



***TAMA / SP***  
***3<sup>rd</sup> Quarter Membership Meeting***

***Panel on Strengthening OEM and  
Supplier Relationships***

***September 8, 2011***



## *Panel on Strengthening OEM and Supplier Relationships*

- **John Bradburn**, Staff Environmental Engineer, Real Estate and Facilities Group, Energy and Environment, Global Environmental Programs, GM
- **Mark Werthman**, Manager Reg. Planning and Compliance - Stationary Env. Affairs, Chrysler Group LLC
- **Rahul Naik**, Principal In-Charge, ARCADIS, on behalf of Ford

# Suppliers Partnership for the Environment (SP)



Creating Value for North America

# SP Deep South Recipes Lunch Menu

Biscuits from Scratch

Home Cured Ham

Armadillo

Wild Boar

Corn Cob

Catfish

Crawfish



**GM**

Installs Parts in  
Chevrolet Volt

*Served with Sweat Tea*



**GDC Inc.**

Produces Volt  
Components



**Mobile Fluid  
Recovery**

Extracts Oil and  
Wastewater



**Heritage**

**Environmental**

Collects Booms

*Almost as good as Cheese Grits  
and served with Roux Flour*

**Bentley**Harris

**QuietShield**  
AN EARTH-FRIENDLY SOLUTION

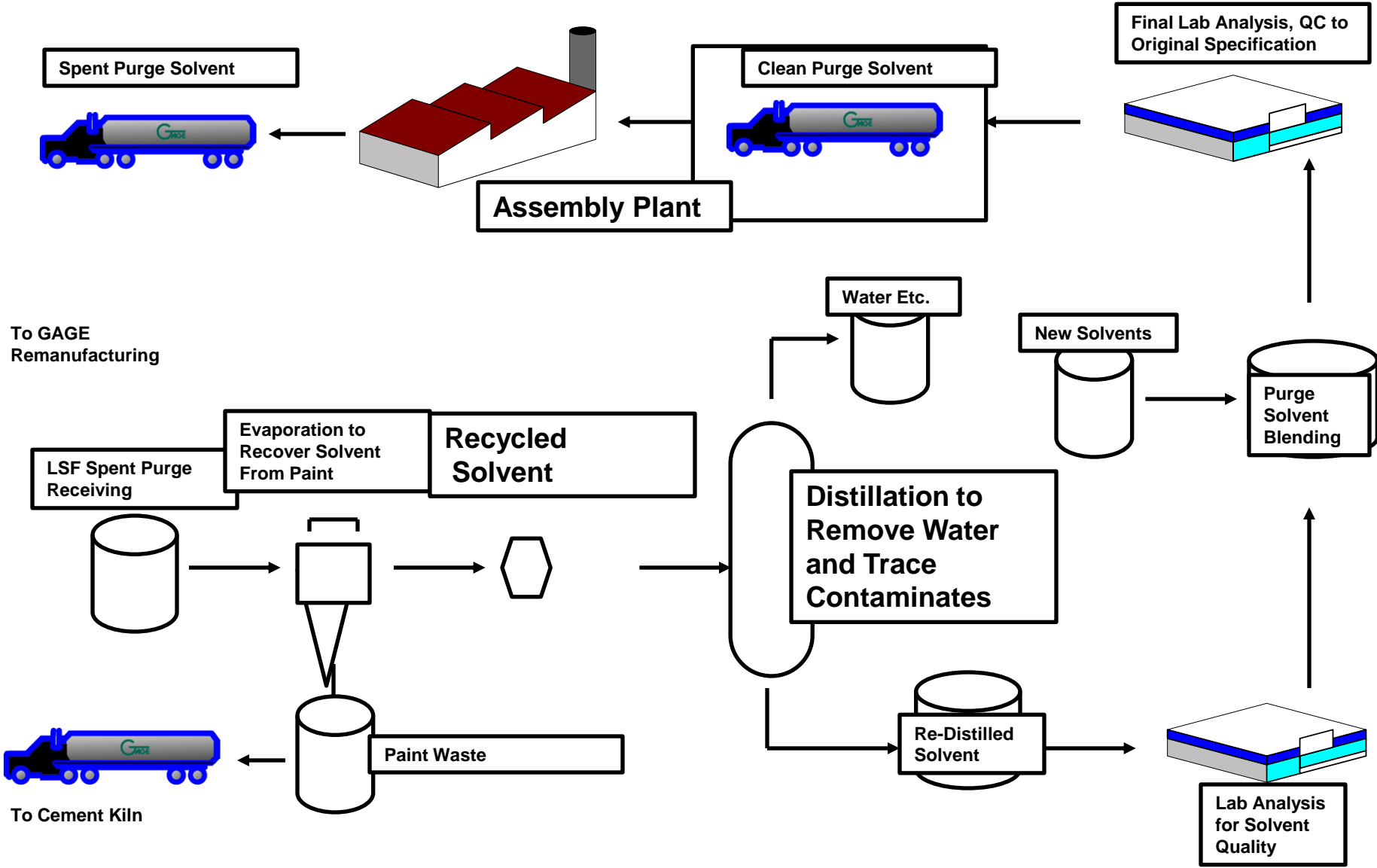
**QuietShield GRN**



DRIVING TOWARD A GREENER,  
MORE SUSTAINABLE FUTURE

*Added Corn cob optional*

# CLOSED-LOOP REMANUFACTURING PROGRAM



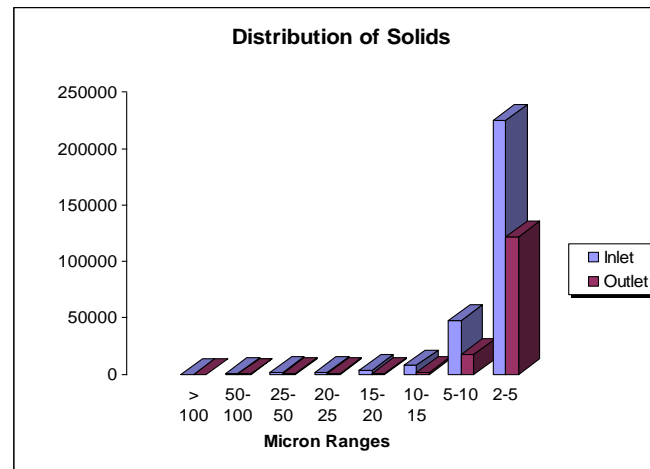
# An Environmental Partnership for Change with Goals

- To replace the current adhesion promoter with FTS Technologies Flame Treatment technology.
- To have a positive impact on product quality and meet the new GMW performance specifications.
- To have a positive effect on environmental performance including, reduction of energy use, reduce chemical use, reduce plant emissions and significantly reduce all waste streams.
- To bring about an enthusiastic response to change through education and demonstration.

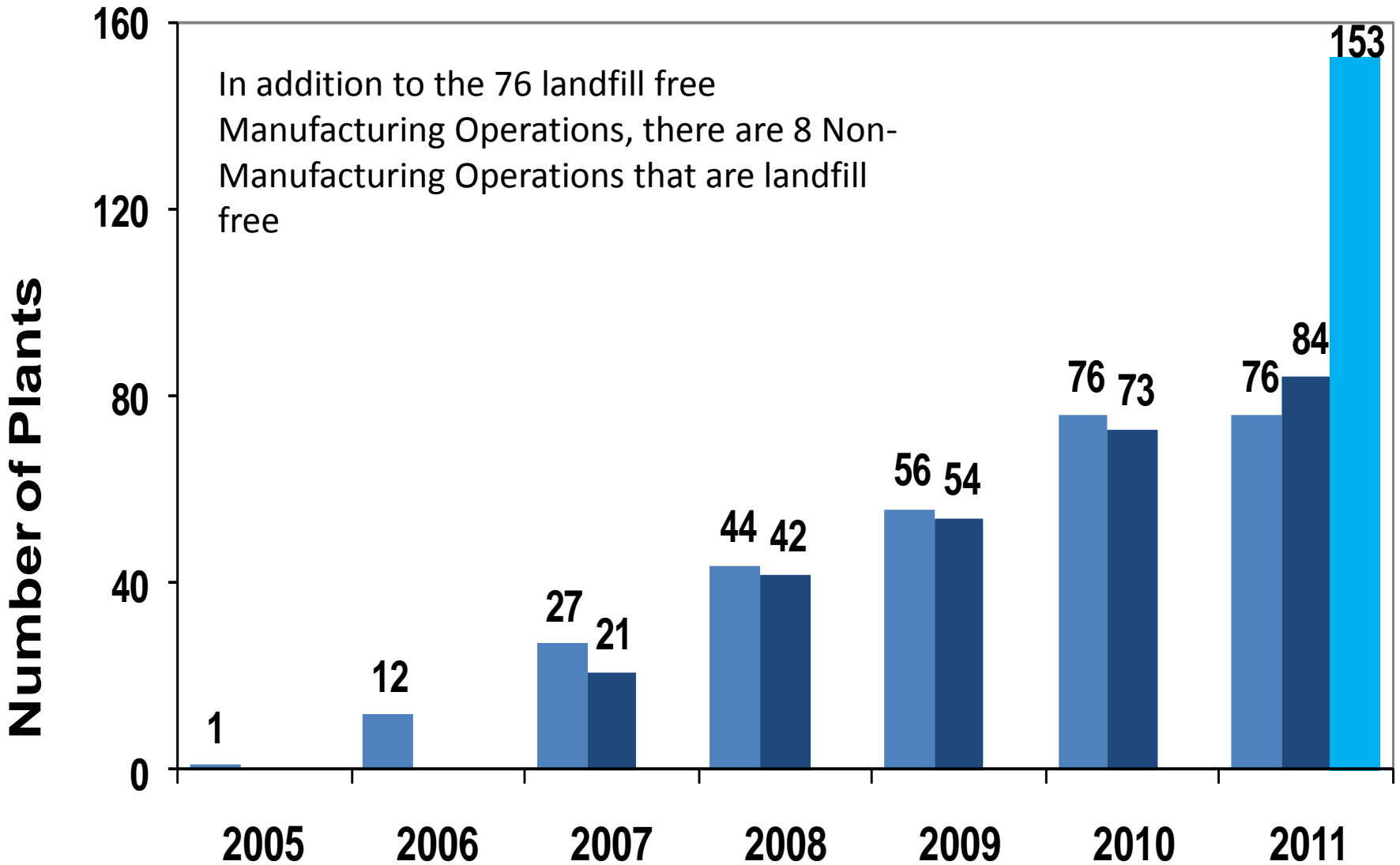




# World Class Filtration Trends



# General Motors – Landfill Free Status



■ Operations landfill-free

■ Targets

■ Total Operations

# General Motors Landfill Free Operations

## GM North America

CET Flint Engine Operations

CET Wixom Facilities

Flint Tool & Die

CET Warren Transmission

CET Silao Transmission

Silao Stamping

Ramos Arizpe Assembly 1 & 2

CET Ramos Arizpe Engine

CET Toledo Transmission

Parma Stamping

San Luis Potosi Stamping

Flint Stamping

CET DMAX Engine

CCA Philadelphia

GMCH Kokomo

## GM South America

CET Rosario, Argentina

CET Tonawanda Engine 1 & 5

CET Baltimore Transmission

Marion Stamping

CET Silao Engine

Silao Assembly

CET St. Catharine's Glendale Ave

Ramos Arizpe Stamping

CET Ramos Arizpe Transmission

CAMI Stamping

San Luis Potosi Assembly

CET San Luis Potosi Transmission

Brownstown Battery Assembly

Grand Blanc Tooling Center

CCA Martinsburg

CCA Davison Rd

Assembly (5) Casting, Engines, Transmissions (16)  
Stamping (9) Non-Manufacturing (3)

# General Motors Landfill Free Operations

## GM International Operations

GM Korea Gunsan	GM Korea Gunsan	GM Korea Gunsan
GM Korea Bupyeong	GM Korea Bupyeong 1 & 2	GM Korea Bupyeong
GM Korea Bupyeong Tooling	SGM Shanghai, China	SGM Shanghai, China
SGM Shanghai North, China	SGM Shanghai South, China	GM Korea Changwon
GM Korea Changwon	GM Korea Changwon	GM Korea Changwon Tooling
SGM Dong Yue, China	SGM Dong Yue, China	SGM Dong Yue, China
GM Korea Boryeong	SGMW Qingdao, China	SGMW Qingdao, China
SGMW Qingdao, China	GM Rayong Car, Thailand	GM Rayong Truck, Thailand
GM Rayong, Thailand	GM Korea Bupyeong	GM Korea Changwon
GM Korea Gunsan	GM India Talegaon	GM India Talegaon

## Opel/Vauxhall

Kaiserslautern, Germany	Kaiserslautern, Germany	Eisenach, Germany
Gliwice, Poland	Gliwice, Poland	Aspern, Austria
Bochum, Germany	Bochum, Germany	Bochum, Germany
Russelsheim, Germany	Szentgotthard, Hungary	Tychy, Poland
VM Motori, Italy	Ellesmere Port, UK	
Ellesmere Port, UK	Strasbourg, France	
Russelsheim, Germany	Russelsheim, Germany	
Millbrook Proving Ground		
Dudenhofen/Pferdsfeld Proving Ground		

Assembly (15)
Casting, Engines, Transmissions (16)
Stamping (15)
Non-Manufacturing (5)



# Suppliers Partnership for the Environment (SP)



**CHRYSLER**

*Zero Waste To Landfill*



# Zero Waste To Landfill

- The Chrysler Group Headquarters and Technology Center (CTC) achieved “Zero Waste to Landfill” status in 2010 for ***both non-regulated and regulated waste streams***.
  - This achievement is an additional benefit of the initiative to apply World Class Manufacturing (WCM) principles and practices within a service organization.
- The CTC Environmental Pillar Team took on the challenge to eliminate CTC’s wastes from landfills and demonstrate its continued commitment toward environmental stewardship.



# Chrysler HQ and Tech Center





# Ambient Lighting at CTC







# Blue Heron at Chrysler Campus





# Facts About the Chrysler Campus

- **Function and Purpose**
  - Product Design
  - Engineering / Scientific Labs
  - Manufacturing / Paint & Pilot Operations
  - Procurement & Supply
  - Finance, Human Resources, Sales & Marketing, etc.
- **Building Overview**
  - 5.4 million square feet gross (502,000 m<sup>2</sup>)
  - 13,500 people
- **Other Amenities**
  - Hiking paths, athletic fields, nature preserve
  - 15,410 parking spaces
  - ***Total site 504 acres***



# Special Challenges

- **Dining & Other Group Assembly Areas**
  - Main Dining & private dining rooms (1,260 people)
  - Headquarters Dining (750 people)
  - Other node food serving areas
  - Coffee bar (Tech Plaza)
  - Vending machines (all nodes)
  - Mobile catering (Process Court – breakfast only)
- **Other Amenities**
  - Sundry shops
  - Barber shops & manicurist
  - Health Activity Center
  - Conference Center
  - Education Center



# Zero Waste To Landfill

- Members of the facility's Environmental Pillar Team partnered with NMS (Formerly Forest Island Recycling, Inc.) for **non-regulated** wastes, and The Environmental Quality Company (EQ) regarding **regulated** wastes.
- Every waste stream generated by CTC's tenant populations were evaluated to determine if one of the three R's (Reduce, Reuse, Recycle) could be applied before turning to alternate control methods.



# Zero Waste To Landfill

- ***Non-regulated*** wastes include paper, cardboard, pallets, tires, scrap metal & wood, plastic bottles and general refuse.
- ***Regulated*** waste streams include fuels, oils, paint, solvents, sealers, adhesives, wet/dry cell batteries, process sludge and numerous other chemical wastes that are controlled under State and Federal government requirements.
- The waste stream audit determined that much of CTC's wastes were reusable and/or recyclable.



# Zero Waste To Landfill

- CTC tenants start the process with a first sort of their wastes within their suites and labs.
- Recyclables are then collected and sent to various recycling programs for processing.
  - The remaining co-mingled **non-regulated** waste streams are sent off-site for secondary sorting to reclaim any additional recyclables and reduce the final volume for energy generation.
- **Regulated** waste streams are segregated and sorted for recycling or sent to fuel blending programs for energy recovery.
- The remaining balance of both **non-regulated** and **regulated** waste streams go for energy generation.
- ***This program demonstrates Chrysler's commitment to manage its operations in an environmentally responsible manner for the betterment of the company and the community.***





# Zero Waste To Landfill



**CTC  
Waste  
Streams**



**Reuse/  
Recycle**



**Fuel  
Blending**



**Power  
Generation**

# Zero Waste To Landfill

Program Timeline			2010				
Program(s)	Task	Responsible	Aug	Sept	Oct	Nov	Dec
All Wastes	CTC Facilities Definition of "Zero Waste to Landfill"	CTC World Class Services (WCS) Leadership Team	15				
Trash (non-regulated waste) and Regulated Waste	List and Volumes	CTC - ECP Team	27				
Trash (non-regulated waste) and Regulated Waste	Current Disposal Method/Site	Vendors		3			
Regulated Waste	Future Options (Incineration and/or Waste to Energy)	CTC - ECP Team, Vendor		10			
Regulated Waste	Cost of Viable Future Options	CTC - ECP Team, Vendor		10			
Regulated Waste	Obtain Buy-in/Approval	Facilities Management Team		10			
Trash (non-regulated waste)	Transition to New Vendor	CTC - Bldg. Grounds & Housekeeping Team, Vendor		13			
Trash (non-regulated waste)	Implementation	CTC - Bldg. Grounds & Housekeeping Team, Vendor		17			
Medical Waste	Current Disposal Method & Options	Vendor			8		
Regulated Waste	Obtain Waste Approvals	CTC - ECP Team, Vendor				29	
Regulated & Medical Waste	Implementation	CTC - ECP Team, Vendor					22



# Zero Waste To Landfill

Batteries - Alkaline	Resmelt	Drum	5,550.00	Pounds
Batteries - Lead Acid (Wet)	Recycle	Pallet	60,740.00	Pounds
Batteries - Lithium	Recycle	Crate	1,600.00	Pounds
Empty Drums - Plastic	Recycle	Drum	1,540.00	Pounds
Empty Drums - Steel	Recycle	Drum	7,360.00	Pounds
Gasoline Rags & Pads	Incineration	Drum	3,100.00	Pounds
Hydro-Jet Sand	Incineration	Tanker	14,525.00	Pounds
Lab Pack	Incineration	Drum	8,933.00	Pounds
Lamps - Compact Fluorescent	Recycle	Crate	81.00	Pounds
Lamps - Fluorescent Tubes - 5 ft.	Recycle	Crate	29.00	Pounds
Lamps - Fluorescent Tubes - 4ft.	Recycle	Crate	47,918.00	Pounds
Lamps - HID	Recycle	Crate	346.00	Pounds
Lamps - Incandescent	Recycle	Crate	659.00	Pounds
Lamps - Broken (Hazardous Waste)	Recycle	Drum	75.00	Pounds
Medical Waste	Incineration	Crate	430.00	Pounds
Lacquer Thinner Rags	Incineration	Drum	6,800.00	Pounds
Oily Pads & Rags	Incineration	Drum	19,200.00	Pounds
Scrap Metal (Ferrous/Non-Ferrous)	Recycle	Roll-off	6,051,954.00	Pounds
<b>TOTAL</b>			<b>6,230,840.00</b>	<b>Pounds</b>

Environmentally Sound

Alternative Process Energy Source

Energy Production



# Zero Waste To Landfill

Car Wash Sludge	Incineration	Tanker	5,258.00	Gallons
Diesel Fuel	Fuel Blending	Drum	825.00	Gallons
Gasoline & Solvents	Fuel Blending	Drum	485.00	Gallons
Gasoline & Water	Recycle	Drum	1,808.00	Gallons
Kitchen Grease	Reuse	Drum	1,705.00	Gallons
Lab Waste System Sludge	Incineration	Tanker	450.00	Gallons
Paint - Latex	Fuel Blending	Drum	55.00	Gallons
Paint & Solvent	Fuel Blending	Drum	890.00	Gallons
Sealers	Fuel Blending	Drum	165.00	Gallons
Sodium Hydroxide	Recycle	Drum	100.00	Gallons
Used Glycol & Water	Recycle	Tanker	5,765.00	Gallons
Used Oil & Water	Recycle	Tanker	37,508.00	Gallons
Used Oil - Refrigerant	Recycle	Drum	465.00	Gallons
<b>TOTAL</b>			<b>55,479.00</b>	<b>Gallons</b>

Environmentally Sound

Alternative Process Energy Source

Energy Production



# Zero Waste To Landfill

Cardboard	Recycle	Roll-off	86.51	Tons
Gloves	Reuse/Recycle	Crate	0.17	Tons
Office Paper	Recycle	Roll-off	69.65	Tons
Plastic Bottles	Recycle	Crate	9.26	Tons
Trash (General Refuse)	Recycle	Roll-off	108.97	Tons
Trash (General Refuse)	Incineration	Roll-off	1,253.16	Tons
Wood (Pallets)	Incineration	Roll-off	0.57	Tons
Wood (Scrap)	Incineration	Roll-off	335.56	Tons
TOTAL			1,863.85	Tons
Tires	Recycle	Crate	1,157.00	Each
Toner Cartridges	Recycle	Crate	6,317.00	Each
TOTAL			7,474.00	Each

Environmentally Sound

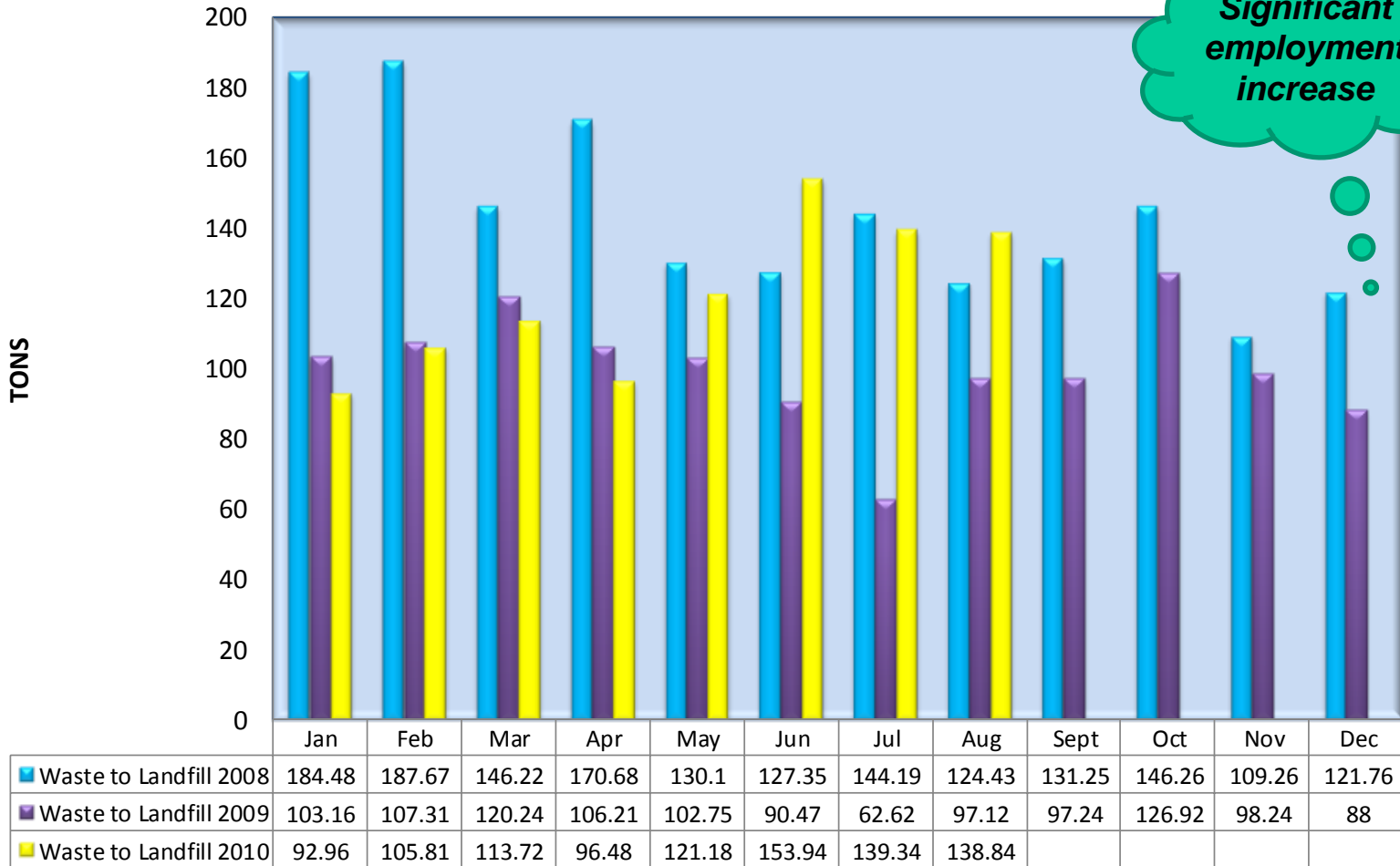
Alternative Process Energy Source

Energy Production



# Zero Waste To Landfill

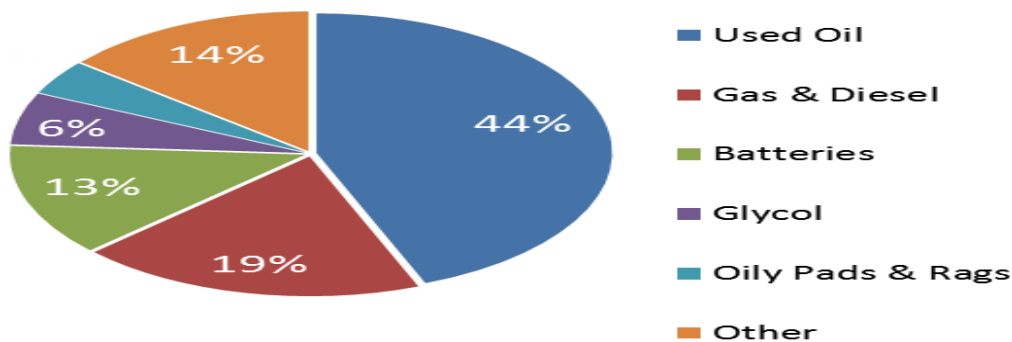
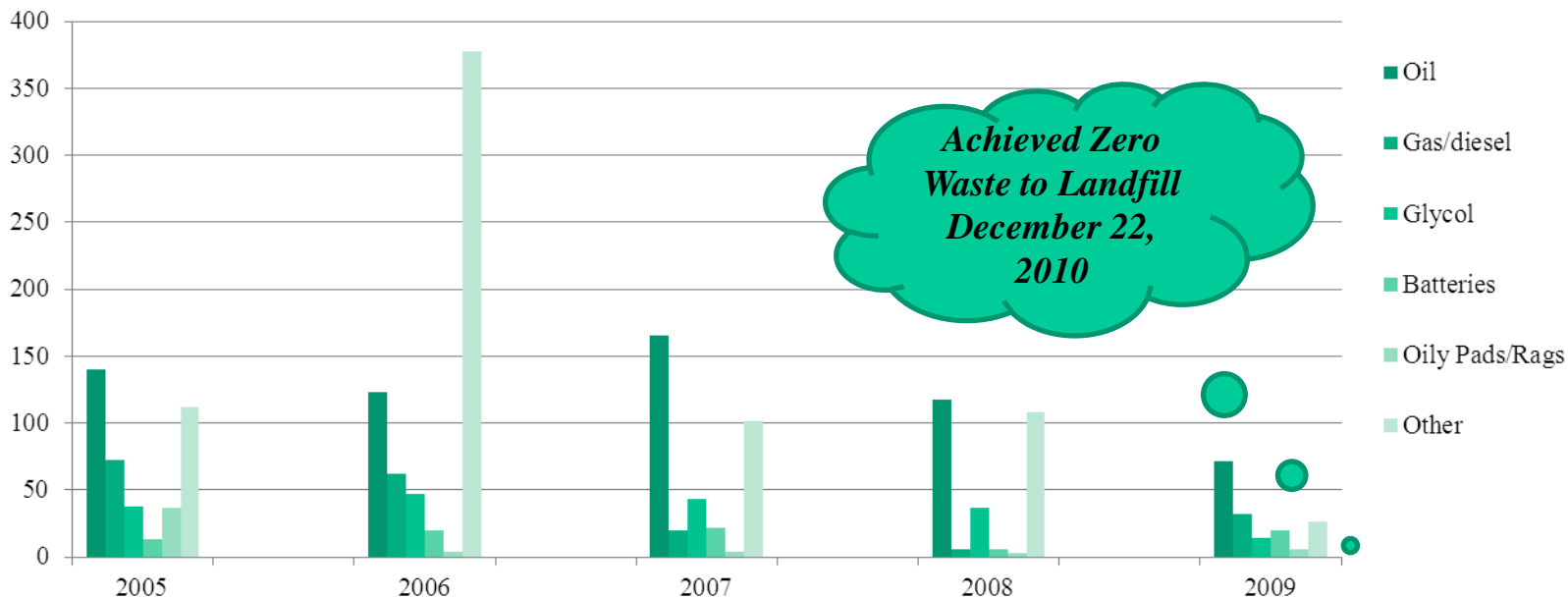
## Trash To Landfill Reduction



*Significant employment increase*



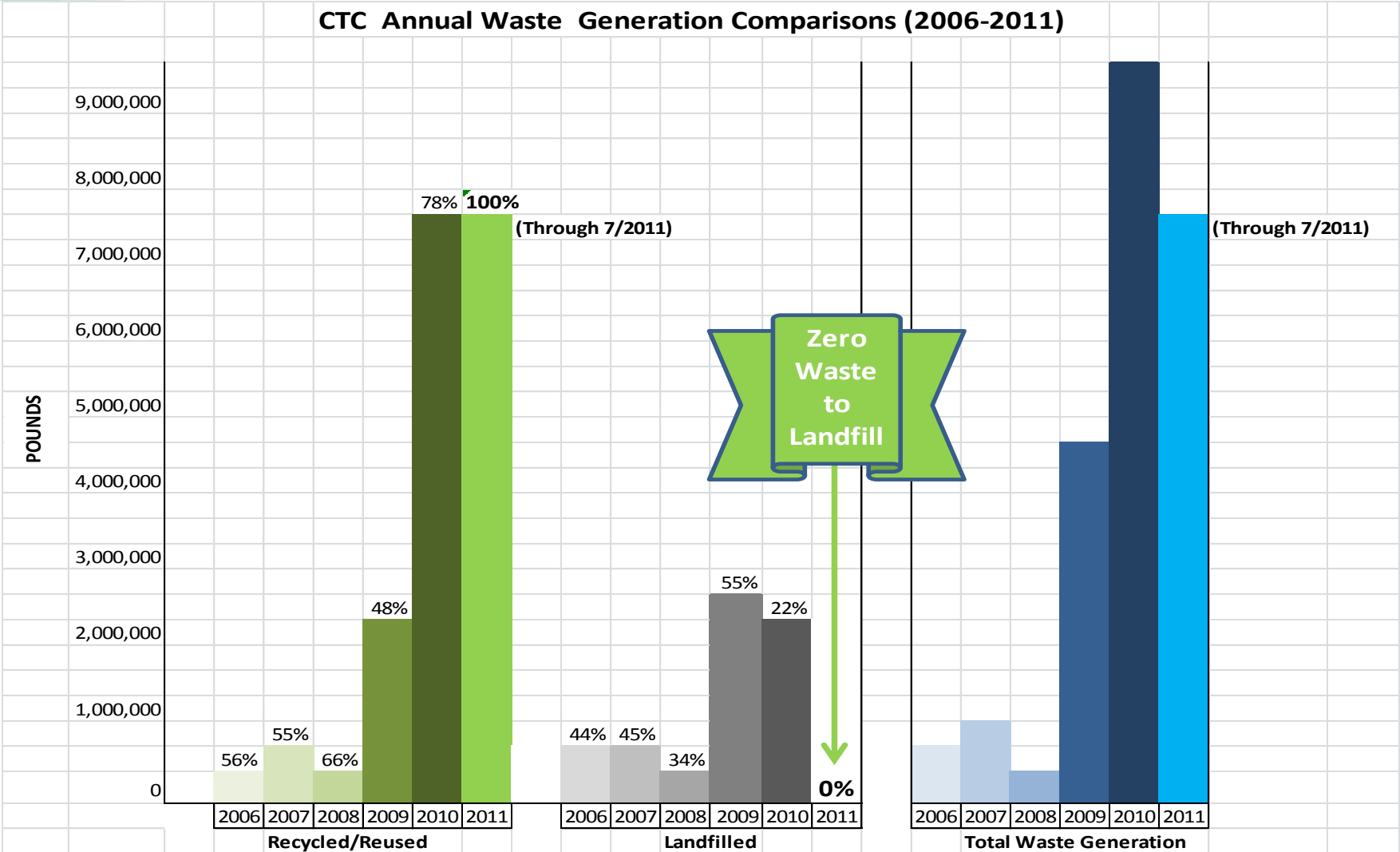
# Zero Regulated Waste To Landfill





# Zero Waste To Landfill

CTC Annual Waste Generation Comparisons (2006-2011)





# Zero Waste To Landfill





# Strengthening OEM and Supplier Relationships through SP

**SP Meeting  
September 8, 2011**



# Ford's Commitment to Environmental Sustainability

- Ford is committed to environmental sustainability in its manufacturing, product development, and supply chain
- In 2010, Ford made significant progress on the environmental aspects of its products and operations. The next slide provides a few examples.

# Ford's Progress in 2010

- Ford introduced packaging guidelines for the transport of parts and materials used in Ford vehicles.
- For the sixth consecutive year, Ford received the Energy Star Sustained Excellence Award from the U.S. Environmental Protection Agency and the U.S. Department of Energy.
- Ford is continuing to expand corporate standards and requirements for sustainable materials and in-vehicle air quality and is continuing to develop new applications for sustainable materials. As of 2011, all vehicles produced in North America use soy foam seating.
- Ford developed and adopted a global water strategy and began implementing this strategy in 2011.
- Ford continued its leadership in facility greenhouse gas reporting. Voluntary GHG reports were developed for all four Ford manufacturing sites in China. Ford also joined the Supply Chain Program of the Carbon Disclosure Project (CDP). Ford was the only automotive company to participate in the CDP Supply Chain Program in 2010.

# Suppliers Partnership for the Environment

- Ford's participation in SP enables the company to share best practices with our suppliers and also to learn from them.
- The breadth of membership in SP (parts suppliers, laboratories, consultants) is a great benefit.
- Ford would now like to share a remediation case study, which will be presented by SP member Arcadis.

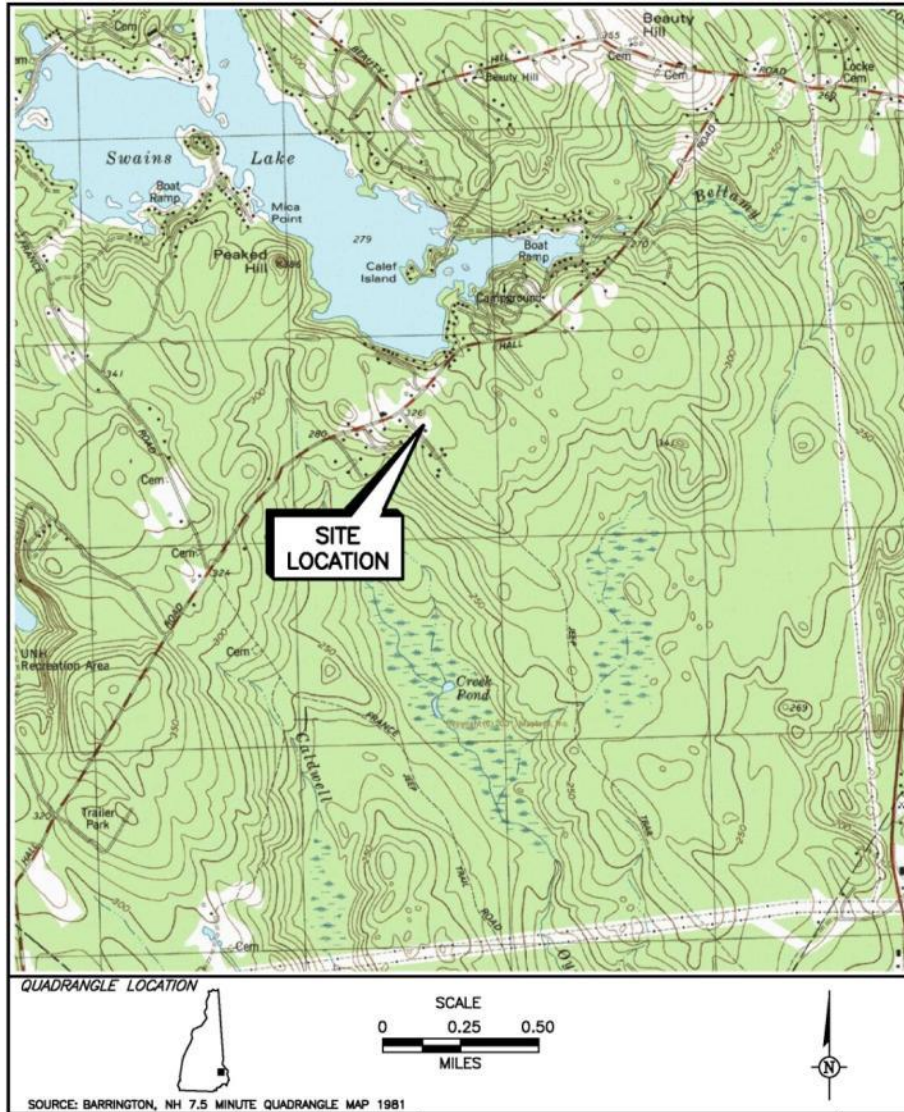
# Progressive Environmental Cleanup

## Site Background

- Located in the village of Barrington, NH (about 75 miles north of Boston)
- Investigation and cleanup activities since 1994
  - Waste and debris removal
  - VOCs in shallow groundwater treated in 3 hot spot areas with Vacuum Enhanced Recovery (VER)
- Long-term successful partnership between Ford and ARCADIS (consultant)



# Progressive Environmental Cleanup



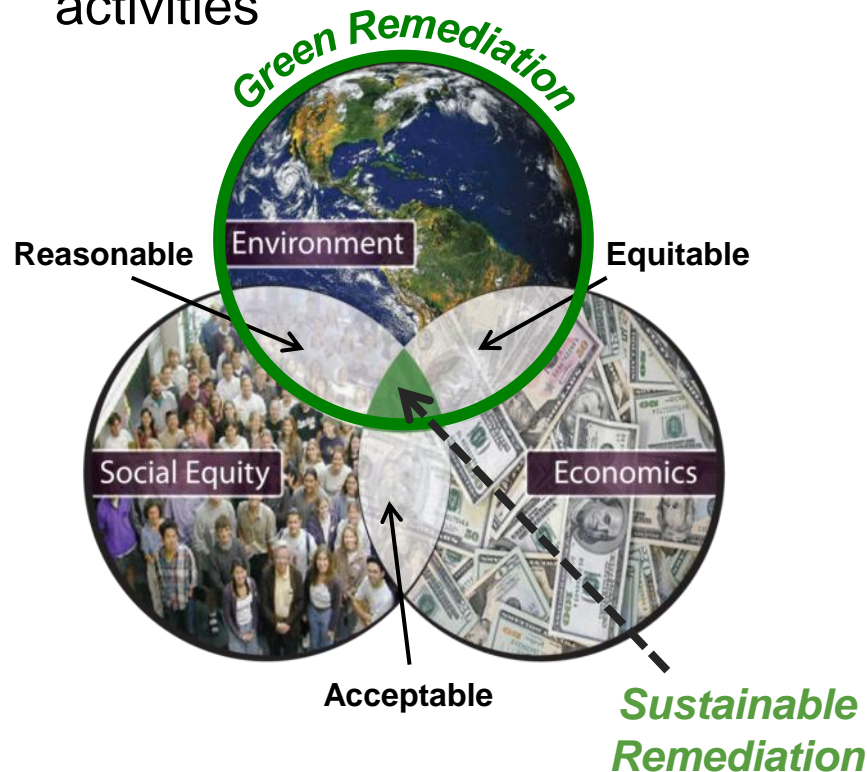
## Recent Site Goals

- Ford desired a long-term solution in harmony with the rural, residential setting.
- ARCADIS incorporated progressive green and sustainable remediation (GSR) actions into project planning and implementation.

# Defining GSR

## Sustainable Remediation

- An integrated assessment of the environmental, economic, and social impacts of remedial activities



## Green Remediation

- “Considering all environmental effects of remedy implementation and incorporating options to minimize the environmental footprints of cleanup” (USEPA, 2010)



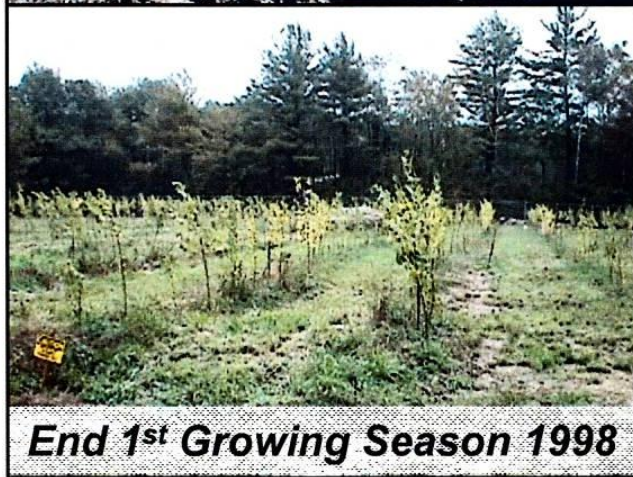
**Green Remediation Elements identified by USEPA**

# GSR Practices at the Site for VOC Treatment

- 1995 – 1997: VER system removes 800 pounds of VOCs in three hot spot areas of the Site
  - ✓ Operated seasonally and in pulse-mode removing 800 pounds of VOCs with a 25% energy reduction and system O&M savings
  - ✓ Discharge of treated groundwater from investigation and remedial activities onsite and not to a POTW
  - ✓ Recondition and reuse of granular activated carbon for groundwater/vapor treatment onsite, eliminating landfilling and being cost effective
  - ✓ Reuse of soil cuttings from drilling activities for onsite roadways
- 1998 – Current: VER system shut-down and implemented phytoremediation with hybrid poplar trees
  - ✓ Use of low-flow groundwater sampling techniques to reduce groundwater extracted during sampling
  - ✓ Carbon sequestration by 1,600 trees

*These GSR approaches were implemented over a decade before GSR was widely recognized in the remediation industry.*

# Phytoremediation



## Objectives

Install hybrid poplar trees to:

- Return the Site to its natural state
- Provide infiltration control
- Increase soil porosity and oxygen levels
- Reduce migration by evapotranspiration
- Reduce residual compounds in soil and shallow groundwater by contaminant uptake



# Phytoremediation

## Benefits

- Reached cleanup objectives faster
- Returned site to beneficial use sooner
- Significantly less electric consumption over conventional technologies
- Reduced costs
- Aesthetically-pleasing
- Fully-embraced by local community
- Site now proposed to be further developed into a Wildlife Habitat and Educational Center



# GSR Decision-making

Decision-making framework to consider alternatives to:

- Reduce carbon footprint;
  - Reduce water consumption;
  - Minimize wastes and waste streams;
  - Maximize use of recycled products;
  - Enhance and incorporate natural systems; and,
  - Maximize use of alternative renewable energy sources...
- ...to achieve balanced and greener remedial solutions.



Broaden our perspective with sustainability to:

- Identify key areas of improvement to develop highly innovative and cost effective remedies
- Reduce costs by reducing or eliminating consumption and waste of resources
- Minimize regulatory permitting requirements with reduced environmental impacts
- Reduce risk by minimizing hazards to workers, environment, and community

# The project location today



*July 2010*

# Conclusion

- We hope you found this case study illuminating.
- If you are not an SP member, we encourage you to consider joining SP.



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