

# Case Study: MMNA and PPG



Applying BC4200NP Paint  
Detackification Chemistry at the  
Normal, Illinois, MMNA Automobile  
Assembly Facility

CMS Forum

10/25/06

# Mitsubishi Motors North America

- The company's only North American manufacturing facility began construction in 1985 and is located about 150 miles south of Chicago, IL
- The automobile assembly plant is one the most technologically advanced in the world, utilizing nearly 1000 robots housed under 2.4 million ft<sup>2</sup>
- Body parts are stamped and bumpers molded in house to produce the Mitsubishi Galant, Eclipse, Endeavor, and Spyder
- Part of an elite group of manufactures to be both ISO 9001 and ISO 14001 Certified





# Mitsubishi

## Environmental Stewardship

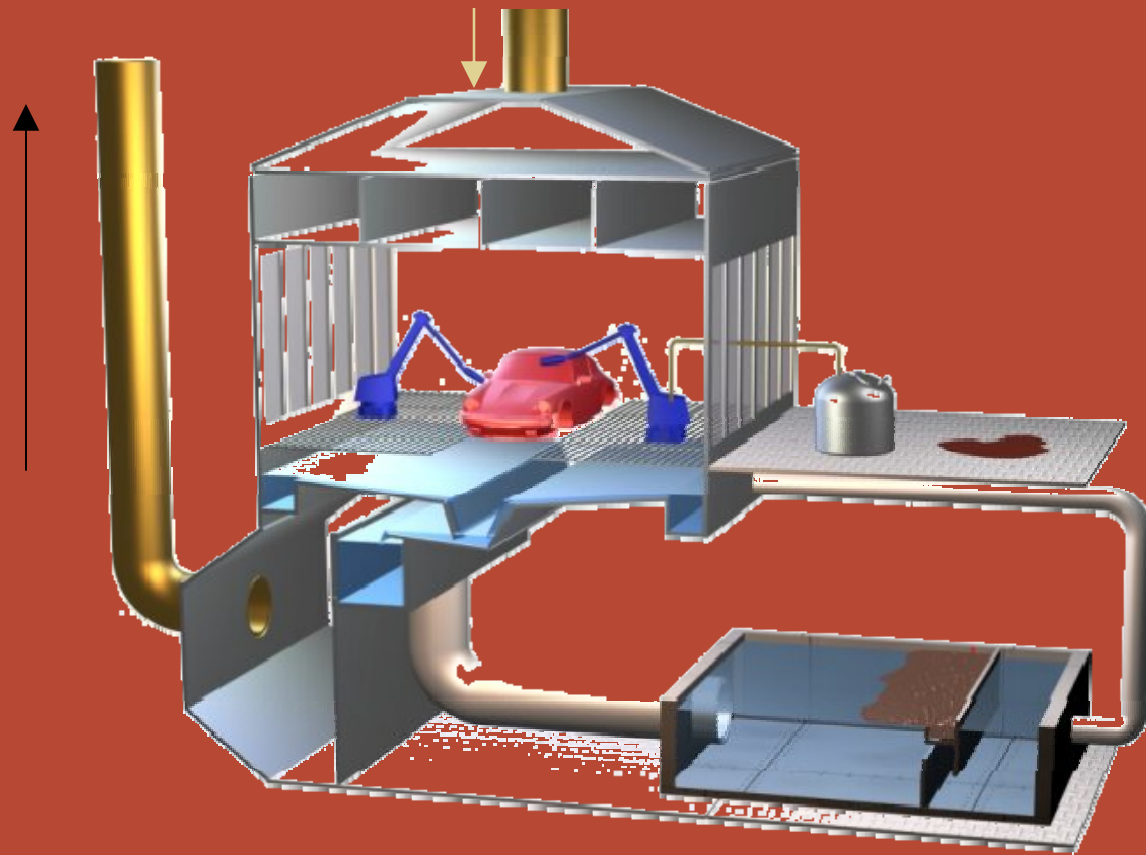
- ISO 14001:1996 certification in 2000
- ISO 14001:2004 certification in 2005
- 3.1 acres of IL natural prairie grass established, increasing tri-county content by 400%
- One of first OEM's to introduce lead free rust prevention coatings
- Fully recyclable TPO bumper systems
- VOC emissions 68% beneath EPA limit and 15% less than 1995 levels
- In a five year period, landfill waste reduced by 35%
- On pace recycle 20 tons of material in 2006, generating \$4.1 million in revenue.

**Protecting the Environment for Our Families**  
**Our Friends**  
**Our Future !**

# PPG Industries, Inc.

- Founded in 1883 in Pittsburgh, PA
- About 31,000 employees worldwide
- Employees are largest stockholder group
- 2005 sales approximately \$10.2 Billion
- Markets served:
  - Coatings: OEM Auto, Industrial, Refinish, Architectural (Pittsburgh Paint), Wood Protection (Olympic Stains)
  - Glass: OEM Auto, Replacement Glass, Architectural, Aerospace Transparencies, Optical (Transition Lenses)
  - Chemicals: WWT, ChlorAlkali, Metal Treatment, Specialty Chemicals

# Typical Paint Spray Booth



- Down draft/water wash booth
- Numerous robotic/manual zones
- 100' – 300' Long

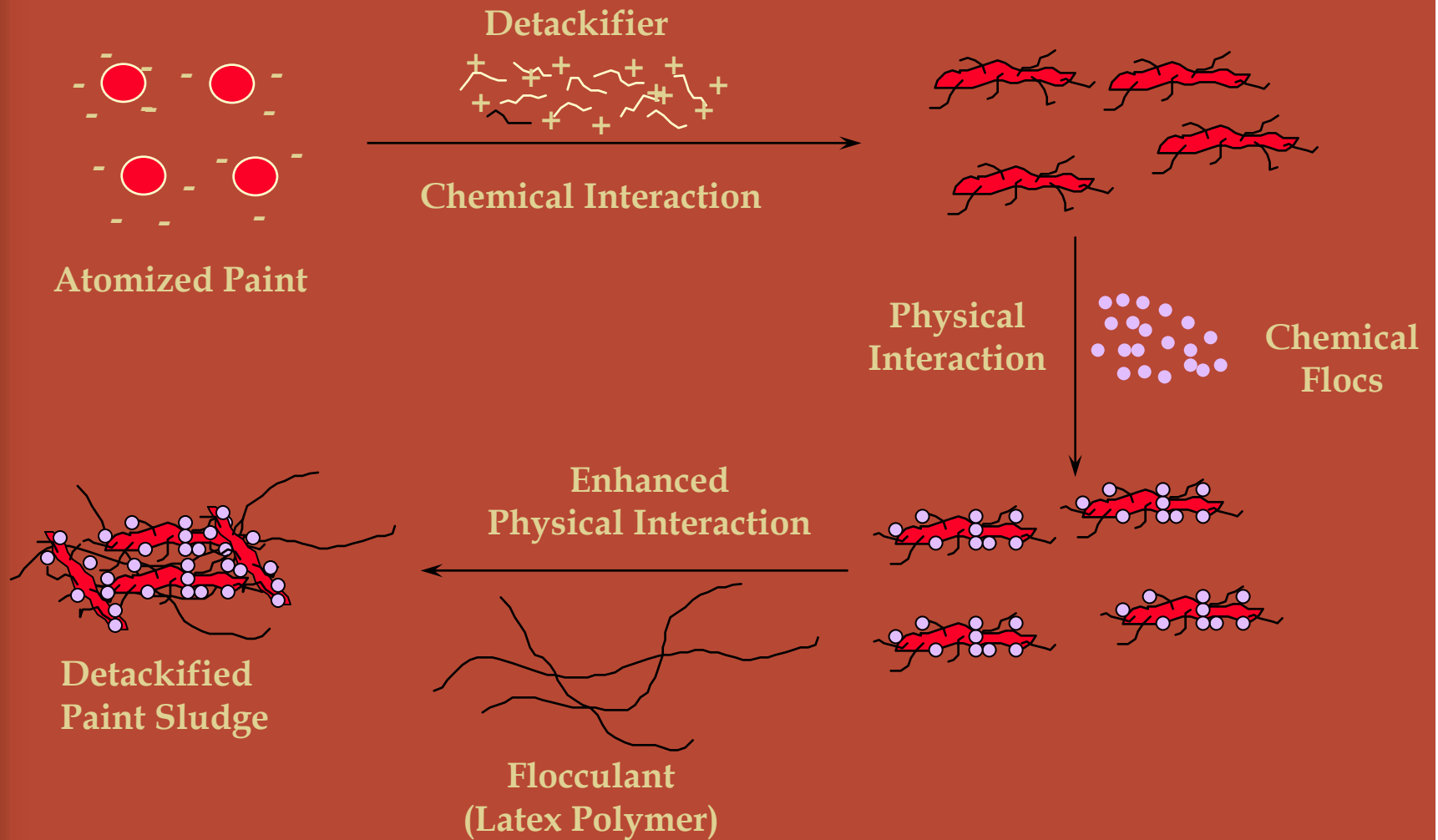
# Paint Detackification Chemicals

- Introduced to “detackify” or render the paint non-sticky / non-tacky
- Further introduced to coagulate paint and solvent particles
- Flocculants added to agglomerate smaller particles
- Specialized form of wastewater treatment

# Mechanism of Paint Detackification

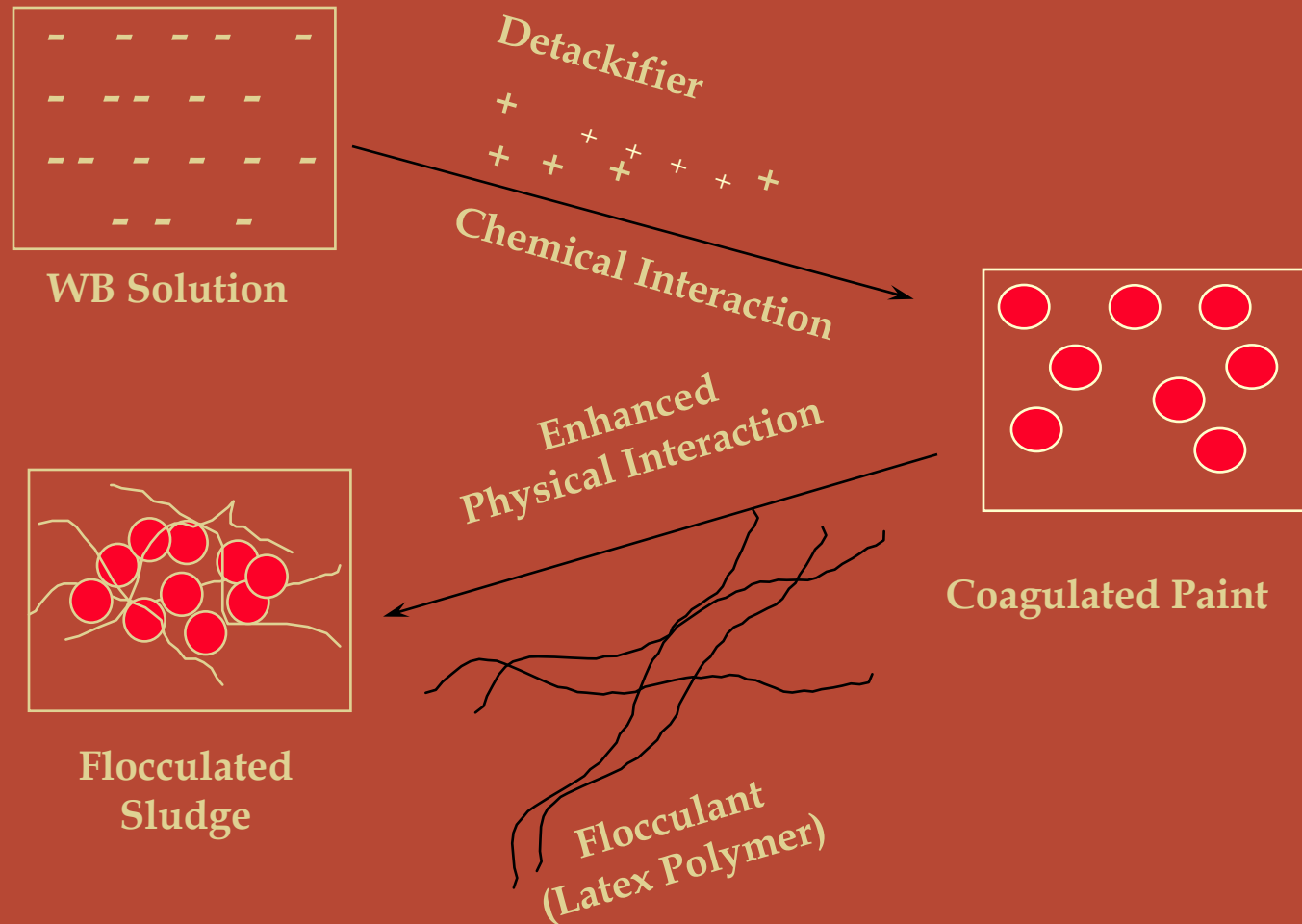
- Chemical Interaction
  - Charge neutralization (coagulation)
  - Favorable at low pH
- Physical Interaction
  - Chemical flocs encapsulate or coat atomized paint particles
  - Favorable at high pH
- Joint Physical/Chemical Interaction

# Mechanism of Treating Solvent Borne Paints

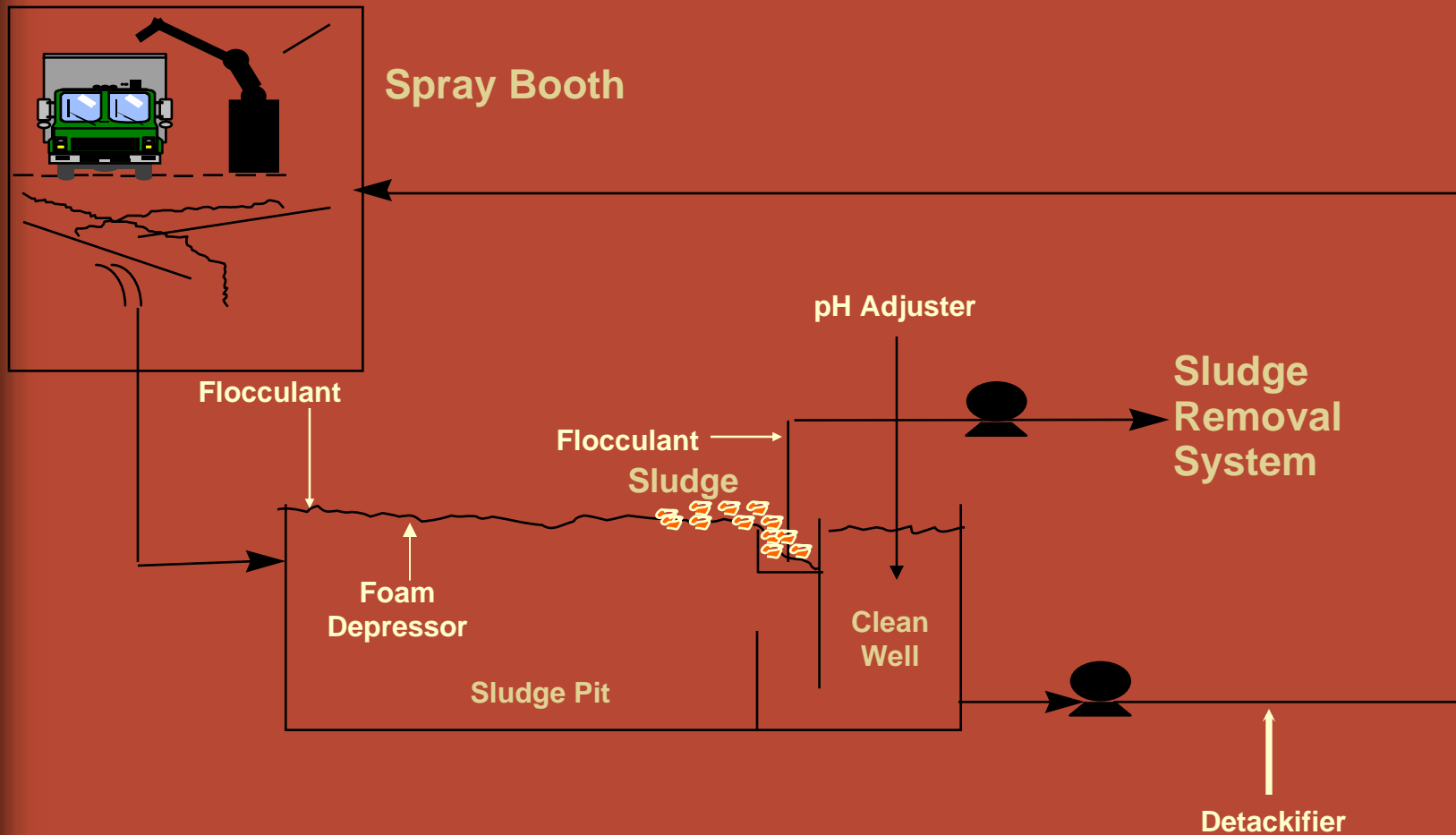




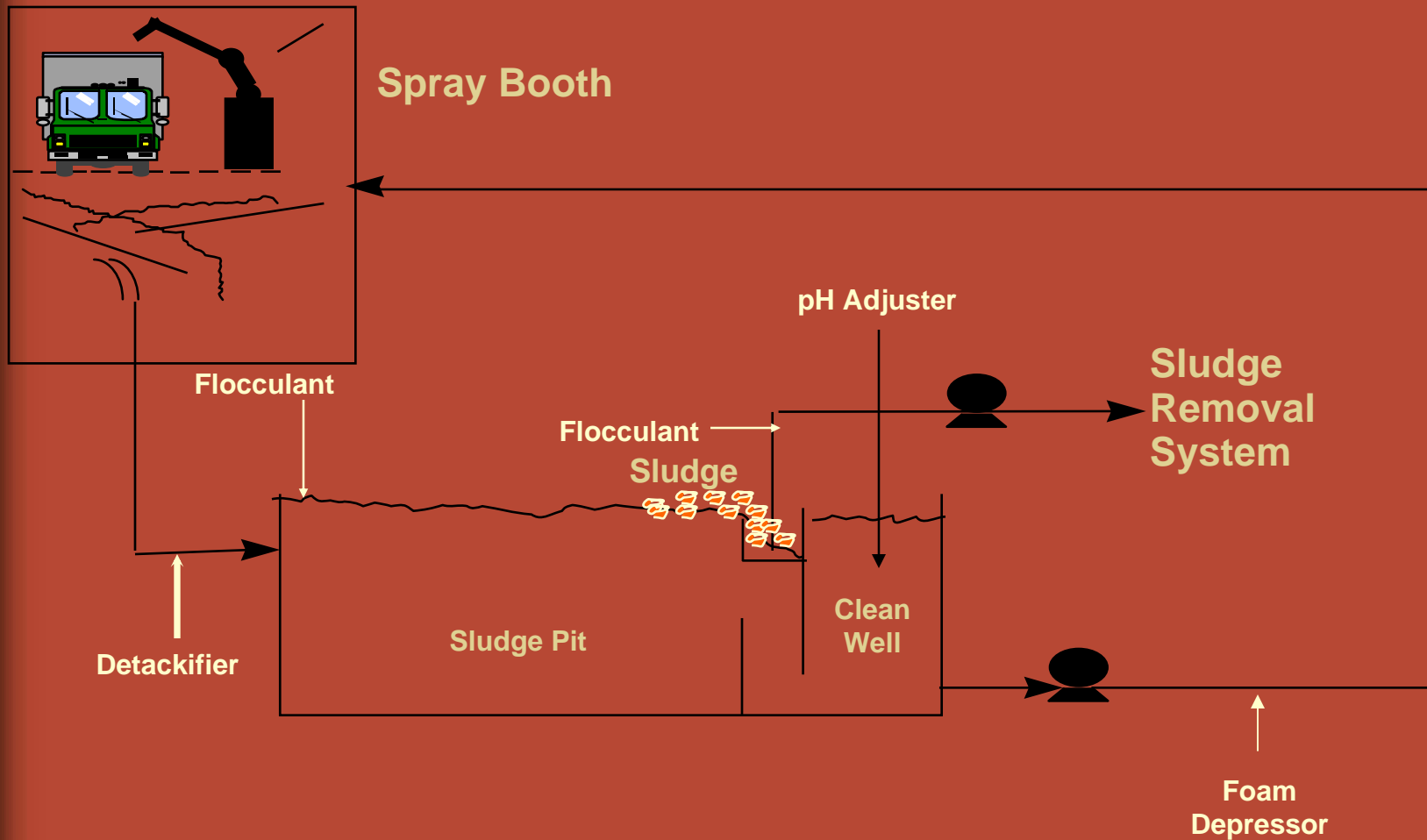
# Mechanism of Treating Water Borne Paints



# Feed Points for Treating Solvent Borne Paints



# Feed Points for Treating Water Borne Paints



# Evolution of Paint Detackification Technology

- 1<sup>st</sup> Generation – Clay/Amine
- 2<sup>nd</sup> Generation – Melamine/Formaldehyde
- 3<sup>rd</sup> Generation – Solution Polymer/Al Salt
- 4<sup>th</sup> Generation – Emulsion/Dispersion Technology
- 5<sup>th</sup> Generation – Naturally Occurring Polymers (chitosan, tannin, starch, etc.)

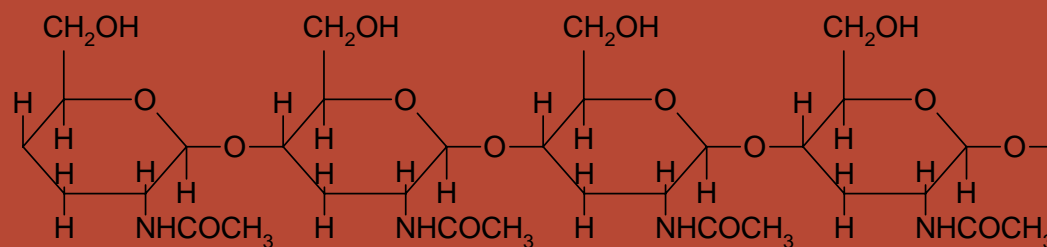


# Environmental Advantages of Chitosan Technology BC4200NP

- A linear polysaccharide derived from exoskeleton of crustaceans
- Main component, chitosan, is similar in composition to keratin and cellulose
- Does not include melamine-formaldehyde resins (residual free formaldehyde)
- Is not derived from acrylic acid or other petroleum derived raw materials (ethylene, propylene)
- Is made from a waste product of food production (shrimp, crab, and lobster shells)
- Technology protected by US Patents #6,673,263 B2 and #6,858,093 B2

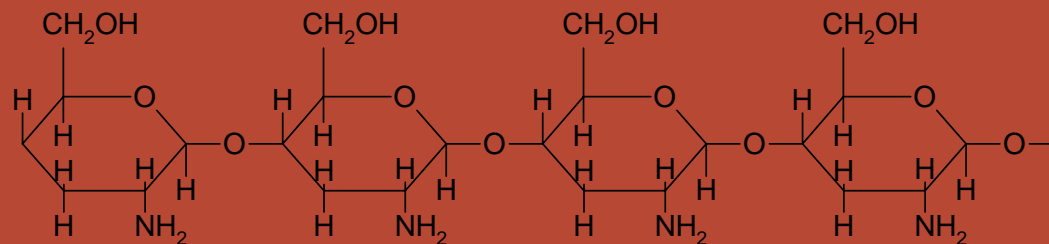
# BC4200NP Chemistry

## The Deacetylation of Chitin to Form Chitosan



chitin

conc. NaOH  
 $135^\circ\text{C}$



chitosan

# Advantages to MMNA of BC4200NP Technology

- Hands off, low maintenance working system
- Runs day in, day out with very little MMNA involvement
- Consistent, low suspended solids and low turbidity detackification pit water
- System Performance is Optimized

# Typical Data from MMNA

Date	Pit #1					
	pH	Turbidity (NTU)	Suspended Solids (ppm)	Conductivity ( $\mu$ mhos)	Degree of Paint Kill	Degree of Foam
7/6/2006	8.37	32	38	3800	9	0
7/5/2006	8.28	28	20	3600	9	0
6/23/2006	8.44	24	32	3700	9	0
6/22/2006	8.40	29	27	3700	9	0
6/21/2006	8.47	37	39	4000	9	0
6/20/2006	8.45	20	23	4000	9	0
6/19/2006	8.46	22	30	3700	9	0
6/16/2006	8.31	23	29	3800	9	0
6/15/2006	8.25	45	52	4000	9	0
6/14/2006	8.36	20	23	3800	9	0
6/13/2006	8.32	37	41	3700	9	0



# Financial Advantages of BC4200NP Program

- Cost per pound of product is revenue neutral vs. other detackifiers
- Paint to Chemical ratio is increased with program, i.e., less overall chemical is required
- Reduced use of caustic (pH adjuster) since product is less acidic than other detackifiers

# Cultural and Technological Changes at MMNA

- First Auto OEM to use this product
- Other Auto OEM's are conducting trials
- Preliminarily installed as revenue neutral product however additional advantages have surfaced
  - Decreased water content of sludge – less time drying before disposal
  - Decreased operator input – less time needed to maintain operation
  - Decreased out of range lab analysis – less time in investigation and remediation
  - Increased dig-out intervals – lower suspended solids in pits yield less settling
  - Increased usable equipment life – lower suspended solids in return streams yield less coating, plugging, and maintenance of equipment

# BC4200NP Environmental Awards

- 2005 recipient of Environmental Achievement Award from Environmental Management Association
- Nominated for 2006 Facility of the Year Award by Environmental Protection Magazine



**THANK YOU CMS FORUM!**

