

The Nuclear Non-Proliferation, Arms Control and Disarmament

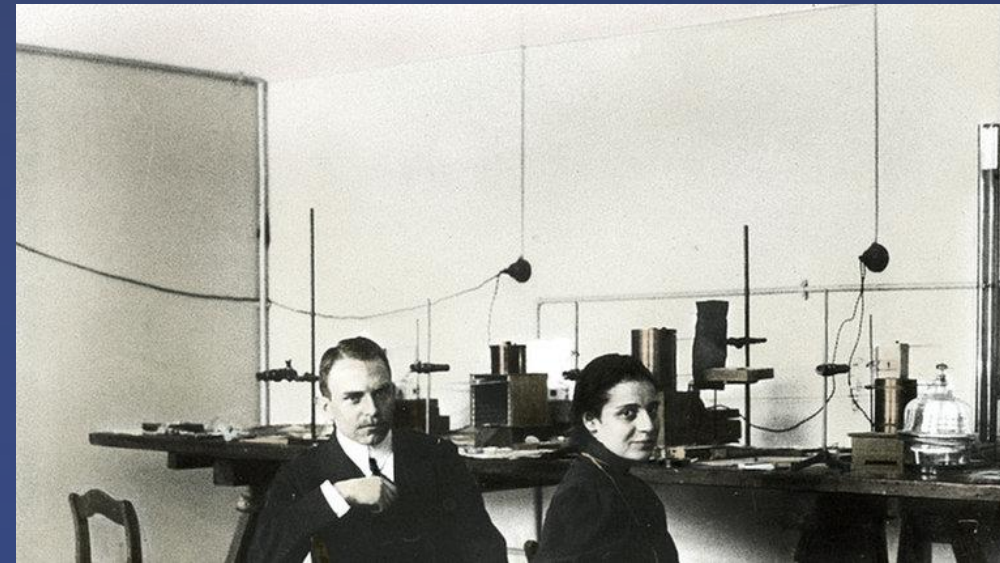
{ Laura Rockwood
{ Executive Director, VCDNP

Conflict Prevention through Arms Control, Disarmament and Non-proliferation
in the OSCE Area

Vienna International Center

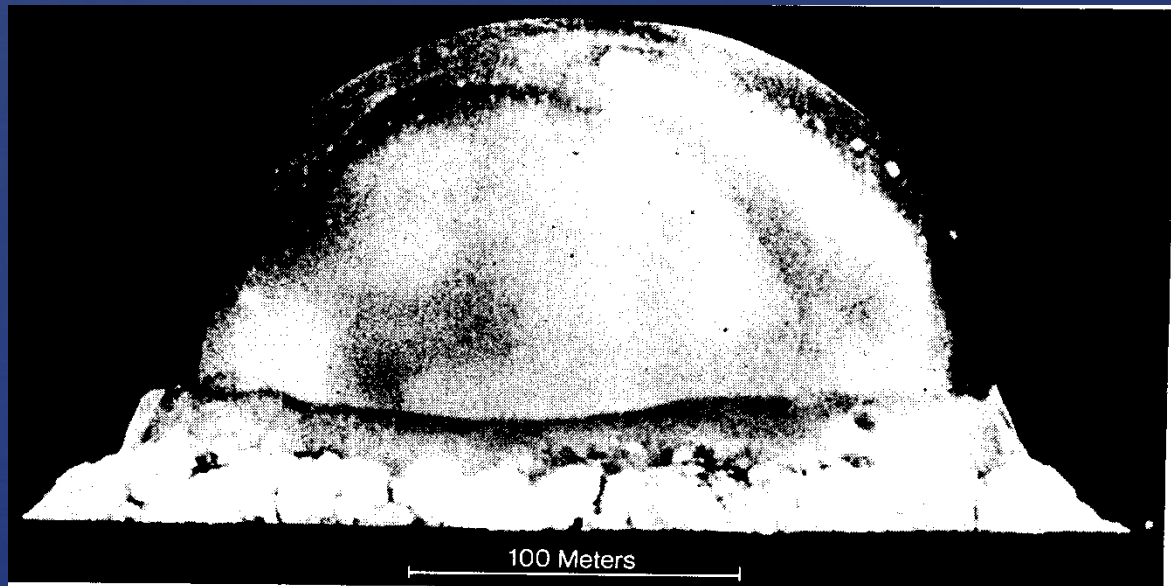
6 May 2019

The Dawn



1938: Discovery of
uranium fission:
Lise Meitner
& Otto Hahn

July 1945: Trinity
Test

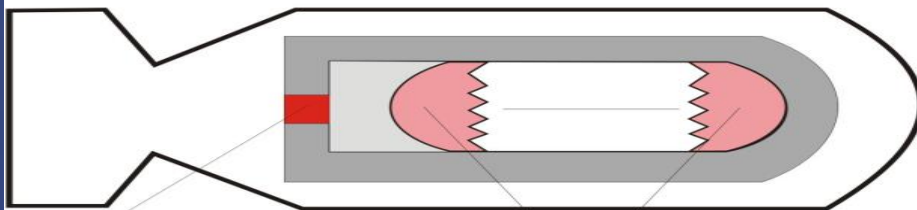


The Threat



The Hiroshima A-Bomb

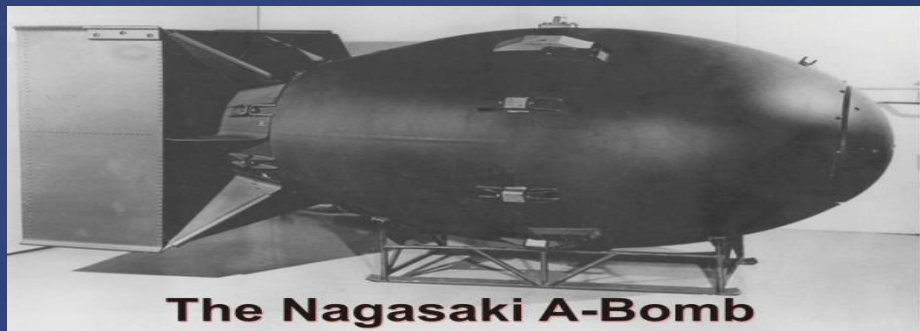
← 6 Aug. 1945: "Little Boy"



Explosive device

Uranium 235

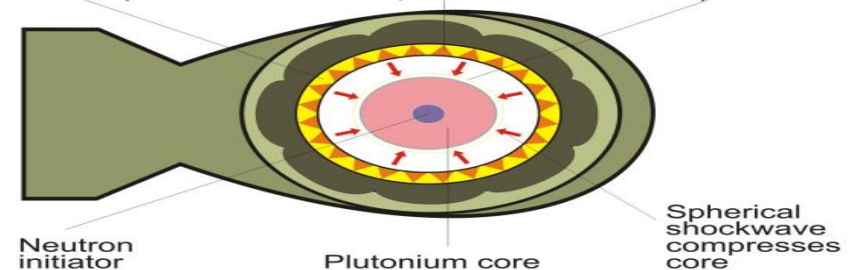
Length	120 inches (approx. 3 metres)
Diameter	28 inches (approx. 0.7 metre)
Weight	9,000 lbs. (Approx. 4 tons)
Element	Uranium 235



The Nagasaki A-Bomb

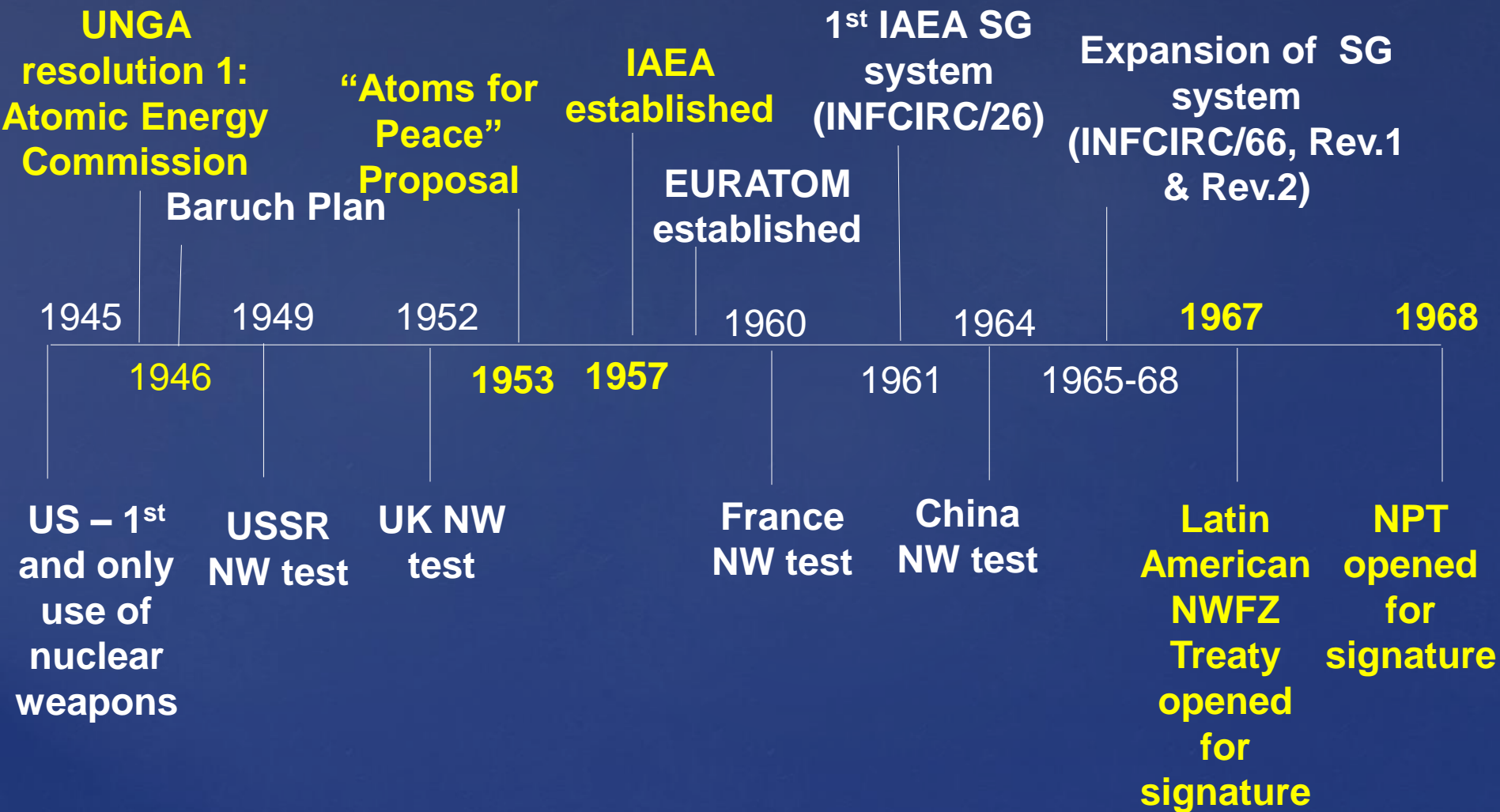
9 Aug. 1945: "Fat Man" →

Fast explosive Slow explosive Tamper/Pusher



Length	128 inches (approx. 3.2 metres)
Diameter	60 inches (approx. 1.5 metres)
Weight	10,000 lbs. (approx. 4.5 tons)
Element	Plutonium 239

The First Twenty-Five Years: Creation of the IAEA and its Safeguards System



Challenges of the 1950's – 60's

Perceived Risk?

Misuse of *supplied* material and items

Exercise unilateral restraint in sharing technology

AND

Create independent international verification
body

AND

Develop system for verifying use of supplied
material and items

Early Efforts

- **UN General Assembly resolution I/1 (1946): UN Atomic Energy Commission**
- 1946: Acheson-Lilienthal Report; Baruch Plan
 - International ownership and operation of “dangerous” nuclear activities: Atomic Development Agency
 - US to give up nuclear weapons after controls in place
- **UN AEC effectively defunct by 1949 with nuclear test by USSR**

SURE - AND HOW ABOUT ALL THOSE OTHER THINGS...

"ATOMIC FLYING MACHINES ON MY BACK."

"ATOMIC DISINTEGRATOR GUNS."

"ATOMIC ROCKETS TO THE MOON."

"ATOMIC 'PILLS' TO RUN OUR AUTOS FOR YEARS."

HOLD ON, JOHNNY... YOU'VE BEEN READING TOO MANY COMICS!

The IAEA: Atoms for Peace

- US “Atoms for Peace” proposal in UNGA – 1953
- Statute of the IAEA in force 1957
- Autonomous inter-governmental organization
- Unique relationship with UN Security Council
- Not a UN organization
- 170 Member States
- Authority to implement safeguards



IAEA safeguards

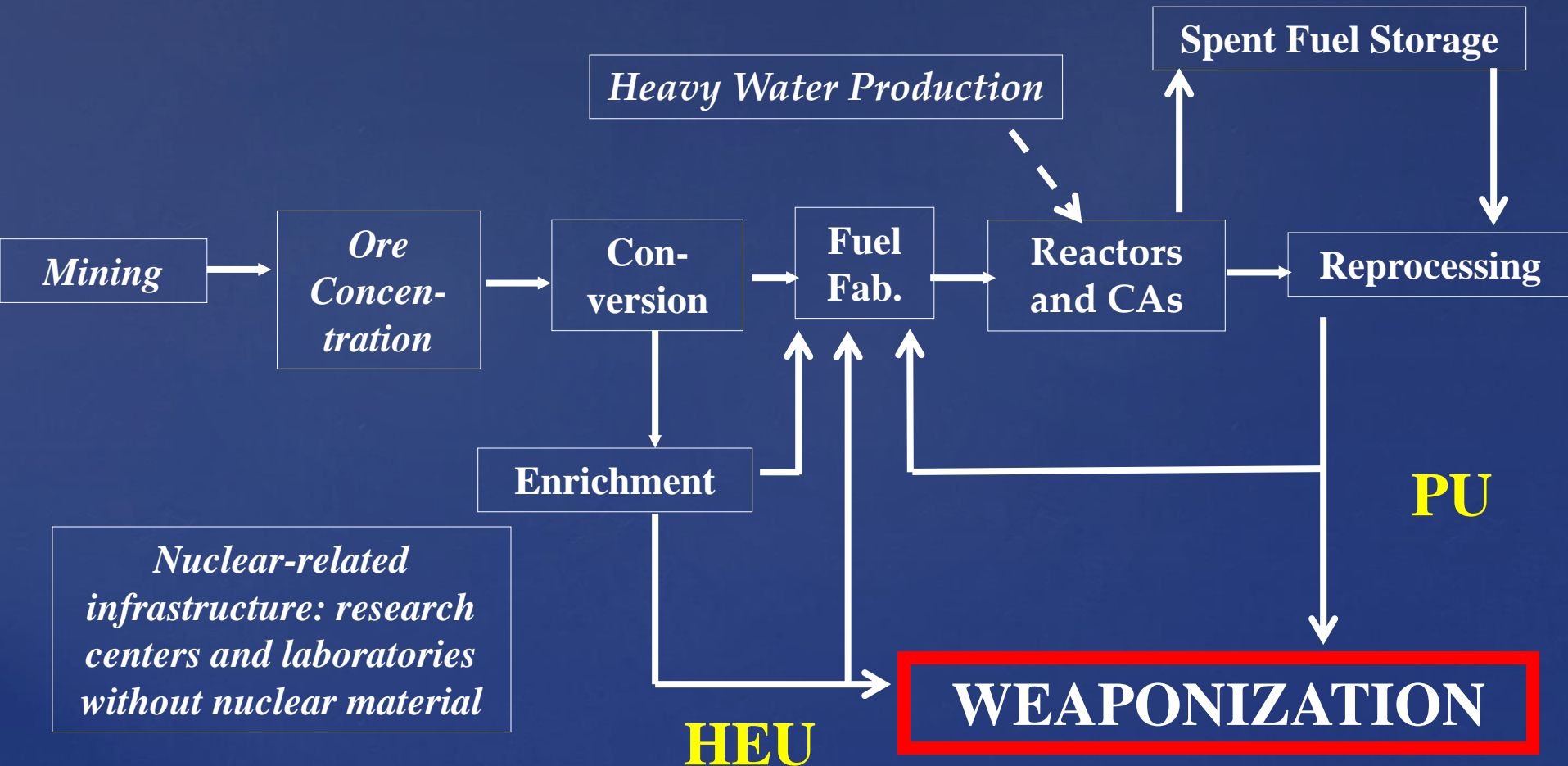
- Membership in IAEA does *not* require acceptance of safeguards
- IAEA safeguards possible in non-Members (and in non-States)
 - DPRK
 - Taiwan, China
- Requires consent of State
 - Voluntary undertaking
 - Security Council Chapter VII
 - Safeguards Agreement



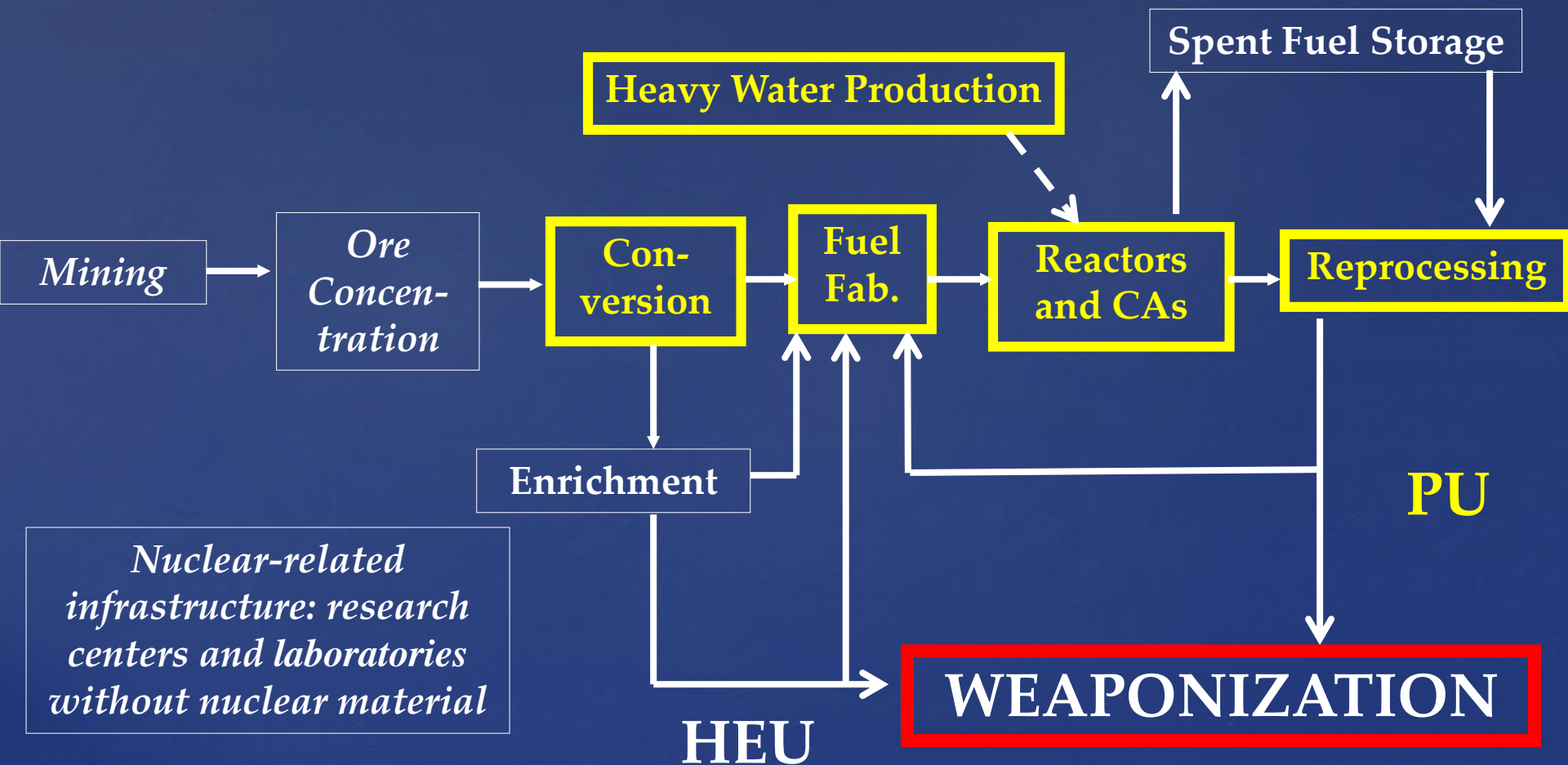
Types of safeguards agreements

- Item Specific (INFCIRC/66-type)
 - India, Israel and Pakistan
- Voluntary Offer Agreements (VOAs)
 - The 5 NPT NWSs: China, France, Russia, UK, US
- Comprehensive Safeguards Agreements (CSAs) (INFCIRC/153-type)
 - In force for 175 of the 186 NNWSs

Critical Path to Weapons-Usable Material



SG Coverage: Item-Specific Agreements



International Arms Control: First Steps

- **1960: Ten Nation Committee on Disarmament**
 - Comprehensive approach to disarmament; equal East/West representation
- **1961-1969: Eighteen-Nation Disarmament Committee**
 - Addition of Non-Aligned countries
- **October 1963: Partial Test Ban Treaty in force**
- **October 1964: China conducts nuclear test**

Regional Arms Control: First Steps

- 1958: Costa Rica proposes regional arms control agreement
- **October 1962: Cuban Missile Crisis**
- April 1963: Declaration of Denuclearization of Latin America
- **February 1967: Treaty of Tlatelolco opened for signature**

1st NWFZ: Latin America & Caribbean



1967 Tlatelolco Treaty

& Non-proliferation and peaceful use undertakings

& IAEA safeguards on all nuclear activities

& Ban on NW testing

& OPANAL

& Protocols:

⌘ States with territories in the zone

⌘ NWSs – negative security assurances

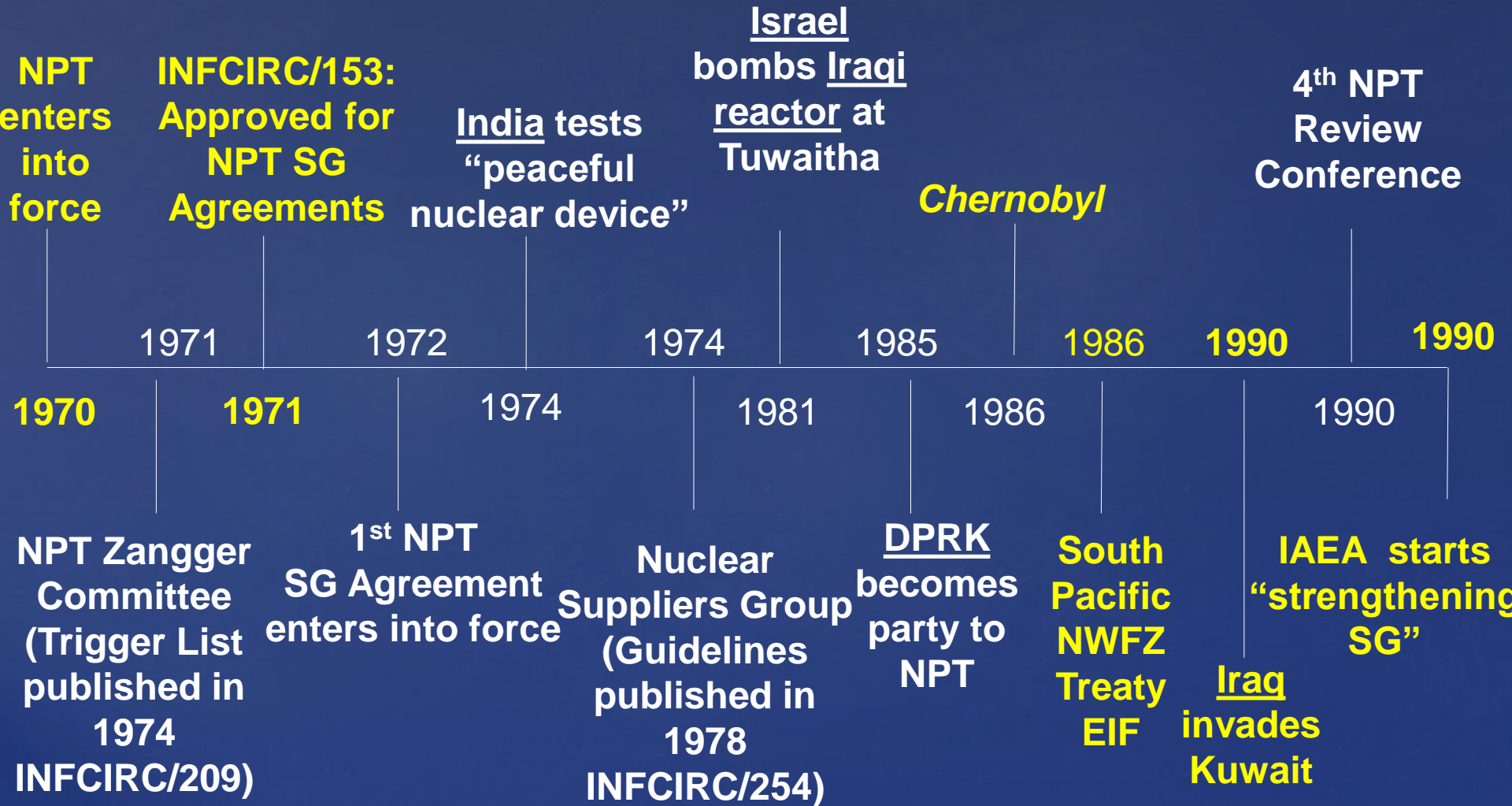
International Arms Control: Next Steps

The NPT

- ⌘ Eighteen-Nation Disarmament Committee, Geneva 1965-1967
- ⌘ Bilateral US/USSR negotiations
- ⌘ August 1967: US/USSR identical drafts
- ⌘ Opened for signature 1968
- ⌘ Entered into force 5 March 1970



The Following Two Decades: The Comprehensive Safeguards System



Challenges of the 1970's – 80's

Perceived Risk?

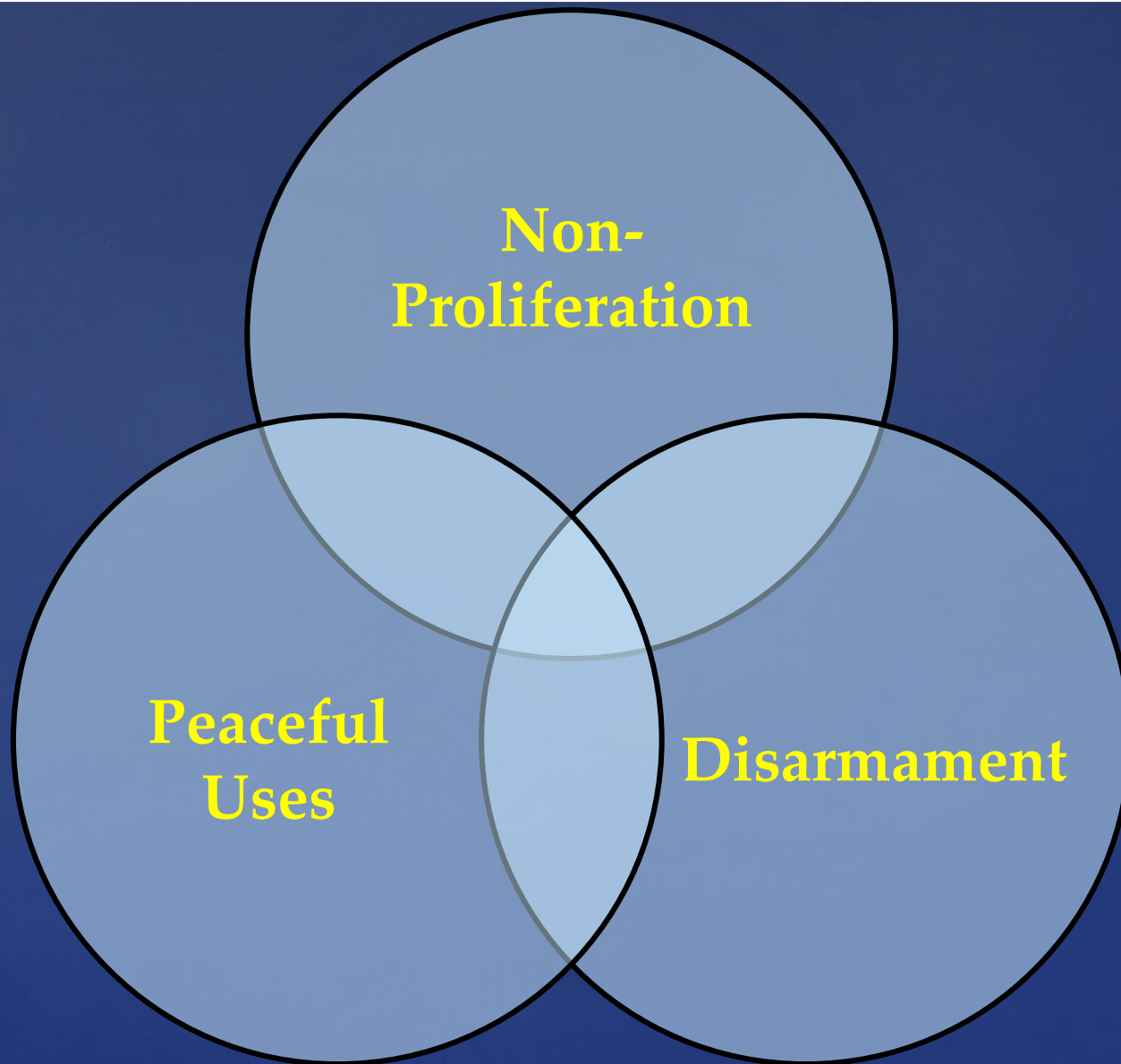
Misuse of *indigenous nuclear fuel cycle*

Develop safeguards system for verifying **supplied**
and produced nuclear material in a State

AND

Require **export controls** for nuclear material and
specialized *single use* equipment and material

The NPT: Three Pillars



The NPT

Nuclear-Weapon States (NWSs)

- Not to provide nuclear weapons or nuclear explosive devices to NNWSs (Art. I)

Non-Nuclear-Weapon States (NNWSs)

- Not to acquire nuclear weapons or other nuclear explosive devices (Art. II)
- Accept safeguards on all nuclear material (Art. III.1, 4)

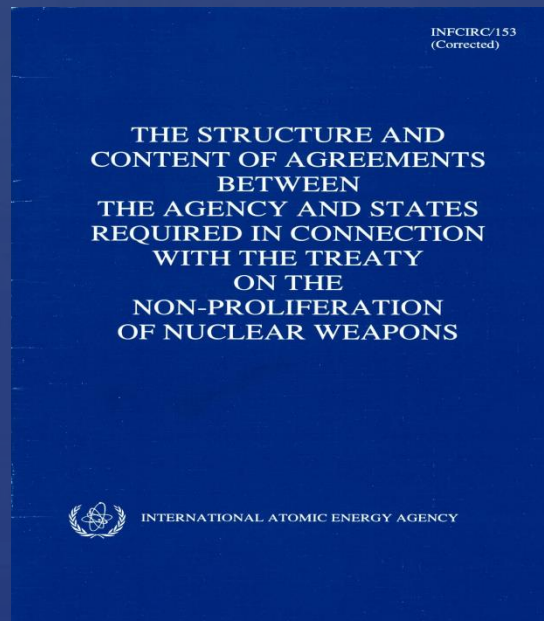
All States Parties

- Export controls: nuclear material; single use items (Art. III.2)
 - Facilitate exchange of technology (Art. IV.2)
- Pursue negotiations on nuclear disarmament (Art. VI)

Comprehensive Safeguards Agreements

**The Structure and Content of Agreements
between the Agency and States required in
connection with the Treaty on the Non-
Proliferation of Nuclear Weapons**

INFCIRC/153 (Corr.)



CSA: State's Undertaking

... to accept safeguards, in accordance with the terms of the Agreement, on all source or special fissionable material in all peaceful nuclear activities within the territory of the State, under its jurisdiction or carried out under its control anywhere ...

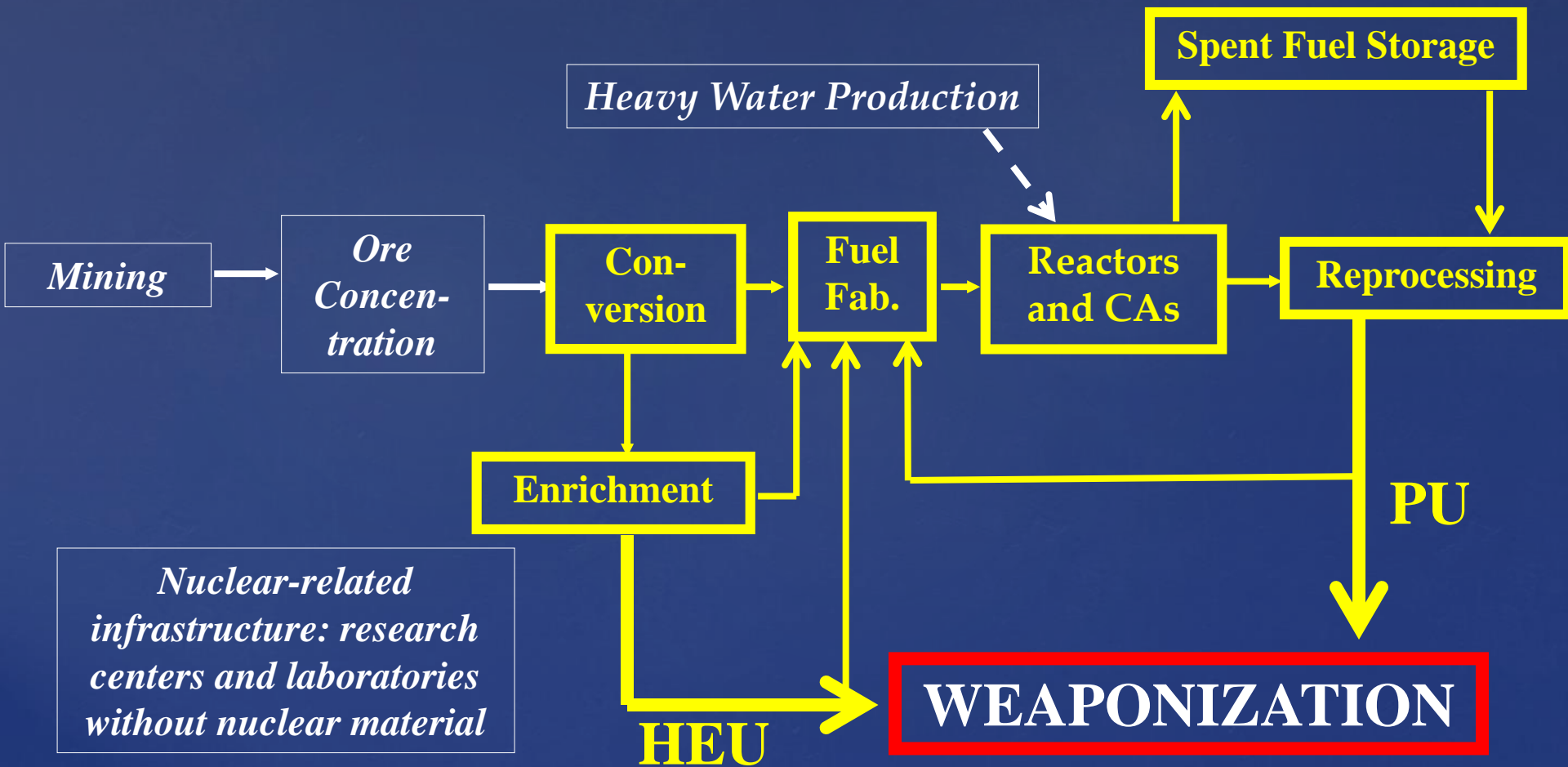
INFCIRC/153, para. 1

CSA: IAEA's Role

Timely **detection of diversion** of significant quantities of nuclear material to “the manufacture of nuclear weapons or of other nuclear explosive devices or for purposes unknown”

Deterrence of diversion by risk of early detection

Routine SG Coverage - CSAs



2nd NWFZ: South Pacific



- ⊗ 1985 - Treaty of Rarotonga
- ⊗ Non-proliferation & peaceful use undertakings
- ⊗ Comprehensive safeguards as a condition of supply
- ⊗ Ban on dumping of radioactive waste
- ⊗ 3 Protocols:
 - ⊗ States with territories in zone
 - ⊗ Negative security assurances
 - ⊗ No testing of nuclear explosives

Export Controls – NPT & Non-NPT

Zangger Committee (1971) – NPT

suppliers

- Trigger List (1974) – Nuclear material and single use items triggering safeguards

(INFCIRC/209)

Nuclear Suppliers Group (1975) – *All*

major suppliers

- List of single use items and related technology (1978)

(INFCIRC/254)

Limitations in Traditional SG

- Limited routine *access* – frequency and locations
- Little attention to *small quantities* of material
- Focus on declared materials (*correctness*)
- No assurances of absence of undeclared nuclear material and facilities (*completeness*)

Limitations in Export Controls

Limited **scope and conditions**:

- No requirement for full-scope SG
- No controls on dual-use items or items relevant to weaponization

Limited **information** exchange:

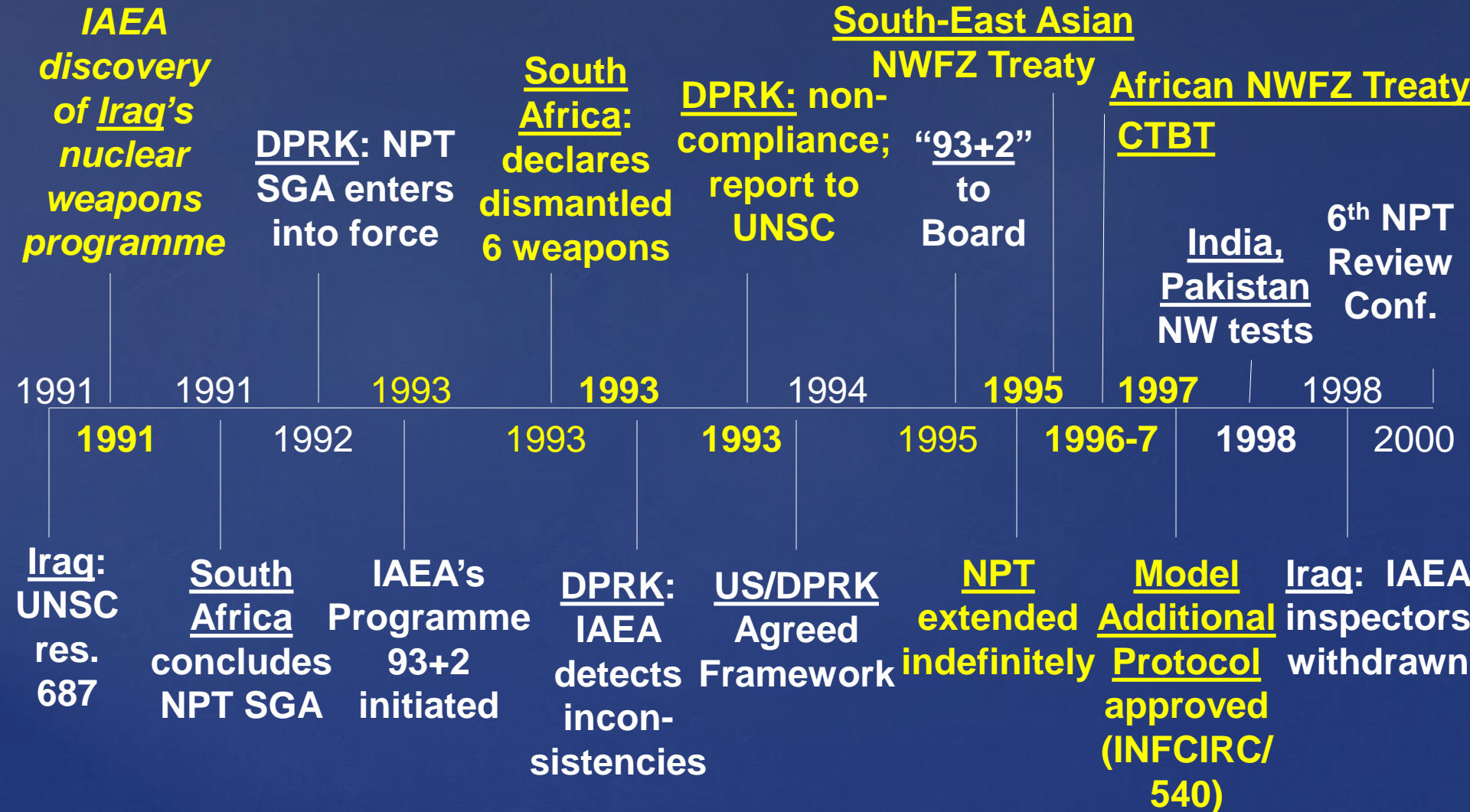
- No procedures for exchanging information on export denials
- No provision of information to the IAEA

Informal, non-binding

1990: The War That Changed Everything

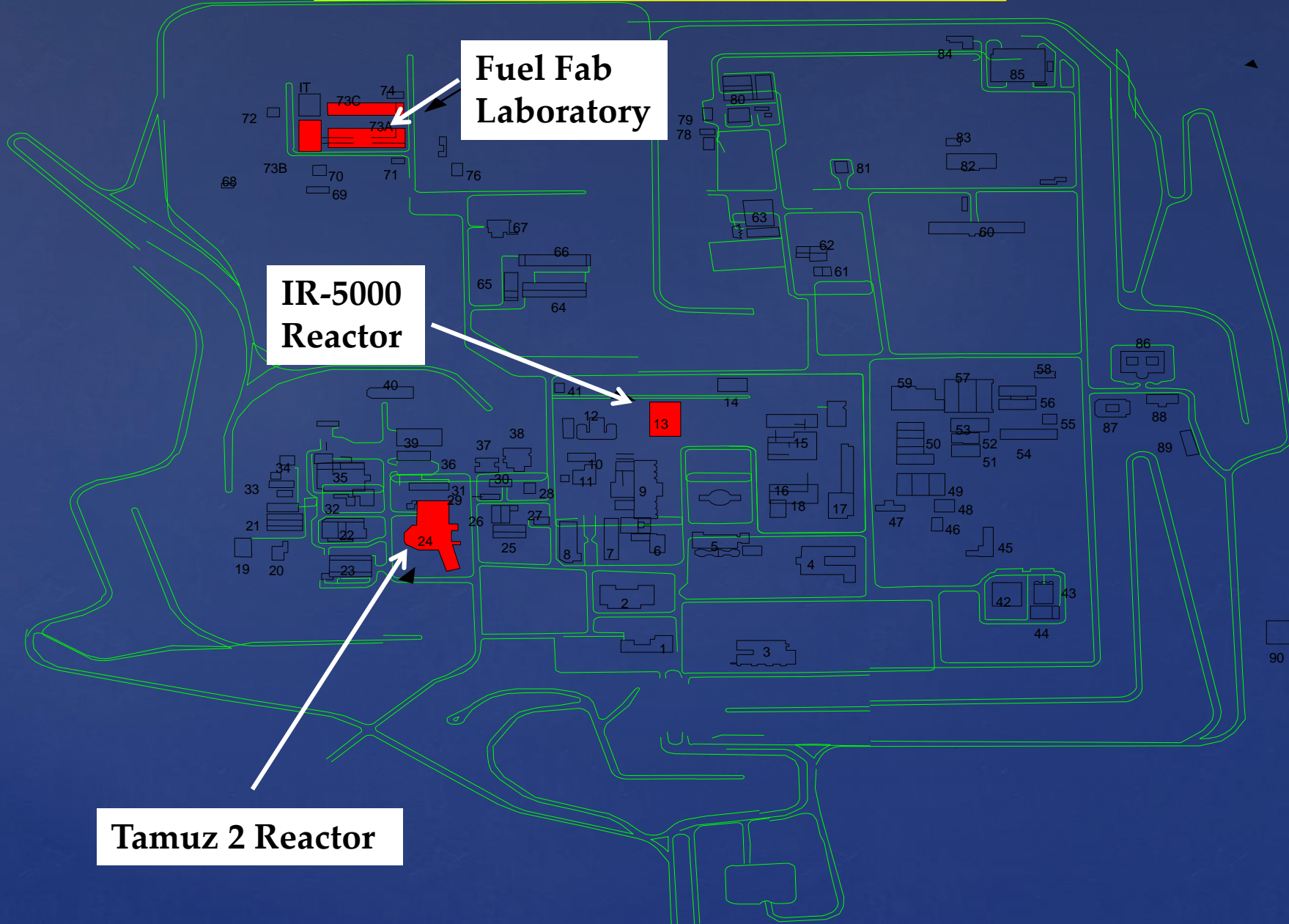


The Next Decade: Strengthening Safeguards



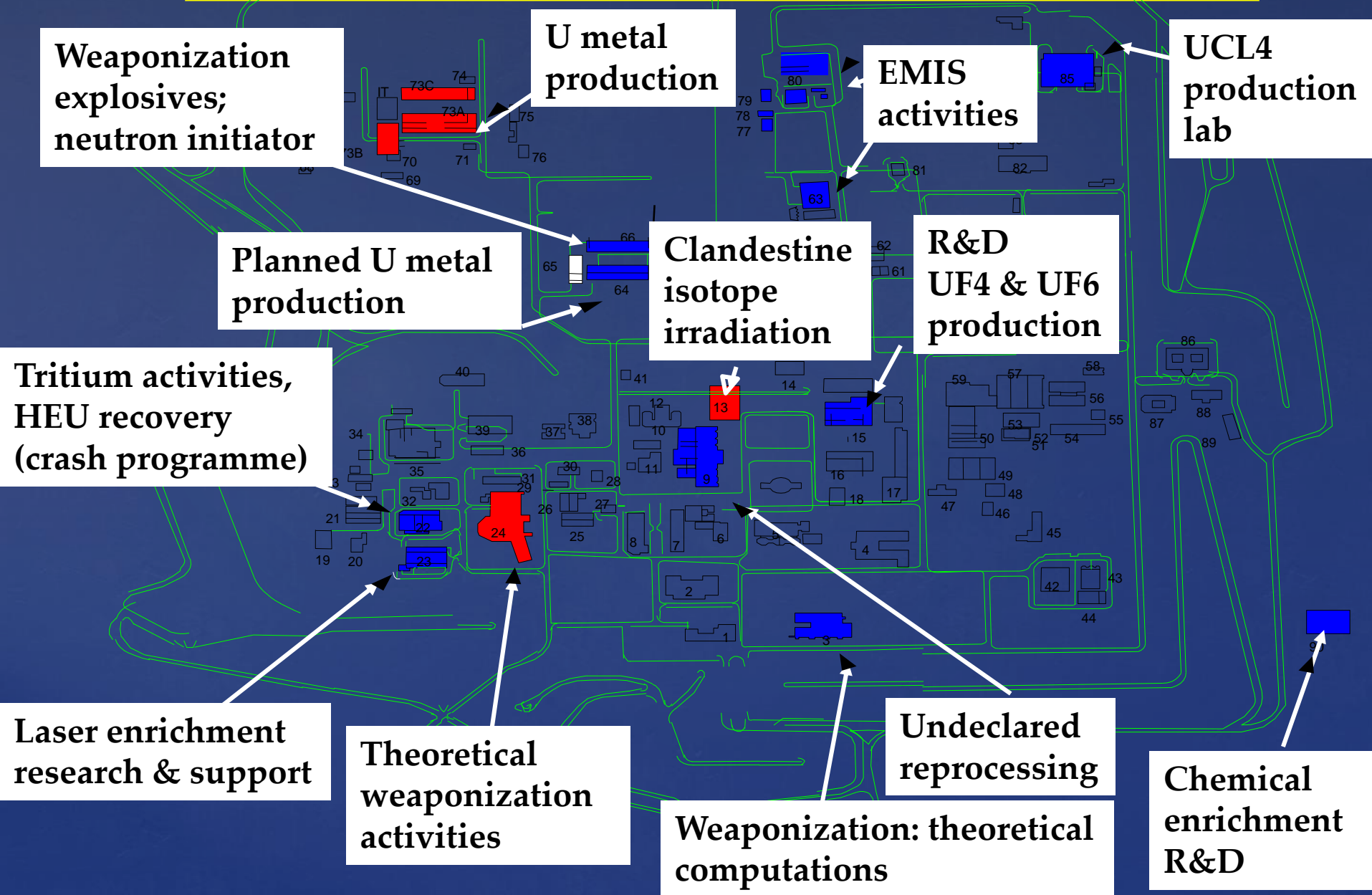
TUWAITHA

Activities Declared Prior to 1991



TUWAITHA

Clandestine Nuclear Weapons Activities



Challenges of the 1990's

Perceived Risk?

Undeclared **nuclear material and activities**

Ensure verification of all nuclear material and activities: **declared** and the **absence of undeclared**

AND

Expand export controls to cover **dual use items**

CSAs: Shifting Perceptions

... the Agency's right and obligation to ensure that safeguards will be applied ... on **ALL** source or special fissionable material in all peaceful nuclear activities within the territory of the State, under its jurisdiction or carried out under its control anywhere ...

INFCIRC/153, para. 2

Redefined Objective

Assurances of *Correctness* and
Completeness of a State's
Declarations

1991-1997: Challenging Years

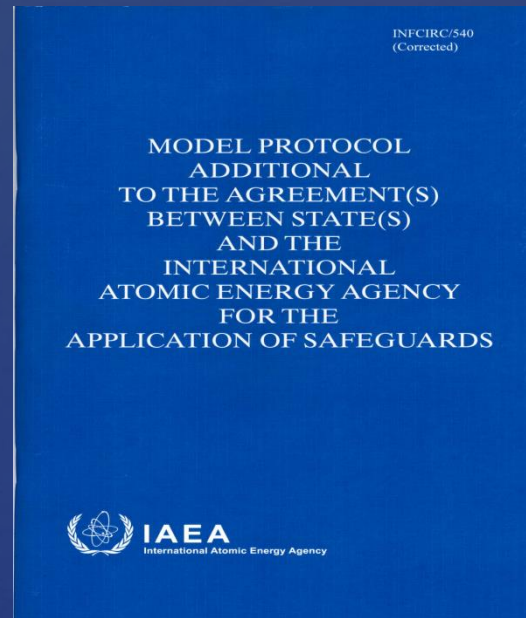


IAEA to
Monitor
& Verify
Shutdown
of DPRK's
Nuclear
Facility

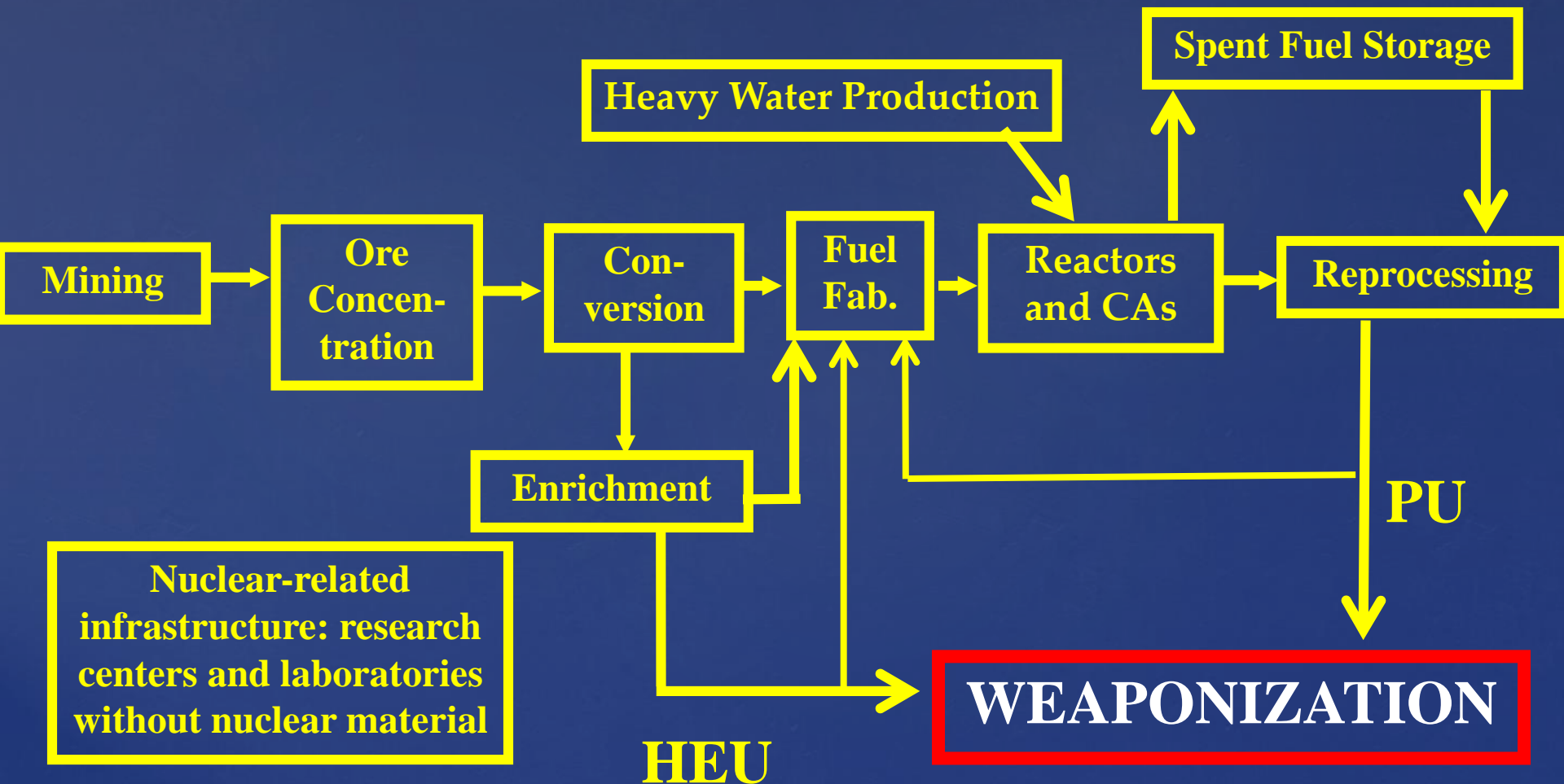


Model Additional Protocol

Model Protocol Additional to the Agreement(s) between State(s) and the International Atomic Energy Agency for the Application of Safeguards INFCIRC/540 (Corr.)



SG Coverage – CSA and AP



Export Control Developments

INFCIRC/254:

- Part 1 (1978): “EDP” items, and technology transfer
- Part 2 (1992): Dual-use equipment, material & technology
- Conditions:
 - ❖ “Full scope” SG as condition for future supplies (1992)
 - ❖ Exchange within NSG of notifications of denials

INFCIRC/539 (Rev.6): Outreach activities

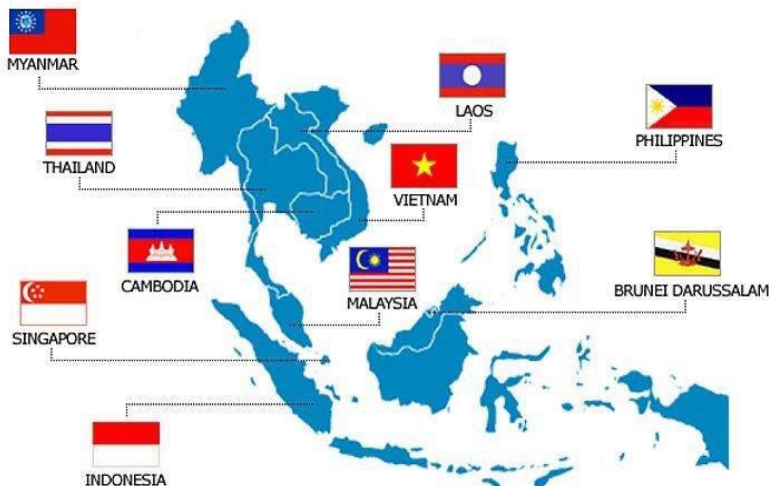
1997: “The Nuclear Suppliers Group: Its Origins, Role and Activities” – revised in 2000, 2003, 2005, 2009, 2012 & 2015

3rd NWFZ: South East Asia

1995 – Bangkok Treaty

- & Non-proliferation & peaceful use undertakings
- & Comprehensive safeguards as a condition of supply
- & Ban on dumping of radioactive waste
- & Protocol:
 - ⌘ Negative security assurances – not to use or threaten to use nuclear weapons in the zone

ASEAN Member Countries



4th NWFZ: Africa

1996 – Pelindaba Treaty

- ⌘ Non-proliferation & peaceful use undertakings
- ⌘ Prohibits nuclear weapons research
- ⌘ Requires nuclear weapons programme rollback
- ⌘ Prohibits attacks on nuclear facilities
- ⌘ 3 Protocols:
 - ⌘ Negative security assurances
 - ⌘ No testing nuclear explosives
 - ⌘ States with territories in zone



9/11

"All the News
That's Fit to Print"

The New York Times

Late Edition

New York Today, unless a few extra
pages (22nd, 23rd, 24th, 25th, 26th, 27th, 28th, 29th, 30th, 31st, 32nd, 33rd, 34th, 35th, 36th, 37th, 38th, 39th, 40th, 41st, 42nd, 43rd, 44th, 45th, 46th, 47th, 48th, 49th, 50th, 51st, 52nd, 53rd, 54th, 55th, 56th, 57th, 58th, 59th, 60th, 61st, 62nd, 63rd, 64th, 65th, 66th, 67th, 68th, 69th, 70th, 71st, 72nd, 73rd, 74th, 75th, 76th, 77th, 78th, 79th, 80th, 81st, 82nd, 83rd, 84th, 85th, 86th, 87th, 88th, 89th, 90th, 91st, 92nd, 93rd, 94th, 95th, 96th, 97th, 98th, 99th, 100th, 101st, 102nd, 103rd, 104th, 105th, 106th, 107th, 108th, 109th, 110th, 111th, 112th, 113th, 114th, 115th, 116th, 117th, 118th, 119th, 120th, 121st, 122nd, 123rd, 124th, 125th, 126th, 127th, 128th, 129th, 130th, 131st, 132nd, 133rd, 134th, 135th, 136th, 137th, 138th, 139th, 140th, 141st, 142nd, 143rd, 144th, 145th, 146th, 147th, 148th, 149th, 150th, 151st, 152nd, 153rd, 154th, 155th, 156th, 157th, 158th, 159th, 160th, 161st, 162nd, 163rd, 164th, 165th, 166th, 167th, 168th, 169th, 170th, 171st, 172nd, 173rd, 174th, 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75 CENTS

U.S. ATTACKED

HIJACKED JETS DESTROY TWIN TOWERS AND HIT PENTAGON IN DAY OF TERROR

A CREEPING HORROR

Buildings Burn and Fall
as Onlookers Search
for Elusive Safety

By N. R. KLEINFIELD

It kept getting worse.
The horror arrived in sporadic bursts of chilling disaster, signified first by smoking towers, sharp screams, cracked windows. There was the second unfathomable realization of a plane, falling from the top of the tall towers, and then the fact that all were again in the air. There was the monstrous sight of bodies helplessly tumbling out, some of them in flames.
Finally, the upper towers themselves were reduced to molten, twisted shapes of twisted metal through the downward currents, falling because the buildings could no longer support their own weight.



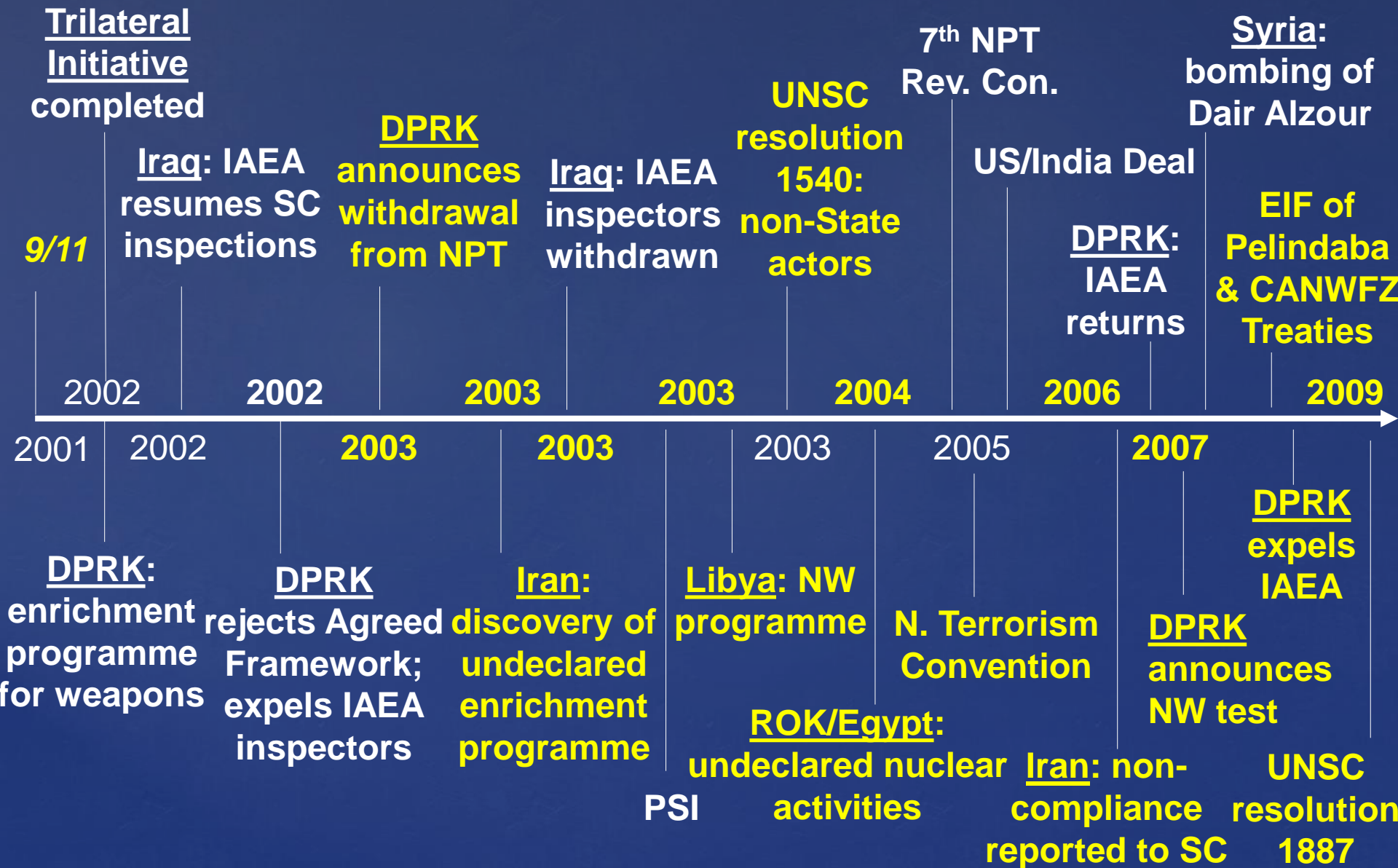
President Vows to Exact Punishment for 'Evil'

By SERGE SCHMEMMANN

Hijackers rammed jetliners into each of New York's World Trade Center towers yesterday, toppling both in a deluge of ash, glass, smoke and leaping victims, while a third jetliner crashed into the Pentagon in Virginia. There was no official count, but President Bush said thousands had perished, and in the momentous aftermath the calamity was already being ranked the worst and most senseless terror attack in American history.
The attacks seemed carefully coordinated. The hijacked planes were all en route to California, and therefore garbled with "en" and their departures were spaced within an hour and 46 minutes. The first, American Airlines Flight 11, a Boeing 767 out of Boston for Los Angeles, crashed into the north tower at 8:48 a.m. Eighteen minutes later, United Airlines Flight 175, also headed from Boston to Los Angeles, plowed into the south tower.
Then an American Airlines Boeing 757, Flight 77, left Washington's Dulles in



The Last Decade



Challenges of the Last Decade

Perceived Risk?

Non-State actors & radiological dispersal devices

Improve physical security of nuclear material & facilities and other radioactive materials

AND

Ensure effective domestic & trans-border controls

Safeguards vs. Security

- **Nuclear safeguards:**
 - Detection and deterrence of diversion of nuclear material by a State
- **Nuclear security:**
 - Detection and deterrence of misuse of nuclear material & other radioactive substances by non-State actors

2002-2009: More Challenges



Nobel Peace Prize – 2005



5th NWFZ: Central Asia

2006 – Semipalatinsk



- ⌘ Non-proliferation & peaceful use undertakings
- ⌘ Requires a CSA & AP
- ⌘ Bans testing of nuclear weapons or nuclear explosive devices
- ⌘ Environmental rehabilitation of territories contaminated due to past activities
- ⌘ Protocol:
 - ⌘ Negative security assurances: not to use or threaten to use nuclear weapons

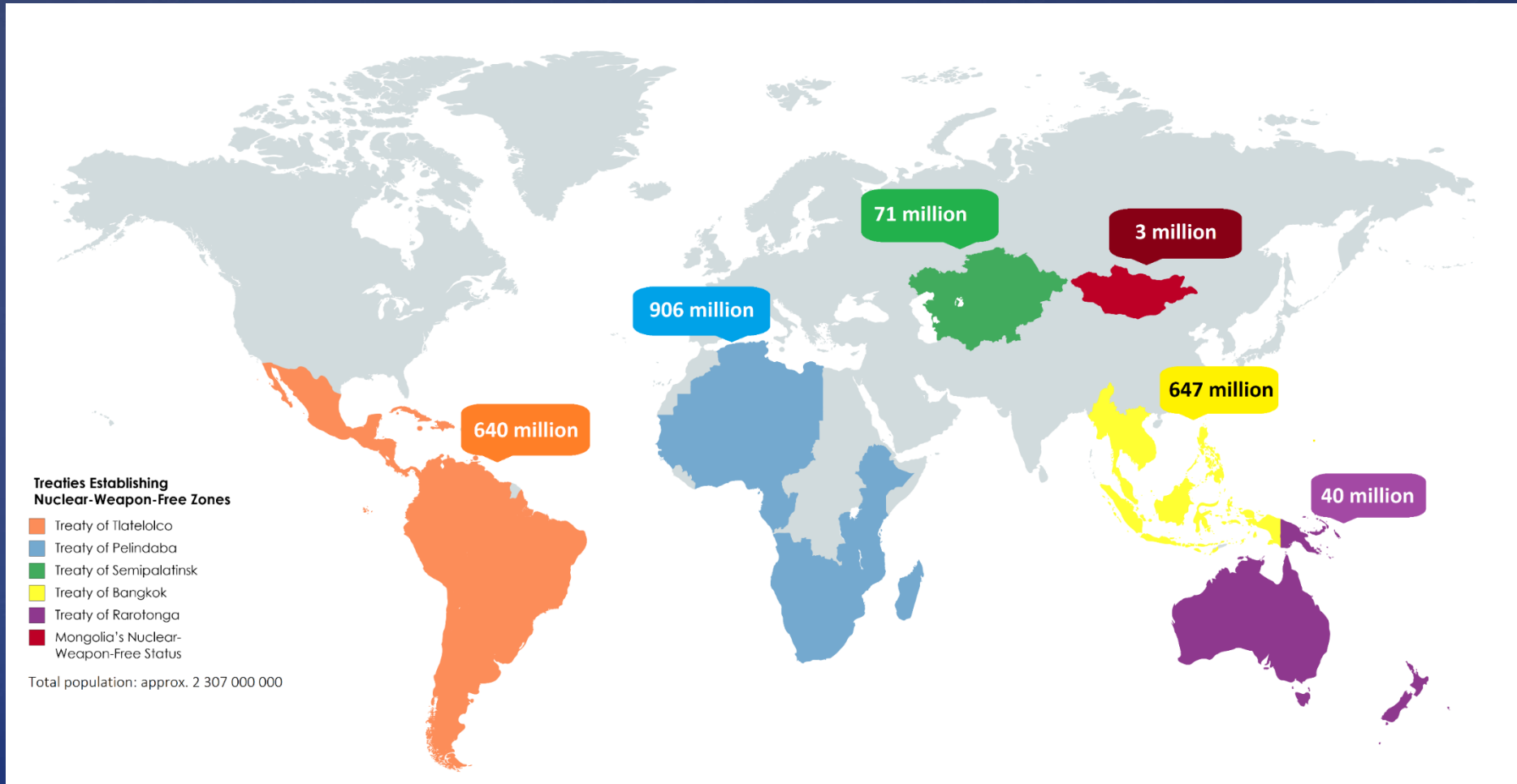
Single State NWFZ: Mongolia



1992 Mongolia NWFZ

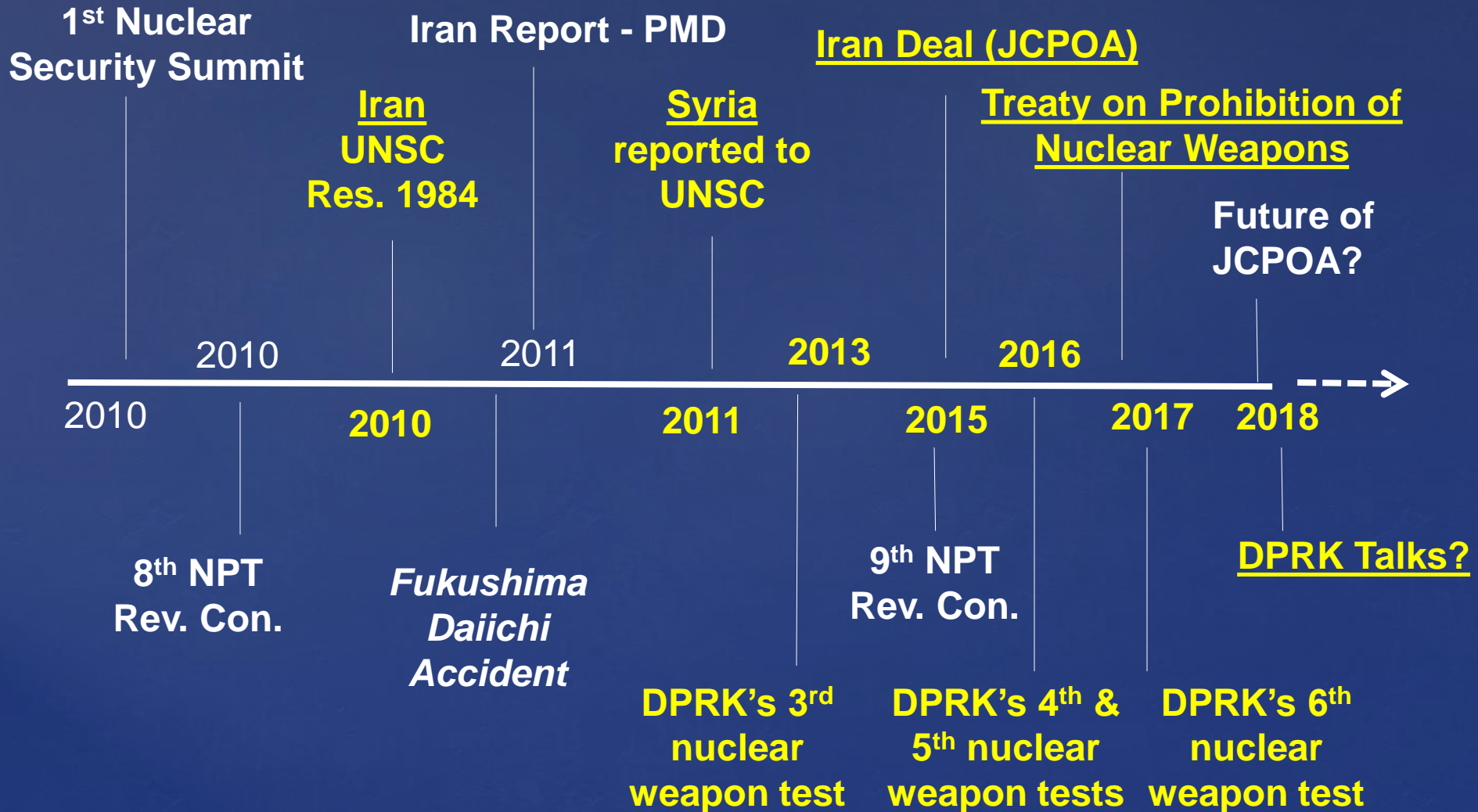
- ⌘ 1992 – Declared itself a single-State NWFZ
- ⌘ 1998 – UN General Assembly recognized NWFZ status
- ⌘ 2000 – Mongolia law on its NWFZ status
- ⌘ 2012 – Declaration with NWSs on nuclear weapon free status & negative security assurances to Mongolia

Nuclear-Weapon-Free Zones



56% of Earth's land area of 149 million km²; 60% of 195 States; 39% of world's population

The Present and Beyond ...



Middle East WMD Free Zone?

- **1995 NPT Review & Extension Conference:**
 - resolution on WMD zone free in Middle East
- **2010 NPT Review Conference breakthrough:**
 - UN SG to convene conference in 2012
 - Facilitator appointed
 - No conference convened
- **2015 NPT Review Conference: extremely contentious**
 - Middle East WMD free zone
 - Disarmament

Humanitarian Initiative & Ban Treaty

2010 NPT Review Conference

- Expressed deep concern at “catastrophic humanitarian consequences” of use of nuclear weapons; reaffirmed need for States to comply with applicable international law, including humanitarian law

Humanitarian Conferences:

- Oslo, 2013; Nayarit, 2014; Vienna, 2014
- Humanitarian Pledge, 2015 – 117 States
- Open Ended Working Group, 2016 – 3 sessions
- UN 1st Committee resolution, 2016
- Negotiations – March, June, July 2017



Treaty on the Prohibition of Nuclear Weapons

20 September 2017



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The New Iran Negotiations: 2013 – 2016

& **Joint Comprehensive Plan of
Action (JCPOA)**

⌘ 14 July 2015

& **Roadmap for Clarification:**

⌘ Past & present outstanding
SG issues - 15 Dec. 2015

& **Implementation Day**

⌘ Sanctions lifted - 16 Jan. 2016

& **US withdrawal**

⌘ 8 May 2018





PRAGUE 2009



Challenges of New Millennium?

Perceived Risks:

Nuclear black markets – non-State actors

US/Russian relations – a new Cold War?

Disarmament slowdown – failure of NWSs to fulfil obligations under Article VI of the NPT

JCPOA - possible collapse

DPRK – ???

And the implications for the **2020 NPT Review Conference**

Today's Regime....

Disarmament

Security

NPT & NWFZ Treaties

Security Council

IAEA Safeguards



Assurances of
Supply

Export controls

Safety

Counter Proliferation

Security Assurances