Regional Environmental Publications

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Anne Laine and Heli Rissanen (eds.)

Bothnian Bay Life

BAT Information Exchange System

LAPLAND REGIONAL ENVIRONMENT CENTRE

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Preface

The environmental authorities around the Bothnian Bay started the cooperation project **Bothnian Bay Life** in late 2001. The project was funded by EU Life Environment and several industries, municipalities and other actors of the area, both in Finland and Sweden. The main objectives of the project were to improve information exchange between countries, regions, industries and municipalities; to develop guidelines for integrated management and monitoring; and to define targets and priorities towards sustainable development in the area.

The project's main product is the **Integrated Management System for the Bothnian Bay**, available in the web site http://www.ymparisto.fi/perameri. The Integrated Management System is formed of the following components, which are the deliverables of the four subprojects of the Bothnian Bay Life:

1. Environmental Information Database, coordinated by West Finland Regional Environment Centre
2. BAT Information Exchange System, coordinated by Lapland Regional Environment Centre
3. Water Quality and Ecosystem Model, coordinated by Lapland Regional Environment Centre
4. Bothnian Bay Action Plan, coordinated by the County Administrative Board of Norrbotten

Working groups, with members from participating environmental authorities, municipalities and industries, were nominated for the subprojects. Their role was to guide and to aid in the implementation of the subprojects. The whole project was coordinated by North Ostrobothnia Regional Environment Centre. The County Administrative Board of Västerbotten was in charge of the Swedish coordination and the Bothnian Bay Exhibition.

Participating environmental authorities:

North Ostrobothnia Regional Environment Centre, Finland
County Administrative Board of Norrbotten, Sweden
County Administrative Board of Västerbotten, Sweden
Lapland Regional Environment Centre, Finland
West Finland Regional Environment Centre, Finland

Participating municipalities: Haparanda, Hailuoto, Haukipudas, Ii, Kalix, Kemi, Keminmaa, Kempele, Kokkola, Luleå, Oulu, Pietarsaari, Piteå, Raahe, Tornio

Participating industries: Stora Enso Oyj, Kemi; Oy Metsä-Botnia Ab, Kemi; Outokumpu Stainless Oy, Tornio; UPM-Kymmene Oyj, Pietarsaari; SCA Packaging Munksund AB, Piteå; Kappa Kraftliner, Piteå; Billerud Karlsborg AB, Kalix; Stora Enso Oyj, Oulu; Boliden Kokkola Oy, Kokkola; OMG Kokkola Chemicals Oy, Kokkola; Rautaruukki Oyj, Raahe; SSAB Tunnplåt AB, Luleå; Boliden Mineral AB, Rönnskär, Skellefteå

Other participants: The Finnish-Swedish Frontier River Commission, Council of Oulu Region, Ostrobothnia Water Protection Agency

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Part I

Project Report

Anne Laine and Heli Rissanen

Introduction

BAT[1] Information Exchange System (BATIES) is a product of Bothnian Bay Life -project[2] that was financed by EU LIFE Environment and regional organizations in Finland and Sweden. The objective of the Bothnian Bay Life was to build an integrated management system for the Bothnian Bay in order to improve information exchange between countries, industries and municipalities and to aid in improving the state of the Bothnian Bay. Bothnian Bay Life project consists of four subprojects that aim at creating the integrated management system.

The objective of the BATIES subproject was to develop an operational BAT Information Exchange System on a local level in relation to BAT information exchange requirements of the IPPC directive (96/61/EC). According to the article 16, section 2, of the IPPC directive, "the Commission shall organize an exchange of information between Member States and industries concerned on best available techniques, associated monitoring and developments in them". The Commission (Environment Directorate-General) publishes the results of the information exchange as IPPC BAT Reference Documents (BREFs). However, there are no operational systems for local authorities and industries to exchange BAT information between countries. In the current situation there are even difficulties in getting commensurable information of emissions, state of the environment, etc. from a neighbouring country. BATIES was included to Bothnian Bay Life to study the possibilities of answering these demands and needs. Additional important objective of BATIES has also been to improve cooperation and information exchange on a practical level between countries and regions as well as between authorities and industry.

This report of BATIES subproject consists of two separate parts. Part I is a project report by the subproject coordinator and the project leader. The main outcome of Part I is the discussion over the subproject's results (chapter 'Findings and Conclusions') to which also the subproject steering group has contributed (see appendix I for steering group members). Part II consists of IVL's technical report on the database and web-interface, and it describes the practical project implementation.

The primary result of BATIES is the BAT database and the web-interface that enables easy usage of the database. The application is available for a limited time at internet. Link to the BATIES application can be found at Bothnian Bay Life www-pages[2]. Username and password are BAT and BAT respectively.

[1] *BAT = Best Available Techniques*

[2] *Further information at www.ymparisto.fi/perameri*

2 Implementation

BATIES was launched in February 2002 by the subproject's kick-off meeting, where the subproject steering group discussed the terms of reference (ToR) for the subproject. BATIES was to be implemented by an outside consultant and was therefore put out to tender. Of the two tenders received, IVL Swedish Environmental Research Institute Ltd (IVL) was assigned. IVL offered a ready solution of setting up a BAT database, which would then be used via a simple web-interface.

BAT information exchange system was to be developed based on actual and existing activities. For this purpose, one industrial branch – metal industry – around the Bothnian Bay had earlier been determined to serve as an example.

Implementation of BATIES is further described in IVL's report in part II.

3 Findings and Conclusions

Use of BAT Information

According to the interviews that were carried out during the project BAT information is widely used among BATIES steering group members. The most used sources for BAT information seem to be the Commission's BAT Reference Documents, BREF's, but also other sources are used and a kind of benchmarking, comparing solutions with other similar plants, is done. Among the Finnish environmental authorities, BAT issues are also discussed in internal seminars and conferences dealing with permitting and compliance monitoring of certain industrial sectors.

The main application for use of BAT information is permitting procedure where the authorities first compare the information in permit applications to available BAT information and then apply the comparison results in two different ways:

1. *permitting authority* uses the results in permit consideration and when giving permit conditions
2. *compliance monitoring authority* uses the results when giving its statement of permit application (statement includes consideration whether the suggested environmental performance is acceptable in reference to BAT).

The applicant has a key role in providing well-founded evidence on their performance compared to BAT.

Compliance monitoring authorities use BAT information also when there are changes at a plant that do not necessarily require a permit procedure (if emission levels do not grow etc.). Compliance monitoring authority gives its statement regarding the acceptability of the change in reference to permits, BAT etc.

Among the steering group members BAT information is also used as reference material when discussing compliance monitoring issues between plant operators and compliance monitoring authorities.

In general, many of the steering group members shared the opinion that there is a sufficient amount of BAT information available. However, they hoped for more attention on the following matters:

- collecting practical experiences of applying BAT thus enabling comparison of how BAT is applied by different operators in the same industrial sector
- emission monitoring (methods) and reporting; current emission reports and statistics are not comparable due to inconsistencies in monitoring and reporting; collecting information from industrial operators and their supervising authorities on how emissions are monitored and reported and comparing these methods
- best practices and requirements of waste management.

According to the steering group, the more there is need to get information on the applications of BAT in practise, the more useful it is to exchange this information on a regional level. At least from the authorities' point of view comparative information exchange regarding existing industrial operators would be useful and productive.

BAT Database

In the database, local processes and emission abatement measures are compared to the relevant BREF's. This part of the database, named "Detailed processes and local measures", forms the main collected data and it is also considered to be the most useful part of the database. However, putting this information into a database form could not be done without simplifying and generalizing the available information. By using the database, an overall picture of local conditions compared to BREFs can be formed. It is important to note that only selected information has been collected, analyzed and fed into the database due to limitations of how much data could in practice be handled within this project. This means that the project dealt with only the information that was anticipated to be most common and most comparable e.g. mitigation measures of certain customary emission parameters. The chosen parameters were considered to cover the main emissions to the environment.

Even though certain emission parameters and their mitigation measures were chosen to be the information of interest, many of the plants provided the subproject with much more material than was asked. Consequently some plants have more information in the database than others since the information entered has not been limited. The determined emission parameters have thus been treated more as minimum criteria for the data collection than as limiting factors. Therefore the industrial plants have not been treated in a totally consistent manner.

Also permit data has been collected. However, only the comparable information of chosen emission parameters has been entered to database. The permit information entered deals with maximum allowed annual emissions (tons/a), the idea being that the permit limits could then easily be compared with the actual annual emissions that have also been collected for the reference year of 2002. In most cases, permit conditions are not given in this form and thus much of the permit information is left out of the database. The database may therefore give the wrong idea that some plants have very few permit limits. Thus the permit comparison function in the present form is not a very useful tool. Permit comparison was not in the scope of the project so therefore not much attention could be given to the development of it. However, many interest parties, compliance monitoring authorities as well as industry, do consider more detailed permit information of great interest, e.g. in regard to how BAT is being applied in practice. This function could therefore be something to develop further should it be decided that this form of information exchange is to be continued.

Also emission monitoring was discussed in the BATIES group. Monitoring method (calculated / measured continuously / measured periodically) was agreed to be included into the database as well, but at present the monitoring information is too general to actually serve monitoring information exchange.

Other Experiences

Collecting BAT information, even in its most simplified forms, proved to be a very time consuming work phase. It demands quite a lot of resources both from the industrial representatives as well as from those who evaluate and process the information into a form suitable for the database.

The main sources of information from industrial plants are permit applications and the possible BAT evaluations that nowadays are regular studies required to be included in the applications. This material is written, without exceptions, in the national language, which can be a major resource issue if the database administrator does not have the necessary language skills. Due to the massive amount of material, it is not considered an option to translate all source material for database uses. One

option to avoid massive data processing and translation could be that each industrial plant in question would provide their information in a ready, processed form so that the administrator would only feed in the data. The drawback with this option would be the differences in processing the information. The only way to ensure analogous data evaluation and processing would be to it centralize it to only a few persons, preferably a third party with suitable expertise.

All in all, four steering group meetings were organized all in different locations and three of the meetings also included a site visit at one of the BATIES plants. The steering group meetings were productive and necessary and served practical information exchange well in the form of site visits. Steering group had representatives from all the industrial plants and regional authorities in question. Such large steering group could be considered heavy but at the same time it formed an extensive metal industry network for the Bothnian Bay region and resulted in productive cooperation during the project and built a good basis for further interaction between the same parties.

Conclusions

The BAT database puts large amount of BAT information of existing industrial plants into a simple and easily accessible form but because of the aforementioned needs and uses of BAT information, a database, which for obvious reasons simplifies the information, is not considered to be the most effective way for exchanging BAT information by the subproject steering group. Still, the database that has been set up is useful in many ways, e.g. the "local measures" part of it offers additional and useful information in reference to BREFs and other BAT sources.

The decision of whether or not to keep up the database requires careful consideration on whether the resource demand of administrating and updating a database can be balanced by the benefits of the database. Other alternatives to exchange information, such as network meetings or seminars on specifically allocated subjects and for selected participants, could be more feasible ways to exchange the BAT information that was found most interesting on a regional level (permit details, practical experiences on BAT applications, emission monitoring etc.).

Evident interest to exchange BAT information regionally, and on a practical level, exists. The network that was created during the project between the different operators in the metal industry and the authorities around Bothnian Bay builds a good and natural basis for BAT information exchange and thus fulfils the objective of the BATIES subproject of improving cooperation and information exchange well.

Part II

Technical Report of BAT Information Exchange System

Magnus Klingspor, Uwe Fortkamp and Mikael Olshammar

Background

The main objective of the BATIES subproject of the Bothnian Bay Life was to develop an operational system that would improve cooperation and information exchange regarding BAT and BREFs on a local level between industries and municipalities in the two countries around the Bothnian Bay. This was achieved through the development and implementation of an information exchange system that acts as a hub of knowledge for the monitoring and application of best available techniques.

The BAT Information Exchange System was developed based on actual and existing activities. For this purpose, one industrial branch, the metal industry around the Bothnian Bay, was selected to serve as an example. One metal plant from each participating regional authority (except two from West Finland) was chosen to participate the project.

The target plants and regional authorities were:

Outokumpu Stainless Oy, Tornio	Lapland Regional Environment Centre
Rautaruukki Oyj, Raahe	North Ostrobothnia Regional Environment Centre
Kokkola Zinc Oy, Kokkola	West Finland Regional Environment Centre
OMG Kokkola Chemicals, Kokkola	West Finland Regional Environment Centre
SSAB Tunnplåt, Luleå	County Administrative Board of Norrbotten
Boliden Mineral AB, Rönnskär	County Administrative Board of Västerbotten

The operational system was built by IVL Swedish Environmental Research Institute around considerations on what information the system should hold and on what the needs of the different users are. The system was planned in a way that will make it highly accessible. The application of the system to other industrial branches, countries and regions is to be possible as well.

In order to provide an efficient tool, the following actions were taken:
- Data on emissions, limits and used technology was collected.
- The data was analysed and compared to BREF notes
- It was determined which BAT information can be of interest
- A web-based information exchange system including a database with BAT information and the data collected was designed

2 Project Organisation

The Bothnian Bay Life project is coordinated by North Ostrobothnia Regional Environment Centre (NOREC). The project leader is Dr. Anne Laine and the Swedish project coordinator Dr. Jan Albertsson, County Administrative Board of Västerbotten (CAV).

Lapland Regional Environment Centre (LAPREC) is responsible for coordinating the BATIES subproject. The subproject coordinator is Ms. Heli Rissanen.

The steering group for BATIES consisted of project leader Anne Laine, project coordinator Jan Albertsson, subproject coordinator Heli Rissanen and representatives of each regional authority and industrial plant involved in the project. Also a representative of the consultant was nominated to the steering group (appendix 1).

The project team at IVL consisted of Uwe Fortkamp, project management, Emma Henningsson, Jessica Zakrisson, Mikael Olshammar and Erik Lindblom regarding web- and database programming, Jyri Kaplin, evaluation of Finnish information and Magnus Klingspor, data collection and evaluation.

Uwe Fortkamp, the project manager at IVL, was nominated to the steering group and together with Magnus Klingspor he was in contact with the project team and attended the steering group meetings.

General Information of the Target Plants

3

Six major industrial plants were chosen to participate in the project. Of these, OMG Kokkola Chemicals shares the outlet pipe with Kokkola Zinc.

Boliden Mineral AB, Rönnskär, contact person Michael Borell.
Boliden Mineral AB, Rönnskärsverken, a smeltery in Skelleftehamn, northern Sweden, extracts metals and chemicals from mineral concentrates and various recycling materials. The main products are copper, lead, gold, silver and zinc clinkers. Examples of by-products are liquid sulphur dioxide, sulphuric acid, selenium, and nickel sulphate.

Kokkola Zinc Oy, Kokkola, contact person Kai Nykänen.
Kokkola Zinc Oy is located in Kokkola on the west coast of Finland by the Bothnian Bay. The plant produces zinc in metallic form with the highest capacity of 270 000 t/y, and as a by-product, mercury in metallic form. Mercury was produced 25 t in the year 2003. Zinc is produced by a hydrometallurgical process (roasting, leaching, purification) and separated from the solution by electro-winning.

The most significant environmental aspects on site are waste management, and emissions to air and seawater. Significant improvements concerning these environmental issues have been accomplished in the last few years. One significant investment has been the improvement of the waste area on site to fulfil the requirements of the new landfill legislation. The improvements were completed in 2000, when the waste area was enclosed with a cut-off barrier and seepage water collection system. The barrier and water recovery system prevents seepage from flowing outside the area. Also lately the emissions to air and seawater have decreased significantly due to improvements that were completed at the plant in the year 2000.

The main purpose of the improvements was to take in use a new direct leaching process for concentrates. In addition to this, the project also increased energy-efficiency and made also the recovery of zinc more efficient. In terms of energy consumption, Kokkola Zinc is currently one of the most efficient zinc plants in the world. Kokkola Zinc's voluntary energy-saving agreements naturally cover energy consumption as well. Kokkola Zinc Oy operates according to non-ferrous BAT documents and has outstanding environmental performance compared to other similar plants globally. Kokkola Zinc Oy has been granted the Quality Management System as a proof of the official approval of the ISO 9001 Standard in the year 1992. The Environmental Management System was certified according to the ISO 14001 standard in 2000.

OMG Kokkola Chemicals Oy, Kokkola, contact person Kim Sundell.
OMG Kokkola Chemicals has been a part of the OMG group that produces one fourth of the world's cobalt products, and a significant share of its nickel chemicals, since 1991. The majority of these products are manufactured in Kokkola. OMG Kokkola Chemicals manufactures inorganic salts and oxides as well as various cobalt powders. The product range also includes organic and inorganic metal carboxylates.

Outokumpu Stainless Oy, Tornio, contact person Juha Ylimaunu.
The Tornio Works is centred on the integrated coil production facility in Tornio. The key production units within the Tornio facility are the melt shop and the hot and cold rolling mills. The steel melting process is integrated with the ferrochrome production unit, a separate Division within the Special Products Business Area, enabling the usage of molten ferrochrome.

The Tornio Works' melting and hot rolling capacities will be increased to about 1.65 million tons and the coil production capacity will be increased to about 1.20 million tons per annum. The installation of a new high-capacity integrated line, including cold rolling, annealing, pickling and skin passing, will be the focus of Outokumpu Stainless' growth in coil products, producing finished products as well as providing low cost feedstock for cold rolling in Outokumpu Stainless' other coil business units.

The integration of chrome raw materials with stainless steel melting, hot rolling and coil production on one site and the investment in integrated coil production technology, together with shortening lead times and improved on-time deliveries, supports the Tornio facility's cost and quality leadership position.

Rautaruukki Oyj, Raahe, contact person Eila Paldanius.
Rautaruukki's Raahe Works is situated on the northeastern coast of the Bothnian Bay some five kilometers southwest from Raahe town center.

Raahe Steel Works produces plate and strip products from iron ore concentrates. The works' operations include the harbor, raw materials handling and storage, coke production and the accompanying by-products, sintering of ore concentrates, iron production, scrap handling, steel plant operations, plate and strip rolling, component production, slag handling, power plant, and water and sewage treatment.

Annual steel production is 2.8 million tons. Raahe Steel Works has a certified ISO 14001 Environmental Management System, and is also approved in the EU's EMAS register.

SSAB Tunnplåt AB, Luleå, contact person Anders Bergman.
SSAB Tunnplåt AB is the biggest steel sheet manufacturer in Scandinavia and one of Europe's leaders in the development and manufacture of high-strength steel grades. SSAB Tunnplåt was formed in 1988 by the merger of the steelworks in Luleå and Borlänge. The company has a coking plant, blast furnaces and steelworks in Luleå. Three or four trainloads of slabs are shipped every day on the 'Steel commuter train' from Luleå to Borlänge.

SSAB Tunnplåt is a member of the SSAB Svenskt Stål Group, has a turnover of SEK 10 billion (2002), and has around 4400 employees in Borlänge, Luleå, Finspång, Ronneby and Göteborg. In addition, the company has subsidiaries in Finland, Denmark, Italy, the Netherlands and Great Britain. SSAB Tunnplåt has an annual production capacity of more than 2.8 million tons. The company's rolling mills and coating plants are located in Borlänge. SSAB Tunnplåt also has a coil coating line Finspång, a lamination line in Ronneby, and special steel production in Luleå.

General for all of the six target plants is that their environmental protection measures, except in very few details, fulfil the BAT recommendations according to the IPPC BREFs. This can be seen in the database, where the local environmental protection measures are compared with the IPPC BREF notes.

Implementation of the BATIES Database

4

For the purpose of developing the BAT Information Exchange System, data regarding existing BAT information and its monitoring and application was collected and analysed. This included separate evaluation of each target plant regarding techniques, comparison to BREFs and evaluation of the use of the BAT concept and BREFs by authorities, industry and other parties.

Collecting the necessary information required literature survey, industrial process analysis and evaluation, survey of recent permits, interviews and analysis of how the handling of BAT issues had been organised by the different parties; the target plants, regional authorities and national BAT administration, etc.

Plant visit was performed at Boliden Mineral AB. During plant visit and interviews, the following information was collected from the plant:

- data regarding the use, the monitoring and the development of BAT
- data of industrial processes and emission loads
- environmental permits and other administrative material
- information regarding the environmental situation, environmental protection measures taken and plans for the future.

From the remaining plants SSAB Tunnplåt (Luleå), Outokumpu Stainless Oy (Tornio), Kokkola Zinc Oy (Kokkola), OMG Kokkola Chemicals (Kokkola) and Rautaruukki Oyj (Raahe), the corresponding information has been gathered using E-mail, telephone and contacts at steering group meetings.

BAT information was collected from the EU-IPPC Bureau, the Oslo and Paris Convention (OSPARCOM) and the Helsinki Convention (HELCOM).

The recommendations from OSPARCOM and HELCOM were discussed at the meeting commenting the Final report in Tornio, September 2003, and were considered to be either out of date or already covered by the IPPC BREFs. The meeting agreed to include only BAT information from the IPPC BREFs within the project. This means that the collected information from the target plants was compared to the following BREFs:

- Best Available Techniques Reference Document on the Production of Iron and Steel, December 2001.
- Reference Document on Best Available Techniques in the Non Ferrous Metals Industries, December 2001
- Reference Document on Best Available Techniques in the Ferrous Metals Processing Industry, December 2001

All parties included in the BATIES project were familiar with the IPPC BREFs. Many of them have participated in the development of the BREFs, either as an active partner in the negotiations within the technical working groups at the EU IPPC Bureau in Sevilla, or by giving their standpoints before the negotiations.

All parties, representing both industry and authorities, found BAT information as an important and necessary source of information within the environmental field.

In both Finland and Sweden new environmental legislation came into force some years ago, modernising the legislation and harmonising it with the EU legislation. According to the IPPC Directive all industrial operations must update their permits according to the new legislation.

During the permitting procedure both the industry and the authorities have to check and comment whether the applied or proposed environmental measures comply with the IPPC BREF documentation.

5 Possible Links

The BAT Information Exchange System was developed as a stand-alone web application. It is however easy to link the application to the Bothnian Bay Life Project main home page or integrate it into other home pages. However, this will not be done until it is decided where the BAT Information Exchange System will be hosted from when the project is finalised. Another possible link in the future would be to the Environmental Information Database of the Bothnian Bay Life project.

6 Technical Description of the BAT Information Exchange System

The overall aim with the BAT Information Exchange System is to have a common platform for sharing and getting access to the information about the Best Available Techniques in the Bothnian Bay area. In order to reach this goal the system has been built with one central database, which is accessible through two different interfaces:

- Web application interface – This interface gives all members access to the search function in the database with an ordinary web browser. While this is a distributed application, the user can get access to it wherever there is an Internet connection available (Figure 1).

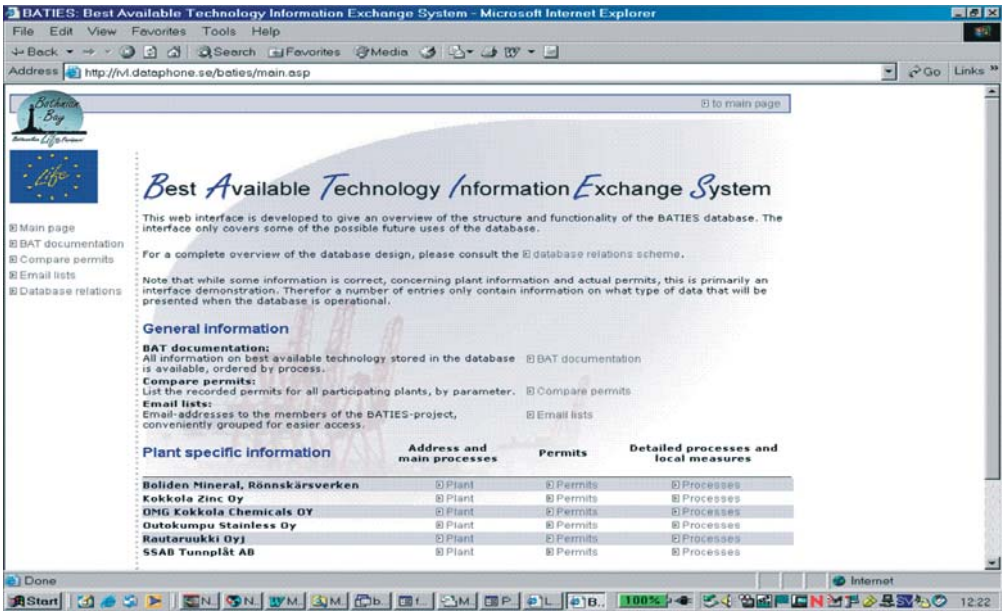


Figure 1. Web application interface.

- Database form interface – Interface used by the database administrator to edit and update the database with new information. This is a client-server application, which means that the user must work in the same network where the database is located. It provides more functionality than the web application and it is easier to develop. On the other hand, it has the drawbacks of client computer software need and lack of Internet accessibility (Figures 2 and 3).

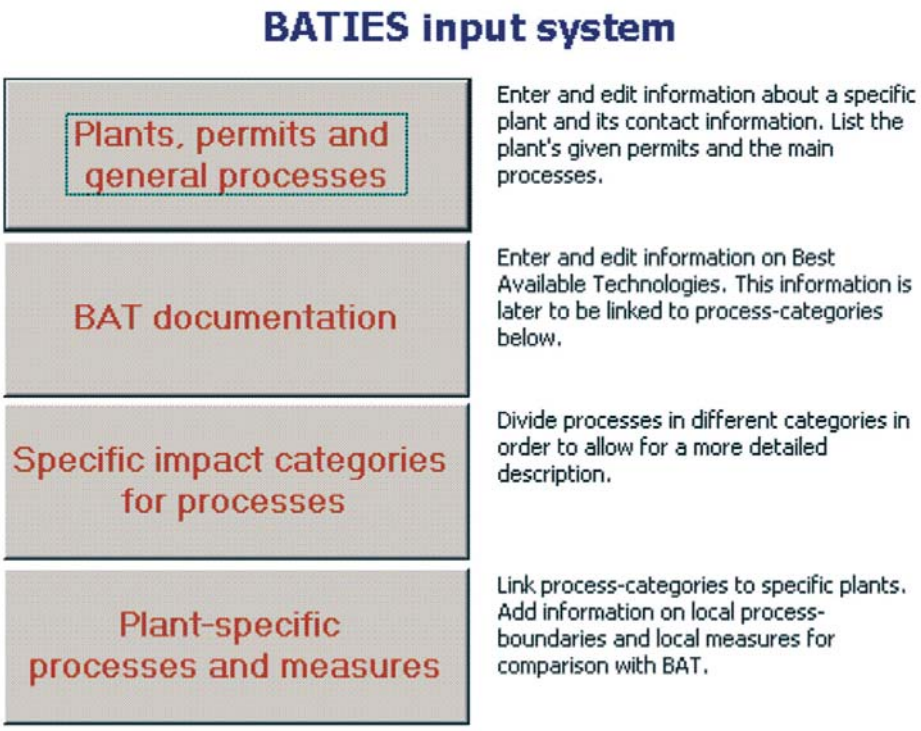


Figure 2. Database form interface, main menu.

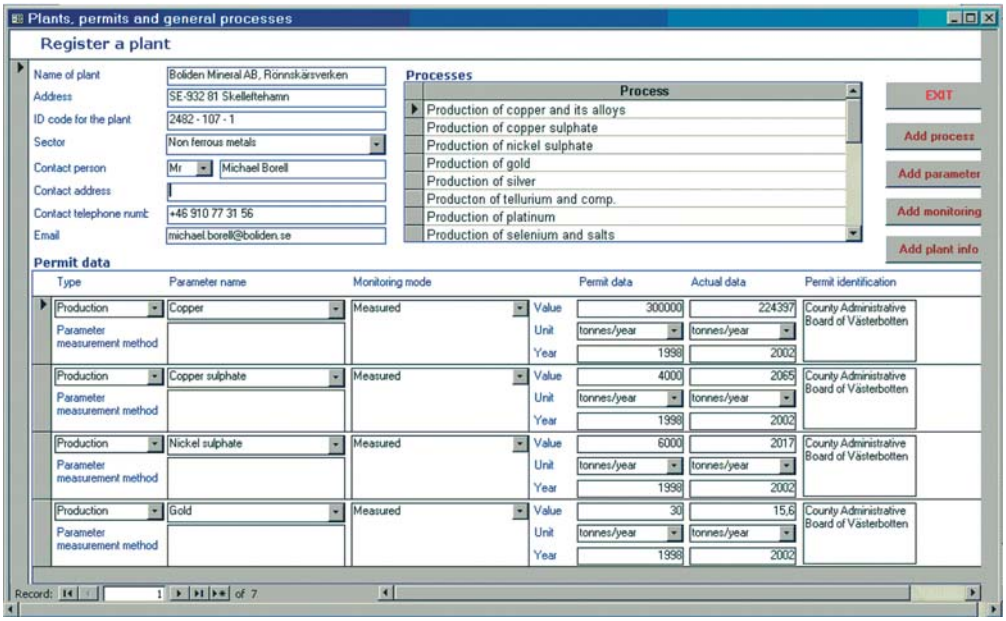


Figure 3. Database form interface example.

In order to keep the database in good order it is vital that only a few people administer it. At the same time it is important that as many users as possible can access the database when searching for BAT data. These needs have been fulfilled with the technical solution used in this project.

System Architecture

The web application is built with HTML, Java script and ASP. ASP stands for Active Server Pages and is Microsoft's server side web technology. This means that the application is running on the server and not on the client. Major advantage with this technology is that no software or software component needs to be installed on the client's machine and the application can be accessed from any modern web browser such as Internet Explorer or Netscape.

The limitation with this technology is that the web server running the application must be a Microsoft Internet Information Server. However, this is not a serious problem as about 40% of all web servers in the world are of that type.

The database and database forms are built with Microsoft Access 2000, which is the most common database on the market for handling restricted amounts of data where the need for simultaneous writing in the database is limited. The database forms are also built in MS Access and are integrated within the database software, which means that in order to run the forms, MS Access 2000 needs to be installed on the client computer. This is a drawback but it provides the advantage of a fast system development and small risk of bugs in the application.

If there is a need for a future upgrade of the database to a more powerful platform, the application can with small modifications be moved to a SQL Server database, while the MS Access forms can still be used in that database.

The web application can also, with small modifications, be made to work in another relational database, which means that the whole BAT Information Exchange System is scaleable.

Database Structure

The database structure is presented in Figure 4. The diagram shows that the main object in the database, the plant, can have many permits for several parameters that can be monitored in many ways. All tables containing CT, for instance "Process CT", are connection tables. These are needed for changing many-to-many relationships – that are not allowed in relational databases – into one-to-many relationships. The diagram also shows that a plant may have many processes, and for each process an environmental measure fulfilling the requirements of BAT can be recommended depending on category, see the example in the table below.

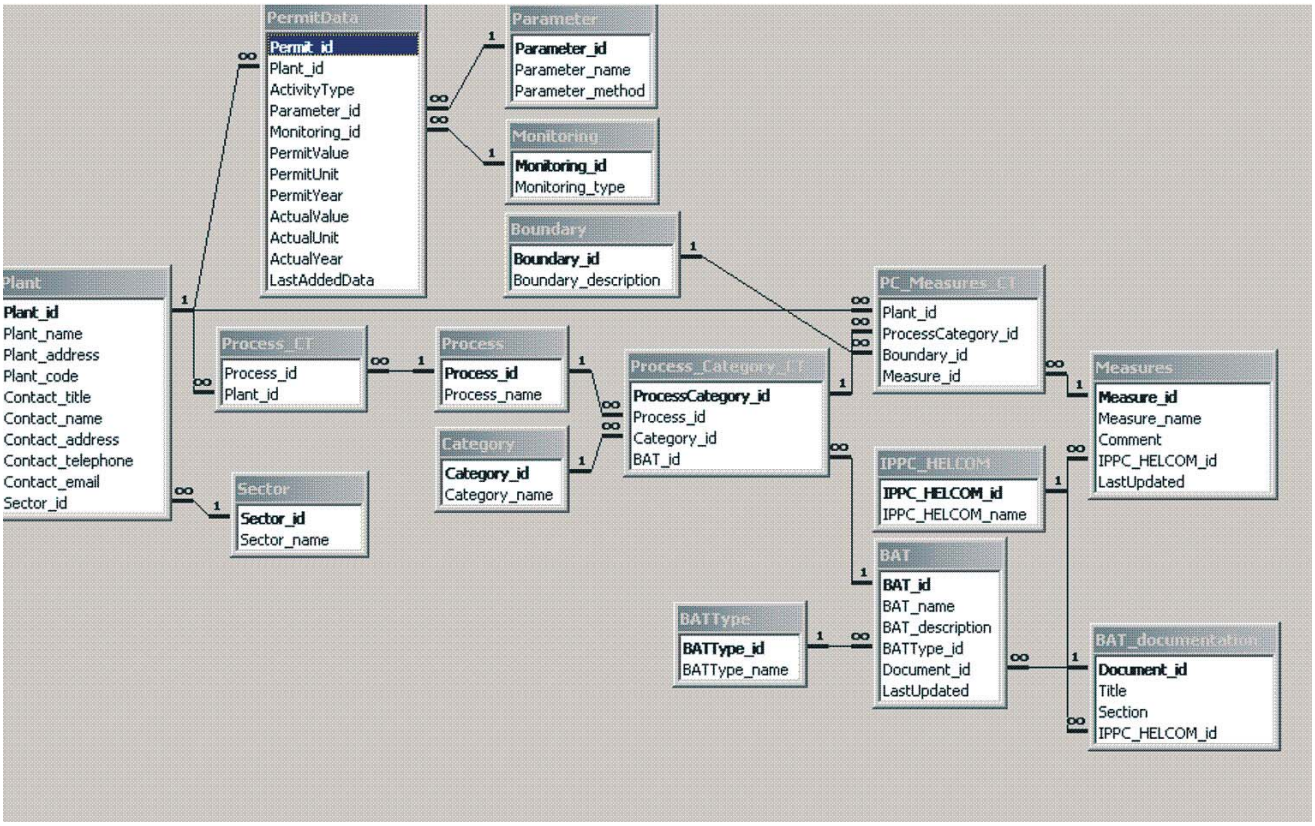


Figure 4. Database relational diagram.

Table. Database example

Table name	Plant	Process	Category	BAT
Table content	Boliden mineral	Production of Copper	Dust emission	Fabric filter

7 Editing and Updating the Database

The database form interface, the BATIES input system, is used by the database administrator to edit and update the database with new information. The interface contains four different sections, as shown in Figure 2.

Plants, permits and general processes

BAT documentation

Specify impact categories for processes

Plant-specific processes and measures

Information about a specific plant is entered and edited in *Plants, permits and general processes*. This interface section, as shown in Figure 3, contains input areas for contact information (name of plant, address and contact person, etc.) and main processes. It also contains input areas for permit type (production, or emission) and for actual data on production, emissions and discharges, parameter type, monitoring mode, permit data. This section also contains buttons that will open new windows. There are new windows for adding process type, parameter type and monitoring mode. These windows will occur as pop-up menus for choosing relevant designation while entering information. There is also a button for adding general information about a certain plant. The result on the web page is shown in Figure 5.

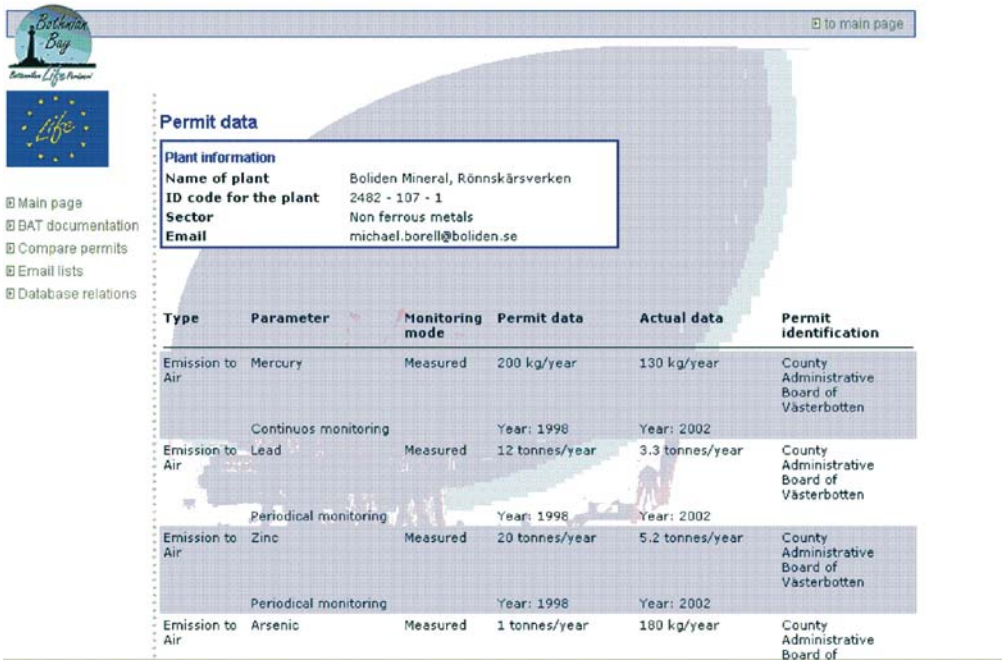


Figure 5. Permit data, Web application.

BAT documentation section is used for entering and editing information on BAT measures. In Figure 6, the input possibilities for this information are shown. For a specific type of BAT, in this example different ways to reduce NOx, a description of available techniques are connected to a BAT type (Emissions to air) and to the valid BREF. This section contains buttons that will open new windows for adding "BAT type" and "BAT documentation".

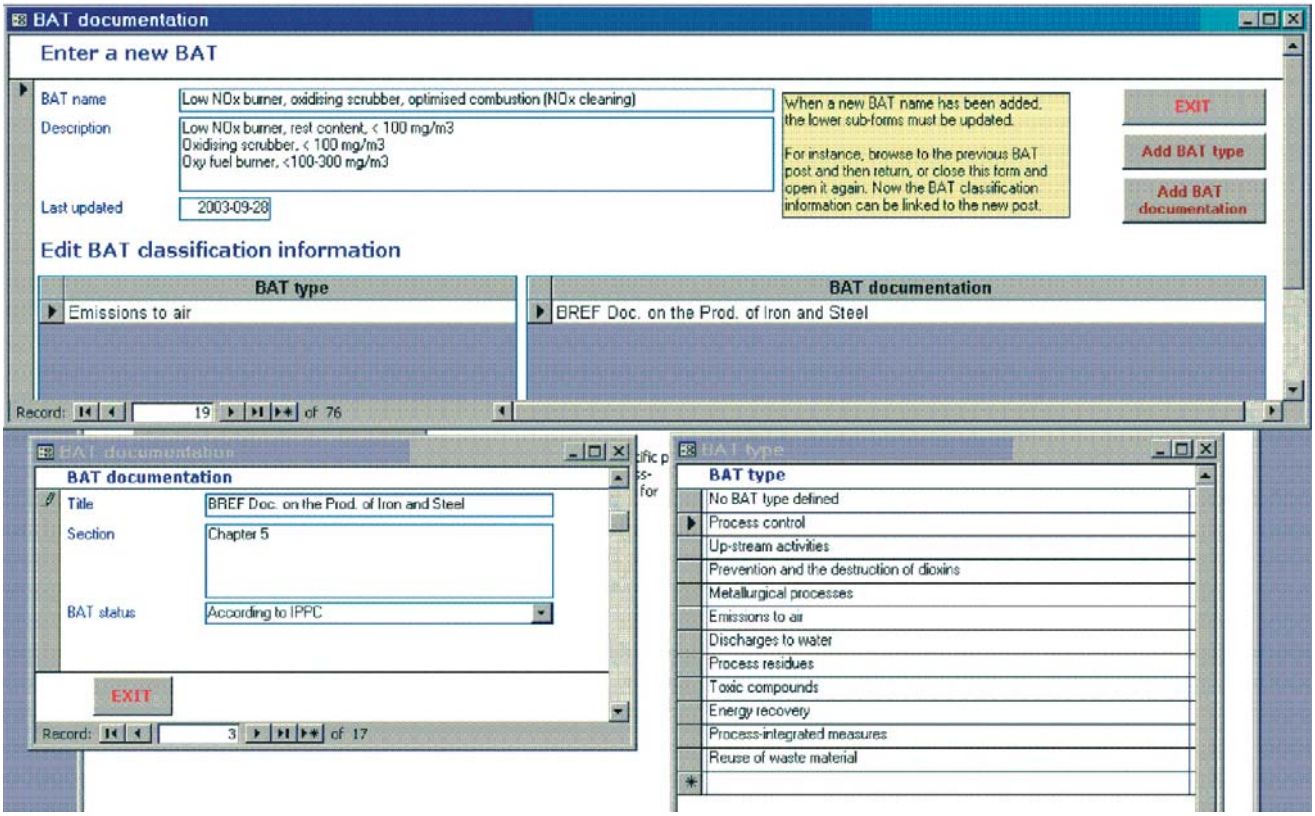
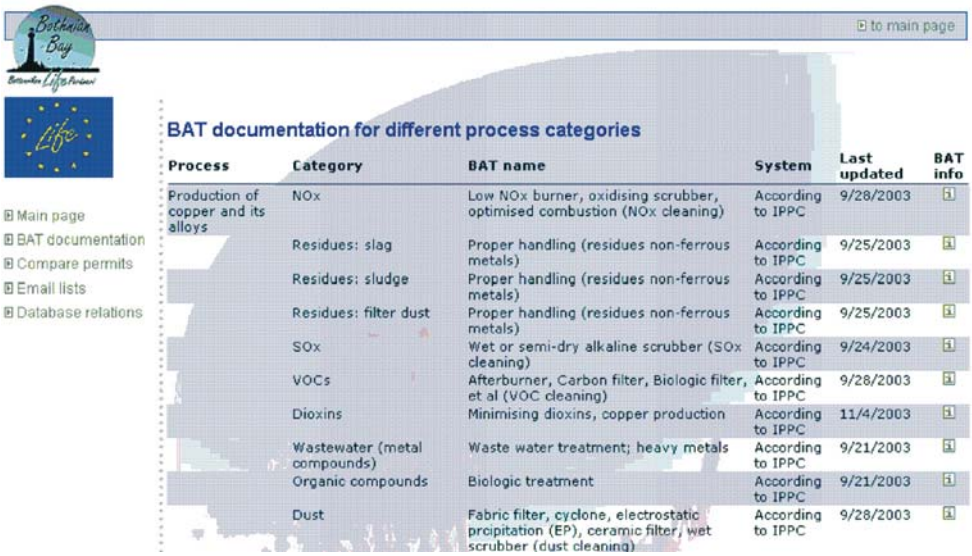


Figure 6. BAT documentation input form.

The result on the Web application is shown in Figures 7 and 8.

In Figure 7, overall information regarding a certain process according to the BREF documents is presented. For each category and BAT name more detailed information can be obtained by clicking the respective BAT info button, see Figure 8. For the detailed information the source is indicated, which in this case is the IPPC BREF document on the Non Ferrous Metal Industry, chapter 2.



Process	Category	BAT name	System	Last updated	BAT info
Production of copper and its alloys	NOx	Low NOx burner, oxidising scrubber, optimised combustion (NOx cleaning)	According to IPPC	9/28/2003	
	Residues: slag	Proper handling (residues non-ferrous metals)	According to IPPC	9/25/2003	
	Residues: sludge	Proper handling (residues non-ferrous metals)	According to IPPC	9/25/2003	
	Residues: filter dust	Proper handling (residues non-ferrous metals)	According to IPPC	9/25/2003	
	SOx	Wet or semi-dry alkaline scrubber (SOx cleaning)	According to IPPC	9/24/2003	
	VOCs	Afterburner, Carbon filter, Biologic filter, et al (VOC cleaning)	According to IPPC	9/28/2003	
	Dioxins	Minimising dioxins, copper production	According to IPPC	11/4/2003	
	Wastewater (metal compounds)	Waste water treatment; heavy metals	According to IPPC	9/21/2003	
	Organic compounds	Biologic treatment	According to IPPC	9/21/2003	
	Dust	Fabric filter, cyclone, electrostatic precipitation (EP), ceramic filter, wet scrubber (dust cleaning)	According to IPPC	9/28/2003	

Figure 7. BAT documentation, Web application.

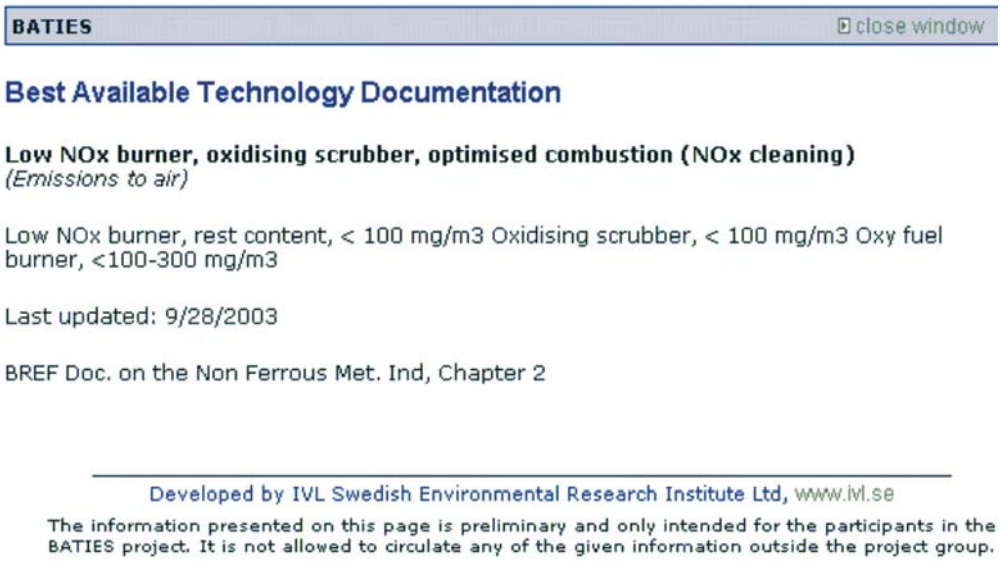


Figure 8. Detailed BAT documentation, Web application.

Specify impact categories for processes. For a certain production process there may be many environmental impacts and for each environmental impact there can be a number of possible BAT measures that could be used. These links are entered and edited in this section, shown in Figure 9.

For each process a number of impact categories are listed and for each impact category one or more BATs are listed according to the relevant BREF note. The buttons in this section will open new windows for adding ”Processes” and ”Categories”. Another button ”Add BAT” will open the previous section for entering a new BAT.

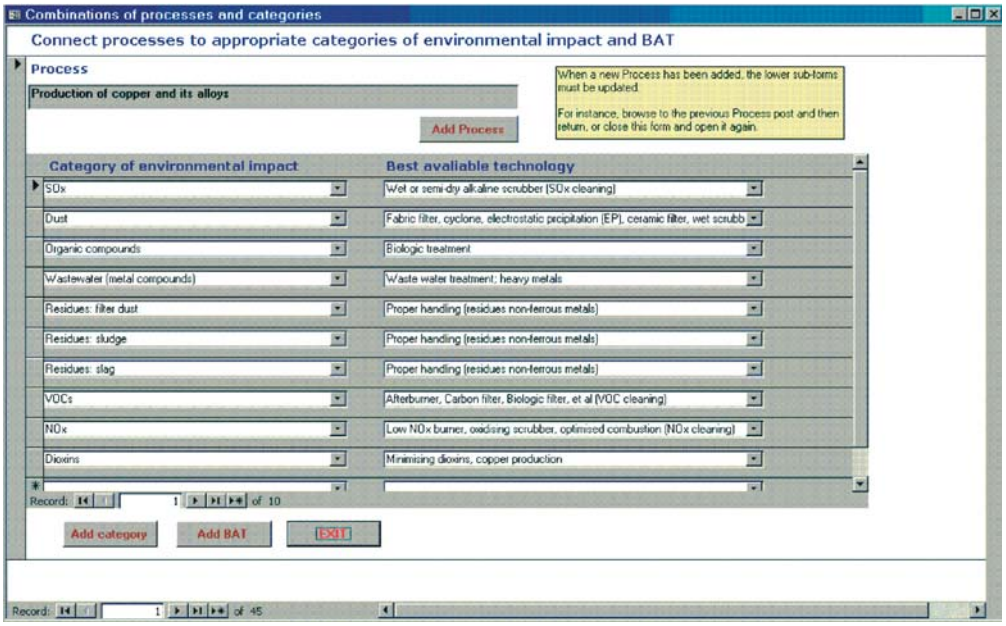


Figure 9. Impact categories for processes.

Plant-specific processes and measures section handles information regarding environmental measures taken at the target plants. These measures are presented in connection with process types and categories of environmental impact. In this section, shown in Figure 10, process type and connected impact categories can be chosen from lists. For each combination of process and category for a certain plant, the local measure is described. The input area for the local measures is a separate window, which is reached by an "Add measure" button, and where the BAT description and status are entered.

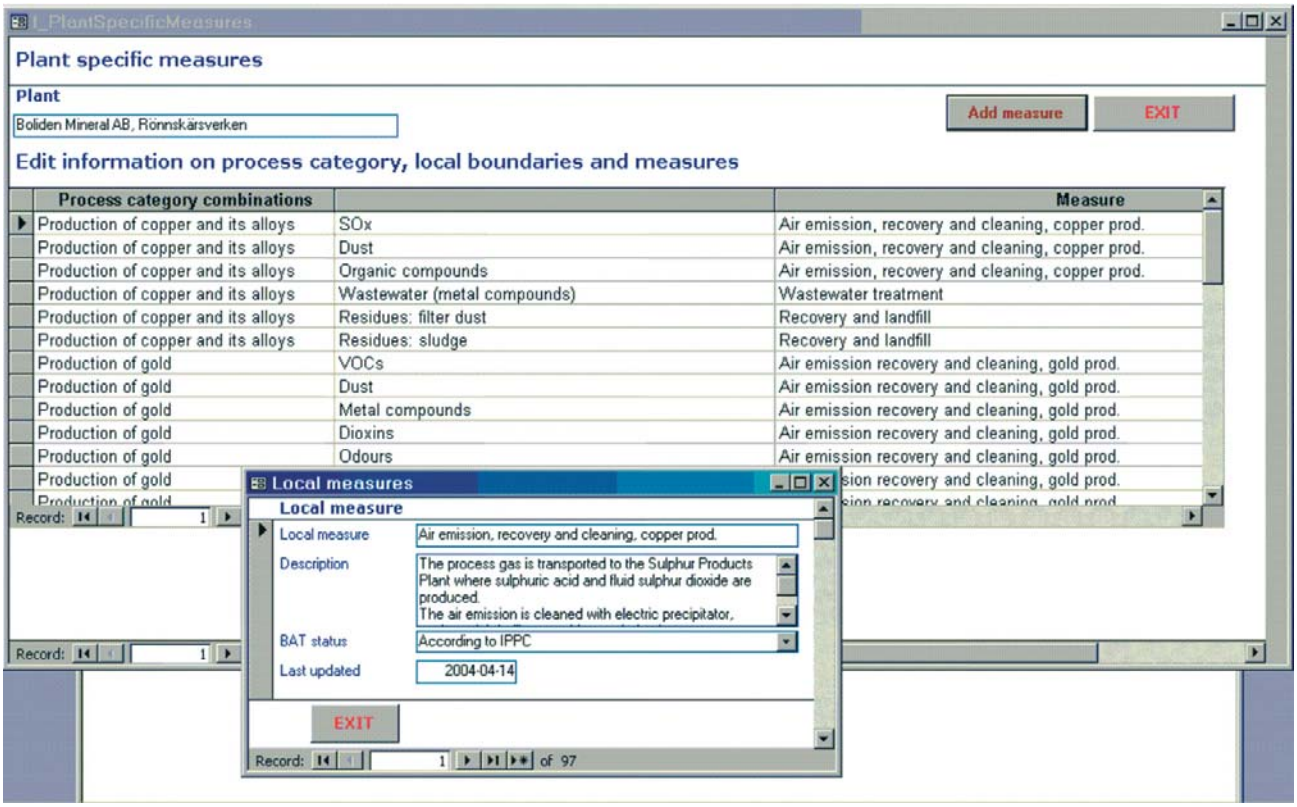


Figure 10. Plant-specific processes and measures.

In Figure 11, the result of the Plant-specific processes and measures section is shown. For each plant, process and impact category the local measure is described. Also in this window the BAT description according to the BREF documents can be viewed by clicking the respective BAT info button, se Figure 8.

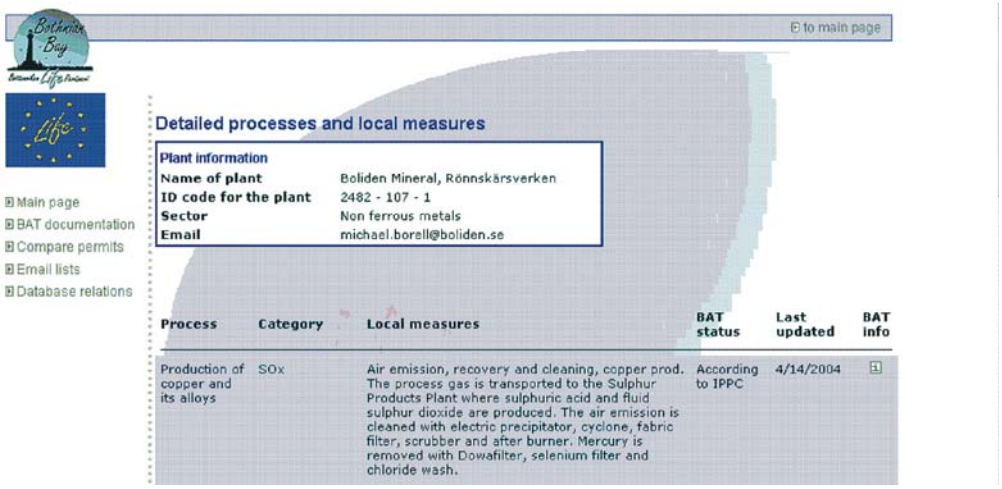


Figure 11. Plant-specific processes and measures, Web application.

8 Future Development

The BATIES system could be further developed in various ways depending on the aims and resources of the owners and users of the system. A natural step would be to integrate other industries and more companies into the system. Regarding the content of the system it would be worthwhile to test the system for e.g. one year and to evaluate the usage afterwards. Based on the experience gained, it will be easy to improve the user-interface if needed.

The BATIES system contains two categories of information: Permit and emission values and information on BAT. The permit and emission values are already registered with the responsible authorities. It would be advantageous to create an integrated system in order to avoid double data input. This would require compatible systems for both Finland and Sweden. It would be desirable to have a system of this kind covering the whole EU.

Information on BAT for several processes would be of interest to many industries in several countries. Easy access to the right information for a specific production will facilitate the use of BAT information. Therefore the BAT information part of the BATIES system can be developed to cover other industries and countries. IVL has some ideas regarding this development, especially regarding the other countries around the Baltic Sea. The usage of BAT information will depend not only on accessibility but also on data quality. Therefore it will be important to update BAT information regularly in order to be able to provide valuable and up-to-date information.

Based on the BREF notes for different industrial branches, national experts could be responsible for updating the BAT information for each country and each industrial branch. A system for a larger group of countries (e.g. Baltic 21 countries or EU) would be desirable.

9 Summary

A system for co-operation and information exchange regarding best available techniques (BAT) between countries, industries and municipalities around the Bothnian Bay has been set up. This was achieved through the development and implementation of an information exchange system that acts as a hub of knowledge for the monitoring and application of best available techniques.

The information exchange system is based on a database. Information from the database is provided via a web-interface on the Internet.

Information provided in the database includes:

- general data about the participating companies from the metal industry
- processes used at these companies,
- data on permits and emissions,
- general data about best available techniques for the used production processes
- comparison of used processes with BAT
- comparison of permits with different parameters
- e-mail list of the project participants

The access to the information is password protected.

Information on BAT has been collected from IPPC BREF documents. Information about the plants was collected during plant visits and by phone and e-mail contact.

The system might be developed in the future. It would be especially interesting to integrate BAT and company information from other industrial branches as well. An integrated reporting system would make it easier for companies to avoid double reporting to both the BATIES system and the national authorities that control the permits.

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Documentation page

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Parts of publication/ other project publications	The publication is also available in the Internet: http://www.environment.fi/publications
Abstract	A system for co-operation and information exchange regarding best available techniques (BAT) between countries, industries and municipalities around the Bothnian Bay has been set up. This BATIES system was achieved through the development and implementation of an information exchange system that acts as a hub of knowledge for the monitoring and application of best available techniques. The information exchange system is based on a database. Information from the database is provided via a web-interface on the internet. Information provided in the database includes general data about the participating companies from the metal industry and the processes used at these companies, data on permits and emissions and general data about best available techniques for the used processes. It is also possible to compare permits for different parameters. An e-mail list of the project participants is available as well. The access to the information is password protected. Information on BAT has been collected from IPPC BREF documents. Information on the plants was collected during plant visits and by phone and e-mail contacts. The system can be further developed in the future. It would be especially interesting to integrate BAT and company information from other industrial branches as well. An integrated reporting system would make it easier for companies to avoid double reporting to both the BATIES system and the national authorities that control the permits. The BAT database puts large amount of BAT information of existing industrial plants into a simple and easily accessible form and especially the "local measures" part of it offers additional and useful information in reference to BREFs and other BAT sources. Evident interest to exchange BAT information regionally, and on a practical level, exists. The network that was created during the project between the different operators in the metal industry and the authorities around Bothnian Bay built a good and natural basis for this purpose.
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Theme of publication	
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Julkaisun osat/ muut saman projektin tuottamat julkaisut	Julkaisua on saatavissa myös internetissä: http://www.environment.fi/publications
Tiivistelmä	Projektissa on rakennettu järjestelmä Perämeren ympäristön maiden, teollisuudenalojen ja kuntien välistä yhteistyötä ja parhaita käyttökelpoisia tekniikoita koskevan tiedon vaihtoa varten. Tämä saatiin aikaan kehittämällä ja toteuttamalla tiedonvaihtojärjestelmä, joka toimii parhaiden käyttökelpoisten tekniikoiden soveltamista ja seurantaa koskevan tiedon keskuksena. Tiedonvaihtojärjestelmä perustuu tietokantaan, joka tarjoaa tietoa verkkokäyttöliittymän kautta Internetissä. Tietokannan tarjoama tieto sisältää yleistä tietoa projektiin osallistuneista metallialan yrityksistä ja niistä prosesseista, joita nämä yritykset käyttävät, tietoa yritysten luvista ja päästöistä sekä yleistä tietoa parhaista käyttökelpoisista tekniikoista käytössä oleviin prosesseihin liittyen. Tietokannan avulla on myös mahdollista vertailla lupamääräyksiä eri parametrien suhteen. Tietokantaan sisältyy sähköpostilista projektiin osallistuneista yhteyshenkilöistä. Pääsy tietokantaan on salasanasuojattu. BAT-vertailutiedot on kerätty IPPC BREF-asiakirjoista. Tietoa teollisuuslaitoksista kerättiin tehdaskäyntien ja puhelin- ja sähköpostikontaktien kautta. Järjestelmää voitaisiin kehittää tulevaisuudessa. Erityisen mielenkiintoista olisi integroida järjestelmään BAT- ja yritystietoa myös muilta teollisuuden aloilta. Järjestelmää voisi kehittää myös integroidun raportointijärjestelmän suuntaan. Tällainen integroitu raportointijärjestelmä auttaisi yrityksiä välttämään päällekkäistä raportointia BATIES-järjestelmään ja valvontaviranomaisten raportointijärjestelmiin. BAT-tietokanta kokoaa suuren BAT-tietomäärän eri teollisuuslaitoksista yksinkertaiseen ja helposti käytettävään muotoon ja erityisesti sen “local measures” (paikalliset toimenpiteet) -osio tarjoaa hyödyllistä lisätietoa BREF-dokumentteihin ja muihin BAT-lähteisiin verrattuna. Mielenkiintoa BAT-tiedon vaihtoon alueellisesti ja käytännön tasolla selvästi on. Projektin aikana Perämeren ympäristön metalliteollisuuden ja viranomaisten välille rakennettu verkosto muodostaa hyvän ja luonnollisen perustan tällaiselle tiedonvaihdolle myös jatkossa.
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Bothnian Bay Life – BAT Information Exchange System

As a part of the Bothnian Bay Life project (2001–2005), a system for co-operation and information exchange regarding best available techniques (BAT) between countries, industries and municipalities around the Bothnian Bay has been set up. The information exchange system is based on a database and information from the database is provided via a web-interface on the Internet. This report summarizes the experiences gained when setting up the system and exchanging BAT information in practice (part I) and describes the system with technical details (part II). The system was developed based on actual and existing activities. The metal industry around the Bothnian Bay served as an example.

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