Huntingdonshire

district council

Application for a Permit for a Standard Part B Installation

Pollution Prevention and Control Act, 1999
Pollution Prevention and Control (England and Wales) Regulations 2000
(as amended)

For local authority use		
Application Reference	Officer reference	Date received
S2318	AJM	22 DECEMBER 2005

When to use this form:
This regime is known as Local Authority Pollution Prevention and Control, LAPPC. Installations permitted under this regime are known as B installations. Use this form if you are sending an application for a 'Part B' permit to a Local Authority under the Pollution Prevention and Control (England and Wales) Regulations 2000 (as amended) ("the PPC Regulations").

Before you start to fill in this form:
Please read the Defra general guidance manual issued for LA-IPPC and LAPPC. This contains a list of other documents you may need to refer to when you are preparing your application, and explains some of the technical terms used. You will also need to read the relevant sector guidance note, BREF note or Process Guidance note as relevant. Process Guidance Notes can be viewed at http://www.defra.gov.uk/environment/airquality/lapc/pgnotes/default.htm.
The Pollution Prevention and Control (England and Wales) Regulations 2000 can be obtained from The Stationary Office, or viewed on their website at: www.legislation.hmso.gov.uk/si/si2000/20001973.htm

Which parts of the form to fill in:
You should fill in as much of this form as possible. The appropriate fee must be enclosed with the application to enable it to be processed further. When complete return to:

Environmental Health Department
Huntingdonshire District Council
Pathfinder House
St Mary's Street
Huntingdon
Cambs PE29 3TN
For the attention of: Aaron Morley - Environmental Protection Officer

LAPPC Application Form to be completed by the operator

A - INTRODUCTION

A1.1 Name of the installation

Wood Shavings Process

A1.2 Please give the address of the site of the installation

Sundown Products Ltd

Station Road Tilbrook

Huntingdon Cambridgeshire

Postcode PE28 0JY Telephone 01480 860745.

Ordnance Survey national grid reference 8 characters, for example SJ 123 456

E 508628 N 271100

A1.3 Existing authorisations

Please give details of any existing LAPC or IPC authorisation for the installation, including reference number(s):

Licence No. HDC/LA/078287

Please provide the information requested below about the "Operator", which means the person who it is proposed will have control over the installation in accordance with the permit (if granted).

A2.1 **The Operator – Please provide the full name of company or corporate body:**

Sundown Products Ltd

Trading/business name (if different):

Registered Office address:

Station Road
Tilbrook Huntingdon
Cambridgeshire Postcode: PE28 0JY

Principal Office address (if different):

Postcode:

Company registration number:

3896568

A2.2 Holding Companies

Is the operator a subsidiary of a holding company within the meaning of Section 736 of the Companies Act 1985?

No ☑

Yes ☐ *name of ultimate holding company*

Registered office address

Postcode:

Principal Office address (if different)

Postcode:

Company registration number:

A3.1 Who can we contact about your application?

It will help to have someone who we can contact directly with any questions about your application. The person you name should have the authority to act on behalf of the operator. This could be an agent or consultant rather than the operator.

Name: David Cubitt

Position: M.D.

Address: Swindown Products Ltd, Station Road, T/Brooke

Huntingdon, Cambs Postcode: PE28 0JY

Telephone number: 01480 860745

Fax number: 01480 860781

E-mail address: david.cubitt@swindownproducts.co.uk

B1 About the Installation

Please fill in the table below with details of all the current activities in operation at the whole installation.

In **Column 1a** ***Activities in the stationary technical unit***
Please identify all activities listed in Schedule 1 to the PPC Regulations that are, or are proposed, to be carried out in the stationary technical unit of the installation.

In **Column 1b** ***Directly associated activities***
Please identify any directly associated activities that are, or are proposed, to be carried out on the same site which:

- have a technical connection with the activities in the stationary technical unit
- could have an effect on pollution

In **column 2a and b Schedule 1 references**, please quote the Chapter number, Section number, A(2) or B, then paragraph and sub-paragraph number as shown in Part 1 of Schedule 1 to the PPC Regulations. For example, *Manufacturing glass where the use of lead compound is involved*, would be listed as Chapter 3, Section 3.3, Part B(b).

B1.1 Installation table for new permit application

COLUMN 1a	COLUMN 2a
Activities in the Stationary Technical Unit	Schedule 1 References
Drying, by the application of heat, vegetable matter	6.8 Part B (a)
COLUMN 1b	**COLUMN 2b**
Directly associated activities	**Schedule 1 References**

B1.2 Why is the application being made?

This is a retrospective application being made to legitimise the use of a plant installed by previous owners during 2003

B1.3 Site Maps

Please provide:

- A suitable map showing the location of the installation clearly defining extent of the installations in red.

  Doc Reference Appendix (i)

- A suitable plan showing the layout of activities on the site, including bulk storage of materials, waste storage areas and any external emission points to atmosphere.

  Doc Reference Appendix (ii)

B2 The Installation

Please provide written information about the aspects of your installation listed below. We need this information to determine whether you will operate the installation in a way in which all the environmental requirements of the PPC Regulations are met.

B2.1 Describe the proposed installation and activities and identify the foreseeable emissions to air, water and land from each stage of the process (this will include any foreseeable emissions during start up, shut down and any breakdown/abnormal operation).

The use of process flow diagrams may aid to simplify the operations

Doc Reference: Appendix (iii)

B2.2 Once all foreseeable emissions have been identified in the proposed installation activities, each emission should be characterised (including odour) and quantified.

– atmospheric emissions should be categorised under the following
(i) point source, (e.g. chimney/vent, identified by a number and detailed on a plan)
(ii) fugitive source (e.g. from stockpiles/storage areas).

If any monitoring has been undertaken please provide the details of emission concentrations and quantify in terms of mass emissions. If no monitoring has been undertaken please state this.

(Mass Emission – the quantification of an emission in terms of its physical mass per period of time, eg. Grams per hour, tonnes per year)

B2.3 For each emission identified from the installations' activities describe the current and proposed technology and other techniques for preventing or, where that is not practicable reducing the emissions. If no techniques are currently used and the emission goes directly to the environment, without abatement or treatment this should be stated.

Doc Reference: Appendix (iii)

B2.4 Describe the proposed systems to be used in the event of unintentional releases and their consequences. This must identify, assess and minimise the environmental risks and hazards, provide a risk based assessment of any likely unintentional releases, including the use of historical evidence. If no assessments have been carried out please state.

Doc Reference: Appendix (iii)

B2.5 Describe the proposed measures for monitoring all identified emissions including any environmental monitoring, and the frequency, measurement methodology and evaluation procedure proposed. (e.g. particulate matter emissions, odour etc.) Include the details of any monitoring which has been carried out which has not been requested in any other part of this application. If no monitoring is proposed for an emission please state the reason.

Doc Reference: Appendix (iii)

B2.6 Provide detailed procedures and policies of your proposed environmental management techniques, in relation to the installation activities described.

Doc Reference: Appendix (iii)

B3 Impact on the Environment

B3.1 Provide an assessment of the potential significant local environmental effects of the foreseeable emissions (for example, is there a history of complaints, is the installation in an air quality management area?)

Doc Reference: Appendix (iii)

B3.2 Are there any sites of special scientific interest (SSSIs) or European Sites which are within 2 kilometres of the installation?

No ☑

Yes ☐ *please give names of the sites*

B3.3 Provide an assessment of whether the installation is likely to have a significant effect on such sites and, if it is, provide an assessment of the implications of the installation for that site, for the purposes of the Conservation (Natural Habitats etc) Regulations 1994.

Doc Reference: N/A

B4 Environmental Statements

B4.1 Has an environmental impact assessment been carried out under The Town and Country Planning (Environmental Impact Assessment) (England & Wales) Regulations 1999, or for any other reason with respect to the installation.

No ☑

Yes ☐ *Please supply a copy of the environmental impact assessment and details of any decision made.*

Doc Reference:

B5 Additional Information

Please supply any additional information which you would like us to take account of in considering this application.

Doc Reference:

C1 Fees and Charges

The enclosed charging scheme leaflet gives details of how to calculate the application fee. Your application cannot be processed unless the application fee is correct and enclosed.

C1.1 Please state the amount enclosed as an application fee for this installation:

£ Cheques should be made payable to **Huntingdonshire District Council**

We will confirm receipt of this fee when we write to you acknowledging your application.

C1.2 Please give any company purchase order number or other reference you wish to be used in relation to this fee.

C2 Annual charges

If we grant you a permit, you will be required to pay an annual subsistence charge, failure to do so will result in revocation of your permit and you will not be able to operate your installation.

C2.1 Please provide details of the address you wish invoices to be sent to and details of someone we may contact about fees and charges within your finance section.

Contact name: David Cubitt

Address: Sundown Products Ltd, Station Road

Tilbrook, Huntingdon

Postcode: PE28 0JY Telephone: 01480 860745.

C3 Commercial Confidentiality

C3.1 Is there any information in the application that you wish to justify being kept from the public register on the grounds of commercial confidentiality?

No ☑

Yes ☐

Please provide full justification, considering the definition of commercial confidentiality within the PPC regulations.

Doc Reference:

C3.2 Is there any information in the application that you believe should be kept from the public register on the grounds of national security?

No ☑

Yes ☐

Do not write anything about this information on the form. Please provide full details on separate sheets, plus provide a copy of the application form to the Secretary of State for a Direction on the issue of National Security.

C4 Data Protection

The information you give will be used by the Local Authority to process your application. It will be placed on the relevant public register and used to monitor compliance with the permit conditions. We may also use and/or disclose any of the information you give us in order to:

- consult with the public, public bodies and other organisations,
- carry out statistical analysis, research and development on environmental issues,
- provide public register information to enquirers,
- investigate possible breaches of environmental law and take any resulting action,
- prevent breaches of environmental law,
- assess customer service satisfaction and improve our service.

We may pass on the information to agents/representatives who we ask to do any of these things on our behalf.

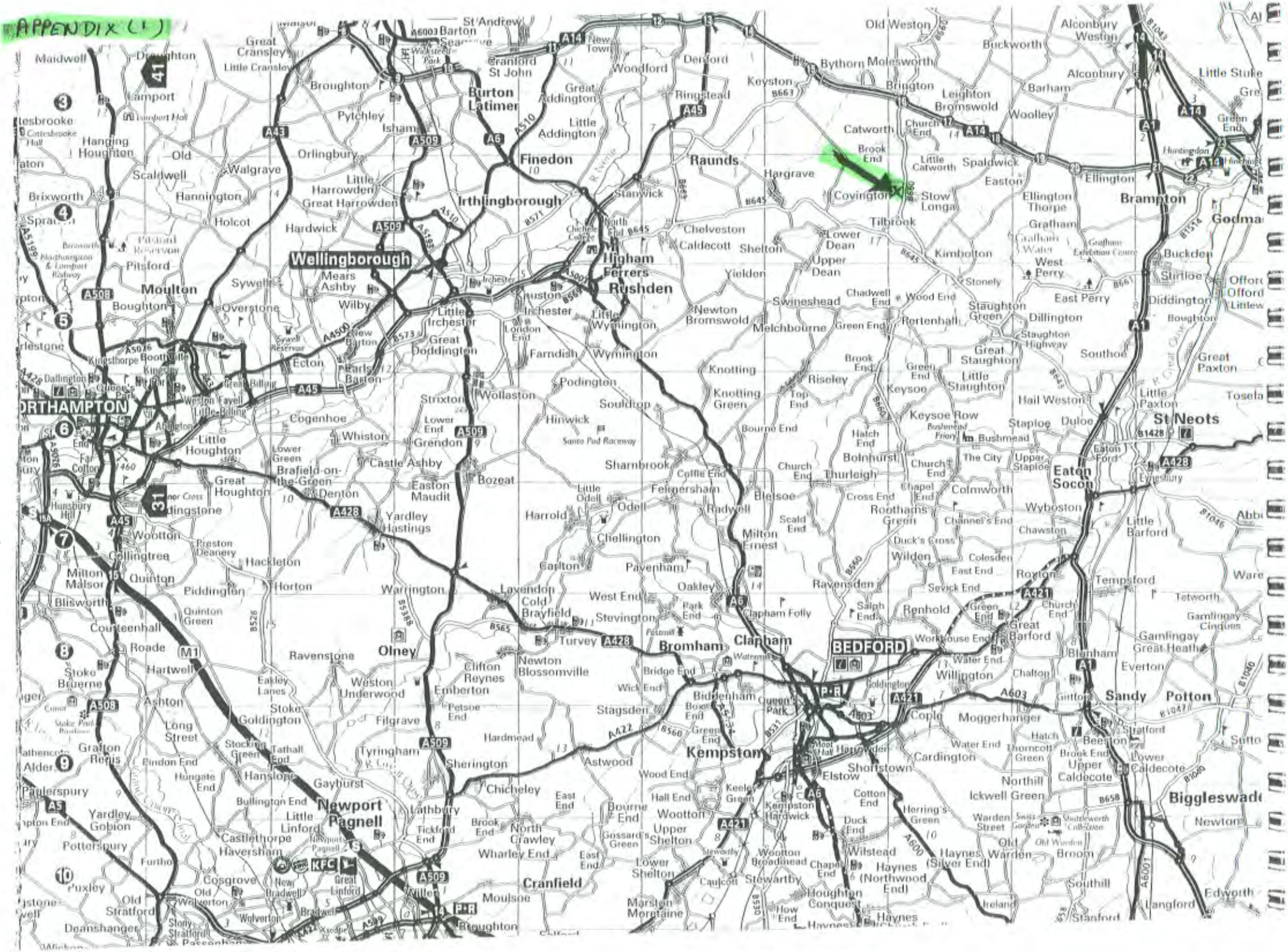
It is an offence under Regulation 32 of the PPC regulations, for the purpose of obtaining a permit (for yourself or anyone else) to:

- make a false statement which you know to be false or misleading in a material particular,
- recklessly make a statement which is false or misleading in a material particular.

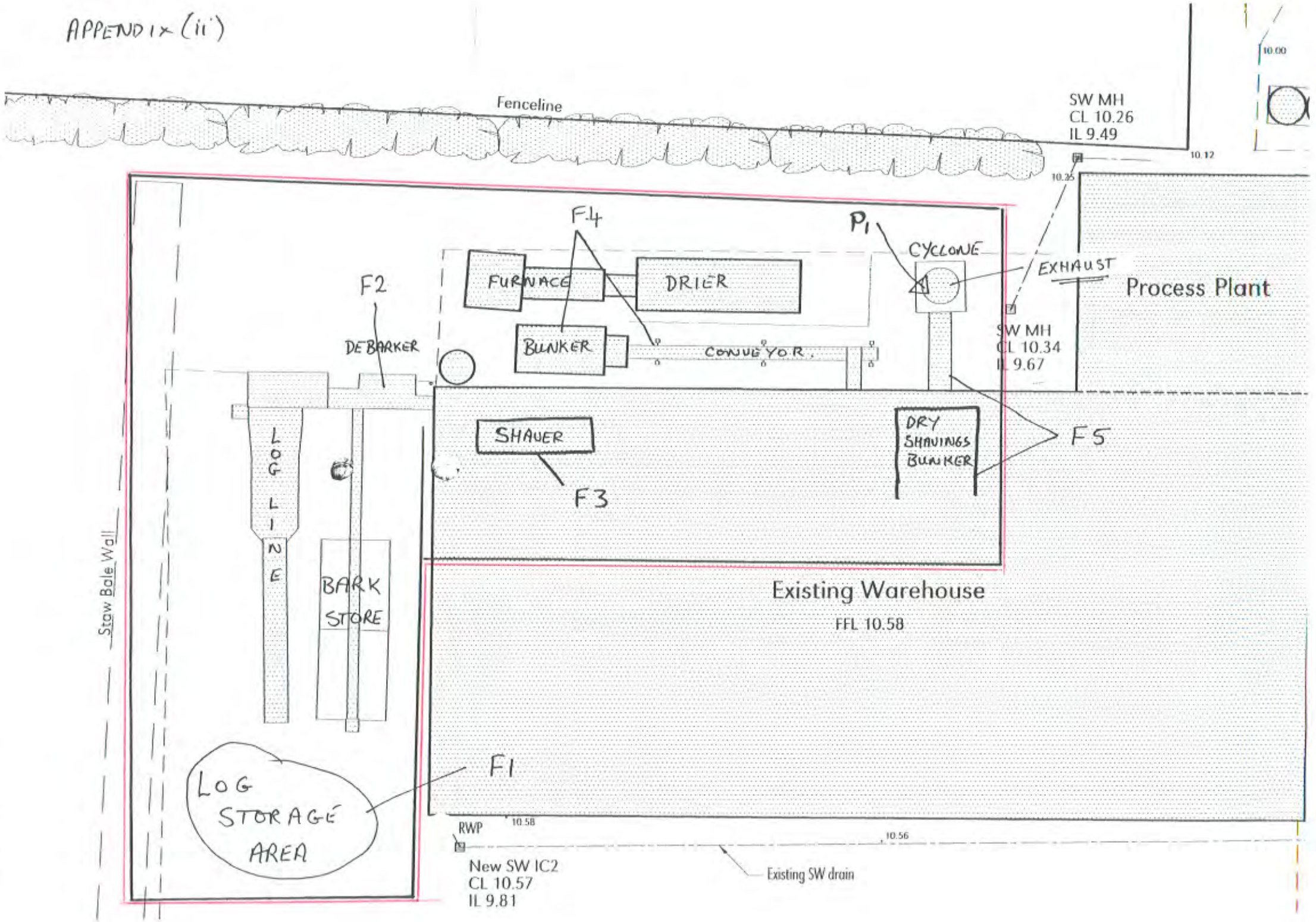
If you make a false statement

- we may prosecute you, and
- if you are convicted, you are liable to a fine or imprisonment (or both).

APPENDIX (F)


Wellingborough
Irthlingborough
Finedon
Burton Latimer
Higham Ferrers
Rushden
Raunds
Moulton
Brixworth
Pitsford
Holcot
Walgrave
Hannington
Scaldwell
Orlingbury
Great Harrowden
Little Harrowden
Hardwick
Mears Ashby
Wilby
Sywell
Overstone
Boughton
Pytchley
Isham
Broughton
Great Cransley
Little Cransley
Maidwell
Draughton
Lamport
Hanging Houghton
Old
Great Addington
Little Addington
Woodford
Denford
Ringstead
Stanwick
Chelveston
Caldecott
Shelton
Yielden
Upper Dean
Lower Dean
Kimbolton
Tilbrook
Hargrave
Stow Longa
Covington
Catworth
Brook End
Little Catworth
Keyston
Bythorn
Molesworth
Old Weston
Brington
Leighton Bromswold
Woolley
Barham
Alconbury
Alconbury Weston
Buckworth
Spaldwick
Easton
Ellington
Ellington Thorpe
Brampton
Godmanchester
Huntingdon
Grafham
Grafham Water
Grafham Exhibition Centre
West Perry
East Perry
Stonely
Buckden
Stirtloe
Diddington
Offord
Offord Littlew
Boughton
Great Paxton
Little Paxton
Tosela
St Neots
Eaton Socon
Eaton Ford
The City
Upper Staploe
Staploe
Duloe
Hail Weston
Bushmead
Bushmead Priory
Keysoe Row
Keysoe
Bolnhurst
Hatch End
Church End
Thurleigh
Colmworth
Wyboston
Chawston
Little Barford
Tempsford
Roxton
Wilden
Colesden
East End
Duck's Cross
Roothams Green
Channel's End
Scald End
Milton Ernest
Ravensden
Renhold
Salph End
Clapham Folly
Oakley
Pavenham
Carlton
Harrold
Odell
Little Odell
Radwell
Felmersham
Sharnbrook
Coffee End
Bletsoe
Knotting
Knotting Green
Riseley
Podington
Souldrop
Hinwick
Wymington
Little Wymington
Melchbourne
Newton Bromswold
Swineshead
Chadwell End
Wood End
Rertenhall
Staughton Green
Dillington
Staughton Highway
Great Staughton
Little Staughton
Southoe
Brook End
Green End
Top End
Bourne End
Hatch End
Strixton
Wollaston
Grendon
Lower End
Cogenhoe
Whiston
Lower Green
Brafield-on-the-Green
Castle Ashby
Denton
Easton Maudit
Bozeat
Great Doddington
Farndish
Irchester
Little Irchester
Wilby
Mears Ashby
Sywell
Overstone
Boughton
Moulton
Pitsford
Brixworth
Spratton
Harlestone
Kingsthorpe
Boothville
Kingsley
Dallington
Great Billing
Weston Favell
Little Billing
Ecton
Earls Barton
New Barton
Irchester
Kuston
Chichele College
North End
Chelveston
Caldecott
Shelton
Lower Dean
Upper Dean
Yielden
Swineshead
Chadwell End
Wood End
Newton Bromswold
Melchbourne
Green End
Rertenhall
Staughton Green
Dillington
Staughton Highway
Great Staughton
Little Staughton
Southoe
Riseley
Keysoe
Keysoe Row
Bushmead
Bushmead Priory
Hail Weston
Staploe
Duloe
Eaton Socon
Eaton Ford
The City
Upper Staploe
St Neots
Little Paxton
Great Paxton
Tosela
Offord
Diddington
Boughton
Stirtloe
Buckden
Godmanchester
Brampton
Ellington
Ellington Thorpe
Easton
Spaldwick
Little Catworth
Brook End
Covington
Stow Longa
Hargrave
Stanwick
Raunds
Ringstead
Denford
Woodford
Great Addington
Little Addington
Keyston
Bythorn
Molesworth
Old Weston
Brington
Leighton Bromswold
Woolley
Barham
Alconbury
Alconbury Weston
Buckworth
Little Stukeley
Huntingdon
Green End
Hanging Houghton
Old
Scaldwell
Walgrave
Hannington
Holcot
Orlingbury
Great Harrowden
Little Harrowden
Hardwick
Mears Ashby
Wil

APPENDIX (ii)


Fenceline
SW MH
CL 10.26
IL 9.49
10.12
10.35
10.00
F4
P1
CYCLONE
EXHAUST
Process Plant
F2
FURNACE
DRIER
DEBARKER
BUNKER
CONVEYOR
SW MH
CL 10.34
IL 9.67
SHAVER
DRY
SHAVINGS
BUNKER
F5
F3
LOG LINE
BARK
STORE
Straw Bale Wall
Existing Warehouse
FFL 10.58
LOG
STORAGE
AREA
F1
RWP
10.58
10.56
New SW IC2
CL 10.57
IL 9.81
Existing SW drain

Sundown Products Ltd - Part B Application

Appendix (iii)

B 2.1 Process Description

The plant subject to this application is to produce high quality flakes of wood from pine logs to be used as top quality horse bedding.

The Process
Pine logs are delivered to site and stored in a log storage area.
This area will be regularly swept to prevent dry bark etc being spread by the wind.

The logs are loaded onto a logline by a wheeled loader, the log line delivers the logs to a debarker machine, the bark is removed and is stored in the bark storage bunker. The logs and bark are wet at this stage and so there is a minimum of dust at this stage.

The debarked logs are then delivered by conveyors to the shaving machine, as the logs to be planed are wet and the knives are kept sharp, there is a minimal emission of dust from this process.

The wet shavings are conveyed from the shaver to a sieve, which removes the larger bits of wood. The larger bits of wood are stored in bulk bags, the wet shavings are conveyed to a storage hopper, the external conveyors and bunker are covered to prevent any dust emissions to atmosphere.

The wet shavings are fed into a rotating, three-pass drum drier, the heat from the drier is provided by a diesel-fuelled furnace with a maximum output of 18 million btu/hr. Operating temperature of the furnace seldom exceeds 500 degrees centigrade. As the drier rotates, the shavings are continually lifted and dropped into an air stream, created by a fan, which carries the shavings to the end of the drier. The shavings drop into a conveyor and enter the dry shavings bunker inside building via a covered conveyor.

The drier exhaust is expelled up an exhaust stack. The particulate matter emissions have been measured by Dust Environmental (Engineering) Ltd and were found to be well below 30mg/m3, see appendix (iv)

B 2.2

Atmospheric Emissions

1) **The only point source** is the drier exhaust (Marked P1 on Plan). This will contain:
   - The products of combustion, the fuel being diesel oil
   - Particulate matter, measured by Dust Environmental (Engineering) Ltd as averaging 21.2mg/m3 (Appendix iv)
   - Pine Odour as measured by Netcen Ltd, Report enclosed (appendix v)

2) **Fugitive sources**

- F1: Log Store, Fugititive dust will be kept to a minimum as the logs are wet and the area is kept clean
- F2: Debarker, There will be small amounts of fugative dust as the logs and bark are still wet
- F3: Shaver, There will be small amounts of fugative dust as the logs are wet and the blades are kept sharp
- F4: Conveyors and buffer store. Wet shavings conveyors, transitions and the bark buffer are all covered
- F5: Dry Shavings conveyors are covered, the dry shavings bunker is inside and is three sided to prevent 'wind lash'

B 2.3

Point Source – Drier Exhaust

Dust cyclones are currently described as 'Best Available Techniques' to remove particulate matter from driers and coolers. It is worth noting that the current emissions have been measured significantly below the set level of 150mg/m3

Fugitive Sources

Six Fugitive sources of dust emissions have been identified as above, in each case the design ensures the mimimum amount of dust is allowed to escape. In each case the main way of preventing emissions is to keep the surrounding areas clean and regularly swept.

In time it is proposed to enclose the dry shavings into a bin from which dust will not be able to escape.

B 2.4

The risks of the point emissions have been identified as an 'over drying' situation. There are many safe guards in place to prevent this happening as 'over drying' represents a very serious fire risk. The safe guards are as follows:

- The furnace can't start with out the wet feed system being in full operation
- There is a wet feed system failure, system shut off alarm
- There is a furnace over temperature, system shut off alarm
- There is an exhaust over temperature system shut off alarm

B 2.5

There will be daily visual monitoring of emissions, if there are any unacceptable emissions, they will be recorded and the cause identified and rectified.

In addition annual monitoring will be carried out to BS ISO9096: 2003 to measure particulate matter emissions, constant measuring is not practical due to the very high moisture content of the exhaust gasses.

B 2.6

There will be daily visual monitoring of emissions, if there are any unacceptable emissions they will be recorded and the cause identified and rectified.

B 3 Effects on the local environment

There have been complaints from local residents regarding this plant, they have primarily been due to noise emissions and odour emissions.

Noise emissions are being addressed by enclosing the (very noisy) shaver into an acoustic enclosure as recommended by Acoustic Associates in their letter dated 10.10.05 see appendix (v).

Odour emissions will be dealt with by installing a 20 m high exhaust stack to lift the odour emissions over the wind turbulence caused by the surrounding buildings as recommended in their odour impact assessment, see appendix (vi).

B5 Additional information

There is currently a Part B license operated on this site and controlled by Huntingdonshire District Council. This process is subject to a further application because the new process is not technically connection to the process controlled by the existing Part B license.

APPENDIX (IV)

Dust Environmental (Engineering) Limited

Reg No: 70557
VAT No: 343 2993 45
Telephone: (01924) 263453
Fax No: (01924) 263818
Unit 2, Ashley Industrial Estate, Wakefield Road, OSSETT, West Yorkshire WF5 9JD

ISO-KINETIC SAMPLING (1)

COMPANY NAME: SUNDOWN STRAW PRODUCTS LTD

ADDRESS:

Station Road
Tilbrook
Huntingdon
Cambs
PE18 6YN

REF. NO. W1005

TEL No. 01480 860745

FAX No. 01480 860781

PLANT:

Timber Drier

ARRESTMENT PLANT:

PRIMARY H.E.Cyclone

AUTHORISATION:

Mr David Cubitt

TEST BY:

G.M.Teal/S.Webster

SIGNATURE: G.M.Teal

DATE: 28-09-05

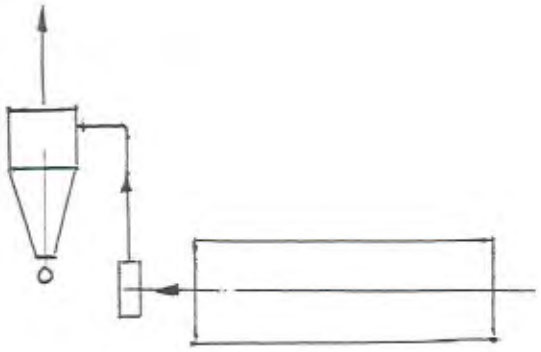
ISO-KINETIC SAMPLING (2)

SITE / LOCATION :

Sundown Straw Products Ltd

DATE: 28-09-05
REF. NO. W1005

GENERAL LAYOUT:



WAS THERE COMPLIANCE WITH BS12141.02 YES: NO:

IF NO STATE REASON:

Process Temp 478^{0}C

EMISSION RESULTS		1st TEST	2nd TEST	MEAN
TEMPERATURE	°C	94.0	96.2	95.1
VELOCITY	m/s	16.7	17.1	16.9
WEIGHT OF PARTICULATES COLLECTED	mg	36.3	46.4	41.3
AIRFLOW RATE	m^3/s	13.1	13.4	13.2
RATE OF MASS EMISSION	g/hr	877	1148	1012
EMISSION CONCENTRATION	mg/m^3	18.6	23.8	21.2

REF CONDITIONS	°C	KPA	%RH	%	OTHER
	95	3.1	34	0^2	

REF NO. W9837

ISO-KINETIC SAMPLING (3)

COMPANY / SITE: SUNDOWN STRAW PRODUCTS

TEST NO: 1.1 DATE: 28-09-05

TIME / DURATION: 10.25 to 10.40

PRODUCT: 2 Tonne/Hour

AIRFLOW: 13.1m^3/s Temperature – 94^{0}C

SAMPLE DRIED AND WEIGHED

B5

AFTER 118.3504
BEFORE 118.3710

. 0206

= 20.6

B5

AFTER 73.8565
BEFORE 73.8408

.0157

= 15.7

TOTAL COLLECTED I N 20 MINUTES = 36.3mg

SAMPLE VOLUME = .13m^3/m

DUST LEVEL = $\frac{36.3}{15 \times .13}$ =

TOTAL 16.6mg/m^3

REF NO. W9837

ISO-KINETIC SAMPLING (4)

COMPANY / SITE: SUNDOWN STRAW PRODUCTS

TEST NO: 1.2 DATE: 28-09-05

TIME / DURATION: 10.45 to 11.00

PRODUCT: 2 Tonne/Hour

AIRFLOW: 13.4m^3s Temperature – 96.2^{0}C

SAMPLE DRIED AND WEIGHED

B7

AFTER 118.9414
BEFORE 118.9118

. 0296

= 29.6

B7

AFTER 73.7942
BEFORE 73.7774

.0168

= 16.8

TOTAL COLLECTED I N 15 MINUTES = 46.4mg

SAMPLE VOLUME = .13m^3/m

DUST LEVEL = $\frac{46.4}{15 \times .13}$ =

TOTAL 23.8mg/m^3

APPENDIX (B)

Acoustic Associates

PETERBOROUGH

NOISE ASSESSMENT AT

SUNDOWN PRODUCTS

IN MAY AND JUNE 2004

IN ACCORDANCE WITH

THE NOISE AT WORK REGULATIONS, 1989.

CLIENT:	Sundown Products Ltd. The Old Mill Station Road Tilbrook Huntingdon, PE28 0JY
CONTACT:	Mr James Nunn
REPORTED BY:	**Sean Sullivan**
CHECKED BY:	Terry Marshall MIOA MIDiagE
REPORT NO:	**SS/J0178/8605**
DATE:	14th June 2004

ACOUSTIC ASSOCIATES (PETERBOROUGH)

32 South Street, Stanground, Peterborough, PE2 8ET.

Tel: 01733 896346 FAX: 01733 567779

email: Acoustic.Associates@btinternet.com website: www.AcousticAssociates.co.uk

SUMMARY

An assessment of employees' noise exposure has been carried out at Sundown Products on 5th May 2004 and 2nd June 2004 in accordance with the Noise at Work Regulations 1989.

The report shows that all 6 employees surveyed were likely to be exposed to a daily personal exposure level ($L_{EP,d}$) which was in excess of the 'Second Action Level' of 90 dB(A).

Recommendations are given in the report to enable to Sundown Products to comply with the NAW Regulations.

SUMMARY 2

1 OBJECTIVES: 4

2 CONCLUSIONS: 4

3 RECOMMENDATIONS: 5

4 NOISE ASSESSMENT: 8

5 DISCUSSIONS: 10

6 TABLES OF RESULTS: 11

COLOUR CODING FOR $L_{EP,d}$ VALUES IN TABLES 1 - 2 11
Table 1 – RESULTS OF NOISE ASSESSMENT 12
Table 2 – RESULTS OF NOISE ASSESSMENT 13
Table 3 – MEASURED OCTAVE BAND L_{Aeq} 14
Table 4 – ASSUMED PROTECTION VALUE (APV) FOR HEARING PROTECTORS 14
Table 5 – ASSUMED PROTECTED LEVELS L_{Aeq} 14

APPENDIX 1 - Glossary of Terms 15

APPENDIX 2 - Noise Instrumentation 16

APPENDIX 3 - Summary Of Actions Required For The Noise At Work Regulations 1989 17

REFERENCES 18

1 OBJECTIVES:

1.1 To carry out an assessment of employees noise exposure at Sundown Products in accordance with the Noise at Work (NAW) Regulations 1989 (Ref. 1 and 2).

2 CONCLUSIONS:

2.1 All employees surveyed were likely to be exposed to a 'daily personal exposure level' ($L_{EP,d}$)* at or above the Second Action Level of 90 dB(A) during a typical working day.

2.2 The Peak Action Level of 200 Pa (140 dB) was not exceeded at any location.

2.3 The building housing the Log Shaver and the Pellet Maker areas must be designated as Ear Protection Zones. Hearing protection signs must be displayed at these locations.

2.4 The hearing protection issued to employees should provide adequate attenuation for the noise levels measured (see Tables 3 - 5) although the use of this hearing protection should only be considered as a last resort.

2.5 Noise control recommendations aimed at reducing employee's noise exposure levels are given in section 5 of this report.

* see Appendix 1 for Glossary of Terms

3 RECOMMENDATIONS:

3.1 In order to comply with the **Noise At Work Regulations 1989** it is recommended that the following actions are carried out:-

Regulation 4 – Assessment of Exposure:

This assessment should be reviewed whenever there are any significant changes in machinery or working practices, or after a period of two years, whichever occurs first.

Regulation 5 – Assessment Records:

This report records the results of the current noise assessment. Regulation 5 requires that this report should be kept until another assessment is made. However, we would recommend that assessment reports be kept for at least 40 years.

Regulation 6 – Reduction of Risk of Hearing Damage:

Sundown Products should reduce the risk of damage to the hearing of its employees from exposure to noise to the lowest level reasonably practicable. For example, a positive purchasing policy should be adopted of buying quiet plant/machinery etc when existing machines are due for replacement.

Regulation 7 - Reduction of Noise Exposure:

Where employees are exposed to a $L_{EP,d}$ at or above the Second Action Level of 90 dB(A) or the Peak Action Level of 140 dB, the NAW Regulations state that the noise exposure must be reduced where reasonably practicable. Employees working in the following areas were shown as likely to exceed an $L_{EP,d}$ of 90 dB(A).

DEPT	Machine/Process
Log shaver area	Operators of log shaver and debarker (2 employees)
Log shaver area	Cleaner
Log shaver area	Bale stacker operator
Pellet press area	Technician
Pellet press area	JCB Driver

Regulation 8 - Ear Protection:

For employees exposed to $L_{EP,d}$'s at or above the First Action Level but below the Second Action Level hearing protectors must be supplied to those that request them but the wearing of them is optional. A range of hearing protectors should be provided in order to suit the personal preference of the employee. For employees above the Second Action hearing protectors must be supplied and they **must** be worn.

Regulation 9 - Ear Protection Zones:

The building housing the log shaver and the Pellet plant area must be designated as 'Ear Protection Zones'. Sundown Products must fit "ear protection zone" signs in these areas and in accordance with the Health and Safety (Safety Signs and Signals) Regulations 1996 they must ensure that they cover all the approaches to the areas. An example of a sign is shown below.

The non-standard hearing protection signs currently on display in the building housing the log shaver must be removed and replaced with standard signs such as that shown above.

Regulation 10 - Maintenance and Use of Equipment:

Sundown Products should ensure that any equipment supplied by them in accordance with these Regulations is used, fully maintained and is in good repair.

Regulation 11 - Provision of Information to Employees:

Sundown Products must provide each of their employees who is likely to be exposed to $L_{EP,d}$ levels above the First Action Level with adequate information, instruction and training on:-

[i] the risk of damage to hearing that such exposure can cause

[ii] what steps employees can take to minimise the risks

[iii] the steps that the employee must take in order to obtain personal ear protectors

[iv] employees' obligations under these Regulations

The Health and Safety Executive (HSE) provide literature and publications which could assist Sundown Products in meeting the requirements of this regulation for example:-

INDG75(rev)	The noise at Work Regulations – A brief guide to the requirements for controlling noise at work.
INDG362	Noise At Work – Advice for employers.
INDG363	Protect your hearing – Pocket card for employees.
IND99(rev)	Noise at work – a guide for employees.

HSE priced and free publications are available by mail order from:

HSE Books, Tel: 01787 881165, Fax: 01787 313995. Website: www.hsebooks.co.uk

Note! The Actions required under The NAW Regulations are summarised in Appendix 3.

4 NOISE ASSESSMENT:

Every employer is required by the Noise at Work Regulations 1989 to ensure that a "competent person" makes an adequate noise assessment when any of the employees is likely to be exposed to noise at the First Action Level [a $L_{EP,d}$ of 85 dB(A)] or above. The employees at Sundown Products are exposed to noise from various types of machines and processes. The assessment was carried out by a "competent person" using an integrating sound level meter and a dosemeter. See Appendix 2 for details.

Measurements of "A" weighted sound pressure levels (L_{Aeq}) were taken at the employees' ear position, whilst they were carrying out typical activities in their work areas. The employee "daily personal exposure level" ($L_{EP,d}$) was then calculated from the measured L_{Aeq} together with the amount of time that the employee was likely to spend carrying out the activity. The $L_{EP,d}$ values were rounded up to the nearest whole number. In addition, the sound level meters were set to detect whether the "peak" sound pressure exceeded 200 Pa (140 dB), i.e. the Peak Action Level.

Tables 1-2 show the measured L_{Aeq} noise levels together with daily exposure times and the calculated 'daily personal exposure levels' ($L_{EP,d}$). The $L_{EP,d}$ values in these tables are based on a normal working day of 8 hours for the employees working in the log shaver area and 11½ hours for employees working in the pellet maker area.

If different hours are worked in the log shaver area the following adjustments should be made to the $L_{EP,d}$ values:-

Hours Worked	Add to $L_{EP,d}$ (dB)
10	(+) 1
12	(+) 2

If different hours are worked in the pellet maker area then the following adjustments should be made to the $L_{EP,d}$ values:-

Hours Worked	Subtract from $L_{EP,d}$ (dB)
8	(-) 2
10	(-) 1

Prior to carrying out the noise measurements it was confirmed with the employees and management that the operations were typical of those that normally occurred.

Octave band frequency noise measurements (Table 3) were also taken to identify the dominant frequencies associated with the noisiest machine operations. Table 4 gives 'assumed protection values' for the ear protectors supplied by Sundown Products. Table 5 gives the calculated protected level for the hearing protectors.

5 DISCUSSIONS:

The Noise at Work assessment was carried out throughout the production area of Sundown Products. All 6 employees surveyed were exposed to an $L_{EP,d}$ which was above the Second Action Level of 90 dB(A).

The following points should be considered:-

5.1 The dominant noise source in the log shaver area appears to be the Blue Diamond Shaver itself but the noise levels from it are so loud that the other 2 employees working in that building are exposed to noise levels above the Second Action Level. As measurement 1d shows this generates high noise levels even when it is idling (i.e. running but not shaving logs). The manufacturer of the shaver should be consulted to see if it is possible to reduce noise emissions from this machine. Two possible means of noise reduction which may prove effective are :-

a) The enclosure of the log shaver corner by a PVC strip curtain. This would reduce sound emission from the log shaver area to other parts of the building and hence help protect other employees working in the building.
b) The enclosure of the Blue Diamond operator on the mezzanine floor within an acoustic haven to protect the operator from log shaver noise emission.

Further investigation is needed to determine whether these methods or any others suggested by the manufacturer are practical and cost effective.

5.2 A new EU Noise Directive (2003/10/EC); which is to be implemented within the UK in 2006, reduces the action values for employee's noise exposure level. A decrease of 5 dB(A) will be made to the First and Second Action levels, and they will be known as the Lower and Upper Exposure Action Values (LAV & UAV). In addition a new criteria is to be introduced, this will be the Exposure **Limit** Value (ELV), the noise limit is set at an $L_{EP,d}$ of 87 dB(A) and is the maximum daily exposure permitted. Hearing protection can as a last resort be used to achieve the ELV. It is therefore recommended that any noise reduction strategy considered by Sundown Products take into account the requirements of this new directive.

6 TABLES OF RESULTS:

COLOUR CODING FOR $L_{EP,d}$ VALUES IN TABLES 1 - 2

The $L_{EP,d}$ values in Tables 1 - 2 have been highlighted to reflect the different Action Levels for the employees' noise exposure.

$L_{EP,d}$ below the First Action Level of 85 dB(A)	
$L_{EP,d}$ at or above the First Action Level of 85 dB(A)	
$L_{EP,d}$ at or above Second Action Level of 90 dB(A)	

Table 1 – RESULTS OF NOISE ASSESSMENT

COMPANY NAME **Sundown Products** LOCATION Log shaver area

ENGINEER **Sean Sullivan** Date 5th May 2004

Location/ Machine	Noise (dB)		L_{Aeq} Time	Daily Exposure	$L_{EP,d}$ dB(A)	Nos. Exp'd	Condition/ Comments
	L_{Peak}	L_{Aeq}					
1. Blue Diamond Log Shaver							
1a) Operator	116.2	100.1	10m	4h	99	2	Surveyed at operator's position on mezzanine floor. Searing tonal noise from log shaver.
1b) Repeat measurement	117.7	99.4	5m				
1c) Repeat measurement	119.6	104	6m				
2. Debarker Operator	-	86.4	5m	4h			Surveyed at operator's position on debarker.
1d) Background noise measurement – Log Shaver	-	103.2	3m	-	-	-	Background noise measurement of log shaver taken while machine was "ticking over" i.e. not shaving logs.
3) Bale Stacker							
3a) Operator	106.3	91	5m	8h	92	1	Surveyed carrying out typical duties – supervising machine. Dominant noise source appeared to be the Blue Diamond Log Shaver.
3b) Repeat	117.7	92	5m				
4) Cleaner							
4a) Cleaning	-	96	5m	3h	92	1	Surveyed sweeping up wood shavings around baler. Dominant noise source appeared to be Blue Diamond Log Shaver.
4b) Background noise in yard.	97.2	76.9	5m	5h			Noise cleaner is exposed to for the rest of the shift.

COMMENTS:

Non-standard signs on machines "Eye and ear protection must be worn"

Table 2 – RESULTS OF NOISE ASSESSMENT

COMPANY NAME **Sundown Products** LOCATION Pellet Maker area

ENGINEER **Sean Sullivan** Date 2nd June 2004

Location/Machine	Noise (dB)		L_{Aeq} Time	Daily Exposure	$L_{EP,d}$ dB(A)	Nos. Exp'd	Condition/ Comments
	L_{Peak}	L_{Aeq}					
5) VIS Technician	114	95.2	14m	10.5h	98	1	Usual duties – checking and greasing machines. Very loud tonal noise from 2 presses
	-	96.1	3m	1h			Measurement taken on upper floor
6) Tractor Driver	117	88.8	46m	11.5h	91	1	Dosemeter measurement – Employee surveyed moving bales of straw in yard with JCB.

Table 3 – MEASURED OCTAVE BAND L_{Aeq}

Location	Octave Band L_{Aeq} Levels - dB(A)								Total L_{Aeq}
	63	125	250	500	1K	2K	4K	8K	
1a) Blue Diamond Operator	64.6	77.2	81.8	97.3	93.6	90.7	83.1	73.2	100.1
1c) Blue Diamond Operator	65.8	81	87.8	101.8	98	94.4	87.3	76.9	104
1d) Blue Diamond "ticking over" background noise	64.6	76.8	81.2	102.2	94.5	89.7	80.9	71.9	103.2
3a) Bale Stacker Operator	56.4	68.5	75.4	89.5	83.4	78.2	71.3	61.4	91.0
The measurement at the Blue Diamond Operator 1c is used for the assessment of hearing protectors (Table 1) as it was the highest encountered during the assessment.									

Table 4 – ASSUMED PROTECTION VALUE (APV) FOR HEARING PROTECTORS

Protector	Octave Band Levels - dB							
	63	125	250	500	1K	2K	4K	8K
Peltor Optime 2	-	13	17.7	30.2	37.2	34.0	30.4	37.9

Assumed protection value (APV) is the mean attenuation level minus one standard deviation.

Table 5 – ASSUMED PROTECTED LEVELS L_{Aeq}

Protector	Octave Band L_{Aeq} Levels - dB(A)								Total L_{Aeq}
	63	125	250	500	1K	2K	4K	8K	
Peltor Optime 2	65.8	68	70.1	71.6	60.8	60.4	56.9	39	76

APPENDIX 1 - Glossary of Terms

Sound	That which is detected by the ear.
Noise	"Unwanted" sound.
Sound Pressure	The variation of ambient pressure that is detected by the ear as sound.
Decibel (dB)	Ten times the logarithm of the square of the ratio of the Sound Pressure to a reference pressure (20 micro-Pascals)
Sound Pressure Level (L_p)	The decibel version of the Sound Pressure
A-Weighting	A frequency weighting which simulates the response of the ear. Sound pressure levels with the 'A' weighting have units of **dB(A)**
L_{eq}	The value of the sound pressure level, in dB, of a continuous steady sound which has the same mean-square sound pressure as a sound that varies with time, i.e., the "average" sound pressure level. The L_{Aeq} is the 'A' weighted L_{eq}
$L_{EP,d}$	The "daily personal exposure level". This is the level of daily personal noise exposure of an employee taking no account of the effect of any personal ear protector used.
L_{Peak}	The value of the peak sound pressure level, in dB(C) or dB(Lin).
First Action Level	An $L_{EP,d}$ of 85 dB(A)
Second Action Level	An $L_{EP,d}$ of 90 dB(A)
Peak Action Level	A peak sound pressure of 200 Pascals (140 dB)

APPENDIX 2 - Noise Instrumentation

- SVAN 912A Sound and Vibration Analyser, Serial Number 2059
- Quest I800 – Integrating Sound Level Meter – Serial No HP0010019
- Castle Vocis M – Integrating 1/1 & 1/3 Octave Band Sound Level Meter, Serial Number 0063247
- Castle GA 255 -Personal Sound Exposure Meters, Serial Numbers 026362 - 061511
- Castle GA607 Calibrator, Serial Number 032942

The calibration of all instrumentation was checked before and after the measurement session, at 94.0 +/- 0.1 dB.

APPENDIX 3 - Summary Of Actions Required For The Noise At Work Regulations 1989

ACTION REQUIRED WHERE $L_{EP,d}$ IS LIKELY TO BE:- (see note 1 below)	Below 85 dB(A)	85 dB(A) 1st. AL	90 dB(A) 2nd. AL
EMPLOYER'S DUTIES			
General Duty to Reduce Risk. Risk of hearing damage to be reduced to the lowest level reasonably practicable. (Reg 6).	*	*	(2) *
Assessment of Noise Exposure. Noise assessments to be made by a Competent Person. (Reg 4).		*	*
Record of assessments to be kept until a new one is made. (Reg 5).		*	*
Noise Reduction. Reduce exposure to noise as far as is reasonably practicable by means other than ear protectors. (Reg 7).			*
Provision of Information to Workers. Provide adequate information, instruction and training about the risks to hearing, what employees should do to minimise risk, how they can obtain ear protectors if they are exposed between 85 and 90 dB(A), and their obligations under the Regulations. (Reg 11).		*	*
Make ear protection zones with notices, so far as reasonably practicable. (Reg 9).			*
Ear Protectors. Ensure so far as is practicable that protectors are:-			
- provided to employees who ask for them (Reg 8[1]).		*	
- provided to all exposed (Reg 8[2]).			*
- maintained and repaired (Reg 10[1, b]).		*	*
- used by all exposed (Reg 10[1, a]).			*
Ensure so far as reasonably practicable that all who go into a marked ear protection zone use ear protectors. (Reg 9[1, b]).			* (3)
Maintenance and Use of Equipment. Ensure so far as is practicable that:-			
- all equipment provided under the Regulations is used, except for the ear protectors provided between 85 and 90 dB(A). (Reg 10[1, a]).		*	*
- ensure all equipment is maintained. (Reg 10[1, b]).		*	*
EMPLOYEE'S DUTIES			
Use of Equipment. So far as is practicable:-			*
- use ear protectors (Reg 10[2]).		*	*
- use any other protective equipment (Reg 10[2]).		*	*
- report any defects discovered to his/her employer (Reg 10[2]).			
MACHINE MAKER'S & SUPPLIER'S DUTIES			
Provision of Information. Provide information on the noise likely to be generated (Reg 12).		*	*

Notes:

[1] The dB (A) action levels are values of daily personal exposure to noise ($L_{EP,d}$).

[2] All the actions indicated at 90 dB (A) are also required where the peak sound is at or above 200Pa (140 dB re 20μPa).

[3] This requirement applies to all who enter the zones, even if they do not stay long enough to receive an exposure of 90 dB (A) $L_{EP,d}$

Source of above information is the HSE

REFERENCES

1. Noise at Work Regulations 1989, SI 1989 No. 1970
HMSO ISBN 0 11 097790 4

2. Reducing Noise At Work
Guidance on the Noise at Work Regulations 1989.
HMSO ISBN 0 7176 1511 – 1

APPENDIX (vi)

Report

netcen

netcen is an operating division of AEA Technology plc

Sundown Products: Impact Assessment of Odour

Report to Sundown Products Ltd
By
Nigel Gibson
Netcen, AEA Technology plc

Netcen/ED44895/Issue 1
6 July 2005

Title	Sundown Products:Impact Assessment of Odour
Customer	Sundown Products Ltd
Customer reference	
Confidentiality, copyright and reproduction	Restricted Commercial This document has been prepared by Netcen in connection with a contract to supply goods and/or services and is submitted only on the basis of strict confidentiality. The contents must not be disclosed to third parties other than in accordance with the terms of the contract.
File reference	Netcen/ED44895/3.3
Reference number	Netcen/ED44895/Issue 1

Address for Correspondence

Netcen
AEA Technology plc
Building 551
Harwell
Didcot
Oxfordshire
OX11 0QJ
Telephone 0870 190 6478
Facsimile 0870 190 6608

nigel.gibson@aeat.co.uk

Netcen is an operating division of AEA Technology plc.

Netcen is certificated to ISO9001 & ISO 14001.

	Name	Signature	Date
Author	Dr N Gibson	NGibson	13 July 2005
Reviewed by	Dr A Collings	A Collings	13 July 2005
Approved by	Dr A Collings	A Collings	13 July 2005

Executive Summary

Sundown Products Ltd contracted AEA Technology's National Environmental Technology Centre (Netcen) to address the following issues at their factory producing dried wood shavings for use as animal bedding:

- to determine the odour emission rate from the wood drying process;
- to predict the impact of odour from the drying process as currently operated using a 12m stack; and
- to predict the stack height necessary to ensure compliance with the draft odour exposure standards published by the Environment Agency in their Horizontal Guidance Note H4 part 1.

Odour samples were collected at a range of burner operating temperatures consistent with normal operation. In addition one burner temperature above the normal operating range was considered for completeness. Emission rates at burner temperatures below 488°C appear to be approximately constant, while for burner temperatures above this the emission rate starts to rise. Under the normal range of operating conditions considered it was found that:

- The impact of odour at concentrations of 3 ou/m^3 or more only affects a small number of properties.
- Under the current discharge configuration, i.e. the dryer being discharged through a 12 m stack height and with emission rates up to about 313,000 ou/s, impact concentrations at the closest properties with the exception of Blackwell Farm all exceed the upper odour exposure criterion of 3 ou/m^3 considered appropriate for this process (see Table 5.1). This finding indicates that odour concentration at these locations may be sufficient to cause annoyance.
- By increasing the stack height from 12m to 18m, 20m, 22m, 25m or 30m progressively reduces the impact concentration at the closest receptors. If the emission rate is maintained at about 313,000 ou/s then raising the stack height to 20m should be sufficient to avoid annoyance.

Contents

1 INTRODUCTION 1

1.1 Preamble 1

1.2 Remit of Study 1

2 ODOUR SAMPLING AND ANALYSIS 2

2.1 Olfactometry 2

2.2 Gas Flow Rates 2

2.3 Results 2

2.4 Odour Emission Rates 4

3 ODOUR ASSESSMENT 5

3.1 Background 5

3.2 Assessment Criteria 6

4 DISPERSION MODELLING 8

4.1 Methodology 8

4.2 Model Scenarios 9

5 DISPERSION MODELLING RESULTS 10

6 FINDINGS 17

7 REFERENCES 18

1 Introduction

1.1 PREAMBLE

Sundown Products Ltd manufacture dried wood shavings for use as animal bedding. The process involves:

- stripping bark from logs;
- shaving the wood into the required size;
- drying the wood in a diesel fired drier;
- recovering the dried wood using a cyclone; and
- packaging the product for sale.

The drying process is covered by the PG 6/27 'Vegetable Matter Drying'.

1.2 REMIT OF STUDY

Sundown Products Ltd contracted AEA Technology's National Environmental Technology Centre (Netcen) to address the following issues:

- to determine the odour emission rate from the wood drying process;
- to predict the impact of odour from the drying process as currently operated using a 12m stack; and
- to predict the stack height necessary to ensure compliance with the draft odour exposure standards published by the Environment Agency in their Horizontal Guidance Note H4 part 1.

2.3.2 Gas Flow Rates

The gas flow rates measured during testing are summarised in Table 2.2.

Table 2.2: Gas Flow Rate

Stack: Drier Exhaust Reading	Run 1		Run 2		Mean
	h	√h	h	√h	
1	60	7.75	160	12.65	
2	80	8.94	160	12.65	
3	180	13.42	90	9.49	
4	130	11.40	60	7.75	
5	80	8.94	60	7.75	
6	80	8.94	60	7.75	
7	80	8.94	90	9.49	
8	120	10.95	120	10.95	
9	90	9.49	80	8.94	
10	80	8.94	70	8.37	
11	100	10.00	70	8.37	
12	160	12.65	140	11.83	
13	170	13.04	120	10.95	
14	80	8.94	60	7.75	
15	80	8.94	60	7.75	
16	40	6.32	40	6.32	
17	60	7.75	100	10.00	
18	0	0.00	0	0.00	
19	60	7.75	60	7.75	
20	40	6.32	40	6.32	
Mean		8.97		8.64	
Velocity (m/s)		13.3		12.9	13.1
Diameter (m)		1.02		1.02	
Cross sectional area (m^2)		0.82		0.82	
Temperature (deg C, K)	112	385	120	393	
Flow rate (m^3/s)		10.8		10.5	10.7

3 Odour Assessment

3.1 BACKGROUND

There are no defined exposure standards for odours in the UK, although criteria have been presented in the Environment Agency's draft Horizontal Guidance Note H4 part 1, which covers permitting for odour under the IPPC regime. An annoyance or offensiveness threshold can be established by correlating a complaint data set with the results of a dispersion modelling exercise.

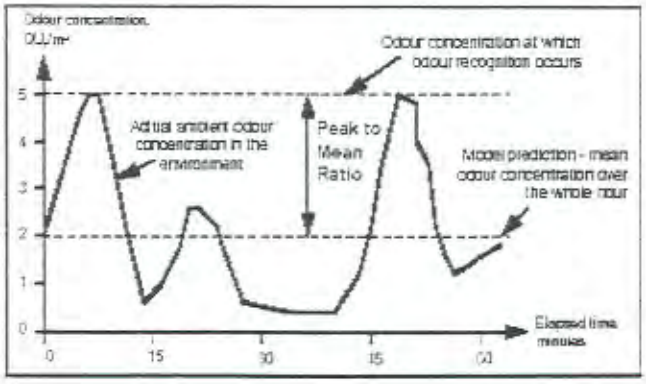
The key factors that need to be taken into account when assessing whether a nuisance will occur or whether an odour will be deemed offensive are:

- **Frequency** – how often does it happen;
- **Duration** – how long does it happen for; and
- **Intensity** – how strong is the smell when it occurs.

The combination of these factors in conjunction with the willingness of people to complain, dictates whether or not an odour will give rise to a complaint being made to the regulating authority. In this section the approach used to assess these factors is considered. However, the willingness of people to complain is not part of the assessment described here.

Odour assessment criteria are expressed in terms of a nuisance threshold concentration at ground level and a statistical averaging period during which time the nuisance threshold is not exceeded. Computer dispersion modelling allows the ground level odour concentration impacting in a location to be statistically analysed so that the frequency of occurrence of hourly concentrations above a certain odour concentration can be predicted. For the purpose of assessing odour hourly average values are considered, as this is the time period over which meteorological data is recorded. It is recognised that within an hour period there will be occasions when the actual concentration may be above or below the hourly average. This is illustrated in Figure 3.1.

Figure 3.1: Odour dispersion model prediction compared with reality



If a receptor lies outside an area bounded by the appropriate contour or isopleth then there should be 'no reasonable cause for annoyance'. The converse applies if a receptor lies within an area bounded by the appropriate contour or isopleth, and the likelihood of annoyance occurring increases as the impact concentration increases.

Where other sources of wood chip type odour are present e.g. where wood chip or similar is used as a bedding material a less stringent criterion may be appropriate.

Using these criteria does not mean that receptors lying beyond the isopleth assigned to the particular concentration threshold will not experience an odour event. Literature suggests that such criteria will protect the bulk of the population (ca. 90%).

Table 4.1: Building Dimensions Used

Building	Height (m)	Length (m)	Width (m)	Orientation
Silo	13	12	12	35
Main building (a)	8.5	49	23.5	305
Main building (b)	8.5	12	12	35
Straw processing building	13.4	13.5	12	35

4.2 MODEL SCENARIOS

A number of emission scenarios have been considered to provide an overview of how the odour discharge impacts on receptors. These scenarios are summarised in Table 4.2.

Table 4.2: Emission Scenarios Considered

Scenario	Stack Height
Current	12 m
New - 1	18 m
New – 2	20 m
New – 3	22 m
New – 4	25 m
New – 5	30 m

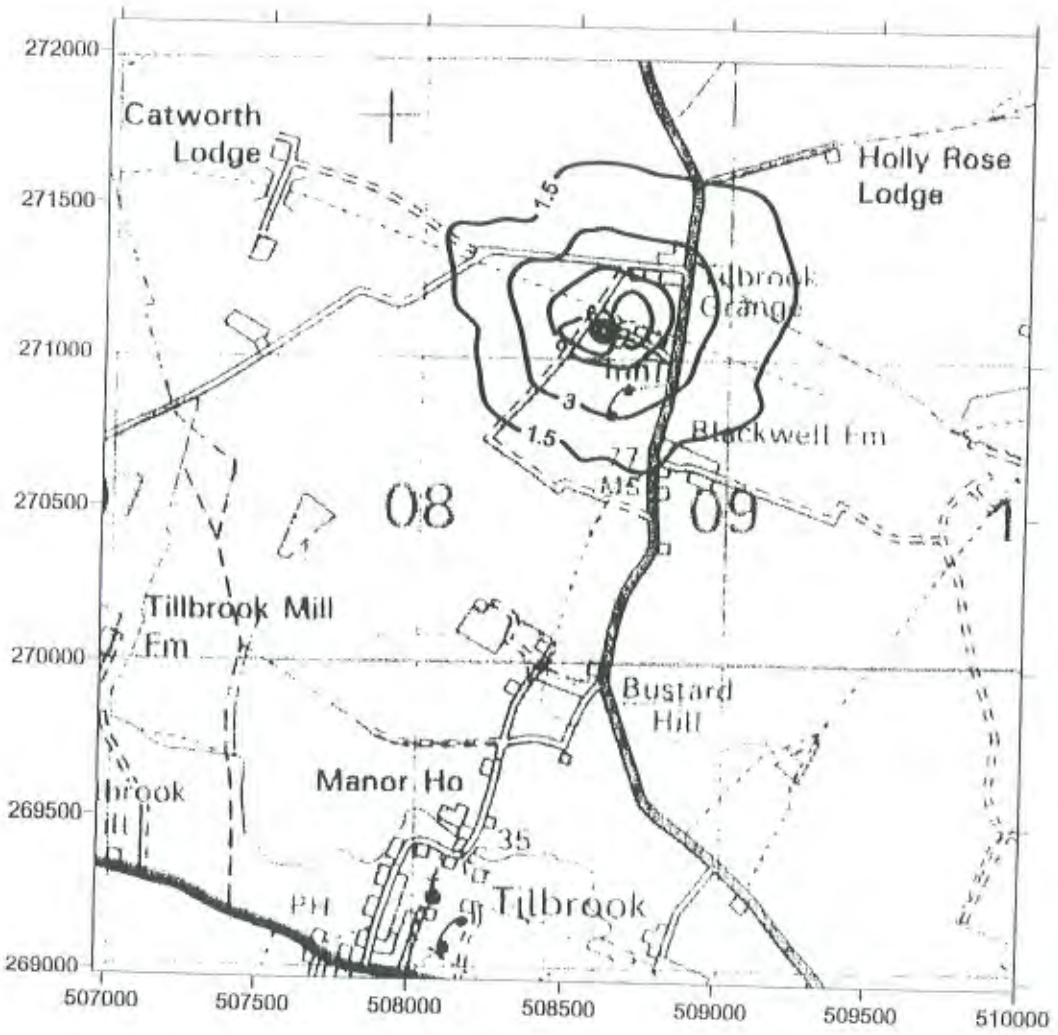


Figure 5.1: Predicted odour concentrations (as 98th%ile 1 hour values) based on the measured emission rate of 312,930 ou/s discharged through the current 12 m stack

Contours shown are:
1.5, 3, 6, and 10 ou/m^3.

Based upon the Ordnance Survey 1:50,000 scale map with the permission of The Controller of Her Majesty's Stationary Office C Crown Copy right. O.S. Licence AEA Technology Harwell Oxon OX11 0QJ ALS 1905A0001.

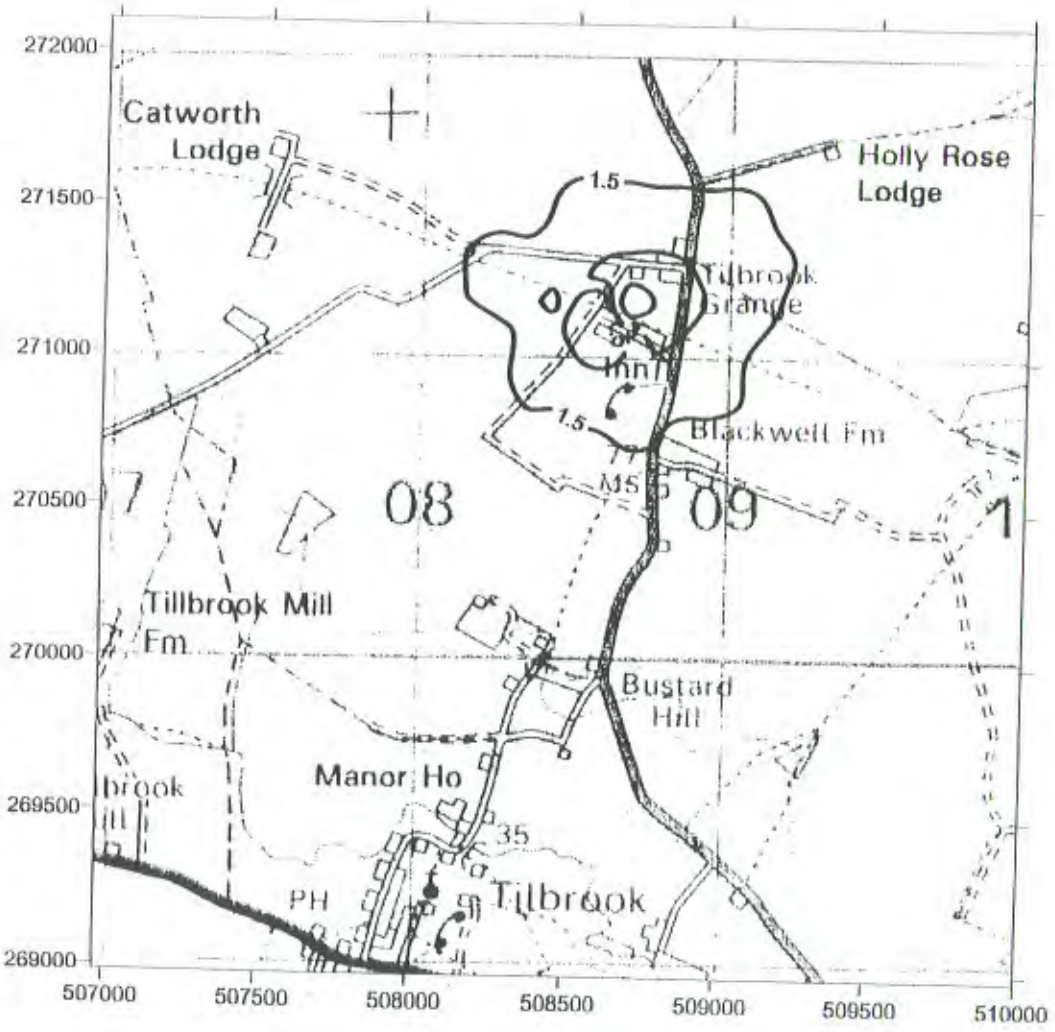


Figure 5.2: Predicted odour concentrations (as 98th%ile 1 hour values) based on the measured emission rate of 312,930 ou/s discharged through a 18 m stack

Contours shown are:
1.5, 3, and 6 ou/m^3.

Based upon the Ordnance Survey 1:50,000 scale map with the permission of The Controller of Her Majesty's Stationary Office C Crown Copy right. O.S. Licence AEA Technology Harwell Oxon OX11 0QJ ALS 1905A0001.

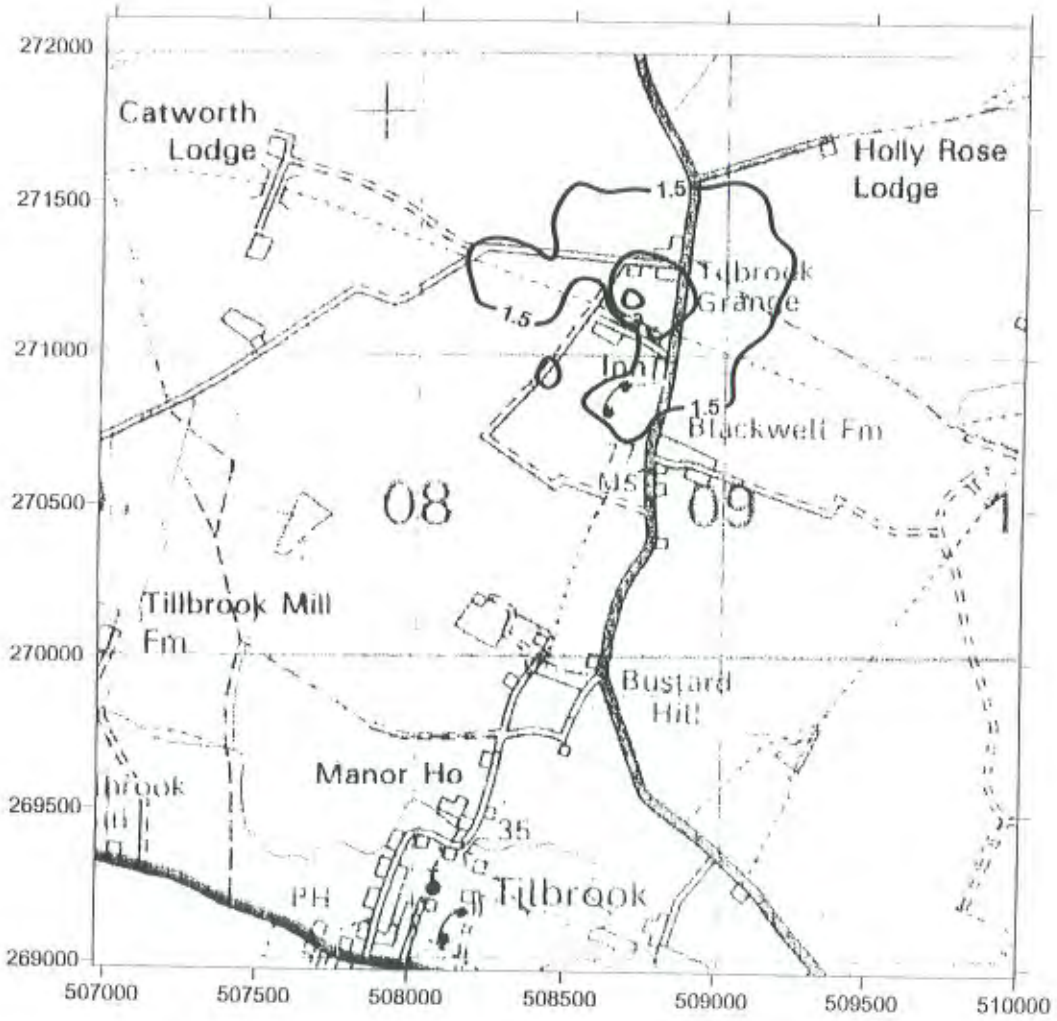


Figure 5.3: Predicted odour concentrations (as 98th%ile 1 hour values) based on the measured emission rate of 312,930 ou/s discharged through a 20 m stack

Contours shown are:
1.5, 3, and 6 ou/m^3.

Based upon the Ordnance Survey 1:50,000 scale map with the permission of The Controller of Her Majesty's Stationary Office C Crown Copy right. O.S. Licence AEA Technology Harwell Oxon OX11 0QJ ALS 1905A0001.

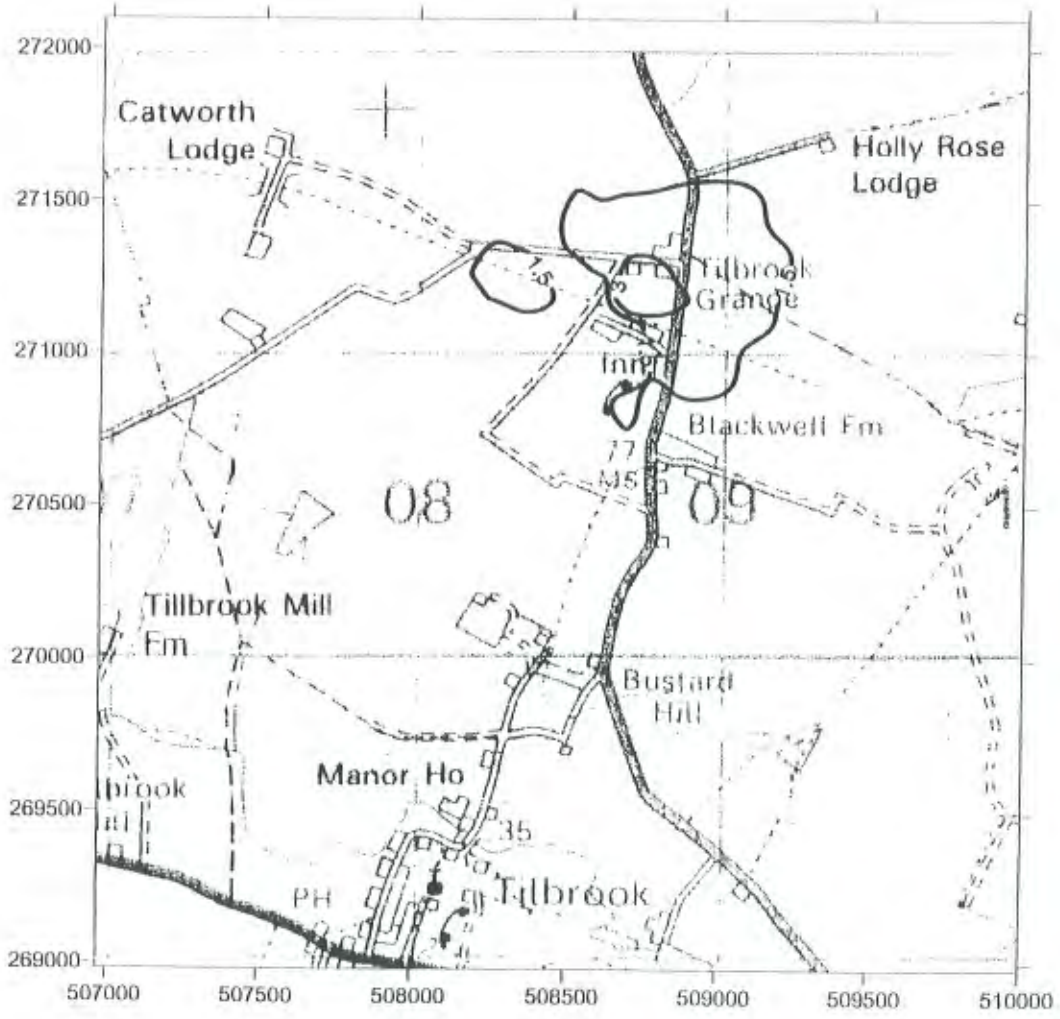


Figure 5.4: Predicted odour concentrations (as 98th%ile 1 hour values) based on the measured emission rate of 312,930 ou/s discharged through a 22 m stack

Contours shown are:
1.5, 3, and 6 ou/m^3.

Based upon the Ordnance Survey 1:50,000 scale map with the permission of The Controller of Her Majesty's Stationary Office C Crown Copy right. O.S. Licence AEA Technology Harwell Oxon OX11 0QJ ALS 1905A0001.

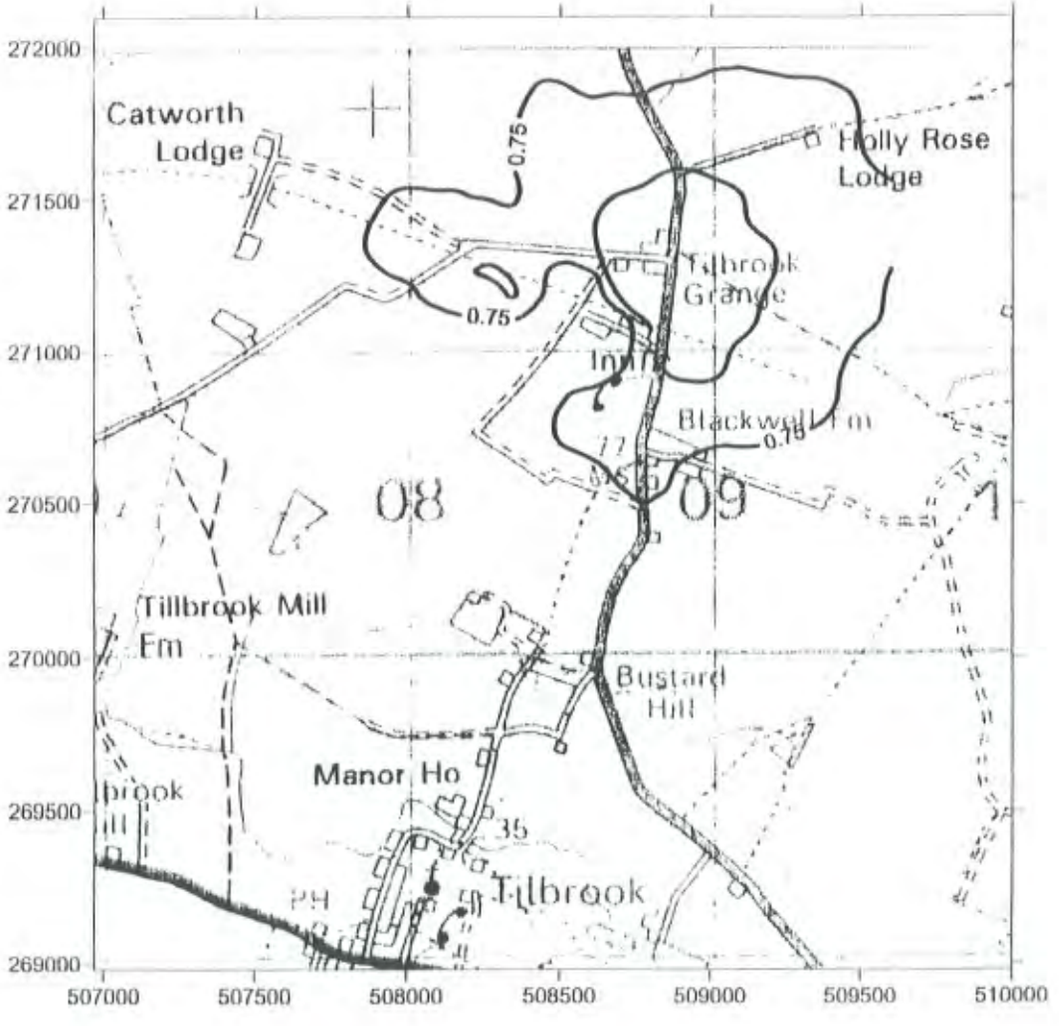


Figure 5.5: Predicted odour concentrations (as 98th%ile 1 hour values) based on the measured emission rate of 312,930 ou/s discharged through a 25 m stack

Contours shown are:
0.75, 1.5 and 3 ou/m^3.

Based upon the Ordnance Survey 1:50,000 scale map with the permission of The Controller of Her Majesty's Stationary Office C Crown Copy right. O.S. Licence AEA Technology Harwell Oxon OX11 0QJ ALS 1905A0001.

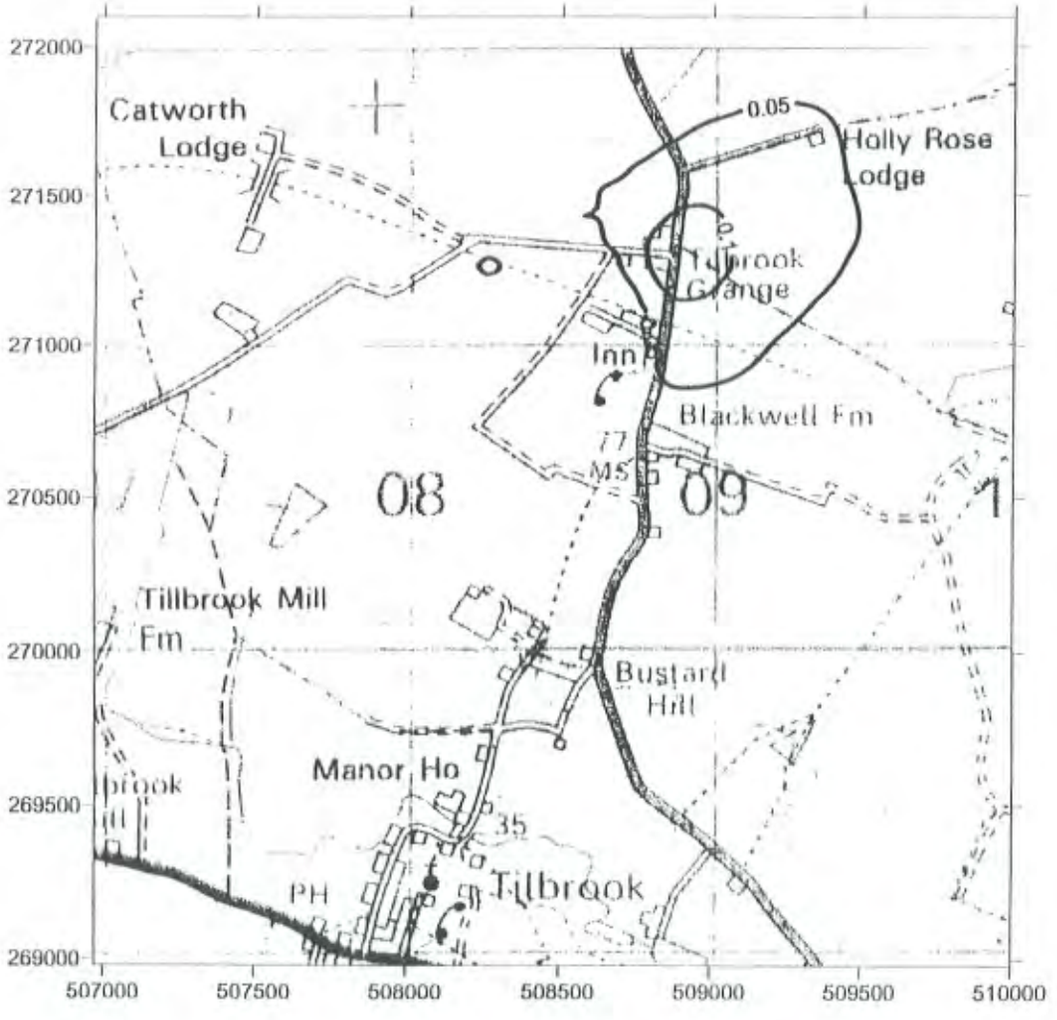


Figure 5.6: Predicted odour concentrations (as 98th%ile 1 hour values) based on the measured emission rate of 312,930 ou/s discharged through a 30 m stack

Contours shown are:
0.05 and 0.1 ou/m^3.

Based upon the Ordnance Survey 1:50,000 scale map with the permission of The Controller of Her Majesty's Stationary Office C Crown Copy right. O.S. Licence AEA Technology Harwell Oxon OX11 0QJ ALS 1905A0001.

6 Findings

Odour samples were collected at a range of burner operating temperatures consistent with normal operation. In addition one burner temperature above the normal operating range was considered for completeness. Odour emission rates at burner temperatures below 488°C appear to be approximately constant, while for burner temperatures above this the emission rate starts to rise. Some variability in the emission concentration is likely due to factors such as the moisture content of the raw wood as this affects the amount of wood that will be introduced into the burner. Under this range of operating conditions it can be seen that

- The impact of odour at concentrations of 3 ou/m^3 or more only affects a small number of properties (see Figure 5.1).
- Under the current discharge configuration, i.e. the dryer being discharged through a 12 m stack height and with emission rates up to 313,000 ou/s, impact concentrations at the closest properties with the exception of Blackwell Farm all exceed the upper odour exposure criterion of 3 ou/m^3 considered appropriate for this process (see Table 5.1). This finding indicates that the odour concentration at these locations may be sufficient to cause annoyance.
- By increasing the stack height from 12m to 18m, 22m, 25m and 30m progressively reduces the impact concentration at the closest receptors. If the emission rate is maintained at about 313,000 ou/s then raising the stack height to 20m should be sufficient to avoid annoyance.