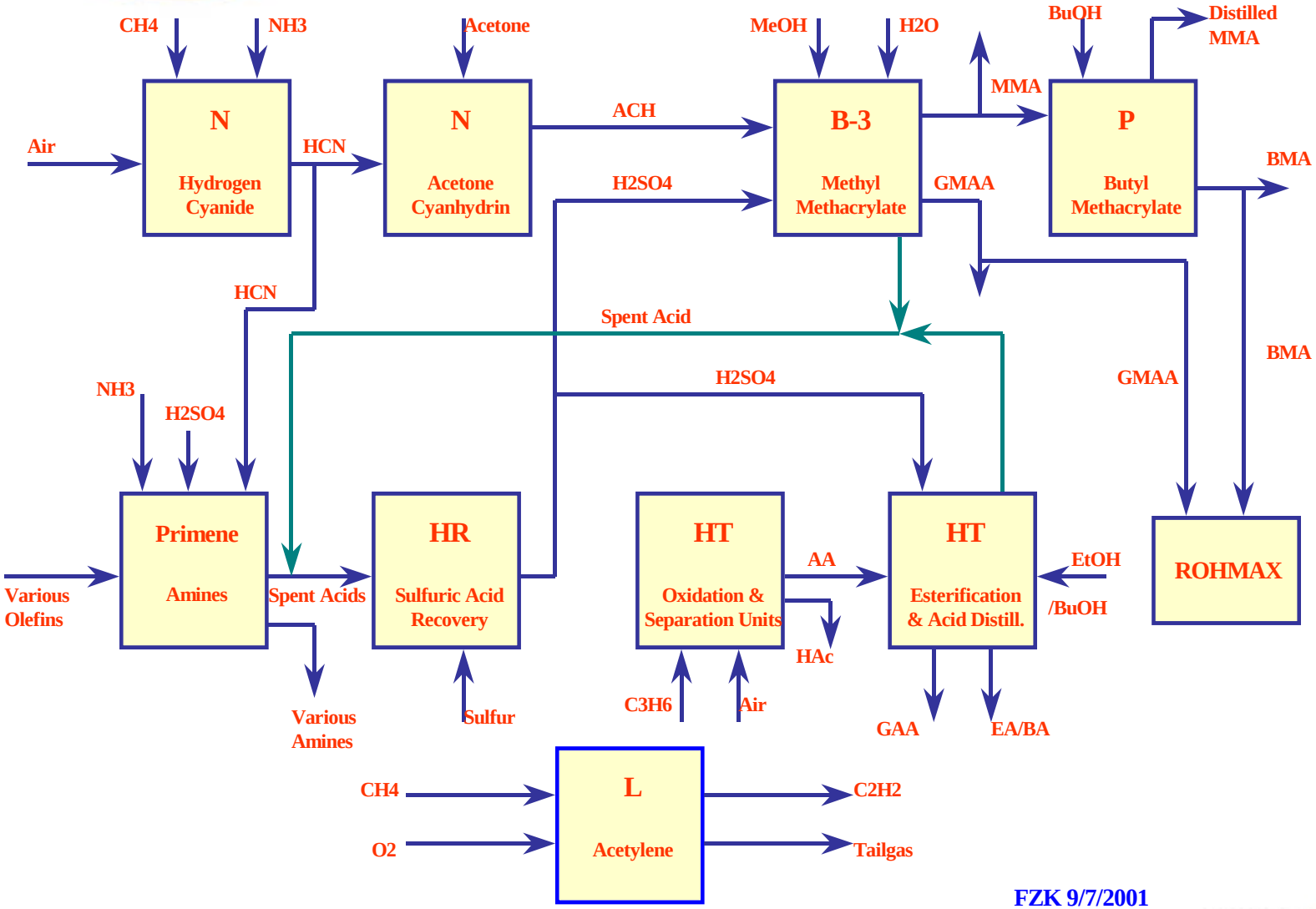
Rohm and Haas Texas Incorporated

Plant Product Flow Sheet



FZK 9/7/2001
ProFlow.ppt Ver 2.1

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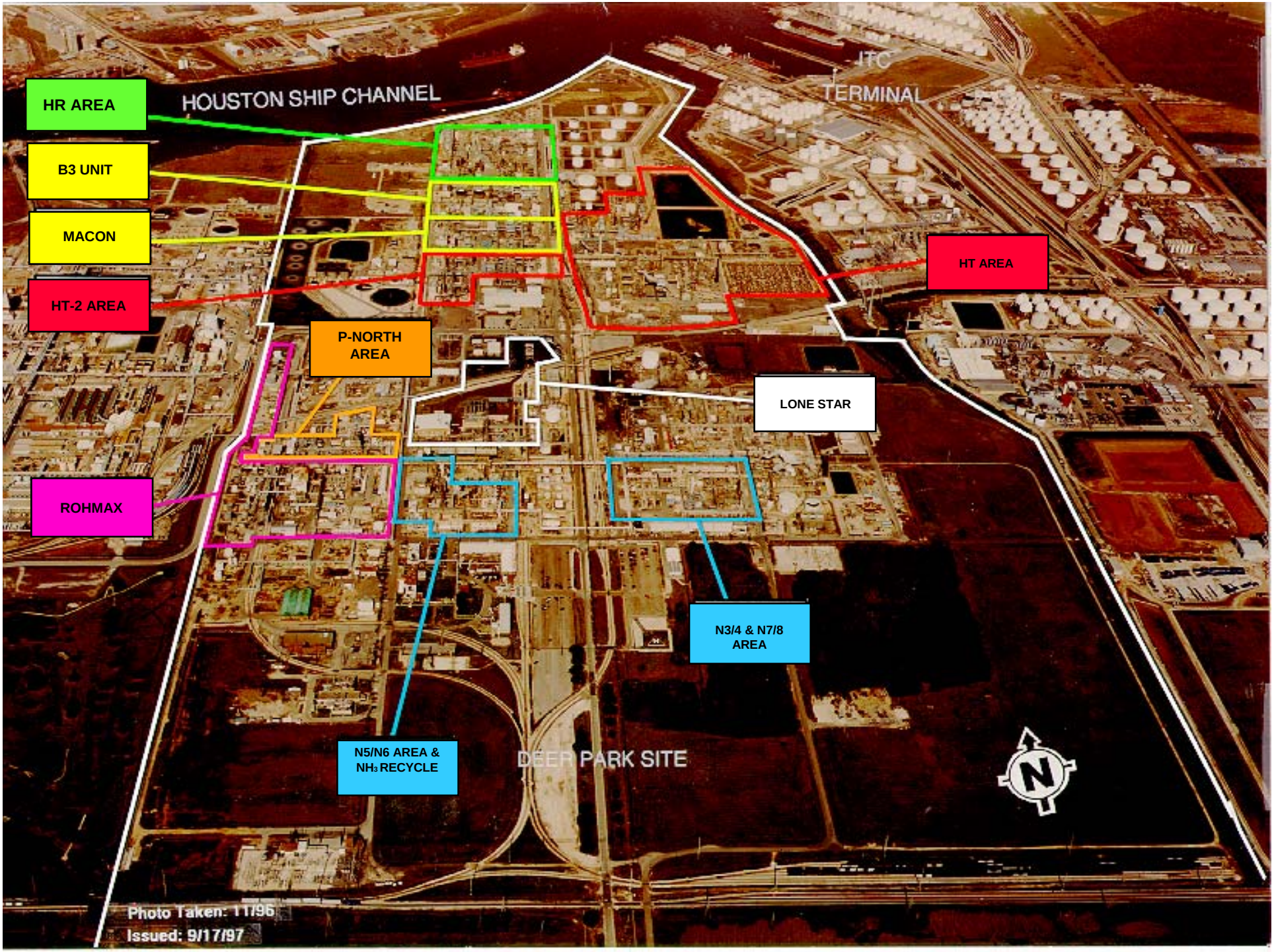
HR AREA
HOUSTON SHIP CHANNEL
ITC
TERMINAL
B3 UNIT
MACON
HT-2 AREA
HT AREA
P-NORTH AREA
LONE STAR
ROHMAX
N3/4 & N7/8 AREA
N5/N6 AREA & NH3 RECYCLE
DEER PARK SITE
N
Photo Taken: 11/96
Issued: 9/17/97

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Houston Plant 2006 ESA

- ESA-023 (25-27 April, 2006)
- ESA Type Steam
- ESA Specialist Riyaz Papar, PE, CEM

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SSST Score Results

	POSSIBLE SCORE	YOUR SCORE	AVERAGE SCORE
STEAM SYSTEM PROFILING	90	81	53
STEAM SYSTEM OPERATING PRACTICES	140	127	104
BOILER PLANT OPERATING PRACTICES	80	69	50
DISTRIBUTION, END USE, RECOVERY OP. PRACTICES	30	22	16
TOTAL SCOPING TOOL QUESTIONAIRE SCORE	**340**	**299**	**223**
TOTAL SCOPING TOOL QUESTIONAIRE SCORE (%)		**88%**	**66%**

With a score this high - We have to think out of the box!

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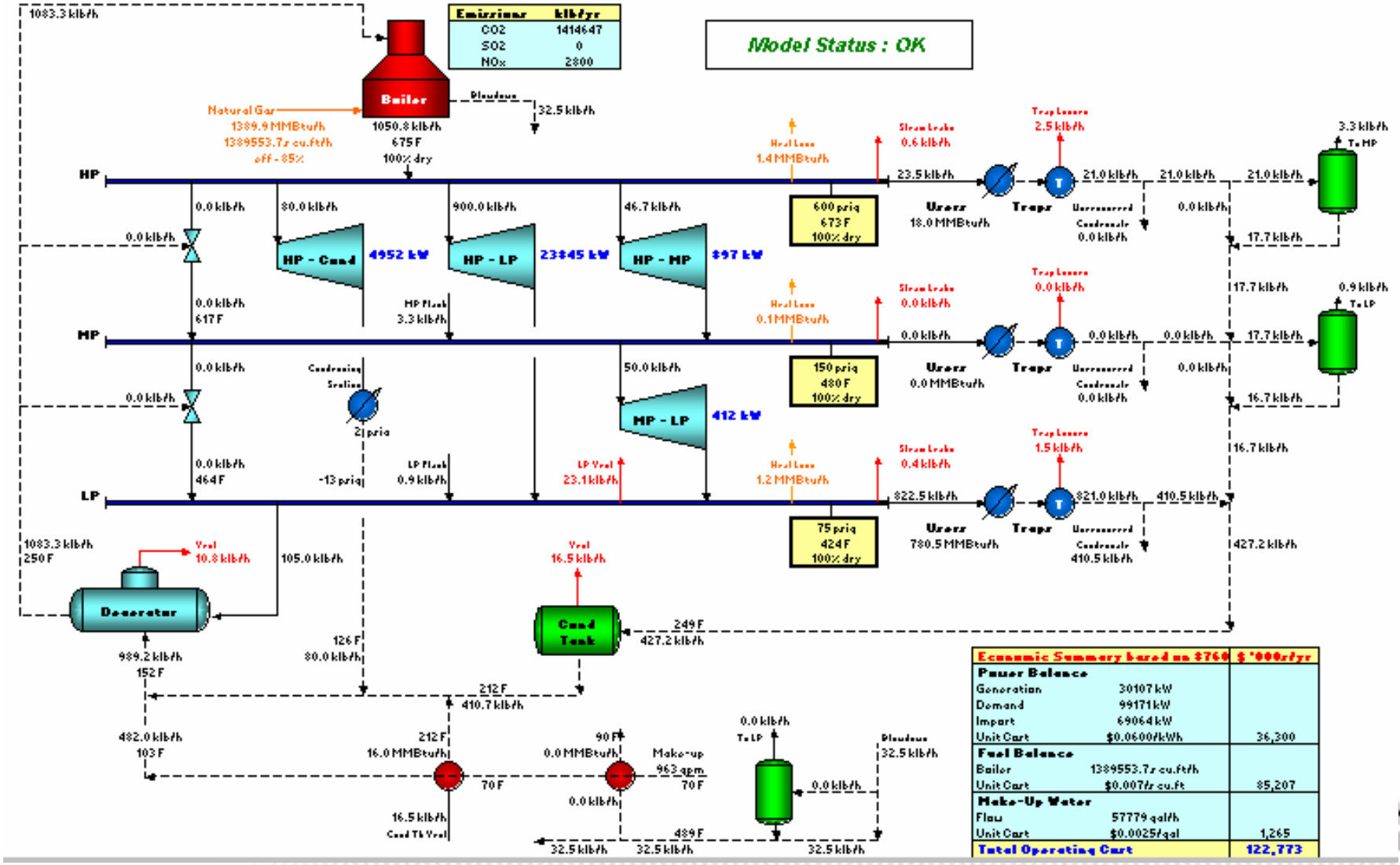
Steam System Assessment Tool

Rohm and Haas Company, Deer Park, TX ESA

Current Operation



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ENERGY SAVINGS OPPORTUNITY SUMMARY INFORMATION					
Identified Opportunity	**Savings/yr**				
	$	**kWh**	**MMBtu**	**Fuel Type**	**N,M,L**
Low pressure steam distribution system reconfiguration	992,600	0	141,800	Natural gas	M
Reduce excess steam venting with use of a condensing steam turbine	336,900	5,615,000	0	Electricity	N
Use of excess steam to provide refrigeration and/or process cooling	225,840	3,764,000	0	Electricity	L
Use of superheat from C-train TO WHB for condensing turbine	114,100	0	16,300	Natural gas	N
Improve condensate return	816,200	0	116,600	Natural gas	M
Utilize blowdown flash tank and blowdown heat recovery exchanger	251,300	0	35,900	Natural gas	N
Increase exhaust pressure of 600-35 psig steam turbine	0	0	0	Natural gas	N

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Energy Savings Opportunities

- Increase the exhaust pressure of 600-35 psig turbine to 75 psig
  - Will lead to higher steam flow for the same power generation
  - But will reduce pressure letdown from 150 to 75 psig
  - Hence, net reduction in overall steam generation
  - Eliminates venting!
  - Allows operation of either Atomizing Air Compressor without jeopardizing steam balance

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IDENTIFIED PLANT BEST PRACTICES	
Energy Cost Reduction Team (ECRT) at plant level	Existence of energy cost reduction project portfolio
Dedicated personnel for specific efficiency improvement areas – steam traps, etc.	Real-time tracking of energy efficiency metrics & high fidelity energy balance models (Monte Carlo)
Completed thermal pinch analysis study for the plant	Excellent documentation for energy use systems
Steam production from waste heat boilers	Oxygen trim controls, wherever applicable
Good PM protocol for periodic tune-up	Good record and log of water treatment & blowdowı
Use of back-pressure turbines for pressure-letdown	Optimization modules control production operations
Above average condensate return	Highly integrated distribution system

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Mission and Goals

- **Mission**
  - **Design and implement a Site-Wide Energy Management program that delivers a significant permanent reduction in energy consumption.**
- **Goals**
  - To reduce the plant's energy intensity such that a $5MM (based on 2008 BP value for energy) reduction in run rate would result by the end of 2008 and an additional $5MM (based on 2009 BP value for energy) reduction in run rate would result by the end of 2009.
  - To develop a short term program of quick return projects for immediate benefit.
  - To develop a long term program focusing on driving the plant energy intensity to the minimum that is economically justifiable and creating and sustaining a culture that will keep the plant operating there.

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A Multi-Pronged Attack

- ✓Renewed Assessments
- ✓Improved Process Technology
- ✓Improved Execution of Existing Technology
- ✓Improved Energy Culture
- ✓Improved Energy Management

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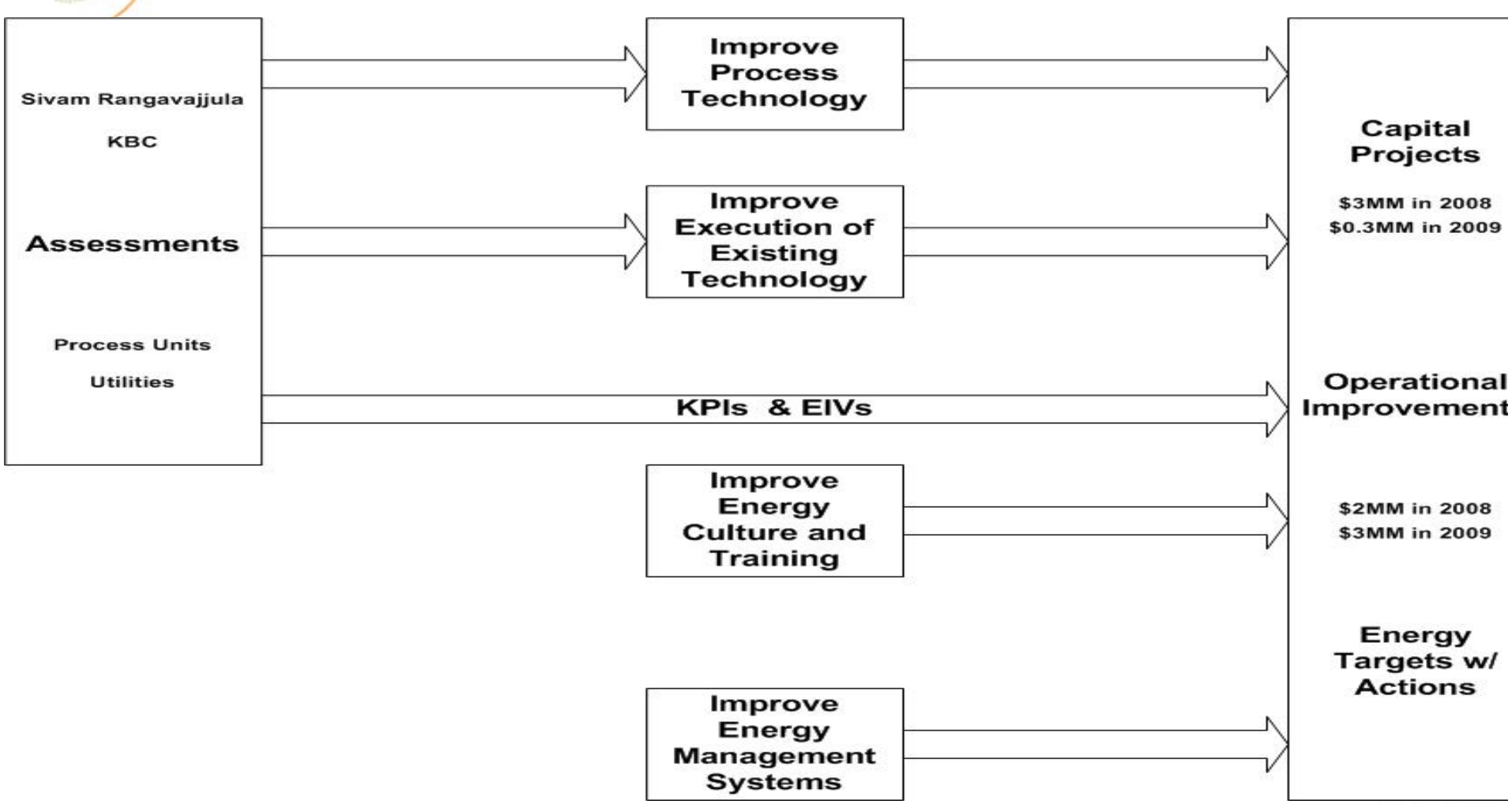
Work Element Flow



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Resources Fully Staffed to find opportunities

TCM II Energy Management Working Team	
Name	Role
Mike Warth	Champion\Manager
Julio Rodriguez	TCM Manager
Fred Fendt	Team Leader
Tony Dafft	Utility Expert
John Stuart	Project Engineer
Dave Anton	Utility Expert
Jay Deshmukh	Proc. Control Expert
Clinton Whitehead	VM Server Support

Contract Consultants	
KBC	
Name	Role
Andrew McMullan	Mgmt\Energy
Alan Karp	Mgmt\Energy
David Williams	Human Perfomance
Chet Vlaun	Reliability\Maintenance
Darren Le Geyt	Chem Engineer
David Hart	Data Mining
Soteica	
Oscar Santollani	Mgmt
Jorge Mamprin	Consultant

Energy Project Support	
Insulation	John Stuart
Instrument & Meter Improvement	Natalee Bailey
Capital Portfolio Feed	
Aprox. 2 EQ from:	Leo Klawiter
	Joe Kindrick (?)
	Nicole Koegle (?)
	Danielle Mauz (?)
	Quenton Leigh (?)

Assessment Support		
	Engineer	**Manager**
Acrylates		
Cindy Cooper		Kevin Sokora
		Rene Zamarripa
Methacrylates		
Deepak Dang		Lesli Poole
		Steve Weinberg
South Plant		
Mandy Whitecotton (P2)		Susan Lee
Gerard Rogers (N)		
		Kevin Holder

Note: Staffing does not include Manpower for opportunity execution.

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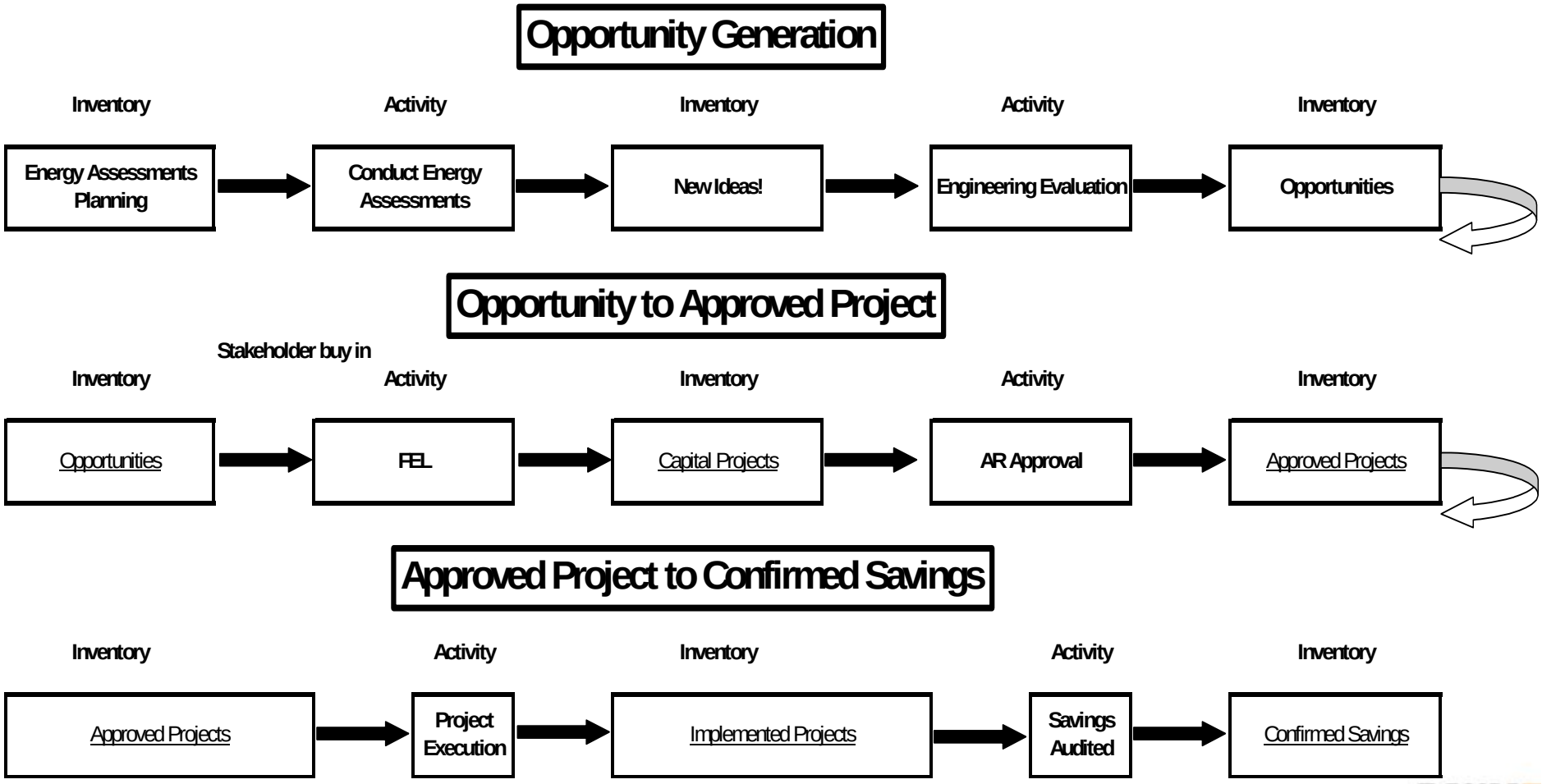
From Ideas to Savings
The CDP Process



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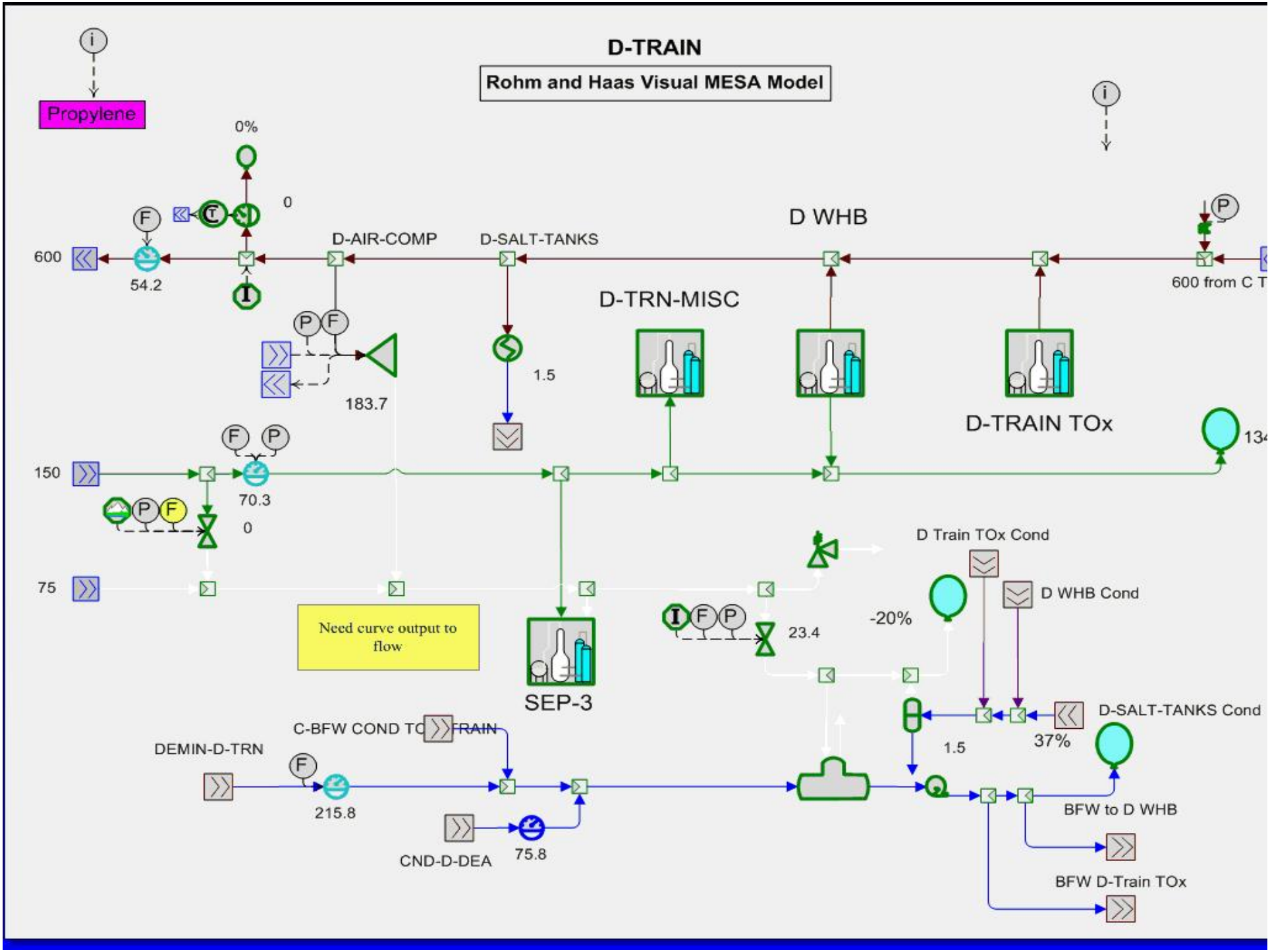
D-TRAIN
Rohm and Haas Visual MESA Model
Propylene
0%
0
600
54.2
D-AIR-COMP
D-SALT-TANKS
D WHB
600 from C T
D-TRN-MISC
183.7
1.5
D-TRAIN TOx
150
70.3
0
75
Need curve output to flow
SEP-3
23.4
D Train TOx Cond
D WHB Cond
-20%
D-SALT-TANKS Cond
37%
1.5
DEMIN-D-TRN
C-BFW COND TO TRAIN
215.8
CND-D-DEA
75.8
BFW to D WHB
BFW D-Train TOx

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Questions?

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