

# Waste Disposal

## A Digest on Waste Disposal

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A Presentation to  
Durham Region Council and Interested Parties

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## Objectives

- Under the Current Proposal for MSW, ...
  - ◆ Exposures are Under-Estimates
  - ◆ Total Costs are Under-Estimates
    - ↳ Must Include Peripheral Costs
  - ◆ The NtP has Two Major Flaws
  - ◆ Project Needs a Critical Review

## Outline

- Technical Considerations
  - ◆ Nature of Municipal Wastes
  - ◆ Risk Analysis and Exposure
  - ◆ Mitigation Requirements
  - ◆ Cost Implications
- Summary
- Appendix: Additional Concerns

## Some Initial Reflections ...

- "Knowledge is a process of piling up facts; wisdom lies in their simplification."  
Martin H. Fischer.
- "Any intelligent fool can make things bigger, more complex and more violent. It takes a touch of genius and a lot of courage, to move in the opposite direction."  
Albert Einstein.

## Sect. 1: Municipal Wastes

- Bio-Wastes
  - ◆ Denatured by Heat
- Techno-Wastes
  - ◆ Many are non-Combustible
  - ◆ Yet, have Heat-Induced Toxicity
    - ↳ e.g. Halogenated Compounds

## Some Process By-Products

- Difficult to Detect
  - ◆ Stealth-Like Presence
    - ↳ No "Signature" - like Nuclear Radiation
  - ◆ Cannot be Used for "Real-Time" Process Control
- Biologically Potent
  - ◆ Hormone Disrupters
  - ◆ No Safe Level
  - ◆ Nano-Particulates

### Sect. 2: Computed Exposures

- Predictions are **Optimistic Underestimates**
  - ◆ Do Not Account for Unavoidable Equipment Failures
  - ◆ Operation Presumed to be Optimal 100% of the Time
  - ◆ No Allowance Made for Operator Error or Non-Compliance
  - ◆ Require Absolute Diligence at Transfer Stations
  
- Defines the “**Best of the Best that can be Expected**”
  - ◆ **NOT** “Risk Analysis”

### Idealized Risk Assessment

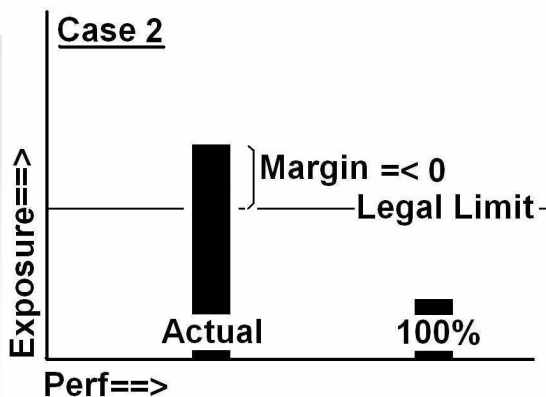
- **1) Leads to Under-Estimates for Exposure/Risk**
  - ◆ Lacks Redundancies to Provide Uninterrupted Protection
  
- **2) Simplistic Plant Design**
  - ◆ No Quick Shutdown Provision, e.g. CO2 or N2 Dowsing
  
- **3) Monitoring**
  - ◆ Reactive: For Compliance Tracking, not Preventative Actions

### True Risk Assessment

- Must Include Chemical “**Body Burden**” Factor
  - ◆ 100% Population Affected
  
- Exposure/Dose should be Based on **Worst Case Scenario**
  
- Meaningless Without **Occurrence Probability**, e.g.
  - ◆ 100 year Storm, DNGS, Car
  - ◆ Equipment Failure per 10,000 hrs

### Consequences

- **Illusion of Safety ...**
  - ◆ **Over-Estimates** for Process Reliability
  
  - ◆ **Under-Estimates** for Exposures
    - ↳ Minimum Possible Exposures **WRONGLY** Taken as the Norm
    - ↳ Most Probable Actual Exposures **NOT** Considered
  
- Please Remember Fukushima



### NtP Art. 13.2

- Allows Legal and Indefinite Operations in **Out-of-Spec Mode**
  - ◆ Start-up, Shutdown and Transient/Malfunction Modes
    - ↳ Permissible **Duration** not Specified
    - ↳ Permissible **Frequency of Occurrence** not Specified
  
- This Article is Potentially Hazardous for Durham Residents
  - ◆ Flaw Requires Amendment

## A.P.C.

- **Capture Dimensions** of Bag-House not Indicated
  - ◆ Air Flow Requirement Conflicting with Capture Function
  - ◆ Porosity Implies PM2.5 Unfiltered.
  - ◆ Only Way to Capture PM2.5 is Electrostatic Precipitators
- **M.A.C.T. (Maximum Achievable Control Technology)**
  - ◆ Where technologically feasible ...

## Section 3: Mitigation

- **Pre-Screening to Reduce Haz. Waste in the Feedstock**
  - ◆ Remove "Worst Offender" prior to Incineration
- **Retrieval of Haz. Waste is Difficult and Costly**
  - ◆ Process **NOT** Conducive to Automation
  - ◆ Pre-Screening Does **NOT** Eliminate Exposures

## Two Conflicting Views

- Operator Concerned about **Plant Protection**
  - ◆ **Unacceptable Waste**
  - ◆ Large Objects Potentially **Dangerous to the Plant**
  - ◆ Think of "**The Big Fish**"
- Population Concerned about **Plant Emissions**
  - ◆ **Hazardous Waste**
  - ◆ Small Objects Cumulatively **Harmful to the Population**
  - ◆ Think of "**The Many Small Fishes**"

## Definition of Haz. Waste

- Per CofA: Non-Haz. MSW means Waste Generated Within York-Durham and collected at Regional Facilities and Direct Hauled from Curbside Vehicles.
  - ◆ A Very Ambiguous Definition Reflecting Views of Proponent
  - ◆ No Mention is Made of Required Pre-Screening
    - Removal of Unavoidable Haz. MSW
- Conversely, Minister's NtP Requires Removal of Haz. Waste
  - ◆ A Physical Impossibility

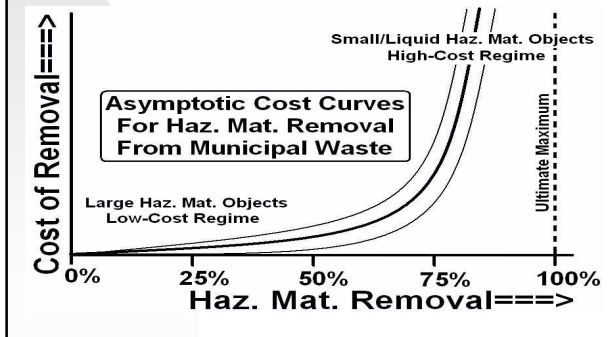
## Logistics of Pre-Screening

- Task to be Performed by Region at Transfer Stations
  - ◆ Facilities and Manpower Required
    - Special Case: Clarington
  - ◆ Very Difficult and Costly
    - Labour Intensive
    - Task Cannot be Automated
  - ◆ **CANNOT** be Done with 100% Confidence

## Logistics of Verification

- Random Tipping Floor Screening (Front-End Loader)
  - ◆ Can **Only** Hope to Get the **Large** Haz. Items, if any
- Crane Operator/Floor Personnel to Check for Unacceptable Waste after Tipping Waste in the Pit
  - ◆ Not Likely - Unless Large Object on Top of Waste Pile
  - ◆ Not Realistic for **Small** Objects

## Visual Representation



## S.O.P. for Rad. Waste

- Item C - Driver to Stay in Truck
  - ◆ Not Safe
- Item F - Driver Asked to Return Load
  - ◆ Not Safe - CNSC would **NOT** Approve

## From NtP, re: Haz. Waste

- **Minister Clearly Orders Exclusion of Haz. Waste:**
  - ◆ Art. 14.1(e): **Only non-hazardous waste** is being received ...
  - ◆ Art. 21.1: **Only non-hazardous** MSW ... may be accepted ...
  - ◆ Art. 21.3: ... **Only non-hazardous** MSW is being accepted
- Minister did **NOT** say: "**Do The Best You Can**"

## Feasibility

- 100% Separation is **Impossible**
  - ◆ e.g. Small Batteries, Liquid Contaminants
- Only **Partial Separation** is Possible
  - ◆ The Better it is, the Higher the Cost
- Must Include **Surrounding Tainted Material**
  - ◆ Additional Tonnage to be Disposed of
  - ◆ "Put or Pay" Implications

## Sect. 4: Cost Implications

- Mitigate Emissions through **Pre-Screening**
- Achievable only with visual means
  - ◆ Labor-intensive **High Cost Operation**
  - ◆ **Not Suitable for Automation**
    - ↳ Electro-Mechanical Separators
  - ◆ **Low Reliability** of Screening Process
    - ↳ Monotony and Operator Vigilance Relaxation

## Monitoring After-The-Fact

- **Retro-Active Logging**
  - ◆ **Basically For Compliance Recording**
    - ↳ Penalties/Performance Bonus
  - ◆ **Delayed History**, not "Real-Time"
  - ◆ **Not for Process Control and Mitigation**
    - ↳ Delayed Results from Stack Sampling Cartridges

## Additional Costs

- Extended Outages
- "Put or Pay Holiday" for Non-Performance
  - ◆ If Extended Outage, Need Securing Alternative and Costing
- Sale of Energy if Unreliable Production
- Citizens' Class Action
- Workplace Liability
- Financial Distress
  - ◆ e.g. Harrisburg

## Case Study

- **Harrisburg, Pa**
- <http://www.governing.com/topics/transportation-infrastructure/Harrisburgs-failed-infrastructure-project.html>
  - ◆ Breakdown were frequent
  - ◆ Emissions violated EPA standards
  - ◆ Plant was at times shut-down
  - ◆ Near bankruptcy
- **The Big Question:** Could it happen here?

## More Additional Costs

- Long-term Landfill Provision
  - ◆ For life of Contract
- Punitive Cost for Conservation
  - ◆ "Put or Pay" for 140 kT/y (142.1 kT/y actual)
- Unacceptable Waste: Durham Responsible for
  - ◆ Removal
  - ◆ Transportation
  - ◆ Alternative Disposal

## Repeat of a Costly Mistake?

- "Twenty-five years later, we've realized it was a mistake"

Durham Region spokesperson

[Commenting on Polybutylene Connectors]

Toronto Star, 2009/08/20

## Summary

- 1) Exposure Levels are Underestimates
- 2) Plant Design does not Allow for Redundancies
- 3) NtP Requires Haz Waste Separation
  - ◆ A Significant Financial Obligation for the Region
- 4) One NtP Condition is Impossible to Meet
- 5) Region must Develop Contingency Plans
  - ◆ Operational
  - ◆ Financial
- 6) Region should Assess Wisdom of Continuing with Project

## Some Final Reflections ...

- "When you build an incinerator in your community, you are advertising to the world that you are not clever enough, either politically or technically, to recover your discarded resources in a manner which is responsible to your local community or future generations."

Dr. Paul Connett

- "Nothing is Created, Nothing is Lost,  
Matter is only Transformed"

Lavoisier (1743-1794)

## End

### Questions

## Appendix

### Additional Concerns

## Natural Gas Requirements

- Used for Start-up and to Maintain Flue Temp.
  - ◆ <500 hrs/year (CofA Sect 1.3.1.5.1, pg. 23)
  - ◆ Value is Estimate
- HHV previously 11.0 to 15.0 MJ/kg
  - ◆ Now 8.4 to 15.0 MJ.kg (CofA Sect. 1.1)
  - ◆ Combustibility Compensated by Gas-Fired Burners

## Alternate Disposal Site

- In case of a long-term or unscheduled outage, bypassed MSW will be directed to a licensed disposal Facility
  - ◆ CofA. (Waste), pg 12, Sect 5.0
  - ◆ Here, DBO Recognizes Possibility of Equipment Failures,
    - ☞ but **NOT** When Assessing Exposures.
- Unprocessable Waste sent to NY or Alt. Fac'y (Sect. 5.2)
  - ◆ Deducted from "Put or Pay"

## Portland Cement

- To Be Used to Bind Fly Ash
- This is **NOT** a Permanent Binding Agent
  - ◆ Eventual Breakdown
    - ☞ Not Permanent as Vitrification