

WM'07: 33rd Annual Waste Management Conference

Tucson Convention Center; Tucson, Arizona, USA; February 25 - March 1, 2007

Global Accomplishments in Environmental and Radioactive Waste Management

SESSION 03 - Panel:

Global Partnership: Spent Fuel Management from the User's Perspective

The Safety of Waste Disposal & Global Partnership:



An Argentine Perspective

Abel J. González

Autoridad Regulatoria Nuclear Argentina; ✉ Av. Del Libertador 8250; (1429) Buenos Aires, Argentina

☎ +54 1163231306; 📧 agonzale@sede.arn.gov.ar

Content

1. Introducing Nuclear Argentina

2. The Panel:

Spent Fuel Management from the User's Perspective

3. The Global Partnership



1. Introducing Nuclear Argentina

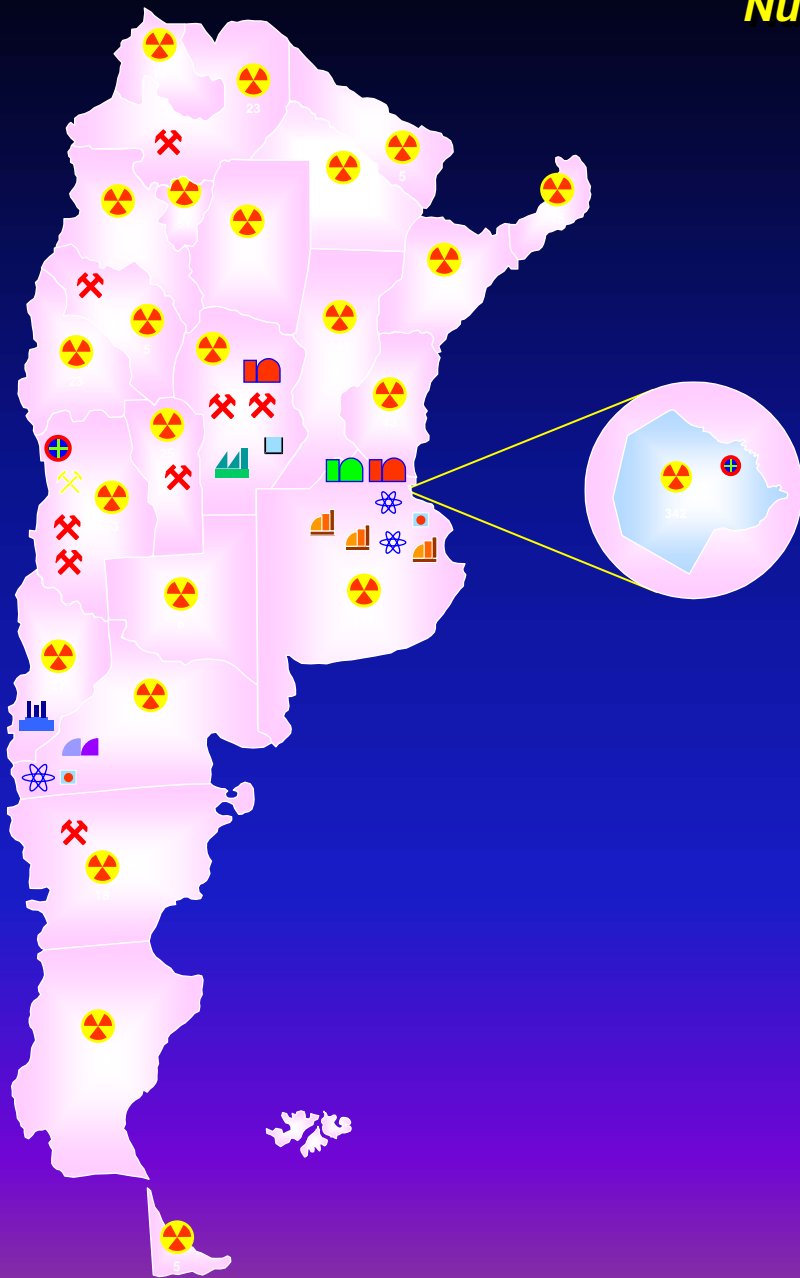


Argentina had a very strong and self sustainable nuclear energy programme

- 1. The Argentine Nuclear Programme started in the 50's.**
- 2. The fuel cycle was completed and the first NPP build in the 60's**
- 3. In the 70's Argentina was reprocessing nuclear fuel and obtaining plutonium and in the 80's enriching uranium**

Total Power Production (including Nuclear): 92176.4 GWh(e)/year

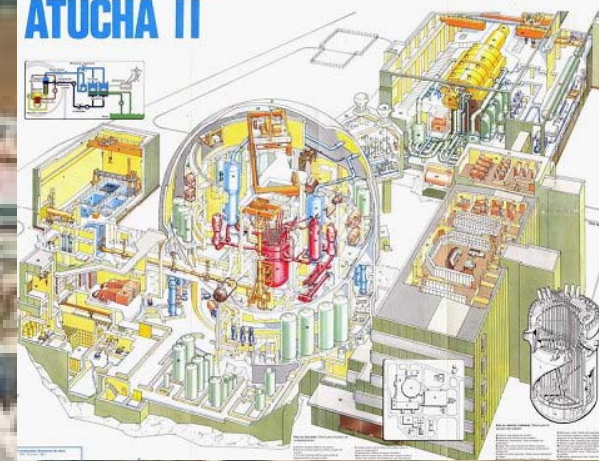
Nuclear Power Production: 6374.4 GWh(e)/year



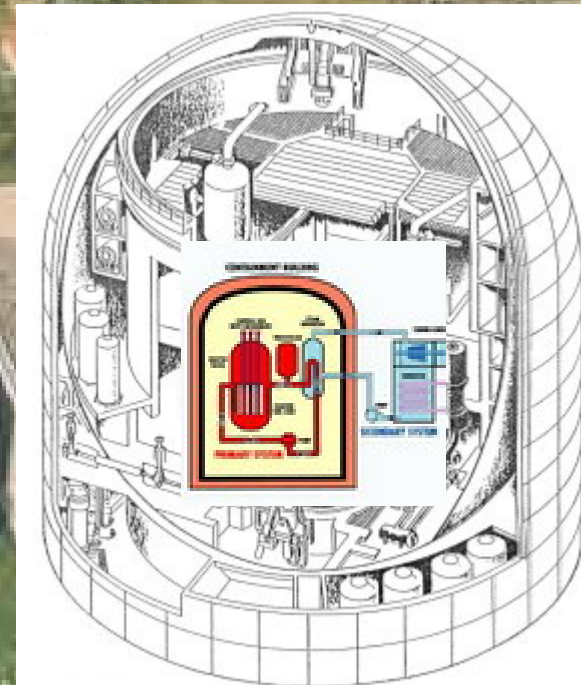
-  **NPP UNDER CONSTRUCTION**
-  **NPPs IN OPERATION**
-  **NUCLEAR RESEARCH CENTERS**
-  **RESEARCH REACTORS**
-  **RADIOISOTOPE PRODUCTION PLANT**
-  **NUCLEAR FUEL FABRICATION PLANT**
-  **HEAVY WATER PRODUCTION PLANT**
-  **UO2 PRODUCTION PLANT**
-  **URANIUM ENRICHMENT FACILITY**
-  **URANIUM MINING AND MILLING FACILITY**
-  **URANIUM MINES**
-  **MEDICAL CENTERS**
-  **RADIOACTIVE MATERIAL USERS**

Atucha NPP

Atucha II
745 MW(e)



Atucha I
357 MW(e)
since 19th March 1974



Embalse NPP

648 MW(e)

since April 25th 1983



CONUAR:

Fuel Element Fabrication Plant

Natural or 0.85% enriched uranium fuel elements
(Atucha type natural and enriched uranium fuel elements,
and natural uranium Candu type),

*Fuel assemblies:
heavy water reactor
Fuel assemblies:
research reactors
Fuel cladding
Fuel engineering
Fuel inspection
equipment
and services
Fuel testing and
research
Spent fuel storage,
dry
Uranium oxide
Zirconium*





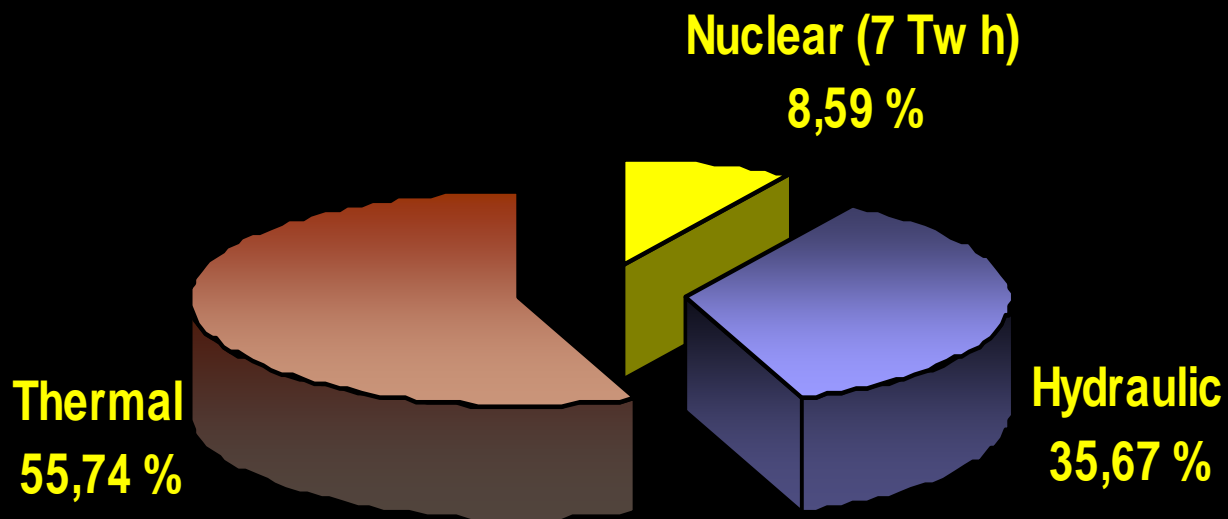
Arroyito Heavy Water Production Plant

**Production capacity=200 tons per year
(split into two production lines of 100 tons each)**

Process: Monothermal Ammonia-Hydrogen Isotopic Exchange



Nuclear electricity share



In 1982, the Argentine Nuclear Programme was *de facto* blocked and entered into '*chronic stagnation*'



Argentina's nuclear intelligentsia confronted a serious dilemma



Huarangal, Perú, near Lima. Instituto Nuclear del Perú (INPE) Nuclear Reactor RP10



80's Reactor NUR (Algeria)

1 MWth, cooled by light water and moderated by graphite; 1×10^{13} n/(cm² seg)

plate-type fuel elements (MTR type, approx. 20% enriched uranium) with aluminum cladding



90's Reactor ETRR-2 (Egypt)

22 MWth; 2.7×10^{14} n/(cm² seg); Fuel: U₃O₈ <20% Enriched (MTR type)



Now: Australia's OPAL Reactor 20MWth



The CAREM reactor Project

**Advanced 27 MW electric-power-generation nuclear station
Inherent safety characteristics based on passive safety systems.**



**After two decades of nuclear stagnation,
last year the Argentine Government decided
to trigger a nuclear renaissance.**



'Argentina flanks synarchists with ambitious nuclear program'
Executive Intelligence Review. September 1, 2006

2. The Panel

Spent Fuel Management from the User's Perspective

Questions to the panel

- 1. What is the total yearly inventory of commercial spent fuel and which fraction is destined for reprocessing and for disposal”?**
- 2. What is your country doing to solve its current SNF/HLW problem?**
- 3. What would lead you either to believe or to question the willingness of Global Partnership fuel or reactor supply countries to take back spent nuclear fuel (SNF))?**
- 4. Given the legacy of spent nuclear fuel already dispersed in de facto user states throughout the world, what waste management assurances would user states need before “signing up” to a Global Partnership? (e.g., internationally licensed repositories in place (not just discussed), international escrow accounts, bilateral treaty-level agreements, more???)**
- 5. There are several countries producing NSF and HLW in small amounts that do not justify, economically and environmentally, a national geological disposal. What type of engagement by the suppliers to these countries would be required to deal with this problem? Could an international (regional) storage system be a temporary solution? What would be the long term solution?**
- 6. If some sort of waste partitioning were to occur through reprocessing, which of these waste streams would be easiest and hardest to deal with? Why?**
- 7. What types of agreements, treaties, international or national guarantees, take-back demonstrations, financial incentives, regional commitments, etc. would be needed to convince users countries that they will not be stuck with SNF as in the past?**
- 8. What steps should supplier countries take now to convince user countries that they won't be stuck with the job of disposing of SNF and HLW?**



República Argentina

**NATIONAL REPORT
TO THE JOINT CONVENTION**



República Argentina

JOINT CONVENTION ON THE SAFETY OF
SPENT FUEL MANAGEMENT AND ON THE
SAFETY OF RADIOACTIVE WASTE
MANAGEMENT

NATIONAL REPORT

www.arn.gov.ar

ARGENTINA
2003

Inventory of Spent Fuel

LOCATION	SPENT FUEL QUANTITY	NAT U (t)	SEU (t)	LEU (kg)
CNA I	8,967	1,231	142	----
CNE	98,117	1,850	----	----
AGE	300	----	----	100

Embalse's spent fuel dry storage



Ezeiza's spent fuel centralized storage facility



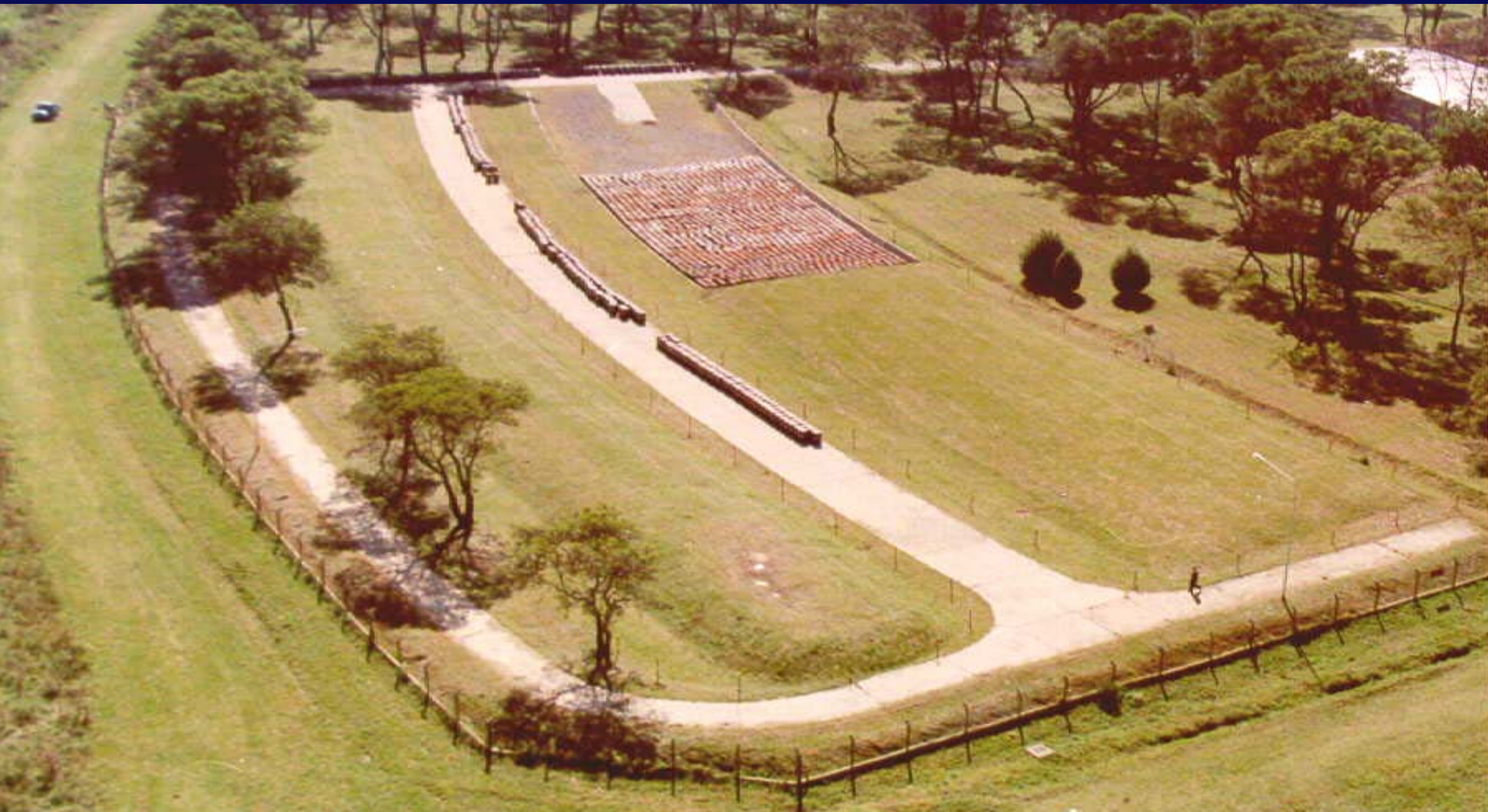
Argentine Inventory of Radioactive Waste

<http://www.cnea.gov.ar/xxi/residuos/sp/Segundo%20Informe%20Nacional%20rev1%20Digital.pdf>, and
<http://www.cab.cnea.gov.ar/residuos/CC2003/013-SecL.pdf>

Inventory of radioactive waste

LOCATION	VOLUME (m³)	WEIGHT (t)	ACTIVITY (TBq)
CNA I	2.19 E02	- - - - -	4.86 E01
CNE	5.62 E02	- - - - -	- - - - -
AGE	3.23 E03	- - - - -	1.33 E03
MINING AND MILLING WASTE (several sites)	- - - - -	3.2 E07	- - - - -

Ezeiza's near surface disposal facility for low-level solid radioactive waste



Ezeiza's interim storage of radioactive sources



Summary Argentine Policy

- Spent fuel is not automatically defined as ‘waste’
(It is a by-product that, in principle can be an asset)
- Waste disposal: Store, wait and see
- Decision: Target 2030
- Meanwhile Argentina studies all options



3. The Global Partnership

(promoted by some 'policyholders')

The 'Global Partnership'

Issues:

- **Nuclear fuel supply nations versus user nations**
- **Objective**

'Supply' Nations versus 'User' Nations

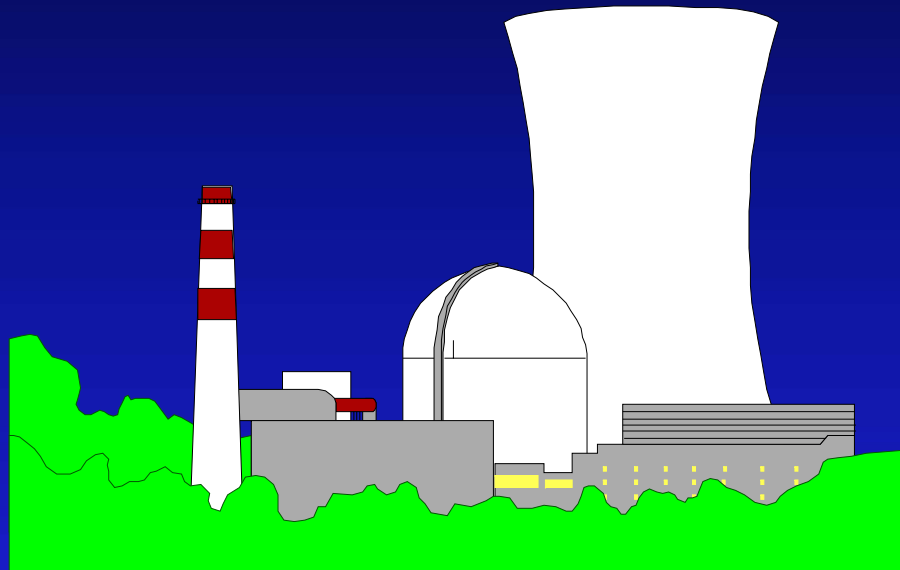
- Who decide '**who is who**' and on what basis?

e.g., how Argentina is classified and by whom ?

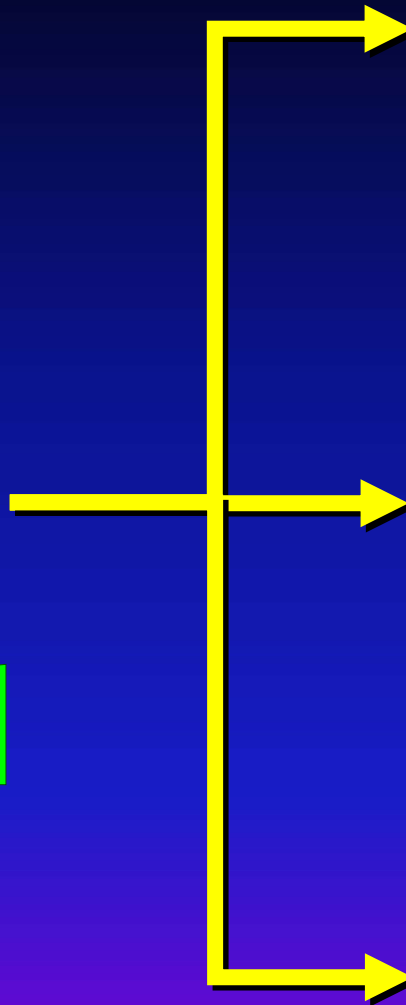
A no-patronizing global joint venture of equals (partnership) is really needed...but the objectives shall be clear and alike for all.

For instance, it would be a prerequisite to build a serious international nuclear regime covering:

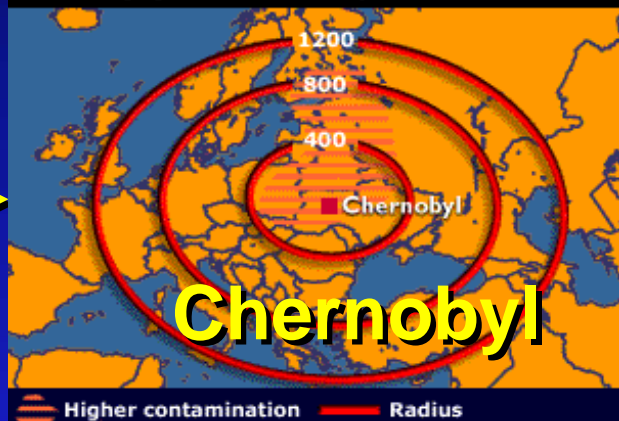
- 1. Verification of uses**
- 2. Safety & security**



This is the only solution for the nuclear concerns!



Chernobyl global radiation patterns



Who should lead such a partnership?



**The IAEA has statutory functions to do it...
...and it is recognized as the international
nuclear watchdog!**



The Nobel Peace Prize

2005



“For their efforts

[i] to prevent nuclear energy from being used for military purposes and

[ii] to ensure that nuclear energy for peaceful purposes is used in the safest possible way“

Can the IAEA do it?

- **No**, with its current programme and structure
- Yes... **IF** ...





***I kindly invite you
to re-discuss the
international
partnership on
safety in
IRPA 12 –
in
Buenos Aires
2008***

www.irpa12.com.ar

Argentina 2008

Strengthening Radiation Protection Worldwide

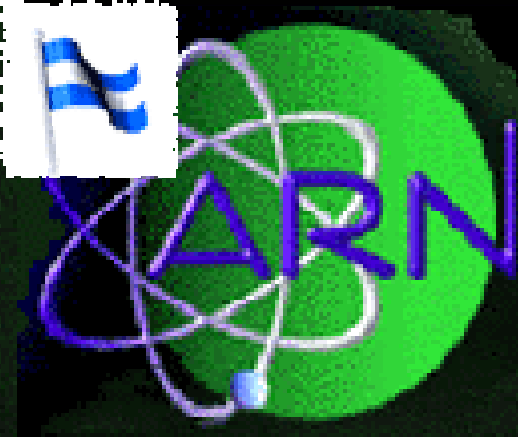


IRPA 12

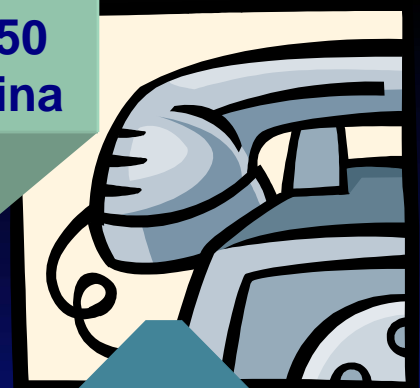
**19 - 24 October 2008
BUENOS AIRES**



www.sar.radioproteccion.org.ar/IRPA12BA.htm



Av. del Libertador 8250
Buenos Aires, Argentina



+541163231758

Thank you!

agonzale@sede.arn.gov.ar



Mechanisms for partnership

- **Convention**
- **Standards**
- **Inspections**