European Bank
for Reconstruction and Development

Sub-sectoral Environmental and Social Guidelines: CHEMICALS AND ALLIED PRODUCT (Wholesale Distribution and Storage)

PROCESS DESCRIPTION

This guideline covers the following activities:

- Transportation of chemicals to a warehouse;
- Storage of chemicals at a warehouse;
- Repackaging or loading of chemicals prior to distribution from the warehouse.

It does not cover the production of chemicals or the transportation and storage of petroleum products. Both of these activities are discussed in separate guideline documents.

Subsequent to manufacture, chemicals and allied products are typically stored in:

- Fixed bulk storage tanks (gases and liquids) or silos (powders);
- Transportable containers, such as, cylinders (gases), drums (liquids, solids) and bags (solids).

Therefore transfer from the site of manufacture to the warehouse will typically involve bulk tanker delivery or off-loading of individual, or group packaged containers. Therefore, receiving warehouses require:

- Suitable off-loading equipment, such as pumps, hoses and forklifts;
- Bulk storage facilities;
- Adequate storage space for transportable containers;
- A thorough knowledge of the properties of the chemicals being transported and stored. This information is available on Material Safety Data Sheets (MSDS) which accompany the transfer;

Distribution of chemicals from the warehouse will raise similar issues to those identified for delivery to the warehouse.

KEY ENVIRONMENTAL, HEALTH AND SAFETY RISK/LIABILITY ISSUES

Soil, Groundwater and Surface Water Contamination

Contamination of soil, groundwater and surface waters (on site and in transit) can occur through acute incidents and accidents such as a major spillage or via gradual or repeated leakage. Surface waters are particularly vulnerable to chemical contamination. Chronic, undetected leakages on site can occur as a result of fractured vessels, seals, valves and pipelines.

Hazardous Materials

Significant hazardous properties relating to individual chemicals include flammability, combustion potential, toxicity, corrosive potential and oxidising potential. Chemicals with such properties should be labelled with the appropriate internationally recognised diamond shaped hazard symbol[1]. Inadequate control of hazardous chemicals can elevate the risk of amajor accident harming workers, the local community and the environment.

Accidental release of hazardous chemicals on site and in transit may result in explosions, air pollution and significant environmental impacts in relation to soil, groundwater and surface water contamination. Releases of hazardous

[1] United Nations 2007

substances to the air could impact the local environment including human receptors. Particular care should be taken during unloading, loading and repackaging operations.

Some chemicals may only possess a hazard potential if they have the opportunity to react with other compounds. Therefore, these incompatible chemicals may create any of the ecological and exposure hazards listed above if stored together. In general, chemicals with different hazard symbols should not be stored together - clear guidance on the compatibility of different chemicals can be obtained from the MSDS (which should be readily available from the manufacturer and on site).

Air Emissions

The most significant air emissions will be in the form of greenhouse gases arising from the freight vehicles used to transport the chemical products.

Emissions to air will also result from the storage, transfer and handling of gases, volatile compounds and powders. This is a potential source of nuisance (e.g. odour or dust emissions) and can present an environmental risk. Emissions to air can be controlled by operational practices (e.g., conveyors rather than manual handling to reduce dust emissions) or abatement techniques such as vapour recovery lines or carbon absorption for organic compounds.

Wastes

Damaged product which should be considered as waste, particularly if hazardous in nature, will require appropriate storage and disposal techniques. Packaging may be contaminated with hazardous chemicals. Both damaged product and packaging may generate significant volumes of waste. The site should comply with the regulatory requirements for the storage and disposal of solid and hazardous wastes [if disposal is defined as a final option the practice of disposal on the site should be avoided] and use authorised waste transport and disposal contractors, where authorised contractors are unavailable the company should make every effort to ensure that the selected waste contractor is operating responsibly .

Transport of Dangerous Goods

Carrying goods e.g. road, rail, inland waterway, sea and air involves the risk of traffic accidents. If the goods carried are dangerous, there is also the risk of an incident, such as spillage of the goods, leading to hazards such as fire, explosion, chemical burn or environmental damage. When transported these goods need to be packaged correctly as laid out in the various international and national regulations for each mode of transport to ensure that they are carried safely to minimise the risk of an incident. EU Directive 2008/68/EC covers the inland transport of dangerous goods within the EU.

Fire/Explosion Risk

Major explosions or fires at chemical storage facilities have historically resulted in widespread contamination and destruction, impacting not only the immediate site but surrounding land, rivers and communities. The release of hazardous gases which may travel many kilometres from the site, is of particular concern. Compensation costs for such incidents are high and widespread remediation and rebuilding may be necessary.

Security

Chemical storage and distribution networks could be targets for criminals, sabotage or terrorism and therefore appropriate security measures must be implemented to minimise this hazard.

OTHER ENVIRONMENTAL, HEALTH AND SAFETY RISK/LIABILITY ISSUES

Chemical Compatibility

Some chemicals stored on the site can become hazardous when combined with other chemicals which may be present. Building and storage design must allow both vertical and horizontal separation of chemicals.

Wastewater

Wastewater will be generated from cleaning operations, water softener back flush, treated sanitary water and safety shower water and could be contaminated with a wide range of pollutants. Some facilities operate wastewater treatment plants to perform primary treatment of wastewater prior to discharge to the sewerage system. A permit or consent is usually required for this discharge.

Polychlorinated Biphenyls (PCBs) and Asbestos

- PCBs are a group of substances which are good electrical insulators. Typically, PCBs may be present as constituents of hydraulic oils or dielectric fluids in electrical switchgear, transformers and fluorescent light starters. Maintenance should be undertaken to ensure no leakage and plans should be made to upgrade equipment to remove the requirement for PCBs.
- Asbestos has been used on a large scale for many years as a fire proofing and insulation material and may be encountered in a wide range of forms including asbestos cement boards, as fire retardant gaskets in pipework and as fire retardant insulation around boilers and furnaces. The organisation should identify the presence of asbestos, confirm its condition and encapsulate or remove it using appropriately experienced and qualified people.

Particular attention should be given to buildings constructed before the 1980s.

Packaging

Large quantities of packaging may be used. Companies operating with the European Union (either as a manufacturer or as a supplier into European Union countries) will be subject to the European Union Packaging and Packaging Waste Directive (94/62/EC), which aims to reduce the amount of packaging that is being introduced into waste streams.

Permitting

Large chemical storage facilities in the EU will be subject to national regulations under the Seveso II (1996/82/EC) which aim to control the major accident hazard from dangerous substances. Operations outside the EU will be subject to local regulation but this will generally set less stringent requirements on the techniques to be adopted.

Legal entities in the EU manufacturing, importing or using certain chemical substances may be subject to a new EU regulation called the Registration, Evaluation and Authorisation of Chemicals (REACH) (1907/2006). This regulation places potentially new requirements

on "users/manufacturers" to evaluate and control the health and environmental risks associated with certain substances

Noise

Material transfer areas can create high noise levels. Noise induced hearing loss can occur from working in noisy areas.

Manual Handling and Repetitive Work

Lifting and carrying heavy or awkwardly shaped objects, such as bags, can result in manual handling injuries.

Confined Spaces

Storage silos are dangerous confined spaces and entry to them must be strictly controlled and avoided wherever possible.

Collision

In distribution areas there is a particularly high risk of collision between vehicles or between people and vehicles.

Slips, Trips and Falls

These often occur on the same level and are primarily caused by uneven surfaces, inappropriate footwear, lighting, weather conditions, trailing cables and pipe work especially during unblocking, maintenance and cleaning activities.

KEY SOCIAL, LABOUR AND COMMUNITY RISK/LIABILITY ISSUES

Public Anxiety

Public anxiety, particularly from neighbouring residents, can be caused by a lack of knowledge regarding the nature of the chemicals being stored on the site, odours from the site, the potential for fires and explosions and the action that will be taken in the case of an accidental release. This public anxiety can result in significant planning constraints being imposed on this type of facility.

Accidents

Accidental leaks of toxic compounds and the presence of flammable gases and liquids pose the most critical hazards to community health and safety.

Air Emissions

Public/environmental health and nuisance issues associated with dust and vented fumes can arise from production activities and may have a significant effect on neighbouring locations. This may be important if there are neighbouring residential and industrial activities in the area.

Transport

A distribution centre typically has high volumes of road traffic where transfer/delivery is being made by road tanker. This traffic movement can lead to increased congestion and road traffic noise.

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FINANCIAL IMPLICATIONS

- Many countries are signatories to the Kyoto Protocol and have adopted targets for the reduction of CO_2 emissions. Where Governments have set up carbon emission reduction programmes industrial processes have been required to reduce their CO_2 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;
- Injuries may lead to increased payroll costs to replace skilled workers and lost production time;
- If the products are to be sold or used within the EU they must be registered under the REACH regulations. This may represent a substantial cost and will be particularly significant to manufactures producing small quantities of a large range of chemicals;
- Capital investment may be required to comply with new environmental, health and safety requirements;
- There is a relatively high potential for soil and groundwater contamination to be present which can be very costly to remediate;
- Fines, penalties and third party claims may be incurred for non-compliance with environment, health and safety regulations.

IMPROVEMENTS

Environmental, Health and Safety Improvements

- Conduct a facility wide risk assessment, including detailed consequence analysis in accordance with regulatory and/or industry standards;
- Use brushes, scrapers and vacuums to remove dry spilt product prior to washing;
- Minimise leakages and fugitive releases from pipework through the use of appropriate corrosive resistant materials and leak proof valve and pump design;
- Regular inspection should be carried out of all bulk containment and infrastructure on site to prevent leakage and product loss;
- Provision of secondary spill containment for bulk storage tanks and silos;
- Delivery, handling and transfer or decanting areas should be designated, marked as such and isolated from the surface water drainage system, e.g. with ramps, sumps or drainage shut-off valves;
- Delivery and handling areas should be impermeable to the raw materials and products handled and covered to minimise ingress of rainwater;
- Good housekeeping should be maintained at all times in all areas;
- Ensure legal compliance regarding waste water treatment requirements;

- Install air pollution control devices, such as baghouses, cyclones, filters, and wet scrubbers to control the release of volatile or dust emissions;
- Enclose conveyors and storage areas to reduce dust;
- Maintain on site abatement equipment and treatment plant;
- Provision of personal protective equipment (PPE) that is fit for the task to prevent injury and maintain hygiene standards. Staff should be trained in the correct selection, use and maintenance of PPE;
- Train workers in correct use of machinery and safety devices;
- Redesign manual processes to avoid heavy lifting/repetitive activities;
- Install mechanical lifting aids where possible and rotate work tasks to reduce repetitive activities;
- Separation of people from moving equipment:
    - Ensure that the process layout reduces opportunities for process activities to cross paths;
    - Installation of safeguards on moving parts of conveyor belts to reduce risk of entrapment of employees;
    - Install walkways to separate people from vehicle movements to reduce risk of collision;
- Introduce a one way system for site traffic and introduce speed limits to reduce the likelihood of traffic accidents.
- To reduce the risk of noise exposure isolate noisy equipment and rotate tasks to minimise time spent in a noisy area over an eight hour period and provide personal protective equipment where people have to enter noisy areas;
- Construct walkways of non slip materials;
- Install automatic alarms and shut off systems;
- Installation or upgrade of abatement technology to minimise exposure to toxic raw materials and products, such as enclosure of equipment, appropriate ventilation with filters, gas balancing systems;
- Maintain an up-to-date inventory of all substances present or likely to be present which could be hazardous to health or the environment;
- Provide local fire department with list of raw materials and products stored on the premises;
- Emergency storage lagoons may be needed to prevent contaminated firewater reaching groundwater or surface water in the vicinity;
- Avoid potential sources of ignition including banning smoking in and around facilities;
- Use explosion-proof equipment and conductive materials and ensure that equipment is grounded and bonded;

- Undertake a security vulnerability assessment and consider need for upgrades to existing security measures;
- Explore manufacturer willingness/capability to "take-back" damaged products;
- Coat floor of warehouse with chemical resistant material.

Social, Labour and Community Improvements

- Implement a programme of assessment of routine monitoring of worker health;
- Involve the neighbouring community in the creation and practice of plans to respond to major incidents at the installation.

GUIDE TO INITIAL DUE DILIGENCE SITE VISITS

During the initial site visit, the issues will vary according to the type of chemical product being stored and distributed and depending on the level of environment, health and safety management already introduced. While visiting the site it is important to discuss and review the following:

- Confirm organisational responsibilities and systems for EHS;
- Check the condition of storage facilities for finished products;
- Check for automatic safeguards on machinery to prevent accidental injury;
- Note any odours that might cause a nuisance;
- Note the noise and dust levels at the site to determine whether abatement equipment is in use or might be required;
- What is the standard of "housekeeping" on site? Do areas look clean and tidy? Look for evidence of any recent spills or releases of raw materials/product;
- Are staff wearing Personal Protective Equipment?
- Check signage around the site:
  - Does it convey the health and safety risks?
  - Are fire exits and/or evacuation routes clearly marked?
  - Are there demarcated routes for pedestrians and vehicles?
- Is site safety equipment clearly signed and readily available, e.g. fire extinguisher(s), eye wash, safety shower, first aid equipment, emergency escape routes, emergency stop, decontamination equipment, and absorbent materials?
- Check the age and condition of equipment and vehicles. Look for signs of wear and tear, degradation, leaks and breaks;
- Check that solid waste storage equipment is in a good condition;
- 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;

- Have the premises been inspected recently by the regulatory authorities for health, hygiene and environment? What were their findings?

- Check for automatic safeguards on machinery to prevent accidental injury;

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

- Check that hours worked, including overtime, are recorded and staff should receive written details of hours worked and payment received;

- Has the Company received inspections from the local labour inspectorate in the previous three years? Have these resulted in any penalties, fines, major recommendations or corrective action plans?

- Does the organisation have a grievance mechanism which allows employees to raise workplace concerns?

- Are employees free to form, or join, a worker's organisation of their choosing?

- Does the organisation have insurance to cover any significant damage to the environment/community/operations (this may be covered by public liability insurance or the organisation may be party to an industry insurance scheme). Review the terms of the cover.

- Have there been any recent incidents on site such as fatalities, fires/explosions, spills? Is insurance in place to cover such incidents?

- Does the business plan have line items for Environment, Health and Safety improvements as well as asset management and maintenance?

- Where are the organisations main markets? Are they manufacturing or exporting to the EU? Will new product standards such as REACH regulation be relevant? Could the organisations markets and hence revenue be impacted by REACH? Is investment required?

- If investment or refinancing will lead to restructuring of the organisation what will be the potential impacts on health and safety at the operation and wider community? Have these been considered and assessed by the company?

- If the company plans to invest in new technology, what will be the impacts and benefits for human resources?

- Check the conditions and duration of validity for all permits.

Social, Labour and Community

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

- Check that hours worked, including overtime, are recorded and staff should receive written details of hours worked and payment received;

- Check that wages and working hours are consistent with the average for the sector and national standards;

- Has the Company received inspections from the local labour inspectorate in the previous three years? Have these resulted in any penalties, fines, major recommendations or corrective action plans?

- Does the organisation have a grievance mechanism which allows employees to raise workplace concerns?

- Are employees free to form, or join, a worker's organisation of their choosing?

Take note/ask questions relating to any activities that address the improvements listed in the improvements section of this document

ACTION PLANS

Dependent on the individual business, select appropriate improvements from the list above to include in the action plan. As a minimum, any business should be required to have the following in place:

Environmental, Health and Safety

- Operational procedures to manage environmental, health, safety and social risks;

- Monitoring programmes;

- Improvement objectives, targets and project plans;

- Training for personnel;

- Regular inspections, checks and audits with records to demonstrate achievement of the required level of performance against legal requirements and improvement action;

- Emergency plans for environment, health and safety accidents or hygiene non-compliance;

- Management review/demonstrated involvement in environment, health, safety and hygiene management.

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