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Contract EIE/04/0312/S07.38

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Elaborato Ciceri Giovanni (ASV)
08000849 436625 AUT

Verificato Negri Antonio Nicola (ASV)
08000849 436621 VER

Approvato Negri Antonio Nicola (ASV)
08000849 436621 APP

Mod. RAPF v. 02

CESI RICERCA S.p.A.

Società con unico socio

Via R. Rubattino 54
20134 Milano - Italia
Telefono +39 023992.1
Fax +39 0239925440

Capitale sociale 1 100 000 Euro
interamente versato
Registro Imprese di Milano,
C.F. e P.IVA 05058230961
N. R.E.A. 1793295

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REVISIONS HISTORY

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1 Project objectives and major achievements during the reporting period

1.1 Project objectives

The overall objectives of the QUOVADIS Project are:

1. Full documentation (including Round Robins and ruggedness) on validated TS for 19 TS for chemical, physical, biological, and sampling to be submitted to CEN; so as to cover:
 - (a) sampling, (sampling and sample reduction; preparation of test-portion)
 - (b) chemical properties (minor elements -As, Ba, Be, Cd, Co, Cr, Cu, Hg, Mo, Mn, Ni, Pb, Sb, Se, V, Zn-; major elements - Si, Al, K, Na, Ca, Mg, Fe, P, Ti; elemental analysis - C, H, N-; halogens and sulphur -Cl, Br, F, S-; metals with melting points below 700 °C; preliminary digestion method for chemical analysis)
 - (c) physical properties (calorific value; bulk density; moisture content; content of volatile matter; ash content; ash-melting behaviour; particle dimensions and particle-size distribution; durability and density of pellets and briquettes; bridging properties)
 - (d) biological properties (determination of the biodegradable fraction)
2. Production of a validated classification system for SRF;
3. Documentation on the application of QM to three selected plants, including cost/benefit analysis (CBA) for the validation of the TS on QM;
4. A comprehensive database on SRF in Europe, based on the classification system necessary for the validation of the TS;
5. Proceedings of two dissemination workshops in the NMS and one final conference event.

Besides the documentation for validation as requested by Mandate M325, which will support the market for SRF the project will make a significant contribution in improving waste-management in the NMS by the dissemination of knowledge about existing options and the availability of standards supporting trade and legislation. The project is designed to facilitate contacts between the existing SRF-related industry and possible partners and regulatory authorities in the NMS. This should catalyse the implementation of the Acquis in the NMS.

Promoting the use and technology-development of SRF in Europe through a harmonised QM and classification systems and diffusion of validated EN, this project will have environmental, economic and social benefits.

1.2 Summary of activities and results for the reporting period

As far as objective 1 is concerning, the work done in the period covered by the present Confidential Management Report was focused to closing all the activity scheduled in the Project. In particular:

- complete validation of the sampling TSs developed by CEN/TC 343;
- implementation and conclusion of the ruggedness testing on chemical, physical and biological parameters.
- Complete validation of the TSs on the base of a Round Robin test.

As far as objective 2 is concerning, the work done was focused to the finalisation of the final definition at CEN/TC 343 level of the parameters and the classes to be considered for the implementation of the classification system. The TS produced and approved by CEN/TC 343 was acquired as reference document for the validation exercise. Up to now the classification system has been applied to the data base developed by WP2.

As far as objective 3 is concerning, the work done was focused to conclude the dissemination of the documentation on the application of QM to three selected plants, and the implementation of the Quality management System.

As far as objective 4 is concerning, the work done was focused to the preparation of the final updated list of European production plant of SRF in the former EU 15. The work done is mainly concerning the collection of data about production and quality of SRF in Western Europe.

As far as objective 5 is concerning, the work done in this period includes:

- organisation of the first workshop (Ispra) for the dissemination of QUOVADIS;
- organisation of the first workshop (Warsaw) for the definition of the present state of the for waste management and the potential for the production of SRF in the NMS of the enlarged EU 25.
- organisation and participation to a dedicated workshop in Larnaca (Cyprus) for the implementation of the data collection concerning potential for the production of SRF in the NMS of the enlarged EU 25.
- organisation and participation to a dedicated workshop in Roma (Italy) for the implementation of the presentation of the final results and the main activity done to within QUOVADIS Project.

1.3 Identified problems and corrective action taken

Problems arisen about the collection of data on the quality of SRF at production plants throughout the EU, including those in the Mediterranean states, were completely solved with a supplemental great effort spent by the WP leader (CTI) and the other WP Partners.

No other problems about the Project timetable occurred in the period covered by the present progress Report.

2 Consortium management of the period

The objectives of WP 1 (Co-ordination and management) are:

- to manage the project from a technical and financial point of view;
- to co-ordinate all the action to within the project;
- to manage and solve any request from the Commission;
- to report on the progress of the Project to the Commission, CEN/TC 343 and to a Steering committee (SC).

Activities done in the period covered by this Final Report

After the signing of the Contract and the starting of the Project (January 2005), all the expected deliverables has been produced and submitted to the Commission.

In particular the progress of the works are constantly update on the QUOVADIS website. (<http://quovadis.cesi.it>).

Another main issue was the nomination of the Steering Committee. Mr. B. M. Gawlik has been appointed as Secretary of the Steering Committee. The steering Committee is composed by:

- the Secretary (B. M. Gawlik);
- the QUOVADIS Project Manager (G. Ciceri);
- the QUOVADIS WP's Leaders;
- the representative of CEN/TC 343 (J.F. Vicard) appointed during the TC 343 meeting held in Cuneo on February 24 and 25, 2005;
- financial contributors and /or stakeholder, in particular:
- APAT (Italian National Environment Protection Agency);
- European Tyre Recycling Association (ETRA);
- CEMBUREAU;
- ECOS Europe;
- ERFO;
- Plastic Europe;
- CEPI Cartonboard.

All Steering Committee documents, including the main deliverable to be are available on the QUOVADIS web site at the proper link of the page <http://quovadis.cesi.it/Steering%20Commitee.htm>

The management activity also included the collection of the document for the Pre financing of the Project and the distribution of the received money to the associated beneficiaries.

Furthermore we predisposed all the document for the change of the name of one of the associated beneficiaries (RWE do REMONDIS) as well as the Co-ordinator from CESI to CESI RICERCA. The amendment of the Contract is in progress. All the actions scheduled have been done without any delay,

- organisation of the kick off meeting (held in Milan on January 25, 2005).
- organisation of the scheduled Consortium meeting, in Ispra on June 30 2005 and on December 6 2005 and in Larnaca (Cyprus), on June 20 and 21, 2006.
- after the nomination of the Steering Committee and the first meeting in Brussels on on March 15, 200, other ADS meeting has been held in conjunction with the Consortium meetings.

Status of deliverables and milestones

All the planned deliverables in the period cover by the present Report has been concluded and delivered to the Commission. Furthermore all the produced deliverables are available at the Report section of the QUOVADIS website (<http://quovadis.cesiricerca.it>)

3 Work package progress of the period

As general consideration, all the activities planned for the period covered by the present Final Report have been achieved.

3.1 Progress on work plan against initial

WP 1 – Co-ordination and Management - WP Leader: Ciceri, G. (CESI - IT) - Participant: CESI – IT - Duration in months: 1-36

Already described in paragraph 2.

WP 2 – A holistic approach towards quality management and classification -WP Leader: Riva, G. (CTI - IT) - Participant: CTI (IT), GLR (UK), INFA (DE), CREED (FR), RWE (DE) - Duration in months: 1-36

The objectives are:

the work is focused on the validation of:

(a) the Technical Specification (TS) on Specification and Classification developed by TC 343 WG 2. This TS must facilitate good understanding between seller and buyer as well as good communication with manufacturers of relevant equipment.

(b) the TS on quality-management (QM) developed by TC 343 WG 1, which should offer a route through which the confidence of customers and regulators in the characteristics of the fuel, in particular, conformity to agreed specifications, can be established and maintained, so that SRF will become a readily accepted and commonplace fuel of the future.

To fulfil these main objectives, four Tasks have been conceived within WP2:

Task 2.1 State of the art on quality of SRF and method for Cost Benefit Analysis (CBA)

(Task Leader: G. Riva-CTI).

The required actions are:

(a) to collect information on the quality of SRF at production plants throughout the EU, including those in the Mediterranean states, and to review existing QM systems applied to the production and trade of SRF at these plants; and

(b) to agree the methodology to be applied to perform a cost/benefit analysis (CBA) by which the direct and environmental costs associated with the implementation of QM at the selected sites will be assessed in Task 2.4.

Task 2.2 European Database on the quality of SRF and validation of the TS on classification

(Task Leader : S. Flamme INFA).

The required action is to develop a European database on the quality of SRF according to the classification system introduced by the TS for specification and classification and to check that this TS is fit for purpose

Task 2.3 QM Guidelines (Task Leader: D.C. Pike-GLR).

The required actions are to produce guidelines and one or more model-manuals for the application of the TS for QM systems that CEN/TC 343/WG1 is currently finalising

Task 2.4 Implementation and validation of the TS on QM (Task Leader: F. Monie - CREED/VEOLIA ENVIRONNEMENT

The required action is to implement, with the assistance of the above-mentioned methodology for CBA (Task 2.1) and the guidelines for QM (Task 2.3), the TS for QM within selected sites, so as to assess benefits (and disadvantages) resulting from that implementation.

Before the project started, three (four) possible sites were located: one in Norway, two (one) in Italy and one in Germany. That choice was to be verified on the basis of the effective accessibility and cooperation of the selected sites.

The required contributions of each partner in this work package are as follows:

CTI will co-ordinate all the activity of WP2, will lead the execution of Task 2.1, and will manage one regional team for the collection of data.

INFA will be the task-leader of Task 2, for the developing of a European data-base for SRF quality.

GLR will co-ordinate the activity of Task 3 as task-leader in the elaboration of guidelines and model-manuals for the application of TS for QM.

CREED will be the task-leader of Task 4, for the validation of TS on QM.

RWE will be involved in the activity of Task 2.4, managing one of the three regional teams for the implementation of QM system, taking account also of RAL-GZ 724.

Activities done in the period covered by this Final Report

Task 2.1 State of the art on quality of SRFs and method for Cost Benefit Analysis (CBA) – CTI.

Considerable effort has been invested by CTI in seeking information on the quality of SRF at production plants throughout the EU, including those in the Mediterranean states. The first Deliverable D 2.1 Part 1 was issued on April 2005 showing the first results of the survey.

Because this collection of data is so important for the validation of the TS on classification and specification, requests for support have been made to the most important institutions operating in the field on European level, including all national representatives within CEN TC 343.

The methodology to be applied to perform a CBA, by which the direct and environmental costs associated with the implementation of QM at the selected sites will be assessed, has been finalised and the Deliverable D 2.1 Part 2 has been issued on April 2005.

D 2.2 and 2.3 were issued on March 2006 (a delay in respect of the delivery date of December 2005 was asked for and CESI Ricerca provided a positive response on the request).

Globally, a rate of responses of 50% on the state of the art of the existing QMS was provided, and a good rate in the answers on the state of the art of the SRF production was provided as well (see previous table).

Furthermore, CTI cooperated with GLR and CREED in the Deliverable D 2.7 and D 2.8.

Task 2.2 European Database on the quality of SRF and validation of the TS on classification – INFA

Workings for this task are extensively finished. The data, collected from CTI, have been checked for plausibility and analysed with a data base.

All in all, data for 90 SRFs from 78 plants out of 10 countries have been received by INFA. In case that analyses results for the classification parameters NCV, Cl or Hg were available, these data have been used for the following classification:

- less than ten assays available: no categorisation possible,
- ten or more assays available: categorisation via statistic,
- forty or more assays available: categorisation via statistic and via random generator (RND) additional

The detailed description of the classification procedure, the results and the discussion of them occurred in the report D 2.4 “European database on SRF production according to the classification system” (September 2006), which also contains the analysis of selected specification parameters.

Report on the validation of TS on specification and classification including recommendations to TC 343 for the eventual revision of the TS before its upgrade to an European Standard (EN)

The report D 2.5 has been issued according to the QUOVADIS schedule.

Task 2.3 QM Guidelines – GLR

The first contract-deliverable (D2.6), a report on “Guidelines for the site-specific implementation of the TS on QM to selected sites” was required by Month 7. To achieve delivery in good time, a great deal of effort was expended on this at the beginning of the project. To improve the usefulness of D2.6, the following extra parts were appended: (a) text from the TS on QM; (b) a note on how the outputs of the five WGs of TC343 should fit together; (c) a note on WP2 of QUOVADIS; (d) suggestions for a manual; and (e) a check-list that had been requested by other members of WP2. Item (d) here was the

Final version of Deliverable D2.7 – “Model manual(s) for the site-specific implementation of QM”, which is required by the EC contract to be delivered in September, 2007.

Task 2.4 Implementation and validation of the TS on QM – Creed Veolia

The required action is to implement, with the assistance of the above-mentioned methodology for CBA (Task 2.1) and the guidelines for QM (Task 2.3), the TS for QM within selected sites, so as to assess benefits (and disadvantages) resulting from that implementation.

Before the project started, four possible sites were located: one in Norway (for which Creed is responsible for collection of data), two in Italy (for which CTI is responsible for collection of data and delivery of this data to CREED) and one in Germany (for which Remondis is responsible for collection of data and delivery of this data to CREED).

There are three main phases of this work:

1. Implementation of a QMS compliant with CEN TC343 TS15358 at each of the host-sites
2. Report on the practicalities of this implementation
3. Completion a Cost Benefit Analysis regarding implementation and maintenance of a QMS compliant with CEN TC343 TS15358

Activities in Norway.

The Norwegian subsidiary, Norsk Gjenvinning (= Norwegian Recycling), of the French-based Veolia Environnement Group has offered its SRF-producing plant at Haraldrud in Oslo as one of the host-sites for Task 2.4. The Task-Leader, M. Pierre Casabonnet, has formed a team to carry out the necessary studies, which includes several senior staff from Norsk Gjenvinning, Miss Sarah Moseley from the London office of CREED (the research-arm of Veolia) and Dr D.C.Pike of Green Land (Leader of Task 2.3). An inspection of the site was made by Creed, CTI and GLR teams in April 2006.

The input materials at Haraldrud are mixed commercial and industrial wastes (municipal wastes are delivered directly to a mass-burn incinerator), with a separate stream of waste wood. These raw materials are processed into two grades of SRF – a baled fluff that is delivered to a nearby district-heating plant and chipped wood.

The plant already has a QM system (QMS) based on ISO 9000, so the main aims of the current investigation are to provide answers to the following questions:

- (a) Does the current QMS in use at the plant need to be amended so that it complies with the draft TS of TC343?
- (b) Is it possible to estimate costs and benefits of applying QMS?
- (c) Do Items (a) and/or (b) raise difficulties that ought to be considered by WP2?

It has become clear that more specific procedures need to be drafted for control of input materials and for sampling and testing, and that work is now in progress.

A pragmatic approach has been adopted for the assessment of the costs of three cases of QMS:

- (a) The hypothetical case of no QMS.
- (b) The current QMS.
- (c) An amended QMS to comply with the TS of TC343.

A questionnaire to collect relevant data on costs has been prepared and this part of the study is now in progress.

Procedures have been written to cover areas of the TS compliant QMS that were not already in place under the current QMS. Site work to investigate the practicalities of the implementation of these procedures was completed. This work highlighted some issues regarding practical implementation of these procedures.

Cost data associated to:

- 1) implementation of the TS compliant QMS and
- 2) maintenance of this QMS

has been collected and analysed.

A Report presenting the implementation of the QMS and issues relating to practicalities of this implementation as well as the cost analysis has been produced.

The methodology for collection of benefits is to be confirmed. A questionnaire is being drafted to cover intangible benefits.

Activities in Italy.

The Italian Ecodeco Group has offered its SRF-producing plant at Corteolona as one of the host-sites for Task 2.4. Prof. G. Riva, has formed a team to carry out the necessary studies, which includes several senior staff from CTI (J. Calzoni and MP Maranzana), and Ecodeco (Mr. L. Negri and Miss C. Mensi). Four meetings were held by the team in July, October and November, 2005, and one in February 2006 (also Creed and GLR were invited). Other meetings between CTI and the company's management took place in 2006.

The plant already has a QMS based on ISO 9001, so the main aims of the current investigation are to monitor the following:

- a) Is there a procedure for the input materials? If so, provide an explanation of it;
- b) Is it possible to provide quality-control of the process?
- c) Is it possible to provide quality-control of the final product?
- d) Does the material produced satisfy the limits in the TS for classification and specification?
- e) Are there external controls on the product?
- f) General considerations on the implementation of the TS of TC 343 to the plant.

The Final Report was discussed during the meeting of WP 2 at Ispra on December the 5th, 2005.

The Italian Pirelli Ambiente Group has offered its SRF-producing plant at Idea Granda as one of the host-sites for Task 2.4. Prof. G. Riva, has formed a team to carry out the necessary studies, which includes several senior staff from, Pirelli Ambiente. Three meetings were held by the team in July, October and November, 2005, and one took place in February 2006 (also GLR and Creed attended). Other meeting between CTI and the company's management took place in 2006.

Later on CTI provided Creed the information and data about the Italian host sites, Ecodeco and Idea Granda. CTI in 2006 worked constantly with Ecodeco, Pirelli and and their management for the analysis of the Quality Management System and the analysis of costs.

A Final technical Report on the evaluation of costs of the Ecodeco plant has been prepared by CTI, and has been discussed during the Paris meeting of WP2 (September 2006) and during the meeting at Erfstadt (October 2006), and in Bruxelles (April 2007).

Activities in Germany

The German REMONDIS Group has offered its HCF-sorting and SRF-production plant VZEK in Erfstadt near Cologne as one of the host-sites for Task 2.4.

The input materials are production specific wastes for the production of the SRF-quality BPG[®] in the SRF-production plant called AKEA, which has been built in 1996, rebuilt in 1998 and modernized in 2005. MSW, bulky wastes and mixed commercial wastes are sorted positively via NIR-technology in the sorting plant called ABA, built in 2005. The gathered High Calorific Fractions (HCF) are used to produce the SRF-quality SBS[®].

It can be summarized for VZEK and the SRF-production plant AKEA that a QMS has been established and maintained in conformity with and certified according to

- 9001 (in 1996)
- Efb (in 1997)
- RAL-GZ 724 (in 2002)

In practice the conformity with all of the three systems is checked externally within one run with the help of the so-called check-list of the Bundesgütegemeinschaft Sekundärbrennstoffe.

The existing QMS is composed i.e. of the subsequent tools:

- QMM (digital) for AKEA according to ISO 9001, Efb, RAL-GZ 724
- manual sampling of input materials (input for AKEA) and products (different kinds of SRF)
- high speed analysis of H₂O-contents of products

- specifications for different products/SRF's with the trade marks BPG[®] and SBS[®]
- standard analysis for products
- analytical documentation (digital) of input materials (input for AKEA) and products
- documentation of the amount of input materials and products

During 2006 the QMS has been extended on the complete new plant too. This extension comprises i.e. the following tools:

- quality management manual (digital) for the complete plant ABA
- automatic sampling of the products (further technical improvement necessary)
- investigations about online and/or high speed analysis of Cl, NCV, Hg and Al for the high calorific fractions and the products BPG[®] and SBS[®]
- refinement of the specification of BPG[®] and SBS[®]
- training of the staff
- new work orders for ABA and AKEA

I.e. the following new work orders have been developed and set into force:

- malfunction within the treatment process
- sampling of High Calorific Fractions (input SRF-production)
- formula for Solid Recovered Fuels
- sampling and sample preparation of Solid Recovered Fuels
- loading and transport of Solid Recoverd Fuels

The compliance of the existing QMS with the CEN TC 343 standards has been checked internally and successfully in 2007. All the necessities (i.e. sampling, sample preparation, analysing) of CEN TC 343 are covered by the RAL-GZ 724 and even a higher amount of samples has to be taken, a higher amount of parameters has to be analysed regularly and a higher amount of assays has to be involved into the regular external compliance checks according to RAL-GZ 724.

Nevertheless the different realized technical improvements and the above mentioned organisational tools, especially the new work orders helped to increase the

- operational capacity of the complete plant ABA
- availability of the plant
- HCF and SRF-quality
- commercialisation of the products

Although sampling of input materials is a challenging task, it is an important approach to check the effectiveness of the sorting process (see picture 1, ABA). In Erfstadt it is realised by using the technical equipment of the AKEA (crushing devices, size reduction by granulators) and taking an appropriate volume of the crushed material with a particle size of less than 80mm.

Status of deliverables and milestones

All the deliverables scheduled in the QUOVADI Project has been concluded and delivered to the Commission. Furthermore all the produced deliverables are available at the Report section of the QUOVADIS website (<http://quovadis.cesiricerca.it>)

WP 3 – Organisation of validation exercises - WP Leader: Gawlik, B.M.. (JRC-IES - EU) - Participants: JRC-IES (EU), JRC-IRMM (EU), STRATENE (FR), SCORIBELI (BE) - Duration in months: 1-36

The objectives are:

- identification of representative SRF for the production of test materials;
- production and characterisation of test materials for validation studies;
- to perform ruggedness testing and validation exercises according to ISO-Standard 5725;
- to perform a statistical evaluation of validation intercomparisons (performance characteristics of methods).

Activities done in the period covered by this Interim Report

Sampling and transport of the representative SRF to be used as basis material for the validation of the TS defined on the CEN TC. Start of material production including statistical controls.

Based on the previous work on the identification of sampling sites, the following sampling campaigns were executed:

- Two PE barrels of SRF from the Pirelli IDEA GRANDE plant were sampled in Cuneo, Italy and transported to JRC IES for further processing. From this material 5 L of acidic digest were produced following the draft TS for mineralisation. The digest was sent to JRC IRMM for ampouling.
- From the ECODECO plant in Milan, Italy, 6 PE barrels of SRF(soft pellets) were sampled and shipped to JRC for further processing.
- Demolition wood have been sampled in Lassila & Tikanoja's plant in Kerava (about 30 km north from Helsinki) a waste management plant where different types of waste (Electrical and Electronic Appliances, Plastics and Municipal Waste, Demolition Wood) are processed. Twelve 60 litres PE barrels have been filled from the process output after plant inspection.
- The shredded tyres samples were collected at Norvalo Centre de Valorisation des Pneumatiques at Dompierre-Bequincourt, near Amiens. After plant inspection, five 60 litres PE barrels have been filled with the tyre pieces (mixture of iron, rubber and cotton textile) from the open air stocks of semi-processed material. Samples were collected in different parts of the stocks in order to preserve representativeness.
- Municipal waste-derived fuel was sampled at Remondis plant in Erfstadt, in the surroundings of Cologne, Germany. In this plant a highly advanced technology is employed to enhance the fuel quality at the end of the process; a detailed presentation of the process was given us before the sample collection. Five 60 litres barre plus one 40 litres box of sample were collected according to the plant's QA/QC sampling procedures.
- Some 100 kg of suitable sludge SRF were obtained from SCORIBEL, Belgium. After collection this material were delivered to IRMM in Geel for storage and processing.

Material production and Homogeneity testing

A series of homogeneity testing and process optimisation were carried jointly by the WP partners. The subsequent statistical treatment has been carried out in cooperation with JRC IRMM (Deliverable 3.4).

Delivery of validation samples to laboratories for intercomparisons

The selection of the participants in the intercomparisons have been finalized and the validation samples have been delivered. A Microsoft® Excel® template has been prepared, in cooperation with CESI Ricerca, in order to speed up final collection of data for the validation experiment. Letter to laboratories

accompanying the samples and the template to be filled up with the results are available at the home page of QUOVADIS website (<http://quovadis.cesiricerca.it>).

A specific database management system is in preparation for this activity.

In the table hereafter the selected participant laboratories are listed with the respective laboratory test to be carried out.

The final selection of the participants in the intercomparisons have been Reported in the Last Progress Report (June 2007).

The validation exercise has been completed and the detailed results are presented in the Deliverable 3.5.

Status of deliverables and milestones

All the deliverables scheduled in the QUOVADI Project has been concluded and delivered to the Commission. Furthermore all the produced deliverables are available at the Report section of the QUOVADIS website (<http://quovadis.cesiricerca.it>)

WP 4 – Sampling - WP Leader: Cuperus, J.C. (TAUW-NL) - Participants: TAUW (NL), VTT (FIN), INFA (DE) - Duration in months: 3-36

The objectives are:

- drafting of a reference document for the validation of sampling;
- validation of the TS for sampling SRF;
- to establish the performance of ruggedness test for sampling.

Activities done in the period covered by this Interim Report

In this period the reference document on validation and ruggedness testing of solid recovered fuel regarding sampling has been delivered. This document describes what and how activities will be performed in this work package.

The main activities of WP 4 have been performed as well. Samples were taken at five sites in the following countries:

- Belgium 2 sites
- France 1 site
- Germany 1 site
- Netherlands 1 site.

It proved not possible to perform the prescribed sample preparation for the samples taken from the site in France. This is an important indication that the guidelines can not apply to each type of SRF. In this case (chips of) tyres are produced as SRF.

Based on the “Reference document on validation and ruggedness testing” the sampling has been carried out by Tauw and VTT. Samplers of these companies have drafted their own sampling scheme on the basis of the draft standards. Sampling focused on the influence of the number of increments and on the influence of the lot size. All samples were collected and analysed at the laboratory of INFA in Germany. Analysis took place on moisture content, NCV, Cl, Hg, Th and nine heavy metals.

The results of the analyses have been processed in excel sheets. Ruggedness testing showed that the number of increments had only little influence on repeatability. Lot size also had little influence on repeatability. As for sample preparation, ruggedness testing showed that comminution to 1 mm. is insufficient. Recovery and repeatability improved significantly at 0.5 mm.

Validation testing showed that reproducibility for the total measurement is large and amounts to between 100% and 200% for microparameters. The repeatability is larger than the reproducibility and ranges for microparameters between 200% and 800%. For macroparameters such as NCV and moisture repeatability ranges between 0% and 20%.

Full reports have been drafted by Tauw bv. VTT gave support and carried out a second opinion on the evaluation and the reporting.

The activities have been carried out in line with the planning. The activities of WP 4 have been finished.

Status of deliverables and milestones

All the deliverables scheduled in the QUOVADI Project has been concluded and delivered to the Commission. Furthermore all the produced deliverables are available at the Report section of the QUOVADIS website (<http://quovadis.cesiricerca.it>)

WP 5 – Physical parameters - WP Leader: Maier, J. (IVD, Stuttgart University-D) - Participants: IVD (GER), SLU (SWE), VTT (FIN), IRC/CNR (IT) - Duration in months: 1-36

The objectives are:

- Further evaluation of robustness of TS for physical properties through ruggedness testing on available materials and on selected reference materials from WP 3.
- Homogeneity test

The main objective for concluding the work scheduled in the QUOVADIS Project were:

- Identification and selection of boundary conditions for ruggedness test on physical properties.
- Definition of sample and sample reduction requirements to perform ruggedness test according to a test matrix.
- Definition of sample constitution and sample quantities required for all and individual analyses.
- Definition of responsibilities for fuel and test portion preparation and shipment.
- Information exchange and co-operation among the WP and project Partners.
- Concluding of tests regarding the TS for the physical parameter.
- Contact to laboratories which where selected for the round Robin tests.
- Concluding of ruggedness tests regarding TS for the existing material
- Concluding homogeneity test for the materials QRA, QRA2, QRC and QRE
- Preparation to the validation test

Activities done in the period covered by this Final Report

The major achievements in the QUOVADIS Project are:

IVD:

- Ruggedness and validation testing of sample material from JRC and material available at IVD
- Homogeneity of ash content tested with 5 different material and 126 samples with the results meeting the requirements for homogeneity of the samples
- Ruggedness test of ash content with 5 different materials from JRC and the variation of parameters showed the robustness of this method
- Ruggedness test for the determination of volatile matter with JRC material showed an applicableness of the method.
- Ruggedness test for the determination of the ash melting behaviour concluded, the results so far showed an applicableness of the method.
- Preparation of a list with laboratories for the Round-Robin –Testsù
- Validation tests done by participating to the interlaboratory tests
- Finishing the report “SRF – Determination of combustion behaviour” (WI 00343035)

SLU

- Homogeneity tests with JRC material

- Ruggedness tests for moisture content showed generally that all parameters give significant main effects in the same direction for most of the reference materials
- Ruggedness tests for the determination of calorific value showed that only dried sludge (QR-C) passes the criteria specified in the standardised method that the difference between max and min values must not exceed 0.4 MJ/kg for SRF
- No significant model, no parameter had significant effect on model.
- Ruggedness test for the durability of pellets were concluded with available materials.

VTT

- Ruggedness tests for the bulk density showed that the robustness of this method can be low due to the SRF material. Some changes in the method (matter of CEN/TC 343) are recommended.
- For ruggedness tests for particle density only one material (hard pellet) were available, but the robustness for this material was good.
- Ruggedness tests for metal aluminium were made with both methods, dissolution method and DTA, where the dissolution method show a better robustness dependent on the sample size and the heterogeneity of the Material

Activities done in the period covered by this Interim Report

According to the time and work schedule the Partners reached all the goals requested in the QUOVADIS Project. Following the meetings in the last period, the workshop on Cyprus (2006) and Rome (2007) and the meeting in Ispra in December 2006 gave good possibilities for the exchange of results and discussing the work in WP 5. Beside the QUOVADIS project meetings the Partners use their co-operation for CEN 343/335 and their working group meetings to enhance the information exchange.

All WP partner could carry out all of their ruggedness tests on the physical parameters they investigate with the available material from JRC and/or with material available at their institutes. The laboratories were contacted and listed, then JRC took over the further preparation of the tests in co-operation with the WP leaders. All material were sent to the selected laboratory and the Round Robin test successfully concluded.

Status of deliverables and milestones

All the deliverables scheduled in the QUOVADI Project has been concluded and delivered to the Commission. Furthermore all the produced deliverables are available at the Report section of the QUOVADIS website (<http://quovadis.cesiricerca.it>)

WP 6 – Chemical parameters - WP Leader: Achilli, M. (CESI-IT) - Participants: CESI (IT), ENEL GEM (IT), VTT (FIN) - Duration in months: 1-36

The objectives are:

- evaluation of robustness of TS for chemical properties through ruggedness testing on selected reference materials from WP 3;
- support and supervision of the intercalibration exercise for the validation of TS for chemical analysis based upon the TS from TC 343 WG5. Identification and selection of the participating laboratory for the intercalibration
- validation of sample-reduction procedure from laboratory sample to test-portion.

Activities done in the period covered by this Final Report

The design of the ruggedness testing was carried out by applying the analytical method(s) to be validated with some controlled variations of analytical parameters in repeatability conditions (i.e. within

a single laboratory, using the same instruments by the same analysts), in order to evaluate separately the influence of each varying parameter on the final results.

The evaluation of ruggedness is carried out on five types of SRF samples:

- QR-A. SRF produced from shredded tyres.
- QR-B. SRF produced from demolition wood.
- QR-C. SRF produced with dried waste water sewage sludge, filtercake and coal or lignite residues.
- QR-D. SRF produced from the combustible fraction of municipal solid waste.
- QR-E. SRF produced from industrial non hazardous waste like a combination of plastic, cardboard and paper.

For the different methods under validation the “key variables” have been identified (composition, grain size, amount of test portion, etc.), along the number of levels and experimental tests. The following tables summarize the structure of tests that have already completed out to the date.

<i>prCENTS 15407</i>				
<i>Methods for the determination of carbon (C), hydrogen (H) and nitrogen (N) content</i>				
Flash combustion	composition	3 levels	QR-A shredded tyre sample QR-C dried sludge sample QR-E paper plastic fluff sample	5 levels
	grain size	3 levels	QR-A Shredded tyres sample	

<i>prCENTS 15408</i>				
<i>Methods for the determination of sulphur (S), chlorine (Cl), fluorine (F) and bromine (Br)</i>				
Combustion	composition	3 levels	QR-A shredded tyre sample QR-C dried sludge sample QR-E paper plastic fluff sample	5 levels
	grain size	3 levels	QR-E paper plastic fluff sample	

<i>prCEN/TS 15410</i>				
<i>Method for the determination of the content of major elements (Al, Ca, Fe, K, Mg, Na, P, Si, Ti)</i>				
Method A - EN 13656 (aqua regia + HF + boric, microwave) + ICP-OES/MS + Method A - EN 13657 (aqua regia only, microwave) + ICP-OES/MS	composition	4+4 levels	QR-A shredded tyre sample QR-B demolition wood QR-C sample dried sludge sample QR-E paper plastic fluff sample	8+8 levels
	amount of test portion	3+3 levels	QR-E paper plastic fluff sample	
	grain size	3+3 levels	QR-E paper plastic fluff sample	
Method B - Ashing (prCEN/TS 15403) + EN 13656 + ICP-OES/MS	grain size	3 levels	QR-A shredded tyre sample	3 levels
Method B - Ashing (prCEN/TS 15403) + ASTM D4326 (XRF)	grain size	3 levels	QR-E paper plastic fluff sample	3 levels
Method C (perchloric acid at 190 °C) + ICP-OES/MS	time of heating	4 levels	QR-E paper plastic fluff sample	5 levels
	grain size	2 levels	QR-E paper plastic fluff sample	

<i>prCEN/TS 15411</i>				
<i>Methods for the determination of the content of trace elements (As, Ba, Be, Cd, Co, Cr, Cu, Hg, Mo, Mn, Ni, Pb, Sb, Se, Tl, V and Zn)</i>				
Method A - EN 13656 (aqua regia + HF + boric, microwave) + ICP-OES/MS + Method A - EN 13657 (aqua regia only, microwave) + ICP-OES/MS	composition	4 +4 levels	QR-A shredded tyre sample QR-B demolition wood QR-C sample dried sludge sample QR-E paper plastic fluff sample	8+8 levels
	amount of test portion	3 +3 levels	QR-E paper plastic fluff sample	
	grain size	3 +3 levels	QR-E paper plastic fluff sample	
Method B - Ashing (prCEN/TS 15403) + EN 13656 + ICP-OES/MS	grain size	3 levels	QR-A shredded tyre sample	3 levels
Hg direct - AMA	grain size	3 levels	QR-D MSW sample	5 levels
	amount of test	3 levels	QR-D MSW sample	
Method C (perchloric acid at 190 °C) + ICP-OES/MS	time of heating	4 levels	QR-E paper plastic fluff sample	5 levels
	grain size	2 levels	QR-E paper plastic fluff sample	

<i>prCEN/TS 15412</i>			
<i>Methods for the determination of metallic aluminium</i>			
Method A – extraction with nitric acid + ICP	amount of test portion	3 levels	8 levels
	grain size	3 levels	
	boiling time	3 levels	

<i>prCEN/TS 15413</i>			
<i>Methods for the preparation of the test sample from the laboratory sample</i>			
composition	2 levels	QR-D MSW sample QR-B demolition wood	6 levels
particle size reduction system	3+3 levels	QR-D MSW sample QR-B demolition wood	

The ruggedness evaluation implied the preparation of about 570 different samples (including replicates), and the execution of more than 8000 independent analyses. Most important results from ruggedness testing will be used, if necessary, to improve the current drafts of the methods.

For the intercalibration exercise, about twenty laboratories have been selected among those having experience in waste and SRF analysis of different type and origin. These laboratories are distributed all over Europe. The intercalibration started in the first quarter of 2007 and was conclude according the schedule of QUOVADIS Project.

Status of deliverables and milestones

All the deliverables scheduled in the QUOVADI Project has been concluded and delivered to the Commission. Furthermore all the produced deliverables are available at the Report section of the QUOVADIS website (<http://quovadis.cesiricerca.it>)

WP 7 – Biological parameters - WP Leader: S. Flamme. (INFA-DE) - Participant: INFA (DE) - Duration in months: 1-36

The objectives are:

The objectives of the Work Package 7 of the Quovadis-Project are to work out Information of ruggedness of procedures for biological parameters (based on the at a time available version of the draft document CEN/TC 343/WG 3 N xx “Solid recovered fuels: Methods for the determination of biodegradable / biogenic material” and since 01/2006 on the prCEN/TS 15440 – 0452 – “Solid recovered fuels – Method for the determination of biomass content”). Furthermore reference values for the selective dissolving method for determining the biomass content by using the manual waste sorting method shall be delivered. Finally, a reference document for determination of the biomass / biodegradable fraction in SRF shall be designed. Generally, this work package is divided into four tasks:
Task 7.1: Carry out determination of the content of biodegradable material using the manual sorting and the selective dissolving methods.

The manual sorting method and the selective dissolving method should be used with five reference SRF materials provided by WP3, to represent the main types produced and used within Europe. In a first step, these materials should be sorted as described in the at a time available version: “*Solid recovered fuels: methods for the determination of biomass content*” (CEN TC 343/WG 3 N xx; prCEN/TS 15440 – 0452). Because the selected SRFs for the production of reference materials are not suitable for the manual sorting method, alternatively SRF materials (original and converted) has been used for the manual sorting method.

The results of the selective dissolving method of the reference materials (homogeneity tests, see below) can be used as reference values for the Round Robin test in WP 3. The selective dissolving method will

be accompanied by the analyses of the following properties: dry-matter content, calorific value, ash content and loss on ignition. These investigations are necessary to allow statements on the ruggedness of the test as described in Task 7.2.

Task 7.2: Work out information on the ruggedness of procedures for biological parameters

First of all, the results of Task 7.1 will be taken into account for the appraisal of the ruggedness. In the second step, the results of the Round Robin test of WP 3 are used for conclusions on the ruggedness.

The following aspects will be taken into account:

comprehensibility of the draft TS of CEN TC 343/WG 3;

manageability of the test methods;

applicability of the test for different types of SRF.

Task 7.3: Support WP 3 for the realisation of the Round-Robin test and the analysis and interpretation of the results

On the basis of the trials with the draft method, WP 3 will receive support during the realisation of the Round Robin and with the interpretation of the results acquired from it. The results of homogeneity tests can be compared with the results of different laboratories using the selective dissolving method. On the other hand WP 3 gets support for the comparison of the results of the several participating laboratories among each other.

Task 7.4: Design a draft reference document for determining the biodegradable fraction of SRF based on the TS from CEN TC 343 WG 3

Based on the experiences of the previous tasks, the prCEN/TS 15440 will be optimised in terms of comprehensibility, manageability and applicability. The results will lead to a draft reference document for the biodegradable fraction of SRF based on the TS from CEN TC 343 WG 3. Depending on the results of the Round Robin test, the reference document will be revised, as necessary.

Activities done in the period covered by this Final Report

Now, the document for the determination of the biomass content is the Final Draft “prCEN/TS 15440 – 0452” – “Solid recovered fuels – Method for the determination of biomass content” from January 2006 is used for the determination of the biomass content of different SRF-materials by:

- Manual Sorting of SRF material and determination of the biomass content in percent by weight
- Selective dissolution tests with different SRF materials. Determination of the biomass content in
 - percent by weight,
 - percent by total carbon,
 - percent by calorific value.
- Comparison of the Manual sorting method and selective dissolution test (with SRF samples from municipal wastes)
- Calculation of the biomass content with manual sorting as defined in the CEN draft and with variances in the classification
- Determination of water content, TC, ignition lost, calorific value of single fractions
- Comparison with results of the selective dissolution test
- Selective dissolution tests with materials similar to samples for the round robin of QUOVADIS
 - Soft pellets
 - Hard pellets
 - SRF-Samples

The detailed results are described in the progress reports for 2005 (December 2005), 2006 (June 2006) and 2007 (June 2007). The latest results on the selective dissolution tests are summarised as follows.:

Concerning the manual sorting method, the classification of some fractions should be reviewed. When using the modified calculation, that is described in table 2, the results of the manual sorting and the selective dissolution test are nearly the same.

Table 2: Classification of some sorting fractions

Fraction	prCEN/TS 15440	Modified classification
Fines	Inert	50 % Biomass
Drink Cartons	Biomass	80 % Biomass
Fabrics	Biomass	35 % Biomass
Leather / rubber	Biomass	80 % Biomass

All in all, the method can be judged as time consuming and difficult to conduct. This is mainly a result of the difficulties in sorting of materials with grain sizes from 10 mm to 30 mm, because often the identification of the sample fragments composition is barely feasible. Previous experiences indicates that the biomass content on the basis of the manual sorting method is higher, than the results of the selective dissolution tests. Nevertheless, the manual sorting method give a first appraisal of the biomass content of a SRF sample and could be useful for investigation e. g. for internal quality control.

Selective dissolution tests

The results for the mass related biomass content on the basis of the **selective dissolution test** of different solid recovered fuels (see chapter 3) show a rather small variance. The single results of the conducted threefold determination and the results for the different converted samples are good comparable, when regarding the mass based biomass content (see progress report, june 2006). Concerning carbon based biomass fraction and the calorific value based biomass fraction, the quality of the residue has a comparatively great influence on the results. The previous experiences show, that the residue normally is less homogenous, than the laboratory sample, that is used for the selective dissolution. This leads to the demand of appropriate accuracy for the TC- and the calorific value determination. Therefore, the TC analyses should be done in appropriate repeated determinations or higher amounts of test material should be used for each measurement (depending on the TC-analyser). Same remarks do apply to the determination of the calorific value.

The results of the selective dissolution tests with materials similar to samples for the round robin of QUOVADIS, that means Soft pellets, Hard pellets, SRF-Samples are summarised in table 1:

Table 3: Latest results for selected solid recovered fuels

	Unit	Hard pellets	Soft pellets	SRF
$X_{\text{biomass, mass dry}}$	[Mass-% DS]	61	27	53
$X_{\text{biomass, TC}}$	[% TC]	58	19	46
$X_{\text{biomass, calorific value}}$	[Joule %]	51	18	49

It has to be considered, that the given results are average values of repeat determination of five samples per solid recovered fuel. The three materials include a range of biomass content from 27 to 61 mass-% ds. The carbon-related biomass content vary from 19 to 58 % TC and the calorific value related biomass content from 18 to 51 Joule %.

Since the end of 2006 the technical specification for the determination of the biomass content, the “CEN/TS 15440 ” – “ Solid recovered fuels – Method for the determination of biomass content” is available and used for the determination of the biomass content of different SRF-materials. For the investigation of the ruggedness of the selective dissolution method, INFA performed selective dissolution tests with SRF-materials, that were crushed to the grain sizes of < 2 mm, < 1 mm, < 0.5 mm. Furthermore, the INFA worked out different Comments and proposed changes of the TS 15440 and supports the WP 3 in the preparation for the round robin. Therefore, INFA carried out analyses of the reference samples for the round robin, inquired several laboratories concerning their participation in the round robin, designed draft data sheets for the biomass determination and revised the CEN/TS 15440.

Final results - Influence of the grain size on the biomass content

Concerning the biomass content, it can be assumed, that the ranges of the results for every particle size seem to be very similar. Regarding the averages, it seems, that the samples with the grain size of 0.5 mm show the (slightly) highest values, but because of the alike ranges, this might be random. Summarising it can be stated, that, on the basis of the present result, an influence of the grain size on the biomass content could not really be ascertained.

Preparation and execution of the round Robin Test

For supporting WP 3 of CEN/TC 343, with the realisation of the Round-Robin test INFA did the following work:

Comments on the TS 15440

For the preparation of the round robin, INFA checked the CEN TS 15440 and worked out different comments and proposed changes (see the progress Report at June 2007 for more details).

Results for the homogeneity of the samples for the biomass determination

As mentioned in the last progress report, for the determination of the biomass content in SRF samples by the selective dissolution test, reference materials, produced from IRMM will be used in the round robin. For the materials, that are within the scope of the CEN/TS 15440 “Solid recovered fuels – Method for the determination of the biomass content”, homogeneity tests have been carried out by INFA. These tests were performed in repeatability conditions and in a randomised order. One replicate measurement per test portion has been made. The homogeneity in terms of biomass have been investigated on a mass-related basis.

In comparison of the three investigated materials, the biomass content in the demolition wood samples show the highest biomass contents of the investigated samples with a range from 92.5 – 94.8 mass-% ds and an average of 94.15 mass-% ds. The relative standard deviation is about 1.2 %, that argues for an adequate homogeneity of the prepared samples, even when taking in mind, that the Technical Specification normally is not applicable to pure fractions of waste, products and by-products, classified as CO₂-neutral biomass according to Annex G of the TS. In Annex G.1a of the TS, Waste wood pellets are classified as CO₂-neutral, so that a biomass determination in wood samples is normally not necessary. But, in dependency on the composition, wood waste can content a relevant part of non-biomass fractions, especially when regarding demolition wood. For these materials, the determination of the biomass content might be reasonable.

The biomass contents of the SRF samples are between 66.2 and 68 mass-% ds, with an average of 67.4 mass-% ds. The relative standard deviation is very low with 0.72 %, that also affirmed the homogeneity of the sample.

The lowest biomass contents show the plastics & paper samples, that are between 50 and 57.8 mass-% ds. The average is 51.28 mass-% ds and the relative standard deviation is about 5.0 %, which is, in comparison to the other samples, the highest standard deviation. This might be attributed to the material composition of these samples. When producing this mixture with lumpy paper and plastics fractions, it might be difficult to achieve a sufficient homogeneity between the paper and the plastics, what could result in slightly different material compositions of the different samples.

Preparation of the data sheet for the round Robin concerning the determination of the biomass content with the selective dissolution test

The data sheets, INFA, ENEL and CESI Ricerca designed for the round Robin, is partly shown in Annex 2 of the Progress report at June 2007.

Concerning the influence of the grain size on the biomass content, it can be assumed, that the ranges of the results for every particle size seem to be very similar and that the (slightly) higher biomass value averages for the samples with grain size of 0.5 mm might be random. All in all, it seems, that an influence of the grain size on the biomass content could not really be ascertained.

The results for the mass based biomass content on the basis of the selective dissolution test show a rather small variance. The single results of the conducted threefold determination and the results for the different converted samples are good comparable, when regarding the mass based biomass content. Concerning carbon based biomass fraction and the calorific value based biomass fraction, the quality of

the residue has a comparatively great influence on the results. The previous experiences show, that the residue normally is less homogenous, than laboratory sample, that is used for the selective dissolution. This leads to the demand of appropriate accuracy for the TC- and the calorific value determination. Therefore, the TC analyses should be done in appropriate repeated determinations or higher amounts of test material should be used for each measurement (depending on the TC-analyser). Same remarks do apply to the determination of the calorific value.

The WP 3 received full support during the realisation of the Round Robin and the interpretation of the results acquired from it. INFA proved the results in terms of plausibility and trueness. For a better evaluation, the results were compared with the results of the homogeneity tests, that have been done with the same samples and with further data of similar materials.

For the interpretation of the results of each laboratory, INFA - together with ENEL and CESI Ricerca - has performed a data sheet, that will contain the different intermediate and final results. That means, that it will be possible to proof, whether a single result is based for example on a wrong handling of the test (comprehensibility) or on calculation mistakes (problems with the equations of the Technical Specification), etc.

Status of deliverables and milestones

All the deliverables scheduled in the QUOVADI Project has been concluded and delivered to the Commission. Furthermore all the produced deliverables are available at the Report section of the QUOVADIS website (<http://quovadis.cesiricerca.it>)

WP 8 – Data collection - WP Leader: Ciceri, G. (CESI-IT) - Participants: CESI (IT) – subcontractor IEN CENERG (POL) - Duration in months: 1-36

The objectives are:

- collecting information on current and expected waste-management strategies in NMS and analysing how implementation of standards for SRF might affect those strategies to maximise the use of SRF;
- gathering and updating information about current practices in waste-management in NMS;
- determining data about the waste-streams that are relevant for SRF-production in NMS. Considering how NMS could influence the perspective of the-production and use of SRF in the enlarged EU;
- foster the application of the new standards so that SRF will contribute to lower-cost energy production, and reduce specific investments in infrastructure, e.g. by substituting co-combustion for incineration.

Activities done in the period covered by this Final Report

The activity was finalised to the organisation of the data collection in the New Member States (NMS). In this frame the first of the two scheduled Workshops on the practice of SRF in Europe, finalised to collect information about actual and potential production and use of SRF, was organised and held in Warsaw on June 13-17, 2005.

The meeting, organised by the Centre for Central Europe for Research in Energy Supply from Fossil Fuels and Renewable Sources (CENERG), and in particular by the Poland Institute of Power Engineering (subcontractor of CESI in WP 8), was focused to the presentation of the present state of the art about waste management and potential production and use of SRF in NMS.

Time was also dedicated to the selection of the contact persons in NMS for data collecting (many of them were attending the Workshop) and to the preparation of a data collecting Questionnaire to be circulated among the NMS. To complete the creation of an ad hoc group of experts, CESI will organise bilateral meetings with the major NMS Institutions in the frame of the waste policy and management.

The proceedings of the workshop will be published buy the Poland Institute of Power Engineering. All available documents (including the agenda and the list of participants) are available at the document page of the QUOVADIS site.

In the second half of 2005 this year the following steps have been undertaken

- CENERG setting up a three experts representatives for collecting the potential of SRF in the Newly Members States. Mr. Ladislav Pazdera from Ministry of Industry and Trade from Czech Republic is responsible for data collection for Czech Republic and Slovak Republic. Mr. Vaclovas Kveselis from Lithuanian Energy Institute will operate in Baltic area in Lithuania , Latvia and Estonia. Ms. Temenuga Manoilova is responsible for three south-east Europe countries i.e. Bulgaria, Hungary and Romania.
- CENERG is responsible for data collection in Poland and has been co-ordinating experts activity. The proposal of task agreement concerning the work description of SRF was send to all experts and the contracts will be signed during few weeks. All experts have to prepared definition of waste – streams for SRF production, collection of information on waste management and market potential for SRF according to the classification system introduced by questionnaires received from Warsaw workshop.
- in November this year the databases of existing installations and equipments for waste recycling and list of entities engaged in this business in Poland were prepared, according to National Waste Management Plan from 2002 and in cooperation with Ministry of the Environment.
- in the latest several week the Questionnaire on information about the produced SRF has been translated into Polish and prepared to distribution.

In 2007 IEn/CENERG (CESI RICERCA Subcontractor) has undertaken the following steps:

On January CENERG prepared task agreement with three experts representatives for collecting the potential of SRF in the Newly Members States.

Mr. Ladislav Pazdera from Ministry of Industry and Trade from Czech Republic was responsible for data collection for Czech Republic and Slovak Republic.

Mr. Vaclovas Kveselis from Lithuanian Energy Institute covered in Baltic area i.e. Lithuania , Latvia and Estonia .

Ms. Temenuga Manoilova was responsible for three south-east Europe countries i.e. Bulgaria, Hungary and Romania.

The task agreement concerning the work description of SRF was send to all experts.

From January to April all experts worked on collection information on waste generation, management and market potential for Solid Recovery Fuels.

The reports have been finished on April and they are constitute the base for deliverable 8 -

“The updated overview of waste management in new member states”. The structure of this report is enclosed below.

The data will be continuously updated. For example in the end of 2006 the new National Waste Management Plan will be prepared by Ministry of Environment and data for SRF for Poland will be updated according to the new NWMP.

On May 2005 contact with incineration plant located in Warsaw, operated by the Municipal Solid Waste was established. There is only one incineration plant for no hazardous waste in Poland. We presented and discussed issues concerning QUOVADIS Questionnaire. According to the current data incinerator processes thermally approximately 55 thousand tons of waste annually.

The activity was presented at the Workshop: Waste Management and Solid Recovered Fuels Potential in the Enlarged European Union – Larnaca (Cyprus), June 20-23, 2006, as dedicated lecture.

Furthermore, was concluded the data collection on waste production and management in New Member State in order to have an up to date picture of this important problem. In particular investigations have been focused to obtain a preliminary, but well documented state of the art about the market-potential for SRF in the NMS.

This resulted in several reports produced by “key Person” appointed in each New Member State (or covering a number of them) that CENERG condensed in a review Report which is the matter of the deliverable reported below.

Results indicate a very interesting potential situation that, mainly if supported by incentivisation actions, may result in a big production of Solid Recovered Fuels as one of the way to follow for both electricity production and a modern waste management.

Status of deliverables and milestones

All the deliverables scheduled in the QUOVADI Project has been concluded and delivered to the Commission. Furthermore all the produced deliverables are available at the Report section of the QUOVADIS website (<http://quovadis.cesiricerca.it>)

WPs 9 – Dissemination -WPs Leader: Ciceri, G. (CESI-IT) -Participant CESI (IT) - Duration in months: 1-33

WP 9.1 - Own dissemination activity

WP 9.2 – Common dissemination activity

The objectives are:

- avoid the divorce between the requested and delivered information on the TS validation process;
- define a strategy for an efficient communication of the gathered WP results.
- ensure proper dissemination of the information gathered to all of the Project's stakeholders.
- contribution, upon request of the Commission, to the development of online information systems under EC management;
- participation, upon request of the Commission, at contractors' meetings and conferences in association with the EIE and other relevant programmes, EU-wide exhibitions, etc;
- contribution, upon request of the Commission, to the preparation of common presentation material related to EIE actions.

Activities done in the period covered by this Final Report

The activity have been at first finalised to the organisation of the dissemination events that results in the schedule given at the QUOVADIS web site <http://quovadis.cesiricerca.it/>. One of the main event is the presentation of the QUOVADIS Project at the International Solid Waste Association Conference that will be held in Buenos Aires on November 6-10, 2005.

The first dissemination meeting: "QUOVADIS Waste-to-fuel conversion? A thinkshop" was held at the JRC of Ispra on April 28 and 29, 2005. The event was attended by some 40 participants from whole Europe.

All the available document about this meetings (including agenda and preliminary conclusions) are available at the document page of the QUOVADIS web site.

More information can be found in the Work Package Report of Deliverable D 9.1.3: "Results and follow-up of the first dissemination conference".

The proceedings of the meeting are in print. EUR and ISBN Numbers application submitted to the EU Official Publication Office, Luxembourg.

The second six months of 2005 were finalised to the organisation of some dissemination event that results in the schedule given at the QUOVADIS web site <http://quovadis.cesiricerca.it/>. One of the main event was the presentation of the QUOVADIS Project at the International Solid Waste Association Conference that was held in Buenos Aires on November 6-10, 2005.

All the available document about this event are available at the document page of the QUOVADIS web site.

More information can be found in the WP Report of Deliverable D 9.2.1: "Abstract, including regular updates. Project presentation slides, packages presentation, written abstracts, posters, dissemination

material, etc. Presentational material including abstracts, visuals including photographic material, interviews”.

The activity (1996) has been finalised to the organisation of the Workshop in Larnaca (Cyprus) that results in the schedule given at the QUOVADIS web site <http://quovadis.cesiricerca.it/>.

For the preparation of the workshop a preliminary meeting with the Ministry of Agriculture, Natural Resources and Environment of the Cyprus Republic took place at the end of January, 2006, with the participation of CESI RICERCA and JRC-IES. The workshop was very interesting and successful both for local people and QUOVADIS Stakeholders with a great and significant change of opinions and experiences.

Documents, including list of participants, and preliminary conclusion as available at the QUOVADIS web site. The preparation of the proceeding is in progress and in will be published by the Commission with the co-operation of JRC-IES. All the available document about this event, including slides of the presentations, are available at the QUOVADIS web site.

During the last year (2007) the activity was finalised to:

- preparation of a paper to be submitted to Energy Policy, entitled “Quality Management Organisation, Validation of Standards, Developments and Inquiries for Solid-Recovered Fuels - An Overview on the QUOVADIS-Project". This paper has published in Energy Policy.
- organisation of the event:: QUOVADIS Consortium Meeting, Steering Committee And Workshop: Classification, Characterisation And Quality Management Of Solid Recovered Fuels. This event is being to be organised with the contribution of APAT (Italian National Environment Agency) and will take place in Roma on October 23-25, 2007.

PROGRAM OF THE EVENT

FIRST DAY: from 2 p.m. to 6 p.m.

Steering Committee

SECOND DAY: from 9 a.m. to 5 p.m.

Workshop (Draft Agenda)

- Quality management (CTI)
- Classification of SFR (INFA)
- Characterisation of SRF:
- Chemical parameters (CESI RICERCA, ENEL, VTT)
- Physical parameters (IVD)
- Determination of the biodegradable fraction of SRF (INFA)
- The validation exercise (JRC)

THIRD DAY : from 9 a.m. to 4 p.m.

Consortium Meeting

The Workshop was very successfully with the participation of about 35 person of different Organisation. Documents, including list of participants and final programme are available at the QUOVADIS web site. The preparation of the proceeding is in progress and in will be published by the Commission with the co-operation of JRC-IES. All the available document about this event, including slides of the presentations, are available at the QUOVADIS web site.

Status of deliverables and milestones

All the deliverables scheduled in the QUOVADI Project has been concluded and delivered to the Commission. Furthermore all the produced deliverables are available at the Report section of the QUOVADIS website (<http://quovadis.cesiricerca.it>)

3.2 Deviations from the project work plan

No deviation from the scheduled working plane occurred to within the reporting period.

3.3 Up-date of time

N.A.

3.4 List of deliverables

All the deliverables scheduled in the QUOVADIS Project have been produced and delivered to the Commission.

4 Performance indicators

The success of the proposal, according to the project's objectives, is judged against the following fundamental criteria:

- the availability at the end of the project of a set of validated TS ready to be upgraded to EN;
- recommendation to CEN/TC 343 on how to modify the TS so as to upgrade them to TS.

However the results of the validation exercise turn out, the output of the project shall be such as to guarantee the upgrading of the TS to EN in a short period. This implies that the recommendations to CEN/TC 343 for amendments of the TS will include detailed and technically justified suggestions.

Moreover, an important phase to check the results of the proposal will be the assessments to be made by the project's Steering Committee of the final key documents reporting the results of the validation exercise.

These assessments will make it possible to receive feedback from the sector's stakeholders on the effectiveness and efficiency of the validated TS, thus providing a rapid and valid opinion on the likely acceptability in the market of the EN that will be published after the end of the project.

Regarding performance indicators for the criteria described above, a detailed set of milestones, expected results and deliverables is included in the proposal and can be used by the co-ordinator, the participants and third parties, to assess the performance and degree of fulfilment of the project's objectives.

Up to now all scheduled actions has been done according to the original schedule. In particular:

- the Steering Committee has been appointed and three meetings have been held (Brussels on March 15, Ispra on December 5, 2005 and Larnaca on June 21, 2006) with a good stakeholders participation. Its advisory function resulted very useful, mainly to solve the problems concerning data collection of SRF production and quality;
- the liaison with CEN/TC 343 is very good also in consideration of the fact that many WP leader are steering the related WGs. The first great interaction was the evaluation of deliverables D4.2 "Results of ruggedness testing of the sampling procedures" and D4.3 "Report on the validation of the sampling procedures including recommendations to TC 343 for the eventual revision of the TS before its upgrade to a European Standard (EN)". Presentation was done in Vienna on May 8 and 9, 2006.

In conclusion looking at the proposed indicators, no particular or immediate problems about QUOVADIS success can be found.

Annex 1 to the QUOVADIS Confidential Management Report

Overview on the current status of deliverables due in the last period of the QUOVADIS Project (01/07/2006 -31/12/2007)

Participant Short Name	Expenditure at 6 - 2007 in %									Total %
	Co-ordination	Quality Management and Classification	Organisation of Validation Exercises	Sampling	Physical Parameters	Chemical Parametres	Biological Parameters	Data Collection in Accessing Caountries	Dissemination	
CESI Ricerca	110					105		105	100	105
CTI		100								100
JRC			100							100
TAUW				100						100
IVD			100		100					100
INFA		100		100			100			100
ENEL						84				84
CREED		120								120
GREEN		100								100
GEOCYCLE			100							100
STRAT			100							100
VTT				227	100	100				108
REMONDIS		100								100
SLU					100					100
CNR					100					100
TOTAL	110	104	100	106	100	100	100	105	100	102

Annex 2 to the QUOVADIS Confidential Management Report

Overview table on the state of advancement (in %) of the budget expenditure per partner and per work package in all the period covered by QUOVADIS Project (01/01/2005 – 31/12/2007)

MONTH	WP	DELIVERABLE	CONTENT	TYPE OF DOCUMENT
33	WP 2	D2.7	Model manual(s) for the site-specific implementation of QM	Technical Report
33	WP 2	D2.8	Results of the implementation of QM at selected sites, so as to check the validity of the draft TS on QM for SRF and to provide recommendations to TC 343 for the validation or eventual revision of the TS before its upgrade to a EN	Technical Report
33	WP 3	D3.5	Final results of intercomparison exercises and ruggedness testing	Technical Report
33	WP 5	D5.3	Final Report on ruggedness testing of physical parameters including recommendations to TC 343 for the eventual revision of the TS before its upgrade to a European Standard (EN)	Technical Report
33	WP 7	D7.1	Draft reference document for the validation of biological parameters including details about validation exercise	Technical Report
33	WP 7	D7.2	Raw results of ruggedness testing on biological parameters	Technical Report
33	WP 7	D7.3	Raw results of validation testing on biological parameters	Technical Report
33	WP 7	D7.4	Reference values for the determination of biodegradable/biogenic material in SRF including recommendations to TC 343 for the eventual revision of the TS before its upgrade to a European Standard (EN)	Technical Report
33	WP 8	D8.3	Overview of waste-management strategies in NMS	Technical Report
36	WP 1	D1.3	Final Report of QUOVADIS - Confidential Management Report	Technical Report
36	WP 1	D1.9	Final Report of QUOVADIS - Publishable Result-Oriented Report	Technical Report
36	WP 9.2	D9.2.3	Abstract, including regular updates. Project presentation slides, packages presentation, written abstracts, posters, dissemination material, etc. Presentational material including abstracts, visuals including photographic material, interviews	Technical Report
36	WP 9.1	D9.1.5	Results and follow-up of the first dissemination conference including slide packages, presentations, written abstracts, posters, dissemination material, etc.	Technical Report

No significant deviation between forecast and the reported progress percentage occurred, apart for GREENLAND which spent more time than expected to collect data end information about SRF production in Europe.