WTERT 2008 Bi-annual Meeting at the Columbia University, October 16/17

The „Isséane“ Plant in Paris
Integrating an Energy-for-Waste Plant into a major city

New York, 2008-10-16, Peter Chromec
Isséane – Integrating an EfW Plant into a major city

- The Owner
- The Pre-conditions for the Project
- The Project – General aspects
- The Project – Design aspects
- The Project – Construction aspects
- Summary
SYCTOM:

- Europe’s largest cooperation
- Founded 1985/87
- 85 communities participate
- 5,48 Mio. inhabitants in the cooperation area
- 2,67 Mio. t (metric) MSW disposed (2006, without glass recycling)
Isséane – Integrating an EfW Plant into a major city

- The Owner
- The Pre-conditions for the Project
- The Project – General aspects
- The Project – Design aspects
- The Project – Construction aspects
- Summary
## Isséane – The Pre-conditions 1: Emissions

<table>
<thead>
<tr>
<th></th>
<th>EU &amp; French Law</th>
<th>Isséane requirements</th>
<th>11% O2 (7% O2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOx</td>
<td>200</td>
<td>65 (44.3)</td>
<td>mg/Nm3 (ppmv)</td>
</tr>
<tr>
<td>HCl</td>
<td>10</td>
<td>5 (4.3)</td>
<td>mg/Nm3 (ppmv)</td>
</tr>
<tr>
<td>SO2</td>
<td>50</td>
<td>17 (8.3)</td>
<td>mg/Nm3 (ppmv)</td>
</tr>
<tr>
<td>HF</td>
<td>1</td>
<td>0.8 (1.3)</td>
<td>mg/Nm3 (ppmv)</td>
</tr>
<tr>
<td>Particulates</td>
<td>10</td>
<td>3 (2.3)</td>
<td>mg/Nm3 (mg/scm)</td>
</tr>
<tr>
<td>Mercury</td>
<td>50</td>
<td>30 (23)</td>
<td>μg/Nm3 (μg/scm)</td>
</tr>
<tr>
<td>Σ Cadmium and Thallium</td>
<td>50</td>
<td>40 (31)</td>
<td>μg/Nm3 (μg/scm)</td>
</tr>
<tr>
<td>Dioxins and Furans (TE)</td>
<td>0.1</td>
<td>0.07 (0.05)</td>
<td>ng/Nm3 (ng/scm)</td>
</tr>
<tr>
<td>other values according to 2000/76/EC</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Waste is our energy.
8 points included

For example:

- Supervision of nuisances (noise, odor, etc. from construction start)
- Construction-Erection- and Traffic-concept reducing truck traffic (transport by barge)
- Regular and systematic information of the public regarding site activities
- Site construction waste concept with source separation and recycling as possible
Isséane – Integrating an EfW Plant into a major city

- The Owner
- The Pre-conditions for the Project
- The Project – General aspects
- The Project – Design aspects
- The Project – Construction aspects
- Summary
Isséane – The Project: general data

- **Technology:**
  - 2 lines **MSWI**, 460,000 tpy (metric) corresponds to 2 x 800 tpd (short) Grate, dry flue gas cleaning, SCV
  - **Turbine 52MW** / District heating
  - **Sorting- and Recycling plant**
    2 lines for totally 55,000 tpy metric

- **Civil:**
  - Architectural consideration of the location at the Seine river shore
  - Stack/plume not visible from street
  - O&M truck traffic not visible
Waste is our energy.
Located centrally: max. waste transport distance: 10km
Location at river avoids 4250 trucks/year due to barge ash transport
Isséane – The Project: general - location 3

- 38’000m² (9.4 acres), former production site of Renault cars/trucks
- Needed rebuilding / remediation in any case (justifies part of cost)

Waste is our energy.
Isséane – The Project: general - location 4

- Total building almost 2/3 in the ground
- Total building height including stacks: 55 m (180 ft)

Waste is our energy.
Isséane – Integrating an EfW Plant into a major city

- The Owner
- The Pre-conditions for the Project
- The Project – General aspects
- The Project – Design aspects
- The Project – Construction aspects
- Summary
Molded walls: 6.000 tons of armoring iron for 258 molded walls is almost the weight of the Eiffel Tower steel structures!
132 piles for loads of the plant equipment and structure

- Pile length:
  - up to 50 m (160 ft)
  - to assure position of building within the ground water
Total: 359 piles, 18‘000 t building steel;
126‘000 m3 (4.4 M ft3) Concrete
Waste is our energy.

Isséane – The Project: design – process 1

(HHV: 5600 BTU/lb)

(HHV: 4800 BTU/lb)

Temporary overload range

Normal operation range

With air preheating

Waste is our energy.
Isséane – The Project: design – process 2

Von Roll Inova scope: „chute-to-stack“

Waste is our energy.
Isséane – The Project: design – process 3

Grate / Boiler System

- No of lines: 2
- Throughput per line: 30.5 tph
- Mechanical maximum: 35 tph
- Thermal capacity: 85 MW
- Grate: System Von Roll, 4 lanes, 5 zones, thereof 3 Aquaroll® water-cooled, area: 108 m²
- Flue gas recirculation system
- Boiler: 4-draft, hor.
- Steam production per line: 100 tph
- Steam parameters: 400°C/50 bar
- Turbine (1 common): 52 MW

Waste is our energy.
Isséane – The Project: design – process 4

Flue Gas Cleaning System
- Flue gas per line: 145,000 Nm³
- Pre-de-dusting: ESP
  Fields: 2
- Flue gas cleaning: dry
  bicarbonate-process & act carbon
- Bag filter compartments: 6
- NOx-control
  SCR catalyst (low temp.)
- No of catalyst layers: 3
- Plume prevention: Gas burner
- Burner capacity: 10.5 MW
- Max. FG-temperature: 290°C (550°F)

Waste is our energy.
Waste is our energy.

Isséane – The Project: design – process 4

- **Turbosorp with hydrated lime**
- **Turbosorp with sodium bicarbonate**
- **Turbosorp + wet scrubbing**

- **France**
- **USA**
- **Canada**
- **Germany**

Residue disposal cost vs. HCl uncontrolled/controlled emissions

High landfill cost
Low landfill cost
Isséane – Integrating an EfW Plant into a major city

- The Owner
- The Pre-conditions for the Project
- The Project – General aspects
- The Project – Design aspects
- The Project – Construction aspects
- Summary
Isséane – The Project: construction - excavation

Below -15 m (-50 ft), use of mining methods
1.2 Million tons of earth was excavated, most of it by barge

Waste is our energy.
Isséane – The Project: erection general

Difficult situation regarding erection and site logistics

- Very little preassembly space
- Truck deliveries (if unavoidable) had to be „just in time“
- Barge delivered goods had to be transported across a main road without interruptions
- Large lifting distances
- Crane capacity had to be shared by various site players
Isséane – The Project: erection – preassembly 1

Preassembly:
took place outside Paris

Waste is our energy.
Preassembled parts were loaded to barges.
Isséane – The Project: erection – barge delivery 1

From the barge, pre-assembled parts were lifted onto a specially constructed jetty…

Waste is our energy.
… on the jetty heavy-load trucks waited only to …
Isséane – The Project: erection – in-site transport 1

... cross a specially constructed bridge over the river road!
Isséane – The Project: erection – in-site transport 2

...so the piece arrives to site after 200 meters/yards

Waste is our energy.
Isséane – The Project: erection – crane coordination

Large lifting distances
Sharing cranes with many others
Multi-level operation (literally)
Isséane – Integrating an EfW Plant into a major city

- The Owner
- The Pre-conditions for the Project
- The Project – General aspects
- The Project – Design aspects
- The Project – Construction aspects
- The Project – Operation & Summary
Isséane – The Project: operation

- Permits obtained Sep 2000
- Civil works (2001)-2003/5
- Erection 2005-2007
- Commissioning 2007
- Line 1 in operation since December 2007
- Line 2 in operation since January 2008
- Operated by the Client without supervision since July 2008
- Produces up to 52 MW electricity
- Heats an equivalent of 79’000 houses
1. Dispose of waste where it arises – produce energy where it is needed (expected revenues per year: 8 MEUR steam & 3 MEUR electricity)

2. Set clear standards, assure they are kept and communicate them (communication since 1999, the name “Isséane” was chosen by the public)

3. A good solution may cost something – but it is worth!

---

Waste is our energy.
THANK YOU FOR YOUR ATTENTION!