EBC 12th Annual
Construction and Demolition Materials Management Summit
Welcome

David Murphy

Chair, EBC Solid Waste Management Committee

Vice President, Tighe & Bond
Thank you to the Collaborating Organizations!
Thank you to our Sponsors!

Brown and Caldwell
Tunnel Hill Partners
Mackie Shea PC
Harvey Waste Removal and Recycling
Weston & Sampson
EBC Environmental Business Council of New England, Inc.
USA Gypsum Drywall Recycling
Expectations and Goals for the Summit

Tony Wespiser

Chair, EBC C&D Summit

Managing Engineer, Brown and Caldwell
Briefing on MassDEP Solid Waste Programs & Priorities

Martin Suuberg

Commissioner

MassDEP
Regional Developments

Steve Changaris

Regional Manager, Northeast
National Waste & Recycling Association
EBC 2018 C&D Summit
Framingham, MA
Wednesday, January 24, 2018
From 2017 Presentation - Views, Thoughts & Happenings

A few thoughts on taxes & economic policy

> Lower corporate taxes – to 20%?

> Immediate expensing of equipment costs?

> Two for One Federal Regulatory Reforms?
What’s Happening Since – Current Developments

Infrastructure Working Group

A 10 year – $1 trillion investment – addresses funding for highway infrastructure financing problems (gas tax)

Joint Employers’ Rule

The NLRB in 2015 expanded the definition of “what direct and immediate control” over a worker meant; a December 2017 ruling of this board reversed that decision to the previous standard
What’s Happening Since – Current Developments

MA DEP C&D Study – released May 2017

Short term Tax Law Change Impacts

WM - $2,000.00 bonuses to about 34,000 employees

Apple - $ 2,500.00 bonuses to about 120,000; repatriating $250+ billion
What’s Happened Since – Current Developments (con’t)

• Nucor steel - old 31% tax rate; new 21% tax rate; and impacts of immediate expensing of deductions for equipment purchases

• Bob Kraft and his paper mill or paper products plant in NC
What’s Happening - Other Issues

• Chinese Import Restrictions for Recyclables

• Safety, safety, safety

• The ton continues to evolve

• Tight local/regional disposal market
• **Chinese Import Restrictions Recyclables**

• In 2016 $18 billion of recyclables in imports went into China; said another way 45m tons of scrap metal, paper/fiber and plastics

• Recycling scrap steel requires 60% less energy than producing new steel from iron ore
• Safety, Safety, Safety

• December 2017 BLS Report -- Census of Most Dangerous Industries; we are down 10% in 2016; but still rank nationally as 5th most deadly

• NWRA Safety Stand Down on Vehicle Backing – Feb. 12-16

• https://wasterecycling.org/safety/safety-stand-down

• Industry remains committed to moving the safety needle
SNOW SAFETY
Keep Yourself & Collection Workers Safe

Cover ears & head

3+ layers
1 insulating layer
3+ layers
1 insulating layer
2+ layers
1 insulating layer

Layer Up
In Extreme Cold
Cold weather has numerous adverse effects, including medical conditions like hypothermia and frostbite. Layering properly helps prevent these conditions.

Walk Like a Penguin
To Avoid Slips In Ice
1. Point your feet out slightly like a penguin.
2. Bend slightly and walk on-tiptoes with your body weight directly over your feet.
3. Extend your arms out to your sides to maintain balance.
4. Keep your hands out of your pockets.
5. Take short steps and shuffle your feet for stability.
6. Watch your step.

Collection Worker Safety
Help Make Their Jobs Safer In The Snow
1. Check hauling company’s website for weather collection schedules and instructions.
2. Don’t put out collection container while snowing or before heavy snowfall.
3. Cover the opening of container so snow doesn’t fall inside. Open containers with snow could injure collection workers.
4. Shovel out a space for container to help assist collection workers.
5. Shovel out containers before snow so the hauling company can get to it.
6. Be sure to clean up and put back containers knocked over by snowplows.
7. Report the severity of any damaged container to your hauling company.
• The Evolving C&D Ton

• The Tight Disposal Market
EBC C&D Summit, 1-24-18
EBC C&D Summit, 1-24-18
EBC C&D Summit, 1-24-18
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NWRA NE Region Office
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National Developments

William Turley

Executive Director

Construction & Demolition Recycling Association
Status Update On C&D Recycling Projects

William Turley
Executive Director, CDRA
Overview

- OSHA Employee Silica Exposure rule
- EPA Sustainable Materials Management
- Markets
- C&D Fines Study
- Gypsum Recycling Protocol
- 50-State C&D Regulations Overview
- C&D White Paper
OSHA Silica Exposure Rule
OSHA Silica Exposure Rule

- Rule has been implemented
- Litigation was rejected
- Overreach on technical issues
- Silica everywhere
- Mostly affect concrete recycling
- Able to scale back from original regulations
- Water key to dust control
- Questions on operator booths
Sustainable Materials Mgmt.
In the Built Environment

Fiscal Year
2017 - 2022

U.S. EPA Sustainable Materials
Management Program
Strategic Plan

October 2015
Sustainable Materials Mgmt. In the Built Environment

- Decrease disposal rates
- Reduce environmental impacts of materials
- Increase socio-economic benefits
- Increase ability to adopt SMM policies
- Built environment one sector to focused on
- Successfully held others on food waste, auto fluff
Why Is This Important

- End of life important part of discussion
- Problems with current green building materials
- Design for recycling and reuse
- Providing input to EPA that could help the agency in further policy setting
- Making sure recyclers’ views are part of the process
- Other stakeholders include architects, sustainability experts, construction contractors
Markets

- End markets most important part of recycling process
- Challenging throughout U.S., including New England
- No landfill outlets for disposal
- Causing the development of alternative methods of disposal, such as rail haul
- End Markets are responsibility of recyclers
- Instead of helping find solutions to markets problem, state is just shipping its problems elsewhere
C&D Fines Study

C&D fines are one of the major recycled products produced at mechanized C&D recycling operations.

Potential markets:
- Non-structural construction fill
- Soil amendment
- Landfill cover

Research has been underway to examines C&D fines characteristics at a national level.
C&D Fines Basics

- Materials screened from the mixed CDD
  - Soil
  - Aggregate
  - Wood
  - Gypsum
  - Shingles
- Depends on waste stream, materials removed, degree of processing
- Size depends on screen size
Samples Tested in 2016-17: 14 samples from 12 facilities
• Continued work on C&D fines:
  – Examine the role of asphalt products on marketability
  – Methods for improving physical and chemical characteristics to enhance reuse options
  – Strategies for better managing and communicating risk in the development of markets for C&D fines
50-State Regulatory Profile

- Original released in 2015
- Regulations always changing, update needed
- Solid waste, C&D, recycling, landfill, diversion
- Key contact person
- Disposal/recycling data
- What is considered recycled, diverted, or landfilled
- Any specific rules for fuel made from C&D
- How are C&D fines regulated in the state
- 583 million tons generated
- Majority remain aggregates
- 682 million (million BTU) saved in 2014, a value equivalent to 117 million barrels of oil
- Assuming 50-ft deep, saving 5500 acres annually
- 28,000 direct green jobs
- Direct, indirect and induced revenue $23.4 billion
EU Protocol for Gypsum Board Recycling

Terry Weaver

President

USA Gypsum
Solve the Drywall Problem in 5 Steps

“Problems that remain persistently insoluble should always be suspected as questions asked in the wrong way” - Alan Watts
Still Talking About This?

- 1973 Asbestos ban
- 1978 Lead paint ban
- 1978 H2S landfill odor linked to gypsum
- 1985 Drywall recycling began due to H2s
- 2005 Drywall Recycling in MA
- 2007 “Gypsum removal should occur prior to processing”.. *Control of Odorous Gas at MA Landfills* MASS DEP
- 2010 MA new drywall waste ban
- 2015 MA recovered drywall 811 tons (DSM)
### Power gen coal 2006-2016

**Bloomberg**

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<th>State</th>
<th>2006</th>
<th>2016</th>
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</tr>
<tr>
<td>NH</td>
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<td></td>
</tr>
<tr>
<td>NY</td>
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<td></td>
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<tr>
<td>VA</td>
<td>-51.7</td>
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</tr>
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<td>NC</td>
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<tr>
<td>GA</td>
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</table>

**Drywall Waste Technology, Gas & Trains!**
Gypsum Supply Disrupted!

Demand Up - Supply Down

- Consumption 37 million metric tons
- (Mined 60% - FGD 40%)
- FGD -19%
- Demand +5-15%?
- Mining +8%
- Imports +15%

FGD = Gypsum from coal fired power plants

Supply Adequate - $10 Fob Mine + Freight Cost
Source: USGS
The Problem: 13.5 Million Tons Scraps
25% New 75% Demolition?

Source: EPA 2014
What Happens To It? (In MA)
C&D processing (recycling) concentrates Sulfate %

- Mixed C&D @ 10% drywall (=1.5% Sulfate)
- Mixed C&D loads impossible to separate
- Gypsum into C&D Fines
- **Fines 0.17-12% Sulfate MA BUD 2007**
- Processing removes Recyclables
- Remaining gypsum is process residuals
- Sulfate in an anaerobic environment may convert to sulfide and release H2S
- **Gypsum Size reduction increases H2S rates**
Where Does It Go?

- Exported to rural landfills?

- 21.5 million ton mixed C&D fines (CDRA)

- “It is likely that significant quantities of gypsum will be recycled only if gypsum is not allowed in landfills due to $\text{H}_2\text{S}$ issues”  
  MA 2007 C&D Debris study

- Sulfide-bearing waste which generates toxic gases or vapors at a quantity sufficient to present a health danger? (haz waste definition)

- Or just a nuisance?
Are There H2S Issues?

*Let's ask the neighbors!*

- C&D fines used as cover
- Gypsum caused H2S odors
- H2S short term health effects (*HHS*)
- Class action lawsuits etc.
- Legislation passed to seize
- $10M NJDEP clean up
- **Owner Claims Superfund in Federal Court - waste generators to pay for remediation (denied)**
- Owner Indicted
Are There Other Cases?

- Seneca Meadows, NY odor issues
  - Agrees to reduce S levels
  - Class action filed Supreme Ct of NY
- OH EPA closes recycler. Gypsum & H2S
- Big Run, KY odor stops trains
- High Acres, NY odors - ongoing
- Niagara landfill odors - ongoing

SC Supreme Court rules nuisance odor is trespassing - tangible invasion $2m award 2013
Public Nuisance In Social Media Age

► “tourists were seen retching by the side of the road as they hit the vile wall of smell.”

► “landfill and it’s importation of gympsum drywall, which generates noxious hydrogen sulfide.”

► “I’m being told it’s the hydrogen sulfide. It sort of smells like rotten eggs," he said. The smell of rotten eggs is making its way into classrooms”

► “about 2200 members of the Facebook group, Fresh Air for the Eastside, have been creating their own data. Members started compiling complaints with emails, then a spread sheet, a google form and now an app designed specifically for the cause”

Accusations become facts - no due process in court of public opinion
Why Doesn’t It Go There?
It is only Money! (Allocation?)

- **Cheap Gypsum?**
  - New mines built & reopened
  - Stranded FGD wallboard plants
  - New transport facilities built

- **Cheap Disposal?**
  - New transport facilities built
  - H2S odor abatement
  - Suppressed methane generation
  - H2S gas treatment systems
  - Leachate contamination

- **Legal risk & costs - asbestos vs. H2S**
Who Has The Money?
Drywall Economics

- $0.02 Billion drywall recyclers?
- $3.4 Billion mixed C&D waste
- $60 Billion solid waste
- $10 Billion board products
- $748 Billion building industry

- $0.675 Billion Solves The Problem?
  (13.5m tons x $50? = 0.09% building)

Sources; Me, CDRA, Statista, Gypsum Assn, Statistic-brain
Our Customers Have the Money! What do they want?

“Recycling is always cheaper, no matter how much it costs!”

- LEED (since 2000)
- Environmental Product Declarations
- Sustainable Materials Management
- Zero Waste
- Closed Loop Funds
- ASTM Recycling Standard
- Waste bans - Ordinances - Mandates

Major companies & cities have “zero waste” goals
Five Steps Outlined by NEWMOA 2010

“All of the NEWMOA states have experienced public health and/or nuisance problems with hydrogen sulfide gas at landfills that use C&D residuals”

1. **Ban** the disposal of gypsum wallboard waste in landfills
2. Require recycling of wallboard wastes produced by state-financed projects
3. Require waste management planning
4. Develop common terminology and reporting requirements
5. Develop and implement extended producer responsibility approaches
The 5 steps - Proven in Canada & EU

Happening now in NW USA

1. **Ban** landfilling
2. Recycling protocol
3. Drywall abated (source separated)
4. Documented verifiable chain of custody
5. Processing SOP

► Ceiling Tile Example
#1 Ban Gypsum From MSW, C&D Landfills

- **BC** - Bans all gypsum from landfills

- **EU** - Ban from MSW & CD landfills no mixing with biodegradable waste. Separate “dry” cell

- **Seattle** - Ban + permit 85% of new scrap - 29,000 tons 2013

*Classify as Reactive hazardous waste to provide outlet?*
#2 U.S. Recycling Protocol

Standard process the industry can Agree upon?

- Issued 2009 updated 2013
- CDRA contracts University of Florida adaption for U.S. version
- BMP’s for acquiring & processing
- Reclaimed gypsum specifications
- **Address US legal risk asbestos & H2S**
#3 Abate Demolition Drywall

- Recycler pre authorizes project
- Drywall removed and placed in separate identified cart or bag
- Material remains in identified receptacle until received by recycler

Similar to ceiling tile
#4 Chain of Custody
Maintained
#5 Processing SOP

- Demo material inspected upon receipt. Scanned?
- Suspect material Isolated for further testing &/or haz waste disposal
- Processing to end market requirements
- Processed material “batch” tested
- Facing w paint or specialty landfilled (10%)
Could This Work? Stakeholder Results

- C&D processors
  - 865k tons processed x 10% gypsum = 86k diverted
  - Reduce fines volume %?
  - Improve fines quality for beneficial use
  - Cleaner recyclables
- Improve Recycle Rate 40%
  - 219k tons + 86k = 305k

"The years just pass like trains, I wave but they don't slow down"....Steve Wilson on twitter
C & D Transport by Rail Haul

Michael Kozak, J.D.
Senior Vice President
Tunnel Hill Partners
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Tunnel Hill Partners Highlights

» Largest integrated waste-by-rail service provider in the US
  — Strong network of collections / hauling, transfer, recycling and disposal operations
  — Handles ~4.0 million tons of waste volume annually
  — Large Northeast and New England presence

» Highly diversified customer base
  — Services commercial, industrial, residential and municipal clients as well as construction, remediation and dredging projects
  — Permitted waste types include municipal solid waste (MSW), construction / demolition debris (C&D), contaminated soils, dewatered or stabilized dredge spoils, biosolids, recyclables and organics
  — Primary transfer station and 3rd party rail customers consist of recycling and processing facilities

» Experienced management team with waste industry and rail transportation expertise
  — Over 100 years of combined professional history
Total Service Area
- Material Recovery Facility (Recycling)
- Transfer Station
- Landfill / Beneficial Reuse Facility

Hauling Service Area (City Carting assets)
- Managed Municipal Material Recovery Facility (Recycling)
- Managed Municipal Transfer Station
- Disposal / Recycling Only Municipality Contracts

Tunnel Hill is the leading integrated waste services provider in the Northeast.
Benefits of Rail

» Declining local landfill capacity in the Northeast drives demand for farther disposal outlets
  - Number of operating landfills has naturally shrunk to less than 1,500 from 8,000 in 1988 in the US, significantly increasing the distance between landfills and urban areas
    - Decrease in operating landfills in New England even more pronounced
  - Extremely difficult to open new landfills
    - Permitting process for the last new landfill in New England lasted 11-12 years

» Higher diversion rates to recycling / processing facilities and incinerators projected to be insufficient to offset local landfill capacity decline and increase in waste generation
  - Aging waste-to-energy (“WTE”) facilities and less economically-favorable power purchase agreements have resulted in higher disposal prices and capacity constraints
  - This has created disruptions in some localities as recycling / processing facilities try to find disposal sites for excess post-recycled waste

» Waste-by-rail is more cost effective and environmentally-friendly than trucking for long hauls
  - In the Northeast, transporting waste beyond ~150 miles is increasingly more economical by rail – benefits increase for longer distances and higher volumes
  - Rail is not affected by common trucking concerns, such as traffic congestion, driver safety, tire punctures, and other vehicle damage at landfills
  - Trains are on average 4x more fuel efficient than trucks and produce less greenhouse gases
Constrained Local Capacity Driving Waste Out Of Northeast

Northeast Landfill Disposal Capacity

<table>
<thead>
<tr>
<th>Year</th>
<th>Capacity (M Tons)</th>
<th>Change</th>
</tr>
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<tbody>
<tr>
<td>2004</td>
<td>582</td>
<td>(5%)</td>
</tr>
<tr>
<td>2009</td>
<td>553</td>
<td>(15%)</td>
</tr>
<tr>
<td>2014</td>
<td>468</td>
<td>(10%)</td>
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<tr>
<td>2019E</td>
<td>421</td>
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Net Importers (Exporters) of Waste

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<thead>
<tr>
<th>State</th>
<th>2014 Tons</th>
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<td>PA</td>
<td>6.7</td>
</tr>
<tr>
<td>OH</td>
<td>2.6</td>
</tr>
<tr>
<td>NH</td>
<td>0.4</td>
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<tr>
<td>ME</td>
<td>0.2</td>
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<tr>
<td>VT</td>
<td>(0.1)</td>
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<tr>
<td>RI</td>
<td>(0.1)</td>
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<td>CT</td>
<td>(0.6)</td>
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<tr>
<td>NJ</td>
<td>(4.0)</td>
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<tr>
<td>NY</td>
<td>(7.3)</td>
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Source: Waste Business Journal
Northeast defined as Maine, New Hampshire, Vermont, Massachusetts, New York, Rhode Island, Connecticut, New Jersey, and Pennsylvania
Waste defined as MSW and C&D
Decline in Landfill Capacity to Continue

Pennsylvania
Losing ~1.7M tons of annual landfill capacity over next 5 years

Rhode Island
1 large and 1 small active landfill and no WTE plants

Massachusetts
6 active landfills (3 closing in next 24 months) and 7 WTE plants currently exceeding generation by 300k tons / year (deficit to triple in next 2-3 years)
Projected to lose ~1.5M tons of annual landfill capacity over next 5 years

New York (1)
Losing ~0.7M tons of annual landfill capacity over next 5 years

New Hampshire
6 active landfills and 1 WTE facility currently exceeding generation by 530k tons / year
Largest landfill limiting out-of-state waste to preserve capacity for in-state disposal

Maine
42 active small landfills and 3 WTE plants currently exceeding generation by 150k tons / year

New Jersey
Losing ~0.9M tons of annual landfill capacity over next 5 years

1 Primarily related to reduced landfill capacity at the Brookhaven landfill located on Long Island

Connecticut
1 active landfill and 5 aging WTE plants currently exceeding generation by 300k tons / year

Vermont
1 active landfill and no WTE plants currently exceeding generation by 150k tons / year

Source: Waste Business Journal, EBC

(1) Source: Waste Management
Anatomy of Waste-by-Rail

Rail provides a cost-effective, environmentally-friendly method of transportation for C&D waste exports

THP primarily accepts C&D from roll-off operations or processing facilities

C&D is transported over short and long lines to rail-served landfills

Railcars transport approximately 100 tons of waste / car

Transport and disposal of waste typically takes ~1 week (one-way)
## Rail vs. Trucking

<table>
<thead>
<tr>
<th>Rail</th>
<th>Trucking</th>
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<tbody>
<tr>
<td><strong>Economies of Scale</strong></td>
<td></td>
</tr>
<tr>
<td>→ Each railcar carries up to 110 tons / load (vs. typical 20 - 25 tons / truckload)</td>
<td></td>
</tr>
<tr>
<td>→ Cost advantage increases with distance and volume</td>
<td></td>
</tr>
<tr>
<td><strong>Reliability</strong></td>
<td></td>
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<tr>
<td>→ Undeterred by traffic congestions</td>
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<tr>
<td>→ Limits wear and tear on customer equipment (truck never enters landfill)</td>
<td>→ Traffic congestions slow turnaround time</td>
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<tr>
<td>→ Tractor trailers incur punctured tires and other damages accessing landfills</td>
<td>→ Driver wages on the rise</td>
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<tr>
<td><strong>Optionality</strong></td>
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<tr>
<td>→ Creates alternative to declining landfill capacity in the Northeast</td>
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<tr>
<td></td>
<td>→ Impracticable for long distance disposal and large loads</td>
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<tr>
<td></td>
<td>→ Unable to escape increasing disposal costs in the Northeast as landfill disposal capacity disappears</td>
</tr>
<tr>
<td><strong>Environmentally &amp; Infrastructure Friendly</strong></td>
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<tr>
<td>→ Trains are on average 4x more fuel efficient than trucks</td>
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<tr>
<td>→ Greater use of rail over trucking offers a simple and immediate solution to meaningfully reduce GHG emissions</td>
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<tr>
<td>→ Rail tracks maintained by the railroads; highways maintained by taxpayers</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Rail Access</strong></td>
</tr>
<tr>
<td>→ Requires access to rail-served facility</td>
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</table>
Reuse of Asphalt Shingles

Chris Carney

Owner

C. Carney Environmental
Patriot Recycling Corp.

dba/C. Carney Environmental
1958 Broadway
Raynham, MA

Asphalt Shingles
Processing and Reuse
Processed ABC and Shingle Staging Area
Shingle Grinding and Screening
Shingle Grinding with Metal Removal
Shingle Chips and Fine Screened Product
C & D Generators & Processors Discussion

Moderator:
• David Murphy, Tighe & Bond

Panel Members:
• Ben Harvey, E.L. Harvey & Sons, Inc.
• John Hastings, Costello Dismantling Co., Inc.
• Jeffrey Leech, Tunnel Hill Partners
• Scott Lemay, United Waste Management

Environmental Business Council of New England
Energy Environment Economy
Closing Discussion

Tony Wespiser

Chair, EBC C&D Summit

Managing Engineer, Brown and Caldwell