

ENV-PR # 7 (final)

PROGRESS REPORT # 7 (final)

Period:

01-05-01 to 31/07/04

V1.0



IPS-2000-0035



| |
|---------------------------|
| Table of contents. |
|---------------------------|

- 1 PREFACE 3**
- 2 DESCRIPTION OF THE WORK..... 4**
 - 2.1 Introduction4**
 - 2.2 Overview of the final workplan, with main changes in approach.....4**
 - 2.2.1 Initial Workplan5
 - 2.2.2 Final Workplan.....6
 - 2.3 Summary of tasks carried out per WP.7**
 - 2.3.1 Wp1000. Characterisation of problems in the referenced geographic areas
7
 - 2.3.2 WP2000. Operative Forum Definition and Startup.9
 - 2.3.3 WP2500.....10
 - 2.3.4 WP3000. Characterisation of alternative solutions and applicability.
Definition of the ideal parameters of a BAT.13
 - 2.3.5 WP4000. Laboratory Level Technology Application.....14
 - 2.3.6 WP5000. Demonstrations in Technological centers (industrial pilot level) 15
 - 2.3.7 WP6000.....16
 - 2.3.8 WP7000. Training and Know-How Transfer17
 - 2.3.9 WP8000. Alternative Scenarios18
 - 2.3.10 WP9000. Forum Strategic Plan. Stablishment of a Multi-regional
Permanent Network.....18
 - 2.3.11 WP10000. Public Dissemination of Achievements and Strategies.19
 - 2.3.12 WP11000. Project Management.....20
 - 2.3.13 WP12000. Link to the TOP Cluster.....21
 - 2.3.14 WP13000. Link to the Accompanying Measures22
- 3 RESOURCES EMPLOYED..... 23**
- 4 CHANGES TO THE ORIGINAL WORK SCHEDULE 24**
- 5 DOCUMENTED RESULTS. 27**
 - 5.1 List of deliverables.....27**
 - 5.2 Project Management.28**
 - 5.2.1 Project meetings.....28
 - 5.2.2 Project Activities28
- 6 ANNEX: MINUTES OF ENV-M-14 28**

1 Preface

The ENVIREDOX Final Report actually includes two parts: a publishable version –enclosed in the final pack as an standalone document FR#1- and this basicly “administrative” reporting, in which topics such as the work performed, resources employed, changes to the original work schedule and results achieved are treated.

2 Description of the work.

2.1 Introduction

The ENVIREDOX Project has followed the initial workplan at a high degree. Work has been structured around the RTD and DEM facets of the project.

The technical core of the project (represented by WP 4000, 5000 and 6000) has developed a series of four environmental applications at a final industrial-scale status.

The Demonstration part of the project (referenced sometimes as non-technical part) has developed a methodology –based on participatory forums- that analyzes and evaluates the suitability of an environmental solution to a given situation, much in the sense of the BAT concept of the IPPC directive. After the GO-NO GO, this part was enhanced with the addition of a new WP (WP2500) to the initial plan, thus including WP1000, 2000, 2500, 3000, and 8000.

WP7000, 9000, 10000, 11000, 12000 and 13000 represent common areas shared by the RTD and DEM parts, that range from training to collaborative work, and dissemination.

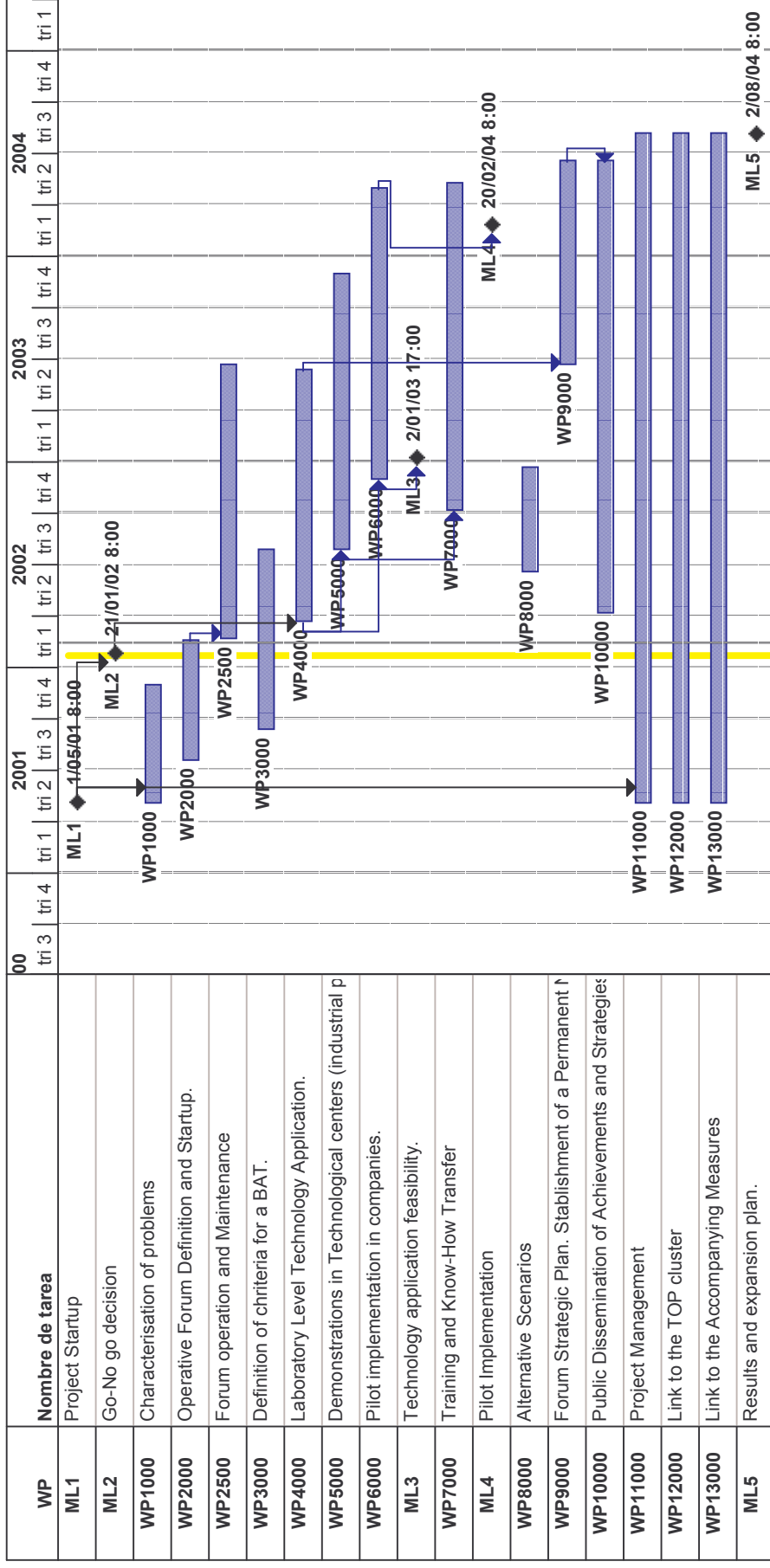
2.2 Overview of the final workplan, with main changes in approach.

The main changes in the ENVIREDOX Project have been schedule changes or operative changes due to the development of the tasks (Merged deliverables, increase in some tasks, a bigger role of some of the partners...). These changes will be explained in the point 4.

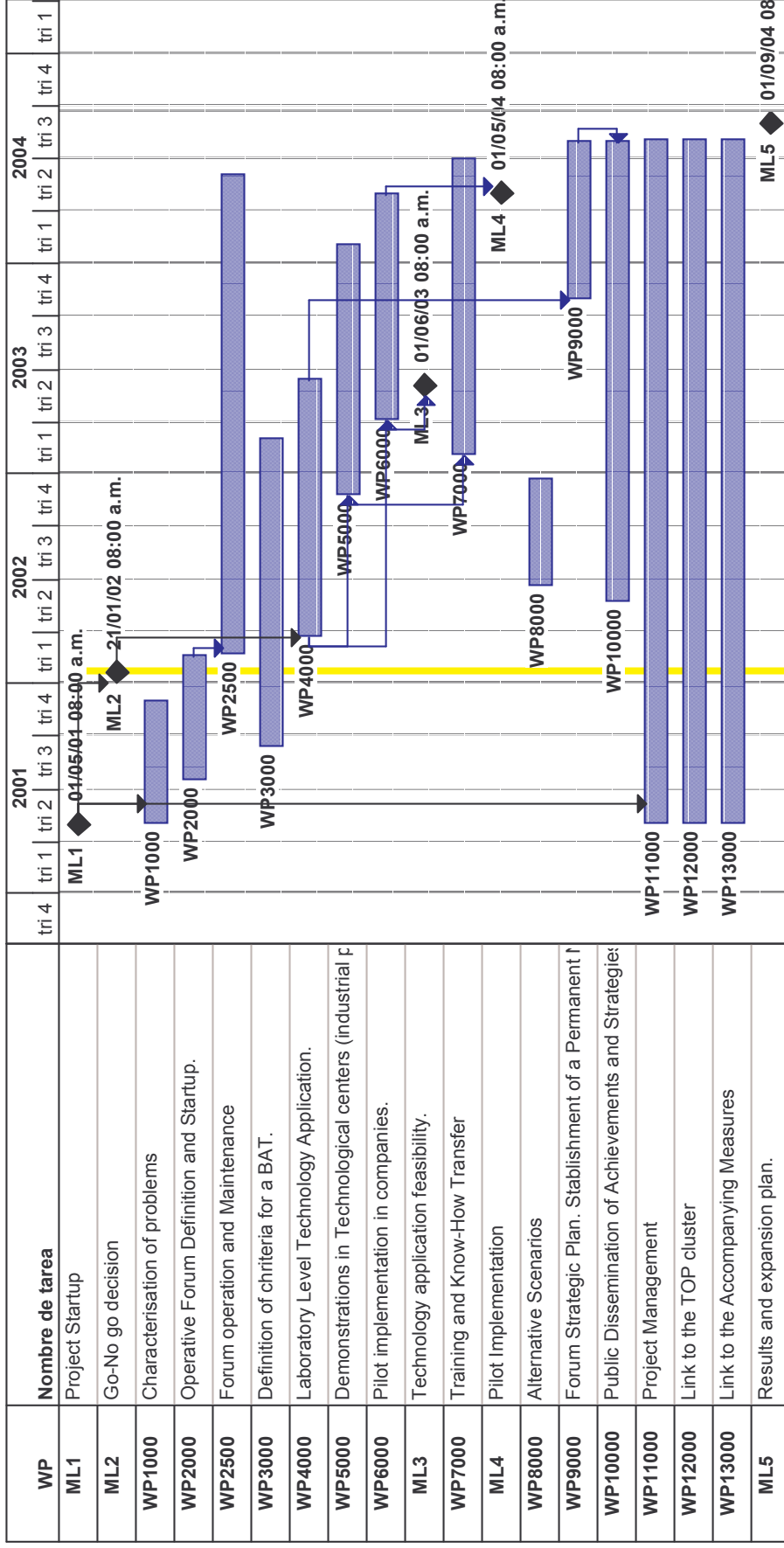
No changes in approach have influenced the ENVIREDOX project in its structure, that has remained steady around the RTD and DEM cores. As an interesting point, the ENVIREDOX strategic plan – initially foreseen to be applied mainly to the constituted forums- has widened its scope to the exploitation of the technological solutions developed, due to the clear success of some of them.

The initial and final workplan of the ENVIREDOX project are shown.

2.2.1 Initial Workplan



2.2.2 Final Workplan



2.3 Summary of tasks carried out per WP.

2.3.1 Wp1000. Characterisation of problems in the referenced geographic areas

1. DL 1001 – Characterisation of the referenced geographic areas:

- A. Geographical distribution and characterisation of the Metallurgic and Metalmechanical Industry in the North Region, Valencia, Alicante and St.-Etienne (all partners), according to three criteria (economic, industrial, and representativity):
 - Contact with several organisations (Ministries, Chambers of Commerce, Institutions, Associations, Commissions);
 - Identification the main actors in the environmental domain -and their competences- in the four referenced regions.
 - Identification of the main industrial and economic indicators of the four regions.
 - Development of companies databases for the North Region (1500 companies), Valencia (3500) and Alicante (5000). Databases for auto repair shops were also developed in Porto (200 comp.).
 - Distribution of the North Region, Valencia and Alicante companies, by industrial activity and geographical unit.
- B. Identification/Quantification of the waste and wastewater generated in the sector, which could possibly be handled / treated through the technology to be developed in the Project:
 - Development of a methodology for the quantification of the presence of ENVIREDOX residuals in the referenced geographic areas: Valencia, Alicante, Rhone-Alpes and North Region.
 - In the Rhône-Alpes region, as explained in the methodological introduction to DL1001, a simplified version of the methodology (PESE, EMSE/ARMINES) has led to the identification of the relevance of the ENVIREDOX approach. Working with the NAF codes, and with the help of data from Chambers of Commerce, INSEE, DRIRE, and Kompass, a repartition of NAF codes by department in Rhône-Alpes was estimated. The table with the competent authorities at the local and regional levels was developed, as well as a work of synthesis to obtain the waste limits regulation in France.
 - Elaboration and distribution of a questionnaire to all the North Region companies (including repair shops), in order to estimate the real dimension of the problem in terms of its environmental impact and to acquire more information about equipment, facilities and manufacture processes of each company. In Valencia and Alicante the approach was slightly different, as the work was addressed to complete existing data from previous environmental surveys developed by FEMEVAL, FEMPA and AIMME. Therefore, the questionnaire used was a subset of the former one, and was distributed only to a statistical sample of companies
 - Elaboration of a metallurgic and metalmechanical waste list able to be treated by the electrolytic combustion technology being developed in this project;
 - Contact the competent organisations: INResíduos (Institute of waste - Official entity that regulates the waste domain in Portugal), and Conselleria de Medi Ambient (Valencia and Alicante) in order to collect the official information about the amount of industrial wastes produced in the referenced geographic areas.
 - Contact the Auto workshops associations for collecting information about the amount of wastes produced (currently not included in the official figures);

- Visits to companies belonging to the activities more closely related to the foreseen ENVIREDOX applications in order to validate the information received and to analyse the production processes of these eventual ENVIREDOX recipients. A total of 8 visits were carried out (AIMME, CATIM).
- Collect all the information in order to distribute geographically the waste production quantities (this distribution was done based in the criteria defined by the consortium in order to normalise the data presentation on the different countries).
- Integration of trends on harmonization of different regional / local policies within the EU. Identification of requisites related with forum objectives. European legislation review. Identification of trends out of the current applicable policies. (Annexed documentation to DL1001). (INNOVE, EMSE)
- A simplified version of the document DL1001 (previously regionalized) has been prepared for the first formal Forum Meetings.

2. DL 1002 – Catalogue of enviredox potential applications:

- Contact the waste's managers to collect information concerning waste management costs;
- Contact with associations and technological centres of other sectors in order to identify wastes and wastewaters with characteristics which allow them to be treated with the technology in study;
- Elaboration of a waste matrix with the characterisation of other sectors (AIMME, ECS, ASTRE).
- A glossary, previously part of this deliverable, has been rewritten as a separate document.

3. DL 1003 – Definition of waste limits in the different geographic areas:

- Compilation of the Portuguese, Spanish and French applicable legislation on waste/wastewater with potential interest for the technological application study; (FEMEVAL, FEMPA, AIMMAP, INNOVE, PESE, EMSE/ARMINES).
- Contact the municipal drain entities manager in order to define the waste limits discharge in the four areas of the project.
- Technical and economical feasibility studies of the cyanide and COD destruction by electrochemical oxidation have been accomplished. Based on previous experiment and resulting hypothesis, thresholds of economical viability have been defined. (AIMME, CATIM, ECS, ASTRE).
- New electrodes named BDD (Boron Doped Electrode) are appearing on the market. These electrodes show very high oxidation power and are probably very good candidates for ENVIREDOX. A visit to a producer of BDD electrodes has been organised in order to integrate these new materials in the project. (ECS)
- ECS participated to the 4th International Workshop Diamond Electrode held in May 2001 in Braunschweig (Germany). Latest reports of anodic oxidation tests from the industry have been reported. A synthesis of these results has been edited and is included in DL1003 as a compilation of the laboratory and pilot experiences with electrochemical oxidation that can be assimilated to ENVIREDOX applications. Critical analysis to ensure the feasibility of the ENVIREDOX applications.
- Development of the first set of objectives to be presented to the forums.
- A simplified version of the document has been translated and presented to the forum participants in each region. The general objectives per application were included in the document.

2.3.2 WP2000. Operative Forum Definition and Startup.

1. DL 2002 – Working methodology and procedures – Initial set objectives per forum:

- Definition of the common tools and standards. The result are **forms** for initial assessment, map of potential actors, evaluations and social agent information. (INNOVE)
- Definition of the process for the identification of forum actors (INNOVE with rest of partners). The process consists of an iterative procedure which is based upon two kinds of criteria:
 - Pre-choice criteria (previous to contacts with stakeholders)
 - Selection criteria for evaluating the information obtained from contacts.
- Establish a list with the potential actors for the North Region, Valencia, Alicante and St-Etienne Forums;
- Elaboration of four maps representing the different organizations/actors and the potential and actual relationships between them at local, regional and national level.
- Contacts and visits with the potential actors. Meetings were organized in september with a first list of potential actors for the Forum:
 - In France the meeting was organised by PESE (Sept. 10th) to make sensitive the actors to the new technology and to the forums. Jean Constans and Pascal Formisyn have presented the non technical part of the Enviredox project. The creation of a forum was described as a “space” of discussion where local actors must be associated because of their competences: technical, political, social, economic.. In the second part of the meeting, the participants asked questions about the Enviredox technology to Didier Grange and Yves Pellet. In general, the participants were interested by the project and the forums. They proposed to associate others actors like professional trade-union, water agency, environmental ministry, ADEME, and to open the forum to textile and food industries.
 - In Spain, (Valencia and Alicante) the *first meeting* approach has been followed by several individual meetings, rather than a collective action.
 - As a reference, more than 20 different organizations have been contacted and their feedback included in the methodology. The contacted actors are listed in the point of external stakeholders.
- Elaboration of a first evaluation of results and conclusions.
- A first tentative to set objectives for the forum at the very beginning of the project has been carried out. This is a proposal which should be debated, upgraded and agreed when the forums will be operational in each country.
- An explanation of terms concerning objectives has been defined and a rather detailed scope of the plan is foreseen as a good tool to ensure a sound communication between partners and forum participants. A **presentation** and **glossary of terms** have been developed (see WPs 1000 and 10000).
- The methodology has focused on the forum structure and role of the selected actors. Two kind of actors were needed for the forum: permanent and non permanent ones. The permanent actors will constitute the forum core and assume the forum functions dealing with animation, assessment and decision making tasks. The non permanent actors will contribute to the forum support, validity of the adopted solutions and also to the promotion and dissemination of the new techniques among the stakeholders.
- Definition of the validation process of a new technique (INNOVE with ALL PARTNERS).

- The actors selected by the application of the methodology have been assigned according to the defined tasks.
- The results of the improved methodology have been taken into account in order to start to prepare the first forum meeting in Valencia scheduled for May, 29th, 2002

2. DL2001- ENVIREDOX WebSite.

- Development of the first version of the Project WebSite. Emphasis has been put on the promotional view, as well as in the aids to management, including the reference documentation (last versions of the deliverables and other information generated) and main figures of the project.
- Initial work on functional analysis of the Website related with the forums operation, communication needs, information to be shared between partners and forums, access to information, etc.
- Definition and programming of the Forum Part of the ENVIREDOX WebSite. It is currently operative as a prototype, remaining only its adaptation to the image of the WebSite.
- Incorporation of the corporate image on the ENVIREDOX WebSite (www.enviredox.org).
- Integration of the on-line forum tool in the ENVIREDOX Website. Pilot work has been intensively done by the partners and continuous improvements have been added. Although starting of the online forum tools was expected for September 2002, online Forums will be officially launched in December 2002. For practical purposes, the Valencia and Alicante forums have been integrated in an *spanish* forum.

Several sections were defined and created so as each country may manage and share information with its own forum actors. The result is the availability on the Website of development tools for collaborative work between forum participants in each country. These sections are:

- Presentation of the Enviredox project.
 - Events Panel: information about events of interest.
 - Messages: forum participants will maintain discussion about topics to be debated outside the forum meetings.
 - Documents: availability of working documents, minutes of the forum meetings and dissemination papers.
 - Participants: data related with the registered forum participants.
 - Administration: restricted area for the web administrators to update and manage the Website.
- Continuous updating of the website sections (Project Progress, etc.) helping the objectives of WP10000 (Public Dissemination).

2.3.3 WP2500

1. DL 2501 (Formerly DL2002) – Working methodology and procedures – Initial set objectives per forum:

- The methodology resulting from wp2000 has been updated, based upon the results of the first forums held in Spain, France and Portugal from May to September 2002. A version of DL2501-2 has been issued. The sequence of the achieved activities has been as follows:

- a) Forum organisation for the two Spanish forums (Alicante and Valencia) (FEMEVAL, FEMPA, INNOVE, AIMME). The launching of the two forums has been prepared by making visits to almost all the chosen actors, distributing informative Enviredox brochures and mailings with formal invitations to relevant members of the participating organisations. The content of the presentations was also prepared as well as opinion questionnaires to position the debates and collect the comments and suggestions.
 - b) Forum Launching. The Spanish forums were launched, first in Valencia, on May 29th and second, in Alicante, on September 26th. The meeting places were Innove Verda (Valencia) and FEMPA (Alicante) facilities. There was a fairly good response from the invited actors and a general interest for the Enviredox approach
 - c) Coordination of all the forums. After the Valencia forum, support has been given for the preparation of the French and Portuguese forums which were held respectively on June 24th and July 11th. Information, conclusions and documents from the Valencia Forum were submitted to forum coordinators in order to provide some guidance and confidence in the success of the event.
 - d) Conclusions - Minutes of the forum were prepared and sent to all forum members for their information, comments and suggestions.
- Additionally the feedback from forum participants and the St. Etienne meeting discussions have also been key points to update the methodology document. Though the general approach has been the same for the three countries, some particular differences have been showed and will be included in the DL-2502.

2. DL25xx documents

Besides the continuous updating of the document, during the 5th project period the DL-2501 version was updated with the technique evaluation results obtained from the first quarter 2003 forums and the Valencia workshop held on July, 2003. This technique evaluation methodology has been the core of DL2501-2, since then.

Information was collected from the Consortium in order to produce the DL-2502 document about forum experiences. This document shows the evolution of the forums in the participating countries, the stakeholders response to the methodology and the recommendations to be taken into consideration in order to make the forums being an useful tool for new techniques implementation wherever they are planned (within UE scope).

This is in fact the purpose of the DL-2503 document that has been created. DL-2503 is a Management and Auditing Guide which contains feedback information from the DL-2501 and DL-2502 documents. It provides assistance to organisations in implementing best available techniques by means of a forum system. This Guide also intends to be a Standard Draft which could be afterwards worked out by certification entities as a diffusion measure.

Activities with forum management have also been carried out (INNOVE, CATIM, PESE, EMSE/ARMINES). In Spain the 4th forum has been scheduled for November 2003 and prepared, as for the non technical part, mainly as a working forum in order to test the Evaluation methodology with the Enviredox techniques (Cyanides, degreasing wastes and cooling fluids from car repairs)

From September to October 2003, a great deal of information was gathered on Enviredox techniques (technical, environmental, social and economic) according to the methodology criteria and an Assessment document was issued. This document is also intended to be sent the EIPPCB of Sevilla in order to contribute to the elaboration of the BREF document on Best Available Techniques used in Surface Treatments (AIMME, CATIM).

It is also to be stated that the Spanish forum has made contacts with the Regional Administration in order to present the Enviredox forum as a valuable tool to be considered in the Draft IPPC Regional Law which is going to be transposed (FEMEVAL)

The input from the different forums celebrated has been included in all the DL25xx deliverables. After the final meeting (June 28, 29 and 30th), and with the global view of the

different forum operations, along with the project's global results and the future issues on the table, the final version of DL2502 has been issued.

3. Organization and participation in the different forums launched.

- The first forums in each of the regions shared a similar structure. We show here the structure of the first French forum, that PESE coordinated and organised.
 - Technical part : presentation by AQUATEC and ECS of the innovate technology and its industrial applications
 - Methodological part: presentation by EMSE and PESE of the purpose of the forum and degree of implication that the partners are expecting from all the actors.
- Some of the following forums are described below. Usually, forums are organised by the regional co-ordinators (CATIM, INNOVE, PESE) with the help of the other regional partners. Minutes of the forum were prepared and sent to all forum members for their information, comments and suggestions.
 - i) Saint Etienne (31/01/03): This 2nd Forum was opened to regional actors and 23 people participated (Partners of the project, Agence de l'Eau RMC, APDD, BREUIL Consultants, B.S.M.A., CCI de Lyon, Club de l'Eau/CCI Savoie, CETIM, CRITT de Savoie/Club éco-industries Savoie, FRAPNA Loire, NOVELECT, Saint-Etienne Métropole, SIVO (Syndicat Intercommunal de la Vallée de l'Ondaine)

This meeting was organised in three parts :

- Demonstration of the telematic tool for the forum and attribution of a login and a password to the participants.
- Technical part : presentation of the first results.
- Methodological part : presentation of the BREF document and of the different methods to validate a BAT

- ii) Valencia (6/3/2003) . 22 persons attended the 3rd Spanish forum with a special participation from Environmental Administration, other represented members were Universities from Alicante and Valencia, enterprises participating in the pilot tests METALORFE, GALOL and ELIG, CC.OO trade union, Alicante Chamber of Commerce and Quart de Poblet townhall.

The meeting agenda was dedicated to:

- a. Technical part: presentation of the first results on cyanides and degreases.
- b. Methodological part: presentation of the evaluation process and first set of criteria for conducting the technique assessment under technical, environmental, social and economic aspects.
- c. Presentation of telematic tool for forum actors communication.

- iii) The 2nd Portuguese FORUM took place on the 8th of May, at Porto; 50% of the Entities invited were present:
 - 67% Administration
 - 40% Business
 - 33% Social
- On-line forum participation. In the french forums, an interesting discussion was introduced about the BAT concept. The spanish forums included as first discussion the technology evaluation methodology. All relevant documents have been uploaded in the forum. Despite of the initial discussions in the telematic forums, and the work of the forum animators (CATIM, INNOVE and EMSE, that continued to animate the Enviredox forum sites, placing messages and documents available to be discussed by the members), the fact is that the

participation has been lower than expected. This has led the consortium to put additional emphasis in the presential forums that have taken place till the final part of the project.

- In fact, during the sixth period of the project, two forums were held in Portugal, two in Spain and none in France, due to difficulties in getting a representative participation to perform a meeting. Experiences have been included in the DL-2502 document.

This period has allowed consolidating in all the forums the proposal of the generic assessment criteria (technical, environmental, social and economic) and therefore the content of the assessment request form. In the meanwhile, French and Portuguese forums also started to develop some specific indicators that could be applicable to Enviredox techniques and could also be useful in making the request form easier to fill in. This initiative was directly worked up by forum members without a previous proposal document. Though a complete screening of environmental, social and economic factors could not be concluded, this work is a complementary approach in establishing the ideal content of the form. It was agreed that further standardization of the content was necessary to be carried out.

- The methodology has been actually tested during the 4th Spanish forum by using available data from the technical pilots' implementation. It has been a very interesting session during which the working groups have assessed some of the Enviredox Techniques. Homogeneity of concepts, quality of available information and stakeholder skills have been found key points to rely on in order to produce a valuable assessment report.

Work has also been done with respect to the diffusion of Enviredox methodology in collaboration with Spanish legal authorities and a relative influence has been obtained in the transposition of National IPPC law to the Regional one, as for the stakeholder's participation in the process of assessing the environmental integrated permit.

- In Portugal, CATIM developed the third and forth forum meetings (December 4th 2003 and the 11th of February, respectively), where interests of the different parties were discussed together with a methodology to evaluate any new Best Available Technique (BAT).

2.3.4 WP3000. Characterisation of alternative solutions and applicability. Definition of the ideal parameters of a BAT.

- Development of a first draft of the sensitive criteria for the analysis of the requirements for a BAT. The document includes the consideration of the concept of EST (Environmentally Sound Technology) additionally to the BAT idea.
- The first draft of the document on the sensitive criteria for the analysis of the requirements for a BAT has been included in the wide-scope impact analysis for the ENVIREDOX technology in the different regions (WP1000). Input from the project partners has been related to:
 - Contribution to the definition of the technical and non-technical indicators
 - Contribution to the definition of a BAT criteria for the Spanish, French and portuguese regions for technical and social and environmental criteria.
- As it was stated in the forum conclusions, no existing evaluation methodology for technique acceptance has been found up to now, in such a way this means that DL-3001 and DL3002 have been structured as a reference document for the technique evaluation process.
- After ENV-M-7, definition of categories of criteria for the technique evaluation were included in DL3002:
 - Technical and implementation / operating costs of the technique.
 - BAT criteria contained in the Annex IV of IPPC Directive.

- Social and economic factors which will be able to describe the impact of a technique on a local community.

These criteria were redefined and extensively harmonized with the criteria used in the IPPC and the BREF documents. The criteria were structured in a *grid* and several questionnaires (with a view on using them in the forums) were developed.

The analysis of the criteria by stakeholders and other experts (CLEANTOOL Project) was integrated in the formats used for the *Evaluation of the Technique (DL2501-2)*.

2.3.5 WP4000. Laboratory Level Technology Application.

The detailed tasks carried out within the context of wp4000 were:

- Acquisition of the pilot equipment and electrodes for laboratory testing.
- Contacts with the spanish collaborator companies (METALORFE, GALOL and ELIG) in order to set up specific objectives and collect featured residuals.
- A bespoke data acquisition system has been designed and built to measure the significant parameters.
- Realisation of preliminary tests of COD removing.
- Development of technical sessions to exchange experiences between the technical actors (AIMME, CATIM, ECS, AQUATEC –and EMSE-).
- Concerning the application **cyanides**, liquid residuals were collected in Spain and France from the collaborator companies.
 - Development of the laboratory testing with rinsing waters from cyanide waters in brass coating processes.
 - At constant current density, different anodes were tested in terms of toxicity elimination.
 - In parallel, decreasing of COD, behaviour with heavy metals (for both elimination and eventual re-use) were studied.
 - Definition of the choice of electrodes for pilot testing.
 - Comparative of the results achieved in France and Spain.
- Analysis of the residuals chosen for the **degreases** application. Degreases chosen were electrolytic and chemical. Both are from the collaborator company GALOL.
 - Samples of the degreases collected in Spain were sent to France for analysis.
 - Development of the laboratory testing with BDD cells. After some problematic situations with these anodes¹, in a decision based in early discussions in ENV-T-8 (Valencia) and ENV-M-9 (Porto), the choice of electrodes has changed.
 - Clarification and solution of the problems that, related to the BDD cells, appeared in the former period. ECS developed some laboratory tests on degreasing waste at electrode supplier's facilities.
 - First results with the alternative anodes.
 - Testing of the most suitable pretreatment for the degreases (lowering of the initial COD level) by ultrafiltration and de-emulsifying (cationic flocculator).. The choice of pretreatments followed the initial conclusions in the former period. They were carried out both in France, Spain and Portugal, where the most suitable pre-treatment for the degreasing baths with a view to lowering of the

¹ See Annexes on minutes of the historical of incidences with BDD anodes.

initial COD level was carried out by ultrafiltration, de-emulsifying and decantation, after addition of a cationic flocculator.

- In the application **cooling** liquids (**automotive**), first testings have been carried out by the french partners with unused liquids, due to some co-ordination problems with the Spanish collaborator company. Pre-treatments are not being used in these first testings.
- The final tests were carried out with direct purge of the cooling circuits and with the rinsing water after the purging operation. Conclusions lead to the use of rinsing waters. The main part of this work was carried out by AQUATEC.

It must be noted that CATIM has decided to be intensively involved in WP4000, 5000 and 6000, when initially it was only foreseen to work in industrialisation of the applications (wp5000 and – mainly- wp6000). Main work in this WP is still carried out by AQUATEC and ECS and –additionally- AIMME.

2.3.6 WP5000. Demonstrations in Technological centers (industrial pilot level)

- Technical definition and budgetary evaluation of the equipment for laboratory, industrial validation and demonstration works
 - Based on the conclusions of the definitions in WP4000 and the work carried out in WP1000, some specifications have been anticipated in WP5000.
 - Initial specifications of the industrial pilots to be built, as well as the complementary equipment for data caption and process. These specification are not expected to change, since they depend on the morphology of the anodes, the composition of the effluents and the representative volumes to be processed. None of these parameters will change but for a major evolution of the technology.
 - Schedule of the industrial pilot testing (testing cycles), to be carried out in technical centers/partners.
 - The equipment acquired followed the specifications marked in the previous period, and the laboratory results showed that no changes were expected.
- Pilot testing

A data acquisition system has been designed and is currently being connected to the pilot equipment. This system is based on the one developed to the laboratory testing.

 - Testing of the application **cyanides** has been carried out at different current densities, and with different cathodes, with a view of improving metals recovery. Pilot testing in technical center for cyanides has been developed for two companies (Elig Manufacturas de acero and Metalorfe). In Portugal the company was STA.
 - Choice of cathodes and current densities for the pilot validation in companies (anodes follow choice in WP4000). Finalised applications cyanides (France, Portugal and Spain) and degreases (France and Spain). Range of suitable anodes identified
 - Definition of complementary techniques (filtration, etc.) for pilot validation.
 - After the pilot testing, the conclusions are that the technology reaches, under the conditions stated in the project, the threshold value. Theoretically, direct discharge is possible. Additionally to the elimination of toxicity, DBO decreases remarkably.
 - Results with **degreases** in the company GALOL have initially yielded not satisfactory results and have been repeated with different anodes. This task has been overlapped to the industrial implementation at the company in order not to delay additionally the task. Finally, the results in both the pilot application and the pre-industrial testing have been

adequate. I must be noted that, as in other cases, pretreatments are as important as the ENVIREDOX technique. The choice of anodes (thickness of the catalytic coating) is the most important parameter. A big deal of testing has been carried out with this application. I.E., in Portugal CATIM tried to treat several saturated degreasing baths but none of them had the expected results, it was not possible to have feasibility to determine a good set to start an industrial test till the last period of the project.

- Toxicity was eliminated, as in other applications.
- The **Cooling liquids** application used initially liquids from the company AUTOBALMI (Spain). After the initial results, other sources were considered (France and Spain). The considerations done in WP4000 apply. Besides, conductivity is a key parameter and saline additives have been needed to decrease energy consumption. Thresholds values have been not reached but come fairly close. Testing was carried out by AQUATEC, CATIM (at the company BAVIERA) and AIMME
- The application **Painting waters** has seen how its relevance diminished during the project process: In France wet painting booths have disappeared and so its happening in Spain, while in Portugal is a fairly used technique yet. The consortium has concentrated in the rest of the applications, although results are available from this application. The performance of the technique depends on composition of the painting system. Pretreatments are a must and should be taken into account in the *industrial* phase. Cooling is also needed due to presence of volatile species. Toxicity is additionally decreased. Testing has been carried out with residuals from the company POSTIGO (Spain).

2.3.7 WP6000

In Spain:

- Industrial testing of the application **cyanides** at the companies METALORFE and ELIG carried out by AIMME. AQUATEC provided technical assistance in the implementation. Pilots have been implemented for more than three weeks in each of the companies
- Ending of industrial implementation² at GALOL (**degreases**). It must be said that work in this application has showed to be complicated since the work at the company has to take into account the circumstances of their production (changes, re-formulations, etc.), and this has been the case. In order to have consistent results, two types of degreases were processed. The case of complex mixes is not suitable to be treated –efficiently- by the ENVIREDOX technique, while a more simple formulation of the degreases yields satisfactory results. AIMME developed the implementation, assisted by AQUATEC/VEOLIA and ECS.
- Work at AUTOBALMI (application **cooling liquids from automotion**) has been completed. Treatment of the wastes corresponding to this application has been quite successful. Due to the volatility of such liquids, a Cooling system was arranged.

In Portugal:

- Cyanides industrial application to validate the technology in this particular application. Three long tests helped to determine not only if it functions but also its feasibility. Carried out by CATIM at the company STA.
- Refrigeration fluids industrial application to validate it on an industrial level with two tests having results even better than the expected.
- Problems with anodes in the degreases application led to increasing number of tests with the particular Portuguese degreases. Testing lasted till last period of the project.

Technical economical studies

² It must be noted that an industrial application includes training of the technicians in the company

- Technical-economic studies use the results in the industrial testing to evaluate industrial solutions with “commercial” technologies. These studies have collected data from the companies (AIMME, CATIM) and have been developed by VEOLIA assisted by ECS. These studies have led to interesting conclusions:
 - The electrolytic cells used are designed for batch working. Depending on the dimension of waste generation, this may be a limiting factor, not directly related to the ENVIREDOX technique. Otherwise, it is specially suited for batch generation of residuals, such as in the case of degreases, cooling liquids, etc.
 - Expected Returns on Investments (RoI) are surprisingly good for some applications. *Industrial* life span of the anodes could be an issue.
 - Some applications will still need conventional treatment modules. However, the project has demonstrated that threshold values are reachable, although not necessarily industrially efficient.

2.3.8 WP7000. Training and Know-How Transfer

- A common internal training session in Valencia (18/09/2002) took place with CATIM and AIMME, in order to set up the use conditions of the pilot equipment during the experiences, based in the previous knowledge of related processes. Also, a technical meeting with extensive know-how transfer on degreases and cyanides treatment was carried out in Valencia in 10/01/2003
- Development of a training course on Best Available Technologies by EMSE-ARMINES. The course has been internally used and has been the base for the continuous training in the forums about this topic.
- Development of the “laboratory phase information set” as an internal document. The document has been the basis for the DL4001.
- Technical session with results from laboratory and technical center phases. This session took place in the frame of ENV-M-10 in Valencia.
- Internal technical sessions among french partners (St Etienne on September the 12th on October the 16th 2003).
- Technical session with about BDD technology. The session took place in Valencia, in March 04. Attendants were ECS and 4 technicians from AIMME. The results were duly transferred to CATIM.
- Internal technical sessions among french partners (St Etienne January 2004).
- In each of the industrial implementations, both in Spain and Portugal, technicians from the companies have been trained in the fundamentals of the technology, practical issues and process conditions. Results have been extensively commented as a final part of this technical training.
- In each of the forums carried out, continuous training has taken place in topics such as BAT concept and IPPC, criteria on suitability of a technique, evolution of the regulations about industrial environment, the dl2501-2 methodology, the evaluation of a technique and the fundamentals, possible applications and results of the ENVIREDOX technique. All this training is described in the minutes of such forum meetings.
- A continuous effort of technology update has been carried out by the technical partners of the consortium. ECS has continuously provided the consortium with up-to-date information of the catalytic anodes used. As an example, the information included in ML#2 and ML#3, and the choice of anodes for the **degreases** application (not initially foreseen), as well as new applications of the BDD anodes. EMSE has also performed this technology update

effort on the electrochemical processes to be used in recycling of water, as well as in the BAT concept evolution, and the techniques to be included in the BREF documents.

- The Polytechnic University of Valencia carried out an study of the main sources and keywords to be controlled (as well as procedures) to keep a technology watch effort on the generation of knowledge around the ENVIREDOX technique.

2.3.9 WP8000. Alternative Scenarios

- EMSE developed a first version of the document DL8001. The rest of the french partners participated in:
 - The Elaboration of comparative tables for diverse treatment techniques.
 - Definition of the French situation for hazardous industrial wastewaters
 - Contribution to the definition of the French scenarios: off-site treatment and in-site treatment
- Updating of the initial document DL8001. Final Version of DL8001 prepared by the responsible partners (JRU EMSE-ARMINES).
- With a view on dissemination activities, a new “light” version of DL8001 has been prepared by the responsible partners (JRU EMSE-ARMINES and PESE).
- The document was one of the bases for the comparison of the situation in the four considered regions, and main conclusions were presented to forum participants in Spain and Portugal.

2.3.10 WP9000. Forum Strategic Plan. Stablishment of a Multi-regional Permanent Network.

- Development of a toolkit in technology watch for the ENVIREDOX applications. This work is currently being done by experts from the Universidad Politécnic de Valencia, and experts from the University of Alicante have also been involved. The toolkit is currently a list of sources (databases, providers, technical fairs, etc.) and their updating procedures. The information obtained is then analysed by the expert group. Although the work is currently being developed mainly in Spain, its application has included all the technical partners. These sets of procedures are being used for the definition of new technical objectives of the consortium (i.e the use of the ENVIREDOX fundamentals as a intermediate technique for generic waste problems).
- Feasibility study of the ENVIREDOX Consortium as a network of excellence in industrial environment. This feasibility study will be part of the DL9001, with the eventual network being supported by the forums. The consortium has decided to hire an external consultant specialist in Strategic Planning to evaluate the impact and future of the Forum Methodology and the sustainability of the current groups in the different countries. After the first works of the external consultant, it has been clear that the Strategic Plan must take into account also the technical issues and, therefore:
 - Has widened its scope from what was initially foreseen.
 - Has to be closely related to the TIP.
- The version submitted of DL9001 (Enviredox Strategic plan) is a complete version in the sense of covering all issues analyzed by the partners. However, early evolutions of this document are expected in the next three months, as the development of the Strategic Plan will include also its refinement.

- As a key event the Enviredox final day in Porto (15th of April), organised by CATIM in co-operation with AIMMAP included all the most relevant stakeholders at the Portuguese level, with presence of the rest of the consortium members.
- Participation of all partners in the Final Day in Porto, in the part of the analysis of the future of the ENVIREDOX Consortium.
- As a result of the tests carried out with the stakeholders in wp2500 a report was sent to EIPPCB of Sevilla in order that the European organisation evaluates the possibility to have the Enviredox technique included as an emergent technique, in the BREF document on Surface treatments which is actually under elaboration (1st. Draft).
- All the remarks and analysis carried out in the forums have been included in DL9002, as a refinement of the methodology.

2.3.11 WP10000. Public Dissemination of Achievements and Strategies.

- The french partners have prepared a technical article for a conference on process engineering which will take place in Saint-Nazaire in France in September 2003.
- Presentation of the ENVIREDOX project to about 50 companies from Savoie, which took place at CRITT Savoie on January the 21st 2003.
- Definition and first issue of the ENVIREDOX newsletter in Portugal. Example annexed in DL10001.
- A TV report on ENVIREDOX has been issued in the regional TV channel in Valencia (Oct. 03). AIMME and the company GALOL (application degreases) were interviewed. Re-issued in March 2004.
- Seminar done on the 30 of October 2003, in Porto, prepared by CATIM and AIMMAP, and related to the new “Environmental permit”, mandatory for certain companies, covered by the IPPC application. The presentation of this last topic was carried out by CATIM. It was also focused on the possibilities of the emergent Enviredox technique, to be present on the BREF for the surface treatment. Presentation of ENVIREDOX was carried out by Sofia Araújo (CATIM's environmental department).
- Publication of articles with references to ENVIREDOX in France: “Environnement Magazine” (July 2003) and “Petites Affiches de la Loire” (July 4th 2003). Annexed in DL10001
- Initial definition of the ENVIREDOX dissemination pack. The pack will consist of:
 - Leaflets (already done).
 - A sheet on the technique description
 - Application sheets
 - A consortium Sheet.
 - A document on IPPC related issues
 - A document on the forums instruments and participants (customized by each region).
 - A glossary
- Elaboration of different parts of the ENVIREDOX dissemination pack. It will finally consist of:
 - Leaflets.
 - A sheet on the technique description (AIMME)
 - Application sheets
 - A document on IPPC related issues (EMSE/ARMINES), with an analysis of the IPPC situation in France.
 - A document on the forums instruments and participants (customized by each region) (INNOVE).
 - A common presentation of results in the different countries (loosely based on the Porto Event presentations).
- FEMEVAL attended the technical day “Gestión Medioambiental Sector Metalúrgico” at Gijón, in which a description of the ENVIREDOX activities and its impact as emergent technique in the treatment of industrial residuals was presented.

- Writing of an article (EMSE/ARMINES) for the European Roundtable on sustainable and cleaner production (Bilbao, 11th to 14th May 2004)
- Two numbers of the newsletter “Forum Notícias Enviredox” were published, distributed and placed in CATIM’s web page.
- The “Portugal Ambiente” fair (14-17th Of April) was also used for the Project dissemination by CATIM that reserved a site (equivalent to two stands) to present some documentation and expose the Anodic oxidation pilot, so that people could see how it works. All the work behind the presence in the fair such as the selection of information to disseminate, the place arrangement, the poster design and print including the people needed to explain the project and the Anodic oxidation functioning was also developed by CATIM.
- Presentations of AIMME, FEMPA and FEMEVAL on the technical results of the applications of the ENVIREDOX technology (June 04 both in FEMPA and FEMEVAL). The technical presentations had as audience the subsectors on which the ENVIREDOX technique might be applied in the regions of Valencia and Alicante (surface treatment, repair workshops, metallic products, etc). The presentation in Valencia was shared with the CLEANTOOL project.
- Presentation of AIMME in the Confederación de empresarios de Zaragoza (Spain, May 04) on the technical results of the applications. The presentation in Zaragoza was shared with the CLEANTOOL project.
- A massive dissemination with the dissemination pack has been carried out by the Managerial Federations (FEMEVAL, FEMPA, AIMMAP and PESE). More than 800 companies of the considered sectors in Spain, France and Portugal have been reached by this action. It must be noted that the costs initially allocated to the dissemination actions by FEMEVAL and FEMPA finally were not executed, as the main dissemination actions were organised within the usual operation of the dissemination activities of the organisation (premises, mailing, etc.). Additional costs linked to these activities have been, therefore, negligible.
- A higher detail of this information is in DL10002 (Report on the issued dissemination activities), where continuous dissemination actions (mainly to stakeholders) are also described.

2.3.12 WP11000. Project Management

- Contacts with eventual co-financing partners at the beginning of the Project. The meetings did not have remarkable consequences.
- Development of standard information and templates for the Consortium use (word documents and e-mail headings codification).
- Development of a Project Management Manual (set of management procedures), which evolved in three versions.
- First steps in the elaboration of a Consortium Agreement. Although with a fair progress degree since the very beginning, the Consortium Agreement has experimented different delays due to the change in nature of the partner ASTRE/AQUATEC/VEOLIA.
- Other than the tasks related to reporting to the UE and organising project meetings, the following activities may be pointed out:
 - Internal meetings for regional co-ordination in Bron, Porto, Paterna, and Saint Etienne.
 - Circulation of the Consortium Agreement for signature.
 - Two addendas have been asked for: the first of them because of adjustments after the GO-NO GO and the inclusion of the JRU nature of EMSE/ARMINES in the contract. The 2nd addenda, because of contractual modifications due to the change in nature of one of the partners (AQUATEC -> VEOLIA) and the proper inclusion of EMSE/ARMINES.
- The list of project meetings and tasks managed is shown in the point *Project Management*.

2.3.13 WP12000. Link to the TOP Cluster

- Clustering (TOP Cluster activities) have just started as far as our project is concerned. Two clustering events have been attended:
 - Gotembourg (June 11th): Participation in the “Turning Obstacles into Opportunities” workshop, included in the “New approaches to Technology Transfer” conference (June 9-11th). This event was attended even before the signing of the contract.
 - Luxembourg (Sept. 18th): the first formal meeting of the TOP Cluster
- Contacts with the MEMORIA project , through exchange of project objectives and descriptions, have been carried out.
- Also in the first period, and following a suggestion from the evaluation report written by PRIDE, contacts have been produced with the EVA (IPS-1999-00039) project. (Valencia, Oct. 01)

- The activity of the second period was strongly influenced by the GO-No Go Decision, not only in our project, but in the other IPs. Only punctual clustering activities took place during this period: contacts with the CLEANTOOL project were done, due to the conceptual similarities of their consulting groups and the ENVIREDOX forums. Personnel from the ENVIREDOX team has participated in one of the CLEANTOOL consulting meetings and the CLEANTOOL team is informed of the progress concerning the preparation and development of the forums in Valencia and Alicante.
- Two cluster workshops (Pamplona and Brussels) were attended by the ENVIREDOX Consortium in the third period.
 1. Pamplona (June 3-5/06/2002).

In the Pamplona Event a new classification of clusters was developed. ENVIREDOX showed its interest in issues related to involvement of stakeholders. With other projects, the GO (Getting the most out of Innovation) Cluster was created. Gaspar Lloret and Manuel Sánchez attended the meeting from AIMME.

A draft workplan was discussed, with a view of getting it formal before the end of the year.
 2. Brussels (Oct. 21-22/10/2002).

In the two-days Brussels workshop –attended by the project co-ordinator-, the different clusters worked out their workplans and showed some advances and tools to the other projects.

- Concerning the relationship with other projects, the ENVIREDOX consortium invited members of the CLEANTOOL consortium to the forum session in Valencia, and partners from the CLEANTOOL project are current participants in the on-line forums.
- AIMME initiated a preparatory work for the new clustering strategy, but could not attend the Luxembourg meeting in October 30th and 31th . In the subsequent period, new clustering events and activities will be participated.
- AIMME (Manuel Sánchez) and CATIM (Claudia Ribeiro) attended a clustering meeting at Florence. The partners in the ENVIREDOX consortium got involved in two sub-clusters: Sustainable development and SME Growth.
- Taking advantage of the Porto Event, a cluster meeting of the SUSDEV Cluster was arranged. A part of the agenda for ENV-M-13 included a common discussion of environmental issues

between the members of the cluster. SUSDEV Cluster members also participated in the Porto Event.

- Although not specifically within the clusters operative, a coordinated dissemination strategy has been defined between the ENVIREDOX and CLEANTOOL projects.

2.3.14 WP13000. Link to the Accompanying Measures

In the Goteborg Event (Conference on “New Approaches to Technology Transfer”) some contacts were done with the following accompanying measures:

- CLIP (Mildred Lacomme and Nicolas Kandel).
- SHOWCASE (Eva Honnecke).
- Eco-Innovation (Igor Idareta and José María Zabala).
- LIFESTYLE (Paolo Martínez and Philip Fischer).
- PRIDE (Hans-Joachim Siegler).

During ENV-M-2 took place a GOPP workshop co-ordinated by PRIDE AM. In that workshop the whole set of AMs and their capabilities to improve the project performance were presented. The evaluation report that came out of that workshop has been used by the AMs to study an integrated approach to aid the project. Although individual contacts to CLIP and LIFESTYLE have been produced, the actions to be developed are currently waiting to the “integrated approach” document to be generated by the AMs.

During the subsequent period, and with a view on the forums approach, several Accompanying measures have been contacted and asked for an action plan:

- CLIP (Methodology for identification of relevant agents).
- Eco-Innovation (Methodology for the development of Wide Scope Impact Studies, Information about the IPPC and environmental impact analysis, Environmental diagnosis tool).
- LIFESTYLE (Continuous Improvement Workshops as a tool to be applied among the forum participants, First contacts to evaluate possibilities of the AMs being the assessment entity of the Forums operation).
- STRATEGI.ST (EASW methodology as a tool to enhance the prospective vision in the forums).

Although the main task of the AMs refers currently to the collaborative support to the IP clusters, specific support was expected. At then end links with the AMs referred mainly to cluster facilitation.

3 Resources employed.

Most of the resources initially foreseen have remained unchanged. However, some issues are worth to be pointed out:

- Pilot equipment has been finally less expensive than expected, because some of the pilots built have been useful for more than one application. Some of them have undergone modifications during the project in order to get the most of it.
- The use of human resources in the different workpackages has been characterised by:
 - Higher generic involvement in WP1000.
 - A continuous effort in WP2000/Wp2500 that has involved more work than initially foreseen, specially by the regional coordinators (CATIM, INNOVE, PESE).
 - The Technical core of the project has roughly kept under forecast, although some of the applications took more than expected. AQUATEC and ECS, as well as CATIM, finally had higher involvement than initially stated (definition of technical-economical reports, alternative testings in degreases and industrial implementations, respectively).
 - After some staff movements at PESE, during the last part of the project, its coordination role in the French region was taken over by EMSE, and more work had to be carried out by VEOLIA and ECS.
 - In WP9000, responsibility of DL9001 was given to an external consultant, but that did not affected the workforce allocated to the workpackage, since tasks carried out involved a high participation of all partners and part of the stakeholders.
 - Due to the availability of results later than foreseen, dissemination actions have maybe not been developed completely. The consortium has committed to continue the dissemination actions after the project conclusion. Additional costs (including other costs) linked to these activities have resulted to be much lower than expected, and most of them have been centralised via AIMME.
 - It is a fact that resources initially allocated to WP13000 have not been used in the expected level.

4 Changes to the original work schedule

Summary of the reported changes in the original work schedule:

- The amount of man/months dedicated to the activities related to WP1000 and WP2000 slightly changed (decreasing in the former and increasing in the latter).
- The feasibility analysis of the ENVIREDOX applications, initially foreseen in DL1002, has been moved to DL1003, as it has been considered as more coherent. Having in mind that this DL is the basis for the definition of the quantitative objectives of the forums, specific communication information has been added to this DL (a standard presentation for the forums and a Forum Glossary).
- The work concerning the ENVIREDOX Website has started before than expected and has used higher resources than the initially foreseen.
- WP11000 has increased its foreseen presence due to the elaboration of the new deliverables DL11001 and DL11002 (Management Manual and Consortium Agreement).
- There has been a change in the consortium: ASTRE has been substituted by AQUATEC.
- As a consequence of the GO-No Go workshop, a new workpackage WP2500 has been defined. It groups the tasks concerning forum operation and maintenance. These tasks –and its related resources- were already present in the former workplan, but now they have specific objectives and deliverables.
- Due to the influence of the GO-No Go decision over the supply of materials and the building of the prototypes, an extension of 3 months on the workplan has been granted. The end of the project is now foreseen for July-04.
- The start of the forums a little later than expected has lead to the DL3001 to be in its v0.9 version, waiting for the last comments of the participants in the forums. The need for a framework for discussion in the Forums has led to an early start of the criteria to be included in DL3002, that, being the basis for the wide scope impact analysis, are more developed than initially foreseen in the current version of DL3001.
- Similar reasoning applies to DL2501-2. Final version of the deliverable is waiting for the forums acceptance.
- **Most of the information related to WP2500 has been decided to be delayed till an effective validation by the forum participants.** This includes the deliverables DL2502 (Particular applications of the forum Methodology. Analysis of the regional situations) and DL2503 (Audit Manual of the Forum Operation. Assessment Reports of the individual Forums), as well as the final version of DL3002 (Biding conditions for a BAT in the featured applications and geographic areas). As far as this period is concerned, only DL2502 is affected. **New deadline for DL2502 is expected to be end of February 2003 (Month 22), after the second forum session and its follow-up have been taken into account. New dealine for DL2503 is not decided yet, but it should not be before the third forum session, which lead us towards September/October 2003. DL3002, which is in its early version, will have a significant progress after the second forum meeting and the next project meeting in March.** Summarizing, the proposal for modification of deliverable deadlines is:

| Deliverable | Workplan Date | Proposed Date |
|-------------|---------------|---------------|
| DL2502 | Month 15 | Month 22 |
| DL2503 | Month 20 | Month 27 |
| DL3002 | Month 16 | Month 23 |

- The need for additional technical and non-technical specific meetings will have as a consequence more meetings than initially foreseen. New meetings other than general coordination (ENV-M) are expected. One of the outcomes of ENV-M-9 is a tri-monthly default periodicity in project meetings.
- Coordination of the non technical part has faced new challenges out of the forums operation. The technology evaluation approach and the harmonisation with the IPPC are increasing the duration of WPs such as WP2500 and WP3000. Some of the activities carried out, though (relationship with regional support and qualification entities), are anticipating relevant issues in WP9000.
- Laboratory tasks have accumulated a delay due to both difficulties in decreases and the problems with the BDD cells that appeared in the last period. **Deliverable DL4001 is delayed and will be issued in month 32.**
- Work with pilot in centers (WP5000) have what may be considered as an standard variance. Due to August stop, application painting booths has not been solved, but pilots in technical centers go steady. As there is dependence to WP4000, **deliverable DL5002 will be issued in month 33**
- WP2500 has been extended till the end of the project. Although forums are working 100%, the fact is that the methodology and the group dynamics will be evolving during the whole workplan. Objectives have already been completed.
- As anticipated in the previous PR#4, the application painting booths is being analyzed in detail, since relevance of the environmental problem has decreased dramatically in France and Spain. Wp5000 and Wp6000 tasks will be affected in the next period as, although with real waste, industrial on-site tests will not take place.
- In WP7000 and wp10000, tasks are being carried out in an up-to-date basis, but it has been detected a delay in the production of documentation. No modification in existing workplan.
- In period #6 a new addenda –mainly for administrative reasons: inclusion of VEOLIA and the JRU nature of ARMINES and ENSMSE-, has been asked for. No schedule modifications
- Application painting booths has been completed at the pilot level, and as stated in previous PRs, will not take place at the industrial level. All this work is reflected in WP5000 and 6000. Laboratory tasks and work with pilots are completed, although the availability of the final data has delayed the the start of dissemination phase. Technical deliverables are issued in this period.
- While collecting technical data and structuring the technical-economical reports, it has been detected that the separation between dl6001-6004 and 6005 is no longer needed. Therefore, DL6005 will disappear and will be integrated in the different technical-economical reports of each application (decided in ENV-M-13 minutes and reported in PR#6).
- **Additionally, in this last period (months 37 to 39), when putting together the information related to DL6006 it has been clear that:**
 - a) **The information about the companies where the pilot tests had taken place had been already included in the new DL6001-6004 (in fact, some of the “company sheets” produced were excerpts of the descriptions in DL6001-4).**
 - b) **Training and skills needed by that companies –as described in DL7001- were almost non-existent due to the fact that the ENVIREDOX technique is an electrochemical in-process technology.**

For that reasons –and although there has been no previous information- it has been decided not to produce DL6006, since it would contain nothing but redundant information with little –if any- value additional to other deliverables.

- It should be pointed out that the workplan has remained essentially unchanged from the beginning of the project. Changes have been related to:
 - a) Optimisation of the role of the forums and the participative methodology (inclusion of the new WP2500).
 - b) Rationalisation of the information generated (grouping of DL6001-6004, 6005 and 6006).
 - c) Adaptation to the industrial needs (inclusion of the application AUTOMOTIVE COOLING LIQUIDS and partial testing cycle in PAINTING BOOTHS).

The rest of small modifications are mainly schedule adjustments that have had no major influence in the project plan.

5 Documented results.

5.1 List of deliverables.

The final list of deliverables produced, with their actual titles, is shown below:

| | | |
|--------------|----------|--|
| PR1 | WP 11000 | Progress report to the Commission |
| DL 1001 | WP 1000 | Technical report concerning the situation of the different geographic areas in the project in relation to the featured residuals |
| DL1002 | WP1000 | Catalogue of enviredox potential applications |
| DL 1003 | WP 1000 | Initial definition of waste limits in the different geographic areas. |
| DL2002-1 | WP2000 | Working methodology and procedures V0.9. Initial set of Objectives per forum. |
| DL-ASS-1 | | Report on the project's non-technical issues. Assesment report. |
| DL2001 | WP2000 | ENVIREDOX Web Site |
| DL 11001 | WP 11000 | Consortium Agreement |
| DL 3001 | WP 3000 | Comparative report of applications/technologies and suitability to the different geographic areas |
| PR2 | WP 11000 | Progress report to the Commission |
| DL 11002 | WP 11000 | Project Management Manual |
| DL 2501-2 | WP 2500 | Working methodology and procedures V1.0. |
| DL2502 | WP 2500 | Particular applications of the forum Methodology. Analysis of the regional situations. Initial set of Objectives per forum (as Annexes). |
| DL 3002 | WP 3000 | Bidding conditions for a BAT in the featured applications and geographic areas. |
| DL5001 | WP5000 | Bidding condition for the industrial pilots. |
| PR3 | WP 11000 | Progress report to the Commission |
| DL2503 | WP 2500 | Audit Manual of the Forum Operation. Assesment Reports of the individual Forums (Confidential Annexes). |
| DL 8001 | WP 8000 | Applicability of the french implementation in other geographic areas. |
| PR4 | WP 11000 | Progress report to the Commission |
| DL 4001 | WP 4000 | Technical reports issued of laboratory testing (4 applications) |
| PR5 | WP 11000 | Progress report to the Commission |
| DL 5002 | WP 5000 | Technical reports issued of industrial pilot testing (4 applications) |
| DL 6001-6004 | WP 6000 | Final report of pilot implementation in companies (including Technical-economical evaluation reports of the industrial implementations) |
| DL 7001 | WP 7000 | Set of support materials for training. |
| PR6 | WP11000 | Progress report to the Commission |
| DL 7002 | WP 7000 | Practical Manual of the ENVIREDOX Technology |
| DL 10001 | WP 10000 | Information pack on the application of ENVIREDOX |
| DL 9001 | WP 9000 | Enviredox Strategic Plan. |
| DL 9002 | WP 9000 | V2.0 of the working methodology and procedures. |
| DL10002 | WP10000 | Report on the issued dissemination activities |
| PR7 | WP 11000 | Project final report to the Commission (interim report) |
| FR1 | WP11000 | Project final report to the Commission (report specifically intended for publication) |
| PR10 | WP 11000 | Technology Implementation Plan. |

5.2 Project Management.

5.2.1 Project meetings.

| Code | Date | Venue |
|----------|--|--|
| ENV-M-1 | 07-08/06/01 | Valencia (Kick-Off Meeting). |
| ENV-M-2 | 18-19-20/07/01 | Saint-Etienne (includes a GOPP workshop) |
| ENV-M-3 | 24-25/09/01 | Porto |
| ENV-M-4 | 04-05/12/01 | Paris |
| GO-No GO | 17/01/02 | Luxembourg |
| ENV-M-5 | 7-8/03/02 | Alicante |
| ENV-T-6 | 22-23/04/02 | Bron |
| ENV-M-7 | 17-18/10/02 | Saint Etienne |
| ENV-T-8 | 09/01/03 | Valencia |
| ENV-M-9 | 27-28/03/03 | Porto |
| ENV-M-10 | July 2003, 3rd and 4th | Valencia |
| ENV-M-11 | Nov 2003, 4 th and 5 th | Saint-Etienne |
| ENV-M-12 | Feb 2004, 4 th and 5 th | Alicante |
| ENV-M-13 | Apr 2004, 14 th to 16 th | Porto |
| ENV-M-14 | Jun 2004 28 th to 30 th | Valencia |

The minutes of the project meetings are available in the private part of the ENVIREDOX WebSite www.enviredox.org (data warehouse/WP11000).

5.2.2 Project Activities

The management procedures used in the meetings are the *activities*, which are integral part of the meeting minutes. As an indicator, a total of 228 *project activities* have been issued and 96% have been completed. The list of activities can also be accessed in the private part of the ENVIREDOX WebSite.

6 Annex: Minutes of ENV-M-14