Assessment of the Risk of Brominated Dioxin Formation At Carranstown Waste Management Facility

Brominated chemicals are mainly used as flame-retardants for synthetic fibre and plastics. These Brominated Flame Retardants (BFRs) are used in electrical and electronic appliances, coatings, in automotive parts and in packaging and padding materials[1].

Due to their widespread usage, materials containing bromine will be present in municipal waste and thus the possibility of brominated dioxins (as opposed to chlorinated dioxins) forming during incineration is possible. The USEPA has found that the toxicity of bromo- and chlorobromo-substituted dioxin analogs are comparable to that of chlorinated dioxins in short-term toxicity assays[2] although current environmental levels are judged to be much lower than those for the ubiquitous PCDDs and PCDFs[3].

Recent research has been carried out in this area[1,4-6]. A study carried out in Sweden found no evidence for any unacceptable environmental risk from the incineration plants with good combustion conditions and equipped with flue gas cleaning. Moreover, it was highlighted that fires in landfills can cause substantial emissions of dioxins and probably brominated organic micro-pollutants. As a result the report recommends that controlled combustion should be favoured as the treatment method for BFR municipal waste as opposed to landfilling[4].

A recent study into the waste management of plastics containing BFRs found that "waste from E & E equipment and insulation foam can be safety added to today's municipal solid waste (MSW) to generate in an environmentally sound manner useful energy when incinerating BFR-containing materials. PBDD/F formation is not altered by the presence of the bromine-containing waste, and remains well within emission standards in these processes"[5]. The report also cites a report from the European Commission[6], which concluded that incineration of BFRs leads to insignificant amounts of brominated dioxins/furans.

The Waste Management Policy Group of the Organisation for Economic Co-operation and Development (OECD) recently published a "Report on Incineration of Products Containing Brominated Flame Retardants"[1]. The report concluded:

"In conclusion, based on the very limited amount of data available, a small amount of brominated and mixed brominated/chlorinated dioxins and furans are formed in municipal waste fly ash and presumably are to be found in even smaller amounts in the flue gas leaving the incinerator. It has been estimated that these materials may represent up to 10% of the total PCDD and PCDF formed during the incineration of municipal waste".

In relation to high temperature combustion and flue gas cleaning in modern incinerators, the report further concludes:

"measures will be equally effective in reducing the formation and emission of brominated and mixed brominated/chlorinated dioxins. It should be noted that the highest formation rates for brominated dioxins and furans from PBBOs during the laboratory experiments were associated with low temperatures and pyrolytic conditions. Modern incinerators are specifically designed to avoid these conditions"[1].

Thus, the evidence from the recent research highlighted above indicates that brominated dioxins are not a significant risk from modern waste-to-energy facilities such as is proposed for the Carranstown Waste Management Facility.

References

(1) OECD (1998) Report on Incineration of Products Containing Brominated Flame Retardants.

(2) USEPA, Region 6 (1998) Human Health Risk Assessment Protocol, Chapter 2: Facility Characterisation.

(3) WHO (2000) Polybrominated Dibenzo-p-dioxins and Dibenzofurans, Environmental Health Criteria No. 205.

(4) Oberg et al, (1990) Bromine & Waste Incineration – An Environmental Risk, Organohalogen Compounds, Vol. 2, Ecoinforma Press, Germany.

(5) Tange & Drohmann (2002), Waste Management of Plastics Containing Brominated Flame Retardants, FR 2002 Conference, London.

(6) European Commission (1995), Techno-economic studies on the reduction of industrial emissions to air, discharges to water, and the generation of waste from the production, processing and destruction (by incineration) of brominated flame retardants.

Report on the Suitability of a Site for the Installation of a Puraflo™ System at Carranstown, Co Louth.

December 2000

Prepared by:

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Report on the Suitability of a Site for the Installation of a Puraflo™ System at Carranstown, Co. Louth.

1. Introduction

K.T Cullen & Co. were requested by Project Management to carry out trial pitting and percolation tests at a site in Carranstown Co. Louth. The purpose of the work was to assess the suitability of the site for the installation of a Puraflo™ system with associated septic tank and percolation area. The system was designed to cater for a maximum of 100 people.

2. Field Work

2.1 On Site Assessment

The site is underlain by limestone bedrock. No outcrops, springs or karst features were seen at the site. Monitoring wells and trial wells drilled at the site in May 2000 indicate relatively deep overburden deposits varying from approximately 5 metres to 21 metres of clays and gravels. The water table in one of these boreholes (MW1) was measured as being approximately 10.5 metres below the ground level at the time of trial pitting (12/12/00).

The field in which the work was carried out has a shallow ditch to the south-east which had water in it at the time of trial pitting. Prior to fieldwork, the weather in general had been extremely wet and parts of the field near the ditch were experiencing ponding of surface water.

The site is presently under grass and apart from the localised ponding appears to be well-drained. The brown/red colour of the subsoil would also indicate a well-drained site.

2.2 Trial Pits

Two trial pits were dug at the site of the proposed percolation area. The trial pit logs are shown in Appendix A and their location is shown in Figure 1. The trial pits were excavated to a depth of 2.8 m and 3 m respectively. Both encountered similar overburden deposits-1.2-1.8 m of boulder clay and then

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Appendix

a clayey gravel which became more gravelly with depth. No seepages were encountered during the digging and after 48 hours, no water had entered the hole.

2.3 Percolation Pits

Four percolation pits were dug at the site of the proposed percolation area. The top 0.30 metres of soil was removed at the location of each of the four pits by the JCB. 0.30 metres was chosen as this is the depth at which effluent will be introduced to the soil according to Puraflo™ Agrément Certificate 97/00060. The pits were then dug in these depressions with in accordance to dimensions specified in the EPA's Wastewater Treatment Manuals. The percolation pits measured 0.3 m by 0.3 m and were completed at a depth of 0.4 m-approximately 0.7 m below the ground surface.

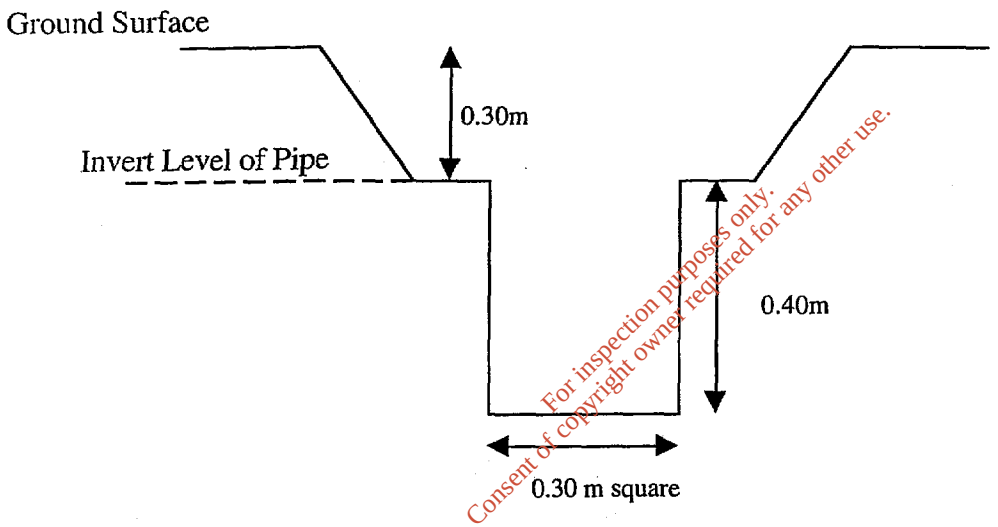


Figure 2: Design of the Percolation Pits as recommended by EPA Wastewater Treatment Manual.

The sides of the percolation pits were scored with a trowel and filled with water to simulate fully saturated soil conditions. The pits were then left overnight to soak.

On the following day the water had still not drained completely out of the holes even though it had dropped in each of them. The holes were refilled to a depth of 0.30 m with water, in order to assess the time taken for the water level to drop 0.1 m (100 mm). After 4 hours the water level had dropped 0.04 m in Percolation Pits 1 and 4, 0.01 m in Percolation Pit 2 and 0 m in Percolation Pit 3. This would give a minimum T value of 150.

3. Conclusions

The site has failed the percolation test as the T value obtained was greater than 50 (EPA Wastewater Manual). This is due to the presence of clays beneath the site which had become highly saturated during the recent bad weather.

The water table at the site is not high and no seepages were seen in the trial pits.

4. Recommendations

- We would recommend, in accordance with EPA Guidelines, that the site be engineered to meet the required specifications. This will involve the removal of the existing overburden material over an area of 300 m^2 and the importing of material with a suitable T value-preferably a fine sand or clayey sand with a T value of between 5 and 15. The imported soil can be placed in layers 0.3 m thick and each layer should be compacted lightly prior to the adding of the next layer. Percolation tests should be carried out on every 0.3 m thick layer. The depth of the fill should be approximately 2 metres to allow at least 1 m between the lowest level of a percolation trench (0.7 m below ground level) and the original soil level. This is a total volume of material of 600 m^3. Once the overburden material is in place a full percolation test should be carried out. A reserve percolation area should also be constructed in the event of the main area malfunctioning.

- Alternatively, a sand filter could be constructed with associated polishing filter. The loading rate on this constructed filter is recommended to be 50 l/m^2/day. The advantage of this type of sand filter is that it takes up considerably less area than the trenched percolation area. The disadvantages are that a polishing filter is necessary and pumping of wastewater might be needed to transfer effluent from the sand filter to the polishing filter. Sand filters are used in conjunction with septic tanks in soil which is unsuitable for conventional percolation areas. The filter system consists of 600-900 mm of graded sand underlain by 200 mm of gravel. The filter system is overlain by the natural topsoil but is separated from it by a geotextile membrane. The wastewater is treated by moving through the sand filter and can then be directed under gravity or pumping to a final polishing filter. (EPA Wastewater Treatment Manual).

Respectfully Submitted

Victoria Conlon

Victoria Conlon B.Sc.M.Sc.

8/01/01

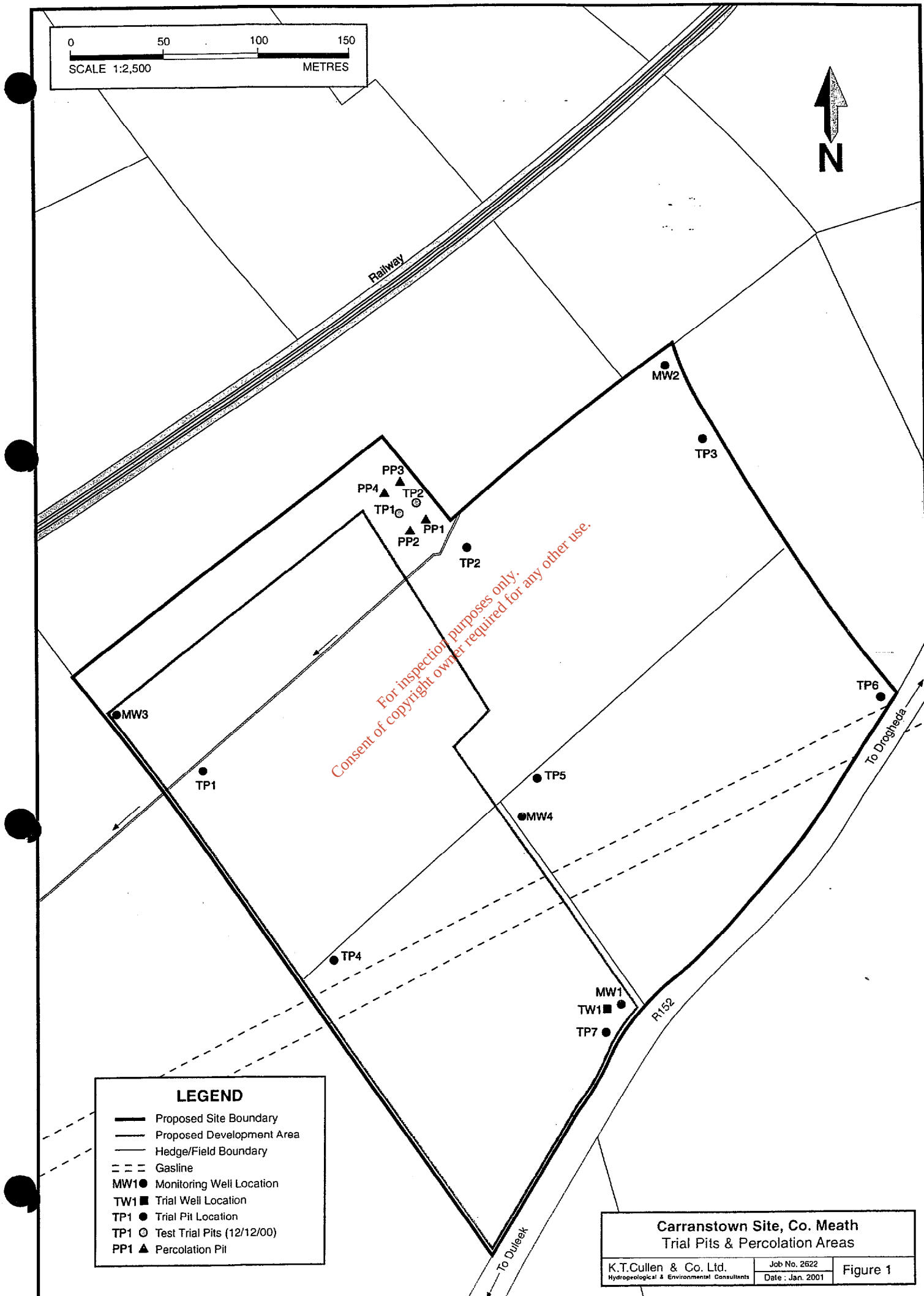
Date

Kieran O Dwyer BE MIEI

8/01/01

Date

FIGURE



APPENDIX A

Trial Pit Records

Project No. : 2622 **Location :** Carranstown Duleek **Date :** 12/12/00

Drilling Method : JCB **Supervisor :** VC

TRIAL PIT NO. 1

Geology :

0 - 0.1	Grass and Topsoil
0.1 - 1.8	Light Brown Silty BOULDER CLAY with pebbles and cobbles
1.8-2.8	Light Grey Clayey Sandy GRAVEL with well rounded boulders, becoming more gravelly with depth.

Depth to Rock : >2.8

Rock Type : None Encountered

Water Entry : None Encountered

Static Water : None after 48 hours

Total Depth : 2.8 metres

Elevation

Comments : N/A

K.T.Cullen & Co. Ltd.
Hydrogeological & Environmental Consultants

Trial Pit Records

Project No. : 2622 **Location :** Carranstown Duleek **Date :** 12/12/00

Drilling Method : JCB **Supervisor :** VC

TRIAL PIT NO. 2

Geology :

0 - 0.1	*Grass and Topsoil*
0.1 - 1.2	Light Brown Silty BOULDER CLAY with pebbles and cobbles
1.2 - 3.0	Light Grey Clayey, Sandy GRAVEL with well rounded boulders, becoming more gravelly with depth. Mostly limestone boulders

Depth to Rock : >3 metres

Rock Type : None Encountered

Water Entry : None Encountered

Static Water : None after 48 hours

Total Depth : 3 metres

Elevation

Comments :

K.T.Cullen & Co. Ltd.
Hydrogeological & Environmental Consultants

MinChem
PART OF THE INDAVER GROUP

INDAVER IRELAND

Procedure: Environmental Complaints

Reference	Status	Version	Owner
Operations_6.2	Authorised	1	Patricia McGrath

Type Operations Manual **Sub-Type** Environmental

1. Purpose

The purpose of this procedure is to document environmental complaints and their resulting corrective actions.

2. Definition

3. Responsibilities

The Quality and Environmental Manager is responsible for ensuring that this procedure is implemented.

This procedure applies to all MinChem and Indaver personnel receiving environmental complaints, by telephone, in writing or by personal contact with the external party and to those involved in the processing of environmental complaints.

4. References

MinChem Waste Licence 36-1	
Environmental Complaints Form	Operations 6.2.1
Environmental Complaints Register	Operations 6.2.2

5. Procedure

Receipt of Complaint

The person receiving the complaint will enter the details on an Environmental Complaint Form Operations 6.2.1 under the following headings:

- Name and address of complainant
- Phone number if applicable
- Date of complaint
- Time of complaint
- Nature of complaint
- MinChem/Indaver contact person

He/she will then pass on a copy of the form to the Quality & Environmental Manager.

Recording Complaint

The Quality & Environmental Manager will log the complaint in the Environmental Complaints Register Operations 6.2.2 under the following headings:

- Ref No.
- Date
- Time
- Complainant's name
- Complainant's Address
- Complainant's Telephone Number
- Person receiving complaint
- Brief Details
- Passed to
- Action
- Response sent (date)
- Notified to EPA (for complaints received by MinChem)
- Proposed Completion date
- Review comments
- Completion date

Investigation

The Quality & Environmental Manager and the relevant department manager investigate the complaint and determine the root cause.

This investigation should include measures for:

- Restoring compliance as quickly as possible
- Preventing recurrence
- Assessing and mitigating any adverse environmental effect

Corrective Action

Following this investigation an appropriate corrective action is decided upon. This is entered on the both the Environmental Complaint Register Operations 6.2.2 and the Environmental Complaint Form Operations 6.2.1.

The corrective action is given a proposed completion date and a person responsible for carrying out the corrective action is nominated.

The proposed corrective action is monitored by the Quality & Environmental Manager to ensure that the desired goals are met.

If the corrective action has not been discharged by the proposed completion date, the Quality & Environmental Manager will inform the relevant manager.

Based on the proposed corrective action, the Quality & Environmental Manager in consultation with the relevant Manager must decide if:

- Changes to the procedures, manual, documentation or records need to be made
- Findings of the complaints investigation need to be reported to external regulatory agencies (other than the EPA).
- External communications media need to be briefed.
- Interaction with other components of the management system such as occupational health and safety and quality is required.

Where corrective action may involve initiation of a project over a significant time scale, this should form part of the Schedule of Environmental Objectives and Targets Operations 10.4.1

Signing Off Complaint

After the corrective action has been taken, the person responsible signs and dates the Environmental Complaints Form.

The Quality & Environmental Manager then signs off the Environmental Complaints Form and the Environmental Complaints Register. Environmental Complaints Forms are filed numerically and retained by the Quality & Environmental Manager

The Quality & Environmental Manager informs the complainant in writing of the root cause of the complaint and the resulting corrective action.

MinChem Complaints - Reporting

All environmental complaints received by **MinChem** must be reported to the EPA as per condition 3.14 of MinChems Waste Licence.

Reviewing

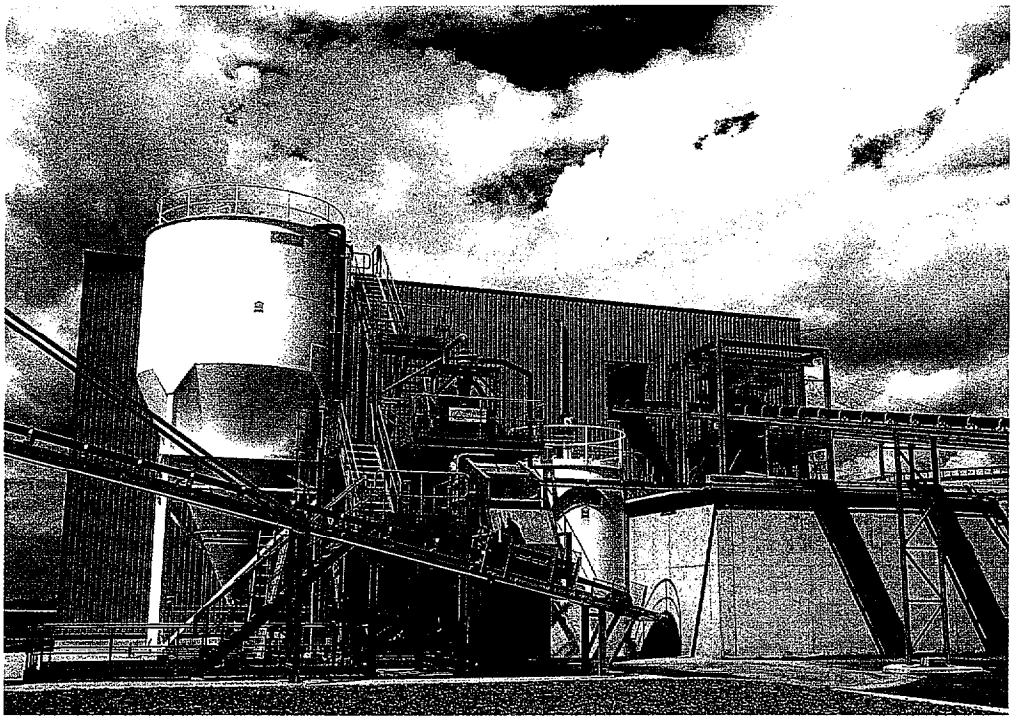
Management will review all environmental complaints on an annual basis during the Environmental Management Review.

Records

Environmental Complaints Forms will be maintained on file by the Quality & Environmental Manager for a minimum period of 7 years.

Change History:
Suggested Next Review Date: 12/04/2002

- End of Document -

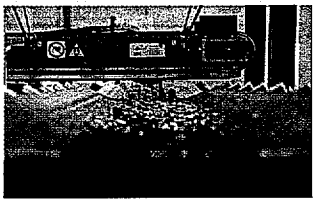


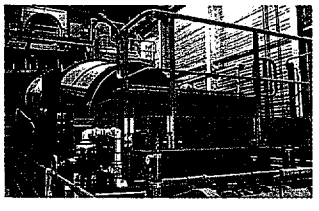
Ash treatment

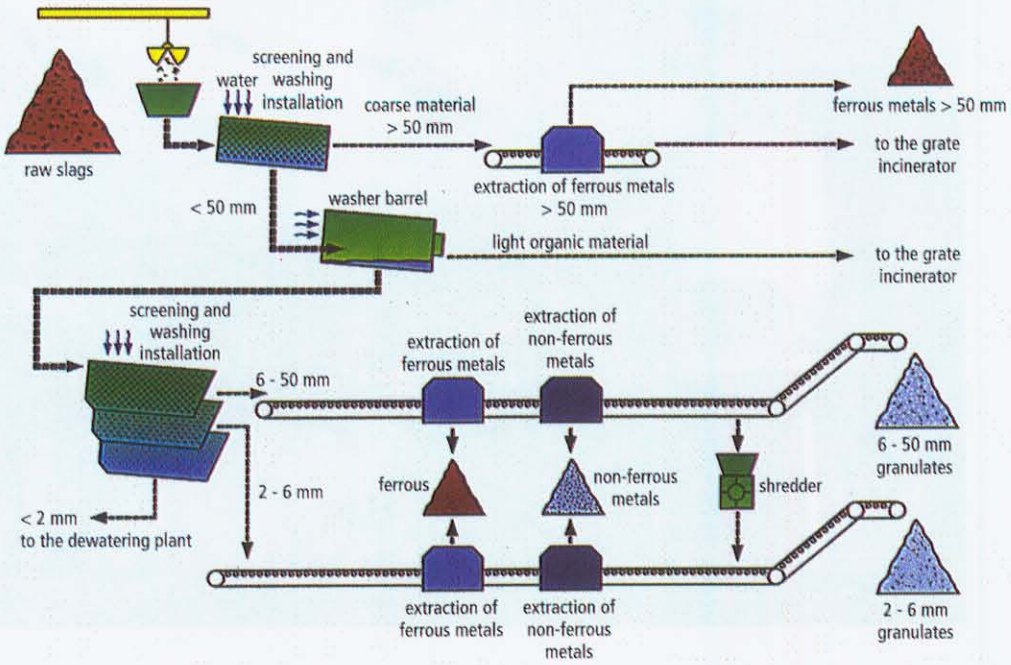
Useful application of ashes

In the ash treatment unit, ashes from the household incineration facilities are washed, sieved and purified. The end product is a valuable secondary material that can be used for several applications.

Ferrous and non-ferrous metals are carefully removed in various cut, sieve and wash units. Some of those recuperated metals will be re-used in industry. Inert ashes remaining after incineration are converted into granulates. These can be used as secondary materials in the construction industry, in accordance with the relevant VLAREA regulations.







ash treatment

Delivery

Some of the ashes from the Indaver grate incinerators are transferred to the ash treatment unit. Comparable incinerator ashes from other household incineration facilities can also be treated, provided they comply with the prescribed quality requirements. Waste materials can only be supplied after contacting our planning department.

Treatment

The incineration ashes are treated in various cut, sieve and wash units.
A robust bar sieve first separates the large pieces of metal and stones. A rotary sieve then separates other large pieces, which are de-ironed and sent back to the grate incinerator. The ashes are then separated into three fractions in the wash and sieve unit. Ferrous separators retrieve the iron from the two largest fractions. A non-ferrous separator retrieves mainly aluminium. The inert fraction is converted into granulates, which are used as secondary materials in construction. The smallest fraction is dehydrated and deposited in a landfill class 1 site. The installation has been designed and constructed in such a way that Indaver can respond to the changing market demands and comply with the most recent regulations.
Three end products result from the treatment of the incineration ashes. The ferrous and non-ferrous fractions, which can be recycled and the granulate fraction, with sizes from 0 to 2 mm. In accordance with the OVAM certificate, the 2-6 and 6-50 mm fractions can be used as formless construction material (ballast) below foundations.

INDAVER IRELAND

Mr Seamus Mattimoe
North Eastern Health Board
Kells
Meath

3rd November 2000

Dear Mr Mattimoe,

Please find enclosed information on our proposed Waste Management Facility at Carranstown.

We are launching the project to the public on Monday 6th November. The following is a brief description of the first stage of our consultation programme:

Friday 3rd November
- Meeting with Meath Council Officials

Monday 6th November
- Meeting with Meath Councillors
- 500 copies of the enclosed information leaflet to be distributed by our staff to all houses in the local environs
- Press briefing 2:00 - 5:00pm to Local and National Media
- Information Pack to be delivered to Meath T.D.s

Tuesday 7th November
- Information Packs to be delivered to Louth, Cavan and Monaghan County Council Officials
- Information Pack to be delivered to Councillors and T.D.s in above areas
- Information Pack to be delivered to other interested bodies in the region e.g. IFA, ICA, Chambers of Commerce and Political Parties.

We will update you on further aspects of our communication programme as it develops. If you have any queries about our project or our programme please feel free to contact myself, John Ahern or Laura Burke.

Yours sincerely

Jackie Keaney
Communications Manager

Carranstown EIS – Review of Air Quality Impact at Mount Hanover School

Air dispersion modelling of the Carranstown Waste Management Facility was carried out using the United States Environmental Protection Agency's (USEPA) regulatory model ISCST3. The aim of the study was to assess the impact of typical emissions and at the emission limits outlined in Council Directive 2000/76/EC, in the ambient environment. The study demonstrates that all substances which will be emitted from Indaver Ireland will be at levels that are well below even the most stringent ambient air quality standards and guidelines.

Summary of Maximum Impacts

Modelling results indicate that the ambient ground level concentrations are below the relevant air quality standards or guidelines for all compounds under maximum operations of the site (see Table 1). The modelling results indicate that this maximum occurs at or near the site's northern boundary. Maximum operations are based on the emission concentrations outlined in EU Directive 2000/76/EC.

Concentrations fall off rapidly away from this maximum and the short-term limit values at the nearest residential receptor will be less than 30% of the worst-case concentration. The annual average concentration has an even more dramatic decrease in maximum concentration away from the site with concentrations from emissions at Indaver Ireland accounting for less than 6% of the limit value (not including background concentrations) at worst case sensitive receptors near the site. Thus, the results indicate that the impact from Indaver Ireland is minor and limited to the immediate environs of the site.

In the surrounding main population centres, Duleek and Drogheda, levels are significantly lower than background sources with the concentrations from emissions at Indaver Ireland accounting for less than 1% of the annual limit values for all pollutants.

Summary of Impact At Mount Hanover School

Modelling results indicate that the ambient ground level concentrations at Mount Hanover School are significantly below the relevant air quality standards or guidelines for all compounds under maximum operations of the site (see Table 2). The modelling results indicate that the concentrations at Mount Hanover School are predicted to be significantly lower than the maximum concentrations, which occurs at or near the site's northern boundary. The maximum concentrations at Mount Hanover School range between 0.1 – 13% of the air quality standards and between 5 – 18% of the maximum concentration near the site boundary. Thus, the impact at Mount Hanover School is significantly lower than those values reported in the EIS and well below the most stringent air quality standards and guidelines.

Table 1 Predicted Maximum Ground Level Concentrations Compared to Air Quality Standards

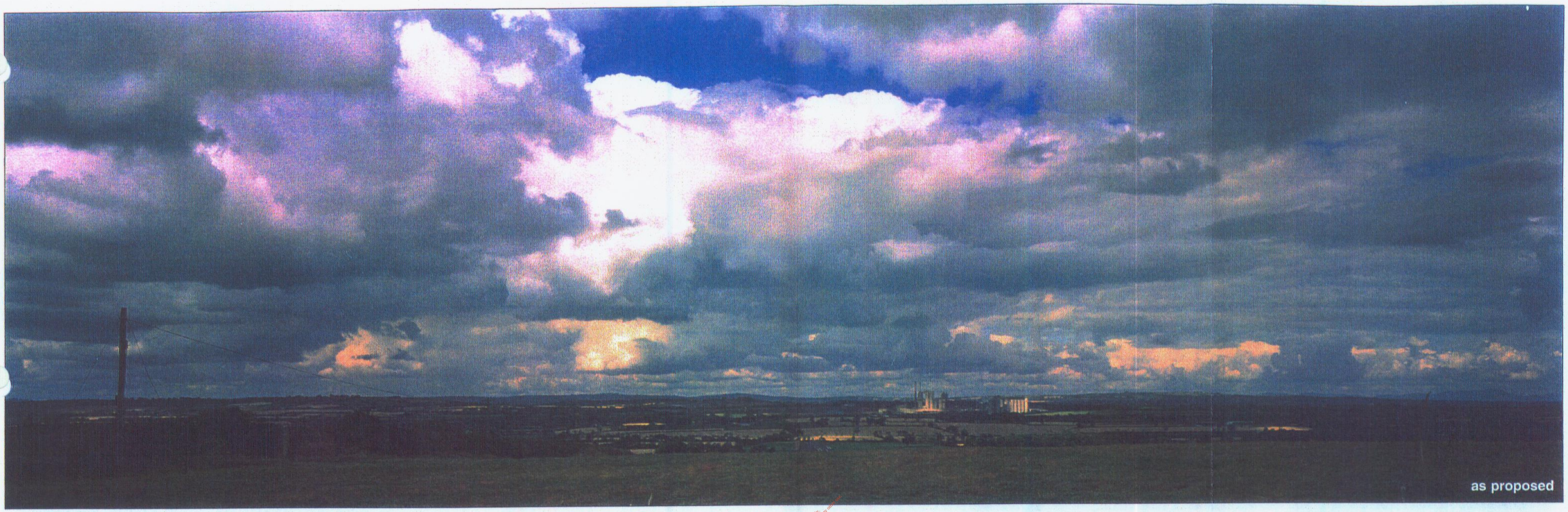
Emission	Type of Prediction	Modelling Concentration ($\mu g/m^3$)	Background ($\mu g/m^3$)	Concentration Including Background ($\mu g/m^3$)	Limit Value	Compliance
NO_2	99.8th percentile of a Years Hourly Average	65	20	**85**	200	**Yes**
NO_2	Annual Average	8	10	**18**	40	**Yes**
SO_2	99.7th percentile of a Years Hourly Average	52	8	**60**	350	**Yes**
SO_2	99.2th percentile of a Years Daily Average	20	4	**24**	125	**Yes**
Dust (as PM_{10})	90.5^{th} Percentile of 24-hr concentrations	1.9	20	**21.9**	50	**Yes**
Dust	Annual Average	0.51	20	**20.5**	40	**Yes**
TOC	Hourly Average (as a 98th%ile)	6.7	100	**107**	1000	**Yes**
HCl	Hourly Average (as a 98th%ile)	6.7	0.01	**6.7**	100	**Yes**
HF	Hourly Average (as a 98th%ile)	0.68	0.01	**0.69**	3	**Yes**
HF	Annual Average	0.051	0.005	**0.056**	0.3	**Yes**
PCDD/PCDF	Annual Average (ng/m^3)	5.0	28 – 46	**Range: 33 - 51**	-	-
Hg	Annual Average	0.0024	< 0.005	**< 0.0074**	0.1	**Yes**
Cd & Tl	Annual Average (Emission conc. = 0.025 mg/m^3)	0.0012	< 0.023(2)	**< 0.024**	0.005	**Yes(1)**
Sum of Metals	Annual Average (for antimony)	0.026	0.012	**0.035**	0.14	**Yes**
Sum of Metals	Maximum 1-Hour (for manganese)	0.83	0.024	**0.85**	5.0	**Yes**
Arsenic	Annual Average (Emission conc. = 0.015 mg/m^3)	0.008	< 0.02(2)	**< 0.028**	0.004	**Yes(1)**
Nickel	Annual Average (Emission conc. = 0.015 mg/m^3)	0.008	0.006(2)	**0.014**	0.010	**Yes(1)**

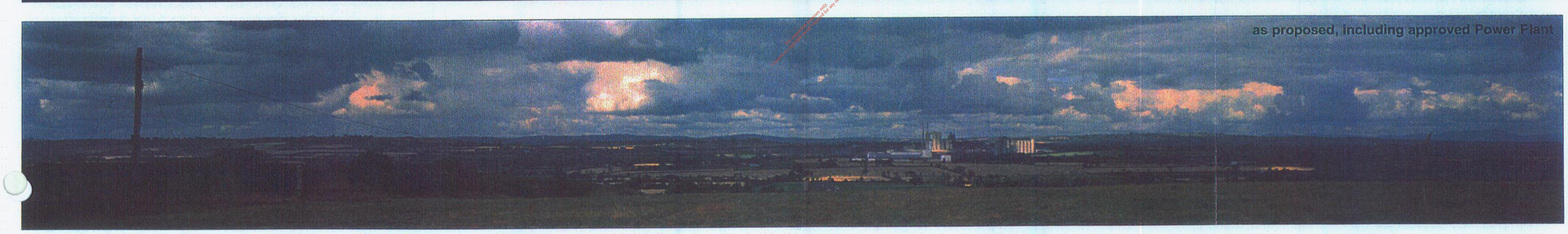
(1) Cd, As & Ni predicted ambient concentration within the applicable PSD Increment of 25% for a Class II area.
(2) Based on non-detects being equal to the limit of detection.

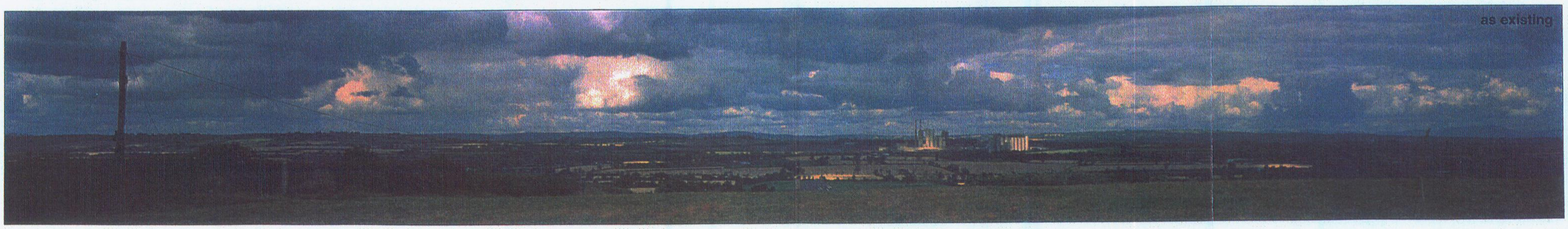
Table 2 Predicted Ground Level Concentrations At Mount Hanover School Compared to Air Quality Standards

Emission	Type of Prediction	Modelling Concentration (µg/m³)	Backgrounc (µg/m³)	Concentration Including Background (µg/m³)	Limit Value	% of Maximum Value(3)	% of Limit Value(3)
NO_2	99.8th percentile of a Years Hourly Average	11.8	20	**40**	200	**18**	**5.9**
NO_2	Annual Average	0.47	10	**10.5**	40	**5.9**	**1.2**
SO_2	99.7th percentile of a Years Hourly Average	9.4	8	**17.4**	350	**18**	**2.7**
SO_2	99.2th percentile of a Years Daily Average	2.0	4	**6.0**	125	**10**	**1.6**
Dust (as PM_{10})	90.5th Percentile of 24-hr concentrations	0.09	20	**20.1**	50	**4.7**	**0.18**
Dust	Annual Average	0.03	20	**20.0**	40	**5.9**	**0.08**
TOC	Hourly Average (as a 98th%ile)	0.57	100	**100.6**	1000	**8.5**	**0.06**
HCl	Hourly Average (as a 98th%ile)	0.57	0.01	**0.58**	100	**8.5**	**0.6**
HF	Hourly Average (as a 98th%ile)	0.06	0.01	**0.07**	3	**8.5**	**2.0**
HF	Annual Average	0.003	0.005	**0.008**	0.3	**5.9**	**1.0**
PCDD/PCDF	Annual Average (ng/m³)	0.31	28 – 46	**Range: 28 - 46**	-	**6.2**	**-**
Hg	Annual Average	0.0002	< 0.005	**<0.005**	0.1	**8.3**	**0.2**
Cd & Tl	Annual Average (Emission conc. = 0.025 mg/m³)	0.0001	< 0.023(2)	**<0.023**	0.005	**8.3**	**2.0**
Sum of Metals	Annual Average (for antimony)	0.0016	0.012	**0.014**	0.14	**6.2**	**1.1**
Sum of Metals	Maximum 1-Hour (for manganese)	0.15	0.024	**0.11**	5.0	**11.2**	**3.0**
Arsenic	Annual Average (Emission conc. = 0.015 mg/m³)	0.0005	< 0.02(2)	**<0.02**	0.004	**6.3**	**12.5**
Nickel	Annual Average (Emission conc. = 0.015 mg/m³)	0.0005	0.006(2)	**0.007**	0.010	**6.3**	**0.5**

(1) Cd, As & Ni predicted ambient concentration within the applicable PSD Increment of 25% for a Class II area.
(2) Based on non-detects being equal to the limit of detection.
(3) Not including background concentrations







73.5° | 60° | 50° | 40° ANGLE OF VISION SCALE 40° | 50° | 60° | 73.5°

View 13

Proposed Waste Management Facility at Carranstown, County Meath.

View from Bellewstown

An Roinn Ealaíon, Oidhreachta, Gaeltachta agus Oileán
Department of Arts, Heritage, Gaeltacht and the Islands

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4 Haddington Terrace,
Dun Laoghaire,
Co. Dublin.

Dear Mr Kelly,

I refer to your letter to this office dated 30/01/01 received in this office on the 31st January 2001 regarding lands in Co. Meath. I have checked the maps and the following is the position regarding the lands in :-

OS ME 27 in the Td of Carranstown.
Appears not to be within pNHA/SAC/SPA.

I have forwarded a copy of your query to our National Monuments & Historical Properties section for their observations.

If you have any more enquiries please contact me on 01-6472363 or e-mail me at mphelan@ealga.ie.

Please note:
Six inch pNHA/SAC maps are available for inspection at our Head Office (By Appointment), Local Authority Offices, Teagasc, FDS and our Regional Offices should you which to verity if any area is within pNHA/SAC.

Yours Sincerely,

Michael Phelan
Site Designations & Plans.

An Roinn Ealaíon, Oidhreachta, Gaeltachta agus Oileán
Department of Arts, Heritage, Gaeltacht and the Islands

Dúchas
The Heritage Service

Séadchomharthaí Náisiúnta &
Na Sealúchais Stairiúla
National Monuments &
Historic Properties

6 Plás Ely Uachtarach
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Glao Áitiúil 1890 474 847
Web www.heritageireland.ie

Robert Kelly
Indaver Ireland
4 Haddington Terrace
Dun Laoghaire
Co Dublin

Dear Mr Kelly

I refer to your letter of 30/1/01 and enclosed map which was referred to the National Monuments and Architectural Division on 6 February, 2001. It seems that there are no **known** archaeological sites within the area outlined in green on the map.

I return your map herewith.

Yours sincerely

Marie O'Gallagher
National Monuments & Architectural Protection Division

14 February, 2001

Eanna O'Kelly and Associates
Consultant Acoustic Engineers

24 Strand Street,
Skerries,
Co. Dublin.

Phone: +353 (1) 8494500
Fax: +353 (1) 8494859
Mobile: 087 2430872
087 2310487
E-mail: eokelly@iol.ie

Date: 23rd July 2002
Ref: IND 399

Attn. Robert Kelly,
INDAVER Ireland Ltd.,
4 Haddington Tce,
Dunlaoghaire,
Co. Dublin.

Dear Robert,

I have the following comments in relation to blasting at Platin and its impact on the proposed INDAVER Plant.

1. Blasting has been carried out at the Platin Quarry over the last 30 years, usually one or at most twice per week. This frequency of occurrence is likely to continue.

2. Blasting will not give rise to electrical interference. It will give rise to ground borne vibration. The IPC licence sets a peak particle velocity limit of 12mm/sec. at the nearest noise sensitive location. This location is a house located to the south east of the quarry at a distance of approximately 280 metres from the quarry face. The turbine hall and condenser unit at the proposed plant is located approximately 380 metre distance from the nearest face of the quarry. Consequently the peak particle velocity level can be expected to be approximately 75% less at this location, assuming the same maximum instantaneous charge of explosive is used in the blasting.

3. With a peak particle velocity of 12mm/sec. there is only a 5% probability of very slight cosmetic damage to buildings such as slight cracking of plaster and 50mm/sec. is the upper limit for safe blasting to avoid structural damage to buildings.

4. Peak particle velocity and/or acceleration levels will be derived in considering the appropriate seismic design of the foundations for major items of plant. These levels will take account of predicted levels and safety factors to cover the possible variation in geological condition and in blasting technique. This will ensure that there will be no adverse vibrational impact on the plant and machinery.

5. Where required the protection of vibration sensitive equipment and instrumentation, or items of plant can invariably be achieved by the use of vibration isolation techniques whilst still blasting economically. It should be noted that many vibration sensitive items require to be vibration isolated from vibrations arising within their own local environment, e.g. scanning electron microscopes, very fine balances, precision machine tools etc. Manufacturers of these type of equipment will specify vibration limits in terms of either maximum velocity, particle velocity or displacement over a given frequency range, thus setting the performance specification for the vibration isolation system.

6. It should be noted that the laboratories and control room at Irish Cement Platin are located at a distance of 380 metres from the nearest face where blasting took place.

7. Phase 1 of the Huntstown Power Plant, a Combined Cycle Gas Turbine Plant of capacity of 450MW is presently being commissioned. This is located within the confines of Huntstown Quarry at a distance of 500 metres from the Southern Quarry, which is presently being worked, and at a similar distance from the Western Deposit which is intended to be developed.

Yours Sincerely

Eanna O'Kelly

Eanna O'Kelly B.E. M Acoustical Society of America **Gavan O'Kelly B.Sc Applied Physics AMIOA**
Donat O'Kelly B.A. B.A.I.

BYRNE Σ Ó CLÉIRIGH
ENGINEERS CONSULTANTS

Indaver Ireland,
Haddington Terrace,
DUN LAOGHAIRE,
Co. Dublin.

For attention Laura Burke/Robert Kelly

25th July 2002

02P0890
FBS: 321: 14.02.01

Re: Investigation into impact of Natural Gas inventory on the Seveso II Status of the Waste Management Facility at Carranstown

Dear Sirs,

We set out hereunder the findings of an investigation aimed at assisting Indaver in responding to comments on the EIS prepared on behalf of a third party appellant – No Incineration Alliance, c/o Aine Walsh, P.O. Box. 2001, Drogheda, Co. Louth.

This letter relates to a claim that the Indaver site is a Top Tier Seveso II site based on the inventory of natural gas in an underground pipeline which crosses the site. To put our findings into context, we reproduce here the text of the comments on the EIS in relation to the impact of the natural gas pipeline on the Seveso Status of the site:

Mr. Michael A. O'Neill MIPI of O'Neill Town Planning, Harbour Road, Howth, has cited the following under item 1.2.5 of his letter of 20th January 2002 to the Secretary of An Bord Pleanála.

Quote

1.2.5 Natural Gas main running through site

There is an existing main natural gas pipe line from Drogheda to Navan which runs under the proposed site. It is situated between the warehouse and reception hallj/ sorting plant. The gas main diameter is a 300mm @ 60 Bar (density 0.6). The length of the pipe under the site map ref 2666-22-DR-012 is approx 300 metres.

"Natural Gas" is listed as one of the 51 "named substances" under the First Schedule of the Regulations in SI 476.

The quantity of natural gas present in the pipeline with the site boundary is 763 tonnes. This is 3.8 times in excess of the upper tier threshold of 200 tonnes. The facility therefore qualifies as a Seveso site under SI 476, there is a potential for a major accident involving one or more dangerous substances at the site.

Indaver as part of their EIS have failed to assess the site as being a Seveso site.

Unquote

Byrne Ó Cléirigh, 30a Westland Square, Pearse Street, Dublin 2, Ireland.
Telephone: + 353 – 1 – **6770733**. Facsimile: + 353 – 1 – **6770729**. Email: **Admin@boc.ie**. Website: **www.boc.ie**

Directors: L Ó Cléirigh, BE, MIE, C Eng, FIEI, FI Mech E. AJ Clarke, BE, C Eng, FIEI. TV Cleary, BE, C Eng, FIEI, F I Chem E. JB Fitzpatrick, FCA.

Our findings are as follows:

1. There is a natural gas pipeline running under the site.

2. The length of the pipeline is approximately 300 metres. We have checked the length by reference to the two drawings referred to in para 3 below.

3. We note that the diameter of the pipeline is not 300mm as stated by Ó Neill Town Planning in their letter to An Bord Pleanala of 20th January 2002 but is in fact 200mm. The drawing referred to by Ó Neill Town Planning viz. 2666-12-DR-012 is a site drainage layout drawing that was issued as part of the Waste Licence Application submitted by Indaver to the EPA.

   We understand from Indaver that the pipeline diameter as shown on that drawing was indeed 300mm but this is not correct. We have confirmed to our satisfaction that the diameter of the actual pipeline laid by BGE is 200mm. The correct diameter may be confirmed by reference to two drawings. The first is the BGE Strip Map – Drawing No. BGE/68/AL/05 Rev 9 Dated 28th February 2001. We have also examined a revised version of the Indaver Drawing No. 2666-22-DR-012. Revision D of this drawing, dated 24/07/02, shows the gas pipeline diameter as 200-mm diameter i.e. the diameter of pipeline actually laid by BGE.

4. From a telephone discussion, which the writer had with BGE, we note that the gas distributed in the Carranstown area originates in Scotland. Based on the volumetric gas composition provided to the writer by BGE's Cork staff, we have calculated that the gas currently distributed has a molecular weight of 18.56. For comparison the molecular weight of air is 28.96. The relative density of the gas (relative to air at standard temperature and pressure) is thus 0.64.

5. The pipeline has a design pressure of 70 bar and can operate at pressures in excess of 60 bar. At these high pressures the gas becomes somewhat compressible. BGE provided a figure of 0.8144 for the compressibility factor (z), which they use for this gas at these pressures. The impact of compressibility is to increase the density of a gas above what it would be if it behaved as an ideal gas. Using the compressibility factor increases the gas inventory over what would be computed assuming ideal gases.

6. We have computed the volumetric capacity of the pipeline below the Indaver site to be 9.74 cubic metres. This takes account of the fact that there are two lengths of pipeline each approximately 150 m long installed with slightly different internal diameters. From the table entitled Proximity Details on the BGE Strip Map, there are two different values cited for the pipe wall thickness used under the Indaver site. The wall thickness for the 30m-proximity section of the line is 6.35mm and is 11.91 mm for the 3-m proximity section. The wall thickness in each section converts to an internal diameter of 206mm ID for a 30-m proximity section and 195-mm ID for a 3-m proximity section. We have computed the internal volume based on the respective pipe lengths for each wall thickness.

7. We have computed the actual density of the gas at 70 bar and 15 degrees C as 66.62 kgs per cubic metre of gas taking the BGE compressibility factor into account.

8. Based on the computed pipeline volume beneath the Indaver site of 9.74 cubic metres and a computed density at the transmission conditions, we estimate the mass of natural gas in the pipeline under the site to be 649 kgs.

The Appellant's Planning Consultant is correct in his statement that were there to be an inventory of 763 tonnes of natural gas in that portion of the pipeline under the Indaver site then the site would indeed be a Top Tier Seveso II site. However, this is clearly not the case. In fact even at 70-bar pressure, the quantity of natural gas in the line is more than 50 times lower than the minimum threshold (50 tonnes) natural gas at which the Seveso Regulations would apply. Furthermore the inventory is over 1000 times lower than the inventory as computed by the Appellant's planning consultants or their advisers.

It should also be noted that if, instead of the 200mm diameter of the as-constructed pipeline, the diameter was in fact 300mm, then even this larger size of pipeline would not result in the gas inventory approaching the minimum threshold for Seveso. Computed at the same conditions as those for the 200mm pipeline a 300-mm line would have an inventory of approximately 1.5 tonnes. This is still over 30 times lower than the Seveso minimum threshold of 50 tonnes and some 500 times lower than the inventory claimed in the letter from the Appellant's Town Planning Consultants.

Recommendation

On the basis of our assessment there is nothing further which Indaver needs to do other than to bring these findings to the attention of An Bord Pleanala and the Environmental Protection Agency. In their submissions to An Bord Pleanala and/or EPA, Indaver should make sure to enclose a copy of the relevant BGE Strip Map drawing with the Indaver site superimposed thereon and also a copy of Rev. D of Indaver drawing 2666-22-DR-012.

These will clearly demonstrate that the as-laid pipeline diameter under the Indaver site is 200mm and not 300 mm.

Yours faithfully

Thomas Cleary BE CEng EurIng FIChemE FIEI
Chartered Engineer

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Submission--25D

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