

# NC Management of Solid Wastes

Ellen Lorscheider - NCDENR Division of Waste Management

Solid Waste Section

EEHS Training August 21, 2012



- Solid waste basics
- Materials banned from landfills and incinerators
  - Scrap Tires
  - White Goods
  - Electronics
- Special industrial wastes:
  - Building (Construction and Demolition)
  - Coal fired energy
  - Medical

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- ▶ 1952 – *Refuse Disposal by Sanitary Landfill*
  - ▶ Written by the NC Division of Sanitary Engineering / State Board of Health



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▶ 1967 - *Solid Waste Management Survey*

- ▶ Federally funded 3 positions
- ▶ 479 disposal sites
- ▶ 23 were deemed “protective”



▶ 1969 - *Solid Waste Disposal Act*

- ▶ State Board of Health assist Local Govt
- ▶ Insect & Rodent Control Section > Solid Waste and Vector Control Section
- ▶ 9 State funded positions



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- ▶ 1971 – *Rules and Regulations Providing Standards for Solid Waste Disposal*
  - ▶ 456 dumps > 160 landfills
  - ▶ Language changed from just disposal to “Reduction”, “Reuse”, and “Recycling”



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- ▶ 1976 – EPA, Resource Conservation and Recovery Act
- ▶ 1980s – Medical Waste on beaches



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- ▶ Belief that capacity in NC did not exist
- ▶ Late 1980s - draft of Subtitle D language
- ▶ NC policy to protect groundwater outside of landfills



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▶ 1989 - *Solid Waste Management Act*

- ▶ Established:
  - Goals & policies
  - New programs
  - Landfill bans
  - Reporting requirements
  - Planning requirements



1987 garbage barge from  
New York City

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- ▶ 1991 – EPA Revisions to Subtitle D of RCRA
- ▶ 1993 – First landfill bans become effective.
- ▶ Creation of Scrap Tire and White Goods programs





# Municipal Solid Waste

- 40 municipal landfills
- 1 municipal incinerator
- 11 out-of-state landfills



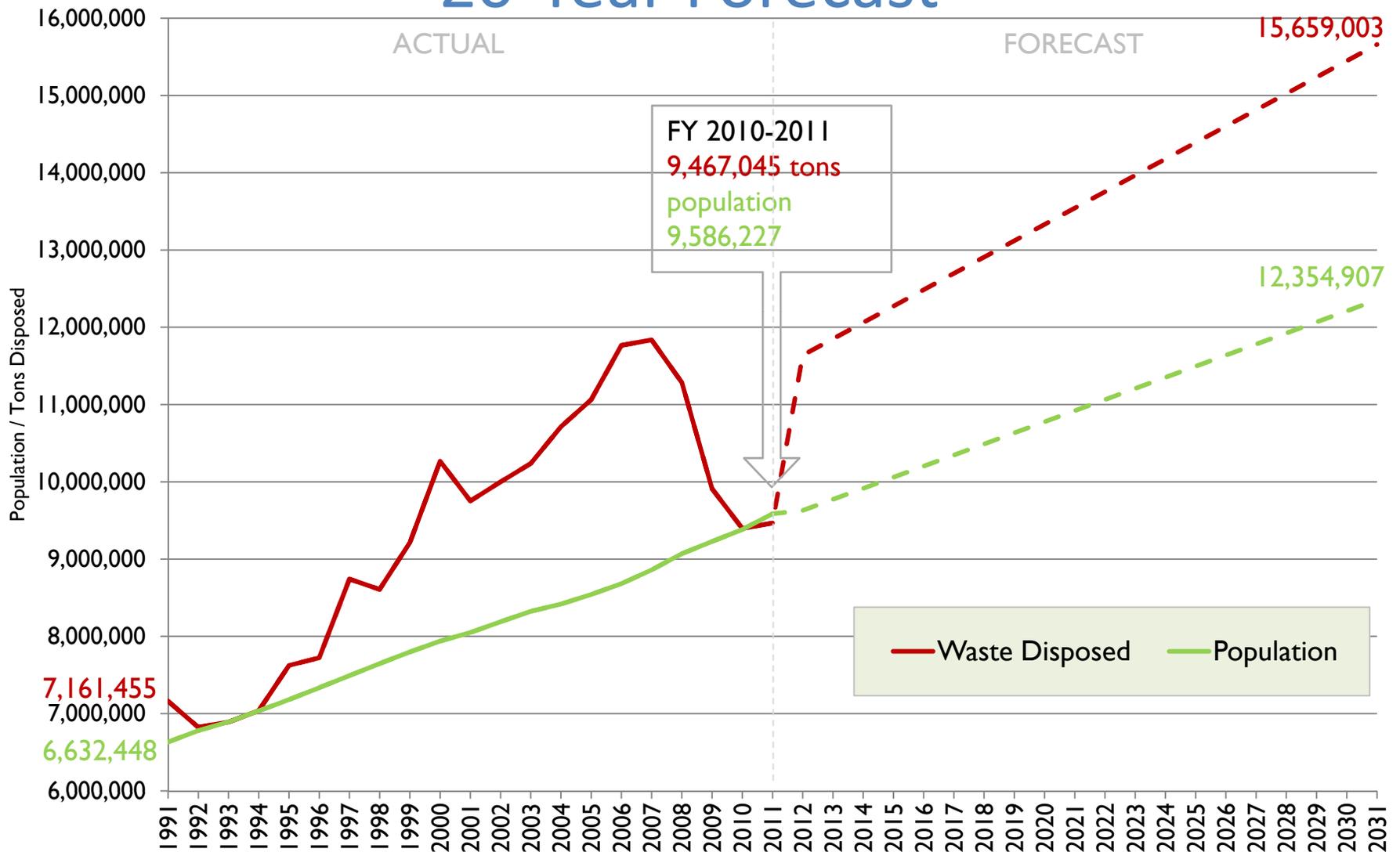
## Landfill Design:

Landfills are lined and have leachate collection systems.

Environmental monitoring includes assessment of groundwater, surface water, leachate and landfill gas conditions. Monitoring may be required even after a facility closes.



# North Carolina Solid Waste Disposal 20-Year Forecast



A photograph of a landfill site. In the foreground, a worker wearing a yellow hard hat, an orange safety vest over a red shirt, and dark pants stands on a concrete surface. The background is a large, colorful pile of discarded waste, including plastic, metal, and other debris. The scene is brightly lit, suggesting a sunny day.

## Landfill Bans:

The following are banned from disposal in landfills in North Carolina:

1. Used oil
2. Yard trash
3. White goods
4. Antifreeze
5. Aluminum cans
6. Whole scrap tires
7. Lead-acid batteries
8. Beverage containers
9. Motor vehicle oil filters
10. Recyclable rigid plastic containers
11. Wooden pallets
12. Oyster shells
13. Discarded computer equipment
14. Discarded televisions

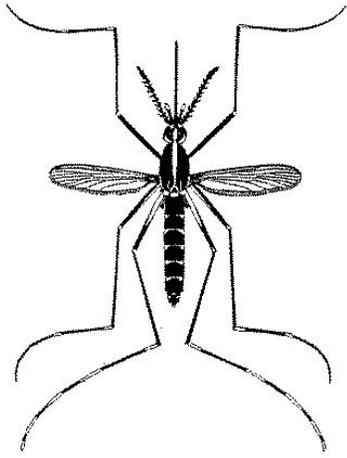


# SCRAP TIRE MANAGEMENT

§130A-309.53-130A-309.63 &  
15A NCAC 13B SECTION .1100

# Tire Management in North Carolina

- Whole tires were banned from landfills as of Mar 1, 1990
- Tire collectors (scrap tire collection sites or scrap tire disposal sites) must notify NCDENR of their activities and may need to obtain a permit.
- Scrap tire haulers must register with NCDENR
- 2% tax on all tires sold with a diameter of less than 20 inches and a 1% tax on tires with a diameter of 20 inches or greater
- More than 7 million tires from unpermitted sites have been cleaned up since 1994



# Why manage scrap tires?

- Rodents
- Mosquitoes (can carry encephalitis, West Nile virus, Malaria, Dengue Fever, Yellow Fever...)
- **Fires**
  - Difficult to extinguish and expensive to clean-up
  - Pollute the air, soil, and water (Air emissions may include polycyclic aromatic hydrocarbons (PAHs), benzene, styrene, phenols, and butadiene)



## Scrap Tires

**122,206 tons**, managed by counties and shipped to two NC processing firms

**1,508 tons**, managed by counties and shipped to out-of-state processors

**28,292 tons**, tires taken directly to processing firms (privately-funded cleanups or tire dealers not participating in a county program)

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**152,006 tons = Total tires from citizens of North Carolina**



# Some Notable Tire Fires

- 1983 – 7 million tires burn in Winchester, Virginia for **9 months**, polluting nearby areas with lead and arsenic. The location was cleaned up as a **Superfund project** from 1983 to 2002.
- 1989 – In Wales a fire involved approximately 10 million tires burnt for at least **15 years**.
- 1990 – In Hagersville, Ontario, a fire started in a 12 to 14 million tire pile. It burned for 17 days and nearly forced 4,000 people to evacuate.
- 1998 – A grass fire ignited the 7 million tires at an unlicensed tire disposal Facility in Tracy, California. It was extinguished, after **26 months**, with water and foam in December, 2000.
- 1999 – Arsonists ignited the former Kirby Tire Recycling facility, containing an estimate 25 million tires located on 110 acres (0.45 km<sup>2</sup>) near Sycamore, Ohio. The fire burned for 30 hours, involved over 250 firefighters, the Ohio National Guard and the EPA and caused significant environmental damage.
- 1999 – Lightning struck a tire dump in Westley, California, which burned for **30 days**. Pyrolytic oil flowed into a nearby stream and also ignited. A response to the oil and tire fires was beyond the capabilities of local and state agencies. **Total EPA response costs were \$3.5 million.**
- 2012- On January 27, 2012, a massive tire fire sparked at a tire recycling plant in Lockport, N.Y. causing dangerous amounts of soot and smoke to burn over the city for over 22 hours , causing serious damage to many homes.

# Recent Tire Fires in NC

- Sept 2009 – Chadbourn, NC (Columbus Co)
  - A Columbus County firefighter was sentenced to 7 years in prison for setting fire to a tire store
  - About 30,000 tires were inside the store, and the fire burned for 4 days. About 150 firefighters from 36 fire departments battled the fire.



# More Tire Fires in NC

- February 2012 – Sampson County
  - About a half-million tires and 1 1/2 acres
  - Required Firefighters from every department in the county, as well as Dunn and Cumberland County, N.C. Forestry Service, Emergency Management employees, N.C. Department of Transportation workers and Sampson County's Mobile Command Unit.

# Sampson County Fire



# After the fire in Sampson County



Some fires are intentionally set to  
extract metals



# Where do scrap tires go?

In 2003, markets for scrap tires were consuming 233 million, or 80.4%, of the **290 million** annually generated scrap tires:

- 130 million (44.7%) are used as fuel
- 56 million (19.4%) are recycled or used in civil engineering projects
- 18 million (7.8%) are converted into ground rubber and recycled into products
- 12 million (4.3%) are converted into ground rubber and used in rubber-modified asphalt
- 9 million (3.1%) are exported
- 6.5 million (2.0 %) are recycled into cut/stamped/punched products
- 3 million (1.7%) are used in agricultural and miscellaneous uses
- Another 16.5 million scrap tires are retreaded. After any retreading has been performed, 290 million scrap tires are generated. About 27 million scrap tires (9.3%) are estimated to be disposed of in landfills or monofills. (*Source: Rubber Manufacturers Association, 2004.*)

A crumb rubber screener.



# Tire shreds, crumb rubber



Crumb rubber ready for shipment.

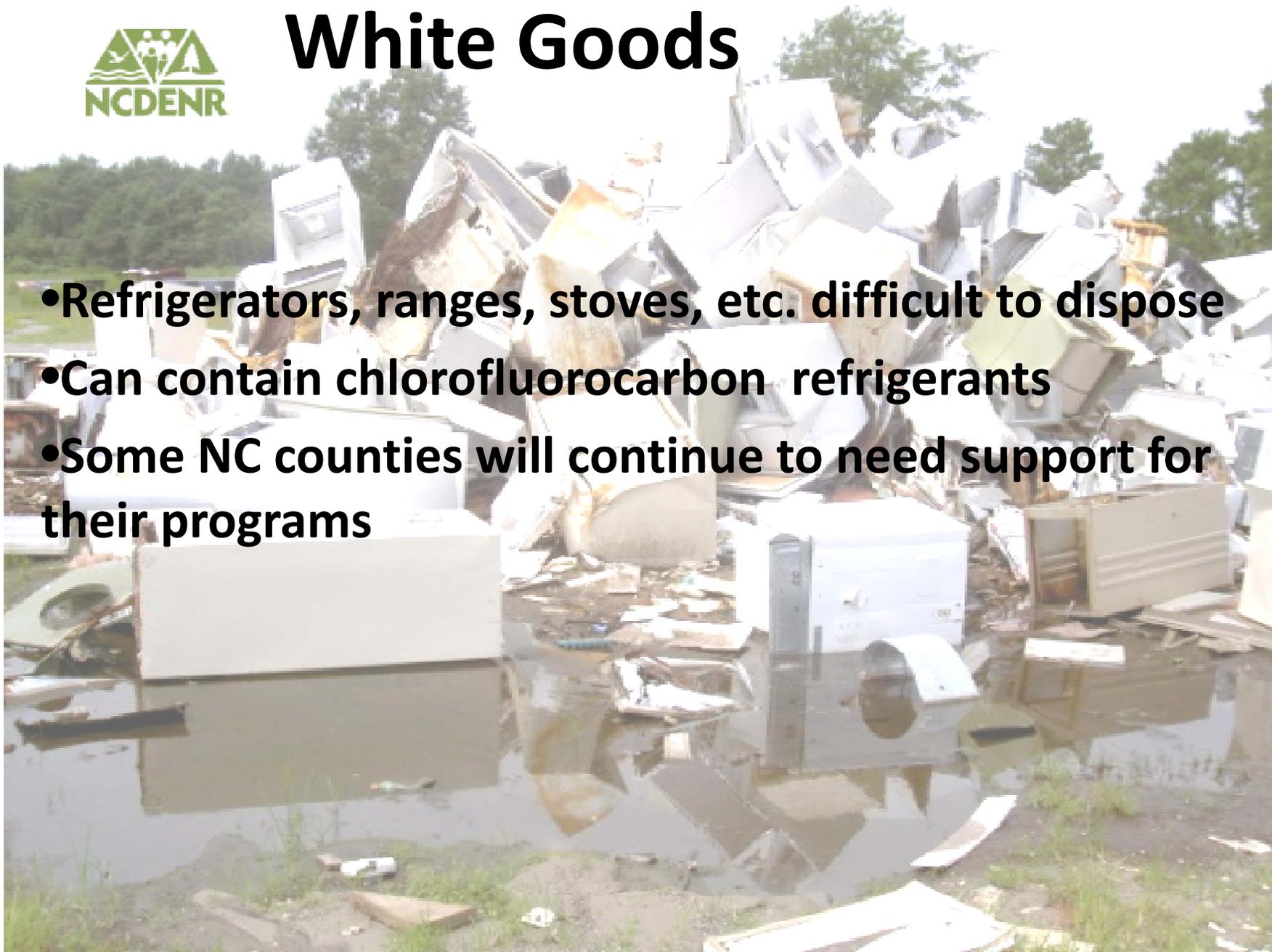


- 
- **Highway Sound Barriers**
  - **Athletic / Recreational Surfaces**
  - **Railroad Ties**
  - **Molded rubber products**
  - **Brake pad & brake shoes**
  - **Flooring material and mats**
  - **Boiler Fuel**
  - **Drainage Coarse**



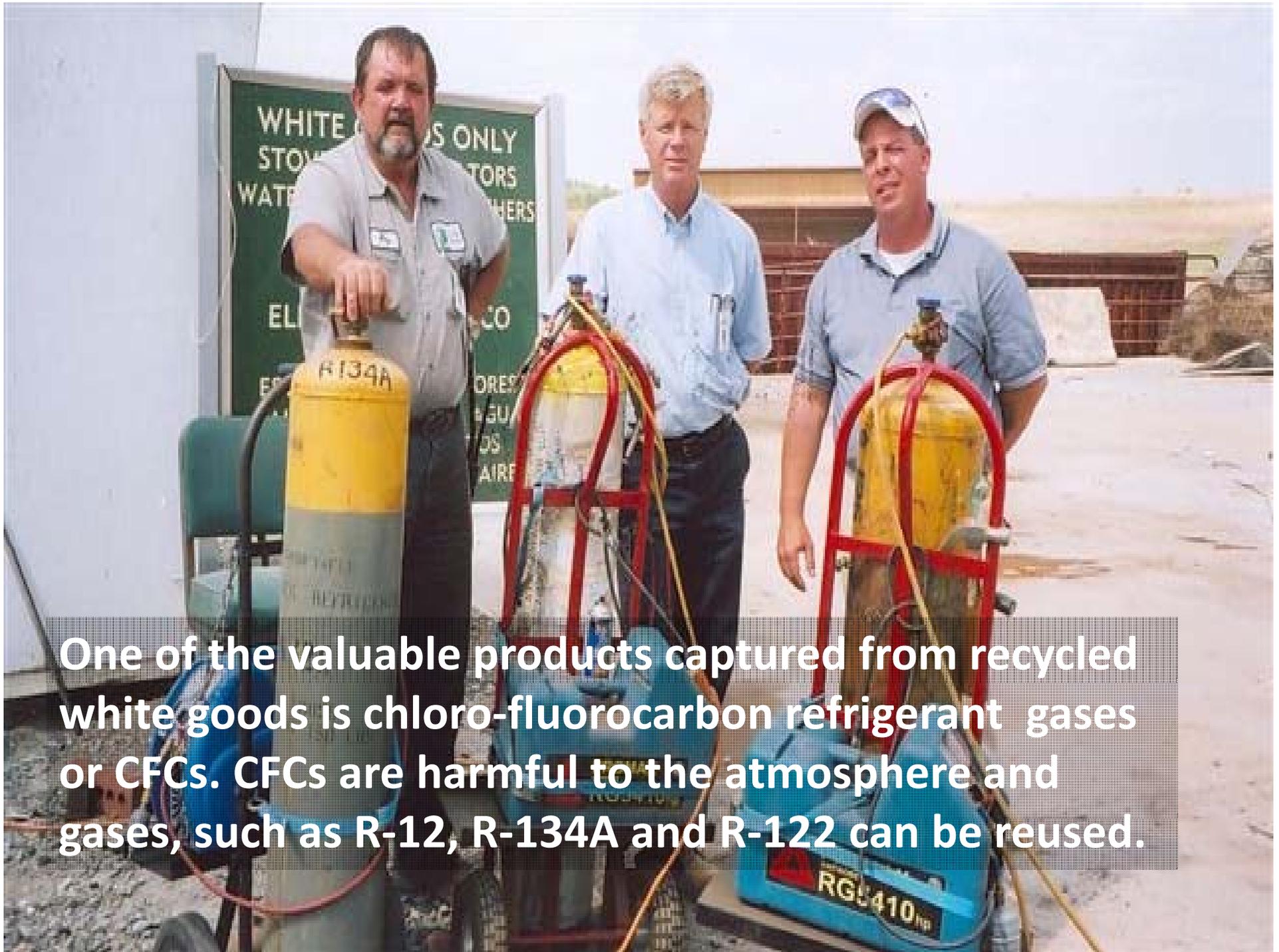
# White Goods

- Refrigerators, ranges, stoves, etc. difficult to dispose
- Can contain chlorofluorocarbon refrigerants
- Some NC counties will continue to need support for their programs



Discarded appliances or “white goods” have an assortment of metals and plastics valuable for recycling.





One of the valuable products captured from recycled white goods is chloro-fluorocarbon refrigerant gases or CFCs. CFCs are harmful to the atmosphere and gases, such as R-12, R-134A and R-122 can be reused.



# **North Carolina Electronics Management Program**

N.C. General Statutes 130A-309.130  
through 130A-309.141

# North Carolina's Electronics' Recycling Law

- Effective July 1, 2011, **Discarded computer equipment** (includes laptops, desktops, monitors, video displays, printers, scanners, printer-scanner-fax combos, mice and keyboards) and **tv's** are **banned** from NC landfills.



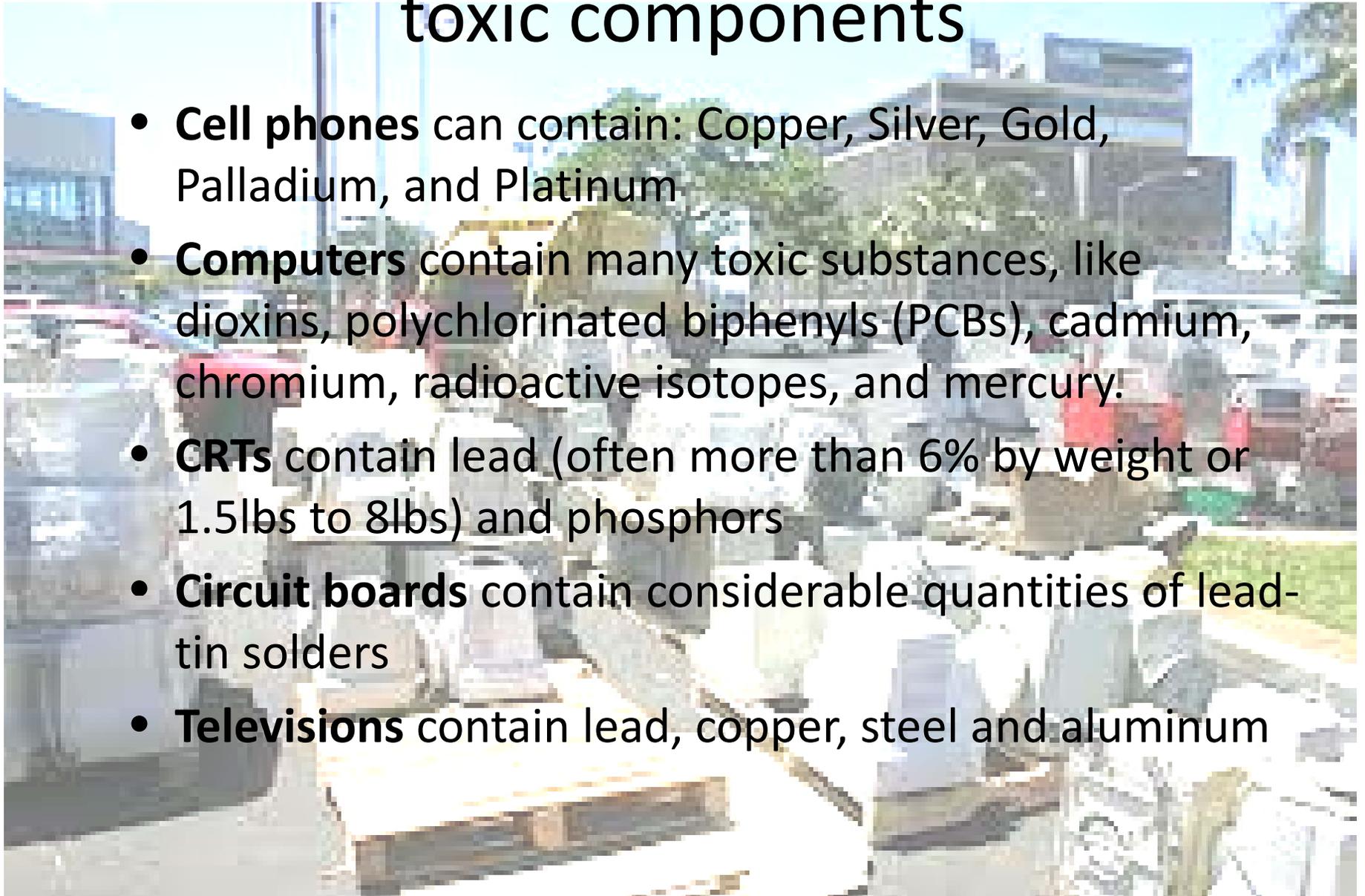
# Why recycle electronics?

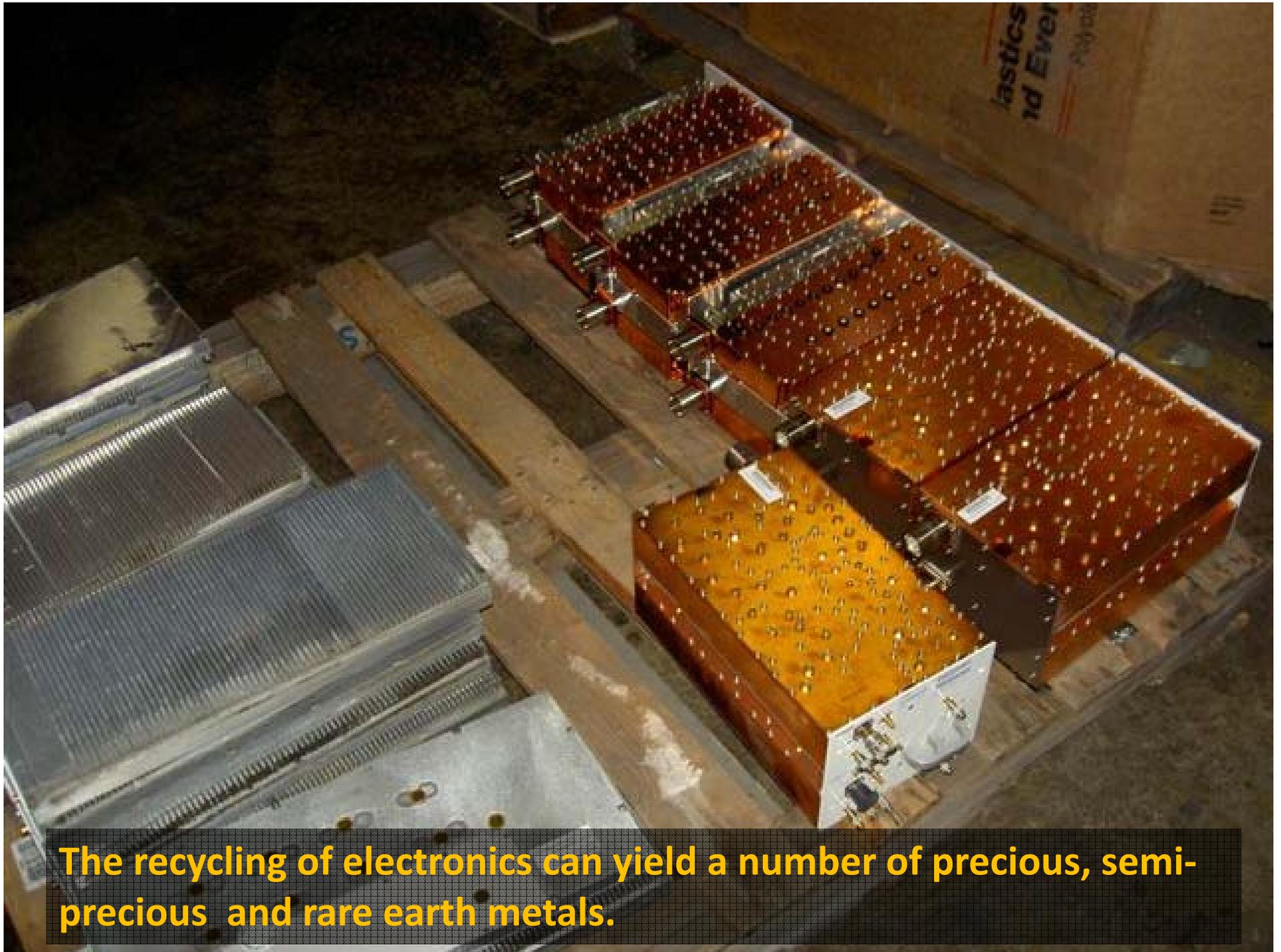
- Electronic equipment and gadgets are the fastest growing waste stream in many countries. For example:
  - Global cell phone sales are projected to exceed 2 billion units per year by 2015 with many being smartphones
  - Tablet PC sales in the US are expected to reach 44 million by 2015



# Electronics contain valuable and/or toxic components

- **Cell phones** can contain: Copper, Silver, Gold, Palladium, and Platinum
- **Computers** contain many toxic substances, like dioxins, polychlorinated biphenyls (PCBs), cadmium, chromium, radioactive isotopes, and mercury.
- **CRTs** contain lead (often more than 6% by weight or 1.5lbs to 8lbs) and phosphors
- **Circuit boards** contain considerable quantities of lead-tin solders
- **Televisions** contain lead, copper, steel and aluminum





**The recycling of electronics can yield a number of precious, semi-precious and rare earth metals.**

# When incinerated or improperly handled, scrap electronics can pollute air and water

- The Environmental Protection Agency estimates that only 15-20% of e-waste is recycled, the rest of these *electronics go* directly into *landfills* and incinerators.
- Additionally, significant percentage of “recycled” e-waste is being improperly recycled or shipped to developing countries (maybe as much as 80%)

# Potential for Air Pollution

- Burning the brominated flame retardants in plastic casings of electronics can create pollutants such as Polychlorinated dibenzo-*p*-dioxins and dibenzofurans





# Potential for Water Pollution

- Acid baths contaminate water sources
- Leachate from landfilling or dumping electronics can contaminate surface and groundwater
  - According to EPA, 70% of the heavy metals in landfills, including lead, mercury and cadmium, comes from electronic equipment discards
  - Electronics can also leach barium and beryllium



# Industrial Waste

3 landfills serve the pulp and paper industry

1 landfill serves the automotive industry

1 landfill serves the battery industry

7 landfills serve electric industry

Waste is processed, recycled and disposed of in landfills:

Building Industry

Medical Industry



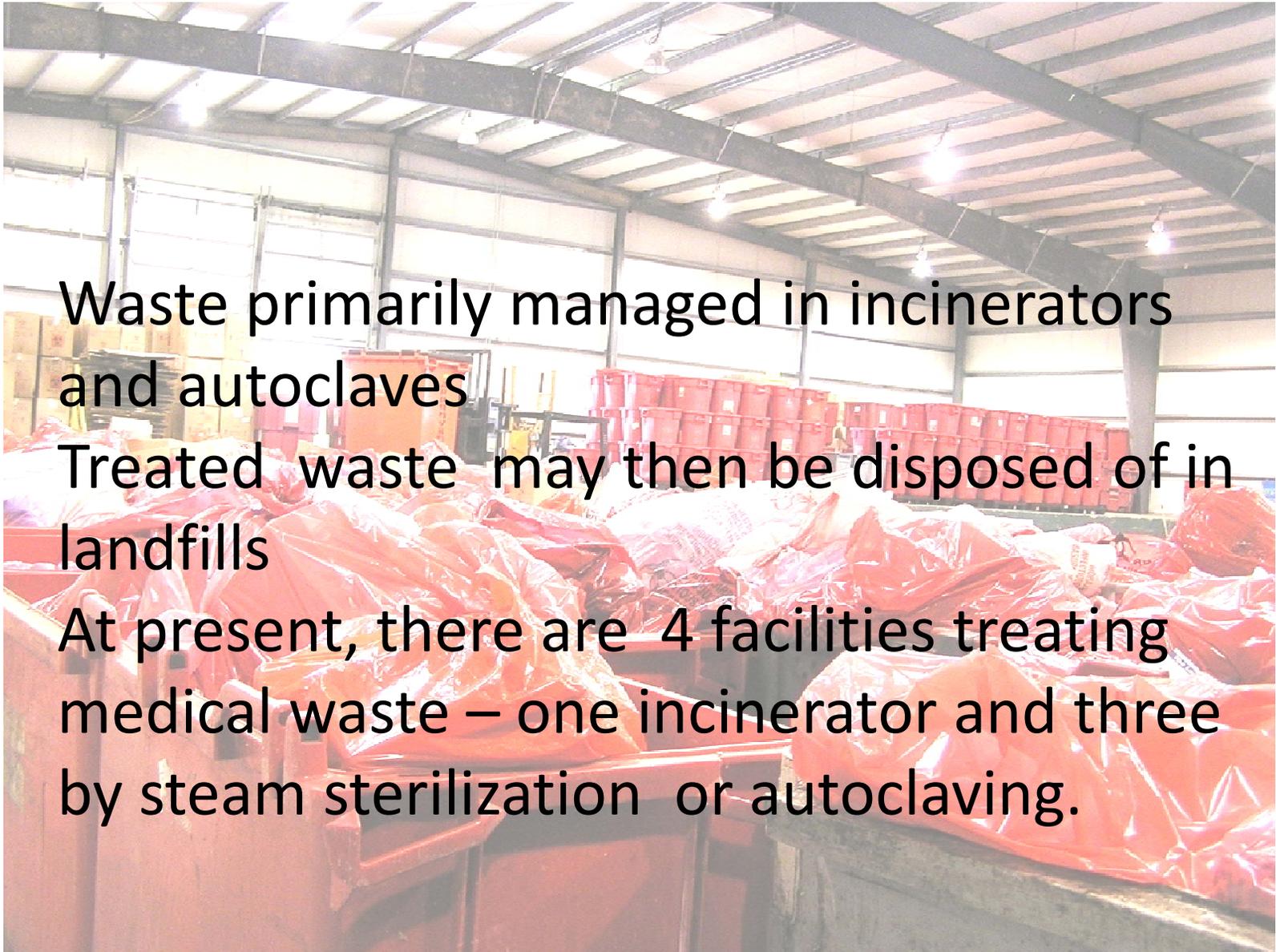
Large Type III Compost Facility in Goldston, NC

# Medical Waste

Waste primarily managed in incinerators and autoclaves

Treated waste may then be disposed of in landfills

At present, there are 4 facilities treating medical waste – one incinerator and three by steam sterilization or autoclaving.



## Regulated Medical Waste

- Regulated medical waste means blood and body fluids in individual containers in volumes greater than 20 ml (about the size of a test tube), microbiological waste, and pathological waste .
- Roughly 9 percent to 15 percent of the waste stream at hospitals is regulated medical waste.
- Regulated medical waste must be treated prior to disposal.

# Blood and Body Fluids

- Blood and body fluids means liquid blood, serum, plasma, other blood products, emulsified human tissue, spinal fluids and pleural and peritoneal fluids.
- Dialysates, urine, and feces are **not** blood or body fluids under this definition (NCAC 13B)
- Blood and fluids can be incinerated or disposed of in the sewer going to waste water treatment plants, as long as they are notified.

# Microbiological Waste

- Microbiological waste means cultures and stocks of *infectious agents*, including, but not limited to, specimens from medical, pathological, pharmaceutical, research, commercial and industrial laboratories.
- Can be autoclaved, incinerated, or treated with disinfectant chemicals (bleach 1:5).

# Pathological Waste

- Pathological waste means human tissues, organs and body parts; and the carcasses of animals that were ***known*** to have been exposed to pathogens ***or that died*** of a ***known*** or ***suspected*** disease transmissible to humans.
- Only method of treatment by regulation – incineration (but may get other methods approved by DENR) .

# Medical Waste

Medical waste means **any** solid waste which is generated in the diagnosis, treatment, or immunization of human beings or animals.

*General Statutes 130A-309.26*

*15A NCAC 13B .1200*

## Non-Regulated medical and related wastes

- Medical waste –dressings, bandages (even when blood soaked), sponges, disposable instruments, used gloves, and tubing.
- Biohazardous waste such as trauma scenes
- Animal carcasses, the exception is animals that died from a zoonotic disease (*e.g.-rabies, Mad Cow Disease*) .
- Household medical waste (home injectors, pharmaceuticals)



Autoclave  
Steam Sterilizer



# Incinerator

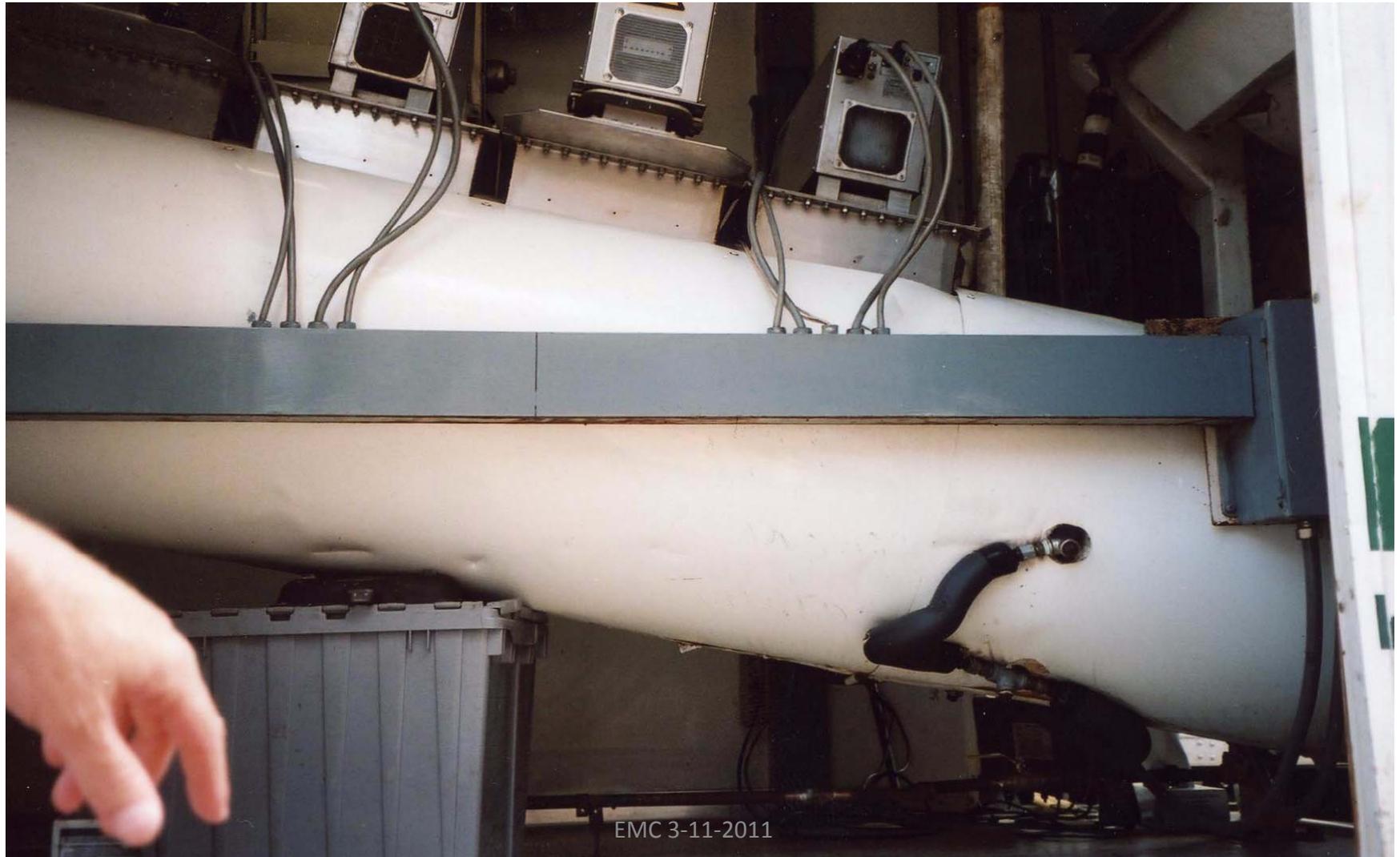








# Microwave



# Pyrolizer





## Shred and Lime Treatment (Calcium Oxide)

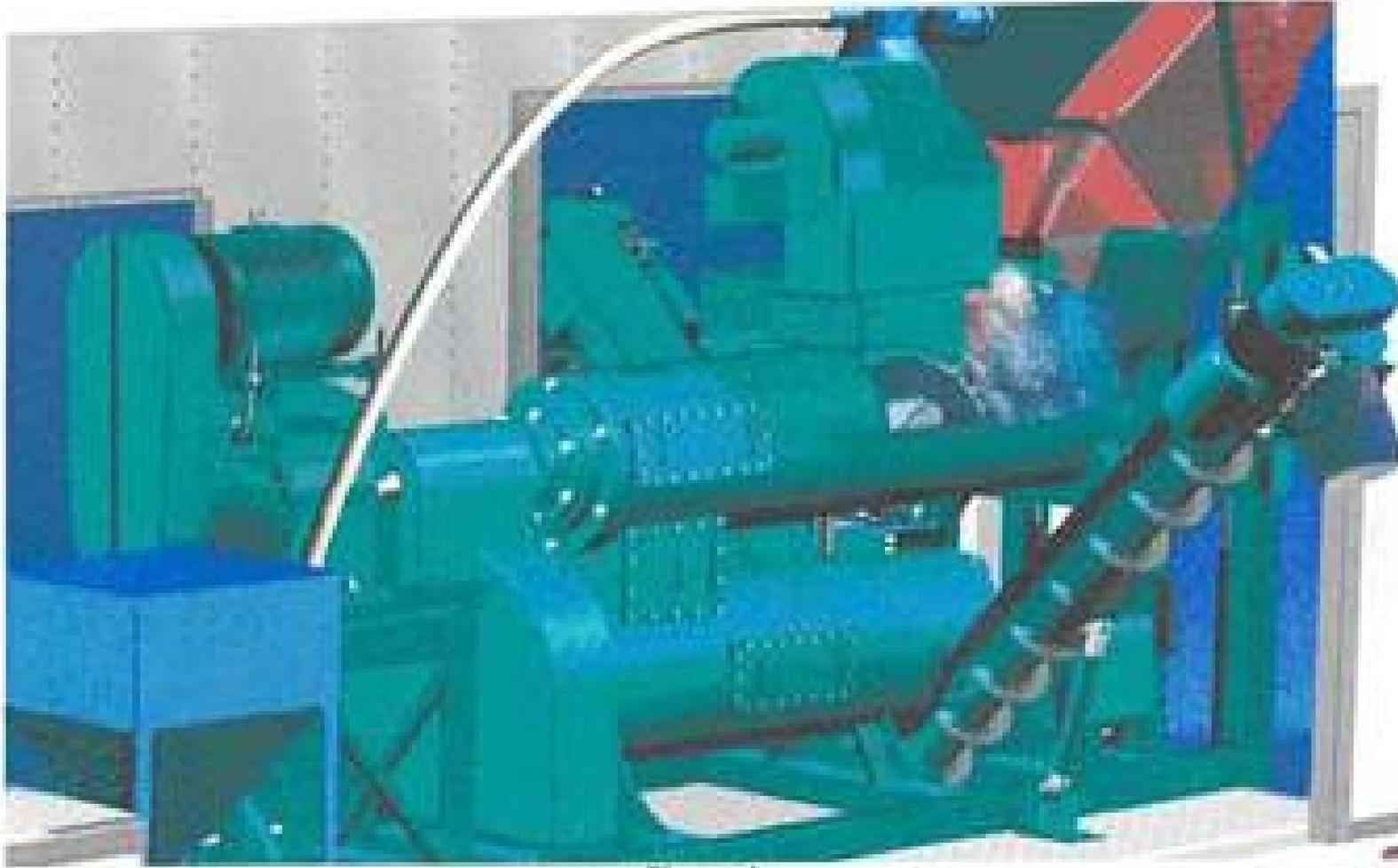


Figure 1

## Shred and Treat (Ozone)



# Shred and Treat (Chlorine Oxide)



## Alternative Medical waste treatment types

Usually two step process.

Shredding- to reduce volume and render waste unrecognizable.

Application of heat or chemical treatment to reduce infectious nature.

- Super heated water- water under pressure and temp.
- Sodium hydroxide- tissue digestion, alkaline hydrolysis

Other chemical treatments

- Peracetic acid, chlorine dioxide, ozone, calcium oxide
- Disinfecting solidifiers- for suction canister liquids-
- Sodium Dichloro-s-triazinetriene dihydrate

# Sharps

- NC rules do not require treatment of sharps before disposal.
- They must be packaged in a container that is rigid, leak-proof when in an upright position and puncture resistant.
- The package may then be disposed of with general solid waste.
- Facilities should check with county or city authorities for local approval Ex. Buncombe County.

# Pharmaceutical Waste

- It is no longer a “best management practice” to dispose of unwanted pharmaceuticals by flushing them down a commode.
- Most Rx and OTC products can be disposed of safely in the landfill.
- Approximately 10% of pharmaceutical waste from hospitals is hazardous
- More info at the website:  
[http://www.wastenotnc.org/swhome/MedWaste/Pharmaceutical\\_Waste\\_Guidance.pdf](http://www.wastenotnc.org/swhome/MedWaste/Pharmaceutical_Waste_Guidance.pdf)

# What really happens

- Hospitals are only 3% of generators, but account for 70% of medical waste.
- Some facilities, such as long-term care facilities, generate medical waste but little to no *regulated* medical waste.
- Landfills are not required to take medical waste.

Even if bags have a biohazard symbol it may be non-reg and allowed in landfills by state regulations



Some landfills do not want this waste because they believe the infectious wastes are an unacceptable hazard



# Transportation Regulations – US DOT and NCAC 13B

- Transport of regulated medical waste must comply with US Dept. of Transportation and NC Waste Management rules.
  - Display biohazard symbol 
  - Must be delivered to storage or treatment facility within 7 days
  - Refrigeration if kept longer than 7 days
  - Manifests required to be kept for 3 years

# NORTH CAROLINA MEDICAL WASTE MANAGEMENT

## INSTITUTIONALLY GENERATED MEDICAL WASTE

### SHARPS

### REGULATED MEDICAL WASTE

### NON-REGULATED MEDICAL

PROPERLY  
TAGGED  
AND  
PACKAGED  
IN A RIGID,  
PUNCTURE  
PROOF  
CONTAINER

PATHOLOGICAL  
WASTES &  
CARCASSES OF  
INFECTED  
ANIMALS

CULTURES &  
BROTHS OF  
KNOWN  
PATHOGENS

BLOOD &  
BLOOD  
PRODUCTS,  
PLEURAL,  
SPINAL,  
PERITONEAL  
FLUIDS

URINE,  
FECES,  
DIALYSATES

DRESSINGS,  
GOWNS,  
BANDAGES  
GLOVES,  
TUBING,  
PAPER,  
PLASTIC,  
AND  
EVERYTHING  
ELSE

With local approval

INCINERATION  
(OR OTHER  
APPROVED METHOD)

AUTOCLAVED,  
MICROWAVED  
CHEMICALS,  
OR OTHER  
APPROVED  
METHOD.

PUBLIC WASTE  
WATER  
TREATMENT  
PLANT

OVER 90%  
OF WASTE  
STREAM

With local approval

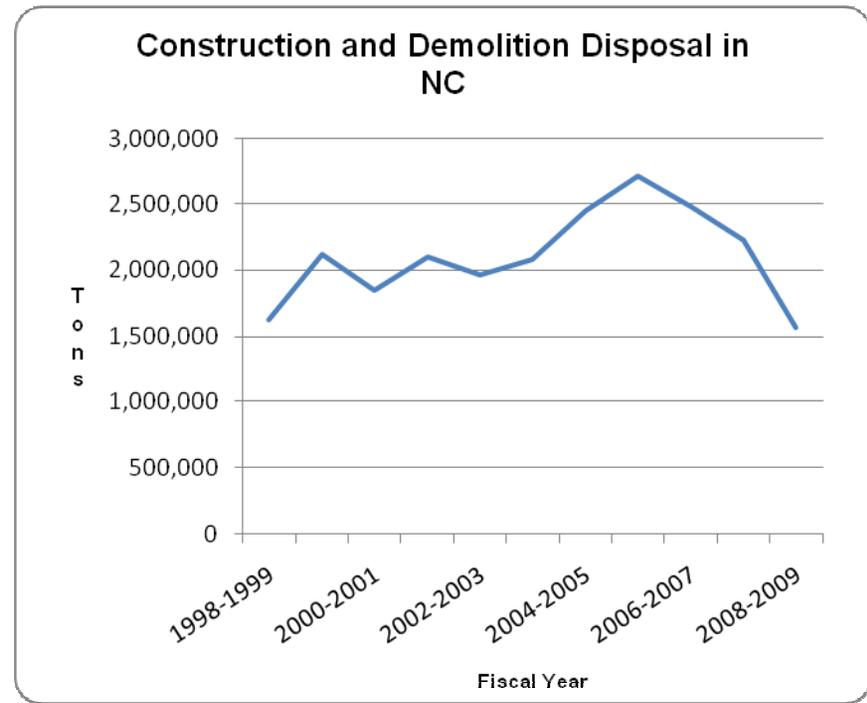
MUNICIPAL SOLID WASTE STREAM- TO THE LANDFILL



**Management of waste and materials from building industry**



## ***Building Industry: Less Construction = Less Disposal***





A container of mostly nails from construction and demolition waste.





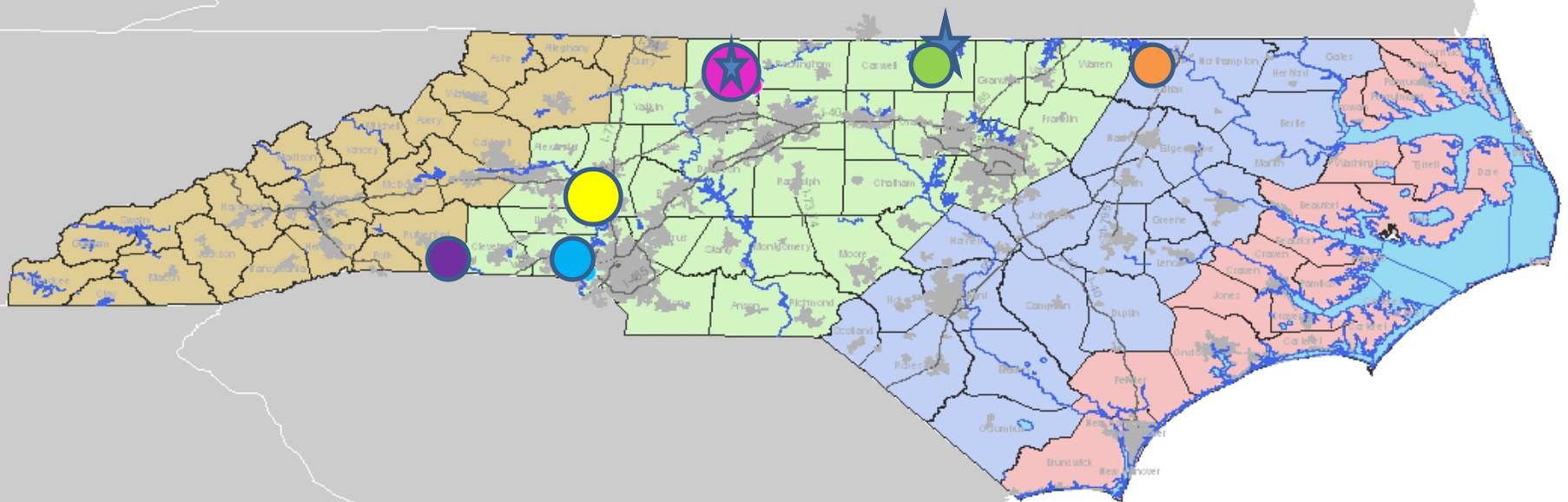






**Clean wood with no paint or preservatives can be ground and made into mulch for landscaping applications.**

# Coal Combustion Waste



## Legend

- Marshall Steam Station
- Allen Steam Station
- Cliffside Steam Station
- Belews Creek Steam Station
- Roxboro Steam Station
- Halifax Coal Ash LF
- US Interstates
- Major Hydrography
- Urban Areas



Map created 18 February 2010 by Darrel M. Johnson  
NCDENR, DWM, Solid Waste Section

Data Sources: NC One Map and Solid Waste Section Core Database



# Coal Ash Use & Storage

- Inorganic parameters sampled by utility companies for DENR permitted facilities

*Antimony	Copper	Selenium
Arsenic	Fluoride	Silver
Barium	Iron	Sulfate
*Beryllium	Lead	*Thallium
Boron	Manganese	Zinc
Cadmium	Mercury	pH
Chloride	Nickel	TDS
Chromium	Nitrate	

\* No 2L standards.

- Parameters that exceed 2L standards for ash landfills typically are boron, manganese, and iron; pH is generally below standard range.

### Landfills at Power Plants in North Carolina

Permit ID	County	Permit Name	Status	Liner System	Most Recent PTO Date	Previous Landuse	Acreage	FGD	Ash	GW Monitoring
1804-INDUS-1983	Catawba	Duke Energy-Marshall Steam Station (Abestos & C&D)	Closed (June 2008)	unlined		greenfield	61		✓	✓
1809-INDUS	Catawba	Duke Energy-Marshall Steam Station (FGD Residual)	Active	lined w/ LCS	Nov 2011	greenfield	31.9	✓		✓
1812-INDUS-2008	Catawba	Duke Energy-Marshall Steam Station (Indus Landfill #1)	Active	double lined w/ LCS & LDS *	Mar 2011	Phase 1- greenfield & retired ash pond	93.4		✓	leak detection system
3612-INDUS-2008	Gaston	Duke Energy-Allen Steam Station (RAB Landfill)	Active	double lined w/ LCS & LDS	Dec 2010	retired ash basin	47	✓	✓	leak detection system
8106-INDUS	Rutherford	Duke Energy-Cliffside Steam Station	Active	lined w/ LCS	Sept 2010	greenfield	85	✓	✓	✓
8503-INDUS-1984	Stokes	Duke Energy-Belews Creek Steam Station (Pine Hall Rd LF)	Closed (Dec 2007)	unlined		greenfield			✓	✓
8504-INDUS	Stokes	Duke Energy-Belews Creek Steam Station (Craig Rd LF)	Active	lined w/ LCS	Nov 2007	greenfield	90	✓	✓	✓
8505-INDUS	Stokes	Duke Energy-Belews Creek Steam Station (FGD Residual)	Active	lined w/ LCS	Jan 2008	greenfield	22.6	✓		✓
7302-INDUS	Person	Progress Energy-Roxboro	Active	lined w/ 40mL LLDPE-GM	July 2007	lined landfill over unlined landfill over retired ash basin	71	✓	✓	✓
7302-INDUS	Person	Progress Energy-Roxboro	Closed 2002	unlined		unlined landfill over retired ash basin	113		✓	✓

\*LDS - leak detection system, LCS - leachate collection system

# Proposed Federal Regs

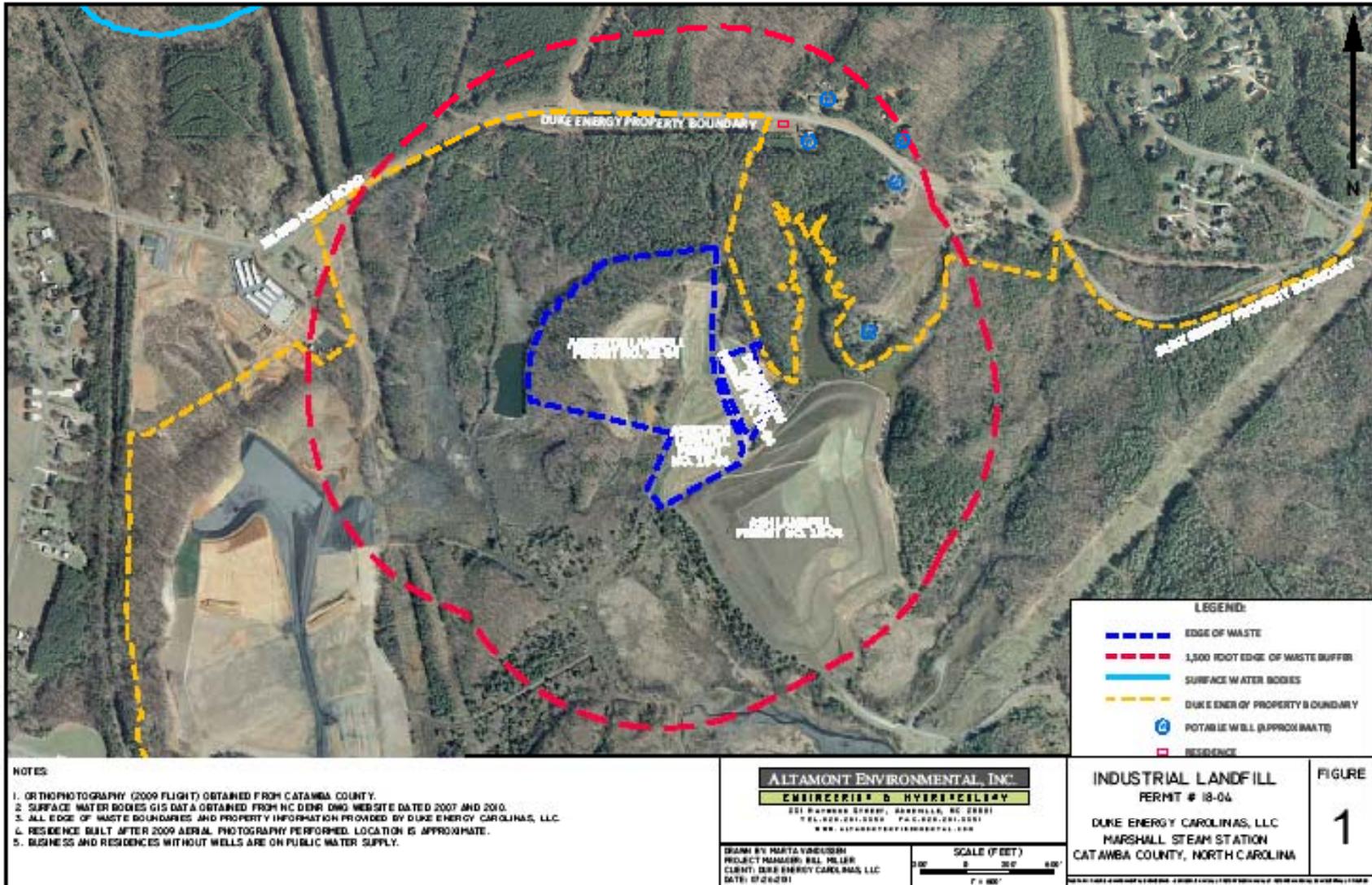
- Hazardous and Solid Waste Management System; Identification and Listing of Special Wastes; Disposal of Coal Combustion Residuals From Electric Utilities; Proposed Rule  
Proposed Rule: June 2010 concerning proposed subtitle D (solid waste) or Subtitle C (haz waste) regulations.
- Comments were sent Nov 2010 (proposed rule)
- Nov 2011 comments were sent concerning comments from public meetings and documentation within docket.
- No timetable of final rule.
- Effluent Guidelines for Steam Electric Plants. draft due out July 2012, final 2014

# Progress Energy Roxboro - #7302

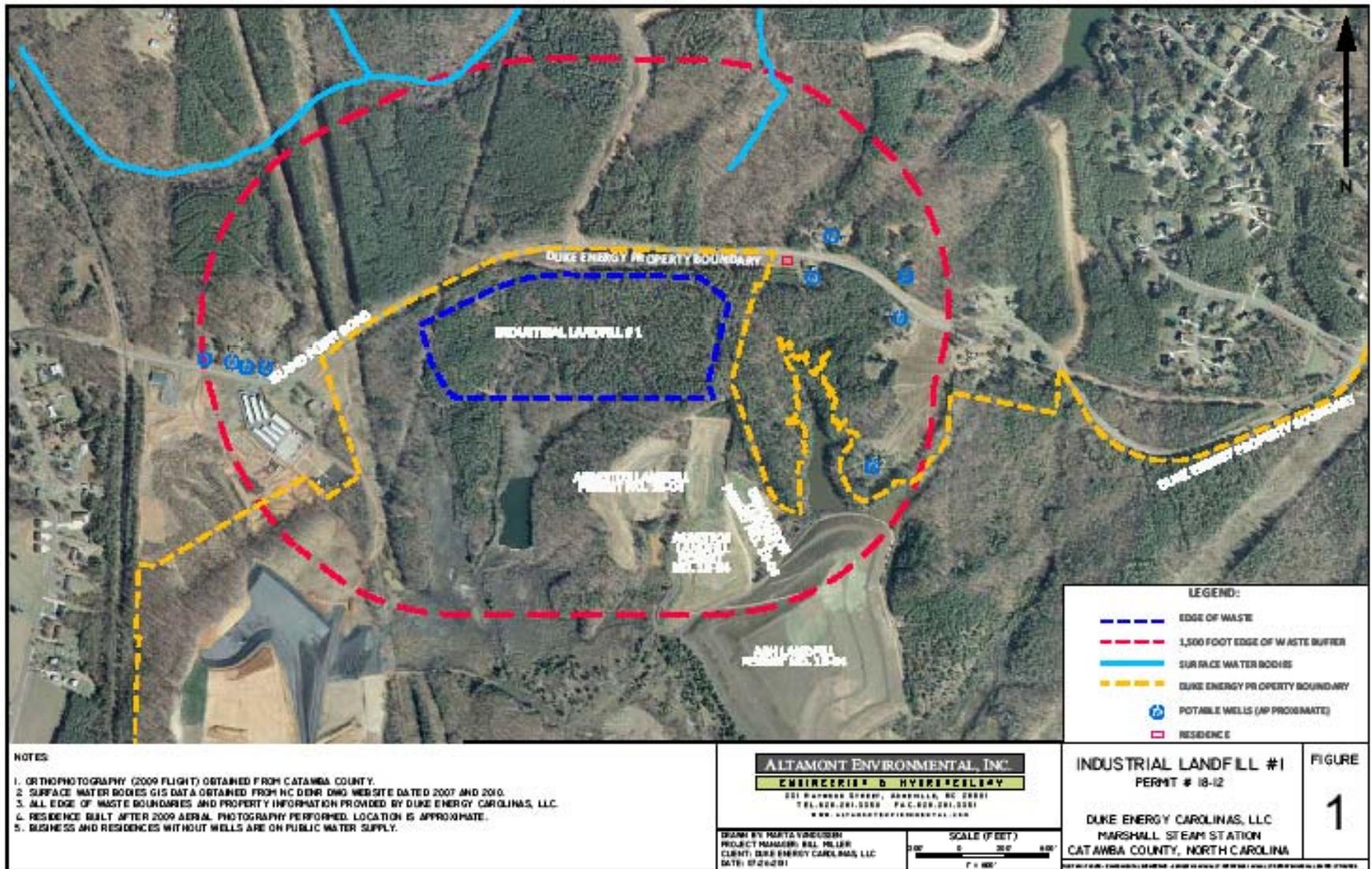


Progress Energy – Roxboro Steam Station  
Roxboro, NC – Person County

# Duke Marshall – Dry Ash, #1804



# Duke Marshall – Industrial LF#1, #1812



# Duke Marshall – FGD, #1809



**NOTES**

1. ORTHOPHOTOGRAPHY (2009 FLIGHT) OBTAINED FROM CATAMBA COUNTY.
2. SURFACE WATER BODIES GIS DATA OBTAINED FROM NC DENR DWS WEBSITE DATED 2007 AND 2010.
3. ONLY POTABLE WELLS WITHIN THE 1,500' BUFFER ARE SHOWN.
4. BASED UPON THE CATAMBA COUNTY UTILITIES AND ENGINEERING WEBSITE, A PUBLIC WATER LINE IS NOW LOCATED ALONG SHERRILLS FORD ROAD.
5. WELL LOCATIONS PROVIDED BY DUKE ENERGY CAROLINAS, LLC.
6. ALL EDGE OF WASTE BOUNDARIES AND PROPERTY INFORMATION PROVIDED BY DUKE ENERGY CAROLINAS, LLC.

221 Parkway Street, Asheville, NC 28801  
 TEL: 828.281.2222 FAX: 828.281.2221  
 WWW.DUKEENERGY.COM

DRAWN BY: MARTA VANDERBILT  
 PROJECT: FGD RESIDUE LANDFILL  
 CLIENT: DUKE ENERGY CAROLINAS, LLC  
 DATE: 07/26/09

SCALE (FEET)  
 0 300'  
 2" = 60'

**FGD RESIDUE LANDFILL**  
 PERMIT # 18-09

**DUKE ENERGY CAROLINAS, LLC**  
**MARSHALL STEAM STATION**  
 CATAMBA COUNTY, NORTH CAROLINA

FIGURE

1

DATE PLOTTED: 08/04/09 09:58:43 AM

# Duke Belews Creek – Craig Rd, #8504



**NOTES:**

1. ORTHOPHOTOGRAPHY WAS OBTAINED FROM NC ONEMAP GIS WEB SITE FOR STOKES COUNTY (DATED 2008).
2. SURFACE WATER BODIES GIS DATA OBTAINED FROM NC DENR DWG WEBSITE DATED 2007 AND 2010.
3. ALL EDGE OF WASTE BOUNDARIES AND PROPERTY INFORMATION PROVIDED BY DUKE ENERGY CAROLINAS.

ALTAIR ENVIRONMENTAL, INC.

231 HAYWOOD STREET, ASHEVILLE, NC 28601  
 TEL: 828.261.3330 FAX: 828.261.3351  
 WWW.ALTAIRENVIRONMENTAL.COM

DRAWN BY: MARTA A VANDUSSEN  
 PROJECT MANAGER: BILL MILLER  
 CLIENT: DUKE ENERGY  
 DATE: 07/08/2011

SCALE (FEET)  
 0 300 600  
 1" = 600'

CRAIG ROAD ASH LANDFILL PHASE I

PERMIT NUMBER 85-04

DUKE ENERGY CAROLINAS  
 BELEWS CREEK STEAM STATION  
 STOKES COUNTY, NORTH CAROLINA

1

FIGURE 1

# Duke Belews Creek – FGD LF, #8505



**NOTES:**

1. ORTHOPHOTOGRAPHY WAS OBTAINED FROM NC ONEMAP GIS WEB SITE FOR STOKES COUNTY (DATED 2008).
2. ALL PROPERTY SHOWN OWNED BY DUKE ENERGY CAROLINAS.
3. SURFACE WATER BODIES GIS DATA OBTAINED FROM NC DENR DWQ WEBSITE DATED 2007 AND 2010.
4. ALL EDGE OF WASTE BOUNDARIES AND PROPERTY INFORMATION PROVIDED BY DUKE ENERGY CAROLINAS.

ALTA MONT ENVIRONMENTAL, INC.

231 HAYWOOD STREET, ASHEVILLE, NC 28801  
 TEL. 828.261.3330 FAX. 828.261.3351  
 WWW.ALTAMONTENVIRONMENTAL.COM

DRAWN BY: MARTA A VANDUSSEN  
 PROJECT MANAGER: BILL MILLER  
 CLIENT: DUKE ENERGY CAROLINAS  
 DATE: 07/08/2011

SCALE (FEET)  
 0 300 600  
 1" = 600'

FGD RESIDUAL LANDFILL FIGURE  
 PERMIT # 85-05

DUKE ENERGY CAROLINAS  
 BELEWS CREEK STEAM STATION  
 STOKES COUNTY, NORTH CAROLINA

1

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# Duke Allen – Retired Ash Basin LF, #3612



**NOTES**

1. ORTHOPHOTOGRAPHY WAS OBTAINED FROM NC ONEMAP GIS WEB SITE FOR GASTON COUNTY (DATED 2009)
2. SURFACE WATER BODIES GIS DATA OBTAINED FROM NC DENR DNR WEBSITE DATED 2007 AND 2010.
3. ALL EDGE OF WASTE BOUNDARIES AND PROPERTY INFORMATION PROVIDED BY DUKE ENERGY CAROLINAS.

201 Parkway Street, Asheville, NC 28801  
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 WWW.EDUCORPORATION.COM

DRAWN BY: MARTA A. VANDUEN  
 PROJECT MANAGER: BILL MILLER  
 CLIENT: DUKE ENERGY CAROLINAS  
 DATE: 07/2012

SCALE (FEET)  
 0 100 200  
 1" = 60'

**RETIRED ASH BASIN (RAB)  
 LANDFILL  
 PERMIT # 35-12**

**DUKE ENERGY CAROLINAS  
 ALLEN STEAM STATION  
 GASTON COUNTY, NORTH CAROLINA**

FIGURE

**1**

# Duke Cliffside – CCP LF, #8106



**NOTES:**

1. ORTHOPHOTOGRAPHY WAS OBTAINED FROM NC ONEMAP GIS WEB SITE (DATED 2009) FOR CLEVELAND AND RUTHERFORD COUNTIES.
2. SURFACE WATER BODIES GIS DATA OBTAINED FROM NC DENR DWG WEBSITE DATED 2007 AND 2010.
3. ALL EDGE OF WASTE BOUNDARIES AND PROPERTY INFORMATION PROVIDED BY DUKE ENERGY CAROLINAS.
4. POTABLE WELL LOCATIONS ARE APPROXIMATE. OTHER RESIDENCES HAVE WATER METERS AND ARE ASSUMED TO BE ON PUBLIC WATER SUPPLY.

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 CLIENT: DUKE ENERGY CAROLINAS  
 DATE: 07/25/2011

SCALE (FEET)  
 0 300 600  
 1" = 600'

CCP LANDFILL  
 PERMIT # 81-06

DUKE ENERGY CAROLINAS  
 CLIFFSIDE STEAM STATION  
 CLEVELAND AND RUTHERFORD  
 COUNTIES, NORTH CAROLINA

FIGURE

1



# Shale Gas Industry

Federal haz waste regs include the following **exclusion**: “The following solid wastes are not hazardous wastes: Drilling fluids, produced waters, and other wastes associated with the exploration, development or production of crude oil, natural gas or geothermal energy.” 40 CFR 261.4(b)(5)

Naturally occurring radioactive materials (NORMs) contribute to background radiation. Uranium (U) and Thorium (Th) are two of the most common radioactive elements that occur in most igneous, metamorphic and sedimentary rocks, in very low concentrations of 1 to 3 parts per million (ppm). These elements together with their decay daughters – Radium (Ra) and Radon (Rn) – have been associated with NORMs.



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