

Practical Approaches that Work

Waste Assessments

Tracking and Measurement

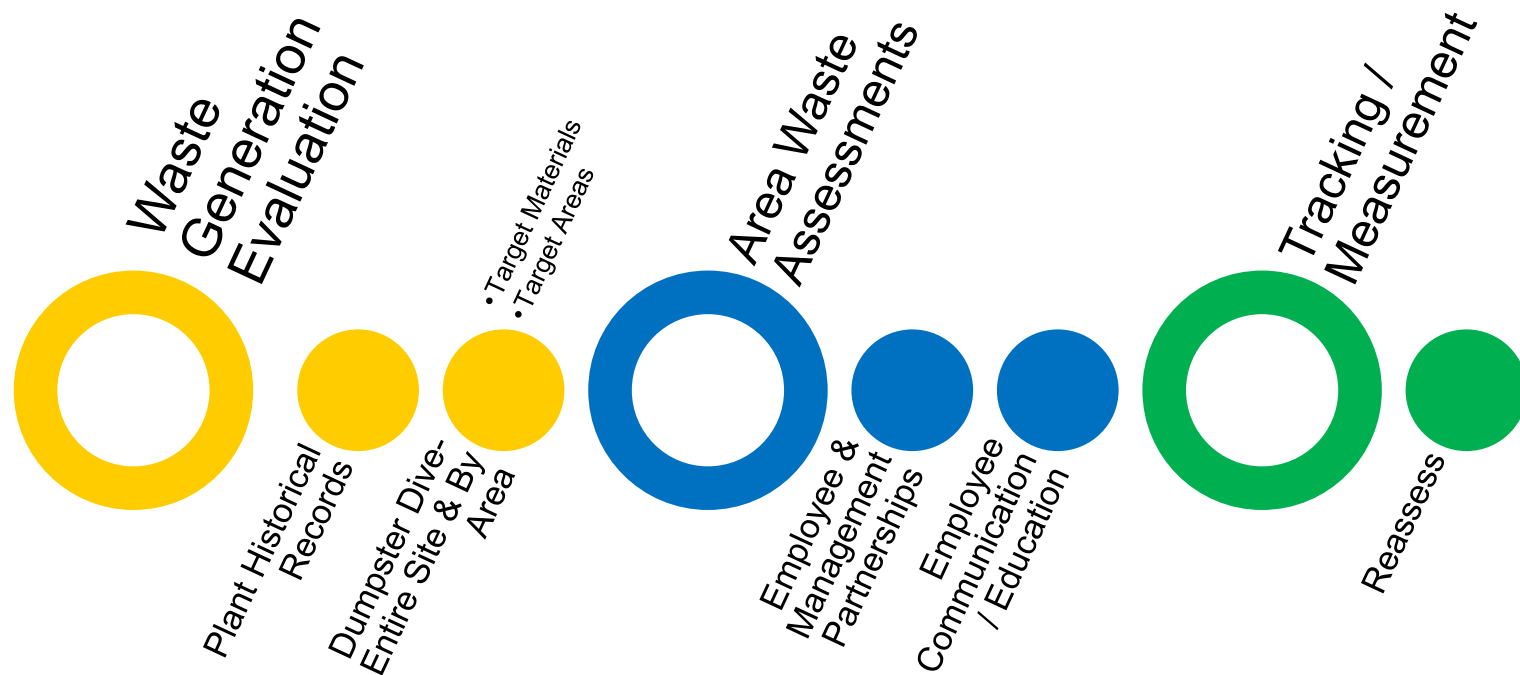
Diana P. Joyner, Environmental Engineer

March 22nd, 2016



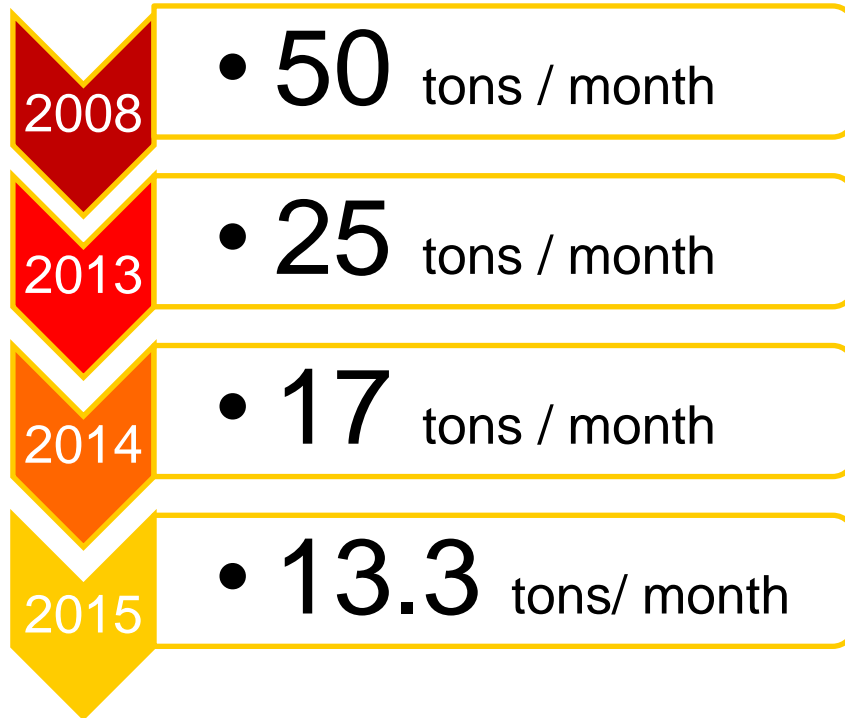
START

Approach



Westinghouse, Columbia Fuel Fabrication

Solid Waste Generation Rates (FY)

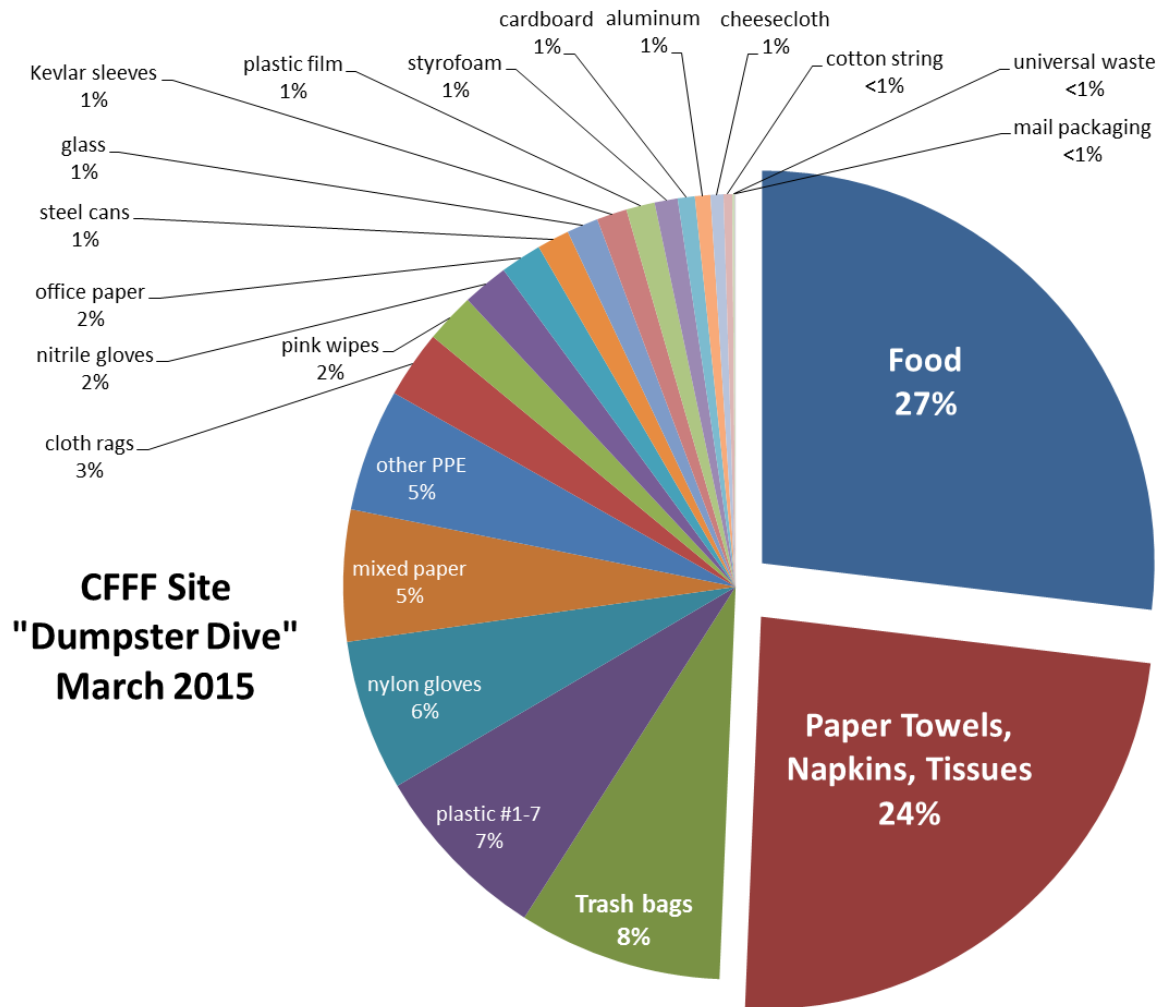


Ultimate Goal = 0



What Does Your Company Throw Away?

CFFF Site Dumpster Dive March 2015



**Where should the
Site's Focus Be?**

- Food Waste
- Paper Towels
- Trash Bags

Waste Reduction Opportunities

Food Scrap Collection

Food Scraps



OR



&



Food Digester



Food Composter

0 Food
Waste
to Landfill

27%
reduction
in Westinghouse
Non-Manufacturing
Waste

Waste Assessments

Waste Assessment Benefits

- In-depth understanding of waste generation for **source targeting**
- **Area Focus** (aka “Buy In”) to the site’s larger goal of ZWTL
- **Feedback** for site sustainability team on what is and is not working



Waste Assessment Basics

- **Count** Receptacles
- Describe the **Location**
 - When possible, take pictures
- **Assess** Receptacles for:
 - Proximity to generation
 - Size / Capacity
 - Usage
 - at the end of the shift/day
 - Contents
 - Currently Recyclable?
 - Potentially Recyclable?
 - Truly Landfill?



114

6/24/2014 Tool Room

Blue	① By Bestwright's office	10-15% capacity	<u>Remove</u>
	- pink wipes	- cheese cloth	
	- nitrile gloves	- sand paper	
	- Solo cup	- grocery bags	
	- Al foil		
Grey	② <u>I-beam 11C</u>	5-10% capacity	<u>Remove</u>
	- plastic	- sandpaper	
	- pink wipes	- ear plugs	
	- nitrile gloves	- plastic laminated cards	
Grey	③ <u>I-beam 11C (covered)</u>	10-15% capacity	- Remove - Replace w/ blue for good rod sleeves
	- pink wipes	- tamper safe seals	
	- nitrile gloves	- gum box (paperboard)	

Waste Assessments

Area: CFFF Tool Room

Waste Assessment

Area Focus: CFFF Tool Room



Waste Assessment

Area Focus: CFFF Tool Room

- **20 Trash Receptacles**
 - 11 rigid receptacles
 - 9 portable carts
 - Both used 56-gal capacity bags
- **Area Assessment**
 - Recyclable items were being thrown away because recycling receptacles were not easily accessible
 - Too many trash receptacles for the work space
 - Emptied too frequently
 - Oversized receptacles

Waste Assessment

Area Focus: CFFF Tool Room

Path Forward

- **Area Buy-In**
 - Area managers and workers agreed they did not need 20 receptacles
- **Receptacle Reduction**
 - Reduced by half, with primary decision to use portable carts
 - Recycling receptacles added where needed
- **Can Liner Reduction** by half
- **Service Frequency**
 - Discussions initiated with janitorial staff not to remove bags less than half full

Waste Assessments

Receptacle: CFFF Tube Prep

A picture is worth



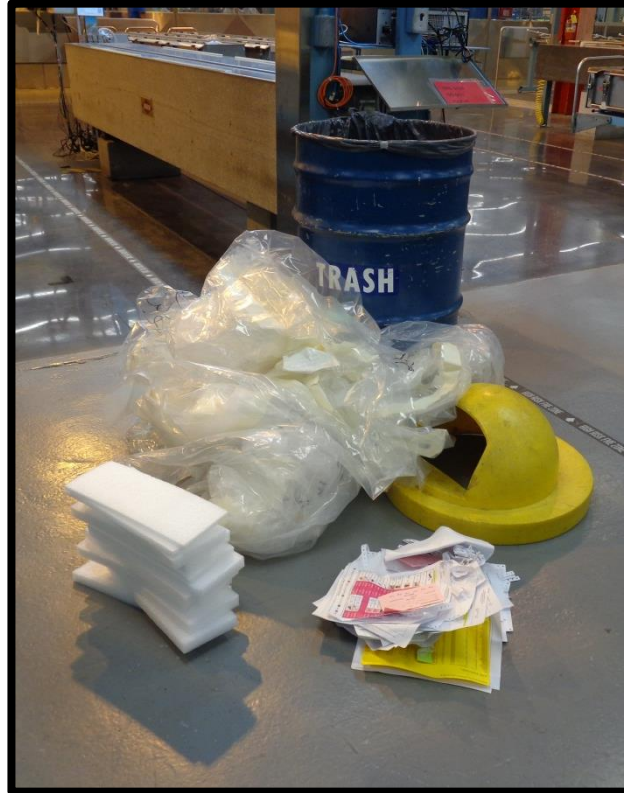
words

Waste Assessment

Receptacle: CFFF Tube Prep



Before

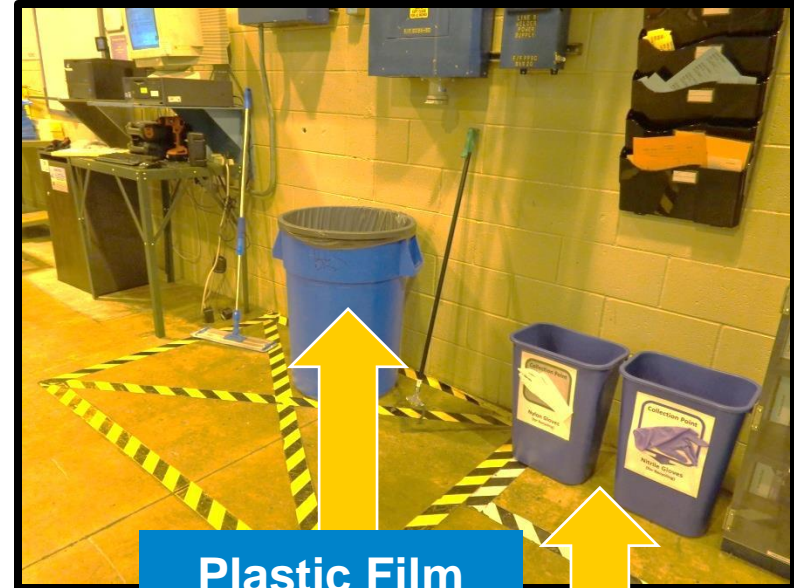


After

What recycling programs were implemented at the time?

Waste Assessment

Employee Education & Communication



Plastic Film

Glove
Receptacles

Waste Assessments

Receptacle: CFFF Break Room 301/302

Waste Assessment

Receptacle: Break Room by 301/302

Opportunity:

- Trash cans located near exit
- Simple location of bin did not encourage recycling



Solution:

- Reorganized room to co-locate trash and recycling receptacles
- Improved communication signs

Waste Assessment

Employee Education & Communication



3-Dimensional
Signs Created

Waste Assessment

Employee Education & Communication

NO

- Cups
- Napkins
- Paper Towels

YES



MIXED PAPER

EMPTY ALL CONTAINERS AS PRACTICABLE



PLASTICS, RIGID #1-7

Tracking and Measurement

Tracking and Measurement

Why measure and track solid waste?

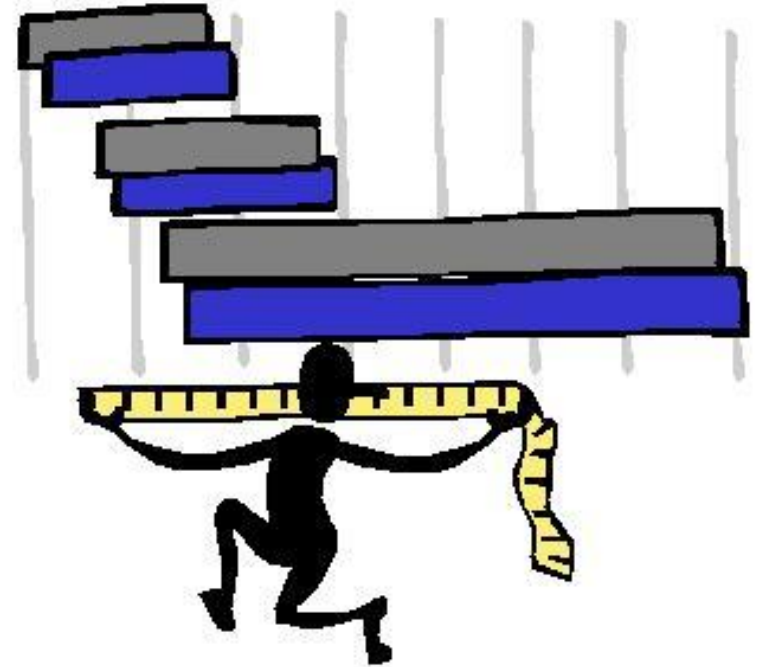
- To set goals and/or meet company requirements
- Understand your waste stream
- Identify Improvement Opportunities
- Cost accounting
- To establish a baseline



Tracking and Measurement

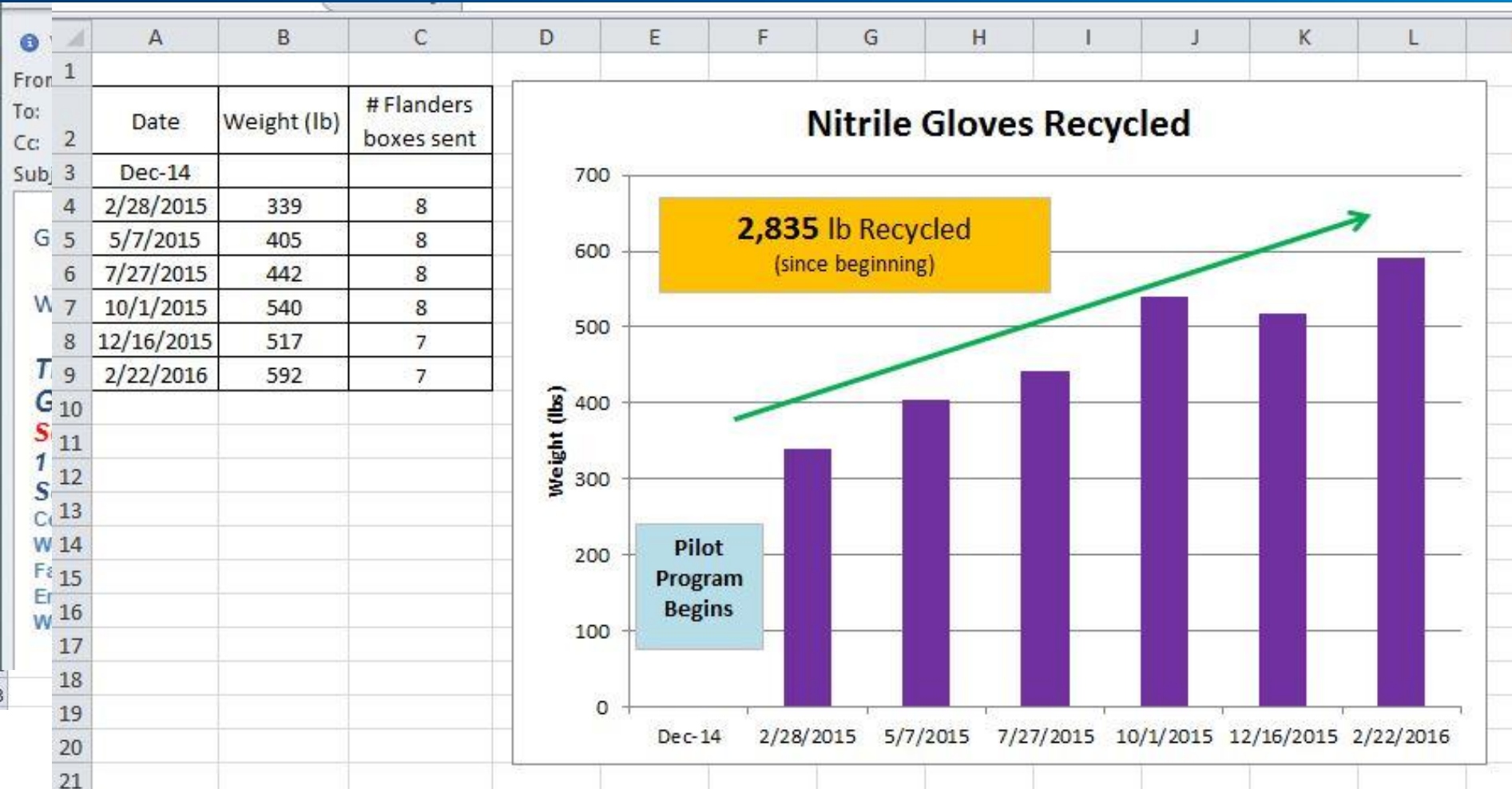
Establish a Baseline

- Create a **spreadsheet** / use a company template
- **Compile** several years of waste generation data
 - Note any anomalies or changes that could skew the data:
 - Production
 - Headcount
 - Construction activities, etc.
- **Select** representative baseline measurement term, usually a calendar year or fiscal year



Tracking and Measurement

Waste Generation Data Collection



Tracking and Measurement

Set Goals and Track Them

T32		fx															
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	
1	PLEASE SUBMIT YOUR SUPPORTING DATA FILE; IN THIS FORMAT OR HOWEVER YOU TRACK THE CATEGORIZATION OF SEGREGATED STREAMS																
2	Westinghouse Electric Company LLC																
3	Baseline Environmental Performance Indicators			Period: FY15													
4	Waste data collection for Major facilities																
5																	
6	Location name:	Columbia															
9																	
10	Waste Generation and Disposition Data																
11																	
12	Peer Reviewed:																
13	<u>Toshiba category</u>	<u>Itemized Waste stream included in category</u>	<u>Units (for Toshiba category)</u>	Apr-2015	May-2015	Jun-2015	Jul-2015	Aug-2015	Sep-2015	Oct-2015	Nov-2015	Dec-2015	Jan-2016	Feb-2016	Mar-2016	<u>conversion</u> <u>conversion</u>	
31	Waste Plastics																
32		Waste Tires	pounds													0.45359	
33		Plastics	pounds	5220	2580.0	4380	2020	3220	5860	5380	6020	3800	1620			0.45359	
34	Waste Paper (including general waste)																
35		Solid waste (generated and not segregated); Municipal solid	tons (short tons)	18.87	3.47	20.55	8.39	9.72	6.2	19.32	17.8	4.87	9.46			907.19	
36		Paper	pounds	10,710	3015.0	5,190	2,780	8,430	5,800	12540	5580.0	2720	5140			0.45359	
37		Corrugated cardboard	pounds			21,498		21,040			18720		19480			0.45359	
42	Wood Scrap																
43		Wood waste (broken, dirty pallets)	tons (short tons)													907.19	
44		Wood waste	tons (short tons)	3.73	3.49	3.36	2.44	2.52	3.05	5.43	1.99	3.69	4.49			907.19	
logsdoci: 940 lbs mixed paper 4200 lbs shred paper																	
Instructions Information Official Waste Sheet 2 Combined data by category 3 Waste categories in kgs Peer Reviewer Guidance Change Rec																	

logsdocj:
940 lbs mixed paper
4200 lbs shred paper

File Home Insert Page Layout Formulas Data Review View Acrobat SecureZIP

Paste Cut Copy Format Painter Clipboard

Arial 10 Font

B I U Alignment

Wrap Text Merge & Center

General Number

Conditional Formatting Styles

A41

fx

1 **This sheet is now MANDATORY. However, you may include this information as a separate attachment if you wish.**

2 Westinghouse Electric Company LLC

3 Baseline Environmental Performance Indicators Period: FY15

4 Energy & waste data collection for Major facilities

5 = recycled no revenue A = attempted to report, but quality issue with the val

9 = recycled with revenue

10 **Waste Generation and Disposition Data** = incinerated or otherwise combusted

11 recycled onsite

12

13 *Toshiba category* *Itemized Waste stream included in category* *Units (for Toshiba category)*

31 **Waste Plastics** kg Apr-2015 May-2015 Jun-2015 Jul-2015 Aug-2015 Sep-2015 Oct-2015 Nov-2015 Dec-2015

32 Waste Tires kg - - - - - - - - - -

33 Plastics kg 2,368 1,170 1,987 916 1,461 2,658 2,440 2,731 1,724

34 **Waste Paper (including general waste)** kg 21,977 4,516 30,748 8,872 22,185 8,255 23,215 27,170 5,652

35 Solid waste (generated and not segregated); Municipal solid waste kg 17,119 3,148 18,643 7,611 8,818 5,625 17,527 16,148 4,418

36 Paper kg 4,858 1,368 2,354 1,261 3,824 2,631 5,688 2,531 1,234

37 Corrugated cardboard kg - - 9,751 - 9,544 - - 8,491 -

42 **Wood Scrap** kg 3,384 3,166 3,048 2,214 2,286 2,767 4,926 1,805 3,348

43 Wood waste (broken, dirty pallets) kg - - - - - - - - -

Wood waste kg - - - - - - - - -

Tracking and Measurement Rates

- **Waste to Landfill (WTL) / Final Disposal Rate (FDR)**

$$\text{Ratio} = \frac{\text{total waste sent to landfill}}{\text{total waste}}$$

$$\text{Percent} = \frac{\text{total waste sent to landfill}}{\text{total waste}} \times 100\%$$

- **Diversion Rate**

- percentage of waste materials diverted from traditional disposal such as landfilling or incineration to be recycled, composted, re-used, waste to energy, **or otherwise kept from going to a landfill**

$$\text{Ratio} = \frac{\text{total materials recycled, composted, reused, etc}}{\text{total waste}}$$

$$\text{Percent} = \frac{\text{total materials recycled, composted, reused, etc}}{\text{total waste}} \times 100\%$$

- Waste to Landfill (WTL) / Final Disposal Rate (FDR)

$$\text{Ratio} = \frac{\text{total waste sent to landfill}}{\text{total waste}}$$

$$\text{Percent} = \frac{\text{total waste sent to landfill}}{\text{total waste}} \times 100\% = \frac{17,119 \text{ kg}}{146,317 \text{ kg}} \times 100\% = 11.7\%$$

- Diversion Rate

- percentage of waste materials diverted from traditional disposal such as landfilling or incineration to be recycled, composted, re-used, waste to energy, or otherwise kept from going to a landfill

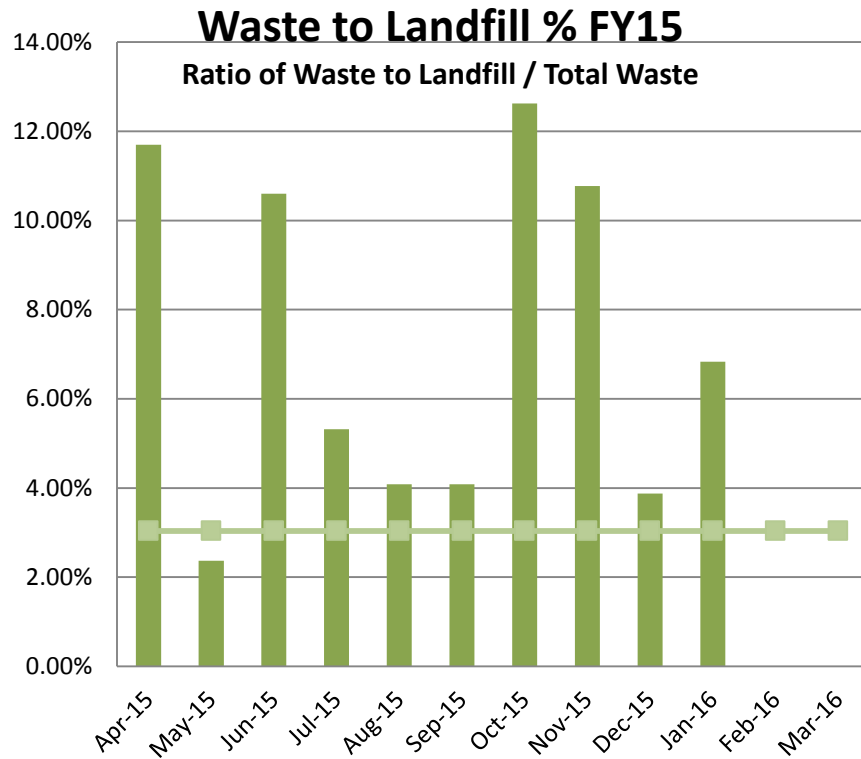
$$\text{Ratio} = \frac{\text{total materials recycled, composted, reused, etc}}{\text{total waste}}$$

$$\text{Percent} = \frac{\text{total materials recycled, composted, reused, etc}}{\text{total waste}} \times 100\% = \frac{129,198 \text{ kg}}{146,317 \text{ kg}} \times 100\% = 88.3\%$$

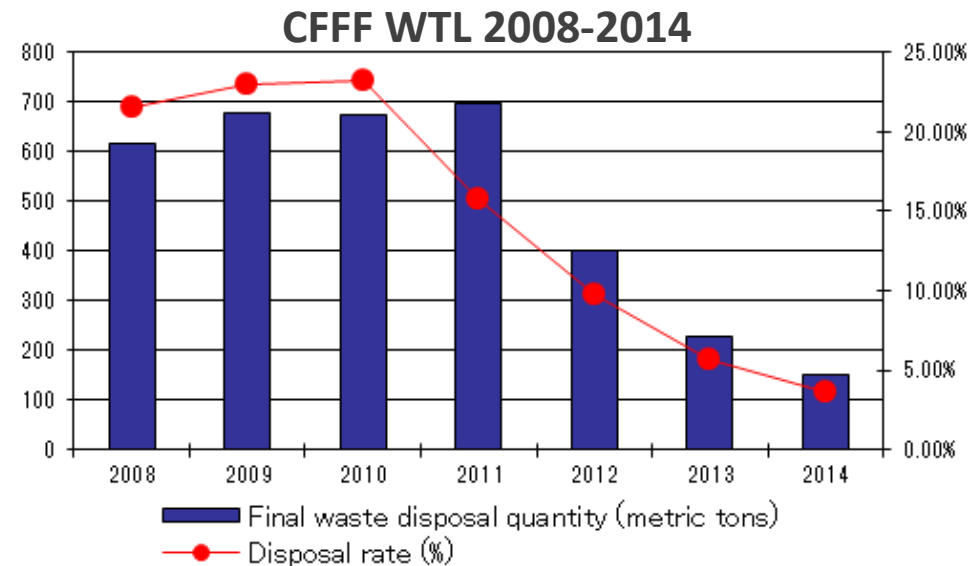
585	C1m+D1m+F1m	Total recycled amount(material)	(kg)	129198	124096	157271	151239	207296	165737	121336	13
586	C1t+D1t+F1t	Total recycled amount(thermal)	(kg)	0	6358	0	3106	0	5469	0	5
587	(C1m+D1m+F1m)/A1	Total recycled rate(material)	(%)	88.30%	92.87%	89.40%	92.78%	95.92%	92.86%	87.38%	85
588	(C1t+D1t+F1t)/A1	Total recycled rate(thermal)	(%)	0.00%	4.76%	0.00%	1.91%	0.00%	3.06%	0.00%	3
589	(C1+D1+F1)/A1	Total recycled rate(material+thermal)	(%)	88.30%	97.63%	89.40%	94.68%	95.92%	95.92%	87.38%	89
590	G1	Direct final disposal amount	(kg)	17119	3168	18643	8666	8818	7282	17527	10
591	G1c	---Payment2	USD, \$	\$747	\$24,868	\$814	\$15,474	\$385	\$4,312	\$765	\$
592	H1	Final disposal amount after intermediate treatme	(kg)	0	0	0	0	0	0	0	0
593	G1+H1	Total final disposal amount (FDA)	(kg)	17119	3168	18643	8666	8818	7282	17527	10
594	C1c	Total sale of waste with value	USD, \$	\$0	\$672	\$629	\$0	\$7,370	\$724	\$148	\$
595	D1c+E1c+G1c	---Total payment	USD, \$	\$8,705	\$65,090	\$9,894	\$59,772	\$29,427	\$73,511	\$8,468	\$
596	(G1+H1)/A1	Final disposal rate	(%)	11.7%	2.4%	10.6%	5.3%	4.1%	4.1%	12.6%	10
597		Site Production/Activity level**-->	equivalent units	293	200	287	313	301	254	300	
598		Waste generation intensity (kg/activity unit)	<-----	499.374	668.110	612.941	520.804	717.985	702.715	462.877	47
599		FDA Sustainability Index Subscore (YTD)		0.586	0.413	0.501	0.437	0.406	0.388	0.418	
600											
601											
602		JPY/USD Conversion rate:	Currency Conv	119.87	124.16	122.16	123.93	121.23	119.77	120.62	12

Tracking and Measurement

Waste To Landfill (Final Disposal Rate)



CFFF WTL Goal = 3.04%



FDR has decreased overall and will continue. Changes to CFFF sludge prediction methodology caused a setback in FY15.

Tracking and Measurement

Benchmarking

- WTL / FDR
- Diversion Rate
- Per capita
(generation and reduction)
- Normalization with
production metric
- Cost
(including source reduction
and other avoided costs)

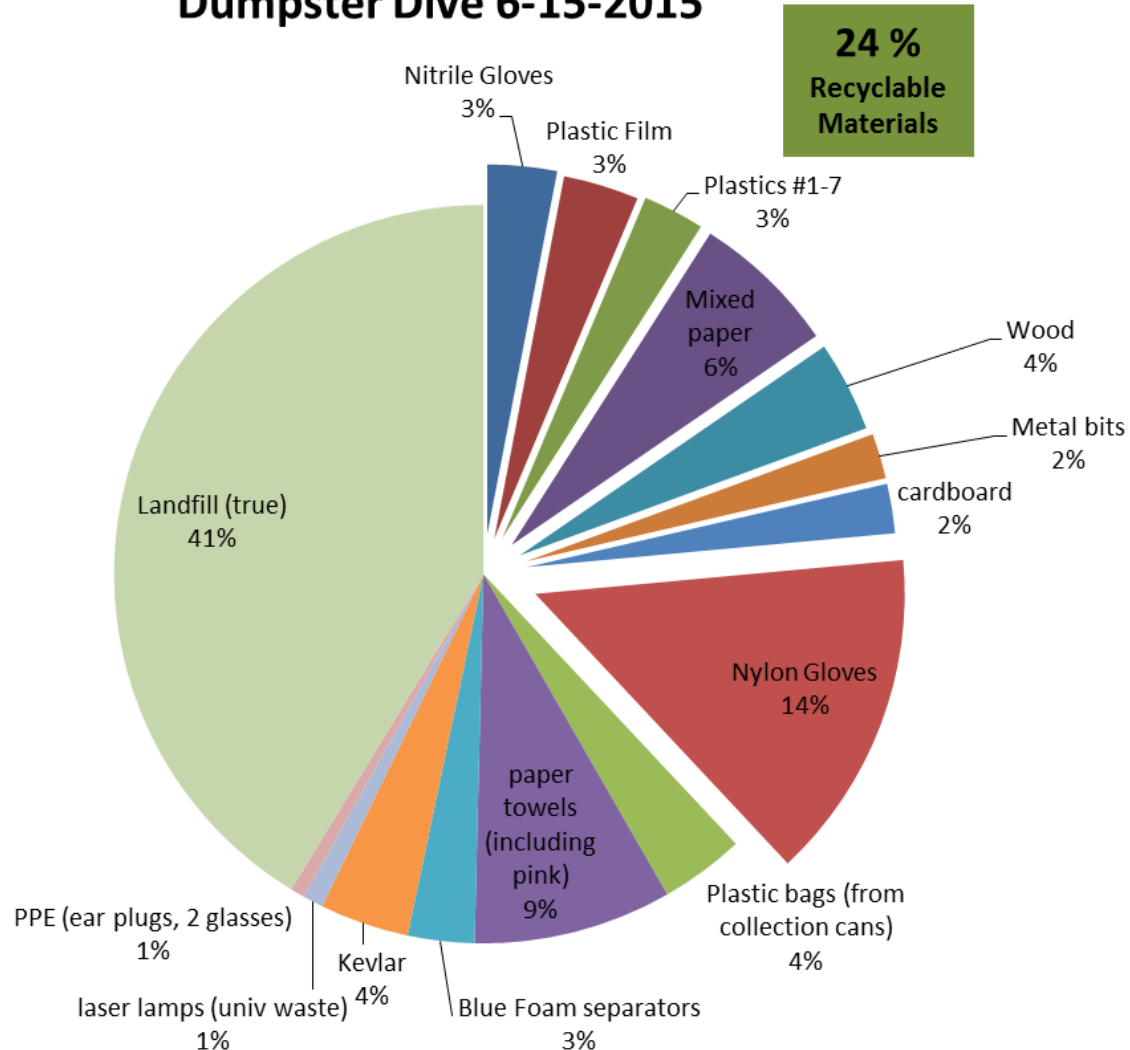


Reassess

Reassess

Area Focus: Component Area

**Component Area
Dumpster Dive 6-15-2015**



Reassess-Communicate

Nylon Glove Recycling

Maintenance Corner beside Lamp Closet (central collection)



- 14% Component Area Waste (by weight)
- 6% of Total Site Waste
- Final Assembly began the pilot program in May 2015
- All other Mechanical Areas begin collection in August 2015
- Area personnel are responsible for taking the gloves to the central collection point

100% collection for recycling =
588 lb/mo or 7,056 lb annually
diverted from landfill

Reassess-Communicate

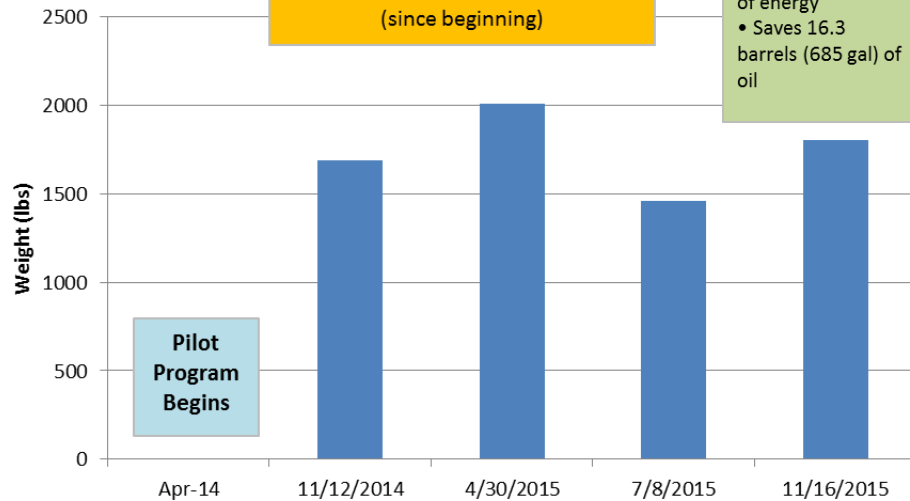
Recycle Rates: Plastic Film & Nitrile Gloves

Plastic Film Recycled

6,961 lb Recycled
(since beginning)

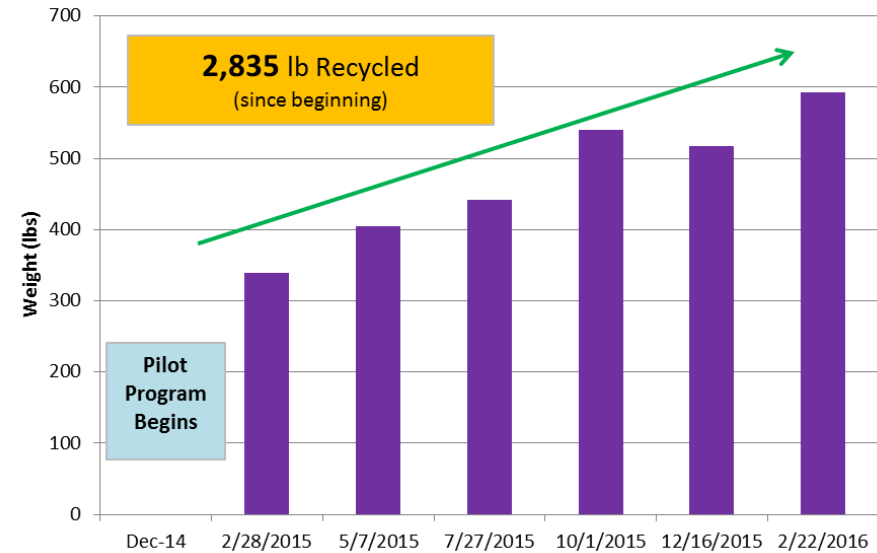
Recycling 2,000 lb
of plastic:

- Saves 5,774 kWh of energy
- Saves 16.3 barrels (685 gal) of oil

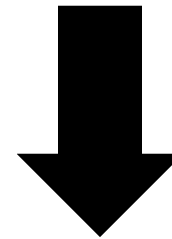


Nitrile Gloves Recycled

2,835 lb Recycled
(since beginning)



= 2%



FY15 Waste
to Landfill

ANY
QUESTIONS
?

Diana P. Joyner

joynerdp@westinghouse.com

803.647.1920 (office)