

## 2.5 Waste Service Company Seminar

### 2.5.1 Presentation Materials

Presentation for Waste Service Company Seminar (April 7, 2010)

### Waste Service Company Database (WSC\_DB)

Development Waste Service Company Database (WSC\_DB)

**To properly IWM it is essential to eliminate non-registered activities and foster sound waste service companies (WSC)**

**Problems**

- It is difficult for IPAAM to decipher WSCs in the license list because the places of the registration are dispersed in various different categories
- The waste generators who are obliged to consign their IW to registered WSCs will not know who the actual registered waste service company is unless a correct and simple registration list is informed.

**To do so**

IPAAM has collaborated with the study team from JICA to explore the possibility of establishing a registration system that would introduce a new category for waste management

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### Waste Management Codes of IPAAM for Environmental Licensing

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

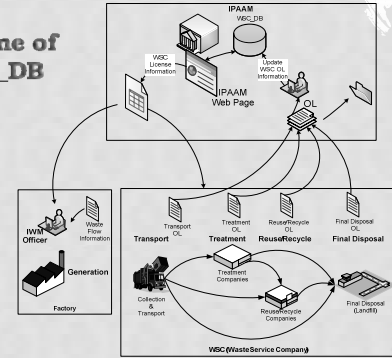
### Proposed Table of Categories (Draft)

Code	Major Classification	Code	Sub-Classification	Class [Types of Waste Handled]
33	Municipal Waste Management	3301	Collection and Transportation	Class I (HW), Class II-A(NON-HW, NON-INERT), Class II-B (NON-HW, INERT)
			Intermediary 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)
			Final Disposal	Class II-A (NON-HW, NON-INERT), Class II-B (NON-HW, INERT)
34	Industrial Waste Management	3401	Collection and Transportation	Class I (HW), Class II-A(NON-HW, NON-INERT), Class II-B (NON-HW, INERT)
			Intermediary Treatment	Class I (HW), Class II-A(NON-HW, NON-INERT), Class II-B (NON-HW, INERT)
		3403	Recycling	Class II-A (NON-HW, NON-INERT), Class II-B (NON-HW, INERT)
			Final Disposal	Class II-A (NON-HW, NON-INERT), Class II-B (NON-HW, INERT)

### Elimination of Non-Licensed Activities

- ◆ Non-Licensed Companies are:
  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.

### Scheme of WSC\_DB



### Why the WSC DB and a New Categorization

#### Benefit for WSC's

- Official publication of the service to the market
- Elimination of the non-registered company
- Public definition of the limits of the responsibilities that shares with their Customers.
- Attendance "1 click" for the SUFRAMA team.

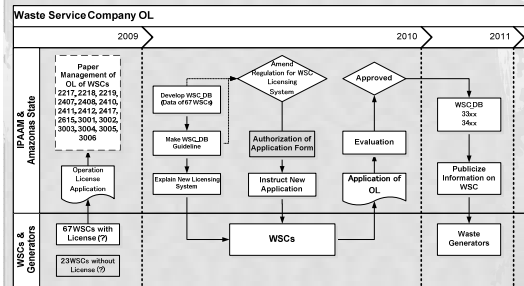
#### Benefit for SUFRAM and IPAAAM

- Elimination of the non-registered company
- Clear and objective definition of the licensed activity.
- Easiness and objectivity in the administration of the activities.
- Effecting environmental requirement for Industrial District.

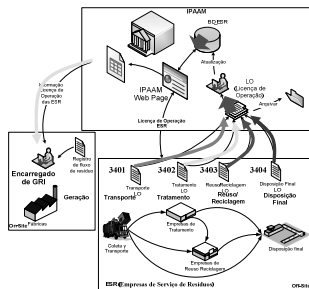
#### Benefit for Generators (Clients)

- Easy guides and objective of the WSC that can assist to your needs.
- Official information of WSC that will share with your responsibility.

### Implementation diagram of WSC\_DB



### WSC Operation Licensing



Development of the Database for Waste Service Companies  
WSC\_DB

### Concept for the IPAAAM Webpage



## 2.6 Seminar

### 2.6.1 Program

Program for Seminar: May 27, 2010

#### Program for Seminar: Study Results

*For the Draft Master Plan for Industrial Waste Management in the Industrial Pole of Manaus*

Venue	Date	Time	Objective
Auditorio Floriano Pacheco, SUFRAMA	May 27, 2010	08:30 ~ 16:30	Publicizing the Study Results and the Master Plan
Session	Time	Title	Speaker
	08:30 - 09:00	Registration	---
	09:00 - 09:20	Opening Address	Mr. Elino Ivan Pessoa da Silva Superintendent, in charge of Administration of SUFRAMA
1	09:20 - 09:40	Seminar objectives and procedure	Mr. Susumu SHIMURA JICA Study Team: Leader
2	09:40 - 10:10	Current Issues of IWM in PIM	Mr. Alexandre Kadota FIEAM/CIEAM/CCONB
3	10:10 - 10:50	Industrial Waste Management Master Plan in PIM	Mr. José Felício Haddad JICA Study Team
4	10:50 - 11:30	Good practices of IWM in Brazil and Japan	Mrs. Rita Mariê - SUFRAMA / Mr. Armando Bandeira Jr. - SUFRAMA
	11:30 - 12:00	Question and Answer Session	Audience/Speakers
	12:00 - 13:30	Lunch	
5	13:30 - 14:00	Waste Inventory Database	Mr. Kunito Ishikashi - JICA Study Team / Mr. David Silva - SUFRAMA / Mr. Ivo Brasil Filho - SUFRAMA
6	14:30 - 15:00	Waste Service Company Database	Mr. Antônio Stroski - IPAAM / Mr. Emerson Silva - IPAAM
7	15:00 - 15:30	Coffee Break	
	15:30 - 16:00	Question and Answer Session	Audience/Speakers
	16:00 - 16:30	Closing remarks	Ana Maria Souza - SUFRAMA

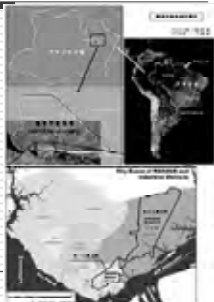
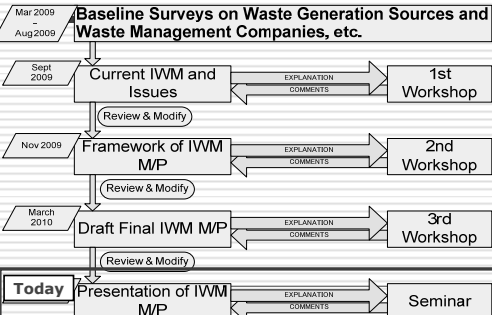
Note: The Q&A session will take place after the 4 session morning presentation. Written questions will be collected from the audience by the end of each lecture. Another Q&A session will take place in the afternoon concerning the database presentations, with additional time given for general questions.

2.6.2 Presentation Materials

Handout for Seminar: May 27, 2010

<p>The Study for the Development of an Integrated Solution Related to Industrial Waste Management in the Industrial Pole of Manaus</p> <p>Asian International Cooperative Agency Kokusai Kogyo Co., Ltd. &amp; EX Corporation</p> <p>Thursday, May 27/2010 08:00-18:00 - SUPRAMA Auditorium</p> <p><b>Seminar:</b></p> <p><b>Publicizing the Study Results and Master Plan</b></p> <p>To improve current issues concerning how industrial waste is handled and managed in the Industrial Pole of Manaus</p> <p>Thank you for attending the seminar for The Study for the Development of an Integrated Solution related to Industrial Waste Management in the Industrial Pole of Manaus. The seminar will provide stakeholders with the latest information on efforts to improve industrial waste management in the Industrial Pole of Manaus. The study aims to formulate a draft Master Plan for Industrial Waste Management in the Industrial Pole of Manaus, to be implemented from 2011 to 2015, along with draft guidelines to assist in implementation.</p> <p>The proposals are based upon baseline results from the first stage of the project, which consisted of mapping of the local industrial park wastes (i.e. "waste stream"), the information collected by the JICA Study Team of during the weekly meetings being held with the cooperation of the project, naming of representatives from the appropriate government and local agencies, and the typical local participants of a series of workshops (see page 3). Please check the SUPRAMA website for more information and materials available for download. <a href="http://www.jica.go.jp">http://www.jica.go.jp</a></p> <p><b>Background of the Study</b></p> <p>The Manaus Free Trade Zone (MFTZ) is a Regional Development Policy adopted by the Brazilian government to create a sustainable economic base in the Amazon Basin. At the heart of the MFTZ is the Manaus Industrial Pole (MIP), one of the most modern industrial parks of Latin America. The MIP gathers approximately 230 national and multinational industries working in a variety of sectors, mostly assembly production, annually responsible for creating about 500,000 jobs and directly employing 100,000 people.</p> <p>A technical cooperation agreement was signed between the Brazilian and Japanese cooperating agencies JICA and JICA and the Superintendent of the Manaus Free Trade Zone (SUPRAMA) to evaluate the current conditions of how industrial waste is handled and managed in the MIP. This study was established as a result, and began in February 2008. The Japanese government is providing around \$2 million US dollars to execute the study over an 18-month period and SUPRAMA is providing the study sites with logistical support. JICA selected coordinators from Kokusai Kogyo Co., Ltd. and EX Corporation to carry out the study, and is also working with JIBAM, CIBAM, SUPRAMA and IPAAM.</p>	<p>The Study for the Development of an Integrated Solution Related to Industrial Waste Management in the Industrial Pole of Manaus</p> <p>Asian International Cooperative Agency Kokusai Kogyo Co., Ltd. &amp; EX Corporation</p> <p><b>Overall Objectives and End Goals of the Study</b></p> <p>The Study Team has already begun to complete its final report, having reviewed current conditions of industrial waste management in the MIP/MFTZ and the surrounding area. In order to achieve its overall objectives, as follows, it is necessary to work closely with related organizations and stakeholders.</p> <ul style="list-style-type: none"> <li>To formulate a basic master plan (2011-2015) for industrial waste management in MIP along with guidelines for the improvement of industrial waste management in MIP.</li> </ul> <p>Achieving these objectives needs the following end goals:</p> <ul style="list-style-type: none"> <li>To have established appropriate industrial waste disposal and the concept of 3R (Reduce, Reuse, Recycle) based on the master plan for industrial waste management in the larger study area.</li> <li>With the establishment of appropriate industrial waste disposal and the 3R strategy, to have reduced improper disposal of industrial waste and minimize environmental impact.</li> </ul> <p>In order to grasp the actual conditions of industrial waste disposal, the first step is creating a chart which clearly demonstrates the stream of waste. This was done by dividing the waste stream of MIP into two large categories: (a) generation sources which we call "Sources" and (b) waste discharged from generation sources which we term "Disposal".</p> <p>The inventory currently used in Brazil shows "what to where and how much" a factory has discharged but does not reveal the process of off-site disposal. For that, it is necessary to clarify the waste stream stream of generation sources and the path for off-site streams, while also grasping the actual conditions at waste service companies to get a clear picture of the entire off-site stream. The waste stream diagram constructed by the JICA Study Team to this effect are available on the SUPRAMA website as well as Newsletter Vol. 3 in their full size.</p>
<p>The Study for the Development of an Integrated Solution Related to Industrial Waste Management in the Industrial Pole of Manaus</p> <p>Asian International Cooperative Agency Kokusai Kogyo Co., Ltd. &amp; EX Corporation</p> <p><b>Development of the Master Plan for Industrial Waste Management in MIP</b></p> <p>The study's participants (agencies and their officials) have discussed progress and issues on a regular basis. However, broad stakeholder opinion was sought through workshops where broad industry discussions took place. Today, the seminar is intended to present the latest study results. Through these activities, the study members hope to gain the cooperation and understanding from society in formulating the master plan, to promote disclosure of information and include environmental considerations in the plan.</p>	<p>The Study for the Development of an Integrated Solution Related to Industrial Waste Management in the Industrial Pole of Manaus</p> <p>Asian International Cooperative Agency Kokusai Kogyo Co., Ltd. &amp; EX Corporation</p>

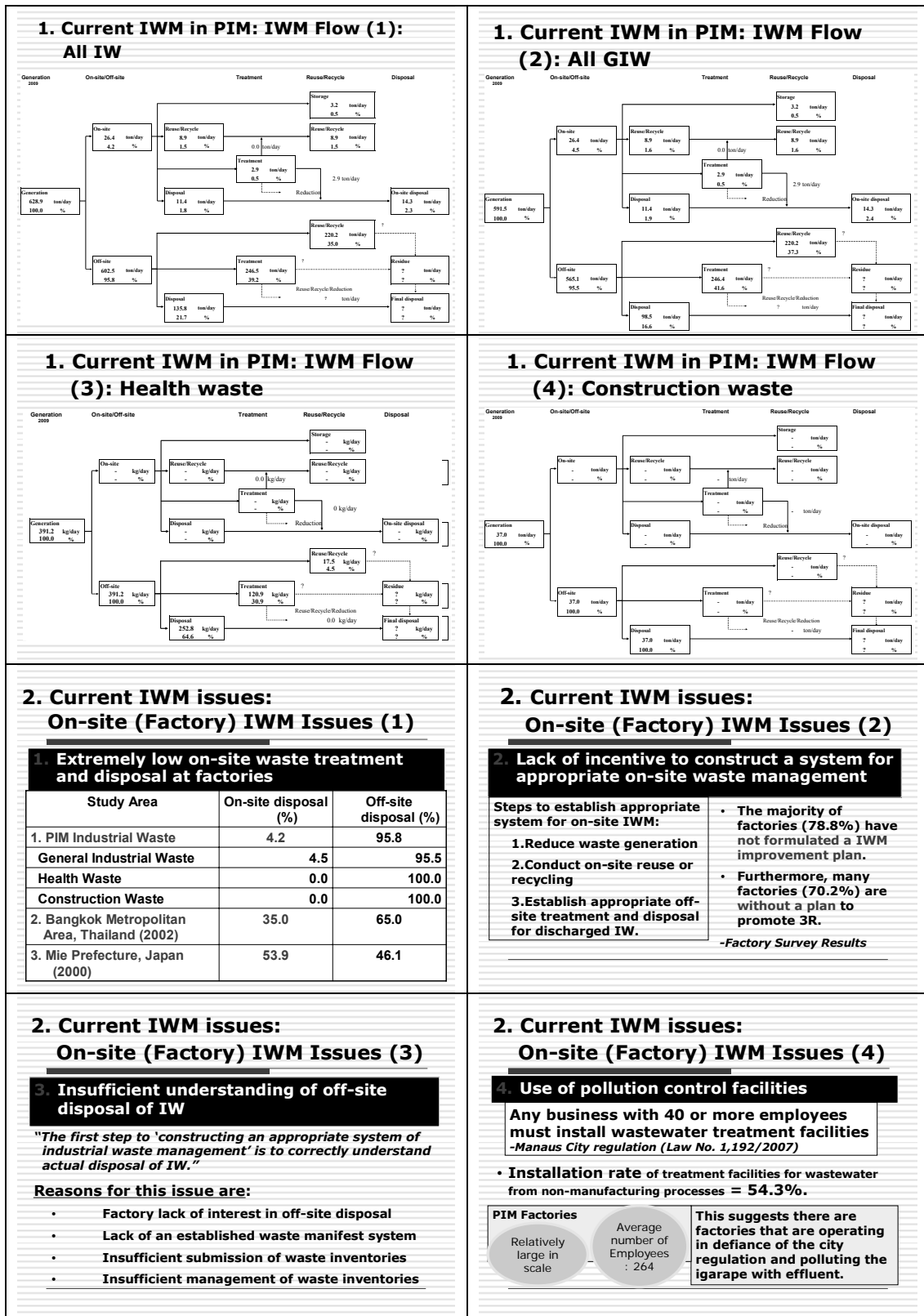
Presentation 1 for Seminar (May 27, 2010): Seminar Objectives & Procedures

<p><b>Session 1</b></p> <p align="center"><b>Objectives and Procedures of the Seminar</b></p> <hr/> <p align="center"><b>May 27, 2010</b> <b>JICA Study Team</b> For the Study for the Development of an Integrated Solution Related to Industrial Waste Management in the Industrial Pole of Manaus</p> <p align="right">1</p>	<p align="center"><b>Agenda</b></p> <ol style="list-style-type: none"> <li>1. Outline of the Study</li> <li>2. Objectives of the Seminar</li> <li>3. Seminar Procedures</li> </ol> <p align="right">2</p>																																																																																																																																																																														
<p><b>1. Outline of the Study (1): Objectives of the Study</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> To review the current conditions of industrial waste management (IWM) in the Manaus Free Trade Zone (MFZ)/Industrial Pole of Manaus (PIM) and the surrounding area and compile the results into a report.</li> <li><input type="checkbox"/> To formulate a master plan for IWM (five-year plan from 2011 to 2015) in PIM and a guideline for the improvement of IWM in PIM.</li> </ul> <p align="right">3</p>	<p><b>1. Outline of the Study (2): Study Area and Target Waste</b></p> <ol style="list-style-type: none"> <li>1. Study Area Manaus Free Zone (MFZ)</li> <li>2. Target Waste Industrial waste factories are required to report by waste inventory under CONAMA Resolution 313.             <ul style="list-style-type: none"> <li><input type="checkbox"/> General Industrial Waste</li> <li><input type="checkbox"/> Health Waste</li> <li><input type="checkbox"/> Construction Waste</li> <li><input type="checkbox"/> Radioactive Waste</li> </ul> </li> </ol>  <p align="right">4</p>																																																																																																																																																																														
<p><b>1. Outline of the Study (3): Study Schedule</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Phase 1: Study of current conditions (February 2009 - September 2009)</li> <li><input type="checkbox"/> Phase 2: Formulation of the industrial waste management master plan and guidelines (October 2009 - August 2010)</li> </ul> <table border="1"> <thead> <tr> <th rowspan="2">Year</th> <th colspan="12">2009</th> <th colspan="12">2010</th> </tr> <tr> <th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th><th>9</th><th>10</th><th>11</th><th>12</th> <th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th><th>9</th><th>10</th><th>11</th><th>12</th> </tr> </thead> <tbody> <tr> <td>Phase</td> <td colspan="12">Phase 1</td> <td colspan="12">Phase 2</td> </tr> <tr> <td>Study in Brazil</td> <td colspan="12">[Active]</td> <td colspan="12">[Active]</td> </tr> <tr> <td>Study in Japan</td> <td colspan="12">[Active]</td> <td colspan="12">[Active]</td> </tr> <tr> <td>Workshop/Seminar</td> <td colspan="12">[Active]</td> <td colspan="12">[Active]</td> </tr> <tr> <td>Report</td> <td colspan="12">I/R/A</td> <td colspan="12">I/R/A</td> </tr> </tbody> </table> <p align="right">5</p>	Year	2009												2010												1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	Phase	Phase 1												Phase 2												Study in Brazil	[Active]												[Active]												Study in Japan	[Active]												[Active]												Workshop/Seminar	[Active]												[Active]												Report	I/R/A												I/R/A												<p><b>2. Objectives of the Seminar (1): Policy of the Study</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Policy of the study The M/P shall:             <ol style="list-style-type: none"> <li>1. be formulated on the initiative of the Brazilian counterpart → Brazilian Initiative</li> <li>2. be understood by, and obtain the cooperation of, members of society → Social Understanding and Cooperation</li> <li>3. be considerate of environmental protection wherever possible</li> <li>4. be practicable</li> </ol> </li> </ul> <p>To facilitate this policy, there have been 3 Workshops and this Seminar</p> <p align="right">6</p>
Year		2009												2010																																																																																																																																																																	
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<p><b>2. Objectives of the Seminar (2)</b></p>  <p align="right">7</p>	<p><b>2. Objectives of the Seminar (3)</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> The Seminar aims to:             <ol style="list-style-type: none"> <li>1. Publicize the results of the study,</li> <li>2. Promote and form consensus on industrial waste management master plan (M/P) for PIM with as many stakeholders as possible.</li> </ol> </li> <li><input type="checkbox"/> We welcome your active participation in the seminar</li> </ul> <p align="right">8</p>																																																																																																																																																																														

<h3 style="text-align: center;">3. Seminar Procedures</h3> <ul style="list-style-type: none"> <li><input type="checkbox"/> Morning: 3 speakers</li> <li><input type="checkbox"/> Afternoon: 2 speakers</li> <li><input type="checkbox"/> Question &amp; Answer Sessions             <ul style="list-style-type: none"> <li>■ Submit written questions at the end of each speaker's presentation.</li> <li>■ Questions will be answered before the breaks.</li> </ul> </li> </ul>	<hr style="width: 50%; margin: 0 auto;"/> <h2 style="margin: 0;">Thank you very much for your attention</h2> <p style="margin: 0;"><b>Susumu Shimura</b> <a href="mailto:susumu_shimura@kkc.co.jp">susumu_shimura@kkc.co.jp</a></p>
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Presentation 2 for Seminar (May 27, 2010): IWM Issues in PIM

<p><b>Session 2</b></p> <h2 style="text-align: center;">Current Issues of Industrial Waste Management (IWM) in PIM</h2> <p style="text-align: center;"><b>May 27, 2010</b> Counterpart to JICA Study Team For the Study for the Development of an Integrated Solution Related to Industrial Waste Management in the Industrial Pole of Manaus</p>	<h3 style="text-align: center;">Agenda</h3> <ol style="list-style-type: none"> <li>1. Current IWM in PIM             <ul style="list-style-type: none"> <li><input type="checkbox"/> Waste Generation</li> <li><input type="checkbox"/> Waste Flows</li> </ul> </li> <li>2. IWM Issues in PIM             <ul style="list-style-type: none"> <li><input type="checkbox"/> On-site (Factory) IWM Issues</li> <li><input type="checkbox"/> Off-site IWM Issues</li> <li><input type="checkbox"/> Issues on Administration of IWM</li> </ul> </li> </ol>																																								
<h3 style="text-align: center;">1. Current IWM in PIM: IW Generation (1)</h3> <ul style="list-style-type: none"> <li><input type="checkbox"/> Industrial wastes included in the Study are:             <ol style="list-style-type: none"> <li>1. General Industrial Waste (GIW)</li> <li>2. Health Waste (HeIW)</li> <li>3. Construction Waste (ConW)</li> <li>4. Radioactive Waste (RadW)</li> </ol> </li> <li><input type="checkbox"/> The following surveys were conducted to identify management of each waste:             <ol style="list-style-type: none"> <li>1. GIW =&gt; Factory Survey</li> <li>2. HeIW =&gt; Medical Institutions Survey</li> <li>3. ConW =&gt; Construction Waste Survey</li> <li>4. RadW =&gt; Radioactive Waste Survey</li> </ol> </li> </ul>	<h3 style="text-align: center;">IW Generation (2): The IW generation amount from PIM for 2009 is 628.9 tons/day</h3> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Industrial Waste</th> <th>Non-HIW (ton/day)</th> <th>HIW (ton/day)</th> <th>Total Generation (ton/day)</th> </tr> </thead> <tbody> <tr> <td>General Industrial Waste (GIW)</td> <td>471.8</td> <td>119.7</td> <td>591.5</td> </tr> <tr> <td>Health Waste (HeIW)</td> <td>0.2</td> <td>0.2</td> <td>0.4</td> </tr> <tr> <td>Construction Waste (ConW)</td> <td>37.0</td> <td>0.0</td> <td>37.0</td> </tr> <tr> <td>Radioactive Waste (RadW)</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> </tr> <tr> <td><b>Total IW</b></td> <td><b>509.0</b></td> <td><b>119.9</b></td> <td><b>628.9</b></td> </tr> </tbody> </table>	Industrial Waste	Non-HIW (ton/day)	HIW (ton/day)	Total Generation (ton/day)	General Industrial Waste (GIW)	471.8	119.7	591.5	Health Waste (HeIW)	0.2	0.2	0.4	Construction Waste (ConW)	37.0	0.0	37.0	Radioactive Waste (RadW)	0.0	0.0	0.0	<b>Total IW</b>	<b>509.0</b>	<b>119.9</b>	<b>628.9</b>																
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<h3 style="text-align: center;">GIW Generation (3) by Type of Industry</h3> <p style="text-align: center;">Total Generation <math>\Rightarrow</math> 591.5 ton/day</p> <p>Large Generation Sources <math>\Rightarrow</math></p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Type of Industry</th> <th>Waste Gen (ton/day)</th> </tr> </thead> <tbody> <tr> <td>F04 Electric, electronic, and communication appliances industry</td> <td>174.1</td> </tr> <tr> <td>F17 Transport Machinery</td> <td>118.8</td> </tr> <tr> <td>F10 Paper industry</td> <td>83.3</td> </tr> <tr> <td>F07 Metallurgy</td> <td>67.0</td> </tr> <tr> <td>F14 Plastic Industry</td> <td>42.4</td> </tr> <tr> <td>F06 Mechanical</td> <td>40.9</td> </tr> <tr> <td><b>Sub-total</b></td> <td><b>526.5</b></td> </tr> </tbody> </table> <p>90% of the total industrial waste comes from 6 types of industries.</p>	Type of Industry	Waste Gen (ton/day)	F04 Electric, electronic, and communication appliances industry	174.1	F17 Transport Machinery	118.8	F10 Paper industry	83.3	F07 Metallurgy	67.0	F14 Plastic Industry	42.4	F06 Mechanical	40.9	<b>Sub-total</b>	<b>526.5</b>	<h3 style="text-align: center;">GIW Generation (4) by Type of Waste</h3> <p style="text-align: center;">Composition of Industrial Waste</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Type of Waste</th> <th>Waste Generation (ton/day)</th> </tr> </thead> <tbody> <tr> <td><b>Non-Hazardous Industrial Waste</b></td> <td><b>471.8</b></td> </tr> <tr> <td>Metal scrap</td> <td>163.5</td> </tr> <tr> <td>Waste Paper</td> <td>119.9</td> </tr> <tr> <td>Plastic or polymers &amp; resins</td> <td>54.5</td> </tr> <tr> <td>Others</td> <td>133.9</td> </tr> <tr> <td><b>Hazardous Industrial Waste</b></td> <td><b>119.7</b></td> </tr> <tr> <td>Waste Oil</td> <td>20.0</td> </tr> <tr> <td>Sludge (Organic/Inorganic)</td> <td>20.3</td> </tr> <tr> <td>Organic Compounds</td> <td>18.9</td> </tr> <tr> <td>Others</td> <td>60.5</td> </tr> <tr> <td><b>Total</b></td> <td><b>591.5</b></td> </tr> </tbody> </table> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> <p>Considerable amount of non-hazardous general industrial waste may be recyclable (e.g. metal scrap, papers, and waste plastic)</p> </div> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> <p>Approximately 20% of the total general industrial waste is hazardous.</p> </div>	Type of Waste	Waste Generation (ton/day)	<b>Non-Hazardous Industrial Waste</b>	<b>471.8</b>	Metal scrap	163.5	Waste Paper	119.9	Plastic or polymers & resins	54.5	Others	133.9	<b>Hazardous Industrial Waste</b>	<b>119.7</b>	Waste Oil	20.0	Sludge (Organic/Inorganic)	20.3	Organic Compounds	18.9	Others	60.5	<b>Total</b>	<b>591.5</b>
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F10 Paper industry	83.3																																								
F07 Metallurgy	67.0																																								
F14 Plastic Industry	42.4																																								
F06 Mechanical	40.9																																								
<b>Sub-total</b>	<b>526.5</b>																																								
Type of Waste	Waste Generation (ton/day)																																								
<b>Non-Hazardous Industrial Waste</b>	<b>471.8</b>																																								
Metal scrap	163.5																																								
Waste Paper	119.9																																								
Plastic or polymers & resins	54.5																																								
Others	133.9																																								
<b>Hazardous Industrial Waste</b>	<b>119.7</b>																																								
Waste Oil	20.0																																								
Sludge (Organic/Inorganic)	20.3																																								
Organic Compounds	18.9																																								
Others	60.5																																								
<b>Total</b>	<b>591.5</b>																																								



### 2. Current IWM issues: Off-site IWM Issues (1)

**1. Insufficient understanding of actual conditions concerning waste service companies**

**a** → **The number of WSCs is uncertain**

WSC Classification	Number of WSCs
With Environmental License	67*1
Without Environmental License	23*2
<b>Total</b>	<b>90</b>

(Note) \*1: Of these 67 companies, 35 were on the IPAAM WSC list, and 32 were added by the local consultant  
\*2: These 23 companies were found by the local consultant

### 2. Current IWM issues: Off-site IWM Issues (2)

**1. Insufficient understanding of actual conditions concerning waste service companies**

**b** → **Discord between WSC operation and environmental licenses**

Replies from surveyed WSCs

Possession of Environmental License	1) Collection / Transportation	2) Intermediate Treatment	3) Final Disposal	4) Reuse / Recycling	Total
With	41	9	10	42	102
Without	7	0	0	18	25
<b>Total</b>	<b>48</b>	<b>9</b>	<b>10</b>	<b>60</b>	<b>127</b>

Results after checking environmental licenses of WSCs

Possession of Environmental License	Collection / Transportation	Intermediate Treatment	Final Disposal	Reuse / Recycling	Unable to categorize *1	Total
With EL	26	24	0	21	4	75

### 2. Current IWM issues: Off-site IWM Issues (3)

**1. Insufficient understanding of actual conditions concerning waste service companies**

**c** → **Non-licensed WSCs**  
At least 23 were identified -WSC survey

**2. Secure Final Destination**

- Final disposal site without operation license:  
= No licensed landfill in PIM...but 10 WSCs doing final disposal activities
- Promote Co-processing  
Co-processing at a cement factory is a environmentally desirable form of final destination, but currently only a very limited ratio to production volume.  
PIM: 0.84%      Japan: 43.5%

### 2. Current IWM issues: Off-site IWM Issues (4)

**2. Secure Final Destination**

- Poor Business Environment for Industrial Waste Disposal
 

Manaus City landfill does not collect a disposal fee	Some WSCs are without an environmental license
Some entities discharge waste with little concern for proper disposal	Administration does not have a clear picture of actual WSC practices, including the licensed entities
- Fierce competition between WSCs
- Extremely low disposal fees

→ Greatly limits the ability to attract investment for the construction and operation of appropriate treatment and disposal facilities.

### 2. Current IWM issues: Issues on Administration of IWM (1)

**1. Organizational Structure**

□ Legal System:  
The required legal system to carry out IWM is in place. The problem is developing the tools and the organizational structure needed to enforce the law.

□ State-level Structure:  
Strengthening the organizational structure is needed at the State level which is responsible for actual administration of IWM according to the law.

### 2. Current IWM issues: Issues on Administration of IWM (2)

**2. Improvement and Upgrading of Management Tools**

- Improve factory database keeping it up-to-date.
- Improve database of waste inventories, which show the amount and composition of IW generated at factories as well as management conditions.
- Improve the waste manifest system in order to track and monitor where and how IW discharged from factories is being disposed.
- Develop a registry and management database for industrial waste service companies (WSCs).

### 2. Current IWM issues: Issues on Administration of IWM (3)

**3. Strengthening Regulation**  
Step up control of illegalities--non-licensed operators, illegal dumping, and unsound treatment & disposal routes-- and eliminate them.

**4. Insufficient Cooperation among Administration, Dischargers and Waste Service Companies**

Better cooperation needed between:

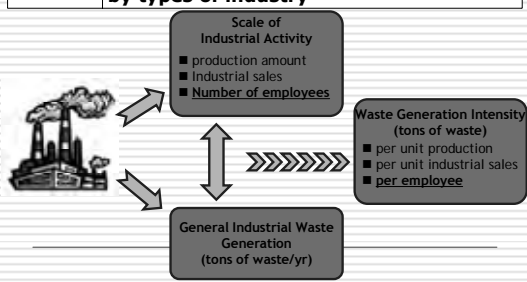
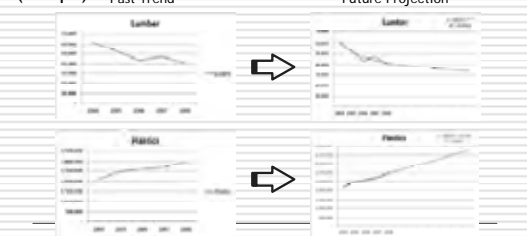
- Administrative Entities ↔ Other Admin Entities
- Administration ↔ Dischargers of Waste
- Administration ↔ WSCs
- Administration ↔ Dischargers ↔ WSCs

**Thank you very much for your attention**

**Alexandre Kadota**  
[alexandre.kadota@gmail.com](mailto:alexandre.kadota@gmail.com)



Presentation 3 for Seminar (May 27, 2010): Off-site IWM in Japan

<p style="text-align: center;"><b>Session 3</b></p> <p style="text-align: center;"><b>Industrial Waste Management Master Plan (Draft) in PIM</b></p> <p style="text-align: center;"><b>May 27, 2010</b> Counterpart to JICA Study Team Study for the Development of an Integrated Solution Related to Industrial Waste Management in the Industrial Pole of Manaus</p> <p style="text-align: right;">1</p>	<p style="text-align: center;"><b>Agenda</b></p> <ol style="list-style-type: none"> <li>1. Objective of the Industrial Waste Management (IWM) Master Plan (M/P) in PIM</li> <li>2. Future Estimation of IW Generation</li> <li>3. Outline of IWM M/P in PIM</li> </ol> <p style="text-align: right;">2</p>										
<p><b>1. Objective of the Industrial Waste Management M/P in PIM</b></p> <ul style="list-style-type: none"> <li>□ Target year of the Master Plan is 2015.     ⇒ 5-year Action Plan.</li> <li>□ Objective: To establish an appropriate IWM system in PIM in 2015.</li> <li>□ Requirements to reach the proposed objective:             <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> <ol style="list-style-type: none"> <li>1. Establish appropriate treatment/disposal of IW and the 3Rs (Reduce, Reuse, Recycle) in PIM.</li> <li>2. Avoid improper treatment and disposal.</li> <li>3. Eliminate negative environmental impacts.</li> </ol> </div> </li> </ul> <p style="text-align: right;">3</p>	<p><b>2. Future Estimation of IW Generation</b></p> <p><b>Target wastes are:</b></p> <ul style="list-style-type: none"> <li>□ General Industrial Waste</li> <li>□ Health Waste</li> <li>□ Construction Waste</li> </ul> <p style="text-align: right;">4</p>										
<p><b>2.1 Methodology for estimating future general IW generation (1)</b></p> <p><b>STEP 1 Estimating waste generation intensity by types of industry</b></p>  <p style="text-align: right;">5</p>	<p><b>2.1 Methodology for estimating the future general IW generation (2)</b></p> <p><b>STEP 2 Projection of the future industrial activities in PIM area</b></p> <p><b>Business-as-Usual Scenario</b></p> <p>⇒ Assuming that the past trend of industrial growth will be maintained and reflected in the future trend,</p> <p>↓</p> <p>Based on the production output data during 2004-2008 for each type of industry, future growth trend is estimated through approximate function analysis (statistical analysis method).</p> <p>↓</p> <p>Future growth trend is converted into the future number of employees for each type of industry to estimate the future general industrial waste generation</p> <p style="text-align: right;">6</p>										
<p><b>2.1 Methodology for estimating the future general IW generation (3)</b></p> <p><b>STEP 2 Projection of the future industrial output in the PIM area</b></p> <p>(Example) Past Trend      Future Projection</p>  <p style="text-align: right;">7</p>	<p><b>2.1 Methodology for estimating the future general IW generation (4)</b></p> <p><b>STEP 3 Future Estimation of Industrial Waste Generation</b></p> $IWG = \sum_{i=1}^n \sum_{j=1}^m (M_i * G_{ij})$ <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <td>IWG</td> <td>Industrial Waste Generation (ton/year)</td> </tr> <tr> <td>i</td> <td>Factory type</td> </tr> <tr> <td>j</td> <td>Type of industrial waste</td> </tr> <tr> <td>M</td> <td>Number of Employees</td> </tr> <tr> <td>G</td> <td>Waste Generation Rate (ton/employee/year)</td> </tr> </table> <p style="text-align: right;">8</p>	IWG	Industrial Waste Generation (ton/year)	i	Factory type	j	Type of industrial waste	M	Number of Employees	G	Waste Generation Rate (ton/employee/year)
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<h3>2.2 Future General IW Generation (PIM Area in 2015) by Type of Industry</h3> <p>Total Generation <math>\Rightarrow</math> 737.7ton/day</p> <p>Large generation sources <math>\Rightarrow</math></p> <table border="1"> <thead> <tr> <th>Type of Industry</th> <th>Waste Gen (ton/day)</th> </tr> </thead> <tbody> <tr> <td>F04 Electric, electronic, and communication appliances industry</td> <td>176.0</td> </tr> <tr> <td>F17 Transport Machinery</td> <td>186.6</td> </tr> <tr> <td>F10 Paper industry</td> <td>99.4</td> </tr> <tr> <td>F07 Metallurgy</td> <td>117.5</td> </tr> <tr> <td>F14 Plastic Industry</td> <td>52.6</td> </tr> <tr> <td>F06 Mechanical</td> <td>52.9</td> </tr> <tr> <td><b>Sub-total</b></td> <td><b>685.0</b></td> </tr> </tbody> </table> <p>93% of the total industrial waste comes from the same 6 types of industries as in 2009.</p>	Type of Industry	Waste Gen (ton/day)	F04 Electric, electronic, and communication appliances industry	176.0	F17 Transport Machinery	186.6	F10 Paper industry	99.4	F07 Metallurgy	117.5	F14 Plastic Industry	52.6	F06 Mechanical	52.9	<b>Sub-total</b>	<b>685.0</b>	<h3>2.2 Future General IW Generation (PIM Area in 2015) by Type of Waste</h3> <h4>Composition of General Industrial Waste</h4> <table border="1"> <thead> <tr> <th>Type of Waste</th> <th>Waste Gen (ton/day)</th> </tr> </thead> <tbody> <tr> <td>Non-Hazardous Industrial Waste</td> <td>580.5</td> </tr> <tr> <td>Metal scrap</td> <td>218.0</td> </tr> <tr> <td>Waste Paper</td> <td>137.2</td> </tr> <tr> <td>Waste/scrap plastic</td> <td>62.8</td> </tr> <tr> <td>Others</td> <td>162.5</td> </tr> <tr> <td>Hazardous Industrial Waste</td> <td>157.2</td> </tr> <tr> <td>Waste Oil</td> <td>27.0</td> </tr> <tr> <td>Sludge (Organic/Inorganic)</td> <td>24.9</td> </tr> <tr> <td>Organic Compounds</td> <td>22.5</td> </tr> <tr> <td>Others</td> <td>82.8</td> </tr> <tr> <td><b>Total</b></td> <td><b>737.7</b></td> </tr> </tbody> </table> <p>Total industrial waste generation will increase by 3.7%/year during 2009-2015</p> <p>No significant change in composition of industrial waste during 2009-2015</p> <p>Approximately 21% of the total industrial waste is hazardous.</p>	Type of Waste	Waste Gen (ton/day)	Non-Hazardous Industrial Waste	580.5	Metal scrap	218.0	Waste Paper	137.2	Waste/scrap plastic	62.8	Others	162.5	Hazardous Industrial Waste	157.2	Waste Oil	27.0	Sludge (Organic/Inorganic)	24.9	Organic Compounds	22.5	Others	82.8	<b>Total</b>	<b>737.7</b>		
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<h3>2.3 Health and Construction Waste Generation (1)</h3> <p>GR of Clinics &amp; Factories <math>\rightarrow</math> Current GA of Health &amp; Construction Waste <math>\rightarrow</math> GR of an Employee <math>\rightarrow</math> Future GA of Health &amp; Construction Waste</p> <p>Generation rate of an employee (GR<sub>e</sub>) = GA/116,192 (No. of employees in 2009)</p> <p>Total generation amount (GA) of PIM health waste &amp; construction waste. GR x No. of Factories (PIM: 124 clinics &amp; 123 construction projects) = Current GA in PIM for those wastes</p> <p>Generation rate (GR) of those that had construction work within the previous year: kg/clinic/day &amp; kg/factory/day</p>	<h3>2.3 Health and Construction Waste Generation (2)</h3> <ul style="list-style-type: none"> <li>Generation amount (GA) in 2015 calculated by: <math>GA = GR \times 148,936</math> (No. of employees in 2015)</li> <li>Forecast of Generation Amount for Construction Waste in 2015</li> </ul> <table border="1"> <thead> <tr> <th>Class</th> <th>Class A</th> <th>Class B</th> <th>Class C</th> <th>Class D</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Construction Waste Generation in 2009</td> <td>36.79</td> <td>0.17</td> <td>0.00</td> <td>0.00</td> <td>36.96</td> </tr> <tr> <td>Construction Waste Generation in 2015</td> <td>47.28</td> <td>0.26</td> <td>0.00</td> <td>0.00</td> <td>47.54</td> </tr> </tbody> </table>	Class	Class A	Class B	Class C	Class D	Total	Construction Waste Generation in 2009	36.79	0.17	0.00	0.00	36.96	Construction Waste Generation in 2015	47.28	0.26	0.00	0.00	47.54																								
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<h3>3. Outline of IWM M/P: Approach and Measure</h3> <p>&lt;M/P Objective&gt; Establish Appropriate Industrial Waste Management System in PIM</p> <p><b>A. Understand Actual Treatment and Disposal of Industrial Wastes</b></p> <p>A1. Establish Waste Manifest System A2. Report Location of Final Destination A3. Ensure Submission of All Waste Inventories</p> <p><b>B. Secure Industrial Waste Final Destination</b></p> <p>B1. Move Forward with Construction of New Industrial Waste Landfill B2. Implement Provisional Measures B2.1 Use Manaus Municipal Landfill B2.2 Promote Appropriate Treatment of Hazardous Waste B2.3 Promote Co-processing</p> <p><b>C. Strengthen Administration of Industrial Waste Management</b></p> <p>C1. Strengthen Organizational Capacity of IWM C2. Improve Management System of Waste Service Companies (WSCs) C3. Strengthen Regulations C4. Strengthen Cooperation between Administration, Generators and WSCs</p> <p><b>D. Improve Business Environment for Waste Service Companies</b></p> <p>D1. Make Manaus Municipal Landfill Fee-based D2. Regulate Improper Waste Disposal D3. Publicize, Educate and Train Generators and WSCs D4. Cultivate Preferred WSCs</p>	<h3>Approach A. Understand Actual Treatment and Disposal of Industrial Waste</h3> <p>A. Understand Actual Treatment and Disposal of Industrial Wastes</p> <p>A1. Establish Waste Manifest System A2. Report Location of Final Destination A3. Ensure Submission of All Waste Inventories</p>																																										

### Measure A1. Establish Waste Manifest System (WMS) (1)

- **Objective:** IPAAM is in charge of the IWM conditions from discharge to final destination.
- **Content:**
  1. IPAAM will issue a set a format for the waste manifest in Amazonas State, collaborating with the INEA (State Institute of Environment) of Rio de Janeiro and others.
  2. Waste manifest on-line.

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### Measure A1. Establish Waste Manifest System (WMS) (2)

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### Measure A2. Report Location of Final Destination (1)

- **Objective:** Until the manifest system is established, IPAAM will understand and manage the final destination of factory waste.
- **Content:**
  - IPAAM requires generators (factories) to specify final destination of industrial wastes on the application for operational license.
  - IPAAM requires all waste service companies to specify the final destination of wastes they are contracted to handle.

### Measure A2. Report Location of Final Destination (2)

### Measure A3. Ensure Submission of All Waste Inventories (1)

- **Objective:** Raise the number of Waste Inventories submitted from 1/4th to 100%.
- **Content:**
  1. Develop a waste inventory database (WI\_DB).
  2. Standardize WI reporting form in order to standardize input into WI\_DB, and prepare guidelines.
  3. Instruct factories to appoint an IWM officer that will prepare the WI.
  4. Hold explanatory meetings on how to fill out WIs to ensure IWM officers at all factories understand the reporting forms.
  5. Arrange on-line preparation of WI

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### Measure A3. Encourage Submission of WI (2)

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### Measure A3. Encourage Submission of WI (3)

### Approach B. Secure Industrial Waste Final Destination

#### B. Secure Industrial Waste Final Destination

- B1. Move Forward with Construction of New Industrial Waste Landfill
- B2. Implement Provisional Measures
  - B2.1 Use Manaus Municipal Landfill
  - B2.2 Promote Appropriate Treatment of Hazardous Waste
  - B2.3 Promote Co-processing

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### Measure B1. New IW Landfill

- **Objective: Construct a new IW disposal site as the primary final destination for IW**
- **Content:**
  1. Create a system where waste generators bear the necessary disposal fee.
  2. Create an environment that promotes proper treatment and disposal
  3. In addition to beneficial policies in the tax system, consider subsidies or other funding schemes for the construction of the landfill.
  4. Make sufficient social and environmental considerations.

25

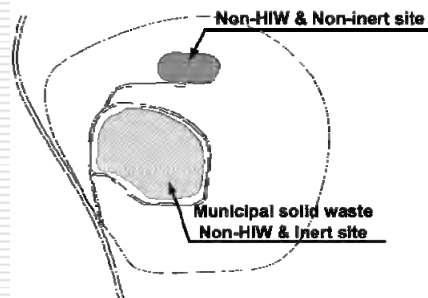
### Measure B2. Provisional Measures

#### Measure B2.1. Use of Manaus Municipal Landfill (1)

- **Objective: Use Manaus Municipal landfill as Final Destination until the new landfill is operational.**
- **Content:**
  1. Construct a dedicated site for Non-HIW & Non-inert industrial waste at one section of the Manaus Municipal landfill (ATRINI: Non-HIW & Non-inert Temporary Disposal Site).
  2. Generators will pay a disposal fee for ATRINI.
  3. IW shall be disposed of at ATRINI, which is strictly separate from the disposal site for municipal waste.

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#### Measure B2.1. Use of Manaus Municipal Landfill (2)

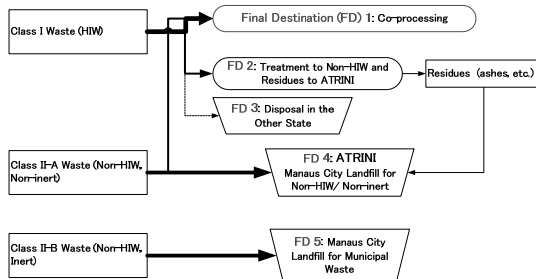


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#### Measure B2.2. Measures and methods for the Appropriate Treatment of Hazardous Industrial Waste (HIW) (1)

- **Objective: Indicate measures and promotion methods for the appropriate treatment of hazardous industrial wastes.**
- **Content:**
  1. Promote co-processing which utilizes waste as fuel and /or raw material.
  2. For HIW inappropriate for co-processing, detoxify at an IPAAM approved treatment facility and disposal of residue in ATRINI.
  3. For HIW that cannot be treated, it will be taken to a treatment and disposal facility in another state. The storage at the factory for a later disposal in Amazonas, should be approved by IPAAM.

#### Measure B2.2. Measures and methods for the appropriate treatment of hazardous industrial wastes (HIW) (2)



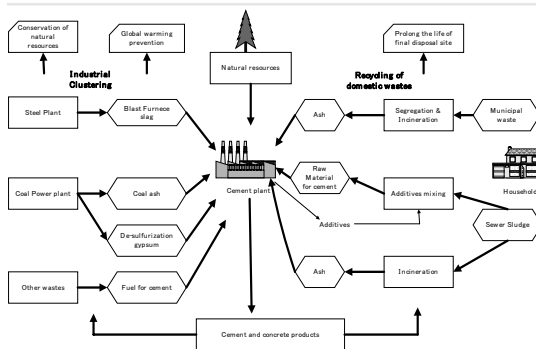
29

#### Measure B2.3. Co-processing (1)

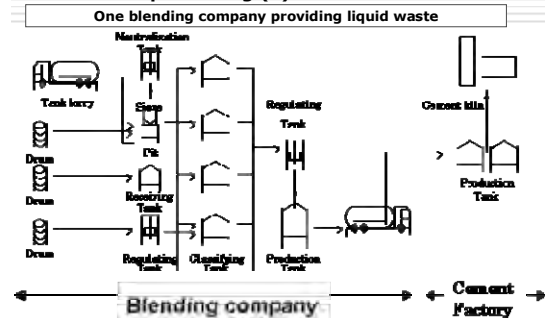
- **Objective: Indicate promotion methods for co-processing, which is ideal for appropriate treatment /disposal of industrial waste.**
- **Content:**
  1. Indicate cement factory treatment and the methods for that.
  2. In co-processing, it is necessary to foster companies (blenders) that will be able to blend the several kinds of wastes to be accepted by the cement factories.

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#### Measure B2.3. Promote Co-processing (2)



#### Measure B2.3. Promote Co-processing (3)



### Approach C. Administration of Industrial Waste Management

#### C. Strengthen Administration of Industrial Waste Management

- C1. Strengthen Organizational Capacity of IWM
- C2. Improve Management System of Waste Service Companies (WSCs)
- C3. Strengthen Regulations
- C4. Strengthen Cooperation between Administration, Generators and WSCs

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#### Measure C1. Strengthen Organizational Capacity of Industrial Waste Management

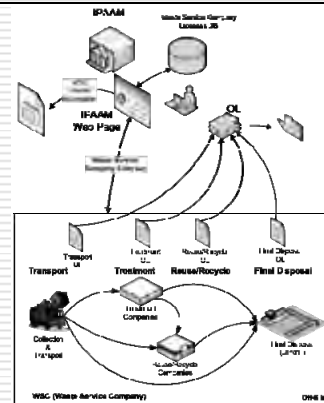
- **Objective:** Strengthen IPAAM and SUFRAMA
- **Content:**
  1. Appoint an officer in charge of IWM at the Environmental Licensing Management Section (GELI) at IPAAM.
    - a) The IWM officer will work with Information Analysis Management (GEAI) to develop and manage a waste service companies database (WSC\_DB).
  2. SUFRAMA will establish an Industrial Waste Management Group (IWM Group) and officially appoint IWM officers.
    - a) The IWM officers will work with the IT engineer of CGMOI (Modernization and Informatics General Coordination) and develop a waste inventory database (WI\_DB).
    - b) Analyze the data in the WI\_DB and work with IPAAM to submit a PIM IWM Report to IBAMA and the State Public Ministry.

#### Measure C2. Improve Management System of Waste Service Companies (WSCs) (1)

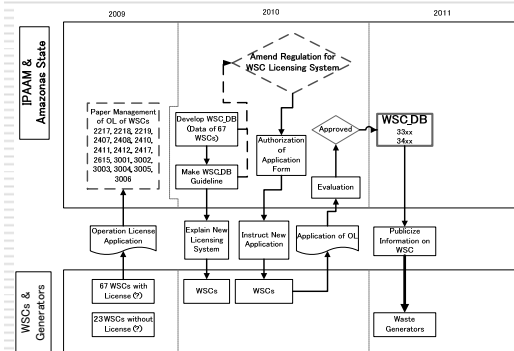
- **Objective:** Know the WSCs holding environmental licenses and the activities therein and indicate a plan to correct non-licensed companies and activities.
- **Content:**
  1. Enter WSCs under the standardized codes.
  2. Systemize conditions to obtain a license to operate as waste treatment company.
  3. Instruct WSCs to obtain an operational license as appropriate with their actual activities. :
    - collection and transportation
    - intermediate treatment
    - reuse and recycling
    - final disposal
  4. Develop a WSC\_DB and enter approved companies. Make information on these licensed WSCs available to waste generators.
  5. Regulate both against generators contracting non-licensed WSCs and licensed WSCs conducting inappropriate treatment and disposal activities.

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#### Measure C2. Improve Management System of WSCs (2)



#### Measure C2. Improve Management System of WSCs (3)



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#### Measure C3. Strengthen Technical and Legal Regulations

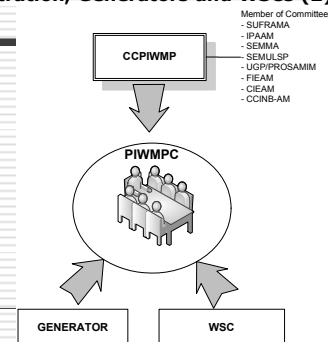
- **Objective:** Indicate preventive measures for inappropriate treatment/disposal.
- **Content:**
  1. Make use of the WSC\_DB and its licensing and management system to promote regulation against improper treatment/disposal by WSCs.
  2. Promote regulations against improper treatment/disposal through securing contractual agreements between waste generators and only licensed companies.

#### Measure C4. Strengthen Cooperation between Administration, Generators and WSCs (1)

- **Objective:** Make a measure for administration, generators and WSCs to collaborate in order to realize the "establishment of appropriate industrial waste management system".
- **Content:**
  1. Promote cooperation between administration bodies.
  2. Promote cooperation between administration and waste generators.
  3. Promote cooperation between administration and waste service companies (WSCs).
  4. Strengthen cooperation between administration, generators, and WSCs.

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#### Measure C4. Strengthen Cooperation between Administration, Generators and WSCs (2)



<p><b>Approach D. Business Environment for Waste Service Companies</b></p> <p><b>D. Improve Business Environment for Waste Service Companies</b></p> <ul style="list-style-type: none"> <li>D1. Make Manaus Municipal Landfill Fee-based</li> <li>D2. Regulate Improper Waste Disposal</li> <li>D3. Publicize, Educate and Train Generators and WSCs</li> <li>D4. Cultivate Preferred WSCs</li> </ul> <p style="text-align: right;">41</p>	<p><b>Measure D1. Make Manaus Municipal Landfill Fee-based</b></p> <ul style="list-style-type: none"> <li>□ <b>Objective: Make the Manaus Municipal landfill, which accepts the largest amount of industrial waste, fee-based by collecting a fee necessary for appropriate disposal</b></li> <li>□ <b>Content:</b> <ol style="list-style-type: none"> <li>1. <b>SUFRAMA in cooperation with IPAAM will work with Manaus Municipality so that a dedicated site for Non-HIW &amp; Non-inert IW can be constructed and make the necessary efforts to achieve construction.</b></li> <li>2. <b>Once it is constructed, SUFRAMA and IPAAM will work to ensure that Manaus City strictly manages the site to keep municipal waste separate from Non-HIW &amp; Non-inert IW, and also so that a fee is collected to recover the necessary investment and operation costs.</b></li> </ol> </li> </ul> <p style="text-align: right;">42</p>
<p><b>Measure D2. Regulate Improper Waste Disposal</b></p> <ul style="list-style-type: none"> <li>□ <b>Objective: Once the administration prepares a system for IWM, indicate a regulation measure against the improper treatment/disposal for industrial waste generators and WSCs.</b></li> <li>□ <b>Content:</b> <ol style="list-style-type: none"> <li>1. <b>IPAAM will work with SUFRAMA for waste generators to recognize the need for costs corresponding with proper treatment and disposal.</b></li> <li>2. <b>IPAAM will strengthen its regulation against non-licensed entities.</b></li> <li>3. <b>IPAAM will strengthen its regulation against improper treatment/disposal by licensed companies.</b></li> </ol> </li> </ul> <p style="text-align: right;">43</p>	<p><b>Measure D3. Publicize, Educate and Train Generators and WSCs</b></p> <ul style="list-style-type: none"> <li>□ <b>Objective: Indicate measure to publicize, educate and train waste generators and WSCs.</b></li> <li>□ <b>Content:</b> <ol style="list-style-type: none"> <li>1. <b>Actively publicize information on WSCs to waste generators (factories).</b></li> <li>2. <b>Provide training and guidance on technical information to promote the 3Rs in factories.</b></li> <li>3. <b>Hold seminars for WSCs and provide training and guidance on technical information for appropriate treatment and disposal.</b></li> </ol> </li> </ul> <p style="text-align: right;">44</p>
<p><b>Measure D4. Cultivate Preferred Waste Service Companies</b></p> <ul style="list-style-type: none"> <li>□ <b>Objective: Indicate measure to cultivate preferred waste service companies.</b></li> <li>□ <b>Content:</b> <ol style="list-style-type: none"> <li>1. <b>Proactively introduce good examples from advanced states, such as Sao Paulo, and improve the business environment for WSCs.</b></li> <li>2. <b>Consider introducing the system now used by many Prefectures in Japan for "Promotion of Preferred Waste Service Companies".</b></li> </ol> </li> </ul> <p style="text-align: right;">45</p>	<p>Thank you for your attention!</p> <p style="text-align: center;"><b>Jose Felicio Haddad</b>  <a href="mailto:jfhaddad@saniplanengenharia.com.br">jfhaddad@saniplanengenharia.com.br</a>          (21) 3326-4464          (21) 8272-3655</p> <p style="text-align: right;">46</p>

Presentation 4 for Seminar (May 27, 2010): Good Practices of IWM in Brazil and Japan

**Session 4**

## Good Practices of Industrial Waste Management (IWM) in Brazil and Japan

**May 27, 2010**

**Counterpart to JICA Study Team**  
For the Study for the Development of an Integrated Solution Related to Industrial Waste Management in the Industrial Pole of Manaus

1

### Agenda

- 1. Good Examples of On-site Management**  
*On-site = At Generation Sources (i.e. factories)*
  - "Zero Emission" and IWM in Japan Today
    - Example 1: Kokubo Industrial Estate
    - Example 2: Suzuka Factory of Honda
- 2. Good Examples of Off-site Management**
  - Japan (Iwate Prefecture):
    - Waste Service Company Rating System and Environmental Fund in Iwate Prefecture
  - Brazil (State of Sao Paulo):
    - Sao Jose Dos Campos Landfill

2

### Good Examples of On-site Management

- 1. On-site IWM in Japan Today**

**Why do so many factories in Japan aim for "Zero Emission"?**

**1. Off-site disposal is very expensive, especially landfill disposal fees**

**Reduce, reuse and recycle waste in the factory as much as possible (3Rs)**

**2. Government waste management policy**

**Basic Law for Establishing a Recycling-based Society (2000)**

**3. Consumer support**

**Support for "environmentally friendly" companies**

3

### 1. Industrial Waste Flow in Mie Prefecture, Japan (2000)

**Note: On-site management is OVER HALF: 53.9%**

4

### 1. Industrial Waste Flow in PIM (2009)

**Note: ALMOST ALL is managed off-site: 95.8 %**

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### 1.1 "Zero Emission" Industrial Park: Kokubo Industrial Park

On-site Example 1

**Background**

- Established in 1975
- 28 Factories (as of April 2009)
- Over 5,000 employees
- 958,400 sq. meter area
- Total production value (2008):
  - 363.7 billion yen (US\$3.9 billion)

**A problem with the landfill revealed in early 1990 prompted all 28 companies to work together so that the industrial park would generate zero landfill waste.**

6

### 1.1 "Zero Emission" Industrial Park: Kokubo Industrial Park (2)

On-site Example 1

**Overview of Approach**

- Established a research committee for zero emission industrial waste management.
- Established common rules inside the industrial park
- Applied new technologies for waste treatment
- Established a joint policy of sustainability; reuse and recycling within the industrial park (the concept of "zero emission")

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### 1.1 Kokubo Industrial Park (3)

On-site Example 1

**Approach**

- 1. Prepare a Manual:**
  - A manual is prepared on internal management of waste (e.g. waste reduction, separation)
  - Each company takes responsibility to implement the 3Rs.
- 2. Reduce Waste:**
  - Raw materials and wastes are reduced through improvements in production methods
  - Packaging waste is reduced by using reusable containers for parts and raw material supply.
  - Office waste is reduced by making double-sided copies and using recycled paper

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**1.1 Kokubo Industrial Park (4)** On-site Example 1

**3. Separate Wastes**

Wastes are carefully separated according to recycling category using a color scheme

**Blue:** Paper and Cardboard  
**Yellow:** Metals  
**Green:** Glass  
**Red:** Plastics  
**Brown:** Organic wastes  
**Orange:** Hazardous wastes  
**Black:** Wood  
**Gray:** General non-recyclable wastes or mixed, contaminated or not capable of separation  
**Purple:** Radioactive wastes  
**White:** Health service wastes



**1.1 Kokubo Industrial Park (5)** On-site Example 1

**4. Pre-process by compressing and cutting wastes for storage and transportation**

**5. Use special storage containers for each type of waste, placed appropriately to facilitate off-site recycling and treatment**



**1.1 Kokubo Industrial Park (6)** On-site Example 1

**1st Step** Joint Operation of Waste Paper Recycling (November 1995)  
1. Waste paper were collected from 23 factories.  
2. Toilet paper was produced by the waste paper.  
3. 23 factories purchased the toilet paper.

**2nd Step** Joint Collection of Combustible Waste and sending to RDF Facility (January 1997)  
1. Combustible waste (plastic, wood, etc.) were collected from factories.  
2. RDF (refuse derived fuel) was produced by the waste.  
3. RDF was used as fuel of cement factories.

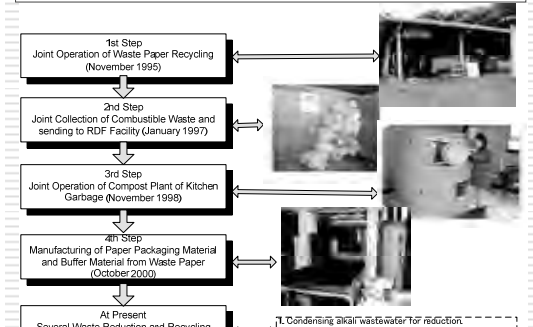
**3rd Step** Joint Operation of Compost Plant of Kitchen Garbage (November 1998)  
1. Food wastes of canteens were collected and used for compost production.  
2. The compost was used as fertilizer for fruit production.  
3. The fruits were purchased by the factories.

**4th Step** Manufacturing of Paper Packaging Material and Buffer Material from Waste Paper (October 2000)  
1. Waste paper were collected from 23 factories.  
2. Paper packaging material and buffer material were produced by the waste paper.  
3. 23 factories purchased those product for packaging.

**At Present** Several Waste Reduction and Recycling Activities  
1. Condensing alkali wastewater for reduction.  
2. Reduction of cutting oil consumption by strict control.  
3. Recovery of copper from print circuit board in cooperation with recycling companies.

**1.1 Kokubo Industrial Park (7)** On-site Example 1

**1st Step** Joint Operation of Waste Paper Recycling (November 1995)  
**2nd Step** Joint Collection of Combustible Waste and sending to RDF Facility (January 1997)  
**3rd Step** Joint Operation of Compost Plant of Kitchen Garbage (November 1998)  
**4th Step** Manufacturing of Paper Packaging Material and Buffer Material from Waste Paper (October 2000)  
**At Present** Several Waste Reduction and Recycling Activities  
1. Condensing alkali wastewater for reduction.  
2. Reduction of cutting oil consumption by strict control.  
3. Recovery of copper from print circuit board in cooperation with recycling companies.



**1.1 Kokubo Industrial Park (8): Policy of Zero Emission** On-site Example 1

**What are the necessary elements to implement a zero-emission project?**

- Commitment**
  - Environmental awareness
  - Selection of effective waste management
  - Encouraging use of recycled products
- Technology**
  - Application of proper recycling and waste recovery methods
- Systematization**
  - Compliance with requirements set by ISO 14001

**1.2 Suzuka Factory of Honda Co., Ltd.** On-site Example 2

**Background**

- "Green Factory Plan" contained a zero-emission target (see next slide)
- Zero-emission is defined as "No IW for final disposal (landfill) shall be discharged outside the factory"
- A Zero-emission Team created as part of the "Green Factory Project" in 1997.
- Became Japan's 1st zero-emission automobile manufacturing company in 1999.

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**1.2 Suzuka (2): Green Factory Plan** On-site Example 2

**Green Factory**

**Target: Zero-Emission**

- Promotion of Recycling: Ex: Waste Wood Recycle in Factory
- Reduction of Waste: Ex: Long Term Use of Cutting Oil Use of Incinerated Ash at Cement Factory
- Reduction of Air Pollutant: Ex: Measures for VOC & Dioxin
- Preservation of Water Quality: Ex: Strict Treatment of Wastewater

**Save Materials & Energy**

- Improve Energy Efficiency: Ex: Cogeneration

**Environmental Management**

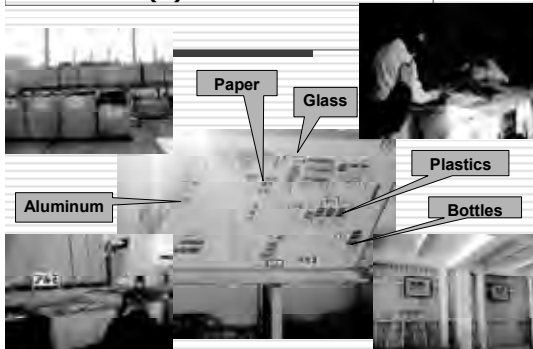
- Obtain ISO 14001
- Introduction of Life Cycle Assessment

**Amenity Production**




- Amenity Factory & Compliance of Law: Ex: Use of Robot
- Coordination with Local Community: Ex: Clean Local Community and Creation of Community Forest

Source: HONDA ECOLOGY (2000)

**1.2 Suzuka (3): View of the Plans** On-site Example 2





<p><b>2. Good Examples of Off-site Management</b></p> <p>To establish good off-site management, there needs to be close coordination between 3 parties:</p>  <p>Off-site Example 1: in Japan      Off-site Example 2: in Brazil</p> <p style="text-align: right;">17</p>	<p style="text-align: right;">Off-site Example 1: in Japan</p> <p><b>2.1 Good Example: Iwate Prefecture (1)</b></p> <p><b>Background</b></p> <ul style="list-style-type: none"> <li>□ 1991: Two WSCs began illegal dumping of industrial wastes, including hazardous wastes.</li> <li>□ Licensed for intermediate treatment (composting IW), but not licensed for landfill operations.</li> <li>□ 1999: Companies prosecuted for illegally dumping 920,000 m<sup>3</sup> of waste.</li> <li>□ 2000: Companies went bankrupt and the Prefectural Government was left responsible for the clean-up costs.</li> </ul> <p style="text-align: right;">18</p>
<p style="text-align: right;">Off-site Example 1: in Japan</p> <p><b>2.1 Iwate Prefecture (2)</b></p> <p><b>Background</b></p> <ul style="list-style-type: none"> <li>□ Prefectural Government found generators which entrusted their IW to those companies.</li> <li>□ 2010: In March this year, 28 generators agreed to pay the clean-up costs.</li> </ul> <p>This led to the introduction of a waste service company rating system &amp; environmental fund system</p>  <p style="text-align: right;">19</p>	<p style="text-align: right;">Off-site Example 1: in Japan</p> <p><b>2.1 Iwate Prefecture (3)</b> Waste Service Company Rating System</p> <p>Prefectural "Ordinances for a Recycling-based Society" established rating system &amp; environmental fund</p> <p>□ <b>Rating System</b></p> <ul style="list-style-type: none"> <li>■ WSCs are approved by the prefecture.</li> <li>■ They are rated into one of 3 levels according to a fixed standard.</li> <li>■ Rating is valid for 2 years.</li> <li>■ Society can trust these WSCs more</li> <li>■ Waste generators have meaningful information to select preferred WSCs.</li> </ul> <p style="text-align: right;">20</p>
<p style="text-align: right;">Off-site Example 1: in Japan</p> <p><b>2.1 Iwate Prefecture (4)</b> Environmental Fund System</p> <p>□ <b>Environmental Fund System</b></p> <ul style="list-style-type: none"> <li>■ Fund is operated by Iwate Prefecture Industrial Waste Consortium</li> <li>■ WSCs prepare the fund, each company contributing ¥1 million (or ¥0.5 million for members of Industrial Waste Consortium)</li> <li>■ Used if necessary to deal with urgent incidents.</li> <li>■ Allows WSCs to appeal to waste generators with more reliable disposal qualifications.</li> </ul> <p style="text-align: right;">21</p>	<p style="text-align: right;">Off-site Example 2: in Brazil</p>  <p style="text-align: center;">UNIDADE INDUSTRIAL DE SÃO JOSÉ DOS CAMPOS</p> <p><b>2.2 Good Example: Sao Paulo State</b> Sao Jose Dos Campos Landfill</p> <p style="text-align: right;">22</p>
<p style="text-align: right;">Off-site Example 2: in Brazil</p> <p><b>2.2 Sao Jose Dos Campos Landfill (1)</b></p> <p><b>Background</b></p> <ul style="list-style-type: none"> <li>□ Established in 1985 as a private landfill</li> <li>□ Brazil's first HW (Class I) landfill</li> <li>□ Brazil's first ISO 14000 certified landfill</li> <li>□ 756,000 sq. meter area</li> <li>□ Developed cell by cell, with a limited operation area: 120m x 30m x 8m</li> </ul> <p>When the municipal landfill refused to accept HW &amp; Non-HW in 2007...</p> <p>→ Factories requested Sao Jose Dos Campos Landfill to accept their Non-HW.</p> <p style="text-align: right;">23</p>	<p style="text-align: right;">Off-site Example 2: in Brazil</p> <p><b>2.2 Sao Jose Dos Campos Landfill (2)</b></p> <p><b>Background</b></p> <p>Since 2007:</p> <ul style="list-style-type: none"> <li>□ HW landfill began operations to dispose of Class II-A waste (Non-HW) from factories.</li> <li>□ Municipal regulation provided a new business opportunity for private entities</li> <li>□ Avoids mixing Non-HW at high-risk of containing hazardous waste with low-risk municipal waste.</li> <li>□ Clients visit the site twice a year to confirm the final destination of their wastes, and CETESB every month.</li> </ul> <p style="text-align: right;">24</p>

<p><b>2.2 Sao Jose Dos Campos Landfill (3)</b></p>  <p>Current HW Landfill</p> <p><b>Overview of the landfill</b></p>	<p>Off-site Example 2: in Brazil</p>  <p>Previous HW Landfill</p>  <p>New HW Landfill</p>	<p><b>2.2 Sao Jose Dos Campos Landfill (4)</b></p>  <p>Current Non-HW Landfill</p> <p><b>Overview of the landfill</b></p>	<p>Off-site Example 2: in Brazil</p>  <p>Leachate Collection</p>  <p>Previous Non-HW Landfill</p>
<p><b>2.2 Sao Jose Dos Campos Landfill (5)</b></p>  <p>Inside Monitoring Well</p> <p><b>Overview of the landfill</b></p>	<p>Off-site Example 2: in Brazil</p>  <p>Monitoring Well</p>  <p>Construction Waste Recycling</p>	<p><b>2.2 Sao Jose Dos Campos Landfill (6)</b></p>  <p>Laboratory</p> <p><b>Overview of the landfill</b></p>	<p>Off-site Example 2: in Brazil</p>  <p>Laboratory Samples</p>  <p>Construction Waste Recycling</p>
<p><b>Thank you very much for your attention</b></p> <p>Rita Marie rita.marie@suframa.gov.br Armando Bandeira asjunior@suframa.gov.br</p> <p>29</p>			

Presentation 5 for Seminar (May 27, 2010): Waste Inventory Database

<p>Session 5</p> <p><b>Wastes Inventory</b> Development of the Wastes Inventory Data Base WI_DB</p> <p>May 27, 2010 Counterpart to JICA Study Team For the Study for the Development of an Integrated Solution Related to Industrial Waste Management in the Industrial Pole of Manaus</p>	<p><b>Resolution CONAMA N. 313 from 29 October 2002</b> (Industrial Wastes National Inventory)</p> <p><b>Wastes Inventory:</b> Is the set of information about the generation, characteristics, storage, transport, treatment, reuse, recycling, recovery and final disposal of the wastes generated by the industries.</p> <ul style="list-style-type: none"> <li>- In 2002, the National Council of the Environment (CONAMA) issued Resolution 313.</li> <li>- According to this Resolution (Art. 8), each Industry should register monthly (and keep) the wastes generation data in order to get information for the National Industrial Wastes Inventory.</li> <li>- The environment state organizations should submit to IBAMA the data of the Wastes Inventories (Art. 4).</li> </ul>
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