TIRE DERIVED FUEL – PAST, PRESENT AND FUTURE

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PAST

- TDF has been used in the U.S., Europe and Japan since 1970’s

- Goodyear installed a Lucas Furnace using waste tires as fuel in early 1970s

- GM experimented with TDF in a power boiler in the mid-1970s

- Mike Rouse experimented with rubber buffing dust to replace scarce oil for a waste wood boiler at his Georgia Pacific paper mill in the Pacific Northwest in 1974, explored available shredding equipment and initiated tire processing in conjunction with a landfill owner in Portland, OR
PAST (CONTINUED)

• Waste Recovery was formed in early 1980s to help Mike Rouse develop tire processing and TDF markets.

• Oxford Energy was formed in the mid-1980s to develop dedicated tire burning power generation facilities using 5-10 million tires per year in each facility.

• TDF became the first major market for waste tires.
TDF’S RECENT ROLE

Source: Rubber Manufacturers Association
PRESENT

- TDF is the one of the largest end use markets for waste tires in most industrialized countries.

- TDF is the cornerstone of state waste tire management programs with appropriate facilities.

- TDF has not prevented development of other markets as demonstrated by current market diversity
MAJOR TDF MARKETS - 2013

- Cement kilns: 34%
- Pulp and paper mills: 34%
- Electric utility boilers: 27%
- Dedicated scrap tires to energy: 5%
- Industrial boilers: 0%

Source: Rubber Manufacturers Association
CEMENT INDUSTRY

• Current Position

– Many kilns use TDF - 39 plants in 13 states
– Others unlikely – public perception, logistics
– Industry is rebounding from recession
– Specific industry impact – oil/gas
– Economics are shifting
CEMENT (continued)

• Projections

  – TDF usage dependent on production levels at existing kilns
  – TDF cost will be controlled by other alternative fuels, including fluff
  – Industry consolidation may impact some kilns and TDF usage
  – More use of shreds to maximize TDF usage
  – Future TDF consumption likely to be cyclical
CEMENT INDUSTRY IN COLORADO

- Cement Manufacturing Facilities
  - Holcim
  - GCC
  - CEMEX

- Historical and future cornerstone of expanded market growth, especially for use of at least one monofill

- Important, but not to the exclusion of market diversity
NON-HAZARDOUS SECONDARY MATERIALS RULE

• Defines which secondary material are, and are not solid wastes when burned for energy recovery

• Impacts application of CAA Section 112 regulations if NHSM or more rigorous CAA Section 129 solid waste incinerator regulations if solid waste.
PRACTICAL IMPACT

• Tires collected from on-going generation or from some managed amnesty programs are not a solid waste
• Tires that have been abandoned in stockpiles or monofills are solid waste unless processed with some reinforcing wire removal (even limited free wire liberated during shredding)
• This definition was upheld in court judgment issued about two weeks ago
PULP AND PAPER INDUSTRY

• Current Position

- Many mills use TDF - 21 plants in 15 states
- Industry has adjusted capacity to reflect mature US market with white paper and boxboard only strengths
- Industry rebounding from recession, investing for future viability of mills
- Regulatory impact from Boiler MACT and Clean Water rule implementation
PULP & PAPER (continued)

• Projections

- Some gains and some losses from regulatory change
- TDF pricing will be controlled by other fuels, with low gas and oil pricing impacting some regions
- Smaller mills remain vulnerable to economic conditions and continuing market trends
- Future TDF consumption likely to cycle at some mills as they adjust to regulatory changes.
PULP & PAPER INDUSTRY IN COLORADO

- NONE
POWER GENERATION

• Current Position

  – Very small % of power boilers use TDF- 25 facilities in 8 states
  – The market segments are diverse and are being impacted differently by regulatory and economic changes
  – Major gains include a large CFB boiler in Kentucky (up to 5 million tires/year) and several other potential major users
  – Major losses include the Oxford facility (10 million tires/year in Sterling, CT), biomass facilities in MI and several utility boilers
  – Resulting impact has been significant in some regions
• Market segments

- TDF usage in MSW power units will increase for power generation if capacity is available.
- TDF usage in renewable energy (biomass) facilities is being negatively impacted by economic incentives intended to promote wind and solar energy.
- Low oil and natural gas prices are decreasing avoided cost revenue for merchant biomass power generation facilities.
- Decreased energy tax credits for renewable energy power generation facilities also may have negative impact
POTENTIAL ACCELERATOR

• Greenhouse gas reporting rules continue to evolve.
• EPA recognizes conceptually that the natural rubber portion of tires is a renewable energy resource
• Under evolving Clean Air and Clean Power Plant rules, and related greenhouse gas reduction rules, use of TDF may receive greenhouse gas credits for renewable fraction.
POWER GENERATION IN COLORADO

- Generally fluidized bed, cyclone and some stoker-fired boilers
- All 19 identified large coal-burning units are unsuitable (wall and tangentially fired)
- Three small fluidized boilers have limited potential
- Biomass boilers can require supplemental energy for complete combustion, but changing economics and renewable energy regulatory status is detrimental
EXPORT

• Global energy markets and pricing have a significant impact in some regions
• Historical baled tire exports to China were disruptive to US waste tire industry in some regions, especially West and East Coasts
• Current exports of shredded tires represent a major market operating within the industry infrastructure primarily on West Coast, but vulnerable to global energy price fluctuations
Thank You

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