

# Our 7 Questions for the EPA!

Cork Harbour Alliance for a Safe  
Environment – City Group

EPA Oral Hearing  
February 2005

“Matter cannot be created nor  
destroyed”

Incineration is *superficially* a process of  
disposal. Waste combusted is transformed  
into:

- gases which go into the air
- particles which go into the air or are arrested
- ash as “fly ash” or “bottom ash”.

## “Matter cannot be created nor destroyed”

- All of the heavy metals in the waste find their way into one of these phases.
- All toxic organic compounds formed during the process are emitted as gases, or particles, or in ash
- Thus all of these waste elements from incinerators pose problems for human & environmental health as well as for disposal
- An Incinerator license applicant therefore must demonstrate competency, technical expertise in defining the operation, relevant experience and have a safe and uneventful track record if these hazards are to be managed and compliance to the license guaranteed

## Specific Questions on License

1. Are the Process / Operations defined ?
2. Are all potential Hazards identified
3. Is the technology BATNEEC
4. Have VOC Emissions been addressed
5. Will there be significant air pollution ( deterioration of Air Quality ) due to this development
6. Is the Licensee competent to operate this facility and avoid breaches of the license
7. Is the license application Valid

## Specific Questions on License

Q1. Have the Process / Operations been adequately defined ?

### 1. Process / Operation is unknown

- There is No known characterisation of the hazardous waste to be incinerated
- All data provided by Indaver / MinChem is theoretical or indicative (as per fine print)
- Incorrect Material classifications were used in the original Application\* ( shows applicant does not understand hazardous nature of all waste materials )
- \*The listings were revised on September 15, 2003 in follow on submissions to the EPA

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## Specific Questions on License

Q2 Are all potential Hazards identified ?

- 2a Emissions of Particulate Matter
- 2b Emissions of Heavy Metals
- 2c Effluent Discharges
- 2d Materials being Handled
- 2e Processes being Conducted

## 2a Emissions of Particulate Matter

- The License applicant does not adequately address fine particulate emissions
- Particulates are a Concern because of their
  - Health effects due to Composition
  - Exposure and Transport Characteristics
  - Intensification by applicants technology
- The license applicants Pollution Control Measures do not mitigate this hazard

## 2a Health Risks of Fine Particulates

Fine particulate material matter emitted as a result of waste incineration is of **greatest** human health concern due to the following reasons <sup>1</sup>:

- They are easily transported over long distances
  - Penetrate indoors readily,
  - Reach deep into the lung,
  - The particles are most enriched in toxic compounds

(Ref 1: NRC: Waste Incineration & Human Health pg 84 as referenced, )

## 2a Emissions of Particulate Matter

- The **transport characteristics** of particles depend on their size
- Fine and coarse particles in ambient air differ in their chemical composition, solubility, acidity, sources, and formation processes
- Every particle in the atmosphere tends to settle to the ground through the effects of gravity
- The tendency to settle is opposed by other effects including electrostatic and aerodynamic forces
- Coarse particles are principally controlled by gravity the settling velocity is proportional to the square of the particles size
- Very Fine Particles are more controlled by electrostatic and other effects than by gravity so they deposit more rapidly than their size or the effects of gravity would suggest ( hence the concentration of polluting particles around power lines etc )

## 2a Emissions of Particulate Matter

- Fine particles originating out doors infiltrate into homes and buildings to a greater degree than do coarse particles <sup>1</sup>
- Thus ambient particles penetrate indoors and are available to be breathed into the lungs <sup>1</sup>

(Ref 1: NRC: Waste Incineration & Human Health pg 84 as referenced. )

## 2a Health Risks of Fine Particulates

- Incinerators are known to produce particularly fine particulates
- "Major studies have found that there is a clear relationship between fine particulate air pollution and human deaths, and it ruled out smoking as a cause of the observed deaths"

(Pope et al., 1995; Villeneuve et al., 2002; Pope et al., 2002)\*

\* See the Proof of Evidence submitted by Dr C.V Howard MB, Ch.B, PhD, FRCPath. (update 30/09/2003) pg. 14 An Bord Pleanála Oral Hearing for a full treatment of this topic.

## 2a Emissions of Particulate Matter

### Schedule B1 "*Emission Limits to Air*"

Dust Emission limits on the licence in Schedule B1 are in-sufficient :

- They do not limit the particle size fraction emitted, and
- No onus is put on the licensee for continuous improvement with respect to this specific important parameter

## Conditions of IPC Licence for Dust Emissions

### Requirement for Total Dust ( $\text{mg}/\text{m}^3$ )

- "None of the half-hourly average values shall exceed  $30\text{mg}/\text{m}^3$  or,
- 97 % of the half-hourly average values over the year shall not exceed  $10\text{mg}/\text{m}^3$  "

### Comments: Method Iso Kinetic / Gravimetric

In theory 3 of every 100 measurements could be on average  $30\text{mg}/\text{m}^3$ .

However lets look at what this means

## 2a Emissions of Particulate matter

- The EPA Inspectors Memorandum dated 1 October 2004 page 28 makes reference to ambient monitoring for dust using  $\text{PM}_{10}$  sampling / modelling
- Reference MUST also be made to  $\text{PM}_{2.5}$  levels and emission limits imposed

## 2a Emissions of Particulate matter

- PM10 means particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers as measured by a reference method (1)
- 1979: The US National Research Council said "measuring particles by weight, without regard to particle size, has little utility for judging effects". Particle size is a vital consideration when it comes to air pollution and health.

## 2a Poor Efficiency of Air Pollution Control Equipment

- Air pollution control equipment greatly reduces emissions of total particulate matter from waste incinerators
- The type of air pollution control equipment used effects the particle size distribution of the emitted dust
- The filtration equipment is generally more effective on the larger particles
- Whilst reducing the total particulate emission, filtration equipment only changes the proportion of large to finer particulates in the resulting emissions to air

## 2a Efficiency of Air Pollution Control Equipment

- The bag filter technology proposed is not efficient at filtering very fine particles
- The majority of numbers of ultra-fine particles will pass through
- Current Irish standards do not consider the sizes of the particles emitted by an incinerator

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## Efficiency of Baghouse Filters for Fine Particles (as claimed by Operators)\*

Particle Size	Collection Efficiency
PM 10's	95% to 98%
PM 2.5	65% to 70%
PM below 2.5	5% to 30%

\* IPC Application by Onyx Hampshire September 1999

## Efficiency of Air Pollution Control Equipment

- Indaver's proposed fluidized bed technology is the wrong choice for best control of fine particle emissions ( see Section 3 :BATNEEC )
- The evolution of particle size distribution and the composition of the bed material (*especially when fed with uncharacterised wastes*) cannot be predicted with confidence
- Fluidisation Leads to excessive escape of Fine Particles from the bed (fines) and overloading of the downstream Filters

## Specific Questions on License

Q2 Are all potential Hazards identified ?

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2b Emissions of Heavy Metals

2c Effluent Discharges

2d Materials being Handled

2e Processes being Conducted

## 2b Emissions of Heavy Metals

- Particulate matter emissions from Incinerators consists primarily of entrained non-combustible matter in the flue gas
- Products of incomplete combustion that exit in solid or aerosol form
- Chemically the ash consists of (Ref 1; pg 50):
  - Contaminated Inorganic Ash: Mineral matter and Metallic species
  - Contaminated Carbonaceous soot formed in the combustion process
- The Incinerator will add to gross heavy metal contamination already present in the area due to the operation of the Irish Steel facility

## 2b Heavy Metal and Incinerator concentrated Toxic Solid Waste

These materials are of potential hazard

Because :

- They leave the combustion chamber as bottom ash or “fly (*ing*) ash”
- They contain concentrated chemicals
- Particles are reduced in size
- Material handling equipment is poor at containment of the ash leading to operator / transporter exposure
- Potential Non flue Emissions have not been assessed

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## 2c Effluent discharges

The applicant has not addressed the potential discharge of contaminated effluent from surface run off in the event of:

Breach of containment of tank bunds

1. Failure of more than 1 tank
2. Fire and Explosion caused through mixture of uncharacterised or incorrectly labelled waste
3. Run off or leachate from solid waste handing areas
4. Spillages of toxic ash

The Applicant has also failed to assess the potential environmental damage and clean-up cost due to such events

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## Seveso II Notification

- European Communities ( Control of Major Accidents involving Dangerous Substances: COMAH ) Regulations, Implements the Seveso directive in Irish Legislation SI No 476 of 2000, (96/82/EC)
- This directive and Irish legislation specifies the duties of all establishments having dangerous substance in excess of application thresholds
- Under Annex 1 Appendix B of the directive named substances are classified under *Upper Tier* and *Lower Tier* categories
- An examination of the proposed inventory must be carried out to determine the establishments status or tier
- A second assessment using the International Labour Office ( ILO ) document *Major Hazard Control a Practical Manual* gives recommended separation distances from 'major hazard works' which are defined as works in which substances stored in quantities exceeding defined thresholds are stored