

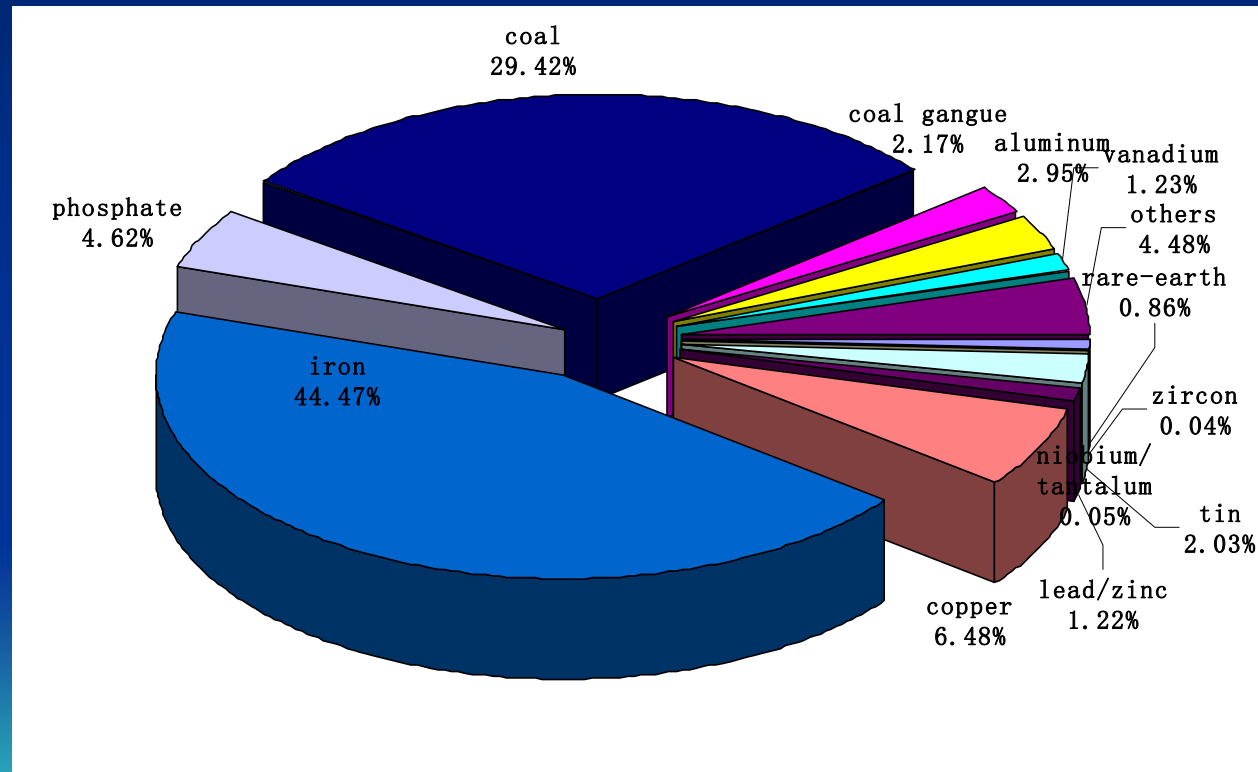
# Summary for WG2 – Reference approaches to modelling for management and remediation of NORM and legacy sites

Astrid Liland, NRPA, Norway, WG2 Leader  
EMRAS II meeting, Vienna HQ  
24-28 January 2011



# Work performed last year

## 1. Presentations of NORM and legacy sites in various countries, e.g. NORM solid waste distribution in China



## 2. Discussions on modelling and regulatory challenges

### 3. Gela - phosphogypsum stack disposal site

- Modelling with e.g. ReCLAIM and RESRAD, both for the present situation and for future scenarios
- Comparing to criteria, both the 1000 Bq/kg clearance level for natural decay chains material and dose criteria of 0.3 – 1 mSv/y
- Clear that Gela cannot be released for unrestricted use and the phosphogypsum cannot be reused (e.g. for building roads) due to both radiological and other pollutants present

## 4. General Assessment Methodology Process (GAMP) development

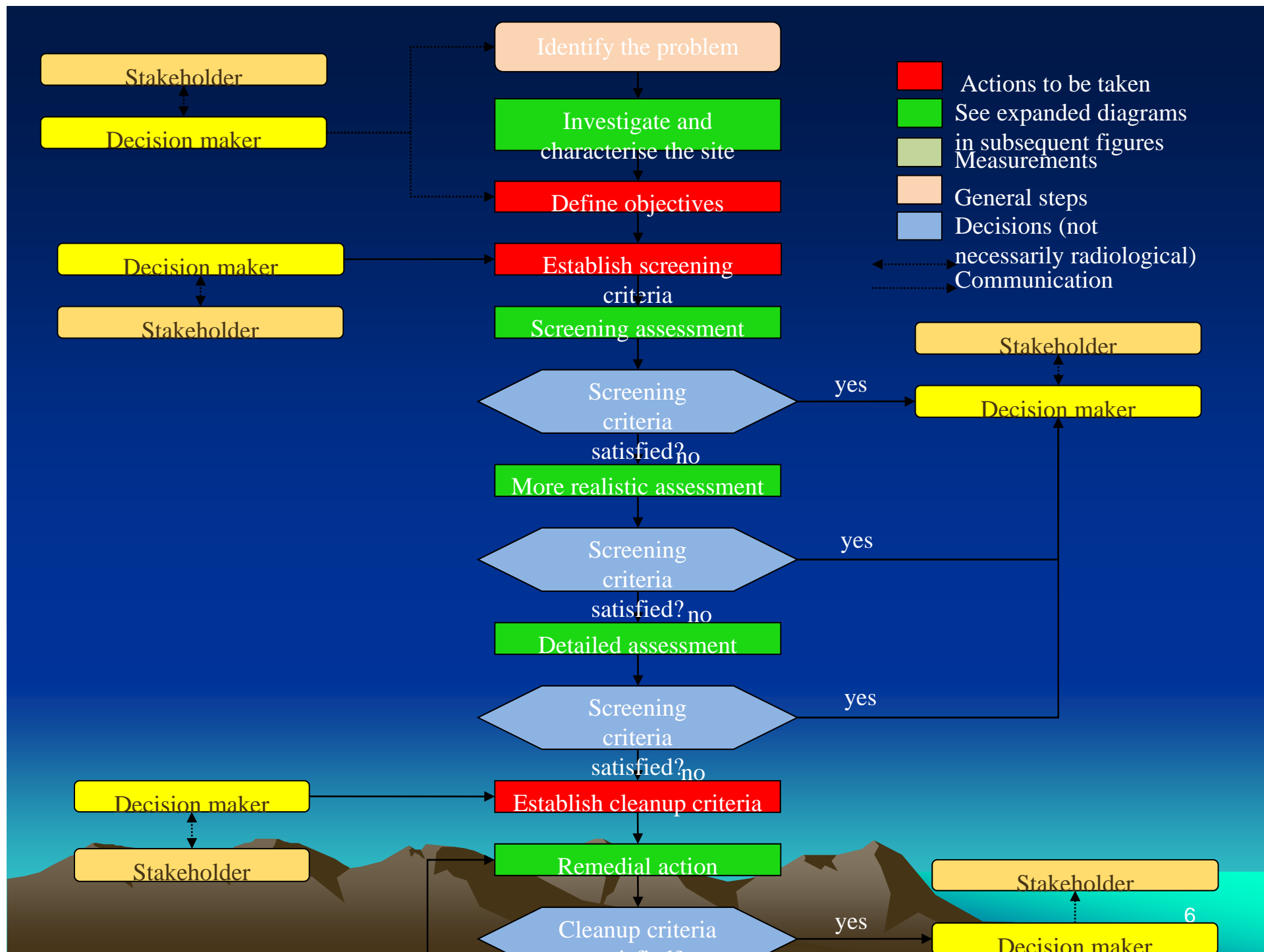
- Guidance document on how to use models for assessing the radiological impact of NORM and legacy sites
- Valuable input from many countries and different disciplines (modellers, regulators, technical advisors)
- Draft version tested for various types of sites



## 4b. Testing the draft General Assessment Methodology Process

The draft GAMP was tested for real sites in:

- Australia (nuclear weapons testing)
- Belgium (phosphate industry, radium extraction and production of sources)
- Brazil (monazite ore processing)
- Italy (phosphogypsum stack)
- Norway (former rare earth metals mining site)



# Interim meeting in France 2010

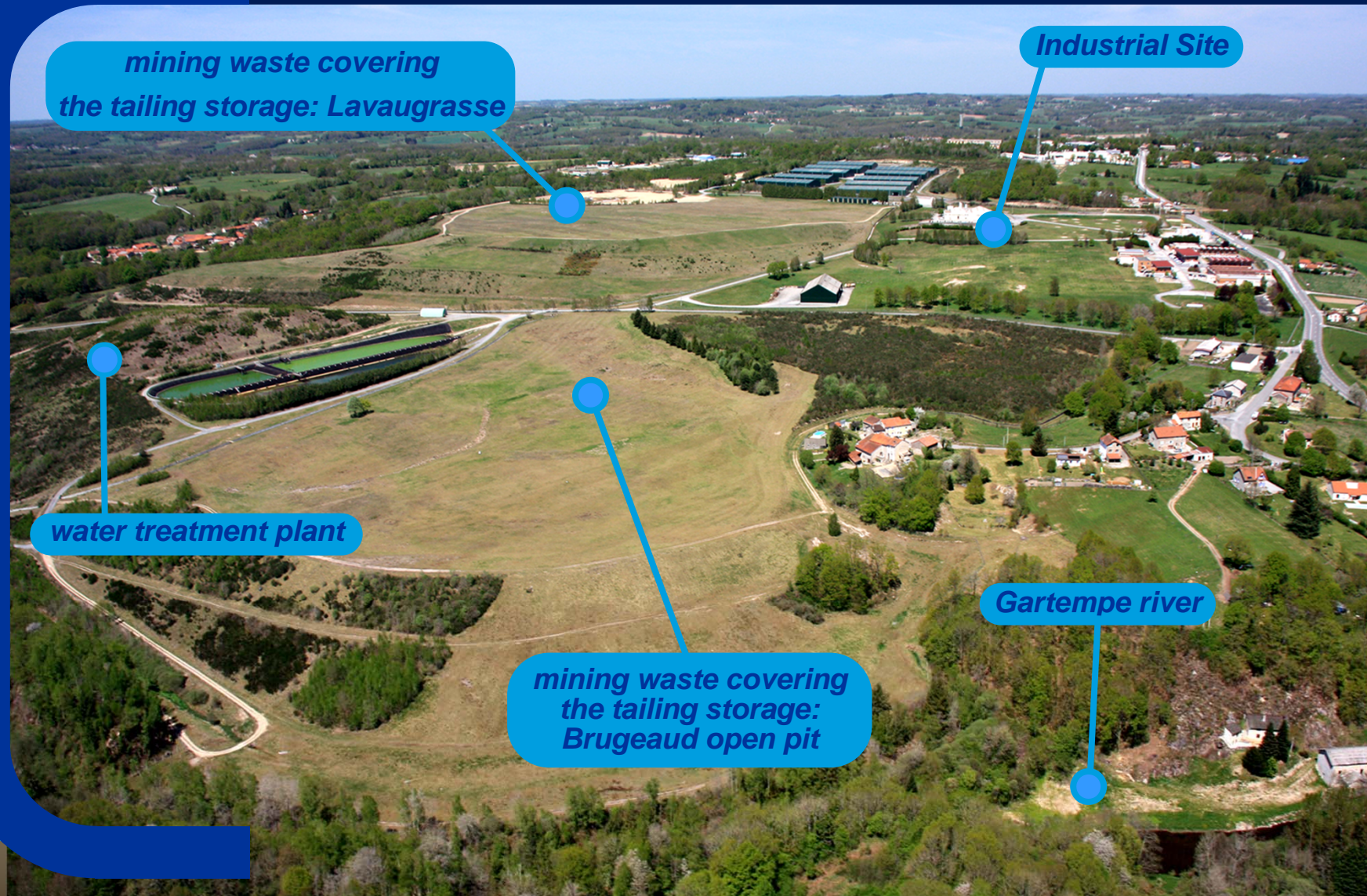
- Facilitated by IRSN and AREVA
- Former uranium mining and milling sites in the Limousin region
- Presentation of the pre remediation situation as well as the current status
- All available monitoring data shared with the group
- 19 participants from 15 countries, all continents represented

## *Industrial Site of Bessines in 1978*





# Industrial Site of Bessines in 2010





## *Bellezane Open-Pit Mine (in operation)*

1992





## *Bellezane Open-Pit Mine (Reclaimed)*



2001

# Plans for this week

- Discuss modelling experience with the Gela and Bellezane sites
- Added features of the RESRAD-OFFSITE code
- Links between Regulatory Objectives, Assessment Methods and Scientific Support and link to the IAEA's International Working Forum for Regulatory Supervision of Legacy Sites
- Discuss the role of guideline levels
- Final discussions on draft GAMP and plan for finalization
- Interim meeting venue – suggestions from Argentina, Belgium, Bulgaria, China, USA, possibly more
- Contents and structure of final report to be decided
- Action plan for 2011 to be decided



# "International Conference on Radioecology and Environmental Radioactivity" in June 2011 in Hamilton, Canada

The IAEA Environmental Modelling for Radiation Safety programme  
(EMRAS II)

– new working group on “Reference approaches to modelling for management and remediation at NORM and legacy sites”

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- Oral presentation of the group and its work so far
- [www.ecorad2011.net](http://www.ecorad2011.net)