

Sub-sectoral Environmental Guidelines

FURNITURE AND FITTINGS

PROCESS DESCRIPTION

The manufacture of furniture and fittings from wood and wood based products involves the supply and storage of timber, carpentry, preservation of wood, bonding, gluing of wood and final assembly into finished products.

SUMMARY OF KEY ENVIRONMENTAL RISK/LIABILITY FACTORS

Soil and Groundwater Contamination

Chemicals used in the manufacture of furniture and fittings may include varnishes, solvents, wax emulsions, fungicides, formaldehyde, PCP (pentachlorophenol) and coal tar creosote. These may be stored in (above and below ground) bulk storage tanks or drums and may leak into the ground to give rise to ground contamination and may also pose a significant occupational exposure hazard (several of these preservatives contain substances which are carcinogens).

Health and Safety Issues

Fumes (indoor and outdoor) from furniture and fittings manufacturing sites (e.g. resins and varnishes, volatile organic compounds in solvents) have health impacts. Adequate ventilation and fume extraction must therefore be provided. Dust suppression through air filtration will also be required. Solvents and inflammables should be stored separately from main work areas, and these areas should be provided with effective fire prevention and fire fighting equipment.

Source of Raw Materials

There is increasing international pressure to use timber from sustainably harvested forests. Before investing in a furniture and fittings business it is imperative to ensure that there is a sustainable and legally permitted supply of timber.

Dust & Noise Abatement

Fugitive saw dust and noise from carpentry activities may pose significant environmental (boundary) and health and safety (occupational exposure) liabilities.

FINANCIAL IMPLICATIONS

Emissions and Discharges

There may be requirements for VOC emission control at furniture and fittings sites, particularly those using large quantities of solvent based varnishes, paints and other coatings.

Dust & Noise Abatement

Dust and noise emissions may be costly to abate. Furniture and fittings sites may be required to reduce noise and dust emissions in order to comply with local and national regulations. Compensation from noise induced hearing loss may present a major liability. The installation of additional dust cyclones and filters as well as acoustic boards and sound barriers may incur substantial costs.

Fire/Explosion Hazard

Significant capital expenditure may be required to install adequate fire/explosion prevention and protection measures. Uncontrolled fires at furniture and fittings sites may not only destroy the business but also cause significant damage to neighbouring properties and habitats. Fine dust particles may also represent an explosion hazard.

OTHER POTENTIAL ENVIRONMENTAL ISSUES

Storage of Oils and Chemicals

Typically the chemicals used at furniture and fittings sites will include resins and adhesives such as urea formaldehyde and phenol formaldehyde, oils (fuel and lubrication) and drums of assorted additives, solvents, wood treatment chemicals, hardeners, wax emulsions and fungicides. Secondary containment should be installed for all bulk storage vessels to reduce the risk of ground contamination and pollution of surface waters.

ENVIRONMENTAL IMPROVEMENTS

Furniture and fittings manufacturing sites should be encouraged to:

- upgrade storage areas to allow for proper containment of accidental spills and leakages including the provision of bunding for bulk storage tanks;
- develop procedures for the handling and storage of hazardous chemicals;
- use less toxic and persistent preservatives;
- review timber sources on a regular basis to ensure that sustainable sources are being used;
- implement measures to minimise wastage.
- enforce the use of personal protective equipment and provide regular training.

ENVIRONMENTAL ACTION PLAN

An environmental action plan for an enterprise in this sector should include:

- developing programmes to minimise the risk of ground contamination;
- implementing dust, noise and odour abatement programmes;
- installing improved fire protection measures and developing protection procedures, emergency plans and training;
- developing programmes to reduce impacts associated with the transport of raw materials and finished products to, and from the site;
- developing safety management systems for chemical storage and handling.

GUIDE TO INITIAL DUE DILIGENCE SITE VISITS

When visiting a furniture and fittings manufacturing site some of the key features to assess are:

- sources of timber
- chemical handling and utilisation;
- the potential for existing and historic ground contamination from chemicals stored and used at the site;
- signs of dust accumulation;
- the adequacy of fire fighting equipment;
- the presence of any odour and noise abatement equipment on site;
- whether waste is incinerated on-site;
- means of transport to and from the site and the associated impacts;
- local views on the operations at the site.

It is also suggested that contact is made with local regulatory agencies to determine compliance record and whether complaints have been made by the public.

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WOOD PROCESSING

PROCESS DESCRIPTION

The manufacture of wood products can be broadly categorised into sawmill production and plywood and chipboard production.

Sawmills usually receive softwood and hardwood timber from a variety of local and regional sources. At the sawmill the timber is segregated, cut to size, and dispatched. Wood processed at sawmills is often seasoned, heat treated or treated with preservatives. Chemical treatment is commonly undertaken under vacuum conditions in pressurised vessels. The latest preserving technique involves the irradiation of logs and timber

Plywood is formed from a series of veneers, or layers. Thin wooden layers are bonded together through a series of processes including log conditioning, peeling, clipping, drying, grading, adhesive application and pressing followed by trimming, filling and sanding. A variety of resins and bonding agents are used in the manufacture of chipboards and plywood.

Chipboard is a particle board made of small wood particles and a binder (usually a synthetic resin). Wood is mechanically taken apart and then reconstituted using a synthetic resin adhesive. Chipboard production involves the following processes: debarking, chipping/milling, drying, sifting/particle classification, glue blending, mat forming and pressing followed by final trimming and sanding.

SUMMARY OF KEY ENVIRONMENTAL RISK/LIABILITY FACTORS

Soil and groundwater contamination

Preservatives used for timber treatment may include formaldehyde, PCP (pentachlorophenol), lindane, MDI (Methyl diphenyl di-isocyanate), TBT (tributyl tin) compounds, CCA (copper/chrome/arsenate) and coal tar creosote. These preservatives may be stored in (above and below ground) bulk storage tanks and may give rise to ground contamination as well as pose a significant occupational exposure hazard (several of these preservatives are suspected carcinogens). Drums of assorted additives, solvents, wood treatment chemicals, hardeners, wax emulsions and fungicides may also be stored on site. Drying of treated timber may occur in open yard areas unprotected from rain. Ground contamination may occur as a result of leakages from storage tanks and from spillages as a result of poor handling practices.

Occupational Health and Safety and Neighbourhood Claims

Significant health risks from workers exposure to chemicals, dust, noise and unguarded machinery may be associated with these operations. Chemicals used to treat the wood can be extremely hazardous to human health, some being known carcinogens. There may also be health-related claims from neighbours, particularly in relation to exposure to dust, formaldehyde and MDI.

Transport related damage and planning constraints

Transport of raw materials to the site and dispatch of the finished products, particularly through built up areas and sensitive wildlife habitats may cause significant public concern, and can lead to damage of local highways, waterways and ecologically important areas and species. As a result, any proposed development could be subject to significant planning constraints.

Dust & noise abatement

Dust and noise may pose significant environmental problems (e.g. nuisance for neighbours and disturbance to wildlife) and health and safety problems (e.g. worker exposure and compensation claims). As a result, sawmills may be required to reduce noise and dust emissions in order to comply with local and national regulations. The available control measures, such as installation of dust cyclones and filters as well as acoustic boards and sound barriers may incur substantial costs.

Fire risk

Due to the flammable nature of the raw materials and the high levels of dust, sawmills and plyboard/chipboard production sites may represent a fire hazard. Significant capital expenditure may be required to install adequate fire prevention and protection measures (equipment and procedures). Uncontrolled fires at sawmills may not only destroy the business but also cause significant damage to neighbouring properties and habitats.

Reputational Risk

Companies engaged in unsustainable forestry and logging are vulnerable to risks associated with the customer supply chain. Western companies may not wish to buy wood from such suppliers because of end consumer preferences. Once allegations of environmentally unsound logging are made in the international community, whether true or not, it may take years for a logging company to regain lost market share.

<i>FINANCIAL IMPLICATIONS</i>

- Variations in supply and cost of timber may arise due to environmental pressures placed upon suppliers over sustainable harvesting, and due to consumer pressure on the wood processing company. The 'reliability' of suppliers and volatility in price are likely to become an increasingly important issue.

- Soil and groundwater contamination related to spillages of wood preservatives may be extremely expensive to remediate.
- Upgrade of hazardous material storage areas may be required.
- Upgrade of site infrastructure may also be necessary (including wastewater treatment plants).
- Cost of health and safety equipment to upgrade the mill to the required standard.
- Cost health-related compensation claims from the workforce and neighbours.

<i>OTHER POTENTIAL ENVIRONMENTAL ISSUES</i>
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Other potential environmental issues associated with the wood products industry include:

- air emission and odour management;
- water supply and wastewater management;
- storage of oils and chemicals;
- energy conservation;
- waste management.

Air Emission Management

The main technical issues of concern relate to dust, boiler and dryer emissions, on site burning and odour. Site management issues to be considered include the adequacy of monitoring/control measures for internal and external dust emissions and local nuisance complaints relating to air pollution from on site burning and odorous emissions. Vents may also exist on chemical treatment vessels, or vacuum systems that may occasionally contain the treatment chemicals.

Water Supply and Wastewater Management

Site drainage and wastewater discharges may be contaminated. These effluents can be intercepted and directed to the sewer (with the approval of the authorities) or treated on site in order to comply with local and national regulations and to prevent contamination of local watercourses.

Typically, timber treatment and timber product sites are well established and therefore features such as the drainage system may be old and in poor repair and act as conduits for pollution.

Storage of Oils and Chemicals

Typically the chemicals used at sawmills will include resins and adhesives such as urea formaldehyde and phenol formaldehyde, oils (fuel and lubrication) and drums of assorted additives, solvents, wood treatment chemicals, hardeners, wax emulsions and fungicides.

Secondary containment should be installed for all bulk storage vessels to reduce the risk of ground contamination and pollution of surface waters.

ENVIRONMENTAL IMPROVEMENTS

Wood processing facilities should be encouraged to:

- upgrade storage areas to allow for proper containment of accidental spills and leakages including the provision of bunding for bulk storage tanks;
- develop procedures for the handling and storage of hazardous chemicals;
- use less toxic and persistent preservatives, including moving from solvent based to water based materials;
- review timber sources on a regular basis to ensure that sustainable sources are being used;
- check log tags and logging permits;
- implement measures to minimise wastage;
- identify and address the impacts of the transportation methods used;
- consider measures to improve energy utilisation and efficiency.

GUIDE TO INITIAL DUE DILIGENCE SITE VISITS

When visiting a wood processing facility some of the key features to assess are:

- the potential for ground contamination from chemicals stored and used at the site (e.g. by looking for stained earth/concrete and dead vegetation near storage containers and areas, assessment of age and integrity of drainage system);
- signs of dust accumulation;
- the availability of fire fighting equipment;
- whether waste is incinerated on-site;
- means of transport to and from the site and the associated impacts;
- local views on the operations at the sawmill;
- that the necessary permits have been obtained;
- that there no outstanding fines;
- health and safety provisions, i.e. guards on saws, personal protective equipment etc.;
- adequate ventilation throughout the facility (check for odours);
- the size and nature of offcuts, giving an indication of operational efficiency.

It is also suggested that contact is made with local regulatory agencies to determine compliance record and whether complaints have been made by the public.

Sub-sectoral Environmental Guidelines

LOGGING

PROCESS DESCRIPTION

Logging comprises the harvesting of timber through the felling of trees either selectively or by clear felling. Timber is then dragged through the forest to designated loading points where primary processing takes place (such as branch/root lopping, debarking) and may include cutting the timber into lengths. The main auxiliary activity included in this guideline is the construction and use of access roads/tracks through the forest.

SUMMARY OF KEY ENVIRONMENTAL RISK/LIABILITY FACTORS

Regulatory Requirements

National and Regional requirements for forestry management by logging companies and concessional agreements specify companies responsibilities for reforestation and harvesting. These are undergoing constant evolution and may change drastically during the life of a leasehold, therefore requiring adaptation of the company or re-negotiation of operating standards and demarcation of logging areas.

Forest Management and Sustainability

The aim of forest management is to achieve a balance between felling, and replacement by means of natural regeneration or replanting. Natural forests have evolved to form a complex habitat involving nutrient cycling and support diverse plant and animal life. The habitat and the life it supports is destroyed with tree felling. It is important to retain some natural forest areas in an undisturbed state as a refuge for plants and animals which can recolonise regenerated areas subsequently.

Fire Hazard

Anthropogenic activity increases the risk of fires during dry periods due to the introduction of flammable material and spark sources and the increased dry organic residues upon harvesting.

Water Quality

Inappropriate felling and logging operations may adversely affect downstream water quality (turbidity and siltation) and impact on downstream water users. Fish farms and spawning areas may be damaged leading to litigation.

Soil Degradation

Significant damage to soil structure and chemistry can be caused by the use of heavy machinery on the forest floor, and the use of link roads, during wet seasons as a result of soil compaction on top soil erosion. Areas which are vulnerable to erosion include unstable slopes, particularly those greater than 30%, flood plain soils, areas adjacent to river channels and stream crossings. Soil degradation compromises reforestation activities because it limits plant growth due to poor drainage or loss of nutrient rich topsoil.

Workers Safety

Logging often involves the use of heavy machinery and potential workers' exposure to impact from falling trees. This could bear significant consequences on the operation, particularly in terms of liability.

Reputational Risk

Companies engaged in unsustainable forestry and logging are vulnerable to risk associated with the customer supply chain. Western companies will not wish to buy wood from such suppliers because of end consumer preferences. Once allegations of environmentally unsound logging are made in the international community, whether true or not, it may take years for a logging company to regain lost market share.

<i>FINANCIAL IMPLICATIONS</i>

These are essentially long term from the investors' perspective. Unsustainable exploitation of forest resources will deplete natural forests far quicker than they can recover, especially if clear-felling and soil erosion take place. Long term returns from logging concessions will thus be affected.

Maintaining the Resource

Sustainable harvesting of forests can have significant financial implications. This may mean restricting harvesting activities on the basis of sustainable yield plans and ensuring reforestation by ground enhancement measures and the planting of new stock. Areas of forest recently felled need to be reforested almost immediately to ensure that the younger trees grow rapidly and fill the gaps in the canopy. This will also prevent significant soil degradation from occurring. The provision of nursery facilities is generally required, which entails significant costs.

Soil Degradation

Soil degradation will result in significantly reduced yields. To reduce the risk of soil erosion, some forest areas (buffer strips) may need to be left unharvested, especially on slopes. Poor weather conditions and potential damage to soil can delay harvesting operations until the soil is not saturated with water. In order to minimise erosion, bare unvegetated areas should be

replanted as soon as practicable so that new roots can bind the soil together. These issues all have financial implications, whether it be in terms of lost profit, slow growth or cost of replanting.

Liability may arise if water quality or fish hatcheries are affected by silt generated during logging operations.

Fire and Workers' Protection

The need for training and equipment to ensure fire prevention and worker's protection may require significant financial licensing requirements (by the authorities). Contractual arrangements of owners of the forest could involve important payments. Fines paid for non compliance may be significant.

<i>OTHER POTENTIAL ENVIRONMENTAL ISSUES</i>
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Effects on Forest Flora and Fauna

Sudden changes in forest structure can have a significant effect on the plant and animal species found in that habitat. Direct damage can occur through tree felling, dragging timber across the forest floor and through structural damage to the remaining stand. Indirect effects on botanical diversity will occur as a result of changes in light intensity, structural diversity of the forest and the introduction of competitive weed species. Populations of insect, bird and mammal species will be particularly affected by the changes in structural diversity and planting regimes. These changes may jeopardise an area's potential for natural forest regeneration.

Effects on Landscape

Logging impacts the landscape significantly and alters the scenery. This effect may be a temporary, visual one or it could lead to permanent change should the area incur significant soil erosion from logging activities.

Reclassification of Forest Areas

In the course of regulatory evolution, certain areas may be re-classified as mature protected areas of the national and international level. These are usually pre-determined and a logging operation must identify their location early on prior to start up. Public consultation on the operations, independent of regulatory planning and requirements, should be undertaken at the local and national levels as it may influence subsequent litigation claims arising from some erosion for example.

ENVIRONMENTAL IMPROVEMENTS

Potential environmental improvements may include:

- selective rather than clear felling of natural forest;
- the felling of trees in such a way to minimise damage to the remaining stand;
- establish reserved areas for natural regeneration;
- the maintenance and planting of native species to ensure ecosystem regeneration (provision of nursery);
- minimising the number of stream crossings and ensuring these are at right angles to the stream;
- ensuring that waste vegetation is not disposed of into streams, and that any blockages are cleared promptly;
- extraction should be stopped when the soil is saturated as this is when the greatest soil damage can occur;
- development of plans to prevent forest fires;
- maintaining a buffer strip of vegetation adjacent to water bodies;
- address inefficiencies in wood processing to reduce production demand;
- avoid harvesting at critical times in the life cycle of key animals, e.g. during spawning seasons;
- co-ordinate operations and subcatchments to minimise disturbance to surrounding (unlogged) areas and minimise potential for pollution.

ENVIRONMENTAL ACTION PLAN

Recommended environmental action plans should focus on the sustainable management of the forest, prevention of fire damage, conservation and the protection of watercourses.

- Develop and implement a Forestry Management Plan covering:
 - selection, felling and extraction of timber;
 - construction, maintenance and rehabilitation of roads, bridges, extraction routes, landings and firebreaks;
 - regeneration of harvested species (maintenance of nursery stock);
 - environmental protection including designating protected areas and rehabilitation of selectively logged areas;
 - fire management and control;
 - pest, disease and weed control;
 - control of settlement, including forest closure procedures;
 - contingency plans for all aspects of operation;
 - record-keeping;
 - revisions scheduled on a regular basis;
- Implement a plan for conserving biodiversity.
- Retain corridors of uncut forest between reserved and harvested areas to allow movement of key plant and animal species.
- Prohibit commercial timber extraction in environmentally strategic forests, such as those necessary for watershed protection or wildlife conservation.

- Consider an international timber certification scheme, particularly if exporting to USA or European Community countries.
- Regular environmental auditing of logging operations.

GUIDE TO INITIAL DUE DILIGENCE SITE VISITS

During an initial site visit to a logging operation it will be important to assess the following:

- environmental awareness amongst staff
- methods of logging and equipment used;
- condition of watercourses. Check for turbidity and siltation;
- discuss water quality with downstream users;
- condition and effects of access roads and tracks;
- planting regimes and programmes and reforestation schedules;
- health of remaining stock and of new growth;
- current environmental management activities;
- obtain information regarding growth rates/yields.
- look at size of cut trees and marking procedures;
- examine logging permits, quota records and correspondence with authorities;
- means of waste disposal (including branch/roots);
- measures taken to ensure safety on the job and to prevent fires.