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for Reconstruction and Development

## **Sub-sectoral Environmental and Social Guideline: Animal Feed Processing**

### **Introduction**

This guideline is designed to be used by EBRD Financial Intermediaries (FIs) to understand the nature of environmental and social (E&S) risks associated with existing operations in this sector and suggested actions for businesses to manage these E&S risks. It also provides guidance for FIs on potential due diligence questions to raise with management to understand how their business is managing these E&S risks. This guideline focuses on material E&S risks; it is not an exhaustive list of E&S risks. In managing E&S risks, all businesses should be compliant with relevant E&S laws and regulations.<sup>1</sup> Where applicable, these include European Union legislation, which may also be taken as a benchmark for good practice.

This guideline covers the preparation of compound animal food, for example in feed mills, and includes the preparation of protein concentrates and other mixtures which are added to cereal mixes.

Reference NACE codes:

- 1.6 Support activities to agriculture and post-harvest crop activities
  - 1.62 Support activities for animal production
- 10.9 Manufacture of prepared animal feeds
  - 10.91 Manufacture of prepared feeds for farm animals

### **Material risks**

Below is an overview of the material risks present in animal feed processing:

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<sup>1</sup> This guideline outlines some relevant legislation but does not provide an exhaustive list of applicable laws and regulations.



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## Sub-sectoral Environmental and Social Guideline: Animal Feed Processing

<b>Environmental &amp; Social Risk Category</b>	<b>Environment</b> 	<b>Health and Safety</b> 	<b>Labour</b> 	<b>Community</b> 	<b>Page no.</b>
Key E&S Risks <sup>2</sup> <i>(In order of materiality)</i>	Affect the natural environment	Affect the health or safety of employees	Affect workplace conditions and the treatment of employees	Affect the health and safety, livelihoods, and environment of the community and wider public	
<b>Waste</b>	√			√	<b>6</b>
<b>Water Use</b>	√			√	<b>6</b>
<b>Energy Use</b>	√				<b>7</b>
<b>Wastewater</b>	√			√	<b>7</b>
<b>Odour</b>	√			√	<b>8</b>
<b>Noise</b>	√	√	√	√	<b>8</b>
<b>Use of GMOs</b>	√			√	<b>8</b>
<b>Air Emissions</b>	√	√		√	<b>8</b>
<b>Fires and Explosions</b>		√		√	<b>9</b>
<b>Manual Handling</b>		√			<b>10</b>
<b>Moving Equipment and Machinery</b>		√			<b>10</b>

<sup>2</sup> Note: this table provides an indicative list of the EHS risks associated with the sub-sector; it is not meant to be an exhaustive list and EHS risks will depend on the specific setting and scale of the operation or facility.



**European Bank**  
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## **Sub-sectoral Environmental and Social Guideline: Animal Feed Processing**

<b>Confined Spaces</b>		√			<b>10</b>
<b>Slips, Trips and Falls</b>		√			<b>11</b>
<b>Hazardous Materials</b>		√		√	<b>11</b>
<b>Product/Feed Hygiene</b>	√		√	√	<b>12</b>
<b>Product Safety</b>				√	<b>12</b>
<b>Traffic Management</b>	√			√	<b>12</b>



**European Bank**  
for Reconstruction and Development

## **Sub-sectoral Environmental and Social Guideline: Animal Feed Processing**

### **Contents**

<b>Section</b>	<b>Page No.</b>
<i>1. Process Description</i> .....	<i>5</i>
<i>2. Key E&amp;S Risks</i> .....	<i>5</i>
<i>3. Financial Implications</i> .....	<i>13</i>
<i>4. Suggested due diligence questions</i> .....	<i>13</i>
<i>5. References and additional sources</i> .....	<i>17</i>



## 1. Process description

The animal feed production process converts widely-ranging raw materials into a mixture suitable for producing a desired nutritional response within the animal to which it is fed.

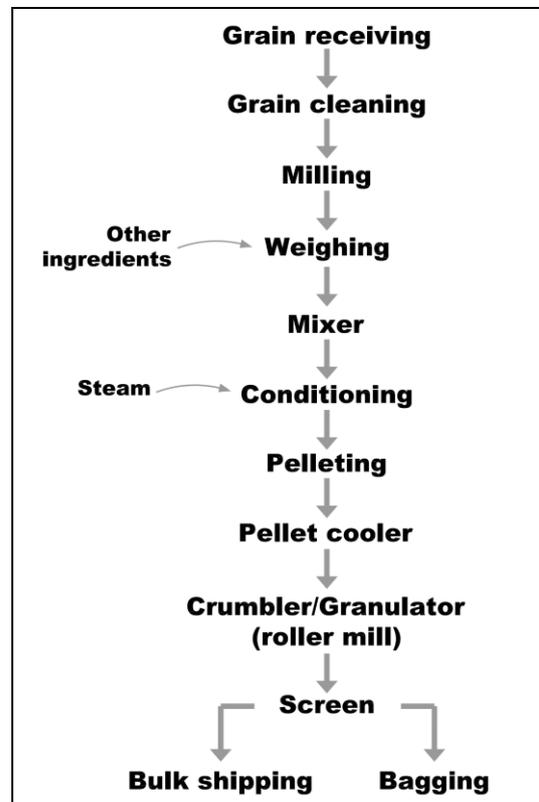
Over 200 ingredients may be used in feed, including grain, by-products (e.g. meat meal, bone meal, waste vegetables), medicines, vitamins and minerals. Some raw materials may have undergone extensive processing prior to inclusion into an animal feed, e.g. extraction of oil from oilseeds by solvent or mechanical means, or production of fish and meat meal by rendering fish and meat processing waste products.

The main activities in the production of animal feed are:

- **Receipt of raw materials:** such as grain, protein, vitamins, minerals, oils fats and medicinal additives etc.;
- **Testing:** raw materials may be variable in composition and quality – routine testing will detect such variations. Samples of finished product may also be tested, as small variations in composition can have a marked adverse effect on animal health.
- **Drying and storage:** Moisture content directly affects biological and pest activity within the materials and should be kept as low as possible;
- **Weighing:** accurate weighing of raw materials according to the feed formulation is critical;

- **Processing:** e.g. grinding, mixing, liquid addition, oil extraction, extrusion, de-hulling, pelleting;
- **Packaging and despatch:** loaded into palletised bags or bulk distribution via bins or trucks.

An indicative animal feed production process is shown below:



Source: adapted from US EPA 1995.

## 2. Key E&S Risks

Below are the material E&S risks associated with this sector and key measures to manage them. Where gaps are found in the management of key E&S risks, the E&S risk management measures may form part of a corrective E&S action plan agreed with your customer.



### Waste



Feed can be transported loose or in reusable containers for bulk delivery or in bags filled directly from mixers or holding bins. Wastes may arise through the packaging process in the form of incorrectly packaged feed and packaging offcuts.

Some waste feed products may be capable of being recycled into the feed production process but others may contain substances which prohibit this disposal route and these wastes must be isolated, identified and disposed of in accordance with local regulations and not used as feed.

#### *How can a business manage this risk?*

- Collect and store organic waste separately from other waste to enable composting and/or use for soil enhancement, or energy production;
- Recycle/reuse waste in the production process;
- Store solid wastes in adequate containers and segregate where possible to encourage recycling;
- Segregate and store wastes in accordance with best practice;
- Companies operating within the European Union (either as a manufacturer or as a supplier into the European Union) are subject to the European Union Packaging and Packaging Waste Directive (94/62/EC) and its amendments, which aims to reduce the amount of packing that is being introduced into waste streams.

### Water Use



Water of a suitable drinking quality for animals (i.e. free from contaminants and sediment) is required for:

- Steam conditioning during the pelleting operation if the mill has a steam conditioner;
- Addition to the mixer to raise the moisture content of the meal to a level suitable for pelleting.

Water may also be used for cleaning and disinfecting machinery. Water may be obtained from a mains supply or by abstraction from rivers or boreholes. The use of groundwater may lead to a strain on groundwater or surface water resources if also used by local communities.

#### *How can a business manage this risk?*

- Obtain abstraction or water use permits which detail the allowable volumes of water abstraction. Where changes take place in product volumes, this should be reflected in the permit;
- Discharges and abstraction from water resources should be considered under the requirements within the EU Water Framework Directive (2000/60/EC) and local environmental regulations and permitting requirements;
- Evaluate water supply and water efficiency measures (e.g. recycling, reuse, run-off reduction, storage etc.) to reduce potential impacts on surrounding resources and supplies.



## Energy Use



Processing operations may consume energy as:

- Thermal energy in the form of steam and hot water used for processing, cleaning, sterilising;
- Electricity for machinery operation, lighting and the production of compressed air.

Energy usage has a direct correlation to the operating costs of the company, and energy generation and consumption may be regulated or taxes/levies applied to reduce energy use and associated emissions of gases such as carbon dioxide.

### *How can a business manage this risk?*

- Implement energy savings initiatives involving heat recovery, controlling boiling temperatures, optimisation of refrigeration and cooling systems etc.;
- Examine options for heat recovery and insulation to reduce/supplement energy consumption.

## Wastewater



Operations producing prepared meals may produce wastewater with a high organic content. Wastewater will arise primarily from cleaning, surface water runoff and steam condensate. Contaminated wastewater presents a pollution risk if

allowed to enter a watercourse without adequate treatment, as it may contain:

- Powdered organic material, e.g. grain, protein meal;
- Medicinal additives;
- Cleaning products;
- Solvent and oils used in equipment operation;
- Oils, fats and molasses from blended products.

Animal feed plants normally discharge to a municipal wastewater treatment system but some onsite pre-treatment may also be required. Wastewater discharge from an animal feed processing facility will typically require a permit.

### *How can a business manage this risk?*

- Install/improve wastewater/effluent monitoring and treatment facilities;
- Install grids to reduce or avoid introduction of solid materials into the wastewater drainage;
- Adopt equipment cleaning-in-place (CIP)<sup>3</sup> methodologies to reduce chemical, water and energy consumption;
- Reuse wastewater through recycling, thus minimising final wastewater volumes.

<sup>3</sup> CIP is a method of cleaning the interior surfaces of pipes, vessels, process equipment, and associated fittings, without disassembly using approved chemicals and/or detergents with minimal environmental impact and compatible with subsequent wastewater treatment processes.



### Odour



Odour can occur, particularly where products are mixed with fats or molasses. Environmental permits may place requirements on the design and height of chimneys and vents to maximise the dispersion of odour.

#### *How can a business manage this risk?*

- Maintain good housekeeping at all times in all areas;
- Adopt good cleaning and working practices as routine to reduce odour emissions and improve hygiene standards;
- Upgrade exhaust stack heights from cooking processes to minimise air pollution and nuisance to the local community;
- Control temperature and humidity to reduce odour emissions.

### Noise



Noise can be generated by equipment such as hammer mills, grinders, ventilation, banging equipment, and manoeuvring trucks, and can be a danger to workers and a nuisance if the site is located close to residential areas and other sensitive receptors.

#### *How can a business manage this risk?*

- Isolate noisy equipment to reduce the risk of noise exposure;
- Rotate tasks to minimise worker's time spent in noisy areas over an eight hour

period;

- Provide personal protective equipment where workers and visitors have to enter noisy areas.

### Use of Genetically Modified Organisms



A genetically modified organism (GMO) is an organism whose genetic material has been altered artificially (i.e. by genetic engineering). Many GMOs are developed for use in animal feed.

GMOs are highly regulated in the EU, and may not be used or released into the environment without approval by the competent authorities. In areas which have been declared as GMO free, GMOs may not be used.

Where the use of GM animal feed is proposed, producers must apply to the Competent Authorities, specifying the scope of its use (i.e. in food, animal feed import, processing or cultivation).

#### *How can a business manage this risk?*

- Secure approvals from the Competent Authority for the use of GM inputs;
- Follow all appropriate application procedures and adhere to legislation and guidelines on usage.

### Air Emissions



Dust may arise from storage, handling and drying activities. Aerosols (clouds of fine solid particles or liquid droplets) typically



arise from the use of compressed air and high-pressure water for cleaning.

Dust presents health and safety hazards in terms of inhalation leading to respiratory problems in personnel who work in dusty atmospheres without appropriate extraction and ventilation. Workers may inhale or ingest dust and aerosols, which can cause irritation to the respiratory tract. Occupational lung disease can occur from exposure to dust.

When combined with high levels of humidity, dust and aerosols may cause skin irritation or allergic reactions.

### *How can a business manage this risk?*

- Enclose and seal plant and equipment to prevent the escape and accumulation of dust;
- Cover transport equipment, which also reduces product losses;
- Install extraction equipment within the mill and storage facilities;
- Provide respiratory protective equipment (RPE) as a last resort after other abatement options are considered; regularly check and maintain PPE;
- Use doors/plastic strip curtains on building access points;
- Redesign processes to reduce free-fall distances and speed of movement for grain and other dry products;
- Install windbreaks and covers in outside handling areas;
- Replace any external bulk storage areas with silos, fitted with alarms to prevent overfilling;
- Install centralised piped vacuum cleaning systems;
- Install dust extractors e.g. cyclones and

fabric filters;

- Improve ventilation within buildings;
- Maintain a slight negative pressure within storage vessels such as bins and silos;
- Install dust monitoring equipment at the most sensitive points;
- Redesign processes where practicable to remove dust and aerosol-generating activities.

### Fires and Explosions



A dust cloud of any flammable material (such as grain) will explode where:

- The concentration of dust in air falls within the explosive limits;
- A source of ignition is present.

The most common locations for fire and explosion are driers, grinding mills and anywhere where hot work is performed. Grinding operations may generate considerable quantities of heat and dust and the temperatures of raw materials may rise by 10 - 20°C.

### *How can a business manage this risk?*

Explosion risks are reduced by good maintenance to prevent dust accumulation, and through the installation of dust control systems.

Further measures are described below:

- Improve removal of metal, stones and glass which can cause sparking;
- Locate equipment carefully, if within a lightweight building, so that the roof and wall cladding panels can act as explosion relief;



- Locate grinding equipment in a separate building;
- Fit silos and bins with extraction systems to reduce the risk of explosion

### Manual Handling



Lifting, repetitive work and posture injuries can occur as a result of lifting and carrying heavy or awkward shaped items (such as sacks and boxes) and from manoeuvring carts or forklifts within the plant. Repetitive tasks such as the operation of machines can lead to musculoskeletal injuries.

#### *Managing Risk*

- Redesign manual processes to avoid heavy lifting/repetitive activities;
- Install mechanical lifting aids where possible and rotate work tasks to reduce repetitive activities.

### Moving Equipment and Machinery



In a busy manufacturing environment it is common to have injuries where people interact with machinery or equipment. Accidents can occur where workers are struck by moving or falling objects such as crates and boxes, or from moving vehicles, plant or equipment such as conveyors and forklift trucks.

#### *How can a business manage this risk?*

- Install safeguards on moving parts of conveyor belts and packaging machinery to reduce the risk of entrapment of employees;
- Provide workers with appropriate personal protective equipment to protect against unavoidable sharp items and edges. Particular attention should be paid to conveyors, mills, mixers, rotary valves, pelleting presses and packaging machinery;
- Separate people from moving equipment by ensuring that the process layout reduces opportunities for process activities to cross paths;
- Install walkways to separate people from vehicle movements to reduce risk of collision;
- Train workers in the correct use of machinery and safety devices.

### Confined Spaces



Storage silos are dangerous confined spaces. Entry to confined spaces without effective management and control can result in engulfment and asphyxiation.

#### *How can a business manage this risk?*

- Strictly control entry to silos and prevent solo working in accordance with safety procedures;
- Confined spaces training is required for all staff working in confined spaces.



## Slips, Trips and Falls



Slippery floors and surfaces caused by oil deposits present a high risk of slips, trips and falls where spills have not been cleared up or effective cleaning has not taken place.

### *How can a business manage this risk?*

- Keep walking and working surfaces clean and dry;
- Restrict access restriction to areas being cleaned or where spillages have occurred;
- Schedule floor cleaning for a time when work is not in progress or has finished for the day and floors have dried as much as possible

## Hazardous Materials



Bulk storage facilities are used to store raw ingredients, finished product, chemicals for the production process and for cleansing and disinfection, and fuel oils for energy production.

Cleaning and disinfecting processes and some food preservation processes use materials that if used or stored inappropriately, could result in dermal contact and inhalation.

Contact can lead to burns or inflammation of skin from irritation or allergy. Inhalation of harmful/toxic fumes can lead

to respiratory difficulties, and ingestion of harmful substances can also be dangerous.

### *How can a business manage this risk?*

- Provide suitable secondary spill containment for storage and process vessels;
- Conduct regular inspections of all bulk containment on site to prevent leakage and product loss;
- Install alarms to detect leakages of bulk liquid materials and prevent overfilling;
- Secure storage facilities to prevent pest invasion;
- Store processed feed separately from unprocessed materials to prevent cross-contamination;
- All outdoor bulk storage of dusty, or potentially dusty materials should be in silos and ventilation/extraction equipment used to minimise dust generation;
- Provide personal protective equipment (PPE) that is fit for the task to prevent injury and maintain hygiene standards;
- Train staff in the correct selection, use and maintenance of PPE;
- Inspect PPE regularly and maintain or replace as necessary.

## Product/Feed Hygiene



Companies operating within the European Union (either as a manufacturer or as a supplier into European Union countries) will be subject to the EC Regulations 183/2005 which lay down requirements for feed hygiene. The Regulations require all establishments producing feed supplied within the EU to be registered and inspected. They also require establishments within the EU, exporting to



non-EU countries, to satisfy the requirements of EC Regulation 178/2002 relating to food law and safety. Suppliers into the EU must comply with EU Directive 2002/32/EC on undesirable substances in animal feed, and its amendments. This Directive sets maximum levels for undesirable substances in feedstuffs for circulation in the EU.

### Product Safety



Animal feed can become contaminated through:

- Ingress of contaminated raw materials e.g. chemical residues, pathogenic bacteria (such as salmonella), antibiotic residues and debris (such as metal, wood, or stones). For example, mammalian meat and bone meal is banned from all farm animal feed in the EU due to its links with the spread of bovine spongiform encephalopathy in cattle;
- Poor storage conditions e.g. raised moisture levels promoting insect, mould and bacterial growth;
- Poor hygiene standards within the processing operations, e.g. unclean machines, unhygienic handling.

#### *How can a business manage this risk?*

- Implement a quality control plan including:
  - Sampling procedures and frequencies;

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- Analysis methods;
  - Confirmation of final destination of non-compliant product;
  - Records and samples of the ingredients used and of each product batch.
  - Employ product traceability systems that facilitate tracing of products once released for sale;
  - Reduce spoil and loss of inputs and product by:
    - Weather-proofing windows, doors and other openings against pests and water;
    - Controlling moisture content in grain storage;
    - Monitoring product losses during processing operations.
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### Traffic Management



Transportation of bulky raw materials and finished product to and from the facility could result in an increased risk of road traffic incidents involving the general public, or may cause traffic congestion or excessive noise.

#### *How can a business manage this risk?*

- Implement a traffic management plan and provide appropriate training for all vehicle users;
  - Maintain accident records and ensure that all drivers are licensed, and vehicles regularly inspected and maintained.
-



### 3. Financial Implications

- The characteristics of feed production and the complexity of the distribution chain means that it is difficult to withdraw contaminated or below-specification feed from the market. Consequently, the cost of rectification is often borne by public funds<sup>4</sup>;
- Significant upgrades in quality control standards may be required at the production facility in order to reduce the risk of contamination during processing and to satisfy national and international food hygiene standards;
- Product recall can have a significant financial impact on the business, e.g. compensation claims, loss of reputation, loss of contracts and market share. A system of product traceability may be required to facilitate product recall;
- Many countries are signatories to the UN Framework Convention on Climate Change, and its various protocol and agreements, and have adopted targets for the reduction of CO<sub>2</sub> emissions. Where Governments have set up carbon emission reduction programmes, industrial processes have been required to reduce their CO<sub>2</sub> emissions through the setting of targets. This can result in a need for substantial investment in new/clean technologies to achieve the emission targets. These targets may be reflected in environmental permits;

- Where large quantities of energy are used then this can result in high operating costs to the business;
- Capital investment in new equipment may be required in order to meet and maintain environmental, hygiene and health and safety standards;
- Injuries may lead to increased payroll costs to replace skilled workers;
- Fines, penalties and third party claims may be incurred for non-compliance with environment, hygiene and health & safety regulations.

### 4. Suggested due diligence questions

Perform a complete tour of the facility, accompanied by someone knowledgeable about all the activities at the site.

The issues to look out for during the site visit will vary according to the type of feed product being produced, as well as the level of environment, health and safety management already introduced.

When assessing E&S risks, it is important to engage the customer on how these risks are managed. Below are suggested questions to discuss with management, as relevant to the business.

Confirm organisational responsibilities and systems for environment, health, safety and social matters and that these systems cover both employees employed directly and sub-contractors.

<sup>4</sup> EU, 182/2005/EC paragraph 22.



### **General Housekeeping**

- Check the standard of housekeeping at the facility, e.g. do areas look clean and tidy, is there build up of dust on floors and surfaces, is there evidence of any recent spills or releases of raw materials/product, are the walking and working surfaces kept clean and dry, etc.;
- Confirm what processes are undertaken and whether any hazardous chemicals are used? How hazardous are the materials and have associated risks been documented and addressed in appropriate systems?
- Check the condition of storage facilities for chemicals;
- Check the age and condition of equipment, look for signs of wear and tear, degradation, leaks and breaks.

### **Emissions and Discharges**

- Check the condition and efficiency of any wastewater treatment plant present and location of discharge points. Note whether the plant discharges to a local watercourse or the municipal wastewater treatment works. Note the colour and appearance of adjacent watercourses (if any);
- Review measures of controlling the odour coming out from the plant.

### **Inspections, Permitting and Regulations**

Check what permits are required for the site (air, water, wastewater, noise) and compliance monitoring reports. Check the conditions and duration of validity for all permits;

- Note the extent to which monitoring and testing is undertaken as a requirement of operating licences and the extent of compliance in recent years;
- Explore any environmental requirements which may affect the cost or type of packaging used;
- Has the company undertaken a systematic, documented review of operations against national legal requirements relevant to Environmental, Health, Safety and Social performance and the extent of compliance with that legislation?

### **Product Quality**

- Discuss procedures to check the source of raw materials and screening for contamination. In particular, check which contamination parameters are analysed (e.g. pesticides, herbicides, radioactivity, heavy metals, industrial pollutants);
- Check if there is a quality control system and a feed traceability system.

### **Waste Management**

- Check that solid waste storage and disposal equipment is in a good condition;
- Check that waste disposal takes place on a regular basis;
- Check that waste storage areas are clear of debris and that skips are covered to prevent waste escaping, for example, check that waste containers have lids or are stored in an area with a roof.



### Health and Safety

- Check for automatic safeguards on machinery to prevent accidental injury;
- Note whether Health and Safety risks have been systematically assessed and addressed;
- Note whether staff wearing Personal Protective Equipment. If PPE is required, check that it is being supplied by the employer, is used effectively and maintained/checked regularly;
- Check signage around the site:
  - Does it convey the health and safety risks?
  - Are fire exits clearly marked?
  - Are there demarcated routes for pedestrians and vehicles painted on floor?
- Is fire-fighting and first aid equipment available, and is it checked/maintained regularly?
- Have there been any recent (within last three years) incidents on site such as fatalities, fires/explosions, spills? Were these incidents investigated? Are there insurances in place to cover such incidents?

### Labour Management

Check that labour standards, contracting and remuneration are in line with national law and are consistent with the average for the sector;

- Ask particularly about the working hours, pay and conditions regarding

casual and contract labour, and check what health and safety provisions (e.g. PPE) are provided for them; are these comparable with permanent employees? This is a particular issue in the agribusiness sector;

- Has the Company received inspections from the local labour, H&S or environmental inspectorate in the previous three years? Have these resulted in any penalties, fines, major recommendations or corrective action plans? What is the status of these?
- Check worker accommodation;
- Does the organisation have a grievance mechanism which allows employees to raise workplace concerns?
- Is a grievance mechanism in place to allow the community to raise concerns regarding the animal feed production operations?
- Are employees free to form, or join, a worker's organisation of their choosing?

### Investment

- Does the business plan have budgeted line items for environment, health and safety improvements? Are there any high value improvements noted in the business plan for E,H and S issues in the coming months/years?

### Management Plans

Review the operational procedures and management plans available the control of risks.



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## **Sub-sectoral Environmental and Social Guideline: Animal Feed Processing**

As a minimum any business should be required to have the following in place:

- Environmental, Health & Safety management systems which include operational procedures that are communicated, implemented and regularly reviewed (i.e. “live” systems that are used in practice, not just kept as an office manual);
- Monitoring and testing programmes (water, air, noise etc.);
- Improvement objectives, targets and project plans;
- A training plan for personnel to include environmental and health and safety issues;
- Regular inspections, checks and audits against records to demonstrate achievement of the required level of performance against legal requirements and improvement actions;
- Emergency plans for environment, health and safety incidents and site security;
- Demonstrable involvement of senior management in environment, health & safety management and leadership.



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## **Sub-sectoral Environmental and Social Guideline: Animal Feed Processing**

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