GREENPEACE | DIGITAL

Criminal Damage:

A review of the performance of municipal waste incinerators in the UK

Greenpeace, Canonbury Villas, London, N1 2PN Tel: 020 7865 8100 Fax: 020 7865 8200 Join: FREEPHONE 0800 269 065

Greenpeace incineration report-2001

Introduction

This report examines the performance of all the municipal waste incinerators currently operating in England. The information is taken directly from the public registers for IPC (Integrated Pollution Control) held at Environment Agency offices and the relevant local authority. Although this information is available to the public, it is dispersed across the country (and involves large amounts of paper which need reading, copying and interpreting, all of which is cumbersome and time-consuming) so it has, until now, been very difficult to compare the performance of incinerators against each other. The data in this report particularly focuses on breaches of legal limits on aerial pollution and total discharges of pollution per year. The report summarises this data and presents it in a form in which comparisons can be made.

Those seeking further details are encouraged to visit the relevant register, and details of where the records for each incinerator is held are included. A telephone call to the relevant office is advisable to make sure the material is available.[1]

The incineration process

Incineration is a convenient, but highly polluting, way of making waste disappear from view. Incinerators do not destroy waste (matter cannot be destroyed), but convert it to other forms – gases, ash and dust particles. Gases and dust, with as many of the pollutants and particulates removed as can be, are dispersed as far as possible via a chimney stack. The emissions and breaches documented in this report illustrate some of the technical and practical limitations to removing those pollutants.

Ash and filter residues are released to land - either in hazardous ("special") landfill sites, ordinary licensed landfill sites or increasingly in construction aggregates for roads and building blocks. Occasionally these contaminated ashes are disposed of in highly irregular ways. Incinerators will also discharge wastewaters, either treated or untreated, to the sewage system.

In this respect incineration reflects and embodies the old fashioned idea that pollution can be dealt with by dispersion and dilution into the Earth's ecosystem. Quite literally, incinerators are designed to spread waste as thinly as possible over as wide an area as possible. Some of the pollutants from incinerators travel many hundreds of miles (and are the subject of

[1] It should be noted that the register is a smaller version of the Environment Agency's working files. Incinerator operators can request confidentiality, and for various other reasons the information available is sometimes incomplete.

international conventions attempting to control trans-boundary air pollution). However, local populations are subjected to most of the fallout from incinerators (both from stacks and fugitive emissions from the plant itself, transported ash etc.) and most health impacts studies have been conducted within a 5km radius of the chimney.

How incinerators work

There are a number of minor variations in the process, but municipal waste incinerators in the UK operate in an essentially uniform manner. Mixed refuse collected by local authorities is tipped into one or more large bunkers. From here it is transferred to a furnace, where it is burnt at temperatures that should be between 850 and 1300ºC. Gases from the combustion process are passed through one or more air pollution control systems before being vented to the atmosphere. Ash is collected and stored for final disposal. A combustion temperature of about 1000ºC is used in order to attempt to minimise the quantity of pollutants formed by the chemical and thermal reactions taking place in the furnace. However, it should be noted this in itself is a compromise. For example, more nitrogen dioxide is formed at high temperatures and more carbon dioxide is formed at lower temperatures.

All UK incinerators now recapture some of the heat they produce in order to drive turbines. This allows them to export some electricity to the national grid. The Sheffield and Nottingham plants also heat water, which is supplied through a pipe network to district heating schemes. These are both extremely inefficient ways of generating heat or power, particularly when the need to replace the resources lost in the burning process is considered.

Regulation of incinerators

The Environment Agency (EA) is the UK regulatory body responsible for authorising incinerators, for monitoring levels of pollution, and for bringing prosecutions against those who break the terms of their authorisation. Their remit is to ensure environmental protection and they are charged with ensuring that there is no threat to human health from processes under their control. But a philosophy of ‘dilute and disperse’ is central to the way they execute their obligations.

The regulatory principle of ‘dilute and disperse’ leads to an official acceptance of ‘tolerable’ levels of public exposure to even the most dangerous substances. The regulation of incinerators is based on this principle. Allowable limits for emissions of about a dozen pollutants from incinerators are specified by the EA. They have confirmed that these limits are based on what is technically achievable, *not* what is safe for

human health.[2] It is widely accepted that the health effects of incinerators are poorly understood,[3] and the limited amount of studies on workers at incinerator plants and populations living near to incinerators have identified a wide range of associated health impacts.[4]

Efficiency of regulatory system

Despite the fact that legal limits to emissions are based on what is technically and economically feasible, not on what is safe for human health or the environment, this report shows that no incinerator currently operating in England is able to meet the legal requirements of its license. All incinerators currently operating in England regularly breach their emission limits.

Furthermore, actual emission limits may be systematically under-reported. The system relies on self-reporting of breaches. Virtually all breaches reported are of continuously monitored releases. Less than half a dozen substances are continuously monitored (generally only sulphur oxides, nitrogen oxides, carbon monoxide, hydrogen chloride and particulate matter). Poisonous metals like mercury, cadmium and lead are measured by point samples, generally once every three months. Dioxins are measured by point samples normally once every six months. The Environment Agency also send in sampling contractors up to four times a year to take measurements. These checks take place within a specified "window" of time, normally two or so weeks, agreed between the EA and the operator.

When the public registers are examined it quickly becomes apparent that, despite the enormous numbers of breaches reported for substances which are continuously monitored, there are virtually no reports of other substances exceeding legal limits. It is difficult to accept that this is truly the case. High levels of pollutants in the gases often indicate a malfunction in the system or poor combustion of waste. For example, high levels of carbon monoxide would indicate poor combustion conditions under which increased production of dioxins, particles of incomplete combustion and other pollutants might be expected. Similarly, high levels of hydrogen chloride may be the result of large amounts of chlorine in the system, which again would provide improved conditions for dioxin formation. These peaks in production of dioxins and other hazardous substances are unlikely to be recorded by sampling undertaken only for a few hours, twice a year.

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[2] See Department of Environment Transport and Regional Affairs Committee, March 2001, Report HC 39-I, Delivering Sustainable Waste Management, Vol. 1 paragraph 93.

[3] *"There are...some truths which can be drawn from the debate over the health impacts of incineration. Firstly, that the health effects which result from an incinerator's emissions are not yet fully known…"* Department of Environment Transport and Regional Affairs Committee, March 2001, Report HC 39-I, Delivering Sustainable Waste Management, Vol. 1 paragraphs 97/98.

[4] See "Incineration and Human Health", Greenpeace, March 2001, for a comprehensive review of the published scientific literature.

Results

Fig.1 Self-reported breaches per incinerator 1999

Incinerator	dioxin	*HCl*	*SO2*	*NOx*	*CO*	*Part*	*Total*
Dudley	0	54	7	0	3	0	64
Wolverhampton	0	30	18	0	5	0	53
Cleveland	0	0	0	0	1	1	2
Coventry	0	8	1	12	33	1	55
Tyseley, Birmingham	0	4	0	0	0	0	4
Nottingham	0	6	8	8	1	1	24
Sheffield	0	17	8	6	64	0	95
Stoke	0	19	8	2	1	0	30
Edmonton, London	0	7	1	0	3	0	11
Lewisham, London	0	4	2	1	0	0	7
Total	0	149	53	29	111	3	345

Fig. 2 Self-reported breaches per incinerator 2000

Incinerator	dioxin	*HCl*	*SO2*	*NOx*	*CO*	*Part*	*Total*
Dudley	0	13	1	2	0	0	16
Wolverhampton	0	2	3	1	7	2	15
Cleveland	0	1	0	0	4	4	9
Coventry	0	11	7	0	13	4	35
Tyseley, Birmingham	0	5	0	4	2	0	11
Nottingham	0	7	6	16	0	0	29
Sheffield	0	16	4	5	35	1	61
Stoke	0	9	3	1	3	0	16
Edmonton, London	0	0	0	0	6	2 fly ash	8
Lewisham, London	0	0	0	1	0	0	1
Total	0	64	24	30	70	13	201

Fig. 3 Self-reported breaches per incinerator 1999 & 2000

Incinerator	dioxin	*HCl*	*SO2*	*NOx*	*CO*	*Part*	*Total*
Dudley	0	67	8	2	3	0	80
Wolverhampton	0	32	21	1	12	2	68
Cleveland	0	1	0	0	5	5	11
Coventry	0	19	8	12	46	5	90
Tyseley, Birmingham	0	9	0	4	2	0	15
Nottingham	0	13	14	24	1	1	53
Sheffield	0	33	12	11	99	1	156
Stoke	0	28	11	3	4	0	46
Edmonton, London	0	7	1	0	9	2	19
Lewisham, London	0	4	2	2	0	0	8
Total	0	213	77	59	181	16	546

Fig. 4 League Table

Position	Incinerator	Total self-reported breaches 1999 & 2000
1	Sheffield	156
2	Coventry	90
3	Dudley	80
4	Wolverhampton	68
5	Nottingham	53
6	Stoke	40
7	Edmonton	19
8	Tyseley	15
9	Cleveland	11
10	Lewisham	8

Conclusion

The figures in this report, provided as they are by the operators themselves, clearly demonstrate two things. Firstly, even though the parameters within which incinerators operate are based on what is technologically achievable and not on what is safe for human health, no incinerator actually operates within these limits. All of the incinerators in this survey exceed their legal pollution limits and some of them have performance records that are little short of appalling. The Sheffield incinerator, for instance, has breached its legal limits on aerial emissions 178 times in the past three years.

Secondly, the regulatory regime is clearly inadequate. The range of pollutants monitored is too narrow and the frequency of monitoring completely incapable of establishing a reasonable picture of what is entering the environment. The entire regulatory system is based on self-assessment and the penalties are virtually invisible. Of the 546 breaches of pollution limits in 1999 and 2000 there was only one prosecution for aerial pollution (Sheffield in 1999 – the City Council was fined £18,000).

The conclusion to be drawn from this report is that incineration is an unreliable and dangerous technology incapable of being regulated with proper regard to human health and the environment. Current Government proposals to permit a massive expansion in incinerator numbers in the UK are clearly misguided and should be abandoned in favour of strategies for waste reduction, reuse and recycling.

The current regulatory regime is extremely weak and needs to be completely overhauled for the period that incinerators continue to operate in the UK. Currently operating incinerators are clearly incapable of functioning safely and should be closed as soon as technically possible.

Annex 1

Health Effects of Common Pollutants from Incinerators

Heavy Metals

Since wastes may contain a wide range of heavy metals these can be emitted in the flue gases, waste waters and residues from incineration. Lead has been associated with learning impairment, especially in children. High levels of cadmium have been associated with lung cancer and a range of non-cancer effects. Mercury exposure has been found to affect behaviour and lead to renal damage even at low levels.

Acid gases

In addition to emissions of heavy metals, dioxins and furans the incineration of waste also generates emissions of acid gases and particulate matter. Acid gases include nitrogen oxides, sulphur oxides, and

hydrogen chloride. Exposure to high levels of acid gases can cause respiratory problems, while long range transport can lead to ecosystem damage by acidification. Much lower levels of toxic hydrogen fluoride can also be emitted.

At relatively high concentrations, nitrogen dioxide causes inflammation of the airways. There is evidence to show that long-term exposure to nitrogen dioxide may affect lung function and that nitrogen dioxide may enhance the response of sensitised individuals to allergens. Studies have reported associations between respiratory hospital admissions and nitrogen dioxide levels but it is unclear whether this effect is due to nitrogen dioxide itself or to particles which often increase at the same time as nitrogen dioxide.

In addition to the acidification of ecosystems and potential acute and chronic effects of high levels of nitrogen dioxide, oxides of nitrogen play a significant role in the production of low level ozone. Ozone is a dangerous irritant to eyes, throat and lungs and is a component of photochemical smog.

Particulates

Particulate matter in the atmosphere has been associated with large-scale chronic adverse effects on human health although the mechanisms by which it acts are not fully understood. Emissions of acid gases can lead to formation of secondary particulate matter and this may contribute to adverse health effects.

Incineration gives rise to emissions of particulate matter. The nature of the
particulates depends on the waste and the technology used for combustion and emissions control. Poorly controlled incineration plants can emit high levels of particulate matter and contribute to local environmental problems.

Dioxins and Furans

Although a wide range of organic compounds is emitted from incinerators, most attention is focused on dioxins and furans. The most toxic dioxin (2,3,7,8 – TCDD) is a known human carcinogen. The compounds are known to produce chloracne at high exposures and a wide range of non-cancer effects are thought to occur at extremely low levels of chronic exposure, including adverse effects on reproduction, impacts on the development of the unborn foetus and associations with impaired mental ability.

Annex 2

Note on incinerators which have been excluded

Neither Byker incinerator or the Isle of Wight incinerator are currently operating and so are excluded from this survey. Bolton incinerator and Dundee incinerator have only very recently begun operation and there is not yet enough data to make an assessment of their compliance with legal pollution limits.

Plant name: **Eastcroft Incinerator**

Authorisation No: AH0653 Variations: AZ8196, BJ6755, BF2129, BE1445, AX9109

Address: Incinerator Road
Off Cattle Market Road
Nottingham
NG2 3AF

Operator: WasteNotts (Reclamation) Ltd.
Parent company is Waste Recycling Group PLC.

Owned by: Waste Recycling Group PLC

Capacity: 150 000 tonnes per year

Waste burnt: Municipal, clinical and light trade waste.

Process: The municipal waste incinerator comprises two incineration streams each capable of burning 11.5 tonnes per hour of municipal and light trade waste. As with all MSW incinerators, steam is generated to produce electricity. In addition heat is used to support a district heating scheme in Nottingham city centre.

Waste is tipped into 2 refuse silos, each capable of holding 1250 tonnes (4 days' supply). The waste is transferred by grab crane onto feed chutes (one for each combustion chamber). Hot gases are passed through dust hoppers and material collected here is discharged directly into ash quenching troughs. Gases are cooled to about 130ºC to achieve the correct temperature for acid gas treatment. Each incinerator stream has its own flue gas treatment system. Gases are dosed with a mixture of hydrated lime powder, activated carbon powder and recirculated reagent, in order to reduce acid gases, organic compounds and mercury. The exhaust gases and reagent particles are then passed through a fabric filter to reduce the dust burden, before being discharged from the 91m high chimney. Fly ash from the dust filters is collected and discharged to a silo. Some of the flyash is used with the recirculated reagent. The silo is emptied into skips and transferred to a hazardous waste landfill site. Bottom ash from the furnaces is disposed of in ordinary landfill.

The clinical waste incinerator is capable of burning up to 750 kg/hour of clinical waste.

EA office responsible:

Lower Trent Area Office (Midlands Region)
Trentside Offices
Scarrington Road
West Bridgford
Nottingham
NG2 5FA

Public Register at: EA office, as above

Most recent self-reported emissions to air

For 1999

Hydrogen chloride	7.4 t
Mercury	5 kg
Cadmium	4.8 kg
Lead no figures given	(< 10 kg reported, no figures given)
Carbon monoxide	< 10 t (No figures given)
Oxides of Nitrogen	307 t
Volatile organic compounds	2.7 t
Particulates No figures	< 10 t reported
PM10s	Not reported
Dioxins (TEQ)	0.01g
Sulphur dioxide	22 t

Releases to land

Bottom ash to landfill	34,465 t
Flue gas treatment residue to special waste landfill	5117.9 t

Self-reported breaches in the last 3 years:

	Authorised release	Reason given
06.12.00	Use of fabric filter bypass vent	Lost seal in ash discharger. Heat economiser trip
12.09.00	NOx	Identified from extractive test, not continuous monitoring
24.08.00	HCl, SO2	Rubber on grate (possibly due to tyres being present in waste
23.08.00	HCl	None given. "Operators to scrutinise waste feed"
23.07.00	Use of fabric filter bypass vent	Operator error
17.06.00	Use of fabric filter bypass vent	ID fan tripped due to high temp on inverter drive
14.06.00	NOx	Broken grate bars due to molten metal in waste - unable to control combustion
13/14.06.00	Use of fabric filter bypass vent	ID fan inverter drive failed completely
12.06.00	Use of fabric filter bypass vent	High inverter drive temp. and/or contamination caused ID fan trip
07.06.00	NOx	Monitoring equipment suspected inaccurate
06.06.00	NOx	None given
27.05.00	NOx	Exceedance due to green garden refuse
23.05.00	NOx	Exceedance due to green garden refuse
22.05.00	NOx	Exceedance due to green garden refuse deposited in bins at weekend
06.05.00	Use of fabric filter bypass vent	Firedown caused by faulty PLC
03.05.00	NOx	Large content of wet garden waste in refuse following bank holiday
20.04.00	Use of fabric filter bypass vent	ID fan tripped - reason unknown
20.04.00	Use of fabric filter bypass vent	Bypass partially opened whilst incinerator being brought online
22.03.00	NOx	Monitoring equipment suspected inaccurate
20.03.00	NOx	Monitoring equipment suspected inaccurate
03/04.03.00	NOx	Monitoring equipment suspected inaccurate
01/02.03.00	NOx	Monitoring equipment suspected inaccurate
28/29.02.00	NOx	Monitoring equipment suspected inaccurate
25.02.00	NOx	Monitoring equipment suspected inaccurate
23.02.00	NOx	Monitoring equipment suspected inaccurate
21.02.00	Use of fabric filter bypass vent	High differential pressure during inspection to find cause of NOx exceedances
02.02.00	SO2, HCl	None found. Abnormal waste suspected
01.02.00	HCl	Abnormal waste suspected
01.02.00	SO2, HCl	Black smoke visible on grate. Abnormal waste suspected
24.01.00	NOx	None given
09.11.99	NOx	Monitoring equipment suspected inaccurate
01.11.99	SO2, HCl	Thought to be caused by sulphur in waste, but no unusual waste identified
12.10.99	Use of fabric filter bypass vent	Air line connection blew off
01.10.99	EVS opened (CWI)	EVS opened with waste still smouldering due to fault on water sprays
13.09.99	SO2, HCl	Two tyres burning on grate
10.09.99	SO2	Thought to be due to unusual waste. No unusual deliveries identified
05.09.99	EVS opened (CWI)	ID fan inverter panel over temperature
21.08.99	S02	Thought to be due to unusual waste
10.08.99	Use of fabric filter bypass vent	Accidental use of ID fan emergency stop button
02.08.99	EVS opened (CWI)	High bag filter inlet temperature
30.07.99	NOx	None given
29.07.99	NOx	None given - "unit being adjusted to achieve steady burning conditions"
28.07.99	NOx	None given - "unit being adjusted to achieve steady burning conditions"
27.07.99	Use of fabric filter bypass vent	ID fan failure. Reason could not be identified, software suspected (2nd event)
27.07.99	Use of fabric filter bypass vent	ID fan failure. Reason could not be identified
27.07.99	NOx	None given - "unit being adjusted to achieve steady burning conditions"
26.07.99	NOx	None given - "unit being adjusted to achieve steady burning conditions"
23.07.99	NOx	Unit back on line after overhaul. Unit being adjusted to get steady burning
23.07.99	Use of fabric filter bypass vent	Fractures air pipe damaged whilst clearing a screw conveyor blockage
03.07.99	Use of fabric filter bypass vent	Lighting storm caused loss of power
14.06.99	Use of fabric filter bypass vent	ID fan shut down - due to software fault (line 1). Open 51 mins
14.06.99	Use of fabric filter bypass vent	ID fan shut down - due to software fault (line 2). Open 3hrs 31 mins
16.06.99	Use of fabric filter bypass vent	ID fan trip - faulty trip switch on inverter cabinet door
03.06.99	Use of fabric filter bypass vent	ID fan trip caused by electrician while fault finding
31.05.99	Use of fabric filter bypass vent	ID fan failure due to dirty contacts caused by cooling fan vibration
27.05.99	Use of fabric filter bypass vent	ID fan failure due to dirty contacts caused by cooling fan vibration
21.05.99	Use of fabric filter bypass vent	ID fan trip, probably due to a flare on the grate, possibly from a gas cylinder
16.05.99	EVS opened (CWI)	Electrical failure
21.04.99	Use of fabric filter bypass vent	ID fan tripped. Unable to identify the cause
24.03.99	EVS opened (CWI)	Electrical failure led to slight emission of black smoke
19.03.99	Black smoke from EVS stack	Leak in draft control valve + compressor failure (CWI)
26.03.99	SO2	Thought to be due to unusual waste. No unusual deliveries found
26.03.98(?)	SO2 (line 2)	Unusual waste. Date misprint? Notification dated 30.03.99

12.03.98(?)	S02 (line 1)	Burst boiler tube caused blockage. (Date misprint? Notification dated 15.03.99)
24.02.99	CO, Particulates	Monitor fault due to contaminated air supply to the instrument
29.01.99	Use of fabric filter bypass vent	Access door opened during maintenance works
29.01.99	Use of fabric filter bypass vent	Emergency stop button inadvertently pressed by contractors
27.01.99	Use of fabric filter bypass vent	Heat exchanger blocked
08.01.99	Use of fabric filter bypass vent	Mistake during routine filterbag check
04.01.99	Plant abort (Clinical WI)	Suspected draught sensor fault. Smoke coming from Emergency Vent Stack
22.12.98	Effluent to sewer	PH too high (12.2). Regulations relaxed to allow higher PH discharges
21.12.98	Plant abort (Clinical WI)	Waste smouldering while plant shut down and EVS open
26.11.98	Plant abort (Clinical WI)	Emergency vent valve opened when plant stopped for boiler clean
12.11.98	SO2	Closed cardboard boxes containing PVC cheque book covers caused breach
03.11.98	Use of fabric filter bypass vent	Control fault on turbine passout system
13.10.98	Effluent to sewer	PH value 11.5 for 25 hours

Environment Agency pollution registers are often kept in a state of extreme disorder and this can sometimes result in researchers under-estimating the actual number of breaches that have occurred. The breaches listed above are not necessarily all those known to the Environment Agency. In March 2001, a parliamentary answer by Environment Minister Michael Meacher gave some Environment Agency data on pollution breaches and where these figures are greater than those discovered by our field researchers, we have taken the higher figures as the true ones

Comments

Persistent use of the fabric filter bypass must raise questions over the quantity of particulate matter being vented to atmosphere during these periods (the fabric filters are there primarily to reduce the amount of particulate matter in the exhaust gases). Similarly opening of the Emergency Vent Stacks on the medical waste incinerator means that gases are being emitted totally unabated during this time.

In 1998 White Rise Environmental applied to burn radioactive substances (from clinical and university waste and “several large commercial companies”). White Rose have plans for Eastcroft to become the “second major northern plant” for burning this kind of waste. White Rose state they are “currently very pro-active in the sales market to secure radioactive incineration business in order to make the company more commercially viable.” Greenpeace has been unable to find a variation granting permission to burn radioactive waste on the public register, however the Environment Agency have informed us over the phone that permission to burn radioactive waste has been granted but not yet used. They added that the incinerator may start burning C14, tritium and iodide waste after June.

Enforcement notices / warnings

On 30th May 1997 an EA inspector placed a notice on the public register regarding large peaks in the amount of hydrogen chloride (hydrochloric acid) that the Eastcroft incinerator emitted from its stack on the 12th, 16th and 19th May. The agency states that these peaks appeared to be the

result of the lime dosing system being unable to neutralise the large quantities of acid gas generated from burning trade waste containing high levels of PVC. The agency concludes, “the company delivering waste has been denied access to Eastcroft until it can demonstrate that its waste is free of these problematic materials. Since this action was taken (approximately one week ago) there have been no further breaches of the HCl limit. The Agency is satisfied that the operator has taken appropriate action in order to prevent these sort of high HCl emissions. Since these actions have achieved the same end as a formal enforcement notice, such action by the agency is not required at the present time.”

Prosecutions: None

Plant name: **South East London Combined Heat and Power (SELCHP)**

Authorisation No: AE 7236

Address: Landmann Way
London
SE14 5RS

Operator: SELCHP

Owned By: Onyx

Waste Burnt: Household waste from Lewisham, Greenwich, Southwark and Westminster boroughs, and limited clinical waste.

Capacity: 420 000 tonnes per annum

Process: Mass burn. Two incinerator lines are used, raising steam to generate electricity. Resultant combustion gases are treated with activated carbon to reduce organic species, lime to reduce acid gases, ammonia to reduce oxides of nitrogen and a bag filter system to remove particulates.

Solid combustion grate residues, bottom ash, are quenched in water, and ferrous metals are extracted for reclamation. Some bottom ash has been used as an ingredient in road surfacing material. Both bottom ash and flyash from the bag filters is collected and stored onsite prior to disposal in a landfill.
Water is recycled onsite into the process, for instance as ash quench water.

E.A. office responsible:
Thames Region
South East Area

Public register at:
Kings Meadow
Reading

Most recent self-reported emissions to air:

For 2000

Cadmium	<1.35 kg
Carbon dioxide	303,657 t
Carbon monoxide	19.15 t
Dioxin	0.039 g
Hydrogen chloride	22.7 t
Oxides of nitrogen (as NO2)	567.3 t
PM10s	2.15 t
Sulphur dioxide	BRT (<10 t)
Bottom ash	111,342 t
Fly ash	14,932 t

Self-reported breaches in last 3 years:

	Unauthorised release	Reason given
14.02.01	Particulates (dust)	Venting of boiler gas feed bypass valve
25.04.00	NOx	Ammonia system problems
20.12.99	HCl	Waste content problem
04.12.99	SOx	Possible waste content problem
07.05.99	HCl	Possible waste content problem
30.03.99	HCl	Waste content problem
28.01.99	HCl	Waste content problem
18.01.99	NOx	Boiler startup problem
22.10.98	HCl	Waste content problem
27.09.98	NOx	Ammonia pump failure, alarm system failure
28.08.98	SOx	Waste content problem
02.07.98	HCl	Waste content problem
16.06.98	SOx	Re-incineration of boiler tube cleanings
08.03.98	HCl	Waste content problem
08.03.98	SOx	Waste content problem
30.01.98	HCl	Waste content problem
20.01.98	HCl	Waste content problem
27.12.97	SOx	Waste content problem
04.11.97	Particulates (dust)	Soot cleaning fault
11.11.97	HCl	Waste content problem
22.10.97	HCl	Waste content problem

Environment Agency pollution registers are often kept in a state of extreme disorder and this can sometimes result in researchers under-estimating the actual number of breaches that have occurred. The breaches listed above are not necessarily all those known to the Environment Agency. In March 2001, a parliamentary answer by Environment Minister Michael Meacher gave some Environment Agency data on pollution breaches and where these figures are greater than those discovered by our field researchers, we have taken the higher figures as the true ones.

Comments

SELCHP has experienced 15 acid gas (SOx / HCl) exceedances since October 1997, all of which have been due to waste composition, but on no occasion has it proved possible for the nature or source of the waste responsible to be identified.

Plant name: **Sheffield, Bernard Road Incinerator**

Authorisation No: BJ6496

Address: Bernard Road
Sheffield
S4 7YX

Operator: Sheffield City Council

Owned by: Sheffield City Council

Waste Burnt: Sheffield City Council burns rubbish collected from 200 000 households in Sheffield, clinical waste (4000 tonnes per year)from Sheffield Area Health Authority, Bassetlaw Area Health Authority and surrounding cities, and small amounts of trade waste.

Capacity: Approx. 150 000 tonnes per year

Process: The municipal waste incinerator consists of two separate furnaces. Gases from the fires are passed through a flue gas treatment system employing dry lime and activated carbon to reduce acid gas content. Each municipal waste furnace has its own flue gas treatment system. The clinical waste incinerator can be connected to share either of the two flue gas treatment systems in the municipal waste incinerator. Gases are also passed through filters to remove some of the dust before being discharged from the 75m chimney. Heat from burning the waste produces steam to generate electricity and hot water is fed to a district heating scheme. The incinerator bottom ash, contaminated lime, carbon and dust from the filters are stored in silos on site before being taken by road to landfill sites. Process water (used to quench hot ashes and dampen filter dusts) is discharged to sewer after recycling.

EA office responsible:
Rotherham

Public Register at: Environment Agency
Phoenix House
Global Avenue
Millshaw, Beeston Ring Road
Leeds
LS11 8PG
Sheffield City Council also hold a copy.

Most recent self-reported emissions to air:

For 2000

Cadmium	1.24 kg
Carbon dioxide	110,305 t
Carbon monoxide	20.279 t
Dioxin	0.326 g
Hydrogen chloride	11.54 t
Mercury	0.22 kg
Oxides of Nitrogen (as NO2)	170.43 t
PM10s	43.24 t
Sulphur dioxide	18.02 t

This is in addition to some 50 000 tonnes of contaminated solid waste sent to landfill.

Between 27th September and 3rd October 1999, Sheffield City Council reported discharging 995 cubic metres of effluent to the sewer system, although they claim that due to heavy rain this figure is probably not a true reflection of the normal amount discharged.

Self – reported breaches in the last 3 years:

Date	Authorised release	Reason given
07.01.01	CO	Damage to feed belt sides
05.01.01	unspecified	Power cut caused CWI gases to be vented directly to air
02.01.01	CO	Difficulty in feeding wet waste
31.12.00	CO	Fan group trip caused loss of control of the fires
12.11.00	NOx & CO	Unknown
30.10.00	CO	Ash pit blocked
18.10.00	CO	Ash pit blocked
17.10.00	HCl	Suspected faulty monitoring equipment
13.09.00	CO	High temperature in CWI
30.08.00	CO	On start up
30.08.00	CO	Fan group tripped causing a further exceedance
30.08.00	HCl	Lime feed blockage
30.08.00	SO2	Suspected faulty monitoring equipment
30.08.00	CO	Suspected faulty monitoring equipment
14.08.00	CO	Suspected faulty monitoring equipment
14.08.00	HCl	Suspected faulty monitoring equipment
13.08.00	CO	Refuse burning in ash pit
13.08.00	CO	Suspected faulty monitoring equipment
13.08.00	HCl	Suspected faulty monitoring equipment
12.08.00	CO	Suspected faulty monitoring equipment
12.08.00	HCl	Suspected faulty monitoring equipment
07.08.00	CO	Relighting fire
06.08.00	CO	Air fan failure
31.07.00	CO	Feed ram fault
31.07.00	HCl	Unknown
31.07.00	CO	Feed ram fault
30.07.00	CO	Relighting fire
30.07.00	HCl	Lime feed blockage
28.07.00	CO	Re lighting No. 1 boiler
25.07.00	CO	Suspected faulty monitoring equipment
23.07.00	CO	Ash pit blocked
20.07.00	HCl	Lime feed blockage
20.07.00	SO2	Lime feed blockage
09.06.00	CO	Re-lighting unit
28.05.00	CO	Excessive green waste in refuse
23.05.00	CO	Excessive green waste in refuse
23.05.00	NOx	Excessive green waste in refuse
23.05.00	HCl	Excessive green waste in refuse
22.05.00	CO	Excessive green waste in refuse
21.05.00	CO	Excessive green waste in refuse
21.05.00	NOx	Excessive green waste in refuse
19.05.00	HCl	Defective reagent fan
18.05.00	HCl	Reagent fan motor burnt out
08.05.00	CO	Unknown
08.05.00	HCl	Suspected faulty monitoring equipment
08.05.00	NOx	Suspected faulty monitoring equipment
08.05.00	SO2	Suspected faulty monitoring equipment
07.05.00	CO	Excessive green waste in refuse
07.05.00	HCl	Lime feed blockage
05.05.00	HCl	Lime feed blockage
04.05.00	HCl	Lime feed blockage

04.05.00	CO	Poor burning of green waste No. 2 stream
02.05.00	CO	Poor combustion in boiler
01.05.00	SO2	Suspected faulty monitoring equipment
23.04.00	NOx, dust	Suspected faulty monitoring equipment
07.04.00	HCl	Lime feed blockage
19.03.00	CO	Lime feed blockage
19.02.00	CO	Suspected faulty monitoring equipment
17.02.00	CO	Destruction of contaminated sweets
10.02.00	CO	Fan group tripped, power unit failed
09.02.00	CO	Turbine tripped, low water conditions
09.02.00	CO	Feed ram fault
07.02.00	CO	Large piece of plywood jammed feed ram
20.12.99	HCl	Lime feed blockage
18.12.99	HCl, SO2	Lime feed blockage
15.12.99	CO	Loss of fan group
14.12.99	CO	Power cut, loss of control on fire
11.12.99	HCl	Lime feed blockage
01.12.99	CO	Feed blockage
01.12.99	CO	Close down for boiler cleaning
17.11.99	CO	Optimisation test on CWI
01.11.99	CO	Ram stopping
24.10.99	CO	Furnace inspection
22.10.99	CO	Oil leak, hydraulic system
21.10.99	unspecified	Ash pit blocked
19.10.99	CO	Blockage in ash pit
19.10.99	CO	Loading of clinical waste into the CWI
18.10.99	CO & HCl	Lime feed blockage
15.10.99	CO	Failed Ash conveyor
14.10.99	CO, HCl & SO2	Lime feed blockage
11.10.99	CO	Turbine tripped high water levels
10.10.99	CO	High furnace temp with low O2 levels
06.10.99	CO	Poor waste self feeding
05.10.99	CO	Poor waste self feeding
03.10.99	CO	Self feeding of poor quality refuse
03.10.99	CO & Nox	Reagent fan failed
29.09.99	CO	Loss of sealing plate
29.09.99	HCl & SO2	Lime feed blockage
26.09.99	CO	ID trip
18.09.99	CO	Poor waste
11.09.99	CO	Unknown
10.09.99	CO	Unknown
06.09.99	CO	Riddlings hopper blocked
24.08.99	CO	Blockage
24.08.99	CO	Fan group tripping
15.08.99	CO	Routine boiler clean
10.08.99	CO	Climate switch failure
10.08.99	CO	Clinker build up
07.08.99	CO	Ash pit blocked
06.08.99	CO	Feed ram failure
29.07.99	CO	Optimisation test on CWI
29.07.99	HCl	Suspected faulty monitoring equipment
27.07.99	CO & HCl	tripped boiler fans
12.07.99	CO	Limit Switch failure
06.07.99	CO	Unknown
05.07.99	CO & Nox	Ash pit blocked
05.07.99	HCl	Lime feed blockage

04.07.99	CO	Self feeding refuse
20.06.99	CO	Poor waste & ram stopped
18.06.99	CO	Boiler feed ram stopping
09.06.99	CO	Boiler feed chute
09.06.99	HCl	Suspected faulty monitoring equipment
09.06.99	CO	14.00hrs poor waste
09.06.99	CO	17.00hrs poor waste
06.06.99	CO	CWI plant
06.06.99	CO	Ash pit blocked
02.06.99	CO	Ash pit blocked
23.05.99	HCl & SO2	Lime feed blockage
22.05.99	HCl & SO2	Limit switch failure on CWI
21.05.99	CO	Clinical waste problem
20.05.99	CO & HCl	Thermocouple failure
10.05.99	SO2	Lime feed blockage
06.05.99	CO	Suspected faulty monitoring equipment
05.05.99	CO	Following burner service
04.05.99	not specified	Combustion difficulties
03.05.99	not specified	Combustion difficulties
03.05.99	not specified	Burners failed
02.05.99	not specified	Burners failed
01.05.99	not specified	Feeder ram stopped 04.00 hrs
01.05.99	not specified	Combustion difficulties 07.00hrs
01.05.99	not specified	Combustion difficulties 19.00hrs
28.04.99	CO	Suspected faulty monitoring equipment
28.04.99	CO & HCl	Stopped feeder ram
17.04.99	CO	Turbine tripped
14.04.99	CO	Blocked feed belt
12.04.99	CO	"Slug" of refuse, self feeding
27.03.99	CO	Suspected faulty monitoring equipment
26.03.99	CO	Lime feed blockage
20.03.99	not specified	Lime feed blockage
17.03.99	CO	Stopped feeder ram
12.03.99	CO	06.00hrs feed ram stopped
12.03.99	CO	16.00hrs feed ram stopped
02.03.99	CO	15.45hrs Turbine trip
02.03.99	CO	16.45hrs Turbine trip
01.03.99	CO	Test running
21.02.99	CO & SO2	Lime feed blockage
31.12.98	CO	Blocked particulate line
25.12.98	CO	High temperature in furnace
25.12.98	CO	Roller jammed
25.12.98	CO & HCl	Power cut
24.12.98	CO & HCl	"Difficulties"
13.12.98	CO, Nox & Hcl	Startekno's optimization of the furnaces
12.12.98	CO, Nox & Hcl	Startekno's optimization of the furnaces
11.12.98	CO, Nox & Hcl	Startekno's optimization of the furnaces
10.12.98	CO, Nox & Hcl	Startekno's optimization of the furnaces
09.12.98	CO, Nox & Hcl	Startekno's optimization of the furnaces
08.12.98	CO, Nox & Hcl	Startekno's optimization of the furnaces
07.12.98	CO, Nox & Hcl	Startekno's optimization of the furnaces
06.12.98	CO, Nox & Hcl	Startekno's optimization of the furnaces
05.12.98	CO, Nox & Hcl	Startekno's optimization of the furnaces
04.12.98	CO, Nox & Hcl	Startekno's optimization of the furnaces
03.12.98	CO, Nox & Hcl	Startekno's optimization of the furnaces
02.12.98	CO, Nox & Hcl	Startekno's optimization of the furnaces

01.12.98	CO, Nox & Hcl	Startekno's optimization of the furnaces
30.11.98	CO, Nox & Hcl	Startekno's optimization of the furnaces
27.11.98	CO	Lighting of the furnace
27.11.98	CO & Nox	Feeder ram gearbox failure
20.11.98	CO	Feed chute blockage
14.11.98	CO	Plant closed pending burner adjustments
13.11.98	Nox	Plant closed pending burner adjustments
09.07.98	CO	Gas burner fault on start up
09.07.98	CO	Lime feed blockage
08.07.98	CO	NNC engineer error
23.05.98	Nox	Ineffective modifications by NNC
23.05.98	CO	Ineffective modifications by NNC
12.05.98	CO	No fault found therefore plant closed down 13.00-14.00 hrs
12.05.98	CO	No fault found therefore plant closed down 15.00-16.00 hrs
28.04.98	NO2, CO, dust	Damaged O2 monitor

Environment Agency pollution registers are often kept in a state of extreme disorder and this can sometimes result in researchers under-estimating the actual number of breaches that have occurred. The breaches listed above are not necessarily all those known to the Environment Agency. In March 2001, a parliamentary answer by Environment Minister Michael Meacher gave some Environment Agency data on pollution breaches and where these figures are greater than those discovered by our field researchers, we have taken the higher figures as the true ones.

Comments

In December 1999 Sheffield City Council was fined £18,000 for persistently failing to ensure that its incinerator complied with legal emissions limits. The most frequent exceedances were for a range of acid gases and carbon monoxide. Carbon monoxide breaches indicate poor combustion conditions and are likely to mean that other pollutants (that are not continuously monitored) are also being emitted in greater than usual quantities. Similarly HCl (hydrogen chloride) breaches indicate the availability of large amounts of chlorine for dioxin formation, but increased levels of dioxin will not be recorded because it is only measured once a year.

According to Environmental Data Services the council has spent over £25 million on trying to improve the incinerator and on the landfilling of waste and alternative fuels for the district heating scheme during the frequent plant shut downs (ENDS Report 299, Dec. 1999).

On 8th February 2000, the EA wrote to Sheffield City Council again stating, “I must express my disappointment at the length of time it has taken to discharge this improvement programme...The completion of the improvement programme to a satisfactory standard must now be discharged... without further qualification. If the satisfactory operation of the Clinical Waste Incineration Plant still can not be demonstrated I shall

have to consider whether the authorisation of such a plant is still appropriate." (Emphasis in original.)

However, as can be seen from the self-reported breaches table the Sheffield incinerator continues to consistently exceed the legal emission limits for a variety of serious pollutants.

Enforcement Notices

11th Jan 1999. The Environment Agency served a notice requiring the operators to remedy three conditions of their authorisation, which the agency considered they were contravening, or were likely to be contravening. These were Part 2 – Releases to Air, Part 7 – Reporting Requirements and Part 8 – Improvement Programme.

Plant name: **Stoke Waste to Energy Plant**

Authorisation No: AG7903

Address:
Campbell Road
Sideway
Stoke on Trent
ST4 4DX
01902 352 864

Operator: Hanford Waste Services

Owned By: Martin Engineering Systems, Ltd.

Waste Burnt: Household and commercial waste of a similar nature from the Stoke on Trent and Stafford municipalities, and some commercial waste from other locations. No special or clinical waste is taken.

Capacity: 200 000 tonnes per annum

Process: Mass burn. Two combustion lines raise steam for electricity generation. Both fresh air and re-circulated flue gases are fed into the burners. Gases are treated with urea to reduce NOx, activated carbon to reduce heavy metals and organic species, lime to reduce acid gases and a bag filter system to remove particulates. Flue gases are then released to the air via a 76m chimney.

Solid residues from the combustion grate, bottom ash, are quenched in water, and have ferrous metals removed by electromagnets. The ferrous metals are stored on site prior to reclamation by an offsite contractor. Remaining bottom ash residues are wet-stored onsite prior to removal to a landfill site for disposal. Fly ash from the bag filters is collected continuously, and stored in an onsite silo prior to offsite disposal in a landfill. Wastewater is treated and recycled into the process. In abnormal conditions, water is to be discharged to foul water sewers.

E.A. office responsible:
Midlands Region
Upper Trent office.

Public register at: Sentinel House
Wellington Crescent
Fradley Park
Lichfield

Most recent self-reported emissions to air:

For 1999

Cadmium	0.9712 kg
Carbon dioxide	237,923 t
Carbon monoxide	27 t
Dioxins	0.278 g
Hydrogen chloride	15 tonnes
Mercury	15.7 kg
Oxides of nitrogen (as NO2)	294 t
PM10s	3 t
Sulphur dioxide	30 t

Releases to landfill

Bottom ash	51.080 t
Fly ash	6,873 t

Self-reported breaches in last 3 years:

Date	Unauthorised release	Reason given
07.01.01	HCl	Lime system blockages
05.01.01	HCl	Lumpy lime mix causing lime system blockages
21.12.00	NOx	Urea system blockage
18.12.00	HCl	Weak lime mix
20.11.00	HCl	Weak lime mix
14.11.00	CO	Feed chute blockage
02.10.00	HCl	Lime turbine changeover problems.
10.08.00	CO	PLC failure
24.07.00	HCl	Waste content
15-16.06.00	CO	Boiler trips and baghouse purge valve failure
02.06.00	HCl	Lime turbine fault
20.05.00	SO2	High wood content in feed waste
15.05.00	HCl	Lime turbine fault
16.04.00	HCl	Lime feed blockage
11.04.00	HCl	Lime turbine blockage
02.02.00	HCl	Lime feed blockage
31.01.00	SO2	Lime slurry flow fault
27.12.99	HCl	Lime turbine changeover problems
24.11.99	SO2	Contractor accidentally shut down lime turbine
24.11.99	HCl	Contractor accidentally shut down lime turbine
31.10.99	HCl	Lime feed screw failure
10.10.99	HCl	Weak lime mix
08.10.99	HCl	Weak lime mix
20.09.99	HCl	Lime feed blockage
20.09.99	CO	Oil burner air supply fault
12.09.99	HCl	Lime feed screw failure
02.09.99	HCl	Lime feed system blockage
31.08.99	HCl	Lime feed system blockage
24.08.99	HCl	Lime turbine changeover problems
13.08.99	NOx	Urea system blockage
09.08.99	HCl	Lime turbine changeover problems
17.07.99	SO2	Waste content
07.07.99	NOx	Urea system blockage
02.07.99	HCl	Lime system faults
21.05.99	Smoke	Baghouse trip
19.05.99	HCl	Lime system blockage
14.04.99	NOx	Urea system blockage
15.03.99	SO2	Waste content
13.03.99	SO2	Waste content
03.03.99	SO2	Waste content
14.02.99	SO2	Waste content
13.02.99	SO2	System blockage
02.02.99	HCl	Lime prep tank overfill
02.02.99	SO2	Lime prep tank overfill.
25.01.99	NH	Waste content
20.01.99	HCl	Weak lime mix
10.01.99	HCl	Unalarmed lime turbine trip
27-28.12.98	HCl	Lime prep problems

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Environment Minister Michael Meacher gave some Environment Agency data on pollution breaches and where these figures are greater than those discovered by our field researchers, we have taken the higher figures as the true ones.

Comments

In common with MES plants in Wolverhampton and Dudley, the Stoke plant has experienced ongoing problems with its lime system, and has as a result exceeded its authorised release limits for acid gases, most commonly HCl, on numerous occasions. These episodes have been persistent, but not to the same degree as those experienced at both Dudley and Wolverhampton, and the Environment Agency has not taken action similar to that which it deemed necessary in the case of these two plants.

Investigations were carried out by MES as a result of E.A. action on Dudley and Wolverhampton. MES concluded, on January 26th 1999 in a letter to IPC/RAS Inspector Andrew Bond, that a majority of these lime system problems arose from the quality of the lime that they were receiving from a new supplier. Action on the issue was taken, and the problems have lessened in number, but have not been eliminated.

Plant name: **Teeside Energy from Waste Plant**

Authorisation No: AM 4380

Address:
Haverton Hill Road
Billingham
Teeside
TS23 1PY
01642 202300

Operator: Cleveland Waste Management Ltd.

Owned By: S.I.T.A. Holdings UK, Ltd.

Waste Burnt: Mainly municipal waste from East Cleveland, though also some commercial waste.

Capacity: 312 000 tonnes per annum

Process: Mass burn. Two incinerator lines raise steam for electricity generation. Resultant combustion gases are treated with activated carbon to reduce organic species and metals and lime to reduce acid gases. A pulse jet, fabric bag filter system is used to reduce particulates, and the remaining gases are released to air via a 70 metre chimney.

Solid grate residues, bottom ash, riddlings and clinker, are quenched in water, and metals are removed for reclamation. The remaining residues are wet-stored onsite prior to offsite disposal. Particulates resulting from bag filtration are stored in closed containers prior to offsite disposal.

Cooling water for the boilers is drawn from the River Tees, and dosed with biocides. Wastewater is treated onsite, then discharged to a public sewer.

E.A. office responsible:
Northeast region
Dales Area.

Public register at:
Coverdale House
Amy Johnson Way
Clifton Moor
York

Most recent self-reported emissions to air:

For 1999

Cadmium	7.3 kg
Carbon dioxide	263,304 t
Carbon monoxide	4.9 t
Dioxin	0.06g
Hydrogen chloride	48.1 t
Oxides of nitrogen (as NO2)	265.1 t
PM10s	BRT (<1 t)
Sulphur dioxide	78.3 t
Bottom ash, (to landfill)	69,985 t
Fly ash (to landfill)	5,894 t

Breaches in last 3 years:

Date	Unauthorised release	Reasons given
20.01.01	CO	Line shutdown problems
17-18.01.01	CO	Shutdown resulting from superheater flow restriction
17-18.01.01	Particulates (dust)	Baghouse bypass valve engaged due to excess moisture
22-23.01.01	Particulates (dust)	Boiler water tube rupture
22-23.01.01	CO	Boiler water tube rupture
03-06.12.00	Particulates (dust)	Line shutdown problems
02-03.12.00	CO	Line shutdown problems
22-24.11.00	Particulates (dust)	Line shutdown problems
21-22.11.00	CO	Line shutdown problems
07-08.11.00	CO	Cooling water intake from River Tees blocked
07-08.11.00	Particulates (dust)	Cooling water intake from River Tees blocked
12-13.08.00	HCl	Line shutdown problems
12-13.08.00	CO	Line shutdown problems
12-13.08.00	Particulates (dust)	Line shutdown problems
06.10.99	Mercury	None determined, blamed on localised source in household waste
27.07.99	CO	Burner oil lance wrongly positioned - no waste being burned
15-16.03.99	Particulates (dust)	None given
01.05.98	Hydrogen flouride	Lime slurry injector fluctuations

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Comments

While breaches have been numerically small compared to other similar plants in the UK, two points should be made. Firstly, a series of CO / particulate exceedances have arisen in the last six months as a result of lines being shut down, a process that should be fully under the control of the plant operators.

Secondly, two exceedances have been reported in separate spot emission checks – for mercury and hydrogen fluoride. These raise questions as to the ability of the extant monitoring systems to detect such exceedances in the course of normal operation. This is more disturbing due to the nature of the two substances released, and the possible consequences for the accuracy of the annual release inventory statistics for them.

Plant name:	**Tyseley Energy from Waste Plant**
Authorisation No:	AS9216 Variations BJ6399, BE4924, BB4081
Address:	James Road Tyseley Birmingham B11 2BA
Operator:	Tyseley Waste Disposal Limited
Owned by:	Onyx Aurora and Birmingham City Council
Capacity:	350 000 tonnes per year
Waste burnt:	Municipal and clinical. A separate clinical waste incinerator shares the gas cleaning equipment and flues with the main plant. Birmingham City Council is tied into a 25 year contract to supply a guaranteed tonnage of waste to feed the incinerator.
Process:	There are 2 furnaces in the municipal solid waste plant each designed to burn 23.5 tonnes of waste per hour. Waste vehicles deposit refuse into a common bunker from where cranes load it onto a feed chute. Moving grates agitate the waste. Hot gases are maintained at a minimum of 850C for two seconds before passing to the boiler and pollution abatement plant. Each furnace has its own gas cleaning equipment consisting of a scrubber and bag filter. In the scrubber slaked lime slurry (to neutralise acid gases) and activated carbon (to adsorb some of the heavy metals and organic species such as dioxins) are mixed with the gases. The baghouse on each furnace stream has 2840 bags each 4.4 meters long with a diameter of 15cm. These filters remove some of the particulates produced by burning the waste and those added by the scrubber. Contaminated dust from the bags falls into a collection hopper for disposal to landfill. The gases are then released to atmosphere via an 80m stack. The clinical waste incinerator is a separate unit handling up to one tonne per hour of clinical waste. Gases are fed to one of the municipal waste abatement plants before being vented via the same stack.

EA office responsible:

Upper Trent
Sentinel House
Wellington Crescent
Fradley Park
Lichfield
WS13 8RR
Tel 01543 444141

Public Register at:

EA Lichfield office
Birmingham City Council

Most recent self-reported emissions to air:

For 1999

Particulate matter	15 t
Sulphur Dioxide	19 t
Oxides of Nitrogen (as NO_2)	473 t
Carbon monoxide	19 t
Dioxins (TEQ)	0.14 g
Lead	200 kg

Releases to land

Approximately 90,000 tonnes of bottom ash and over 8,000 tonnes of fly ash are produced each year. Fly ash is heavily contaminated with toxic substances including high concentrations of lead, cadmium, arsenic and other metals, dioxins and other organic compounds. Bottom ash also contains elevated levels of these substances, though in lesser concentrations than the fly ash. In June 1998 Onyx began disposing of Tyseley's bottom ash my mixing it with construction aggregates. Up to half of the annual output is disposed of in this way. According to Environmental Data Services it has been used in asphalt manufactured by Bardon Aggregates and by Birmingham City Council paving works (ENDS Report 290, March 1999). Bottom ash not used in this way is sent to ordinary landfill. All fly ash goes to hazardous waste landfill sites.

Self-reported breaches in the last 3 years:

	Authorised release	Reason given
08.02.01	CO	Combustion problem possibly caused by boiler tube leak
01.02.01	CO	Combustion problem
20.09.00	HCl	Blocked lime slurry system
18.09.00	HCl	Lime supply problem
09.07.00	NOx	Jammed refuse feeder
15.05.00	CO	Problems in ash discharger caused poor combustion
03.05.00	NOx	"Unknown. An investigation is ongoing into recent high NOx levels"
09.04.00	NOx	None given. Investigation underway.
07.04.00	NOx	None given
17.03.00	HCl	Blocked lime slurry system during startup
13.02.00	HCl	Lime slurry flow difficulties
29.01.99	HCl	Lime slurry line blockages
28.01.99	HCl	Lime slurry line blockages
25.01.99	HCl	Distribution Control System fault
13.11.98	CO	Feeder trip on main plant caused poor combustion
10.11.98	CO	Feeder trip on main plant caused poor combustion
10.08.98	CO	Clinical waste incinerator combustion conditions
09.02.98	HCl	Unknown refuse component responsible for high HCl levels
30.01.98	HCl	Slurry supply problems

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Comments

When Greenpeace examined the public register (in April 2001) the most recent monitoring report (28th June 2000) showed the Tyseley incinerator to be releasing 5g of mercury to the atmosphere every hour. This is ten times more than any other incinerator in the country (but still does not break the limit allowed by the Environment Agency). Mercury is an extremely toxic metal that is vaporised by incineration. Long term inhalation has been associated with loss of memory, excitability, severe depression and personality changes. Once mercury is in the environment it is converted by micro-organisms into methyl-mercury. In this form it can quickly enter the human food chain.

Enforcement notices / warnings

7th September 1999. Tyseley Waste Disposal Ltd were served an Enforcement Notice for contravening sections 1.2 and 1.7 of their authorisation (relating to fly ash in storage silos and reporting of unauthorised releases respectively). The notification was served as a result of fly ash overflowing the storage silo and the failure of the operator to notify the EA of an unauthorised release of a substance which might cause harm.

Prosecutions

In August 1998, Tyseley Waste Disposal Ltd was fined £120,000 for three offences relating to the loss of two radioactive substances. In the course of demolition of the old incinerator in 1995 two radioactive sources went missing and were never traced. The court, sentencing the company, added that Tyseley Waste Disposal failed to heed warnings about the need to manage carefully the handling of the radioactive sources.

Plant name: **Wolverhampton Waste to Energy Plant**

Authorisation No: AX7563

Address:
Corporation Yard
Crown Street
Wolverhampton
WV1 1QB
01902 352864

Operator: Wolverhampton Waste Services

Owned By: Martin Engineering Systems, Ltd.

Waste Burnt: Controlled waste including household, commercial and industrial waste. No clinical, special or chemical waste is taken. The household waste is derived from the Wolverhampton municipality, commercial waste from clients in the UK, but mainly from the local area.

Capacity: 105 000 tonnes per annum

Process: Mass burn. Two boiler lines operate, raising steam for the generation of electricity. Flue gases are treated with urea to reduce NOx, activated carbon to reduce heavy metals and organic compounds, semi-dry scrubbing using lime to reduce acid gases and bag filters to capture particulates. The remaining gases are released to the air via a 76m chimney. Solids, bottom ash, originating from the grate are quenched with water, have ferrous metal removed with electromagnets and the residue wet stored on site prior to disposal offsite at a landfill site. Fly ash residues from the bag filters are stored onsite in polypylene bags prior to offsite disposal at a landfill. Wastewater is treated, and recycled into the process. In abnormal conditions, water will be discharged to foul water sewers.

E.A. office responsible:
Midlands Region
Upper Trent Office.

Public register at:
Sentinel House
Wellington Crescent
Fradley Park
Lichfield

Most recent self-reported emissions to air:

For 2000

Carbon dioxide	147,000 t
Carbon monoxide	29 t
Dioxin	0.225 g
Hydrogen chloride	5.7 t
Oxides of nitrogen (as NO2)	98.2 t
PM10s	12.14 t
Sulphur dioxide	22 t
Bottom ash	28,830 t
Fly ash	4,650 t

Self-reported breaches in last 3 years:

Date	Unauthorised release	Reason given
27.12.00	CO	Boiler trips due to low water levels
03.11.00	CO	Boiler fan failure
18.10.00	CO	Large, unburnable block on the grate
18.10.00	CO	Ash discharger blockage
27.08.00	SO2	Waste input composition
03.07.00	CO	Waste input too wet
03.07.00	CO	Failure of back up burner resulting in burner temperature loss
11.04.00	SO2	Blocked lime line
11.04.00	HCl	Water ingress to lime slurry mixer left open, resulting in over dilute lime treatment
11.04.00	SO2	
17.03.00	HCl	Lime slurry pump fault
17.03.00	Particulates (dust)	Bypass valve opening as baghouse temperature rose
17.03.00	CO	
05.02.00	Particulates (dust)	Bypass valve opening as a result of baghouse air pulsing system failure
14.11.99	CO	Feed chute blockage
06.10.99	HCl	loss of lime silo roof during lime tanker offloading
07.09.99	HCl	Lime slurry pump failure
23.08.99	HCl	Lime slurry pump failure
28.06.99	SO2	High plastics content of waste
28.06.99	HCl	
21.06.99	CO	Feed chute blockage
20.06.99	CO	Crane hydraulic failure
15.06.99	HCl	Lime slurry pump fault
13.06.99	HCl	Lime slurry blocked filter
08.06.99	HCl	Waste composition
06.06.99	HCl	Filter blockage
22.05.99	SO2	Failure of lime slurry system recycled water filters leading to blockage of system
12.05.99	HCl	Lime slurry system blockages
03.05.99	HCl	Dilution water problems to lime slurry mixer
03.05.99	SO2	Dilution water problems to lime slurry mixer
02.05.99	SO2	Grate clinker accumulation
02.05.99	HCl	Dilution water flow to lime slurry mixer decreased, due to filter blockage
02.05.99	SO2	Dilution water flow to lime slurry mixer decreased, due to filter blockage
01.05.99	HCl	Waste composition
01.05.99	SO2	Waste composition
22.04.99	HCl	Blockages in lime slurry system caused by descaling operations
19.04.99	SO2	Control valve and system blockage
19.04.99	CO	Component failure in furnace 02 monitor
16.04.99	SO2	Human error

16.04.99	HCl	Human error
15.04.99	SO2	Blockage to control valve and lime slurry circuit
15.04.99	HCl	Blockage to control valve and lime slurry circuit
07.04.99	HCl	Lime preparation system failure
07.04.99	SO2	
02.04.99	SO2	Weak lime slurry used
26.03.99	SO2	Water pump feeding lime mixer tank failure, resulting in loss of lime supply
17.03.99	SO2	Failure of lime slurry mixer tank inlet, possibly due to foaming in the tank
06.03.99	SO2	Control valve blockage
05.03.99	SO2	Control valve blockage
26.02.99	HCl	Blockage in lime mixer tank water feed pipe
16.02.99	SO2	Lime slurry system blockage
16.02.99	HCl	Lime slurry system blockage
29.01.99	CO	Blocked feed chute
21.01.99	HCl	Lime system blockage
21.01.99	HCl	Break in lime system water supply
13.01.99	SO2	Blocked filters to control valve
13.01.99	HCl	Blocked filters to control valve
12.01.99	SO2	Blocked lime feed screw
12.01.99	HCl	Blocked lime feed screw
09.01.99	HCl	Lime dilution system failure
08.01.99	HCl	Multiple (2) lime dilution system failure
07.01.99	HCl	Multiple (3) lime system failures
06.01.99	HCl	Multiple (11) lime system failures
04.01.99	HCl	Multiple (3) Lime slurry system problems
03.01.99	HCl	Blocked lime feed screw
02.01.99	HCl	Multiple (4) lime system failures
01.01.99	HCl	Lime feed screw blockage
31.12.98	HCl	Dilution tank change over in lime system
31.12.98	HCl	Maintenance work on ball valve
31.12.98	HCl	Lime feed dilution tank ball valve problems
30.12.98	HCl	Lime preparation system tank overflow
22.12.98	SO2	Blocked lime feed screw
19.12.98	SO2	Blocked lime feed screw
16.12.98	HCl	Blocked lime feed screw
06.12.98	Illegible	Lime feed dilution tank ball valve problems
05.12.98	SO2	Lime feed dilution tank ball valve problems

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Comments

As the result of an "unacceptably high number of exceedances" in the preceding two months from both Wolverhampton and Dudley incinerators, IPC/RAS Inspector Andrew Bond of the Environment Agency wrote to MES on July 6th 1998. The letter referred to a meeting between Bond and D. Pike, operations Director, MES. At the meeting, a number of problems were identified, and solutions discussed, with the view that they be implemented "in the near future." It was also recommended that alarm levels on monitoring systems be lowered to give staff at the plant more time to react to imminent exceedances.

A series of HCl exceedances occurred in the early portion of 1999. As a result, Inspector Bond wrote to again MES on January 18th 1999. He was "very concerned about this matter."

Bond further noted that the January 6th exceedances included a continuous 6 hour period. This constituted a further breach of the plant's authorisation, which placed a 4 hour ceiling on such continuous events. He noted that the problem was affecting only one acid gas, HCl, whereas previous exceedances had also included SO_2. Further information was requested as to the plant's performance, and MES were advised that enforcement action was being considered.

MES investigated the phenomena, and replied to Inspector Bond on January 26th. They blamed the situation on the quality of lime being delivered to all three of the MES plants in the Midlands after a change of suppliers. Work was undertaken to resolve these problems, and while the frequency of the exceedances has been reduced, lime system problems have not been eliminated.

Plant name: **Coventry Waste to Energy Plant**

Authorisation Nos: AG7881, variations AU5009, AT 2985, AX72288, BA3004, BA9797, BE4070, BC3765, BJ8430, BI2630

Address: Bar Road
Coventry
CV3 4AN
Tel. 02476 506226

Operator: Coventry and Solihull Waste Disposal Company, Ltd. PLC

Owned By: Coventry City Council, Solihull Metropolitan Borough Council.

Waste Burnt: Municipal waste from Coventry C.C, Solihull M.B.C, corporate clients and the public. Domestic waste, some commercial and industrial. No clinical waste.

Capacity: 270 000 tonnes per annum

Process: Mass burn. Three incinerator lines are operated. Steam is generated from boilers, which is used to generate electricity, and to heat a nearby factory. Ash from the burners is quenched in water, and metal removed by magnets. These recovered metals are stored onsite prior to transfer to a metal reclamation company. The remaining ash fraction is held at an onsite bunker, prior to road shipment to a registered landfill. Lime and activated carbon are used to treat the acid fraction of the flue gasses. Flyash is bag filtered, conditioned with water, and also taken by road to a registered landfill. Remaining flue gases are discharged to air via the 92 metre chimney. Waste water is discharged to sewer.

E.A. office responsible:
Foley House, Kidderminster.

Public register at:
Foley House, Kidderminster

Most recent self-reported emissions to air:

For 2000

Cadmium:	1.19 kg
Carbon dioxide	149,317 t
Carbon monoxide	42.192 t
Dioxin	0.1398 g
Hydrogen chloride	9.202 t
Mercury	155.4 kg
Oxides of Nitrogen (as NO2)	386.752 t
PM10s	BRT (<1t)
Particulates (as dust)	4,507 t
Flyash	Not reported
Bottom ash	Not reported

Self-reported breaches in last 3 years:

Date	Unauthorised release	Reason given
21.02.01	Dry lime	Transfer error
11.01.01	NOx	Thermocouple failure
03.01.01	Smoke	Fan failure
03.01.01-04.01.01	Particulates	none
12.08.00	Particulates	None given
05.07.00-06.07.00	VOCs	Low combustion temperature blamed on poor grate action
05.07.00-06.07.00	CO	Low combustion temperature blamed on poor grate action
11.07.00	HCL	Daily rate also exceeded. Lime hopper failure
19.06.00	Combustion gasses	Compressor failure
13.12.99	Smoke	Fan failure in line 1
05.12.99-08.12.99	CO	Poor combustion in line 2 resulting from tube failure
04.12.99-06.12.99	CO	Poor combustion
28.08.99	Particulates	Particulate monitor failure
01.07.99	Fly ash	2 cubic metres released. Design fault on silo, also occurred 4/5/99 Fault reported to have 'stopped itself'
26.05.99-27.05.99	HCl	None given. Start-up procedure re-examined as a result
26.05.99-27.05.99	VOCs	None given. Start-up procedure re-examined as a result
13.05.99	SO2	Cause 'assumed' to be waste content
04.05.99	Fly ash	As 01 July. "Release took place when tanker driver removing residue from silo No. 3 drove off with trunking still attached."

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Comments

On March 8th 1996 a power failure whilst all three lines were operating resulted in a blow back, which ignited the contents of the waste feed bunker. Twenty tonnes of waste were burned, before the fire brigade brought the fire under control. The electrical failure was blamed on the refurbishment activities which were then ongoing.

In January 1998, a Flue Gas Recirculation system was fitted to line 3 for trials, followed by lines 1 and 2 in October of that year, to reduce the consistent inability of the plant to stay within its NOx emission limits.

Plant name: **Dudley Waste to Energy Plant**

Authorisation No:
AX7571

Address:
Lister Road
Dudley
DY2 8JT
01902 352052

Operator: Dudley Waste Services

Owned By: Martin Engineering Systems, Ltd.

Waste Burnt: Controlled waste including household, commercial and industrial waste. No clinical, special or chemical waste is taken. The waste is derived from the Dudley municipality, plus commercial waste from clients throughout the UK, but mainly from the local area.

Capacity: 90 000 tonnes per annum

Process: Mass burn. Two boiler lines operate, which raise steam for the generation of electricity. Flue gases are treated with urea to reduce NOx, activated carbon to reduce heavy metals and organic compounds, semi-dry scrubbing using lime to reduce acid gases and bag filters to capture particulates. The remaining gases are released to the air via a 76m chimney. Solids originating from the grate, bottom ash, are quenched with water, have ferrous metal removed with electromagnets and the residue wet-stored on site prior to disposal offsite at a landfill site. Fly ash residues from the bag filters are stored onsite in polypylene bags prior to offsite disposal at a landfill. Wastewater is treated and recycled into the process. In abnormal conditions, water is to be discharged to foul water sewers.

E.A. office responsible:
Midlands Region
Upper Severn Office

Public register at:
Foley House
Stourport Road
Kidderminster

Most recent self-reported emissions to air:

For 2000:

Cadmium	0.096 kg
Carbon dioxide	125,387 t
Carbon monoxide	11.5 t
Dioxin	0.015 g
Hydrogen chloride	6.31 t
Oxides of nitrogen (as NO2)	177.2 t
PM10s	2.36 t
Sulphur dioxide	9.8 t
Bottom ash	21,132 t
Fly ash	4,178 t

Self-reported breaches in last 3 years:

Date	Unauthorised release	Reason given
29.12.00	HCl	Weak lime mix
19.12.00	HCl	Lime system blockage
29-30.11.00	HCl	High plastic content in waste
08.11.00	HCl	Lime turbine vibration fault
30.10.00	HCl	Lime slurry pump failure
03.08.00	HCl	Weak lime mix
23.06.00	HCl	Lime turbine vibration fault
22.06.00	NOx	Urea feed pipe blockage
02.06.00	HCl	Waste content
30.05.00	HCl	Lime turbine fault
28.05.00	SO2	Lime turbine electrical fault
28.05.00	HCl	Lime turbine electrical fault
13.04.00	HCl	Lime turbine failure
15.03.00	HCl	High plastic content in waste
15.11.99	HCl	Lime system blockage
01-02.11.99	SO2	Waste content
01-02.11.99	HCl	Waste content
31.10.99	HCl	Lime system blockage
25.10.99	SO2	Waste content
25.10.99	HCl	Waste content
22.10.99	HCl	Waste content
10.10.99	HCl	Waste content
05.10.99	HCl	High plastic content in waste
05.10.99	SO2	High plastic content in waste
03.08.99	HCl	Lime system blockage
29.07.99	HCl	Lime turbine fault
19-20.07.99	HCl	Waste content
17.07.99	HCl	Lime system blockage
16.07.99	CO	Boiler trip owing to system fault
07.07.99	CO	02 monitor fault
05.07.99	HCl	Lime turbine failure
05.07.99	SO2	Lime turbine failure
25.06.99	CO	Boiler fan trip
25.04.99	HCl	Waste content
28.03.99	HCl	None given
19.03.99	HCl	Waste content
19.03.99	SO2	Waste content
18.03.99	HCl	Filter blockage in lime system, due to design fault. Cleaning regime introduced
18.03.99	HCl	High plastic content in waste
17.03.99	HCl	Waste content
03.03.99	HCl	Lime system design fault

03.03.99	SO2	Lime system design fault
26.03.99	SO2	High plastic content in waste
26.03.99	HCl	High plastic content in waste
25.02.99	HCl	Low lime slurry feed rate
22.02.99	HCl	Lime turbine blockage
02.02.99	HCl	Low lime slurry feed rate
31.01.99	HCl	Lime system blockage
20.01.99	HCl	Lime system blockage
18.01.99	HCl	Lime turbine trips
18.01.99	HCl	Lime slurry flow problems
16.01.99	HCl	Lime turbine changeover
16.01.99	HCl	Lime system preparation fault
15.01.99	HCl	Lime turbine changeover
12.01.99	HCl	Lime slurry turbine change
07.01.99	HCl	Lime slurry turbine change
06.01.99	HCl	Lime system blockage
05.01.99	HCl	Lime system blockage
03.01.99	HCl	New lime supply
31.12.98	HCl	Lime slurry flow problems
16.12.98	HCl	Lime system level indicator fault
13.12.98	HCl	High plastic content in waste
17.11.98	HCl	Lime system fault
09.11.98	SO2	Lime turbine fault
09.11.98	HCl	Lime turbine fault
03.11.98	HCl	Waste content
12.10.98	SO2	Lime system fault
12.10.98	HCl	Lime system fault
27.09.98	SO2	Lime system fault
27.09.98	HCl	Lime system fault
26.09.98	CO	Boiler shutdown
10.09.98	HCl	Lime system fault
16.09.98	NOx	Urea feed pipe blockage
09.09.98	Flue bag dust.	Urea house flood due to heavy rain
09.09.98	CO	Urea house flood due to heavy rain
09.09.98	NOx	Urea house flood due to heavy rain
07.09.98	CO	Boiler trip
03.09.98	SO2	Lime system blockage
03.09.98	HCl	Lime system blockage
01.09.98	HCl	Weak lime mix
31.08.98	CO	Enforced boiler shutdown
29.08.98	CO	Boiler trip
24.08.98	SO2	Lime dilution problems
24.08.98	HCl	Lime dilution problems
23.08.98	HCl	Plant breakdown
23.08.98	CO	Plant breakdown
23.08.98	Particulates (dust)	Plant breakdown
18.08.98	CO	Boiler trip due to ash discharge blockage
17.08.98	HCl	Waste content
12.08.98	HCl	Weak lime mix
11.08.98	Flue bag dust.	Boiler trip
11.08.98	CO	Boiler trip

07.08.98	SO2	Lime system blockage
07.08.98	HCl	Lime system blockage
04.08.98	HCl	Lime system fault
03.08.98	HCl	Waste content
02.08.98	CO	Boiler water system level faults
01.08.98	HCl	Low lime slurry flow
30.07.98	HCl	Lime system blockage
29.07.98	NOx	Urea feed pipe blockage
29.07.98	HCl	Lime slurry feed fault
27.07.98	HCl	Pump failure
27.07.98	CO	Grate fault
24.07.98	HCl	Lime system blockage
24.07.98	HCl	Low lime slurry flow
21,07.98	HCl	Lime slurry turbine fault
17.07.98	HCl	Lime slurry system parameter problems
16.07.98	CO	Boiler air system blockage
14.07.98	HCl	Lime system fault
13.07.98	CO	Bag house system fault
10.07.98	HCl	Lime scrubber blockage
14.07.98	NOx	Urea feed pipe blockage
17.06.98	HCl	Lime system fault
13.06.98	CO	Boiler trip
11.07.98	NOx	Urea system blockage
05.07.98	CO	Wet waste
05.07.98	SO2	Poor lime quality
05.07.98	HCl	Poor lime quality
04.07.98	HCl	Lime system blockage
03.07.98	HCl	Lime system blockage
01.07.98	SO2	Lime system blockage
30.06.98	SO2	Modifications to control system
29.06.98	CO	Poor combustion
25.06.98	NOx	Urea system blockage
25.06.98	NOx	Urea system tests
24.06.98	HCl	Boiler start-up problems
24.06.98	CO	Poor combustion
21.06.98	HCl	Combustion air problems due to fan electrical fault
21.06.98	CO	Combustion air problems due to fan electrical fault
19.06.98	HCl	Fan failure, poor combustion
19.06.98	CO	Fan failure, poor combustion
18.06.98	CO	Boiler control problems
17-18.06.98	HCl	Lime system blockage
17-18.06.98	SO2	Lime system blockage
17.06.98	SO2	Lime slurry mix problems
17.06.98	HCl	Lime slurry mix problems
17.06.98	CO	Poor combustion
17.06.98	NOx	Urea flow problems
13.06.98	SO2	Lime system fault
12.06.98	NOx	Urea system modification and testing
12.06.98	CO	Boiler trip

11.06.98	HCl	Boiler system test
10.06.98	SO2	Lime feed system modification
10.06.98	CO	Poor combustion
09-10.06.98	HCl	Waste content
09.06.98	Particulates (dust)	Boiler trip
09.06.98	CO	Boiler trip
08.06.98	CO	Poor combustion
01.06.98	CO	Poor combustion
30.05.98	HCl	Lime system fault
30.05.98	SO2	Lime system blockage
29.05.98	SO2	Lime system modifications
28.05.98	CO	Poor combustion
28.05.98	HCl	Lime turbine fault
28.05.98	SO2	Lime turbine fault
28.05.98	SO2	Lime system pump trip
28.05.98	HCl	Lime system pump trip
27.05.98	SO2	Lime system pump trip
27.05.98	HCl	Lime system pump trip
26.05.98	SO2	Lime system modifications
26.05.98	HCl	Lime system modifications
20.05.98	CO	Grate fault
19.05.98	CO	Boiler start-up problems
19.05.98	HCl	Lime system fault
18.05.98	SO2	Lime system fault
18.05.98	HCl	Lime system fault
18.05.98	Particulates (dust)	Boiler trip
18.05.98	HCl	Boiler trip
15.05.98	SO2	Boiler fault
15.05.98	HCl	Boiler fault
21.03.98	SO2	Possible scrubber problem
24.03.98	SO2	Sulphur abatement system problems
24.03.98	SO2	Waste content

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A further series of HCl exceedences occurred in the early portion of 1999. As a result, Inspector Bond wrote to again MES on January 18th 1999. He was "very concerned about this matter."

Inspector Bond further noted that the January 6th exceedances included a continuous 6 hour period. This was a further breach of the plant's authorisation, which placed a 4 hour ceiling on such continuous events. He noted that the problem was affecting only one acid gas, HCl, whereas previous exceedances had also included SO_2. Further information was requested as to the plant's performance, and MES were advised that enforcement action was being considered.

MES investigated the phenomena, and replied to Inspector Bond on January 26th. They blamed the situation on the quality of lime being delivered to all three of the MES plants in the Midlands, after a change of suppliers. Work was undertaken to resolve these problems, and whilst the frequency of the exceedances has been reduced, lime system problems have not been eliminated.

The plant has also experienced trouble with unsuitable waste being delivered to the site, resulting in HCl exceedences as a result of high plastic content. More seriously, on March 19th 1999, a consignment responsible for a HCl / SO_2 exceedance resulted in some drums being present in the bottom ash, even after pre-sorting of the feed waste. It is not stated whether the contents of the drums, and thus the possible character of any other resultant emissions, were ever determined.

Plant name: **Edmonton Refuse Incinerator**

Authorisation No: AG5269 Variations: AL2900, AV6922, AX6486

Address: Advent Way
Edmonton
London
N18 3AG

Operator: London Waste Ltd. London Waste Ltd. is a joint venture company between the North London Waste Authority and the private sector firm SITA. The North London Waste Authority consists of the London Boroughs of Barnet, Enfield, Haringey, Waltham Forest, Camden, Hackney, and Islington.

Owned by: NLWA/SITA

Waste burnt: A wide variety of material including domestic, commercial, clinical and industrial waste.

Capacity: 540 000 tonnes per year

Process: The plant consists of five incinerator/boiler units, each capable of burning 15 tonnes per hour of refuse, including limited amounts of clinical waste. Refuse vehicles tip waste into bunkers each capable of holding 4000 tonnes. Material is transferred by one of 3 overhead grab cranes into feed chutes where it is pushed into the incinerator by a hydraulic ram. Roller grates move the waste through the incinerator which should burn at 925 - 1040°C. Exhaust gases from the incinerator units pass through electrostatic precipitators (to remove some of the dust), lime (to neutralise acid gases) and activated carbon (to adsorb organic materials such as dioxin). A fabric filter removes more particulates before the gases are vented through the 100m high chimney.

Bottom ash is quenched with water to cool it. Ferrous metal is extracted from it magnetically. Most of the bottom ash now goes to Ballast Phoenix who use it for making construction aggregates. Until August or November 1999 (information from the operators and the Environment Agency is inconsistent) fly ash from the electrostatic precipitators was mixed with this grate ash. Fly ash is very highly contaminated and is classified as hazardous waste. It should normally be sent to a licensed special waste landfill site. Greenpeace has written several letters to London Waste requesting information on the levels of

hazardous materials in the mixed ash and the locations in which it has been used as a construction aggregate. We have not received a reply.

Dust from the dry lime gas treatment process and fabric filters is landfilled as hazardous waste.

Contaminated water from ash quenching is passed through an effluent treatment plant before being discharged to Chingford sewer. Boiler “blowdown” liquor is discharged directly to sewer.

EA office responsible:

NE Thames
Broadmeads Pumping Station
Hertford Road
Ware
SG12 9LH

Public Register at:

Environment Agency regional office
Kings Meadow House
Kings Meadow Road
Reading
Berkshire, RG1 8DQ *and*
London Borough of Enfield
Civic Centre
Silver St.
Enfield
London
EN1 3XA

Most recent self-reported emissions to air:

For 2000:

Cadmium & thallium	8.92kg
Carbon monoxide	191 t
Dioxin	0.08 g
Hydrogen chloride	36.7 t
Total metals	653 kg
Oxides of Nitrogen (as NO2)	1080 t
Particulate matter	25.6 t
Sulphur dioxide	20.6 t

Self reported releases to land for 2000:

Bottom ash and sludge from effluent treatment plant to landfill:	69 417 t
Bottom ash and sludge sent for use as construction aggregate:	70 280 t
Flue gas treatment residue (including precipitator ash):	12 687 t
Material rejected as non-combustible:	209 043 t

Self reported breaches in the last 3 years:

	Authorised release	Reason given
01.03.01	CO	Jammed grates on boiler 2
26.02.01	CO	Fault in air system of FGT plant
26.02.01	HCl	Fault in air system of FGT plant
19.02.01	?	no details on register
18.02.01	?	no details on register
08.02.01	?	no details on register
29.02.01	?	no details on register
18.01.01	CO	Sudden reduction in load, no 1 unit
21/22.11.00	CO	Defective riddling screw
09.10.00	?	no details on register
25.09.00	Fly ash (FGT residue)	Corroded steel plate no. 2 conveyor. 0.5 - 0.75 tonnes fine powder released
14.08.00	Fly ash (FGT residue)	Corroded steel plate no. 4 conveyor. 1-2 tonnes of fine powder released
9/10.08.00	CO	Feeder ram failure
28.07.00	CO	None given. Described as "an unavoidable breach"
20.06.00	CO	Grate drive failure causing loss of fuel to fire bed and drop in burn temp.
21.05.00	CO	Large material in feedstock blocked quench bath
21.11.99	HCl	Feedstock contaminated with an unknown quantity of chlorinated products
03.11.99	HCl	Feedstock contaminated with an unknown quantity of chlorinated products
03.11.99	HCl	Feedstock contaminated with an unknown quantity of chlorinated products
04.10.99	?	no details on register
27.07.99	HCl	incineration of a large quantity of vinyl wallpaper
21.07.99	HCl	Unknown quantity of chlorinated product present in feedstock
21.07.99	HCl	Unknown quantity of chlorinated product present in feedstock
04.04.99	CO	Quench bath flap unexpectedly came adrift
30.03.99	HCl	System unable to cope with large quantity of PVC (1.1 tonnes)
20.03.99	CO	Blocked feed chute
17.02.99	SOx	Possibility of high sulphur content in waste stream
17.02.99	CO	Control failure of the FD Damper Vane
21.12.98	?	no details on register
21.09.98	HCl	Unknown source of chlorinated products present in waste
21.09.98	SOx	High HCl levels mopped up lime dosing
16.04.98	HCl	Contaminated feedstock from 14.4.98
14.04.98	HCl	Unknown source of chlorinated products present in waste
29.11.97	HCl	Incineration of PVC credit cards

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Comments

On the 13th April 1999 the Environment Agency wrote with regard to the persistent hydrogen chloride breaches and asked why the plant's authorisation should not be amended to exclude PVC (which London Waste had identified as the cause of many HCl breaches). The reply was not on the public register when Greenpeace viewed it.

In December 2000 London Waste Ltd. commissioned REC Ltd. to monitor some of the pollutants emitted from its stack. They found that emissions of oxides of nitrogen from the chimney were above the authorised limit for 25 of the 26 hours monitored.

EA notifications / warnings

On 23rd July London Waste was found guilty of 11 out of 12 charges of operating in breach of its authorisation. It was fined £38,500 with £14,705 costs, for burning clinical waste of types not permitted by its authorisation and failing to comply with an Enforcement Notice.

London Waste has never been prosecuted for exceeding authorisation limits to air.