Ministry of State for Environmental Affairs
Egyptian Environmental Affairs Agency (EEAA)

Inspection Manual
Grain Milling Industry

2002

Table of Contents

1. Introduction

The Egyptian Pollution Abatement Project (EPAP) sponsored by EEAA has assigned Finish and Egyptian consultants for the task of developing Sector specific inspection and monitoring guidelines. This task is based on a previous collaboration between FINIDA and EPAP that resulted in the development of four Inspection Guidelines:

- Fundamentals and Background Manual that provides basic information about air pollution, wastewater characteristics, solid waste, hazardous materials and wastes and work environment.
- Guidelines for Inspectorate Management that discusses the strategy, objectives and tasks of the inspectorate management.
- Guidelines for Team Leaders that identifies the team leader responsibilities and tasks.
- Guidelines for Inspectors that presents a methodology for performing all types of inspection. Tasks during the various phases of planning, performing field inspection, report preparation and follow-up are discussed. Several checklists are included.

The three guidelines were later summarized into one that will be referred to as The General Inspection Manual GIM (EPAP, 2002), which was developed, covering aspects common to all industrial sectors.

On the other hand, a Self-Monitoring manual was also developed to present the industrial community and government officials with the general principles, both managerial and technical, to be followed for self-monitoring. The textile industry was chosen as a case study for implementing and testing the manual and a self-monitoring manual for this industry was developed.

1.1 Preface

The developed manuals were tested through a number of training programs that targeted RBOs and EMUs. The inspectors involved in the training used these manuals to inspect a number of industrial facilities. Feedback from the concerned parties led to the improvement of these manuals and their continuous update. There was clearly a need for sector-specific guidelines and EPAP took the initiative to develop such manuals. Five sectors were chosen:

- Food Industry with specific reference to the five sub-sectors of Dairy products, Vegetables and Fruit processing, Grain Milling, Carbonated Beverages and Confectionery.
- Pulp and Paper Industry
- Metallurgical Industry with specific reference to the two sub-sectors of Iron and Steel and Aluminum.
- Engineering Industry
- Textile Industry.

1.1.1 Project Objectives

The project aims at the development of sector-specific guidelines for inspection and monitoring to be used by inspectors and plant personnel respectively. These manuals are meant to be simplified but without abstention of any information necessary to the targeted users. Flowcharts, tables and highlighted notes are used for easy representation of information.

With respect to the food industry, each sub-sector will have two distinct manuals one for inspection and the other for self-monitoring. Description of the industry, pollution aspects and relevant environmental laws will be similar for both manuals. Each manual will be, as much as possible a stand-alone with occasional cross-reference to the General Guidelines previously developed to avoid undue repetitions.

1.1.2 Organization of the Inspection Manual

The inspection manual for the grain milling industry includes ten chapters. The first chapter represents an introduction to the whole project and to the specific sub-sector of the industry. Chapters (2) to (5) deal with the grain milling industry and its environmental impacts.

The description of the industry in chapter (2) includes the inputs and outputs, the different production lines with their specific inputs and outputs, the service and auxiliary units that could be present at the industrial establishment with their potential sources of pollution and the various emissions, effluents and solid wastes generated from the different processes.

Chapter (3) describes the environmental and health impacts of the various pollutants whereas chapter (4) gives a summary of the articles in the Egyptian environmental laws relevant to the grain milling industry. Chapter (5) gives examples of pollution abatement techniques and measures applicable to the industry.

The inspection procedures are described in chapters (6) to (10) starting with a brief description of the inspection process in chapter (6) then the planning aspects that should be considered at the inspectorate level are explained in chapter (7). The different tasks at the inspectors level specific to the grain milling industry, will be described in chapters (8) to (10). The tasks before field inspection are presented in chapter (8) whereas the inspection tasks for actually performing the field visit are defined in chapter (9). Chapter (10) is concerned with the conclusion of the field visit including inspection report writing, supporting the enforcement case and following-up the compliance status of the facility.

1.2 Introduction to the Grain Milling Industry.

Grain milling is a large industry in Egypt. This industry produces:

- Wheat flour, bran and semolina.

- Corn flour and corn meal

Grain is the only raw material used in this industry. The major processes in this industry are performed continuously and are not subject to seasonal variation. Air pollution is a major environmental problem and wastewater characteristics can be violating the relevant laws for certain processes.

1.2.1 Egyptian SIC Code for the Grain Milling Industry

The Standard Industrial Classification (SIC) code for the food industry is 15. There is no sub-sector specific to grain milling. The sub-sector code 153 includes grain milling, starch and animal fodder.

1.2.2 Industry Size and Geographic Distribution

Table 1 presents a classification of the facilities by manpower for Egypt. Manpower is an indicator for the facility size, although modern facilities employ fewer workers for the same production rate. It is clear from that 92% of the facilities are operating with less than 5 workers and 1.1% has more than 40 employees. Table 2 shows the distribution of facilities by manpower for each governorate.

Wheat milling is presented in this manual as an example for the industry. In Egypt most of the large wheat milling facilities are publicly owned. Wheat from different origins is used but the same type is used all over the country at the same time. Egyptian wheat is used 4-5 months/year. Australian, European and American wheat are used the rest of the year.

Table (1) Size Distribution Facilities Included in SIC 153

Manpower	1	2	3	4	5	6-10	11-15	16-20	21-25	26-30	31-40	41-50	51-100	101-500	501-1000
No of Facilities	4506	4761	2718	989	700	92	48	37	24	26	21	64	77	7	6

Table (2) Size Distribution of Grain Milling and Related Industries Per Governorate

Manpower	Cairo	Alexandria	PortSaid	Suez	Damieta	Daqahlya	Sharkia	Qalyoubia	Kafr-el-sheik	Gharbiya	Menoufia	Behera	Ismalia	Giza	Benisuef	Fayoum	Minia	Asyout	Sohag	Qena	Aswan	Luxor	RedSea	NewValley	Matrouh	Sinai	Total
001	30	19		2	52	574	585	66	220	333	134	247	36	77	310	183	442	286	468	293	57	39		43	2	8	4506
002	27	17	2	4	68	539	648	112	372	394	155	365	45	99	262	154	422	316	328	314	56	32		26	3	1	4761
003	21	26	1	1	55	329	327	98	217	189	140	300	19	52	109	92	303	127	127	138	22	13	1	3	5	3	2718
004	9	11			23	137	109	52	78	76	61	125	3	29	27	31	101	29	35	40	6	5	1			1	989
005	21	23	1	1	29	76	73	42	72	59	39	109	5	16	16	26	41	19	12	12	1	2		1	2	2	700
010	5	10	1			10	13	4	8	5	4	9	1	8	2		4	2	4		1					1	92
015	3	6	2		2	2	6	1		4	1	5		6	3			1	4		1				1		48
020	6	3	1		2	3	4	1	3	2		1		4				2	1	1	2			1			37
025	6	2				4	2	2		3	1			2	1						1						24
030	5	1	1		1	2	3			2	1	2	1	2	1				3		1						26
040	4	1			1	1	1	2	3	1		1		1	1	1			1		2						21
050	7	5			2	6	4	3	4	3	5	5	1	6		3	1	2	1	1	2	2		1			64
100	5	13		1	1	6	4	5	6	7	2	1	1	2	1	3	4	2	4	5	3					1	77
500	1	1				1		1				1					1			1							7
1000	1	2					1			1				1													6
Total	151	140	9	9	236	1690	1780	389	983	1079	543	1171	112	305	733	493	1319	786	988	805	155	93	2	75	13	17	14076

2. Description of the Industry

The milling plants are characterized by unit operations that involve changes to the physical properties of the grains through cleaning and size reduction. The production process in these plants can be divided into three general processing lines:

i. Dry cleaning using cylinder or disc millers.
ii. Wet cleaning using cylinder or disc millers.
iii. Wet cleaning using stone millers.

The products from each process are usually the same. The main differences between these lines are the use of different techniques in cleaning and milling processes. Stone milling is an older wet technology that is still applied in many facilities.
All the lines process wheat through 4 stages:

- Grain testing, receiving and storage.
- Grain cleaning and preparation.
- Grain milling and sieving.
- Product packaging.

2.1 Raw Materials, products and Utilities.

Wheat is the only raw material used in this industry. Flour is the main product and bran and semolina are by-products. Each kilogram of wheat produces 72-82 % of flour, 10-13.5 % of fine bran, 9-14 % of coarse bran and 0.5-1 % semolina. Water is used in cleaning (wet process), tempering and conditioning processes. It may be supplied from public water lines, wells or canal water. The type of water will dictate the type of pretreatment.
Chemicals such as alcohols are used in the lab for quality control and analysis but in small amounts. Detergents are used for cleaning purposes.
Lube oil is used in the garage and workshops. The larger milling facilities have their own pumping stations for gas oil (solar) used as fuel for their trucks.
Different types of packaging materials are used (textile or plastic bags).
Large facilities can also include a housing complex generating domestic wastewater.

Note: Defining the inputs and outputs helps predict the expected pollutants.

2.2 Processing Lines

Table 3 presents the different processing lines and service units that can be present in a facility.

Note: Knowledge of the processes involved allows the prediction of pollution hazards and expected violations and helps determine possibilities for

implementing cleaner technology.

Table (3) Production Lines and Service Units in Grain Milling Industry

Process Lines (grain milling)	Service Units
Dry cleaning using cylinder or disc millers. Wet cleaning using cylinder or disc millers. Wet cleaning using stone millers.	Laboratory Workshops and garage Storage facilities. Wastewater Treatment Plant Solid waste processing and handling Restaurant and Housing complex

2.2.1 Dry Cleaning Using Cylinder or Disc Millers

Fig (1) presents the main operations performed according to this processing line, the inputs to the units and the pollution sources. These operations are:

a) Receiving and testing raw grain

Grain trucks discharge their carrying load into a pit. This process takes place in the open air. As a result, uncontrolled emissions of particulates and dust are raised into the atmosphere.

Grain is tested for quality by the facility lab, which measures the following parameters: humidity, purity (cleanliness) and percent of foreign materials.

The price of received grain is determined according to these parameters.

b) Conveying, screening and storage of raw grain

Before being stored in the receiving silos, grain passes through a separator, which is basically a sieve, to separate impurities having a size larger than the grain seeds.

Dust and particulate matters are emitted during this process. A cyclone is used to collect these particles and discharge clean air to the atmosphere. Most of these cyclones are equipped with induced draft fans.

The accepted grain is then fed to the top of the receiving silos by means of enclosed bucket elevators. An air stream is passed through the conveyor in order for any loose dust to be removed. The dusty air is then vented to the atmosphere through a cyclone.

c) First cleaning phase

The first cleaning phase starts with a scouring machine that removes adherent dirt. This process is also important in decreasing bacteria and epidermis. Grain then goes to an air separator, which removes admixtures, bigger or smaller than the seeds. Large admixtures include sticks, large stones, seeds other then the raw material, peas,…, while smaller admixtures include sand, broken kernels

and small stones. Air carrying particulate matters resulting from this process, is discharged to the atmosphere through the cyclones.

The wheat is then passed through the "destoner", which is responsible for separating small stones and other solid impurities with diameters up to 2 mm. The separation techniques relays on fluidizing the seeds using air. The air stream carrying the dust and other fine particles resulting from this process, is discharged to the atmosphere through a dedicated cyclone and not through the first cleaning cyclone.

The grain is then passed through a machine, called "Trieur (cockle)". It removes broken kernels, round seeds and long grains such as oat and barley. The air stream from this process is passed through the cyclone of the first cleaning section.

Grain passes through a magnetic separator, which is basically a sieve equipped with a magnet to separate any metallic impurities, as well as impurities having a size larger than the grain seeds.

Due to all of these mechanical equipments, noise limits could be violated.

d) Tempering and Conditioning

To facilitate the separation of the seed shucks from the endosperm, the grain seeds are wetted. The quantity of the added water should be just sufficient to produce wetted grains with a water content of 14 -16% of the seeds weight. Accordingly the quantity of added water varies with the initial humidity content of the received grain. The wetted seeds are transported to the storing silos by bucket conveyors equipped with ventilation systems. This process is usually achieved in two steps; each step has its own storage silos.

This is the most important step in the milling process. The purpose of this operation is to:

- Facilitate the removal of the shucks.
- Harden bran for easier grinding into powder.
- Facilitate the grinding of the endosperm.
- Increase the sieving efficiency for separating flour from bran.

Hardening of the wheat shucks and their easy removal results in higher quality flour with whiter color. The easier grinding and sieving will result in a decrease in power requirements for milling operations.

On the other hand, if the humidity content of the wheat is too high, sieving will be difficult and the grinding efficiency will be low.

Before storing the wetted grain into its silos, it passes through the "entoleter" (which is a type of impact mill) to kill any pest found with the grain.

e) Second cleaning phase

This phase usually includes a scourer to separate the shucks still adhering to the endosperm. The seeds are passed through an aspiration channel that sucks the seed shucks and a cyclone is used to separate them from the exhaust air.
Noise will be also generated from this stage.

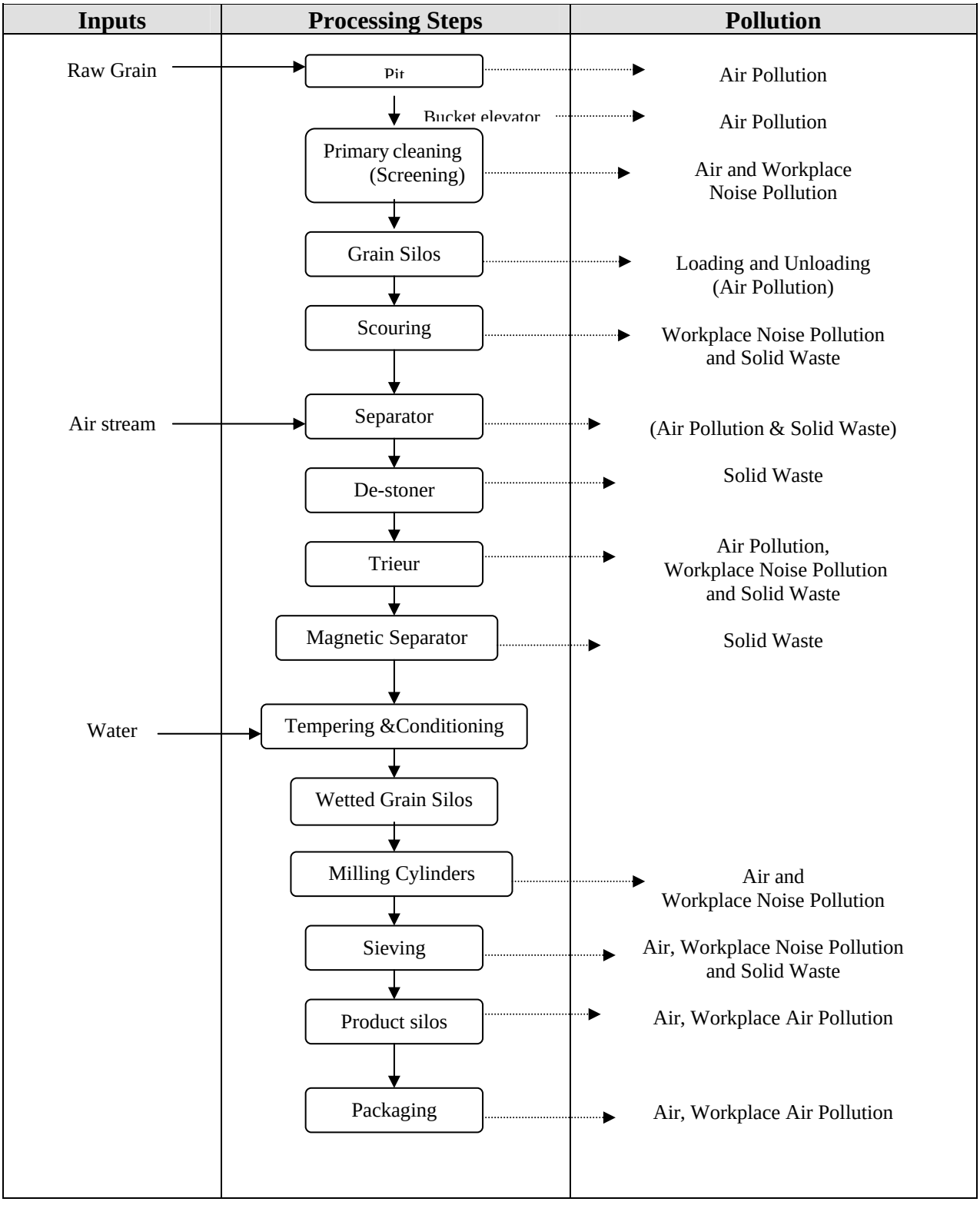
f) Milling using cylinders

By weighing the cleaned wheat a predetermined quantity is passed to the milling machines to produce flour. The quality of the flour is determined according to the percentage of flour extracted, which depends on the number of the milling strokes as well as the distance between the rollers of the milling section. There are five to six milling sections after each section a classifier is used to separate flour from the coarser residues that are introduced to the next milling section for further grinding and flour separation. Bran is obtained as a by-product after separating the brown flour that adheres to the bran particles using the "bran duster".
The milling process is pneumatically controlled.
The milling machines are usually vented to prevent the accumulation of flour dust inside the machine, which might cause explosions. The flour dust is recovered through bag filters installed on the vent stream before exhaust to the atmosphere.
The obtained flour is a mixture of different grain size. A set of vibrating sieves called the "plansifter" is used. The cloth used for the bottom sieve is made of silk. The plansifter classifies flour into three products: fine flour that passes through the silk cloth, the coarse grains that remain on the top sieve and the middling that have particle sizes in between.
An inclined long sieve with varying mesh size, the smaller mesh size at the feeding (lower) end, is used. The sieve is vibrated horizontally and an air stream is used to carry the grain from the lower to the upper end. Dust and bran residues are collected at the upper end. Flour and granular flour (semolina) are obtained from the lower and middle parts respectively.
Loudness of millers sound will be considered.

g) Products storing and packaging

The different products are then passed through the entoleter that gets rid of the insects, tested and stored in their respective silos until packaged in bags of predetermined weight that are then transported to the sales centers using trucks.

Fig (1) Dry Process for Wheat Milling, and Related Pollution Sources



2.2.2 Wet Cleaning Using Cylinder or Disc Millers:

Fig (2) presents the processing steps for this process and the potential pollution sources. The steps performed for receiving and storing raw wheat are the same as those performed in the dry process (a-b). Also the processes performed on the wet stored wheat are also the same (e-f-g). Therefore, only the parts dealing with the cleaning process will be summarized in the following:

c) First cleaning phase

This phase is similar to that used for the dry process. It includes a scouring machine followed by the destoner machine to separate the impurities. The cockle is also used to separate broken kernel and admixtures then an air separator, which takes away the impurities bigger or smaller than the seeds.

Air carrying dust and other particulate matters resulting from this process is discharged to the atmosphere through cyclones.

Noise is generated in this stage.

d) Grain washing & cleaning

This step is used to clean the grain and to wet it at the same time; this operation is implemented in cylinders mills of high technology to produce flour 82 %. Wheat is first passed through screens to separate small particles of dust, mud and impurities of smaller size than wheat grains. Then wheat passes through the destoner to remove stones then a dry scourer to separate any adherent dirt.

The washing process that uses direct water contact comes next and the washed grains are sent to a centrifugal. The wet grains are separated from the water, which is discharged to drain.

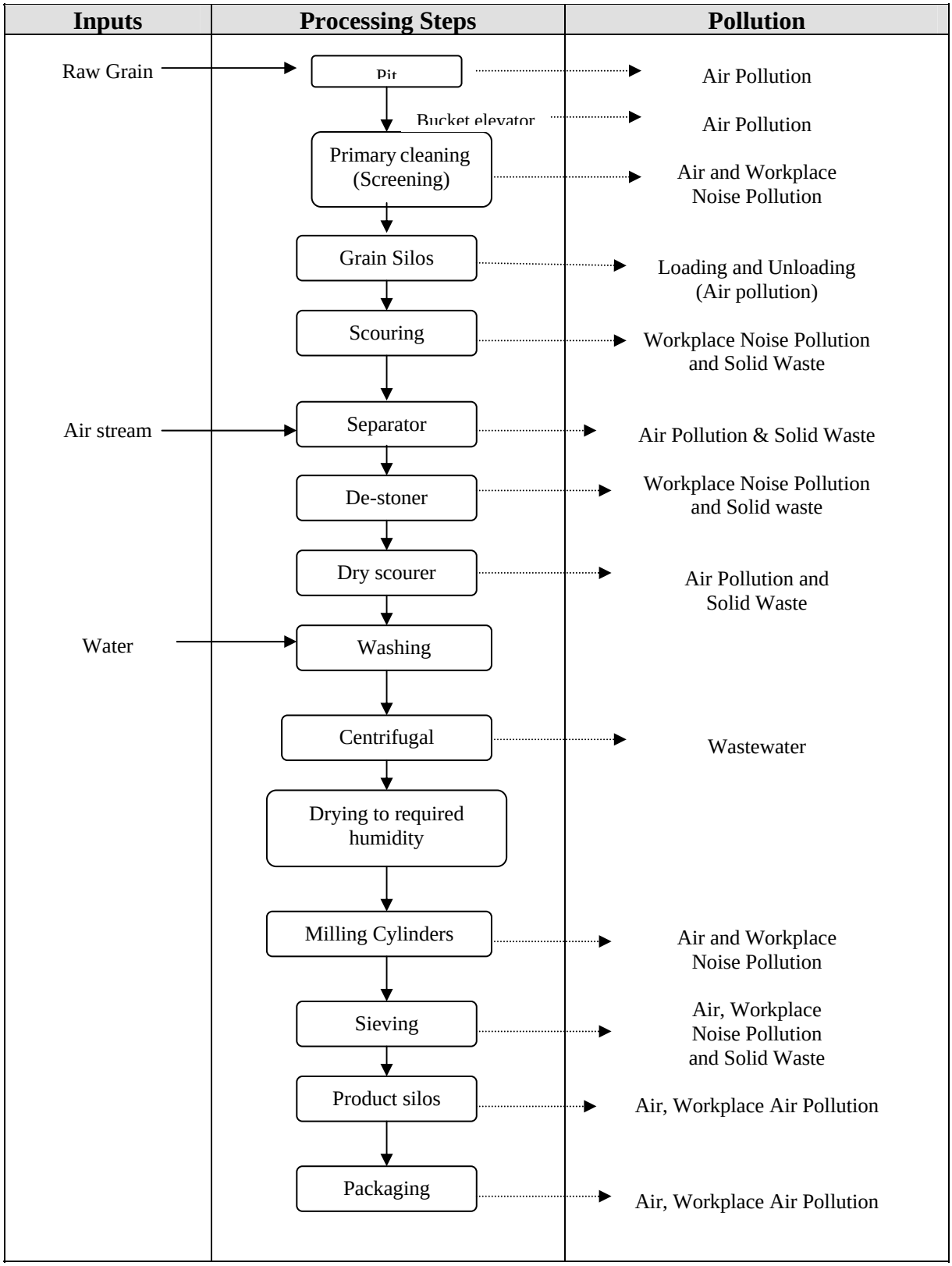
The wastewater from this process is contaminated with suspended solids and organic matter. Particulate matter partially dissolves in the wastewater, increasing the organic load.

The grain is then dried in an air stream then passes through the “entoleter” (which is a kind of impact mill) to kill any pests found with the grain. Ventilated bucket elevators are used to convey the grains to storing silos where conditioning takes place to achieve the humidity necessary for efficient grinding.

Note to inspectors:

- *The maintenance schedule for bag filters used to recover flour, should be checked.*

Fig (2) Wet process for Wheat Milling, Using Disc or Cylinder Millers and Related Pollution Sources



2.2.3 Wet Cleaning Using Stone Millers:

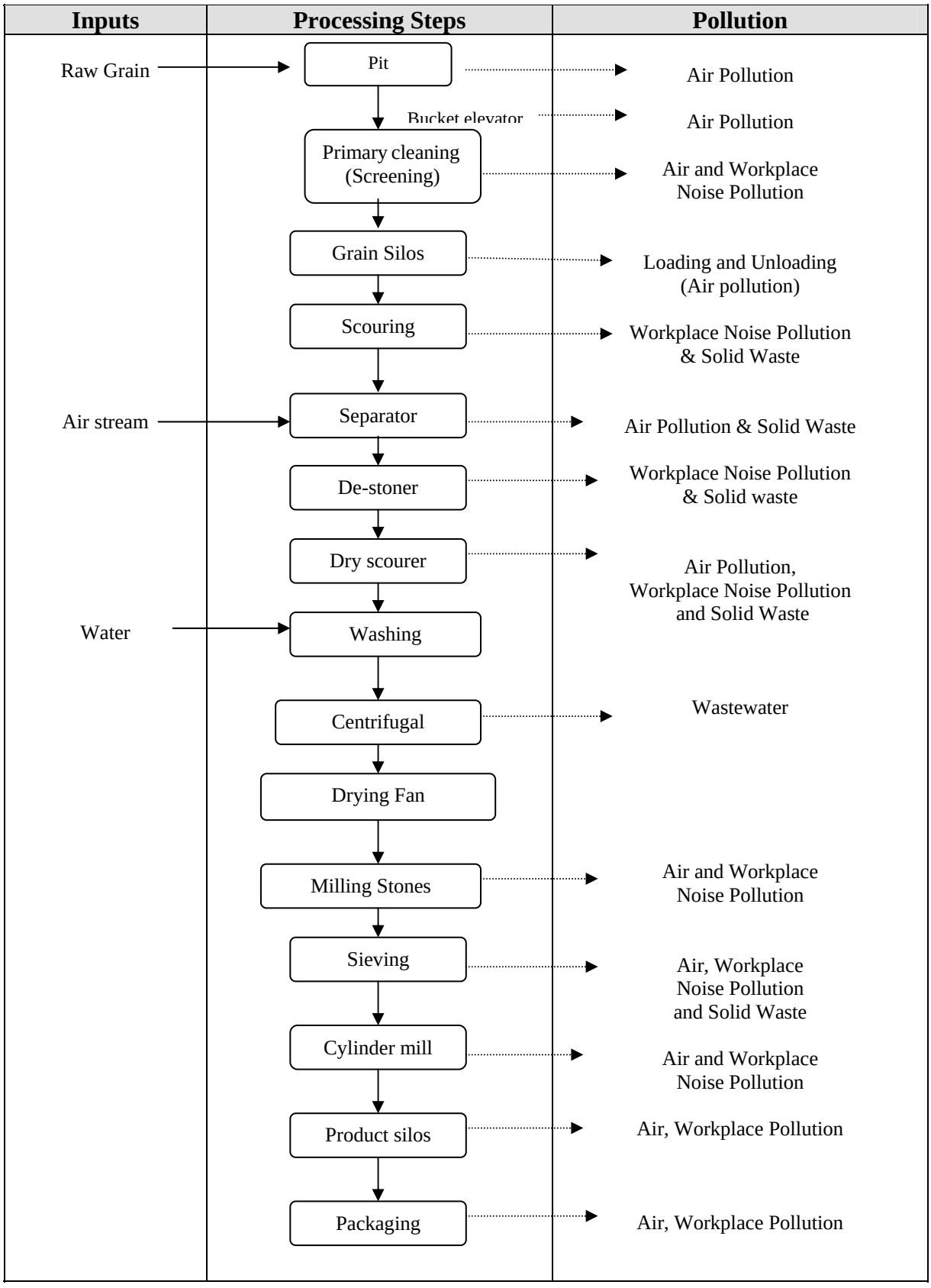
Fig (3) presents the processing steps for this process line, related raw materials and potential pollution sources. The steps are almost the same as for the wet cleaning process using cylinder or disc millers. However, the technology is older and consequently the pollution load is higher than for the other two processes. Less sophisticated equipment are used in these facilities. Steps a and b for receiving and storing raw wheat are the same as well as the final packaging step. Depending on the size and the level of modernization, facilities can be lacking some of the processes.

c) First grain cleaning	The grain from silos passes through screens and scourer to separate impurities and foreign materials. The aspiration channel separates wheat shucks from the grains. Dust and other particulate matters resulted from this process are discharged to the atmosphere through the cyclones. Noise is also generated here.
d) Grain washing & cleaning	This step is used to clean the grain and to wet it at the same time. The washing process takes place with direct water contact. Sieves are used to separate the washed grain from water. The wastewater from this process is contaminated with suspended solids and organic matter. Particulate matter in the air partially dissolves in the wastewater, increasing the organic load. The wetted seeds are transported using a bucket conveyor to storing silos.
e) Second washing process	The grain from wetted grain silos undergoes a second washing process before being fed to the stone millers.
f) Milling using stone millers	By weighing the cleaned wetted grain a predetermined quantity is passed to the milling stones. Theses millers include two large hard stones made of carborandum or quartz. Feed enters the mill through a center hole in one of the stones. It is distributed between the stone faces and ground while working its way to the periphery. A type of hammer mill is then used to obtain finer grains. The product is passed through silk sieves to separate flour. The coarse grains are recycled to a cylinder mill. Further sieving separates bran from flour. Stone millers will generate noise.

Note:

- *Check if an air vent is passed through the bucket elevators at the receiving station .*
- *Check the presence of a stack and cyclone at the intake.*
- *Larger amounts of wastewater will be generated as compared to the wet cleaning using cylinder or disc millers.*

Fig (3) Wet Process for Wheat Milling Using Stone Millers and Related Pollution Sources



2.3 Service Units: Description and Potential Pollution Sources

Medium and large size plants will have some/all of the following service and auxiliary units. These units can be pollution sources and therefore should be inspected and monitored. Fig (3) shows the various units with their corresponding raw materials and potential pollution sources.

2.3.1 Laboratories

Laboratories have an important role in the food industry, as they are responsible for:

- Testing raw materials, water, wastewater, air etc.
- Quality control of the different products and comparing the findings with the standard specifications for raw materials and final products.
- The measured parameters for quality control are physical properties such as humidity and cleaning grade, chemical composition such as ash content, glotein content, protein content, and bacteriological counts.
- The main chemical used for testing quality is alcohol and it used in small quantities.

2.3.2 Workshops and Garage

Large facilities have electrical and mechanical workshops for maintenance and repair purposes. Environmental violations could be due to:

- Noise
- Rinse water contaminated with lube oil

Pollution in the garage area will depend upon the services offered. The presence of a gasoline or diesel station implies fuel storage in underground or over the ground tanks that require leak and spill control plans.

Replacing lube oil implies discharge of spent oil to the sewer lines or selling it to recycling stations.

2.3.3 Storage Facilities

The specifications for the storage facilities depend on the stored material.

- Silos are used to store the raw wheat and different types of intermediate and final products.
- Products are packed in bags of predetermined weight.
- Alcohol is used in the lab in small amounts and is an inflammable substance.
- Fuel is used for the cars and delivery trucks. It is stored in underground or over ground tanks. The types of fuel usually used are gas oil (solar), and gasoline.

Potential pollution sources:

- Air pollution is, expected during the charging and discharging of silos
- Fuel and alcohol are inflammable and their handling, storage measures should be checked.

2.3.4 Wastewater Treatment Plants

Although a WWTP is a pollution abatement measure, it has to be inspected and monitored for potential pollution. Pollution may be due to malfunctioning or improper management. A grain milling facility using the wet cleaning method discharges wastewater, which is high in organic load, and total suspended solids. From time to time peak load will be discharged. The potential pollution sources are:

- Sludge which represents a solid waste problem
- Treated water could represent a water pollution problem if not complying with relevant environment laws.

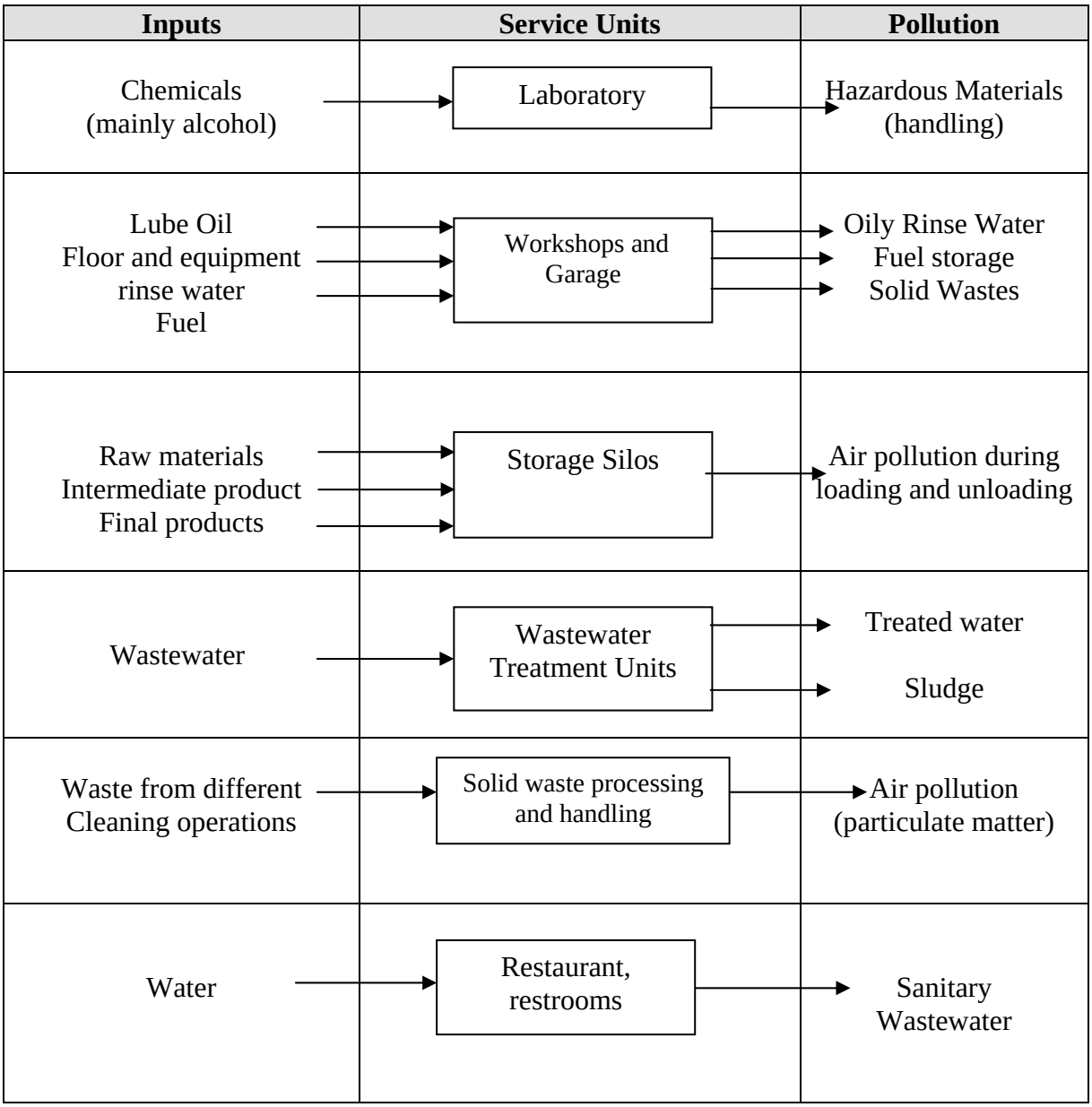
2.3.5 Solid Waste Processing and Handling

Many of the larger facilities have a pneumatic collection system that collects solid wastes from the different cyclones and feeds it to a crusher than to crushed waste silos. This operation can give rise to air emissions.

2.3.6 Restaurants, Washrooms and Housing Complex

The units will generate domestic wastewater as well as domestic solid waste (garbage).

Fig (4) Service Units and their Related Pollution Sources



2.4 Emissions, Effluents and Solid Wastes

Table (4) summarizes the major polluting processes, their outputs and the violating parameters.

2.4.1 Air Emissions

The milling industry generates dust and fine particles (flour, bran impurities) that cause air pollution. The expected violating parameter is the total suspended particulate matters, (PM10).

The major pollution load results from various sources:

- Emissions due to unloading in the pit and the malfunctioning of the cyclone at intake
- Defective enclosure of the bucket elevators and other conveying devices.
- The various sets of sieves throughout the operation.
- The inefficiency of the cyclones at the first cleaning and second cleaning phases.
- The inefficiency of the cyclone at milling section will generate flour particles.
- Pneumatic handling and collection of the solid waste from the various cleaning operations.

Table (4) Pollutants Per Process

MAJOR POLLUTING PROCESS	PROCESS INPUTS	PROCESS OUTPUTS	VIOLATING PARAMETERS	IMPACT
Receiving & Preparation	Raw Grain	Accepted grain	Particulate matters, mg/m^3	Air & Work Environment
Grain Storage & conveying	Grain	Grain	Particulate matters, mg/m^3	Air & Work Environment
First cleaning	Grain	Grain	Particulate matters, mg/m^3	Air , soil & Work Environment
Grain Washing (wet process)	Grain	Washed grain		
	Water	Wastewater	BOD, COD, TSS, TDS	Water
Tempering & Conditioning	Grain	Wetted grain		
	Water			
Second cleaning	Wetted grain	Wetted grain		Soil
Grinding	Conditioned grain	Mixed Products	Particulate matters, mg/m^3	Air & Work Environment
Screening	Milling Products	Milling Products	Particulate matters, mg/m^3	Air & Work Environment
Packaging	Products	Packaged Products	Particulate matters, mg/m^3	Air & Work Environment
WWTP	Process WW	Treated effluent	BOD, COD, TSS, Color	Water
		Sludge	TSS	Soil

2.4.2 Effluents

The polluted wastewater will be generated from facilities using the wet cleaning process. The sources of pollution are:

- Wash water at the cleaning section. The expected violating parameters are BOD, COD, TSS, TDS.
- Spent lube oil from garage and workshops if discharged to sewer, will give oily wastewater (O&G).

Typical effluent characteristics for Egyptian two wheat milling facilities: one using the dry processes and the other using the wet process are shown in table (5).

It is clear that the main impact will be due to high organic load. The effluents from the dry process can be discharged to the public sewer without violation, whereas effluents from the wet process are violating the limits set by law. Table (6) is based on the fact that for 1000 t of flour produced per day, 350 t/d of wastewater are generated from the wet process and about 30 from the dry process.

Table (5) Typical Chemical Analysis of Effluents from Two Milling Facilities

Parameter In Final Effluent	pH	BOD mg/1	COD mg/1	TSS mg/1	TDS mg/1	Oil & Grease mg/1
1. Wet process	7	614	1680	818	1769	1038
2. Dry process	7.5	80	154	94	311	nil

Table (6) Typical Organic Pollution Loads Per 1000 Ton Flour Produced

Final Effluent	Effluent Flow Rate, t/d	BOD kg/d	COD kg/d	TSS kg/d	TDS kg/d	Oil & Grease kg/d
1. Wet process	350	214.9	588	286.3	619.1	363.3
2. Dry process	30	2.4	4.62	2.82	9.33	-

2.4.3 Solid Wastes

The main sources of solid wastes are during the different cleaning processes (broken grain and foreign materials). This waste is transported to a silo to be disposed of in a dumping site.

The biological wastewater treatment plant, if present, also generates sludge.

There are no hazardous wastes discharged from the plants.

2.4.4 Noise

Noise is generated at different levels in different places in the milling industry:

- First cleaning phase (scourer, destoner and cyclones)
- Second cleaning phase (scourer and cyclones)
- Grinding process (millers)
- Screening process

2.5 Characteristics Specific to the Milling Industry

Proper inspection and monitoring of the grain milling industry should take into consideration the following aspects:

- Production lines are operated on a continuous basis.
- Wastewater is generated only if the wet cleaning process is used.
- The major pollution impact is on air. Ambient and work environment limits could be violated.
- Air pollution loads depend on the type of equipment used, the installation of pollution abatement devices and varies with the type of wheat used. American and European wheat is cleaner than Australian and Egyptian wheat. The last two types will therefore generate more pollution.

3. Environmental and Health Impacts of Pollutants

3.1 Impact of Air Emissions

Particulate matters Recent epidemiological evidence suggests that much of the health damage caused by exposure to particulates is associated with particulate matters smaller than 10µm (PM_{10}). These particles penetrate most deeply into the lungs, causing a large spectrum of illnesses (e.g. asthma attack, cough, bronchitis

3.2 Impact of Effluents

Spent lube oil from garage and workshops could be a cause for concern if discharged into the sewer system.
The organic material in wastewater stimulates the growth of bacteria and fungi naturally present in water, which then consume dissolved oxygen.
The environmental impact of the wastewater depends on the receiving water body. The Ministry of Irrigation has set limits for the pollutants in the wastewater discharged into agriculture canals and drains as well as the Nile river for their detrimental effect on agriculture (Decree 8/1983). The parameters of relevance to the milling industry are BOD, COD, TSS, SS, Oil & grease.
Discharge of polluted wastewater high in BOD into lakes and sea can cause eutrification and adversely impact bio-diversity.

3.3 Environmental Impact of Solid Wastes

Solid waste is mainly impurities present with wheat such as dust and foreign food grains. It is collected and stored in silos for further disposal sites. Some smaller facilities accumulates the waste is piles until removed to dumping sites. These piles can cause air pollution since they are in a very fine state.
Scrap from the garage and workshops is collected and sold. No impacts are expected.
Sludge from the wastewater treatment plant should be dried before disposal to landfills.

3.4 Health Impact of Noise

Exceeding the limits set by the law for noise level and the exposure period may result in loss of hearing.

4. Egyptian Laws and Regulations

There are a number of laws and regulations that address the different environmental violations. The following are the laws applicable to the grain milling industry.

4.1 Concerning Air Emissions

There are a number of stacks at the wheat milling facilities. They are generally present at the intake, at the first cleaning operation, at the second cleaning operation and the milling operation. Articles 34 and 35 of law 4/1994 and articles 34, 35, 36 and annexes 5 of the executive regulations, regulate the discharge. Table (7) presents the limits for air quality. The limit for stack emission of particulate matter is given in table 1 of annex 6 for many industries. For unlisted industries it is 200 mg/m^3.

Table (7) Limits of Pollutant in Ambient Air

Pollutant	Maximum Limit, $\mu g/m^3$	Duration of Exposure
Total Suspended Particulate	230	24 hrs
	90	1 year
Particulate Matter (PM_{10})	70	24 hrs

4.2 Concerning Effluents

Limits for pollutants in wastewater vary depending on the type of receiving water body. The parameters that should be monitored and/or inspected are BOD, COD, pH, TSS, TDS, Oil and Grease.
Table (8) presents the permissible limits for discharges to the different recipients (sea, Nile, canals, agricultural drains, public sewer) according to the different relevant laws.
Spent lube oil has a negative impact on water and soil and therefore its disposal should be monitored/inspected. A record should be kept for this purpose.

Table (8) Egyptian Environmental Legal Requirements for Industrial Wastewater Dischrges

Parameter (mg/1 unless otherwise noted)	Law 4/94: Discharge Coastal Environment	Law 93/62 Discharge to Sewer System (as modified by Decree 9/89)	Law 48/82: Discharge into :			
			Underground Reservoir & Nile Branches/Canals	Nile (Main Stream)	Drains	
					Municipal	Industrial
BOD (5day,20 deg.)	60	<400	20	30	60	60
COD	100	<700	30	40	80	100
pH (Grease)	6-9	6-10	6-9	6-9	6-9	6-9
Oil & Grease	15	<100	5	5	10	10
Temperature (deg.)	10C>avg. temp of receiving body	<40	35	35	35	35
Total Suspended Solids	60	<500	30	30	50	60
Settable Solids	__	<10	__	20	__	__
Total Dissolved Solids	2000	__	800	1200	2000	2000
Chlorine	__	<10	1	1	__	__

4.3 Concerning Solid Wastes

A number of laws address solid waste management. The following laws apply to scrap and sludge from the WWTP:

- Law 38/1967, which addresses public cleanliness, regulates the collection and disposal of solid wastes from houses, public places, commercial and industrial establishments.
- Ministry of Housing, Utilities and Urban Communities (MHUUC) decree No. 134 of 1968, which provides guidelines from domestic and industrial sources, including specifications for collection, transportation, composting, incineration and land disposal.
- Law 31/1976, which amended law 38/1967
- Law 43/1979, the Law of Local administration, which provided that city councils are responsible for "physical and social infrastructure", effectively delegating responsibility for infrastructure functions.
- Law 4/1994, article 37 of the law and 38 of its executive regulations regulates the incineration of solid waste.

4.4 Concerning Work Environment

Two types of violations of work environment regulations, are encountered:

Noise:

Due to the mechanical nature of the operations that take place in the milling industry, noise is generated at different levels in different places. Usually noise limits are only slightly exceeded at the different operations. Near heavy machinery: noise is regulated by article 42 of Law 4/1994, article 44 of the executive regulations and table 1, and annex 7. Tables 2 and 3 of annex 7 regulate exposure period.

Workplace Air Quality

- The maximum permissible limit for the concentration of total suspended particulate matter in workplace is 10 mg/m^3. Particulate matter causing suffocation (PM_{10}) is limited to 5 mg/m^3.
- Ventilation is regulated by article 45 of Law 4/1994 and article 47 of the executive regulations.
- Work environment conditions are addressed in Law 137/1981 for Labor, Minister of Housing Decree 380/1983, Minister of Industry Decree 380/1982

Workplace Safety

- Providing fire-fighting equipment is essential at the millers. The presence of fine flour particles in contact with the hot milling surface can generate a fire.

4.5 Concerning Hazardous Materials and Wastes

Law 4/1994 introduced the control of hazardous materials and wastes. The grain milling industry does not generate any hazardous wastes.

The hazardous chemicals used in the lab and the fuel for the boilers, fall under the provisions of Law 4/1994. Articles 29 and 33 of the law makes it mandatory for those who produce or handle dangerous materials in gaseous, liquid or solid form, to take precautions to ensure that no environmental damage shall occur. Articles 25, 31 and 32 of the executive regulations (decree 338/1995) specify the necessary precautions for handling hazardous materials. Storing of fuel for the boilers is covered by the Law 4 as hazardous material There is no explicit articles in Law 4/1994 or in decree 338/1995 (executive regulations), regarding holding a register for the hazardous materials; article 33 is concerned with hazardous wastes. However, keeping the register for the hazardous materials is implicit in article 25 of the executive regulations regarding the application for a license.

4.6 Concerning the Environmental Register

Article 22 of Law 4/1994 states that the owner of the establishment shall keep a register showing the impact of the establishment activity on the environment. Article 17 and Annex 3 of the executive regulations specify the type of data recorded in the register.

The emergency response plan is also part of the environmental register as stated in part 4.5.

5. Pollution Abatement Measures

This section deals with pollution abatement in the three media air, water and soil. Three types of interventions will be considered:

- In-plant modifications, which are changes that are performed in the plant to reduce pollutant concentrations in streams through recovery of materials, segregation and/or integration of streams, reducing the flow rate of the wastewater streams that need further treatment to reduce the hold-up of the required WWTP.
- In-Process modifications, which are changes performed on the process such as the introduction of newer technology, substitution of a hazardous raw material, performing process optimization and control.
- End-of-pipe (EoP) measures, which involve treatment of the pollutant or its separation for further disposal. Whereas in-plant and in-process modifications usually have an economic return on investment, end-of-pipe measures will be performed for the sole purpose of compliance with the laws without economic

Egyptian Environmental Laws do not require water and energy conservation measures. These measures have been considered in this manual since resource depletion and hence conservation is a worldwide-recognized environmental issue that could be implemented in Egypt in the near future. Water conservation measures can lead to higher concentrations of pollutants in the effluent Both energy and water conservation measures will provide both financial and economic benefits.

The term Cleaner Production (CP) refers to the same concepts of pollution reduction through in-process, in-plant and resource conservation, in contradistinction to end-of-pipe treatment. In many cases, the adoption of CP can eliminate the need for (EoP) treatment.

The following CP and EoP measures have been identified for the grain milling industry.

5.1 Air Pollution

In-plant modifications

- Install suction equipment in the buildings to collect and dispose of the accumulated dust and flour to improve workplace conditions.
- Repair and maintain all enclosures of conveying equipment.
- Repair and replace all bags that receive the cyclone dust.
- Tuning the fans that generate induced draft in the stacks. Increasing the fan loading increases the air flow rate for the same weight of emitted dust and therefore dust concentration decreases.
- Addition of dust collection systems. Bag filters are usually recommended for Egyptian milling industry for their lower price ease of maintenance and operation.

5.2 Water Pollution Abatement Measures

In-process modifications	Replace the wet process by the dry process eliminates the need for a wastewater treatment plant.
End-of-pipe treatment	Because of the typically high content of suspended solids, COD and BOD in the grain milling industry waste-streams, end-of-pipe treatment frequently involves settling tanks and biological treatment.

5.3 Abatement Measures for Solid Waste Pollution

Dust and flour particles	Installation of a pneumatic system to collect waste from the various cyclones and dust collecting equipment to be stored in silos for subsequent disposal into disposal sites.
Scrap	Scrap is collected and sold.
Sludge	Effluent treatment processes generate solids. On average 70-80% of the original carbon is converted to solids. Raw sludge is saturated with bound water, should be de-watered and disposed of in sanitary landfills.

6. Industrial Inspection

The inspection of the grain milling industry will follow the procedures described in the General Inspection Manual GIM (EPAP 2002). This chapter presents a summary of the inspection process regarding the purpose and scope of various types of inspection, and the proposed inspection procedure for the Grain Milling Industry.
The overall purpose of inspections is to enforce environmental laws. Table (9) lists the various types of inspections and the objectives that have to be fulfilled for each type.

Table (9) The Different Types of Inspections and their Objectives

Inspection Type	Objectives
Site Inspection	
1. Comprehensive	Evaluate compliance status regarding all aspects of Law 4
2. Specific	Evaluate compliance status regarding some aspects of Law 4 Review special conditions set by EEAA in EIA studies. Investigate complaints
3. Follow-up	Check environmental register and implementation of compliance measures
Inspection Campaign	
1. Geographic	Check pollution sources to specific receiving media
2. Sector specific	Check aspects relevant to specific sector

As evident from the above table, comprehensive inspection deals with all aspects of environmental laws and therefore is considered in this manual. Other inspection types can be tailored accordingly.
Developing an inspection strategy and quarterly and/or monthly plans are the responsibility of the inspectorate management. Developing site-specific inspection plans for carrying out the scope of work that fulfills inspection objectives is the responsibility of the inspection team. Planning for inspections is presented in more detail in the General Inspection Manual, GIM (EPAP-2002).

7. Inspection Planning at the Inspectorate Level

The responsibilities of the inspectorate management regarding the specific inspection are to state clearly, in writing, the type of inspection and related objectives as well as the time schedule necessary to carry out inspection. The inspectorate management is also responsible for providing preliminary information about the facility, inspection tools, and logistics.

7.1 Activities Characteristic to Grain Milling Industry

Taking the comprehensive inspection as an example, the objectives stated in Table (9) dictate the activities required for covering all aspects of compliance with environmental laws and regulations. The required personnel, equipment and logistics are determined accordingly.

The SIC code for the grain milling includes starch and animal fodder production. Therefore, there is no way to determine from this code the number of small grain milling facilities. However small facilities are expected to be using primitive equipment and generate negligible air pollution. These facilities usually use wetted grain brought in by farmers for milling. No wastewater is expected at these facilities.

Medium and large facilities use either the dry or the wet process.
The main problem of using the dry process is the ambient air pollution, which affects the health of the residents in the area. Therefore efficient cyclones are needed to overcome this problem. On the other hand, the problem of using the wet process is the wastewater generated from grain washing and conditioning. This wastewater is high in BOD and in some cases a wastewater treatment plant is needed. Large facilities are expected to have most service units.

When planning for inspection, the inspectorate management should take into consideration the pollution load generated and not only pollutant concentration.

- Smaller facilities generate less pollution load (SQG)
- Medium and large facilities using the wet process will generate polluted wastewater, in addition to the usual air pollution problems associated with the milling industry
- Air pollution problems have a higher priority than wastewater pollution problems because they are health related, having direct health impact on the respiratory system.
- Some medium size facilities might not be financially capable to implement pollution abatement measures. Enforcement should be linked to incentives and long term planning

Note to inspectorate management:
Usually small and medium size facilities cannot afford the cost of biological treatment. Repeated inspections and fines would not solve the problem.

Inspectorate management should have a clear plan on how to proceed with these facilities.

7.2 Providing Information About the Facility

Chapters (2-7) present the technical aspects regarding the grain milling industry, its pollution sources and relevant environmental laws. Information regarding compliance history related to other inspecting parties (irrigation inspectors, occupational health inspectors, etc.) can be helpful in anticipating potential violations and preparing necessary equipment. Other sources of information can be found on the Internet at the following sites:

- http://www.tei.or.th/bep/ctic/danced.cfm
- http://www.lu.se/IIIEE/research/eastern_europe/lithuania/cp_kaunas_1993-95.html
- http://www.emcentre.com/unepweb/publication/food.html
- http://www.emcentre.com/unepweb/tec_case/food_15/house/casename.shtml

7.3 Providing Resources

The required personnel, tools and equipment depend on the method and technology of the facility to be inspected. The inspection team leaders, in coordination with the inspectorate management, are responsible for assessing the inspection needs. The number of inspectors required depends on the size of the facility and the planned activities. Usually the team members are split and assigned different tasks during the field visit to allow the required activities to be performed in parallel. Each task is rotated among the inspectors to diversify their experience.

Wet process using stone millers	These grain milling facilities will probably use the obsolete milling technology by stone. Most of the service units described in section (2.3.) will not be present. Grains are washed with water before milling. Wastewater is generated in very large amounts. The major pollution problem would be the water and air pollution.
Wet process using disc or cylinder millers	These facilities could have a number of service units depending on the size of the facility. Wastewater is generated in large amounts but amount of added water can be controlled. The major pollution problem would also be the water and air pollution. The size of the inspection team for these facilities depends on the production capacity of the facility, which determines the number of production lines.
Dry process using disc or cylinder millers	In this modern process, water is only added for tempering and conditioning purposes. The major pollution problem would be the air pollution.

Planning for the comprehensive multi-media inspection will require several inspectors, sampling equipment to provide proper samples for analysis as well as measuring devices. A lab technician will also be needed. The inspectorate management will provide an inspection checklist tailored to the specific facility and based on the checklist presented in Annex 1.

8. Preparation for Field Inspection (Inspection Team)

As presented in the General Inspection Manual, GIM (EPAP-2002), tasks necessary for preparation for field inspection, are:

- Gathering information about the specific facility to be inspected
- Preparing of the inspection plan
- Preparing the checklists

This manual presents the case of a comprehensive multi-media site-inspection of a large grain milling facility since it represents the highest level of inspection complexity. Tasks for carrying out less complicated inspections can be easily deduced.

8.1 Gathering and Reviewing Information

The inspection team should review the general information prepared for the milling industry (chapters 2-5) and then check - if possible - what production lines and service units are present at the targeted facility. In addition to the required information listed in Annex (C) of the General Inspection Manual, GIM (EPAP-2002), it is important at this stage to determine the following:

- The type of receiving body for the industrial wastewater and review relevant Egyptian laws (Chapter 4).
- The scope of inspection and related activities based on the type and objectives of inspection required by the inspectorate management.
- The potential pollution hazard as addressed in section 2.4, and accordingly, defines measurement and analyses needs.
- The characteristics of the grain milling industry as presented in section 2.5, and their implications on the inspection process of the targeted facility.

Note to inspector:

- *Some facilities dilute its polluted wastewater with water before discharging to sewer. Degree 44/2000 explicitly prohibits this behavior.*

8.2 Preparation of the Inspection Plan

An example of an inspection plan is included in Annex (E) of the General Inspection Manual GIM (EPAP-2002). The plan should take into account the following:

- For large grain milling facilities, the inspection team could be divided into smaller groups. Each group will be responsible for inspecting a number of production lines and service units.
- At the beginning of the field visit, the inspection team should check the environmental register for completeness using the checklist provided in Annex (G) of the General Inspection Manual, GIM (EPAP-2002).
- The results of the analyses included in the environmental register should be checked at the end of the field visit (if suspicion arises about them) and copies of these results should be obtained.

Notes to inspector:

- *Since the final effluent is expected to be in violation of environmental laws, sampling should be planned (in case of a facility using the wet process).*
- *There is no need for composite sample since washing, wetting are operated continuously during the shift.*
- *Make sure that the polluting production lines are in operation since some factory management resort to halting the polluting lines during the inspection.*

8.3 Preparation of the Required Checklists

The checklist for inspecting the grain milling industry is presented in Annex (1) of this manual. The checklist has been prepared in such a way that it starts with general information about the facility and its operation. Separate checklists are then filled for each production line/service unit independently and cover all relevant environmental aspects and media. The inspection team will compile the checklists relevant to existing production lines and service units in the targeted facility.

The development of the checklists goes through the following steps:

- Draw the block flow diagrams for the production lines with their pollution sources as presented in tables 4-8. Similar tables can be developed for other grain milling production lines that were not covered by this manual.
- Identify the areas of possible non-compliance and the parameters that need checking. For example, noise should be checked near the compressors and temperature and humidity where steam leaks occur.
- Identify what to observe, ask and/ or estimate that can convey information about pollutants. For example:
  - The type of detergent or antiseptic determines the contaminant in the wash streams,
  - Oily effluents from production lines or oily cooling water indicates the contamination of the plant effluent with oil

Note to inspector:
Law 4 does not specify standards for effluent from production lines but only for final disposal points. However, effluent quality from production lines is an important indicator of the final discharge

8.4 Legal Aspects

As evident from chapter 2, a wet process using stone millers is expected to be in violation of several environmental laws, specifically with respect to wastewater if no treatment is performed. A dry process using cylinder or disc millers is expected to be violating laws concerning ambient and workplace air

pollution as well as noise pollution. The inspection team should be prepared for legally establishing such a violation.

9. Performing the Field Inspection

9.1 Starting the Field Visit

The General Inspection Manual GIM (EPAP, 2002) describes the procedures involved for entering an industrial facility. The inspector's attitude and behavior are very important from the start and will dictate the factory's personnel response to the inspection tasks.

Note to inspector:

- *It is better at this stage not to ask direct questions about the real amount of solid waste generated from screening. Interviewing the workers on-site in an indirect manner can give better results.*
- *Check the results of effluent analyses, time and place of sampling. If suspicious make your own analyses.*
- *Check the type of pesticides or rodenticides used and check for its presence in air or water.*
- *Get a sketch of the factory layout with sewer lines and final disposal points.*

9.2 Proceeding With the Field Visit

Information gathered during the facility tour is dependent on interviews of facility personnel and visual observation. Annex (H) in the General Inspection Manual, GIM (EPAP-2002) presents some useful interviewing techniques.

For wet process, using the facility layout, start by checking the final disposal points and the various plants and/or service units connected to each point. This will determine where and how to take the effluent samples. Visual observations about the condition of the sewer manholes should be recorded. In some facilities the discharge to the receiving body is performed through a bayara (cesspit), septic tanks or holding tanks. If the holding tank is not properly lined, contamination of the underground water could occur.

Note to inspectors:

- *Cesspits, septic tanks and holding tanks are a form of pre-treatment that generates settled sludge. Check:*
- *The presence of accumulated sludge and related hygienic conditions*
- *The disposal of this sludge*

For both wet and dry processes, note your visual observations about air quality, dust and particulate collection system, and ventilation system.

Inspection of the production lines should start with the feeding of raw materials and end with the product packaging and storage. Referring to Figures 1 to 3, check the following:

Production Lines

Dry Process Production line	
Receiving and Testing Raw Grain	- Are there any emissions of particulate and dust during pit loading? - Check for the presence of stacks at the intake - Notice the quality of the exhaust from these stacks - If you notice the use of out-of-spec raw material, notify relevant health inspection authorities.
Conveying, Screening Storage of Raw Grain	- Are there any dust or particulates emitted during this process? - Check for the use of insecticides and rodenticides. - Check the ventilation system of the storage silos. - Are the conveyors enclosed?
First Cleaning Phase	- Are there any particulate matter emitted? - What happens to solid waste produced? - Check for the effectiveness of the cyclones? - Check for the presence of ambient air analysis? - Measure noise.
Tempering and Conditioning	- What happens in case excess water is added?
Second Cleaning Phase	- What happen to the solid waste produced ? - Check for the effectiveness of the cyclone separating the seed shucks - Check the conveyors (closed or opened). - Measure noise.
Milling Using Cylinder	- Check for noise generated during milling, take measures if necessary. - Check that the millers are enclosed.
Wet Process production line	
Receiving the Raw Grains and First Cleaning Phase	- Are there any emissions of particulate and dust during pit loading? - Check for the presence of stacks at the intake - Notice the quality of the exhaust of these stacks - Are there any particulate matter and dust produced? - What happen to the solid waste generated? - Check the quality of received grains (not necessary unless obvious). - Check for the use of insecticides and rodenticides.

Grain Washing	-	Check for the color of the wastewater produced from this unit?
	-	Check for the loss of raw material in the generated wastewater, it is expected that wastewater is high in suspended solid and organic matter
	-	What is the amount of water used for grain washing?
Second Washing Process	-	What is the amount of waster used?
	-	Quantify the amount of wastewater produced?
Milling by using Stone Miller	-	Check for noise
	-	Check for the presence of air pollution in the work place
For all lines		
	-	Check for losses during packaging and for the presence of spill prevention measures.
	-	How is solid waste managed? Is it washed down to the sewer? This housekeeping practice increases the pollution load in the effluents.
	-	Is the sewer system in the plants made of open gutters covered with a grill or closed pipes with drains? Open gutters contribute to increase of suspended solid in wastewater.
	-	Check the presence of any oil or grease on the floor or with the products.

Service Units

Garage, and Workshops	-	Check for noise and take measurements if necessary.
	-	Check solid waste handling and disposal practices.
	-	Check for spent lube oil disposal method. Ask for receipt if resold.
Storage facilities	-	Check spill prevention and containment measures for storage
	-	Check for insecticides and rodents
	-	Check the ventilation system
WWTP	-	Check for sludge accumulation and disposal.
	-	Analyze the treated wastewater.

Effluent analysis

Receiving body	-	The nature of the receiving body determines the applicable laws.
	-	Check if effluent discharge is to public sewer, canals and Nile branches, agricultural drains, sea or main River Nile.
	-	Accordingly, define applicable laws, relevant parameters and their limits.
Sampling	-	A composite sample must be taken from each final disposal point over the duration of the shift or a grab sample at peak discharge. Each sample will be analyzed independently.

- According to legal procedures in Egypt, the effluent sample is spilt and one of them is sealed and kept untouched.

9.3 Ending the Field Visit

At the end of the field inspection a closing meeting is to be held with the facility's representatives and a legal minutes of meeting aught to be written stating information pertaining to sampling location and time. Violations of work environment regulations should also state location and time of measurements. Other visual violations such as solid waste accumulation, hazardous material and waste handling and storage, and material spills should be photographed and documented. The facility management should sign the legal minutes of meeting.

Note to inspector:

- *The less certain the team leader is about a specific violation the more reason not to discuss it at the closing meeting.*

10. Conclusion of the Field Inspection

The activities performed during the site inspection are essential for preparation of the inspection report, for assessing the seriousness of the violations, for pursuing a criminal or civil suit against the facility, for presenting the legal case and making it stand in court without being contested, and for further follow-up of the compliance status of the facility.

10.1 Preparing the Inspection Report

An example of an inspection report is included in Annex (K) of the General Inspection Manual, GIM (EPAP-2002). The inspection report presents the findings, conclusions, recommendations and supporting information in an organized manner. It provides the inspectorate management with the basis for proposing enforcement measures and follow-up activities.

10.2 Supporting the Enforcement Case

Many issues may be raised and disputed in typical enforcement actions. Enforcement officials should always be prepared to:

- Prove that a violation has occurred. The inspector must provide information that can be used as evidence in a court of law.
- Establish that the procedures were fairly followed.
- Demonstrate the environmental and health effect of the violating parameter.

10.3 Following-Up Compliance Status of Violating Facility

After performing the comprehensive inspection and detecting the violations the inspectorate management should:

- Decide on the sanctions and send the legal report to the judicial authority.
- Plan routine follow-up inspections. This type of inspection focuses on the violating source and its related pollution abatement measure. Self-monitoring results are reviewed during the visit.
- Follow-up the enforcement case (legal department)

Annex (1)

Inspection Checklist for Milling Facility

Ministry of State for Environmental Affairs
Egyptian Environmental Affairs Agency
Basic Data Sheet

Date of visit:……. Visit number:…….

Facility name:……

Commercial name:…….

Licensed Activity:……... Days off:……

Legal status:……

Address of facility

Area of facility:…… Governorate:…….

City:…… Zone:…….

Phone no. :…… Fax no.:…….

……... …….

Year of operation :…….. Postal code:……

The Facility Representative:……..

Environmental management representative:…….

Chairman/Owner:……

Address of Administration

e-mail:……..

Phone no. :…… Fax no.:…….

……... …….

The industrial sector:……

No. of male employees: …… No. of female employees:……

Do they work in production …….

Total no. of employees: …….

Number of shifts/day:…….……shifts/day

Duration of shift:……..…hrs/shift

Environmental register:…….. Hazardous waste register:…….

EIA:…….. Self monitoring:…….

Nature of Surrounding Environment

Industrial ❑	Coastal ❑	Coastal/ Residential ❑
Industrial/ Residential ❑	Residential ❑	Agricultural ❑
Agricultural/ Industrial ❑	Agricultural/ Residential ❑	Desert ❑

Ministry of State for Environmental Affairs
Egyptian Environmental Affairs Agency
Basic Data Sheet

Power Consumption

Electricity ❑ Fuel ❑

Electric power: ……...kWh/(day-month-year)

Type of fuel	Fuel consumption	
Mazot	…….	Ton/(day-month-year)
Solar	…….	Ton/(day-month-year)
Natural gas	…….	Ton/(day-month-year)
Butagas	…….	Ton/(day-month-year)
Other ….	…….	Ton/(day-month-year)

The GPS (Global Positioning System) reading for Gaseous Emissions

1- LAT(Latitude):..……. LONG(Longitude):…….
2- LAT(Latitude):…… LONG(Longitude):…….
3- LAT(Latitude):…… LONG(Longitude):…….

Production

Product	Quantity/ (day-month-year)
……	……
……	……
……	……
……	……
……	……
……	……
……	……
……	……
……	……
……	……
……	……

Water Supply

Artesian well ❑ Municipal water ❑ Treated water ❑ Nile water ❑

Canal water ❑ Other…….. ❑

Ministry of State for Environmental Affairs
Egyptian Environmental Affairs Agency
Basic Data Sheet

Water Consumption

Amount of water consumed in operation (day-month-year):

Process ……..m^3/ Boilers……..m^3/

Domestic usage……....m^3/ Cooling……....m^3/

Other…….. …….m^3 /

Total amount of water consumed (day-month-year)…… ……..m^3/

Type of waste water:
Industrial ❑ Domestic ❑ Mixed ❑

Wastewater Treatment:
Treated ❑ Untreated ❑

Type of Treatment:
Septic tanks ❑ pH adjustment ❑ Biological treatment ❑
Chemical treatment ❑ Tertiary treatment ❑

Amount of treated water/ (day-month-year)……..m^3 /
Amount of waste water/(day-month-year)…….m^3 /

Final wastewater receiving body:
Nile ❑ Lakes (fresh water) ❑ Drain ❑
Groundwater ❑ Public sewer system ❑ Canals❑
Agricultural Land ❑ Desert Land ❑ Other……❑

The Global Positioning System(GPS) reading for final disposal
1-LAT(Latitude):……. LONG(Longitude):…….
2-LAT(Latitude):……. LONG(Longitude):…….

Engineering Drawings for the Facility
Gaseous emissions map Yes ❑ No ❑

Sewer map: Domestic ❑
Industrial ❑
Mixed ❑
Factory Layout ❑
Production process flow diagram ❑

Ministry of Environmental Affairs-EEAA
30 Misr Helwan Agricultural road - Maadi- Cairo 11728
Tel. (02)5256452-(02)5256453 Ext.8849 Fax(02)5256490

Raw material consumption

No.	Trade name	Scientific name	CAS no.	UN no.	Physical state	Type of container	Amount	Classification	
								Hazardous	Non-Hazardous

Inspection Team Member:

Team member	Position

Date: Inspector signature:

Annex (1- B)

Inspection Checklist for Hazardous Materials and Wastes

Annex (F-2)
Inspection checklists for hazardous materials and wastes for a facility

1. Hazardous materials (to be filled in case the facility uses hazardous materials) [1]

Fill the following table according to the codes below

Hazardous material	Amount	Field of utilization	Storage method[2]	Method of disposal of the containers	Conformity of containers to specifications[3]	Presence of MSDS[4]

[1] To be filled from the list of used raw material and chemicals according to the hazardous material list issued by the Ministry of Industry, checking the presence of a valid license for handling

[2] According to law 4/1994, does the storage area have:
S_1: alarm, precaution and fire fighting system? S_2: first aid procedures?

[3] Check containers' compliance with law4/1994:
C_1: sealed and don't cause any threats while handling C_2: unaffected with along storing period
C_3: labeled with hazard and toxicity signs C_4: labeled in Arabic (production, origin, utilization instruction)
C_5: labeled with its content, the effective substance and its concentration

[4] Material safety data sheet

2. Hazardous wastes (to be filled in case the facility generates hazardous wastes)[1]

Fill the following table according to the codes below										
Hazardous waste	**Source**	**Amount generated/ year**	**Storing method**			**On-site treatment and disposal**			**Transportation method**	**Presence of documents indicating off-site disposal[6]**
			Method of storage inside the facility	**Compliance of containers' specifications and labels with law 4/1994[2]**	**Compliance of storage areas with law 4/1994[3]**	**Treatment[4]**	**Final disposal[5]**	**Compliance of treatment and disposal with law 4/1994**		

[1] Hazardous wastes can be identified according to law 4/1994 and by using the hazardous wastes list of the Ministerial decree no.65 for 2002 as refrence

Is there a hazardous wastes register? Yes ❑ No ❑

[2]Does the facility take into consideration that the storage containers should be:
C_1: with sealed covers to protect the container from rain water and dust and to prevent any wastes leakage during storage and/or transportation
C_2: constructed or lined by impermeable material which doesn't react with the contained material
C_3: of suitable capacity C_4: labeled

[3] Specification of storage area: determining specified locations for storage of hazardous wastes where safety conditions are set up to prevent the occurrence of any harm to the public or to those persons exposed to the wastes

[4] Which of the following methods are used by the facility for the treatment of hazardous wastes?
N_1: biodegradation N_2: incineration N_3: physical or chemical treatment

[5] Which of the following methods are used by the facility for the hazardous wastes final disposal?
F_1: land filling in specially engineered landfill F_3: other (specify)…….

[6] Contracts with wastes' contractors and receipts.

Annex (1- C)

Inspection Checklist for Production Lines and Service Units

Checklist for Dry Process

1. General	
1.1 The housekeeping status Floor condition Wash water leaks Piling of solid waste	....
1.2 Make sure the all units of the production line are operated	.....
1.3 Type of millers	☐ Stone ☐ Cylinder ☐ Disc
1.4 Type of grains	☐ Wheat ☐ Corn ☐ Other
1.5 Type of products	☐ Flour ☐ Bran ☐ Semolina ☐ Other
1.5 Amount of raw material processed per day and per shift	....
2. Status of the Work Environment	
2.1 Do you see dust and particulate emissions? <u>if yes</u> Is there a ventilation system in place <u>If yes</u> Is the ventilation system operating	☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No
2.2 Does the facility have noise records? <u>If not and/or suspicious,</u> Make measurements and check exposure time.	☐ Yes ☐ No
2.3 Is the facility using insecticides or rodenticides? <u>If yes</u> Check if they are internationally banned if not check for their presence in wastewater and air?	..... ☐ Yes ☐ No .....

3. Status of Effluents (Wastewater)	
3.1 Check the grain conditioning during operation Is there a containment measure for water loss? Does management record the percentage loss? <u>If yes</u> What is the percentage?	☐ Yes ☐ No ☐ Yes ☐ No .....

Checklist for Wet Process

1. General	
1.1 The housekeeping status Floor condition Wash water leaks Piling of solid waste	....
1.2 Make sure the all units of the production line are operated	.....
1.3 Type of millers	☐ Stone ☐ Cylinder ☐ Disc
1.4 Type of grains	☐ Wheat ☐ Corn ☐ Other
1.5 Type of products	☐ Flour ☐ Bran ☐ Semolina ☐ Other
1.6 Amount of raw material processed per day and per shift	....
2. Status of the Work Environment	
2.1 Do you see dust and particulate emissions? <u>if yes</u> Is there a ventilation system in place <u>If yes</u> Is the ventilation system operating	☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No
2.2 Does the facility have noise records? <u>If not and/or suspicious,</u> Make measurements and check exposure time.	☐ Yes ☐ No
2.3 Is the facility using insecticides or rodenticides? <u>If yes</u> Check if they are internationally banned if not	..... ☐ Yes ☐ No .....

check for their presence in air?	
2.4. Are there records for humidity and temperature at the grain drying and conditioning operation? If not and/or suspicious, Make measurements	☐ Yes ☐ No
3. Status of Effluents (wastewater)	
3.1 Check the grain washing operation and notice the amount of grain loss in WW Does management record the percentage grain loss ? If yes What is the percentage ?	..... ☐ Yes ☐ No ....

Checklist for Garage

1. General	
1.2 Is there any detergent or solvent used for washing equipment parts, trucks, floor,….etc	☐ Yes ☐ No
1.3 What is the amount of oil and grease used per day?	.....
1.4 What is the amount of spent lube oil produced per day ?	.....
1.5 How does the facility dispose of the spent oil ?	.....
2. Status of the Effluent	
2.1 What is the amount of wastewater produced ?	
2.2 Do you observe any oil / foams / solid matter in the inspection manhole ?	☐ Yes ☐ No

Checklist for Workshops

1. Status for the Effluent	
1.1 What is the amount of wastewater produced ? 1.2	.....
1.2 What is your visual observation for the inspection manhole of the workshop ?	.....
2. Status of solid waste	
2.1 What is the amount of solid waste produced	.....
2.2 How does the facility get rid of the solid waste produced ?	.....
3. Status Of the Work Environment	
3.1 Are there any noise in work place If yes Are there any measurements for noise If not Perform measurements	☐ Yes ☐ No ☐ Yes ☐ No

Check list for Laboratories

1. General	
1.1 List the chemicals and materials used in the laboratories	....
2. Status of the work Environment	
2.1 Are there any odor/ gases/noise in the work environment	☐ Yes ☐ No
3. Handling of Hazardous Material	
3.1 Inspect storage of hazardous material. Is it in compliance with the requirements of law 4	☐ Yes ☐ No

3.2 Are there any first aid measures in place	☐ Yes	☐ No

Checklist for Wastewater Treatment

1. General	
1.1 What is the capacity of WWTP	.....
1.2 Specify the units included in WWTP :	
Pumping station	☐ Found ☐ Not found
Equalization tank	☐ Found ☐ Not found
Aeration tank (ditch or channel)	☐ Found ☐ Not found
Final sedimentation tank	☐ Found ☐ Not found
Sludge thickening tank	☐ Found ☐ Not found
Sludge drying	☐ Found ☐ Not found
Others	.....
1.3 List any chemical and their quantity used for wastewater treatment	....
2. Status of Effluent	
2.1 Are there analyses for the effluent If not Make your own	☐ Yes ☐ No
2.2 are the results of the analysis included in the environmental register	☐ Yes ☐ No
3. Status of Solid Waste	
3.1 Determine the sludge disposal method *Note : It can be use in liquid or dry form, in agriculture*	.....
If a third party is involved in disposal, get documents for proof	☐ Found ☐ Not found Comment .....