# The IAEA's Programme on Environmental Modelling for RAdiation Safety (EMRAS II)

## EMRAS II
## Reference Approaches for Human Dose Assessment
## Working Group 2
## Reference Approaches to Modelling for Management and Remediation at "NORM and Legacy Sites"

# M I N U T E S

**of the Fourth Meeting and Site Visit, Limoges, France**
**27 September – 1 October 2010**

| IAEA Scientific Secretary | Working Group Leader |
|---|---|
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| Attending | |
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| **Name / Initials* / Email** | **Organization / Country** |
| Mr Justin Brown ***(JB)***<br>( justin.brown@nrpa.no) | Norwegian Radiation Protection Authority (NRPA), NORWAY |
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| Mr Dawid de Villiers ***(DdV)***<br>(dawid.devilliers@necsa.co.za) | Corporation Limited (NECSA),SOUTH AFRICA |
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| Ms Kremena Ivanova ***(KI)***<br>(k.ivanova@ncrrp.org) | National Centre of Radiobiology & Radiation Protection (NCRRP), BULGARIA |
| Mr Miroslav Jurda ***(MJ)***<br>(miroslav.jurda@sujb.cz) | State Office for Nuclear Safety (SÚJB), CZECH REPUBLIC |
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| Mr Juan Carlos Mora Cañadas ***(JCMC)***<br>(jc.mora@ciemat.es) | CIEMAT,SPAIN |
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*Initials used to refer to participants within minutes and actions as appropriate.

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## Monday, 27 September

*Presentations by Christian Andrés **(CA)** and Laurent Blaszczyk **(LB)** from AREVA, France*

***CA*** – Director for environmental management of all U mining sites in France (more than 220 sites).
***LB*** – Communication Manager.

AREVA is responsible for all of the steps in the uranium mining cycle, i.e., exploration, development (and research), mine operations, processing and site restoration and has 6500 employees in its mining department around the world.

The Limousin area has unusually high amounts of uranium, thus several locations were explored and exploited. The first mining was a military, secret activity.

First French mine, Henriette, in 1950. Exploitation until 1995. Main reclamation done by 1998. The last French mine was closed in 2001.

The aim was to produce yellow cake. Total French U production: 76 000 tons. 166 million tons of waste (no or very low U content ore, taken away before the mining starts - overload) and 51 million tons of tailings (waste after the processing). About 1% of the waste was re-used in the public domain.

Today Bessines is restored and 175 people are still working there to perform R&D for new U ore exploitation, keeping the 60 years data archives of all mining activities in France and the world undertaken by AREVA and their predecessors, maintaining the core and sample archives, running the mineral samples facility, keeping the storage of depleted uranium ($^{238}U_3O_8$), and running the thorium extraction facility (www.arevamed.com) to produce Pb-212 for cancer treatment (colon, ovaries, kidneys) from uraniumthorite from Madagascar.

An excellence centre will be established in Bessines in 2011/2012 for visitors to see the whole uranium history and the future applications.

AREVA was assigned by the government to remediate all of the 220 sites, even if many of them were not under AREVA's contol during exploitation. AREVA is paying for the remediations. So far they have spent around 65 million € in Limousin and a total of 150 million € in France for remediation. Annual expenses for monitoring and surveillance is today around 6–8 million €.

The responsibility of the long term surveillance might transfer back to the government in the future. This was done for old coal mines.

*Marie-Odile Gallerand **(MOG)**: IRSN involvement in post uranium mining issues*

IRSN performs research, e.g. the ageing of tailings in Bessines. AREVA is responsible for sampling, but AREVA and IRSN performs separate analyses and interpretations and meets to discuss results every other year.

IRSN contribute to the monitoring of the national territory – a new strategy of surveillance of former U mining sites to be implemented from 2011. Focus on regional/local site investigations every 3–4 years.

Performs measurements for public (national and regional authorities: MEEDM, DREAL, ASN) and private (e.g. AREVA) organisations.

IRSN public assignments in the uranium field:

— Assessment of technical reports by AREVA;
— Technical assessment of radiological situation in U mining (assessment reports, participation in CLIs set up around the sites);
— Running the national database for former U mining (MIMAUSA programme); and
— Field operations/visits and environmental measurements.

The national regulatory norms are the maximum upper level applicable. The prefect of a region can choose to set norms for a specific site lower than the national norms, but never higher.

Uranium mines and repositories are not defined as nuclear installations in the French law.

A circular from 2009, signed by ASN and the Ministry of Environment relative to the management of the former U mines for the attention for local authorities, lead to an action plan to pursue the management of the former U mining sites.

Stakeholder involvement is a national and European requirement, and the French have positive experience with this. The authorities encourage the continuation or establishment of CLIs for former U mining sites. IRSN has a new unit and budget for stakeholder involvement.

Example: the GEP (expert pluraliste group) was presented (www.gep-nucleaire.org). Final report issued 15 September 2010 that gives 15 recommendations. Summary in English.

***MOG*** presented the IRSN evaluation of the AREVA assessment reports on former U mining sites in Limousin and the recommendations by IRSN were:

— To be more restrictive regarding the uranium content of water discharges;
— To put in place a relevant surveillance network (sediment-trap, biological indexes, air quality, etc.);
— To take into account the surveillance of the diffuse flux (waste rock dump leaching, leakage from the mining system, etc.);
— To include the concern for ecosystems in the regulations and impact assessments;
— To undertake on-site experiments to obtain the data needed:
  - to better understand the hydrological functioning of the mining reservoir and to set out a mathematical model,
  - to better understand the transfer of radon from underground holes to dwellings;
— To consider the issues related to the re-use of waste rock in the public domain.

MIMAUSA – memory and impact of the former uranium mines. Accessible online at www.mimausa.fr, new version in January 2011.

The afternoon of Monday was spent on a site visit. First, we visited the water treatment stations at the Augère site. Then, a prototype pilot experiment for purification of waste water with grinded tree bark was demonstrated at a test site in Margnac by the company Pearl. The last visit was to the lake

Saint Pardoux where 10 000 $m^3$ of contaminated sediments due to run-off from uranium mines had been removed.

## Tuesday, 28 September 2010

The day was spent for a site visit to the remediated industrial site of Bessines where there were previously both mining and milling of uranium, the remediated Bellezane mining site and the Puy de l'Age mining site that had been turned into a lake for recreational purposes.

## Wednesday, 29 September

An introduction was made by ***AL*** reminding all participants where to find all previous presentations of WG2. (http://www-ns.iaea.org/projects/emras/emras2/working-groups/working-group-two.asp?s=8). Amended Agenda presented, no suggested changes. The following is a summary of all presentations given, as per the Agenda, details of which are included at the end of these Minutes.

*"Available data for the Limousin sites for modelling purposes" (Thierry Doursout **(TD)**)*

***TD*** presented the data from AREVA from the various sites we visited (presented previously during the January 2010 meeting in Vienna). ***TD*** will add data from pre-remediation obtained recently from AREVA and the data from IRSN, and synthesize all for the use by the group for modelling.

*"Enhanced Natural Radiation Exposure in China" (Wu Qifan **(WQ)**)*

***WQ*** gave a presentation on the situation in China. A high number of enterprises in mining (besides U mining and milling) are under detailed control due to radioactive by-products. The amounts of NORM waste comes especially from the industries concerning iron mining and refining (44%), and coal mining and combustion (29%).
An example from the Inner Mongolia BaoTou Iron mining company (BTISP) was presented. The ores are rich in thorium.
Measurements: airborne, ground measurements (in situ gamma and radon) and monitoring data.
BTISP produced $3.55 \times 10^6$ tons of ferrous slag annually. Some of the material was used for concrete, bricks, etc. The radon levels in houses using such material was about 4 times higher than for houses built with normal material. The Ra-226 levels in construction products were 25-83 Bq/kg and 212–331 Bq/kg for Th-230.
They need to perform dose assessments for the various sites, both for workers and the public.

*"Screening assessment of Gela site with ReCLAIM" (Kremena Ivanova **(KI)**)*

A screening assessment of the Gela site with ReCLAIM was presented by ***KI***.
How to decide the screening criteria? Can be challenging, but taking into account that a screening assessment is conservative, ***KI*** chose 1 mSv/y for the public as the screening level.
ReCLAIM has three modes of operation:

— Standard scenario;
— Site-specific parameters; and
— Site-specific scenarios.

The results of ReCLAIM satisfy the screening criteria, but the RESRAD onsite does not.
➔More realistic assumptions must be used and the screening criterion was reduced to 0.3 mSv/y.
ReCLAIM showed then 0.04 mSv/y. But then again RESRAD onsite shows higher doses.
***CN*** has values for radionuclides in water inside and outside the retaining wall and she will provide them to ***KI*** so that she can carry out the assessment again with this data.

*"Preliminary testing of the GAMP on the Gela site" (Juan Carlos Mora Cañadas **(JCMC)**)*

***JCMC*** presented a preliminary test of GAMP on the Gela site.
Problem: Quantify the radiological hazard to the public.
Future use: solar power plant after installing a cover (2 plastic lines and 2 m soil)

Objectives: primary and secondary.
If the screening criterion is set to 1000 Bq/kg for natural decay chains (ref. IAEA), there is no need to do anything. But if the decision maker wants a more detailed assessment, one can use other screening criteria such as 1–20 mSv/y (ICRP 103) or RP-122 which recommends 0.3 mSv/y for NORM industry. The last was used.
Screening assessment: background not considered, adults, transfer from soil to vegetables. Shows an effective dose of 1.9 mSv/y ➔ more realistic scenario must be performed. This was done with a recreational scenario. External radiation only for Ra-226, Pb-214, Bi-214 was 0.3 mSv/y. Radon would be in addition, so the doses are higher than the screening criteria.
Also other scenarios show that the screening criteria are not met.
Thus, proposes to remediate by putting in place a cover to reduce Rn and external gamma by a factor of 1000. Modelling showed that a soil cover of ~ 0.8 m would be sufficient for meeting the 0.3 mSv/y criteria.
For even more detailed assessments linked to proposing remediation options, more site specific data and realistic scenario parameters are needed.
RESRAD showed a peak after 2000 years, due to the total erosion of the soil cover, at ~1.1 mSv/y.

*Discussions on the Gela site and participants' modelling experience*

***VK*** clarified that the clearance level of 1000 Bq/kg means that over this level you should regulate and, below this level, you may regulate. For NORM sites, the material would usually be below the level but dose assessments are still justified based on a 0.3 mSv/y dose to the public.

***LM*** explained that they need to convince the regulators that the remediation done for chemical purposes is also sufficient for radiological purposes. The regulators have a higher fear of the radioactivity than necessary, realistically speaking, for the landfill site. The assessments done by the group are consistent with this, but the influence on drinking water, vegetables and fish is not assessed well enough. The next step in assessment would require even more data and effort. For the current situation, it might be easier to go out and monitor samples (but for prospective studies modelling is needed).

***CN*** informed the group that it has been suggested to dismantle the industrial buildings and that the scales will be stored in a closed space on the site. For the dismantling part it is the radiological concern that is of most concern (chemicals have been removed).

It has been valuable to ***CN*** and ***LM*** to discuss the Gela site with the WG2 participants. It is clear that Gela cannot be released for unrestricted use and that the phosphogypsum from Gela cannot be reused (e.g. for building roads) due to both radiological and other pollutants being present.

Other countries are reusing phosphogypsum, e.g., as an addition to cement, to building roads etc. This is usually regulated for chemical hazards, but not for radiological hazards. The regulation is often based on environmental impact assessments, not taking account of radiological impact. Some relevant presentations and documents concerning the reuse of phosphogypsum were discussed and made available to the group during the meeting.

*"General Assessment Methodology Process" (Richard O'Brien)*

Richard O'Brien presented the current version of the GAMP based on inputs from many people in the group. The presentation is on the WG2 web site. Some points from the discussions:
Refer to decision-makers rather than regulators and operators, to cover for national variations in regulatory system. It might be that different decision-makers request different assessments and there may also be some national regulations that require certain assessments.
The timing of these two needs to be switched: "Establish screening criteria" and "Detailed assessment".
For the model development, it is important that the monitoring people and modellers have the same understanding of the needs.

*"Testing GAMP at the Maralinga test site in Australia" (Richard O'Brien **(ROB)**)*

Testing the GAMP on the Maralinga former nuclear test site was presented by ***ROB***. The minor plutonium mechanics tests in 1957–1963 gave more contamination of the region than the atomic explosions of 1956–1957.
The first clean-up (Brumby) was supposed to leave the area in an acceptable situation, but measurements in 1984–1985 showed far higher levels than anticipated, including defined plutonium plumes from each minor trial. Most of the contamination was still within 10–20 cm of the surface (low rainfall).
Many different stakeholders were involved.
The Maralinga Technical Assessment Committee was established in 1993 to evaluate the risks and determine acceptable clean-up criteria (experts from Australia, USA and UK).
The critical group was indigenous people passing through and camping (and possibly hunting) on the site. Most critical pathway: inhalation of dust by children playing in the area.
Clean-up criteria set at 5 mSv/y for full-time occupancy by indigenous people living outstation lifestyle. The top 10–20 cm of soil was removed by scraping and placed in burial pits with thick soil covering level. Some of them underwent in-situ vitrification.
Total area scraped ~4 $km^2$. The clean-up was successful, residual doses were about 5 times lower than the clean-up criteria set.

*"Testing GAMP at the former Soeve mining site in Norway" (Justin Brown **(JB)**)*

Dose rates in some areas exceed 4 microGy/h. Activity concentrations exceed the proposed clearance levels, taken to be the screening levels.
Detailed assessment was done with the RESRAD-Offsite model. Results corresponded quite well with the dose rates measured and using a representative factor, predicting an annual dose of 3.5 mSv/y today, are steadily decreasing with time.
Also put up a bespoke model using Ecolego and calculating external doses using Kocher and Sjoreen (1985) (Microshield might be a better option for this). Dose-rates correspond to the measured values.
Possible remediation options presented, no decision taken by the authorities so far.
Need to discuss where in the document we discuss justification versus optimisation.
GAMP biased towards modelling where monitoring/empirical data collation might be equally valid?

## Thursday, 30 September

*"Does GAMP make the Belgian regulators happy?" (Stéphane Pepin **(SP)**)*

Important that it is clear that this is a radiological impact assessment process, not to be confused with decision-making process.
GAMP must be applicable for both generic questions, like remediation necessary or not? and specific questions like "Gela: could the dismantling waste be landfilled?" or "Belgium: could a jail be built on a former phosphogypsum stack?"
Need to be clear about differences between legacy sites and sites in operation.
GAMP corresponds well with phases/modules of the Belgian approach that will be part of official regulations.
In Belgium the guidelines says that at least 3 scenarios should be considered:

— Current use;
— Worst-case scenario; and
— Likely scenario (likely evolution in the use of the site).

The guidance indicates that doses:

< 1 mSv/y would usually not demand remediation
1-3 mSv/y remediation could be justified
> 3 mSv/y remediation always justified

Belgium uses screening criteria (measurable quantity), intervention criteria (dose) and clean-up criteria (operational quantities, e.g., activity concentrations).

GAMP was tested for both the Tessenderlo and Olen sites. For the Olen site, some preliminary modelling was done with RESRAD on-site and off-site. The results were higher than in a detailed study performed by SCK earlier. ***SP*** said he was not yet very skilled in RESRAD so it was difficult to assess the modelling results.
The GAMP needs a clear statement of uncertainties (sensitivity analysis…).
It is important to have good record keeping and that all of the assumptions and data used in the assessments are transparent, because what is acceptable today might not be acceptable tomorrow ➔ archive of data, reports and remediation activities would be essential if the case should be re-opened.
Discussion: need to make a distinction between criteria and standards.
The GAMP is for the expert/modellers who are advising the decision-makers and are restricted to existing sites in possible need of management and remediation (EMRAS II Working Group 1 is looking at operational releases).

*"An exercise: applying GAMP for Botuxim site" (Dejanira da Costa Lauria **(DCL))***

Th and U by-products were made into Cake II and deposited on site. It is defined as residues, not waste, so that it may be reused. The concentrations of U+Th may be up to 1820 Bq/g.
High concentrations of radionuclides in the Guard well, up to 4 Bq/l of radium.
Radiological criterion: 1 mSv/y
Modelling of various exposure pathways and media (air, surface water, fish…) using RESRAD offsite.
Results: max dose 0.44 mSv/y.
When using the ERICA tool, the doses to fish were as high as 732 microGy/h, thus exceeding both the ERICA screening criterion (10 microGy/h) and the US DOE one (400 microGy/h). The exposure pathways very different for human and biota, so both should be included.
Guidance on sensitivity analysis should be included.
Discussion: importance of radon and how to calculate radon exhalation rates. Should at least be able to give a range of possible values. UNSCEAR 2000 has an annex that describes how to assess this (http://www.unscear.org/docs/reports/annexb.pdf)
Discussions on the GAMP document
The group gave inputs to necessary changes/additions to the GAMP document, focussing on the responsibilities of the modellers while taking into account that a good dialogue with the decision-makers is necessary to be able to advise on site management and possible remediation.
The glossary needs to be in line with the glossary of the IAEA. A lot of discussion took place on the definitions of risk and harm, which is also linked to what are possible scenarios and their consequences. Scenario selection needs to be included – see ISAM methodology and possible IAEA documents. If we include site studies in annexes to the report, it will give examples of what the most important pathways are for various sites and situations.

*Modelling issues*

***AL*** asked the group to describe what kind of modelling activities they would like to perform during the coming year and a half:

***JCMC***: Wants to know which models are best for given situations. Validation of models – all to use the same model for a given scenario or to use different models for the same scenario.

***LWS***: Which scenarios are most probable to govern the remediation situation? USA has done lots of studies on 3 common scenarios: recreational (vacation), people who live on the site (intrusion), site used for industrial purposes, a golf course etc. Use standard scenarios for different sites and compare modelling results.

***GS***: Testing of the GAMP – these could be written up as examples. If several people used the same data set and model, we could compare the results and the interpretation. Propose to take one site and perform the FEPs analysis and develop a conceptual model for that given site/situation. (This was actually done during EMRAS Phase I by the NORM Working Group).

***SP***: Management of uncertainties when applying models. What are the critical parameters, sensitivity analysis ➔ give some guidance on the most relevant parameters in a generic way.

***KP***: Verification of models for PG stacks, the best way to monitor such stacks. The other issue is material polluted with NORM, would like to see how this is/could be managed.

***BV***: Sensitivity analysis + continue the derived limits for agricultural use of land.

***CY***: Uncertainties related to future use scenarios. We don't assign a probability to the scenario. We only look at parameter uncertainty (MC simulations e.g.). Could, e.g., run the model 1000 times to get a range of results that could be used to assess probabilities.

***ROB***: Would like to see modelling of real sites instead of hypothetical scenarios, e.g., Kevala. The Limousin sites would be very good for model validation.

***WQ***: Different models give different results. Have lots of data for Chinese sites and would like the group to use various models for the sites.

***TD***: Run as many models as possible for the sites in Limousin or build a conceptual model.

***DdV***: No experience in modelling so far, needs to get up to speed in learning about models like RESRAD. (He was advised by others to look at the EMRAS Phase I NORM WG report: http://www-ns.iaea.org/downloads/rw/projects/emras/final-reports/norm-final.pdf).

***JB***: Follow up modelling at Søve and also to participate in modelling of a particular site chosen by the group. Like to work more with RESRAD and ECOLEGO.

***MJ***: Has an open pit site with lots of data and would like people in the group to model.

***LM***: Would like to start using RESRAD but due to cuts in his institute not sure how much he can contribute. Would like the group to decide on a common site.

***KI***: Would like to have some guidance on which models would be suitable for different sites or scenarios. For instance, have a problem in Bulgaria of people swimming in tailing ponds and motor crossing on waste rock piles (***LWS*** told her this was included in a scenario in the EMRAS Phase I NORM WG report: http://www-ns.iaea.org/downloads/rw/projects/emras/final-reports/norm-final.pdf).

***CN***: Would like the group to choose one site and apply different models. She could provide an indoor environment model (MATEMATICA). Would give input to uncertainty and parameters criticality.

***DCL***: Better to choose one site and run different models for that site.

***VK***: Propose to organise all of the information on sites presented, exposure scenarios and modelling results including crucial parameters. Choosing one scenario and using different models would be preferable. The Limousin ones would be good since people are living close by.

Residential, recreational and industrial scenarios of various kinds could be assessed.

Could use the Limousin data both for assessing the current situation and for validating models if using the pre-remediation data.

There was agreement in the group that we would choose the three tailing repositories in Limousin and the Gartempe river. ***TD*** will combine and summarize all of the data for the group.

Concerning data: if some are missing, we could look for more at AREVA, at the IAEA or other.

***TD*** will take the lead on synthesizing the data in ArcGIS (ESRI). There is some free software available for reading the data.

***SP*** and ***LWS*** (and ***LM*** if possible) will sketch out the scenarios (link with ***TD***).

The group agreed to create sub-groups for modelling so that people could assist each other in using a given model:

CROM – Juan Carlos Mora Cañadas ***(JCMC)*** to lead
RESRAD – Charley Yu ***(CY)*** to lead + the model Mildos (for Rn emanation)
ERICA Tool – Justin Brown ***(JB)*** to lead
ReCLAIM – Kremena Ivanova ***(KI)*** to lead

Involvement of Quintessa – ***GS*** suggested to include people from Quintessa who are using the AMBER calculating tool. He volunteered to see how people in the UK evaluate Rn from similar sites.

Sites: Lavaugrasse, Le Brugeaud, Bellezane
Problem formulation: ~assess the doses to humans and biota for agricultural, residential and industrial scenarios, today and in the future.
Need to define a receptor and the exposed groups (human and biota) due to radionuclide concentrations in the receptor.
Keep to a reasonable number of scenarios due to the limited time, could expand with more scenarios with time.

In the first instance, run the model and give results so that we can compare models. Next step (after the 2011 meeting), include uncertainty and sensitivity analyses.

There was also a suggestion to model remediation at Gela since it is a closed site and fairly easy to model. ***CN*** and ***LM*** will continue to assist people with data etc., for those who would like to model Gela.

***WQ*** presented a specific site in China where he has data and would like the group to model impacts from the site. Due to the short time before the January 2011 meeting, it was proposed that ***WQ*** would give a more detailed study showing the site and data during the January 2011 meeting, and then the group could model the site after the meeting.

*Site visit + meeting experience, and ideas for next interim meeting:*

The group thought it was positive to incorporate a site visit in conjunction with a meeting and felt it was very useful to see the sites and discuss them with local representatives. There is a need to find a balance between the time for visits and the time spent for meetings (this time the group ran a bit short of time for the meeting). A different type of site would be good for the next time and it could be preferable to limit the site visit to one day in order to have more time for discussions. The site visit makes the modelling part easier because participants obtain a good understanding of the site characteristics, and the experience from one country is transferable to other countries.

Suggestions for next venue for the 2011 Interim Working Group Meeting (and possible) Site Visit:

— China (May or October);
— Argentina (Los Gigantes);
— Canada (ICRER 2011);
— Bulgaria; or
— Greece (Kevala).

Although some participants will attend the ICRER 2011 Conference in Canada (http://www.icrer.org/) a majority of the participants did not opt for this as the venue for the next site visit and interim meeting. There are already many side events planned for the conference which makes the schedule difficult. Also, the possible site visits are not near Hamilton where the conference is being organised.

Suggestions for a venue have been presented during earlier WG meetings and these ideas can be revisited. It was also proposed that people could investigate possibilities in their own country,

including a contact with the operator. Specific suggestions can be presented at the January 2011 meeting and a joint decision taken then for the time and venue of the next Interim WG Meeting.

***Any Other Business***

Presentation of our working group at the ICRER 2011 – deadline for abstracts 15 October 2011. ***AL*** to produce an abstract on the general objectives and results of WG2 and circulate to all participants in time before the deadline. Authors list: all active members in alphabetical order. ***ROB*** to produce an abstract on the Gela site and circulate to relevant people in the group.

***Action plan until January 2011 meeting:***

Minutes distributed to the group by 1 November 2010 ***(AL)***
***TD*** to synthesize all data by 15 November 2010 (more data with time)
***LWS*** and ***SP*** to sketch site specific scenarios by 15 November 2011 (more details with time)
Modelling during the period 15 November 2010 – 24 January 2011 by ***all participants***
Presentations of modelling results at the January 2011 meeting

Send comments for GAMP within two weeks
New version by mid-November
Last round for comments before Christmas
Final version by January 2011 meeting

## Next Meeting

The next (fifth) WG2 Meeting will take place as part of the Third EMRAS II Technical Meeting, being held at IAEA Headquarters in Vienna, 24–28 January 2011.

| WG2 MEETING AGENDA | | |
|---|---|---|
| **Monday, 27 September** | | |
| *09:00–10:30* | *AREVA presentation (Part 1) | Christian Andrés (AREVA, France) |
| ***10:30–11:00*** | ***COFFEE BREAK*** | |
| *11:00–12:00* | *AREVA presentation (Part 2) | Laurent Blaszczyk **(**AREVA, France) |
| *12:00–13:00* | *IRSN involvement in post uranium mining issues | Marie-Odile Gallerand **(**IRSN, France) |
| ***13:00–14:00*** | ***LUNCH BREAK*** | |
| ***14:00–18:00*** | *SITE VISIT* **to Augère, Margnac and Saint Perdoux** | |
| **Tuesday, 28 September** | | |
| ***09:00–17:00*** | ***SITE VISIT*** to Bessines, Bellazane and ***Puy de l'Age*** | |
| **Wednesday, 29 September** | | |
| *09:00–09:15* | Introduction | Astrid Liland, WGL (NRPA, Norway) |
| *09:15–09:35* | Available data for the *Limousin sites for modelling purposes | Thierry Doursout (IRSN, France) |
| *09:35–10:00* | Impressions from the site visits | All participants |
| *10:00–10:45* | Enhanced Natural Radiation Exposure (*ENRE) in China | Wu Qifan (Tsinghua University, China) |
| *10:45–11:15* | Screening assessment of Gela site with *ReCLAIM | Kremena Ivanova (NCRRP, Bulgaria) |
| ***11:15–11:45*** | ***COFFEE BREAK*** | |
| *11:45–12:15* | Preliminary testing of the GAMP on the *Gela site | Juan Carlos Mora Cañadas (CIEMAT, Spain) |
| *12:15–13:00* | Discussions on the Gela site and participants' modelling experience | All participants |
| ***13:00–14:00*** | ***LUNCH BREAK*** | |
| *14:00–14:45* | General Assessment Methodology Process (*GAMP) | Richard O'Brien (ARPANSA, Australia) |
| *14:45–15:15* | Testing GAMP at the *Maralinga test site in Australia | |
| ***15:15–15:45*** | ***COFFEE BREAK*** | |
| *15:45–16:30* | Testing GAMP at the former *Soeve mining site in Norway | Justin Brown (NRPA, Norway) |
| **Thursday, 30 September** | | |
| *09:00–09:45* | Does GAMP make the Belgian regulators happy? | Stéphane Pepin (FANC/AFCN, *Belgium) |
| *09:45–10:15* | An exercise: applying GAMP for *Botuxim site | Dejanira da Costa Lauria (IRD/CNEN, Brazil) |
| *10:15–11:00* | Discussions on the GAMP document including experience from national testing | All participants |
| ***11:00–11:30*** | ***COFFEE BREAK*** | |
| *11:30–13:00* | Discussions on the GAMP document (continued) | All participants |
| ***13:00–14:00*** | ***LUNCH BREAK*** | |
| *14:00–15:00* | Discussions on the GAMP document (continued) | All participants |
| ***15:00–15:30*** | ***COFFEE BREAK*** | |
| *15:30–16:30* | Modelling issues | All participants |
| **Friday, 1 October** | | |
| *09:00–10:30* | Action plan for the next 5 months – focus on modelling issues | All participants |
| *10:30–11:00* | Plans for producing a technical report by the end of 2011 | |
| ***11:00–12:00*** | ***COFFEE BREAK &CHECK OUT*** | |
| *12:00–12:30* | Plans for next interim meeting | All participants |
| *12:30–13:30* | Any other business/ Closure of meeting | Astrid Liland |

* Indicates the name of the presentation given on the WG2 web page (http://www-ns.iaea.org/projects/emras/emras2/working-groups/working-group-two.asp?s=8).