UNIDO PROJECT: GP/RAF/04/004

SUBCONTRACT NO. 16001212

FOR THE DEFINITION OF

WASTE STOCK EXCHANGE MANAGEMENT SYSTEM IN GHANA

THIRD PROGRESS REPORT

(REVISED)

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MAY 2009

1.0 INTRODUCTION

The first two reports have identified eleven non-hazardous industrial wastes in the coastal belt of Ghana and estimated their quantities respectively. This third progress report, according to the terms of reference for the assignment, covers the disposal methods, and existing recycling and environmental management plans for these wastes. The assignment has been carried out through the administration of appropriately designed questionnaires, one-on-one interviews, data collection and analysis.

The major problem in waste management in Ghana is the haphazard and irregular manner in which waste is disposed of. Very few factories recycle all or part of their wastes. The national policy framework and legislation for the management of waste in Ghana include: i) The "National Environment Policy", 1990, ii) the Local Government Act, 1993 (Act 462) and iii) the Environmental Protection Agency Act, 1994, (Act 490). These documents task the District Assemblies to be responsible for the management, treatment and final disposal of all types of waste in their areas of jurisdiction.

However, poor planning for waste management, inadequate equipment and operational funds to support waste management activities, inadequate land-fill sites and facilities of waste management operations, inadequate skills and capacity of waste management staff; and negative attitude of the general public towards the environment have rendered the policy and legislative instruments ineffective in all environmental management issues nation wide.

The major wastes identified in the first progress report were:

i. Plastics,
ii. Waste Oil,
iii. Sawdust/Wood shavings,
iv. Gypsum,
v. Dyestuffs,
vi. Slaked (hydrated) Lime,
vii. Steel Slag,
viii. Scrap Metal,
ix. Carbon Anodes
x. Cocoa Shells, and
xi. Wheat Bran

(In the case of carbon anodes, the only producer, Volta Aluminium Co. Ltd. is no longer in operation)

This report has identified the disposal and recycling methods for these non-hazardous wastes as well as their existing environmental management plans.

2.0 PLASTIC WASTE

2.1 Introduction

Plastic waste disposal starts from communities, beaches and garbage dumps where plastic products such as sachet water bags, plastic buckets and plates, plastic containers, polythene bags, are discarded and left over to pollute the environment. This study describes the current methods used for recycling plastic wastes, as a means to deal with the environmental pollution caused by improper disposal of used plastic materials.

Plastics are by far the most voluminous non-hazardous wastes identified in the coastal belt of Ghana. Sachet water bags, wrapping materials and black polythene carrier bags, all made from flexi-plastic granules, form the principal visible pollution materials along the coastal belt. All the beaches, drains and open areas are littered with these plastic materials. This is mainly due to their non-biodegradable nature and their light weight.

2.2 Disposal of Plastic Waste

In Ghanaian communities, waste disposal mainly originates from the household level. Each household carries its waste in bags, buckets, containers, etc. in the mornings and dumps it into waste containers, either in approved or unapproved dumping sites. Plastic waste is mixed with organic household wastes and dumped together. There is no segregation at source to separate plastic waste from other household wastes. Some households leave their wastes in various types of containers at their doorsteps for collection and disposal by metropolitan, municipal or district authorities. Others engage private waste collectors to cart their household wastes from their doorsteps to disposable sites for a fee.

In some cases, inefficient waste collection systems, such as the breakdown of waste collection vehicles, leave such wastes at the mercy of wind and rain. Plastics, being light, are often carried away into gutters, and open places in general to pollute the receiving environment.

Metropolitan, municipal or district authorities are trying to improve their waste collection systems by placing plastic waste receptacles at vantage points in open places like lorry parks, community markets, garages, etc. for people to dump plastic and other wastes into them. Unfortunately, these receptacles are not sufficient thus allowing people to throw plastic wastes, especially the sachet water bags, on the ground everywhere in public places. In certain situations also, the inability of the authorities to collect the wastes from the receptacles once they are full encourages people to throw their wastes wherever they find convenient.

One major problem identified with the indiscriminate littering is ineffective public education.

Industries likewise dump their wastes, without segregation, into waste containers placed at vantage points within the factory premises, and later into landfill sites to compete with urban wastes for space.

2.3 Recycling of Plastic Waste

There are five (5) major plastic waste recycling companies operating within the Greater Accra Region. These companies recycle plastic wastes ranging from high and low density plastic film materials, mostly sachet water bags and packaging materials. These industries recycle plastic

wastes through cleaning and grinding to produce plastic pellets, the basic raw material for the manufacture of plastic materials. All these factories rely on plastic waste collectors for their raw material, and due to ineffective and inadequate collection facilities, they all produce well below their nominal capacities.

2.3.1 Collection of plastic waste

Plastic waste recycling industries engage plastic waste collectors who move from place to place to pick up these wastes in carts and jute bags. Along the beaches one usually sees collectors all day collecting plastic "trash" and stuffing them in their containers. When containers of collectors are filled they take them to container depots, sited at convenient spots in town, to sell to plastic recycling agents. According to the collectors and collection agents employed by container depot owners, it takes over fourteen (14) hours a day to make enough money to survive on. The collectors are paid between Gh¢ 0.15 to Gh¢ 0.2 per kilogram of plastic waste, which is unattractive to the collectors.

The depot owners who purchase the plastic wastes give guidelines to collectors and agents as to what is "desired". When such wastes are brought they are weighed and a pre-determined price is paid. Different plastic wastes attract different prices. Hence the price of plastic bucket wastes differs from the price of polythene or sachet water bag wastes which are lighter in weight. The degree of contamination also contributes to the price. The plastic waste is thoroughly inspected before weighing to check unscrupulous collectors who add other materials like stones and metals to increase the weight.

When containers at the depot are filled, which takes a couple of months, the content is removed and sold to plastic recycling firms. Individuals living in and around the recycling plants take their small plastic waste collections directly to such plants to sell.

2.3.2 Recycling Processes

There are two groups of recycling plants, viz., the small and medium size recycling plants, whose operations are limited to semi-finished products, i.e. preparation of wastes and grinding of the wastes to pellets in readiness for processing to plastic materials, and the large plants whose operations cover complete recycling, from plastic waste to plastic pellets and plastic products. The few large ones, such as Interplast Ltd., buy the semi-finished products from the small and medium size plants to complete the recycling for finished products. However, large firms also buy plastic wastes from collectors and process them from the "raw material" (that is, the plastic waste) to the finished product.

Plastic wastes are separated into the type of plastic (e.g. polythene or polypropylene; flexible or rigid) and colour. For example, all polythene bags which are black in colour are grouped together while other coloured polythene bag wastes are also grouped separately. In other words, there is no mixing of the different wastes.

The nature of plastic material also determines its mode of processing after cleaning as well as the use to which the processed material is to be put. Generally, rigid polypropylene materials are processed through the use of injection machines. These machines grind the materials into sheets and pellets and the process is carried on by mainly small and medium sized firms, but some large firms also grind the wastes. The production processes, grinding and formation of pellets, recapture about 85% of plastic material while 15% becomes residue in powder form.

According to officials of small and medium sized firms, special clay ovens are built for burning the residues.

Flexible polythene materials go through almost similar processes of thorough washing many times before being sent through the extruder machines which finally turns the materials into blocks and pellets as the final products. Residues from the recycling process are also burnt in ovens.

The table below (Table 2.1) presents the five major plastic recycling plants located within the coastal belt and their production capacities:

Table 2.1 – Some Plastic recycling plants in the coastal belt

Item No.	Name of Company	Category	State of recycling	Plant capacity	Current production capacity	Capacity utilization (%)	Type of plastic recycled
1	Blowplast Recycling Co. Ltd.	Large	Complete recycling from waste to end products like carrier bags, buckets, etc.	24 MT per day	16 MT per day	67	High and low density plastic film materials, polyethylene & polypropylene
2	Creative Plastics Ltd.	Medium	Complete recycling from waste to end products like cups, plates, etc.	2.5MT per day	1.5 MT per day	60	High and low density plastic film materials, polyethylene & polypropylene
3	Petroplast Ltd.	Large	Complete recycling from waste to end products, mainly .carrier bags etc.	15MT per day	8 MT per day	53	High & low density film materials mostly sachet water empties & carrier bags
4	Ghana Waste Plastic Recycling Co. Ltd	Small	Incomplete recycling- from waste to pellets	0.5 MT per day	0.3 MT per day	60	High & low density film materials, mostly sachet water empties & carrier bags
5	City waste Mgt. Co. Ltd.	Small	Incomplete recycling- from waste to pellets	1.0 MT per day	0.2 MT per day	20	High & low density film materials, mostly sachet water empties & carrier bags

Source: Plastic Industries/Consultants' Field Survey

From the table above, it can be observed that the total nominal capacity of all the five (5) major recycling plants is 12,900 MT per annum, which is 61% of the total plastic waste of 21,000 MT per annum (***source – second progress report***), generated along the coastal belt. On the average, the plants are operating below their capacities, (52%) due to lack of adequate raw materials. This is mainly due to the ineffective plastic waste collection and public education.

Segregation of plastic wastes at source, from industry to household level, seems to be one of the solutions to plastic waste management. This shall be reviewed in the next progress report.

2.4 Environmental Management Plans (EMPs)

All the five plastic recycling companies above have updated their Environmental Management Plans (EMPs).

3.0 WASTE OIL

3.1 Introduction

Waste oil, popularly referred to as “dirty oil” in Ghana due to its dirty appearance, is spent lubricating oil. Vehicles and engines replace their lubricating oils periodically when they become used up and ineffective in cooling. Sea going vessels also replace their lubricating oils periodically. Most often, the disposal of these used oils is not properly managed, causing environmental hazards and nuisance to aquatic life.

3.2 Disposal of Waste Oil

Waste oil is drained off periodically in garages and fuel filling stations from automobiles as well as machines in the mining and other manufacturing industries onto the ground and drains. The oil finds its way into lagoons and coastal waters by the action of rain. There is no pre-treatment before disposal. It is a common sight to see waste oil dumped into gutters near garages and workshops. Some fuel stations, however, collect the oil in drums for sale to companies engaged in sawmilling.

Sea-going vessels occasionally illegally drain their waste oil into the sea, sometimes close to the shore, causing oil spills and killing aquatic life in coastal waters. Oil tankers also throw their ballast water into the sea without any treatment. Though the MARPOL Convention forbids this practice, the country’s policing mechanism is inadequate to stop this practice and the vessels take advantage of this weakness.

A new company, Tilsbury Ltd. a foreign oil company, has erected waste oil reception facility in Tema port and some vessels now discharge their waste oil into this reception facility. Another reception facility is under construction in Takoradi port. The company has erected facilities to collect waste oil from vessels which dock in the harbour into barges and then into reception tanks. Sea going vessels which dock in Tema harbour now discharge their waste oil into these reception tanks instead of into the ocean.

3.3 Recycling of Waste Oil

Waste oil is not recycled on commercial basis in Ghana. Tilsbury Ltd. which has waste oil reception facilities in Tema harbour simply separates water and metals from the waste oil and sells the dewatered waste oil to sawmillers for priming wood. The waste oil also serves as an energy source. Ashanti Goldfields Company (AGC) Ltd has also designed atomizers to pulverize the oil and therefore facilitate burning in their kilns. AGC uses waste oil to fire its furnaces in the goldmine in Obuasi.

Recycling of waste oil by distillation or solvent extraction to produce lubricants and fuel is not practiced anywhere in Ghana. The design of a waste oil processing plant to recycle land and marine based waste oil shall be reviewed in the next progress report.

3.4 Environmental Management Plans (EMPs)

The only company in Ghana, Tilsbury Ltd., which undertakes partial recycling of waste oil has updated its Environmental Management Plan.

4.0 SAWDUST AND OTHER WOOD WASTE

4.1 Introduction

Wood industries, consisting of saw-mills, carpentry workshops, etc., scattered along the coastal belt generate 20% of total volume of wood milled as sawdust alone, excluding other wood waste. (source – TIMBOD)

4.2 Disposal of sawdust waste

Sawdust from saw-milling and other wood industries is disposed of in the open environment without any pre-treatment. Heaps of sawdust and other wood waste are often seen in the compounds of sawmills and carpentry workshops. Sometimes when the heap becomes too high, it is either set on fire or carted off from the premises and dumped in nearby open grounds or in landfill sites to compete with urban waste for space. (see picture 1)

4.3 Recycling of sawdust and other wood waste

The major reuse of sawdust, namely for the manufacture of briquettes for firing and chipboard for ceiling, are being practiced on a very small scale presently. Only one company in Takoradi has initiated briquette production on a very small scale. (February 2007). Pergamon Ltd., a wood processing industry in Accra used to manufacture sawdust briquettes for export, but this stopped about ten years ago. Some saw millers, however, use their sawdust and other wood waste as a source of heat energy for their boilers. (A company in Kumasi, not within the coastal belt, has just started briquette production from wood sawdust)

From the field survey, 56% of saw millers in the coastal belt reuse part of their generated sawdust for firing their boilers. They, however, lack effective firing devices to entrain sawdust in air for effective burning. The waste is also used for livestock and poultry beddings on a small scale. It is also used in reclaiming waterlogged areas. Miaco Ltd. in Accra uses a small amount of sawdust in the production of mosquito coils.

Table 4.1 below presents some details of sawdust recycling by some industries

Table 4.1 – Industries engaged in sawdust recycling

Company	Energy generation (boilers)	Dumping in the open	Briquette formation
John Bitar Co. Ltd. Sekondi	60%	38%	2%
Primewood Ltd. Takoradi	90%	10%	-
RAD Forest Ltd., Effia Industrial Area, Takoradi	95%	5%	-
Intex Co. Ltd., Apawa	50%	50%	-
Western Veneer and Lumber Co. Ltd. Takoradi	30%	70%	-
GDC. Biahu-Takoradi	95%	5%	-
Mondial Veneer Gh. Ltd. Takoradi	100%	-	-

Source – Sawmill industries

In general, sawmills in the coastal belt re-use about 56% of their waste as fuel for their boilers, but this is, however, not the case with carpentry workshops. They simply dump their wastes in the open environment. The next progress report will study the design sawdust recycling processes, like briquette and chipboard production, and prepare appropriate business plan to demonstrate the technical feasibility and financial viability of sawdust recycling.

4.4 Environmental Management Plans (EMPs)

All sawmillers visited in the coastal belt have updated their EMPs.

5.0 GYPSUM WASTE

5.1 Introduction

Sea water contains 35.8% solid matter, including sodium and calcium salts. The solubility of the two salts is such that Calcium Sulphate dihydrate, ($CaSO_4.2H_2O$) or gypsum precipitates just before Sodium Chloride (NaCl) or common salt. In the production of salt by solar technology, gypsum precipitates first, and then common salt precipitates on top of the gypsum. Therefore, when the common salt is scraped off, the remaining layer at the base of the pan is gypsum. Salt producers scrape off this gypsum layer to make way for the next filling of the salt pans. This gypsum is dumped on the beaches as waste.

5.2 Disposal of Gypsum Waste

Salt producers scattered along the coastline of Ghana dispose of their gypsum waste in various ways. Some scrape off gypsum from their salt pans regularly and pile it up at the beach. Others, after scrapping the waste from the pans, store it in bitterns, where rain washes it into the sea. In Apam, for example, the Universal Salt Company disposes of its gypsum waste on site and this becomes solidified, rendering the land useless for agricultural purposes. At Abura Nkwantanan Salt Industry Ltd., the gypsum is dumped on site and sold to fishmongers for the conservation of fish.

In all these, there is no pre-treatment before disposal. The waste is simply dumped in the open to occupy space which could otherwise be used for farming and other purposes.

5.3 Recycling of Gypsum Waste

The major reuse of gypsum waste, namely in the production of cement, is not being practiced anywhere in the country, although gypsum waste from solar salt production could be suitable for cement manufacture. The only reuse of gypsum waste presently being practiced is its use as feed additive for cattle and preservative for fish. Shepherds and fishmongers collect gypsum waste from salt industries for these purposes.

Laboratory analysis has confirmed that gypsum waste as found on our beaches contains 90% Calcium Sulphate dihydrate, which is suitable for cement and plaster production, with some refining. There is, therefore, the need to study how best this waste could be employed by cement industries in order to save foreign exchange used in importing gypsum and also to bring down the cost of cement.

5.4 Environmental Management Plans (EMPs)

There are currently no companies in Ghana doing recycling of gypsum waste.

6.0 DYESTUFFS EFFLUENT

6.1 Introduction

Textile industries use various types of dye to colour their fabrics. These dyes are dissolved in water, and the resulting dye-laden effluent is disposed of into drains and other water bodies and eventually into the coastal waters and lagoons, without treatment.

6.2 Disposal of Dyestuff Effluent Waste

The effluent generated from the textile industries contains various dyes, chemicals, auxiliary chemicals and sizing materials, among others. There are four large textile industries along the coastal belt of Ghana, namely:

- Ghana Textile Manufacturing Company (GTMC),
- Ghana Textile Printing Company Limited (GTP),
- Printex Ltd. and
- Tema Textile Limited (TTL).

None of these large textile industries in Accra and Tema embarks on physical, biological, or anaerobic treatment technologies. As a result the disposed effluent contains colour, dissolved solids and trace of metals.

According to the Environmental Protection Agency (EPA) Annual Report of 2004, the four industries together had effluent turbidity levels higher than the EPA's recommended limit of 75 nephelometric turbidity unit (NTU), with values ranging between 160 and 990 NTU. Also, the effluents disposed of contain Chemical Oxygen Demand (COD) concentrations higher than the EPA recommended limit of 250mg/l, with values ranging between 1440 and 73600mg/l (EPA, 2004).

The small scale operators in the textile sub-sector consist of producers of batik and tie and dye fabrics. Production of batik and tie and dye is done at the household level with family members or very few employees to assist the sole proprietor. The volume of wastewater generated from the small-scale operatives ranges between 2180 litres and 43,200 litres per year. 'Olanach Enterprise', located at Lapas, a suburb of Accra, generates the least waste of 2180 litres a year while 'Natural Instinct', which is located both at Achimota and Nungua generates the largest volume of waste of 43,200 per year (EPA, 2004).

None of the firms treats their waste in any way before disposal. They re-use the first volume of wastewater from the first step in the production process by adding activated carbon, and keeping it in barrels and rubber containers. The wastewater considered too low in quality for re-use is finally disposed of indiscriminately into gutters, open spaces and into holes.

6.3 Recycling of Dyestuff Effluent Waste

Recycling of dyestuff effluent by removing the dye from the effluents is not practiced in Ghana, although technology exists for this operation. Dyes can be removed from effluents by the use of activated carbon. Some textile industries add a bit of activated carbon to the effluent to keep its concentration for re-use, but they do not remove the dye completely from the effluent.

Some textile industries have adopted the “Cleaner Production Technology Programme” being promoted by UNIDO for processing industries, with respect to the use of minimum water in their operations in order to reduce the volumes of effluent discharged into the environment. This “beginning of pipe approach”, coupled with recovery of dyes for re-use, i.e. “end of pipe approach”, can reduce drastically the discharge of untreated wastewater containing dyestuffs

All the four major textile industries in Ghana have constructed sedimentation tanks to store and re-use wastewater from the pre-washing steps in the secondary washing process or by circulating the first washing water several times until the quality of the water is considered too low to re-use. The effluent is thereafter passed through tunnels for disposal into rivers, streams and the sea. In this way, the effluent, before disposal, contains less dye but the colour stays the same.

6.4 Environmental Management Plans

Currently, the Project ‘Towards Effluent Zero’ (TOWETO) started in 2003 by a consortium of eight participants from various European industries and Research Institutes is ongoing in the country. The main concern of the project is the characterization and treatment of single textile processing wastewater streams and the development of a protocol to handle the various types of water streams within the treatment and re-use scheme of the major textile industries in Ghana. The overall goal of the project is the characterization of textile effluent before and after treatment using physical and biological parameters. The project is also considering anaerobic treatment technology as one of the effluent treatment options.

The main challenges to compliance and enforcement of environmental management plans are lack of political will to see the environment as a priority area, the lack of adequate resources for environmental management and the carrying out of compliance and enforcement activities. The other challenge is review of existing legislation to reflect the current trend of events and enactment of new legislation.

All the four major textile industries within the coastal belt have updated their EMPs.

7.0 SLAKED (HYDRATED) LIME WASTE

7.1 Introduction

Slaked or hydrated lime is produced alongside the production of acetylene from calcium carbide. Producers of lime waste do not have any proper disposal methods. Some just dump it on the ground, others drain it into gutters and drains, and still others dig holes and bury it. The waste is eventually washed into lagoons and the sea by the action of rain.

7.2 Disposal of Slaked Lime

The main producer of lime waste, L'Air Liquide, does not dispose of its waste directly into gutters. The company throws its lime waste, in the form of slurry, into a series of ponds in the factory premises, for the lime to settle. The water is allowed to drain off, leaving the lime settled in the pond. The settled lime, containing about 20% moisture, is scraped off, bagged and sold to the public for painting walls.

This is not the case among the small scale producers, like welders in garages and mechanical workshops. They dump the waste directly into drains and the open environment.

7.3 Recycling of Slaked Lime Waste

Lime, in general, has several uses. These include painting of walls, medicinal purposes, insecticides, plant and animal food, dehydration and causticizing. It is also used in the manufacture of soap, rubber, high grade steel and cement. In Ghana, Calcium Hydroxide or slaked lime is used extensively in the building industry for painting walls, especially newly plastered ones. Newly plastered walls receive lime wash as first coating before any other paint. The gold mines also employ calcium hydroxide for their leaching operations.

L'Air Liquide company recycles all its lime waste indirectly. Individuals or groups of people go to the company in Tema to buy lime waste, mostly for painting walls. All the company's lime waste generated, estimated at 780 MT per annum is re-used as wall paint in the building industry.

7.4 Environmental Management Plans (EMPs)

L'air Liquide, the major producer of lime waste in the coastal belt, has updated its EMP.

8.0 SLAG FROM STEELWORKS

8.1 Introduction

The production of steel and the recycling of scrap metal are accompanied by the generation of steel slag as by-product, which is thrown away as waste.

8.2 Disposal of Slag waste

The major steel industries in the country generate steel slag from their operations. Producers of this waste do not have any proper way of disposing of it. Some dump this waste on lands near their premises into heaps while others dump the slag waste on the few waste dump sites to compete with urban waste for space.

8.3 Recycling of slag waste

The main re-use of slag as fillers in the road construction industry is practiced only on a very small scale. Slag can be recycled by milling to reduce its boulder size, and make it suitable as fillers in road construction. It can also be milled and used as fertilizer to ameliorate highly acidic soils. It can also be used in the production of special cement.

Unfortunately the 8,507 MT of slag waste generated annually is left to pollute the environment and occupy limited landfill sites.

8.4 Environmental Management Plans (EMPs)

The two major producers of slag waste have updated their EMPs

9.0 COCOA SHELL WASTE

9.1 Introduction

Cocoa processing industries generate cocoa shell waste in the course of polishing the dried cocoa beans for processing into chocolate and various cocoa beverages. These shells, which could be of economic use, are not recycled to any appreciable extent and not properly disposed of and thus become nuisance to the environment. Very few people are aware of its economic values.

9.2 Disposal of Cocoa shells

Ghana, as the second leading producer of cocoa in the world, has some vibrant cocoa industries, which generate cocoa shells as waste. These shells are dumped in the factory premises, and later sent to the waste dump sites, to compete with urban waste for space. Some individuals collect the waste from the factory premises but not to any appreciable extent.

9.3 Recycling of Cocoa Shells

In Ghana the main use of cocoa shells is in the manufacture of manure. Individuals collect this waste from the dumps and convert it to manure for vegetable gardens, by simply leaving it on the land to decompose. The major producer of cocoa products, WAMCO, does not recycle any of its cocoa shell waste.

Cocoa Shell is a superb garden mulch and soil conditioner. The vast majority of the product is used as garden mulch, although some gardeners dig it into sandy or clay soils as it is excellent at moisture retention and breaking up heavy soils. As mulch it is used as a top cover in any beds, generally after planting, although it is simple to plant through the mulch. It contains 100% organic and unlike wood base ground covers, it does not remove nitrogen from the soil as it breaks down. It becomes nutrient rich humus which improves soil structure and increases soil water retention ability. Cocoa shells can also be re-used as fertilizers and for animal feed..

9.4 Environmental Management Plans (EMPs)

The major cocoa processing companies in Accra and Tema have all updated their EMPs

10.0 WHEAT BRAN WASTE

10.1 Introduction

Flour mills generate quantities of wheat bran as by-product in the course of polishing the wheat grains for processing into flour. This wheat bran by-product is not properly disposed of but simply left to cause nuisance to the environment.

10.2 Disposal of Wheat Bran

Wheat bran waste is disposed of through dumping in the open environment and land fill sites. Some flour mills pile up the waste in their premises and sell them to the general public, and in the course of selling the waste, it spreads over the premises and pollute the atmosphere and the environment.

10.3 Recycling of Wheat Bran

The major re-use of wheat bran is as poultry and animal feed. Individuals collect wheat bran waste from flour industries for use as animal feed.
The four major flour mills, namely Takoradi Flour Mills, Irani Brothers Ltd. in Tema, Silver Spoon Ltd. in Tema and Tema Flour Mills, all located within the coastal belt of Ghana, recycle part of the waste to produce pellets for poultry and animal feed while the rest is dumped the environment as waste.

10.4 Environmental Management Plans (EMPs)

All flour mills in Accra, Tema and Takoradi have updated their EMPs.

11.0 SCRAP METAL

11.1 Introduction

The country imports all types of used vehicles, machines and divers equipment, with limited life span. These frequently break down beyond repairs and abandoned anyhow to create environmental problems.

11.2 Disposal of Scrap Metal

Scrap metals, ferrous and non-ferrous, from unserviceable, dilapidated and abandoned vehicles and machines are often found scattered in open places. The disposal of scrap metal waste does not follow any regulation. It is simply left in garages, workshops and along highways to litter the environment. It is common to come across heaps of scrap metal made up of vehicle parts, stoves, household and office equipment, iron cooking pots, rods etc. packed along the roadside.

11.3 Recycling of Scrap Metal

11.3.1 Collection of scrap metal

The two major steel mill factories in Ghana, Wahome Ltd. and Tema Steel Co. Ltd. recycle these wastes, but are not able to collect them effectively from where they are scattered. Collectors are also not able to cope with the rate at which this waste is generated.

Collection of scrap metal waste for recycling is done by individuals and groups of people. They pick them from garages and workshops and open places and transport them mainly on trucks and carts to the steel factories in Tema. Collectors, spread all over the coastal towns and throughout the nation, work from dusk to dawn, collecting scraps from communities and travelling from town to town. The collectors move from alley to alley, garbage dumps, backyards, landfill sites etc. in search of scrap metals. On finding them, the scraps are loaded into sacks (jute bags) that are sent to their places of abode till enough quantities are accumulated to be worth sending to the steel mills for sale. Sometimes ten (10) to twelve (12) bags or sacks are collected in a week which they transport to transaction sites.

11.3.2 Transporting the Scrap Metals to the Mills

As far as scrap lots owners are concerned, on buying the desirable wastes from the various dealers and when enough is accumulated, trucks are engaged once or twice a month on the average to transport the wares to mills for sale. Both individual collectors and lots owners confirmed that the mills are ready markets for wares and pay fair prices.

The two recycling mills i.e. Tema Steel Co and Wahome Steel Limited, are always ready to purchase scrap metals from dealers. It is common to see queues of trucks loaded with scrap metals in the premises of the steel mills waiting their turn to sell their wares. According to dealers, sometimes the trucks are so many that they spend a day or two before their trucks get to the purchasing point.

11.3.3 Export of scrap metal

Some individuals collect and export scrap metal to Togo. This has resulted in the two major recycling factories operating well below capacity. At both factories there are posters at front doors to the offices calling on government to "Support the Ban on Scrap Metal Exports", an advertisement by the Steel Manufacturers Association of Ghana. Some officials lamented over government non-action on export of scraps to neighbouring countries.

The officials stated that hardly do they get enough scraps to produce at capacity. "We are always producing below capacity due to insufficient scraps". Some scrap dealers target the neighbouring nations for the C.F.A currency which has higher value than the Ghanaian cedi. This practice creates a shortage of scrap metal on the local domestic market.

Both companies stated that though the number of scrap dealers coming to them has increased over time, they still are producing under capacity and mills often have to purchase additional scraps from Togo, Burkina Faso, and Cote d'Ivoire. Scraps, they said, originating from Ghana are sold to dealers in those nations and are resold to them in Ghana for more than double the price.

If Government implements the policy to stop export of scrap metal, they said, the local mills will produce to capacity resulting in more employment. More steel will also be available on the Ghanaian market at lower prices while at the same time the environment will be rid of scrap metals.

11.4 Environmental Management Plans (EMPs)

Both scrap metal recycling companies, Tema Steel Co. Ltd. and Wahome Ltd. have updated their EMPs as at 2007.

12.0 CONCLUSION

This third progress report has come out with the manner in which non-hazardous industrial waste is disposed of and available recycling processes in the coastal belt of Ghana. From the above, it can be concluded that only two non-hazardous industrial wastes, namely scrap metal and plastics, go through complete recycling on commercial scale. Recycling plants for these two wastes are, however, operating far below their capacities due to ineffective collection methods applicable to these wastes. Sawdust and slaked lime are also recycled to some extent but not on commercial scale.

All the other wastes are not recycled to any appreciable extent though the potential exists. For example, waste oil can be processed into lubricants and fuel, but it is left to pollute the environment and destroy aquatic life. Gypsum can also be used as a basic raw material for cement, to substitute for imports.

The next report will be based on research study to come out with more effective ways of collecting these wastes to facilitate recycling, especially plastic and scrap metal wastes. Segregation of waste at source, backed by incentives such as provision of waste bins, and reinforcement of appropriate legislations shall be reviewed. It shall also look at the design of plant/machinery and equipment to process these wastes into some useful commodities.

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