ToxCat SPECIAL

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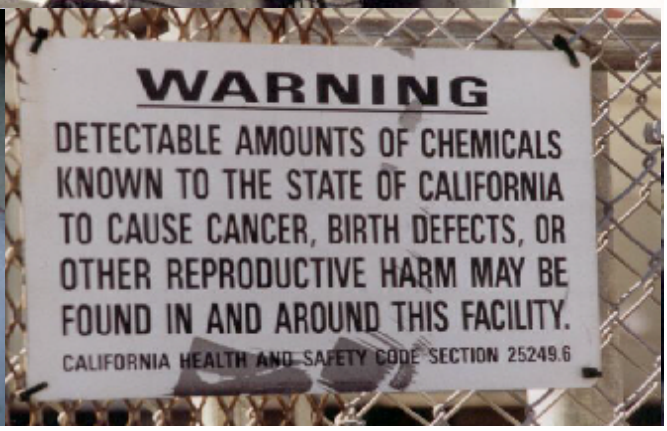
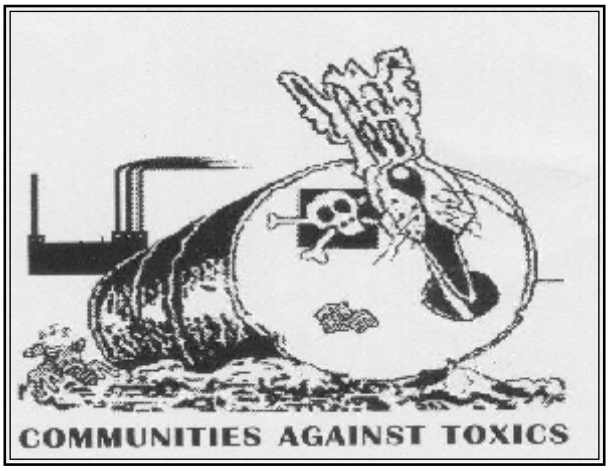
A Beginners Guide to:

Incinerator Emissions & some of the known impact on human health

A great many toxic and possibly neurotoxic agents are emitted hourly by incinerators and circulate freely in the environment; all people and potential progeny are constantly exposed to these complex mixtures and have been for many decades, making it neither reasonable nor prudent to assume a cumulative zero effect on the health of the human population.



Those so-called 'radical' extremists actually want moderate things like a clean environment, affordable medical care for all, increased spending on education rather than used for military purposes, a decent living wage in return for a decent days labour, equal justice for all. The only way these are extreme is they go against everything the capitalist strives for. Michael Parenti 'Dirty Truths'



Communities Against Toxics (CATs) is a national network of the long suffering citizens and communities in Great Britain and Ireland living with incinerators, waste treatment plants, toxic waste landfills, chemical installations and other unsafe, polluting industrial facilities.
Founded in 1990 CATs operates as a non-profit making, non-party political organisation dedicated to increasing public and political awareness on environmental issues and strengthening democracy at a local level.
To help communities protect the environment from industrial pollution and political apathy and indifference. CATs endeavours to provide information and expertise at reasonable cost and whenever possible free of charge to members of the poorer sections of society and groups in country's with transitional economies.
Despite helping 42 communities to resist planning applications for toxic, municipal, medical, crematorium and animal waste burners since its foundation, CATs struggles to get financial support from grant giving Foundations and has to rely on membership subscriptions and donations to survive. It receives no financial support from government sources or industry.
CATs members newsletter ***ToxCat*** is published every two months.
Other publications available to members and subscribers include:
ToxCat 'Beginners Guide' to Dioxin
ToxCat 'Beginners Guide' to Endocrine Disrupters
ToxCat 'Beginners Guide' to Epidemiological Studies Around Incinerators
ToxCat 'What Do You Want, a Boy or a Girl?

If you are interested in sponsoring any of the above publications, an edition of ***ToxCat*** or help us get the web site back on line please contact:
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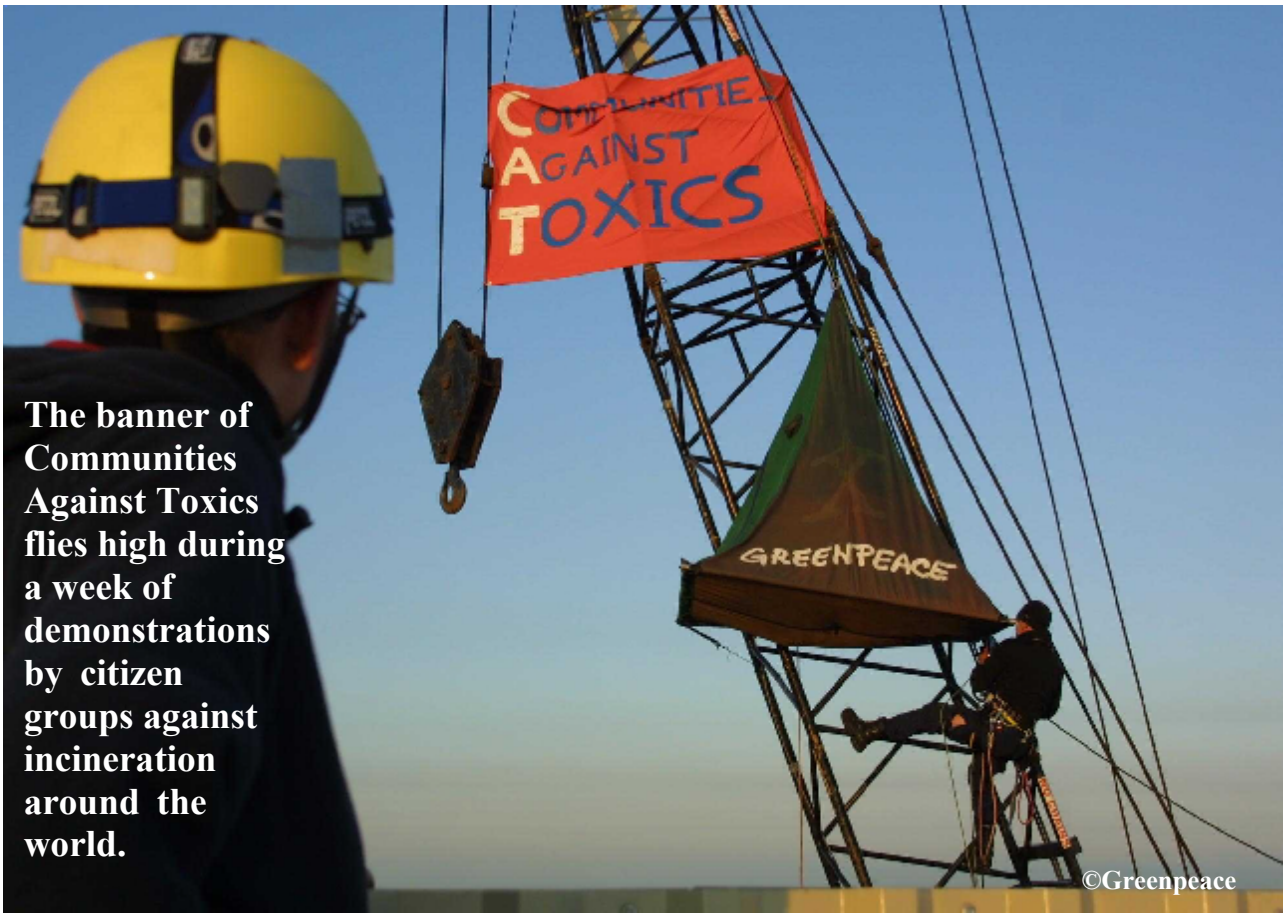

The banner of Communities Against Toxics flies high during a week of demonstrations by citizen groups against incineration around the world.

A Beginners Guide to: *Incinerator Emissions & some of the known impact on human health*

Communities Against Toxics Research Unit, October 2008
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Dr's. Paul Connett and Vyvyan Howard for the many hours spent explaining in detail the disturbing aspects of incineration and the impact of chemicals on human health, especially the developing foetus.
The members of CATs for their efforts to protect the health of future generations from a corrupt political system and a multibillion pound industry whose only interest is making money.

The Trustees of **Fondation Pour Une Terre Humaine**

"...[T]he other factor sir, which needs to be taken into account is the existing pollution in a locality and the incinerator will provide an increment on top of that. A small increment would be more tolerable in a already heavily polluted location..." Professor Roy Harrison, Birmingham University. Statement to House of Lords Select Committee inquiry into Waste Incineration 1999.

The worst sin toward our fellow creatures is not to hate them, but to be indifferent to them: that's the essence of inhumanity: *George Bernard Shaw*

A 18 month old child in Ellesmere Port taking her second daily dose of steroids for asthma. Ellesmere Port is a heavily industrialised town in the north west of England with the highest rate of infant mortality for children under 1 year of age in the UK. It is home to many polluting industries including the largest hazardous waste incinerator in the UK.

Any suggestion that areas like this should host incinerators because the increase in pollution will be more *tolerable* to its residents exhibits a disgraceful indifference towards the well being of children like these. Anyone making such a suggestion should be removed from office immediately and play no further part in advising decision makers at any level.

A young mother looks lovingly at her new-born baby. Whenever citizens question the thinking of industrialists and academics on the impact of chemicals on babies and children they are told: "But they have children to" as if that guarantees they are caring, loving people. Not everyone shows the love expressed in this mothers face towards her child and many experts' and academics exhibit the same indifference as Prof Harrison, as the statements from pesticides expert André Rico and Her Majesty's Inspectorate of Pollution,official Mr. Stuart Wilson testify's:

"It is not up to us to make decisions regarding the fate of unborn children; the future generation must fend for itself like everyone else".
(André Rico former chairman, Pesticide Safety Committee, Conférence UIPP 28 June 2001, Paris).

Cherishing children is the mark of a civilized society. Joan Ganz Cooney

*In conversation with the author at an OECD meeting on Transfer Release Inventories in London. When asked "What are your organisations concerns over the impact of the chemicals emitted by incinerators on the developing foetus"?

We are guilty of many errors and faults, but our worst crime is abandoning the children, neglecting the foundation of life. Many of the things we need can wait. The child cannot. Right now is the time his bones are being formed, his blood is being made and his senses are being developed. To him we cannot answer 'Tomorrow'. His name is Today'

Gabriela Mistral 1945 Noble Prize Winner for Literature.

Ignoring complaints from workers and residents over a 6 years period that the grounding emissions from this 22,000 tons per annum (tpa) liquid toxic waste incinerator was causing ill health. Cheshire County Counicl (CCC) granted the operators a licence to burn *indefinately* on the site in 1980.

When the operator applied for planning permission eight years later to enlarge the plants capacity to 60,000 tpa, a leading councillor admitted the plant was "*passed its sell by date"* and the site was inadequate for the proposed expansion. The counicl consequently offered the operators a much larger site within the petrochemical complex, ignoring again complaints of increased ill health by literally hundreds of workers and residents. Despite no Environmental Impact Assessment (EIA) being conducted, not one County councillor questioned the proposed facility's envisaged environmental impact or the planned disposal of solid waste of which the company had no previous experience during the planning meeting. Planning permission was granted in approx 30-35 minutes with petitions from more than 7000 residents against the scheme being discarded under a table. No mention was made of the complaints of ill-health attributed to the emissions from the existing incinerator. (The same councillors later spent one hour discussing a planned fish and chip shop.)

When I asked at the next council meeting: "what research had been done into complaints that the emissions of the existing incinerator were causing ill-health?" Chairman J Clarke replied "We didn't do any, we left that to our consultants."

My follow-on question was: "What research did your consultants do into the complaints of ill health?" Reply: "They didn't do any... because they didn't consider the complaints serious enough."

If this was true, we have a engineering company making a sweeping 'mass medical diagnoses' on hundreds of complaints.

The new plant (insert) has a colourful history of fires and chemical emissions involving brominated compounds (as many as seven releases in one month). There have been at least three releases of iodine turning the sky above the town purple. The plant has also seen the death of one contractor on site with another seriously injured. This appalling record did not deter CCC from granting planning permission for the building of a 10,000 tpa energy from waste unit at the plant knowing very well this would increase dioxin emissions, as admitted by Manager Douglas Benjafield to Dr. Paul Connett and myself.

"I worked approximately 300 yards from the original incinerator for 17 years seeing and tasting its 'steam plume' on many occasions. But even I was amazed when a drum containing iodine was put into the kiln at the new incinerator and turned a large part of the sky above the town deep purple. This incident showed how large an area is impacted by the particles of poisonous chemicals when the plant is operational. It's disturbing when you consider mothers' leave their babies' in open prams in the back garden 'to enjoy the fresh air.'" *Ralph Ryder*

"If we don't change direction, we'll end up where we're heading."
Old Chinese Proverb

INTRODUCTION

I sat down with the intention of updating earlier editions of *'Epidemiological Studies around Incinerators.'* Then I realised there was a lot more information gained from my personal experience and that of the members of Communities Against Toxics that should be readily available to interested citizens. Consequently I have expanded on my original idea and have produced a number of documents that I think will give newcomers to the anti-incineration battle a factual background of what they are up against.

The other publications are:

A Beginners Guide to: Dioxin
A Beginners Guide to: Endocrine Disrupters
A Beginners Guide to: Epidemiological Studies around Incinerators .
Do You Want a Boy or a Girl?

The bulk of information is taken from the many editions of ***ToxCat*** published over the last 14 years with updates where necessary. My aim is not to present realms of confusing scientific information to the reader. But to bring home in a understandable format the reality of the lies, ignorance, apathy and indifference surrounding the process of incineration and the poisonous compounds it releases hourly into the atmosphere, water, food chain, our bodies and our developing embryo's and foetuses.

You're Life Changes Forever

'An application has been submitted for a Energy from Waste recycling facility.' Notifications like this are usually situated in a small corner of *Public Notices* section of the local paper around the beginning of national holiday like Christmas, Easter or the July/August annual holiday period.

The lay citizen then has 21 days to find out exactly what the application means and educate themselves on the technologies proposed to be able to submit objections on 'sound' grounds, rather than simply write "we don't want it here!"

As if this wasn't difficult enough for anyone with no technical background, sometimes the local planning depart doesnt even have necessary documents for public viewing.

Visiting the planning department of Ellesmere Port to view the details of one application I was shown a file with no real information on the application and it must be said, I had to submit more information when applying for planning permission to build a garage next to my house in the 1970s.

The assistant apologised saying they would send me a copy of the relevent information as soon as they received them.

I waited a week and then contacted another local NGO to see if they had any more details. Its coordinator told me a lot more information had been sent directly to her. She kindly loaned me this information enabling me to put together objections on behalf of a number of local citizen groups.

The documents promised by the planning department arrived the day before closure of comments, which of course would never have given me time to submit objections.

On another occasion I submitted a 22 page document with regards to Cheshire County Councils Waste Plan. When the council altered some minor points of the plan I was informed off-handedly during a poorly attended public consultation in Ellesmere Port that "all objections to the first Plan would be discarded - ignored."

I complained about this saying my objections covered the use of incinerators' and, as the new plan also contained the building of incinerators, my objects regarding incineration were still valid.

A public comment meeting was sent up taking place in Chester. I never received official notification of this only hearing about it through a third party. (The story of my life as a campaigner.)

I duly sent in my 22 pages for the Inspectors consideration but this was returned with the comment I 'hadn't commented on the plan' (therefore my views were irrelevant?)

This was more than a little bewildering as I had been contacted by a local parish councillor requesting a meeting after she had seen my objections on file "at the county offices."

Any citizen who is genuinely concerned about the impact an energy from waste incinerator might have on public health soon realises that one of the biggest obstacles they face is their local politicians and planning department.

Planners will tell them they have to stick to strict planning regulations (which reality shows is only when it suits them). Whereas the majority of today's politicians, shortly after being elected, conform to some unwritten code of conduct ignoring the wishes of the people and championing industry's cause above all else.

Citizens also quickly learn of the appalling ignorance, apathy and indifference among the corridors of power about waste management and its impact on human health and the environment, what we are leaving for future generations to contend with.

One theme running through the publications I receive from the European Union is the importance of closer communications with its citizens. "The people's opinion matters" and 'we must listen to the citizens to build a better future for the European Community" are just two of the statements regularly made.'

However, the reality is citizens can spend months compiling information to present to their MEP and MP only to see it dismissed with the wave of a hand.

During my 34 year involvement in the incineration 'debate' I have witnessed many times the contempt of politicians towards citizens concerns and those who dare to ask awkward questions.

Two of the most appalling examples are that of the Cheshire County Councillors (which you can read about in the forthcoming ***ToxCat*** *Special 'Community Case Studies'*) and what I can only describe as the 'Little Hitler' politicians of the east coast fishing town of Grimsby.

In Grimsby the council planning committee had agreed to the building of a Energy from Waste (EfW) municipal waste incinerator without any consultation with the public or even a full council hearing to debate the issue.

After much public pressure the council finally agreed to a public meeting to 're-consider' the planning committee's decision.

The residents group photocopied approximately 100 copies of a report I had compiled outlining the dangers, expense, and impact of public health etc., of incineration, fully referenced, to present to each councillor. This was rejected off-hand with the council spokesman declaring "we will only look at 2 A 4 sheets."

One councillor took a copy of the report and promptly sat on it without even glancing at the contents.

The contempt of the majority of Grimsby's Labour councillors towards the community's concerns had to be seen to be believed.

The council endorsed the passing of the application with the mayor, who had earlier expressed her feelings against the scheme because of her concern for children's health, casting the deciding vote.

Council Wallace then declared "Mr Ryder was unable to provide any alternatives" without even glancing at the prepared report which for all he knew could have contained realms of information on alternatives.

There was no doubt these arrogant politicians had given the company in question a lot more than ten minutes and 2 A 4 sheets to sell them the incinerator.

Some residents complained bitterly about 'in camera' and 'behind closed door meetings' leading up to the application being passed.

An excellent example of what passes for 'Democracy in action' in the United Kingdom today.

All too often councillors grant planning permission for a incinerator or other dubious project telling the community "we took the advice of the planning officers." Thereby shifting the responsibility and blame onto an un-elected and unanswerable civil servant.

Planners refuse to look at anything prepared by concerned citizens. "We have to follow planning regulations" they say. Yet these same officials cannot, or will not, in Ellesmere Port at least, enforce the regulatory height of a garden fence posing the question:

"If they are so incompetent on such a common occurrence how can we trust them to ensure everything is done according to regulations with such huge project as incinerators?"

The reality is of course we cannot!

Planners will sometimes grant permission for incinerators or other polluting facilities with 'conditions' attached. This gives [the responsibility shifting] councillors the opportunity to announce "the planning department has done really well to ensure certain condition have been set down in writing."

The company then appeals to the government saying the conditions are "unreasonable", resulting in them being thrown out, as happened to conditions attached to the licensing of the hazardous waste incinerator in Ellesmere Port, as councillors knew they would be.

The Incineration Process

The incineration of waste is not only unsafe and polluting, it is a waste of valuable resources we should be conserving for our grandchildren. A finite planet has limited resources and I was very disturbed to hear Chris Allen, a representative of DRG (an organisation many consider simply to be apologist for industry) speaking at a meeting of the European Environmental Bureau (EEB) stating "Resources are not a problem." and "incineration was just fine".

I told him it would be useful if he got out of the office a bit more and spoke to people living around incinerators. He declined my invitation to spend a few days in Ellesmere Port to see the reality of living with polluting industry.

The problem with people like Mr. Allen is they live in a very different, sheltered, affluent world, nothing like that of the members of the socio-economic section hostage to incinerators.

Dilute and disperse

Most people are aware we are abusing nature's resources as if they were never ending. We are dumping millions of tons of highly poisonous compounds, including nuclear waste, into the environment with scant regard for the impact on future generations.

The chemical industry and its associates, aided and abetted by self-interest politicians, has poisoned our air, water, land, food, and bodies to such a degree scientists' are now debating what amount of poisons our bodies can *'tolerate'* - not what is 'safe,' but what is 'tolerable.' Scientists in the United States are warning girls of eight years of age to watch what they eat now because the toxins in the food consumed can pose a risk to the healthy development of any child they might have in ten or 15 years time.

Such a recommendation tells us the regulations governing industrial emissions and chemicals are grossly inadequate.

The reality is the people in place to enforce whatever weak regulations are in place are failing to so. They have allowed industry with its 'dilute and disperse' disposal methods to contaminate

each and every one of us with hundreds of man-made compounds.

Unfortunately influential pyromaniacs within the European Union (EU) are looking for a huge expansion of energy from waste incinerators throughout Europe. They are using the taxes of EU citizens to fund the building of incinerators and, going against a European Court of Justice ruling, have altered the definition of incineration with energy recovery from 'disposal' to 'recovery'. This has opened the door to the import and export of waste to other countries rather than the investment in reduction, reuse, and genuine recycling schemes and cleaner industrial processes.

Persistent Organic Pollutants

Incinerators have been acknowledged as major emitters of Persistent Organic Pollutants (POPs) for decades. There is growing evidence that many systems, including the hormone and the reproductive system of many animal species, are being dramatically affected by the POPs released into the environment over the last 100 years.

POPs are generated and released into the environment by certain industrial processes and waste disposal methods. According to the United Nations Environment Program, incineration is responsible for something like 69% of the planets contamination by one of the POPs of major concern, dioxin.

False Assurances

Until the late 1980's industry build toxic, clinical and municipal waste incinerators with little or no opposition from bewildered communities. Citizens who questioned the safety of such facilities was assured they were "state-of-the-art," 'built using the latest technology,' and 'monitored to strict regulations by the 'efficient officials of government agencies.'

Any citizen who continued to voice concerns over the possible impact on public health of any incinerator, no matter how old the facility, was put down with cries of "alarmist" and "scaremonger' by pyro-politicians who, for reasons known only to themselves, were keen to have incinerators built.

"There is no evidence of ill health around incinerators" concerned communities were repeatedly told.

Today threatened communities are told to "forget the old incinerators they were old, clapped out, not performing as they should have been." A rather different story to what the these pyro's were saying when the plants were operational.

"Today's plants are vastly improved" they proclaim, "the technology is wonderful and the amount of chemicals emitted is 'insignificant.'" As is (they say) the increased levels of ill health and malformed children being born in communities already hostage to incinerators.

Thanks to the efforts of non-governmental organisations (NGOs) like Communities Against Toxics concerned local groups are now better informed. They know that minuscule amounts of many man-made compounds are cancer causing, persistent and accumulative in the environment and human fat/tissues.

They know some chemicals and by-products are capable of disrupting human biological systems causing irreversible damage to the healthy development of the embryo, foetus, breast fed and growing child even beyond puberty.

Forty one communities have resisted planning applications for incinerators to burn toxic, municipal, medical, crematorium, animal waste helped by the contacts and information distributed by CATs since its foundation in 1990.

Given the reality of the cost and impact of incinerators, and the fact that anti-incineration campaigners have won every argument put forward by pyromaniacs for burning waste: ***Economics:** incineration is a very expensive process;

***Environment/Health impact:** incineration is acknowledge as a major emitter of some of the most poisonous compounds known to man, some of which are capable of damaging the development of the embyro and foetus;

***Resources:** incineration destroys resources we should be conserving for future generations:

***Employment:** incineration generates a small amount of jobs compared to recycling schemes handling the same about of discards;

***Safety:** the number of unauthorised releases at modern UK incinerators are disturbing.

Given all these facts its a mystery why governments are still keen to build and fund them with taxpayers money.

One reason is the lazeness of politicans. Incineration seems the easy way out. One facility. No need to plan for several facilities to handle different elements of the waste stream. No need for discussions with several firms to ensure they can take all the glass, paper, metals etc.

Another reason is industry needs to get rid of its waste and excess packaging; one-time use product manufactures (like Bic razors and single use cameras) need to dispose of their discarded products. (Did you know half to a third of products end up in the waste stream within 12 months of purchase - and many are designed for just that?)

It has been estimated that last year approximately 2.02 billion tonnes of municipal solid waste (MSW) were generated worldwide. MSW generation looks set to increase by 37.3% world-wide between 2007 and 2011 according to a *'Global Waste Management Market Assessment Report' (09/10/2007.)* Yet in many countries more waste than ever is being recycled.

The EU Commission claim its amended Waste Framework Directive is looking to 65% recycling, while environmentalists say it is geared to increased incineration and that is why they

have changed incineration with energy recovery from a 'disposal' method to 'recycling.' Simply a play on words.

The report continues: *'The production of energy from waste at incinerators is also growing, but it is important that incineration is not used as a quick method of solving the basic problem of too much waste production...'*

Unfortunately too many decision makers are doing just that and looking no further than the information provided by the industry's PR machine. They do not want to acknowledge the problems created and the long term expensive, health-damaging disaster incineration really is.

Dozens of communities around the world are now hostage to cancer causing incinerators because of the ignorance, apathy, indifference and laziness of their elected representatives.

Evidence on the financial disasters that incinerators are around the world, the small number of jobs created; the epidemiological studies showing malformed children born around incinerators; are all important factors being ignored.

Epidemiological Evidence

As the mountain of damaging epidemiological studies grows, pyromaniacs are doing everything they can to discredit those going showing increased ill health and causing concern for communities, thereby threatening the expansion of the industry.

Dr. Roberts, a leading member of the North Wales Area Health Authority and an avid supporter of burning toxic waste in cement kilns. Declared during a meeting in Wrexham, north Wales that a study by Dr. Knox showing increased ill health in industrialised areas was "seriously flawed and outdated."

When I questioned him on another study by Dr. Knox also showing increased ill health in industrialised areas and published just two weeks before the meeting he declined to comment.

Some pyromaniacs claim even now there are no elevated levels of ill health around even the older incinerators. (See ***ToxCat*** *Special* 'Epidemiological Studies Around Incinerators.)

Others like Prof Andrew Porteous and Dame Barbara Clayton claim all epidemiological studies are "irrelevant" because they have been conducted around older incinerators which "cannot be compared to the emissions from a modern facility".

The truth is of course that while a modern incinerator might intially seem to reduce the amount of pollutants emitted. The increased throughput of waste, (say for example) from 100,000 tonnes per annum (tpa) to 500,000 tpa will undoubted see an increase in certain pollutants being emitted whatever anti-pollution equipment are fitted.

Also, if we take a look at the record of unauthorised releases at the UK's new generation of incinerators any claim of reduced pollutants should be treated with extrem caution.

One important factor never mention by the pyros is the fact that a modern incinerator does do not alter the *toxicity, persistence and bio-accumulative properties of the pollutants emitted, or change their impact on health as individual compounds, mixtures, or the synergistic effect.*

The less articulate

Locating incinerators in lower income areas were the 'less articulate' live (as communities like mine have been called) has given and pyromaniacs the never-to-be-missed opportunity to claim any elevated levels of ill-health are a result of the community's poor socio-economic standing, smoking, excessive drinking, poor diet etc.

The reality is many studies have taken these factors into consideration and still found significantly elevated levels of serious diseases.

In response to the ever-growing mountain of epidemiological evidence going against the industry's interests (and their own plans for burning) the British government comissioned a desk-top evaluation report by Enviros, Birmingham University and DEFRA., *The 'Review of Environmental and Health Effects of Waste Management: Municipal solid Waste and Similar Wastes.'*

One of its authors, Professor Roy Harrison of Birmingham University is a long time supporter of incineration. He previously showned scant regard for the welfare of communities living in heavily polluted areas telling a House of Lords Select Committee inquiry: *..The other factor, sir, which needs to be taken into account, is the existing pollution in a locality and the incinerator will provide an increment on top of that. A small increment would be more tolerable in an already heavily polluted location..."*

Professor Harrison has obviously given little consideration to the statement from the World Health Organisation *'that any additional increase [of dioxin] could have devastating consequences for public health.'*

I personally believe that when influential academics 'suggest' using polluted areas and the poorer sections as sacrificial goats for polluting industry, they should be removed from office regardless of their qualifications and position.

Poverty

While no-one would dispute deprivation, poverty and its accompanying lifestyle plays a part in the poor health of any community. We should not overlook the vast range of toxic chemicals and by-products emitted daily by incinerators including arsenic, cadmium, copper, mercury, lead, vanadium, zinc, dioxins, furans and hundreds of unknown compounds, many of which could likley also be persistent, bio-accumulative with no proven 'safe' threshold.
Synergistic effects are also unknown.

Taking these factors into account, common sense tells any resonable person an incinerator must play a significant role in the poor health of *some* sections of a hostage community be it the elderly, the very young, those suffering illness etc.

We should also not overlook the fact that the emission standards for incinerators are based on what is achievable technically, not at a level that guarantees the safety of public health as pyromaniacs would have the public believe.

The collective experiences of the members of Communities Against Toxics have shown that few politicians have *genuine* concerns for the impact of incinerators on public health and the unborn child.

Despite the statements made by Michael Meacher in May 2000 (see box below) the British government published a Waste Strategy calling for the building of over 112 Energy from Waste incinerators over the next 15 years.

This sparked off a huge outcry from recycling company's, anti-incineration groups, zero wasters' and a number of academic organisations.

This resulted in government spokesmen claiming the Strategy was "based on recycling and not on incineration." But the government had granted more than 70 proposed incinerator facilities subsidies though the Non-Fossil Fuel Obligation (NFFO), subsidies that could well cost the British taxpayer an estimated £728 million.

Several officials of the Environment Agency spoke publicly about the need for "100 energy from waste incinerators" to meet EU legislation, which caused citizens to doubt the government 'recycling' claims.

Slack Monitoring

Threaten communities have been told for decades the UK incineration industry is the most closely monitored section of industry. Unfortunately the reality of real-life tells us a very different story.

During investigations into the spreading of 2,000 tonnes of highly contaminated incinerator ash over food producing areas at BYKER, Newcastle upon Tyne for approximately 6 years. CATs investigators and associates discovered that officials of the UK's Environment Agency were actively encouraging the use of dioxin-laded ash in building blocks to be used in house construction, hard core for road building, and car parks despite knowing the extent of its heavy metal and dioxin contamination.

Communities Against Toxics

Communities Against Toxics (CATs) has been a leading light among UK anti-incineration grassroots groups since 1990. As well as organising something like a dozen conferences it has sent representatives to several important citizen-organised conferences resulting in the collection and distribution of important information and the establishment of contacts around the world.

CATs is a founder member of several International community-based organisations, including the Global Anti-Incineration Alliance/Global Alliance for Incineration Alternatives (GAIA).

At the last GAIA Global Meeting in San Sebastian, Spain, in September (2007) more than 130 activists from 39 countries met and shared experiences, information and expertise. These activists had a revealing insight into:

*an industry surrounded by political ignorance, apathy, and indifference:

*an industry using a seriously flawed technology, backed up with manipulated data to conceal the true toxicity of chemicals emitted:

"Incinerator plants are the source of serious toxic pollutants; dioxins furans, acid gases, particulates, heavy metals and they all need to be treated very seriously."

"There must be absolute prioritisation given to human health requirements ... and the protection of the environment.

"I repeat that the emissions from incinerator processes are extremely toxic. Some of the emissions are carcinogenic. We know scientifically that there is no safe threshold below which one can allow such emissions. We must use every reasonable instrument to eliminate them altogether..."

"It is the overall impact, deposition of substances of different kinds on the environment and the cumulative impact that we do need to be concerned about..."

"It strikes me that we say in a rather blasé manner that we understand the health impacts of all these things, when our knowledge in this particular field of chemical exposure is very limited."

"It is the responsibility of the Environment Agency to look at the overall deposition impacts. I am not sure how well honed that concept is, but certainly with regard to what we have been talking about here; cadmium, mercury and lead, which originate from many different sources, it is of course the cumulative impact which is so serious. .. .I often wonder about whether those safety margins are absolutely, wholly and soundly based..."

Michael Meacher, Secretary for the Environment, (UK) April 14 1999.
In evidence to the House of Lords inquiry into Waste Incineration' HL Paper 71p

*an industry causing increased levels of ill-health and malformation in children among communities around the world;

*the appalling lack of data on the toxicity of 86% of the chemicals in daily use and even less on those emitted by incinerators;

*the extreme sensitivity of the developing foetus and breast fed child to chemical insult;

*the poor enforcement of weak regulations:

*the deliberate omission of children under 10 years of age in studies on the health impact of incinerator ash contaminated with heavy metals and dioxin spread on food producing areas for approximately 6 years;

*how no-one in the national media or governmental body questioned the rationale of this;

*the indifference of politicians, public health officials, regulatory bodies and academics to the welfare of the socio-economic sections hostage to polluting industrial facilities;

* how decison makers ignore the real-life experiences of communities and the ever-increasing mountain of epidemiological evidence.

Of course a major problem is politicians are being lobbied by industry representatives at every opportunity. Some are only to eager to accept salary's as 'advisers' and work within the corridors of power to further industry interests *

Some of these advisers have been in positions of power for decades, working more for industry than the people who voted for them.* As long these Judas' are put into such positions they will abuse the trust of the electorate.

The way to deal with this is not to vote for these people. Forget party politics and vote for the person who will work to benefit the citizens, and not industry,
It really is as simple as that!

*See: *Too Close for Comfort*
A report on MEPs, corporate links and potential conflicts of interests. Andy Rowell. Available from www.spinwatch.org

STATE OF AFFAIRS IN 1994

The following article was first published in Waste Not, 276-277. April 1994. It is repeated here for the benefit of newcomers to the fight to protect our children's health from the incinerator industry.

Asked to conduct a study of papers on the health impacts of incineration before the Subcommittee on Human Resources and Intergovernmental Relations Committee on Government Operations, United States House of Representatives on January 4, 1994, Barry L Johnston, Ph.D. Assistant Surgeon General Assistant, Administrator of the Agency for Toxic Substances and Disease Registry (ATSDR) Public Health Service, U.S. Department of Health and Human Services testified;

"ATSDR often finds itself unable to answer citizen's questions about associations between incineration of waste and public health impacts. The scientific information on health impacts of incineration often isn't available because relevant studies haven't been conducted. Incineration of wastes should be viewed from a public health perspective in the larger context of generation and management of wastes. Wastes become a public concern when they are improperly managed and disposed of.

Therefore, in a public health context, the most protective action is not to produce waste. Waste elimination or minimisation comports with prevention or reduction of health consequences of wastes."

What data currently exist on health impacts from incinerator emissions of dioxin, furans, lead, mercury and other chemicals you think most relevant? What is the range of health effects and their intensity at likely emission levels?

"There are very few data on the actual human health impacts of incinerator emissions on the health of communities near incinerators. Epidemiological investigations have rarely been conducted, nor have studies of disease and illness patterns been undertaken. For example, ATSDR staff conducted a recent literature search of the 10 most frequently used computerised data bases. As part of the search over 1,000,000 entries were identified. Approximately 72,000 of those entries dealt with incineration. Only one (1) single entry discussed the conduct of a population-based study conducted in a community living in the vicinity of an incinerator.

In the absence of human health data reliance is placed on using toxicity data for individual substances released into the environment. The effect of any toxic substance depends on factors such as duration of exposure, concentration of the substance in the environment, biological uptake and a person's susceptibility factors (eg., age). All these factors have to be considered in any estimate of impact of incinerator emissions. Adequate information does not exist to support speculation on what, if any, human health effects might be associated with incinerator emissions.

However, our experience with public health associations related

to hazardous waste sites would suggest the need to conduct two kinds of human health investigations. One kind of investigation would look at cancer, birth defects and respiratory disease rates in areas thought to be impacted by releases from incinerators. A second kind of study would be site specific.
Community health surveys would help clarify whether any unusual exposure or morbidity is occurring that might be associated with a given incinerator."

What kind of data do you have or gather on additive, multiple, and synergistic impacts when there is exposure to more than one chemical, as would be the case with incinerator emissions? Do you expect those impacts would be greater than from a single chemical exposure alone?
"There are few data available in the scientific literature on specific interactions of contaminates that may be released from waste incinerators (dioxin, furans, lead, mercury]. In the absence of specific studies using combined contaminants, and limited understanding of the mechanisms of action for some substances, it is prudent to assume that the effects of exposure to these contaminates is additive."

What data exist on the sensitivity of various populations, by age, gender or ethnic background, to these chemicals?
"Infants and children are arguably the most sensitive segment of the human population to toxic exposures. Infants and children are at special risk because they play outdoors, *(where they spend more time than adults)* they ingest or mouth foreign objects, they are smaller *(greater chemical doses per pound)* than adults, (children are nearer the ground than adults and most chemicals are heavier than air) they also breathe more air, *(25 to 30 times a minute compared to an adults 15)* they are nutritionally challenged *(because of protein-calorie requirements to support rapid growth)* and they are undergoing developmental changes that make them especially vulnerable to chemical exposure. Moreover, they have the longest life expectancies during which long-term adverse health effects may manifest. Certain disorders may not become evident until a child reaches a particular developmental stage, which may occur long after the damage was done. Some of the largest environmental health programs (eg. asbestos) are directed at children." *(Italics are CATs additional information.)*

People of reproductive age.
"All women of reproductive age must be included in this population because the most severe effects usually occur during the very early stages of pregnancy, often before a woman knows she is pregnant. In addition pregnant women, especially those with multiple pregnancies, as well as the developing foetus, have increased protein-calorie requirements to support rapid physical growth.
The developing foetus is particularly sensitive to chemical exposure. Exposure to chemicals has the greatest impact on those functions undergoing the most active development at the time of exposure. Animal studies and some human studies show that there are critical foetal development stages during which chemical exposure can cause permanent and devastating effects. There is also a small, but growing scientific literature that implicates some toxicants as causing effects on male reproductive processes.
For example, laboratory animal studies have shown that exposure to lead causes adverse reproductive outcomes in male rats, leading to effects on neurologic function in the offspring of the males. Similarly, PCBs in fish and waterfowl have been reported to cause feminine features in the male of these species."

Elderly persons and persons with chronic illnesses.
"Elderly persons and the chronically ill tend to be more susceptible to respiratory irritants. Long standing public health policies such as immunisation guidelines for influenza support this notion. The elderly are also nutritionally challenged, often due to reduced protein-calorie intake and combined with the metabolic changes that occur during this stage of life. Underlying illnesses such as is the case in the chronically ill may increase their susceptibility to particular toxicants. For example, persons with chronic diseases of the kidney system may experience more harmful effects from exposure to renal toxicants such as lead and cadmium compared to a healthy individual.
Moreover, elderly persons and those with chronic illnesses are often socially isolated and potentially less aware of environmental emergencies. Because of special physical challenges, they may also require special services during time of evacuation in the event of such an emergency."

Minorities.
"Preventing adverse health effects in minorities exposed to hazardous substances is a priority for the Agency for Toxic Substances and Disease Registry (ATSDR). Minority populations, particularly African Americans, Hispanics, and Native Americans suffer disproportionately from preventable morbidity and mortality.
Regardless of income, education, or geographical locale these populations are often in poorer health than their white counterparts. This disparity is often associated with inadequate access to health care for preventive services as well as early diagnosis and treatment of disorders including those that may be associated with exposure to hazardous substances.

Their disadvantaged economic status also frequently affects priorities on nutritional status.
Occupational chemical exposures may increase this population's susceptibility to adverse health effects resulting from other exposures to hazardous substances.
In addition, certain pre-existing genetic disorders (G6-PD deficiency, sickle cell anaemia) may compound the impact of such exposures... "

What are the most serious data gaps that prevent us from determining the exact health impacts from incinerators?
The data that impede an accurate assessment of the public health impact can be divided into two categories; *those associated with the technology and the facility itself,
*and those related to environmental health.
Following are examples of some key data gaps in both categories. Also listed are actions that should be considered in order to ensure the protection of the public's health. These data gaps and recommended actions are based on ATSDR's experience in providing consultations concerning hazardous waste incinerators.
Key data gaps associated with the incineration technology/facility include:
1) The often inadequate identification and quantification of waste feed as well as fugitive emissions associated with specific incinerator facilities. 2) The deposition rates to soil and water for all potential incinerator stack emissions are not well known. 3) The identification and quantification of emissions during incinerator process upsets are frequently not measured. 4) When stack emissions are analysed for metals the specific metal compounds or species present are not usually identified.
5) Concentrations of contaminates in environmental samples around incinerator facilities, e.g. soil, water and ambient air are typically not measured.
6) There are limitations in the current stack testing, air monitoring and air modeling methods. Some of these methodologies need further validation.
7) Often there is a lack of data on the concentration of contaminates present in foods that are grown near a facility, such as vegetables from gardens, cattle, fish or shellfish etc.... The second category of data gaps concerns the area of environmental health. Key data gaps in this area include; limited demographic and health data on the surrounding community; Lack of environmental data such as the types and concentration of contaminates present and the environmental media contaminates.
Limited number of exposure, health monitoring and surveillance activities in communities living near operating incinerator facilities present and the environmental media contaminated.
*Limited number of exposure, health monitoring and surveillance activities in communities living near operating incinerator facilities.
* Data gaps in our knowledge about the adverse health effects from specific hazardous substances.
* Toxicologic data on the mixture of substances from incinerators.
Efforts by federal and state environmental and health agencies are underway to address a few numbers of these data gaps. In addition to these efforts, attempts should be made to co-ordinate and collaborate in order to maximise the results in each individual area of data needed..."END

".. we think that it would be wrong to discount public concern about the health implications of incineration products (especially dioxins) on the grounds that it is derived from the experience of an older generation of municipal incinerators which the 1989 Directives have essentially done away with. Although considerable progress has been made in understanding the toxicology and exposure effects of many of the key pollutants, continued epidemiological work will be needed. We consider there are well established grounds for caution, justifying the general approach of the draft Directive. We feel that the collection and study of data on the potential health risks, from combus- tion products should continue to be a priority... "

House of Lords Select Committee inquiry into 'Waste Incineration' , 11 Report HL Paper 71, 15th June 1999

WHAT DOES AN INCINERATOR EMIT?

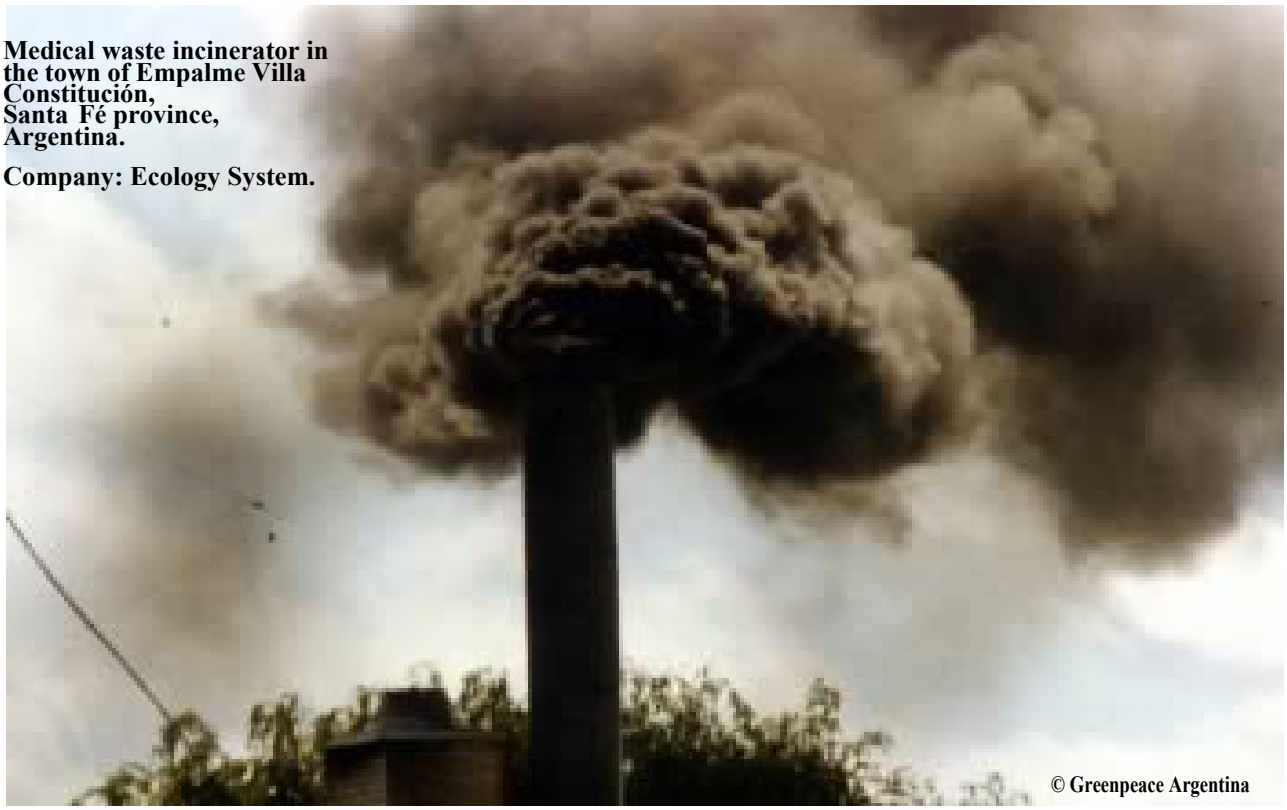
To understand better the likely impact of incinerator emissions on public health we should consider the waste stream a facility will handle every day and the resulting chemicals and by-products emitted; their known impact on health; the health status and sensitivity of the people impacted; the sensitivity of the human endocrine and hormone systems; the complex nature of the developing foetus and its extreme sensitivity to chemical impact.

When we have considered all these factors, we should not overlook the efforts of industry, its scientists, governments and regulatory officials to conceal the toxicity and dangers of some of the chemicals emitted in both large and small amounts - notably 2,3,7,8-tetrachlorodibenzene-p-dioxin (TCDD-dioxin).

Waste Stream

The waste stream of today's generation of Energy from Waste (EfW) incinerators is an ever-changing complex mixture of industrial products, by-products and chemicals. These include chlorinated solvents, pesticides, PVC, inks, dyes, paints, papers, textiles, pharmaceuticals, metals, babies nappies, (diaphers,) chemically treated wood and wood products like MDF, organic waste, upholstery, electrical equipment, flame retardants, building materials.

Supporters of incineration (pyromaniacs) would have the public believe all of these compounds can be completely disposed of at the same time, at the same temperature, with the same oxygen level, and any resulting toxins will be safely captured in the pollution devices resulting in no harmful emissions. This is not technically possible and the gross contamination of areas around incinerators, and indeed around the globe, by persistent organic pollutants is testament to this.



Medical waste incinerator in the town of Empalme Villa Constitución, Santa Fé province, Argentina.

Company: Ecology System.

Chemicals and by-products emitted daily by an incinerator during its operational life span

You should bear in mind that whereas toxicological data for individual chemicals identified in the stack gases of an incinerator can offer some insight into the impacts that can be expected from exposure to that *particular* pollutant. Rudimentary toxicological information about high dose exposure to the few individual chemicals that have been identified gives no indication of the potential effects of long-term, *low dose* exposure to the diverse mixtures of chemical's and by-products released.

Incinerator stack emissions are not comprised solely of harmless gases: they carry waste chemicals that have escaped combustion as well as newly formed "products of incomplete combustion" (PICs). These PICs are thousands of different chemicals of which only a small fraction have been identified.

Many compounds released from incinerators are extremely toxic in very tiny, trace amounts and persistent in the environment for long periods migrating through the food chain. Significant quantities of some of these substances are already present throughout the environment, the human food chain, human tissues and newly born babies, showing they are capable of passing through the placenta.

The incineration of wastes has been acknowledged as the source of persistent pollutants in the environment and human tissues for decades. Polychlorinated biphenyl's (PCBs) Polychlorinated dibenzo-p-dioxins, (PCDDs) and Polychlorinated dibenzofurans, (PCDF) are known to be formed in an incinerator. These, and chlorobenzenes, chlorophenols, and a range of chlorinated

Kay and Steiglitz published a paper in *Chemosphere* identifying the following volatile organic chemicals emitted from a municipal waste incinerator: pentane; trichlorofluoromethane; acetonitrile; acetone; iodomethane; dichloromethane; 2-methyl-2-propanol; 2-methylpentane; chloroform; ethyl acetate; 2,2-dimethyl-3-pentanol; cyclohexane; benzene; 2-methylhexane; 3-methylhexane; 1,3-dimethylcyclopentane; 1,2-dimethylcyclopentane; trichloroethene; heptane; methylcyclohexane; ethylcyclopentane; 2-hexanone; toluene; 1,2-dimethylcyclohexane; 2-methylpropyl acetate; 3-methyleneheptane; paraldehyde; octane; tetrachloroethylene; butanoic acid ethyl ester; butyl acetate; ethylcyclohexane; 2-methyloctane; dimethyldioxane; 2-furanecarboxaldehyde; chlorobenzene; methyl hexanol; trimethylcyclohexane; ethyl benzene; formic acid; xylene; acetic acid; aliphatic carbonyl; ethylmethylcyclohexane; 2-heptanone; 2-butoxyethanol; nonane; isopropyl benzene; propylcyclohexane; dimethyloctane; pentanecarboxylic acid; propyl benzene; benzaldehyde; 5-methyl-2-furane carboxaldehyde; 1-ethyl-2-methylbenzene; 1,3,5-trimethylbenzene; trimethylbenzene; benzonitrile; methylpropylcyclohexane; 2-chlorophenol; 1,2,4-trimethylbenzene; phenol; 1,3-dichlorobenzene; 1,4-dichlorobenzene; decane; hexanecarboxylic acid; 1-ethyl-4-methylbenzene; 2-methylisopropylbenzene; benzyl alcohol; trimethylbenzene; 1-methyl-3-propylbenzene; 2-ethyl-1,4-dimethylbenzene; 2-methylbenzaldehyde; 1-methyl-2-propylbenzene; methyl decane; 4-methylbenzaldehyde; 1-ethyl-3,5-dimethylbenzene; 1-methyl-(1-pro-penyl)benzene; bromochlorobenzene; 4-methylphenol; benzoic acid methyl ester; 2-chloro-6-methylphenol; ethyldimethylbenzene; undecane; heptanecarboxylic acid; 1-(chloromethyl)-4-methylbenzene; 1,3-diethylbenzene; 1,2,3-trichlorobenzene; 4-methylbenzyl alcohol; ethylhex anoic acid; ethyl benzaldehyde; 2,4-dichlorophenol; 1,2,4-trichlorobenzene; naphthalene; cyclopentasiloxanedecamethyl; methyl acetophenone; ethanol-1-(2-butoxyethoxy); 4-chlorophenol; benzothiazole; benzoic acid; octanoic acid; 2-bromo-4-chlorophenol; 1,2,5-trichlorobenzene; dodecane; bromochlorophenol; 2,4-dichloro-6-methylphenol; dichloromethylphenol; hydroxybenzonitrile; tetrachlorobenzene; methylbenzoic acid; trichlorophenol; 2-(hydroxymethyl) benzoic acid; 2-ethylnaphthalene-1,2,3,4-tetrahydro; 2,4,6-trichlorophenol; 4-ethylacetophenone; 2,3,5-trichlorophenol; 4-chlorobenzoic acid; 2,3,4-trichlorophenol; 1,2,3,5-tetrachlorobenzene; 1,1'biphenyl (2-ethenyl-naphthalene); 3,4,5-trichlorophenol; chlorobenzoic acid; 2-hydroxy-3,5-dichlorobenzaldehyde; 2-methylbiphenyl; 2-nitrostyrene(2-nitroethenylbenzene); decanecarboxylic acid; hydroxymethoxybenzaldehyde; hydroxychloroacetophenone; ethylbenzoic acid; 2,6-dichloro-4-nitrophenol; sulphonic acid m.w. 192; 4-bromo-2,5-dichlorophenol; 2-ethylbiphenyl; bromodichlorophenol; 1(3H)-isobenzofuranone-5-methyl; dimethylphthalate; 2,6-di-tertiary-butyl-p-benzoquinone; 3,4,6-trichloro-1-methyl-phenol; 2-tertiary-butyl-4-methoxyphenol; 2,2'-dimethylbiphenyl; 2,3'-dimethylbiphe- nyl; pentachlorobenzene; bibenzyl; 2,4'-dimethylbiphenyl; 1-methyl-2-phenylmethylbenzene; benzoic acid phenyl ester 2,3,4,6-tetrachlorophenol; tetrachlorobenzofurane; fluorene; phthalicester; dodecanecarboxylic acid; 3,3'-dimethylbiphenyl; 3,4'-dimethylbiphenyl; hexadecane; benzophenone; tridecanoic acid; hexachlorobenzene; heptadecane; fluorenone; dibenzothiophene; pentachlorophenol; sulphonic acid m.w. 224; phenanthrene; tetrade- canecarboxylic acid; octadecane; phthelic ester; tetradecanoic acid isopropyl ester; caffeine; 12-methyltetrade cacarboxylic acid; pentadecacarboxylic acid; methylphenanthrene; nonedecane; 9-hexadecene carboxylic acid; anthraquinone; dibutylphthalate; hexadecanoic acid; eicosane; methyl hexadecanoic acid; fluoroanthene; pen-tachlorobiphenyl; heptadecanecarboxylic acid; octadecadienal; pentachlorobiphenyl; aliphatic amide; octade-canecarboxylic acid; hexadecane amide; docosane; hexachlorobiphenyl; benzylbutylphthalate; aliphatic amide; diisooctylphthalate; hexadecanoic acid hexadecyl

methanes, ethanes and ethylenes - all found in incinerator emissions - have been identified as ubiquitous contaminates in human tissues.

"[C]ombustion is the only source of sufficient size and ubiquity to account for the PCDD and PCDF in human adipose tissue." [1]

"Combustion processes are believed to be the source of most PCDD/F to the environment". [2]

We know that PCDDs and PCDFs exert multi-generational effects on multiple organ systems in many species at extraordinary low doses. No safe threshold has been found for reproductive, developmental, and immunological effects of 2,3,7,8-tetrachlorodibenzene-p-dioxin (TCDD) despite more than a decade of intensive research. Yet pyromaniacs still claim the levels of TCDD emitted by a modern facility poses no health threat, despite being bio-accumulative in the environment and human tissues.

One self-confessed pyromaniac, Dame Barbara Clayton, giving evidence to a House of Lords inquiry into 'Waste Incineration' in 1999 expressed her bewilderment that:*"...the public look on dioxins as the very severe chemical that they fear... There is no reason to have that view, but it is very much the public perception."*[3]

Dame Clayton has a vastly different opinion on the toxicity of dioxin than that of Dr. Linda Birnbaum, Dr. Arnold Schecter, Dr. Chris Portier, Dr. Barry Commoner and many other scientists actually working in the field of dioxin research. All have expressed great concern over their impact on health and the mechanism by which they work. A number have spoken of dioxin as "the most toxic synthetic chemical known to man" and "the most potent compound produced in the lab". Dr. Richard Clapp, who studied the impact of [dioxin contaminated] Agent Orange on Vietnam Veterans described it as *"the Darth Vadar of chemicals."*

Another eminent scientist in dioxin research is Dr. Michael DeVito, co-author of Toxicology of Dioxin and Related Chemicals. Speaking at a Symposium at Lancaster University in 1996 he questioned the wisdom of the World Health Organisations (WHO) [then] 'tolerable daily intake' (TDI) of dioxin of 10 pico grams per kilogram of body weigh a day (pg/kg/bw/a day) saying it was *"... insufficiently protective" and "...does not take into full account the differences between human and animal metabolism when drawing conclusions from animals experiments."*

Two years later, (June 4 1998) after a four day debate among 40 specialists from 15 countries the WHO declared: *"The experts recognised that subtle effects may already occur in the general population in developed countries at 2 to 6 pg/kg/be/a day"* and set a new lower rate of TDI as 1 to 4 pg/kg/bw/a day recommending *"...that every effort be made to reduce expose to the lowest possible level."*[4]

To reach this magical figure of 1 to 4 pg the experts of WHO took the lowest observed level that caused problems in laboratory animals and reduced it by a factor of **10.** The normal practice in such circumstances would be to apply a factor of **100,** but had they done this they would have been declaring much of the worlds food supply in industrialised countries dangerously contaminated. They were obviously reluctant to do this for political reasons.

It seems the WHO, like many governments, are bowing to the needs of industry and tacitly accepting the permanent chemical contamination of our air, our food, and our new-born.

Playing with Fire

The following text is unashamedly taken from *Playing with Fire,* written by Pat Costner and Joe Thornton, Greenpeace (updated) 1993.

I have included this because it is an excellent, understandable introduction to the realities of incineration for those of us involved in anti-incineration battles and political decision makers.

Although *Playing with Fire* concentrates on hazardous waste incineration, we should not forget that the waste that goes into a municipal solid waste incinerator contains many of the chemicals that are disposed of in hazardous waste incinerators.

Incinerator Performance: Matter of Fact or Fantasy?

Both the incineration industry and government regulators claim to be able to evaluate and control waste incinerators well enough to guarantee that the pollutants released will cause no harm. These claims are contradicted by numerous scientific reports assembled by, and for, regulatory agencies.

No large-scale combustion system that routinely burns hazardous waste has ever been fully evaluated.

At present, there is no method for continuously monitoring all unburned and newly formed chemicals and metals emitted in stack gases. Even in trial burns, only 1% to 6% of the total mass of unburned chemicals emitted from an incinerator have been chemically identified. As a result, the bulk of the chemicals released from incinerators, even under carefully controlled and monitored conditions, remain uncharacterised.

Without identification and quantification of all stack emissions, an incinerator's performance cannot in fact be determined. Instead, operators and regulators contend that they can predict an incinerator's ability to burn highly variable waste streams and diverse chemical mixtures throughout 20-25 years of routine operation based on measurements taken during a trial burn of one or two individual chemicals for a period of a few hours. Even during these brief, carefully controlled trial burns, incinerator operators rely on partial and surrogate measurements of performance because only a fraction of the

chemicals emitted can be identified.

...Furthermore, scientists found the incinerability of chemicals to vary in a complex and somewhat unpredictable way with incinerator temperature, available oxygen, waste feed rates, and waste composition in single-component experiments. Consequently, additional data...will be needed to assess the situation. However, the amount of data needed to clearly describe the behaviour of all possible mixtures would be prohibitively large and costly.[5]

In summary, there is no sound basis for assuming that the demonstration of a DRE of 99.99% during a trial burn proves that this level of destruction will be achieved during the daily incineration of complex waste mixtures over years or even decades.

Furthermore, POHCs presumed to be relatively easy to destroy may produce PICs that are extremely difficult to incinerate.[6]

Products of Incomplete Combustion

During incineration, fragments of partially burned waste chemicals stabilise or recombine to form new chemicals called PICs. Although these chemical PICs are estimated by the United States Environmental Protection agency (U.S.EPA) to number in the thousands, only a small percentage have been identified. Many pose far greater health and environmental threats than the original wastes.

PICs identified include the polychlorinated dioxins and furans, PCBs, hexachlorobenzene, and other complex organochlorines that are highly toxic, persistent, and bio-accumulative.

According to the United States Environmental Protection Agency (U.S.EPA), as much as 1% of the mass of waste chemicals fed into an incinerator may exit the stack unburned or incompletely burned. Based on these data, an average sized commercial incinerator (70 million pounds per year), emits these chemicals, predominantly PICs, into the air at the rate of 700,000 pounds per year.[7]

The average citizen may have problems understanding the terminology used in relation to emissions from incinerators. Grams per cubic meter (/m3) means absolutely nothing to the lay person. Citizens should demand a

Products of Incomplete Combustion From Hazardous Waste Incineration.

Acetone (1,3) Acetonitrile (5) Acetophenone (1) Benzaldehyde (1,4) Benzene (1,3,4,5) Benzenedicarboxaldehyde (1) Benzofuran (4) Benzoic acid (1) Bis(2-ethylhexyl) phthalate (1,5) 1-Bromodecane (4) Bromofluorobenzene (4) Bromoform (3) Bromomethane (3,5) Butylbenzyl phthalate (1) Isooctane (3) Carbon tetrachloride (1,2,3,4,5) Chlorobenzene (1,3,4) 1-Chlorobutane (4) Chlorocyclohexanol (1) 1-Chlorodecane (4) Chlorodibromomethane (3) 2-Chloroethyl vinyl ether (3) ChloroformU.2,3,4,5) 1-Chlorohexane (4) Chloromethane (3,5) 1-Chlorononane (4) 1-Chloropentane (4) Cyclohexane(l) Cyclohexanol (1) Cyclohexene (1) 1-Decene (4) Dibutyl phthalate (1) Dichloroacetylene (2) Dichlorobromomethane (3) 1,2-Dichlorobenzene (4,5) 1,4-Dichlorobenzene (4,5) 1.1-Dichloroethane (5) 1.2-Dichloroethane (3,4,5) 1,1-Dichloroethylene (3,5) Dichlorodifluoromethane (5) Dichloromethane (1,3,4,5) 2,4-Dichlorophenol (5) Diethyl phthalate (1) Dimethyl ether (3) 3,7-Dimethyloctanol (4) Dioctyl adipate (1) Ethenylethylbenzene (1) Ethylbenzaldehyde (1) Ethylbenzene(l,3) Ethylbenzoic acid (1) Ethylphenol(l) (Ethylphenyl)ethanone (1) Ethynylbenzene (1) Formaldehyde (5) Heptane (4) Hexachlorobenzene (2,5) Hexachlorobutadiene (2) Hexanal (4) 1-Hexene (4) Methane (3) Methylcyclohexane (4) Methyl ethyl ketone (5) 2-Methyl hexane (4) 3-Methyleneheptane (4) 3-Methylhexane (4) 5,7-Methylundecane (4) Naphthalene (1) Nonane (4) Nonanol (4) 4-Octene (4) Pentachloro phenol (5) Phenol (5) Polychlorinated biphenyls (PCBs) (2) olychlorinated dibenzo-p-dioxins (PCDDs) (2,5,6) Polychlorinated dibenzofurans (PCDFs) (2, 5, 6) Pentanal (4) Phenol (1,5) Phenylacetylene (1) Phenylbutenone (1) (1,4-Phenylene) bisethanone (1) PhenylpropenoHl) Propenylmethylbenzene (1) 1,1,2,2-Tetrachloroethane (4,5) Tetrachloroethylene (1,2,3,4,5) Tetradecane (4) Tetramethyloxirane (1) Toluene (1,3,4,5) 1,2,4-Trichlorobenzene (4,5) 1.1.1-Trichloroethane (1,3,5) 1.1.2-Trichloroethane (5) Trichloroethylene (1,2,4,5) Trichlorofluoromethane (3) Trichlorotrifluoroethane (4) 2,3,6-TVimethyldecane (4) Trimethylhexane (1) 2,3,5-Trichlorophenol (5) Vin>“l chloride (3,5)

(1) Trenholm 1986 (eight full-scale hazardous waste incinerators)
(2) Dellinger 1988 (turbulent flame reactor)
(3) Treoholm 1987 (full-scale rotary kiln incinerator)
(4) Chang 1988 (turbulent flame reactor)
(5) U.S. EPA. “PIC database” in U.S. EPA 1989b (review of available data at varied units)
(6) U.S. EPA 1987c (two full-scale rotary kiln incinerators).

Fossil fuels contain little or no halogens and associated compounds. As detailed in PICs resulting from the incineration of halogenated material (such as the chlorinated dioxins, furans, and PCBs) are far more toxic than PICs from fossil fuel burners.

PICs in Ash Residues

One study of incinerator bottom ash identified 37 PICs, some of which were chlorinated species. The concentrations of these PICs in the ash ranged from 0.1 to 500 parts per million (ppm) (Van Buren 1985).

Source: ‘Playing with Fire’ by Pat Costner & Joe Thornton. A Greenpeace Report

table of total releases in an understandable format, one that they can relate to. For example: It was calculated by Greenpeace that a proposed 103MW energy from waste incinerator at Belvedere, South East London, would release every year 70 tonnes of dust; 350 tonnes of sulphur dioxide; 1,401 tonnes of nitrogen dioxide; 0.7 grams of dioxins and furans; 7 tonnes of lead; 7 tonnes of chromium; 0.6 tonnes of mercury and cadmium.[8]

Another study in the USA showed that a 'state of the art' incinerator burning 2,250 tons of household waste a day would annually emit: 5 tons of lead; 17 tons of mercury; 580 lbs of cadmium; 2,248 tons dioxide, 18 tons of fluorides, 98 tons of particulate matter small enough to lodge in the deepest areas of the lung. [9]

If we multiply these amounts by 30, the amount of years the plant will be contracted to burn waste for, we can get some idea of the true amount of health damaging chemicals and metals being emitted.

These are conservative estimates made when the machinery is new and working efficiently. Over the years this will wear out, malfunction, break down and emissions will undoubtedly increase.

These estimates have not included upsets or unauthorised releases, events that occur frequently at the new generation of incinerators in the UK.

It was estimated that up to: "...82 lbs of particles an hour would be thrown into the air, including heavy metals such as lead and cadmium as well as traces of poisonous dioxins," (during, a thermal stack release) at a proposed toxic waste incinerator at Hull, England. [10]

Releases of Heavy Metals

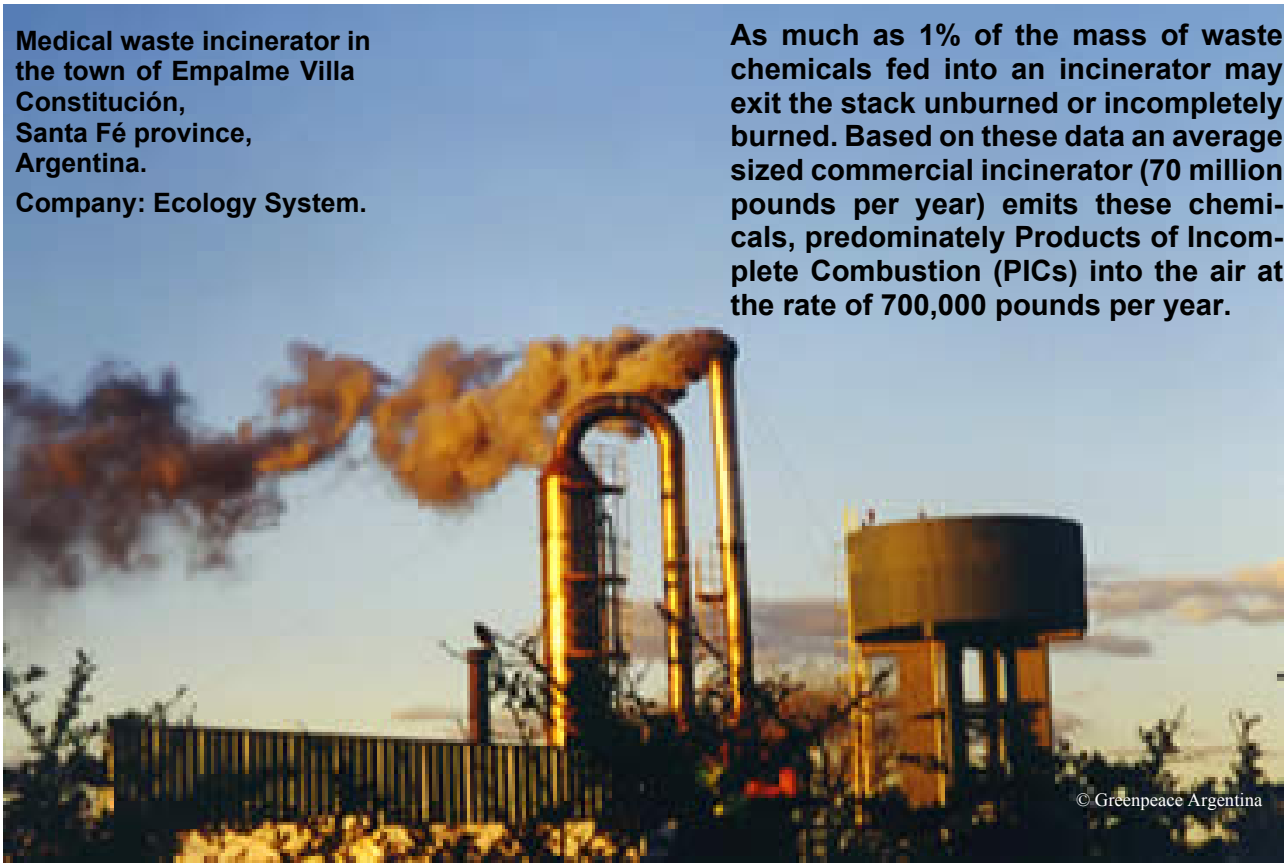
Metals cannot be destroyed by combustion. Moreover, incineration changes some metals into forms that are more toxic, more easily inhaled or ingested by living organisms, or more easily leached from incinerator ashes.

Metal exposure is associated with a range of adverse health effects concerning all body systems. In particular most heavy metals have been reported to be associated with kidney disease, respiratory disease, cardiovascular damage, blood effects and neruotoxicity.[11]

Nonetheless, metals are common constituents in the wastes burned in commercial incinerators and at least 19 have been identified in the stack gases, ashes, and other residues of hazardous waste incinerators.

The following is by no means a comprehensive list of pollutants emitted by an incinerator during its 30 plus years operational lifespan, but it will give the reader some insight into the complexity and dangers of metals and other incinerator by-products.

Metals: are examples of ultimate persistence. Being elements they can be neither degraded nor metabolised. The metals that have severely affected ecological or human health in the last 25 years include lead, mercury, cadmium, selenium and tin. Of these tin, selenium and cadmium are new



Medical waste incinerator in the town of Empalme Villa Constitución, Santa Fé province, Argentina.

Company: Ecology System.

As much as 1% of the mass of waste chemicals fed into an incinerator may exit the stack unburned or incompletely burned. Based on these data an average sized commercial incinerator (70 million pounds per year) emits these chemicals, predominately Products of Incomplete Combustion (PICs) into the air at the rate of 700,000 pounds per year.

problems in the sense that their presence in the environment had not previously been considered a hazard.

An ever-expanding body of scientists now believes the effects of metals have been grossly underestimated and it is highly likely that no-safe level of certain metals, like lead, exists.

Antimony: Acute inhalation exposure to antimony causes irritation of the nose and mouth, abnormalities in the circulatory system and disruption of the respiratory tract. Chronic exposure may result in cardiac lesions and lung changes

Arsenic: is a human carcinogen. Lung cancer is regarded as the critical effect following inhalation exposure. Arsenic contamination is a health concern worldwide with millions exposed to levels that exceed the World Health Organization (WHO) safety standard of 10 parts per billion (ppb). The element was classified as a Group 1 carcinogen by the International Agency for Research on Cancer and has been implicated in such diseases as vascular disorders and diabetes.

A team of researchers from the Massachusetts Institute of Technology (MIT) and Thailand's Chulabhorn Research Institute (CRI) have identified a highly predictive biomarker gene set for prenatal arsenic exposure.

According to the authors the results of the study clearly demonstrated "that prenatal exposure in humans results in measurable phenotypic responses in the newborn." (see box below)

Cadmium: Cadmium is a silvery white brittle metal. It has no role in living systems, but is used increasingly in numerous industries including vinyl stabilizers, pigments, electroplating, alloys, nickel-cadmium batteries and fungicides.

It is extremely toxic to plants and animals and can enter water or soil from the manufacture of pigments, vinyl stabilisers and from sewage sludge and fertilisers, especially if industrial waste is incorporated into the sludge, an ever growing practice in Britain. Cadmium causes cancer in rats and 5 ppm in drinking water shortened rats lives by 15%.

Inhalation of 40mg with retention of 5mg is fatal to humans and short term exposure to high levels of inhaled cadmium causes respiratory effects such as pneumontis. Oral exposure to high levels results in severe gastrointestinal upsets.

Cadmium is bound to metallothionein and sequestered in the kidney. It has been postulated that when the kidney is "saturated," at about 50 years of age, cadmium is released into the blood stream and may trigger hypertension. It has been linked through epidemiological studies to prostrate cancer in humans.

Cadmium enters the human environment in cigarette smoke. In Japan cadmium from a smelter contaminated irrigation water and consumption of rice grown in this water resulted in a disease named itai-itai, or "ouchouch" because of the extreme pain.

The long term effects of continual exposure to inhaled cadmium include emphysema, anaemia and cancer.

Chromium: Chromium VI is a known carcinogen causing lung cancer via inhalation and possibly digestive tract cancer via ingestion.

Cobalt: Its toxic effects include lung irritation, immunological deficiency, heart disease, cancer and death.

Copper: Intake of excessively large doses of copper causes ill effects such as mucosal irritation/corrosion, capillary damage, liver and kidney toxicity and disruption of the central nervous system. Copper acts as a catalyst for dioxin production in incinerators.

Hydrogen Chlorine: Is an eye irritant and at high concentrations causes pulmonary oedema and laryngeal spasms.

Hydrogen Fluoride: Human exposure to greater than 3ppm have shown redness of the skin, burning and irritation of the nose and throat and digestive disorders.

Lead: Lead is inherently toxic and has no useful function in the mammalian organism. It is a cumulative poison and acute poisoning causes intestinal cramps, renal failure, sterility, irreversible brain damage, (cerebral palsy and mental retardation and anaemia). In milder cases, tiredness, irritability, abdominal pain, anaemia and in children behavioural changes.

Long term exposure appears to be decreased neurological development in children and increased blood pressure and hypertension in adults. Low-level lead exposure can significantly impair cognitive and motor function

Study Links Gene Expression Changes in Babies to Arsenic Exposure

The research was led by Mathuros Ruchirawat, Ph.D., director of the CRI Laboratory of Environmental Toxicology in Bangkok, working with Leona Samson, Ph.D., director of the MIT Center for Environmental Health Sciences and the American Cancer Society professor in the departments of Biological Engineering and Biology. Rebecca Fry, Ph.D., a research scientist at the MIT Environmental Health Sciences Center, was lead author of the study. (http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2082467

http://www.niehs.nih.gov/news/newsletter/http://www.niehs.nih.gov/news/newsletter/changes.cfm

January 2008

in children particularly if the exposure occurs before 6 years of age. There is a general consensus among toxicologists that every increase in blood lead levels of 10 micrograms per deciliter is associated with a 1 to 3 drop in IQ.

Children below six are at greatest risk resulting in greater incidence of mouthing behaviour, greater gastrointestinal absorption of lead, incomplete development of the blood-brain barrier and greater sensitivity to neurological and haematological effects since the placenta is an ineffective barrier to the entry of lead into the foetus.

The impacts of lead on the developing brain have been studied for many years. Lead exposures during infancy and childhood cause attention deficits, hyperactivity, impulsive behaviour, IQ deficits, reduced school performance, aggression, and delinquent behaviour. (Rice 1998; Needleman et al. 1996)

A historical review of our understanding of the impacts of lead on the developing brain shows that exposure levels that were once thought to be safe are actually associated with brain damage when children are carefully studied. Even today, the Centers for Disease Control (CDC) is contemplating whether or not to further lower the screening threshold from 10 microgm/dl blood to 5 microgm/dl blood since impacts have now been documented at these lower levels. (Lanphear et al. 2000)

A majority opinion is that there is no threshold of effect in children, meaning that a level so low as to be without measurable effect has yet to be identified.

Mercury: Mercury as an element is indestructible. It gets into the atmosphere when toxic waste is burned. There it builds up in the bodies of animals, usually fish that eat contaminated plants and drink contaminated water.

Emissions are also a major problem as coal-burning power plants spew tons of the metal into the air each year. Many dentists still use mercury as an amalgam in fillings, often released into the atmosphere during cremations. It has been calculated that approximately 15% of the UK mercury contamination comes from crematoriums.

Mercury vapour causes tremors and erethism, a disease which involves a variety of psychological difficulties including short term memory loss and social withdrawal. The metal has been linked to neurological problems and is especially harmful to young children, infants and foetuses.

The EU Commission said up to 2,200 tons of mercury could be found in the dental fillings of people in EU and the EFTA countries -- Norway, Switzerland, Iceland and Liechtenstein. Sweden has now banned this use of mercury.

Once in the environment mercury can be methylated by micro-organisms, producing the biologically much more available methylmercury. More than 95% of the mercury in fish appears in the chemical form of methyl mercury, which is the most toxic form of the clement.

Mercury easily crosses the placenta and enters the foetal brain where it disrupts many different processes necessary for normal

Explosion at an Arkansaw incinerator

brain development. (Atchison and Hare 1994; Sager 1988; Sager and Matheson 1988). Foetal exposure to methylmecury has been shown to cause cerebral palsy.

Methylmercury also acts on the nervous system and in particular the sensory and coordination centers. The nervous system of a child continues to develop through until at least 6 years of age. The U.S.EPA has determined that children born to women with blood concentrations above 5.8 parts per billion are at some increased risk of adverse health effects. About 8% of women of childbearing age in the US had at least this amount in their blood in 1999-2000.

Mercury released into the atmosphere can travel long distances on global air currents and can come to earth in areas far away from the original source. It is usually released in an elemental form and later converted into methylmercury by bacteria.This is more toxic to humans than any other form of mercury, in part because it is more easily absorbed in the body.

The EPA has a reference dose of methylmercury of 0.1 micrograms per kilogram of body weight, which is approximately equal to a concentration of 5.8 ppb mercury in the blood. Children who are exposed to low concentrations of methylmercury are at increased risk of poor performance on neurobehavioral tests, such as those measuring attention, fine motor function, language skills, visual-spatial abilities (like drawing), and verbal memory.[11][12] The mercury poisoning of some 10,000 people who lived around Minamata Bay (Japan) during the period 1956 to 1974 showed that children can be poisoned by daily ingestion of fish polluted at only 0.11ppm.

Many of the uses of mercury have been eliminated, but the waste accumulated from past production cannot be easily cleaned up.

The use of mercury in hospital is being greatly reduced and many countries are looking to ban the metal.

Incineration is probably the second largest source of mercury emissions to the atmosphere after power stations whose annual emissions contains 48 tons and approximately 36% of total emissions.[13]

Large prenatal methylmercury exposures cause psychomotor retardation, seizures, developmental delays, and mental retardation (Harada 1978; Amin-Zaki et al. 1976). Much smaller prenatal exposures can impair IQ, language development, visual-spatial skills, gross motor skills, memory, and attention in offspring (Crump et al. 1998; Grandjean et al. 1997).

As with lead, a historical review of our understanding of the toxicity of mercury in the developing brain shows that more refined testing has exposure level thought to be safe and without adverse effects. The U.S. Environmental Protection Agency (U.S. EPA) has developed a reference dose for mercury of 0.1µg Hg/kg/day. Maternal exposures at or below this level are thought unlikely to increase the risk

Hu et al., 2003. **Characterization of multiple airborne particulate metals in the surroundings of a municipal waste incinerator in Taiwan.** *Atmospheric Environment* 37: 2845–2852

Abstract

Heavy metals are one of the concerned pollutants emitted by the municipal waste incineration system (MWIs).

The objective of this study was to evaluate the potential impact on local airborne metals from the emissions of an MWI.Aerosol samples were simultaneously collected at eight different sites around the municipal waste incinerator using PS-1 sampler. The concentrations of 16 elements (Mg, Al, Fe, Cu, Zn, Pb, Ti, V, Cr, Mn, Co, Ni, As, Cd, Ba and Hg) were quantified by inductively coupled plasma-mass spectrometry (ICP–MS) and atomic absorption spectrometer (AA). The profiles of the 16 metals in the surroundings of a municipal incinerator in central Taiwan were compared with those of the emission sources. The results showed that the profiles of multiple metals obtained at all sampling sites were similar to those emitted from the MWI stack. These findings suggested hat the local airborne metal pollutants might probably derive from the stack emission of the MWI. Using cadmium as an index metal, it was found that the metals like Mg, Ti, V, Cr, Mn, Co, Ni, As, and Hg are highly influenced by the stack emission from the municipal incinerator. Moreover, the ratio of other metals to Cd that were increased with the distance from the incinerator. This might be due to the additional sources contributed to airborne metals following the emission from the incinerator and a difference in particle size of each particle-bound metal.

[from body of text]

In this study, the concentrations of 16 airborne metals, namely, Mg, Al, Fe, Cu, Zn, Pb, Ti, V, Cr, Mn, Co, Ni, As, Cd, Ba and Hg were measured at eight sampling sites around a municipal incinerator in Taiwan. The results showed a severely high metal concentration observed in the ambient air of the incinerator. Moreover, by comparing the profiles between the sampling sites and stack emission, it was found that metal profiles obtained at sampling sites were similar to the profile of stack emission from incinerator. This finding strongly suggested that stack emission from the incinerator could be the major emission source of metals in the local area.

… Finally, this is the first time that the profiles of airborne multiple metals around a municipal incinerator were characterized .

of harm to the developing foetal brain. A committee of the National Academy of Sciences supports the validity of this reference dose (National Research Council 2000). Unfortunately, according to the EPA, 52,000-166,000 pregnant women in the United States consume fish contaminated with mercury at levels at or above this reference dose (U.S. EPA 1997). A population survey conducted by the CDC indicates that more than 10% of women of reproductive age in the US have blood mercury levels that may increase the risk of impaired brain development in their children. (CDC 2001)

In the United States a government analysis (February 2004) nearly doubled the estimate of the number of newborn children at risk for health problems because of unsafe mercury levels in their blood. Environmental Protection Agency scientists said that research had shown that 630,000 newborns had unsafe levels of mercury in their blood in the years 1999- 2000. In a January 26 presentation at EPA's National Forum on Contaminants in Fish, in San Diego, EPA biochemist Kathryn R. Mahaffey said researchers in the last few years had shown that mercury levels in a foetus's umbilical cord blood are 70% higher than those in the mother's blood.

"We have long known that the effects of methyl mercury on the foetal nervous system are more serious" than on adults, Mahaffey said.

"But we did not routinely measure [umbilical] cord blood. We had thought that the mother and the fetus had the same level."

There is some evidence that exposure to methylmercury can also affect the cardiovascular [14] immune [15][16] and reproductive systems.[17]

Jane Houlihan, a vice president of the Environmental Working Group, noted that the study "for the first time . . . calculated the number based on children's blood levels, not mothers'.

The EPA analysis is showing that even if the mother is below the danger zone, she can give birth to a baby that's over the limit."

Mahaffey extracted data from a survey conducted by the Centers for Disease Control and Prevention in 1999-2000 on mercury levels in pregnant women's blood. The new formula showed that one out of six pregnant women had mercury levels in their blood of at least 3.5 parts per billion, sufficient for levels in the foetus to reach or surpass the EPA's safety threshold of 5.8 parts per billion.

In 1999-2000, the last year for which government data is available, this meant that 630,000 children were at risk instead of the original estimate of 320.000.[18]

Nickel: Inhalation of all forms of nickel causes irritation, lesions and various immunological responses. It is allergenic' some forms are carcinogenic and it has been shown to cause birth defects in certain species of animal.

Thallium: Unlike other heavy metals that have featured prominently in toxicological folklore since antiquity, (such as lead and arsenic) thallium is a relative newcomer. Discovered in 1861 it has since acquired a well-deserved reputation for its toxic properties and is recognised as a potent accidental, occupational and environmental poison.

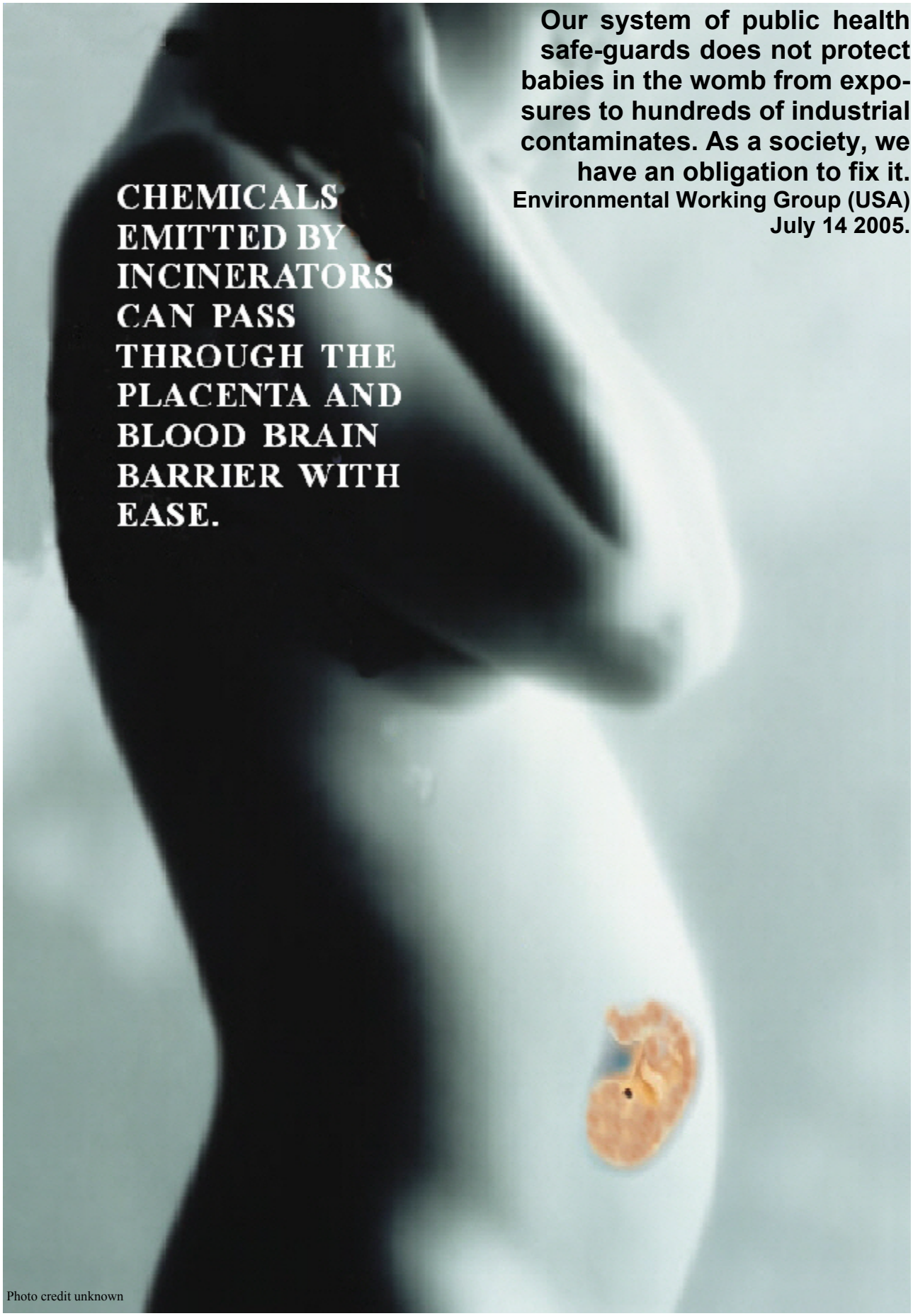
A natural occurrence in humans, the mean tissue concentration has been calculated as 1.2ug/kg from which it was deduced that thallium content in a 75-kg person would be

Kazantzis, G., 2000. **Thallium in the environment and health effects.** *Environmental Geochemistry and Health* 22: 275–280.

Abstract.

Thallium is present in the natural environment in low concentration, being found most frequently in the sulphide ores of a number of heavy metals. Atmospheric emission and deposition from industrial sources has resulted in raised levels in the vicinity of mineral smelters, coal burning power plants, brick works and cement plants. In contaminated areas, raised levels are found in vegetables, fruit and in farm animals. Thallium is used industrially in small quantities, with uses in electronics, in the production of certain glasses and crystals and in medical diagnostics. It has in the past been commonly used as a rodenticide, but its use has now been banned in many countries. Thallium salts are now considered to be amongst the most toxic compounds known. With regard to population exposure, an epidemiological study in an area with high thallium concentrations in soil and garden vegetables centred on a cement plant, has found evidence of a dose response relationship between thallium concentration in urine and a number of non-specific subjective symptoms. Much further research is required to investigate the possible adverse health effects of thallium following population exposure.

The source of the thallium contaminant has also been found to influence plant uptake, thus thallium contamination from cement factory dust has been found to be more available than thallium content of soil. Emissions from a cement plant in Lengerich, Germany, led to high thallium concentrations in soil and in sediments of rivers and brooks (Brockhaus et al., 1981). Sediment levels of 18mg Tl kg-1 dry weight have been found 1 km from the plant and 8.7 mg Tl kg-1 dry weight 4 km from the plant. Increased thallium levels were found in all garden vegetables in the area, with higher levels than in soil, up to 45.2mg kg-1 in savoy cabbage and green kale. The source of the thallium was found to be in residues of pyrite roasting which was added as a ferric oxide additive to powdered limestone to produce the required quality of cement.


CHEMICALS EMITTED BY INCINERATORS CAN PASS THROUGH THE PLACENTA AND BLOOD BRAIN BARRIER WITH EASE.
Our system of public health safe-guards does not protect babies in the womb from exposures to hundreds of industrial contaminates. As a society, we have an obligation to fix it.
Environmental Working Group (USA)
July 14 2005.
Photo credit unknown

in the order of 0.1 mg It has been used in the past as a treatment for ringworm of the scalp as well as in the treatment of syphilis, gonorrhoea, gout and night sweats in tuberculosis.

Thallium is colourless, odourless and tasteless, properties that have made it an ideal poison for rodents. Thallium compounds have been banned as pesticides in a number of countries, but it is still used as a rodentcide, despite recommendation against such use by the world Health Organisation in 1973.

Thallium is one of the most toxic elements and is capable of causing lethal effects due to its degenerative action on nerve fibres. Its periodic neighbours are mercury and lead.

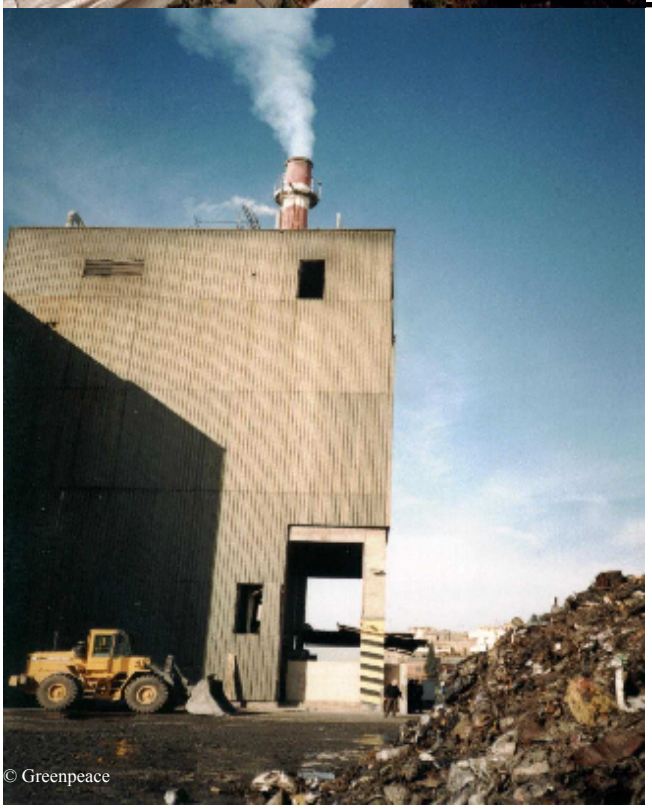
It is not a transition metal and it's melting and boiling point is relatively low. Because of this thallium is volatilised during coal burning and several types of smelting processes.

Since thallium salts are generally volatile, the incineration of any solid wastes containing T1 products can be an important source of this element in the atmosphere. The increasing use of thallium in emerging technologies has raised new concerns about health risks and environmental toxicology of this element. If volatilised thallium escapes anti-pollution devices in smoke stacks it can enter the environment in association with flue dust.

Adverse health effects of long term environmental exposure to trace amounts of thallium from various anthropogenic sources (coal burning, power plants, smellers, refineries, iron and steel industries and burning fuel) are under consideration. Very little is known about the threshold levels that may be harmful to health for different age groups.

Released environmental thallium affects different trophic levels, human thallium cases due to the consumption of thallium-contained vegetables and fruit grown in the vicinity of cement plants have been reported.[19]

In another study a greater number of malformations than expected was reported in a human population exposed long term to thallium contaminated vegetables



These pictures show the incinerator's close proximity to housing and agricultural land. Note in the top picture the vertical plume of smoke signalling a lack of wind. The open cloches on the rows of produce will undoubtedly be impacted by millions of ultra fine chemical particles from the stacks emissions.

In the bottom right hand corner of the lower picture you can see the metals and ash heaped outside in the open environment. Research has shown that incinerator ash contains high levels of heavy metals like lead, cadmium and the chemical by-product dioxin. Many pyromaniacs claim that leaving the ashes open to the elements reduces the toxicity of these metals enabling the ash to be recycled as an 'environmentally friendly' material in road construction and building bricks.

However, mixed ash from the Byker incinerator in Newcastle upon Tyne, England, showed dangerously elevated levels of metals and dioxin levels as high as 4224 ng/kg of soil after lying in the open environment for more than 6 years.

produced in the vicinity of a cement plant.[20]

The clinical picture that thallium poisoning presents depends on the time and level of exposure, the rate of absorption, and particularly on individual susceptibility. It is a cumulative poison with the target organs the gastrointestinal tract, the peripheral and central nervous system, and the skin.

Experimental evidence suggests that the reproductive system is highly susceptible to thallium. Decreased libido and impotence was noted in humans who suffered chronic exposure.

It has shown to cross animal and human placenta.[21]

"Lead, Cadmium, Nickel ...are known to be detrimental to human health at extreme low concentrations."[22]

"Developing infants and children are especially vulnerable to neurological damage from these metals."[23]

Synergestic effects

Mercury and lead are extremely neurotoxic and cytotoxic, but their combined synergistic effect is much worse. A dose of mercury sufficient to kill 1% of tested rats, when combined with a dose of lead sufficient to kill less than 1% of rats, resulted in killing 100 % of rats tested. Thus with combined exposure the safe dose is 1/100 as much as the dose individually. Studies in Australia have confirmed similar relationships hold for people.

This means most people in the U.S. (for example) are getting dangerous levels of these metals, enough to cause some neurologic effects. Similar is true for synergistic effect with other toxic metals like arsenic, and with other toxic chemicals like PCBs.[24]

It is hypothsised that PCBs together with dioxin can disturb vitamin K metabolism in utero and after birth resulting in a deficiency of the vitamin which in turn can lead to severe hemorrhaging in the brain.[25]

A recent report by the National Research Council found that 50% of all pregnancies in the U.S. are now resulting in prenatal or postnatal mortality, significant birth defects, developmental neurological problems, or otherwise chronically unhealthy babies.[26]

Exposure to toxic chemicals or environmental factors appear to be a factor in at least 28% of the 4 million children born each year with at least 1 in 6 having one of the neurological conditions previously listed according to the U.S. Census Bureau.

According to studies reviewed, over 20% of the children in the U.S.have had their health or learning significantly adversely affected by toxic metals such as mercury, lead, arsenic, and cadmium; and over 50% of children in some urban areas have been adversely affected. Significant behavioural effects were also documented. These toxic metals have been found to have synergistic negative effects on childhood development and cognitive ability. [27][28][29][30]

Both mercury vapour and organic mercury have been found to be highly toxic and to have independent and synergistic effects at very low levels.[31][32][33]

However, other studies have pointed out the effects and synergistic interactions of the other toxic metals and the fact that lead and cadmium levels tend to have positive correlations with each other.[34][35][36][37]

A study of rural school children without acute exposures and with IQS in the normal range found highly significant relations between lead and cadmium with intelligence

Heinrich, J., Slama, R., 2007. **Fine particles, a major threat to children.** *International Journal of Hygiene and Environmental Health.* Article in Press. doi:10.1016/j.ijheh.2007.07.012aGSF-National Research Centre for Environment and Health, Institute of Epidemiology, Ingolstädter Landstraße. Available online 4 September 2007.

Abstract

Background

There is a growing body of evidence for serious health consequences of exposure to ambient air pollution. The general question of who is susceptible is one of the most important gaps in current knowledge regarding particulate matter (PM)-related health effects. Who is susceptible depends on the specific health endpoint being evaluated and the level and length of exposure. Here, we restrict the review on the impact of fine particle exposure on children's health to the following outcomes: infant death, lung function, respiratory symptoms and reproductive outcomes.

Methods

This is a strategic review of children's susceptibility to ambient fine particles and characteristics of infant and children which underlie their increased susceptibility to PM.

Results

Ambient fine PM is associated with intra-uterine growth retardation, infant mortality; it is associated with impaired lung function and increased respiratory symptoms, particularly in asthmatics.

Concerning infant mortality, exposure to PM is strongly and consistently associated with post neonatal respiratory mortality and less consistently with sudden infant death syndrome. Although most of the studies reported adverse effects for this health outcome, the evidence is weaker than for infant death. Exposure to fine PM has been associated with impaired lung function and lung function growth.

scores and school achievement tests.[38]

Lead and cadmium explained 29% of the variance in IQ. These two metals have been found to have different mechanisms of CNS damage, with cadmium affecting verbal ability more and lead affecting performance measures more.

"For specific air pollutants, such as some metals incineration is a major contribution. Therefore, we need to understand much more about the chronic health effects the elements emitted from incinerators that may have an impact on health.
Professor Stephen T Holgate, Director, Respiratory Medical Research Council Clinical Professor, University of Southampton.

Polychlorinated biphenyls

Polychlorinated biphenyls (PCBs) include 209 congeners that vary based on the number and positions of chlorine atoms. They are industrial chemicals used throughout the world for decades in electrical equipment, paints, and as lubricants. Their manufacture was banned in the USA in 1977 because of concerns that they could cause cancer. Since then, additional health impacts have become apparent, including impairment of normal brain development.

In Taiwan 2000 people were poisoned by PCB polluted rice oil. Children born to poisoned mothers were studied long term. A quarter of them died before the age of four as a result of respiratory infections. At eight the others still had nail deformities and chronic otitis media (middle ear infection) together with bronchitis. Adults showed an increase in skin allergies, chloracne, headaches, sine and joint diseases and goiter.

People are exposed primarily through eating PCB-contaminated meat, processed food, dairy products, or fish.

Epidemiologic studies have linked prenatal PCB exposure with impaired neurodevelopment in infants and young children. In animal studies prenatal exposure caused decreased levels of the thyroid hormone thyroxine (T4).Given that thyroid hormones are essential for proper neuro-development, disruption of the thyroid system may be a pathway by which PCBs cause damage.

PCBs are persistent in the environment. Consequently, most of the PCBs that were ever produced are still present some where, whether in an electrical transformer, soil, landfill, river or lake sediments. PCBs are soluble in fat and tend to concentrate as they move up the food web. As a result PCBs continue to contaminate the food supply.

Despite the fact that more fat-soluble PCBs are transferred during breastfeeding than transplacentally, studies of neuro-behavourial end points in PCB exposed children have shown persistent deficits during adolescence are associated with transplacental exposure, suggesting that the foetal brain is the most sensitive target organ for neurotoxic effects.

The impacts of PCBs on brain development have been examined in several large human studies where exposures during foetal development were measured by sampling maternal or umbilical cord blood or breast milk.

Foetal exposures to PCBs at current environmental levels cause impaired reflexes, delays in developing motor skills, delayed cognitive development, hyperactivity, and IQ deficits as reported in Jacobsen and Jacobsen 1990; Jacobsen and Jacobsen 1996; Patandin et al. 1999; Lonky et al. 1996; Stewart et al. 2000. Impaired learning, altered behaviour, and hyperactivity have also been demonstrated in laboratory animals (Rice and Hayward 1997; Rice 1999).

Many scientists are studying the mechanisms by which PCBs interfere with brain development. (Zoeller et al. 2000; Brouwer et al. 1999; Osius et al. 1999; Tilson 1997; Koopman-Esseboom et al. 1994)

One mechanism that seems particularly important is interference with normal thyroid hormone function.

Because thyroid hormone is essential for normal brain development, the effects of PCBs and other chemicals that interfere with thyroid hormone function are of particular concern. A study by Haddow et al., in 1999 of women with hypothyroidism during pregnancy showed the extreme sensitivity of the developing brain to even mildly depressed or low-

Andersson, M., Ottesen, R., 2007. **Levels of dioxins and furans in urban surface soil in Trondheim, Norway.** *Environmental Pollution.* Article in Press.

Abstract
A study was conducted on polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/Fs) in surface soil in order to determine the concentration levels and possibly distinguishing between known and potential sources. The concentration levels are low (0.16-14ng ITEQ kg−1). The results show a clear pattern where the highest concentration levels were found in the oldest parts of the city. A number of sources were recognised in the soil samples through congener profiles, not all of them active, although similar congener profiles make it extremely difficult to distinguish between different sources. Estimations show that the municipal solid waste incinerator (MSWI) and domestic wood burning are the largest PCDD/F pollution sources within the area.

normal thyroid hormone levels. At 7-9 years of age, offspring of these women were more likely than the offspring of others with normal thyroid function to perform poorly on tests of attention and word discrimination.[39]

Particulates

Particles of chemicals and their by-products are emitted in the form of an aerosol of ultrafine mist every minute of an incinerators operation. These particulates are chemically highly reactive, even when originating from a relatively un-reactive bulk material.

Particles range in size and the smallest are the most dangerous as they easily enter the deepest part of the lungs. If the particles are soluble in water they pass directly into the bloodstream where they sit for years leaking their toxic contents into the blood stream.[40]

Most people will think of 'particles' as very tiny solid balls. They are in fact like little meteors with irregular shaped surfaces and full of holes (like the chocolate delight Malteser's). It is the surface inside these holes and tunnels that the toxin materials like lead, mercury, and polycyclic aromatic hydrocarbons (PAHs) cover. The massive surface area associated with a small mass of nano-metre sized particles can act as a catalytic surface for the secondary formation of organic compounds thus making particulates a uniquely efficient carrier of dangerous toxins, directly into the bloodstream.

Research has shown that the inhalation of ultrafine particles is associated with changes in the cogulability of the blood and this has been connected with epidemiological findings of increased cardiovascular disease in populations exposed to higher than average PM 10 exposure.[41]

"The study indicated that the air quality of PM2.5, PM10 and PAHs had significant contamination by air pollutants emitted from a medical waste incineration factory, representing a public health problem for nearby residences, despite the factory being equipped with a modern air pollution control system."

There is consistent evidence of an association between long-term exposure to outdoor air pollution with PMs and poor respiratory health in children. Studies have shown that the prevalence of bronchitis symptoms and reduced lung function in children is associated with exposure to particulate matter at annual average levels above 20 Î¼g/m3 as PM2.5 (particles with a diameter under 2.5 Î¼m) or 30 Î¼g/m3 as PM10 (particles with a diameter under 10 Î¼m). Evidence indicates that smog can not only aggravate existing childhood asthma, but may actually cause it, especially in association with ozone exposure.[42]

According to more than a dozen studies there appears to be no threshold, the level of fine particle pollution below which no deaths occur. Even air pollution levels within legal limits are killing people, especially the elderly and people with chronic heart and lung ailments.[43]

Since 1987 the US.EPA have been measuring fine particular air pollution calling it PM10 meaning "particular matter 10 micro metres or less in diameter."

It is difficult to imagine how small these particles are. To help the reader understand what we're talking about here, look at the dot over the letter i. That dot measures

"The study indicated that the air quality of PM2.5, PM10 and PAHs had significant contamination by air pollutants emitted from a medical waste incineration factory, representing a public health problem for nearby residences, despite the factory being equipped with a modern air pollution control system."

Mao et al., 2007. Airborne particle PM2.5/PM10 mass distribution and particle-bound PAH concentrations near a medical waste incinerator. *Atmospheric Environment* 41 (2007) 2467–2475

Abstract

This study attempts to determine the influence of air quality in a residential area near a medical waste incineration plant. Ambient air concentrations of polycyclic aromatic hydrocarbons (PAHs), PM10 and PM2.5 (PM—particulate matter) were determined by collecting air samples in areas both upwind and downwind of the plant. The differences in air pollutant levels between the study area and a reference area 11km away from the plant were evaluated.

Dichotomous samplers were used for sampling PM2.5and PM10 from ambient air. Two hundred and twen-ty samples were obtained from the study area, and 100 samples were taken from a reference area. Samples were weighed by an electronic microbalance and concentrations of PM2.5and PM10 were determined. A HPLC equipped with a fluorescence

The experimental results indicated that the average concentrations of PM2.5 and PM10 were 30.34 +/-17.95 and 36.81 +/-`20.45 mgm _ 3, respectively, in the study area, while the average ratio of PM2.5/ PM10 was 0.82 +/- 0.01. The concentrations of PM2.5 and PM10 of the study area located downwind of the incinerator were significantly higher than The concentration of PAHs in PM2.5 in the study area was 2.2 times higher than in the reference area (P o 0.05).

Furthermore, the benzo(a)pyrene concentrations in PM2.5and PM10 were 0.11 +/- 0.05 ngm -3 and 0.12 +/- 0.06 ngm 5.3 times higher than in the reference area (P < 0.05), respectively.

The study indicated that the air quality of PM2.5, PM10 and PAHs had significant contamination by air pollutants emitted from a medical waste incineration factory, representing a public health problem for nearby residences, despite the factory being equipped with a modern air pollution control system.

about 400 micrometers in diameter. You can fit 40,000 particles with a diameter of 2 um on the dot. When the particles have a diameter of 0.3 um, you can fit 1.7 million particles on the dot over the i.[44]

If particles are 10 micrometers in diameter, then 1600 particles can fit on the dot. If the particle diameter is 2.5 micrometers, then 25,600 particles can fit on the dot. About 60% of PM10 particles (by weight) have a diameter of 2.5 micron meters or less.

Particles larger than 10 micro get caught in your nose and throat, never entering the lungs. Particles smaller than 10 micrometres can get into the large upper branches just below your throat where they are caught and removed by coughing, spitting and swallowing. Particles smaller than five micrometres can get into your bronchial tubes at the top of the lungs. Particles smaller than 2.5 micrometres in diameter can get down into the deepest (alveolar) parts of the lungs where gas exchange occurs between the air and your bloodstream with oxygen moving in and carbon dioxide moving out. These ultra-fine particles are the most dangerous with the deepest sections of the lungs (alveolar) having no effective mechanism for removing them.[45]

One hypothesis is that the particles retained in the deep lung cause inflammation which in turn releases natural chemicals into the blood. [46]

Polycyclic aromatic hydrocarbons (PAH)

Frederica P. Perera of the Columbia Center for Children's Environmental Health studied 60 infants born in New York City to non-smoking mothers participating in an ongoing study beginning in 1998.

The researchers analysed exposure rates to airborne pollutants known as polycyclic aromatic hydrocarbons (PAH)--which are present in vehicle exhaust, power plant emissions and tobacco smoke--in three low-income areas.

The pregnant women filled out questionnaires and wore a portable air monitor for 48 hours during their third trimester. After the birth, the scientists analyzed samples of umbilical cord blood and tested for chromosomal abnormalities. They found that exposure to combustion pollutants was positively linked to chromosomal abnormalities in fetal tissue: newborns in the low-exposure group exhibited 4.7 abnormalities per thousand white blood cells. Babies born to mothers in the highest exposure group had 7.2 abnormalities per thousand cells.

This evidence that air pollutants can alter chromosomes in utero is troubling since other studies have validated this type of genetic alteration as a biomarker of cancer risk,"

Perera remarks. "While we can't estimate the precise increase in cancer risk, these findings underscore the need for policymakers at the federal, state

Hu *et al*., 2003. **Characterization of multiple airborne particulate metals in the surroundings of a municipal waste incinerator in Taiwan.** *Atmospheric Environment* 37: 2845–2852

Abstract

Heavy metals are one of the concerned pollutants emitted by the municipal waste incineration system (MWIs). The objective of this study was to evaluate the potential impact on local airborne metals from the emissions of an MWI. Aerosol samples were simultaneously collected at eight different sites around the municipal waste incinerator using PS-1 sampler. The concentrations of 16 elements (Mg, Al, Fe, Cu, Zn, Pb, Ti, V, Cr, Mn, Co, Ni, As, Cd, Ba and Hg) were quantified by inductively coupled plasma-mass spectrometry (ICP–MS) and atomic absorption spectrometer (AA). The profiles of the 16 metals in the surroundings of a municipal incinerator in central Taiwan were compared with those of the emission sources. The results showed that the profiles of multiple metals obtained at all sampling sites were similar to those emitted from the MWI stack. These findings suggested that the local airborne metal pollutants might probably derive from the stack emission of the MWI. Using cadmium as an index metal, it was found that the metals like Mg, Ti, V, Cr, Mn, Co, Ni, As, and Hg are highly influenced by the stack emission from the municipal incinerator. Moreover, the ratio of other metals to Cd that were increased with the distance from the incinerator. This might be due to the additional sources contributed to airborne metals following the emission from the incinerator and a difference in particle size of each particle-bound metal.

[from body of text]

In this study, the concentrations of 16 airborne metals, namely, Mg, Al, Fe, Cu, Zn, Pb, Ti, V, Cr, Mn, Co, Ni, As, Cd, Ba and Hg were measured at eight sampling sites around a municipal incinerator in Taiwan. The results showed a severely high metal concentration observed in the ambient air of the incinerator. Moreover, by comparing the profiles between the sampling sites and stack emission, it was found that metal profiles obtained at sampling sites were similar to the profile of stack emission from incinerator. This finding strongly suggested that stack emission from the incinerator could be the major emission source of metals in the local area.

… Finally, this is the first time that the profiles of airborne multiple metals around a municipal incinerator were characterized .

and local levels to take appropriate steps to protect children from these avoidable exposures."

Researches found a statistically significant link between bronchitis, the most commonly diagnosed illness, and elevated ambient PAHs, escalating 56% in children aged 2 to 4.5 years for each 30-day-average increase of 100 ng/m3. The increase was 29% for children under age 2 years. For each 30-day-average increase in PM2.5 of 25 µg/m3, bronchitis diagnoses rose 30% for children up to age 2 years. In children aged 2 to 4.5, it rose 23%. Some other pollutants that could play a role in respiratory illness, such as ozone, nitrogen oxides, sulfur dioxide, and metals, were not covered in the analysis.

However, the study was strengthened by the use of a doctor's diagnosis rather than parental reports or recalled incidents, and the likelihood of a sick child visiting a doctor was very high, given that health care was free and readily available.

The findings lead the authors to conclude that relatively short-term exposure to ubiquitous PAHs may pose a significant respiratory threat to children.[47]

2,3,7,8-Tetrachlorodibenzenepara-dioxin (TCDD)

Despite all the evidence to the contrary, many pyromaniacs were saying as recently as July 2005, "the worst thing caused by dioxin is chloracne." The reality is TCDD is the incineration by-product that has caused most concern among scientist and communities.

Much has been written about this unwanted carcinogen, but cancer is not the worst illness to be caused by dioxin. Immune system and reproductive effects appear to occur at body burdens approximately 100 limes lower than those associated with cancer.

The British government admitted in 1995 that incineration was responsible for between 65% to 82% of the UK's dioxin contamination.[48] One year later this figure had risen to 85%. The United Nations Environment Program concluded that incineration is responsible for 69% of the global dioxin contamination. (For more on this by-product see ***ToxCat*** Beginners Guide to: Dioxin.)

After closing the majority of incinerators through their failure to meet new legislation introduced in 1996. The British government estimated that the new generation of EfW incinerator plants would contribute approximately 6% to 18% of the UK's future dioxin contamination. However, this figure was calculated before they published a Waste Strategy in May 2000 calling for the building of approximately 112 EfW incinerator plants over the next 15 years.

For more than a decade they had claimed *"...the dioxin emitted by a modern incinerator poses no threat to the health of any section of society, including nursing children"* despite being unable to substantiate this claim with sound scientific evidence of a 'safe' threshold.

With the publication of (genuine) independent epidemiological studies and studies on dioxin, it became more obvious to activists this statement was an outrageous lie to protect the waste industry's interests. In response to the public outcry following the publication of their Waste Strategy in 2000, the government looked towards scientists whose views were consistent with their policy to produce a 'desk-top' evaluation of a selection of epidemiological studies. The conclusion of this research was that incinerators posed only a *"minor threat to health..."*.[49]

However, the records of incidents at the most modern energy from waste incinerators and the current monitoring system fails to any instill any confidence in threatened communities.

When we consider the slackness of the regulatory bodies at a number of incinerators we find: *Stoke on Trent; where a municipal waste incinerator was exceeding its authorised limits for dioxin by an 300 times. Fully aware of this the council and Her Majesty's

Singh, S., Prakash, V., 2007. **Toxic Environmental Releases from Medical Waste Incineration: A Review.** *Environ. Monit. Assess.* 132:67 – 81

Abstract

Toxic releases from medical waste incineration comprising organic emissions such as polychlorinated dibenzo-dioxin/furan (PCDD/Fs) and polycyclic aromatic hydrocarbons (PAHs), inorganic emissions and ashes containing toxic metals have been reviewed. Attempts made by various investigators to reduce/eliminate emissions have also been included. Legislations concerning emission standards for medical waste incinerators have been discussed.

[from text] ...

MWIs are the major source of PCDD/Fs, PAHs and toxic heavy metals to the environment. These compounds pass to air as vapors or stuck to the surfaces of small solid particles and travel long distances before they return to earth in rainfall or particle setting. The exposure of these compounds and metals to human population occur by inhalation or orally or through skin contacts. Not only the incineration temperature, but their emissions are also related to the type of waste, APCDs, operating parameters, contents of incineration and segregation of waste. Most of the incineration systems, which do not have efficient APCDs and do not implement the segregation processes, do not obey the emission standards for organic emissions.

Inspectorate of Pollution (HMIP) allowed it to continue operating in that state until January 1995, as once again industry's interest came before public health.[50] 1996-2000: 62 exceedences. A now famous note reads: "failure [due] to operator inadvertently pressing wrong button."

*Winchester: Samples were taken in 1989 and 1991 around a municipal waste incinerator in the city and the findings kept secret by HMIP for 4 years. When the results were made public in December 1994 after pressure from environmental organisations, they showed dioxin levels similar to those found at Bolsover, Derbyshire, where dioxin contaminated milk was deemed too toxic for human consumption.

*Residents in one area of Wolverhampton found their lives "a living hell" after the commencement of SITA's (formally Elm Energy's**) tyre burning 'state of the art' waste-to-energy incinerator in the mid 1990's.

"It's a nightmare, life is a misery. The steam and smoke come into your house and you get an acid taste in your mouth, children cough up black stuff and they don't use the playground anymore" said one resident,[51]

** Elm energy tried to set up operations in East Kilbride, Scotland, and Guilford, Surrey, but massive public protests (aided by information and support from CATs) saw off these applications.

The company finally got permission in the 'Black country' region of the midlands where councillors are still of the "where there's muck there's money" mentality and dirty industry rules.

In September 2000 residents picketed the plant which was due to restart operations after it has been

"Of more concern are the residual flows from waste incineration. These are voluminous flows like MSWI fly ash and slags, and several EU member states prefer to re-use these materials in road building and other building products. This might lead to a slow enrichment of the building sector with lead, and the long-term consequences in terms of emissions to water and soil cannot be evaluated within the confines of this study, but are a issue in the sustainable management of lead flow."

Tukker *et al.,* 2006. **Risks to health and environment of the use of lead in products in the EU. Resources, Conservation and Recycling** 49: 89–109

Abstract

The EU Commission's Services asked TNO and CML to perform a study into the risks of the present uses of lead over time, as an input to a discussion on the need of a further reduction of the use of this material. The study was set up as a substance flow analysis to analyse trends in uses and emissions of lead in Europe between 2000 and 2030. The study showed among others that the flow to (final) landfill of lead is declining from about 290 ktpa in 2000 to 220 ktpa in 2003 for the EU15. Alloys, or more specifically lead in electronic equipment, contribute to about 5% of these flows.

The study also compared current actual exposures in the environment, of workers, and the general public (adults and young children) to authoritative limit values set in the EU. From this, it appeared that under unfavourable conditions (high dust/soil intake via hand-mouth behaviour) young children may exceed their tolerable daily intake (TDI). The study hence concluded that for children, there is a need for further information and/or testing.

It has to be stressed, however, that this purely risk based approach leaves several questions about sustainable lead management unanswered. It gives a 'picture' at a given moment in time. Successes in lowering exposure were mainly reached by reducing direct emissions from various sources (e.g. emissions to air via leaded gasoline). However, it is also clear that the use and hence the economical stock of lead is growing, as is the stock in landfills and certain residues from Municipal Solid Waste Incinerators (MSWIs), which might be re-used. This led to a discussion driven by the fear for slow 'enrichment' of the economical and ecological system with lead, and hence a possible higher exposure in future.

[from body of text]

The [lead] flows in the waste stage need attention. It is again a matter of policy rather than science to decide if a relatively high accumulation of lead on landfills is desirable. The mass flows are 1–2 order of magnitudes higher than emissions to soil. One could state that modern controlled landfills have at present such low emissions that it is unlikely that they pose risks; others argue that one should strive for prevention of landfilling of hazardous materials since it can never be guaranteed that the present quality of landfills will be maintained on the very long term. Of more concern are the residual flows from waste incineration. These are voluminous flows like MSWI fly ash and slags, and several EU member states prefer to re-use these materials in road building and other building products. This might lead to a slow enrichment of the building sector with lead, and the long-term consequences in terms of emissions to water and soil cannot be evaluated within the confines of this study, but are a issue in the sustainable management of lead flow. Again, it is a matter of policy rather than science to decide if one desires relatively lead-free final waste residues (implying ensuring a close to 100% recycling or diminishing lead use in products for which this is not achievable), or that one accepts these including the related long-term uncertainties.

closed for 4 months following a large explosion.

Advocates of EfW are now saying “it was the last generation of dirty, old clapped-out incinerators' that were causing the problems.”

But the same people were adamant those plants were working perfectly and "posed no threat to human health” whenever questioned by concerned citizens.

If the technology has improved so much and the operators acting more responsibly and subject to ‘robust enforcement of regulations.’ Why are we witnessing:

*The miscalculation for a period of four years and the submission of 16 wrong entries out of 20 on dioxin monitoring data by the operators of the misnamed South East London Combined Heat and Power Plant (SELCHP) that still isn’t producing heat for anyone.

Neither the independent monitoring company AEA Technology, or the Environment Agency spotted this mistake, although the EA had warned the operators in the first instance they had got their calculations wrong. They never thought to follow up to monitor the plant closely to make sure things were being done correctly.

*The amount of unauthorised emission releases at the same SELCHP facility with the plant breaking the official limit of oxides of nitrogen emissions, (which has been linked to asthma) four times in 19 inspections. Had emissions of up to 50% higher during times when it was not inspected. 1996-2000:101 exceedences

*The Edmonton incinerator, classified as third in the league of major industrial polluters leading to complaints from doctors of patients living on its windward side because of the incidence of asthma.[49] Twenty exceedences.

*The Tyseley incinerator, spoken of as being thought “wonderful by the people of Birmingham" by Dame Clayton to a House of Lords Inquiry was in fact dentified as the second worst polluter on the 1999 Environment Agency table.[52].1996-2000 - 143 exceedances.

*The Nottingham Eastcroft incinerator has had a number of `dump-stack' openings and registered eleven unauthorised releases during 1996- 97. The plant is thought to be the cause of the increased incidence of asthma in the area by residents who have complained of significant emissions of dust. [52] Seventy Two exceedences.

*The high PCB and dioxin contamination around the upgraded, (but now thankfully closed) state of the art ReChem hazardous waste incinerator at Pontypool, south Wales.[53]

The levels of dioxin contamination had not significantly reduced over 10 years, pointing to the continued release of these toxins from the plant.

*The amount of incidents at the Cleanaway (now Veloila) new generation hazardous waste incinerator at Ellesmere Port, Cheshire. The manager of the plant boasted that the facility had the best record of any incinerator in the world over 10 years.

It is a sad indictment of the industry if this is truly the case and the list of incidents is such that no *reasonable* person could say it was a good example of a well-run incinerator.

There have been a number of explosions and as many as 6 releases of the flame retardant chemical bromine in one month. The sky above the town has been turned purple on at least three occasions by unathorised releases of the chemical iodine, showing the mixing of compounds and incineration technology is far from as safe as the government would have the public believe.[54]

Disturbingly, despite its history of incidents, fires, explosions and chemical releases, this plant was given authorisation to dispose of a compound used in chemical warfare and now used in teflon coating. The first consignment was returned during transportation ‘due to a unexplained loss of pressure in the tank en route.’

I attended a special meeting called by Ellesmere Port and Neston Borough Council to discuss the burning of this waste and heard a representative of the Environment Agency tell those attending “the Environment Agency know the health impact of every chemical coming out of the top of the incinerator stack.”

Yet another example of someone in authority seriously misleading decision makers and the general public about incinerator emissions.

Reality of Burning

*The new Dundee EfW incinerator was closed due to being gutted by a in-house fire.

*The upgraded Raikes Lane EMI incinerator in Bolton (Lancashire) has a history of malfunctions and operators errors. One of the most

Thomas, V., McCreight, C., 2007. **Relation of Chlorine, Copper and Sulphur to Dioxin Emission Factors.** *Journal of Hazardous Materials.* Article in Press.

Abstract

Dioxin emission factors for different combustion categories range over five orders of magnitude. Both chlorine and transition metals including copper have been suggested to promote the formation of dioxin in incinerators, and sulphur has been suggested to inhibit dioxin formation. We show that dioxin (PCDD and PCDF) emission factors from 17 different combustion categories are approximately linearly correlated with the average copper or chlorine content of the combusted material, and inverse linearly correlated with the average sulphur content of the material. Copper and chlorine are correlated and thus cannot be distinguished. The analysis suggests that the wide range of dioxin emission factors could be explained by the content of sulphur and transition metals or chlorine in combusted materials.

ridiculous incidents was when they accidentally got the bonnet and side door of a ford transit van down on to the grate!

For 182 days the plant burned 24,492 tonnes of waste representing an availability compared to a design rate of 16 tonnes/per hour of about 35%. For actual operations the availability had been 56°%, but with a throughput of only 10 to 6 tonnes/hr and electrical output of only 7.4 MW compared to a design of 12. Altogether not an inspiring performance.

There have also been a number of breaches of the authorisation since somebody parked the transit van on the grate, including a particulate emission level of 235 mg/m3 (vs 30 mg/m3 standard).
Hydrgen Choride hourly limit 39 mg/m3, reported maximum 282.5 mg/m3.
Carbon monoxide hourly limit 150 mg/m3, reported maximum 258.7 mg/m3.
The Environmental Statement (Section 5, p 37 Table 5.13) said that the number of vehicle movements from the site PER ANNUM (presumably this is an error and should be per month) would be 4,024 'from mid-1998' i.e. when operational.

The previous movements were 9,913 'per annum' (same error) and the planning officers report confirmed that there would be a reduction of 60% of vehicle movements.
In fact movements are recorded as:
Jan 12,344
Feb 10,968
Mar 12,244
(August 2000 had 12,800!)
So much for the traffic benefits that were claimed....

Other plants exceedences were:
Coventry - 67
Sheffield - 203
The operators of the old Sheffield plant admitted the plant was past its sell-by date, but it was allowed to continue operating as the most polluting incinerator in the UK.

Monitoring

Another worrying aspect of the incineration industry is a great many of its monitoring company's are actually subsidiaries of the companies owning the incinerators they are 'independently' monitoring.
ENTEC and AES are both a subsidiary of SITA.
EUS Labs: in 1995 they were the ReChem Environmental Research of Southampton.
FYI: Hampshire's refuse is handled by Hampshire Waste Services Ltd. a joint venture between Onyx a waste management company and AEP who manufacture incinerators. Both Onyx and AEP are owned by Vivendi, another French company, whose Environmental Director is John Gummer, MP. Former UK Secretary of State for the Environment and a trail blazer for the industry at the beginning of the rush to burn in the mid 1990s.

A Minor Health Threat

Given the epidemiological data and increased awareness on the toxicity of the chemicals and by-products emitted hourly by incinerators, the UK government had no choice but to admit incinerators pose at least *some* threat to health. Admitting to them being a "minor health threat" enables politicians and industry to continue their plans to build incinerators the length and breadth of the UK, in the most deprived areas. It also gives the public the impression that they have taken the latest scientific evidence into *serious* consideration. When all they have done is a desk-top summary to down-grade the conclusions of selected epidemiological studies showing elevated levels of ill-health.

Politicians in the UK and EU have now gone one step further by simply refusing to accept incinerators have *any* impact on health.

During a skill share meeting in Brussels on December 13 (2008) representatives of NGOs from 10 Members states delegates were told that during discussions in the European Parliament on proposed amendments to the Waste Framework Directive, the health impact of energy from waste incinerators was not even discussed/tabled. There were NO discussions – health impact was not considered 'because there would not be any!'

Delegates were stunned to hear this news and alarmed that despite:

*having data on the toxicity of only 14% of the chemicals in use today;

*the ever-increasing mountain of epidemiological evidence showing elevated levels of malformed babies, cancers and other serious diseases around incinerators;

*warnings from several ecological and medical related organisations including Doctors;

*the increased knowledge on endocrine disrupting chemicals and the sensitivity of the developing embryo and foetus to chemical impact; MEPs refuse to

Professor Roy Harrison (Birmingham University) told a House of Lords Select Committee looking into 'Waste Incineration' *"...[T]he other factor sir, which needs to be taken into account is the existing pollution in a locality and the incinerator will provide an increment on top of that. A small increment would be more tolerable in a already heavily polluted location..."*
It is interesting to note what the Professor seemingly defines as "a small increment." A proposed waste to energy incinerator at Belvedere, London was calculated to emit annually: 70 tonnes of dust: 350 tonnes of sulphur dioxide; 1.401 tonnes of nitrogen dioxide; 7 tonnes of lead; 7 tonnes of chromium; 0.6 tonnes of mercury and cadmium; 0.7 grams of dioxin. Multiply these figures by 30, the amount of years waste company's are given contracts for, and it amounts to far more than what any *reasonable* person would define as "a small increment."

believe there will be any detrimental impact whatsoever on health from the thousands of chemical mixtures emitted every hour of an incinerators operational lifespan! This is foolishness in the extrem.

It is obvious todays politicians are refusing to learn anything from past experiences and the warning signs so obvious to others. They listen only to the industry's PR machine's; industry paid 'advisers' like pyromaniac MEP Dr Caroline Jackson; and academics like Prof Harrison whose love of incineration is quite simply 'unatural.'

They have learnt nothing from reports like *'Late lessons from early warnings: the precautionary principle 1896-2000'* produced by the European Environment Agency in 2001 (ISBN 92-9167-323-4) revealing how vital signs of damage on 12 topics were ignored by 'experts' for decades.

Deprivation

That incinerators and dirty industry are situated in the most deprived areas is a major social issue in the United States. This 'environmental injustice' is also widely practiced here in the UK, as several published research papers confirm. [55][56][57][58] [59][60][61][62][63]

These all show that incinerators and polluting industrial processes are far more likely to be sited in already heavily polluted lower-working class towns, or as we have so contemptably been described "the less articulate sections.'[64]

Indeed the Mersey basin area with the towns of Runcorn, Halton and Ellesmere Port has always been targetted by dirty industry fully aware of the weakness on the councils concerned.

These are already hostage to the UK's largest hazardous waste incinerator; the Ineos Chlor site with three chemical waste incinerators and huge power station supplying electricity to the complex and the national grid; on top of this planning permission has been granted on the site for a 800,000 tpa EfW incinerator (despite Cheshire only producing 400,000 tpa of waste).

The area also has a nuclear plant (Capenhurst) that todate has sent 1.031 wagon loads of low-level radioactive waste to Sellafield for processing; and 96 hectares of petro-chemical industry.

As if this wasn't enough yet another application for a 600,000 tpa EfW incinerator has been the subject of a public inquiry and the community are nerviously awaiting the Inspectors decision.

It has long been established that there is a strong correlation between industry, poverty and infant mortality. Ellesmere Port has the highest rate of mortality for children up to 1 year of age in the UK. While Haltons elevated disease and deaths rates are far above the national average.

Immunity

Unfortunately, unlike the rest of the UK's work force 'Duty of Care' does not seemingly apply to the peoples' elected representatives. [UK] Politicians are not held accountable for the consequences of decisions they make while in office, no matter how much ill health, suffering and deaths they cause.

The BSE scandal revealed the amazing degree of immunity enjoyed by British politicians who knowingly, to safeguard industrial interests', endangered the health of the nation for something like a decade by keeping the fact that the prion was capable of jumping the species barrier secret. A deceit that resulted in 165 deaths (as of June 2007).

I have no doubt if we follow the incineration route planned we will be seeing a lot more chemically damaged babies being born, and high infant mortality rates within communities hostage to these facilities. 'Birds of passage' politicians will simply walk away leaving the family to care for the unfortunate individual and cope with the economic pressure and psychological trauma of raising a child with physical or mental defects, Society will have to pay fhe health care bills incurred throughout the childs life - something never calculated into the *true* cost of incineration.

Unfortunately experience has shown us that this will not bother the politicians and academics who think it's OK to dump a dangerous, polluting, unnecessary industry onto the poorest section of society and their children and their children.

As a result of their experiences CATs members know the general public give sections of society's hierarchy far too much respect. A university education, nice manners, polished shoes and a nice suit does not guarantee integrity and high moral principals. Indeed, time has shown that many politicians, academics and high ranking officials of government agency's are simply money-orientated charlatans who will lie through their back teeth to safeguard the financial interest of industry and fill their own pockets with 30 pieces of silver.

Newcomers to the anti-incineration fight will undoubtedly experience the reality of this soon enough and realise the only ones who are going to protect the children and future generations from polluting industry are themselves.

Wishing you and your loved ones good health

Ralph Ryder,

"It is hard to imagine a more stupid or more dangerous way of making decisions than by putting those decisions in the hands of people who pay no price for being wrong." Thomas Sowell

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When conducting studies on the impact of dioxin the French scientists of Afssa failed to included dioxin-like PCBs in their calculations. They also failed to consider the intake during the first two years of a child's life, the period intake is highest. Research by the community based independent organisation CNIID showed levels about four times higher than the Afssa study. (See ***ToxCat*** vol. 3 no. 6 Nov/Dec 2000, ISSN 1355-5707)
Britain's Environment Agency failed to included PCBs in their study on the impact of contaminated ash on the community of Byker, Newcastle, claiming they would have been destroyed in the incinerator ignoring the fact PCBs need 1300 degree to be destroyed, a temperature not reached at the Byker incinerator. They, together with the Food Standard Agency, failed to include children under 10 years of age, the most susceptible section to chemical impact and declared there was "no adverse health effects," despite dioxin levels of 4,900ng/kg being found in ash that had been in the open environment for approximately six years.
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Jiang *et al.,* 2007. **Investigation of basic properties of fly ash from urban waste incinerators in China.** *J. En*viron. Sci. 19: 458-464

Abstract
Basic properties of fly ash samples from different urban waste combustion facilities in China were analyzed using as X-ray fluorescence (XRF) scanning electron microscopy (SEM) X-ray diffraction (XRD). The leaching toxicity procedure and some factors influencing heavy metals distribution in fly ash were further investigated. Experimental results indicate that the fly ash structures are complex and its properties are variable. The results of XRF and SEM revealed that the major elements (>10000 mg/kg listed in decreasing order of abundance) in fly ash are O Ca Cl Si S K Na Al Fe and Zn. These elements account for 93% to 97% and the content of Cl ranges from 6.93% to 29.18 % while that of SiO2 does from 4.48% to 24.84%. The minor elements (1000 to 10000 mg/kg) include Cr Cu and Pb. Primary heavy metals in fly ash include Zn Pb Cr Cu etc. According to standard leaching test heavy metal leaching levels vary from 0 to 163.10 mg/L (Pb) and from 0.049 to 164.90 mg/L (Zn) mostly exceeding the Chinese Identification Standard for hazardous wastes. Morphology of fly ash is irregular with both amorphous structures and polycrystalline aggregates. Further research showed that heavy metals were volatilized at a high furnace temperature condensed when cooling down during the post-furnace system and captured at air pollution control systems. Generally heavy metals are mainly present in the forms of aerosol particulates or tiny particulates enriched on surfaces of fly ash particles. The properties of fly ash are greatly influenced by the treatment capacities of incinerators or the variation of waste retention time in chamber. Fly ash from combustors of larger capacities generally has higher contents of volatile component and higher leaching toxicity while those of smaller capacities often produce fly ash containing higher levels of nonvolatile components and has lower toxicity. The content of heavy metals and leaching toxicity maybe have no convincing correlation and high alkali content of CaO greatly contribute to leaching toxicity of heavy metal and acid neutralization capacity against acid rain.

Arickx *et al.,* 2007. **Influence of treatment techniques on Cu leaching and different organic fractions in MSWI bottom ash leachate.** *Waste Management.* Article in Press.

Abstract
The leaching of heavy metals, such as copper, from municipal solid waste incinerator (MSWI) bottom ash is of concern in many countries and may inhibit the beneficial reuse of this secondary material. Previous studies have focused on the role of dissolved organic carbon (DOC) on the leaching of copper. Recently, a study of the Energy Research Centre of The Netherlands (ECN) showed fulvic acid-type components to exist in the MSWI bottom ash leachates and to be likely responsible for the generally observed enhanced copper leaching. These findings were verified for a MSWI bottom ash (B 0.1-2 mm) fraction from an incinerator in Flanders. The filtered leachates were subjected to the IHSS fractionation procedure to identify and quantify the fractions of humic acid (HA), fulvic acid (FA) and hydrophilic organic carbon (Hi). The possible complexation of fulvic acid with other heavy metals (e.g., lead) was also investigated. The identified role of fulvic acids in the leaching of copper and other heavy metals can be used in the development of techniques to improve the environmental quality of MSWI bottom ash. Thermal treatment and extraction with a 0.2 M ammonium-citrate solution were optimized to reduce the leaching of copper and other heavy metals. The effect of these techniques on the different fractions of organic matter (HA, FA, Hi) was studied. However, due to the obvious drawbacks of the two techniques, research is focused on finding other (new) techniques to treat MSWI bottom ash. In view of this, particle size-based separation was performed to evaluate its effect on heavy metal leaching and on HA, FA and Hi in MSWI bottom ash leachates.
[from text]…
In Flanders, the northern part of Belgium, ca. 24% of the collected MSW (3.385 million tons) was incinerated in 2004. Incineration of this MSW and the industrial waste comparable to it, produced almost 220,000 tons of bottom ash in 2004. About 31% of this bottom ash was used as secondary material (VMM, 2005).
…
A MSWI bottom ash fraction (0.1-2 mm) was characterized for heavy metals and DOC in the leachate. Results show that leaching of Cu, Pb and Zn (and also Ba, Mo and Sb) exceed their limit values for reuse as secondary material in granular applications. Three techniques - heating, extraction with ammonium-citrate and particle size-based separation - were optimised to improve the environmental quality of this bottom ash fraction in view of recycling.

Autism Risk Linked To Distance From Power Plants, Other Mercury-releasing Sources

Science Daily (Apr. 25, 2008) — How do mercury emissions affect pregnant mothers, the unborn and toddlers? Do the level of emissions impact autism rates? Does it matter whether a mercury-emitting source is 10 miles away from families versus 20 miles? Is the risk of autism greater for children who live closer to the pollution source?

A newly published study of Texas school district data and industrial mercury-release data, conducted by researchers at The University of Texas Health Science Center at San Antonio, indeed shows a statistically significant link between pounds of industrial release of mercury and increased autism rates. It also shows—for the first time in scientific literature—a statistically significant association between autism risk and distance from the mercury source.

"This is not a definitive study, but just one more that furthers the association between environmental mercury and autism," said lead author Raymond F. Palmer, Ph.D., associate professor of family and community medicine at the UT Health Science Center San Antonio. The article is in the journal Health & Place.

Dr. Palmer, Stephen Blanchard, Ph.D., of Our Lady of the Lake University in San Antonio and Robert Wood of the UT Health Science Center found that community autism prevalence is reduced by 1 percent to 2 percent with each 10 miles of distance from the pollution source.

"This study was not designed to understand which individuals in the population are at risk due to mercury exposure," Dr. Palmer said. "However, it does suggest generally that there is greater autism risk closer to the polluting source."

The study should encourage further investigations designed to determine the multiple routes of mercury exposure. "The effects of persistent, low-dose exposure to mercury pollution, in addition to fish consumption, deserve attention," Dr. Palmer said. "Ultimately, we will want to know who in the general population is at greatest risk based on genetic susceptibilities such as subtle deficits in the ability to detoxify heavy metals."

The new study findings are consistent with a host of other studies that confirm higher amounts of mercury in plants, animals and humans the closer they are to the pollution source. The price on children may be the highest.

"We suspect low-dose exposures to various environmental toxicants, including mercury, that occur during critical windows of neural development among genetically susceptible children may increase the risk for developmental disorders such as autism," the authors wrote.

Mercury-release data examined were from 39 coal-fired power plants and 56 industrial facilities in Texas. Autism rates examined were from 1,040 Texas school districts.

For every 1,000 pounds of mercury released by all industrial sources in Texas into the environment in 1998, there was a corresponding 2.6 percent increase in autism rates in the Texas school districts in 2002.

·For every 1,000 pounds of mercury released by Texas power plants in 1998, there was a corresponding 3.7 percent increase in autism rates in Texas school districts in 2002.

Autism prevalence diminished 1 percent to 2 percent for every 10 miles from the source.

·Mercury exposure through fish consumption is well documented, but very little is known about exposure routes through air and ground water.

·There is evidence that children and other developing organisms are more susceptible to neurobiological effects of mercury.

Implications

"We need to be concerned about global mercury emissions since a substantial proportion of mercury releases are spread around the world by long-range air and ocean currents," Dr. Palmer said. "Steps for controlling and eliminating mercury pollution on a worldwide basis may be advantageous. This entails greener, non- mercury- polluting technologies."

The U.S. Environmental Protection Agency (EPA) estimated environmental mercury releases at 158 million tons annually nationwide in the late 1990s, the time period studied by the Texas team. Most exposures were said to come from coal-fired utility plants (33%of exposures), municipal/medical waste incinerators (29%) and commercial/industrial boilers (18%). Cement plants also release mercury.

With the enactment of clean air legislation and other measures, mercury deposition into the environment is decreasing slightly.

Limitations

Dr. Palmer and his colleagues pointed out the study did not reflect the true community prevalence rates of autism because children younger than school age are not counted in the Texas Education Agency data system.

The 1:500 autism rates in the study are lower than the 1:150 autism rates in recent reports of the U.S.

Centers for Disease Control and Prevention.

Furthermore, the authors note that distance was not calculated from individual homes to the pollution source but from central points in school districts that varied widely in area.

Data sources
Data for environmentally released mercury were from the United States Environmental Protection Agency Toxics Release Inventory. Data for releases by coal-fired power plants came from the same inventory and from the Texas Commission for Environmental Quality. Data for school district autism came from the Texas Education Agency.

Journal reference: Palmer, R.F., et al., Proximity to point sources of environmental mercury release as a predictor of autism prevalence. *Health & Place* (2008), doi:10.1016/j.healthplace.2008.02.001.
http://www.sciencedaily.com/releases/2008/04/080424120953.htm

Slob, W., L. M. Troost, et al. (1993). **The combustion of Municipal Solid Waste in the Netherlands. Emissions occurring during Combustion. Dispersal of dioxins and the associated risk**.
Elevated dioxin concentrations in Dutch cow's milk originating from areas near municipal solid waste incinerators triggered an extensive research programme in the Netherlands, including (1) emission measurements of all Dutch municipal solid waste (MSW) incinerators, (2) compliance of MSW incinerators with licences and directives, (3) dispersion and occurrence of dioxins in air, soil and cow's milk, and (4) dioxin exposure of the Dutch population. These investigations resulted in a large number of reports. This report provides a comprehensive overview of research results and associated policy implications. Seven out of the twelve incinerators did not comply with the licenses, whereas nine of them did not satisfy the Incineration Directive 1985. Technical management and process control were found to be unsatisfactory in several cases. Dioxin emissions varied between 2,2 to 360 ng TEQ/m3 flue gas. Four installations were closed down in 1990. Near several MSW incinerators dioxin concentrations in milk were found exceeding the milk standard of 6 pg/g fat. Milk and related products from these areas were banned from consumption. The milk standard was based on the result of an exposure analysis that at this value less than 1% of the Dutch population would exceed the TDI of 10 pg TEQ/kg body weight. At background dioxin concentrations in milk and related products (2 pg TEQ/g fat), the TDI is exceeded by a small fraction of children below 7 years of age. A mathematical chain model was developed that succeeded in quantitatively relating dioxin emissions with amounts in cow's milk. In addition, this model showed that emissions below the required level of 0.1 ng/m3 (to be satisfied at 30 November 1993) will make a negligible contribution to levels in cow's milk. Great efforts are presently made to reduce the emissions to this required level. Therefore, it may be expected that in the near future exceedance of the milk standard will not occur anymore in the Netherlands.
At some sites levels of 3-4 pg TEQ/g fat will endure because of dioxins that have accumulated in soil from high emissions in the past. Although the dioxin problem in the Netherlands has triggered drastic improvements in emissions, it has at the same time aroused opposition from the Dutch population against incineration of municipal waste. Therefore a delay in growth in incineration capacity may be expected. <http://rivm.openrepository.com/rivm/bitstream/10029/10470/1/730501052.pdf>

Lewtas, J., 2007. Air pollution combustion emissions: **Characterization of causative agents and mechanisms associated with cancer, reproductive, and cardiovascular effects.** *Mutation Research* 636: 95–133
Abstract
Combustion emissions account for over half of the fine particle (PM2.5) air pollution and most of the primary particulate organic matter. Human exposure to combustion emissions including the associated airborne fine particles and mutagenic and carcinogenic constituents (e.g., polycyclic aromatic compounds (PAC), nitro-PAC) have been studied in populations in Europe, America, Asia, and increasingly in third-world counties. Bioassay-directed fractionation studies of particulate organic air pollution have identified mutagenic and carcinogenic polycyclic aromatic hydrocarbons (PAH), nitrated PAH, nitro-lactones, and lower molecular weight compounds from cooking. A number of these components are significant sources of human exposure to mutagenic and carcinogenic chemicals that may also cause oxidative and DNA damage that can lead to reproductive and cardiovascular effects...
Biomarkers of exposure, dose and susceptibility have been measured in populations exposed to air pollution combustion emissions. Biomarkers have included metabolic genotype, DNA adducts, PAH metabolites, and urinary mutagenic activity. A number of studies have shown a significant correlation of exposure to PM2.5 with these biomarkers. In addition, stratification by genotype increased this correlation. New multivariate receptor models, recently used to determine the sources of ambient particles, are now being explored in the analysis of human exposure and biomarker data.
Human studies of short- and long-term exposures to combustion emissions and ambient fine particulate air pollution have been associated with measures of genetic damage. Long-term epidemiologic studies have reported an increased risk of all causes of mortality, cardiopulmonary mortality, and lung cancer mortality associated with increasing exposures to air pollution. Adverse reproductive effects (e.g., risk for low birth weight) have also recently been reported in Eastern Europe and North America. Although there is substantial evidence that PAH or substituted PAH may be causative agents in cancer and reproductive effects, an increasing number of studies investigating cardiopulmonary and cardiovascular effects are investigating these and other potential causative agents from air pollution combustion sources.

The following is adapted from an article published in ***ToxCat*** Vol 6 No 5 (October 2007). I have included it here simply to increase awareness on the reality that public health comes a long way behind industry interests in the corridors of the European Parliament. Despite the UK's DEFRA report on the enormous savings made by not going down the incineration path, the EU Commission, which can only be described as a quango of unelected individuals (undoubtedly with ties to industries and undoubtedly fingers in numerous industry related pies), are ignoring a European Court ruling that doesn't fit in with their plans. It is wise to remember that it wasn't that long ago one set of Commissioners were forced to resign after the truth about their gross corruption was revealed. I think it's time someone looked at the workings, accounts, and interests of the members of this latest group. *R Ryder*

NGO's around the world banded together to fight a proposal by the European Commission to make 622 amendments to current Waste Framework Directive. (See ***ToxCat*** vol 6 No 3) "These changes will not solve any of the problems we face" said Stefan Scheuer of the European Environment Bureau (EEB). These amendments are being pushed by a certain section of people ie. The incinerator lobby and their political allies led by MEP Caroline Jackson. The whole excise serves no purpose other than to make the incinerator industry a lot of money at the expense of the communities of Europe.

On 21st December 2005, the European Commission presented a Proposal for a Draft Directive on Waste and a "Thematic Strategy on the prevention and recycling of waste" Although similar in many ways to the current Waste Framework Directive, the new proposal includes some 622 changes, many of which threaten to completely undermine the stated long term goal for the EU of becoming a "recycling society".

Of principle concern is the proposal to raise the status of incineration from being defined as "disposal" to "recovery" elevating burning with energy recovery to the same level as materials recycling and re-use in a three tier waste hierarchy of reduction, recovery and disposal being promoted by the Draft Direc- tive. The current strategy is based on a 5 tier hierarchy.

To better understand the background and the significance of these proposals we should look back at the 2003 judgment by the European Court of Justice determining on the case C-458/00, the Commission of the European Communities versus the Grand Duchy of Luxemburg Advocate General Jacobs found against the Commission and concluded that the primary objective of incineration in a dedicated municipal waste incinerator is 'waste disposal.'

The Court added that even if, as a secondary effect of the process, energy is generated and used, this classification as a disposal operation is not changed and remains the same, if as a secondary effect of the process, energy is generated and used.

This decision infuriated the members of the Commission who are now ignoring the judgement and pushing for changes in the directive that suits them and the waste industry.

"The Jacobs judgement upset the Commission so they simply throw it out. If they don't like what the courts say they simply change the law. I'm sure not many people outside the corridors of power in Brussels are aware this unelected body have the power to do this.

It seems we are seeing exactly what George Orwell warned us about so long ago, 'the Corporate State'" said one British activists.

An indication of the significance of the Advocate Jacob's judgement European Commission Ignores Court Ruling on Waste Definition against the Commission can be seen in a report produced by the UK Department of the Environment Food and Rural Affairs (DEFRA).

This report assess the consequential damage costs avoided through the reduction in incineration and increased recycling brought about by the judgement. It showed that there would be a net environmental benefit in England of between £45 (€64) million to £182 (€260) million in 2008. The total benefits of the reduction in incineration were estimated as between £238 (€340) million and £814 (€1,163) million.

This is the true reality of what the European Union is all about, putting industry's interests first. The whole idea of a European Union was the brain child of something like forty of the worlds largest industries who were looking to increase their trading markets, their profit margins and protect their interests.

Over the years more and more industry-minded politicians have been elected and today we find ourselves with 15,000 industrial lobbyist working permanently in Brussels. These are daily bending the ear of politicians seemingly all too eager to grant them their wishes, even if its detrimental to the environment, threatens public

A report by the UK Department of the Environment Food and Rural Affairs (DEFRA) assessed the consequential damage costs avoided through the reduction in incineration and increased recycling brought about by the court judgement. It showed that there would be a net environmental benefit in England of between £45 (€64) million to £182 (€260) million in 2008. The total benefits of the reduction in incineration were estimated as between £238 (€340) million and £814 (€1,163) million.

health and is incredibly costly monetary - wise to the communities of Europe.

In 2003, still smarting from the ECJ decision the Commission then undermined it by revising Directive 94/62/EC on packaging and packaging waste. This revision allows the incineration of packaging waste rather than recovery and thus sacrificed the huge reductions in environmental damage.

Much of that waste is now sent to incinerators instead of being recycled showing clearly that incinerators are burning wastes that would otherwise have been recycled, despite the claims of Rapporteur Caroline Jackson in a letter to a concerned citizen.

Now, in the Thematic Strategy, the Commission that the "definitions in the present legislation, as interpreted by the European Court of Justice, do not promote best environmental practice for example as regards recovering energy from waste in municipal incinerators".

That may be correct but it is actually a irrelevant distraction. The decisions of the Court relate essentially to controls on waste shipments which are much more tightly controlled for disposal than for recovery and not to the promotion of energy recovery. There are other controls, including both the Pollution Prevention and Control and the Waste incineration Directives, (which is also being amended to suit industry interest first and foremost) which should, if properly applied, ensure that incinerators are designed, built and operated using Best Available Techniques (BAT) and high levels of energy efficiency.

Indeed the Commission continues "setting the level of the (efficiency) threshold by reference to performance of a BAT plant would facilitate the achievement of the targets for diversion from landfill".

The best way to ensure that works in practice must be to properly enforcing the existing legal framework laws particularly when the proposals also include simplification measures to avoid the requirements for any additional waste permit if an IPPC permit is held.

The Commission also claims that unless the current position law is changed some authorities may be tempted to choose land-filling as a cheaper alternative to incineration. But this ignores the relatively stringent requirements of the Landfill Directive which is providing most of the incentive for authorities to move to incineration as a means of compliance.

The Commission has recently published "additional information" supporting the proposals. This information largely relies on a study by the Confederation of European Waste to Energy Plants (CEWEP) which is not published on the internet and is not readily available.

That study shows that of the 97 unnamed incinerators studied, 67 would comply with the criteria proposed by the Commission for existing installations.

The Commission claims that the "criteria defined by the Court include subjective elements and a grey area remains" and that a number of installations "that have been built with the principal objective of producing energy may be classified as recovery".

Again this may be correct – although no supporting evidence is provided – but this misses the point and the clear language entirely of the opinion of the Advocate General, who said: "the decisive question is whether the waste is used for a genuine purpose: if it were not available for a given operation, would that operation none the less be carried out using some other material?

In the case of waste being incinerated in a plant developed for that purpose, the answer to that question is clearly "no" in the absence of available waste, there would be no incineration."

In genuine terms, then, it is difficult to see how there can be more than a tiny number of examples of incinerators that could be classed as recovery operations in these circumstances. It certainly does not provide a justification to opening the flood gates to include the majority of incinerators in the recovery category!

It is notable that in Case 458/00 which was presumably brought because the Commission felt that strong evidence was available, the Court confirmed "The Commission has not adduced [cited] any evidence in the context of its action… which shows that, contrary to what the competent Luxembourg authorities considered in the contested decisions, …the principal objective of the operation in question was the recovery of waste. It has not provided any evidence at all of this,… such as the fact that the waste in question was intended for a plant which, unless it was supplied with waste, would have had to operate using a primary energy source, or that the waste was to have been delivered to the processing plant in exchange for payment by the plant operator to the producer or holder of the waste".

The Commission's additional information further claims that the very recent changes to the Regulations on waste the shipment of waste which become (applicable as of on 12th July 2007) will allow Member States to oppose some waste exports or imports of some wastes on the basis of the proximity principle. It is not clear from this, however, that the changes it ONLY applies to mixed municipal waste collected from private households (waste entry 20 03 01). Commercial and industrial wastes could therefore move freely over large distances, if they were ultimately destined for incineration in a plant meeting the rather lax efficiency criteria for recovery.

That was one of the Advocate General's principal objections in the opinion of the Advocate General: "It is clearly desirable on environmental grounds to limit large scale shipments of household waste for incineration; if, however, incineration of such waste were classified as recovery simply on the basis that the resulting energy could be used, be encouraged."

The current proposals as currently drafted would certainly encourage such movements – particularly from countries where recycling or incineration is more expensive to those countries with lower disposal costs and cheaper incinerators. The principle beneficiaries of such relaxation is likely to be the packaging industry who would undoubtedly use the proposed changes to support arguments that energy recovery has the same position in the hierarchy as is equivalent to recycling when planning and in support of the proposals for and siting of new incinerators.

This equivalency has the potential to seriously undermine the status of recycling and reuse in all sectors.

In summary, therefore, the concerns raised by the Commission's as justifications for the changes are either ill founded, not supported by evidence, or are best addressed by the effective implementation of the existing legislative framework. Their reasons aren't good enough to make a case for adopting the proposed changes to the Waste Framework Directive. Serious concerns about the impacts of the changes on long distance waste movements remain in spite of recent the revisions to the Waste Shipment Regulations.

These changes do nothing to restrict the free movement and long distance transport of commercial and industrial wastes around Europe as highlighted by the ECJ;.

It should also be noted that changes to the Stockholm Convention on the levels of contamination (including incinerator ash contamination) by Persistent Organic Pollutants and necessitating remediation leave the door wide open for heavily contaminated materials/waste to be exported to developing countries under the 'recovery' tag/description.

"It is clearly desirable on environmental grounds to limit large scale shipments of household waste for incineration; if, however, incineration of such waste were classified as recovery simply on the basis that the resulting energy could be used, be encouraged."

Alternative Positions Promoted by the Waste Incineration Industry:

The International Waste Association (ISWA) has published a short paper. http://www.iswa.org

Commendably they say that "*ISWA finds I problematic that re-use is placed at the same level as recycling and recovery operation. ISWA believes that it is important to introduce drivers for increasing the level of prevention including re-use at a European level."*

And:

ISWA however, finds that it is important to have a European strategy for waste prevention with common quantitative targets, as requested in the 6th Environmental Action Programme.

The European Thematic Strategy for Prevention and Recycling as proposed by the Commission, does not include "real" strategyfor prevention at a European level as expected in the 6EAP.

ISWA would like to see a more ambitious political standpoint for reaching a higher level for prevention at an international level and believe that EU as one of the key players seen in an international environmental policy perspective should take the lead in this area.

On LCA:

ISWA agree that the hierarchy is not the ultimate driver for sustainable waste management, but believes that it is very important to keep this instrument until we have solved the above problems of the LC approach.

On the key aspect of the efficiency level for incineration to become recovery they say:

ISWA suggest it very important that these efficiency criteria, which also are to be set by the Commission in a comitology procedure, are set at a high environmental protection level, which is why ISWA would like see these decisions to be taken in an open democratic procedure.

Some activists think there are some attractions of this approach pointing out that if the efficiency level was high enough then combined with the Article 5 requirement to recover waste then many EU incinerators would have to close. However, more cautious activists point out that this is a extremely dangerous strategy as the efficiency targets could (and undoubtedly would) be lowered at the last minute allowing even the most polluting burners to be classified as a recovery operation.

Confederation of European Waste-to-Energy Plants (CEWEP): CEWEP want to reduce the efficiency factor to 0.5 for existing plants – with a

Continued foot of next page

Veolia (Cleanaway) Hazardous Waste Incinerator, Ellesmere Port.
Capacity 100,000 tonnes per annum. Notifiable releases to air

Year	1998	1999	2000	20001	2002	2003	2004	2005	2006
Antimony	<10kg	<10kg	<10kg	<10kg	<5kg	<5kg	<5kg		1.37kg
Arsenic	<1kg	<1kg	<1kg	<1kg	<1kg	<1kg	<1kg		2.57kg
Cadmium	<100g		<100g	<100g	<1kg	<1kg	<1kg	1kg	5.24kg
Carbon diox	127000t	121358t	12058t	13170t	130333t	124755t	120000t	122598t	108148t
Carbon mon	10.19t	<10t	<10t	11.69t	<100t	<100000kg	<100000kg	<100000kg	<100000kg
Chromium	<10kg	<10kg	<10kg	<10kg	<10kg	<10kg	<10kg	<10kg	<10kg
Copper	<10kg	<10kg	<10kg	<10kg	<10kg	<10kg	<10kg	<10kg	<10kg
Lead	<10kg	<10kg	<10kg	<10kg	<100kg	<100kg	<100kg	<100kg	<100kg
Managanese	<100kg	<100kg	<100kg	<100kg	<50kg	<50kg	<50kg	<50kg	<10kg
Mercury	1080g	1407g	1590g	1402g	<1kg	<1kg	<1kg	1.31kg	7.03kg
Methane	<100kg	<10t	<10t	<10t	<10000kg	<10000kg	<10000kg		<10000kg
Nickel	<10kg	<10kg	<10kg	<10kg	<10kg	<10kg	<10kg	<10kg	<10kg
Particulates	<10t	<10t	<10t	<10t	<10000kg	<10000kg	<10000kg	<10000kg	<10000kg
VOCs	<1t	<1t	<1t	<1t	<10000kg	<10000kg	<10000kg	<10000kg	<10000kg
Dioxin & fur	<0.1g	<0.1g	0.1g	<0.1g	<0.1g	<0kg	<0kg	0kg	<0kg
Sulphur ox	<10000kg	<10000kg	<10000kg	<10000kg	<100t	<100000kg	<100000kg	<100000kg	
<100000kg Vanadium	<100kg	<100kg	<100kg	<100kg	<100kg	<50kg	<50kg	<50kg	<50kg
<10kg Nitrogen ox	137t	109.3t	110.13t	162t	135780kg	132316kg	127000kg	132477kg	
146603kg PCBs as TEQ	<100g	<100g	<100g	<100g					
<0kg									
PM 10		<1t	<1t	<1t	<10000kg	<10000kg	<10000kg	<10000kg	<1000kg
Hydrogen ox				<1t		<10000kg		<10000kg	<10000kg
Hydrogen F						<5000kg			
Inorganic fl					<5000kg	<5000kg	<5000kg	<5000kg	<1000kg
Inorganic c					<10000kg	<10000kg	<10000kg	<10000kg	<10000kg
PM 2.5									< 1000kg

further reduction of 0.1 for 'small plants and plants which produce electricity only due to lack of heat demand'. A 0.5 EF would mean that plant with an electrical generation efficiency of less than 20% would be defined as 'recovery' and 0.4 a pitiful 15% efficiency after applying the 2.6 factor for electrical output. As the formula already allows a high premium for electrical generation there is no good reason to allow a further derogation for plants generating only electricity.

CEWEP claimed that 67 out of 97 – or 69% of existing plants would meet the threshold of 0.6 and that reducing this to 0.5 would ensure that 88% of incinerators would be classed as recovery operations. Even for 'heat only' plant then the overall efficiency would only need to be about 45 %.
These levels can be compared with modern Combined Cycle Gas Turbine (CCGT) plant which have thermal efficiencies of nearly 60% for electrical generation - or condensing boilers which are over 90% for heat.

The councillor who championed for the building of the Cleanaway incinerator in Ellesmere Port saying “it was a environmental improvement” and “the townsfolk should be proud to have this company in their town” later complained about the company in the local press after a series of fires and chemical releases.

NEWS

A blaze of anger

By NICHOLAS MASON

A LEADING county councillor has blasted bosses at Ellesmere Port's controversial Cleanaway incinerator, after a violent blaze ripped through part of the plant.

Worried drivers on the M53 noticed plumes of acrid smoke drifting into the sky, as they made their way home from work last Thursday evening.

Firemen from the town were quickly on the scene and had to use a foam jet and breathing apparatus to bring the blaze under control.

Flames

But Counicllor Derek Bateman (Central and Westminister) said the blaze should never have happend and demanded that Cleanway 'get their act together.'

He said: 'I saw the flames for myself when I was making my way home.'

'There was a huge amount of smoke shooting into the sky and at first I thought it was the bigger incinerator at Shell.

'We will definately be asking tough questions at our next liason meeting with Cleanaway.

'The assurances we have been getting in rcent months suggested that this sort of thing should never happen.

But this is the third major incedent since the plant was opend, which is three too many.

'It is high time Cleanaway got their act together because this is simply not good enough.'

Cleanaway spokesman Alan Tringham said. 'A fire broke out in a redundant vessel which was due to be removed the next day.

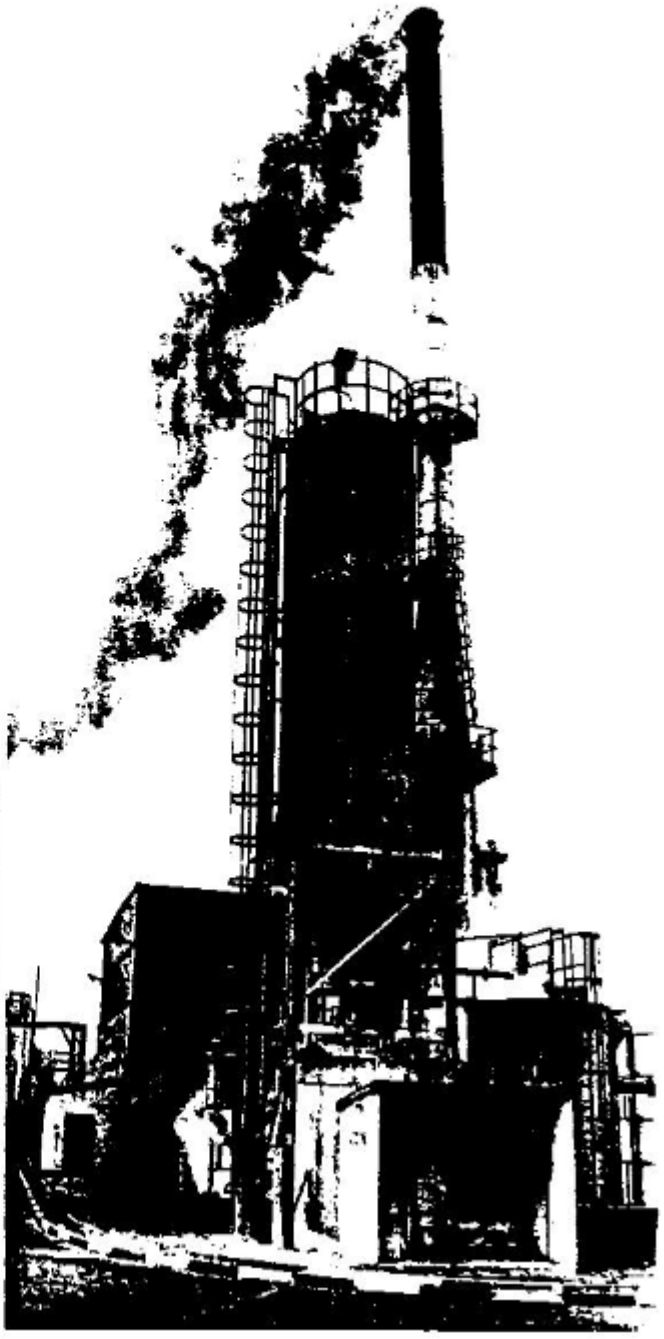
'The vessel had been disconnected from the plant and throughly cleaned prior to dismantling.

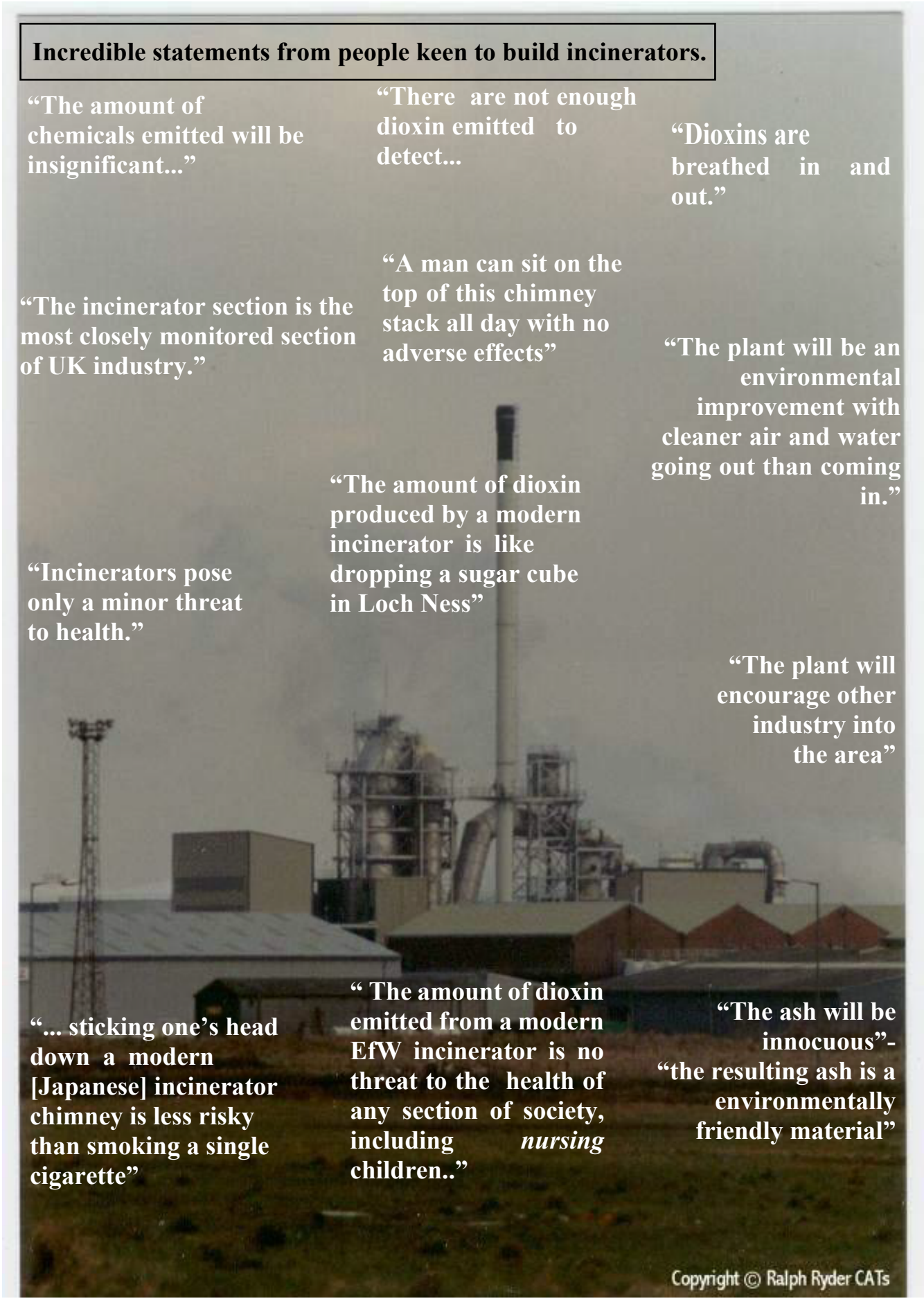
'This ensured no waste was involved in the fire.'

He added that Cleanaway would be carrying out a full investigation.

CLEANAWAY

‘It’s high time the company got their act together, Bateman




Incredible statements from people keen to build incinerators.
"The amount of chemicals emitted will be insignificant..."
"There are not enough dioxin emitted to detect...
"Dioxins are breathed in and out."
"A man can sit on the top of this chimney stack all day with no adverse effects"
"The incinerator section is the most closely monitored section of UK industry."
"The plant will be an environmental improvement with cleaner air and water going out than coming in."
"The amount of dioxin produced by a modern incinerator is like dropping a sugar cube in Loch Ness"
"Incinerators pose only a minor threat to health."
"The plant will encourage other industry into the area"
"... sticking one's head down a modern [Japanese] incinerator chimney is less risky than smoking a single cigarette"
" The amount of dioxin emitted from a modern EfW incinerator is no threat to the health of any section of society, including *nursing* children.."
"The ash will be innocuous"- "the resulting ash is a environmentally friendly material"
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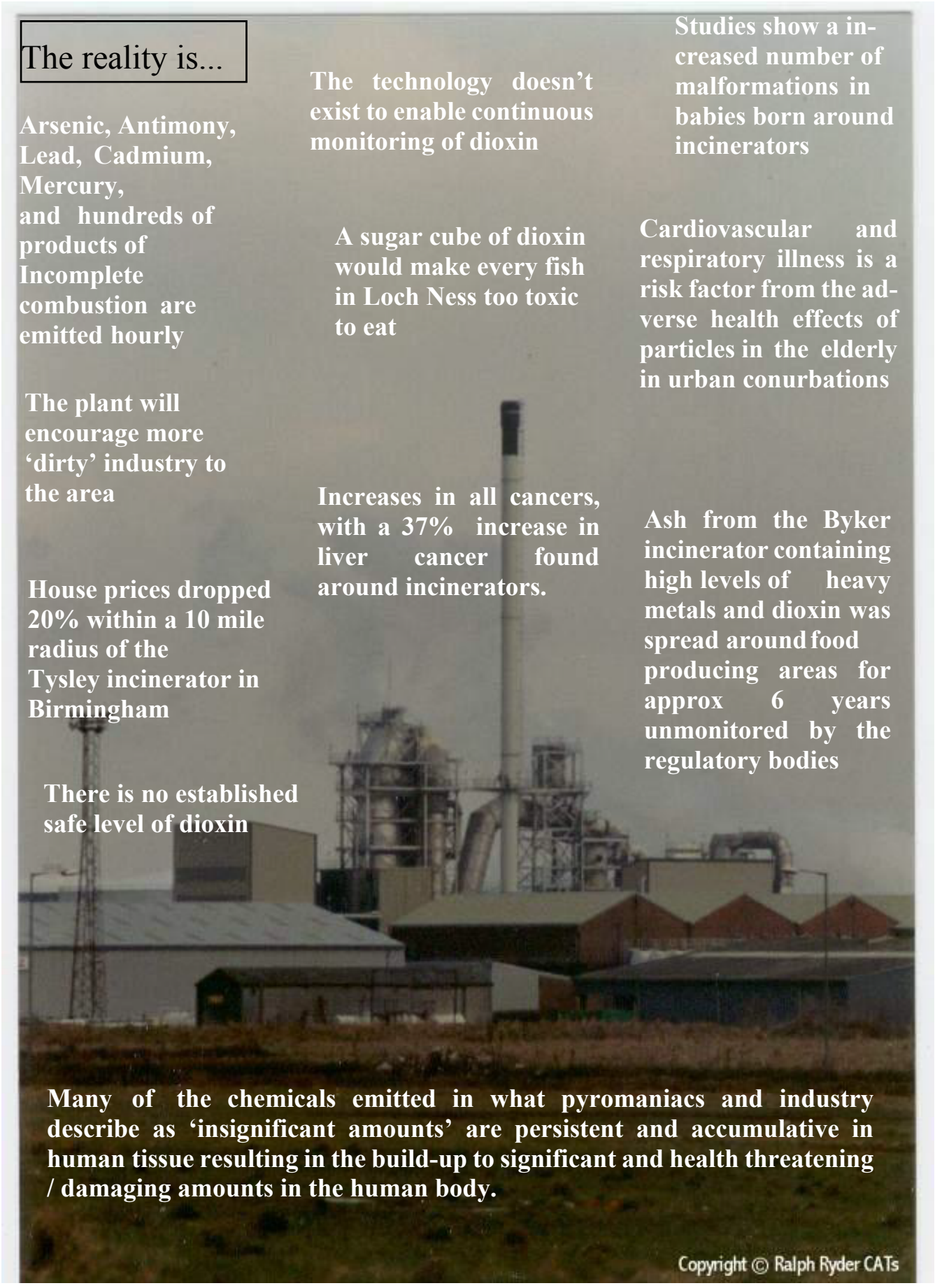
The reality is...
Arsenic, Antimony, Lead, Cadmium, Mercury, and hundreds of products of Incomplete combustion are emitted hourly
The technology doesn't exist to enable continuous monitoring of dioxin
Studies show a increased number of malformations in babies born around incinerators
A sugar cube of dioxin would make every fish in Loch Ness too toxic to eat
Cardiovascular and respiratory illness is a risk factor from the adverse health effects of particles in the elderly in urban conurbations
The plant will encourage more 'dirty' industry to the area
Increases in all cancers, with a 37% increase in liver cancer found around incinerators.
Ash from the Byker incinerator containing high levels of heavy metals and dioxin was spread around food producing areas for approx 6 years unmonitored by the regulatory bodies
House prices dropped 20% within a 10 mile radius of the Tysley incinerator in Birmingham
There is no established safe level of dioxin
Many of the chemicals emitted in what pyromaniacs and industry describe as 'insignificant amounts' are persistent and accumulative in human tissue resulting in the build-up to significant and health threatening / damaging amounts in the human body.
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For years citizens expressing concern that incinerators were damaging the health of people within their community were told at “there is no evidence of increased ill health around incinerators.”
Often they were told of the findings of the Committee on Carcinogenicity of Chemicals in Food, Consumer Products and the Environment (COC) a quango of ‘experts’ who advise the UK government whose conclusion after looking at selected data, was that incinerators pose no threat to health. This conclusion was repeatedly quoted during public inquiries into planning application for incinerators throughout the UK.
Today, despite all the evidence showing increased cancers and other disturbing disabilities, notably in new born children, their stance remains the same. However they now acknowledge that it is possible the ‘old’ incinerators *were* the cause of certain illnesses. (Something Prof Roy Harrison would not agree with.)
The fact that the increased throughput of the modern facilities could well mean that quantities of some pollutants emitted increases does not, according to these experts, mean there is any danger of increased ill-health from incinerators.

Hansard: 26 Nov 2008 : Column 2085W

Derek Twigg: To ask the Secretary of State for Health what research his Department has (a) evaluated and (b) commissioned on the health effects of incinerators on people in the locality. [238581]
Dawn Primarolo: Advice has been sought from the Committee on Carcinogenicity of Chemicals in Food, Consumer Products and the Environment (COC) on the possible health effects populations living in the vicinity of incinerators, based on research carried out by the Small Area Health Statistics Unit (SAHSU). This Unit is based at Imperial College and is funded by the Department.
In 2000, the COC reviewed a large study by SAHSU that examined 14 million people living within 7.5 km of 72 municipal solid waste incinerators, which operated up to 1987. The Committee concluded that, 'any potential risk of cancer due to residency, for periods in excess of 10 years, near to municipal solid waste incinerators was exceedingly low and probably not measurable by the most modern techniques'. The COC issued a statement on this, a copy has been placed in the Library and is available at:
www.iacoc.org.uk/statements/Municipalsolidwasteincineratorscoc00slmarch2000.htm
In July and November this year, the COC reviewed the results of more recent studies from the scientific literature, which have investigated rates of cancer in people living near municipal solid waste incinerators. A COC statement is being prepared and will be published shortly.
COC Minutes of July meeting <http://www.iacoc.org.uk/meetings/documents/COCMinutes170708.pdf>

514 ITEM 7: Update review of "Cancer incidence near municipal solid waste incinerators" (CC/08/15)
1. Following a request from the Chairman of COC, an update review of cancer incidence near municipal solid waste incinerators had been prepared.
The committee was reminded that the COC published a statement in March2000 on municipal solid waste and cancer. The statement concluded that “The Committee was reassured that any potential risk of cancer due to residency (for periods in excess of 10 years) near to municipal solid waste incinerators was exceedingly low and probably not measurable by the most modern epidemiological techniques. The Committee agreed that, at the present time, there was no need for any further epidemiological investigations of cancer incidence near municipal solid waste incinerators”. The committee was informed that there have been a number of publications since the last review of the data on cancer incidence in individuals living close to municipal solid waste incinerators (MSWI), as detailed in CC/08/15. Six further relevant epidemiological papers have been published since the 2000 COC statement, 3 of which investigated cancer incidence around a single incinerator in France. Positive associations were found for non-Hodgkin’s lymphoma, soft tissue sarcoma (STS) and childhood cancer and exposure to pollutants (principally, polychlorinated dibenzo –p-dioxins and polychlorinated dibenzo-p-furans (“dioxins”)) from MSWI in a number of the papers presented. No association or a decreased association was observed for invasive breast cancer and emissions of dioxins from a MSWI.
32. The committee assessed the quality of the epidemiology papers. It was noted that all studies were carried out on incinerators in operation prior to current controls on emissions. The committee was reassured that there were no new data that caused concern about the current situation and therefore there was no need for a change in the advice given in the previous 2000 statement. Looking at the papers individually, the committee agreed that the paper of Knox (2000) contained a complex analysis and lacked control data.
It was noted that the paper of Viel et al (2000) did not make any adjustments for socioeconomic confounding but that the data in the paper by Floret et al (2003) had been adjusted and showed a positive association between STS and dioxin emissions. Members noted the sex difference in the STS association in the Viel et al (2000) paper but commented that there was no information about the quality of the STS diagnosis. There are many variants of STS and there is probably a male excess. For both Zambon et al (2007)and Comba et al (2003), the committee noted that the studies made no adjustments for confounding and the strength of association was poor. Overall, the committee considered that there was possibly some evidence of a positive association at higher levels of exposure in the past but no evidence of an association between cancer incidence and MSWI at current levels of emissions.

33. It was agreed that the secretariat would bring an update statement to the 560 November meeting. The statement by COC at their meeting on 20th November has been published and says <http://www.www.iacoc.org.uk/papers/documents/UPDATECC0816statementonCancerIncidenceandMSWI.pdf>

9. In summary, we consider that, on balance, these studies indicate that there is possibly some evidence of a positive association between the incidence of certain cancers and residence near a MSWI at the higher levels of emissions in the past. However, they offer no support for an association at current levels of emissions. Overall, we are reassured that the new data do not raise any concerns about the current situation and therefore there is no need to change the advice given in the previous statement in 2000.

As pointed out by Alan Watson of Public Interest Consultants: 'It looks like they have finally and very begrudgingly accepted we were right to be concerned about the older incinerators at least... What it should go on to say is that the risk assessments currently being used indicate that those old incinerators were safe and therefore cannot be relied upon...'

Sustainable development rests on three pillars, namely the economy, the society and the environment. Humankind stands in the centre of the prosperous economy, the future oriented society, and the sound environment. Our children and grandchildren, the heart and the soul of sustainable development, will inherit the future society, operate the future economy and manage the environment for the future of mankind. Therefore, it is an intrinsic component of sustainable development to protect the health of children and ensure that children live in environments that allow them to reach their full potential as individuals and contributing members of these societies. World Health Organisation Budapest 2004