

**Guildford Labour Party**

**Representation to the Environment Agency**

**concerning**

**The Application by Thames Waste Management**

**for**

**IPC Authorisation for a Proposed Waste Incinerator**

**at**

**Slyfield, Guildford.**

26th October 2000

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## **1. Introduction**

### **1.1 The Proposed Incinerator and the Site**

Thames Waste Management (TWM) have applied for permission to build a 225,000tpa waste incinerator with additional Materials Recycling Facility (MRF) and a Civic Amenity (CA) site handling 15,000tpa. The process will produce a very small amount of electricity (20MW) that justifies TWM referring to it as an Energy from Waste facility, 67,000tpa of bottom ash / slag and 13,500tpa of fly ash.

The incineration unit will be the first large chemical processing plant to be built in Guildford and its environs. The proposed location, Slyfield Green, is a small commercial estate that is largely made up of distribution businesses, and a few small manufacturing companies. There is also a Civic Amenity site (12,000tpa) for the collection of household and industrial waste, a sewage works owned and operated by Thames Water and a former landfill site which is being slowly developed.

Neither the town of Guildford nor the Slyfield Estate has any special features or environmental advantages that make them a preferred location for an incinerator. The principle of siting incinerators close to the waste source breaks down with this application. Two-thirds of the waste from year one will come from outside Guildford. Road access to the site within the Borough is poor and is entirely through residential areas. The only driving force behind the proposal is the desire of Thames Water to exploit surplus land for commercial gain.

### **1.2 Current Environmental Impacts of the Slyfield Estate**

Residential areas surround this estate, with some residents in Slyfield and Burpham living within 200-300 metres of the proposed incinerator site. The main problems for residents from the present commercial activities come from the cars and heavy lorry traffic. The Civic Amenity site is dirty and dusty with occasional unpleasant odours, but is well managed and is probably as good as can be expected for the handling of mixed solid waste (MSW) on this scale.

The Thames Water sewage processing is the most obnoxious activity taking place in Slyfield and in Guildford. These works are not well maintained. Sewage sludge mixed with lime is dumped randomly in an area adjacent to the CA site. The considerable biological activity of this material is evident from the gases bubbling from the many puddles. When the area is dry, there is no protection for the public from dust that may carry microorganisms that are dangerous to health. The sludge is loaded by mechanical digger into OPEN lorries that leave the site on a regular basis. Unpleasant smells pervade the area at all times and can be detected in residential areas all round the works, at least up to 1 kilometre distance, depending on the wind direction.

### **1.3 The Applicant**

Residents of Slyfield and Burpham have had to live with the bad odours from the sewage works over many years. The poor stewardship of the works and the adjacent sludge area raises considerable doubts about the competence of TW, and its subsidiary TWM, to run the proposed incinerator cleanly, efficiently and fully in compliance with environmental standards. TW in its water business has a proven record for failing to meet standards.

## **2. Comments by Guildford Labour Party**

At the end of July, Guildford Labour Party circulated 2000 copies of a questionnaire asking for views on the incinerator to households within 0.5 kilometre of the proposed site, 1000 on each side of the A3.

The response was remarkable with over 600 being returned before the deadline of the 31<sup>st</sup> August. Of those responding, over 90% were strongly opposed to this scheme. The main concerns were the anticipated pollution of local air, land and water, and the risk of dangerous emissions with the associated long-term health risks. Some families with asthma sufferers added additional notes with their replies to emphasise their special concerns. The other issue causing major concern was the transport of waste and removal of ash from the site, with the firm belief that heavy traffic will inevitably increase with adverse effects on the environment, regardless of the assurances of the applicant.

The Labour Group of Councillors on Guildford Borough Council sent to Surrey County Council Planning Committee a document with detailed objections. The three Labour Councillors in Stoke Ward will be in the front line receiving objections if the plant is built. As a result of the questionnaire, Guildford Labour Party has examined the environmental aspects of the scheme and its comments and objections with reasons are in the following sections.

## **3. Plant Operation and Waste Control**

The proposed incinerator is designed to limit emissions to currently recommended levels. The standards to be achieved for the most hazardous materials (e.g. dioxins, furans, and heavy metals) are based on long-term means. There are some situations where considerable deviations from the average may occur.

### **3.1 Fault Conditions**

It is assumed that the plant is working perfectly at all times. During plant upsets, particularly if these occur during start up and shut down, there is the possibility of incomplete combustion and the release of pollutants at higher levels than the specified limits. Malfunctioning of the flue gas cleaning system, for example premature saturation of the activated carbon, could also give rise to periods of excessive emissions. Failure of the negative pressure arrangements for the incinerator building could allow dust and odours to escape. These problems will increase as the plant ages.

The EU 'Common Position' on Waste Incineration acknowledges that there will be occasional plant problems and it accepts that emission limits will be breached. It specifies that incineration should not continue for more than 4 hours after limits are exceeded. Cumulative 'over the limit' operation is restricted to no more than 60 hours per annum, which is equivalent to 2.5 days operation per annum without emission controls at all. An over limit of 15 times is permissible for dust. These allowances would allow a batch of very hazardous waste to be incinerated without breaching any statutory limits. Operation of the incinerator under ANY fault conditions, no matter how brief, should not be permitted.

### **3.2 Waste Screening**

Municipal solid waste (MSW) is an unknown mixture of materials. There will be times when a specific load of waste (such as chlorinated plastics and wood treated with preservatives) that

can give rise to a high concentration of toxic pollutants will be incinerated. Because the waste will be collected from a wide area of north-west Surrey, it is inconceivable that higher risk trade and industrial waste will not be incinerated. There is no indication in the planning application, nor is it believable, that there will be thorough checks of the waste stream for materials that can give rise to potentially dangerous emissions. It is therefore possible for high levels of toxic chemicals to be released for a limited periods without the operators' knowledge. TWM claim that the operators will mix the waste before it enters the combustion chamber, a procedure that although averaging any potentially dangerous emissions over a short period in no way reduces the cumulative amount of hazardous pollutants being emitted. Low level long-term exposure to some of the heavy metals is a known health hazard. The cumulative effects of dioxins, furans and PCBs etc on health is still under investigation.

### **3.3 Long-term Operational Issues**

The TWM presentation is of a plant working perfectly with high cleanliness throughout its life. The reality is likely to be very different. The waste reception area will become dirtier with increasing quantities of loose dust and the likelihood of unpleasant odours. Dust levels throughout the plant can be expected to increase with age.

The filter cake removal from the bag filters by compressed air jets will result in a continuing increase of dust in the exhaust route. Eventually, a steady-state level of dust emissions, some of which has effectively by-passed the filter system, can be expected.

## **4. Dust Emissions**

### **4.1 Dispersion Modelling of Particle Emissions**

Dispersion modelling has been used to describe the distribution in the atmosphere of the emitted materials. It is not clear from the TWM application whether the effects of rain and fog on the deposition of particles have been included as a mechanism. It is likely to be a much more efficient route for transferring particulates to the surroundings than dry deposition.

The dispersion calculations have been undertaken using an accepted model, but the input parameters are often difficult to estimate, poorly defined or variable in nature. Thus, for instance, a roughness length of 0.15m has been used for all the calculations, which also assume that the effluent always exits the stack at the design temperature. In such circumstances sensitivity studies (using, for instance, an increased roughness length or reduced temperature) are required to demonstrate the robustness of any estimates.

The air quality assessments are critically dependent on sensible estimates of emission rates and it is not clear whether the values used here are derived from measurements made on other UK plant or from assumptions made by the plant designers. It is stated that the base load emission rates used are provided by the plant manufacturers. Have these been demonstrated to be reasonable by long term measurements at other plant?

Most of the dust will be deposited in a small area around Burpham, Jacobs Well and Slyfield Green. As respirable size dust particles cannot be seen by the naked eye, local residents will be unable to distinguish periods of high emission from those of lower emission. They are reliant on accurate dispersion modelling and measurements.

## 4.2 Measurements of Dust

Dust levels in the exhaust gases are normally expressed gravimetrically ( $\mu\text{g}\cdot\text{m}^{-3}$ ). At the two public meetings in Guildford, the Environment Agency representative suggested that dust emissions would be contained at a tolerable level. A comparison was made between national average atmospheric dust burden ( $40\mu\text{g}\cdot\text{m}^{-3}$ ), the Guildford average ( $14\mu\text{g}\cdot\text{m}^{-3}$ ) and an estimated dust level for the incinerator ( $0.1\mu\text{g}\cdot\text{m}^{-3}$ ). The implication is that the incinerator would contribute 400 times or 14 times less dust *by weight* than the national and Guildford levels respectively. This information is misleading.

The important issue is the sizes of the emitted particles. The information required for an assessment is the number density of particles per unit volume for each size fraction. In the example quoted, all three samples could contain the same number density of respirable size particles. There is no information in the TWM application about the size range of the fly ash particles that will be emitted.

## 4.3 Surface Activity of Fly Ash Particles

The ash particles readily adsorb volatile materials formed during combustion especially while cooling in the exhaust stream. They are capable of adsorbing most chemical species present in the gas or vapour phase, including dioxins /furans, heavy metals, VOC and PAH. Adsorption on particulate matter can stabilise compounds that might otherwise be converted to less toxic species by photochemical transformations in the atmosphere. There are usually more pollutants on the surface of the particles than in the interior. Respirable size particles carry a higher burden of pollutants relative to large particles because of their higher surface to volume ratio.

The activated carbon injected into the stream specifically for gas cleaning is also a hazardous material when saturated with pollutants and there are similar concerns with the respirable size carbon particles.

The bag filters are intended to remove these materials, but respirable size particles are at the limit of their capability. The pressure differential across the filter to maintain the required gas flow is likely to force the smallest particles through the system. During compressed air cleaning and subsequently when gas is re-introduced to a filter section small dust particles will be forced through the fabric.

The most dangerous particles that need to be trapped will be the ones that will escape to the flue. TWM have assumed that dust levels will be so low that none of these issues matter.

## 5. Exposure to Pollutants

Local residents have genuine and reasonable concerns about exposure to toxic materials whether in the gaseous state or adsorbed on respirable particles. One has only to look back at the assurances by oil companies of the safety of lead in petrol, to realise why major organisations have lost their credibility for providing honest and reliable assessments. The continued reduction since the 1950's of the safe exposure limits for radioactive materials contrasts with the casual attitude of British Nuclear Fuels in its handling and disposal of radioactive waste.

## **5.1 Dioxins and Related Compounds**

The TWM incinerator is designed to meet current dioxin exposure limits for gaseous emissions. There are many uncertainties surrounding the safety of dioxin & furans. In 1998 the World Health Organisation set a limit of 1-4 picograms per Kg (of bodyweight) per day. This level was a revision downwards by a factor of 10 of the level set only 7 years earlier. The new level is the concentration estimated to be the average daily intake from non-incinerator sources. The 5<sup>th</sup> Environment Action Programme of the EU has the objective of a 90% reduction of dioxin emissions from all sources by 2005 (from the 1985 level). It is quite probable therefore that limits will be lowered further in the future. Any releases by the TWM incinerator would be an addition to whatever level the daily limit is set. It is possible that within a few years the incinerator would be operating outside recommended limits.

Another unknown factor is whether dioxins and furans accumulate in body tissue, which could make continuing low level exposures dangerous. The route by which they are removed from the body as well as from soil and vegetation is also uncertain. It is known from previous ground contamination that they are persistent in the environment especially when stabilised by solids. There are many unknowns concerning the uptake and dangers of dioxins and furans and there is extensive research being carried out to address these issues. Siting an incinerator at Slyfield effectively makes the local residents unwilling participants in a research experiment.

The destruction of halogenated organic compounds depends on the combustion temperature being sufficiently high. The EU 'Common Position' paper recommends temperatures of 1100°C if hazardous wastes with more than 1% of halogenated organic substances are burnt. As discussed in section 2, it is quite possible that some waste batches will meet this criterion. It appears that the TWM incinerator has not been designed to operate at a combustion temperature of 1100°C, but it would be a safer operating temperature for burning an unknown mixture of waste.

The TWM application claims that the dioxin emission limits of 0.1ng.m<sup>-3</sup> will be met. This refers to gaseous emissions. As explained in section 4.3, the greatest threat may arise from dioxins adsorbed on respirable size particles, and emissions by this route will not be measured.

## **5.2 Heavy Metals**

The heavy metals are common components of domestic and industrial products and will be impossible to screen out in the waste reception facility. They will pass through the combustion chamber into the exhaust gases as metal particles or as volatile species the compound formed depending on the composition of the acid gases at the time. They will bind strongly to the fly ash particles. This phenomenon is well known from experience with power station fly ash. Respirable particles will be a significant route by which they are transferred to the surroundings.

## **6. Emissions Monitoring**

The approach of TWM is that the plant will meet statutory emission limits or it will be closed down. There is therefore the presumption that an extensive programme of emission

monitoring will be in place. In practice only those components of the emissions that are easy to measure such as the acid gases will be monitored continuously.

Dioxin measurements, which currently cost about £2000 per analysis, will be carried out 4 times in the first year, then twice each year. The frequency is likely to be reduced further if previous analyses indicate that the emissions are less than 50% of the current limits. These arrangements are very unsatisfactory because in all probability the analyses will miss any high dioxin-releasing incidents from individual batches of waste. With so few measurements it might even be possible for operators to remove chlorinated plastics before an analysis session! Heavy metals will also be analysed on a similar occasional basis, although there is even less justification here because the analysis is more straightforward.

No chemical analyses will be carried out on the respirable size fraction of the fly ash. This is a serious omission. A study of the gas – solid partitioning as a function of particle size, for all volatile and gaseous species, should have been presented.

The application makes no mention of monitoring the distribution of the fly ash particles on the land and in the air in the residential areas surrounding the plant. It is especially important to measure the respirable fraction. There is no mention of the deposition of respirable size particles meeting any statutory limits. These are serious omissions and should be made a requirement of any incinerator approval. Independent monitoring both inside and outside the plant would be an advantage, with public access to the results.

## **7. Ash Disposal**

Some of the 67000 tons of bottom ash / slag produced annually will be sold but a large amount will go to landfill, along with the 13500 tons per annum of fly ash.

### **7.1 Bottom Ash**

There is insufficient information about the nature of the bottom ash. Is it in the form of a non-leachable glass that would make it safe for both building use and landfill disposal? What will be the concentrations of heavy metals and organic compounds?

### **7.2 Fly Ash**

Will the fly ash be subjected to an external vitrification process, as recommended by the UNEP Basel Convention, to make it safer for landfill disposal?

The landfill site must be licensed to accept hazardous wastes. There can be few if any sites in Surrey or north-east Hampshire currently accepting fly ash. There could be problems with both respirable dust emissions and leachate. Have the proposed landfill sites been checked for their suitability to receive fly ash? Local residents who may be affected should be made aware of the change of use.

## **8. Environmental Aspects of Waste Importing**

In their submission to the Surrey CC Planning Committee Guildford's Labour Councillors pointed out that if recycling targets were met, the TWM incinerator would not be viable and

waste would have to be imported from further afield. That situation has come closer with the recent announcement in the Surrey Advertiser (6<sup>th</sup> October 2000) that Grundon Waste Ltd., the operators of a new incinerator to be built at Colnbrook near Slough, are willing to take 150,000 tpa of Surrey's waste. It casts doubt on the need for this incinerator at all.

The TWM transport calculations do not give an accurate estimate of future operations. It is claimed that there will be only a small increase in heavy lorry movements compared to current movements to and from the Civic Amenity site. It is implied that traffic movements will remain much the same throughout the life of the plant.

It is now clear that waste will need to be imported from a much wider area than Surrey in later years. TWM have not addressed the possible future scenarios. The additional road traffic movements, the increasing collection area necessary, and distances travelled required to maintain the waste feed must be calculated for increasing recycling rates. As heavy duty diesel engines are a source of particulate matter, dioxins, PAHs, and VOCs, the increased emissions into the environment should also be taken into account as these will be borne by a population already receiving the heaviest doses of traffic pollutants in the country.

## **9. Conclusions**

1. The Slyfield Estate is not a suitable location for the incinerator. It is too close to 'sensitive receptors' i.e. the people living on the nearby housing estates at Burpham, Jacobs Well and Slyfield. The site has not been selected by TWM because of any environmental merit. It is not close to the majority of the waste sources. The additional pollution throughout the County from waste transportation has not been taken into account.
2. The TWM environmental assessment takes no account of fault conditions that could give rise to excessive emissions. It is assumed that the plant will work perfectly at all times throughout its life. There is no adequate provision for separating especially hazardous waste or it that a practical option.
3. There are serious concerns about the emissions of respirable size dust particles, which can be an important pathway for the transfer of toxic materials. There is insufficient information in the assessment as to how the deposition of particulates is calculated especially under wet weather conditions.
4. The air quality assessments depend on reliable estimates of emission rates. It is not clear whether the data used comes from UK plant experience or is based on assumptions by the plant manufacturers. Their validity needs to be demonstrated by long term measurements at other plant.
5. Toxic pollutants such as dioxins and furans are stabilised on solid surfaces and are very persistent in the environment. The respirable size particles are of special concern because they can carry a higher burden of adsorbed pollutants (compared to larger particles), providing a route for their transfer to humans via the respiratory system or via the food chain. There is the possibility that dioxins & furans are bioaccumulative. The effect of low level cumulative doses is not known. There is no recognition of these problems in the TWM application.

6. The plant will be designed to maintain the gaseous and vapour emissions of pollutants to statutory limits. No account has been taken of the pollutants transferred to the environment via the solid phase and no limits have been set.
7. The trend in recent years has been for safe exposure limits for dioxins to be reduced as knowledge of the health effects grows and there is good reason to suppose that this trend will continue. Incinerators built in the late 1980s and early 1990s were regarded as completely safe and state of the art. They were subsequently shown to be big contributors of dioxins to the environment in Western Europe. If the incinerator is built in the face of incomplete knowledge of the safety issues, the local people are effectively being used as guinea pigs for an experiment on the effects of pollution on health.
8. The proposed monitoring of toxic pollutants at quarterly intervals in the first year reducing to once per year and less subsequently, is completely inadequate. Incineration of batches of especially hazardous waste is unlikely to be detected with such a lax monitoring scheme. The applicant should be required to institute continuous analysis of all toxic pollutants regardless of cost.
9. In view of the potential dangers of particulate deposition in the surrounding area, dust sampling and analysis should be carried out continuously both inside and outside the plant. It is not included in the TWM proposals.
10. Much of the 80,500tpa of ash produced will go to landfill. There is no indication that the local landfill sites selected are suitable to receive these large dust deposits. The ash will include large amounts of respirable particles and contain readily leachable toxic materials.
11. Waste recycling schemes are growing in importance. The 'green box' recycling experiment is already taking place in Guildford and is likely to be extended. With the offer to dispose of 150000tpa of Surrey's waste at the new Colnbrook incinerator, there is further doubt on the viability of the TWM scheme. In future years, waste will have to be imported from a greater area involving more lorry journeys over greater distances. In the TWM application there is no attempt to analyse the future scenario. There is a need to calculate for a range of future recycling options, the increased lorry movements, the extra distances travelled, and the additional pollutants produced from the diesel exhausts.
12. This report has discussed many problems in setting safe emission limits for this plant. The information on potentially toxic particles in the TWA submission is inadequate. The pollution from the waste transportation, and the ash disposal has been ignored. The proposals for preventing hazardous material entering the waste stream are inadequate. The monitoring of the most dangerous emissions from the plant is completely inadequate. No continuous measurements in the residential areas surrounding the plant are proposed.
13. Guildford Labour Party requests the Environment Agency to refuse an IPC authorisation for this plant

## 10. Summary of the Key Issues

1. The Slyfield site is unsuitable. It is too near residential areas. Slyfield is a commercial not an industrial estate. There is no other large chemical processing plant in this area. The site has no environmental advantages. It is too far from the main waste sources. [Section 1.1]
2. The Guildford Labour Party incinerator questionnaire showed that over 90% of residents were wholly opposed to the incinerator scheme. [Section 2]
3. Inadequate attention is given to fault conditions at the plant, which could lead to excessive emissions. The EU Directive accepts that upsets will cause higher emissions and sets conditions for 'over the limit' operation. This is unsatisfactory. The plant should be closed for any fault condition. [Section 2.1]
4. MSW is an unknown mixture and could contain hazardous materials leading to unpredictable high levels of toxic emissions at certain times without the operators' knowledge. No waste screening is proposed or is practical. [Section 3.2]
5. As the plant ages, the operations will become dirtier with increased dust emissions and odours. Filter bag cleaning will increase the dust levels in the exhaust route. [Section 3.3]
6. Deposition on particulate material is an important pathway for transferring toxic pollutants to the surrounding population. It is not clear that the dispersion modelling takes account of the deposition especially in wet weather conditions. [Section 4.1]
7. The dispersion modelling calculations depend on reasonable estimates of emission rates. The source of the data used and its reliability are not clear. [Section 4.1]
8. Dust levels should be expressed as the number density of particles per unit volume, related to the particle size range. Information on respirable size particles is inadequate. [section 4.2]
9. Ash particles can adsorb and stabilise volatile species formed during combustion including dioxins, furans, PAHs, VOCs, and heavy metals. Respirable size particles carry a higher burden of pollutants and are more dangerous than larger particles. [Section 4.3]
10. Respirable size particles are at the lower limit of the bag filter capability. Many of these particles will pass through the filter during normal operation and as a result of filter cleaning. [Section 4.3]
11. Previous assurances by large companies about the safety of their operations have proved to be wrong and this does not inspire confidence in the TWM assessment. [Section 5]
12. The TWM incinerator will meet current safe limits for the gaseous emissions of dioxins but the limits tend to be reduced as knowledge increases. The incinerator is likely to be working outside recommended levels within a few years. There is insufficient knowledge about low level cumulative uptake into body tissue of dioxins and furans and of the effects on health. [Section 5.1]
13. MSW will sometimes contain halogenated organic materials. The recommended combustion temperature is 1100°C, rather than the 850°C upper limit for this plant. [Section 5.1]
14. The dioxins limit to be met refers to gaseous emissions only. No limit has been specified for dioxins adsorbed on solid particles and these concentrations will not be measured. [Section 5.1]
15. Heavy metals will also be carried into the atmosphere adsorbed on respirable dust particles. The application takes no account of this transfer route. [section 5.2]
16. The proposed emissions monitoring is very unsatisfactory. Only the acid gases will be measured continuously. The occasional analyses proposed for the most toxic pollutants (dioxins, furans and heavy metals) and the absence of any analysis of the respirable size dust particles is unacceptable. The failure to propose continuous monitoring in the adjacent residential areas is also unsatisfactory. [Section 6]

17. Most of the ash produced will go to landfill. There is no indication as to whether these sites are suitable for high loads of contaminated dust and the dangers of respirable particle emissions and the leaching of toxic species. [Section 7]
- 18.** Insufficient account is taken of increased recycling in Surrey. No account has been taken of the offer to incinerate Surrey's waste at Colnbrook. These developments could make the Slyfield incinerator economically nonviable, thus requiring waste import from a much wider area. No analysis has been presented of the effect of these alternatives on the additional lorry movements and travelling distances and the additional pollution from the diesel emissions. [Section 8]
19. There are so many problems with the proposed incinerator scheme that there is no justification for the Environment Agency to issue an IPC authorisation. [Section 9]