

Texas Petrochemicals LP

The Leading Producer of C₄ Based Chemicals

Back To The Basics

Sean Diamond

Manufacturing Optimization Manager

Texas Petrochemicals L.P.

Presentation to the Texas Technology Showcase

December 6, 2006



Company Information

TPC has the largest butadiene and butene -1 extraction capacity in North America. In addition, TPC is one of North America's largest producers of isobutylene and derivatives of isobutylene such as polyisobutylene, di-isobutylene, and isobutylene concentrate.

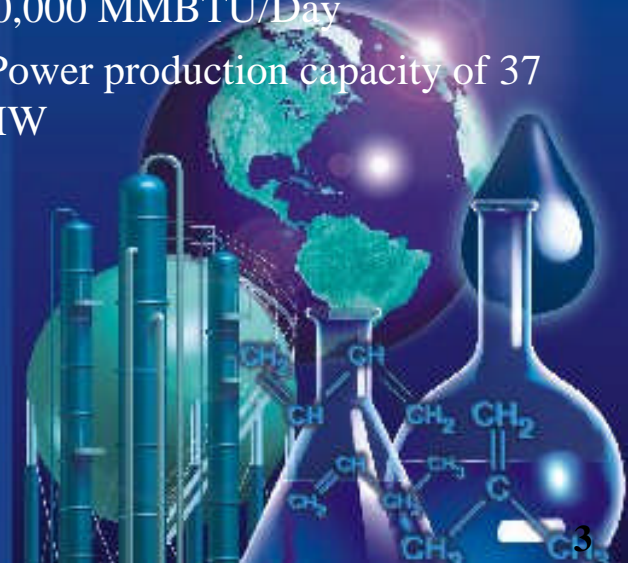
The logo for TPC, consisting of the letters 'TPC' in a bold, white, sans-serif font with a stylized 'C' that has a white arrow-like shape inside it, all set against a dark blue background.

Manufacturing



- 257 acres along the Houston Ship Channel built in mid-40s
- Rated capacity of 1.2 billion lbs/year of BD
- 5 Fired Boilers with steam generation capacity of 1.4 MMPPH
- 3 Waste Heat Boilers with capacity of 700 MPPH
- Fuel Gas requirements of about 40,000 MMBTU/Day
- Power production capacity of 37 MW

TPC



Facilities & Assets

- Houston Production Facility
- Port Neches Production Facility
- Baytown Production Facility and Terminal
- Lake Charles Terminal



Products

- The family of products made by TPC are generally known as C4 olefins
- These products are produced at TPC by various processes including
 - Fractionation
 - Absorption
 - Reaction
 - Extractive Distillation

TPC



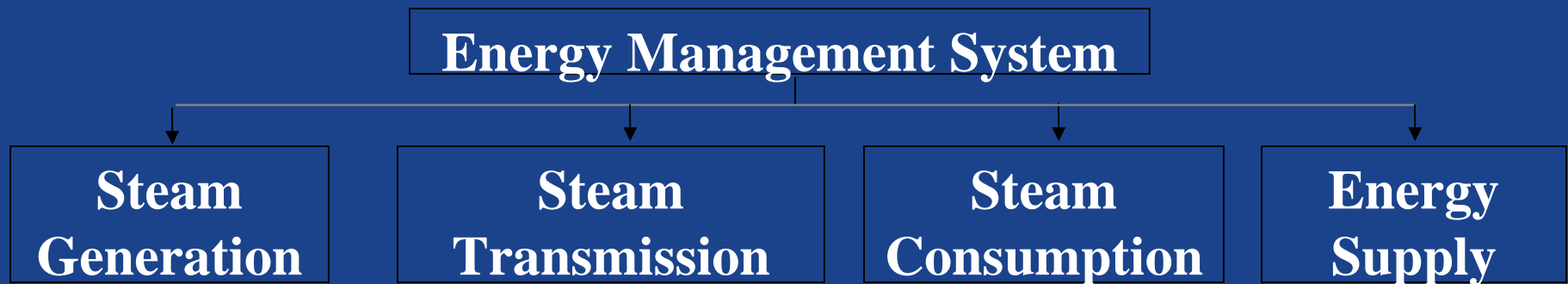
Products

- Butadiene (BD)
- Butene-1 (B1)
- Isobutylene (IC4)
- Di-isobutylene (DIB)
- Polyisobutylene (PIB)
- Alkylate
- Methyl Tertiary Butyl Ether (MTBE)

TPC



Energy Management Strategy



TPC



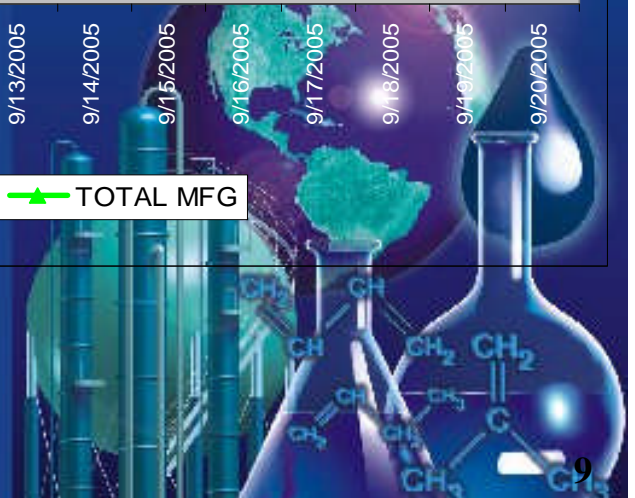
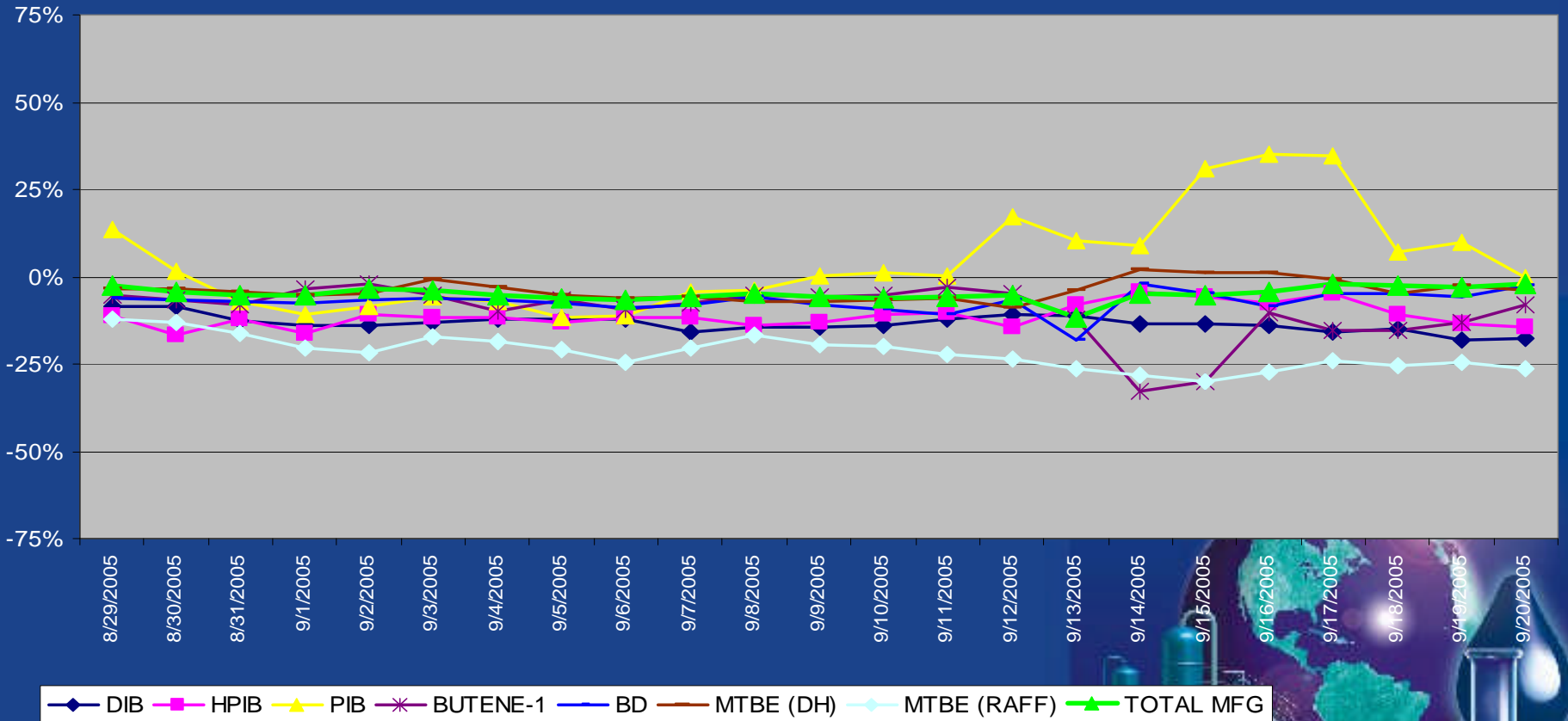
Energy Management Strategy

- Energy Management System
 - Personnel
 - Created Mfg Optimization group with a manager and two engineers; rolled process control group into this group as well
 - Focus of this group is energy and process optimization
 - Direct accountability to SVP of Operations
 - Reporting
 - Daily Energy Report with Steam Balance
 - Process Targets
 - Multi-variant regression model for plant energy usage



Energy Management Strategy

% OF ENERGY TARGET



Energy Management Strategy

- Steam Generation
 - Boiler combustion analysis – tighter targets
 - Bambeck CO controls on #2 and #4 boilers
 - Cleaning/Inspection program for pre-heater wheels
 - Establish loading curves on boilers to find best efficiency point at varying steam demand levels
 - Run less boilers at higher capacity – decrease radiant losses




Energy Management Strategy

- Steam Transmission
 - Utility Leak Program
 - Steam trap management program
 - Insulation Program
 - Condensate recovery program

TPC



Energy Management Strategy


LEAK TAG

No 1266 By: _____

Date: _____

Unit: _____

Location: _____

Utility/Pressure: _____

Outage Required? _____

LEAK TAG

No 1266 By: _____

Date: _____

Unit: _____

Location: _____

Utility/Pressure: _____

Outage Required? _____

Leak Estimate: _____

Promotional Specialties 281-992-6951



TPC

Energy Management Strategy

TPC Leak And Condensation - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://leak/

TPC Connections TPC Leaks And Condensation Summary

Menu:

- Plan
- Completed
- Procedure
- Admin
- Help

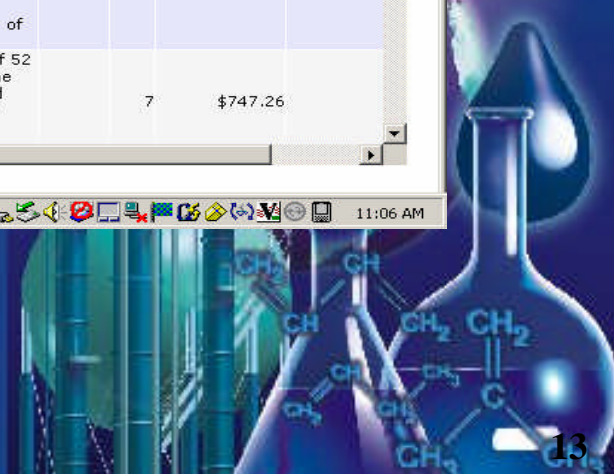
PLAN UTILITY LEAKS AND CALCULATOR:

New Entry Print Plan Filter Plan

Delete	Edit	Leak Tag No.	WD No.	Process Area	Cost Center	Report Date	Utility	Steam PSIG	Plume Length	Outage Req	Location And Details	Status	PPH Loss	Annual Cost	Repairs Complete
✗	✎	2041		boilerhouse		11/12/2004	Steam	750	1	N	3" Valve equalizing line around 750 block valve Ground lvl-Northside TG bldg	Rework Needed	32	\$3,651.90	
✗	✎	0383		South Process		1/26/2005	Steam	150	3	Y	5th st. at column 11-121-A		60	\$6,811.18	
✗	✎	0469		North Process		2/4/2005	Steam	15	3	N	W. of 4E-436 on valve		14	\$1,647.59	
✗	✎	0072		South Process		2/9/2005	Steam	150	2	Y	flange lk. on header side .been pumped once .in rack no. of 1b-506		27	\$3,051.84	
✗	✎	0073		South Process		2/9/2005	Steam	150	2	Y	flange lk. on header side .been pumped once .in rack no. of 1B-506		27	\$3,051.84	
✗	✎	0362		South Process		3/9/2005	Steam	15	2	N	south of 52 twr at the manifold about 3' high off ground		7	\$747.26	

Start | Inboxes - Mi... | TPC Compl... | Microsoft ... | BigDailySt... | Energy Re... | TPC Leak ... | 11:06 AM

TPC



Energy Management Strategy

- Steam Consumption
 - Replace 150-ATM steam turbines with motors
 - Challenge historical targets in distillation columns
 - Reboiler fouling monitoring and cleaning
 - Make better use of ultra low pressure flash steam
 - Establish feed loading curves in parallel trains to find best efficiency point



Energy Management Strategy

- Energy Supply
 - Prior to May 2004, TPC sole-sourced entire natural gas supply (approx 40,000 mmbtu/day)
 - Currently, TPC has diversified its supplier base by taking advantage of its 5 natural gas pipes in the facility with more than 7 suppliers on a monthly basis
 - Engaged a third-party company to execute our natural gas risk management policy
 - These activities have had a favorable impact on our weighted average cost of gas (WACOG)



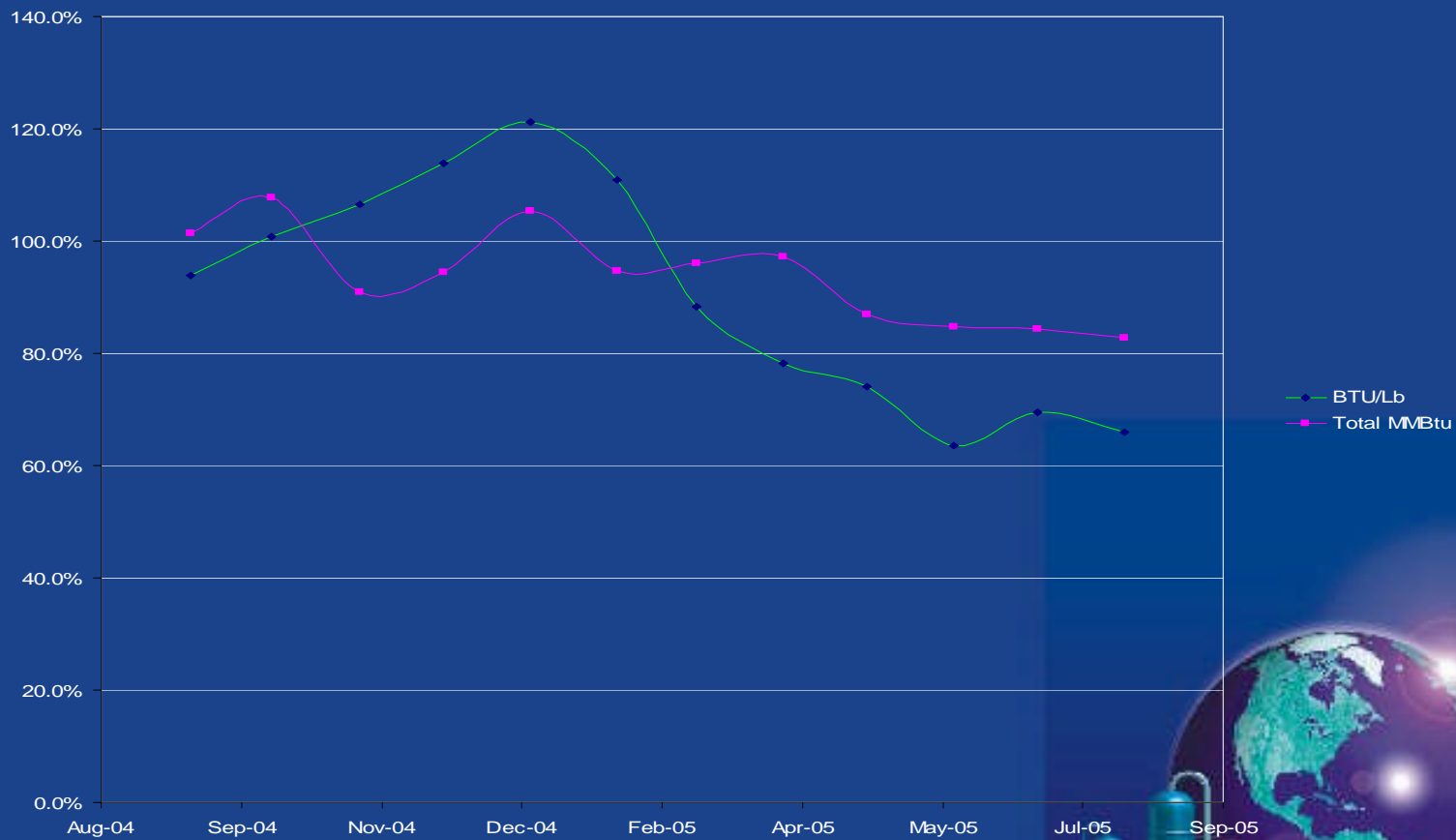
Energy Management Strategy

- Future Projects
 - Multi-million dollar Boiler NO_x project (start-up 7/06)
 - Site PINCH and Column Sequencing analysis
 - Five small capital condensate recovery projects that will capture 350 gpm of condensate to return to boilerhouse
 - Select conversion to motors of steam turbines venting to atmosphere
 - Compressed Air leak and performance testing through Centerpoint Energy's electrical usage reduction program
- Auditing
 - Key aspect to energy management strategy is auditing projects to ensure compliance



Results

Total Energy and Energy Intensity



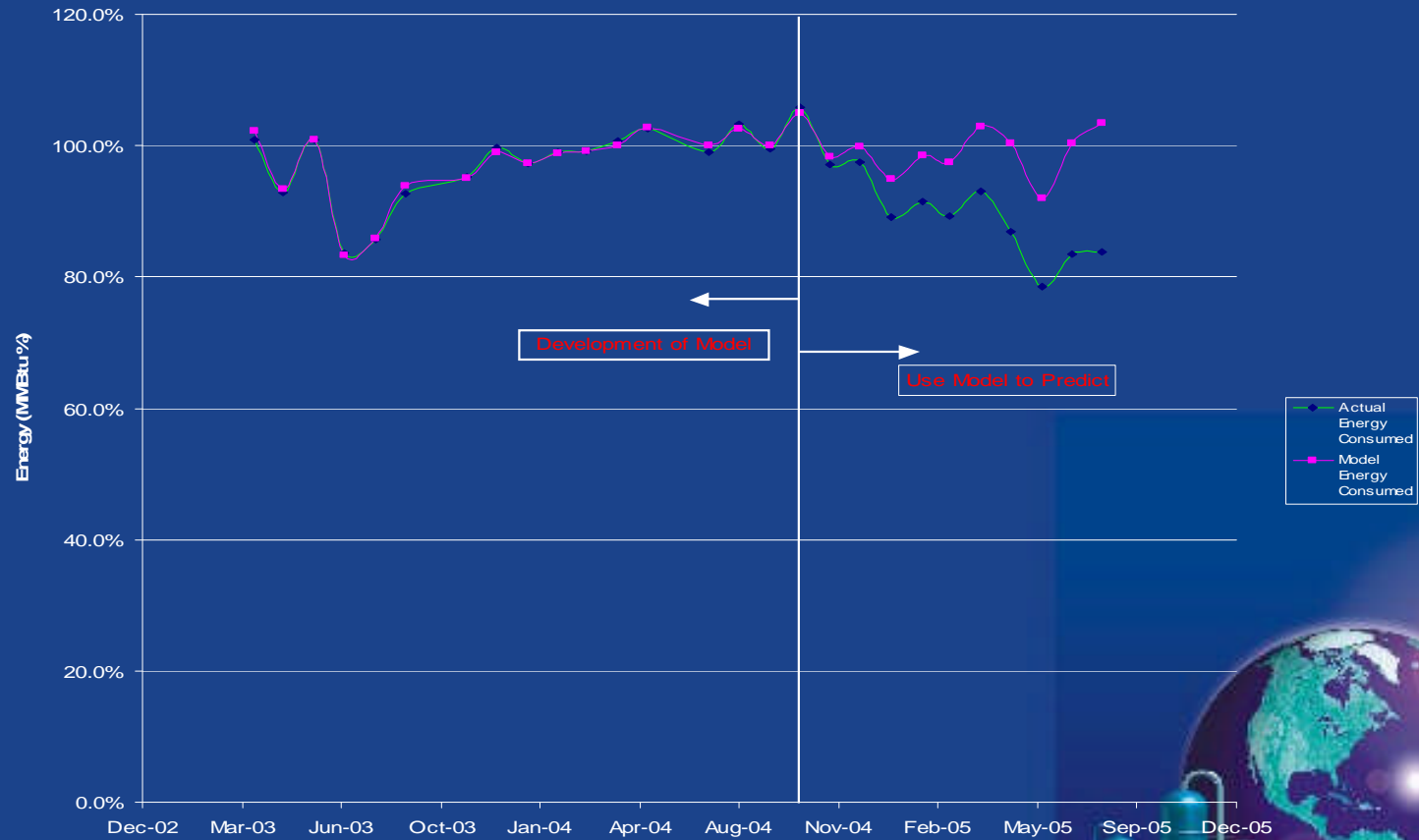
Indexed off of previous 12 months average

TPC



Results

Plant Energy Model



Results

- 6.2% reduction in btu/lb of plant-wide production from FY04 to FY05
- 11.6% reduction in btu/lb of plant-wide production from FY05 to mid-way through FY06
- Achieved these results despite a reduction in plant-wide production of 2.5% due to market conditions



- Thank you for your time!

Sean Diamond

Manufacturing Optimization Manager

Texas Petrochemicals L.P.

