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- Planning Application

LOUISIANA PACIFIC COILLTE IRELAND LTD.

PROPOSED O.S.B. PLANT
AT
GORTEENS, CO. KILKENNY

PLANNING APPLICATION

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CATHERINE STREET
WATERFORD

JANUARY 1994

LIST OF CONTENTS

SECTION 1 - GENERAL

1.1 INTRODUCTION

The proposal to set up an Oriented Strand Board Mill in Ireland is the culmination of five years work by Coillte Teo. and the Industrial Development Authority, and is a major step in developing the pulpwood processing sector of the Irish timber industry.

The project is a Joint Venture between Coillte Teoranta, the State forestry Company, and Louisiana Pacific, one of the leading U.S. forest products Companies. The newly formed Joint Venture, Louisiana Pacific Coillte Ireland Ltd. plans to build an Oriented Strand Board (OSB) Mill at Gorteens, Co. Kilkenny, adjacent to the new Port of Waterford.

The plant will be a "state of the art" facility incorporating sophisticated technology to ensure quality of production, cleanliness, safety and efficiency. Control systems, recognised as representing the "Best Available Control Technology" by the U.S. EPA will be installed in the interests of ensuring that there will be no adverse impact on the environment.

The plant will process approximately 650,000 cubic metres of pulpwood from Irish forests per annum, producing approximately 350,000 cubic metres of oriented strand board, most of which will be for export.

An Environmental Impact Statement accompanies this application. The statement has been prepared to conform in all aspects with the requirements of the EC Directive 85/33/EEC.

The full report is in three volumes:

Volume 1 - Environmental Impact Statement
Volume 2 - Appendices and Tables
Volume 3 - Reports of Specialist Consultants

1.2 LIST OF DRAWINGS

W9370/1	-	Site Location
W9370/2	-	Site Layout
W9370/3	-	Site Topography Details
W9370/4	-	Site Layout
W9370/5	-	Site Survey
W9370/6	-	General Arrangement Ground Floor
W9370/7	-	Sections Through Building
W9370/8	-	Elevations
W9370/9	-	Detail Sheet 1
W9370/10	-	Effluent Treatment Plant
W9370/11	-	General Arrangement Security Offices and Pump House
W9370/12	-	Site Development Details Sheet 1
W9370/13	-	Site Development Details Sheet 2
W9370/14	-	View from North East
W9370/15	-	View from South East
W9370/16	-	Proposed Contour Plan
LPC1/901	-	General Arrangement Layout

1.3 PLANNING APPLICATION FORM

KILKENNY COUNTY COUNCIL
COMHAIRLE CHONTAE CHILL CHAINNIGH
Phone: (056) 21199 Fax: (056) 63884

PLANNING APPLICATION FORM

PLEASE READ "GUIDELINES" OVERLEAF AND ATTACHED "NOTES FOR APPLICANTS" BEFORE COMPLETING

ALL QUESTIONS MUST BE ANSWERED

1 Name of Applicant (Principal – Not Agent): Louisiana Pacific Coillte Ireland Limited

Address of Applicant (Principal – Not Agent): Leeson Lane, Dublin 2

Ltd. Co., Regd. Office (where appropriate): ..... Tel. No. 01-6615555 Ltd. Co. Reg. No. .....

Name and Address to which correspondence is to be sent: Malone O'Regan, Consulting Engineers
St Catherines House, Catherine Street, Waterford

Person/Firm by whom Drawings prepared: Name: Malone O'Regan Technical Qualifications: Consulting Engineers
Address: St Catherines House Catherine Street Waterford Tel. No. 051 - 76855

Existing use of Site/Premises or use when last used: Farmland

Application For: PERMISSION ☑ OUTLINE PERMISSION ☐ APPROVAL ☐ Place ✓ in appropriate box

Brief Description of nature and extent of development: The development of an "ORIENTED STRAND BOARD" manufacturing plant on a 50 acre site

6 Location of Development: Gorteens

Details of applicant's present interest in the property and access thereto (e.g. freehold ownership, contract to purchase, etc.)
Where the site is being to be purchased then: Leasehold being negotiated

Provide name and address of landowner: Waterford Harbour Commissioners jointly with Kilkenny County Council (ii) Has the landowner given consent to apply: Yes

9 Fee submitted with application: £10,000 Method of Payment: Cheque

Basis of Fee calculation: Maximum Fee Development Class: .....

Gross Floor Space of Development: 29 300 square metres

Site Area: 24.3 Hectares. No. of dwellings proposed (if any): —

12 (a) (i) Source of Water Supply: Mains Supply

(ii) Form of Effluent/Sewage Disposal: Effluent Treatment Plant

(iii) Method of Disposal of Surface Water Run-off: Discharge to River Suir

(b) For Group Schemes - This is to certify that the applicant has contributed £ — in respect of connection to the — Group Water supply scheme

Signed: — Secretary of Group Scheme

If Application is for APPROVAL provide details of relevant Outline Permission: — Ref. in Planning Register: —

Date of Grant: —

Has an application under the Building Control Act been lodged (if applicable) Yes ☐ No ☐

If 'Yes' state date of application: —

Signed: JORegan (Applicant or Agent)

Date: 28/1/94.

SECTION 2 - PROJECT DESCRIPTION

THE SITE:

The site is located at the north east end of the New Port of Waterford at Gorteens, Co. Kilkenny. It is within an area which has recently been acquired jointly by the Waterford Harbour Commissioners and Kilkenny County Council.

The site covers an area of approximately 60 acres

The Commissioners and the County Council plan to develop this area for industrial purposes and port services. This development will include roadworks, water supply, sewers, drains, road lighting and landscaping.

Access to the Site:

A new road has recently been opened which gives access to the Port from the N25 National Primary Road.

The access to the site will be via a new road being constructed jointly by the Harbour Commissioners and the County Council to link the site with the Port access road. This road will also be part of the overall road development for the Port Services and industrial area, and is the subject of a separate Planning Application Ref. P868/93, undetermined at time of writing.

Geology:

The site is located in an area where the river cuts through a series of volcanic rocks that extend in a discontinuous north east/south west band from Dungarvan to South Wicklow interspersed in the lower palaeozoic rocks.

Geologically, the estuary is younger at the seaward end. At Dunmore East, the rocks are old red sandstones and at Hook Head Peninsula the bed rock is composed of carboniferous conglomerates and limestones. Throughout the bedrock is covered with varying thicknesses of glacial sediments which tend to be thickest in the river valleys and to be scarce or absent in the high ground.

Preliminary site investigations have already been carried out on the site.

Ground Water:

The meta-sediments and meta-volcanics found here are part of a regional belt of Lower Palaeozoic volcanics that extend from County Waterford, through Wexford to the Irish Sea coast at Arklow. This geological unit is an important groundwater aquifer and has been widely developed as a source of potable water. The two wells drilled at the port site have returned yields in the order of 350 m3/day each which confirms the aquifer status of this unit. There will also be a flow component towards the east in the direction of the local drainage.

Planning History:

The site is currently in agricultural use, and there are no relevant Planning Applications.

Climate:

Table 2-1 sets out the climatological data for Rosslare. The Meteorological Service have confirmed that the data would also apply to Waterford City, although temperatures may be a little greater or lower as Waterford would be less affected by the sea temperatures.

They also make comparison with the JFK Park which is closer to the Belview site.

SCOPE OF DEVELOPMENT:

The development will include:

- site development including major earthworks - excavation and filling of the site which covers an area of approximately 60 acres.
- construction of perimeter earth berms.
- extensive landscaping and planting.
- construction of roads and paved areas.
- construction of drainage systems including effluent treatment, settling and holding ponds.
- construction of water reservoirs and facilities for firefighting.
- construction of security fencing and gates.
- construction of a building covering an area of approximately 30,000 square metres, and ancillary buildings including a gate office and pumphouse.

- installation of processing plant for the manufacture of Oriented Strand Board.

- construction of ancillary facilities.

- installation of process and building services, including storage tanks in bunds, transformer stations, pump houses, etc..

PROCESS DESCRIPTION:

General:

The plant as installed will have a rated capacity to produce 1310 cubic metres of O.S.B. per 24 hour day.

However, experience with similar plants in the U.S.A. would suggest that annual operating efficiency due to scheduled maintenance and production interruptions would be between 75 - 85%. Timber supply contracts are in place to produce approximately 354,000 cubic metres annually of finished board.

Preparation:

A mobile lift will unload the logs and transfer them to the log storage area. In the log storage area, a 2 months maximum supply is stored on a first in/first out basis. As raw materials are needed for the process, logs will be conveyed to the infeed chute which feeds the logs into the debarkers.

The debarkers will remove the bark from the logs. The bark free logs will then be transported by conveyors to the waferisers. The bark is transported to a bark storage area and is then burned as fuel for the thermal oil heating system and the excess bark is transferred off site and used as fuel or mulch.

Waferising:

From the debarkers, the logs are conveyed to the waferisers where cutting blades slice the logs along the grain to form wafers 75 to 100 mm long, 25 to 50 mm wide and approximately 0.7 mm thick.

Drying:

The wafers are fed from green wafer storage bins into one of the four direct fired triple pass rotary dryers. The wafers will enter the driers at approximately 55% moisture content by weight and exit at approximately 6% moisture content. The main drier burner is fired by wood fines with a natural gas burner as backup. The burner firing rate is continuously adjusted to ensure that the wafers are dried to the correct moisture content and throughput remains constant.

The temperature of the exhaust gases from the drier ranges from 95°C. to 120°C. These exhaust gases contain ash, carbon monoxide (CO), sulphur dioxide (SO2) and nitrogen oxides (NOx) from the combustion of wood in the drier burners. In the drier chamber, small quantities of wood fines result from the abrasion of wafers moving through the driers. In addition, organic compounds naturally occurring in the wood are driven from the wafers due to the heat in the driers.

Organic compounds are emitted from the wood as gases with some condensing to form aerosols as the gas cools during passage through the drier exhaust system. Condensation occurs when the exhaust gases from the drier are cooled to temperatures below the boiling point of the organic compounds. The organics attach themselves to the fine solid particles which act as a condensation nuclei. These aerosols are sub-micron in size and difficult to capture.

After exiting the driers, the wafers are transferred pneumatically along the drier exhaust to the primary cyclones which separate the wafers from the dryer exhaust gases. The exhaust gases along with the entrained fines exit the primary cyclones and then pass through a wet electrostatic precipitator where additional fines, condensible organics, and small amounts of VOCs are removed. The collected material is dewatered and fed to the bark burning system. The solids are fed to the Thermal Oil Heater, and the liquid is returned to the Wet E.S.P. After exiting the precipitator, the exhaust gases are ducted to the R.T.Os. and exit to the atmosphere through a stack, approximately 35 metres high.

Dry Storage Blending and Forming:

The wafers are transferred to classifier screens which separates the larger wafers from the fines. They are then transferred via an enclosed metal rake conveyor to either of the two face wafer dry storage bins. The fines from the screens are pneumatically transferred to the dry fuel system.

The dry wafers from the face and core bins feed continuously into separate blenders and are mixed with resin and wax. The face wafers are blended with phenol-formaldehyde (PF) resin. The core wafers are blended with either the PF resin or liquid diisocyanate diphenylmethane (MDI) resin. The purpose of the wax is to improve resin distribution.

After the wafers are blended with the resin and the wax, enclosed rake conveyors transfer the face wafers to each of the two face forming bins and the core wafers to both of the two core forming bins. The wafers are metered from the forming bins and pass through orienting heads onto the forming line. Two forming heads spread the core wafers onto the bottom face layer to form the core layer. Finally, the last forming head spreads the face wafers to form the top face layer. After passing through the forming heads, a flying cut-off trims excess wafer material from each formed mat so that the mats can be separated.

Approximately 30% of the material is spread on each face and the remaining 40% is spread on the core.

A pneumatic system is used to pick up any fines from both the blender transport conveyors and the forming heads. These heads are transported pneumatically to a bag house. The suction collection system is used to collect wafers and fines from the cross cut saw area. The collected material is transported pneumatically to the core former through a cyclone and conveyor.

Pressing:

Fourteen mats are accumulated into the press load so that they can all be pressed simultaneously. The entire press system includes a hydraulic system, thermal oil circulation system and controls for loading, compressing and unloading the mat. The plates of the press are heated to approximately 230°C. The press applies a pressure of 5.3 MN/m^2 to the wafer mat. This allows compression of the final product to the desired thickness.

Heat and pressure from the press along with the residual moisture in the wood wafers combine to bond the resin and form the oriented strand board. Upon completion of the pressing operation, the rough OSB product is then removed from the press to the unloader.

Emissions from the pressing operation consist of VOCs which are emitted from the resins and VOCs which are given off from the wafers in the boards. Emissions of water vapour and VOCs result from the pressure and heat applied during the pressing operation which decreases the amount of moisture in the board to approximately 2%. VOC emissions which are emitted from the wafers during the pressing operation are primarily terpenes which were not driven off in the drying process.

Press emissions will be vented through the R.T.O. before discharge to atmosphere.

Sizing and Finishing:

The press boards are trimmed to final product size with a portion routed to the sander and tongue and groove machine. Each board is grade stamped. Waste material from the edge trim enters the trim baghouse where it is transported to the dryer area for fuel preparation.

OSB panels are stacked and bundled together with a band strapping machine. The edges of the OSB panels are spray coated with a water resistant edge seal in an enclosed room by an operator using a hand held air assisted spray gun. The finished OSB bundles are then spray stencilled with the Company logo and are stored or despatched.

MONITORING:

Monthly production records will be maintained. Records of resin and wax deliveries and usage will be maintained.

Records of usage of gas, water, electricity and various oils will be maintained.

RAW MATERIAL:

The raw material for the plant will generally be drawn from forests owned and operated by Coillte Teo., predominantly in the Southern and Eastern part of the country.
A commitment is already in place for delivery of 650,000 cubic metres per year of logs to the plant from Coillte's forests.

The supply will be made up of small diameter and pulpwood quality spruce and pine logs unsuitable for use in sawmills. Generally, the logs will be approximately 3 metres in length and less than 150 mm in diameter. Much of the pulpwood comes from forest thinnings. Thinning is a vital step in the management of a commercial forest, where some trees are removed to reduce competition for nutrients and allow more space for those left behind to grow into high quality timber.

Up to now, a considerable quantity of pulpwood is exported because of a lack of plants within Ireland to process it.

Logs will be collected at the forests and hauled to the plant by trucks. Discussions are also in progress with Iarnrod Eireann regarding the possibility of hauling logs from the more remote forests by rail.

RESIN AND WAX SYSTEM:

Resin is used to bind the wafers together and wax is also applied to improve the resin distribution and moisture resistance of the finished product.

There are two types of resin used PF resin (phenol formaldehyde) and MDI resin (diisocynate diphenylmethane).

PF Resin:

The resin is in liquid form, with approximately 40% water content.

Resin usage is based on solids content.

This resin is a complex three dimensional polymer containing 0.1% to 0.3% free formaldehyde. OSHA regulates formaldehyde as a potential human carcinogen. The International Agency for Research on Cancer classify it as a Class B carcinogen.

If the resin is inhaled, it may cause irritation.

It is not a fire or explosion hazard.

It forms a mechanical bond between the wafers.

MDI Resin:

Like PF resin, it is in liquid form.

The main health hazard arises when MDI is inhaled, either in the form of vapour, aerosol or dust. The hazard is most likely to arise when materials are heated, sprayed, or used in a confined unventilated space. Therefore, correct handling procedures are essential.

Owing to the low vapour pressure of MDI at ambient temperatures, with adequate ventilation, exposure to hazardous levels of MDI vapour in the atmosphere is unlikely.

MDI vapour, aerosol or dust can act as a primary respiratory irritant. In mild cases the affected person may experience slight irritation of the eyes, nose and throat, possibly combined with dryness of the throat.

In more severe cases, the person may suffer acute bronchial irritation and difficulty in breathing. Individuals who have developed sensitivity to MDI may experience wheezing, tightness of the chest and shortness of breath.

It is not a fire or explosion hazard.

It forms both a mechanical and chemical bond between wafers and is regarded as having a fast curing speed, high moisture tolerance, and superior physical and durability properties.

Wax:

The wax used will generally be a paraffin wax emulsion. It is non-combustible, stable and not regarded as a health hazard.

Wax usage is based on solids portion only.

Storage and Handling:

The resins and wax will be stored on site within the building in bulk tanks, each having a capacity of 20,000 gallons each. The tank rooms will be insulated, and temperature controlled. The tanks themselves will be installed in bunded areas, with a bund capacity at least 110% of the largest tank.

Deliveries of the resins and wax to the site will be made in tankers or in lift on/lift off tanks. The product will be pumped into the bulk tanks in accordance with the safe handling procedures recommended by the manufacturers. Delivery areas will be protected and bunded to ensure that accidental spillages in the coupling of pipes cannot gain access to the surface water drains.

Each of the bulk storage tanks will be fitted with carbon filters. Intake air vents are also fitted with one way operation. The MDI tank is also fitted with an air drier.

The resins and wax will be pumped into separate 2,000 gallon day storage tanks and will then be pumped to the blenders from their respective tanks by metering pumps.

Generally, MDI resin is applied to the wafers in the core of the boards and the PF resin is applied to the wafers in the top and bottom outer skins.

Based on the estimated annual average production, the total quantity of resin used is approximately 8,000 tonnes per year, solids basis, and wax is approximately 3,000 tonnes per year, solids basis.

Boards may be manufactured totally from PF resin or MDI resin. However, the characteristics of the MDI are such that a separating foil has to be applied on the top and bottom of the board to prevent wafers sticking to the press plates.

ENERGY:

Consumption:

The plant will be a major consumer of power and heat, with the following estimated maximum demand:-

Electricity	-	6300 kw/hour.
Thermal Oil Heater	-	450 therms/hour.
Driers	-	1600 therms/hour.
Air Emission Control (RTOs)	-	380 therms/hour.

Efficiency in the use of energy will be a particular feature of the plant design and operation. This will be achieved in a number of ways:-

- waste product will be used instead of prime fossil fuels in the heating and drying processes.
- the exhaust gases from the thermal oil heater will be ducted to the driers to preheat the air supply.
- the control system for the atmospheric emissions will incorporate regenerative oxidisers to minimise heat loss and reduce energy consumption.
- waste heat will be used to heat the large production building.

Electricity:

The plant will require a 7 MW Power supply. The E.S.B. have confirmed that an electricity supply can be made available for this project.

Fuel for Driers:

The fuel for the driers is provided by using waste material from the process including fines and offcuts.

Fuel for Thermal Oil Heater:

The fuel for the thermal oil heater will be a combination of fines and offcuts together with bark which will be transferred from the debarker machines.

Natural Gas:

Natural Gas will be used to fuel the Regenerative Thermal Oxidisers. Negotiations are in progress with Bord Gais Eireann regarding the extension of their supply from Kilbarry in Waterford to the site. The gas consumption will be approximately 2.8 million therms per annum.

Back Up Facility:

A back-up facility of natural gas will be available for the driers and thermal oil heater.

WASTES AND EMISSIONS:

GENERAL:

The plant operation will incorporate a comprehensive waste minimisation plan. This will be manifested in a number of ways:

- Training systems and operation procedures will ensure that waste production is minimised.
- Process by products (bark, fines, etc.) will be used as fuel in the heating and drying processes.
- "State of the Art" control technology will be installed to ensure that the emission of wastes to the environment will be minimised.
- A comprehensive recycling policy will be implemented to promote the recycling of waste paper, oils, and plant consumables, either within the plant itself or by outside agencies.

ATMOSPHERIC EMISSIONS:

There will be atmospheric emissions from the Thermal Oil Heater, the Driers, the Press and from the building itself.

Thermal Oil Heater:

The emission of 34,000 Nm3/hr. from the thermal oil heater will contain dust (particulates), combustion gases and some VOCs. After passing through a multiclone to remove large dust particles, the gases will be passed to the driers as make up air to enhance the heating requirement for the drier.

There will be no direct discharge to atmosphere under normal conditions. An abort stack will be provided for exhaust gas discharge for upset conditions when the drier system is being maintained.

The emissions from the Thermal Oil Heater will have the following characteristics:-

Particulate Matter:	87.8	mg/Nm3
VOCs:	31.3	" "
CO:	283.2	" "
NOx:	200.6	" "
SO2 (wood):	2.5	" "
SO2 (Natural Gas):	0.01	" "
Formaldehyde:	0.17	" "
Phenol:	1.67	" "
MDI:	0	

Driers:

Heated air is used to dry the wafers in the four driers. The total airflow through the driers will be 282,493 Nm3/hr.

The extract from the driers will contain particulate matter; volatile organic compounds (VOCs - mainly terpenes); carbon monoxide (CO); sulphur dioxide (SO2); nitrogen oxides (NOx); formaldehyde; and phenol.

Dust: (Particulate Matter)

The definition of dust has been undergoing change. Dust is now considered to include particulate matter having a diameter less than 10u, as well as organic and inorganic materials that are collected on a fabric filter at 120°C.

The dust from the drier will be approximately 25% inorganic.

Volatile Organic Compounds: (VOCs)

Volatile Organic Compounds from wood flake driers are a complex mixture of compounds. They include both condensible and non-condensible organic compounds. These compounds are of concern as they may contribute to ozone formation in the atmosphere. In wood dryer emission they consist of vaporised terpenes, combustion products, pyrolysis products and vaporised pitch. Recent research has shown that the propensity of VOCs to contribute to ozone formation is enhanced by nitrogen oxides.

Condensible VOCs are organic materials that condense at atmospheric temperatures and do not readily re-evaporate. They are measured as the material that passed through a filter held at 120°C., and captured in the cool impingers of a sampling train. In wood dryer emissions they consist of evaporated pitch and, in some cases, they contain wood pyrolysis products.

Non-condensible VOCs describe that portion of VOCs that do not condense to form an aerosol at typical atmospheric temperatures. Non-condensible VOCs from wood drying include terpenes and other low molecular weight compounds but not evaporated pitch.

Carbon Monoxide:

CO is emitted during pyrolysis of wood and lean air burning of wood.

Nitrogen Oxides:

There are two sources of nitrogen oxides:

- thermal NOx
- fuel bound NOx

Thermal NOx is directly controlled by the peak temperature of the flame and the reaction of "free" nitrogen in the combustion air and the fuel. The amount of thermal NOx generated increased with the peak temperature of the flame.

Fuel bound NOx is related to the amount of nitrogen that is chemically bound in the fuel.

Sulphur Dioxide:

There are two sources of sulphur dioxide:

- ancillary fuel
- wood combusted for energy

The natural sulphur content of wood varies from one species to another, but is much less than that of fuel oils.

Formaldehyde: Formaldehyde is liberated during pyrolysis of wood.

Phenol: Phenol is liberated from the wood during drying.

Control of Atmospheric Emissions from Drier:

The air will go through a three stage cleansing process on exiting from the driers:

(a) It first passes through a cyclone system to remove the product, and the larger fine particulate matter.
(b) It then passes through a wet electrostatic precipitator to remove finer particles and some VOCs

Several OSB facilities use wet ESPs for particulate control in the wood industry, and they have been designated as best available control technology (BACT) in several United States Environmental Protection Agency Permits. However, initial projections that wet ESPs controlled both particulates and volatile organic compounds (VOCs) are shown not to be sustainable, and recent tests indicate minimal VOC removal of about 20%. Removal of particulates, however, is about 95%.

(c) Finally, it passes through a Regenerative Thermal Oxidiser (RTO). This plant uses beds of ceramic materials as heat sinks in order to reduce the amount of fuel required to heat the gas stream. The inlet bed preheats the incoming air stream and, if the heat content and temperature are sufficient, the stream will begin to oxidise. Any combustible material is mixed with supplemental fuel in the combustion chamber and burned at 815°C. The heated gas stream leaves through the outlet bed, which absorbs heat from the gas stream. After a period of time, the inlet flow is routed to the previous outlet bed, and so on. The cycling of beds can achieve up to 95% heat recovery which greatly reduces the amount of supplemental fuel required.

There is potential for coating and plugging of the ceramic beds. However, because of the heat retained in the ceramic beds, coating is significantly reduced, and plugging may occur with time if the amount of inorganic material is excessive. Upstream removal of particulates and condensible organic material on another devise such as wet ESP, will significantly reduce the risk of plugging of the ceramic beds.

The RTO is regarded as Best Available Control Technology by the U.S. EPA for the removal of VOCs from wafer driers

The total air emitted to atmosphere after treatment will have the following characteristics:-

	ACTUAL
Air Flow: (Temp. 120°C)	313,098 Nm3/hr.(moisture 25% by volume)
Dust	14.6 mg/Nm3
Total VOCs	43.89 "
CO	48.45 "
NOx	74.82 "
SO 2 (wood)	1.29 "
SO 2 (natural gas)	-
Formaldehyde	0.425 "
Phenol	0.0704 "
MDI	0 "

Press:

During the press cycle, the mat is heated under pressure to initiate the polymerisation reaction to set the resin. The press temperature and the final surface temperature of the board, as it progresses through the curing cycle, determine the amount of energy available for volatilisation of VOCs and formaldehyde from the wood fibre, the resin, or the wax.

Maximum emissions of the generated vapours occur prior to the end of the press cycle, when the press decompressses, and the moisture escapes from the boards. At the end of the cycle when the press opens, and the boards are unloaded. As the boards cool, the emissions decrease exponentially. The vapours exhaust through the press hood vents, and are ducted to an RTO.

The resins and waxes used for bonding the wafers also give rise to atmospheric emissions. The resins normally used are PF resins, or MDI, either 100% of either or 50% of each. PF resin has a free formaldehyde content of less than 1%, which is the lowest free content of all commercially available formaldehyde based resins.

In general, the primary emission is water vapour. Carbon monoxide and particulate emissions are very small, and may result from some heating of the wood during the press cycle. Oxides of nitrogen are not present since the pressing operation takes place at a temperature of 230°C. which is well below the threshold for NOx production.

The atmospheric emissions contain dust; VOCs; CO; formaldehyde; phenol and MDI.

Dust: (Particulate Matter):	The press vent emissions are approximately 99% organic. Since the press is not designed to burn the wood, very little inorganic material is expected to be released from the wood structure. Thus, the dust from the press vent is essentially combustible organic material. Particulate emissions from the press are considered to be low, since only minimal mechanical operations occur in the loading and unloading operations.
VOCs:	VOC emissions from the press are generated from the wood resins and wax contacting the hot surfaces of the press platens. They are similar in nature to those from the driers, but concentrations are very low.
Carbon Monoxide:	Emissions from the press are very low.

Formaldehyde, Phenol M.D.I.

The resins used for bonding the wafers give rise to atmospheric emissions. Resins normally used are PF resin, or M.D.I.; with 100% of either of 50% of each being used. PF resin has a formaldehyde content of less than 1%, which is the lowest free content of all commercially available formaldehyde band resins. When PF resin is used, there will be a formaldehyde and phenol content in the atmospheric discharge. Similarly, when MDI resin is used, there will be an MDI content in the atmospheric discharge, and a small amount of formaldehyde and phenol.

Control of Atmospheric Emissions from Press:

The emissions from the press are ducted to an RTO for treatment prior to discharge to atmosphere. The RTO will be similar to that proposed for the driers.

The treated emissions discharged from the RTO to atmosphere will have the following characteristics:

	ACTUAL
Air Flow: (Temp. 96°C)	190,882 Nm3/hr (Moisture 2% by volume)
Dust	1.17 mg/Nm3
Total VOCs	7.46 "
CO	18.34 "
NOx	9.38 "
SO 2 (wood)	0
SO 2 (natural gas)	0
Formaldehyde	1.571 "
Phenol	0.538 "
MDI	0.262 "

The emission concentrations given for the press result from the maximum dosage of each resin calculated on a solids basis of 4% of the finished product. It should be noted, however, that when 100% PF resin is used, there will be no MDI emission. When 100% MDI is used, the concentration will be as stated above. When the dosage is 50 : 50, the concentration of the emissions will be approximately 50% of that stated above.

General Extract from Production Building:

The building will be maintained under negative pressure. The air extracted from the building through the pneumatic conveying systems and baghouses will contain trace quantities of dust. This air will be discharged back into the building in normal climatic conditions, but may be ducted to atmosphere in very warm weather. It should be noted that make up air for the driers and the press is drawn through wall louvres within the building itself, so makeup airflow is ensured.

Fugitive Emissions:

Fugitive emissions may arise from:

- handling of timber and bark within the site perimeter
- movement of transport and plant vehicles on unsurfaced ground
- handling of ash from the thermal oil heater
- venting from the building in hot weather

In dry weather, water sprays will be used to minimise dust levels, in the yard areas.

SOLID WASTE:

Product Waste:

Within the plant itself, dust and offcuts will be collected by a vacuum system and transferred to a mill for crushing and then be used as fuel for the dryers and the bark burner. It is not anticipated that there will be any significant surplus material. Whatever surplus is available will be transferred offsite to other processors.

Waste paper will be collected on site and disposed of for recycling if an appropriate collection service is available. Alternatively, it will be taken to a licensed tiphead subject to agreement with the Planning Authority.

Waste metal in the form of chains, knife blades, metal strapping, etc. will be sold for recycling.

Bark:

Approximately 60,000 tonnes of bark will be removed from logs per annum. 25,000 tonnes will be used as fuel and the surplus of 35,000 tonnes will be disposed of. Markets are readily available for this material both in Ireland and England for use as a horticultural mulch and it will be disposed of in this way.

Ash:

There will be an annual residue of approximately 500 tonnes of ash from the burners.

This material will be stockpiled in a bund area for cooling and taken to a licensed tiphead subject to agreement with the Planning Authority.

Grit, Silt, etc. solids from Settling Tank and Wheel Wash:

Grit, silt and solids from the wheel wash will be put in a skip on site and taken to a licensed tiphead.

The solids which settle in the settling pond will be removed at regular intervals and taken to a licensed tiphead.

All disposal will be subject to agreement with the Planning Authority.

LIQUID WASTE:

Liquid Waste:

Waste oils will be collected on site and sold to an appropriate collection service for recycling.

There is no liquid effluent generated by the production process.

Domestic Sewage:

Domestic sewage, (approx. 8m3 per day) will be treated on the site to a standard of 20:30 ppm BOD:SS with the installation of a small effluent treatment plant.

Surface Water Run-off:

Surface water run-off will be treated by means of a screen and settling pond prior to discharge to the river.

SPECIFICATION FOR CONSTRUCTION:

The development shall be carried out in full compliance with the relevant approvals from Planning Authorities, Building Control and other statutory bodies.

SITE DEVELOPMENT AND PLANTING:

The earthworks will create gently sloping embankments sweeping around the site in sympathy with the undulating rolling nature of the surrounding landscape.

Landscaped areas within the site will be mounded and contoured to blend with the existing visual setting.

The holding pond for fire fighting will be developed in a geometric form to contrast with the meandering river valley and incorporated in the landscape design to enhance the south east corner of the site.

The planting programme envisages:-

North West Corner of Site:

This area will be planted as a coniferous plantation of Larch and Pine.

Embankments and Surrounds to Site:

These areas will be planted with trees, both broad leaved and coniferous with the intention of creating a mixed linear woodland of informal character similar in visual impact to the nearby mature woodland to the front of Knockmullen.

Banks should be seeded with a low maintenance mix for immediate greening.

Area around S.E. Corner of Building:

Car parking and firepond to be laid out in an attractive landscape with grass mounds and parkland tree groups.

Existing mature tree groups near this boundary to be retained and contoured with site if possible.

ARCHITECTURAL TREATMENT:

The building envelope, clad in profiled sheeting, will be finished in a dark green metal profile cladding. The colour will be taken through to the roof cladding and this will have the effect of unifying the varying masses of the facility and minimise their impact, particularly with regard to distant viewing.

Office Facade:

The office section of the development in the south east corner of the facility is treated differently from the remainder to highlight its presence and legibility.

The external wall at this point is carried out in a cavity wall, finished in dry dash white sand and cement render and marble chippings.

An entrance porch in steel and aluminium, executed in white, highlights the main entrance for visitors.

Fenestration in this area is carried out in white syntha pulvin aluminium.

Car Parking:

The Car Park for staff and visitors will be sunken in relation to the floor level of the offices to minimise the visual impact of the Car Park at the entrance.

STRUCTURAL DESIGN:

Design loading will be in accordance with BS 6399 Part 1 1984 - Design of Building Part 1.

Floor loadings shall comply with Table 10.

Machine bases and supports will be designed in accordance with data supplied by the manufacturers.

Wind loadings shall be designed in accordance with CP 3 Chapter V for wind speeds appropriate to the area as defined by the code.

CONCRETE WORKS:

All concrete works shall be carried out in accordance with BS 8110.

The concrete grade and location shall be as follows:-

Grade 15:	Filling and blinding sub-bases.
Grade 35:	Foundations and retaining walls.
Grade 40:	Concrete paving generally and floor slab.

STRUCTURAL STEELWORK:

The design of the structural steelwork shall be in compliance with BS 5950.

Materials:

Hot rolled steel plates and sections shall comply with BS 4360.

Cold formed sections shall comply with BS 2994.

Floor Plates:

Steel floor plates shall be chequer plate Durbar pattern.

Fabrication and Erection:

Steel shall be fabricated and erected in accordance with the National Structural Steelwork Specification.

Surface Treatment:

All hot rolled steelwork shall be blast cleaned to Swedish Standard SIS 055900/2.5 and primed with a zinc rich primer to a total d.f.t. of 75 microns. Exposed steelwork shall receive a further coat of micaceous iron oxide primer to a d.f.t. of 75 microns and a finish coat of chlorinated rubber paint to approved colour to a d.f.t. of 50 microns.

ROOF AND WALL CLADDING:

Wall Cladding - Generally:

Generally wall cladding shall be single skin profiled galvanised steel cladding, trapezoidal corrugated sheets, 32 mm profile and shall comply with BS 2989 or similar. The external coating shall be liquid applied Plastisol to approved colour, having a dry film thickness of 200 microns. The internal coating shall be PVC Plastisol. The weather skin shall have a minimum thickness of 0.7 mm.

The insulation shall be mineral wool, 100 mm in thickness.

There shall be an internal lining sheet on the inside face of the sheeting rails comprising 32 mm profile, 0.4 mm thick, galvanised to B.S. 2989, Class Z1 with off-white lining enamel inner coating and a standard light grey backing coat.

FIRE FIGHTING INSTALLATION:

The entire installation including the holding tank, pump systems distribution systems, hydrants and sprinkler system shall comply with the requirements if Factory Mutual Engineering.

SITE WORKS:

The site works shall comprise:-

- bulk excavation and filling
- ground modelling including construction of earth berms

Paving as follows:-

Roads Generally - 50 mm asphalt wearing course on 60 mm dense bitumen base course on 450 mm crushed stone in two layers.

Car Park - 40 mm bitumen macadam on 50 mm dense bitumen base course on 250 mm crushed stone.

Log Yard:

Paving to the log yard shall comprise 450 mm crushed stone laid to falls and compacted.

Dispatch area - 200 mm reinforced concrete 35N20, on 250 mm crushed stone.

Fencing will be chain link fencing on precast concrete post, cranked on top.

Surface water drainage will be generally open culverts, discharging via a screen to a settling pond before discharge to the river.

Foul sewage will be treated in an effluent treatment plant prior to discharge to the river.

WATER SUPPLY

The water supply of approximately 150 m3 per day will be made available from a main being installed in the Belview Port area by Waterford Harbour Commissioners and Kilkenny County Council.

TRAFFIC

It is envisaged that, in the early years of operation, raw materials will be hauled to the plant by road, at a rate of approximately 85 loads per day. There will be other HGVs coming into the site delivering packaging and consumable materials at the rate of 15 per day.

For the longer term, the delivery of raw materials to the site from the more remote forests is being considered.

There will be approximately 25 passenger cars visiting the site per normal working day.

EMPLOYMENT

During construction, the numbers which will be employed in a temporary capacity over the 12 months construction period will vary from 30 to 150.

On completion, there will be a total of 500 people employed. This will include 125 directly employed in the factory and 375 employed in the harvesting, extraction and transport of raw materials to the plant.

HOURS OF WORK

The factory will operate 24 hours a day, 7 days a week, in continuous production.

PROGRAMME

Construction of the plant is due to commence immediately Planning Permission is granted.

The period of construction will be approximately 12 months, with a further 3 months for commissioning.