

Iran as a Pioneer Case for Multinational Nuclear Agreements

Geoff Forden

(with Sir John Thomson)

MIT

Based on a 2005 IAEA report:

Multilateral approaches to the nuclear fuel cycle

Expert Group Report
submitted to the Director General
of the International Atomic Energy Agency



22 February 2005

Satisfies the West's bottom line:

No Nuclear Weapons in Iran

Satisfies (the moderate) Iranians' bottom line:

Enrichment on Iranian soil

Achieves this by the most intrusive inspection regime possible: Westerners present 24 hours a day, 7 days a week.

Our proposal both maintains the NPT's promise of peaceful nuclear technology and reduces the number of national enrichment facilities.

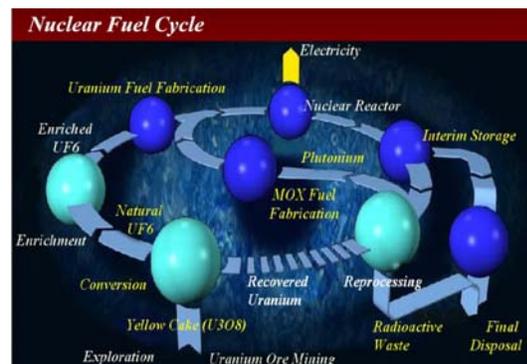
What are the alternatives?

Unfortunately, we see only two possible outcomes unless something new is tried:



Military Action

or



Iran continues its present course, probably outside the NPT.

The Multinational Centrifuge plant:



~168 P1 Centrifuges



50,000 T-21 centrifuges

5 Million SWU-kg/yr → support 42 reactors.

We estimate that the facility will employ about 230 people:



Managers



Accountants

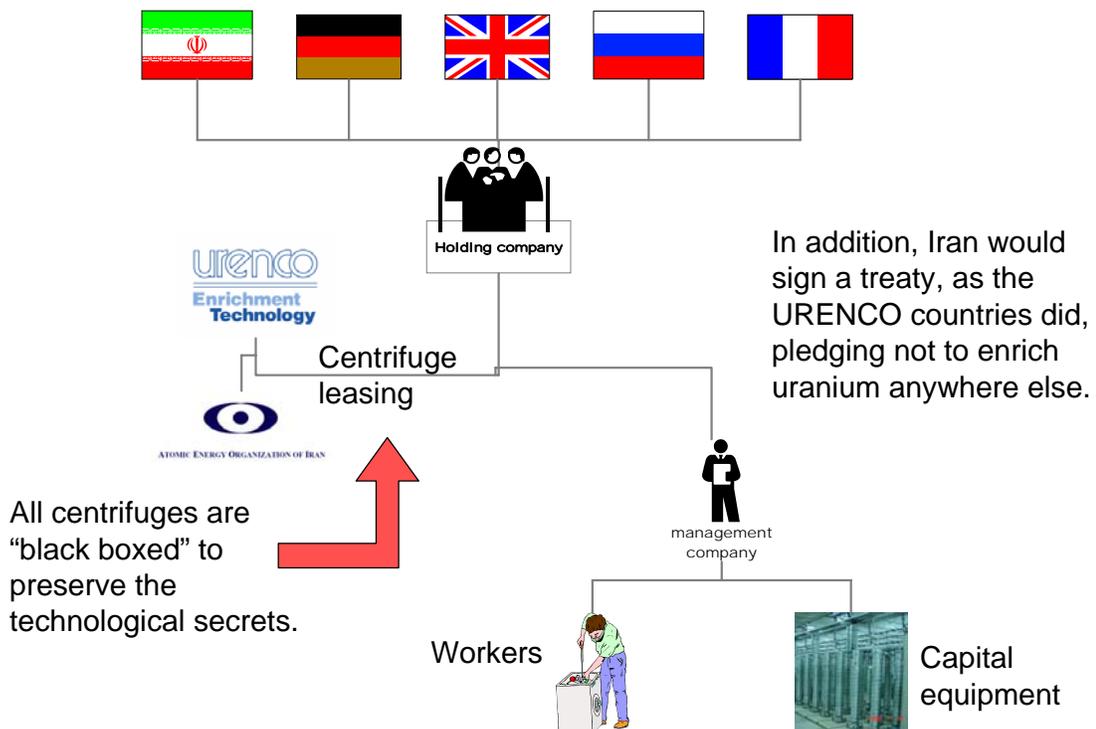


Technicians

Employees will come from each of the partner countries. There will be employees from each country present 24/7.

The most intrusive inspections imaginable!

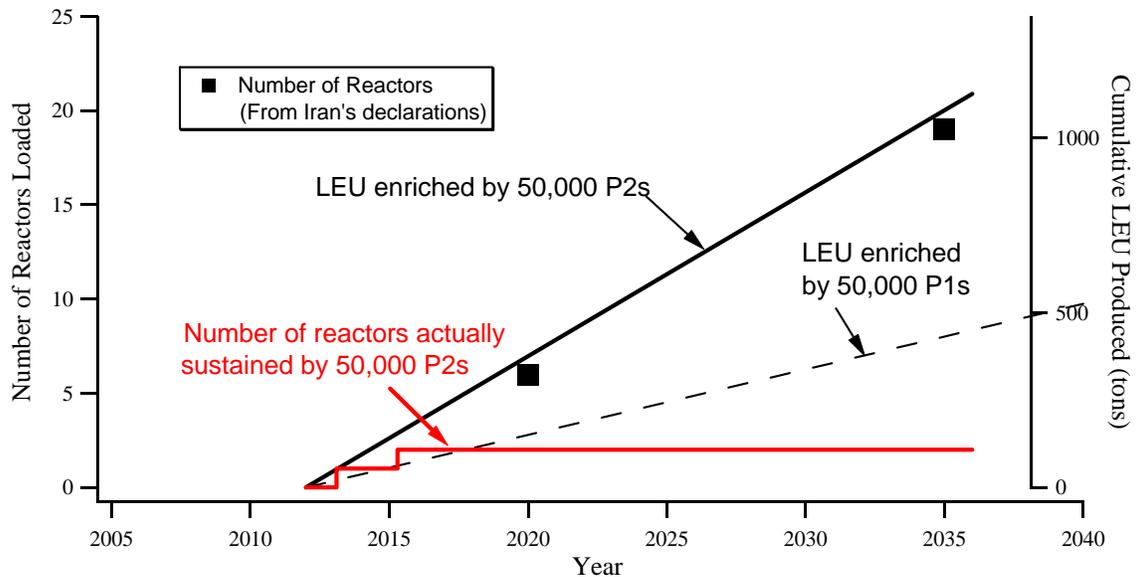
Organizational Chart for Joint Venture



Number of Reactors Sustained	Cascade Capacity SWU-kg/yr	TC-12 (Current URENCO Centrifuges)		TC-21 (Next Generation URENCO Centrifuges)		Russian Generation 6 (?) Centrifuges	
		Number of Centrifuges	Total Capital Investment Required	Number of Centrifuges	Total Capital Investment Required	Number of Centrifuges	Total Capital Investment Required
1	120,000	3,000	\$56M - \$84M	1,200	\$45M - \$67M	48,000	\$66M - \$82M
20	2,400,000	60,000	\$1.1B - \$1.7B	24,000	\$0.9B - \$1.3B	960,000	\$1.3B - \$1.6B
42	5,000,000	125,000	\$2.3B - \$3.5B	50,000	\$1.9B - \$2.8B	2,000,000	\$2.7B - \$3.4B

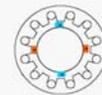
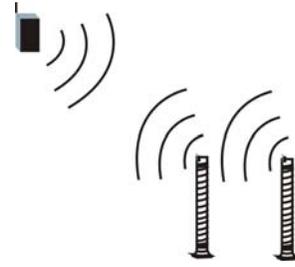
What does this do for Iran?

Iran has declared plans for 50,000 centrifuges (P1s or P2?) and 20 Reactors by 2035—but they don't match up!



What does it do for the West? Increased assurances that Iran will not get a nuclear bomb.

- Technology safe:
 - “black boxed” centrifuges
 - “Smart tags” on centrifuges
 - Continual monitoring of position
 - Motion/acceleration sensors
- Material accountancy much greater than IAEA
 - Western Technicians, bookkeepers, managers
 - Joint venture extending into uranium conversion
- Built in self-destruct mechanisms
- Increased mechanisms for detecting covert enrichment facilities

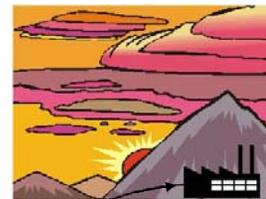


This Proposal Offers Increased Detection of Covert Enrichment Facilities

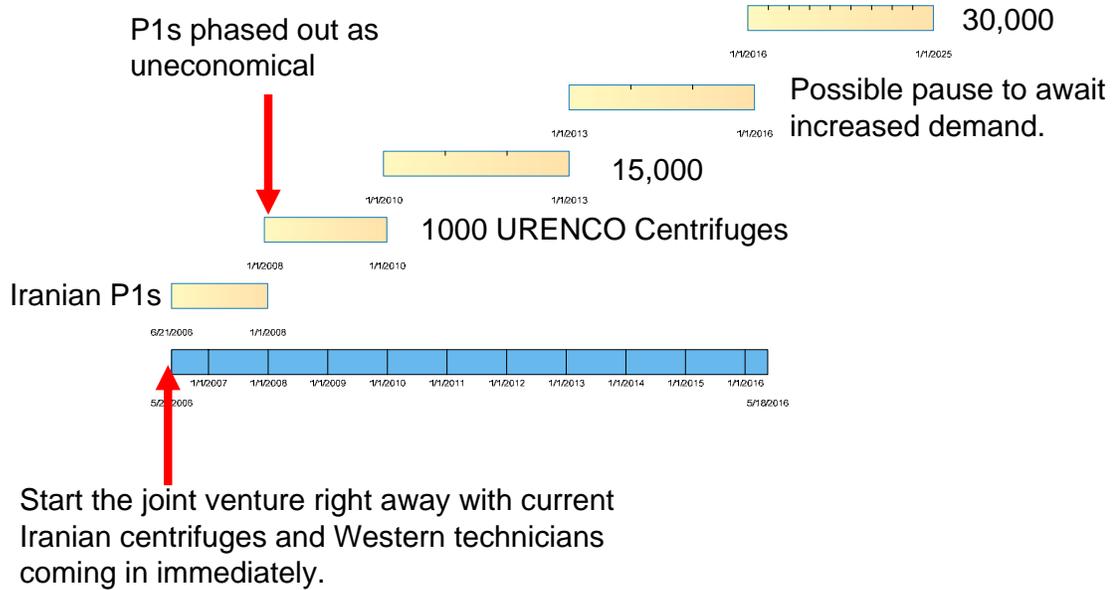
UNMOVIC and UNSCOM found that knowing who are the skilled workers etc. was a key monitoring tool in Iraq.

This was one of the reasons by UNSCR 1441 required Iraq to provide names of all WMD workers.

The Joint Enrichment Facility, with Western Technicians, Western Bookkeepers, and Western Managers working side-by-side with Iranian experts will provide even greater awareness.

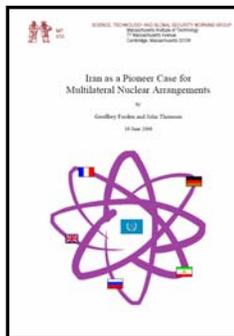


Hypothetical Timeline of Joint Facilities Enrichment Capabilities



More Details, including papers we have written, can be found on our website:

<http://mit.edu/stgs/irancrisis.html>

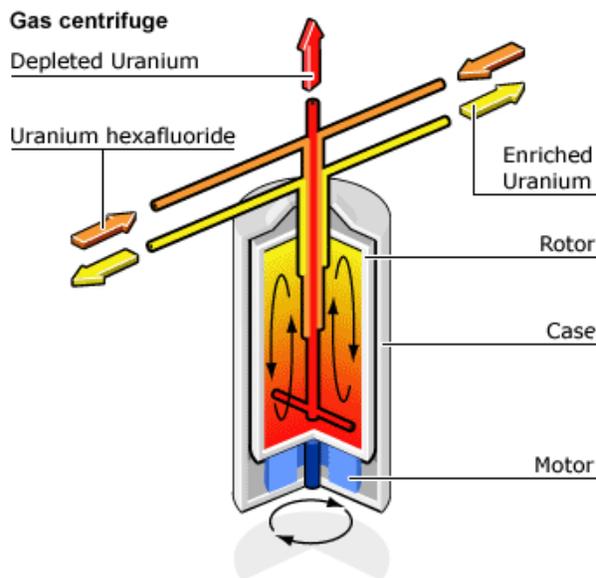
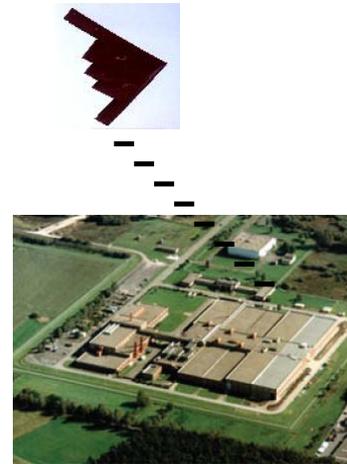


A Possible Self-Destruct Mechanism:

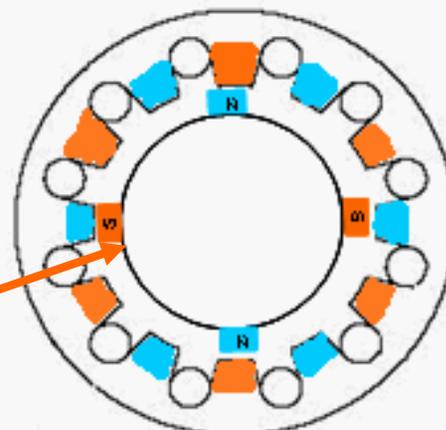
- This seems a political necessity.
- We have some ideas, but it will probably take a developmental program to institute it.

In addition, there are important manufacturing reasons by the facility should be above ground.

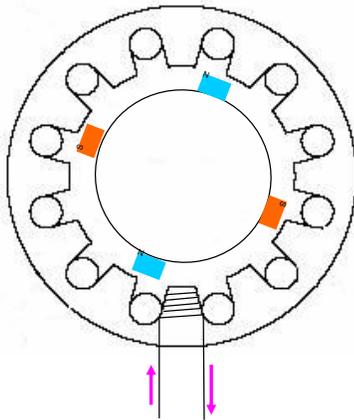
This implies that as a backup destruct mechanism, the plant could be bombed.



Bottom view of electric induction motor that runs the rotor:



Magnetic fields induced in the motor's rotor.



A special circuit could be turned on to produce an asymmetric magnetic field → producing a crash.

