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.

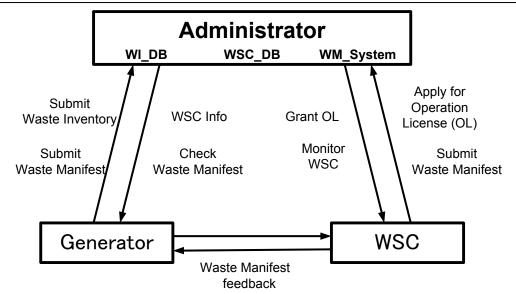


Figure 5-1: Interaction between Administrators, Generators and Receptors to implement industrial waste management

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.
- 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.

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

Table 5-1: Industrial Waste Definitions and Categories

Category	Туре	Waste Code	Description	No
		A005	Not ferrous metal scrap iron (brass, etc.)	1
		A006	Residues of paper and cardboard	
		A007	Polymerized plastic residues of process	1
		A008	Rubber residues	
		A009	Residues wooden I contend not toxic substances	1
		A010	Residues of têxteis materials	
		A011	Not metallic mineral residues	1
		A012	Slag of aluminum casting	
		A013	Slag of iron production and steel	
		A014	Slag of brass casting	
		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	-
		A022	Pastosos residues of stations of treatment of effluent I contend not toxic substances	1
		A023	Pastosos residues I contend limy	
		A024	Bagasse of sugar cane	
		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)	
		A029	Products are of the specification or are of the validity stated period contend not dangerous substances	
		A099	Salty shavings	1
		A104	Metallic packings (empty cans)	1
		A105	Not ferrous metal packings (empty cans)	
		A107	Bombonas of plastic not contaminated	
		A108	Etil acetate residues vinila (EVA)	
		A111	Leached ashes of boiler	
		A117	Glass residues	-
		A199	Foam	1
		A204	Tambores metallic	
		A207	Plastic films and small packings	
		A208	Polyurethane residues (PU)	-
		A299	Caleadas shavings of skins	-
		A308	Silt of the caleiro	-
		A399	Atanado leather shavings, remnants	
		A499	Carnaça	-
		A599	Residues organic of process (tallow, serum, bones, blood, others of the nourishing industry, etc)	

Category	Туре	Waste Code	Description	No
0- 5		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	
		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	I
		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	
		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	
		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	
		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	
		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	
		K195	Silt of stations of treatment of effluent of tanning to chromium	
		K203	Residues of laboratories of research of illnesses	
		K207	It splodges of the used oil re-refining (it splodges	

Category	Туре	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.	Group_A	RMA1	Group A.1 Biologic	1
Health-care		RMA2	Group A.2 Animals	1
Waste		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	Class_A	RCA1	from construction, demolition, refitting and repair of pavement	1
waste		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	
	Class_D	RCD1	Hazardous waste arisen from construction process, such as paints, solvents, oils and so forth	
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.

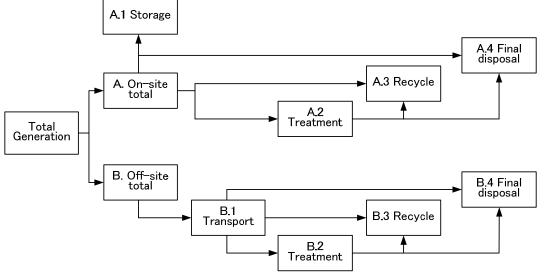


Figure 5-2: Waste Stream for Industrial Waste Disposal

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.

"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

Table 5-2: Storage methods

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.

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

Table 5-3: Intermediate Treatment Method

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.

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.

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

Table 5-5: Final Disposal Method

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.

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

Table 5-6: SUFRAMA Factory Categories

	1	
	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.

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

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

		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.

$$AM (ton / m 3) = \frac{(Gwb - Bw)}{10}$$

(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.

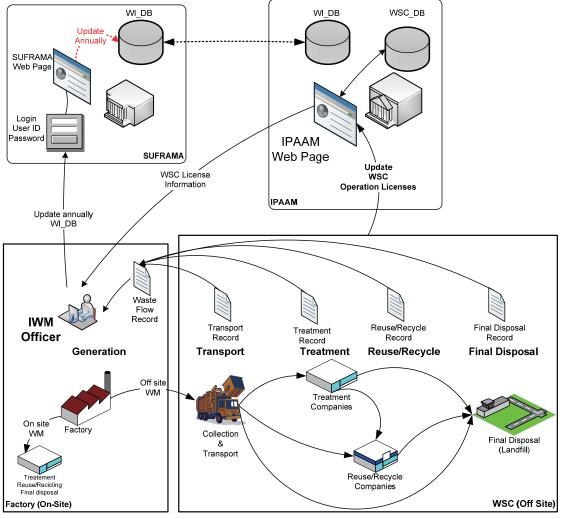
5.3.2 Production and Use of the Waste Inventory (WI)

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.



WI_DB - Waste Inventory Database WSC_DB - Waste Company Service Database

IWM - Industrial Waste Management

WSC – Waste Service Compar WM – Waste Management

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.

Using the WI_DB User Guide c.

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.

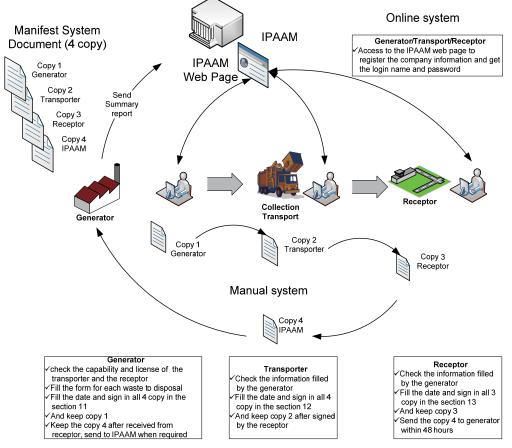


Figure 5-4: The Proposed Waste Manifest System

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 website¹. 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 $(33^{**} \sim 34^{**})$.
- 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.

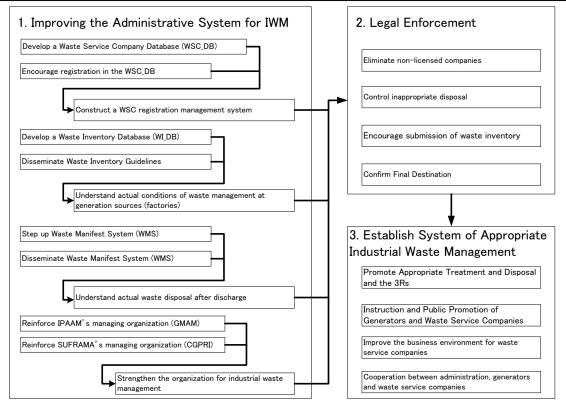


Figure 5-5: Improving the Administrative System of IWM and Establishing a System for Appropriate IWM

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.

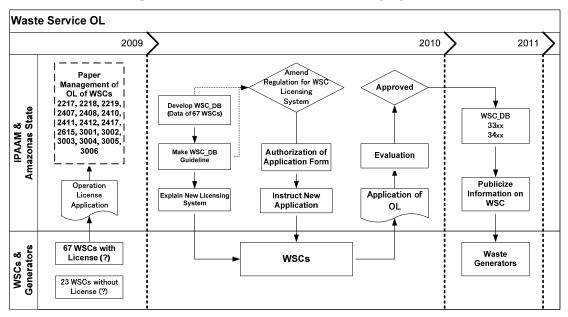
Under the current conditions, in which there is insufficient understanding of how many licensed waste service companies there are, what activities they are licensed for and what activities they are actually engaged in, it is very difficult to eliminate non-licensed companies. It is recommended that, 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 license¹ 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 license¹ 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

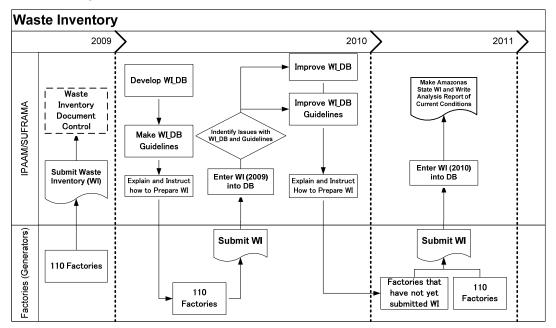
In accordance with CONAMA Resolution 313, in the State of Amazonas, all PIM factories are required to submit a waste inventory. However, only about 1/4 of the factories have complied with submitting their waste inventory. Meanwhile, IPAAM and SUFRAMA have made little progress in analyzing the waste inventories 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 2009², 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)



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.

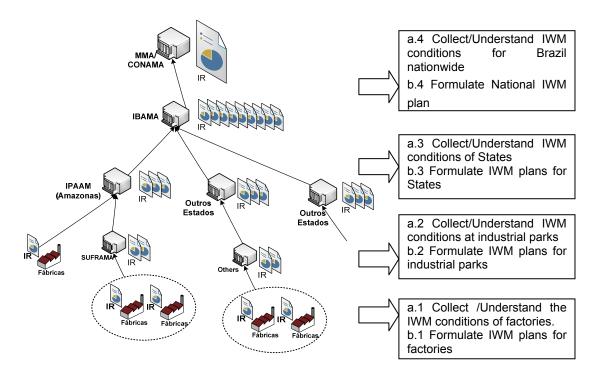


Figure 5-8: Using the WI_DB system and its relationship to understanding waste management at the factory, industrial park, state and national levels

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.

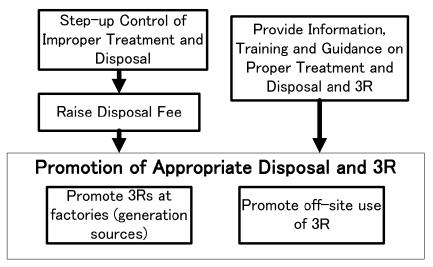


Figure 5-9: Promotion of Appropriate Disposal and 3R

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:

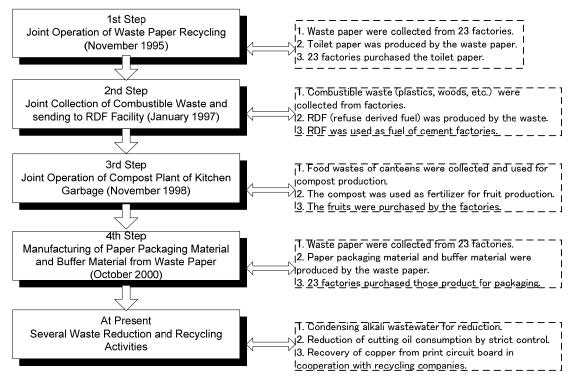
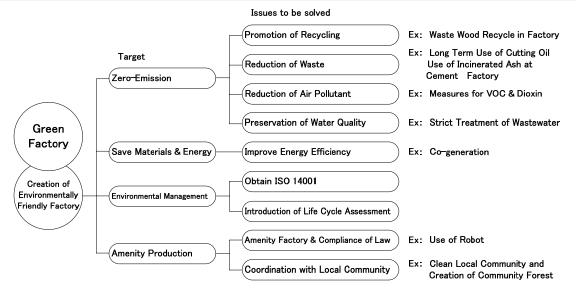


Figure 5-10: Kokubo Industrial Estate efforts for Zero Emission

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.



Source: HONDA ECOLOGY (2000)

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:54Fund 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.

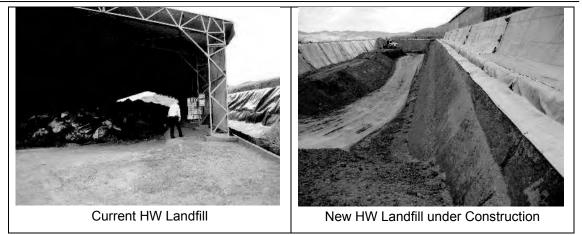
a.5 Application to Improve Industrial Waste Management in Manaus

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 m². 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.



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.



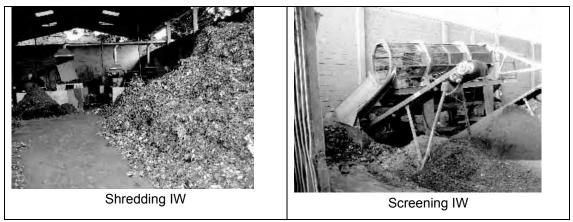
c. A Blender for a Cement Factory in Curitiba State

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 m² 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



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.

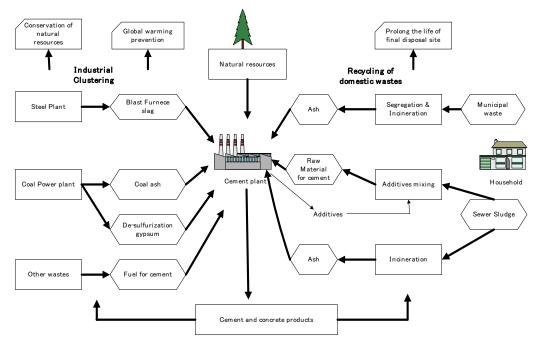


Figure 5-12: Promotion of Co-processing at a Cement Plant

5.7 WI_DB System User Guide



Waste Inventory Database System

User Guide

Contents

1	Purp	105e	1
2	CON	AMA resolution Nº 313 de 29 de October de 2002	3
6	2.1	Scheme of the information required by CONAMA resolution	2
	22	Form to be submitted (Industrial waste inventory- CONAMA)	2
3	Wast	ie Inventory Database (WI_DB)	.5
٢.	3.1	General scheme of WI_DB	.5
	3.2	General Scheme for implementation of the WI_DB	.6
	3.3	Information needed for update waste inventory	. 7
	b. c. d	General information of the factory List of input row material List of the product amount and production process	777
		How to fill the WI Report form	
	3.4.1 3.4.2 3.4.3 3.4.4 3.4.5 3.4.6 3.4.7	F1. Factory General Information F2 Waste Inventory F2.1. Input raw materials F 2.2 List of Product F 2.3 Production Process F 2.4 Generated Waste Sample of how to fill in the generated waste information	10 11 11 11 12
4	Wast	te Inventory Database System (WI_DB System)	14
Č.		General scheme of WI_DB System	
	42	Installation of the WI_DB System	15
	4.3	Using WL_DB System	
	431 432 433 434 435	Start General Information of the factory General information Waste Inventory Information of the Waste Service Company	16 16 19
	4.4	Tables	-
	441 442 443 444 445 446	JICA waste category table CONAMA's waste category table CONAMA's storage category CONAMA's treatment category CONAMA's treatment category CONAMA's final disposal category CONAMA's final disposal category Corresponding Waste category table JICA to CONAMA	26 27 29 29 29 30
	447	Corresponding waste category table CONAMA to JICA	
	4.4.8	Table's diagram	

Purpose

1

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.

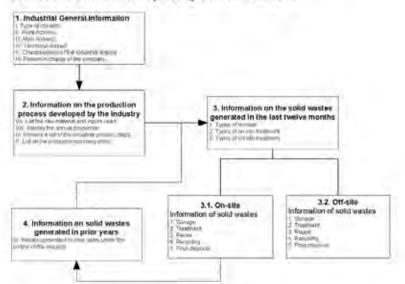
However, there are differences in how waste inventories are filled out by the factories. Therefore, IPAAM and SUFRAMA need a great deal of time to process the data, so the inventory hardcopies are filed and kept. Although a system for the waste inventories was introduced in 2002, IPAAM have been not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

21 Scheme of the Information required by CONAMA resolution



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

I. Factory General	Information:
--------------------	--------------

Municipality

	Reference Period	
	Inbal date:	Final date:
I. Plant address:		
Street N/		
Suburd/District	ZIP:	
Municipality	Telephone:	
OGCITE	GNRJI	
III. Mail address:		
Steet fir		
Suburd/District	ZIP	

۶.	ς.	
	1	

Thippitono

IV. Technical Contact:

Name:	Job the	
E-mail:		
Télephone	Fax	

V. Caracteristicas da atividade industrial:

1 Main indu activity.	strial		Côuigo ChAE	1
2. Productio	in time			
Hour/Day;	-	Day/Month:	Month/Vear.	
3. Total nun	Total number of employees			-
Production:	Street, Street	Administration:	Others areas	
4 Facilities	(m):			
5 Geograph	hic coordinates	of the industrial facilities		
Latitude	Degree:	Minute:	Second:	
Longsude	Degree:	Minute	Second.	

VI. Responsible of the Factory:

Name:		0	Job title:	
declare,	under the	feathers of the Law, th	truthfulness of the information re	endered in the present form
date	1	1		

Information on the production process developed by the industry

VII. List of the raw material and inputs used

Rew material and inputs	Actual quantity (year)	Maximum capacity (year)	Linit -
			-
	-		

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	
4.	1.0	
2.		
3.		
4.		-
5.		
6.		
7.	and the second sec	
8.		
9.		
10.		
11.		
11. 12.		
13.		

Information on the solid wastes generated in the last twelve months

1. Waste cod	e.	Description	
Type of store	ge .		
Code	Description	Type of sprag	e In the industry?
Quantity (ton	/year)?	Physical state	-
Geographico	coordinates of the site		
Latitude	Degree:	Minute:	Second:
Longitude	Degree:	Minute:	Second:

Information on the solid wastes generated - in the Industry

Code	Description	Quantity (ton/year)
2 Treatment Reuse, Reci	cling and linal disposal in the industr	v
Quantity (ton/year)	Quantity (fon/year)	Quantity (ton/year)
3. Treatment: Reuse, Rec.	cling and final disposal in the industr	V:
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 th	e destiny	-
	Name of the tmy 1:	CGC/TE	CNPJ	Enviroimental lucense	N=
Address of	the destiny 1				_
3	Bractin	Mur	NCIPANTY.	ZIP	
	6-mail	Tel	ephone	Fair	
Quantity(tor	Nyear)?		Phisical state:		_
Latitude	Dagree-	Minute	1	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

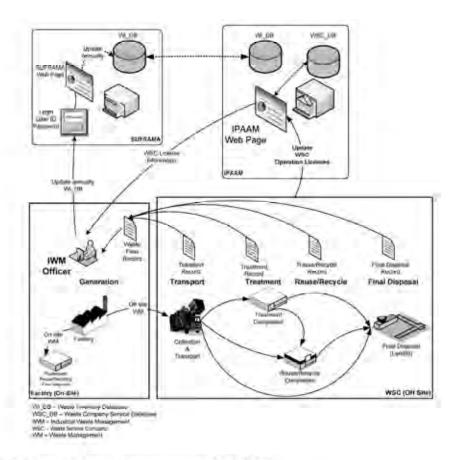
1. Waste co	ode.	Description of th	he waste		
Type of sto	rage:	_		~	
Storage de	scription			In the industry	n
Quantity Isc	on/year)?	-	Phisical state:	1	1
	ográfica do loca	i's			
Latitude	Degree:	Minute	<	Second	-
Longitude	Degree	Minuto	K	Second	

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:

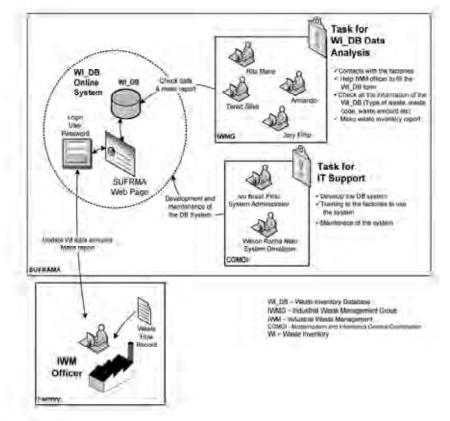
- The factory IWM officer will record all the information about the waste generation and their management (on site and off site transport, treatment, recycling and final disposal). Also from IPAAM web page check the licensed Waste Service Company (WSC).
- Annually the Factory IWM officer, will update the waste inventory in the SUFRAMA online WLDB
- 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 manage 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 W1_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

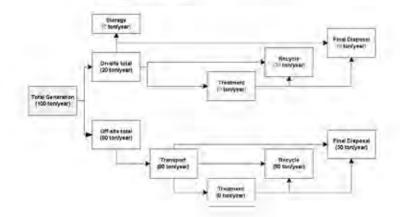


3.3 Information needed for update waste inventory

- 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

- Treatment: 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 Benkark
Company Registration Number:	
Suframa Registration N.	
Company Name	
Mail address:	
Street/n.:	
Suburb/District	
Municipality:	
ZIP:	
Telephone:	
Technical contact	
Name:	
Job-Title:	
B-mail:	
Telephone:	
Fax	
Characteristics of the industrial activit	yt.
Main industrial activity:	
CNAE Code:	See CNAL List
Latitude	GPS Measure in Diagon/Min/Sec-
Longitude	GPS Measure in Degree/Min/Sec

3.4.2 F2 Waste Inventory

Field		Data		Remark
Information on the wa	stes invento	ry		-
D Investory West				Generated by the system
Company Reg, N				
Submission Date	1			
initial Data				
Cinal Dans				
Yeal				
Note				
Address of the industri	al unit			
Strant/n:	-			
Suburn/District				
Municipality				
CORTE				
7.01	-			-
Tylephunu				_
Technician: (In charge	1	wastes managem	ent]	
Names				_
Job-Title:	-			_
E-mail				-
Telephone;				-
Fax: Characteristics of the I		ded no.		
Production time		Days/ monith:	Munihszynan	-
Total number of		Administration:	Other anvas:	
cuspioyees	100000000000000000000000000000000000000	Production and delight.	Contrast all pides:	
Facilities (m-)				
Geographic coordinates of	the industrial (a	cilities		
Latitude				GPS Measure in Digree/Min/Se
Longitade				GPS Measure in Degree/Mid/Se



3.4.3 F2.1. Input raw materials

10		Raw material and inputs	and the second sec	Maximum capacity (a year)	Unit
t	1	inputs 1	20	100	Ton/year
1	2	inputs 2	30	100	Ton/year
1	3	inputs 3	40	100	Ton/year
-				1	
	23			1	1
	Ц.		i		100

3.4.4 F 2.2 List of Product

		Products	Actual quantity (a year)	Maximum capacity (a year)	Linit
1	1	Product 1	100	150	Qnt
4	2	Product 2			
1	3	Product 3			
	1				

3.4.5 F 2.3 Production Process

	Production Process	Description	Observation
1.1	No	Restaurant waste	
t, ·	Yes	Product 1, line 1, step 2	
1	Yes	Product 1, line 1, step 3	
1.		and the second sec	
	1		

3.4.6 F 2.4 Generated Waste

200	Field	Data	Observation
1	10. Inventory Generated Waste		Generated by the system
	ID_Inventory_Waste		Generated by the system
- C	ID Production process stup	Product 1, line 1, step 2	Selection of the production step
Gen	evaled wastes		
0.00	Consumery of the works	IW (Industrial wastes)	Select from the Wastes Table
	Type of synite.	Non-HIW (Non-Hazardous industrial wastes)	Select from the Wastes Table
	CONTRA wante code;	A009 (Wood wastes containing non-toxic substances)	Select from CONAMA Wastes Table
- 081	IDAAMSHERAMA worde code	NW03 (Wood)	Select from JICA Wastes Table
100	Physical states	Solid	
	Bend inden of the water.	Wood chips	
1000	Unit code		TonAyear
E.	Total generation	100	Total generation of wastes.
	Total on-silve	0	Total of on-site management
	Total off-sile	100	Total of off-site management
1	Observation	All treated off-site	
.6.1	Form. 2.4.1 Information	on the flow of which waste genera	ated
	Field	Data	Observation
	10 Inventory GeneratedWas	te	Cenerated by the system
114	ID Inventory GeneratedWas	te	Generated by the system
- Lə	Flow of the generated wastes	AT	
	ID On Off:	Off	
		10.15 m	a contract of the second se

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 of Private
Transport	
10 Transport CNPJ	CN25 of the company inddex on D'AAM news
Quantity 100	
Observation Transpo	ort 1
Treatment	
ID Treatment CNPJ	Chief of the emispiny initiany in thAAM from
Treatment code	Select from the treatment type table
Quantity 0	
Observation	
Hecycling	
ID Recycling CMPJ	ChiPI of the tompany helding an IPAAM lines
Recycling code	Select from the treatment type table
Quantity 0	-1.
Observation	
Final Disposa	1
ID Final Disposal CNPJ	C917 of the company holding: in IPAAM norm
Final disposel code	Select-from the DF type table
Quantity 100	
Observation Disposa	d site 1
Storage	
Storage code	Select from the storage odde table
Description of the eile	
Latinude	GPS Measure in Degree/Min/Sec
Longitude	GPS Measure in Degree/Min/Sec

11.

The Study for the Development of an Integrated Solution Related
to Industrial Waste Management in the Industrial Pole of Manaus
5.7 WI_DB System User Guide

8	Wastein	ID_Ward binvent onv_War	ID_Ward ID cline.nt ID D_Wasteln ony_Ward ProductionProcess	Froce	Waste	i ar	R					Philod	Weste Descriptio	15	Tatal	Total Dn Genera ste	Officie	
3	Ventory	te	Stept		Category:	11	+ of Waster	CONAMA	Type of Waster CONAMA Wate Code:		HCA Wate Cede	1		Unir criste	de tion	total	total	Note
-	-	-	Product 1.	1001	Artificeductriat Waster)	5	NUMP Nuor- Mazaretaru tu Impustrisa (A005 (Residues w Combine not toxic Autostances (ADDS (Resignes webden Gretens not toxic Gubtances ([pooks] EQNIN	Mond	AD BOOM	Resignes	tar/hea	-	100	9	All reation
-	1	8	Product 1, line 1 step 4	(he t	Ri (industrial Wastel)	H +	Rise Mar Hazarrad Innucrital Mattel	A001 (Tessones of the subsection of plant)	dues of	(laded) E() (N	hapeli	Solution	Answers of general	tor/act		1050	200 8	809
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	-	*										_				-	-	
L	F	+	-						ſ								ľ	
- 25	A. Noothing Street of Street Lines	Notes Street	Transition of the state of the	in all a	1.2	June Donner	-	in the second	and threads by	Canal Second		And and a second	Table Provide Street	in the state	CALIFORNIA	-	The second se	and an and a second
4			- m	1		The second		1	1					20	The second value			
4	1.	-	à					1	A.	1	10	100 14 100		-				
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3.4.7 Sample of how to fill in the generated waste info

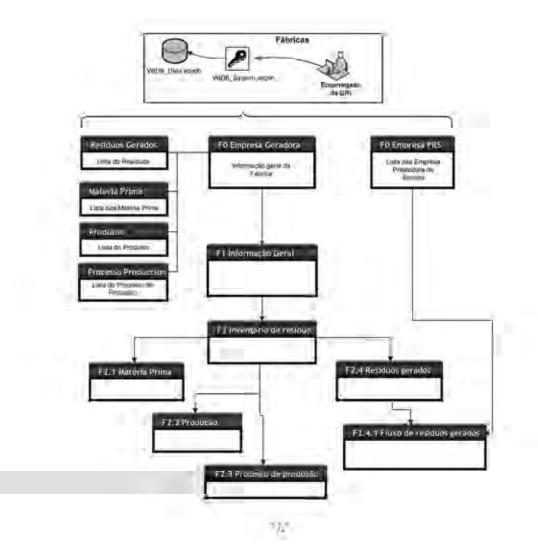
on officer

¢.

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 necessary 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=D9AE78D9-9DC6-4B38-9FA6-2C7 45A175AED&displaylang=cn)

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:XWIDBX]
- Copy the 2 files (WIDB_Data.accdb, WIDB_System.accdb) to the folder (C:XWIDBX)
- 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

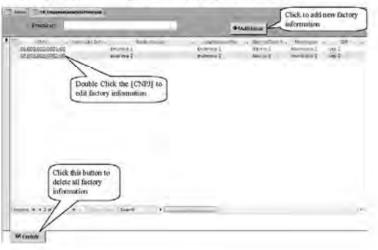
In the folder [CAWIDBY]]double click [WIDB_System.accdb] to open the DB, and will appear the next form

		nie tro	healths
ľ	Principal Tabelas Te	iatorios Exit	
I	i fabricas	Lista Empresa PSR	
	GESTÃO DE RI	Contraction of the second second second	STRIAIS
			DOVERNO DO ESTADODO AMAZONAN
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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

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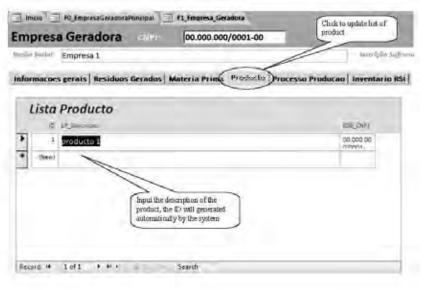
4.3.3.2 List of generated waste

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4.3.3.3 List of Raw material

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4.3.3.1 Product



4.3.3.2 Production Process

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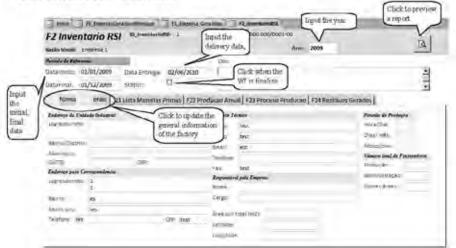
4.3.4 Waste Inventory

With this form will manage the waste inventory by year

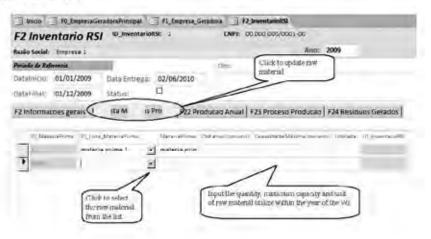
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4.3.4.1 WI Factory General Information



4.3.4.2 WI Raw Material



4.3.4.3 Annual Production

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4.3.4.4 WI Production Process



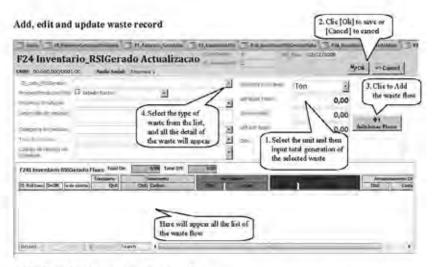
4.3.4.5 WI Generated waste

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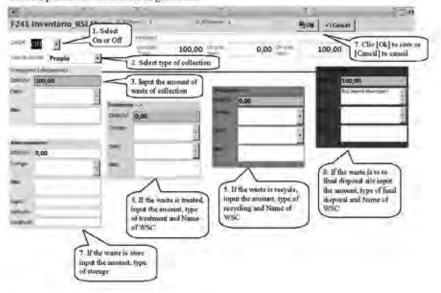
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Add, edit and update waste stream record

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



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4.3.4.6 Preview report of the Waste Inventory

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4.3.5 Information of the Waste Service Company

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4.4 Tables

4.4.1 JICA waste category table

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		NHUY	Paper
		NH04	Firstic or polymers and resust
		NHIIS	Textile and fiber
		\$1106	Ammal oil. Vegetable oil
	Non	NHOT	Robbers and Leather
	Barardows	NH08	Ash/Aust from coal-final power plants, etc.
	Industrial	NH09	Metals and metal allieve such as aluminum, copper, brouge
	waste	NH10	Curanic & Glasses
			Stend, send in material tha have composition of sell and as tile, brick.
		NHU	gypound, centent
			Mixed waste (This code shall be applied in case wastes are discharged
		NH12	without separation.)
		NII13	Obas
Industrial	RIP	HW01	Trionganic acid
Waste		HW02	Oreanic sold
		HW03	Alkulis
		HW04	Texic Compounds
		HW05	Inorganic Compounds
		TTW06	Other horgenic
		HW07	Organic Compounds
	Barardous	FILVOR	Polymeric Materials
	Industrial	HW09	Fuel, Oil and Orease
	waste	HW10	Fine Chemicals and Biocides
	- and	HWL	Treatment Slodge
		HWIZ	Ash fran incoverior
		EIW13	Dust and Air polintion control (APC) products
		HW14	Other Huztrdous substance (besides HW01-HW13)
		HW15	Mixed Winte
		HW16	Hazardous materials from Non-production process
I. RI Total	-	THAT'S.	tintal operations management process
1 RM	Grupo A	RMAL	Oroup A.1 Biologie
* 16.0	Sampo A	RMAI	Group A.1 Annuals
		RMAJ	Group A.3 Rody part
		RMA	Group A.4 Patient care etc
Modical		RMAN	Group A.4 Patent care to: Otoup A.5 Prims
	diama D	RMB1	Chemical Bc
waste	Grupo B	RMBI	
	Grupo C		Radioactave weste
	Grapo D	RMDL	Cottimen weste
S allo the second	Crupo E	RMEL	Porcing or Conting
1 RAT	There I	102011	these companying the allign and plants of many of
1 RC	Classe A	RCAL	from construction, dzmoliluru, refitting and repair of pavament
		Bent	from the construction, demolition reliating and repair of edifications
		RCAL	ceramic components
		Inches.	from transficturing and/or demolition process of concrete pre-modulated
Constanting the	Viter In	RCAF	pieces
- Fritste	Classe B	RCBI	The recyctable waste for other purposes
	-	North	Weste which has no economically feasible technology or applications
	Classe C	RCCI	which may allow it to be recycled
	in	(cost)	Hazardous wiste arisen from construction process, such as paints, solvents,
1 RUTION	Classe, D	RCDI	oile and vo farth

4.4.2	CONA	MA's	waste	category	table
-------	------	------	-------	----------	-------

Linegery	0.vj#	FUNANTA	Description
RI	RINP	A901	Residues of restaurant
		A002	Generated residues natside of the industrial primes
		A003	Restdiles of Vamção of plant
		A004	Ferrous metal scrup icon
		4005	Net firemus metal scrap ires
		A006	Residues of paper and camboard
		A007	Polymenzed plastic reaches of process
		X008	Rubber residues
		A909	Residues wooden I contend not toxic substances.
		3010	Residues el féxteis materials
		A01).	Not installic mineral residues
		A012	Sing of infimitions conting
		A013	Slag of iron production and steel
		A014	Slug of Jenses visiting
		A015	Slag of June costing
		A916	Sand of costing
		A017	Reflictory ceramic residues and material
		A018	Solid residues not toxic metal composites
		AU19	Solid residues of stations of treatment of effluent I contend material biological not text
		A021	Solid residues of stations of treasures of effluent 1 contend out toyle sidetimees
		14023	Pastoses residues of stations of ireatment of effluent 1 contexid nut toxic substances
		A023	Pailusos residues I contend finty
		4024	Bagaisse of sugar curro
		A025	Filme class
	Residuos Industrinis	AU20	Sinn of ratesamento 1 contend not tokic substances
	unu banjimere	A021	Used citativers I contend not toxic substances
		AU28	Residues of system of control of not loxic paseous emission I contend substance
Residnos		A029	Other not dangerous residues
industrials		A090	Salty shavings
		A101	Metallic puckings
		A105	Not ferrous metal package
		A107	Bembosas of plastic nel contananatad
		A108	Enflucetate residues simila
		AID	Leached autres of boiler
		MIT	Glass resolution
		A199	Foun
		A264	Turderes methilis
		A207	Plastic films and small grackings
		3208	Polyenthane residues (PU)
		A209	Calcular shavings of skins
		A108	Silt of the caleiro
		A399	Atunado Teaffier shavings, reminants
		A499	Cwines
		A599	Residues organic of process
		A699	Rindal vice
		A299	Atmodu lostber Sorragem, fran und dast
		4899	Generated residues outside of the industrial process (office, packings, etc.)
		4909	Renduci of Duits
	KUP		Eistais: 10 - dangeroos residuos for containing volatile components
	AU.		
		D001	Dangerous residues for presenting inflammability
	Residuos Industriais	D002	Dangerous residues for presenting corrouvely
	preigones	D003	Durgerous residues for presenting reactivity
		D004	Daugerous residues for presenting pathogenicity

	1777	CORAMA	Orseptption			
		D099	Other disperous residues - to specify			
		and the second	Listing J of Nomi NHR 10004- admittedly dangerous residues - Classoven J, of			
		T091 F0300	net-specific sources			
		F100	Bifenilas Policionadas - PCB's, Packings contaminated with PCBs tion transforming			
		F102	and expectors Residue of catalysers not specified in Norm NBR 10.004			
		1102	Residue of catalysers has specified in Norm ABR 10.004 Deriving residue of industrial laboratories (chemical products) not specified in Norm			
		4'103	NER 10.001			
		F104	Not specified contaminated empty packings in Norm NBR 10:004			
		F105	Solveni contaminated (to specify solvent and the main contaminante)			
		F130	Used bilinitant trid			
		F230	Hydradic floid			
		F330	Cutting and limiting of			
		F430	Used comminated oil in isolation or conline			
		F530	Oll wastes from the water-oil separating system			
		\$001 K209	Listage 2 of Norm NBR 10004- udmittedly danger ous residues of specific sources			
		6051	Remaining portions and you splodge of inks and pigments			
		K978	Residue of cleanness with solvers in the manifacture of inks			
		K081	Silt of ETE of the production of inits			
		K193	Shavings of leither tanned to chromium			
		K194	Leither Serragen and dist] contend chamins			
		K195	Silt of stations of treatment of effluent of tunning to chromium			
		K203	Readure of laboratories of research of illnesses			
		\$207	It splodges of the used oil re-refining (it splodges acid)			
			Listing 5 of Norm NBR 10001 - daughtons residues for containing focic substances			
		P001 P123				
A market		1/001_0246	Listing 6 of Nomi NBR 10004- daugerous residues for containing toxic substances			
I. RI Tubel		and the second second				
1 RM	Grupo_A	RMAL	Orong A.t Biologic			
		KMA2	Group A.2 Animals			
		RMA5	Oroup A.3 Body part			
		RMA	Group A.I Patieni care etc			
Residuos	1.1	RMAS	Group A.5 Prints			
Residuos médicos	Grupo_B	RMA5 RMB1	Groep A.S. Prints Chemical etc			
	Grupo_C	RMA3 RMB1 RM621	Group A 5 Prints Chemical etc Radioactive waste			
	Grupo_D Grupo_D	RMAS RMB1 RM671 RMIN	Group A.3 Prints Chemical etc Radioactive waste Common waste			
médicos	Grupo_C Grupo_D Grupo_E	RMA3 RMB1 RM621	Group A.5 Prints Chemical etc Radioactive waste			
medicos	Grupo_D Grupo_D Grupo_E	RMA5 RAGM RAGM RAG7F RAUM RAE1	Group A.S Prions Chemical etc: Radioactive waste Common waste Prioring or Colling			
medicos	Grupo_C Grupo_D Grupo_E	RMAS RMB1 RM671 RMIN	Group A.S Priors Chemical etc. Radioactive waste Common waste Piercing or Colling from construction, demolition, refitting and repair of povenient.			
medicos	Grupo_D Grupo_D Grupo_E	RMAS RADH RMCH RMDI RMEH RCAI	Group A.5 Priors Chemical etc Radioactive waste Common waste Princing or Colling from construction, demolition, refitting and repair of pavement from the construction, demolition refitting and repair of pavement from the construction, demolition refitting and repair of pavement.			
medicos	Grupo_D Grupo_D Grupo_E	RMAS RMB1 RMC1 RMD3 RME1 RCA1 RCA2	Group A.5 Priors Chemical etc Radioactive waste Common waste Piercing or Colling from construction, densolition, refitting and repair of povenient from the construction, densolition refitting and repair of povenient from the construction, densolition refitting and repair of oddications: consense composition			
medicos <u>2 RM Total</u> 3 RC	Gropo C Gropo D Gropo E Classe A	RMA5 RMB1 RMB1 RMB1 RMB1 RCA1 RCA1 RCA2 RCA3	Group A.S. Priors Chemical etc. Radioactive waste Common waste Prioring or Colling from construction, demolition, refitting and repair of pavement from the construction, demolition refitting and repair of oddications: commic components from manufacturing and/or demolition process of concrete pre-molidated places			
medicos <u>2. RM Total</u> 3. RC ⁻ Resalan de	Grupo D Grupo D Grupo E Classe A Classe B	RMAS RMB1 RMC1 RMD3 RME1 RCA1 RCA2	Group A.S. Priors Chemical etc. Radioactive waste Common waste Piercing or Cutting from construction, demolition, refitting and repair of povenient from file construction, demolition refitting and repair of addications: centeric composition from manifecturing and/or demolition process of concrete pre-modulated pieces. The recycluble waste for other purposes			
medicos <u>2 RM Total</u> 3 RC	Gropo C Gropo D Gropo E Classe A Classe B	RMA5 RM60 RM00 RM00 RM00 RM00 RCA1 RCA2 RCA3 RCA3 RCB1	Group A.S. Priors Chemical etc. Radioactive waste Caramon waste Processor or Carting from construction, demolition, refitting and repair of povenient from the construction, demolition refitting and repair of addications: consense composeries from manificturing and/or demolition process of concrete pre-modulated pieces There excludely waste for other purposes. Weste which has no economically feasible technology or applications which may all Weste which has no economically feasible technology or applications which may all			
medicos <u>2. RM Total</u> 3. RC ⁻ Resalan de	Grupo D Grupo D Grupo E Classe A Classe B	RMA5 RMB1 RMB1 RMB1 RMB1 RCA1 RCA1 RCA2 RCA3	Group A.S. Priors Chemical etc. Radioactive waste Common waste Piercing or Cutting from construction, demolition, refitting and repair of povement from file construction, demolition refitting and repair of deficutions: consense composition from manifecturing and/or demolition process of concrete pre-modulated pieces. The recycluble waste for other purposes			
medicos <u>2. RM Total</u> 3. RC ⁻ Resalan de	Gropo C Gropo D Gropo E Classe A Classe B	RMA5 RM60 RM00 RM00 RM00 RM00 RCA1 RCA2 RCA3 RCA3 RCB1	Group A.S. Priors Chemical etc. Radioactive waste Common waste Princing or Calling from construction, demolition, refitting and repair of pavement. from the construction, demolition refitting and repair of addications: commic composerum from manufacturing and/or demolition process of concrete pre-modulated pieces The recycluble waste for other purposes. Weste which has no economically feasible technology or applications which may all all to be recycled.			



4.4.3 CONAMA's storage category

Code for atual generated waste	Code for waste geneted in the past	Description
501	201	Barral in waterproofing floor, pollected area
511	211	Burel in waterproofing floor, unprotected area
521	221	Barrel on the ground protocted area
\$31	231	Burrel on the ground, upprotected area
5/12	2.02	In bulk on waterproofing liner, protected area
\$12	212	In bulk on waterproofing floor, improtected area
511	221	In bills, on the ground, protected area
\$32	2.82	In bulk on the ground, improvected area
503	- 2.03	Coversil damper track
\$13	213	Uncovered dumper truck
\$44	204	Tank with contention tray
SLI	Z14	Tank without continuo tray
505	2.05	Bottle on waterproviling flyin protected area
\$15	215	Bottle on waterproofing floor, unprotected area
\$25	2.25	Bottle on the governed, protected area
\$35	2.35	Bottle on the ground, unprotected area
344	209	Lagoon with waterproviding
519	219	Lagoon without waterproofing
\$45	201	Other existents (specify)

4.4.4 CONAMA's treatment category

Treatment code	Description	
T01	Licheman	
102	Incinerator with chimber	
105	Ouldoor borning	
T06	Detenation	
197	Ovidation of symples	
Tes	Chemical encapsulaison fixture or solidification	
109	Chemical oxidition	
T10	Precipitation	
TH	Datestification	
T12	Neutralization	
115	Adsorption	
T15	Biologic treatment	
TIS	Composing	
T17	Drying	
718	Land Farming	
T19	Thermal plasma	
T24	Other treatments (specify)	

445 CONAMA's recycling category

Recycling code	Description
R01	Use in industrial over (except in heathir, overs)
R02	Use in boiler
R43	Co-processing in central or ena
R64	Blunding of wastes
R05	Permulation of interpretation
BURN-	incorporation in agricultural soil
RAT	Fertilization and progation
6105	Animal reaction
R(9	Reprocessing of solvens
810	Re-refining of oil
411	Reprocessing of rel
R12	Scrup iron collector
R13	On-the rate on and the overy
R79	Other Soms of responses of the recovery

4.4.6 CONAMA's final disposal category

Final disposal code	Description
391	Intilitation in the soil
802	Municipal Laudfill
10.7	Own Industrial LandIIII
844	Third-putties Industrial Landfill
003	Mancipal Domping Sile
806	Private Domping Sile
Răn	Stever
830	Other (specify)

4.4.7 Corresponding Waste category table JICA to CONAMA

Calleg	Type		JICA code	2	CONAMA code
my	-	Code	Decription	Code	Decription
RI	RIMP	NH01	Kitchen weste (melude waste from mimal such as home akin, hair)	Yest	Residues of restaurant
				A024	Bagener of super cape
				A499	Carmups
				A599	Residues organic of provies
				A699	Rand of noc
				A999	Residues of muta
		NH02	Wood.	A069	Residues wooden 1 contend not toxic substances
		NH03	Piner	A606	Residens of paper and cardboard
		NH04	Plastic or polymers and result	A007.	Polymerized plastic residues of process-
		1000		4107	Tombosas of photic not contain moted
				ALOS	Ftill accuste residues vanita
				A\$07	Plastic films and small packings
				A208	Pulyarethine residues (PU)
		NHM	Textile and fiber	A010	Residues of textus manuals
		NH96	Aminai oil, Venemble oil	12999	Y
		NH07	Rubbers and Leather	A865	Robber residues
		1,4194	Chicken's with Printing	A299	Calculas diayings of ikins
				A399	Aturado leather shrvings, remnines
		NHOS	Ash/dost from cosh-fired power plants, etc.	AHL	Leached when of boiler
		NH09	Metals and metal alloys such as aluminum, coppur. bireaze	A004	Ferrors wetal scrap irou
			soften en en	A005	Net ferring metal accuptions
				A011	Not multiallic maneral reindopt
				A012	Shot of aluminum cauting.
				A013	Stag of iron production and stori
				A014	Shar of brow coding
				AULS	Shar of the Grang
				A016	Sand of carring
				A104	
					Metallic packings
				A105	Not ferrous metal packings
		10000	Augusta E Aliana	A204	Tamborés metallic
		NHI	Cerninic & Ginnen	A917	Refractory certanic residues and material
				A025	Fibre ginis
				A117	Class residney
		ACCR 1	Phone and compared black how and	A299	Alanade leather Serragem, Jean and dust
		NHUT	Stone, sund or material that have composition of soil such as tile, brick, gypson, content	1 (2994)	x.
		NH12	Mixed waste (This code shall be applied in case wastes are discharged without separation.)	A002	Centrated residues outside of the industrial process
		NHD	Öthers	A003	Residues of variation of plans
		- and	NA BUL	A018	Sulid readues not faitic metal composites
				AUI¥	Solid residues of stations of treatment of effluent 1 contend material biological not toxic
				4021	Solid residues of stations of treatment of effluent (contend not roug substances
				A022	Partonov residues of stations of treatment of efficient Leonepi not tosic substances

Type		- UCA code		CONAMA sode
	Code	Destipiton	Code	Decription
		1	A623	Pastoau residues 1 contend linny
			A026	Sing of intermento I contend not texic arbitrances
			A027	Used catalysers I contend not lovic substance-
			A625	Residues of system of control of not toxic gasonus
				emission I contend substance
			A029	Other not daugtrons residents
			A099	Salty diavongs
			A199	Finns
			A368	Sin of the caleno
			A579	Omerated residues outside of the industrial process
			1997.2	(office, parkings, etc.)
HIP.	HANDI	Integanic acid	D002	Dangerous residues for presenting corrosively
sine.	Head	modiant acto	Daid	Dangerous residues for presenting reactivity
			K207	It splodges of the used oil re-refining (# splodges
			P.20	
	100.00.0	26-C - 2 - 2 - 2 - 1	10 alte	acid)
	HW02	Organia sold	D002	Daugerous residues for presenting corresively
	-		Deca	Dangerony residues for presenting reactivity
	HM/03	Alkalis	D902	Dangerous cestilies for presenting conosively
			1000	Dangerous residues for presenting reactivity
	11/094	Tuxac Compounds	F001_F0301	
				dangerous reaches - Chairoom 1, of not-specific
				mmices
			F103	Deriving residue of industrial lithoratories (chemic
				products) not specified in Norm NER 10.004
			F130	Used lubricant all
			1230	Livernulie Ford
			12330	Cutting and hauting oil
			F430	Used contaminited oil in isolation or cooling.
			F530	Oil wantes from the water-oil reporting notem
			K001 6209	Linning 2 of Norm NISE 10001, adminutly
			10001 10200	daugerous residues of epocific summers
			K193	Shrvings of Jewiller tanged to dominion
			K194	Leather Serragan and dust I contend chromium
			K195	Sit of stations of treatment of effort of targing to
			P1/25	chromoti
	10503	Inorganic Compounds	10005 D029	Listing 7 of Norm NBR 10004 alongsroup residues
		and Bear to the surger	all a second second	churacterized by the leaching test
	HWite	Other Inoremie	D005 D029	Listing 7 of Nerm NER 10004, dangerous residies
				charactenzed by the leaching test
	HW87	Organic Compounds	DUNG	Datoprove reaches for presenting readoutly
	1	Competencies and some	F001 F0301	
			Print Contractor	daugerous cendres - Classroom 1, of not specific
				multice description cancelout it of the spectric
			¥100	Bilenilus Policieradus - PCB/'s Parkings
			100	
				contaminated with PCBa also transforming and
			1000	capacitors.
			1105	Solvent constrainted to specify solvent and the
			6 mil 1	main contaminante)
			F130	Ungal Information off
			\$230	Hydranlic Paul
			1330	Cutting and hauling oil.
			F430	Lised contentinated oil in isolation or cooling.
			F330	Oil wastas from the water-oil separating system
			Kao1 46207	Listing 2 of Norm NOR 10004- aduntally
				dangenous relidues of specific sources
			1083	Remaining pertions and you globbe of inks and
			1000	Hugments
			K078	Residue of cleanness with solvent in the construction
			in the	of inks
			KoSt	
				Sit of ETE of the production of inica
			P001 P123	Listing 5 of Nerra NBR 10004 - dangerous residue
	-			for containing taxic substances acately
	HW06	Polymeric Materials	Deet	Dangarous trisichus for presenting inflammability
		Fuel Dif and Grence	DOOL	Damerous residues for presenting inflammability
	HW89	Fuel Tagater cucies		
	HW89	Puel, Creation Creative	1/207	It splodges of the used oil re-refining (it splodges

su.

Calleg	Type	1	IICA code	1	CONAMA sode
ory	1.46	Cale	Destipilion	Code	Decription
_	-	HW10	Fine Chemicals and Blocides	D001	Dangeryas residues for presenting: inflammobility
			Concernence and the second	D004	Dangerous residues for presenting pathogenicity
				D005_D029	Listing 7 of Norm NIIR 10001: dangerous residues characterized by the leaching test
				F193	Deriving residue of industrial laboratories (chemical products) nut specified in Norm NBR 10.000
				K203	Residues of laboratories of research of illnesses
		nwn	Treatment Shulge	D005_D029	Latting 7 of Norm Nilk 10001 dangermay residues districterized by the leaching test.
		-		K051	Sit of ETE of the production of miss
		HW12	Ash from incinentiar	2,999	9°.
		11/13	Duct and Air petholion control (APC) products	2999	4
		UWH	Celin Hazardoni abstance (besides HW01-HW13)	C001_C009	Lining 10 - dangerous readow for containing volutile components
				D001	Danagroup residues for presenting inflammability
				DOUT	Congeroin returner for presenting pathogenicity
				D099	Other degreenes residues - to specify
				F102	Residue of catalysers not specified in Norm NBR 10.004
				F104	Not specified contaminated empty packings in Norr SBR, (0.001)
				L001_1/246	Listing 6 of Norm NBR 10004- dangerous residues for containing toxic substances
		HW15	Mixed Waste	2949	7
		HW16	Hacadors materials from Neu-production neces-	X834	7
2, RC	(flass:)	RCAI	from construction, demolition, refitting and rupair of pavement	RCAI	from construction, deniolition, retitting and repair of pavement
		RCA2	from the construction, demokines refitting and repair of addications: ceramic components	RCAZ	tion the construction, demolston relating and repair of additions: chamic components
		RCAJ	from manufacturing und/or demotion process of concrete pre-modulated preces	RCAJ	from manufacturing and/or demolition process of concrete pro-mudulated process
	Classe	RCRI	The recyclable noste for other purposes	RCBI	The recyclable voste for other purposes
	Class: C	RCC1	Waste which has no economically feasible technology or up/leations which may allow if to be maycled	RCC1	Waste which has no economically feasible technology or applications which may allow it to be recycled
	Class.	RCDI	Hazardow wasts snown from construction process such as points, withouts, sith and so forth	8001	Haderdons works ansen from construction process, and as points, solvents, out and as forth
J.RM	Onesa A	RMA1		RMAI	Group A.1 Biologic
	<i>av</i>	RMA2	Group A.2 Annuals	RMA2	Group A.2 Abumily
		RMA3		RMAJ	Crong A.3 Birdy par
		RMA4		RMA4	Group A.4 Patent care etc.
		RMAS	Group A.5 Prims	KMA5	Group A.3 Prioris
	Grupu_ B	RMB1	Chantical ste	RMB1	Chemieral etc
	Onpo_	RMCI	Radioactive waste	RMC1	Radioactive waste
	Ompó_ D	RMDI	Common waste	RMDI	Common wast
		RME1	Pretoing an Childing	BMET	Percing or Disting

Caleg ary L.RL

4.4.8 Corresponding waste category table CONAMA to JICA

Ē,		CONAMA cule		-IICA-owle
	Cuie	Dessiption	Cade	Decription
1	4091	Residers of restauraal	SHOT	Kählen weste (include weste from minual such a- bone, skui hair)
	A992	Generated residues outside of the unlostral process	NH12	Mixed waste (This code shall be applied in case, wastes are discharged without separation.)
	A093	Residues of variatio of phan	NIII3	Others
	A004	Fernovmetal scrap iron		Metale and metal afloys such as alaminano, copper former
	A005	Not ferrous metal scrap trap	NH09	Metals and metal alloys such as aluminum, copper buowe
	A606	Residuce of paper and cardloand	NI103	Paper
	A607	Polymerized plastic residues of process		Plastic or polymers and resina
	A508	Rubber residues		Rubburs and Leather
	1.009	Residues woulden I contend int taxic mistances		Wood
	A910	Residues of fésteis materials	10105	Testile and fiber
	A911	Nes metallic mineral residues	NH09	Metals and usefal alloys such as aluminum, copper
	A912	Sing of eleminous casting	S1109	bronze Metals and orizial alloymouth an aluminum, support
	A013	Slag of iron production and steel	NH09	bronze Metals and oretal alloys such as oluminum, copput bronze
	A014	Sking of brace carriery	S1109	sconze Metals and ordal alleys and an aluminum, copper fermize
	A015	Sing of nine custing	NH09	
	A010	Sand of costing	NH09	Metale and motal alloys such as aluminum, copper branze
	A017	Refractory ceramic residues and material	NHI	Ceramic & Glasses
	A015	Solid residues not toxic instal composites		Others
	A919	Solid residues of stations of treatment of effluent 1 contend material biological not toxic	NH13	Sthere
	A621	Solid residues of stations of beatment of effluent I coview out toxic substances		Cilhery
	A402		NH13	Others
	A823	Pastosos residues 1 centend limy	20113	Othere
	A024	Dagana of mgar cane		Kitchen waste (include waste from animal such as bone, skin, hair)
	A025	Filley glass	NHID	Ceramic & Olasses
	A826	Sing of intermento I contend not foxic substances		Others
	1425	Usail cathlywars I cont and not fourie substances	NH13	Othere
	A#25	Residuer of system of control of net hosic gaseous emirision I contend substance		Others
	A829	Cither not dangerous residues	NH13	Otters
	A09	Salty-shavings		Others
	A164	Metallic packings	NH09	
	A105	Net ferrous metai pockimp	21105	
	A107	Etembionan of plastic not contaminated	NH04	Plustic or polymers and resins
	A195	Etil acetatic rendars vania		Plastic or polymers and resins
	ADI	Laached ashes of boiler		Ash/dust from coal fired power plants, etc.
	A117	Glass residues		Ceramic & Glasses
	A199	Form		Others
	A294	Tambores metallic		Metals and metal alloys such as slomitron, copper bronze
	A297	Plastic films and small packages	NH04	Physic or polyaners and resura
	A298	Polyuration e residues (PC)		Plastic or polyanezs and resina
	A299	Chiendus shuvings of skinys		Rubbers and Leather
	A306	Sit of the caleiro		Others

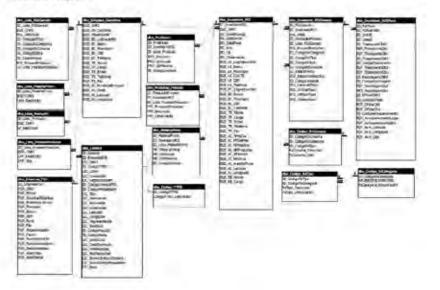
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Calleg	Type		CONAMA code	-	
100		Code	Decription	Cath	Deccipiion
		A499	Camaça	20101	Nitchen weste (include weste from animal such as
		700	a three man is set to		bene, skin, hair)
		A599	Residues organic of princes,	SH01	Kitchen wasie (include weste from animal such as bone, (kin, hair)
		A699	Rind of rice	\$1401	Kitchen waste (include wuste from animal such as
		asass	And of the		bone, skin, hair)
		A799	Attando leather Serragon, bran and dast	NH10	Ceramic & Giasses
		A\$99	Generated residees outside of the industrial		Others
			process (office, packings, etc.)		
		A999	Residues of fruits	NFI01	Kitchen waste (melude waste from anneil atda as
				-	bone skin, hur)
		7.999	7		Animal off, Vegetable off Those, sand or material that have composition of so
				ann	such as file, brick, gypsini, commit
9	RIP	C001_C009	Litting 10 - dangerous residues for containing volatile components	HW14	Other Hazardous substance (besides HW01-HW13)
		Deet	Dangerous residues for presenting- influenceability	HW88	Polymene Materials
			and the second se	17W09	Fuel: Oil and Grease
					Fine Chemicals and Biocides
					Other Hazardous substance (besides HW01-HW13
		13002	Dangeroos residues for presenting corrosively		
					Organic and
					Alkalis
		13003	Dangerous residues for presenting reactivity		Inornatic sold
					Organic scil Alkalis
					Organit: Compriseds
		13004	Dangement residues for presenting, pathogenicity		Fine Chemicals and Biocides
			1-maximum y	HW14	Other Hazandous substance (hesides f1W01-11W13)
		10005_10029	Listing 1 of Norm MINE (0004, dangerous residnes characterized by the leaching rest		Integratic Componende
					Other Duorgenaic
					Fine Chemicals and Biocides
					Trestment Studge
		1099	Other dangerous residues - to opening		Other Hazardous substance (besides fTW01-11W13
		E001 E0001	Listing 1 of Norm NBR 10004 admittedly dangerous residues - Classroom 1, nf not-specific sources	HW04	Totic Compounds
			interference parter	HW07	Otganii: Compounds
		F100	Bifenilas Policioradas - PCB's: Packings contaminated with PCBs also transforming		Organii: Compoundi
		F102	and equacitors Residue of catalysers and quedified in Norm	HWI	Other Flucenthurs solutionse (besider FRW01-FRW13)
		F103	NBR 16.004 Deriving residue of sidustral laboratories	11990.4	Toxic Compounds
		115	(chemical products) not specified in Norm NBE 10 094		Tonic Composition
			11-2-2-3 (0.1)	HW10	Fitse Chemically and Blocides
		F104	Norm NBR 10.004		Other Hazardous substance (besides BW01-RW13)
		F105	Solvest contaminated (to specify solvest and the main contaminante)	HW02	Organic Compounds
		E130	Tised intercent of		Taxic Compounds Organic Compounds
		F230	Hydraulic flaid	HW04	Toxic Compounds Organic Compounds
		F.3.30	Catting and haaling all	HW04	Taxic Compounds Organic Compounds
		F430	Used contaminated will in isolation or cooling	HW04	Toxic Compounds
		State of the second sec	the second se		Organit: Comprisedor
		F530	Oil wustes from the weter-ail separating system	HWOM	Texic Compounds

Callg	lype		CONAMA mide.	JICA cuale		
019	- and	Code	Desciption	Cade	Decription	
	-	K001 K209	Listing 2 of Norm NBR 100042 admittedby	HW04	Texic Compande	
			dangerous residues of specific sources			
		_			Organic Compounds	
		K053	Remaining portion cand you seledge of inks- and comments-	HW07	Organic Compounds	
		K078	Residue of classmess with solvent in the manufacture of take	HW07	Orteanie Compounds	
		K081	Sit of ETU of the production of inks		Organic Componida Treatment Studie	
		K193	Shavings of leaflog tunned to chromium		Textic Consistinds	
		£194	Leather Serragem and dast I contend	HW04	Toxic Compounds	
		K195	Silt of stations of treatment of effluent of faming to chromom	10994	Texic Compounds	
		K203	Residues of laboratories of research of	HW10	Fine Chemicals and Brocides	
		K207	D splodges of the used oil re-refining (it splodges acid)	IIWOL	Inorganic add	
			- Comparison of the second	11570.9	Fiel, Oil and Gross	
		Poot P123	Listing 5 of Norm NBR 10004 - dangerous residues for containing toric substances acousty-	HW07	Organic Dompounds	
		Uest_0246	Listing 6 of Norm NBR 10001: dangerous residues for containing toxic substances	HWT4	Other Hagarabus substance (besides (1W01-0W13)	
		Z999	*		Ash from incaremtur, Dud and Air pollotion control (APC) products	
				IIW15	Mixed Wester	
2. R¢	Classic A	RCAI	from construction, demolition, refuting and reptile of puyement.		Hazardous materialis from Non-production process from construction, demolition, relitting and repair of prevenues	
		RCA2		RCA3	from the construction, demoldion reflitting and repair of odifications, commit comparation	
		RCAJ		RCAJ	from manufacturing and/or demolition process of innerese pre-modulated pieces	
	Classe_	RCIII	The necycluble wrste fin other purposes	RCBI	The recyclubile waste for other purposes	
	Classe_ C	RCCI	While which has no economically feasible technology or applications which may allow it to be recycled	RCCI	Waste which has no economically feasible technology or applications which may allow is to be recycled	
	Classe D	RCDI	Hazardous wave atown trom construction process such as paints, advents, nils and so forth	RCDI	Harardous waste unsen from construction process, such as parate, solventa, only and so forth	
I. IM	Chubu_	RMAL	Group A.I Etimogic	RMAI	Group A.I Binlight	
	-	RMA2	Gring A.7 Animali	RMA2	Group A.7 Animula	
		RMA3	Group A.3 Body part		Group A3 Body part	
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	_	RMAS.	Group A.5 Prions	RMA5	Group A.5 Prions	
	Grupo B	RMBI	Chemical etc	RMBI	Chemical etc	
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	Grupo TJ	RMD1	Common wards	RMDI	Common waste	
	Firupo E	RMET	Piercom of Colling	RATE 1	Phaseing or Cotting	

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Table's diagram 4.5



Tables structure 4.6

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PSR Nome	Text	1.05
PSR InvestoreEstadant	Test	1
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EGE RE Nome	Text	- 54
EGE RE Cargo	Text	- 56

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RSF_TransporteQtd	Double	3
RSF TransporteObs	Menno	1.0
ID TraiamentoCNPJ	Text	20
ID CaligoTratamento	Text	4
RSF TommerinQui	Double	· · . 3
RSF Theraugeduces	Ménuo	1.1
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ID CodigoReastingen	Text	1.14
RSF RecicligenQid	Double	
RFS RecicligenChs	Memo	1.4-5
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ID CodiatOFmal	Text	1 4
RSF DFmatQtd	Double	
KSF DFmalliba	Memo	1.2.1
1D CollisiAmnoningito	Text	1.1114
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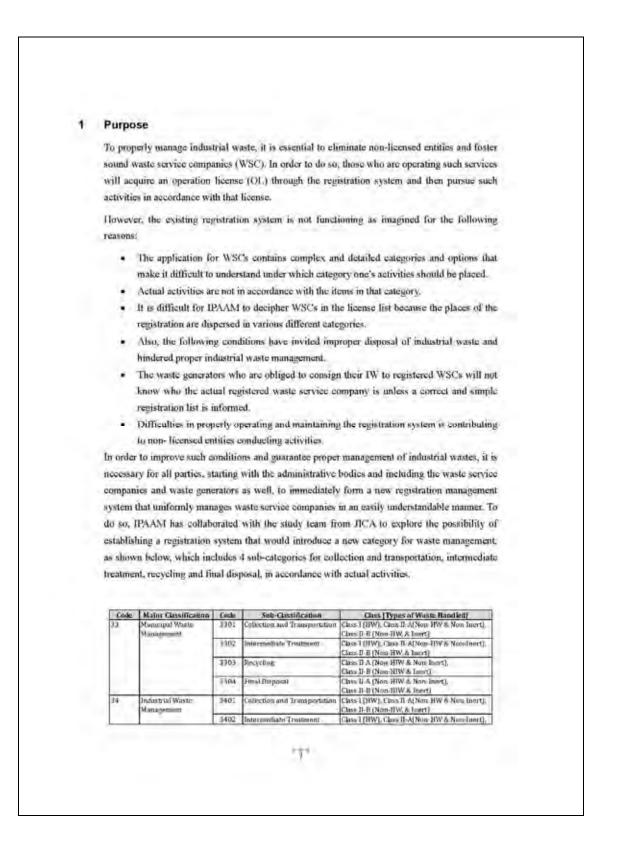
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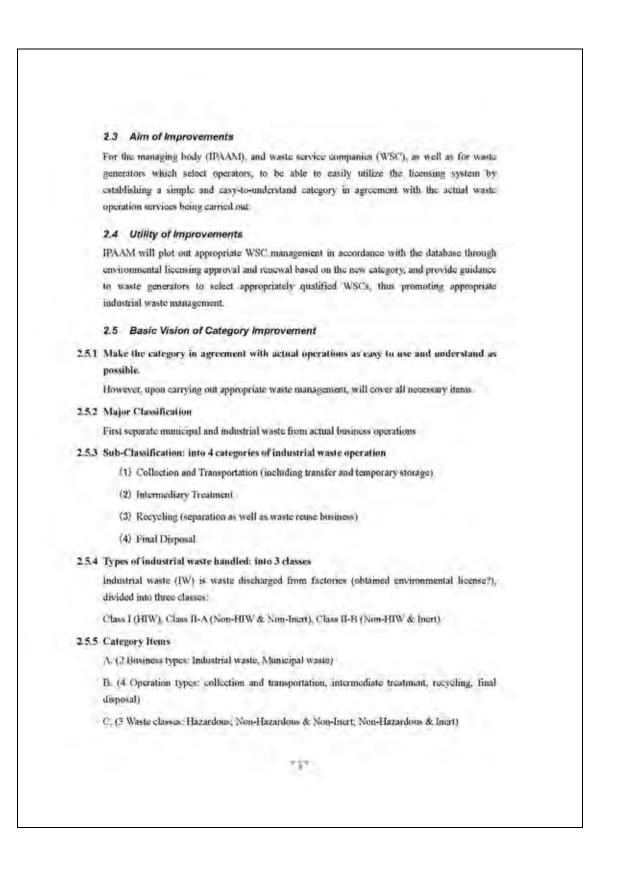
5.8 WSC_DB System User Guide

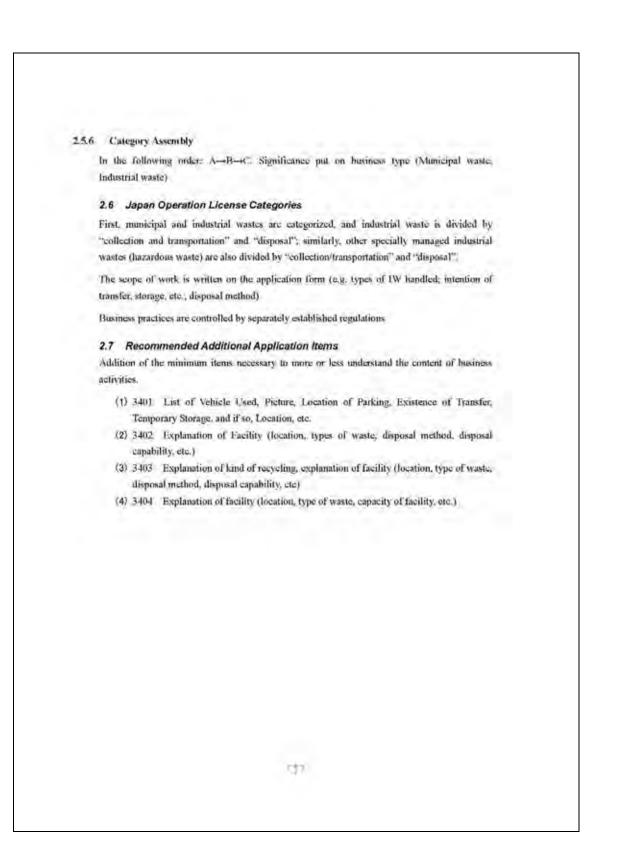
THE STUDY FOR THE DEVELOPMENT OF AN INTEGRATED SOLUTION RELATED TO INDUSTRIAL WASTE MANAGEMENT IN THE INDUSTRIAL POLE OF MANAUS Waste Service Company Database **User Guide**

	Contents	
1 Purr	105¢	
	numendation for Improving Categorization of Waste-related Environmental Licensing	
2.1	Current Issues	-
2.2	Waste Management related Codes of IPAAM for Environmental Licensing	- 1
23	Ain of Improvements	
2.4	Utility of Improvements	
2.5	Basic Vision of Category Improvement	
151	Make the category in agreement with actual operations as carry to use and understand as possible Major Classification	
253	Sub-Classification into 4 categories of industrial waste operation	
25.4	Types of industrial waste handled into 1 classes	
255	Calegory Items	
25,6	Category Assembly	
2.6	Japan Operation License Categories	
2.7	Recommended Additional Application Items	
2.8.1	Recommended form	
182	Treatment	
283	Recycle form	
284	Final Disposal form	
3 Wast	te Service Company (WSC_DB)	5
3.1	General scheme of WSC DB	- 5
3.2	General Scheme for implementation of the WSC_DB	
3.3	WSC_DB User guide	
3.4	Information needed for update waste inventory	
3.5	Diagram of the WSC_DB system F1 Ceneral Information	
351	F2 WSC Operation License information	
353	F2.1. Operation License Restriction	
15.4	F2.2 Transport Detail (if Operation License is for transporte)	
15.5	F2 3. Operation License Waste Management	- 19
3.6	Using WSC_DB System	
3.6.1	Main form	
3.6.2	WSC List Update WSC general information	-12
3.6.4	Update WSC general information Update WSC licenses	
3.7	Search WSC Information on the IPAAM WebPage	
4 Tabl	15	
4.1	WSC license table	
4.2	Polluter category table	
4.3	Polluter size table	
4.4	Waste Class Table	18
4.5	TTRD category table.	
-4.6	Waste Category	
4.61	JICA waste category table	
163	CONAMA's waste category table Corresponding Waste category table JICA to CONAMA	
4.0.4	Corresponding waste category table CONAMA to JICA	
4.7	WSC_DB tubles diagram	
478	Table structure	29



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	Services	2218	Co-processing of wastes	High
		2219	Agrochemical Collection Center	Moderate
24 + +	Other Services (including provision	2407	Solid Industrial Waste Collection and/or Treatment	High
	of electricity and	2408	Municipal Waste Final Destination	High
	water)	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
		B	In the state of the state of the second test and the	High
		2417	Industrial Waste Disposal in Landfill	
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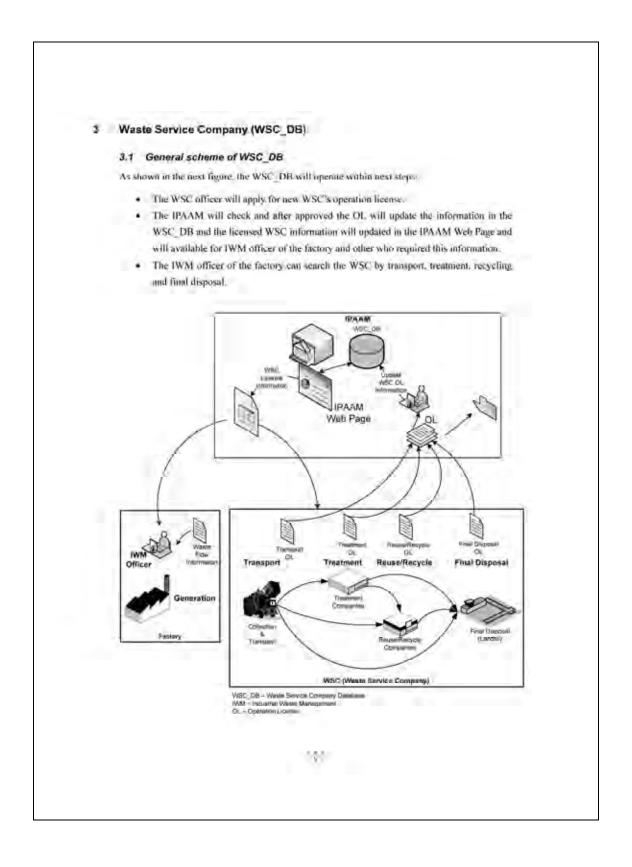


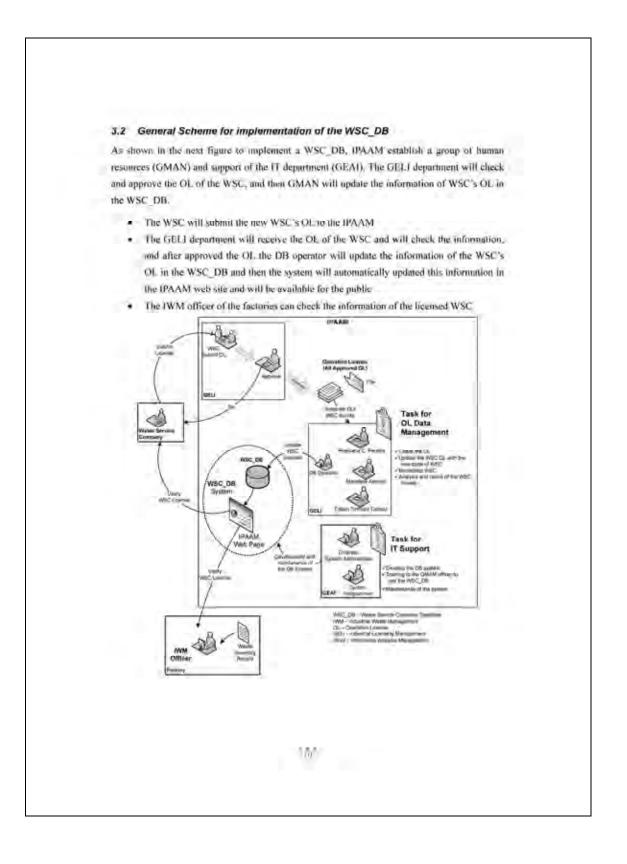
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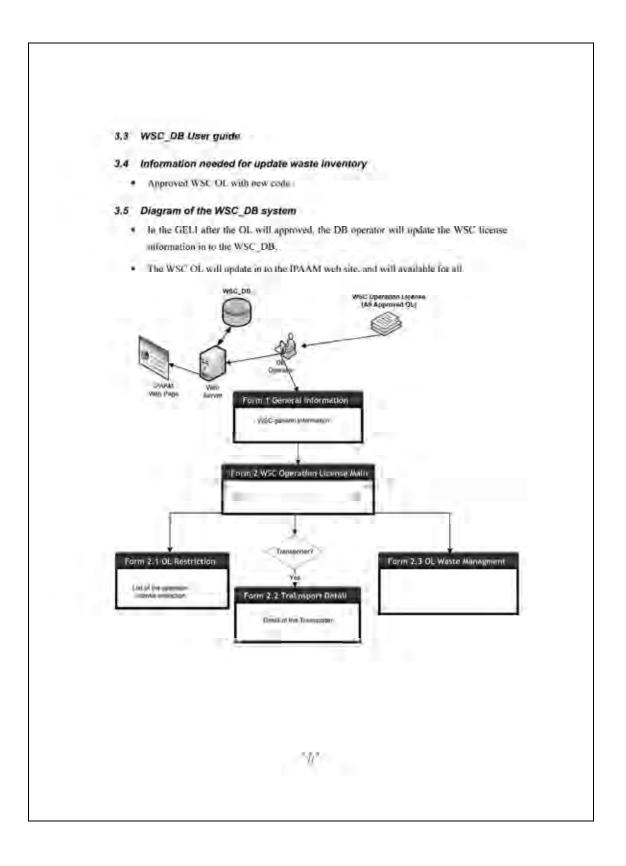
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3. Type of Waste	Final Disposal License			
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		TIN	Description	-11
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Field	Data		Remark
ID_EmpresaPSR		a	
CNPf:	04.025.466/0003-00		
State Registration	04.167.721-8		
Company Name	Empresa 1	-	
Mail Address	-		
Street/nº: Suburb/District:			
Municipality:			
ZIP:	-		
Phone:			
Fax:			
Representative Contact:			
Name:	Nome 1		
fob Title:			
E-mail:			
Type of Activity:			
Number of employee:		20	
	Operation and maintenance	50	
Area			
	the second se	400 m2	
Installation Date:	10/01/2000		
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ID_EmpresaPSR		
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Process No		
IPAAMRegistration		
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	Operation license	Num Province
Type of OL		New, Renew
Renaw	No. 1	Renew license humber
	Transport of NonHW	Activity description
Location of the company:	Address I	-
/100/1555	Latitude [3°07'44.14" S	GPS measure in Degree Min/
Geographic coordinates	Longitude 60°00'45.71" W	
	Longitude 60/00/45.71" W	GPS measure in DegreeMin/
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	00000000	
Polluting Code	A (Alto)	
Polluting size	M (Medio)	
Vality of this license	01/01/2010	
	31/01/2010	
Vality days		
Number of restrictions		
Information of IPAAM		
Name fo the Technical	Name 1	
Manager		
Name of the President	Name 2	
Director Observation	1.1675-0	
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$1 m \sim 0 - 6$	C license table				
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110	3402	TR.	Precipitation	
711	5-602	TR:	Delostfication	
112	3.862	TOR.	Neutralization	
113	3402	TR.	Adsorption	
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Toxic Compounds Inorganic Compounds

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Razardous metnatrial waste

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HW04 HW05

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2. RM Grupo A RMA1 Group A.1 Elologic RMA2 Group A.2 Animals RMA3 Group A.3 Body part RMA4 Group A.4 Balant care stc	
RMA3 Group A3 Body part RMA4 Group A4 Patient care etc	
RMA4 Groep A.4 Patient care etc	
waster Grupo B RMB1 Chemical etc	
Grupo C RMCI Radioactive waste	
Grupo D RMD1 Common wasts Grupo E RME1 Piercing or Conting	
2. RM ADEM	
3 RC Classe A RCA1 from construction, demohition, relating and repair of pavenee	
From the construction. Annotation and repair of edific RCA2 components	
from manufacturing and/or deposition process of concrete pr RCA3 pieces	(e-mode)ated
Classe B RCB1 The recycluble waste for other purposes	
Classe_C ROCI muty allow it to be recycled	
Hatardous wiste arises from construction process, such as p Classe D RCD1 oils and so forth	uints, solvents
3. RC Tetal	
CONAMA's waste category table	
Calesony Type code Description	
Category Type (cod. Description 1, R1 RINP A00) Residues of restaurant	
Category Appe Operation 1. R1 RINP A001 Residues of restaurant A002 Generated residues on toide of the industrial process	
Category Type Order Description 1: R1 RTNP A001 Residues of restaurant 4002 Generated residues ontoide of the industrial process	
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Category Ayre (cold Description I, B1 RINP A001 Residues of restainant A002 Cremental residues of plank A003 Residues of variation of plank A004 Formus metal scrap iron A005 Not formus metal scrap iron A006 Residues of paper and cardboard	
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Latergory Lype Lood Description T. B1 RTNP A001 Residues of restaurant A002 Generatual residues antoide of the industrial practice A003 Residues of restaurant A004 Ferrous metal scrip into A004 Ferrous metal scrip into A004 Ferrous metal scrip into A005 Not forcous metal scrip into A006 Residues of paper and carfboard A006 Residues of paper and carfboard A006 Residues of paper and carfboard A007 Polymerized plastic residues of process A008 Residues woodes I contend not toxic substances A009 Residues of feature materials A010 Residues of feature materials A011 Not metallscription A012 Slag of feature metalscription A013 Slag of feature metalscription A014 Slag of feature casting	
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Countrative 1	type	3021	Description Solid residues of stations of treatment of etfluent I contend not toxic substances
		A022	Pastosos residues of stations of treatment of effluent 1 contend not loxic substances
		A023	Pastonos residues f contend limy
		A034	Bagasse of sign care
		8025	Film: glass
		A020	Sing of jateimento 1 contend not toxic substances Used catalysers 1 contend not toxic substances
		A021 A028	Residues of system of control of not toxic gaseous mission I contend substance.
		A029	Other not dimension reaches
		4009	Salty shavings
		A104	Metallic packings
		4105	Not farms total precimis
		8107 A108	Bombonas of plastic net contaminated Ehl Sectore residues vinila
		A111	Leading aspes of boller
		3117	Glass residues
		3199	Form
		A204	Tan/ores metallic
		A207	Plustic films and small packings
		A208 A299	Polyamhane residues (PU) Calendar shavares of skies
		A308	Sill of the calerro
		A599	Atmade leafter shavings remains
		3499	Camaça
		A599	Residues organic of process
		A699	Rand of tice
		A799- A899	Atunido leather Steragen; bran and daw. Generated residues outside of the industrial process (office, packings, data)
		A999	Readuce of finity
5	COP.		Estang 10 - dangerous residues for centaining volatile components
		Deel	Daugerous residues for presenting inflammability
		D001	Dangerous residues for presenting correspondy
		1D003	Daugerous residues for presenting reactivity
		Doos Doos	Dangerous (esidars for presenting julhagenteity
		1002 1002	 Listing 7 of Niom NBR 10004, daugerous residues characterized by the backing test. Other dangerous residues - to specify
		more.	Listing 1 of Neuro NBR 10004-admittally dangarous residues - Classroom 1, of
		F001 F030	not-specific sources
		P100	Bifemius Policiuradas - PCB's, Puckings contamanaed wells PCBs also transforming and capacitors
		F102	Readure of estaty-second specified in Norm MBR 10.091
	- 1 - 1 - 1		Deriving residue of industrial laboratories (chemical products) not specified in Norm
5	Residunts Industrials perigosos		NER 10:004
	her divers	F194 F105	Not specified caretanizated couply packings in Norm NRR 10.004. Solverst contaminated (to specify solverst and the main contaminante)
		F130	Notvern contaminated courspectify solvern and the main contamination Used labeleant of
		1736	Hydraulic fluid
		F330	Cutting and limiting oil
		F430	Used contaminated cil in isolation or cooling
		F530	Oil wastes from the water-oil separating system
			9. Listing 2 of Norm NBR 10004- idmittedly dangerous residues of specific sources
		K053 K078	Remaining portions and you splodge of inks and prements Residue of cleanness with solvent in the manufacture of inks
		K081	Sill of 1011; of the production of irks
		K198	Shatrings of leather transdue due minim-

	and the second		- Ims	0.010	Array and	-	
	Canabra	Lype	K194	-	Lenther Sering en	and dust les	entend chromium
			K193				effluent of tanning to circentrany
			<u>K203</u>	-	Residues of labors		
			\$207	-			fining (it splodges acid) + dangerous residues for containing toxic substances
					acutely		Legence interiore in an
	I. BI Total	_	U001	U246	Listing 6 of Norm	NHR 10004	- dangerous residues for containing toxic substances
	2 84	Grupo /	R.S.CA	1	Group A.I Biolog	16	
			RMA	2	Group A 2 Anima		
			BMA		Greep A.J Body p		
	Residuos		RMA	_	Group A.5 Priors		
		Grupo I		_	Chemical etc		
		Grupo C RMC1 I		Radionetive waste			
		Grupo 1			Common Walle	-	
	2 RM Total	Grupo F	RME	r	Piercing or Comin	5	
	I RC	Classe A	RCAL	1	from commution	denulition	reliting and repair of processes
		-	1.00	-	from the construct		investiting and repair of edifications commit-
			RCA2 RCA3		components from openativetoria	in and include	notition process of concrete pre-modulated pieces
Residuo de	Cine I			The recyclable wa			
	constructio		Davie C RCCI it to be recycled			o contra s	ally feasible technology or applications which may all
		Carse C					
				-		risen from q	construction process, such as paints, solvings, oils and
63	A RC 1664 Grand Tota				Hazanlous waste a forth		onstruction process, such as pairs, solvents, oils and
	Grand Tota Correspon	nding V	Vaste catégor JICA	y tab	Hazardon's waster forth	onama I	CDNAMA code
	Grant Tota Correspon	nding V	Vaste categor JICA	y tab	Hazardon waste a forth	ONAMA Gode	
	Grand Tota Correspon	iding V	Vaste categor JICA	y tab	Higgarious waste a forth de JJCA to Co Son	ONAMA Code AUUJ	CONANTA code Decription Residuce of red nonat
	Grand Tota Correspon	iding V	Vaste nategor JICA Edition medication	y tab	Higgarious waste a forth de JJCA to Co Son	ONAMA Gode	CONAMA code
	Grand Tota Correspon	iding V	Vaste nategor JICA Edition medication	y tab	Higgarious waste a forth de JJCA to Co Son	ONAMA Code A003 A024 A499 A599	CONANTA code Decription Resident of real name Taquas of real name Canaça Residues organic of process
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Categ Type	Code	JICA code Decription	Coste	CONAMA code Decription
- at	Cons	L Decription	A014	Stap of brass ending
			A015	Slag of rine casting
			A816 A164	Somit of castion Metallic pickings
			Alles	Nor ferrors metal packings
			A264	Tambieres mutullic:
	NRIG	Ceramic & Glasses	A017 A025	Refractory cerumic residues and material Vitre alass
			A117	Gluss (chiduc)
			A799	Atabado leattier Serrarem, bras and dust
	NHI	Stone, sand or maternal that have composition of soil such as tite, bride.	X440	1
	_	gipsum, cement.		the second s
	NH12	Mixed waste (This code shall be applied in case wastes are discharged without separation.)	A012	Generated residues outside of the industrial proces
	NH13		A(03	Residues of variations' plant
			A018 A019	Solid readies not intic metal companies Solid readies of stations of treatment of efforts
			A021	contend material biological not locac Solid residues of stations of treasment of effluent
			A022	contend not toxic substances Pastovov residues of stations of treatment of effluent Lemmend not toxic substances
			A023	Pastosny residues I control limy
			A026 A027	Slag of intermento I contend not loose substances [ised estationers I contend not torge substances
			A429	Residues of system of control of not tasic gaseous amission 1 contend substance.
			A929	Other not dangeron a residues
			A098 A192	Salty shavings Foun
			A368	Silt of the caleiro
			A.899	(Jenerated residues ontside of the industrial proces (office, packings, etc.)
11.22	HW91	Inorganic acid	12002	Dangerous residues for presenting conosively
			(2003) 36207	Dangerone residues for presenting reactivity it splodges of the used on re-refining (it splodges
			Radi	utid)
	HW/02	Organic add	12002	Dangeroin residues for presenting correctively
	100.63	AlLalis	D003	Dangerous residues for presenting reactivity Dangerous residues for presenting correstvely
		- Children	1003	Dangarius resolues for presenting readivity
	HW64	Toxic Compounds	FD01_F0301	I Listing 1 of Nami NRR 10004- admittedly dangerouwresidires - Classroom I, of net-specific sourcer
			F163	Deriving residue of industrial taboratories (diamand products) ner specified in Nerm NBR. 10.004
			FIDE	Liszd labracasi cel
			\$230	Hydraulic fluid
			F334	Cartong and function of Used contaminated oil in Installan or cooling
			F530	Oil wastes from the water-oil veparating system
			K001_K209	Listing 2 of Norm NHR 10004- admittedly diagerous residuel of specific sources
			K193	shaving of leafter tunned to chromium
			K194	Leather Sertagem and shut I consenil cliron on
			K195	Sill of distance of insument of offluorit of tanning to
	HWRS	Inorganic Compounde	De65 De25	dromam Listing 7 of Norm NBR 10004; dangerous residue
				characterized by the leaching test
	HALF	Other teorgenic	73002-13072	Listing ? al Norm-NBR 10004; designous residue

Caleg	Type		JICA code	+	CIDNAMA code
are	1	Code	Decription	Cosfe	Decription
	1	178/07	Organic Ompounds	10003	characterized by the leading test. Daugrams realities for presenting readivity
			Infrant Frankrisens		Listing 1 of Norm XBR 10004- admittedly demerous residues - Classroom 1, of not-specific
				F100	sources Bifenitis Policioradas - PCB & Packings contaminated with PCBs also transforming and
				F105	capacitors Solvent contaminated (to specify solvent and the main contamonate)
				F130	Decit hibricant wil
				F230	Hydraulic fluid
				F330 F430	Cutting and heating all Used concentrated ail in sullation or cotling
				P534	Oil wastes from the write oil separating system
				K001_K209	Litting 2 of Some SBR 10004- admittedly descenses residues of specific murcos
				16053 K078	Remaining portions and you splodge of inks and pigments Reddae of chemices with solvent in the
					manufacture of inks
				K081 P001 P123	Silt of ETE of the production of siles Listing 5 of Norm MBR 10004 - dangerous residues for communing toole substances neutraly
	1	IIWIB	Polymeric Matorials	Dest	Dangerous testidues for presenting inflammability
		HWas	Firel, Oil and Orease	130m1	Dangerous residues for presenting influenceability
				1207	It splodges of the used oil re-refining (it splodges used)
	1	HWI	Time Chemicals and Biocides	Dent	Dangarms residues for presenting inflammability
			40 - 10 - 00 - 10 - 10 - 1	D994	Dangerous resulties for presenting pathogenicity.
				10005 10029	Litting 7 of Norm Milk 10000 damesour readue
				F193	characterized by the leaching text Deriving residue of industrial laboratories (chamical products) not specified in Norm NIUR
				12/0	10:004 Residues of laboratories of research of linesses
	1	nwn	Treatment Studies		
				K081	Silt of ETE of the production of inks
			Ash from incinentar Dust and Air pollotion control (APC) products	2.999 2.999	9 9
	9	HW14	Other Hazardoov salvatance (hesides HW01-HW13)		volaille camponensii
				10001	Dangerous rendues for presenting inflammability
				1500.4 Decem	Dangarous residues for presenting pathogenicity Other dangerous residues - to specify
				1782	Residue of confysers and specified in Norm NBR 10.001
				F104	Not greeiffe-I contaminated impty packings in Narm NBR 10.004
				.C001_0246	Listing 6 of boom roles tunna-dangerous residue for containing toxic substances
			Mixed Waste	Z999	7
		HWIA	Havantines notterfalls from New-posilocitie	II Z.999	2
1.80	Cheve	RCAL		RCAL	from construction, denselition, relitting and repair
	1	RCA1	repair of pavement. from the construction, demolition refining		of powement from the construction, sigmofilian relating and
		_	components		
		RCAJ	from manufacturing and/or demolition process of concrete une-modulated pages		from manufacturing and/or demolition process of consorts are modulated ninces
	Chow_A	RCAI RCAI RCA1	Harandias materials from Non-pasihotia process from construction, densitiion, refitting a repair of pavement. From the construction, densition refittias and requisi of colfications; corangic components.	RCA3	? from construction, densalition, reliting and of pavement from the construction, demolition reliting a repar of edifications, caranic components

in an	There	JICA code			CONAMA code			
Cate		Cude	Decription	Confe	Decription			
1000	_	RCM	The neyclable waste for other purposes	RCBI.	The rayclable ownie for taket parpuses			
	В	-						
	Classe	RCCI	Waste which his no economically feasible technology or applications which may allow	RCCI	Waste which has no economically trasible technology or applications which muy above it to			
	-		it to be recycled		be recycled			
Classe RC		RCDI	Hazardous waste arisen from construction process: such as paints, solvents, oris and so footb.		Ratardous waste arisen from construction process such as prints, sulvents, sils and so forth			
J. RA	Chupa A	RMAI	forth Group A.1 Biologic	RMAI	Orsup A.1 Biologic			
		RMA2	Group A 2 Animily	RMA2	Group A 2 Animals			
			Croup A.3 Gody part	RMA3	Group A Ellody part			
			Group A.4 Patieni, gare etc.	RMA4	Group A.4 Pittient care etc.			
	-		Group A.5 Prions	RMAS	Group A.5 Prions			
			Chemical etc	RMBI	- Chemical etc.			
	C	RMCI	Rubinkrive wade	RMC	Radioactive want:			
	D	_	Coninuari wiste	RMD(-Common wisste			
-	E	RMET	Pitneing or Cutting	RMET	Piercing or Cathing			
54 Cor	respon	ding w	aste category table CONAMA	to diCA				
Fate	The	Code	CONAM A code Decription	Code	JICA colt Decription			
	RINP		Residues of restaurant	N(60)	Kitchen welle (include wrete from animal such			
		A002	Generated residues outside of the indust	nal NH12	as houe, ikin hair) Moted waste (This code shall be applied in case			
		10003	Wooden	53115	westes and discharged without separation 3			
		A003	Residues of varição of plant Ferrom metal scrap fron	NHD NHD	Others Metals and mutal alloymouth an aluminum.			
		Anni	Pennen man scription	Dates.	copper, known			
		A905	Not ferrous metal scrap from	NHES	Metals and oretal alloys such as aluminum, copper, bronze			
		A006	Residues of puper and cardboard	N1003	Paper			
		A007	Polymerized plustic residues of process	N1004	Plastic or polymers and resine			
		A008	Rubber residues.	N1997	Robbers and Leather			
		A009	Residues wooden 1 contend not toxic substances	NH02	Wood			
		A010	Residues of texters materials	NH05	Textile and fiber			
		A011	Not metallic mineral residues.	NH09	Metaly and metal alloys such as aluminum.			
		A012	Sing of aluminum pasting	N1699	Copper, bionic Metals and metal alloysearch as aluminum,			
		A013	Slag of iren production and steel	NH09	Copper, bronze Metals and metal alloys such as aluminum.			
		4.014	Slag of brass coting	NTR/	copper, bronze Metale and pactal alloys such as aluminum,			
		A015	Stag of ring canalog	NH09	copper, brouze Metals and metal alloys such as aluminum,			
		A016	Sand of casting	N1009	Copper, bronzy Metale and exctal alloys such as alominum,			
		A017	Refractory ceramic residues and materi	NH10	Copper, broate Cerantic & Glasses			
	1.1	A018	Solid residues not toxic metal composit		Others			
		A019	Solid residues of stations of treatment of efficient I contend material biological m	NIII3	Otherv			
		7.923	toxic Solid residues of stations of treatment of	_	Others			
		A622	uffluent 1 contend not torne substances Pastosov residues of stations of treatment		Oties			
			effluent 1 contend not torne substances	and strate				

Code A623 A024 A025 A026 A027	CONAMA code Decription Pastoon resulture 1 contend timy Fingures: of organ care	Code MII3	Gliers
A024 A025 A026	Bagane of togar care		Cillers
A025 A026	Bagane of togar care		
A026		NH01	Kuthm weste (include weste from available meh
A026			as brine, skrin; huit)
	Filine glass	NH10	Cerannic & Ginsses
A627	Slag of intermento I contend not toxic substances	NH13	Cliters
	Usul catalysers I contanti net toxic	NIU3	Cillura
A028	substances Residues of system of control of not toxic.	NHD	Otlans
	gaseous emission I contend substance	1.4.1.2	- Martin
A929	Other not forgering readues	NH13	Oliers
A099	Salty slavings	NH13	Calure
A104	Metallic packings	N1019	Metals and matal alleyemeth as aluminum.
1100	AND DOWN THE OWNER	NHIIS	upper, hunaze
A105	Not ferrous metal packings	CALIES .	Metals and metal slidys such as aluminam. copper, broase
A107	Bombonus of plustic not contaminated	P(16)4	Phasic or polymers and resine
A108	Etil accore residues vinita	N104	Plastic or polymers and resins
			Ashahos from coal-fired power plants, etc.
			Ceramic & Glasses
			Ollers
A294	Tambwes webilic	201004	Metals and metal alloys such as aluminam. copper. In men
3207	Plastic films and small successory.	NHOA	Physic or polymers and resins
			Plastic or polymers and resins
A299	Calcada shavings of skins-	NH97	Rubbers and Leather
A308	Sih of the caleiro	NHIJ	Others
A399	Atmade leather shavings, remnants	N1997	Rubbers and Leather
A499	Curraça	NEW	Ritchen waste (include wuste from animal such
A399	Residires organic of process	NHOI	es house skite, bair) Kitchen weste (include waste from winnit mid-
1.000	Rind of size	Atter	as bone, skin, hair) Kitchen wiste (include wiste from unimal wich
Mades.	Remover new	(stud	as hone, skin, bair)
A799	Atantido leather Seringeni, bran and dust	NHD	Ceramic & Glusses
A899		NII13	Otlan
- 000		-	Martin and start for some distance of an A
A999	Residues of muta	14Hint	Kitchen waste (include waste from animal such as hune, skin, hair)
7.999	1	NHM	Aniuml oil, Vegetable ail
		NHD	Stone, shall or material that have composition of
			soil such as tilt, brick, gypnini, cemeni
C001_C009		HW14	Other Hazardon informer (besides
	containing voliitile components		HW01-HW13)
Deel		HHAR	Polymeric Materials
		HWes	Fuel, Oil and Orease
		itwin.	Fine Chamicals and Bindides
		HW14	
110.05	Parameter P	-	11W01-11W13)
1902	and second to different to the second s	114.01	Intergence acid
	refrequencia	HW#2	Organic acid
			Alkalis
Deb3	Daugerous residues for presenting reactivity		Inorganic acid
	Compare of the construction of the	HW02	Organic add.
		NUMP	Alkalo
-	No. of the Address of		Organic Compounds
Dang		tiwin	Fine Chemicals and Biocides
	Januardensen y	HW14	Other Barardous substance (besides-
			HW01-HW13)
	A111 A117 A199 A204 A204 A204 A207 A208 A299 A308 A399 A399 A399 A399 A399 A399 A399 C001_C009 D001	A111 Lendred solves of boiler A117 Glass residues A109 Funn A204 Tambors installitic A204 Tambors installitic A207 Plastic films and small packings: A208 Polyurchase residues (FU) A208 Calcaths shavings of skine A308 Sile of the caletre A399 Calcaths shavings of skine A309 Calcath shavings of skine A309 Calcath shavings of skine A399 Calcath shavings of skine A399 Caracca A439 Caracca A439 Caracca A439 Residues organic of process A699 Rind of rice A799 Agendale safter Serragen, bran and dast A899 Generated residues consold of the industrial process (affice, packings, arc.) A999 Residues of finite Z399 7 C001 Carocitaling volatile components D001 Dangerous residues for presenting inflammafrilRy D002 Dangerous residues for presenting inschively D003 Dangerous residues for presenting inschively	A111 Lendred subsect boiler NH08 A117 Glass residues NH10 A119 Funn NH10 A109 Funn NH10 A204 Tambores metallite NH08 A204 Tambores metallite NH04 A207 Plantic films and small packinges NH04 A208 Polyarchaze residues (PU) NH04 A209 Calcadus shavings of skins NH04 A308 Silu of the calcins NH07 A309 Atmado leather shavings, remnants NH04 A499 Camaça NH01 A699 Rind of rice N1001 A799 Atamado leather Seringen, bran and dast NH10 A699 Rind of rice N1001 A799 Atamado leather Seringen, bran and dast NH10 A799 Atamado leather Seringen, bran and dast NH10 A799 Residues of fruits NH01 A799 Residues of fruits NH01 A799 Looing 10 - dangenous residues for presenting HW14 C001 C002 Daugenous residues for presenting HW14 D002 Daugenous residues for presenting resching HW14 D002 Daugenous residues for presenting resching

Cale Type		CONAMA code	STCA code			
	Code	Decription	Code	Decription		
	5 10029	Loning 7 of Neem NBR 10004 dangerowy	HW95	Inorganie Componista		
		residues characterized by the leaching test				
			ITW06	Other from and		
			HWD	Fine Chemicals and Biocides Treatment Shidge		
1305	99	Other dangerous residues. In specify	HW14	Other Liazardeus substance (besides-		
			9.5	HW01-HW13)		
Poo	1_F0301	Listing 1 of Norm NBR 10004-admittedly dangernes residues - Classroom 1, of not-specific worder	HW94	Toxic Coopeanda		
	_	and a survey of the	HW07	Organic Ompounds		
110	0	Billenithe Publichenithe - PCH a Packings contaminated with PCBs also transforming and capacitors	11997	Organic Compounds		
110	2	Residue of catalysers not specified in Norm NUR 10 064	RW14	Other Hazardoos substance (besides (FW01-HW13)		
F10	3	Deriving residue of industrial haboratories (chemical products) not specified in Norm Stail: 20.0m	elman.	Binic Compounds		
		Contract of the Contract of Co	HWIO	Fine Chemicale and Blueides		
F10	4	Not specified costammated mapsy packings	HW14	Other Hazarship subminee (hesides		
Piece.	-	in Norm NRR 10.004		HW01-HW13)		
Ft0	0	Sulvent contaminated (to specify solvent and the main-contaminante)	PIW97	Organic Campsionis		
F13	0	Cited Minicant of	HW94	Texic Compands		
	_		EPW07	Organic Compounds.		
\$23	a	Hydemliz fluid	119994	Texic Compainds		
F33	0	Cotting and hauling oil	HW07 HW04	Organic Compounds Texic Compounds		
		country, and manual on	filwe?	Urganic Compounds		
F43	0	Used contaminated oil in redation or cooling		Tuxic Compounds		
		200 second discontinue of a second line	HW07	Organic Compounds		
F53		Oil wastes from the water-oil separating system	HWH	Texic Compainds		
Ka	1 1/209	Listing 2 of Nerm MIR 10004- admittedly	HW07 HW04	Overnie Compounds Twije Compounds		
		dangerous residues of specific sources	HWW7	and the state of t		
Koz	0	Remaining portions and you spinding of mka		Organic Compounds Organic Compounds		
ie ie	-	and pigments		riffing conferning		
1607	8	Residue of cleancess with selvent in the manufacture of lnks	HM62	Organic Compounds		
Kin	1	Silt of ETE of the preducting of inks	OW02	Drganie Compounds		
			HWIL	Treatment Shicks		
KIS		Shavings of leather tanned to dirominm	11994	Texic Crepsunds		
KIS	4	Leather Serragem and diss I contenil duronitism	HW04	Texic Compounds		
KIS	15	Silt of stations of ircannent of effluent of taming to chromium	HW94	Toxic Companies		
620	13	Residues of laboratories of research of illusses	HWIS	Fine Chemicals and Blockles		
K20	17	In opfindges of the used oil co-clining (it splodgestarid)	HWat	hooganic ocid		
		And Westerney	HWM	Fach, Coll and Grease		
Poo	1_P123	Listing 5 of Norm NBR 10004 - daugerous residues for containing toxic substances mateix	HW07	Organic Compounds		
100	1 1 246	Tisting 6 of Nerro MIR 10064- damerons residues for containing toxic substances	HW14	Other Warardous substance (besides HW0) (HW15)		
235	9	4	HW12	Ash from increation		
			HW13 HW15	Dust and Air pollinion centrol (APC) products Mared Water		

Cun	Type	Cude	CONAMA code Decription	Code	IICA code Dorription
1	1 Claire		from construction, demolition, reliting and		process: from construction, demolition, refitting and
	A.	RCAL	repair of provincent from the construction, denrolation relations	RCAZ	repair of pavement
		RUAL	and repair of edifications: cerumic	BACA2	from the commution, dentations reliting and repair of edifications: commit components
		RCAS	componenti- from manufacturing and/or demolition	RCAL	true manufacturing and its demolition process
	-		process of concrete pre-modulated preces		of concrete pre-moduliated pieces
	t'lase_	RCBI	The recyclable waste for (door purposes	RCB1	The resycluble sease for other purposes
	Clase,	RCCI	Waste which has no economically feasible rechnology or opplications which may allow	RCCI	Waste which has no economically feasible
		1	is to be encycled.	1.	rectinology or applications which may allow it as be recycled
	D	RCDI	Recardony waste arised from construction	RCDI	Hazardony wate action from transmittion process, such as points, solvenity, wile and no
_			process, such as paints, solvents, eils and au - routs		forth
S: RM	Gente	RMAT	Group A.1 Rinbagie	RMAL	Group A 1 Binlineit:
and the		RMA2	Group A.2 Animals	RMA2	Circup A. 2 Animals
		RMA3	Group A.3 Body part Group A.4 Patient care etc	RMA3 RMA4	Group A.3 Body part Group A.4 Patient care etc.
	-	RMAS	Group A.5 Prions	RMAS	Group A.S Prions
	Gnipe	RMBI	Chemical etc	RMB1	Chemical esc
	Grupo	RMC1	Radioactive waste	RMC1	Radioactive wante
		RMD1	Common waste	RMD1	Common wante
	Gruns	RME1	Piercing or Chilling	RMET	Piercing or Cutting
4.7	ws	C_DB ta	bles diagram	. #	Populari Pacapena Pakjese
(I)	Konstanting Konstanti		- Tourner A Thursday	Table 33	Paradition Paradition

Toble: Collegaria TTRD Name Type Sia ID Categoria/TiPD Teet ID Categoria/Sic Text ID Categoria/Sic Text ID Categoria/D Teet	
ID CategorisTTILD Text	18 m
	3 8 2
ID CramoTIRD Test Descrican Test	2 50
	50
Table: Codigo Licescol'SR	
TD Collass LiemcaPSR. Text.	6/ -
ID Residention Text ID Codeo/TRD Text	3
	90 50
Fatile: Codigo MadalidaLicenci	2
Name Jype Sia (D) CodmoAdodaladade Test	2
	25
Table: Codigo Polatidor Nume Type Sh	
ID Codigo@dilidor Text	I 20
Table: Codigs Parie	
Name Type 50	
ID ColligaForte Text Clurie Destrivas Text	1 20
Table: Codigo RaCalegoria	
Name Type Sta ID Coding/R#Catagoria Trea	
RaCategoria Descricito Text	<u>50</u> <u>30</u>
RsCaliggitin Nota Meno -	
Table: Codigo RaClase Name: Type 514	ie]
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Oliservação Meteo	
Table: Ordigo HeConama	
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Rationama Exemplo Marso -	00
	00.
Reconanta Nota. Memo	
Tables Codigs: RaConomals. Name: Type Sit	
(D. Reforamtils 1.org Inferer	-1-
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Committs des Menio -	
Table: Codigo Ru5. Namé l Type Sia	
1D CodigoRalS Text. 1D CodigoRoCategoria Text	*
10 Catalogues and to the 17km	

RdS Descricio RdS Exemple		.10
RAD COURSE	Test Marei	100
RstS Descrication	Text	100
RsIS ExemploEn Balli Obagyagan	Mano	
Table: Codigo HsTipo		
Name ID CodificilityTips	Text	Str- 10
ID CollapsRaCalegoria	Test	
AsTen Destricts Refine Destriction	Test	50
Ritipe Nota	Menjo	1.
Table: Coding TTRD Name	Type	Sur
TD Codies(T7RD)	Text	. 2
Cocago DERD Descricao	Text	20
Table: Empresa_P5R Name	Dype	Size
ID EmpresaPICS	Long integer	
PSR CNP1 PSR Nome	Test	100
PSR InstituteRutual	Test	15
PSR Endersactorresp	Text Text	100
PSR Municipie	Test	÷0.
PSR Bairro PSR CEP	Test	30
PSR Form	Text	50
PSR Fax PSR Renresentatite	Text	50
PSR Carao PSR cmail	Tast	25
PSR. FindimutioOM	Test Long Integer	
PSR. FoncionarioAdmin PSR. Dataliostulação	Long hilesr Date/Time	*
PSR Area Total	Long Integer	1
PSR AreaPlanta	Louiz Integer	4
Table: Licenca Name	Type	She
ID Littença	Long Integer	- a
ID EmpressPSR LIC_CNDD	Long Integra Text	20
LIC LOSIC	Text	15
LIC ProcessNo LIC RegistralPAAM	Test -	15
ID Coding Linna 258	Test	· A.
ID CodigoModalidade LiC Tepr	Jirxt. Jirxt	13
LIC Renovacio	Text	30
LET Actividade	Text	30
LR ^C Latitude	Test	20
DC Longitude LR' Representante	Test	30
LK: Teléfime	Text	50
ID CodigoPoluidor ID CodigoPorte	Text	1
LIC DataInicio	Date/Time	8
LIC DetaExpiração LIC ValidadeDita-	Date Time Long Integr	8
LIC Noforstroom	Long Integer	4
LIC NameDiretorin/Denica LIC NameDiretorin/Presidenti	Taxt	30-
DR. Observace	Manu	

Tatiri: Lirenca Reviduo Wanne Type Size ID: Locnedikoddas Leng Mitzers 8- JD: Locnedikoddas Leng Mitzers 8- JD: Locnedikoddas Leng Mitzers 8- JD: CollegidsClass Text 4 LB: DeissteadResides Text 255 JD: CollegidsTipo Text 4 ID: CollegidsTonoma. Text 4 LR: CognediddeTonDa Long Integer 8
Name Dype Size U3 LicencaRestricoes Line Integer 4 JD Licenca Lens Integer 4 NoRestricoes Line Integer 2 Danile Text 160
Table: Licenca Transporte Name Type Size ID: Licenca Transporte Long Integer 4 ID: Licenca Transporte Long Integer 4 ID: Licenca Transporte Long Integer 4 ID: Marcia Long Integer 4 ID: Topo Long Integer 4 LT: OpanudadCarga Text 23 LJ: Foto Acclust - LT: Observace Text 56
$\overline{T}\overline{D}$