METHODOLOGY

FOR PLAN, CONTROL OF ROUTINE RELEASES

AND DOSE ASSESSMENTS

IN POLAND

Paweł Krajewski, Grażyna Krajewska

DZIAŁALNOŚĆ PREZESA PAŃSTWOWEJ AGENCJI ATOMISTYKI oraz OCENA STANU BEZPIECZEŃSTWA JĄDROWEGO I OCHRONY RADIOLOGICZNEJ W POLSCE W 2008 ROKU

**REPORT: VERIFICATIONS UNDER THE TERMS OF ARTICLE 35 OF THE EURATOM TREATY POLAND
13 to 17 November 2006**

Questions:

1) Nuclear context: what types of facilities does your methodology cover?

2) National Organization: who is the authority in you country?

What types of manufactures do you have?

Who are the experts?

3) Do you use critical group concept? Or the new ICRP version of it?

4) What are the regulatory limit values? Are they doses? Are they concentrations? Or other units?

5) What modeling approaches do you use?

5a) do you transfer coefficients? (if so which ones?).

5b) what type of atmospheric modeling do you use?

5c) do you use site specific data?

1 Nuclear context:

what types of facilities does your methodology cover?

Atomic Law

ACT OF PARLIAMENT
of 29 November 2000

The Act shall define the following:

activities and practices related to peaceful use of atomic energy, involving actual and potential exposures to ionizing radiation emitted by:

i. artificial radioactive sources,
ii. nuclear materials,
iii. ionizing radiation generating devices,
iv. radioactive waste and
v. spent nuclear fuel;

1 Nuclear context:

what types of facilities does your methodology cover?

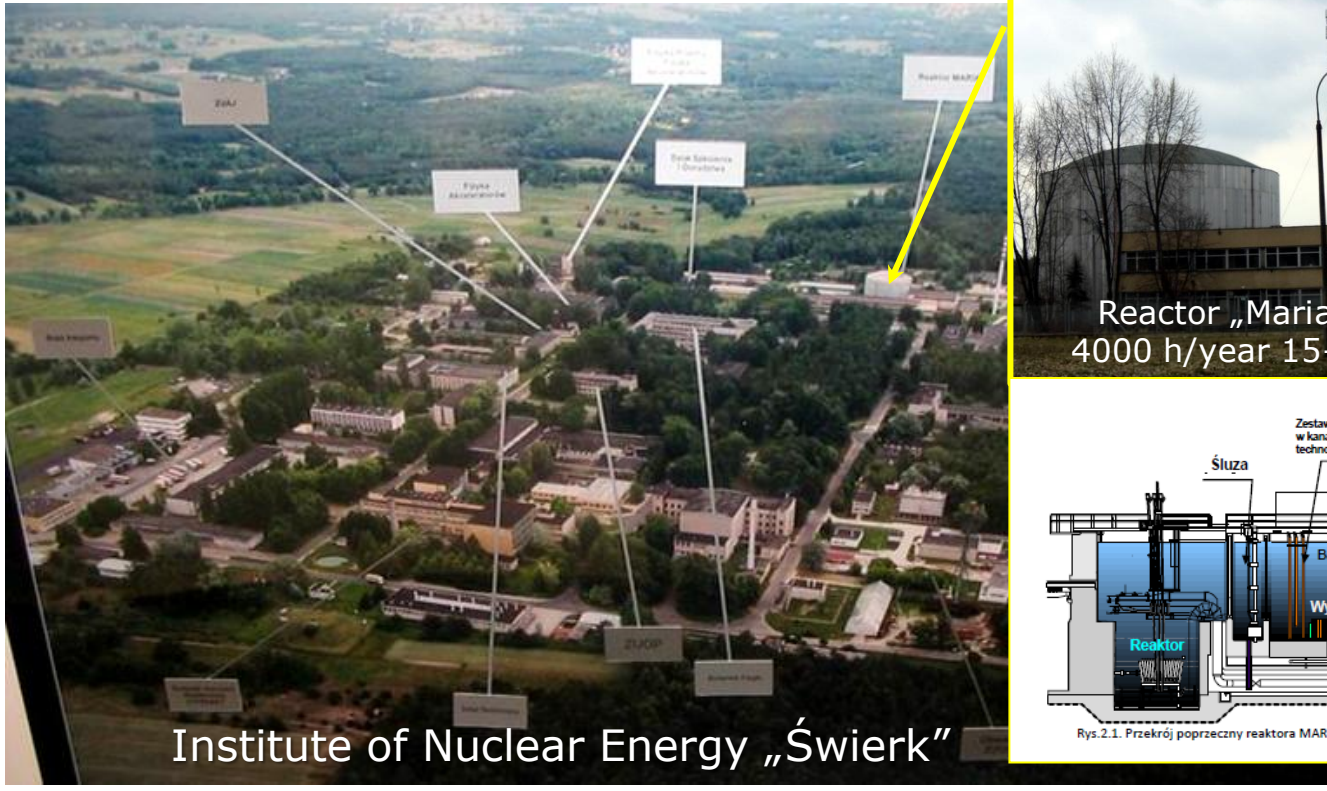
Atomic Law

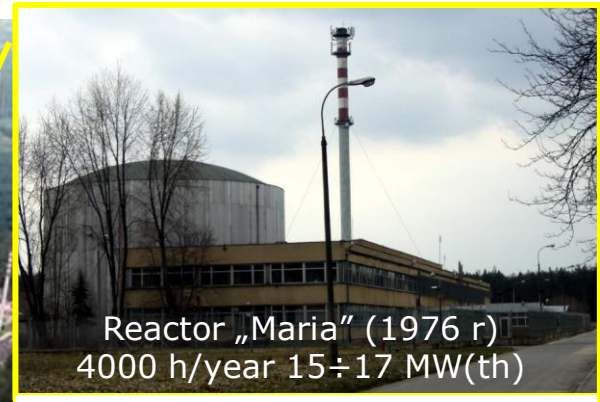
ACT OF PARLIAMENT
of 29 November 2000

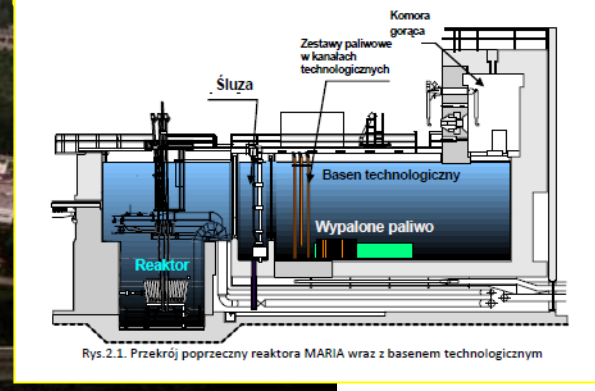
The Act shall be applied also to the activities conducted in the conditions of exposure to natural ionizing radiation enhanced by human activity.
Moreover, the Act shall establish the rules for radioactive contamination monitoring and shall regulate the activities conducted in radiation emergency situations as well as in long-term exposure conditions in the aftermath of radiation emergency or some past practice.

1 Nuclear context:

what types of facilities does your methodology cover?

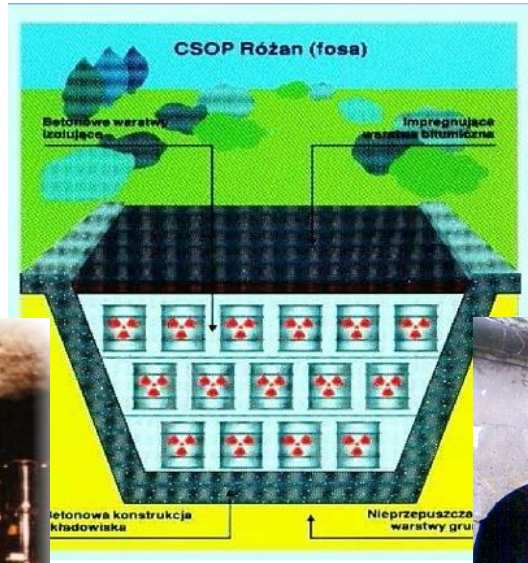


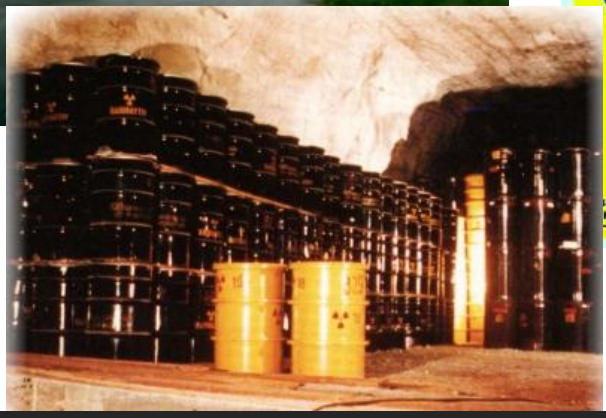




1 Nuclear context:

what types of facilities does your methodology cover?

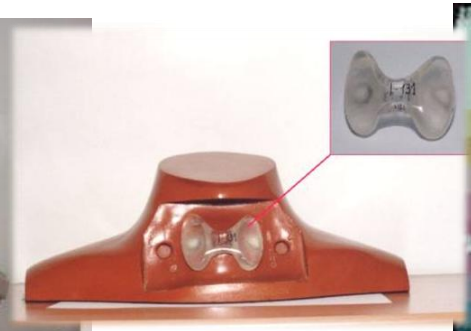


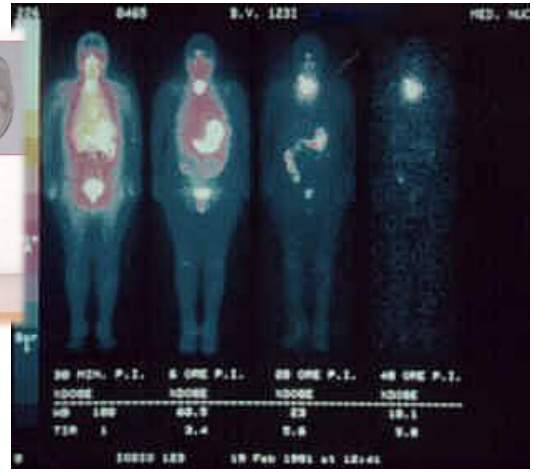


Low and medium waste surface Repository „Rozan”

1 Nuclear context:

what types of facilities does your methodology cover?

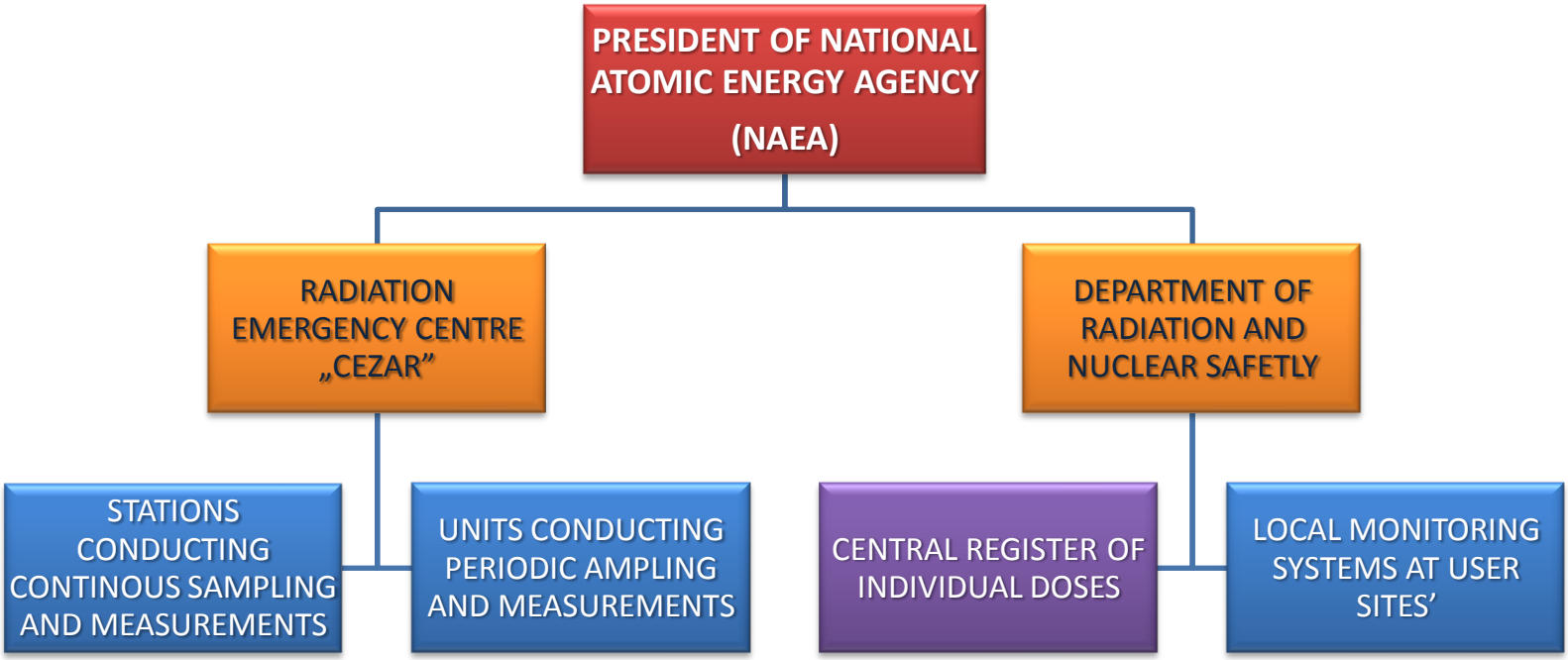




Nuclear medicine Units, I-131 diagnostics and therapy

2) National Organization: who is the authority in you country?

STRUCTURE OF RADIATION MONITORING SYSTEM



2) National Organization: who is the authority in you country?

Authorities involved in radioactivity monitoring

Scope, history and current situation

On the basis of Article 87, paragraphs 1 and 2 of the Act of Parliament of 29 November 2000 –Atomic Law (Polish O.J. of 2004 N°161, Item 1689 and 1808), **NAEA** has been designated the main Art.35 Technical Report – PL-06/7 Page 10 / 48 responsible organisation for the Polish monitoring programme of radioactivity in the environment.

NAEA is supervised by the Ministry of Environment (MENV).

NAEA, through its president, is co-ordinating the monitoring of environmental radioactivity in Poland and is the Competent Authority (CA). NAEA has the responsibility to enforce the above mentioned legislation, to ensure for environmental radioactivity monitoring and for regular reporting to the European Commission (EC-JRC/ISPRA) on the basis of Article 36 of the Euratom Treaty, to ensure for emergency preparedness and response in case of radiological accidents and to deal with all matters concerning the relations of Poland with the EU, with the IAEA and other international organisations in this field.

2) National Organization: who is the authority in you country?

Authorities involved in radioactivity monitoring
Other organisations involved in the national monitoring programme are:

- The Chief Sanitary Inspectorate (CSI): it supervises the basic units (see: 5.1.II) measuring radioactive contamination of the environment, agricultural products and foodstuffs. CSI reports to the Ministry of Health (MH).

- The Central Laboratory for Radiological Protection (CLOR): it supervises the basic ASS-500 aerosol stations (see: 5.1.I), performs the local monitoring of mixed diet, soil, water, radon, etc. by doing the measurements and – based on contracts from NAEA – organises the intercalibration exercises for all basic units.

- The Institute of Meteorology and Water Management (IMGW): it supervises the basic stations (see: 5.1.I) under its responsibility (IMGW stations) and reports to the Ministry of Environment (MENV).

2) National Organization: who is the authority in you country?

Authorities involved in radioactivity monitoring
Other organisations involved in the national monitoring programme are (cont.):

- The Centre of Contamination Analysis (CCA): it supervises auxiliary military stations and reports to the Ministry of Defence (MD).

- The Institute of Atomic Energy in Otwock-Świerk: it performs local site monitoring and reports to the Ministry of Economy (ME).

- ZUOP, the state-owned 'Radioactive Waste Management Plant': it operates the central radioactive waste repository of Poland located in Różan. ZUOP is the only Polish institution responsible for securing, handling and deposition of radioactive wastes. It reports to the Ministry of the Treasury (MT).

Legal framework

Legal basis for radiation protection in Poland

Poland has comprehensive legislation in the area of radiation and nuclear safety. The main legal acts regulating the ***radiation protection topics*** *are:*

I. Act of Parliament of 29 November 2000 – **Atomic Law** (last amendment 14 April 2006); published in: Official Journal of Laws of 2004, no.161, item 1689, no.173, item 188; Official Journal of Laws of 2005, no 163, item 1362: Official Journal of Laws of 2006, no 53, item 378; Chapters X and XI.

II. Regulation of the Council of Ministers of 17 December 2002 on stations for the early detection of radioactive contamination and units which measure radioactive contamination; published in: Official Journal of Laws of 2002 no 239, item 2030.

Legal framework

Legal basis for radiation protection in Poland

Apart from legal documents specific to radiation and nuclear safety there is a set of other legal acts dealing with ***Nuclear/radiological emergency***

III. Regulation of the Council of Ministers of 27 April 2004 on intervention level values for various types of intervention measures and also the criteria for revoking such measures; published in Official Journal of Laws of 2004 no 98, item 987.

IV. Regulation of the Council of Ministers of 27 April 2004 on establishing the entities authorized to exercise control the food and animal feeding stuff of compliance with the maximal permissible levels for radioactive contamination, following a radiological emergency; published in Official Journal of Laws of 2004 no 98, item 988.

Legal framework

Legal basis for radiation protection in Poland

Radioactive waste/Exemptions

V. Regulation of the Council of Ministers of 3 December 2002 on radioactive wastes and spent nuclear fuel; published in Official Journal of Laws of 2002 no 230, item 1925.

VI. Regulation of the Council of Ministers of 6 August 2002 on the instances in which practices involving the risk of exposure to ionizing radiation are not subject to the licensing or reporting requirement, and instances in which the said practices may be conducted based on a report (Amended 27 April 2004); published in Official Journal of Laws of 2002 no 137, item 1153; Official Journal of Laws of 2004 no 98, item 980.

Legal framework

Legal basis for radiation protection in Poland

Legislative acts regulating radioactivity monitoring in foodstuffs

The applied legislation is the one described previously i.e.

I. Act of Parliament of 29 November 2000 – **Atomic Law** (last amendment 14 April 2006); published in: Official Journal of Laws of 2004, no.161, item 1689, no.173, item 188; Official Journal of Laws of 2005, no 163, item 1362: Official Journal of Laws of 2006, no 53, item 378; Chapters X and XI.

IV. Regulation of the Council of Ministers of 27 April 2004 on establishing the entities authorized to exercise control the food and animal feeding stuff of compliance with the maximal permissible levels for radioactive contamination, following a radiological emergency; published in Official Journal of Laws of 2004 no 98, item 988.

Legal framework

Legal basis for radiation protection in Poland

Legislative acts regulating NORM issues

The applied legislation is the one described previously i.e.

I. Act of Parliament of 29 November 2000 – **Atomic Law** (last amendment 14 April 2006); published in: Official Journal of Laws of 2004, no.161, item 1689, no.173, item 188; Official Journal of Laws of 2005, no 163, item 1362: Official Journal of Laws of 2006, no 53, item 378; Chapters X and XI.

IV. Regulation of the Council of Ministers of 27 April 2004 on establishing the entities authorized to exercise control the food and animal feeding stuff of compliance with the maximal permissible levels for radioactive contamination, following a radiological emergency; published in Official Journal of Laws of 2004 no 98, item 988.

VI. Regulation of the Council of Ministers of 6 August 2002 on the instances in which practices involving the risk of exposure to ionizing radiation are not subject to the licensing or reporting requirement, and instances in which the said practices may be conducted based on a report (Amended 27 April 2004); published in Official Journal of Laws of 2002 no 137, item 1153; Official Journal of Laws of 2004 no 98, item 980.

Legal framework

Legal basis for radiation protection in Poland

Legislative acts regulating NORM issues

The applied legislation is the one described previously i.e.

I. Act of Parliament of 29 November 2000 – **Atomic Law** (last amendment 14 April 2006); published in: Official Journal of Laws of 2004, no.161, item 1689, no.173, item 188; Official Journal of Laws of 2005, no 163, item 1362: Official Journal of Laws of 2006, no 53, item 378; Chapters X and XI.

IV. Regulation of the Council of Ministers of 27 April 2004 on establishing the entities authorized to exercise control the food and animal feeding stuff of compliance with the maximal permissible levels for radioactive contamination, following a radiological emergency; published in Official Journal of Laws of 2004 no 98, item 988.

VI. Regulation of the Council of Ministers of 6 August 2002 on the instances in which practices involving the risk of exposure to ionizing radiation are not subject to the licensing or reporting requirement, and instances in which the said practices may be conducted based on a report (Amended 27 April 2004); published in Official Journal of Laws of 2002 no 137, item 1153; Official Journal of Laws of 2004 no 98, item 980.

Guidance documents

I. ICRP 60/72 – BSS,

II. IAEA BSS,

III. EU Directive 96/29 EUROATOM,

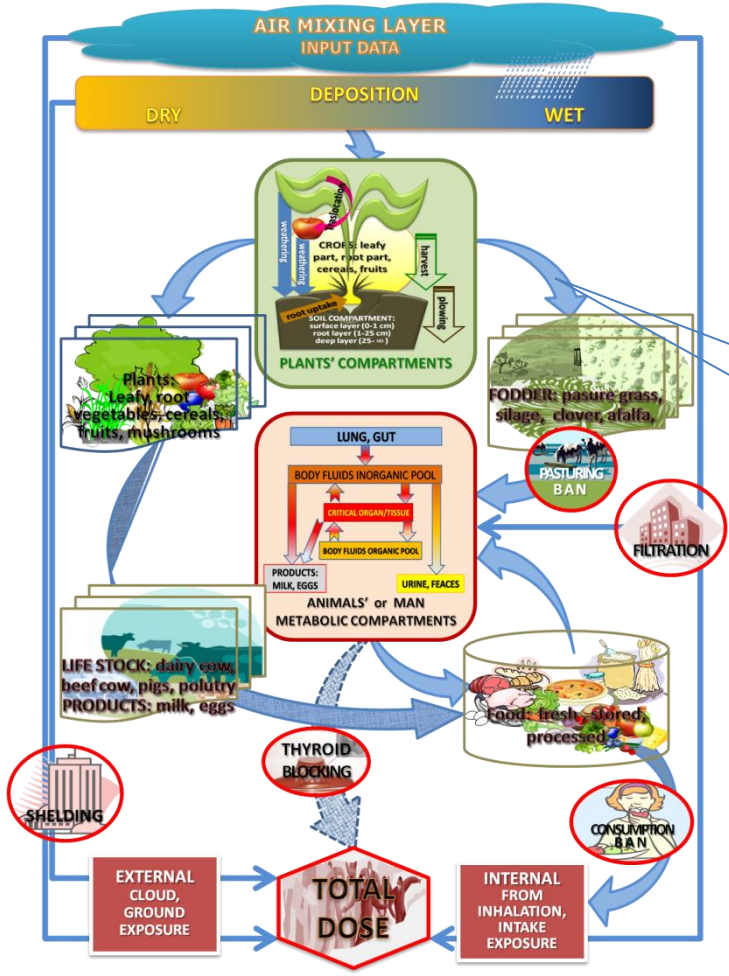
IV. EC Publication Radiation Protection 112,

V. Commission Recommendation 2000/473/Euratom.

What are the regulatory limit values?

Workers and population groups	DOSE LIMIT Effective dose during one year	DOSE LIMIT Effective dose during five years	DOSEE LIMIT Effective dose during one year
Occupational exposure Students and trainees	20 mSv 50 mSv	100 mSv	150 mSv- eyes' lens 500 mSv- skin surface (1 cm^2 irradiated part) 500 mSv- hands, forearms, foots, thighs
Students and trainees 16 - 18 years old	6 mSv	100 mSv	50 mSv- eyes' lens 150 mSv- skin surface (1 cm^2 irradiated part) 150 mSv- hands, forearms, foots, thighs
Students and trainees 16 years old and younger Public members	1 mSv	5 mSv	50 mSv- eyes' lens 150 mSv- skin surface (1 cm^2 irradiated part) 150 mSv- hands, forearms, foots, thighs
Pregnant woman, during the period: since she informs manager to birth of child, 1 mSv.			

What modelling approaches do you use?



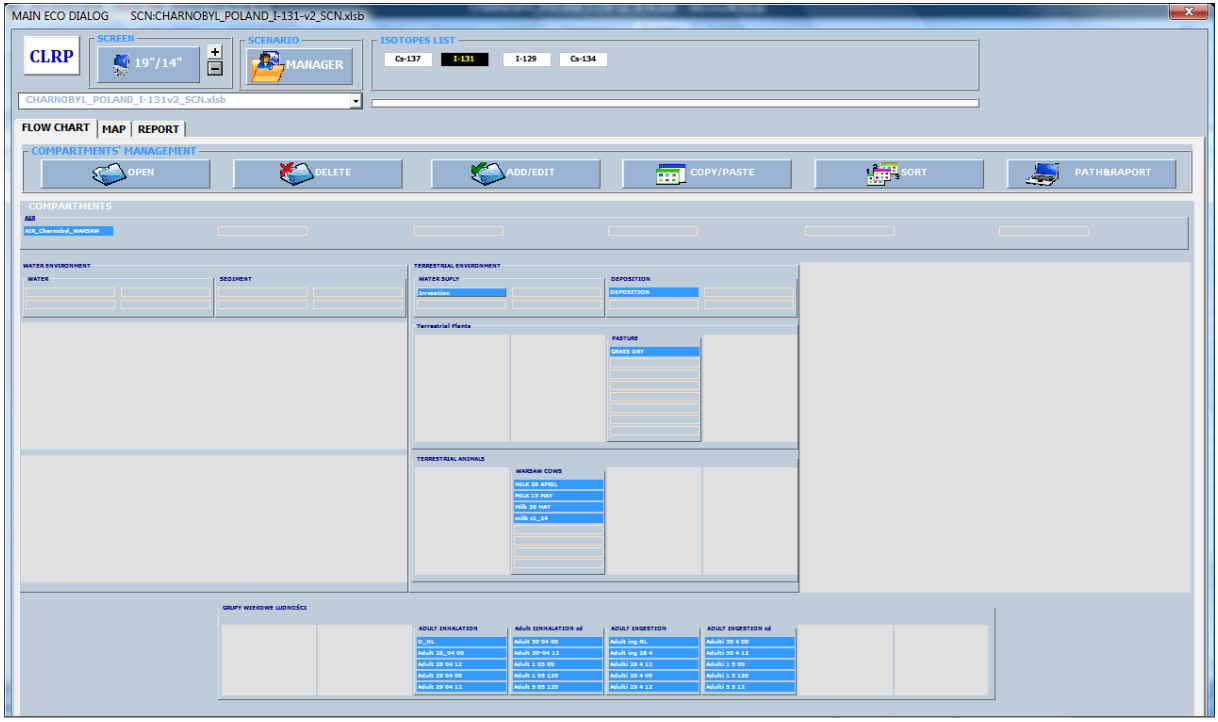
CLRP

Concentrations Levels Rapid Prediction

2009

Flowchart of CLRP calculation sequence. Blue arrows show an order of calculations in the particular compartments, where the results obtained in one compartment (**output data**) are used as **input data** in the next compartment

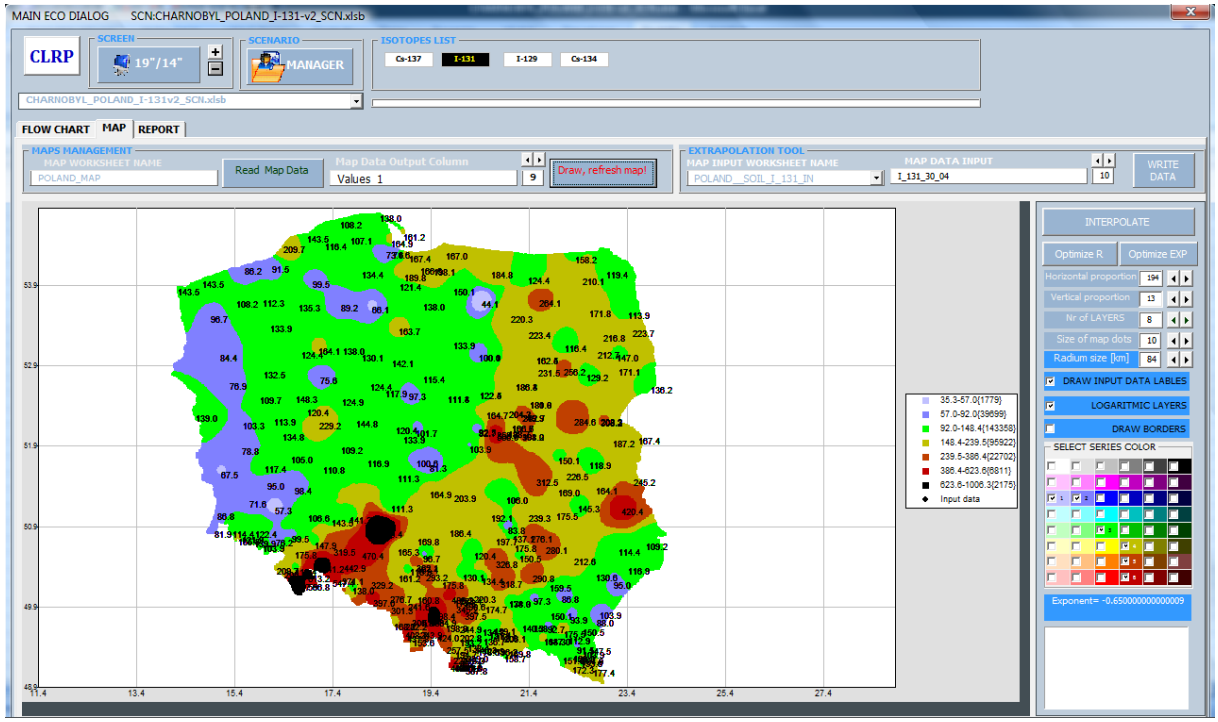
What modelling approaches do you use?



Main CLRP UserForm for Scenario design purposes

CLRP
Concentrations Levels Rapid Prediction
2009

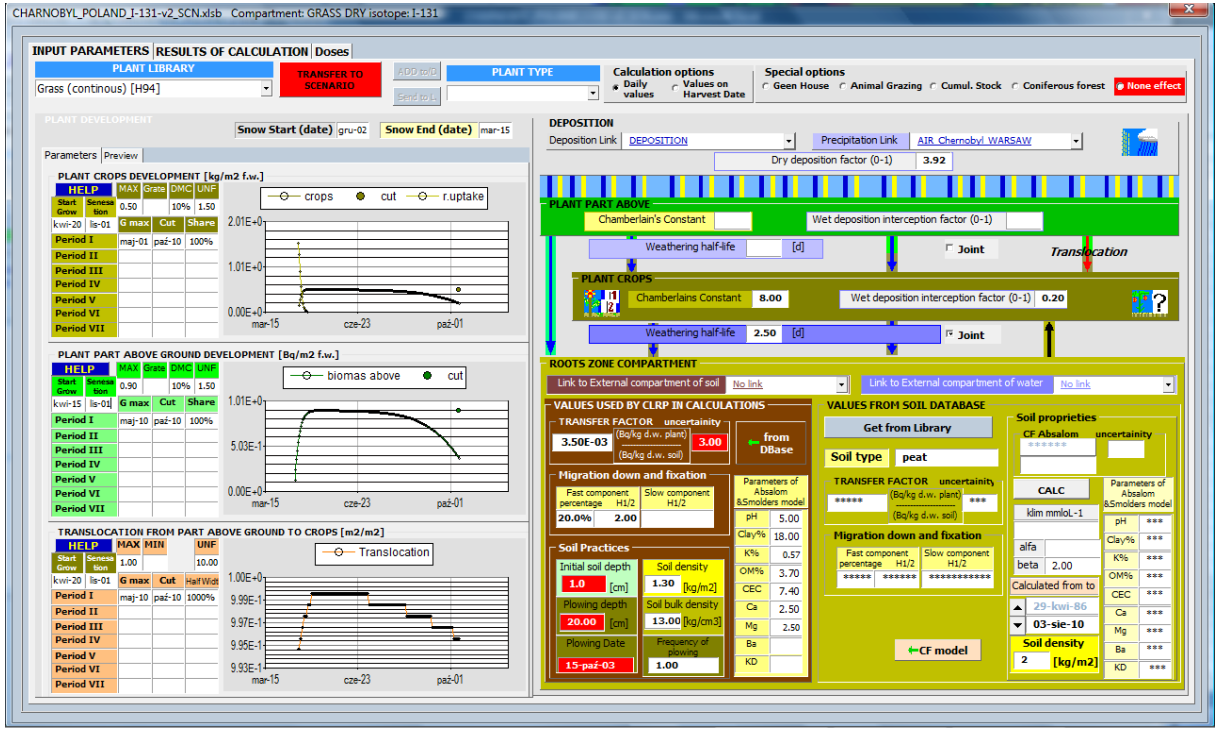
What modelling approaches do you use?



CLRP
Concentrations Levels Rapid Prediction
2009

GIS UserForm driver installed in CLRP – example of map of 137Cs concentration in soil – the study zones were calculated by IDW Shepard interpolations from 370 measured point in 1km×1km grid.

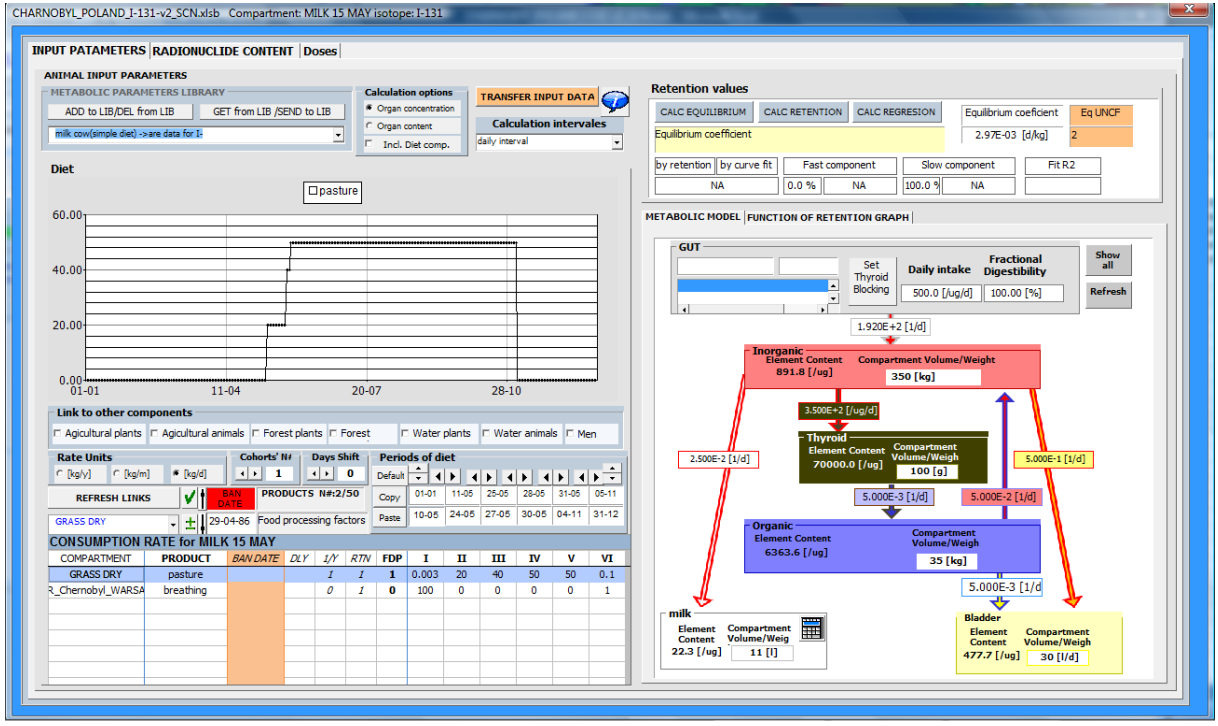
What modelling approaches do you use?



CLRP
Concentrations Levels Rapid Prediction
2009

Plant input parameters UserForm. Leafy part and 'crops' part development during the growing period can be set independently. CLRP contains plants' library of 20 species.

What modelling approaches do you use?



CLRP
Concentrations Levels Rapid Prediction
2009

Animal input parameters UserForm. On the left side: example of pasturing pattern divided on six independent periods. On the right side: iodine metabolic behavior for cows' milk. One can set various mathematical models of metabolic variants by working only with graphic driver.

What modelling approaches do you use?

RADIATION EMERGENCY CENTRE „CEZAR”

Decision support systems:

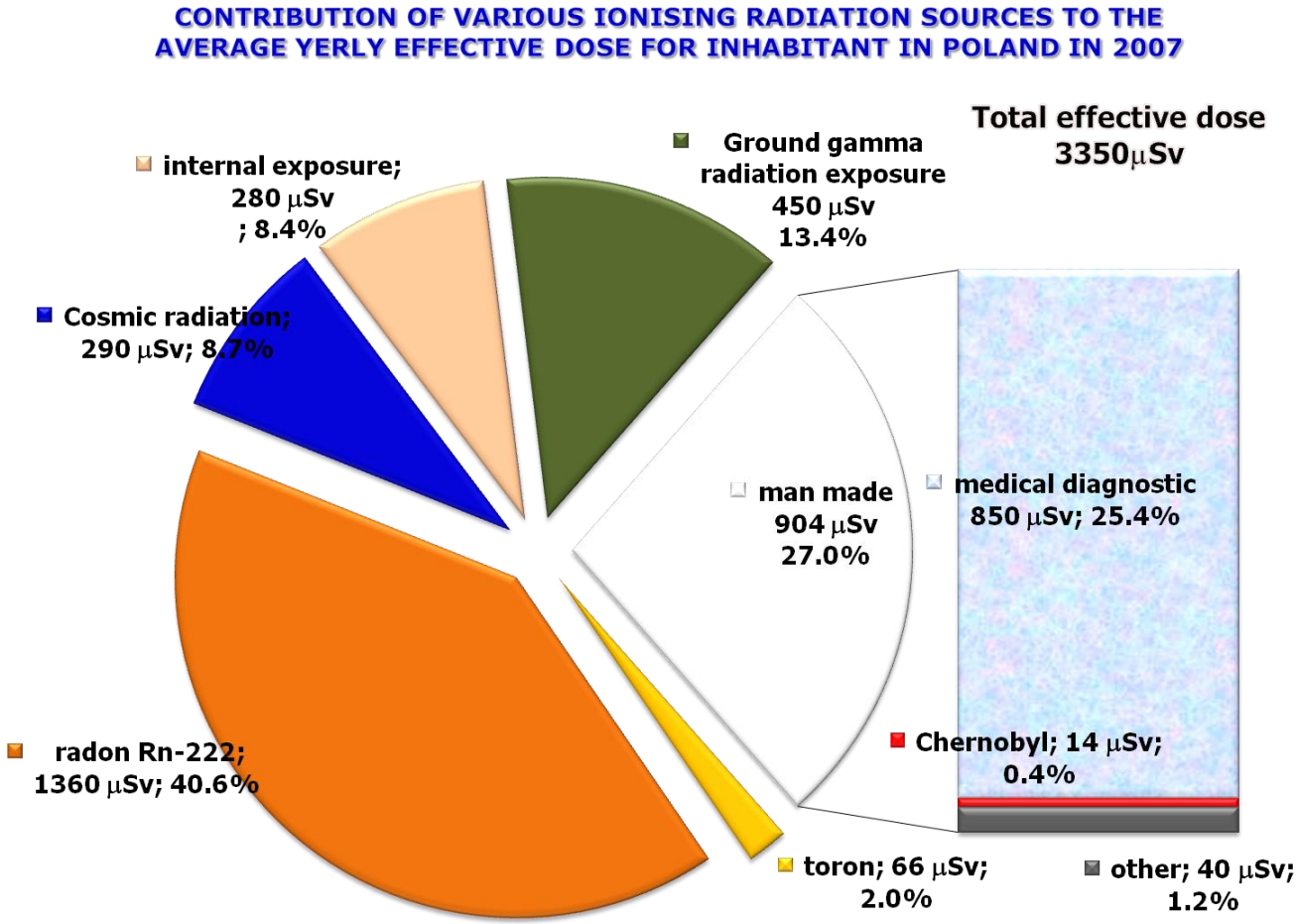
RODOS (short distance, long distance modules)

ARGOS – PMS, ASS Stations

ECOSYS-98 environmental transfer factors

(deposition velocity; soils to plant, fodder to milk, meat, etc.)

What are the regulatory limit values?



What are the regulatory limit values?

On the basis of the Council of Ministers regulation (mentioned in 4.3.1.b) the **Laboratory of Radiometry of the Central Mining Institute (GIG)** was appointed to be the unit performing the measurements of radioactive contamination related to coal mining activities.

The above mentioned regulation specifies requirements for this laboratory and a list of radionuclides which should be measured by the laboratory on behalf of the concerned industry.

In the past, a formal surveillance system was set up to check compliance with the then valid legal limit for discharge activity concentrations (**1.1 kBq/m^3 for Ra-226 plus Ra-228).**

At present there is no regulation or national programme that would oblige coal mine authorities to perform environmental radioactivity monitoring in the vicinity of mines.

What are the regulatory limit values?

However, according to the Atomic Law the legal dose limit of 1 mSv/year for members of the general public applies also to NORM industries; in addition, by a Council of Ministers regulation (OJ 2002, no 220, item 1850; in force since 1 January 2003) there is a constraint for NORM waste uses (1 m above NORM waste material the dose rate shall be less than 300 nGy/hr).

Currently the local municipalities in the mining regions show considerable interest in discharge surveillance. Thus, as part of their environmental protection programme, some coal mine operators contracted GIG to perform analysis on liquid discharges.

Additionally, GIG performs measurements of radioactive contamination of the natural environment in the vicinity of coal-mines within the frame of scientific investigations supported by the Central Mining Institute, the Ministry of Education resp. by the European Community.

Thanks for your attention

Paweł Krajewski, Grażyna Krajewska

Most of the used documents are on the sites:

http://www.paa.gov.pl/dokumenty/atomistyka2008.pdf

http://www.clor.waw.pl/dokumenty/