

## **MID-TERM REPORT**

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**PROJECT N° : FIS5-2002-00040**

**ACRONYM : SAGE**

**TITLE :**

STRATEGIES AND GUIDANCE FOR ESTABLISHING A PRACTICAL RADIOLOGICAL PROTECTION CULTURE IN EUROPE IN CASE OF LONG-TERM RADIOACTIVE CONTAMINATION AFTER A NUCLEAR ACCIDENT

**PROJECT CO-ORDINATOR :**

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**PARTNERS :**

GSF (Forschungszentrum für Umwelt und Gesundheit GmbH), Germany. (Partner no 2)

NRPB (National Radiological Protection Board), United Kingdom. (Partner no 3)

BB RIR (Brest Branch of the Research Institute of Radiology), Belarus. (Partner no 4)

BELRAD (Belarussian Radiological Safety Institute), Belarus. (Partner no 5)

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## **2. EXECUTIVE SUMMARY**

The overall objective of the SAGE Project is to contribute to the development of strategies and guidance for implementing and disseminating a radiological protection culture in Western Europe, in case of a nuclear incident or accident with long-term radiological consequences. The main output of the project will be a handbook on radiation monitoring and protection. This includes comprehensive guidance for the health authorities, nurses, medical doctors in the private and public sectors, medical social workers, etc, and the general population on practical advice to follow in a contaminated territory in order to avoid unnecessary exposures in the course of day-to-day activities and to adopt a responsible and prudent attitude with regard to the protection of health. Other important roles within communities are also considered. These could include local government officials, elected representatives, teachers, NGOs, etc.

The Project is developed based on both a detailed analysis of the current strategies, guidance and organisational arrangements that have been implemented in France, Germany and United-Kingdom to cope with long term radioactive contamination in case of a nuclear accident and the extended experience gained in Belarus associated with the practical management of the consequences of the Chernobyl accident over the last 17 years.

To ensure the applicability of the proposed set of strategies and guidance to the Western European context, European end-users are involved in the context of the preparation of the handbook through stakeholders panels run in France, Germany and UK. The panels are composed of professionals involved in the public health area (such as nurses, midwives, medical doctors, radiation protection experts and medical social workers) as well as representatives of the local population. A panel of local stakeholders from the contaminated territories in Belarus also contributes to the development of the strategies and guidance and evaluate the practicability of the proposed radiation monitoring and protection system including the detailed identification of all technical, economical and social implications.

### **3. OBJECTIVES AND STRATEGIC ASPECTS**

The aim of the project is to develop procedures, tools and guidance that could be used by health professionals and the population in the event of a long-term contamination situation. These would concern the following:

- Organisation of health care activities to take account of this situation within day-to-day practice, particularly through the implementation of an "inclusive" radiation monitoring system to measure external and internal exposure of the population and the contamination of foodstuffs.
- Advice for the health care professionals and the general public on the various aspects of the practical radiological protection culture needed in a contaminated environment resulting from a nuclear accident.

The key output of the project will be a handbook on radiation monitoring and protection of the population. In the handbook, professionals will find guidance on the setting up of the basic infrastructure and procedures to operate an inclusive radiation monitoring system; they will also find advice to help them in having an efficient dialogue with their patients. The general public will find a comprehensive practical information on ways in which unnecessary exposures can be avoided when using or living within a contaminated area on a day-to-day basis. Advice will also be provided on the adoption of a responsible and prudent attitude with regard to the protection of health, particularly for children or other critical population groups.

A workshop will be organised toward the end of the project to give the opportunity to relevant European stakeholders (health professionals, public health authorities, NGOs, etc) to bring their views and interact with all the project partners.

## 4. SCIENTIFIC AND TECHNICAL ASSESSMENT

### 4.1. Technical state of the research

The preliminary results of the work packages are presented hereafter.

#### 4.1.1. Project scientific coordination (WP1)

As scheduled, three coordination meetings have been organised during the reporting period. The first coordination meeting, took place in Fontenay-aux-Roses, France, in November 2002, at CEPN facilities; the second coordination meeting took place in Pinsk, Belarus, in June 2003, hosted by the Brest-Branch of the Research Institute of Radiology. The third coordination meeting took place in Paris, in November 2003 at the ‘*Conservatoire National des Arts et Métiers*’ premises.

A public website has been constructed since the beginning of the project. The progress of the project can be consulted there (<http://www.ec-sage.net/>) and all available documents can be downloaded by the SAGE partners from the private area (‘for partners only’) of the website.

The format and objectives of the dissemination Workshop which will take place in February/March 2005 began to be prepared during the present reporting period.

#### 4.1.2. Review of infrastructures in France, Germany and the United Kingdom (WP2)

The overall objective of WP2 is to evaluate the state of preparation of Western European countries in case of long term radioactive contamination of the environment, as far as the radiation monitoring of the situation and the involvement of stakeholders are concerned.

During the reporting period, information about the emergency preparedness and operating organisations (in France, Germany and the United Kingdom) in case of a nuclear incident were compiled by partners. Three contributions were drafted and then, compiled into a single draft report which includes:

- A description of the regulatory frameworks related to the post-accidental situations in France, Germany and UK.
- An overview of existing organisations on a local and national level responsible during the emergency phase and for post-accidental long term phases. This chapter also includes - mainly for France - the technical capabilities for measurements, analysis

and dose assessments and for medical support. It also briefly describes the existing measurement programmes to monitoring nuclear facilities and environment.

- A list of the available professional training courses related to post-accidental management (especially for professionals from the medical sector).

#### 4.1.3. Feedback experience in Belarus (WP3)

The objective of WP3 is to draw the lessons from 17 years of practical experience in Belarus in the management of the long term contamination from Chernobyl accident as far as the monitoring of the situation and the involvement of the stakeholders are concerned (including the ETHOS project).

The first draft report written during the reporting period mainly describe human and technical resources implemented to reduce the consequences of the accident during the ‘emergency phase’.

The second draft report is more devoted to a description of the system implemented in Belarus to manage the radiological situation and especially, the chronic low-dose irradiation. It mainly includes the following issues:

- The evolution of the principles, rules and laws dealing with the radiation protection of Belarusian population, and the development of a specific regulatory framework between 1986 and 2003;
- The involvement of State institutions vs. non governmental organisations and their interaction - and interferences - in overcoming the consequences of the Chernobyl accident.
- Organisation of the radiation monitoring of agricultural holdings and foodstuffs;
- Organisation of the methodological and technical radiation monitoring of public internal contamination and exposures.

The final report will synthetize both reports mentioned above with specific considerations on the analysis of the experience which consisted to enhance the radiological culture of

people who live in the contaminated territories, and the evaluation of emerging problems. It will point out feedback experience in finding solutions and ways for further improvement.

#### 4.1.4. Preparation of a handbook on practical RP culture in case of a nuclear accident (WP4)

A draft version of the handbook, was prepared and circulated between all partners of the project and then discussed during national stakeholder panels meetings for critical review. The structure which was finally adopted is a modular leaflet primarily tackling the “Questionings” of the concerned actors of the society: *e.g.* the general population, the health professionals, the responsible bodies for radiation monitoring and the co-ordinating and advisory bodies. From these questionings, different “Topics” are further developed through “Technical sheets” which provide more description on technical aspects.

Up to now, two versions of the handbook have been discussed during the national stakeholder panels meetings. The latest (second) version of the handbook has four ‘entry points’ depending on the user (*e.g.* the householder, health professional, measurement professional, stakeholder advisory board). Each entry point is subdivided into a number of key topics based on the concerns of the user. These topics are linked to technical sheets which contain more detailed information often of a practical nature. The final handbook will be produced in a loose-leaf modular format to facilitate revisions and updates.

The handbook contains comprehensive guidance for an inclusive radiation monitoring, based on the findings from the ETHOS experience, and should provide the concerned actors of a contaminated territory with basic practical means to evaluate and directly participate in the management of the radiological situation. This handbook is to be accessible to the general population and the administrations, the local elected representatives and all concerned professionals but primarily the health professionals.

The inclusive system of radiation monitoring and protection is articulated around five main entities:

1. The householder: the handbook will provide the householder with practical information that can help in answering his questions related to radioactivity. It will also enable the

householder to get a grip on the situation. Examples of actions that can be taken by the householder include measurements of ambient dose rate and visits to monitoring stations where measurement professionals can assess contamination levels in foodstuffs and the body. The handbook will also suggest that the householder be given access to reference information and simple tools to interpret different radiological data, etc;

2. The health professionals: they are particularly well placed to help the householder tackle questions about radioactivity and its effects on health. They can assess the individual's situation in view of the results of radiological measurements (ambient dose rates, foodstuffs and body contamination), propose corrective actions, and make suggestions about making complementary measurements. Furthermore, they will have an understanding of the exposure mechanisms, and be able to put the individual's situation into perspective by reference to statistical data on the radiological situation at the local, regional or national levels. Health professionals can alert in case of critical situation. Thus they remain privileged interlocutors for the persons they meet, with regard to the elements of radiation protection culture. It must be noted that the health professionals are not limited to the "doctors", but would include the staff of hospitals, nurses, pharmacists, as well as school doctors and company doctors;
3. The professionals with responsibility for measurements: these professionals have responsibility for measuring the contamination present in foodstuffs and in the human body. They immediately return the results to the householder via a "personalised measure sheet". If measurements indicate high levels of contamination the measurement professional can refer the householder towards other sources of information or points of contact (i.e. the health professionals, the stakeholder advisory board). Periodically the measurement data are also transferred to the stakeholder advisory board. It is important to note that the measurement professional must be able to obtain the necessary information for them to have a global vision of the situation (i.e. from feedback from the stakeholder advisory board). They can also provide information and advice about ambient dose rates at the local level. These functions are relatively new in our societies and need to be further concretely defined;
4. The stakeholder advisory board: the stakeholder advisory board is organised at the level of a village or a municipality. It has a social function to collate and integrate the data on the



local radiological situation, and to interpret these data in the context of the more global situation. The work of the stakeholder advisory board is not only of a technical nature. It works with representatives from administrations, local elected representatives and non-governmental organisations to facilitate the exchange of information about the radiological situation for the whole of society and to better adjust the strategies of the various sectors. It also oversees the proper functioning of the radiation monitoring system. It makes sure of the availability, the reliability (quality insurance) and the pluralism of the sources of measurements. Furthermore it ensures the adaptation of the system according to the social demand and to the evolution of the legal and regulatory framework;

5. The measurement: the radiological measurement constitutes a key point of the whole system of radiation monitoring and protection. It provides information on the situation and its evolution with time. The measurement must be reliable and accepted by all affected stakeholders. It must reveal to them practical information that opens possibilities for action and improvement. Several criteria are essential to meet requirements for the provision of reliable measurements including:

- The proximity of food measuring points close to households and easy access to whole body monitoring equipment , including mobile systems;
- The existence of several independent sources of measurement (e.g. pluralism);
- The coherence of the used measurement units.

The measurement should not only be used to prove compliance with statutory regulations (e.g. ‘maximum permitted levels’ in foodstuffs or ‘dose limits’) but also to supply quantitative and qualitative information to stakeholders and affected individuals on where, when and how they are exposed to radiation, even when levels of contamination are relatively low.

#### 4.1.5. Running of Western stakeholders panel (WP5)

The composition of stakeholder panels in UK, France, Germany and Belarus has been established. Stakeholders include people belonging to environmental local organisations, regulatory bodies, senior public health physicians, doctors, nurses, dosimetrists, teachers and experts in communication, etc. The inaugural meetings of panels in France, Belarus, UK and Germany were convened during the second semester 2003. The working procedures for the different panels were also established. Stakeholders from each of the national panels were

keen to participate in the project and to contribute to a handbook that would benefit long-term rehabilitation in Western Europe following a nuclear accident (or large radioactive contamination). In France and Belarus, it was agreed that the main panel would provide feedback on the handbook. The UK group agreed to take on responsibility for the setting up of several satellite stakeholder panels in different regions of the UK, to evaluate the applicability of the handbook.

## **4.2. Comparison of achieved objectives and stated objectives**

### 4.2.1. Project scientific coordination (WP1)

Neither milestone or deliverable in relation with WP1 were expected during the first 15 months of the project.

As far as the final workshop is concerned (deliverable no 5), discussions during the 3rd SAGE coordination meeting led partners to envisage to enlarge the programme and consequently, the duration of the initial concept.

The final workshop is planned to take place in Paris in February 2005. It will last 2.5 days with one day devoted to work in small groups. A specific session of the workshop will be devoted to the presentation of concrete Western European experiences of the long-term post accidental management.

A first estimation of the workshop budget is approximately 15 k€ taking into account that the meeting rooms will be provided at very low cost by the '*Conseatoire National des Arts et Métiers*'. This extra budget was not quoted in the initial SAGE budget. Consequently, the SAGE coordinator started to look for sponsors in France, UK and Germany. However, **a specific contribution is requested to the Commission.**

### 4.2.2. Review of infrastructures in France, Germany and the United Kingdom (WP2)

The corresponding deliverable (a report) was initially scheduled in month 9, but during the kick-off meeting of the project, SAGE Members have considered that, in order to make the content coherent with the outcomes of the (WP3), it would be necessary to postpone the issuing of deliverable 1 to month no 15.

As expected, three single reports, which describe the English, German and French infrastructures and organisations in case of an accident, were all written and sent to the WPL

at month no 14 (Milestone no 1). As mentioned above, the final report (deliverable no 1), which is synthetic of the three above, was expected at month no 15 (December 2003), but, as already mentioned in the second 6-months management report its issuing will be a few weeks late (month 17).

#### 4.2.3. Feedback experience in Belarus (WP3)

The two Belarussian partners (BB-RIR and BELRAD) worked separately on the work package no 3, and both provided a report at month no 13. It was decided during the third coordination meeting to merge these two reports into a single one (deliverable no 2) with the structure that was agreed during the second coordination meeting. In order to achieve this objective, the SAGE coordinator (CEPN) proposed to help WP3's WPL in finalising the report. Then, as already mentioned in the second 6-months management report, the issuing of deliverable 2, initially expected at month 15, will be a few weeks late (month 17).

#### 4.2.4. Preparation of a handbook on practical RP culture in case of a nuclear accident (WP4)

Since September 2003 (M11), a first draft version of the handbook was circulated and discussed between partners as well as with the participants of the French stakeholder panel. A final draft version of the handbook is expected end of March (M18: Milestone no 2).

#### 4.2.5. Running of Western stakeholders panel (WP5)

All stakeholder panels were constituted earlier than initially expected. They all met once or twice during the reporting period.

## **5. LIST OF DELIVERABLES**

No deliverable was expected during the first period of the contract except both reports mentioned in §4.2.2. and §4.2.3. which will be issued at month no. 17.

## **6. DISSEMINATION AND USE OF THE RESULTS**

As already mentioned, a web site (<http://www.ec-sage.net/>) dedicated to the SAGE project was issued in March 2003. It presents the background, the objectives of the project, as well as partners, work packages, milestones and the project progress. A specific section available only to partners presents all the working documents of the teams (draft reports, slide presentations, stakeholders panels meeting minutes...).

A poster presentation of the SAGE project objectives was performed during the National Congress of the French Society for Radiological Protection (SFRP), which took place in Montpellier in June 2003 (available in French only). The abstract is downloadable on the SAGE website ([http://www.ec-sage.net/D03\\_01.pdf](http://www.ec-sage.net/D03_01.pdf)).<sup>1</sup>

An abstract entitled « Strategies and guidance for establishing a practical radiation protection culture in Europe in case of long term radioactive contamination after a nuclear accident: the sage project » was submitted for the IRPA-11 International Congress in Madrid, and accepted for oral presentation.

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<sup>1</sup>

CROÛAIL P., NESTERENKO V., NISBET A., VOIGT G., SUDAS A. « Stratégies pour le développement d'une culture de protection radiologique pratique en Europe en cas de contamination radioactive à long terme suite à un accident nucléaire. »

## **7. MANAGEMENT AND CO-ORDINATION ASPECTS**

### **7.1. Performance of the consortium**

All partners have actively participated to the three coordination meetings organised in the first mid-part of the project. These meeting have been efficient for distributing the work among partners.

Based on past experience with stakeholders panels (eg. « Farming » project) WP5 started earlier than planned. As a consequence, 5 stakeholder panels were organised during the reporting period (two in France, one in the UK, 1 in Germany and one. They were very efficient with a strong motivation of the participants. It is to note that the number of participants in the French panel increased between the first and the second meeting and further request have been received for participation.

Although, the work with Belarussian partners is globally satisfactory, there are some difficulties related to their lack of experience with international projects, particularly as far as the structuration and the homogeneity of the quality of documents are concerned.

During the reporting period exchanges of information between partners were efficient. However, it is to note that Mrs G. Voigt from GRS left the project in Spring 2003. She was first replaced by Mrs Shemiakina who participated to one coordination meeting and then by Mrs I. Fiedler who joined temporarily the project in Summer 2003. These successive changes have impacted the development of WP2.

### **7.2. Manpower allocation**

See Table 1 , next page.

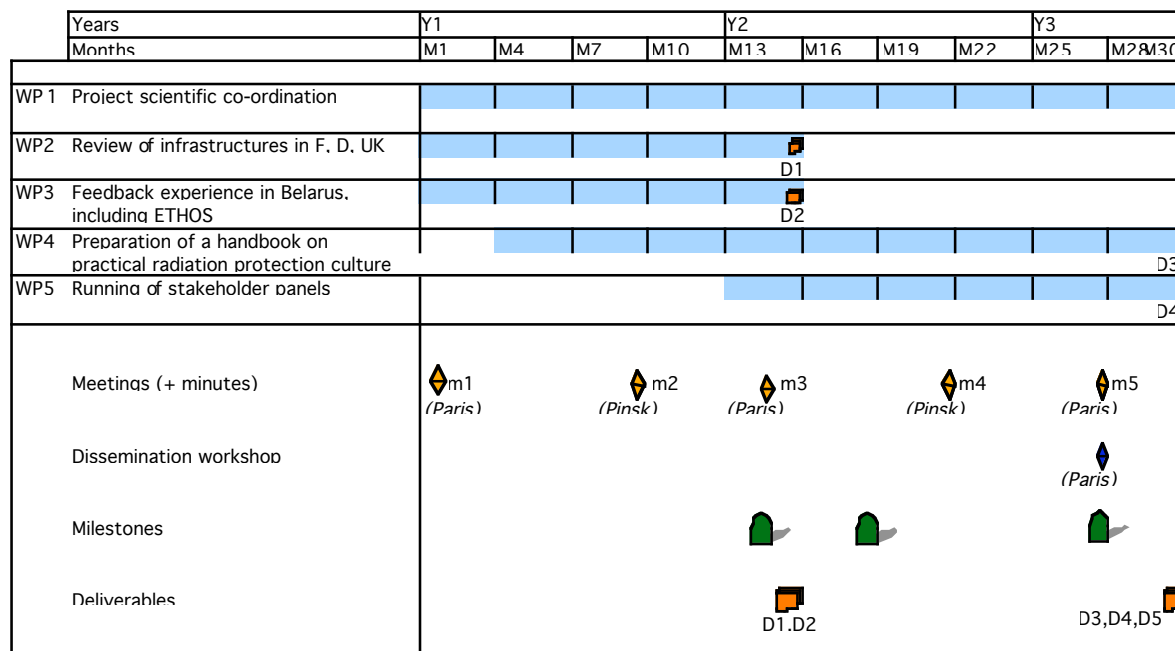
**Table 1. SAGE Man Power and Progress Follow-up Table (mid-term)**

**SAGE Man Power and Progress Follow-up Table - Contract FIKR-CT2002-00205 (mid term)**

Work Packages (n°/title)	Partner (Name, abbrev.)	Man-Months									Technical Progress		
		Planned efforts at start of period (MM)				Actual Effort (MM)	Forecast Effort (MM)			Deviation (MM)	Planned (%)	Assessed (%)	Deviation (%)
		Year 1	Year 2	Year 3	Total	at Mid-term (Dec 2003)	Year 2	Year 3	Total	Total	mid-term	mid-term	mid-term
		a	b	c	d	a1	b1	c1	d1=a1+b1+c1	d1-d			negative number = in advance
WP1 Project Scientific Co-Ordination	CEPN	1,60	1,10	0,80	3,50	2,00	1,00	0,80	3,80	0,30	57%	53%	4%
	GSF	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.
	NRPB	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.
	BBRIR	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.
	BELRAD	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.
	<b>TOTAL WP1</b>	<b>1,60</b>	<b>1,10</b>	<b>0,80</b>	<b>3,50</b>	2,00	1,00	0,80	3,80	0,30	57%	53%	4%
WP2 Review of Infrastructure in France, Germany and the UK	CEPN	0,75	0,25	0,00	1,00	1,00	0,25	0,00	1,00	0,00	100%	100%	0%
	GSF	3,25	0,75	0,00	4,00	4,75	0,25	0,00	5,00	1,00	100%	95%	5%
	NRPB	0,75	0,25	0,00	1,00	1,00	0,00	0,00	1,00	0,00	100%	100%	0%
	BBRIR	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.
	BELRAD	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.
	<b>TOTAL WP2</b>	<b>4,75</b>	<b>1,25</b>	<b>0,00</b>	<b>6,00</b>	6,75	0,25	0,00	7,00	1,00	100%	96%	4%
WP3 Feedback Experience in Belarus including ETHOS	CEPN	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.
	GSF	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.
	NRPB	-	-	-	-	-	-	-	-	-	n.a.	n.a.	n.a.
	BBRIR	12,00	3,00	0,00	15,00	22,00	1,00	0,00	23,00	8,00	100%	96%	4%
	BELRAD	9,50	0,50	0,00	10,00	14,00	2,00	0,00	16,00	6,00	100%	88%	13%
	<b>TOTAL WP3</b>	<b>21,50</b>	<b>3,50</b>	<b>0,00</b>	<b>25,00</b>	36,00	3,00	0,00	39,00	14,00	100%	92%	8%
WP4 Preparation of a handbook on practical RP culture in case of a nuclear accident	CEPN	2,00	2,50	1,50	6,00	2,00	2,50	1,50	6,00	0,00	33%	33%	0%
	GSF	0,00	2,50	1,50	4,00	-	2,50	1,50	4,00	0,00	n.a.	n.a.	n.a.
	NRPB	0,00	1,00	1,00	2,00	-	1,00	1,00	2,00	0,00	n.a.	n.a.	n.a.
	BBRIR	21,00	20,00	10,00	51,00	38,00	20,00	10,00	68,00	17,00	40%	56%	-16%
	BELRAD	13,00	16,50	2,50	32,00	18,00	16,50	2,50	37,00	5,00	40%	49%	-9%
	<b>TOTAL WP4</b>	<b>36,00</b>	<b>42,50</b>	<b>16,50</b>	<b>95,00</b>	58,00	42,50	16,50	117,00	22,00	35%	50%	-15%
WP5 Running of Western stakeholder panels	CEPN	1,25	1,75	0,50	3,50	1,50	1,50	0,50	3,50	0,00	15%	43%	-28%
	GSF	1,25	1,75	0,50	3,50	1,25	1,75	0,50	3,50	0,00	15%	36%	-21%
	NRPB	0,25	2,75	2,00	5,00	1,25	1,75	2,00	5,00	0,00	15%	25%	-10%
	BBRIR	0,00	0,00	0,00	0,00	-	-	-	-	-	n.a.	n.a.	n.a.
	BELRAD	0,00	0,00	0,00	0,00	-	-	-	-	-	n.a.	n.a.	n.a.
	<b>TOTAL WP5</b>	<b>2,75</b>	<b>6,25</b>	<b>3,00</b>	<b>12,00</b>	4,00	5,00	3,00	12,00	0,00	25%	33%	-8%
<b>TOTALS</b> SAGE: FIKR-CT2002-00205	CEPN	5,60	5,60	2,80	14,00	6,50	5,00	2,80	14,30	0,30	50%	45%	5%
	GSF	4,50	5,00	2,00	11,50	6,00	4,50	2,00	12,50	1,00	50%	48%	2%
	NRPB	1,00	4,00	3,00	8,00	2,25	2,75	3,00	8,00	0,00	25%	28%	-3%
	BBRIR	33,00	23,00	10,00	66,00	60,00	21,00	10,00	91,00	25,00	59%	66%	-7%
	BELRAD	22,50	17,00	2,50	42,00	32,00	18,50	2,50	53,00	11,00	64%	60%	3%
	<b>TOTAL</b>	<b>66,60</b>	<b>54,60</b>	<b>20,30</b>	<b>141,50</b>	106,75	51,75	20,30	178,80	37,30	57%	60%	-3%

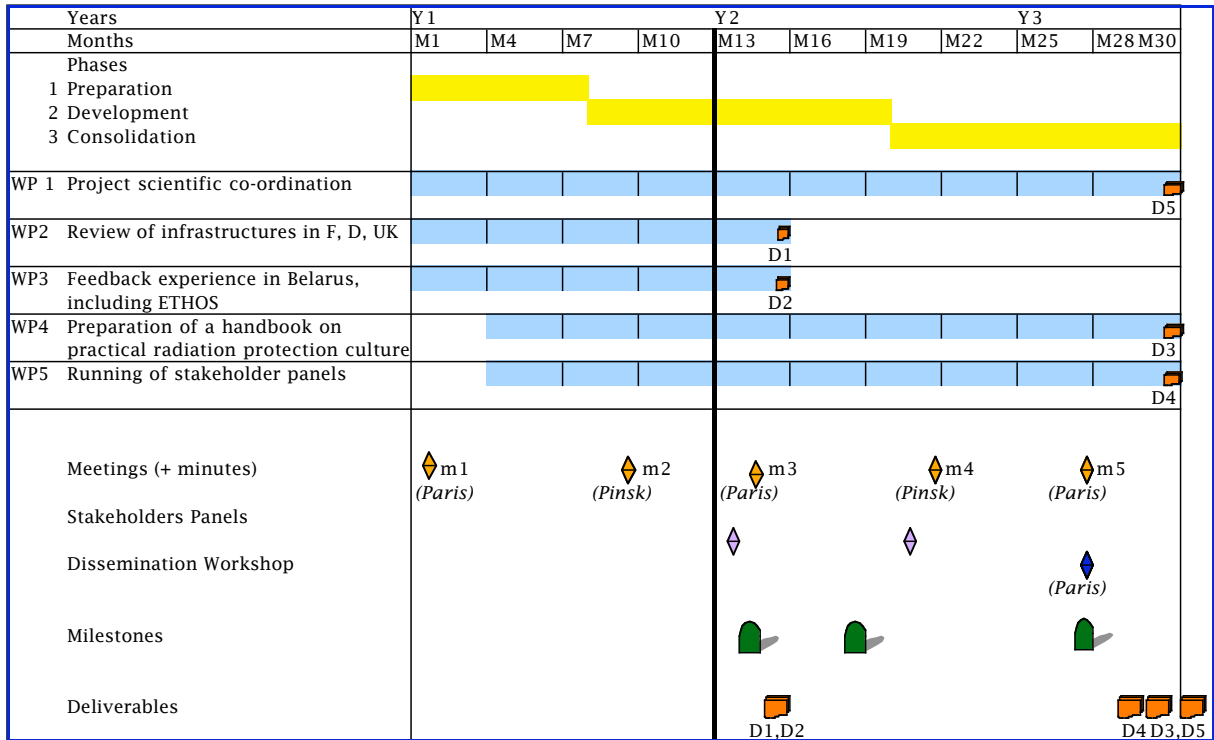
### 7.3. Work plan

Figures 1, 2 and 3 present the initial, the revised and the actual planning of activities, respectively.

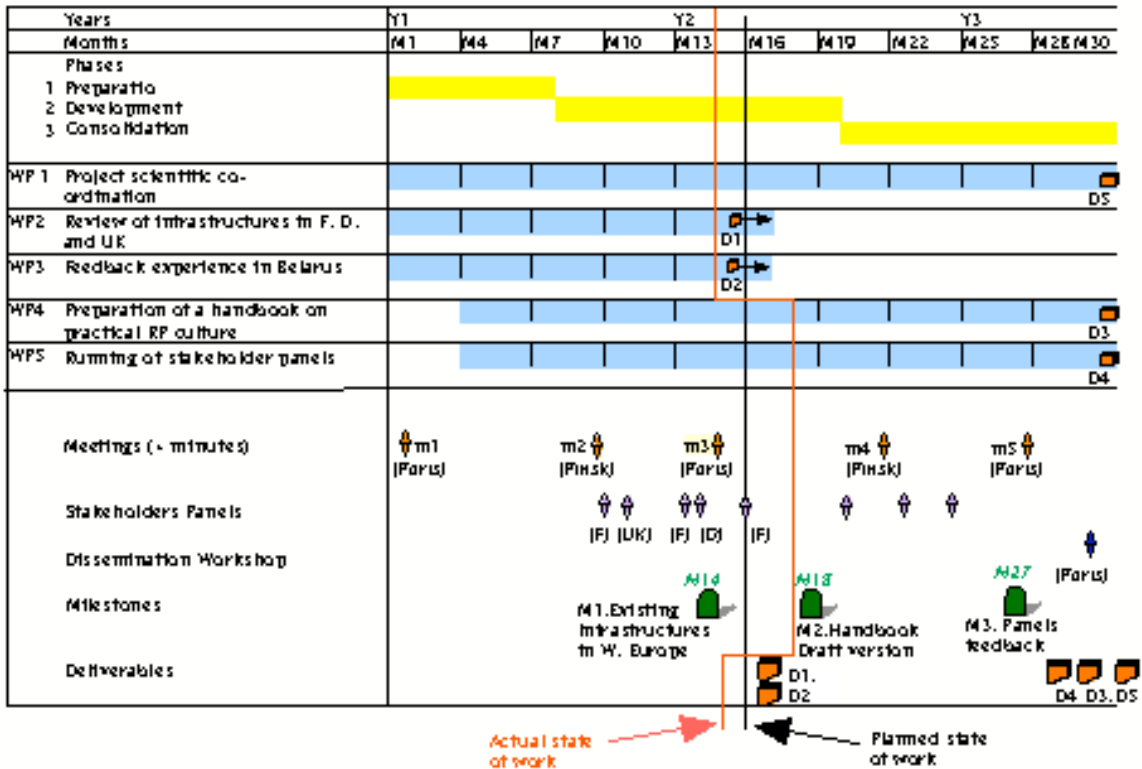


**Figure 1. Initial planning of activities**

To take into account the fact that WP5 work has been initiated earlier than originally planned, a new ‘Gantt chart’ of the SAGE project was issued at Month 12 (see Figure 2). The issuing of WP2 report was also postponed to M15.



**Figure 2. Revised planning of activities (as established at the second 6-months management report term)**



**Figure 3. Actual planning of activities**



## **8. CONCLUSIONS AND POSSIBLE REVIEW OF THE DESCRIPTION OF THE WORK**

Despite the slight delay in the development of three WPs, the current state of the project is in conformity with the initial plan.

The progress of works during the reporting period and the outputs from the stakeholders panels which were much higher than expected, show that it will be possible to finalize a handbook in due time. It is particularly obvious that this form of inclusive participation was and will be very beneficial for the overall quality of the project.

Taking into account the work achieved and the interest raised by the project among the stakeholders, all partners consider that the final dissemination workshop should have a higher profile than initially planned. In this perspective, a particular effort will be devoted at the start of the second period of the project to ensure a large participation and a high quality of the workshop.

In conclusion, all the partners stated that they wish to continue the development of the SAGE project.