5 Guidelines to Improve Industrial Waste Management in PIM

5.1 Guideline Objectives and Composition

5.1.1 Guideline Objectives

The aim of the guidelines is to support the Master Plan objective to "establish an appropriate industrial waste management system in the Industrial Pole of Manaus (PIM)". To achieve this objective, the 3 entities of Generators, Receptors and Administrators shall achieve the following requirements:

1. Establish a management system for industrial waste Generators: Establish an appropriate management system at generation sources (such as factories) for dischargers of industrial waste.
2. Establish a management system for industrial waste service companies, i.e. Receptors: Establish an appropriate management system for industrial waste that has been discharged for waste service companies.
3. Establish a management system for industrial waste Administrators: Establish the administrative system for industrial waste management to promote, guide, monitor and regulate proper management for dischargers of industrial waste and waste service companies.

5.1.2 Composition of the Guidelines

The management system for industrial wastes is composed largely of three actors: the waste generators, waste service companies and administrators. In order to establish this system, administrators, taking the central position, require the tools to properly manage it. Thus, to succeed in "establishing an appropriate industrial waste management system in the Industrial Pole of Manaus (PIM), the 3 tools included in the Master Plan must be applied to their maximum utility.

Tool 1. Waste Inventory Database System (WI_DB System)

Tool 2. Waste Service Company Database System (WSC_DB System)

Tool 3. Waste Manifest System (WM System)

The following figure shows the relationship of the three actors and these three tools, with Administrators at the center.

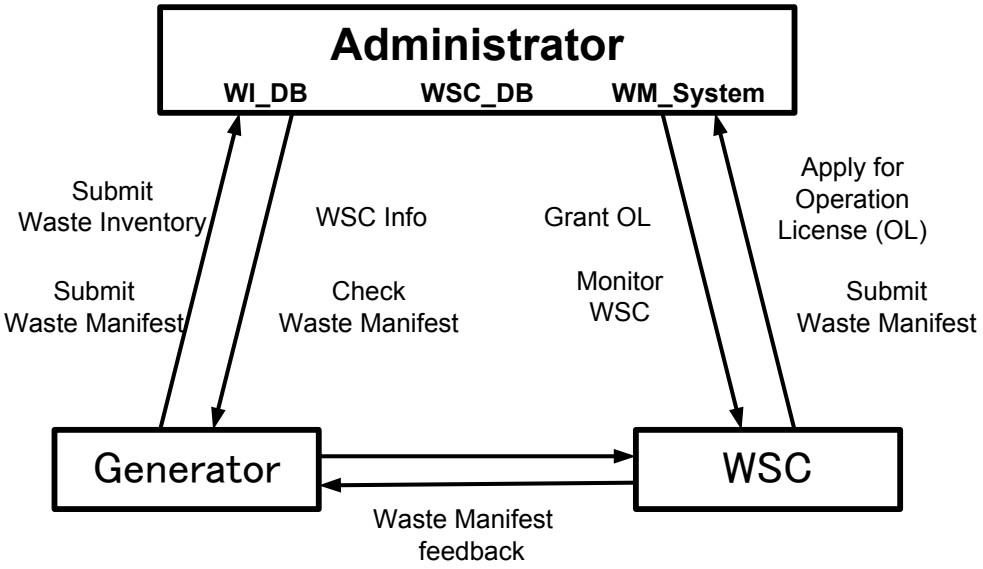


Figure 5-1: Interaction between Administrators, Generators and Receptors to implement industrial waste management

Of the three tools given above, the WI_DB System and WSC_DB System were developed during the study by the Japanese Experts in cooperation with counterparts at IPAAM and SUFRAMA, whereas IPAAM is currently working on developing the Waste Manifest System.

These guidelines are meant to promote the improvement of industrial waste management through the effective use of these tools by waste dischargers, waste service companies (WSC) and administration. The guidelines are composed as shown below:

1. The management of industrial waste by the three parties (Generators, Waste Service Companies and Administrators), as well as items common to the three tools
2. Guidelines for waste dischargers
3. Guidelines for WSCs
4. Guidelines for administrative entities

These guidelines were formulated for the PIM factories that discharge industrial waste in the target study area, the waste service companies (WSCs) which handle the discharged waste, and the administration that handles overall industrial waste management. However, they were created as much as possible so that they may serve as reference material for other industrial complexes or areas where factories are concentrated. Accordingly, stakeholder organizations such as SUFRAMA or the Ministry of Environment, are expected to share these results with related organizations, such as industrial groups and so forth, nationwide.

5.2 Common Items

The first important step to establish an industrial waste system is to define the terms used in conjunction with the system so that all three parties (Generators, WSCs, and Administrators) have the same understanding. Once that is achieved, it is important that the three systems – the WI_DB System, WSC_DB System and Waste Manifest System – are used effectively.

The most important thing to ensure that is for each system to use the same waste codes and units of measurement. This section will not only attempt to define the industrial waste-related terms, but also cover issues dealing with joining these three systems.

5.2.1 Understanding the Industrial Waste Categories and Amount Generated

a. Industrial Waste Categories

All wastes generated in factories should be reported, according to CONAMA Resolution 313. In the case of medical clinics attached to factories, the health-care waste generated is considered as industrial waste. Also, any waste produced from construction undertaken in the factory will be included in the waste regularly generated in the operation of the factory. Furthermore, these two types of wastes are not clearly separated from other types of wastes. The generation source, and properties of health-care and construction waste are very different, and the segregation of these wastes is included in a separate Resolution. As such, these guidelines have divided the industrial wastes covered in CONAMA Resolution 313 into three main categories, as follows:

1. General industrial waste (GIW): Waste generated from factories, except for health-care waste and construction waste.
2. Health-care waste: Waste generated from factory medical clinics
3. Construction waste: Waste generated from factory renovation or expansion.

In principle, if a factory has an attached medical clinic, or if there are plans to perform construction in the year targeted for the waste inventory, it is necessary to report these. However, if there is no clinic and no plans for construction, then naturally there is no need to report these types of waste.

The division of industrial wastes using this 3-type system is shown in the following table. It is divided as follows:

1. The Category column shows the three types of waste mentioned above.
2. The Type column sub-divides each category: (1) General industrial waste (GIW) is sub-divided into Non-HGIW and HGIW, in accordance with CONAMA Resolution 313; (2) Health-care waste is sub-divided into 5 groups according to RDC 36/2004-ANVISA; and (3) Construction waste is sub-divided into 4 classes according to CONAMA Resolution 307.
3. Each type is further divided into individual Waste Codes: 77 codes for GIW, 9 codes for Health-care waste, and 6 codes under Construction waste.
4. In total, there are 92 waste codes for industrial waste.

To manage industrial waste, the three parties – Generators, WSCs and Administrators – will have to produce the proper documents and data according to these categories.

Table 5-1: Industrial Waste Definitions and Categories

Category	Type	Waste Code	Description	No
1. General Industrial Waste (GIW)	Non-Hazardous General Industrial Waste (Non-HGIW)	A001	Residues of restaurant (food remaining portions)	1
		A002	Generated residues outside of the industrial process (office, packings, etc.)	1
		A003	Residues of varrição of plant	1
		A004	Ferrous metal scrap iron	1

Category	Type	Waste Code	Description	No
		A005	Not ferrous metal scrap iron (brass, etc.)	1
		A006	Residues of paper and cardboard	1
		A007	Polymerized plastic residues of process	1
		A008	Rubber residues	1
		A009	Residues wooden I contend not toxic substances	1
		A010	Residues of têxteis materials	1
		A011	Not metallic mineral residues	1
		A012	Slag of aluminum casting	1
		A013	Slag of iron production and steel	1
		A014	Slag of brass casting	1
		A015	Slag of zinc casting	1
		A016	Sand of casting	1
		A017	Refractory ceramic residues and material	1
		A018	Solid residues not toxic metal composites	1
		A019	Solid residues of stations of treatment of effluent I contend material biological not toxic	1
		A021	Solid residues of stations of treatment of effluent I contend not toxic substances	1
		A022	Pastosos residues of stations of treatment of effluent I contend not toxic substances	1
		A023	Pastosos residues I contend limy	1
		A024	Bagasse of sugar cane	1
		A025	Fibre glass	1
		A026	Slag of jateamento I contend not toxic substances	1
		A027	Used catalysers I contend not toxic substances	1
		A028	Residues of system of control of not toxic gaseous emission I contend substance (sleeve precipitadores, filters, among others)	1
		A029	Products are of the specification or are of the validity stated period contend not dangerous substances	1
		A099	Salty shavings	1
		A104	Metallic packings (empty cans)	1
		A105	Not ferrous metal packings (empty cans)	1
		A107	Bombonas of plastic not contaminated	1
		A108	Etil acetate residues vinila (EVA)	1
		A111	Leached ashes of boiler	1
		A117	Glass residues	1
		A199	Foam	1
		A204	Tambores metallic	1
		A207	Plastic films and small packings	1
		A208	Polyurethane residues (PU)	1
		A299	Caleadas shavings of skins	1
		A308	Silt of the caleiro	1
		A399	Atanado leather shavings, remnants	1
		A499	Carnaça	1
		A599	Residues organic of process (tallow, serum, bones, blood, others of the nourishing industry, etc)	1

Category	Type	Waste Code	Description	No
		A699	Rind of rice	1
		A799	Atanado leather Serragem, bran and dust	1
		A899	Generated residues outside of the industrial process (office, packings, etc.)	1
		A999	Residues of fruits (bagasse, must, rind, etc.)	1
	Hazardous General Industrial Waste (HGIW)	C001_C009	Listing 10 - dangerous residues for containing volatile components, in which do not apply solubilização and/or leaching tests, presenting superior concentrations to the indicated ones in listing 10 of Norm NBR 10004	1
		D001	Dangerous residues for presenting inflammability	1
		D002	Dangerous residues for presenting corrosively	1
		D003	Dangerous residues for presenting reactivity	1
		D004	Dangerous residues for presenting pathogenicity	1
		D005_D029	Listing 7 of Norm NBR 10004: dangerous residues characterized by the leaching test	1
		D099	Other dangerous residues - to specify Outros resíduos perigosos - especificar	1
		F001_F0301	Listing 1 of Norm NBR 10004- admittedly dangerous residues - Classroom 1, of not-specific sources	1
		F100	Bifenilas Policloradas - PCB`s. Packings contaminated with PCBs also transforming and capacitors	1
		F102	Residue of catalysers not specified in Norm NBR 10.004	1
		F103	Deriving residue of industrial laboratories (chemical products) not specified in Norm NBR 10.004	1
		F104	Not specified contaminated empty packings in Norm NBR 10.004	1
		F105	Solvent contaminated (to specify solvent and the main contaminante)	1
		F130	for used lubricative Oil	1
		F230	for hydraulical Fluid	1
		F330	for Oil of cut and usinagem	1
		F430	for contaminated used Oil in insulation or the refrigeration	1
		F530	for oily Residues of the separating system of water and oil	1
		K001_K209	Listing 2 of Norm NBR 10004- admittedly dangerous residues of specific sources	1
		K053	Remaining portions and you splodge of inks and pigments	1
		K078	Residue of cleanness with solvent in the manufacture of inks	1
		K081	Silt of ETE of the production of inks	1
		K193	Shavings of leather tanned to chromium	1
		K194	Leather Serragem and dust I contend chromium	1
		K195	Silt of stations of treatment of effluent of tanning to chromium	1
		K203	Residues of laboratories of research of illnesses	1
		K207	It splodges of the used oil re-refining (it splodges	1

Category	Type	Waste Code	Description	No
			acid)	
		P001_P123	Listing 5 of Norm NBR 10004 - dangerous residues for containing toxic substances acutely (remaining portions of packings contaminated with substances of listing 5; contaminated residues of spilling or ground, and products are of specification or products of commercialization forbidden of any constant substance in listing 5 of Norm NBR 10.004	1
		U001_U246	Listing 6 of Norm NBR 10004- dangerous residues for containing toxic substances (contaminated residues of spilling or ground; products are of specification or products of commercialization forbidden of any constant substance in listing 6 of Norm NBR 10.004	1
1. Sub-total				77
2. Health-care Waste	Group_A	RMA1	Group A.1 Biologic	1
		RMA2	Group A.2 Animals	1
		RMA3	Group A.3 Body part	1
		RMA4	Group A.4 Patient care etc.	1
		RMA5	Group A.5 Prions	1
	Group_B	RMB1	Chemical etc.	1
	Group_C	RMC1	Radioactive waste	1
	Group_D	RMD1	Common waste	1
	Group_E	RME1	Piercing or Cutting	1
2. Sub-total				9
3. Construction waste	Class_A	RCA1	from construction, demolition, refitting and repair of pavement	1
		RCA2	from the construction, demolition refitting and repair of edifications: ceramic components	1
		RCA3	from manufacturing and/or demolition process of concrete pre-modulated pieces	1
	Class_B	RCB1	The recyclable waste for other purposes	1
	Class_C	RCC1	Waste which has no economically feasible technology or applications which may allow it to be recycled	1
	Class_D	RCD1	Hazardous waste arisen from construction process, such as paints, solvents, oils and so forth	1
3. Sub-total				6
Ground Total				92

Below, general industrial waste, health-care waste and construction waste, as shown in the proceeding table, are explained individually.

a.1 General Industrial Waste (GIW)

The categorization of general industrial waste is in accordance with CONAMA Resolution 313, which regulates the submission of industrial waste inventories. CONAMA Resolution 313 categorizes industrial waste in great detail, even beyond the categories of health-care and construction waste; the categories in the Resolution are based on chemical and physical

properties, which results in a very complex and differentiated list of wastes. In particular, there are many types of hazardous wastes that must be analyzed to identify them; in fact, there are a total of 708 waste types: 48 Class II (A&B) non-hazardous, general industrial wastes and 660 Class I hazardous, general industrial wastes. As a result, the work required in making a waste inventory and aggregating the data can be overwhelming. Therefore, the waste categorization in these guidelines and the three systems has put a portion of the various hazardous wastes under a single code (e.g. U001_U246). By doing so, it was possible to arrange the wastes into 77 types, with 48 types of non-hazardous GIW and 29 types of hazardous GIW.[1]

a.2 Health-care Waste

This is waste generated from a medical facility within a factory (i.e. a clinic), and is in accordance with health-care waste as regulated in RDC 306/2004-ANVISA. If there is no clinic in a factory, then there is no need to report on health-care waste generated or how it is disposed.

There are a total of 9 types of health-care waste: 8 hazardous (Class I) wastes and one (Group D) non-hazardous (Class II) waste.

a.3 Construction Waste

The amount of construction waste generated and how it was disposed must be reported if there was construction within the factory premises during the year targeted for the waste inventory. Construction waste is in accordance with CONAMA Resolution 307, which regulates the category for construction waste.

There are a total of 6 types of construction waste: 5 non-hazardous (Class II) wastes and one is a hazardous (Class D) waste.

b. **Understanding the Generation Amount of Industrial Wastes**

Fundamentally, if the necessary data is entered into the WI_DB System, then it is possible to know the amount of all industrial waste generated in total, or separately for general industrial wastes, health-care waste and construction waste. Moreover, the sub-categories of each of these wastes can be aggregated as necessary. The method to aggregate each type of waste is outlined below.

b.1 Understanding the Generation Amount for Each Waste Code (92 waste types)

The WI_DB System allows industrial wastes generated from factories to be entered under 92 Waste Codes, as shown in Table 5-1: Industrial Waste Definitions and Categories. The database system will then contain the amount of industrial waste generated for each of the 92 Waste Codes. Using these 92 Waste Codes, it is possible to aggregate the generation amount for each type of industrial waste.

b.2 Understanding the Generation Amount for each Type

The generation amount for a particular type of waste can be extracted by aggregating the generation amount of all its related waste codes. For example, general industrial waste is sub-divided into two types, which are hazardous general industrial (Class 1) waste and

[1] The factory survey conducted by JICA divided general industrial waste into 13 categories for non-hazardous GIW and 16 for hazardous GIW, for a total of 29. The waste streams for these 29 wastes were then clarified and the results saved in SUFRAMA's WI_DB. Following these guidelines, it is possible to use the code sheet in the JICA Report to compare the JICA factory study results with the general industrial waste data by using the categories in CONAMA Resolution 313.

non-hazardous general industrial (Class II) waste. To know the generation amount for non-hazardous general industrial (Class II) waste, the generation amounts for each related waste code under that type would be aggregated.

b.3 Understanding the Generation Amount for each Category

The generation amount for a particular category (i.e. GIW, Health-care Waste, or Construction Waste) can be found by aggregating the generation amount of all waste codes belonging to that category. For example, to know the generation amount for GIW, aggregate the generation amounts for all waste codes in that category. Similarly, health-care waste can be found by aggregating the generation amount for all waste codes related to its category.

b.4 Understanding the Generation Amount for all Industrial Waste

To know the overall generation amount for all categories of industrial waste generated at factories (i.e. GIW, Health-care Waste, Construction Waste), the amounts of all of those categories are aggregated. This generation amount is the total amount of all 92 types of industrial wastes shown in Table 1: Industrial Waste Definitions and Categories.

b.5 Understanding the Generation Amount for Hazardous Industrial (Class I) Waste, and Non-hazardous Industrial (Class II) Waste

To find the generation amount for hazardous industrial (Class I) waste, the generation amount for all the waste codes in each category belonging to the hazardous waste type would be aggregated. The hazardous waste types in each category are as follows:

1. General industrial waste: HGIW
2. Health-care waste: Group A, B, C & E
3. Construction waste: Class D

The generation amount of non-hazardous industrial (Class II) waste can be found by aggregating the waste codes excluding those mentioned above for hazardous waste types.

5.2.2 Waste Stream for Industrial Waste Management

a. **Waste Stream**

In order to establish appropriate industrial waste management, it is necessary to grasp the actual conditions regarding industrial waste disposal. To do so effectively, the flow of industrial waste disposal must be clarified. This “waste stream” is made up of on-site (i.e. at the factory) industrial waste management (IWM) and off-site IWM. The figure below shows the concept of the waste stream, which shows the disposal methods (i.e. treatment, recycling, etc) of the various wastes.

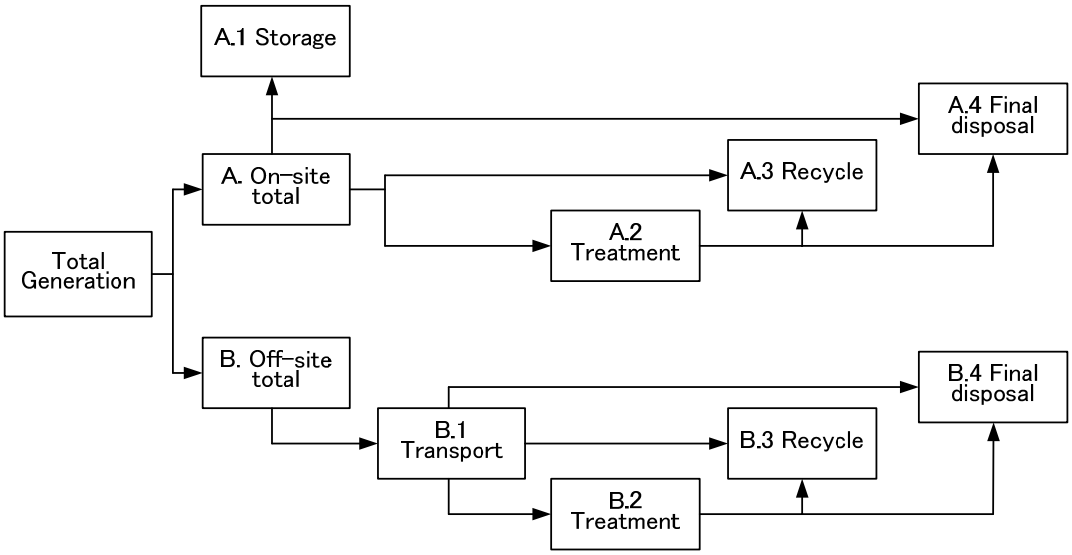


Figure 5-2: Waste Stream for Industrial Waste Disposal

b. **How to Make the Waste Stream**

By entering the data about generation of each type of industrial waste mentioned above into the WI_DB System, as well as disposal data (as shown in the following section), it is then possible to know the waste stream for general industrial waste, health-care waste and construction waste, or all of the industrial wastes together. Furthermore, one can produce the waste stream for each detailed type of waste, as necessary. The following section is how to make a waste stream for each type of waste.

b.1 Making the Waste Stream for each Waste Code (92 types of waste)

The WI_DB System allows the data for on-site and off-site disposal methods to be entered according to the 92 waste codes. The disposal method according to each waste code can be entered as shown in Figure 5-2: Waste Stream for Industrial Waste Disposal. This can then be used to make the waste stream for each of the 92 types of waste. The disposal methods are explained in more detail below.

b.2 Making the Waste Stream for each Type

The waste stream for a particular type of waste can be made by aggregating the disposal methods of all waste codes for that type. For example, general industrial waste is divided into hazardous general industrial (Class I) waste and non-hazardous general industrial (Class II) waste, so the disposal methods for the waste codes related to those types are aggregated to make the waste stream. Similarly, for health-care waste, the waste stream for each group can be made by aggregating the disposal method for all waste codes belonging to the relevant group.

b.3 Making the Waste Stream for each Category

The waste stream for a particular category (GIW, Health-care Waste, Construction Waste) is made by aggregating the disposal methods for all waste codes which belong to that category. For example, the waste stream for general industrial waste would be the disposal methods for all of the waste codes in the GIW category. Similarly, the waste stream for health-care waste is made by aggregating the disposal methods for all the waste codes belonging to that category.

b.4 Making the Waste Stream for All Industrial Wastes

The waste stream for all industrial wastes (i.e. GIW, health-care waste and construction waste) can be made by aggregating all disposal methods for all of the categories.

b.5 Making the Waste Stream for hazardous industrial (Class I) waste or non-hazardous industrial (Class II) waste

To make the waste stream for hazardous industrial (Class I) waste, the disposal method for all waste codes that belong to hazardous wastes in each category are aggregated. The hazardous waste types in each category are as follows:

1. General industrial waste: HGIW
2. Health-care waste: Group A, B, C & E
3. Construction waste: Class D

The generation amount of non-hazardous industrial (Class II) waste can be found by aggregating the waste codes excluding those mentioned above for hazardous waste types.

5.2.3 Industrial Waste Disposal

When making the waste inventory, the first step is to select whether the waste code is for on-site or off-site disposal, and then select each disposal method that was used. CONAMA Resolution 313 regulates the disposal methods for all waste generated from factories as follows.

a. **Storage**

Storage is the amount shown in Figure 5-2: Waste Stream for Industrial Waste Disposal in the section A.1 Storage, in regards to factory on-site storage of industrial waste. There are two main choices for on-site storage methods:

1. "S" for wastes generated in the past one year, and
2. "Z" for wastes stored more than one year.

Both of these are further divided into particular storage methods.

Table 5-2: Storage methods

"S" for wastes generated in the past one year	"Z" for wastes stored more than one year residues more	Description
S01	Z01	Barrel in waterproofing floor, protected area
S11	Z11	Barrel in waterproofing floor, unprotected area
S21	Z21	Barrel on the ground, protected area
S31	Z31	Barrel on the ground, unprotected area
S02	Z02	In bulk on waterproofing floor, protected area
S12	Z12	In bulk on waterproofing floor, unprotected area
S22	Z22	In bulk on the ground, protected area
S32	Z32	In bulk on the ground, unprotected area
S03	Z03	Covered dumper truck
S13	Z13	Uncovered dumper truck

S04	Z04	Tank with contention tray
S14	Z14	Tank without contention tray
S05	Z05	Bottle on waterproofing floor, protected area
S15	Z15	Bottle on waterproofing floor, unprotected area
S25	Z25	Bottle on the ground, protected area
S35	Z35	Bottle on the ground, unprotected area
S09	Z09	Lagoon with waterproofing
S19	Z19	Lagoon without waterproofing
S08	Z08	Other systems

b. **Intermediate Treatment**

Intermediate treatment is the amount of industrial waste shown in Figure 5-2: Waste Stream for Industrial Waste Disposal in the on-site section A.2 Treatment, and off-site section B.2 Treatment. Intermediate Treatment is further divided according to the choices shown in the following table.

Table 5-3: Intermediate Treatment Method

Code	Description
T01	Incinerator
T02	Incinerator with chamber
T05	Outdoor burning
T06	Detonation
T07	Oxidation of cyanides
T08	Chemical encapsulation/fixture or solidification
T09	Chemical oxidation
T10	Precipitation
T11	Detoxification
T12	Neutralization
T13	Adsorption
T15	Biologic treatment
T16	Composting
T17	Drying
T18	Land farming
T19	Thermal plasma
T34	Other treatments

c. **Recycle**

Recycle is the amount of industrial waste shown in Figure 5-2: Waste Stream for Industrial Waste Disposal for on-site in the section A.3 Recycle, and off-site in section B. 3 Recycle. Recycle is further divided according to the choices shown in the following table.

Table 5-4: Recycle Method

Code	Description
R01	Use in industrial oven (except in heating ovens)
R02	Use in boiler
R03	Co-processing in cement ovens

R04	Blending of wastes
R05	Formulation of micronutrients
R06	Incorporation in agricultural soil
R07	Fertilization and irrigation
R08	Animal reaction
R09	Reprocessing of solvents
R10	Re-refining of oil
R11	Reprocessing of oil
R12	Scrap iron collector
R13	On-site reuse/recycling/recovery
R99	Other forms of reuse/recycling/recovery

d. **Final Disposal**

Final disposal is the amount shown in Figure 5-2: Waste Stream for Industrial Waste Disposal for on-site in section A.4 Final Disposal and off-site in section B. 4 Final Disposal. Final disposal is further divided according to the choices shown in the following table.

Table 5-5: Final Disposal Method

Code	Description
B01	Infiltration in the soil
B02	Municipal Landfill
B03	Own Industrial Landfill
B04	Third-parties Industrial Landfill
B05	Municipal Dumping Site
B06	Private Dumping Site
B20	Sewer
B30	Other

5.2.4 Non-IW Common Items

a. **Factory Categorization Code**

The factory categories utilize the categorization SUFRAMA uses for registered factories.

SUFRAMA uses 19 factory codes, and further subdivides 4 of the factory codes for a total of 28. However, only the large factories included in Part 1 of the SUFRAMA factory list use the sub-categories, so only the 19 primary categories are used for industrial waste management, such as when creating the waste flowcharts.

The factory codes and categories are shown in the following table.

Table 5-6: SUFRAMA Factory Categories

Factory Code	Sector	
	Main Category	Sub-category
F01	Beverages	
F02	Leather	
F03	Printing	
F04	Electrical	
	4-1	Parts

		4-2	Products (except copy machines)
		4-3	Copy machines
F05	Lumber		
F06	Machinery		
		6-1	Clock/watch
		6-2	Other machinery industry
F07	Metal		
F08	Nonferrous		
F09	Furniture		
F10	Paper		
F11	Rubber		
F12	Food		
F13	Chemical		
F14	Plastic		
F15	Textiles		
F16	Clothing		
F17	Transportation		
		17-1	Two-wheelers
		17-2	Ships
		17-3	Other transportation
F18	Construction		
F19	Other		
		19-1	Optics
		19-2	Toys
		19-3	Small instruments
		19-4	Writing utensils, razor blades
		19-5	Other

b. **Waste Service Company Categorization Code**

IPAAM plans to use a new environmental license code dedicated only for waste service companies (WSC). There are two main categories depending on the type of waste the WSC handles: "Municipal Waste (code 33＊＊)" and "Industrial Waste (code 34＊＊)", which are then subdivided into categories for collection/transportation, intermediate treatment, reuse/recycling, and final disposal. These codes are given in the table below.

If a company conducts more than one type of service, it must be licensed and registered under all of the appropriate codes. For example, if a company collects and transports industrial waste and also recycles it, then it will have to be registered under both code 3401 and 3403.

Table 5-7: Waste Service Company Classification and Code (Draft)

Code	Major Classification	Code	Sub-Classification	Class [Types of Waste Handled]
33	Municipal Waste Management	3301	Collection and Transportation	Class I (HW), Class II-A(Non-HW & Non-Inert), Class II-B (Non-HW & Inert)
		3302	Intermediate Treatment	Class I (HW), Class II-A(Non-HW & Non-Inert), Class II-B (Non-HW & Inert)
		3303	Recycling	Class II-A (Non-HW & Non-Inert), Class II-B (Non-HW & Inert)
		3304	Final Disposal	Class II-A (Non-HW & Non-Inert), Class II-B (Non-HW & Inert)
34	Industrial Waste Management	3401	Collection and Transportation	Class I (HW), Class II-A(Non-HW & Non-Inert), Class II-B (Non-HW & Inert)
		3402	Intermediate Treatment	Class I (HW), Class II-A(Non-HW & Non-Inert),

				Class II-B (Non-HW & Inert)
		3403	Recycling	Class II-A (Non-HW & Non-Inert), Class II-B (Non-HW & Inert)
		3404	Final Disposal	Class II-A (Non-HW & Non-Inert), Class II-B (Non-HW & Inert)

c. **Units of Measurement**

The amount of general industrial waste, health-care waste and construction waste generated in PIM is indicated in weight (tons) as a unit of measurement, which also served to create the PIM waste flow. Waste generated by volume or individually is to be converted to indicate weight before being entered. Also, in cases where the generation amount is extremely small, such as for health-care waste, it can be indicated in kilograms (kg) instead of tons.

(Note: measure by apparent density as a simple conversion method from volume (m^3) to weight (ton))

(1) Things to prepare

- Sample (when weight is unknown)
- Plastic bucket (about 20 litres)
- Scale (max. approx. 50 kg)

(2) Measure the weight of the plastic bucket (Basket weight (Bw): kg)

(3) Measure the weight of the plastic bucket with 10 liters of water (the water ratio is 1.0 so this is 10 kg).

(4) Mark the water line of 10 liters of water in the bucket.

(5) Pour out the water and pack the sample into the bucket up to the line. (Gwb (kg) = Bw + Weight of 10 liter sample)

(6) The sample's apparent density AM (ton/m^3) is calculated with the following formula.

$$AM\ (ton\ /\ m3) = \frac{(Gwb\ -\ Bw)}{10}$$

(7) Sample weight conversion: Multiply the known volume of the sample by AM and calculate the weight.

d. **Other**

The databases for the waste inventory management system (WI_DB), waste service company licensing and registry management system (WSC_DB), and waste manifest system (WMS) are all managed using the National Corporate Tax Payer registration number (CNPJ) as their "Primary key" so that all the databases can be linked. Consequently, the format of the CNPJ to be entered will be the officially registered CNPJ. If this is done online, a program will confirm the number entered according to the following format.

CNPJ Format: XX.XXX.XXX/0001-1

5.3 Industrial Waste Management Improvement Guidelines for the Generator (Factory)

5.3.1 Responsibility of the Generator (Factory) in relation to Industrial Waste Management

a. Responsibility of the Generator (Factory) in relation to Industrial Waste Management

The generator holds primary responsibility for the appropriate disposal of industrial waste, whereas the transporter/receptor and other waste service companies (WSC) has only joint responsibility. The generator must be sufficiently aware of this point and needs to establish an industrial waste management system for the factory. In order to do so, the generator must carry out the following:

- Assign an officer in charge of industrial waste management
- Make a waste inventory (WI)
- Make a waste manifest (WM)
- Obtain the services of a waste service company, such as the transporter, disposal company, etc., that has the appropriate operation license (OL)
- Promote improvement of industrial waste management and 3R at the factory

b. Assignment of an Industrial Waste Management Officer

In order to establish an industrial waste management system in the factory, it is necessary to assign a technician to be in charge of industrial waste management (i.e. an IWM officer). This IWM officer would be in charge of overall IWM in the factory, and be the first one responsible for the appropriate management of industrial wastes generated at the factory. Accordingly, this officer would receive notices and guidance concerning IWM from IPAAM and carry out the appropriate action. The officer would also receive guidance from IPAAM and, according to regulation, make a summary of the waste inventory (WI) and waste manifest (WM). Furthermore, through making the WI, the officer would be conscious of any issues concerning IWM in the factory. To make improvements as needed, the officer would receive instruction from IPAAM and formulate an industrial waste management plan.

5.3.2 Production and Use of the Waste Inventory (WI)

The first step to establishing appropriate industrial waste management in a factory is to properly produce the waste inventory (WI) as required by CONAMA Resolution 313. Namely, the WI exhibits the proper understanding of how industrial waste is being managed in the factory. Then, using the WI, an IWM improvement plan will be formulated and carried out. The following points are to be kept in mind when producing and making use of the WI.

a. Summary of the Waste Inventory Database

A summary of the waste inventory database is shown in the figure below.

The database inventory seeks to report off-site disposal. The generator (factory) obtains information from a waste service company database (WSC_DB) on WSCs that have obtained the proper operation license. Then, making use of both the WI_DB and WSC_DB, it is possible to produce a highly accurate account of off-site disposal.

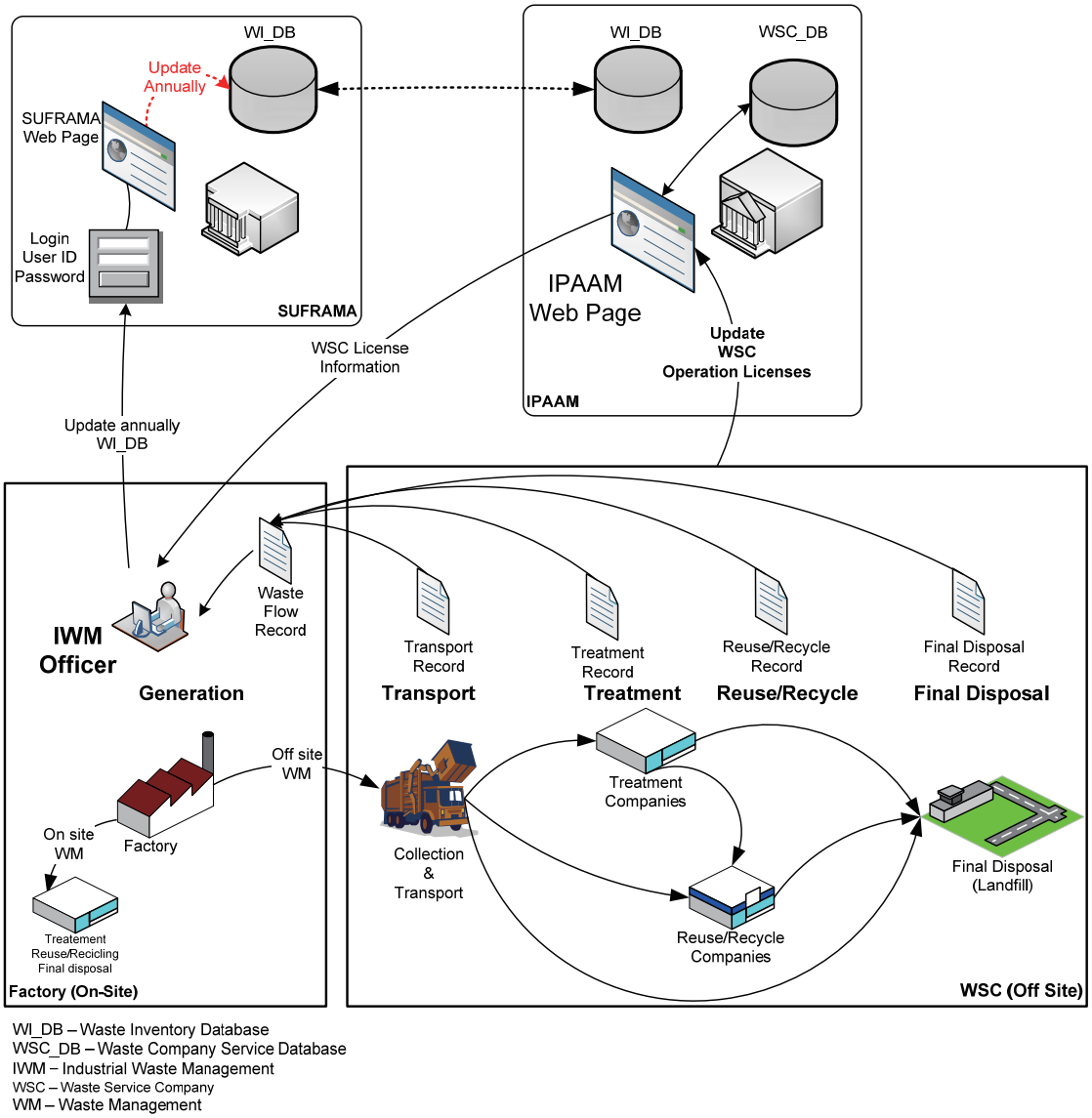


Figure 5-3: Summary of the Waste Inventory Database

b. Using the Waste Inventory Database (WI_DB) System File

Each factory uses the system file made for the WI_DB system developed in this study to enter accurate data about their waste management situation (i.e. the waste inventory). Then, using these waste inventories, it is possible to know the conditions of each factory's waste management. Accordingly, the IWM officer at each factory will need to receive this system file from IPAAM, along with instruction on how to use it, and make a proper waste inventory.

c. Using the WI_DB User Guide

In order to produce a proper waste inventory using the WI_DB system file, it is necessary to pay close attention to the WI_DB User Guide. The WI_DB User Guide primarily provides instruction on how to enter data into the database. However, it assumes that the user already has a good understanding of the common items introduced earlier in these guidelines. Accordingly, with an understanding of the common items mentioned above, the officer will use the WI_DB User Guide and the WI_DB system file to enter the necessary data. In doing

so, the officer can direct any technical questions about entry methods toward IPAAM, the owner of the WI_DB, or the appropriate officer at SUFRAMA.

d. **Using the WI**

By using the WI_DB system file to produce a proper waste inventory, a factory IWM officer is able to obtain the invaluable data to carry out industrial waste management.

- As shown in the common items, it is possible to clarify the generation amount for any of the 92 waste codes, or by type (such as non-hazardous general industrial waste, and hazardous general industrial waste), or for any of the three categories, (general industrial waste, health-care waste, construction waste).
- Moreover, if each waste disposal method is properly entered, as shown in the common items, then it is possible to produce each waste stream diagram for any of the 92 waste codes, or by type (such as non-hazardous general industrial waste, and hazardous general industrial waste), or for any of the three categories, (general industrial waste, health-care waste, construction waste).
- Using this waste stream, it is possible to understand how and where each type of waste generated is being disposed. This also serves as reference data concerning disposal costs of each waste, so factories can identify IWM issues at their factories.
- Also, for wastes that are disposed of off-site by WSCs, this makes it possible to identify any potential problems or unreliable companies, the disposal methods and processes, and take necessary measures.

5.3.3 Production of the Waste Manifest (WM)

The waste manifest system differs from the "waste inventory database system" (WI_DB System) and the "waste service company database system" (WSC_DB System) in that it was not developed during the study period. Based on the proposed M/P, IPAAM plans to formulate a waste manifest form and system for Amazonas State. Moreover, they plan to develop an online waste manifest system in the year 2011.

The methods to produce a waste manifest (WM) here, then, is entirely based on what was suggested in the M/P, and it will be necessary to make the appropriate revisions based on the Amazonas State waste manifest formulated by IPAAM.

The waste manifest (WM), as shown in the image below, is produced by the waste generator, and a copy of it is given to the collection/transport company (transporter) that hauls away the waste from the factory. The WM is made separately for according to each waste code when the waste is discharged. The transporter will fill in the necessary sections of the WM copy, and then give a copy (copy 3) to the treatment or disposal company. Likewise, the receptor of the waste will again fill in the necessary sections of the WM copy, and pass a copy on to the place of final destination. The company in charge of final destination, such as a landfill, will fill in any necessary items and then give a copy back to the generator, i.e. the original factory. Once this final copy is received by the factory, as the waste generator, they have a complete and accurate picture of the off-site disposal process. As a result, with the final copy from the waste receptor, the generator/factory will then have all of the essential information about waste disposal to produce a waste stream diagram.

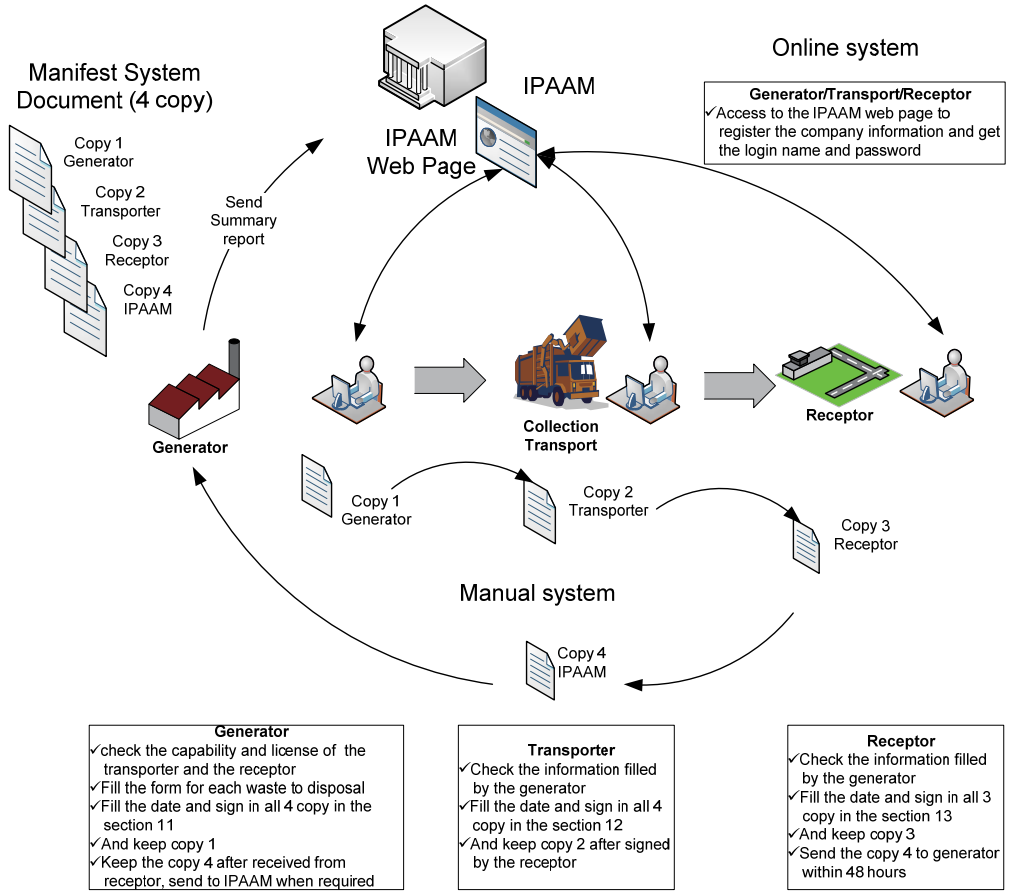


Figure 5-4: The Proposed Waste Manifest System

5.3.4 Entrusting Collection and Treatment/Disposal to a Licensed (OL) Waste Service Company

The generator must take responsibility for any inappropriate disposal of discharged industrial wastes. There are cases where the cost to rectify the environmental damage due to inappropriate disposal is extremely high. In order for the generator to avoid that risk, they must entrust off-site waste disposal to a waste service company that possesses the appropriate operation license (OL).

There are many kinds of waste service companies, and many kinds of industrial waste disposal, as mentioned in these guidelines, Section 5.2.3 Industrial Waste Disposal. Therefore, in order to select an appropriate waste service company, waste generators must have information concerning those that have an operation license (OL). The WSC_DB is used to manage this information, and as shown in Figure 5-3: Summary of Waste Inventory Database, IPAAM plans to make information concerning waste service companies available on a related part of their website[1]. Generators will have to make sufficient use of the website and select the appropriate waste service company for collection/transport and treatment/disposal.

[1] As of August 2010, the environmental licensing system for waste service companies as suggested in the M/P has not been established, and this part of the website does not yet exist. These guidelines were written assuming that this system will be put into place and waste service companies will apply and be approved for the new operation license.

5.3.5 Methods to Promote Industrial Waste Management Improvement and 3R at Factories

The promotion of appropriate disposal of industrial waste and 3R was emphasized in the Substitute of Draft Bill No. 203 National Policy on Solid Waste, which was approved by the National Congress in March 2010. The need for such measures has become obvious in the current age, and from a global perspective, the demand for appropriate disposal and 3R are increasing particularly for factories located in the Amazon region, where attention is focused on environmental conservation.

Based on this situation, the IWM officer at each factory must play a central role in formulating a plan for industrial waste improvements that promote appropriate disposal and 3R. It is recommended that the industrial waste improvement plan be formulated using the WI to maximum effect, as follows:

Step 1. Construct a Factory WI_DB

Using the WI_DB system file to make the factory WI, each factory constructs a WI_DB.

Step 2. Know the Conditions of Factory Industrial Waste Management

Using the WI_DB constructed in Step 1, make a waste stream diagram showing the generation amount and discharge amount for each type of industrial waste generated at the factory in accordance with how it is being managed, separately for On-site Management and Off-site Management.

Step 3. Analyze Conditions of Factory Industrial Waste Management

Analyze the waste disposal flow for On-site Management and Off-site Management made in Step 2, and identify issues concerning industrial waste management for each. It is necessary to utilize data that is not in the WI_DB, such as disposal costs for each type of industrial waste, when analyzing the conditions.

Step 4. Formulate an Industrial Waste Improvement Plan

Gather together the concerned stakeholders to discuss possible solutions to the issues identified in both On-site and Off-site Management which were identified in Step 3. Based on that, formulate a factory industrial waste improvement plan.

5.4 Industrial Waste Management Improvement Guidelines for Waste Service Companies (WSC/Receptor)

5.4.1 Industrial Waste Management related Responsibilities of Industrial Waste Service Companies

a. Industrial Waste Management related Responsibilities of Industrial Waste Service Companies

Although responsibility for appropriate disposal of industrial wastes discharged from factories lies with the generator of the waste, waste service companies (WSC) are directly responsible to rectify environmental pollution caused by inappropriate disposal. WSCs must be fully aware of this point and establish a management system for wastes they were entrusted to transport or dispose by the generator. In order to establish such a system, WSCs will need to execute the following items.

- Assign an industrial waste management officer
- Make a waste inventory (WI) (if the factory has one or they are required to submit one)
- Make a waste manifest (WM)
- Obtain an operation license (OL)
- Promote industrial waste management improvement and 3R

b. **Assign an Industrial Waste Management Officer**

In order for a WSC to establish a system for the management of industrial wastes, they will need to appoint a technician who will be responsible for that system, the IWM officer. This person will apply for an operation license (OL) granted by IPAAM. Then, based on the acquired OL, the officer is responsible for industrial waste management, and bears the first responsibility of proper management for the industrial wastes they are entrusted with. Thus, IPAAM will issues notices and provide guidance through this IWM officer.

Also, the IWM officer will receive instruction from IPAAM and, according to those provisions, make a waste inventory (WI), if required, and submit it to IPAAM. Moreover, through making the WI, they will become aware of the issues concerning factory industrial waste management. Then, in order to improve those issues, they receive instruction from IPAAM and formulate an industrial waste management plan.

5.4.2 Production and Use of the Waste Inventory (WI)

It is necessary for waste service companies (WSC) to produce a waste inventory (WI) if they are operating on a factory level. In general, WSCs operating intermediate treatment or recycling factories must submit a WI. On the other hand, it is generally accepted that collection/transportation companies that do not own a factory do not need to submit a WI. Therefore, the methods to produce and use the WI are put forth here keeping in mind waste service companies that have a factory.

a. **Summary of Waste Inventory Database**

A summary of the waste inventory database is given in Figure 5-3: Summary of Waste Inventory Database.

Usually, intermediate treatment and recycling companies will generate residues as a result of their operations. Accordingly, WSCs operating intermediate treatment and recycling plants may need to discharge these residues to another company for treatment and disposal, which puts them in the position of waste generator along with other factories. Therefore, similar to other factories (generators), by making use of the two databases, the WI_DB and WSC_DB, they will be able to include highly accurate information concerning off-site disposal of their wastes (i.e. residues).

b. **Using the Waste Inventory Database (WI_DB) System File**

It is possible to understand the conditions of waste management at each respective factory if they properly report their situation (i.e. the WI produced by each factory) using the database system file developed with the WI_DB system in this study. Accordingly, for those WSCs that are operating at the factory level, their industrial waste management officer must receive the system file from IPAAM and, with the necessary instruction, produce an accurate waste inventory.

c. **Using the WI_DB User Guide**

By using the WI_DB system file, a proper waste inventory can be produced. When making the WI, it is necessary to have a sufficient understanding of the common items presented in these guidelines, and fully utilize the WI_DB User Guide.

d. **Using the WI**

The WI is used in a manner similar to that shown above in 5.3 "Industrial Waste Management Improvement Guidelines for the Generator (Factory)", in the section on "Using the WI", but adapted to the particular needs of waste service companies. The important thin in using the WI, is that the waste inventory is made properly.

5.4.3 Production of the Waste Manifest (WM)

As mentioned in "Industrial Waste Management Improvement Guidelines for the Generator (Factory)", the method to produce the waste manifest (WM) is based only on suggestions in the M/P, and will need to be revised according to the WM for Amazonas State formulated by IPAAM.

The waste manifest (WM) is made by the factory, which is the generator of wastes, according to the 92 waste codes when discharging their waste to a WSC, as shown in Figure 5-4: "The Proposed Waste Manifest System". The WSC will receive a copy of the WM from the generator and fill in the required items, and then give a copy of that to the final destination. The final destination will fill out the necessary items and return a copy to the original generator. For those WSCs that are not operating as a final destination (recyclers, etc.), they will need to confirm the final destination of the wastes in order to obtain an operation license (OL).

5.4.4 Obtaining an Operation License (OL)

IPAAM is now planning to make substantial revisions to the current environmental license system for waste service companies (WSC) based on recommendations by the JICA Study Team. The revisions to the environmental license system must be approved by the Amazonas State Congress, so the new environmental license system for WSCs has not yet been established as of this writing (August 2010). Nevertheless, these guidelines were written on the premise that the new environmental license system will be executed as per recommendations by the JICA Study.

The main items in the environmental license system for WSCs to be revised are as follows:

1. Make a clear division between the environmental license for waste service companies and other licenses. To do so, a special license code will be set aside (33** ~ 34**).
2. Divide the license code into two types, for Municipal Waste (where the first two digits begin with 33**) and Industrial Waste (first two digits are 34**).
3. Furthermore, as shown in Table 5-7: Waste Service Company Classification and Code (Draft) the code will be categorized into four types depending on the type of operation: 1. Collection and transportation, 2. intermediate treatment, 3. recycling, 4. final disposal. Moreover, announce categories for operations 2, 3 and 4, which are sub-divided according to the relevant operations shown in Table 2, 3 and 4, respectively.

4. In addition, the wastes to be targeted are: Hazardous; Non-Hazardous & Non-Inert; Non-Hazardous & Inert

Given the above revisions, waste service companies will have to understand the common items in these guidelines and utilize the User Guide to apply for an operation license.

5.4.5 Promotion of Industrial Waste Management Improvement and 3R

As mentioned previously, the promotion of appropriate disposal and 3R for industrial wastes is expected in the current age. Also, the world is focused on the environmental conservation of the Amazon Region. Consequently, waste service companies operating in the Amazon region to collect, treat and dispose industrial wastes are seeing demand gradually increase to promote appropriate disposal and 3R.

Based on this situation, it is necessary for waste service companies, and especially for those in the industrial sector, to formulate industrial waste improvement plans that promote appropriate disposal and 3R for the waste generated at their factories or through the their business operations. It is recommended that when formulating an industrial waste improvement plan, reference is made to "Methods to Promote Industrial Waste Management Improvement and 3R at Factories" as shown in "Industrial Waste Management Improvement Guidelines for the Generator (Factory)".

5.5 Industrial Waste Management Improvement Guidelines for Administration

5.5.1 The Role of Administration in Industrial Waste Management

a. **Improving the Administrative System for Industrial Waste Management and Establishing a System for Appropriate Industrial Waste Management**

In order to "establish an appropriate industrial waste management system", it is essential for administration to fulfill its role, as shown in Table 5-7: Waste Service Company Classification and Code (Draft). Accordingly, it is unlikely that the goal to "establish an appropriate industrial waste management system" would be reached without first improving the administrative system, to which the M/P formulated in the JICA Study gives top priority. In order to realize the goal, an implementation plan was formulated and now being implemented, as shown in the following figure. These guidelines were formulated on the premise that "1. Improving the Administrative System for IWM" has already been implemented.

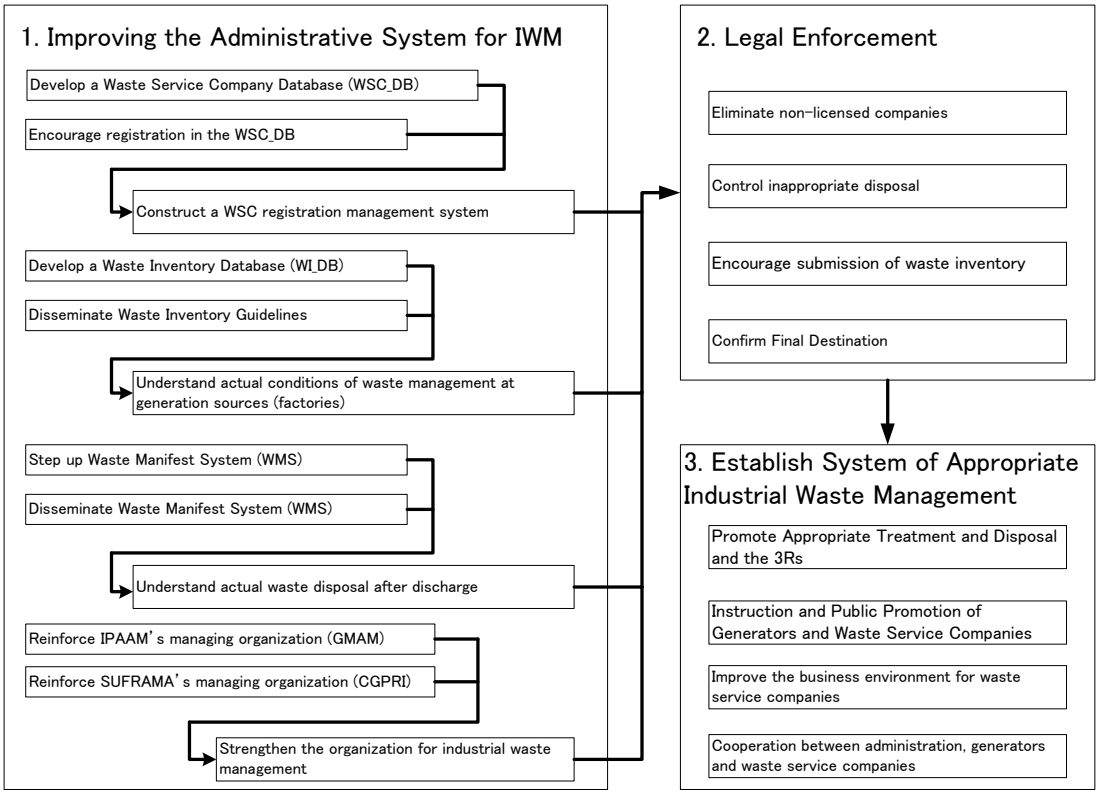


Figure 5-5: Improving the Administrative System of IWM and Establishing a System for Appropriate IWM

b. **The Role of Administration in Industrial Waste Management**

Having implemented the first step, "Improving the Administrative System for IWM", administration will need to carry out the following items.

- Encourage generators and waste service companies to appoint industrial waste management officers
- Use the waste inventory database (WI_DB)
- Use the waste manifest (WM)
- Use the waste service company database (WSC_DB)
- Improve industrial waste management and promote 3R

c. **Encourage Generators and Waste Service Companies to Appoint Industrial Waste Management Officers**

In order to "establish an appropriate industrial waste management system", administrators will need to collaborate closely with generators and industrial waste service companies, as shown in Figure 5-1: Interaction between Administrators, Generators and Receptors to implement industrial waste management. Namely, for administration to enforce the laws and regulations that have been put in place, waste generators and industrial waste service companies need to demonstrate they are carrying out appropriate industrial waste management based on those regulations. To do so, it is not only the enforcement of those regulations, but generators and WSCs must be poised to receive instruction on methods to promote industrial waste management improvement and 3R.

To achieve this, generators and WSCs must appoint a technician as an officer in charge of industrial waste management so that IPAAM can establish a system for appropriate industrial waste management. IPAAM can communicate with that officer to notify and provide guidance about regulation, as well as provide training, education and guidance on improving IWM and promoting 3R. The IWM officer would produce and submit the waste inventory, produce and manage the waste manifest and apply for the operation license (OL) from IPAAM.

5.5.2 Legal Enforcement

As written above, once the administrative system for industrial waste management is improved, it is necessary to strengthen the enforcement of laws and regulations and provide guidance to generators of industrial waste and the waste service companies enlisted to dispose of that waste appropriately. It will be worth demonstrating to business entities the environmental responsibility of the wastes Generator, Transporter and Receptor; and why the integrated information and control system recommended herein facilitate the definition of their responsibilities.

a. **Elimination of Non-Licensed Companies**

Non-licensed companies can mainly be classified into two categories.

1. Those carrying out waste related services without having obtained an environmental license
2. Those which have obtained an environmental license, but are carrying out activities other than those for which they are licensed.

Under the current conditions, in which there is insufficient understanding of how many licensed waste service companies there are, what activities they are licensed for and what activities they are actually engaged in, it is very difficult to eliminate non-licensed companies. It is recommended that, to ameliorate these conditions, IPAAM eliminate Non-Licensed companies (including those conducting activities other than those for which they are licensed), by following the steps below.

1. Immediately make the waste service company registration management system developed in this study a legal requirement and require companies to obtain an operation license for waste services as a condition to engaging in waste related services.
2. Then, instruct those companies currently conducting waste services which have obtained an environmental license[1] to acquire an operation license according to their activities, for collection and transportation, intermediate treatment, recycling or final disposal, respectively. IPAAM will grant a specific license for each activity so that the general licenses are no longer too varied; such criteria may be very useful when renewing the license.
3. When approving the operation licenses, any discrepancy between the activities applied for and actual activities are confirmed. The approved companies should be registered in the waste services companies data base (WSC_DB) developed in this study, according to the guidelines of the WSC_DB, and the information registered about the WSC should be made public.

[1] 67 such companies were identified in the survey of waste service companies.

4. By publicizing information about these WSCs, waste generators will have access to the basic information they'll need, such as which companies have a license and what activities they are licensed to conduct. In addition, IPAAM shall remind the waste generators that the main responsibility of proper IWM lies with them, whereas the transporter/receptor has only joint responsibility. Also the generator, as well as the environmental authority, must audit IW disposal activities of the transporter/receptor.

5. Providing waste generators with information about sound operators they can hire will push out both non-licensed companies and those conducting non-licensed activities. At the same time, non-licensed companies conducting waste services without an environmental license[1] will be instructed to acquire the appropriate license.

The data on waste service companies entered in March 2010 into the WSC_DB, developed in the JICA study, is that of the 67 companies which were confirmed in the survey of waste service companies to have operational licenses. In addition, the data entered concerning the activities of those 67 companies are not the activities they are licensed for, but the actual activities they are undertaking. Accordingly, once IPAAM establishes its license/registration system, it will be necessary to promptly instruct those companies to obtain licenses in compliance with their actual activities.

The above-mentioned procedure is summarized in the following figure.

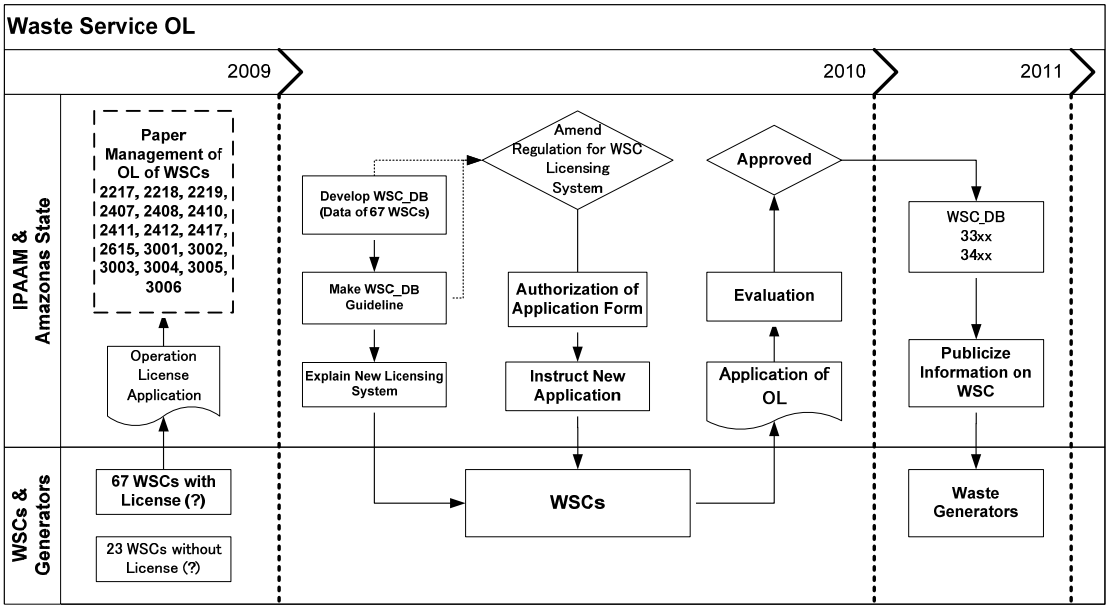


Figure 5-6: Proposed Schedule of Establishment of WSC_DB

b. Controlling Inappropriate Disposal

By eliminating non-licensed companies and non-licensed activities through the above procedures, it is possible to focus on monitoring the activities of companies that have acquired licenses for collection and transportation, intermediate treatment, recycling and final disposal, respectively. Accordingly, IPAAM will be able to check whether companies that have obtained operation licenses are conducting business according to the appropriate standards and carry out regular monitoring activities to control improper treatment and

[1] 23 such companies were identified in the survey of waste service companies.

disposal. Nevertheless, IPAAM should retain surveillance over any kind of landfill in order to avoid the dumping of improper wastes and make sure the corresponding manifest is being used.

It is equally important to monitor the companies which co-process industrial wastes into usable construction-related products, in bulk or not. This will assist in preventing those companies from utilizing wastes or processes different from those for which they are licensed, and ensure the correct use of the manifests.

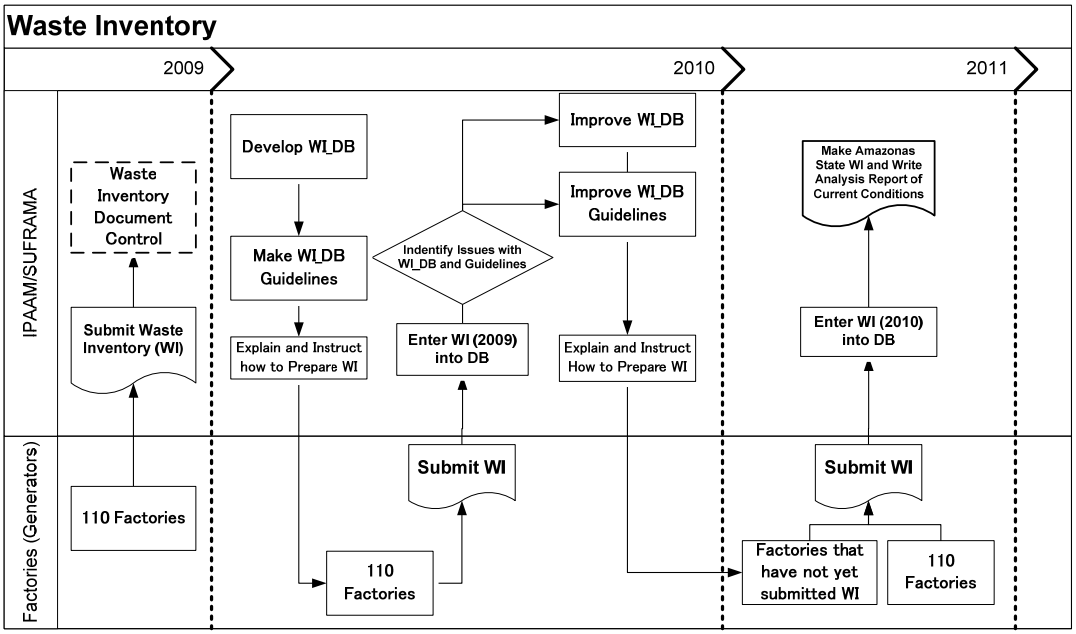
c. **Encourage Submission of Waste Inventory**

In accordance with CONAMA Resolution 313, in the State of Amazonas, all PIM factories are required to submit a waste inventory. However, only about 1/4 of the factories have complied with submitting their waste inventory. Meanwhile, IPAAM and SUFRAMA have made little progress in analyzing the waste inventories which have been submitted. Therefore, they have not yet submitted a report on waste inventories to the Brazilian Institute for the environment and Renewable Natural Resources (IBAMA)[1]. Based on these conditions, it is recommended that IPAAM and SUFRAMA follow the steps given below to encourage factories to submit the waste inventories.

1. In order to encourage the submission of waste inventories, the first step is to put a system in place to aggregate and analyze them in order to gauge the current conditions of industrial waste management and formulate an improvement plan, as required by CONAMA Resolution 313.
2. To do so, guidelines were written to instruct how data will be entered in a uniform fashion into a waste inventory database (WI_DB), developed in this study.
3. In order to analyze the aggregated data from the waste inventories entered into the WI_DB to understand current conditions on industrial waste management in PIM, it is essential to standardize the data entry methods. To do so, it is presumed that the person at each factory in charge of writing the waste inventory will collaborate in producing the inventory and have a good understanding of how to fill out the forms. Therefore, a certain amount of time will be necessary until the uniform data input is achieved for all PIM factories.
4. A number of improvements will need to be made to the WI_DB and related guidelines developed in this study in order to sufficiently comply with the requirements of CONAMA Resolution 313. IPAAM/SUFRAMA will first focus on the factories that submitted waste inventories in 2009[2], provide them with guidance concerning how to write the inventory for the WI_DB format, and then analyze the inventories that are submitted. This process will clarify any issues related to factories properly making the WI so that the WI_DB and guidelines can be improved. In other words, this will improve the WI_DB and guidelines developed in this study for data on actual conditions at PIM factories.
5. After the improvement of them, public information and guidance will be provided for all PIM factories so that the waste inventories will be submitted.

[1] CONAMA Resolution 313, Article 6 obligates the environmental agency in each state to submit the report.
[2] In 2008 110 factories have submitted.

6. SUFRAMA should require companies, in the requirements to receive tax benefits, to link to the respective DB and the manifests system, as well as to submit a Wastes Management Plan.



WI (Waste Inventory), **WI_DB** (Waste Inventory Database)

Figure 5-7: Promote Submission of Waste Inventories

d. Confirm Final Destination

In order to "establish a system for appropriate industrial waste management", it is necessary to construct a tracking system that ensures wastes are properly treated and disposed of after being discharged from the generation source until they reach their final destination. To do so, IPAAM requires a waste manifest be submitted when granting environmental (operation) licenses. However, no specific format or system has been designated so tracking efforts have not been established satisfactorily. In order to confirm proper treatment and disposal until final destination, it is recommended that IPAAM uses the following measures.

1. Immediately establish and normalize waste manifest documents and a system for the State of Amazonas.
2. Until the documents and system are established and normalized, in order to clarify responsibility of the factories which discharge wastes, and for their own legal protection, instruct them to demand that the collector submit the waste destination certificate together with the respective units of measurement (in weight).
3. Once the documents and system are ready, instruct all related parties, from the generator to final destination, to submit the waste manifest documents.

The Wastes Manifest System (WMS) should include both public and private entities which generate or receive wastes, with the exception of municipal wastes.

5.5.3 Using the Waste Inventory Database (WI_DB)

As shown in the following image, the WI_DB system will clarify the waste management conditions at each factory (see a.1, below). This is made possible if each factory correctly fills out files on the system (if the factories complete the waste inventory). Then, based on what is known about these conditions, it is possible for each factory to formulate a management plan for industrial waste (see b.1).

Next, the factories will use the system files to prepare their WI, and if the individual results are compiled for the industrial park, it is possible to know the waste management conditions for it (see a.2). Then, based on what is known about the waste management conditions of the industrial park, it is possible to each industrial park to formulate their own industrial waste management plan (see b.2).

If the same is done in each State, it is even possible to clarify the waste management conditions for the country (see a.3, a.4), and formulate an industrial waste management plan .

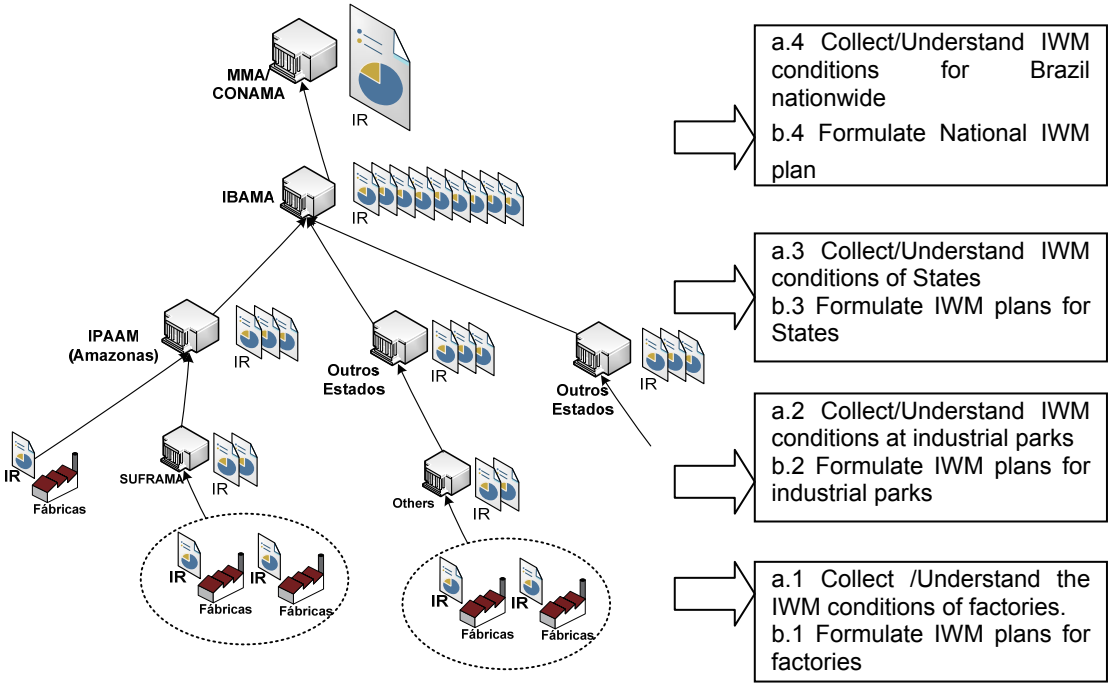


Figure 5-8: Using the WI_DB system and its relationship to understanding waste management at the factory, industrial park, state and national levels

IPAAM uses the waste inventory database (WI_DB) and produces the following reports, which are then submitted to IBAMA, the Brazilian Institute for the Environment and Renewable Natural Resources. Also, based on these reports, and cooperating with generators and waste service companies, it is necessary for IPAAM to drive toward establishing a system for the appropriate management of industrial wastes in Amazonas State.

- Amazonas State Industrial Waste Management Status Report
- Amazonas State Industrial Waste Management Improvement Plan

Furthermore, SUFRAMA would be able to cooperate with IPAAM, as necessary, utilizing the WI_DB, to produce an Industrial Waste Management Status Report and formulate an Industrial Waste Management Improvement Plan for PIM.

5.5.4 Using the Waste Manifest (WM) and Waste Service Company Database (WSC_DB)

a. **Using the Waste Manifest (WM)**

The waste manifest is a system for each factory to submit their summary report to IPAAM, as shown in Figure 5-4: The Proposed Waste Manifest System. Also, when waste service companies obtain their operation license (OL), they will submit a report of the waste manifest, including the Final Destination, to IPAAM.

IPAAM will analyze the waste inventory database (WI_DB) and use those results, as well as the above-mentioned waste manifest summary reports as reference to clarify the status of industrial waste management in Amazonas State and uncover any issues that may exist.

b. **Using the Waste Service Company Database (WSC_DB)**

As written in Section 5.5.2 "Legal Enforcement", in order to eliminate non-licensed companies and control improper disposal, IPAAM must make effective use of the waste service company database (WSC_DB). Of particular importance is that the clients of waste service companies in the industrial sector—the waste generators—are provided the most up-to-date and accurate information as possible.

5.5.5 Improving Industrial Waste Management and Promoting 3R

In March 2010, the National Congress approved the Substitute of Draft Bill No. 203, National Policy on Solid Waste, which stresses appropriate treatment and disposal, and the 3Rs. Regardless of on- or off-site disposal, strengthening regulation is the most effective means to promote proper treatment and disposal, and the 3Rs.

Namely, if the administrative side (IPAAM) develops a management system and strengthens control of appropriate treatment and disposal, the off-site disposal fee will be raised. By raising the off-site disposal fee, it will not be possible for generation sources (i.e. factories) to commission 95% or more of the waste generated, as it is now. The result is that PIM factories, like those in Japan, will promote on-site 3R and reduce the amount disposed of off-site.

Also, in response to regulations and putting various environmental measures in place, disposal costs will rise even for off-site treatment and disposal. With that, waste service companies will want to reduce the disposal costs by reducing the amount of residues after treatment or by actively reusing or recycling residues. In states with more advanced destination practices, such as Rio de Janeiro, co-processing is widely used, mainly by cement factories which do not generate any waste after processing.

In order to encourage co-processing at cement factories, in addition to introducing a disposal fee, waste blending techniques that do not affect product or cement quality will need to be introduced. With that, to encourage even better treatment and disposal techniques and 3R measures, IPAAM should be encouraged to not only strengthen regulation, but to actively provide information to both waste generators and WSCs about appropriate treatment and disposal and the 3Rs, and offer training and guidance where needed. Furthermore, ideally, IPAAM would hold a training seminar for both waste generators and WSCs with the cooperation of stakeholders from states and countries with more advanced practices.

Finally, IPAAM should instruct the companies to elaborate their Wastes Management Plan, the basic instrument used to devise rational and economic handling and destination, including the procedures to minimize the wastes and costs they bear.

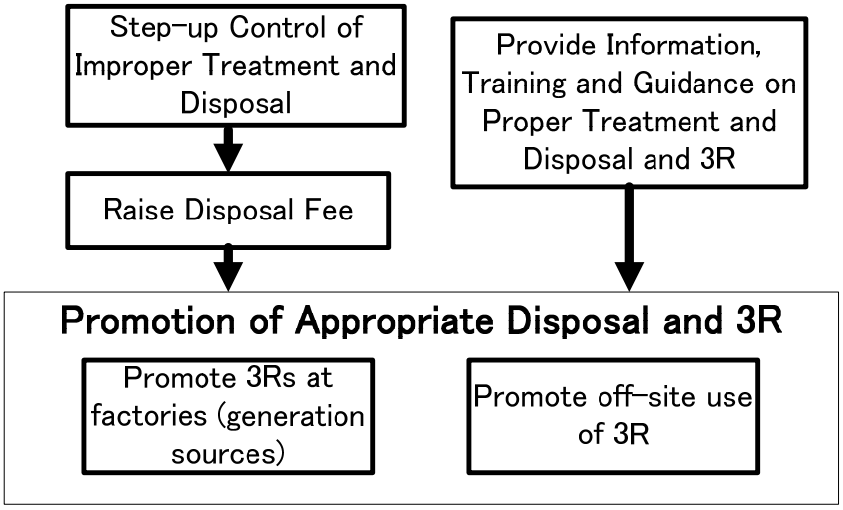


Figure 5-9: Promotion of Appropriate Disposal and 3R

5.6 Good Examples of IWM

5.6.1 Good Examples of Industrial Waste Management at Generation Sources (Factories)

Since the 1990s, many factories in Japan have been aiming for "Zero Emission" from their factories due to the following reasons:

- Since the off-site disposal cost is extremely expensive--especially the landfill disposal fee--they shall reduce, reuse and recycle waste in the factory as much as possible to reduce the cost of IWM.
- The Japanese Government set up a waste management policy, "Recycling-based Society ", through the Basic Law for Establishing the Recycling-based Society (enacted in 2000); and
- Recently, consumers tend to support companies they consider to be environmentally friendly.

"Zero Emission" is the concept that there is "zero" waste going to the landfill from a factory. The Manaus municipal landfill takes waste at no charge so it is unlikely that most PIM factories would enact waste management in the way that Japanese factories have. Nevertheless, if the Manaus landfill becomes fee-based as proposed in the Master Plan and things proceed similar to other Brazilian States, it should be possible for factories in PIM to work toward a similar situation as Japanese factories in the near future. As such, five counterpart personnel received training in Japan from the end of January to early February 2010, receiving training on efforts at the following two places.

- Kokubo Industrial Estate
- Honda Suzuka Factory

a. **Kokubo Industrial Estate**

The Kokubo Industrial Estate is a 958,400 square meter area established in 1975 which now has 28 factories (as of April 2009), and 5,041 employees. The total production value in 2008 was 363.7 billion yen. Kokubo Industrial Estate is located inland, away from the ocean, in Yamanashi Prefecture, and a problem with the landfill was revealed in early 1990. As a result, all 28 companies began working together so that the industrial estate generated zero landfill waste.

A diagram of their activities to do so is shown below:

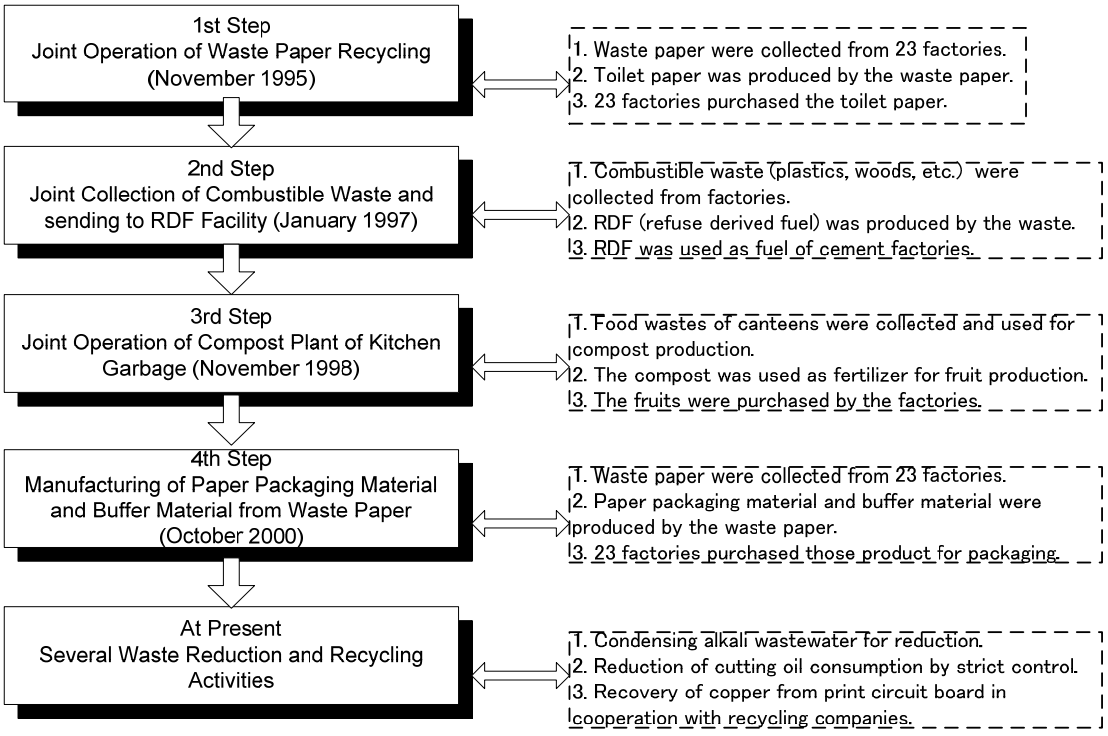


Figure 5-10: Kokubo Industrial Estate efforts for Zero Emission

b. **Honda Suzuka Factory**

Honda Suzuka Factory is one of the factories that achieved Zero-emission. Zero-emission is one of targets of the "Green Factory Plan" presented in the following figure. A Zero-emission team was created in the "Green Factory Project" in 1997. Zero-emission is defined as "No IWM for final disposal shall be discharged outside the factory". In 1999, Honda Suzuka Factory became the first zero-emission automobile manufacturing company in Japan.

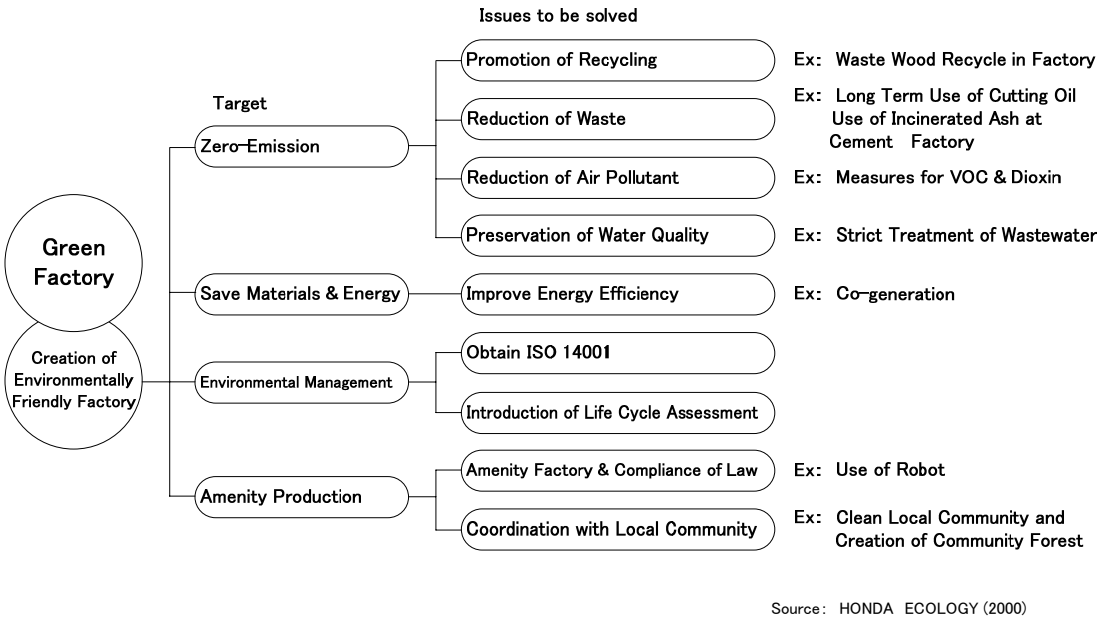


Figure 5-11: Green Factory Project of Honda Suzuka Factory

5.6.2 Good Example of Off-site IWM

a. Good Example of IW Administration in Japan: Waste Service Company Rating System and Environmental Fund in Iwate Prefecture

a.1 Introduction

Industrial waste administration in Japan is legally entrusted to prefectural and dedicated (large population) city governments by the central government according to a nationwide essentially uniform standard so that some regions are engaging in effort to promote appropriate industrial waste administration.

a.2 Background

Iwate Prefecture is located in Japan's northeast, with an area of approximately 15 thousand square kilometers and a population of around 1.4 million.

It is a picturesque prefecture largely dominated by primary industries such as agriculture, but in recent years had been wrestling to get to the bottom of a large-scale illegal dumping case near the border with Aomori Prefecture to the north, to prosecute those responsible and return conditions to normal.

In 1991, two WSCs of Iwate Prefecture, which has operation licenses for intermediate treatment (composting industrial wastes) but not licensed for landfill operations, had began illegal dumping of industrial wastes, including hazardous wastes. Those industrial wastes were mainly brought from the Tokyo metropolitan area. In 1999 the WSCs were prosecuted for illegally dumping of 920,000 m3 of industrial wastes (IW). The WSCs went bankrupt and the Prefectural Government was left responsible for the clean-up costs in 2000. Iwate Prefectural Government found generators which entrusted their IW to those companies by 2010. In March 2010, 28 generators agreed to pay the clean-up costs.

This incident led to the introduction of a waste service company (WSC) rating system & environmental fund system in Iwate Prefecture.

a.3 System Summary

As detailed below, a WSC rating system and an environmental fund system were established based on Iwate Prefecture's "Ordinances for a Recycling-based Society".

a.3.1. Rating System

The prefecture announced a system to approve waste disposal contractors (and rate them) according to a prescribed and fixed standard. Waste Service Companies (WSCs) that are approved (and rated) can expect more social trust, and generators of waste have meaningful information to select preferred WSCs. Those companies are rated into one of 3 levels that is valid for 2 years.

a.3.2. The Fund

WSCs prepare a fund to be set aside for unforeseen incidents, which would be returned if it is necessary to deal with urgent incidents. Each company contributes 1 million yen, or 500 thousand yen for members of the Iwate Prefecture Industrial Waste Consortium, which operates the fund. Thanks to this fund, WSCs are able to appeal to waste generators with more reliable disposal qualification.

a.3.3. Public Announcement

The ratings and fund contributors are publicly announced on a website and in local newspapers.

Number of Companies (F.Y. 2008)

Rated WSCs:	54
Fund Contributors:	81

a.4 Results

Waste generators are able to select preferred WSCs, fostering preferred operators and eliminating malicious ones.

WSCs raise their awareness through participating in the system and improve self management and regulation.

a.5 Application to Improve Industrial Waste Management in Manaus

Fostering healthy WSCs is a key issue and lies at the heart of this guideline. Introduction of this system would further clarify and foster preferred operators, and the introduction of an environmental fund will enable reliable and assured service to waste generators

b. Sao Jose Dos Campos Landfill of Sao Paulo State

b.1 Outline of the Landfill

The Sao Jose Dos Campos Landfill is the first HW landfill in Brazil, established in 1985. It is also the first landfill in Brazil to have received ISO 14000. Now its area has been expanded up to 756,000 m^2. The HW landfill has been developed step-by-step and its operation area is limited. Each landfill is 120m (Length) x 30m (Width) x 8m (Height) with a roof. Each site must receive an operation license.

Current HW Landfill

New HW Landfill under Construction

b.2 Good Example

In 2007, Sao Jose Dos Campos City refused to accept hazardous wastes as well as non-hazardous industrial wastes. The factories requested that non-hazardous industrial waste be accepted at a private hazardous waste landfill, Sao Jose Dos Campos Landfill. Then, from 2007, the HW landfill began operations to dispose the Class II-A waste (Non-HW) of factories. Accordingly, the municipal regulation has provided a new business opportunity for the private entity, and has contributed to the city to avoid mixed disposal of low-risk municipal waste with non-hazardous industrial waste that was at high risk of being mixed with hazardous waste.

Current Non-HIW Landfill

Previous Non-HIW Landfill

c. A Blender for a Cement Factory in Curitiba State

c.1 Outline of the Blender

Processa Tecnologia Ambiental Ltda is a blender for the cement factory, Rio Blanco Factory of Votorantim in Curitiba. The Processa Tecnologia Ambiental Ltda had a license for blending waste in 2003 from SEMA (State Environmental Agency of Parana). It is operation a blending factory of area 16,800 m^2 in the suburb of Curitiba City. The factory receives the Class I waste (hazardous waste) except PCB, etc. The blending factory locates 38km from the Rio Blanco Cement Factory. The Rio Blanco Cement Factory produces 10,000ton/day of clinker and 15,000 ton/day of cement. There are 5 to 7 blenders for the cement factory and 3 are in the compound of the cement factory. The cement factory receives 200 ton/day of the

Class I waste in total and 1/4 of it, i.e. 50 ton/day, is brought from the Blender. The Blender charges the following price for the treatment of the Class I waste, i.e. blending wastes:

- Sludge: 350 R$/ton without transportation. Then 90 – 100 R$/ton to be paid for the cement factory
- Solid wastes to be shredded: 700 R$/ton without transportation. Then 90 – 100 R$/ton to be paid for the cement factory

Shredding IW

Screening IW

c.2 Good Example

Co-processing of IW at a cement plant including hazardous waste is an ideal treatment method of IW treatment because it will not generate residues after processing. And it is very common in industrialized countries including Japan. However, although there is a bid cement plant in PIM, co-processing of IW at the cement plant is very limited in Manaus due to none existence of blenders and their market. The blender for a cement factory in Curitiba State provides a good example for the promotion of co-processing at a cement plant.

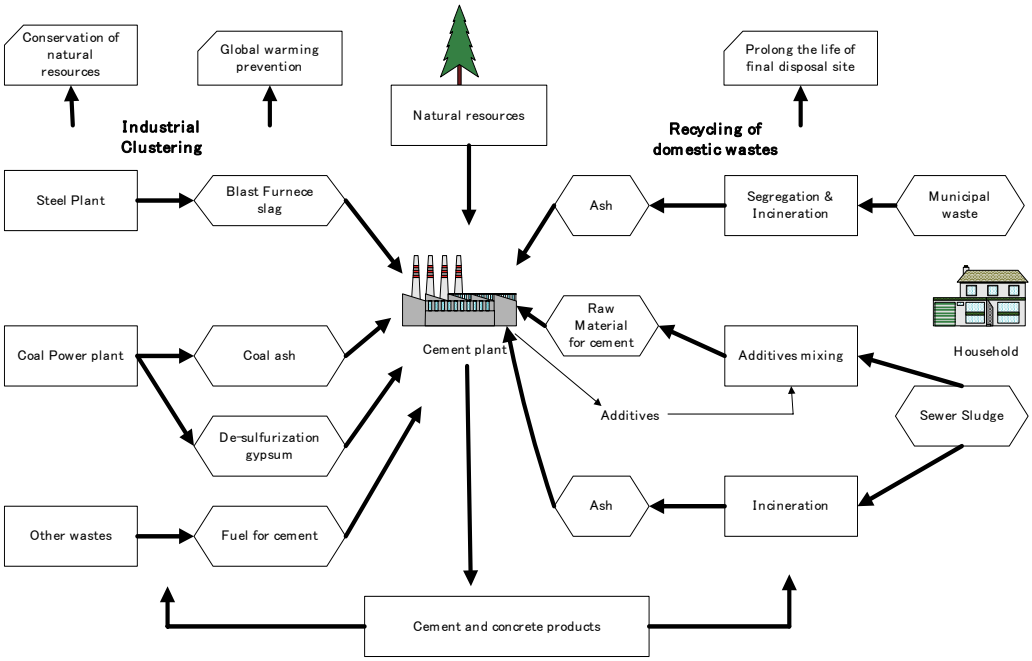
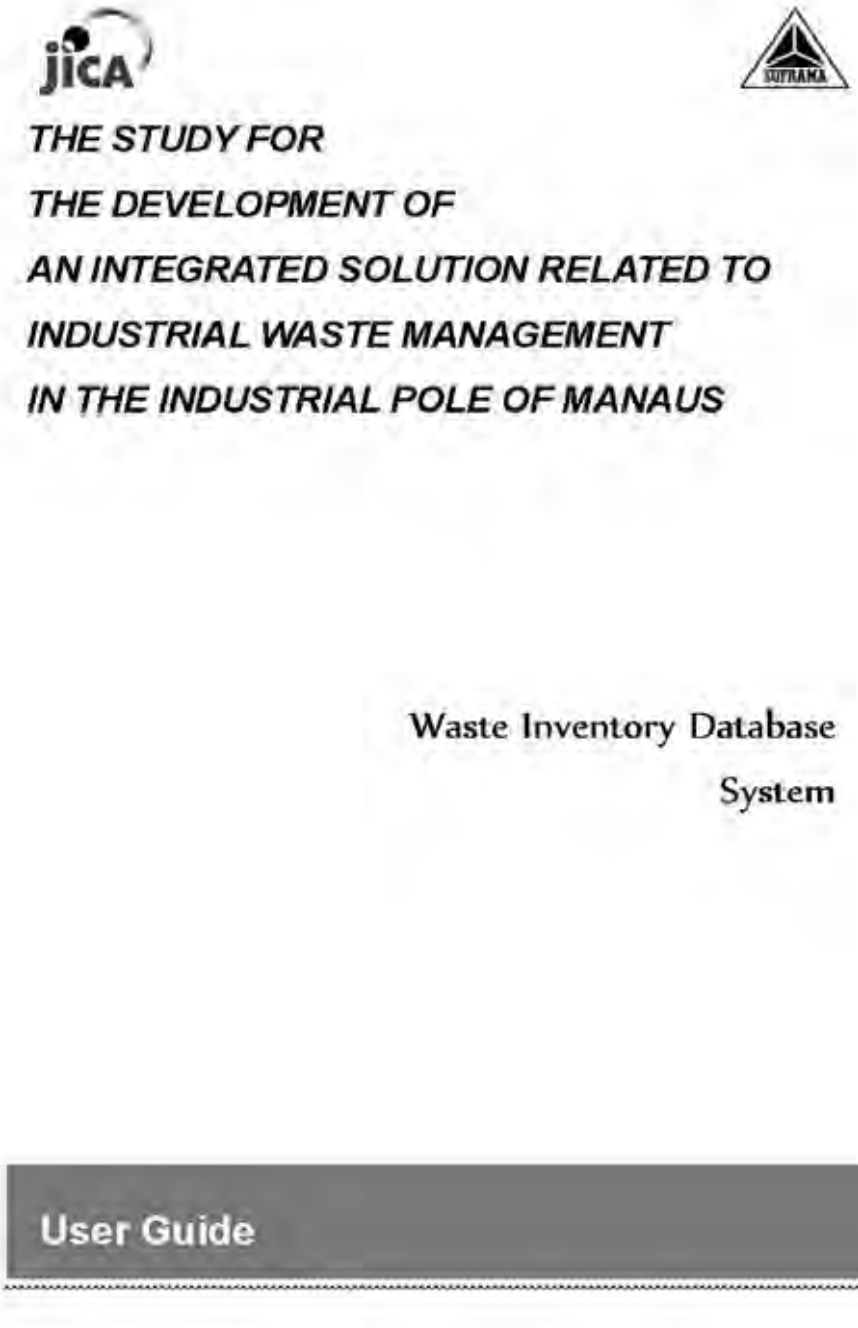


Figure 5-12: Promotion of Co-processing at a Cement Plant

5.7 WI_DB System User Guide



Contents

1 Purpose

Registered factories currently make waste inventories based on CONAMA Resolution 313 and submit these to IPAAM. Once these are processed and analyzed, it is possible to gauge the current conditions of industrial waste management and then formulate plans to resolve any issues.

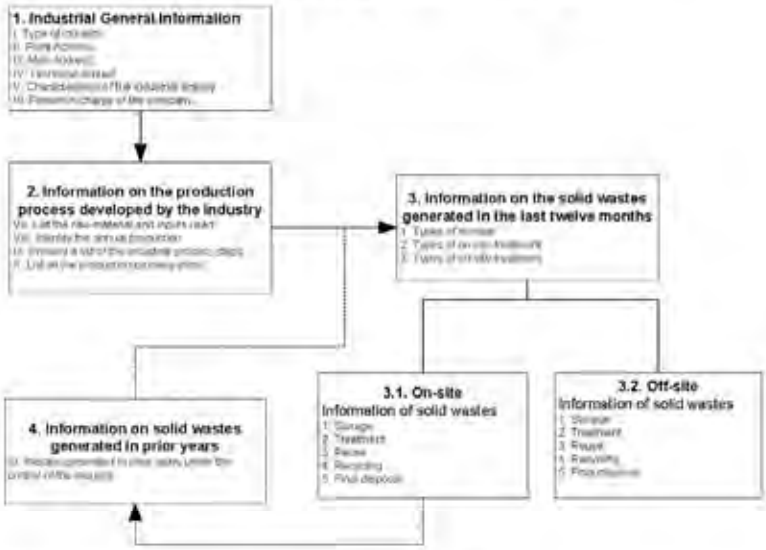
However, there are differences in how waste inventories are filled out by the factories. Therefore, IPAAM and SUFRAMA need a great deal of time to process the data, so the inventory hardcopies are filed and kept. Although a system for the waste inventories was introduced in 2002, IPAAM have been not able to report the current conditions of IWM in PIM to IBAMA and the factories which submit the waste inventories.

To resolve this problem, IPAAM and SUFRAMA have decided to unify how factories fill out the waste inventory and create a waste inventory database (hereafter, WI_DB) for those which are reported. This WI_DB will be used to establish a sound management system for all industrial waste.

2 CONAMA Resolution 313

Forms and information required by CONAMA to present the waste inventory report

2.1 Scheme of the information required by CONAMA resolution



2.2 Form to be submited (industrial waste inventory- CONAMA)

I. Factory General Information:

	Reference Period			
	Initial date:		Final date:	

II. Plant address:

Street N°:			
Suburd/District:		ZIP:	
Municipality:		Telephone:	
OGC/TE:		CNPJ:	

III. Mail address:

Street N°:			
Suburd/District:		ZIP:	
Municipality:		Telephone:	

IV. Technical Contact:

Name:		Job title:	
E-mail:			
Telephone:		Fax:	

V. Caracteristicas da atividade industrial:

1. Main industrial activity:				Código CNAE:	
2. Production time					
Hour/Day:		Day/Month:		Month/Year:	
3. Total number of employees					
Production:		Administration:		Others areas:	
4. Facilities (m²):					
5. Geographic coordinates of the industrial facilities:					
Latitude:	Degree:		Minute:	Second:	
Longitude:	Degree:		Minute:	Second:	

VI. Responsible of the Factory:

Name:		Job title:	
I declare, under the feathers of the Law, the truthfulness of the information rendered in the present form			
date / /			
Signature:			

Information on the production process developed by the industry

VII. List of the raw material and inputs used

Raw material and inputs	Actual quantity (year)	Maximum capacity (year)	Unit

VIII. Identify the annual production

Products	Actual quantity (year)	Maximum capacity (year)	Unit

IX. Present a list of the industrial process steps

Production process steps of the industry

X. Relate all the steps of the production process

Steps Name	Description
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	
13.	

Information on the solid wastes generated in the last twelve months

1. Waste code:			Description:			
Type of storage:						
Code:	Description:		Type of storage:		In the industry?	
Quantity (ton/year)?			Physical state:			
Geographic coordinates of the site:						
Latitude:	Degree:		Minute:		Second:	
Longitude:	Degree:		Minute:		Second:	

Information on the solid wastes generated – in the Industry

1. Treatment, Reuse, Recicling and final disposal in the industry		
Code:	Description:	Quantity (ton/year):
2. Treatment, Reuse, Recicling and final disposal in the industry		
Quantity (ton/year):	Quantity (ton/year):	Quantity (ton/year):
3. Treatment, Reuse, Recicling and final disposal in the industry		
Quantity (ton/year):	Quantity (ton/year):	Quantity (ton/year):

Information on the solid wastes generated – outside the Industry

1. Treatment, Reuse, Recicling and final disposal in the industry outside of the industry

Code of the destiny:		Description of the destiny:			
Company/Name of the destiny 1:	CGC/TE:	CNPJ:	Environmental license N°:		
Address of the destiny 1:					
Street/n°:		Municipality:		ZIP:	
E-mail:		Telephone:		Fax:	
Quantity(ton/year)?		Phisical state:			
Latitude:	Degree:		Minute:	Second:	
Longitude:	Degree:		Minute:	Second:	

XI. Information on solid wastes generated in prior years

Wastes generated in prior years under the control of the industry

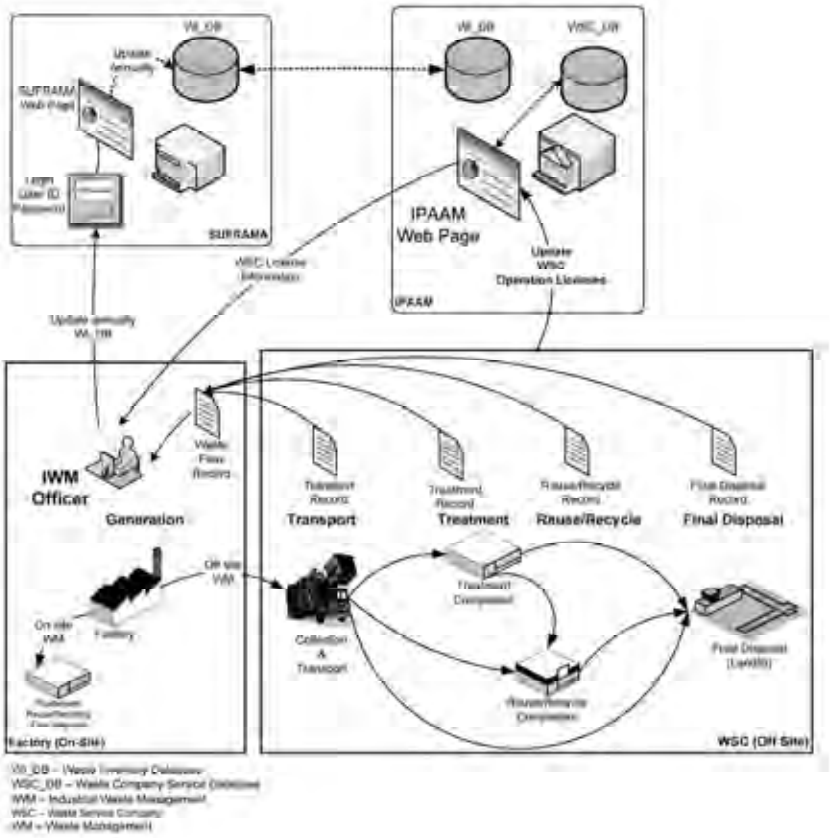
1. Waste code:	Description of the waste:				
Type of storage:					
Storage description:				In the industry?	
Quantity (ton/year)?		Phisical state:			
Posição geográfica do local:					
Latitude:	Degree:		Minute:	Second:	
Longitude:	Degree:		Minute:	Second:	

3 Waste Inventory Database (WI_DB)

3.1 General scheme of WI_DB

As shown in the next figure, the WI_DB will operate within next steps:

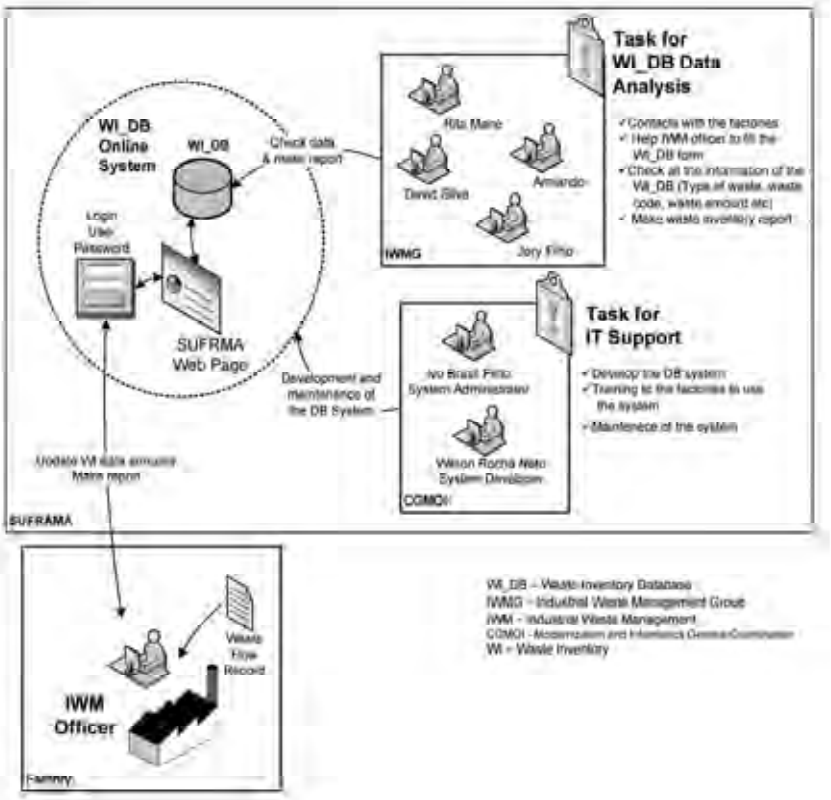
- The factory IWM officer will record all the information about the waste generation and their management (on site and off site transport, treatment, recycling and final disposal). Also from IPAAM web page check the licensed Waste Service Company (WSC).
- Annually the Factory IWM officer, will update the waste inventory in the SUFRAMA online WI_DB
- SUFRAMA waste management group will chek the WI_DB information and make waste inventory report and summit to the IPAAM



3.2 General Scheme for implementation of the WI_DB

As shown in the next figure to implement a WI_DB, SUFRAMA establish a group of human resources (IWMG) and support of the IT department (CGMOI). The CGMOI department will develop and maintain the online system to manage de WI_DB and IWMG will manage all the information on the database.

- The IWMG will help and support to all IWM officer of the factories to fill in the waste inventory information in a uniform WI_DB system
- The IWM officer of the factories will record all the information of generated waste within a year and update the waste inventory information annually using the online system



3.3 Information needed for update waste inventory

a. General information of the factory

b. List of input raw material

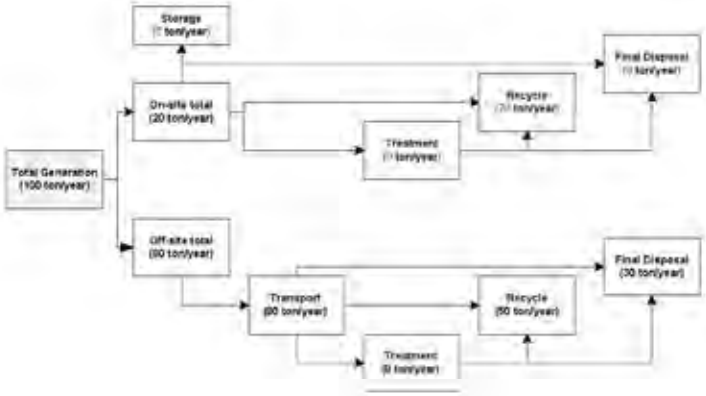
c. List of the product amount and production process

d. Information of the generate waste

- Select waste code for each waste from CONAMA waste category or JICA waste category
- Record the information of each generated waste amount and if they are manage on site or off site
  - On-site (information about storage, treatement, recycle and final disposal)
  - Off-site (information about storage, treatement, recycle and final disposal)
- To obtain the waste stream as shown in the figure will be necessary record the next WSC informations
  - Tranport: General information of the transport company, waste amount

transported for each company

- Treatmen: General information of the treatmen company, waste amount and type of treatment made by each company
- Recycling: General information of the recycling company, waste amount and type of recycle made by each company
- Final disposal: General information of the final disposal company, waste amount and type final disposal



3.4 How to fill the WI Report form

3.4.1 F1. Factory General Information

Field	Data	Remark
Company Registration Number:		
Suframa Registration N.		
Company Name		
Mail address:		
Street/n.:		
Suburb/District:		
Municipality:		
ZIP:		
Telephone:		
Technical contact:		
Name:		
Job-Title:		
E-mail:		
Telephone:		
Fax:		
Characteristics of the industrial activity:		
Main industrial activity:		
CNAE Code:		See CNAE List
Latitude:		GPS Measure in Degree/Min/Sec
Longitude:		GPS Measure in Degree/Min/Sec

3.4.2 F2 Waste Inventory

Field	Data						Remark
Information on the wastes inventory							
ID_Inventory_Waste							Generated by the system
Company Reg. N.							
Submission Date							
Initial Date							
Final Date							
Year							
Note							
Address of the industrial unit:							
Street/n:							
Suburb/District:							
Municipality:							
CGCTE							
ZIP:							
Telephone:							
Technician: (In charge of the solid wastes management)							
Name:							
Job-Title:							
E-mail:							
Telephone:							
Fax:							
Characteristics of the industrial activity:							
Production time	Hours/ day:		Days/ month:		Months/year.		
Total number of employees	Production:		Administration:		Other areas:		
Facilities (m²)							
Geographic coordinates of the industrial facilities:							
Latitude							GPS Measure in Degree/Min/Sec
Longitude							GPS Measure in Degree/Min/Sec

3.4.3 F2.1. Input raw materials

ID		Raw material and inputs	Actual quantity (a year)	Maximum capacity (a year)	Unit
1	1	Inputs 1	20	100	Ton/year
1	2	Inputs 2	30	100	Ton/year
1	3	Inputs 3	40	100	Ton/year

3.4.4 F 2.2 List of Product

		Products	Actual quantity (a year)	Maximum capacity (a year)	Unit
1	1	Product 1	100	150	Qnt
1	2	Product 2			
1	3	Product 3			

3.4.5 F 2.3 Production Process

	Production Process	Description	Observation
1	No	Restaurant waste	
1	Yes	Product 1, line 1, step 2	
1	Yes	Product 1, line 1, step 3	

3.4.6 F 2.4 Generated Waste

Field	Data	Observation
ID_Inventory_GeneratedWaste		Generated by the system
ID_Inventory_Waste		Generated by the system
ID Production process step	Product 1, line 1, step 2	Selection of the production step
Generated wastes		
Category of the waste:	IW (Industrial wastes)	Select from the Wastes Table
Type of waste:	Non-HW (Non-Hazardous industrial wastes)	Select from the Wastes Table
CONAMA waste code:	A009 (Wood wastes containing non-toxic substances)	Select from CONAMA Wastes Table
IPAAM/SEMA waste code:	NW03 (Wood)	Select from JICA Wastes Table
Physical state:	Solid	
Description of the waste:	Wood chips	
Unit code		Ton/year
Total generation	100	Total generation of wastes
Total on-s/te	0	Total of on-site management
Total off-s/te	100	Total of off-site management
Observation	All treated off-site	

3.4.6.1 Form. 2.4.1 Information on the flow of which waste generated

Field	Data	Observation
ID_Inventory_GeneratedWaste		Generated by the system
ID_Inventory_GeneratedWaste		Generated by the system
Flow of the generated wastes		
ID On Off:	Off	
Type of collection:	Private	Own or Private
Transport		
ID Transport CNPJ		CNPJ of the company holding an IPAAM license
Quantity	100	
Observation	Transport 1	
Treatment		
ID Treatment CNPJ		CNPJ of the company holding an IPAAM license
Treatment code		Select from the treatment type table
Quantity	0	
Observation		
Recycling		
ID Recycling CNPJ		CNPJ of the company holding an IPAAM license
Recycling code		Select from the treatment type table
Quantity	0	
Observation		
Final Disposal		
ID Final Disposal CNPJ		CNPJ of the company holding an IPAAM license
Final disposal code		Select from the DF type table
Quantity	100	
Observation	Disposal site 1	
Storage		
Storage code		Select from the storage code table
Description of the site		
Latitude		GPS Measure in Degree/Min/Sec
Longitude		GPS Measure in Degree/Min/Sec

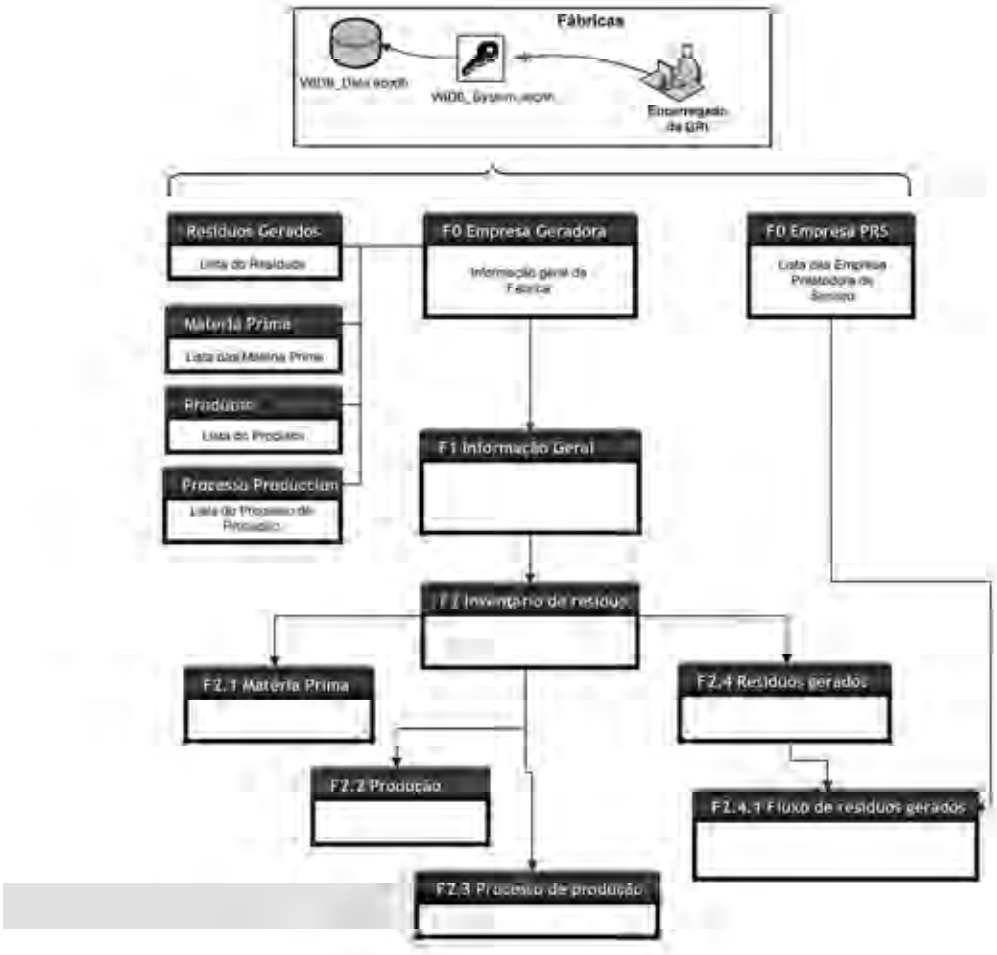
3-4.7 Sample of how to fill in the generated waste information

ID_Wasteinventory	ID_Waste inventory_Waste	ID Production Process Steps	Waste Category:	Type of Waste:	CONAMA Waste Code:	IBCA Waste Code:	Physical State:	Waste Description	Unit code	Total Generation	On site total	Off site total	Note:
1	1	Product 1, line 1 (step 2	R II (Industrial Waste)	RINP (Non-Hazardous industrial waste)	A000 (Residues-western / environment non-toxic substances)	NA00 (Wood)	Solido	Residues of wood	ton/ano	100	0	100	All matter offsite
1	2	Product 1, line 1 step 4	R II (Industrial Waste)	RINP (Non-Hazardous industrial waste)	A001 (Residues of varrição of plant)	NA03 (Papel)	Solido	Residues of papel	ton/ano	1000	200	800	
1	3												
1	4												

4 Waste Inventory Database System (WI_DB System)

4.1 General scheme of WI_DB System

The WIDB system is developed with Microsoft Access 2007, each factory, can install this DB System in their desktop PC and, input the information of the generated waste and their corresponding flow. The next figure shows the general scheme of the DB system.



4.2 *Installation of the WI_DB System*

The WI_DB system is developed with Microsoft Access 2007, to use this system it will be necesary the Microsoft Access 2007 program. If the PC doesn't have installed Access, it will be necessary to install the "AccessRuntime.exe". The Microsoft Office Access 2007 Runtime enables to use Access 2007 applications to users who do not have the full version of Access 2007, this file can be downloaded by Microsoft web site.
(http://www.microsoft.com/downloads/details.aspx?FamilyId=D9AE78D9-9DC6-4B38-9FA6-2C745A175AED&displaylang=en)

The WI_DB system use 2 files, **[WIDB_Data.accdb]** that will have the information of the waste inventory and **[WIDB_System.accdb]** is the system that contain the form to manage the information.

- Make new folder **[C:¥WIDB¥]**
- Copy the 2 files **[WIDB_Data.accdb, WIDB_System.accdb]** to the folder **[C:¥WIDB¥]**
- Run the WIDB_System.accdb
- Always make a backup of the **[WIDB_Data.accdb]** because in this file you will store all the information.

4.3 *Using WI_DB System*

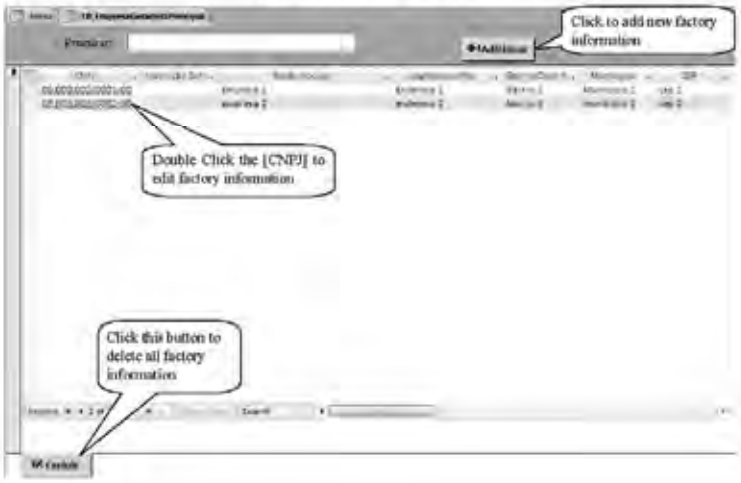
4.3.1 Start

In the folder **[C:¥WIDB¥]**double click **[WIDB_System.accdb]** to open the DB, and will appear the next form

4.3.2 General Information of the factory

4.3.2.1 Register new factory information

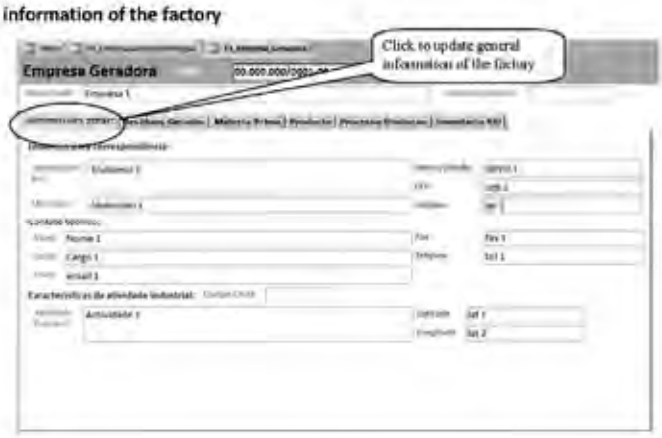
With this system you can manage the waste inventory of various factories.



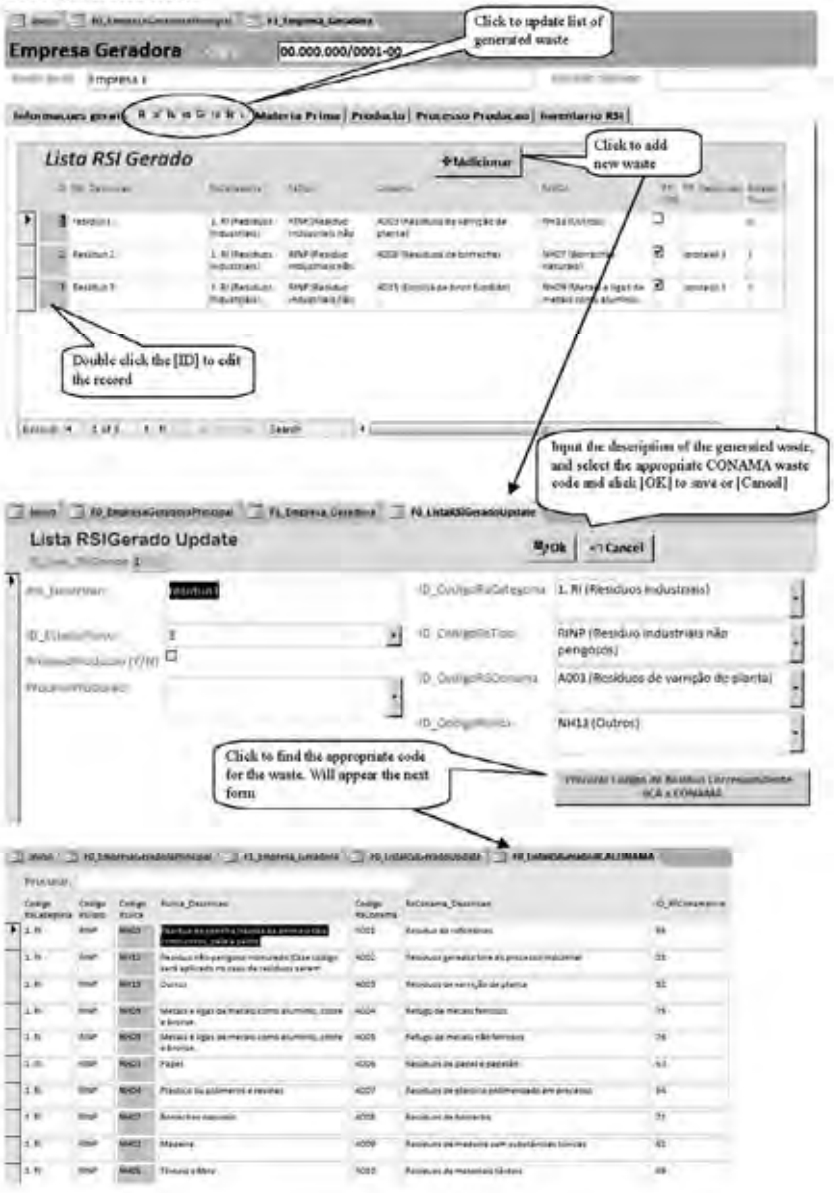
4.3.3 General information

Firstly it will be input all the general informations of the factory, and then make codification of the lists of generated waste, raw material, products and production processes, that will be used then in the system.

4.3.3.1 General information of the factory



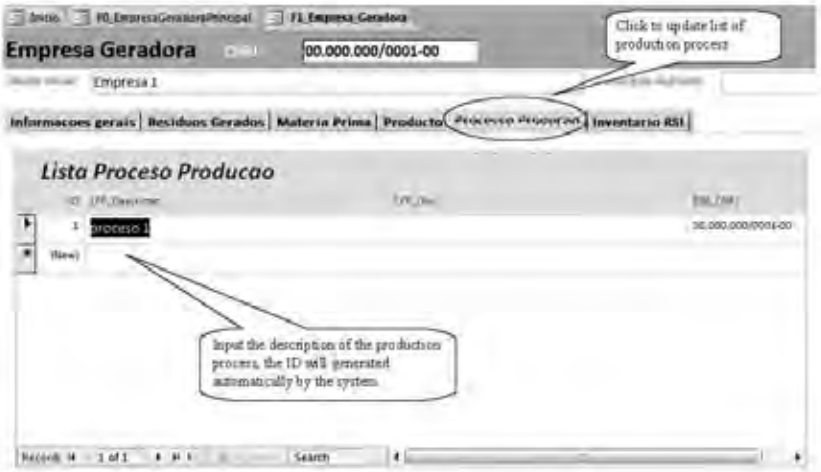
4.3.3.2 List of generated waste



4.3.3.3 List of Raw material

4.3.3.1 Product

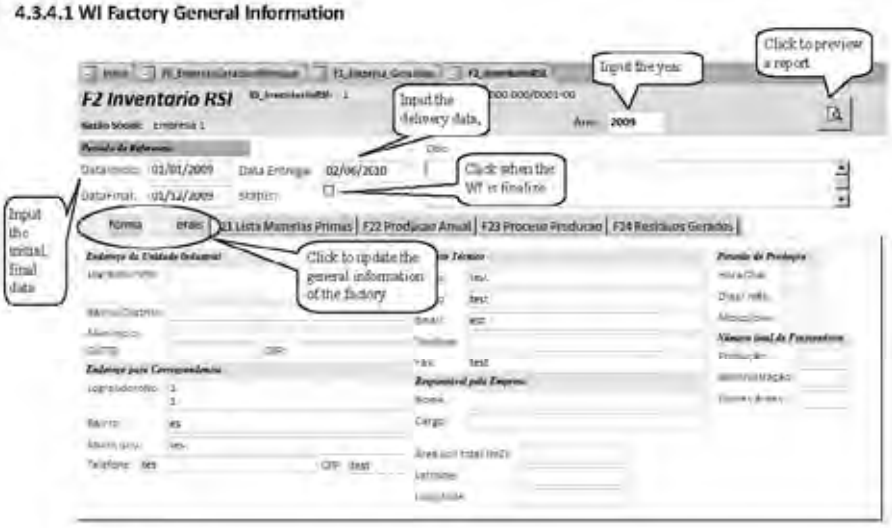
4.3.3.2 Production Process



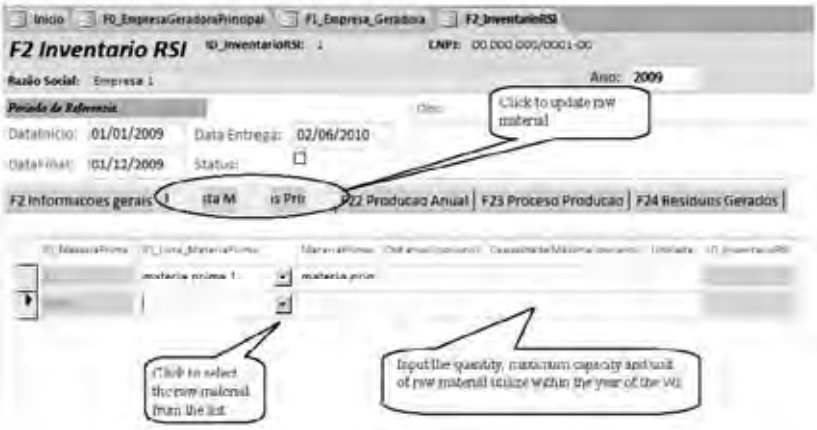
4.3.4 Waste Inventory

With this form will manage the waste inventory by year

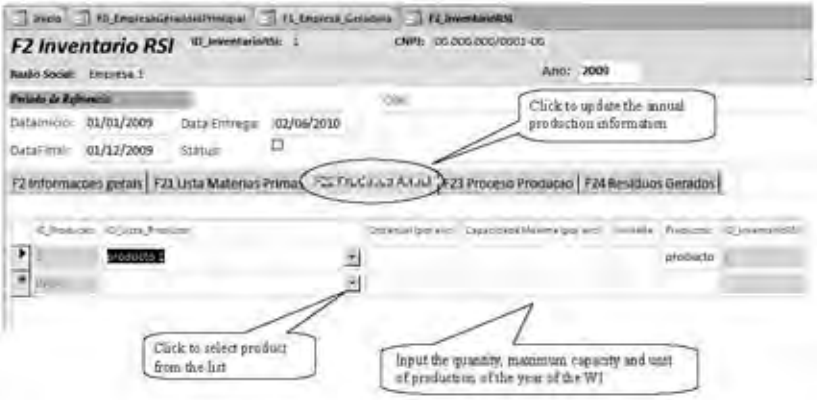
4.3.4.1 WI Factory General Information



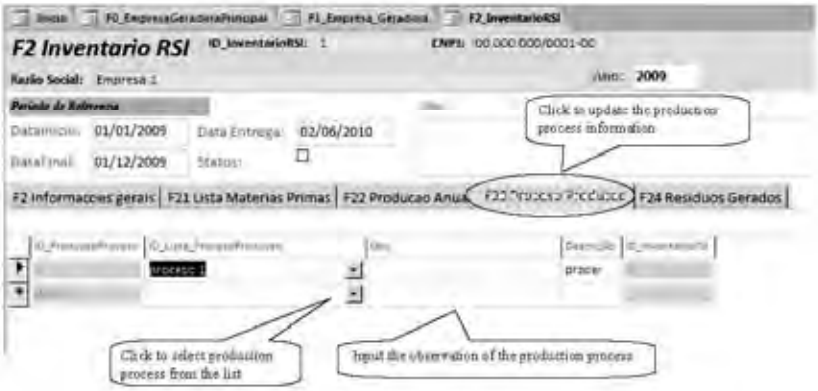
4.3.4.2 WI Raw Material



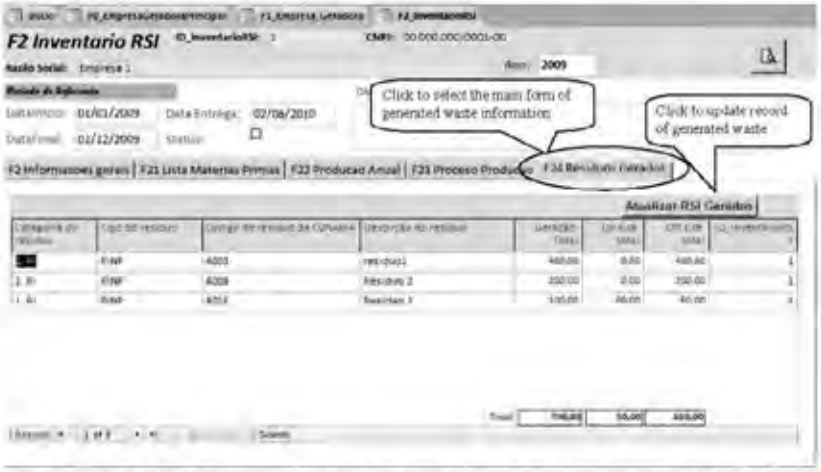
4.3.4.3 Annual Production



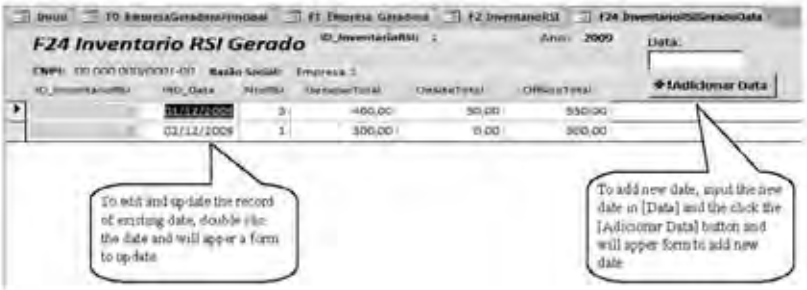
4.3.4.4 WI Production Process



4.3.4.5 WI Generated waste



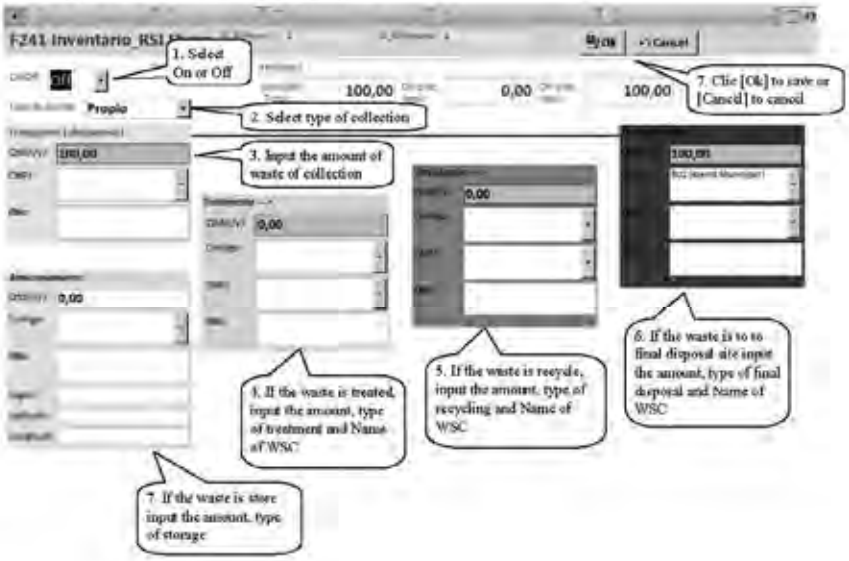
The information of the generated waste will be input by date, to update the record follow the next step



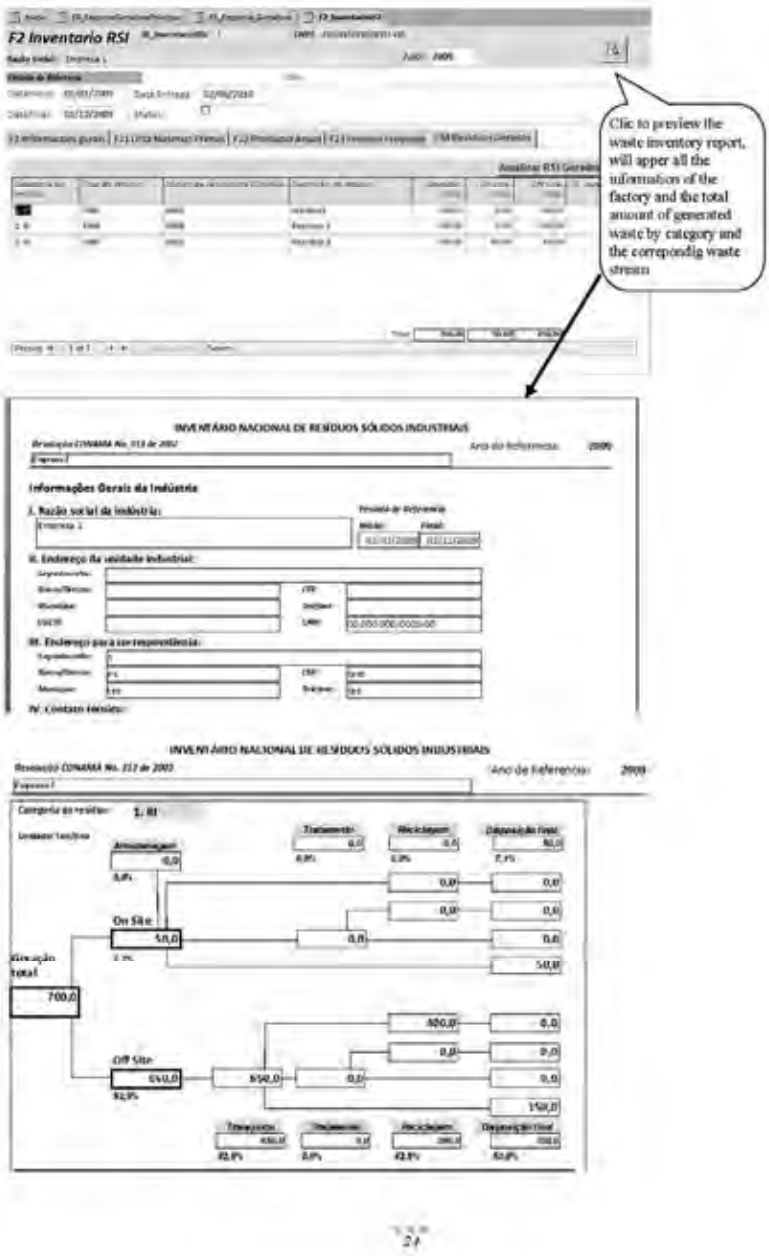
Add, edit and update waste record

Add, edit and update waste stream record

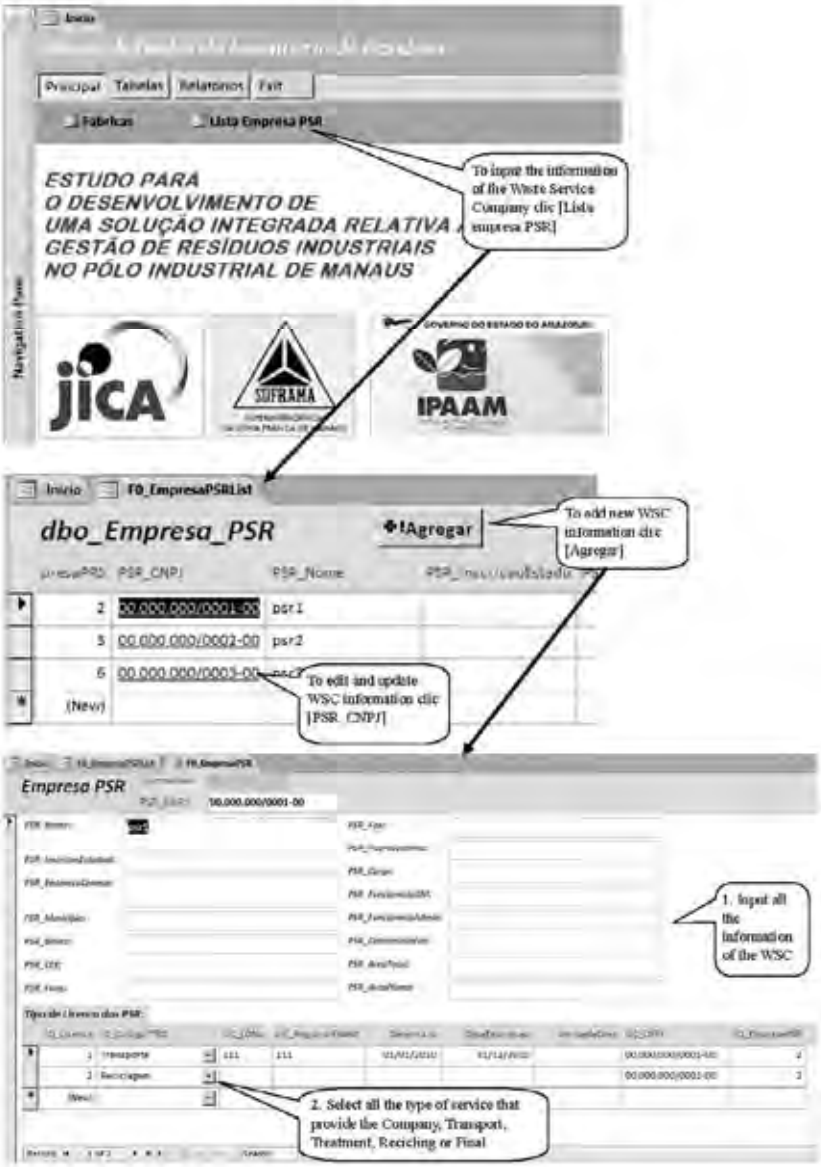
In this form it will be entered all possible waste streams, the total amount of the all waste stream it will be equal to the Amount of total generation



4.3.4.6 Preview report of the Waste Inventory



4.3.5 Information of the Waste Service Company



4.4 Tables

4.4.1 JICA waste category table

Category	Type	JICA Code	Description	Qty
1. RI	RINP	NH01	Kitchen waste (include waste from animal such as bone, skin, liver)	1
		NH02	Wood	1
		NH03	Paper	1
		NH04	Plastic or polymers and resins	1
		NH05	Textile and fiber	1
		NH06	Animal oil, Vegetable oil	1
	Non-Hazardous industrial waste	NH07	Rubbers and Leather	1
		NH08	Ash/dust from coal-fired power plants, etc.	1
		NH09	Metals and metal alloys such as aluminum, copper, bronze	1
		NH10	Ceramic & Glasses	1
		NH11	Stone, sand or material that have composition of soil such as tile, brick, gypsum, cement	1
		NH12	Mixed waste (This code shall be applied in case wastes are discharged without separation.)	1
		NH13	Others	1
Industrial Waste	RIP	HW01	Inorganic acid	1
		HW02	Organic acid	1
		HW03	Alkalis	1
		HW04	Toxic Compounds	1
		HW05	Inorganic Compounds	1
		HW06	Other Inorganic	1
		HW07	Organic Compounds	1
	Hazardous industrial waste	HW08	Polymeric Materials	1
		HW09	Fuel, Oil and Grease	1
		HW10	Fine Chemicals and Biocides	1
		HW11	Treatment Sludge	1
		HW12	Ash from incinerator	1
		HW13	Dust and Air pollution control (APC) products	1
		HW14	Other Hazardous substance (besides HW01-HW13)	1
		HW15	Mixed Waste	1
		HW16	Hazardous materials from Non-production process	1
1. RI Total				29
2. RM	Grupo_A	RMA1	Group A.1 Biologic	1
		RMA2	Group A.2 Animals	1
		RMA3	Group A.3 Body part	1
		RMA4	Group A.4 Patient care etc	1
Medical waste		RMA5	Group A.5 Prions	1
	Grupo_B	RMB1	Chemical etc	1
	Grupo_C	RMC1	Radioactive waste	1
	Grupo_D	RMD1	Common waste	1
	Grupo_E	RME1	Piercing or Cutting	1
2. RM Total				9
3. RC	Classe_A	RCA1	from construction, demolition, refitting and repair of pavement	1
		RCA2	from the construction, demolition refitting and repair of edification ceramic components	1
		RCA3	from manufacturing and/or demolition process of concrete pre-modulated pieces	1
Constructio n waste	Classe_B	RCB1	The recyclable waste for other purposes	1
	Classe_C	RCC1	Waste which has no economically feasible technology or applications which may allow it to be recycled	1
	Classe_D	RCD1	Hazardous waste arisen from construction process, such as paints, solvents, oils and so forth	1
3. RC Total				6
Total geral				44

4.4.2 CONAMA's waste category table

Category	Type	CONAMA code	Description	Qty
I, RI	RINP	A001	Residues of restaurant	1
		A002	Generated residues outside of the industrial process	1
		A003	Residues of varrição of plant	1
		A004	Ferrous metal scrap iron	1
		A005	Not ferrous metal scrap iron	1
		A006	Residues of paper and cardboard	1
		A007	Polymerized plastic residues of process	1
		A008	Rubber residues	1
		A009	Residues wooden I contend not toxic substances	1
		A010	Residues of têxteis materials	1
		A011	Not metallic mineral residues	1
		A012	Slag of aluminum casting	1
		A013	Slag of iron production and steel	1
		A014	Slag of brass casting	1
		A015	Slag of zinc casting	1
		A016	Sand of casting	1
		A017	Refractory ceramic residues and material	1
		A018	Solid residues not toxic metal composites	1
		A019	Solid residues of stations of treatment of effluent I contend material biological not toxic	1
		A021	Solid residues of stations of treatment of effluent I contend not toxic substances	1
		A022	Pastoses residues of stations of treatment of effluent I contend not toxic substances	1
		A023	Pastoses residues I contend lime	1
		A024	Bagasse of sugar cane	1
		A025	Fiber glass	1
	Residuos Industriais não perigosos	A026	Silts of tratamento I contend not toxic substances	1
		A027	Used catalysers I contend not toxic substances	1
Residuos Industriais		A028	Residues of system of control of not toxic gaseous emission I contend substance	1
		A029	Other not dangerous residues	1
		A099	Salty shavings	1
		A104	Metallic packings	1
		A105	Not ferrous metal packings	1
		A107	Bombonas of plastic not contaminated	1
		A108	Etil acetate residues emila	1
		A113	Lesified silts of boiler	1
		A117	Glass residues	1
		A199	Foam	1
		A204	Timbores metallic	1
		A207	Plastic films and small packings	1
		A208	Polyurethane residues (PU)	1
		A299	Caleadas shavings of skins	1
		A308	Silt of the caleiro	1
		A399	Atanado leather shavings, remnants	1
		A499	Carnaça	1
		A599	Residues organic of process	1
		A699	Rind of tree	1
		A799	Atanado leather Serragem, lean and dust	1
		A899	Generated residues outside of the industrial process (office, packings, etc.)	1
		A999	Residues of fruits	1
	RIP	C001, C009	Listing 10 - dangerous residues for containing volatile components	1
		D001	Dangerous residues for presenting inflammability	1
		D002	Dangerous residues for presenting corrosively	1
	Residuos Industriais perigosos	D003	Dangerous residues for presenting reactivity	1
		D004	Dangerous residues for presenting pathogenicity	1
		D005_D029	Listing 7 of Norm NBR 10004: dangerous residues characterized by the leaching test	1

Category	Type	CONAMA code	Description	No.
		D099	Other dangerous residues - to specify	1
		F001_F0301	Listing 1 of Norm NBR 10004- admittedly dangerous residues - Classroom 1, of non-specific sources	1
		F100	Bifamilas Policloradas - PCB's. Packings contaminated with PCBs also transforming and capacitors	1
		F102	Residue of catalysers not specified in Norm NBR 10.004	1
		F103	Deriving residue of industrial laboratories (chemical products) not specified in Norm NBR 10.004	1
		F104	Not specified contaminated empty packings in Norm NBR 10.004	1
		F105	Solvent contaminated (to specify solvent and the main contaminante)	1
		F130	Used lubricant oil	1
		F230	Hydraulic fluid	1
		F330	Cutting and heating oil	1
		F430	Used contaminated oil in isolation or cooling	1
		F530	Oil wastes from the water-oil separating system	1
		K001_K209	Listing 2 of Norm NBR 10004- admittedly dangerous residues of specific sources	1
		K051	Remaining portions and you explodes of inks and pigments	1
		K078	Residue of cleanness with solvent in the manufacture of inks	1
		K081	Silt of ETE of the production of inks	1
		K193	Shavings of leather tanned to chromium	1
		K194	Leather Serragem and dust I contend chromium	1
		K195	Silt of stations of treatment of effluent of tanning to chromium	1
		K203	Residues of laboratories of research of illnesses	1
		K207	It explodes of the used oil re-refining (it explodes acid)	1
		P001_P123	Listing 5 of Norm NBR 10004 - dangerous residues for containing toxic substances acutely	1
		U001_U246	Listing 6 of Norm NBR 10004- dangerous residues for containing toxic substances	1
1. RI Total				25
5. RM	Grupo_A	RMA1	Group A.1 Biologic	1
		RMA2	Group A.2 Animals	1
		RMA3	Group A.3 Body part	1
		RMA4	Group A.4 Patient care etc	1
Resíduos médicos		RMA5	Group A.5 Prions	1
	Grupo_B	RMB1	Chemical etc	1
	Grupo_C	RMC1	Radioactive waste	1
	Grupo_D	RMD1	Common waste	1
	Grupo_E	RME1	Piercing or Cutting	1
2. RM Total				9
3. RC	Classe_A	RCA1	from construction, demolition, refitting and repair of pavement	1
		RCA2	from the construction, demolition refitting and repair of edifications: ceramic components	1
		RCA3	from manufacturing and/or demolition process of concrete pre-moldated pieces	1
Resíduo de construção	Classe_B	RCB1	The recyclable waste for other purposes	1
	Classe_C	RCC1	Waste which has no economically feasible technology or applications which may allow it to be recycled	1
	Classe_D	RCD1	Hazardous waste arisen from construction process, such as paints, solvents, oils and so forth	1
3. RC Total				6
Grand Total				40

4.4.3 CONAMA's storage category

Code for atual generated waste	Code for waste geneted in the past	Description
S01	Z01	Barrel in waterproofing floor, protected area
S11	Z11	Barrel in waterproofing floor, unprotected area
S21	Z21	Barrel on the ground, protected area
S31	Z31	Barrel on the ground, unprotected area
S02	Z02	In bulk on waterproofing floor, protected area
S12	Z12	In bulk on waterproofing floor, unprotected area
S22	Z22	In bulk on the ground, protected area
S32	Z32	In bulk on the ground, unprotected area
S03	Z03	Covered dumper truck
S13	Z13	Uncovered dumper truck
S04	Z04	Tank with contention tray
S14	Z14	Tank without contention tray
S05	Z05	Bottle on waterproofing floor, protected area
S15	Z15	Bottle on waterproofing floor, unprotected area
S25	Z25	Bottle on the ground, protected area
S35	Z35	Bottle on the ground, unprotected area
S09	Z09	Lagoon with waterproofing
S19	Z19	Lagoon without waterproofing
S08	Z08	Other systems (specify)

4.4.4 CONAMA's treatment category

Treatment code	*Description*
T01	Incineration
T02	Incinerator with chamber
T05	Outdoor burning
T06	Detonation
T07	Oxidation of cyanide
T08	Chemical encapsulation/fixture or solidification
T09	Chemical oxidation
T10	Precipitation
T11	Detoxification
T12	Neutralization
T13	Adsorption
T15	Biologic treatment
T16	Composting
T17	Drying
T18	Land farming
T19	Thermal plasma
T24	Other treatments (specify)

4.4.5 CONAMA's recycling category

Recycling code	*Description*
R01	Use as industrial oven (except in heating ovens)
R02	Use in boiler
R03	Co-processing in cement ovens
R04	Blending of wastes
R05	Formulation of inforcements
R06	Incorporation in agricultural soil
R07	Fertilization and irrigation
R08	Animal reaction
R09	Reprocessing of solvents
R10	Re-refining of oil
R11	Reprocessing of oil
R12	Scrap iron collector
R13	On-site reuse/recycling/recovery
R99	Other forms of reuse/recycling/recovery

4.4.6 CONAMA's final disposal category

Final disposal code	Description
B01	Infiltration in the soil
B02	Municipal Landfill
B03	Own Industrial Landfill
B04	Third parties Industrial Landfill
B05	Municipal Dumping Site
B06	Private Dumping Site
B20	Sewer
B30	Other (specify)

4.4.7 Corresponding Waste category table JICA to CONAMA

Category	Type	JICA code		CONAMA code	
		Code	Description	Code	Description
1. RI	RINP	NH01	Kitchen waste (include waste from animal such as bone, skin, hair)	A001	Residues of restaurant
				A024	Bagasse of sugar cane
				A499	Carnaça
				A599	Residues organic of process
				A699	Rifnd of rice
				A999	Residues of fruits
		NH02	Wood.	A009	Residues wooden I contend not toxic substances
		NH03	Paper	A006	Residues of paper and cardboard
		NH04	Plastic or polymers and resins	A007	Polymerized plastic residues of process
				A107	Bombonas of plastic not contaminated
				A108	Bill accurate residues vanila
				A207	Plastic films and small packings
				A208	Polyurethane residues (PU)
		NH05	Textile and fiber	A010	Residues of textile materials
		NH06	Animal oil, Vegetable oil	Z999	?
		NH07	Rubbers and Leather	A008	Rubber residues
				A299	Caleados shavings of skins
				A399	Atanado leather shavings, remnants
		NH08	Ash/dust from coal-fired power plants, etc.	A111	Leached ashes of boiler
		NH09	Metals and metal alloys such as aluminum, copper, bronze	A004	Ferrous metal scrap iron
				A005	Not ferrous metal scrap iron
				A013	Not metallic mineral residues
				A012	Slag of aluminum casting
				A013	Slag of iron production and steel
				A014	Slag of brass casting
				A015	Slag of zinc casting
				A016	Sand of casting
				A104	Metallic packings
				A105	Not ferrous metal packings
				A204	Tambores metallic
		NH10	Ceramic & Glasses	A017	Refractory ceramic residues and material
				A025	Fibre glass
				A117	Glass residues
				A799	Atanado leather Serragem, lime and dust
		NH11	Stone, sand or material that have composition of soil such as tile, brick, gypsum, cement	Z999	?
		NH12	Mixed waste (This code shall be applied in case wastes are discharged without separation.)	A002	Generated residues outside of the industrial process
		NH13	Others	A003	Residues of varrição of plant
				A018	Solid residues not toxic metal composites
				A019	Solid residues of stations of treatment of effluent I contend material biological not toxic
				A021	Solid residues of stations of treatment of effluent I contend not toxic substances
				A022	Pastoon residues of stations of treatment of effluent I contend not toxic substances

Category	Type	JICA code		CONAMA code	
		Code	Description	Code	Description
				A023	Pastoso residues I contend lime
				A026	Slag of pirometalo I contend not toxic substances
				A027	Used catalysers I contend not toxic substances
				A028	Residues of system of control of not toxic gaseous emissions I contend substance
				A029	Other not dangerous residues
				A099	Salty shavings
				A199	Foam
				A308	Silt of the cisterns
				A899	Generated residues outside of the industrial process (office, packings, etc.)
	RIP	HW01	Inorganic acid	D002	Dangerous residues for presenting corrosively
				D003	Dangerous residues for presenting reactivity
				K207	It splodges of the used oil re-refining (it splodges acid)
		HW02	Organic acid	D002	Dangerous residues for presenting corrosively
				D003	Dangerous residues for presenting reactivity
		HW03	Alkalis	D002	Dangerous residues for presenting corrosively
				D003	Dangerous residues for presenting reactivity
		HW04	Toxic Compounds	F001_F0301	Listing 1 of Norm NBR 10004- admittedly dangerous residues - Classroom 1, of not-specific sources
				F103	Deriving residue of industrial laboratories (chemical products) not specified in Norm NBR 10.004
				F130	Used lubricant oil
				F230	Hydraulic fluid
				F330	Cutting and hauling oil
				F430	Used contaminated oil in isolation or cooling
				F530	Oil wastes from the water-oil separating system
				K001_K209	Listing 2 of Norm NBR 10004- admittedly dangerous residues of specific sources
				K193	Shavings of leather tanned to chromium
				K194	Leather Serragem and dust I contend chromium
				K195	Silt of stations of treatment of effluent of tanning to chromium
		HW05	Inorganic Compounds	D005_D029	Listing 7 of Norm NBR 10004 -dangerous residues characterized by the leaching test
		HW06	Other Inorganic	D005_D029	Listing 7 of Norm NBR 10004, dangerous residues characterized by the leaching test
		HW07	Organic Compounds	D003	Dangerous residues for presenting reactivity
				F001_F0301	Listing 1 of Norm NBR 10004- admittedly dangerous residues - Classroom 1, of not-specific sources
				F100	Bifenilas Policloradas - PCB's. Packings contaminated with PCBs also transforming and capacitors.
				F105	Solvent contaminated (to specify solvent and the main contaminants)
				F130	Used lubricant oil
				F230	Hydraulic fluid
				F330	Cutting and hauling oil
				F430	Used contaminated oil in isolation or cooling
				F530	Oil wastes from the water-oil separating system
				K001_K209	Listing 2 of Norm NBR 10004- admittedly dangerous residues of specific sources
				K053	Remaining portions and you splodges of inks and pigments
				K078	Residue of cleanness with solvent in the manufacture of inks
				K081	Silt of ETE of the production of inks
				P001_P123	Listing 5 of Norm NBR 10004 - dangerous residues for containing toxic substances acutely
		HW08	Polymeric Materials	D001	Dangerous residues for presenting inflammability
		HW09	Fuel, Oil and Grease	D001	Dangerous residues for presenting inflammability
				K207	It splodges of the used oil re-refining (it splodges acid)

"fl."

Category	Type	IBCA code		CONAMA code	
		Code	Description	Code	Description
		HW10	Fine Chemicals and Biocides	D001	Dangerous residues for presenting inflammability
				D004	Dangerous residues for presenting pathogenicity
				D005_D029	Listing 7 of Norm NBR 10004 - dangerous residues characterized by the leaching test
				F103	Derving residue of industrial laboratories (chemical products) not specified in Norm NBR 10.004
				K203	Residues of laboratories of research of illnesses
		HW11	Treatment Sludge	D005_D029	Listing 7 of Norm NBR 10004 - dangerous residues characterized by the leaching test
				K081	Silt of ETE of the production of inks
		HW12	Ash from incinerator	Z999	?
		HW13	Dust and Air pollution control (APC) products	Z999	?
		HW14	Other Hazardous substance (besides HW01-HW13)	C001_C005	Listing 10 - dangerous residues for containing volatile components
				D001	Dangerous residues for presenting inflammability
				D004	Dangerous residues for presenting pathogenicity
				D099	Other dangerous residues - to specify
				F102	Residue of catalysers not specified in Norm NBR 10.004
				F104	Not specified contaminated empty packings in Norm NBR 10.004
				U001_U246	Listing 6 of Norm NBR 10004 - dangerous residues for containing toxic substances
		HW15	Mixed Waste	Z999	?
		HW16	Hazardous materials from Non-production process	Z999	?
2. RC	Classe_A	RCA1	from construction, demolition, refitting and repair of pavement	RCA1	from construction, demolition, refitting and repair of pavement
		RCA2	from the construction, demolition refitting and repair of edifications: ceramic components	RCA2	from the construction, demolition refitting and repair of edifications: ceramic components
		RCA3	from manufacturing and/or demolition process of concrete pre-modulated pieces	RCA3	from manufacturing and/or demolition process of concrete pre-modulated pieces
	Classe_B	RCB1	The recyclable waste for other purposes	RCB1	The recyclable waste for other purposes
	Classe_C	RCC1	Waste which has no economically feasible technology or applications which may allow it to be recycled	RCC1	Waste which has no economically feasible technology or applications which may allow it to be recycled
	Classe_D	RCD1	Hazardous waste arisen from construction process such as paints, solvents, oils and so forth	RCD1	Hazardous waste arisen from construction process such as paints, solvents, oils and so forth
3. RM	Grupo_A	RMA1	Group A.1 Biologic	RMA1	Group A.1 Biologic
		RMA2	Group A.2 Animals	RMA2	Group A.2 Animals
		RMA3	Group A.3 Body part	RMA3	Group A.3 Body part
		RMA4	Group A.4 Patient care etc	RMA4	Group A.4 Patient care etc
		RMA5	Group A.5 Prions	RMA5	Group A.5 Prions
	Grupo_B	RMB1	Chemical etc	RMB1	Chemical etc
	Grupo_C	RMC1	Radioactive waste	RMC1	Radioactive waste
	Grupo_D	RMD1	Common waste	RMD1	Common waste
	Grupo_E	RME1	Piercing or Cutting	RME1	Piercing or Cutting

4.4.8 Corresponding waste category table CONAMA to JICA

Category	Type	CONAMA code		JICA code	
		Code	Description	Code	Description
1. RI	RINP	A001	Residues of restaurant	NH01	Kitchen waste (includs waste from animal such as bone, skin, hair)
		A002	Generated residues outside of the industrial process	NH12	Mixed waste (This code shall be applied in case wastes are discharged without separation.)
		A003	Residues of varrição of plant	NH13	Others
		A004	Ferrous metal scrap iron	NH09	Metals and metal alloys such as aluminum, copper, bronze
		A005	Not ferrous metal scrap iron	NH09	Metals and metal alloys such as aluminum, copper, bronze
		A006	Residues of paper and cardboard	NH03	Paper
		A007	Polymerized plastic residues of process	NH04	Plastic or polymers and resins
		A008	Rubber residues	NH07	Rubbers and Leather
		A009	Residues wooden I contend not toxic substances	NH02	Wood
		A010	Residues of têxteis materials	NH05	Textile and fiber
		A011	Not metallic mineral residues	NH09	Metals and metal alloys such as aluminum, copper, bronze
		A012	Slag of aluminum casting	NH09	Metals and metal alloys such as aluminum, copper, bronze
		A013	Slag of iron production and steel	NH09	Metals and metal alloys such as aluminum, copper, bronze
		A014	Slag of brass casting	NH09	Metals and metal alloys such as aluminum, copper, bronze
		A015	Slag of zinc casting	NH09	Metals and metal alloys such as aluminum, copper, bronze
		A016	Sand of casting	NH09	Metals and metal alloys such as aluminum, copper, bronze
		A017	Refractory ceramic residues and material	NH10	Ceramic & Glasses
		A018	Solid residues not toxic metal composites	NH13	Others
		A019	Solid residues of stations of treatment of effluent I contend material biological not toxic	NH13	Others
		A021	Solid residues of stations of treatment of effluent I contend not toxic substances	NH13	Others
		A022	Pastosos residues of stations of treatment of effluent I contend not toxic substances	NH13	Others
		A023	Pastosos residues I contend limy	NH13	Others
		A024	Bagasse of sugar cane	NH01	Kitchen waste (includs waste from animal such as bone, skin, hair)
		A025	Fibre glass	NH10	Ceramic & Glasses
		A026	Slag of jateamento I contend not toxic substances	NH13	Others
		A027	Used catalysers I contend not toxic substances	NH13	Others
		A028	Residues of system of control of not toxic gaseous emission I contend substance	NH13	Others
		A029	Other not dangerous residues	NH13	Others
		A099	Salty shavings	NH13	Others
		A104	Metallic packings	NH09	Metals and metal alloys such as aluminum, copper, bronze
		A105	Not ferrous metal packings	NH09	Metals and metal alloys such as aluminum, copper, bronze
		A107	Bombonas of plastic not contaminated	NH04	Plastic or polymers and resins
		A108	Etil acetate residues vinis	NH04	Plastic or polymers and resins
		A111	Leached ashes of boiler	NH08	Ash/dust from coal-fired power plants, etc.
		A117	Glass residues	NH10	Ceramic & Glasses
		A199	Foam	NH13	Others
		A204	Tambores metallic	NH09	Metals and metal alloys such as aluminum, copper, bronze
		A207	Plastic films and small packages	NH04	Plastic or polymers and resins
		A208	Polyurethane residues (PU)	NH04	Plastic or polymers and resins
		A299	Calendas shavings of skins	NH07	Rubbers and Leather
		A300	Silt of the caleiro	NH13	Others
		A399	Aparade leather shavings, remnants	NH07	Rubbers and Leather

"4"

Category	Type	CONAMA code		JICA code	
		Code	Description	Code	Description
		A499	Carnaça	NH01	Kitchen waste (include waste from animal such as bone, skin, hair)
		A599	Resíduos orgânicos de peixes	NH01	Kitchen waste (include waste from animal such as bone, skin, hair)
		A699	Rind of rice	NH01	Kitchen waste (include waste from animal such as bone, skin, hair)
		A799	Aparado leather Serragem, bran and dust	NH10	Ceramic & Glasses
		A899	Generated residues outside of the industrial process (office, packings, etc)	NH13	Others
		A999	Resíduos of fruits	NH01	Kitchen waste (include waste from animal such as bone, skin, hair)
		Z999	?	NH06 NH11	Animal oil, Vegetable oil Stone, sand or material that have composition of soil such as tile, brick, gypsum, cement
	EP	C001_C009	Listing 10 - dangerous residues for containing volatile components	HW14	Other Hazardous substance (besides HW01-HW13)
		D001	Dangerous residues for presenting inflammability	HW08 HW09 HW10 HW14	Polymeric Materials Fuel, Oil and Grease Fine Chemicals and Biocides Other Hazardous substance (besides HW01-HW13)
		D002	Dangerous residues for presenting corrosively	HW01 HW02 HW03	Inorganic acid Organic acid Alkalis
		D003	Dangerous residues for presenting reactivity	HW01 HW02 HW03 HW07	Inorganic acid Organic acid Alkalis Organic Compounds
		D004	Dangerous residues for presenting pathogenicity	HW10 HW14	Fine Chemicals and Biocides Other Hazardous substance (besides HW01-HW13)
		D005_D029	Listing 7 of Norm NBR 10004 -dangerous residues characterized by the leaching test	HW05 HW06 HW10 HW11	Inorganic Compounds Other Inorganic Fine Chemicals and Biocides Treatment Sludge
		D099	Other dangerous residues - to specify	HW14	Other Hazardous substance (besides HW01-HW13)
		F001_F0301	Listing 1 of Norm NBR 10004- admittedly dangerous residues - Classroom 1, of non-specific sources	HW04 HW07	Toxic Compounds Organic Compounds
		F100	Bifenilas Policloradas - PCB's- Packings contaminated with PCBs also transformers and capacitors	HW07	Organic Compounds
		F102	Residue of catalysers not specified in Norm NBR 10.004	HW14	Other Hazardous substance (besides HW01-HW13)
		F103	Deriving residue of industrial laboratories (chemical products) not specified in Norm NBR 10.004	HW04 HW10	Toxic Compounds Fine Chemicals and Biocides
		F104	Not specified contaminated empty packings in Norm NBR 10.004	HW14	Other Hazardous substance (besides HW01-HW13)
		F105	Solvent contaminated (to specify solvent and the main contaminant)	HW07	Organic Compounds
		F130	Used lubricant oil	HW04 HW07	Toxic Compounds Organic Compounds
		F230	Hydraulic fluid	HW04 HW07	Toxic Compounds Organic Compounds
		F330	Cutting and fusing oil	HW04 HW07	Toxic Compounds Organic Compounds
		F430	Used contaminated oil as isolation or cooling	HW04 HW07	Toxic Compounds Organic Compounds
		F530	Oil wastes from the water-oil separating system	HW04 HW07	Toxic Compounds Organic Compounds

Category	Type	CONAMA code		JICA code	
		Code	Description	Code	Description
		K001_K209	Listing 2 of Norm NBR 10004- admittedly dangerous residues of specific sources	HW04 HW07	Toxic Compounds Organic Compounds
		K053	Remaining portions and you solvedge of inks and pigments	HW07	Organic Compounds
		K078	Residue of cleanness with solvent in the manufacture of inks	HW07	Organic Compounds
		K081	Silt of ETE of the production of inks	HW07 HW11	Organic Compounds Treatment Sludge
		K193	Shavings of leather tanned to chromium	HW04	Toxic Compounds
		K194	Leather Serragem and dust I contend chromium	HW04	Toxic Compounds
		K195	Silt of stations of treatment of effluent of tanning to chromium	HW04	Toxic Compounds
		K203	Residues of laboratories of research of illnesses	HW10	Fine Chemicals and Biocides
		K207	Explodges of the used oil re-refining (explodges acid)	HW01 HW09	Inorganic acid Fuel, Oil and Grease
		P001_P123	Listing 5 of Norm NBR 10004 - dangerous residues for containing toxic substances acutely	HW07	Organic Compounds
		U001_U246	Listing 6 of Norm NBR 10004- dangerous residues for containing toxic substances	HW14	Other Hazardous substance (besides HW01-HW13)
		Z999	?	HW12 HW13 HW15 HW16	Ash from incinerator Dust and Air pollution control (APC) products Mixed Waste Hazardous materials from Non-production process
2. RC	Classe_A	RCA1	from construction, demolition, refitting and repair of pavement	RCA1	from construction, demolition, refitting and repair of pavement
		RCA2	from the construction, demolition refitting and repair of edifications: ceramic components	RCA2	from the construction, demolition refitting and repair of edifications: ceramic components
		RCA3	from manufacturing and/or demolition process of concrete pre-modulated pieces	RCA3	from manufacturing and/or demolition process of concrete pre-modulated pieces
	Classe_B	RCB1	The recyclable waste for other purposes	RCB1	The recyclable waste for other purposes
	Classe_C	RCC1	Waste which has no economically feasible technology or applications which may allow it to be recycled	RCC1	Waste which has no economically feasible technology or applications which may allow it to be recycled
	Classe_D	RCD1	Hazardous waste arisen from construction process -such as paints, solvents, oils and so forth	RCD1	Hazardous waste arisen from construction process, such as paints, solvents, oils and so forth
3. RM	Grupo_A	RMA1	Group A.1 Biologic	RMA1	Group A.1 Biologic
		RMA2	Group A.2 Animals	RMA2	Group A.2 Animals
		RMA3	Group A.3 Body part	RMA3	Group A.3 Body part
		RMA4	Group A.4 Patient care etc	RMA4	Group A.4 Patient care etc
		RMA5	Group A.5 Prions	RMA5	Group A.5 Prions
	Grupo_B	RMB1	Chemical etc	RMB1	Chemical etc
	Grupo_C	RMC1	Radioactive waste	RMC1	Radioactive waste
	Grupo_D	RMD1	Common waste	RMD1	Common waste
	Grupo_E	RME1	Piercing or Cutting	RME1	Piercing or Cutting

4.5 Table's diagram

4.6 Tables structure

Table: dbo_Categoria_TTRD

Name	Type	Size
ID_CodigoCategoria	Text	3
ID_PSKLocemia	Text	4
ID_CodigoTTRD	Text	2
Descricao	Text	60
Nota	Text	50

Table: dbo_Codigo_CNAE_Classes

Name	Type	Size
ID_CNAE_Classe	Text	6
ID_CNAE_Secao	Text	1
ID_CNAE_Divisao	Text	2
ID_CNAE_Grupo	Text	3
CNAE_Classe	Text	200

Table: dbo_Codigo_CNAE_Divisao

Name	Type	Size
ID_CNAE_Divisao	Text	2
ID_CNAE_Secao	Text	1
CNAE_Divisao	Text	200

Table: dbo_Codigo_CNAE_Grupo

Name	Type	Size
ID_CNAE_Grupo	Text	3
ID_CNAE_Secao	Text	1
ID_CNAE_Divisao	Text	2
CNAE_Grupo	Text	200

Table: dbo_Codigo_CNAE_Secao

Name	Type	Size

ID_CNAE_Secao	Text	1
CNAE_Secao	Text	200

Table: dbo_Codigo_CNAE_SubClasses

Name	Type	Size
ID_CNAE_SubClasses	Text	10
ID_CNAE_Secao	Text	1
ID_CNAE_Divisoes	Text	2
ID_CNAE_Grupo	Text	3
ID_CNAE_Classes	Text	6
CNAE_SubClasses	Text	200

Table: dbo_Codigo_RsCategoria

Name	Type	Size
ID_CodigoRsCategoria	Text	6
RsCategoria_Descricao	Text	50
RsCategoria_DescricaoEn	Text	50

Table: dbo_Codigo_RsConama

Name	Type	Size
ID_CodigoRSConama	Text	10
ID_CodigoRsCategoria	Text	6
ID_CodigoRsTipo	Text	10
RsConama_Descricao	Text	100
RsConama_Obs	Memo	-

Table: dbo_Codigo_RsJica

Name	Type	Size
ID_CodigoRsJica	Text	4
ID_CodigoRsCategoria	Text	6
ID_CodigoRsTipo	Text	10
RsJica_Descricao	Text	100
RsJica_Obs	Memo	-

Table: dbo_Codigo_RsJICA_CONAMA

Name	Type	Size
ID_RSConamaJica	Long Integer	4
ID_CodigoRsCategoria	Text	6
ID_CodigoRsTipo	Text	10
ID_CodigoRsJica	Text	4
ID_CodigoRsConama	Text	10
RsJica_Descricao	Text	255
RsConama_Descricao	Text	255

Table: dbo_Codigo_RsTipo

Name	Type	Size
ID_CodigoRsTipo	Text	10
ID_CodigoRsCategoria	Text	6
RsTipo_Descricao	Text	100
RsTipo_DescricaoEn	Text	100

Table: dbo_Codigo_TTRD

Name	Type	Size
ID_CodigoTTRD	Text	2
CodigoTTRD_Descricao	Text	20

Table: dbo_Codigo_Unidad

Name	Type	Size
ID_CodigoUnidad	Long Integer	4
CUN_Nome	Text	50
CUN_Sigla	Text	10

Table: dbo_Empresa_Geradora

Name	Type	Size
EGE_CNPJ	Text	20
EGE_Ins_Suframa	Text	20

EGE_RazaoSocial	Text	50
EGE_EC_LogradoNo	Text	100
EGE_EC_Bairro	Text	50
EGE_EC_Municipio	Text	20
EGE_EC_CEP	Text	20
EGE_EC_Telefone	Text	50
EGE_TR_Nome	Text	50
EGE_TR_Cargo	Text	20
EGE_TR_Email	Text	50
EGE_TR_Telefone	Text	50
EGE_TR_Fax	Text	50
EGE_AI_AtividadePrincipal	Text	100
EGE_AI_CNAE	Text	10
EGE_AI_Latitude	Text	25
EGE_AI_Longitude	Text	25

Table: dbo_Empresa_PSR

Name	Type	Size
ID_EmpresaPSR	Long Integer	4
PSR_CNPJ	Text	20
PSR_Nome	Text	100
PSR_InscricaoEstadual	Text	15
PSR_EnderecoCorreio	Text	100
PSR_Municipio	Text	50
PSR_Bairro	Text	50
PSR_CEP	Text	25
PSR_Fone	Text	50
PSR_Fax	Text	50
PSR_Representante	Text	25
PSR_Cargo	Text	75
PSR_FuncionarioOM	Long Integer	4
PSR_FuncionarioAdmin	Long Integer	4
PSR_DataInstalacao	Date/Time	8
PSR_AreaTotal	Long Integer	4
PSR_AreaPlanta	Long Integer	4

Table: dbo_Inventario_RSI

Name	Type	Size
ID_InventarioRSI	Long Integer	4
EGE_CNPJ	Text	20
IRI_DataEntrega	Date/Time	8
IRI_DataInicio	Date/Time	8
IRI_DataFinal	Date/Time	8
IRI_Ano	Long Integer	4
IRI_Ok	Yes/No	1
IRI_Observacao	Memo	-
EGE_UT_LogradouroNo	Text	100
EGE_UT_Bairro	Text	50
EGE_UT_Municipio	Text	20
EGE_UT_CDCTE	Text	20
EGE_UT_CEP	Text	20
EGE_UT_Telefone	Text	50
EGE_EC_LogradouroNo	Text	100
EGE_EC_Bairro	Text	50
EGE_EC_Municipio	Text	20
EGE_EC_CEP	Text	20
EGE_EC_Telefone	Text	50
EGE_TR_Nome	Text	50
EGE_TR_Cargo	Text	50
EGE_TR_Email	Text	50
EGE_TR_Telefone	Text	50
EGE_TR_Fax	Text	50
EGE_AI_PPHaDia	Integer	2
EGE_AI_PPDiaMes	Integer	2
EGE_AI_PPMesAno	Integer	2

EGE_AI_NFProducao	Long Integer	4
EGE_AI_NFAdicao	Long Integer	4
EGE_AI_NFOutros	Long Integer	4
EGE_AI_AreaUtilTotal	Long Integer	4
EGE_AI_Latitude	Text	25
EGE_AI_Longitude	Text	25
EGE_RE_Nome	Text	50
EGE_RE_Cargo	Text	50

Table: dbo_Inventario_RSIFluxo

Name	Type	Size
ID_RsiFluxo	Long Integer	4
ID_RSIGerado	Long Integer	4
ID_OnOff	Text	3
ID_Coleta	Long Integer	4
ID_TransporteCNPJ	Text	20
RSF_TransporteQtd	Double	8
RSF_TransporteObs	Memo	-
ID_TratamentoCNPJ	Text	20
ID_CodigoTratamento	Text	4
RSF_TratamentoQtd	Double	8
RSF_TratamentoObs	Memo	-
ID_ReciclagemCNPJ	Text	20
ID_CodigoReciclagem	Text	4
RSF_ReciclagemQtd	Double	8
RFS_ReciclagemObs	Memo	-
ID_DFinalCNPJ	Text	20
ID_CodigoDFinal	Text	4
RSF_DFinalQtd	Double	8
RSF_DFinalObs	Memo	-
ID_CodigoArmazenamento	Text	4
RSF_ArmazenamentoLocal	Text	50
RSF_ArmazenamentoQtd	Double	8
RSF_Arm_Latitude	Text	20
RSF_Arm_Longitude	Text	20
RSF_Arm_Obs	Memo	-

Table: dbo_Inventario_RSIGerado

Name	Type	Size
ID_RSIGerado	Long Integer	4
ID_InventarioRSI	Long Integer	4
IRG_Data	Date/Time	8
ID_ProdicaoProcesso	Long Integer	4
ID_Lista_RSIGerado	Long Integer	4
RSI_ProcessoProduto	Yes/No	1
ID_CodigoRsCategoria	Text	6
ID_CodigoRsTipo	Text	10
ID_CodigoRsFisica	Text	4
ID_CodigoRsConama	Text	10
ID_EstadoFisico	Text	1
IRG_DescricaoResiduo	Text	100
ID_CodigoUnidade	Text	3
IRG_GeracaoTotal	Double	8
IRG_OnSiteTotal	Double	8
IRG_OffSiteTotal	Double	8
IRG_Observacao	Memo	-

Table: dbo_Licenca

Name	Type	Size
ID_Licenca	Long Integer	4
ID_EmpresaFSK	Long Integer	4
LIC_CNPJ	Text	20
ID_CodigoTTRD	Text	2
LIC_LiPlio	Text	15
LIC_ProcessNo	Text	15

LIC_RegistroIPAAM	Text	10
ID_CodigoLicencaPSR	Text	4
ID_CodigoModalidade	Text	2
LIC_Tipo	Text	15
LIC_Renovacao	Text	30
LIC_Actividade	Text	50
LIC_Localizacao	Text	100
LIC_Latitude	Text	20
LIC_Longitude	Text	20
LIC_Representante	Text	50
LIC_Telefone	Text	50
ID_CodigoPolicia	Text	1
ID_CodigoPorto	Text	1
LIC_DataEmissao	Date/Time	8
LIC_DataExpiracao	Date/Time	8
LIC_ValidadeDias	Long Integer	4
LIC_NrsRestricoes	Long Integer	4
LIC_NomeDiretoriaTecnica	Text	50
LIC_NomeDiretorPresidente	Text	50
LIC_Nota	Memo	-

Table: dbo_Lista_MateriaPrima

Name	Type	Size
ID_Lista_MateriaPrima	Long Integer	4
EGE_CNPJ	Text	20
LMA_Descricao	Text	100

Table: dbo_Lista_ProcessoProducao

Name	Type	Size
ID_Lista_ProcessoProducao	Long Integer	4
EGE_CNPJ	Text	20
LPP_Descricao	Text	100
LPP_Obs	Memo	-

Table: dbo_Lista_Producto

Name	Type	Size
ID_Lista_Producto	Long Integer	4
EGE_CNPJ	Text	20
LP_Descricao	Text	100

Table: dbo_Lista_RSIGerado

Name	Type	Size
ID_Lista_RSIGerado	Long Integer	4
EGE_CNPJ	Text	20
RSI_Descricao	Text	100
ID_CodigoRsTipo	Text	10
ID_CodigoRsCategoria	Text	6
ID_CodigoRsClasse	Text	10
ID_CodigoRsAlea	Text	4
ID_EstadoFisico	Text	1
RSI_ProcesseProducao	Yes/No	1
ID_Lista_ProcessoProducao	Long Integer	4

Table: dbo_MateriaPrima

Name	Type	Size
ID_MateriaPrima	Long Integer	4
ID_InventarioRSI	Long Integer	4
ID_Lista_MateriaPrima	Long Integer	4
MP_MateriaPrima	Text	50
MP_QntAnual	Long Integer	4
MP_QntMensal	Long Integer	4
ID_CodigoUnidade	Text	25

Table: dbo_Producao

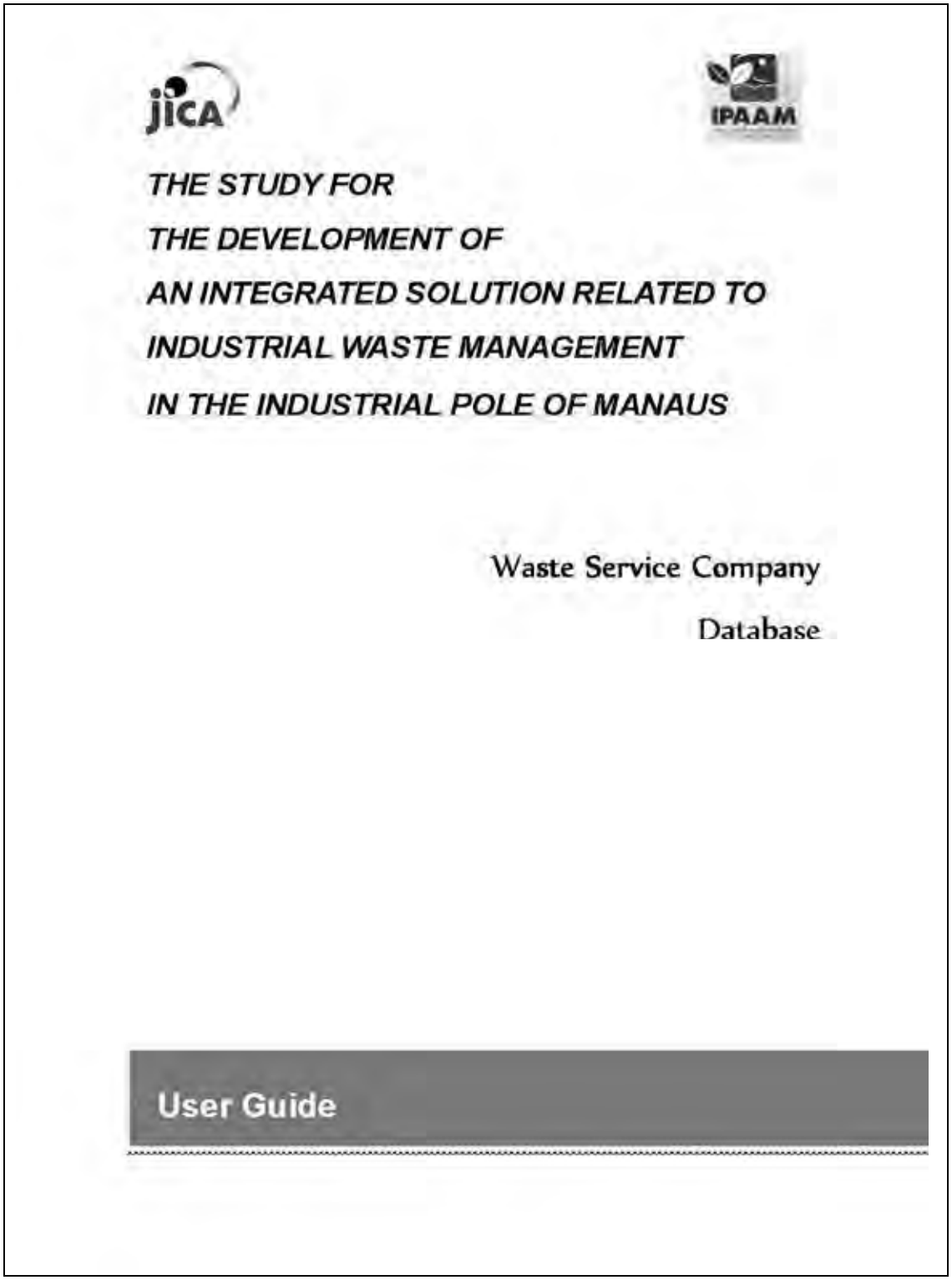
Name	Type	Size
ID_Producao	Long Integer	4

ID_InventárioRSI	Long Integer	4
ID_Lista_Produto	Long Integer	4
PRO_Produto	Text	50
PRO_QntAnual	Long Integer	4
PRO_QtdMensal	Long Integer	4
ID_CodigoUnidade	Text	25

Table: dbo_ProducaoProcesso

Name	Type	Size
ID_ProducaoProcesso	Long Integer	4
ID_InventárioRSI	Long Integer	4
ID_Lista_ProcessoProducao	Long Integer	4
PPR_ProcessoProducao	Yes/No	1
PPR_Descricao	TEXT	100
PPR_Observacao	Memo	-

5.8 WSC_DB System User Guide



Contents

1 Purpose

To properly manage industrial waste, it is essential to eliminate non-licensed entities and foster sound waste service companies (WSC). In order to do so, those who are operating such services will acquire an operation license (OL) through the registration system and then pursue such activities in accordance with that license.

However, the existing registration system is not functioning as imagined for the following reasons:

- The application for WSC's contains complex and detailed categories and options that make it difficult to understand under which category one's activities should be placed.
- Actual activities are not in accordance with the items in that category.
- It is difficult for IPAAM to decipher WSC's in the license list because the places of the registration are dispersed in various different categories.
- Also, the following conditions have invited improper disposal of industrial waste and hindered proper industrial waste management.
- The waste generators who are obliged to consign their IW to registered WSCs will not know who the actual registered waste service company is unless a correct and simple registration list is informed.
- Difficulties in properly operating and maintaining the registration system is contributing to non- licensed entities conducting activities.

In order to improve such conditions and guarantee proper management of industrial wastes, it is necessary for all parties, starting with the administrative bodies and including the waste service companies and waste generators as well, to immediately form a new registration management system that uniformly manages waste service companies in an easily understandable manner. To do so, IPAAM has collaborated with the study team from JICA to explore the possibility of establishing a registration system that would introduce a new category for waste management, as shown below, which includes 4 sub-categories for collection and transportation, intermediate treatment, recycling and final disposal, in accordance with actual activities.

Code	Major Classification	Code	Sub-Classification	Class [Types of Waste Handled]
33	Municipal Waste Management	3301	Collection and Transportation	Class I (HW), Class II-A(Non-HW & Non Inert), Class II-B (Non-HW, & Inert)
		3302	Intermediate Treatment	Class I (HW), Class II-A(Non-HW & Non-Inert), Class II-B (Non-HW, & Inert)
		3303	Recycling	Class II-A (Non-HW & Non Inert), Class II-B (Non-HW & Inert)
		3304	Final Disposal	Class II-A (Non-HW & Non-Inert), Class II-B (Non-HW & Inert)
34	Industrial Waste Management	3401	Collection and Transportation	Class I (HW), Class II-A(Non-HW & Non Inert), Class II-B (Non-HW, & Inert)
		3402	Intermediate Treatment	Class I (HW), Class II-A(Non-HW & Non-Inert),

				Class II-B (Non-HW & Inert)
		3403	Recycling	Class II-A (Non-HW & Non-Inert), Class II-B (Non-HW & Inert)
		3404	Final Disposal	Class II-A (Non-HW & Non-Inert), Class II-B (Non-HW & Inert)

2 Recommendation for Improving Categorization of Waste-related Environmental Licensing

2.1 Current Issues

The categories are not organized from the view point of waste management since they are complex and dispersed across a range of larger categories, making it difficult to make use of them for appropriate operator management.

2.2 Waste Management related Codes of IPAAM for Environmental Licensing

Code	Class	Code	Sub-Class	
				Impact
22 * *	Commerce and Services	2217	Incineration	High
		2218	Co-processing of wastes	High
		2219	Agrochemical Collection Center	Moderate
24 * *	Other Services (including provision of electricity and water)	2407	Solid Industrial Waste Collection and/or Treatment	High
		2408	Municipal Waste Final Destination	High
		2410	Collection and Transport of Inert Solid Waste	Minimal
		2411	Collection and/or Storage and/or Commercialization of Solid Waste (e.g. recycling)	Moderate
		2412	Collection and/or Treatment of Hazardous Liquid Industrial Waste	High
		2417	Industrial Waste Disposal in Landfill	High
26 * *	Transportation	2615	Transport and Storage of Hazardous Solid Industrial Waste	High
30 * *	Waste Treatment and Recycling	3001	Treatment and Recycling of Solid Industrial Waste without chemicals	Moderate
		3002	Treatment and Recycling of Industrial Liquid Waste	Moderate
		3003	Treatment and Recycling of Solid Industrial Waste without Chemicals	High
		3004	Treatment and Recycling of Palettes	Moderate
		3005	Paper and Cardboard Recycling	Moderate
		3006	Treatment and Recycling of Mineral Waste (Waste Re-processing)	Moderate

(Source) Classificacao das Fontes Poluidoras IN 001/06 Publicada em (3/12/2007)

2.3 Aim of Improvements

For the managing body (IPAAM), and waste service companies (WSC), as well as for waste generators which select operators, to be able to easily utilize the licensing system by establishing a simple and easy-to-understand category in agreement with the actual waste operation services being carried out.

2.4 Utility of Improvements

IPAAM will plot out appropriate WSC management in accordance with the database through environmental licensing approval and renewal based on the new category, and provide guidance to waste generators to select appropriately qualified WSCs, thus promoting appropriate industrial waste management.

2.5 Basic Vision of Category Improvement

2.5.1 Make the category in agreement with actual operations as easy to use and understand as possible.

However, upon carrying out appropriate waste management, will cover all necessary items.

2.5.2 Major Classification

First separate municipal and industrial waste from actual business operations

2.5.3 Sub-Classification: into 4 categories of industrial waste operation

(1) Collection and Transportation (including transfer and temporary storage)

(2) Intermediary Treatment

(3) Recycling (separation as well as waste reuse business)

(4) Final Disposal

2.5.4 Types of industrial waste handled: into 3 classes

Industrial waste (IW) is waste discharged from factories (obtained environmental license?), divided into three classes:

Class I (HIW), Class II-A (Non-HIW & Non-Inert), Class II-B (Non-HIW & Inert)

2.5.5 Category Items

A. (2 Business types: Industrial waste, Municipal waste)

B. (4 Operation types: collection and transportation, intermediate treatment, recycling, final disposal)

C. (3 Waste classes: Hazardous; Non-Hazardous & Non-Inert; Non-Hazardous & Inert)

2.5.6 Category Assembly

In the following order: A→B→C. Significance put on business type (Municipal waste, Industrial waste)

2.6 *Japan Operation License Categories*

First, municipal and industrial wastes are categorized, and industrial waste is divided by "collection and transportation" and "disposal"; similarly, other specially managed industrial wastes (hazardous waste) are also divided by "collection/transportation" and "disposal".

The scope of work is written on the application form (e.g. types of IW handled; intention of transfer, storage, etc.; disposal method)

Business practices are controlled by separately established regulations

2.7 *Recommended Additional Application Items*

Addition of the minimum items necessary to more or less understand the content of business activities.

(1) 3401 List of Vehicle Used, Picture, Location of Parking, Existence of Transfer, Temporary Storage, and if so, Location, etc.
(2) 3402 Explanation of Facility (location, types of waste, disposal method, disposal capability, etc.)
(3) 3403 Explanation of kind of recycling, explanation of facility (location, type of waste, disposal method, disposal capability, etc)
(4) 3404 Explanation of facility (location, type of waste, capacity of facility, etc.)

2.8 Recommended form

2.8.1 Transport form

OPERATION LICENSE
TRANSPORT

1. General information					
Company / Individual:					
CNPJ / CPF:		State Registration N. (SEFAZ-AM):			
Mail address					
Suburb:	Municipality:		ZIP:		
Phone:		Fax:			
E-mail:					
Representative:		Job-Title:			
N. of employees:	Administration		Operation and Maintenance		
Area	Total (m²)		Site (m²)		

2. TYPE OF LICENSE					
Modality:	( ) Operation License – OL / ( ) Renewal.				
IPAAM Register N.:		Process N.:		License Code	
Activity					
Initial Date:		Expiration Date:		Validity of this license:	
Polluting/Degrading Potential				Size:	
This license has restrictions:					
Location of the Company:					
Geographic Coordinates:	Latitude:		Longitude:		
Name of the Representative					
Phone:					
Name of the Technical Management Advisor (IPAAM):					
Name of the President-Director (IPAAM):					

3. Type of Waste Transportation License	
A	Transportation of non-hazardous industrial wastes

4. List of Restrictions and/or conditions for the validity of this license
1. Restrictions 1 2. Restrictions 2 3. Restrictions 3 etc.

4. List of the transportation vehicles					
N.	Plate n.	Make	Model	Load capacity	Obs. (Picture)
1					
2					
3					

2.8.2 Treatment

OPERATION LICENSE
TREATMENT

1. General information				
Company / Individual:				
CNPJ / CPF:		**State Registration N. (SEFAZ-AM):**		
Mail address:				
Suburb:	**Municipality:**		**ZIP:**	
Phone:		**Fax:**		
E-mail:				
Representative:		**Job-Title:**		
N. of employees:	Administration		Operation and Maintenance:	
Area:	Total (m²)		Site (m²)	

2. TYPE OF LICENSE				
Modality:	( ) Operation License – OL	( ) Renewal		
IPAAM Register N.:		**Process N.**	**License Code**	
Activity				
Initial Date:		**Expiration Date:**	**Validity of this license:**	
Polluting/Degrading Potential			**Size:**	
This license has restrictions:				
Location of the Company:				
Geographic Coordinates:	**Latitude:**		**Longitude:**	
Name of the Representative				
Phone:				
Name of the Technical Management Advisor (IPAAM):				
Name of the President-Director (IPAAM):				

3. Type of Waste Treatment License			
Type of Waste		**Type of Treatment**	
Code	**Description**	**Code**	**Description**
A	Treatment of non-hazardous industrial wastes	T01	Incinerator

ID	Description
T01	Incinerator
T02	Incinerator with chamber
T05	Outdoor burning
T06	Detention
T07	Oxidation of cyanides
T08	Chemical encapsulation/fixture or solidification
T09	Chemical oxidation
T10	Precipitation
T11	Detoxification
T12	Neutralization
T13	Adsorption
T15	Biological treatment
T16	Composting
T17	Drying
T18	Land farming
T19	Thermal plasma
T34	Other treatments (specify)

4. List of Restrictions and/or condition for the validity of this license:
1. Restrictions 1
2. Restrictions 2
3. Restrictions 3 etc.

2.8.3 Recycle form

OPERATION LICENSE
RECYCLING

1. General Information				
Company / Individual:				
CNPJ / CPF:		**State Registration N. (SEFAZ-AM):**		
Mail address:				
Suburb:	**Municipality:**		**ZIP:**	
Phone:		**Fax:**		
E-mail:				
Representative:		**Job-Title:**		
N. of employees:	Administration		Operation and Maintenance	
Area	Total (m²)		Site (m²)	

2. TYPE OF LICENSE					
Modality:	( ) Operation License – OL	( ) Renewal			
IPAAM N.:		**Process N.**		**License Code**	
Activity					
Initial Date:		**Expiration Date:**		**Validity of this license:**	
Polluting/Degrading Potential				**Size:**	
This license has restrictions:					
Location of the Company:					
Geographic Coordinates:	**Latitude:**		**Longitude:**		
Name of the Representative					
Phone:					
Name of the Technical Management Advisor (IPAAM):					
Name of the President-Director (IPAAM):					

3. Type of Wastes Recycling License			
Type of Waste		**Type of Recycling:**	
Code	**Description**	**Code**	**Description**
A	Non-hazardous industrial wastes	T01	Incinerator

ID	Description
R01	Use in industrial oven (except in heating oven)
R02	Use in boiler
R03	Co-processing in cement oven
R04	Blending of wastes
R05	Formulation of macronutrients
R06	Incorporation in agricultural soil
R07	Fertilization and irrigation
R08	Animal reaction
R09	Reprocessing of solvents
R10	Re-refining of oil
R11	Reprocessing of oil
R12	Scrap non collected
R13	On-site reuse/recycling/recovery
R99	Other forms of reuse/recycling/recovery

4. List of Restrictions and/or condition for the validity of this license:
1. Restrictions 1 2. Restrictions 2 3. Restrictions 3 etc.

2.8.4 Final Disposal form

OPERATION LICENSE
FINAL DISPOSAL

1. General Information					
Company / Individual:					
CNPJ / CPF:		State Registration N. (SEFAZ-AM):			
Mail address:					
Suburb:	Municipality:		Suburb:		
Phone:			Fax:		
E-mail:					
Representative:			Job-Title:		
N. of employees:	Administration		Operation and Maintenance		
Area:	Total (m²)		Site (m²)		

2. MODALIDADE DA LICENÇA					
Modality:	( ) Operation License – OL	( ) Renewal			
IPAAM N.:	IPAAM N.:		IPAAM N.:		
Activity					
Initial Date:	Expiration Date:		Validity of this license:		
Polluting/Degrading Potential			Porte:		
This license has restrictions:					
Location of the Company:					
Geographic Coordinates:	Latitude:		Longitude:		
Name of the Representative					
Phone:					
Name of the Technical Management Advisor (IPAAM):					
Name of the President-Director (IPAAM):					

3. Type of Waste Final Disposal License			
Type of Waste		Type of Recycling	
Code	Description	Code	Description
A	Non-hazardous industrial wastes	T01	Incinerator

ID	Description
B01	Infiltration in the soil
B02	Municipal Landfill
B03	Own Industrial Landfill
B04	Third-parties Industrial Landfill
B05	Municipal Dumping Site
B06	Private Dumping Site
B20	Sewer
B30	Other (specify)

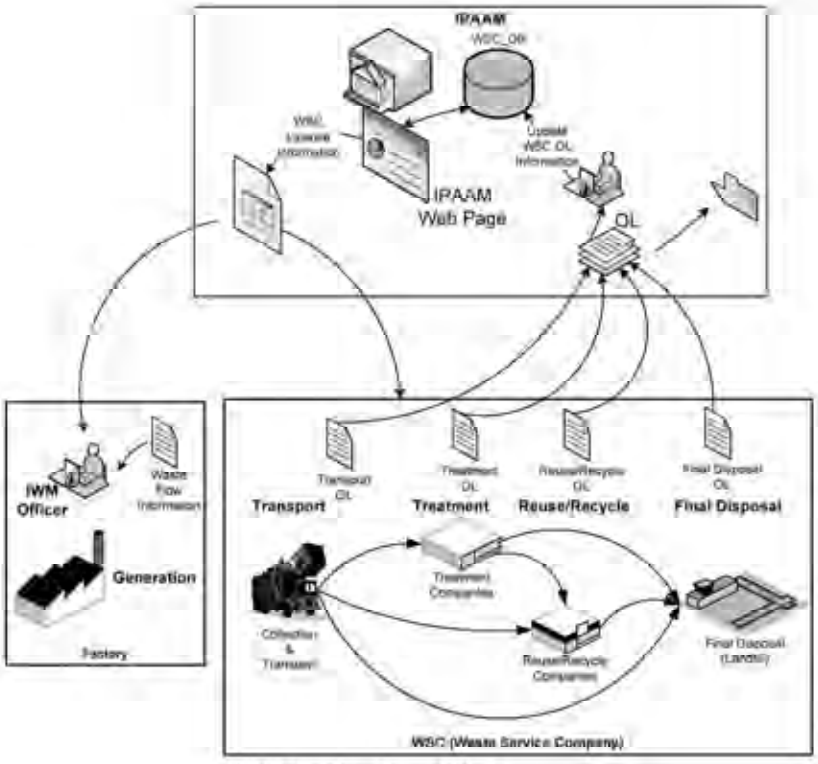
4. List of Restrictions and/or condition for the validity of this license:
1. Restrictions 1 2. Restrictions 2 3. Restrictions 3 etc.

3 Waste Service Company (WSC_DB)

3.1 General scheme of WSC_DB

As shown in the next figure, the WSC_DB will operate within next steps:

- The WSC officer will apply for new WSC's operation license.
- The IPAAM will check and after approved the OL will update the information in the WSC_DB and the licensed WSC information will updated in the IPAAM Web Page and will available for IWM officer of the factory and other who required this information.
- The IWM officer of the factory can search the WSC by transport, treatment, recycling and final disposal.

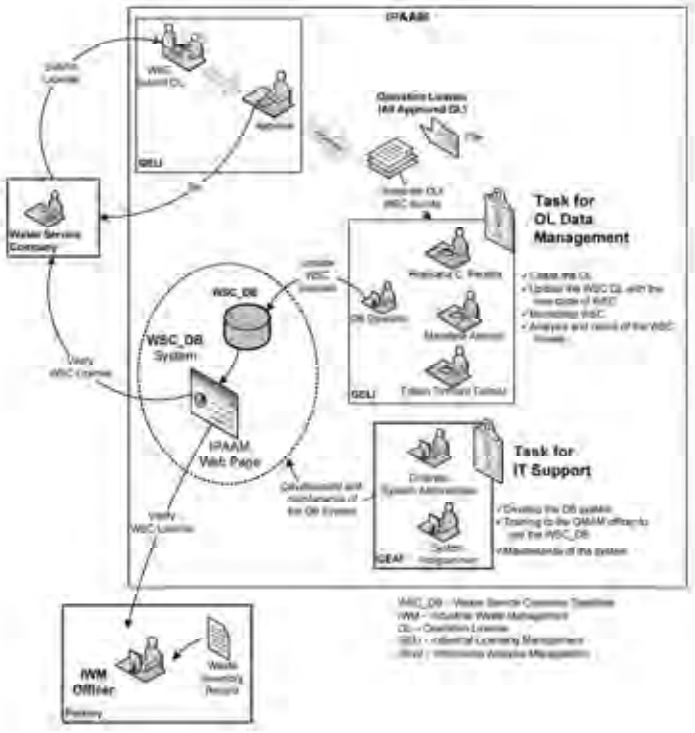


WSC_DB – Waste Service Company Database
IWM – Industrial Waste Management
OL – Operation License

3.2 General Scheme for implementation of the WSC_DB

As shown in the next figure to implement a WSC_DB, IPAAM establish a group of human resources (GMAN) and support of the IT department (GEAI). The GELI department will check and approve the OL of the WSC, and then GMAN will update the information of WSC's OL in the WSC_DB.

- The WSC will submit the new WSC's OL to the IPAAM
- The GELI department will receive the OL of the WSC and will check the information, and after approved the OL the DB operator will update the information of the WSC's OL in the WSC_DB and then the system will automatically updated this information in the IPAAM web site and will be available for the public
- The IWM officer of the factories can check the information of the licensed WSC



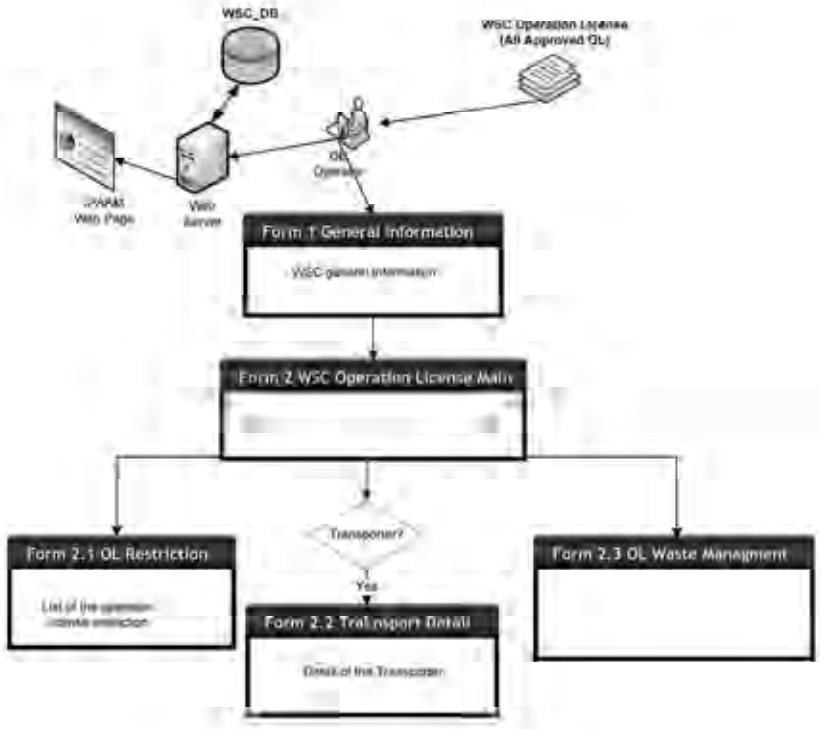
3.3 WSC_DB User guide

3.4 Information needed for update waste inventory

- Approved WSC OL with new code

3.5 Diagram of the WSC_DB system

- In the GELI after the OL will approved, the DB operator will update the WSC license information in to the WSC_DB.
- The WSC OL will update in to the IPAAM web site, and will available for all.



3.5.1 F1. General Information

Field	Data		Remark
ID_EmpresaPSR	1		
CNPJ:	04.025.466/0001-00		
State Registration	04.167.721-8		
Company Name	Empresa 1		
Mail Address:			
Street/nº:			
Suburb/District:			
Municipality:			
ZIP:			
Phone:			
Fax:			
Representative Contact:			
Name:	Nome 1		
Job Title:			
E-mail:			
Type of Activity:			
Number of employee:	Administration	20	
	Operation and maintenance	50	
Area:	Total	3000 m2	
	Plant	400 m2	
Installation Date:	10/01/2000		

3.5.2 F2 WSC Operation License information

Field	Data		Remark
Information generated by the system			
ID_Licenca			
ID_EmpresaPSR			
CNPJ:	04.025.466/0001-00		
Operation license No	354/01-05		
Process No	0257/T/01		
IPAAMRegistration	1012.3001		
WSC License Code	3401 (Collection and Transport)		Select from WSC license code
OL mode code	Operation license		
Type of OL	Renew		New, Renew
Renew	00001		Renew license number
Activity	Transport of NonHW		Activity description
Location of the company:			
Address	Address 1		
Geographic coordinates	Latitude	3°07'44.14" S	GPS measure in Degree/Min/Sec
	Longitude	60°00'45.71" W	GPS measure in Degree/Min/Sec
Responsible of the WSC			
Name	Nome 1		
Phone	000000000		
Polluting Code	A (Alto)		
Polluting size	M (Medio)		
Vality of this license			
Initial Date	01/01/2010		
Expire date	31/01/2010		
Vality days	365		
Number of restrictions	10		
Information of IPAAM			
Name fo the Technical Manager	Name 1		
Name of the President Director	Name 2		
Observation			

3.5.3 F2.1. Operation License Restriction

ID	ID_Licenca	No	Description
1	1	1	Restriction 1
2	1	2	Restriction 2
3	1	3	Restriction 3

3.5.4 F2.2. Transport Detail (if Operation License is for transporte)

List of the vehicles used for transport

ID	ID_Licenca	Plate	Mark	Model	Type	Capacity	Picture	Observation
1	1	AAA234	VW	TA340	Compactor	8ton	sim	
1	2							
1	3							

3.5.5 F2.3. Operation License Waste Management

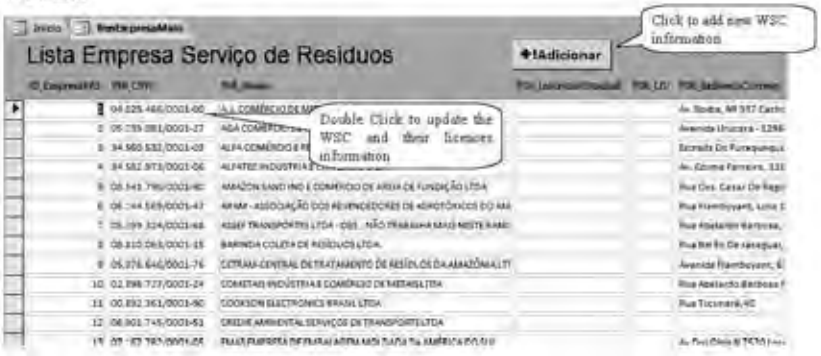
Field	Data	Remark
Information generated by the system		
ID_LicencaResiduo		
ID_Licenca		
Code of Type of waste	B (Non HW)	
Description of the waste	Non HW waste	
Category of WSC	5401 collection and transport	Select from WSC license code table
Category of waste (CONAMA)		
Category code	RI (Industrial waste)	Select from waste category table
Type code	RINP (Non HW)	Select from waste type table
CONAMA Code	A006 Resíduos de papel e papelão	Select from CONAMA waste code
Capacity per day	500	Capacity of transport, treatment, receiving and final disposal
Observation	Não	

3.6 Using WSC_DB System

3.6.1 Main form

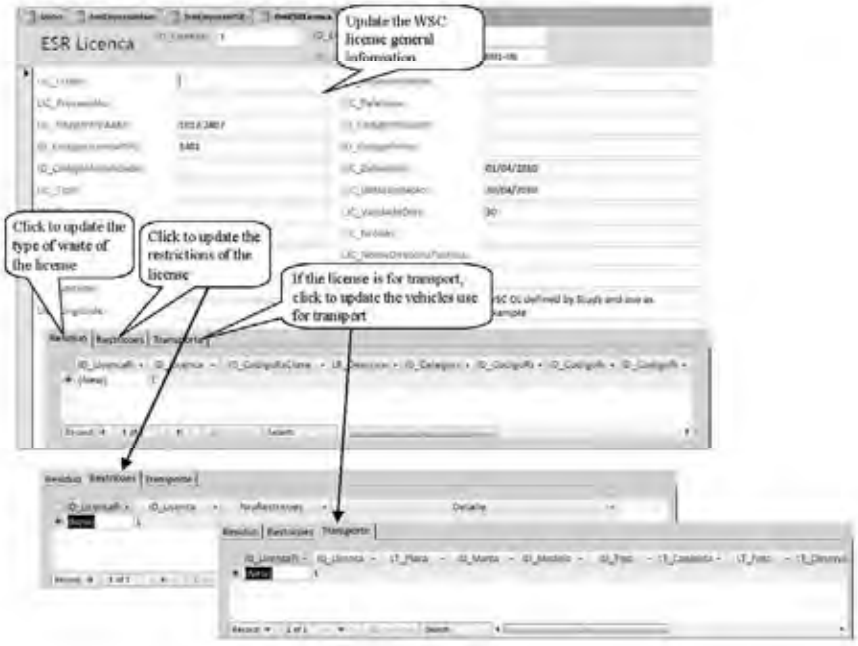
Open the WSC_DB System and will show the next screen

3.6.2 WSC List



3.6.3 Update WSC general information

3.6.4 Update WSC licenses



3.7 Search WSC Information on the IPAAM WebPage

The IPAAM web page is linked to the WSC_DB and all the information about the WSC license will avaible in the next page

4 Tables

4.1 WSC license table

ID_Codigo_LicencaPSR	ID_ResiduoTipo	ID_CodigoTTRD	Description	Note
3301	RSU	TT	Collection and transport	A (HW), B (Non-HW & NONinert) C (Non-HW, Inert)
3302	RSU	TR	Treatment	A (HW), B (Non-HW & Non-Inert), C (Non-HW & Inert)
3303	RSU	RR	Recicling	B (Non-HW & Non-Inert) C (Non-HW & Inert)
3304	RSU	DF	Final disposal	B (Non-HW & Non-Inert), C (Non-HW & Inert)
3401	RSI	TT	Collection and transport	A (HW), B (Non-HW & Non-Inert), C (Non-HW & Inert)
3402	RSI	TR	Treatment	A (HW), B (Non-HW & Non-Inert), C (Non-HW & Inert)
3403	RSI	RR	Recicling	B (Non-HW & Non-Inert), C (Non-HW & Inert)
3404	RSI	DF	Final disposal	B (Non-HW & Non-Inert), C (Non-HW, Inert)

4.2 Polluter category table

ID_CodigoPoluidor	CP_Descricao
A	High
G	Big
M	Moderate
P	Small

4.3 Polluter size table

ID_CodigoParte	Size description
G	Big
M	Middle
N	Micro
P	Small

4.4 Waste Class Table

ID_CodigoRsClasse	Class Description	Observation
A	Hazardous Waste (RP, RIP)	
B	Non Hazardous Waste, Non inert (RNP, RINP,Non-Inert)	
C	Non Hazardous Waste , Inert (RNP, RINP, Inert)	

4.5 TTRD category table

ID_Categoria TTRD	ID_Codigo_LicencaPSR	ID_CodigoTTRD	Description	Observation
Final disposal code				
B01	3404	DF	Infiltration in the soil	
B02	3404	DF	Municipal Landfill	
B03	3404	DF	Own Industrial Landfill	
B04	3404	DF	Third-parties Industrial Landfill	
B05	3404	DF	Municipal Dumping Site	
B06	3404	DF	Private Dumping Site	
B20	3404	DF	Sewer	
B30	3404	DF	Other (specify)	
Recicling code				
R01	3403	RR	Use in industrial oven (except in heating ovens)	

R02	3403	RR	Use in boiler	
R03	3403	RR	Co-processing in cement ovens	
R04	3403	RR	Blending of wastes	
R05	3403	RR	Formulation of micronutrients	
R06	3403	RR	Incorporation in agricultural soil	
R07	3403	RR	Fertilization and irrigation	
R08	3403	RR	Animal reation	
R09	3403	RR	Reprocessing of solvents	
R10	3403	RR	Re-refining of oil	
R11	3403	RR	Reprocessing of oil	
R12	3403	RR	Scrap iron collector	
R13	3403	RR	On-site reuse/recycling/recovery	
R99	3403	RR	Other forms of reuse/recycling/recovery	
Treatment code				
T01	3402	TR	Incinerator	
T02	3402	TR	Incinerator with chamber	
T05	3402	TR	Outdoor burning	
T06	3402	TR	Detonation	
T07	3402	TR	Oxidation of cyanides	
T08	3402	TR	Chemical encapsulation/fixture or solidification	
T09	3402	TR	Chemical oxidation	
T10	3402	TR	Precipitation	
T11	3402	TR	Detoxification	
T12	3402	TR	Neutralization	
T13	3402	TR	Adsorption	
T15	3402	TR	Biologic treatment	
T16	3402	TR	Composting	
T17	3402	TR	Drying	
T18	3402	TR	Land farming	
T19	3402	TR	Thermal plasma	
T99	3402	TR	Other treatments (specify)	

4.6 Waste Category

4.6.1 JICA waste category table

Category	Type	JICA code	Description	No.
1: R1	RINP	NH01	Kitchen waste (include waste from animal such as bone, skin, hair)	
		NH02	Wood	
		NH03	Paper	
		NH04	Plastic or polymers and resins	
		NH05	Textile and fiber	
		NH06	Animal oil, Vegetable oil	
	Non Hazardous industrial waste	NH07	Rubbers and Leather	
		NH08	Ash/dust from coal-fired power plants, etc.	
		NH09	Metals and metal alloys such as aluminum, copper, ferrous	
Industrial Waste		NH10	Ceramic & Glasses	
		NH11	Stone, sand or material that have composition of soil such as tile, brick, gypsum, cement	
		NH12	Mixed waste (This code shall be applied in case wastes are discharged without separation.)	
		NH13	Others	
	RHP	HW01	Inorganic acid	
	Hazardous industrial waste	HW02	Organic acid	
		HW03	Alkalis	
		HW04	Toxic Compounds	
		HW05	Inorganic Compounds	

Category	Class	IBAMA code	Description	No.
		HW06	Other Inorganic	1
		HW07	Organic Compounds	1
		HW08	Polymeric Materials	1
		HW09	Fuel, Oil and Grease	1
		HW10	Fine Chemicals and Biocides	1
		HW11	Treatment Sludge	1
		HW12	Ash from incinerator	1
		HW13	Dust and Air pollution control (APC) products	1
		HW14	Other Hazardous substance (besides HW01-HW13)	1
		HW15	Mixed Waste	1
		HW16	Hazardous materials from Non-production process	1
1. RI Total				29
2. RM	Grupo A	RMA1	Group A.1 Biologic	1
		RMA2	Group A.2 Animals	1
		RMA3	Group A.3 Body part	1
		RMA4	Group A.4 Patient care etc	1
Medical waste		RMA5	Group A.5 Prions	1
	Grupo B	RMB1	Chemical etc	1
	Grupo C	RMC1	Radioactive waste	1
	Grupo D	RMD1	Cramming waste	1
	Grupo E	RME1	Piercing or Cutting	1
2. RM Total				9
3. RC	Classe A	RCA1	from construction, demolition, refitting and repair of pavement	1
		RCA2	from the construction, demolition refitting and repair of edifications: ceramic components	1
Construction waste		RCA3	from manufacturing and/or demolition process of concrete pre-modulated pieces	1
	Classe B	RCB1	The recyclable waste for other purposes	1
	Classe C	RCC1	Waste which has no economically feasible technology or applications which may allow it to be recycled	1
	Classe D	RCD1	Hazardous waste arisen from construction process, such as paints, solvents, oils and so forth	1
3. RC Total				6
Total geral				44

4.6.2 CONAMA's waste category table

Category	Type	CONAMA code	Description	No.
1. RI	RINP	A001	Residues of restaurant	1
		A002	General residues outside of the industrial process	1
		A003	Residues of varrição of plant	1
		A004	Ferrous metal scrap iron	1
		A005	Not ferrous metal scrap iron	1
		A006	Residues of paper and cardboard	1
		A007	Polymerized plastic residues of process	1
		A008	Rubber residues	1
		A009	Residues wooden I contend not toxic substances	1
Residues Industrials	Residuos Industriais não perigosos	A010	Residues of têxteis materials	1
		A011	Not metallic mineral residues	1
		A012	Slag of aluminum casting	1
		A013	Slag of iron production and steel	1
		A014	Slag of brass casting	1
		A015	Slag of zinc casting	1
		A016	Sand of casting	1
		A017	Refractory ceramic residues and material	1
		A018	Solid residues not toxic metal composities	1
		A019	Solid residues of stations of treatment of effluent I contend material biological not toxic	1

Category	Type	[illegible] code	Description	[illegible]
		A021	Solid residues of stations of treatment of effluent I contend not toxic substances	1
		A022	Pastosos residues of stations of treatment of effluent I contend not toxic substances	1
		A023	Pastosos residues I contend limy	1
		A024	Bagasse of sugar cane	1
		A025	Fibre glass	1
		A026	Slag of jateamento I contend not toxic substances	1
		A027	Used catalysers I contend not toxic substances	1
		A028	Residues of system of control of not toxic gaseous emission I contend substance	1
		A029	Other not dangerous residues	1
		A099	Salty shavings	1
		A104	Metallic packings	1
		A105	Not ferrous metal packings	1
		A107	Bombonas of plastic not contaminated	1
		A108	Ebl hospital residues vinils	1
		A111	Leached ashes of boiler	1
		A117	Glass residues	1
		A199	Foam	1
		A204	Tambores metallic	1
		A207	Plastic films and small packings	1
		A208	Polyurethane residues (PU)	1
		A299	Calendar shavings of skins	1
		A308	Silt of the caleiro	1
		A399	Atanado leather shavings, remnants	1
		A499	Carnaça	1
		A599	Residues organic of process	1
		A699	Rind of face	1
		A799	Atanado leather Serragem, bran and dust	1
		A899	General residues outside of the industrial process (office, packings, etc.)	1
		A999	Residues of fruits	1
	RIP	C001_C009	Listing 10 - dangerous residues for containing volatile components	1
		D001	Dangerous residues for presenting inflammability	1
		D002	Dangerous residues for presenting corrosively	1
		D003	Dangerous residues for presenting reactivity	1
		D004	Dangerous residues for presenting pathogenicity	1
		D005_D029	Listing 7 of Norm NBR 10004: dangerous residues characterized by the leaching test	1
		D099	Other dangerous residues - to specify	1
		F001_F0301	Listing 1 of Norm NBR 10004 - admittedly dangerous residues - Classroom 1, of not-specific sources	1
		F100	Bifenilas Policloradas - PCB's. Packings contaminated with PCBs also transforming and capacitors	1
		F102	Residue of catalysers not specified in Norm NBR 10.004	1
	Residuos Industriais perigosos	F103	Deriving residue of industrial laboratories (chemical products) not specified in Norm NBR 10.004	1
		F104	Not specified contaminated empty packings in Norm NBR 10.004	1
		F105	Solvent contaminated (to specify solvent and the main contaminants)	1
		F330	Used lubricant oil	1
		F230	Hydraulic fluid	1
		F330	Cutting and finishing oil	1
		F430	Used contaminated oil in isolation or cooling	1
		F530	Oil wastes from the water-oil separating system	1
		K001_K209	Listing 2 of Norm NBR 10004 - admittedly dangerous residues of specific sources	1
		K053	Remaining portions and you splodge of inks and pigments	1
		K078	Residue of cleanness with solvent in the manufacture of inks	1
		K081	Silt of ETE of the production of inks	1
		K191	Shavings of leather tanned to chromium	1

Category	Type	CONAMA code	Description	qty
		K194	Leather Serragem and dust I contend chromium	1
		K195	Silt of stations of treatment of effluent of tanning to chromium	1
		K205	Residues of laboratories of research of illnesses	1
		K207	It splodges of the used oil re-refining (it splodges acid)	1
		P001_P123	Listing 5 of Norm NBR 10004 - dangerous residues for containing toxic substances acutely	1
		U001_U246	Listing 6 of Norm NBR 10004 - dangerous residues for containing toxic substances	1
1. RI Total				22
2. RM	Grupo_A	RMA1	Group A.1 Biologic	1
		RMA2	Group A.2 Animals	1
		RMA3	Group A.3 Body part	1
		RMA4	Group A.4 Patient care etc	1
Resíduos médicos		RMA5	Group A.5 Prions	1
	Grupo_B	RMB1	Chemical etc	1
	Grupo_C	RMC1	Radioactive waste	1
	Grupo_D	RMD1	Common waste	1
	Grupo_E	RME1	Piercing or Cutting	1
2. RM Total				9
3. RC	Classe_A	RCA1	from construction, demolition, refitting and repair of pavement	1
		RCA2	from the construction, demolition refitting and repair of edifications: ceramic components	1
		RCA3	from manufacturing and/or demolition process of concrete pre-embedded pieces	1
Resíduo de construção	Classe_B	RCB1	The recyclable waste for other purposes	1
	Classe_C	RCC1	Waste which has no economically feasible technology or applications which may allow it to be recycled	1
	Classe_D	RCD1	Hazardous waste arisen from construction process, such as paints, solvents, oils and so forth	1
3. RC Total				6
Grand Total				92

4.6.3 Corresponding Waste category table JICA to CONAMA

Category	Type	JICA code		CONAMA code	
		Code	Description	Code	Description
1. RI	0350*	NH01	Kitchen waste (include waste from animal such as bone, skin, hair)	A001	Residues of restaurant
				A024	Bagasse of sugar cane
				A499	Carnaça
				A599	Residues organic of process
				A699	Rind of rice
				A999	Residues of fruits
		NH02	Wood	A009	Residues wooden I contend not toxic substances
		NH03	Paper	A006	Residues of paper and cardboard
		NH04	Plastic or polymers and resins	A007	Polymerized plastic residues of process
				A107	Bombonas of plastic not contaminated
				A308	Ltd acetate residues vinils
				A207	Plastic films and small packings
				A208	Polyurethane residues (PU)
		NH05	Textile and fiber	A010	Residues of texteis materials
		NH06	Animal oil, Vegetable oil	2999	?
		NH07	Rubber and Leather	A008	Rubber residues
				A299	Caleadas shavings of skins
				A399	Aparads leather shavings, remnants
		NH08	Ash/dust from coal-fired power plants, etc.	A311	Leached ashes of fowler
		NH09	Metals and metal alloys such as aluminum, copper, bronze	A004	Ferrous metal scrap iron
				A005	Not ferrous metal scrap iron
				A011	Not metallic mineral residues
				A012	Slag of aluminum casting
				A013	Slag of iron production and steel

Category	Type	JICA code		CONAMA code	
		Code	Description	Code	Description
				A014	Slag of brass casting
				A015	Slag of zinc casting
				A016	Sand of casting
				A104	Metallic packings
				A105	Not ferrous metal packings
				A204	Tambores metallic
		NH10	Ceramic & Glasses	A017	Refractory ceramic residues and material
				A025	Fibre glass
				A117	Glass residues
				A799	Alguado leather Serragem, bran and dust
		NH11	Stone, sand or material that have composition of soil such as tile, brick, gypsum, cement.	Z999	?
		NH12	Mixed waste (This code shall be applied in case wastes are discharged without separation.)	A002	Generated residues outside of the industrial process
		NH13	Others	A003	Residues of varrição of plant
				A018	Solid residues not toxic metal composites
				A019	Solid residues of stations of treatment of effluent I content material biological not toxic
				A021	Solid residues of stations of treatment of effluent I content not toxic substances
				A022	Pastosos residues of stations of treatment of effluent I content not toxic substances
				A023	Pastosos residues I content lime
				A026	Slag of pirometa I content not toxic substances
				A027	Used catalysers I content not toxic substances
				A028	Residues of system of control of not toxic gaseous emission I content substances
				A029	Other not dangerous residues
				A099	Salty shavings
				A199	Foam
				A368	Silt of the esteiro
				A899	Generated residues outside of the industrial process (office, packings, etc.)
	II[2]	HW01	Inorganic acid	D002	Dangerous residues for presenting corrosively
				D003	Dangerous residues for presenting reactivity
				K207	If splodges of the used oil re-refining (if splodges acid)
		HW02	Organic acid	D002	Dangerous residues for presenting corrosively
				D003	Dangerous residues for presenting reactivity
		HW03	Alkalis	D002	Dangerous residues for presenting corrosively
				D003	Dangerous residues for presenting reactivity
		HW04	Toxic Compounds	F001_F0301	Listing 1 of Norm NBR 10004- admittedly dangerous residues - Classroom I, of not-specific sources
				F103	Deriving residue of industrial laboratories (chemical products) not specified in Norm NBR 10.004
				F130	Used lubricant oil
				F230	Hydraulic fluid
				F330	Cutting and forming oil
				F430	Used contaminated oil in isolation or cooling
				F530	Oil wastes from the water-oil separating system
				K001_K209	Listing 2 of Norm NBR 10004- admittedly dangerous residues of specific sources
				K193	Shavings of leather tanned to chromium
				K194	Leather Serragem and dust I content chromium
				K195	Silt of stations of treatment of effluent of tanning to chromium
		HW05	Inorganic Compounds	D005_D029	Listing 7 of Norm NBR 10004: dangerous residues characterized by the leaching test
		HW06	Other Inorganic	D005_D029	Listing 7 of Norm NBR 10004: dangerous residues

Category	Type	JICA code		CONAMA code	
		Code	Description	Code	Description
					characterized by the leaching test
		HW07	Organic Compounds	D003	Dangerous residues for presenting reactivity
				F001_F0301	Listing 1 of Norm NBR 10004- admittedly dangerous residues - Classroom 1, of not-specific sources
				F106	Bifenilas Policloradas - PCB´s. Packings contaminated with PCBs also transforming and capacitors
				F105	Solvent contaminated (to specify solvent and the main contaminant(s)
				F130	Used lubricant oil
				F230	Hydraulic fluid
				F330	Cutting and boaling oil
				F430	Used contaminated oil in isolation or cooling
				F530	Oil wastes from the water-oil separating system
				K001_K209	Listing 2 of Norm NBR 10004- admittedly dangerous residues of specific sources
				K053	Remaining portions and you splodge of inks and pigments
				K078	Residue of cleanness with solvent in the manufacture of inks
				K081	Silt of ETE of the production of inks
				P001_P123	Listing 5 of Norm NBR 10004 - dangerous residues for containing toxic substances scarcely
		HW08	Polymeric Materials	D001	Dangerous residues for presenting inflammability
		HW09	Fuel, Oil and Grease	D001	Dangerous residues for presenting inflammability
				K207	It splodges of the used oil re-refining (It splodges acid)
		HW10	Fine Chemicals and Biocides	D001	Dangerous residues for presenting inflammability
				D004	Dangerous residues for presenting pathogenicity
				D005_D029	Listing 7 of Norm NBR 10004- dangerous residues characterized by the leaching test
				F103	Deriving residue of industrial laboratories (chemical products) not specified in Norm NBR 10,004
				K203	Residues of laboratories of research of illnesses
		HW11	Treatment Sludge	D005_D029	Listing 7 of Norm NBR 10004- dangerous residues characterized by the leaching test
				K081	Silt of ETE of the production of inks
		HW12	Ash from incinerator	Z999	?
		HW13	Dust and Air pollution control (APC) products	Z999	?
		HW14	Other Hazardous substance (besides HW01-HW13)	C001_C059	Listing 10 - dangerous residues for containing volatile components
				D001	Dangerous residues for presenting inflammability
				D004	Dangerous residues for presenting pathogenicity
				D099	Other dangerous residues - to specify
				F102	Residue of catalysers not specified in Norm NBR 10,004
				F104	Not specified contaminated empty packings in Norm NBR 10,004
				U001_U246	Listing 6 of Norm NBR 10004- dangerous residues for containing toxic substances
		HW15	Mixed Waste	Z999	?
		HW16	Hazardous materials from Non-production process	Z999	?
2. RCC	Classe_A	RCA1	from construction, demolition, refitting and repair of pavement	RCA1	from construction, demolition, refitting and repair of pavement
		RCA2	from the construction, demolition refitting and repair of edifications: ceramic components	RCA2	from the construction, demolition refitting and repair of edifications: ceramic components
		RCA3	from manufacturing and/or demolition process of concrete pre-modulated pieces	RCA3	from manufacturing and/or demolition process of concrete pre-modulated pieces

Category	Type	JICA code		CONAMA code	
		Code	Description	Code	Description
	Classe_B	RCB1	The recyclable waste for other purposes	RCB1	The recyclable waste for other purposes
	Classe_C	RCC1	Waste which has no economically feasible technology or applications which may allow it to be recycled	RCC1	Waste which has no economically feasible technology or applications which may allow it to be recycled
	Classe_D	RCD1	Hazardous waste arisen from construction process such as paints, solvents, oils and so forth	RCD1	Hazardous waste arisen from construction process such as paints, solvents, oils and so forth
3. RM	Grupo_A	RMA1	Group A.1 Biologic	RMA1	Group A.1 Biologic
		RMA2	Group A.2 Animals	RMA2	Group A.2 Animals
		RMA3	Group A.3 Body part	RMA3	Group A.3 Body part
		RMA4	Group A.4 Patient care etc.	RMA4	Group A.4 Patient care etc.
		RMA5	Group A.5 Prions	RMA5	Group A.5 Prions
	Grupo_B	RMB1	Chemical etc.	RMB1	Chemical etc.
	Grupo_C	RMC1	Radioactive waste	RMC1	Radioactive waste
	Grupo_D	RMD1	Common waste	RMD1	Common waste
	Grupo_E	RME1	Piercing or Cutting	RME1	Piercing or Cutting

4.6.4 Corresponding waste category table CONAMA to JICA

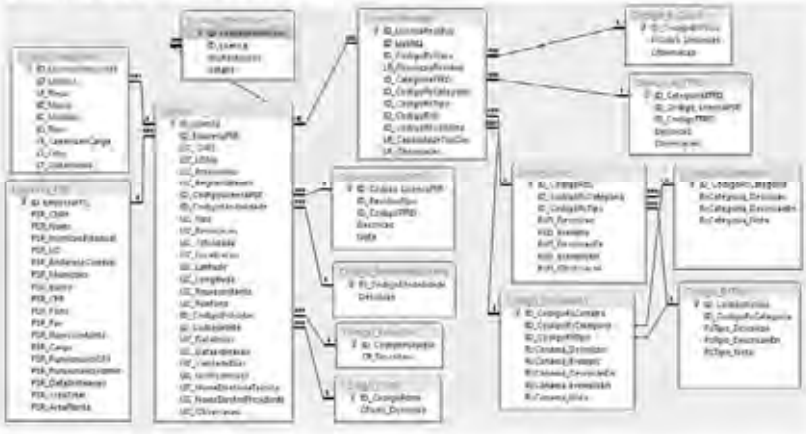
Category	Type	CONAMA code		JICA code	
		Code	Description	Code	Description
1. RI	RINP	A001	Residues of restaurant	NH01	Kitchen waste (include waste from animal such as bone, skin, hair)
		A002	Generated residues outside of the industrial process	NH12	Mixed waste (This code shall be applied in case wastes are discharged without segregation.)
		A003	Residues of varrição of plant	NH13	Others
		A004	Ferrous metal scrap iron	NH09	Metals and metal alloys such as aluminum, copper, bronze
		A005	Not ferrous metal scrap iron	NH09	Metals and metal alloys such as aluminum, copper, bronze
		A006	Residues of paper and cardboard	NH03	Paper
		A007	Polymerized plastic residues of process	NH04	Plastic or polymers and resins
		A008	Rubber residues	NH07	Rubbers and Leather
		A009	Residues wooden I contend not toxic substances	NH02	Wood
		A010	Residues of textiles materials	NH05	Textile and fiber
		A011	Not metallic mineral residues	NH09	Metals and metal alloys such as aluminum, copper, bronze
		A012	Slag of aluminum casting	NH09	Metals and metal alloys such as aluminum, copper, bronze
		A013	Slag of iron production and steel	NH09	Metals and metal alloys such as aluminum, copper, bronze
		A014	Slag of brass casting	NH09	Metals and metal alloys such as aluminum, copper, bronze
		A015	Slag of zinc casting	NH09	Metals and metal alloys such as aluminum, copper, bronze
		A016	Sand of casting	NH09	Metals and metal alloys such as aluminum, copper, bronze
		A017	Refractory ceramic residues and material	NH10	Ceramic & Glasses
		A018	Solid residues not toxic metal composites	NH13	Others
		A019	Solid residues of stations of treatment of effluent I contend material biological not toxic	NH13	Others
		A021	Solid residues of stations of treatment of effluent I contend not toxic substances	NH13	Others
		A022	Pastosos residues of stations of treatment of effluent I contend not toxic substances	NH13	Others

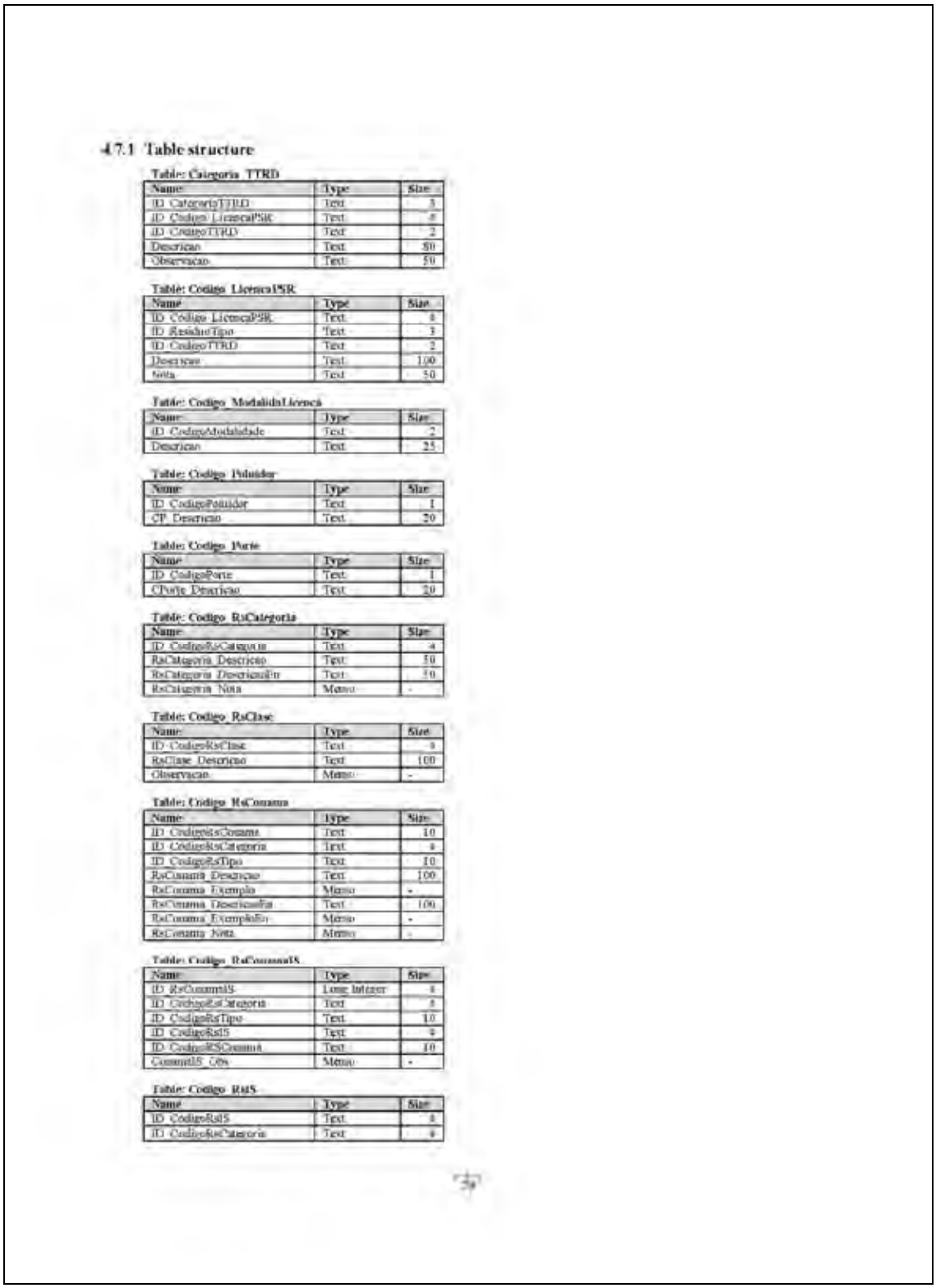
Category	Type	CONAMA code		JICA code	
		Code	Description	Code	Description
		A023	Pastoses residues I contend lime	NH13	Others
		A024	Bagasse of sugar cane	NH01	Kitchen waste (include waste from animal such as bone, skin, hair)
		A025	Fibre glass	NH10	Ceramic & Glasses
		A026	Slag of pirometro I contend not toxic substances	NH13	Others
		A027	Usual catalysers I contand not toxic substances	NH13	Others
		A028	Residues of system of control of not toxic gaseous emission I contend substance	NH13	Others
		A029	Other not dangerous residues	NH13	Others
		A099	Salty shavings	NH13	Others
		A104	Metallic packings	NH09	Metals and metal alloys such as aluminum, copper, bronze
		A105	Not ferrous metal packings	NH09	Metals and metal alloys such as aluminum, copper, bronze
		A107	Bombonas of plastic not contaminated	NH04	Plastic or polymers and resins
		A108	Efil acetate residues vinils	NH04	Plastic or polymers and resins
		A111	Leached ashes of boiler	NH08	Ash/dust from coal-fired power plants, etc.
		A117	Glass residues	NH10	Ceramic & Glasses
		A199	Foams	NH13	Others
		A204	Tambores metallic	NH09	Metals and metal alloys such as aluminum, copper, bronze
		A207	Plastic films and small packings	NH04	Plastic or polymers and resins
		A208	Polyurethane residues (PU)	NH04	Plastic or polymers and resins
		A299	Caleados shavings of skins	NH07	Rubbers and Leather
		A308	Silt of the caleiro	NH13	Others
		A399	Atanado leather shavings, remnants	NH07	Rubbers and Leather
		A499	Carnaça	NH01	Kitchen waste (include waste from animal such as bone, skin, hair)
		A599	Residues organic of process	NH01	Kitchen waste (include waste from animal such as bone, skin, hair)
		A699	Rind of rice	NH01	Kitchen waste (include waste from animal such as bone, skin, hair)
		A799	Atanado leather Serragem, bran and dust	NH10	Ceramic & Glasses
		A899	Generated residues outside of the industrial process (office, packings, etc.)	NH13	Others
		A999	Residues of fruits	NH01	Kitchen waste (include waste from animal such as bone, skin, hair)
		Z999	?	NH06 NH11	Animal oil, Vegetable oil Stone, sand or material that have composition of soil such as tile, brick, gypsum, cement
	RIP	C001_C009	Listing 10 - dangerous residues for containing volatile components	HW14	Other Hazardous substance (besides HW01-HW13)
		D001	Dangerous residues for presenting inflammability	HW05 HW09 HW10 HW14	Polymeric Materials Fuel, Oil and Grease Fine Chemicals and Biocides Other Hazardous substance (besides HW01-HW13)
		D002	Dangerous residues for presenting corrosively	HW01 HW02 HW03	Inorganic acid Organic acid Alkalis
		D003	Dangerous residues for presenting reactivity	HW01 HW02 HW03 HW07	Inorganic acid Organic acid Alkalis Organic Compounds
		D004	Dangerous residues for presenting pathogenicity	HW10 HW14	Fine Chemicals and Biocides Other Hazardous substance (besides HW01-HW13)

Category	Type	CONAMA code		JICA code	
		Code	Description	Code	Description
		D005_D029	Listing 7 of Norm NBR 10004: dangerous residues characterized by the leaching test	HW05	Inorganic Compounds
				HW06	Other Inorganic
				HW10	Fine Chemicals and Biocides
				HW11	Treatment Sludge
		D099	Other dangerous residues - to specify	HW14	Other Hazardous substance (besides HW01-HW13)
		F001_F0301	Listing 1 of Norm NBR 10004- admittedly dangerous residues - Classroom 1, of not-specific sources	HW04	Toxic Compounds
				HW07	Organic Compounds
		F100	Bifenilas Policloradas - PCB s. Packings contaminated with PCBs also transforming and capacitors	HW07	Organic Compounds
		F102	Residue of catalysers not specified in Norm NBR 10.004	HW14	Other Hazardous substance (besides HW01-HW13)
		F103	Deriving residue of industrial laboratories (chemical products) not specified in Norm NBR 10.004	HW04	Toxic Compounds
				HW10	Fine Chemicals and Biocides
		F104	Not specified contaminated empty packings in Norm NBR 10.004	HW14	Other Hazardous substance (besides HW01-HW13)
		F105	Solvent contaminated (to specify solvent and the main contaminante)	HW07	Organic Compounds
		F130	Used lubricant oil	HW04	Toxic Compounds
				HW07	Organic Compounds
		F230	Hydraulic fluid	HW04	Toxic Compounds
				HW07	Organic Compounds
		F330	Cutting and hauling oil	HW04	Toxic Compounds
				HW07	Organic Compounds
		F430	Used contaminated oil in isolation or cooling	HW04	Toxic Compounds
				HW07	Organic Compounds
		F530	Oil wastes from the water-oil separating system	HW04	Toxic Compounds
				HW07	Organic Compounds
		K001_K209	Listing 2 of Norm NBR 10004- admittedly dangerous residues of specific sources	HW04	Toxic Compounds
				HW07	Organic Compounds
		K053	Remaining portions and you splendor of inks and pigments	HW07	Organic Compounds
		K078	Residue of cleansers with solvent in the manufacture of inks	HW07	Organic Compounds
		K081	Silt of ETE of the production of inks	HW07	Organic Compounds
				HW11	Treatment Sludge
		K193	Shavings of leather tanned to chromium	HW04	Toxic Compounds
		K194	Leather Serragem and dust I contend chromium	HW04	Toxic Compounds
		K195	Silt of stations of treatment of effluent of tanning to chromium	HW04	Toxic Compounds
		K203	Residues of laboratories of research of illnesses	HW10	Fine Chemicals and Biocides
		K207	It sludges of the used oil re-refining (it sludge acid)	HW01	Inorganic acid
				HW09	Fuel, Oil and Grease
		P001_P123	Listing 5 of Norm NBR 10004 - dangerous residues for containing toxic substances acutely	HW07	Organic Compounds
		U001_U246	Listing 6 of Norm NBR 10004- dangerous residues for containing toxic substances	HW14	Other Hazardous substance (besides HW01-HW13)
		Z999	?	HW12	Ash from incinerator
				HW13	Dust and Air pollution control (APC) products
				HW15	Mixed Waste
				HW16	Hazardous materials from Non-production

Category	Type	CONAMA code		JICA code	
		Code	Description	Code	Description
					process
2. RC	Classe_A	RCA1	from construction, demolition, refitting and repair of pavement	RCA1	from construction, demolition, refitting and repair of pavement
		RCA2	from the construction, demolition refitting and repair of edifications: ceramic components	RCA2	from the construction, demolition refitting and repair of edifications: ceramic components
		RCA3	from manufacturing and/or demolition process of concrete pre-modulated pieces	RCA3	from manufacturing and/or demolition process of concrete pre-modulated pieces
	Classe_B	RCB1	The recyclable waste for other purposes	RCB1	The recyclable waste for other purposes
	Classe_C	RCC1	Waste which has no economically feasible technology or applications which may allow it to be recycled	RCC1	Waste which has no economically feasible technology or applications which may allow it to be recycled
	Classe_D	RCD1	Hazardous waste arises from construction process, such as paints, solvents, oils and so forth	RCD1	Hazardous waste arises from construction process such as paints, solvents, oils and so forth
3. RM	Grupo_A	RMA1	Group A.1 Biologic	RMA1	Group A.1 Biologic
		RMA2	Group A.2 Animals	RMA2	Group A.2 Animals
		RMA3	Group A.3 Body part	RMA3	Group A.3 Body part
		RMA4	Group A.4 Patient care etc	RMA4	Group A.4 Patient care etc
		RMA5	Group A.5 Prions	RMA5	Group A.5 Prions
	Grupo_B	RMB1	Chemical etc	RMB1	Chemical etc
	Grupo_C	RMC1	Radioactive waste	RMC1	Radioactive waste
	Grupo_D	RMD1	Common waste	RMD1	Common waste
	Grupo_E	RME1	Piercing or Cutting	RME1	Piercing or Cutting

4.7 WSC_DB tables diagram





4.7.1 Table structure

Table: Categoria_TTRD

Name	Type	Size
ID_CategoriaTTRD	Text	3
ID_Codigo_LicencaPSR	Text	8
ID_CodigoTTRD	Text	2
Descricao	Text	80
Observacao	Text	50

Table: Codigo_LicencaPSR

Name	Type	Size
ID_Codigo_LicencaPSR	Text	8
ID_ResiduoTipo	Text	3
ID_CodigoTTRD	Text	2
Descricao	Text	100
Nota	Text	50

Table: Codigo_ModalidadLicenca

Name	Type	Size
ID_CodigoModalidade	Text	2
Descricao	Text	25

Table: Codigo_Poluidor

Name	Type	Size
ID_CodigoPoluidor	Text	1
CP_Descricao	Text	20

Table: Codigo_Porte

Name	Type	Size
ID_CodigoPorte	Text	1
CPorte_Descricao	Text	20

Table: Codigo_RsCategoria

Name	Type	Size
ID_CodigoRsCategoria	Text	4
RsCategoria_Descricao	Text	50
RsCategoria_DescricaoEn	Text	50
RsCategoria_Nota	Memo	-

Table: Codigo_RsClasse

Name	Type	Size
ID_CodigoRsClasse	Text	9
RsClasse_Descricao	Text	100
Observacao	Memo	-

Table: Codigo_RsConama

Name	Type	Size
ID_CodigoRsConama	Text	10
ID_CodigoRsCategoria	Text	4
ID_CodigoRsTipo	Text	10
RsConama_Descricao	Text	100
RsConama_Exemplo	Memo	-
RsConama_DescricaoEn	Text	100
RsConama_ExemploEn	Memo	-
RsConama_Nota	Memo	-

Table: Codigo_RsConama15

Name	Type	Size
ID_RsConama15	Long Integer	8
ID_CodigoRsCategoria	Text	8
ID_CodigoRsTipo	Text	10
ID_CodigoRs15	Text	8
ID_CodigoRSConama	Text	10
Conama15_Obs	Memo	-

Table: Codigo_Rs15

Name	Type	Size
ID_CodigoRs15	Text	8
ID_CodigoRsCategoria	Text	8

ID_CodigoRsTipo	Text	10
RsIS_Descricao	Text	100
RsIS_Exemplo	Memo	-
RsIS_DescricaoEn	Text	100
RsIS_ExemploEn	Memo	-
RsIS_Observacao	Memo	-

Table: Codigo_RsTipo

Name	Type	Size
ID_CodigoRsTipo	Text	10
ID_CodigoRsCategoria	Text	4
RsTipo_Descricao	Text	50
RsTipo_DescricaoEn	Text	50
RSTipo_Nota	Memo	-

Table: Codigo_TTRD

Name	Type	Size
ID_CodigoTTRD	Text	2
CodigoTTRD_Descricao	Text	20

Table: Empresa_PSR

Name	Type	Size
ID_EmpresaPRS	Long Integer	4
PSR_CNPJ	Text	20
PSR_Nome	Text	100
PSR_InscricaoEstadual	Text	15
PSR_UF	Text	1
PSR_EnderecoCorresp	Text	100
PSR_Municipio	Text	50
PSR_Bairro	Text	50
PSR_CEP	Text	25
PSR_Fone	Text	50
PSR_Fax	Text	50
PSR_Representante	Text	25
PSR_Cargo	Text	25
PSR_email	Text	100
PSR_FuncionarioOM	Long Integer	4
PSR_FuncionarioAdmin	Long Integer	4
PSR_DataInstalacao	Date/Time	8
PSR_AreaTotal	Long Integer	4
PSR_AreaPlanta	Long Integer	4

Table: Licenca

Name	Type	Size
ID_Licenca	Long Integer	4
ID_EmpresaPSR	Long Integer	4
LIC_CNPJ	Text	20
LIC_UF	Text	15
LIC_ProcessoNo	Text	15
LIC_RegistroIPAAM	Text	10
ID_CodigoLicencaPSR	Text	4
ID_CodigoModalidade	Text	2
LIC_Tipo	Text	15
LIC_Renovacao	Text	30
LIC_Actividade	Text	50
LIC_Localizacao	Text	100
LIC_Latitude	Text	20
LIC_Longitude	Text	20
LIC_Representante	Text	50
LIC_Telefone	Text	50
ID_CodigoPoluidor	Text	1
ID_CodigoPorte	Text	1
LIC_DataInicio	Date/Time	8
LIC_DataExpiracao	Date/Time	8
LIC_ValidadeDias	Long Integer	4
LIC_NroRestricoes	Long Integer	4
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LIC_NomeDiretorPresidente	Text	50
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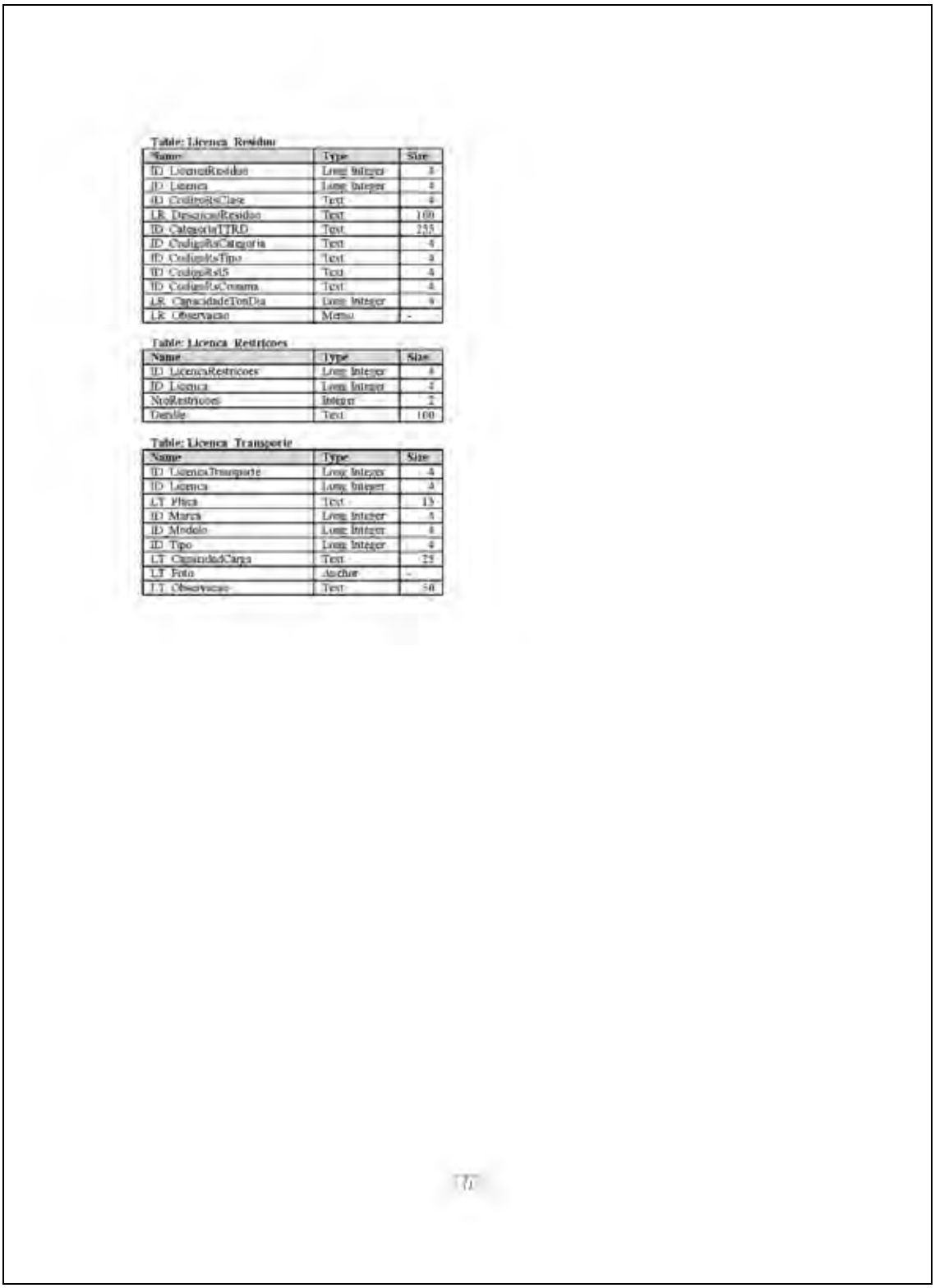

Table: Licenca_Residuo

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ID_Licenca	Long Integer	4
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LR_DescricaoResiduo	Text	100
ID_CategoriaTTRD	Text	255
ID_CodigoRsCategoria	Text	4
ID_CodigoRsTipo	Text	4
ID_CodigoRs05	Text	4
ID_CodigoRsCenama	Text	4
LR_CapacidadeTonDia	Long Integer	4
LR_Observacao	Memo	-

Table: Licenca_Restricoes

Name	Type	Size
ID_LicencaRestricoes	Long Integer	4
ID_Licenca	Long Integer	4
NroRestricoes	Integer	2
Detalle	Text	100

Table: Licenca_Transporte

Name	Type	Size
ID_LicencaTransporte	Long Integer	4
ID_Licenca	Long Integer	4
LT_Placa	Text	15
ID_Marca	Long Integer	4
ID_Modelo	Long Integer	4
ID_Tipo	Long Integer	4
LT_CapacidadCarga	Text	25
LT_Foto	Anchor	-
LT_Observacao	Text	50