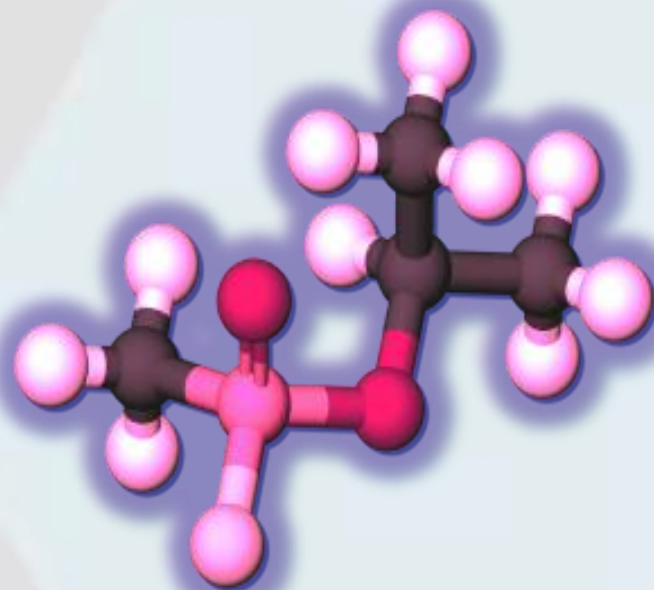




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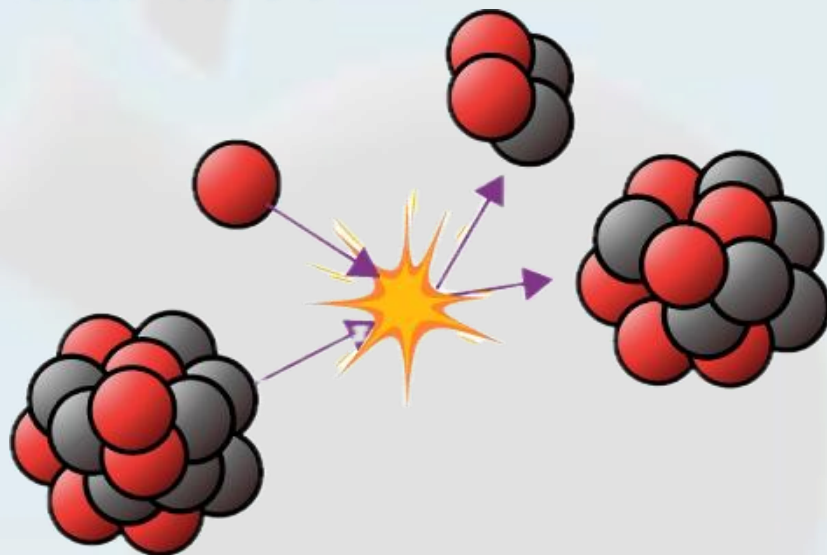
# CW AND NW STOCKPILES AND ITS DESTRUCTION TECHNOLOGIES



## III INTERNATIONAL CBRN CONGRESS

**Dr. Yaugen Ryzhykau**  
**CBRN Protection TCT BV, CEO**  
**EU CBRN CoE Project 65 Manager**

Ankara, Turkey  
20-22 November 2024



# CONTENT

- ☐ **CWC & TPNW TREATIES DEVELOPMENT AND ACHIEVEMENT**
  - ☐ **CHEMICAL WEAPONS CONVENTION (CWC)**
  - ☐ **TREATY ON THE PROHIBITION OF NUCLEAR WEAPONS (TPNW)**
  - ☐ **CWC VIS TPNW**
- ☐ **CW DESTRUCTION AFTER WORLD WAR I & II**
- ☐ **CW DESTRUCTION TECHNOLOGIES UNDER CWC**
- ☐ **NW DESTRUCTION**



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# CWC & TPNW TREATIES DEVELOPMENT AND ACHIEVEMENT



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# **CHEMICAL WEAPONS CONVENTION (CWC)**

**CONVENTION ON THE PROHIBITION OF THE  
DEVELOPMENT, PRODUCTION, STOCKPILING  
AND USE OF CHEMICAL WEAPONS AND ON  
THEIR DESTRUCTION**



# CW DISARMAMENT START POINTS IN THE USA

- ☐ CW munitions leaking at storage facilities, including M55 rockets in dangerous condition
- ☐ Operation CHASE (Cut Holes and Sink 'Em) was a US DoD program that involved the disposal of unwanted munitions at sea from 1964 into 1970s. Number of incidents occurred with CW during its transportation for dumping at sea and large scale marina environment damage
- ☐ VX sprayed accidentally over large territory at Dugway Proving Ground which cause death of almost 6.5 thousands of sheep and horses
- ☐ All mentioned above events have triggered the protest movement around the US
- ☐ Nixon Administration initiated review its CW policy in 1968 and subsequently unilaterally renounced the use of CW, in late 1969



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# USSR CW OFFENSIVE AND DEFENSIVE PROGRAMMES IN 60S-70S



# THE CWC AND OPCW

- Negotiations concluded in 1992 and the draft CWC was subsequently endorsed by the UNGA
- **13-15 January 1993** - Signing Ceremony of the CWC , UNESCO Headquarters, Paris: Secretary-General Boutros Boutros-Ghali
- Its entry into force was prepared for by a Preparatory Commission working in The Hague between February 1993 and 29 April 1997



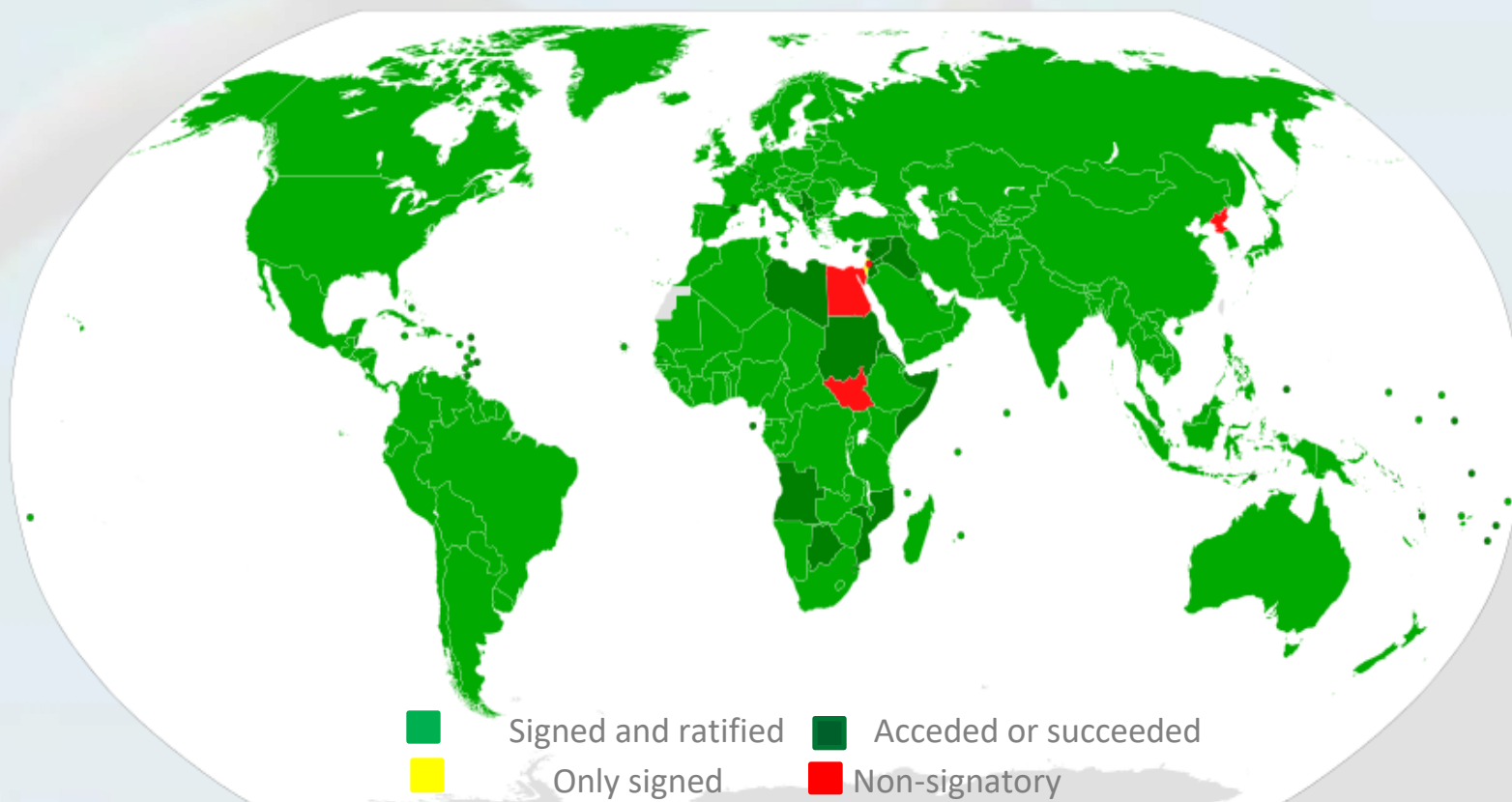




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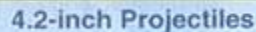
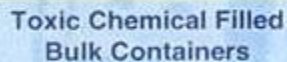
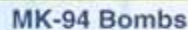
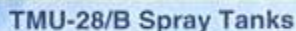
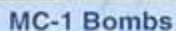
# PARTICIPATION IN THE CWC AS OF 2024

- 192 - States Parties - 98% of the global population
- 1 - Signatory States (Israel)
- 3 - Non-signatory states (DPRK, Egypt and South Sudan)





# МНУ ІЗ ДЕРЖАВОЇ ОМДЕР СМС

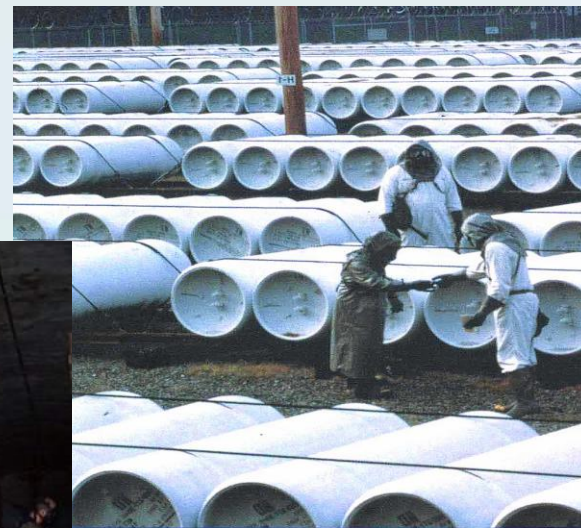






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# STOCKPILED CHEMICAL WEAPONS





# NON-STOCKPILE CHEMICAL MATERIAL



DF/QL Bulk Containers  
(Drums)/Multi-Pack Bottles



Empty Ton Containers  
(Environmental  
Cleanup Program)

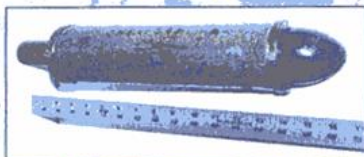


M687 155mm  
Binary GB Projectiles



Former CW Production  
Facilities

Mortar Projectiles



Artillery Projectiles



Other Munition Types

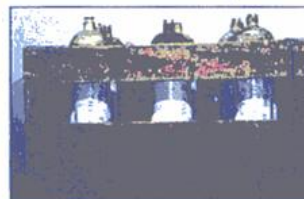


Recovered Chemical Warfare and Other Materiel

Bombs/Bomblets



Chemical Samples



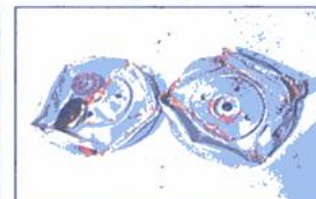
Steel DOT Bottles

Category 3 CW



MK-116 (Weteye Bomb)

Category 3 CW



Destroyed Empty M23 Mine

Miscellaneous Chemical Warfare and Other Materiel





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# TREATY ON THE PROHIBITION OF NUCLEAR WEAPONS (TPNW)





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# TPNW DEVELOPMENT



**The treaty entered into force on  
22 January 2021**

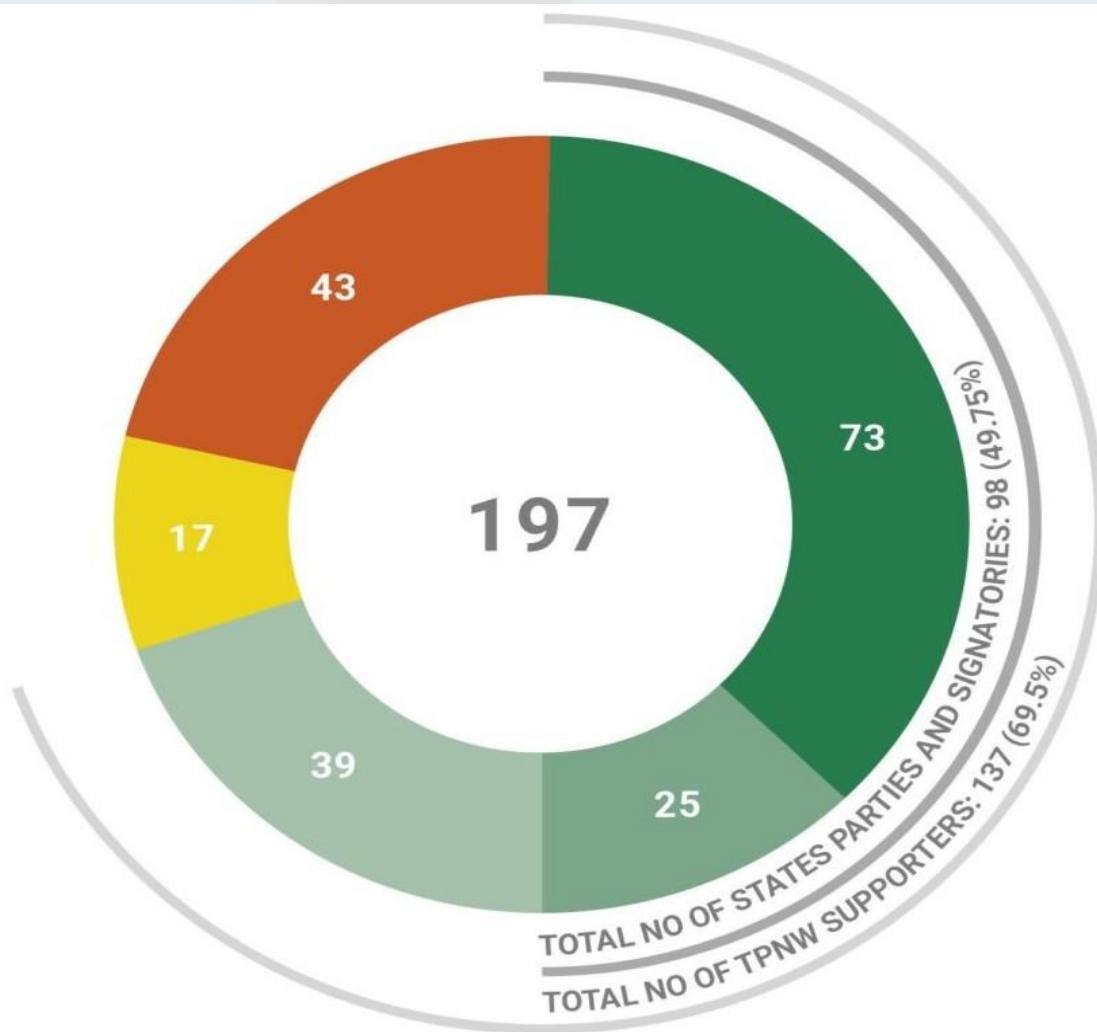
- Proposals for a nuclear weapons–ban treaty first emerged following a review **conference of the NPT in 2010**
- Five officially recognised nuclear-armed state parties – the United States, Russia, Britain, France and China – rejected calls for the start of negotiations on a treaty
- UN member states debated the idea of a nuclear weapons–ban treaty in **Geneva in May 2016**
- The vote on the final draft took place on **7 July 2017**, with 122 countries in favour, 1 opposed (Netherlands), and 1 abstention (Singapore)



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# TPNW SIGNATORIES AND STATE PARTIES AS OF SEPTEMBER 25, 2024

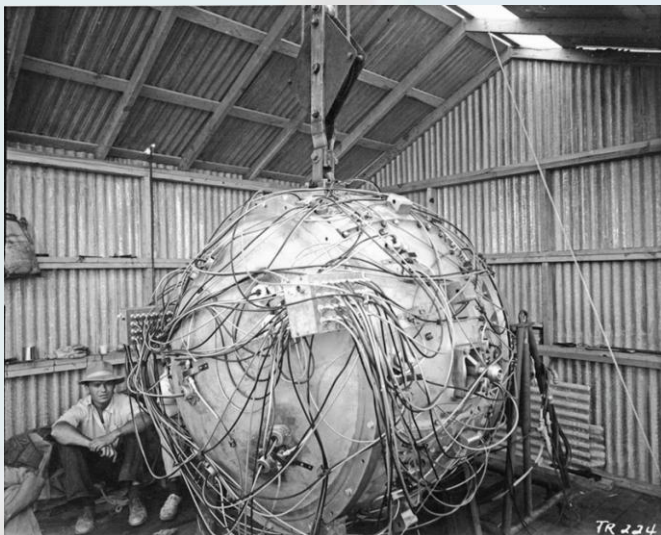
- States parties
- Signatories
- Other supporters
- Undecided
- Opposed



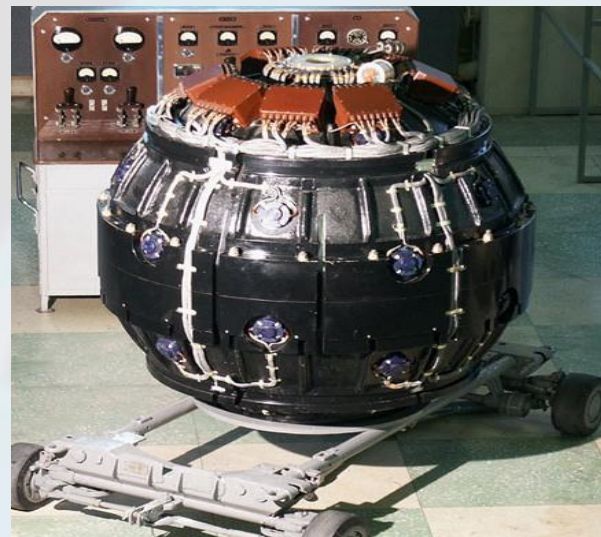


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# USA AND USSR -THE FIRST ONE



**The Gadget - first US atomic device, 1945**



**Device 501 – first USSR atomic device 1949**



**Fat Man - - first US atomic bomb, 1945**



**RDS 1 – first USSR atomic bomb 1949**





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# DESTRUCTION UNDER TPNW

## NUCLEAR TRIAD







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# NUCLEAR WEAPONS EX.

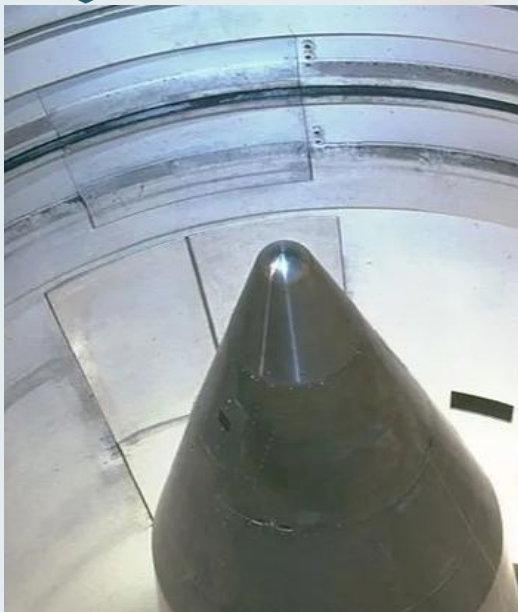






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# NUCLEAR WEAPONS EX.







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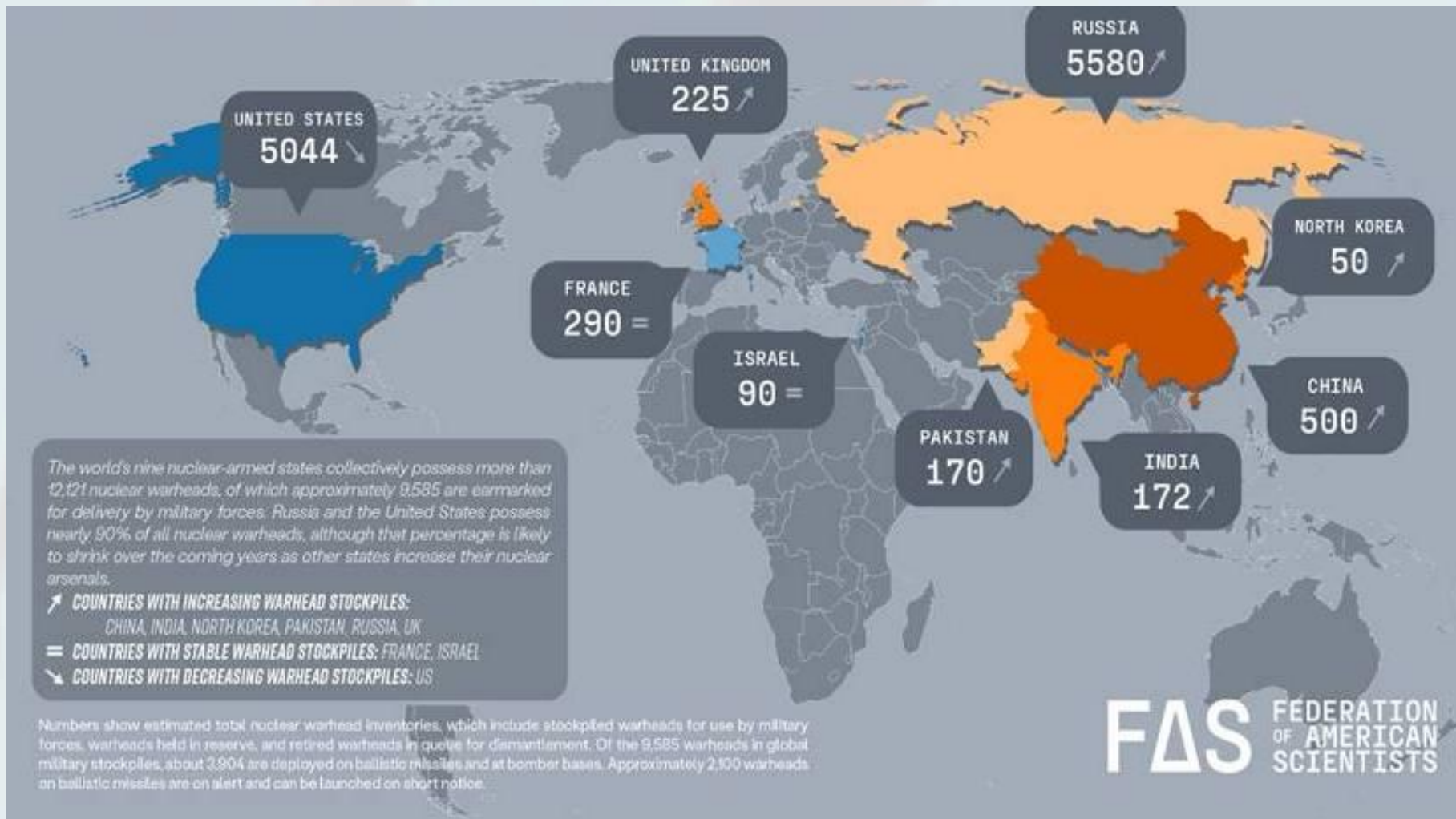
# NUCLEAR WEAPONS EX.





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# ESTIMATED GLOBAL NUCLEAR WARHEADS INVENTORY 2024





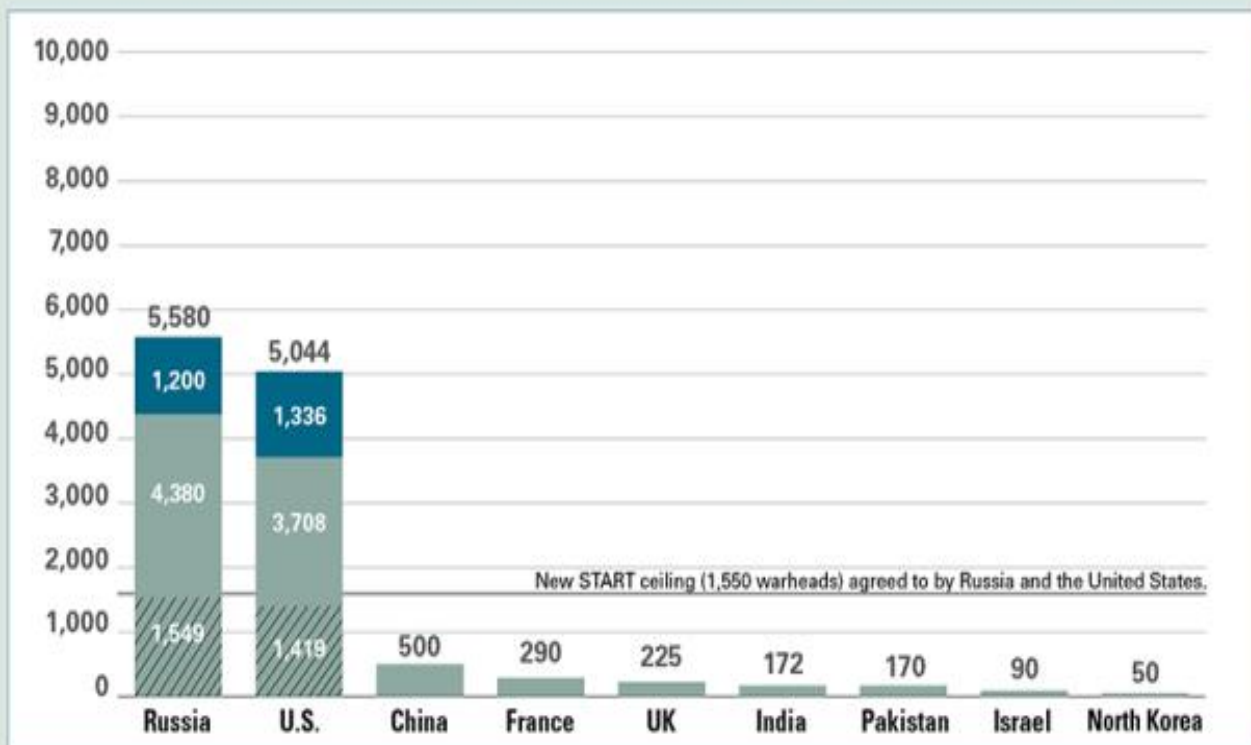


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# NUMBER OF NUCLEAR WARHEADS WORLDWIDE AS OF JANUARY 2024

## 2024 Estimated Global Nuclear Warhead Inventories

The world's nuclear-armed states possess a combined total of over 12,100 nuclear warheads; nearly 90% belong to Russia and the United States. Approximately 9,600 warheads are in military service, with the rest awaiting dismantlement.



### Retired:

warheads no longer in the stockpile but remain intact as they await dismantlement.

### Military Stockpile:

warheads assigned for potential use on military delivery vehicles; includes active and inactive warheads.

### Strategic Deployed:

**U.S. and Russian** warheads on ballistic missiles and at U.S. bomber bases.

*Numbers based on New START counting rules which attribute one deployed warhead per deployed heavy bomber no matter how many warheads each bomber actually carries.*

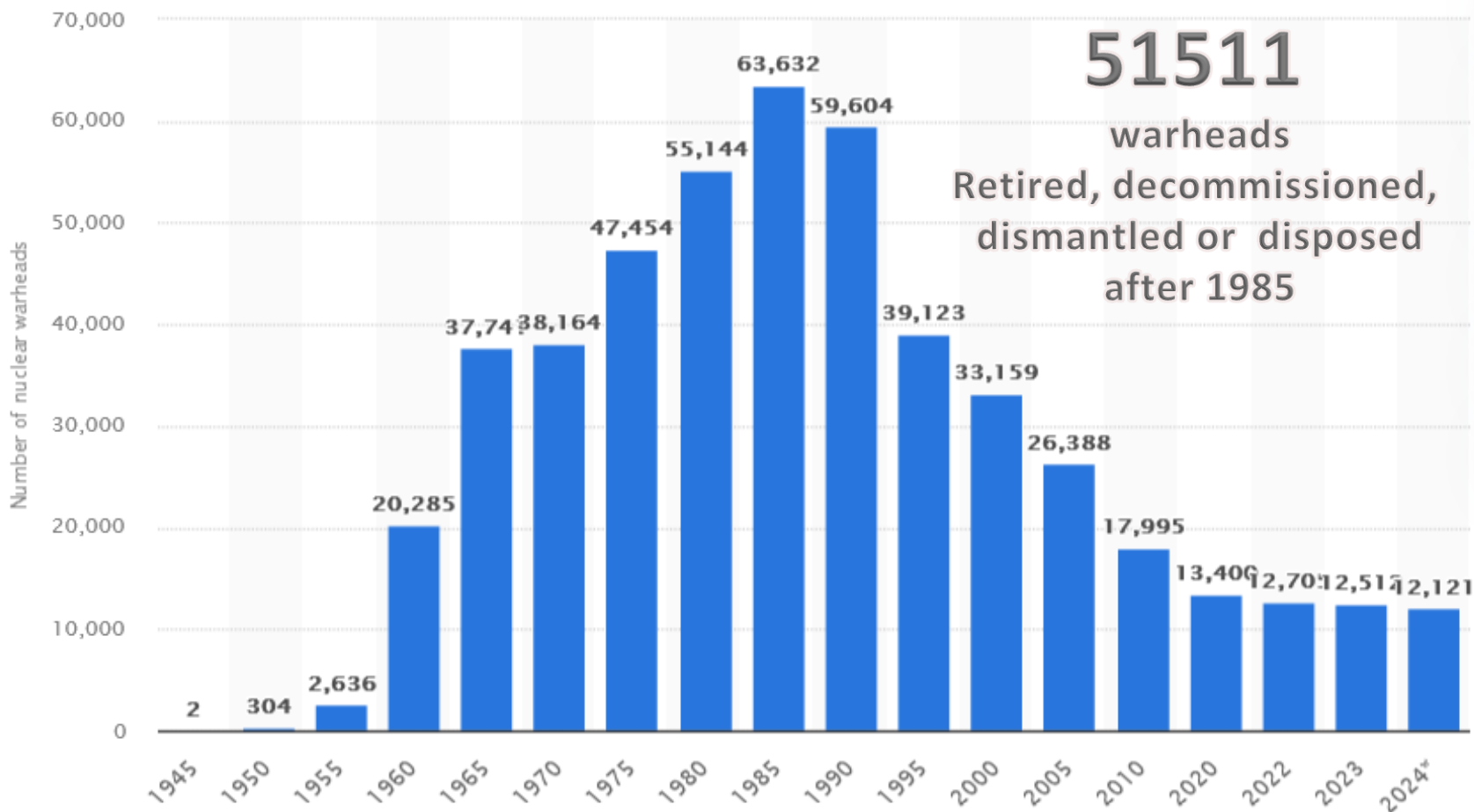
Source: Hans M. Kristensen, Matt Korda, Eliana Johns, and Mackenzie Knight, Federation of American Scientists, U.S. Department of State, and the Stockholm International Peace Research Institute. Updated: June 2024

Arms Control  
Association





# NUMBER OF NUCLEAR WARHEADS WORLDWIDE FROM 1945 TO 2024





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# CWC VIS TPNW





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# DEFINITION & DECLARATION

## CWC

**Chemical Weapons means the following, together or separately:**

- **Toxic chemicals and their precursors**, except where intended for purposes not prohibited under this Convention, as long as the types and quantities are consistent with such purposes;
- **Munitions and devices, specifically designed** to cause death or other harm through the toxic properties of those toxic chemicals specified in subparagraph (a), which would be released as a result of the employment of such munitions and devices;
- **Any equipment specifically designed** for use directly in connection with the employment of munitions and devices specified in subparagraph (b)

## TPNW

**Nuclear Weapons -NO Definition by TPNW**

- **Nuclear weapons** mean any device designed to release energy in an explosive manner as a result of nuclear fission, nuclear fusion, or a combination of the two processes (Britannica)
- **Nuclear weapons** - explosive devices that use nuclear reactions to produce a nuclear explosion (IAEA)
- **Nuclear material**: uranium, plutonium, and thorium in any form (IAEA)
- **Special fissionable material**: This includes, inter alia, enriched uranium (U-235), uranium-233, and plutonium-239 (IAEA)



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# DESTRUCTION

## CWC

- Each State Party undertakes to destroy **chemical weapons** it owns or possesses, or that are located in any place under its jurisdiction or control, in accordance with the provisions of this Convention (para 2, Article 1)

**Principles and methods for destruction of chemical weapons (para 12,13,14 of Part 4)**

- **"Destruction of chemical weapons"** means a process by which chemicals are converted in an **essentially irreversible way** to a form unsuitable for production of chemical weapons, and which in an irreversible manner renders munitions and other devices unusable as such

## TPNW

- Each State Party that owns, possesses or controls nuclear weapons or other nuclear explosive devices **shall immediately remove them from operational status, and destroy them as soon as possible** but not later than a deadline to be determined by the first meeting of States Parties, in accordance with a legally binding, time-bound plan for the verified and irreversible elimination of that State Party's nuclear-weapon programme, including the elimination or irreversible conversion of all nuclear-weapons-related facilities (para 2, Article 4)



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# DESTRUCTION

## CWC

- Each State Party shall determine how it shall destroy chemical weapons, except that the following **processes may not be used: dumping in any body of water, land burial or open-pit burning. It shall destroy chemical weapons only at specifically designated and appropriately designed and equipped facilities**
- Each State Party shall ensure that its chemical weapons destruction facilities are constructed and operated in a manner to ensure the destruction of the chemical weapons; and that the destruction process can be verified under the provisions of this Convention

## TPNW







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# HOW WEAPONS ARE TO BE DESTROYED

## CWC

- only at specifically designated and appropriately designed and equipped facilities (par. 13, Part IV(A),VA)
- CWDFs to be constructed and operated in a manner to ensure the destruction of CW in an irreversible way (par.12 and 14, Part IV(A))
- during destruction of CW the SP shall assign the highest priority to ensuring the safety of people and protection of the environment (par.10, Art.IV and par.3, Art.VII)
- in accordance with general and detailed annual plans (par.1(a)(v), Art. III)
- the destruction process can be verified under the provisions of the CWC (par.14, Part IV(A),VA)

## TPNW





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# CW DESTRUCTION AFTER WORLD WAR I & II



# WORLD WAR II CHEMICAL WEAPONS STOCKPILES

| Country        | 1940 (metric tonnes) | 1945 (metric tonnes) |
|----------------|----------------------|----------------------|
| Germany        | 15 000               | 250 000              |
| United Kingdom | 1 500                | 60 000               |
| USA            | 1 500                | 135 000              |
| Japan          | 5 000                | 10 000               |
| Russia         | 3 800* (40 000**)    | 122 400 + 40 000     |

**617400 MTs**

\*Mustard gas produced before WWII (1936);

\*\* Total quantity of chemical agents in bombs as of 1.12.1936





# CW DISPOSAL METHODS AFTER WW I & II

Chemical weapons were destroyed at that time by many methods:

- burial in the ground
- disposal at sea
- burning at storage sites/proving grounds in special incinerators and open pits
- explosion of chemical artillery shells and aircraft bombs on specially equipped firing ranges



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# CW DISPOSAL, WW I





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# CW DISPOSAL, WW I



No  
environmentally  
friendly  
destruction  
method used  
after WW I







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# BLISTER GAS DECONTAMINATION, WWII



National Archives of Japan

Chemical treatment  
- For mustard gas, use calcium hypochlorite.  
- Wash rubber products 30 minutes after exposure.

Wet-heat treatment  
- Steam: 20 minutes  
- Boil: 15 minutes  
- Hot water (80 degrees Celsius): 30 minutes

Dry-heat treatment  
- Incinerate

Wash and wipe  
Sun-dry

- Winter: 5 days  
- Spring/Autumn: 1 to 3 days  
- Summer: 8 hours

Burial

- Disappearance of gas odor is a sign of decontamination  
- Do not allow residual gas indoors when decontaminating



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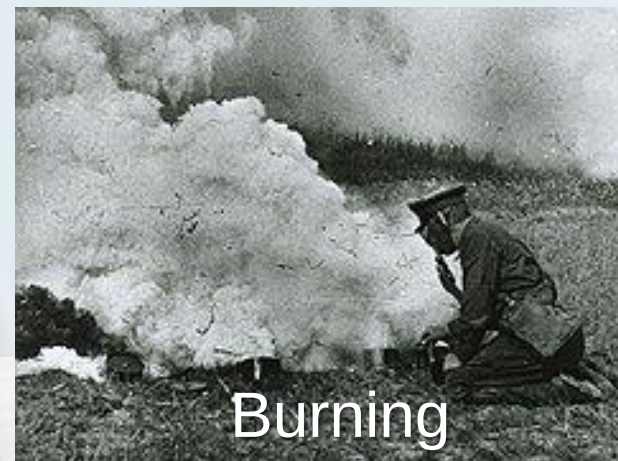


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# GERMAN CW DISPOSAL



Burial in the ground



Burning



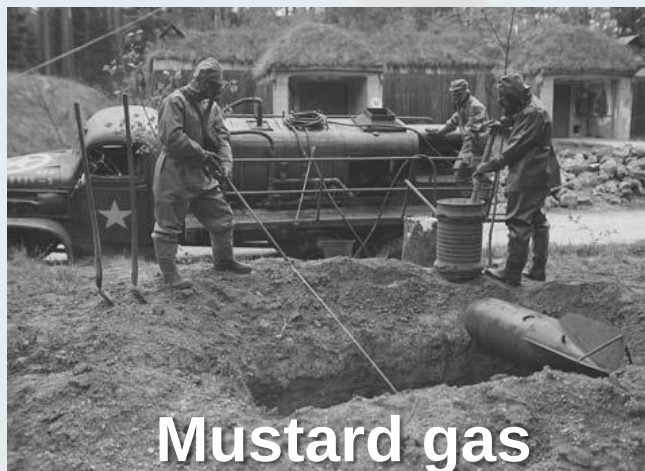
Explosion of chemical  
artillery shells





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# CW DISPOSAL AFTER WWII

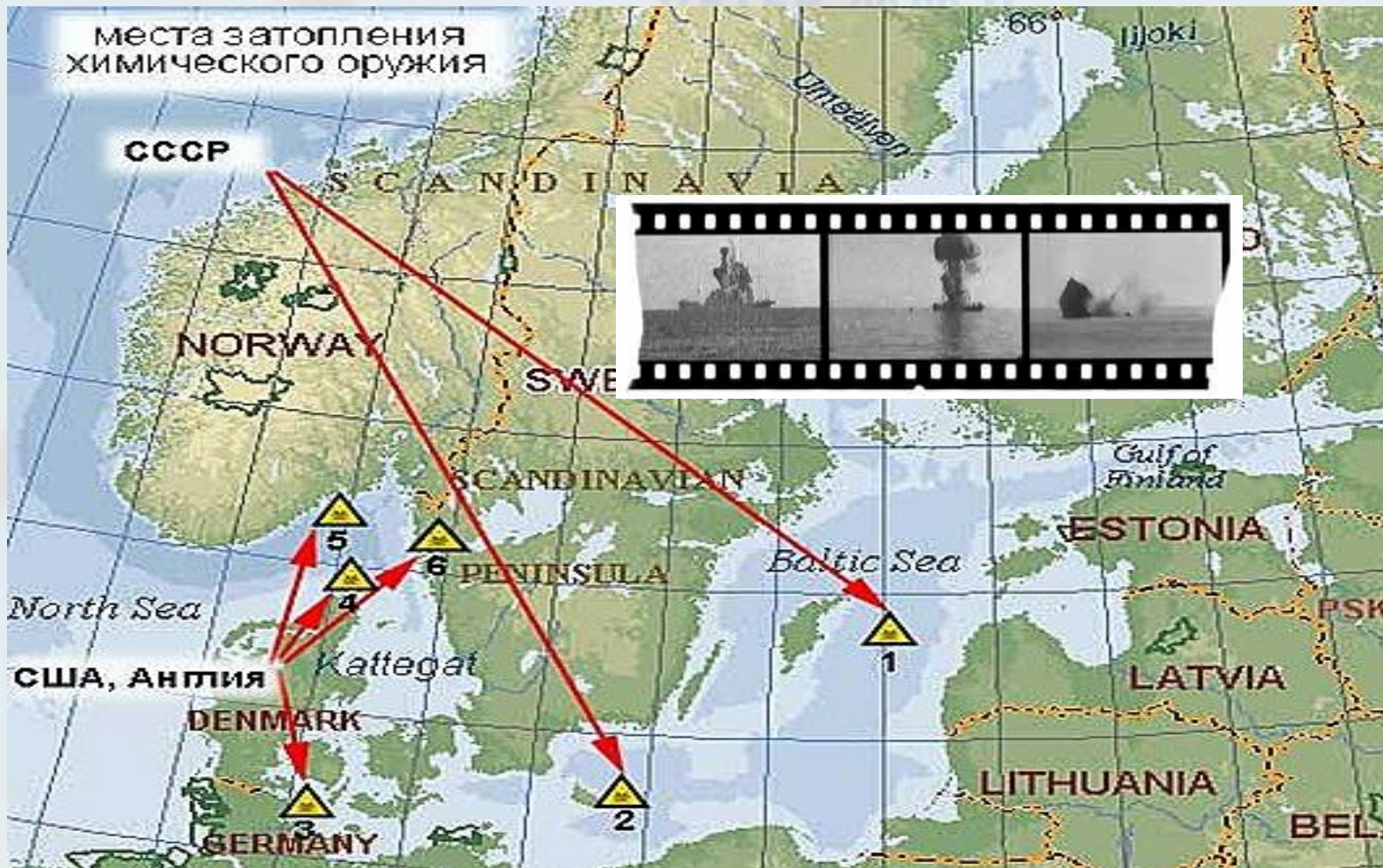






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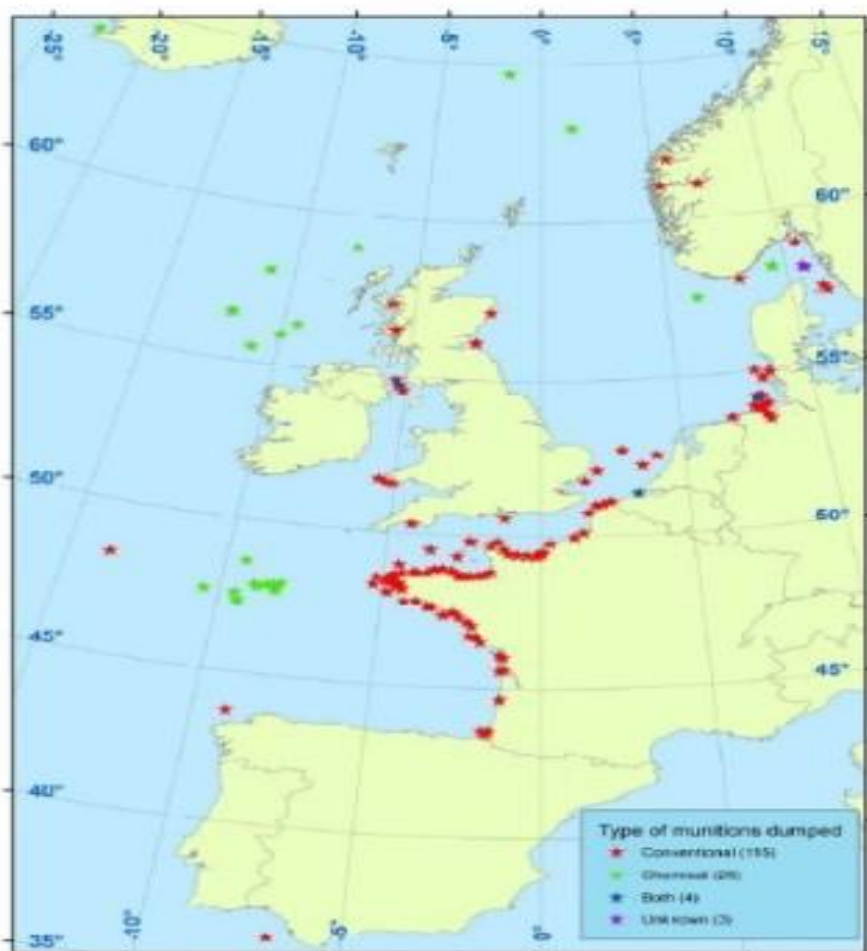
# GERMAN CW DUMPED IN BULTIC SEA AFTER WW II





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# CW DUMPING AT WEST COAST OF EUROPE



Estimates suggest that in excess of one million tonnes of munitions were dumped in Beaufort's Dyke (Irish Sea), some 180,000 tonnes\* in Skagerrak and some 300,000 tonnes in the North Sea...There are 148 individual dumpsites spread from Ireland to Gibraltar

\* Vic Rodrick, "Sea Shells: Deadly Harvest of Munitions is Washed up on Scotland's Beaches," *Red Orbit*, 1 October 2006





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# CW DUMPED BY THE USA



[http://cns.miis.edu/stories/090806\\_cw\\_dumping.htm](http://cns.miis.edu/stories/090806_cw_dumping.htm)





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# USA CW DISPOSAL AT SEA AFTER WW II

## Disposal By Scuttling

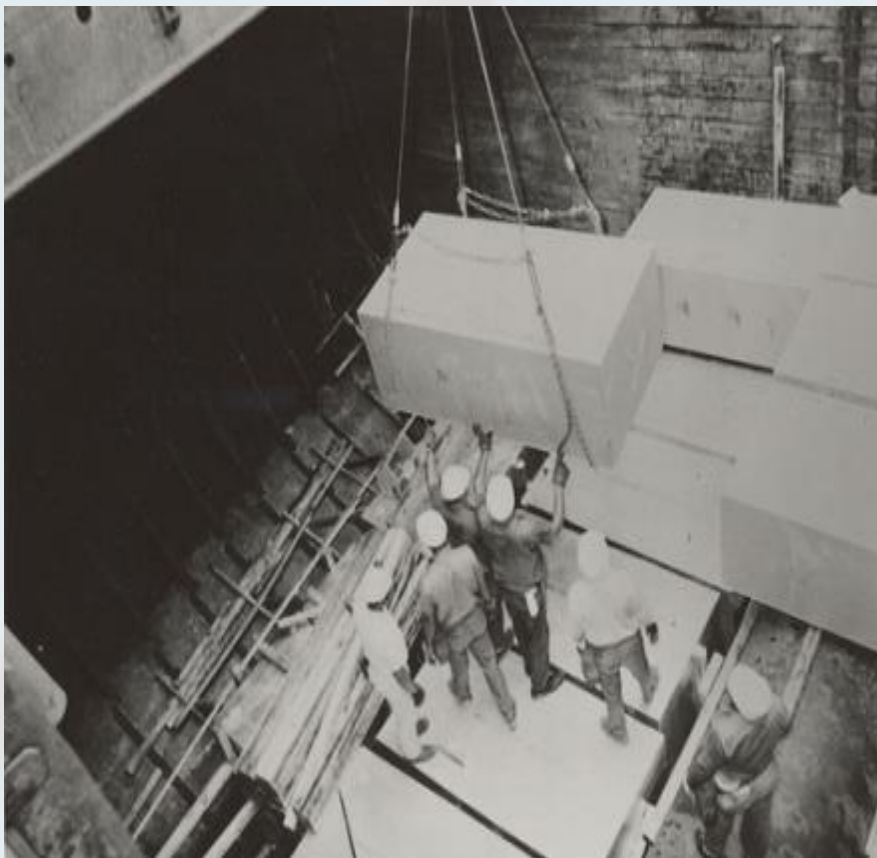
The SS William Ralston filled with 301,000 mustard gas bombs and 1,500 1-ton canisters of Lewisite - - sinks in the Pacific off San Fransico in 1958. (Photo courtesy of the U.S. Army)





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# US CW DISPOSAL AT SEA AFTER WW II



Concrete-encased M55 rockets full of nerve gas are loaded into a sea.  
(Photos courtesy of the U.S. Army)



Shipments of Lewisite for ocean disposal. Shipped to port via railroad car and dumped off the coast of South Carolina 1968).  
(Photos courtesy of the U.S. Army)



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# US CW DISPOSAL AT SEA AFTER WW II



## Chemical dumping

In 1964,  
mustard gas  
canisters are  
pushed into  
the Atlantic

(Photo courtesy of the  
U.S. Army)





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# CW DUMPED BY RUSSIA, JAPAN AND AUSTRALIA



[http://cns.miis.edu/stories/090806\\_cw\\_dumping.htm](http://cns.miis.edu/stories/090806_cw_dumping.htm)



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# CW DESTRUCTION IN AUSTRALIA AFTER WW II



Mustard gas stocks burning at Newnes State Forest, west of Sydney, in early 1946. Burning was found to be an effective method of disposing of bulk supplies of mustard. The bright flare in the center is the result of two cases of thermite incendiaries which had been mixed with the mustard stocks





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# CW DISPOSED AT THE LAND AND SEA IN USSR



[http://cns.miis.edu/stories/090806\\_cw\\_dumping.htm](http://cns.miis.edu/stories/090806_cw_dumping.htm)





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# CWS DESTRUCTION IN IRAQ







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# CW DESTRUCTION METHODS. IRAQ 1992-1994





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# DESTRUCTION OF CWS STOCKPILED, IRAQ, 1998







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# CW DESTRUCTION TECHNOLOGIES UNDER CWC



# CW DESTRUCTION TECHNOLOGIES USED

Three main groups of CW destruction technologies used by the States Parties and verified under the OPCW verification regime:

- high temperature destruction technologies
- low-temperature destruction technologies
- explosives use detonation technologies
- *combined technologies and post treatment*
- *other methods*



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# HIGH TEMPERATURE DESTRUCTION TECHNOLOGIES

**Baseline incineration** of chemical warfare agents ( $1500^{\circ}\text{C}$ ) followed by high temperature treatment of Munitions bodies in metal Parts furnace (MPF) and body deformation or cut. The same was used at **JACADS, ANCDF, UMCDF and PBCDF**



## Tooele Chemical Agent Disposal Facility, Utah, USA

Area Ten Liquid Incinerator (ATLIC), Utah, USA







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# HIGH TEMPERATURE DESTRUCTION TECHNOLOGIES

**Pyrolysis** in  $N_2$   
atmosphere (600-  
800°C, 18 h)  
followed by  
incineration (**1100°C**)

**Qaf-Molla chemical weapons destruction facility,  
Albania**







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# LOW-TEMPERATURE DESTRUCTION TECHNOLOGIES

One-step process. Chemical neutralisation followed by liquid waste reduction (water evaporation)

**Kambarka CWDF, Russia**



**Gorny CWDF, Russia**







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# LOW-TEMPERATURE DESTRUCTION TECHNOLOGIES

Two steps process. Chemical  
neutralisation followed by  
reaction mass bituminisation  
**Shchuch'ye** (same process to  
be used at Kizner)







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# LOW-TEMPERATURE DESTRUCTION TECHNOLOGIES

Two-step process.  
Chemical  
neutralisation followed  
by reaction mass  
cementation/oxidation  
and evaporation

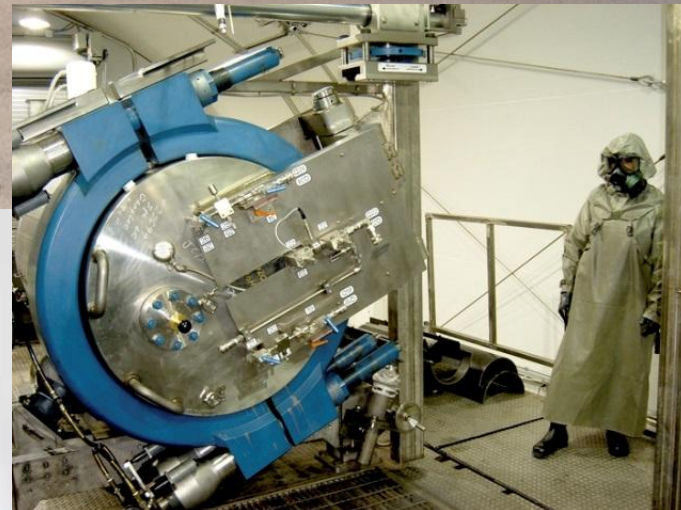




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# EXPLOSIVES USE DETONATION TECHNOLOGIES

The **EDS** uses cutting charges to explosively open chemical munitions, destroying their explosive elements before the chemical agent is neutralised (DPG-EDS, AB-EDS and PB-EDS)





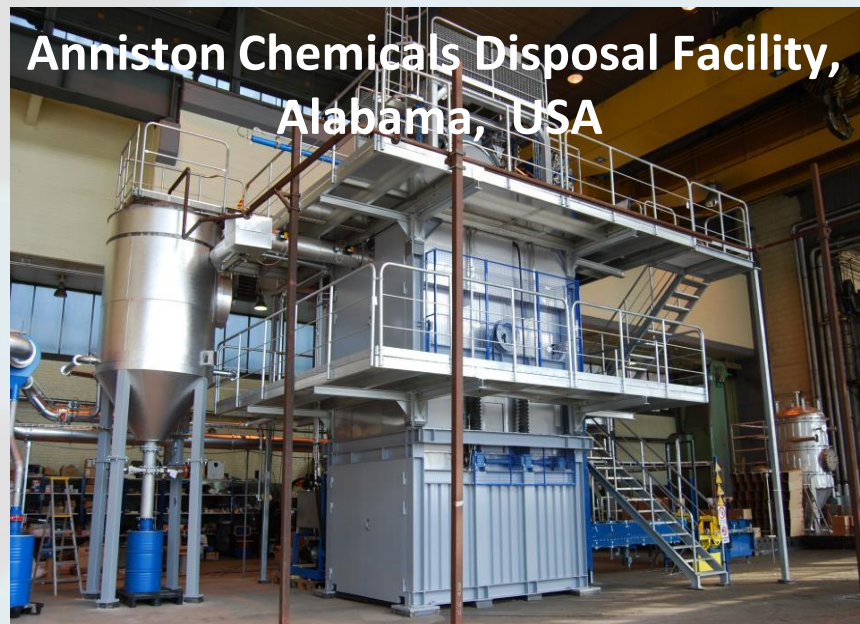


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# EXPLOSIVES/HIGH-TEMPERATURE USE DETONATION TECHNOLOGIES

**SDC (DYNASAFE).** The boxed munitions are dropped onto a heated ( $550^{\circ}\text{C}$ - $600^{\circ}\text{C}$ ) shrapnel (scrap) bed at the bottom of the detonation chamber, resulting in deflagration, detonation, or burning of the munition's explosive fill. The chemical agent in the munitions is destroyed by the shock wave from the detonation or by decomposition due to the high heat in the chamber (**Anniston, Pueblo and Blue Grass all in the USA**), Libya

**Anniston Chemicals Disposal Facility,  
Alabama, USA**







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# STATIC DETONATION CHAMBER, RUWAGHA, AL JUFRA, LIBYA

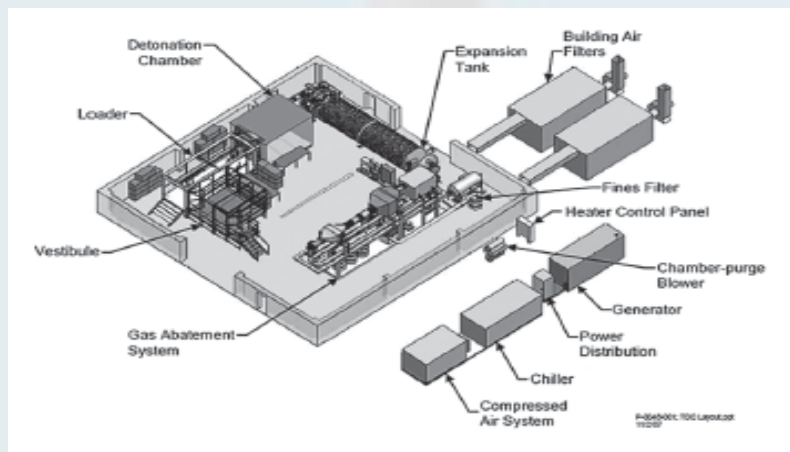
**Libya completed the destruction of Category 1 CW  
on 26 January 2014**





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# EXPLOSIVES USE DETONATION TECHNOLOGIES



**TDC** Transportable Detonation Chamber.

Simplified process flow diagram. Destruction of Old Chemical Weapons at Columboola

(Image: Copyright CH2MHILL)

The **TDC** is a self-contained system, which includes a detonation chamber, an expansion chamber and an emission control system. It destroys munitions that are wrapped in explosive by detonating them within the fully-enclosed chamber. Applications of the TDC include destruction of recovered chemical weapons in Poelkapelle, Belgium, and at Schofield Barracks, Hawaii. Currently, the TDC is undergoing testing at Aberdeen Proving Ground, Md.







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# EXPLOSIVES USE DETONATION TECHNOLOGIES

**DAVINCH™ Kobe Steel**  
(Detonation of Ammunition in a Vacuum Integrated Chamber)  
operation is based on the process uses a detonation chamber in which chemical munitions are destroyed when donor charges surrounding the munitions are detonated. Up to 60 kg of explosives







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# OCW DESTRUCTION IN BELGIUM AND FRANCE

3000-5000 chemical  
munitions per year



DAVINCH and  
low temperature  
Neutralisation (Belgium)

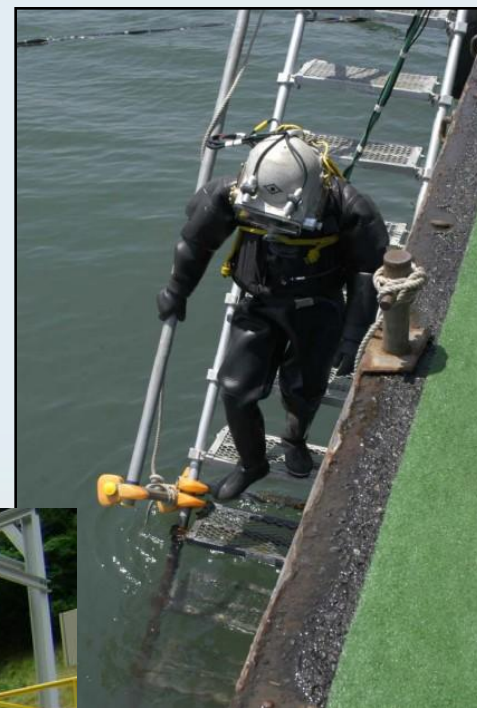






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# OCW DESTRUCTION IN JAPAN



**DAVINCH**







**CBRN  
PROTECTION  
TCT**

# OCW DESTRUCTION IN GERMANY



**GEKA mbH in  
Munster**



**Pyrolysis and  
incineration**







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# OCW DESTRUCTION IN ITALY



**Civitavecchia**



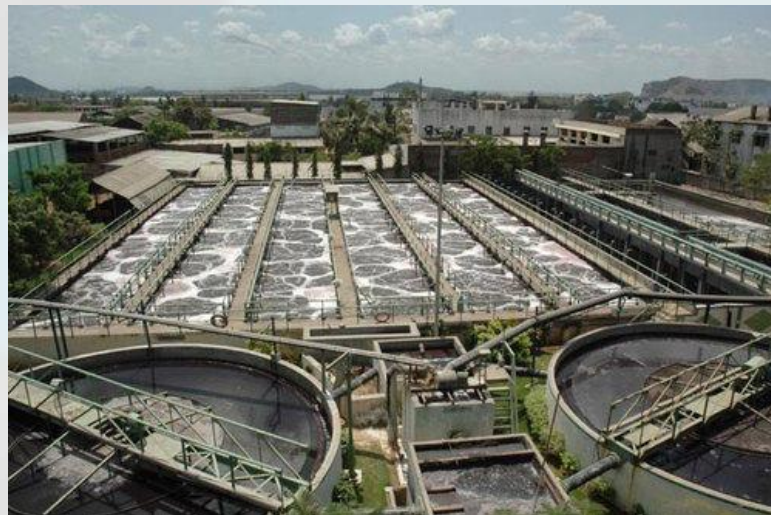
**Low-temperature  
hydrolysis  
and neutralisation.  
Adamsite incapsulation**



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# REACTION MASS POST TREATMENT

- **Russian** nerve agents neutralisation technology – incineration and/or bituminisation
- **Newport** VX neutralisation – mixing with the industrial waste and its incineration
- **Aberdeen and Blue Grass** HD neutralisation – biodegradation
- **Pine Bluff and Pueblo** - Wet Air Oxidation in Deer Park, Texas







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# SYRIAN CW (HD AND DF) DESTRUCTION AT MV CAPE RAY





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# FIELD DEPLOYABLE HYDROLYSIS SYSTEM





# PRECURSORS DESTRUCTION SITES

## Danish and Norwegian Vessels

- **UK (Veolia)** - B salt, B & BB solution (priority 1 chemicals)
- **Finland (Ekokem)** - Priority 2 chemicals (organic) + Substance A + DF effluent (RM) (from Cape Ray)
- **USA (Veolia)** - Priority 2 chemicals (inorganic)
- **Germany (GEKA mbH)** - Mustard effluent (RM) from Cape Ray





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# HIGH TEMPERATURE INDUSTRIAL WASTE TREATMENT USED FOR CWC PURPOSES



## **Veolia Environmental Services Technical Solutions, LLC (U.S.A.)**

Destruction of inorganic  
P2 chemicals by mixing with  
other waste and incineration -150  
days

## **CW disposal facility of GEKA mbH in Munster, Germany**

Disposal of HD effluent,  
incineration - 90 days







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# HIGH TEMPERATURE INDUSTRIAL WASTE TREATMENT USED FOR CWC PURPOSES



## Veolia Waste disposal site in Ellesmere Port, UK

Temperature Incinerator  
Destruction of subst. B, BB - 30 days

## Ekokem OY AB (Finland)

Disposal of DF effluent 290 days  
Destruction by incineration  
of subst. A and organic P2  
Chemicals 177 days (43 days for  
subst. A and 134 days for P2  
chemicals)



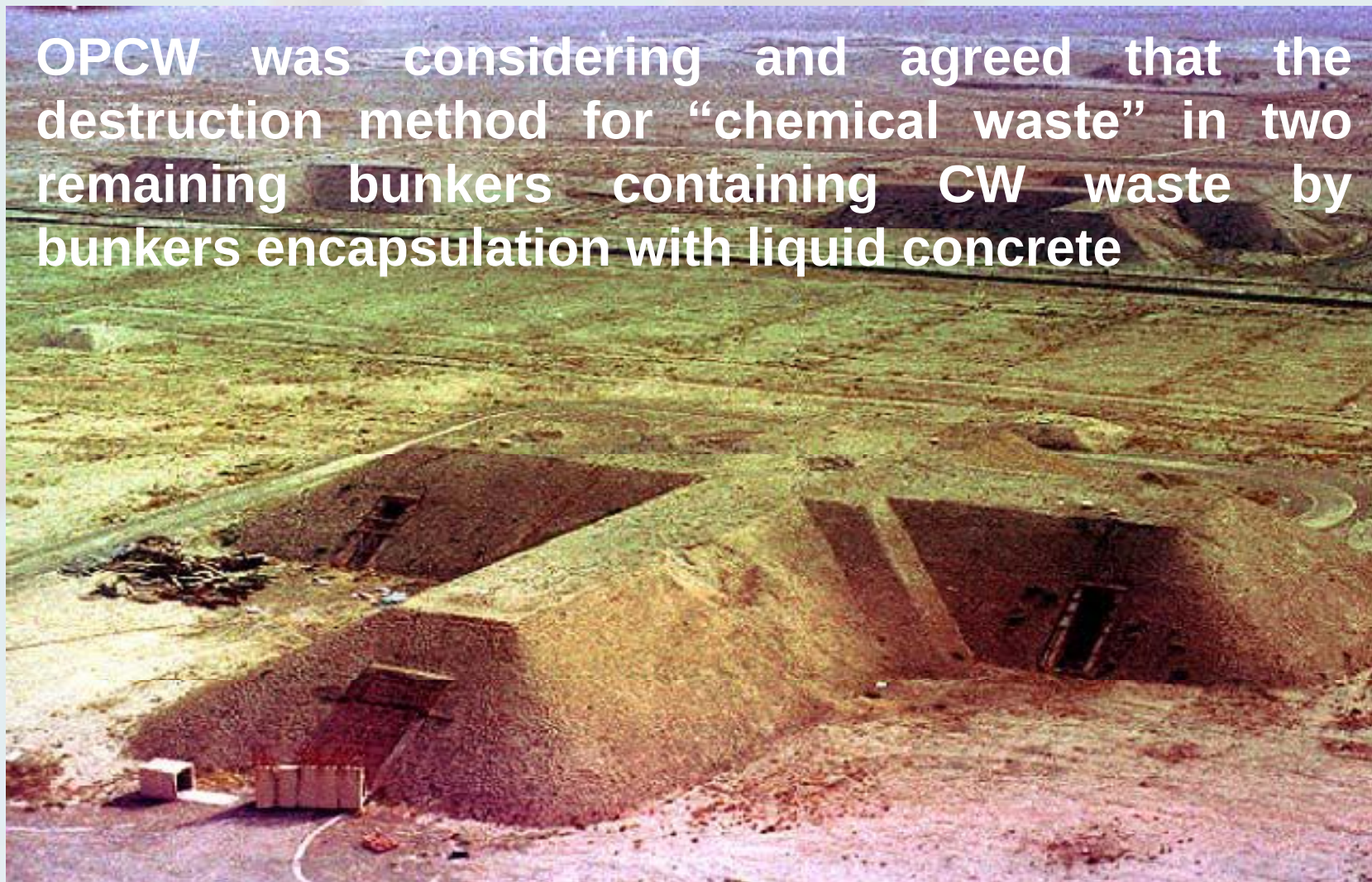




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## AL MUTHANA SITE, IRAQ

OPCW was considering and agreed that the destruction method for “chemical waste” in two remaining bunkers containing CW waste by bunkers encapsulation with liquid concrete







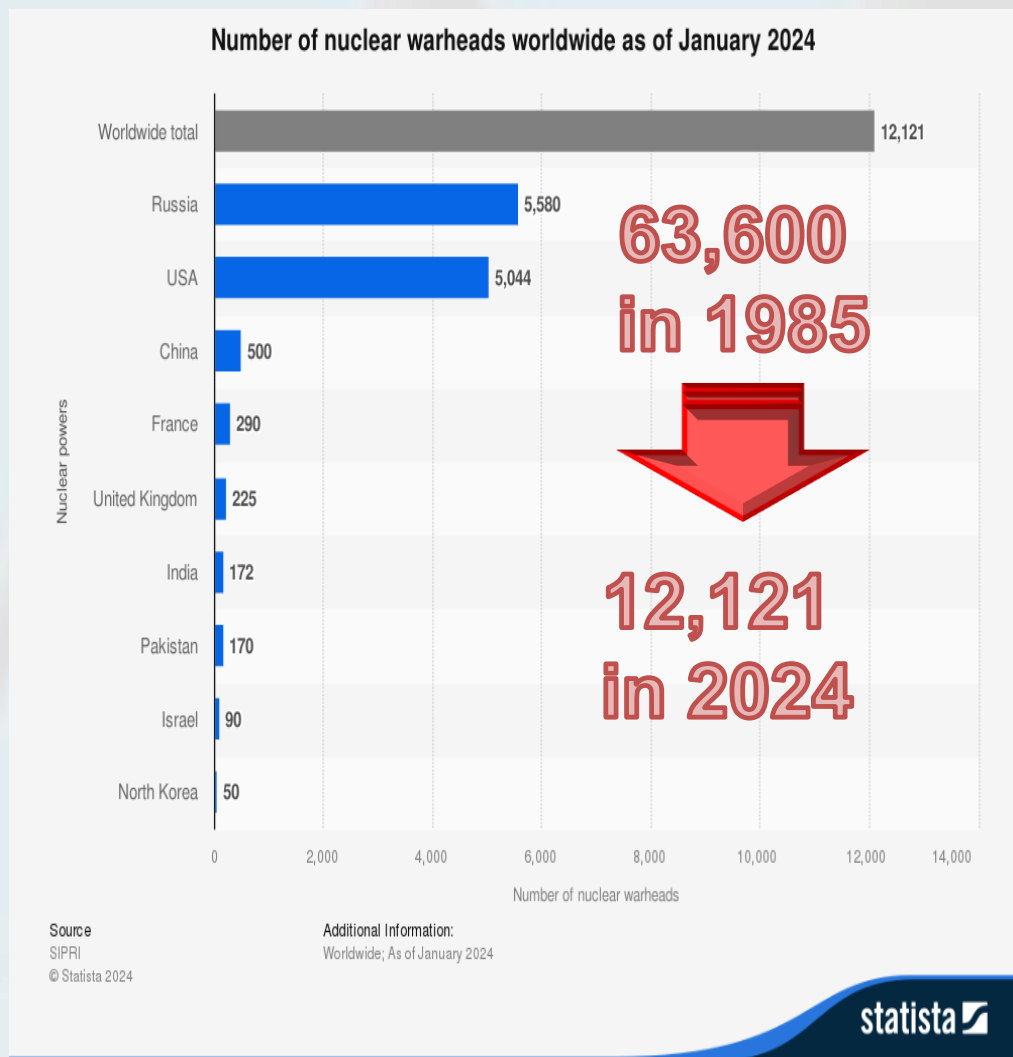
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# NW DESTRUCTION

## DISMANTLEMENT VIS DISPOSAL?



# NW DISMANTLEMENT TILL NOW



➤ The number of nuclear warheads decreased significantly after its peak in 1985, when an estimated 63,600 nuclear warheads existed. The potential danger of nuclear weapons has received increased attention recently after February 2022

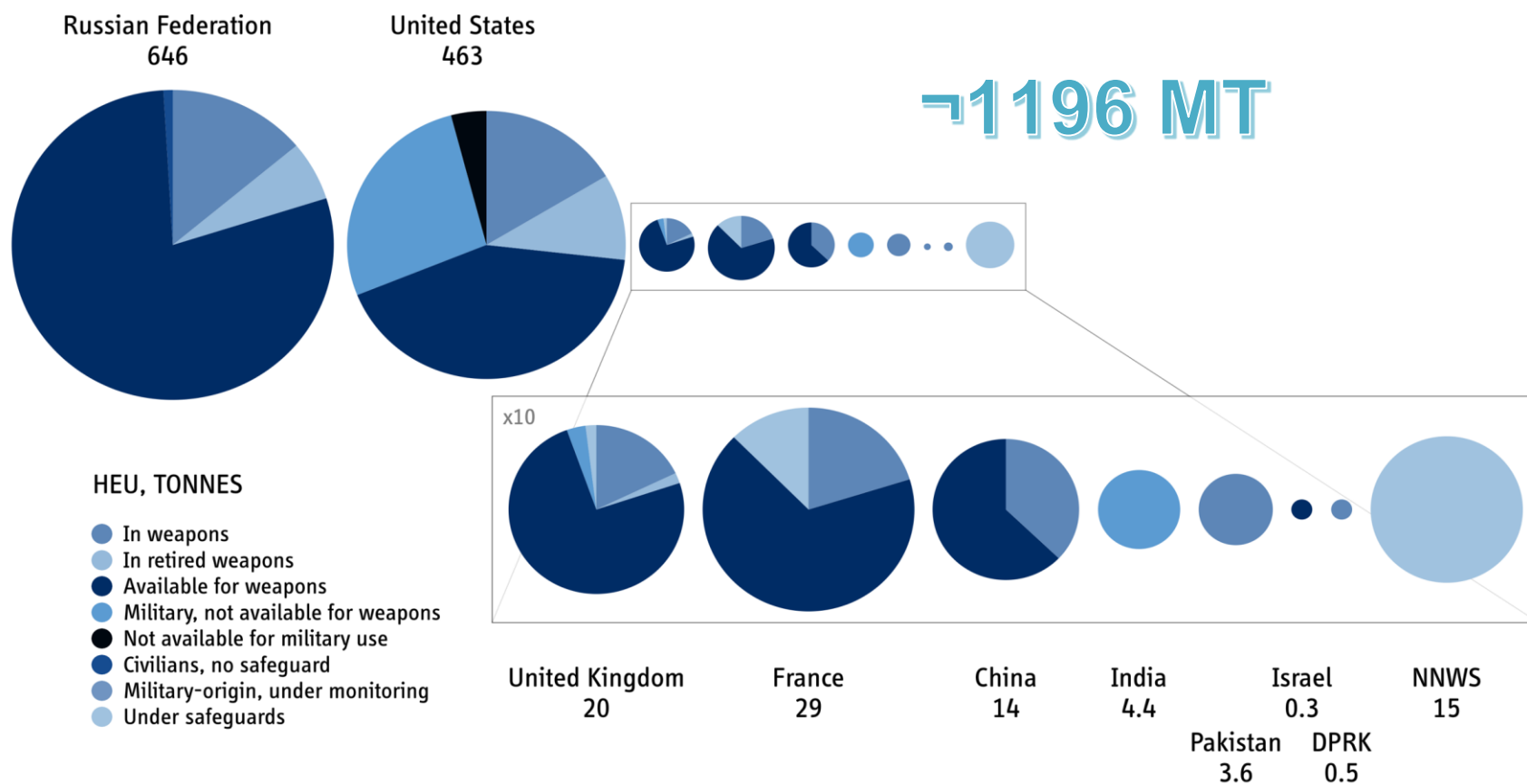
➤ Prohibition of nuclear weapons will require the dismantlement of some 12,121 items of nuclear weapons that currently exist in nine states. While this dismantlement will pose major operational challenges, facilities and procedures are in place that can accomplish it





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# GLOBAL INVENTORY OF UNIRRADIATED HIGHLY ENRICHED URANIUM BY COUNTRY AND CATEGORY (NNWS INDICATES NON-NUCLEAR-WEAPON STATES)

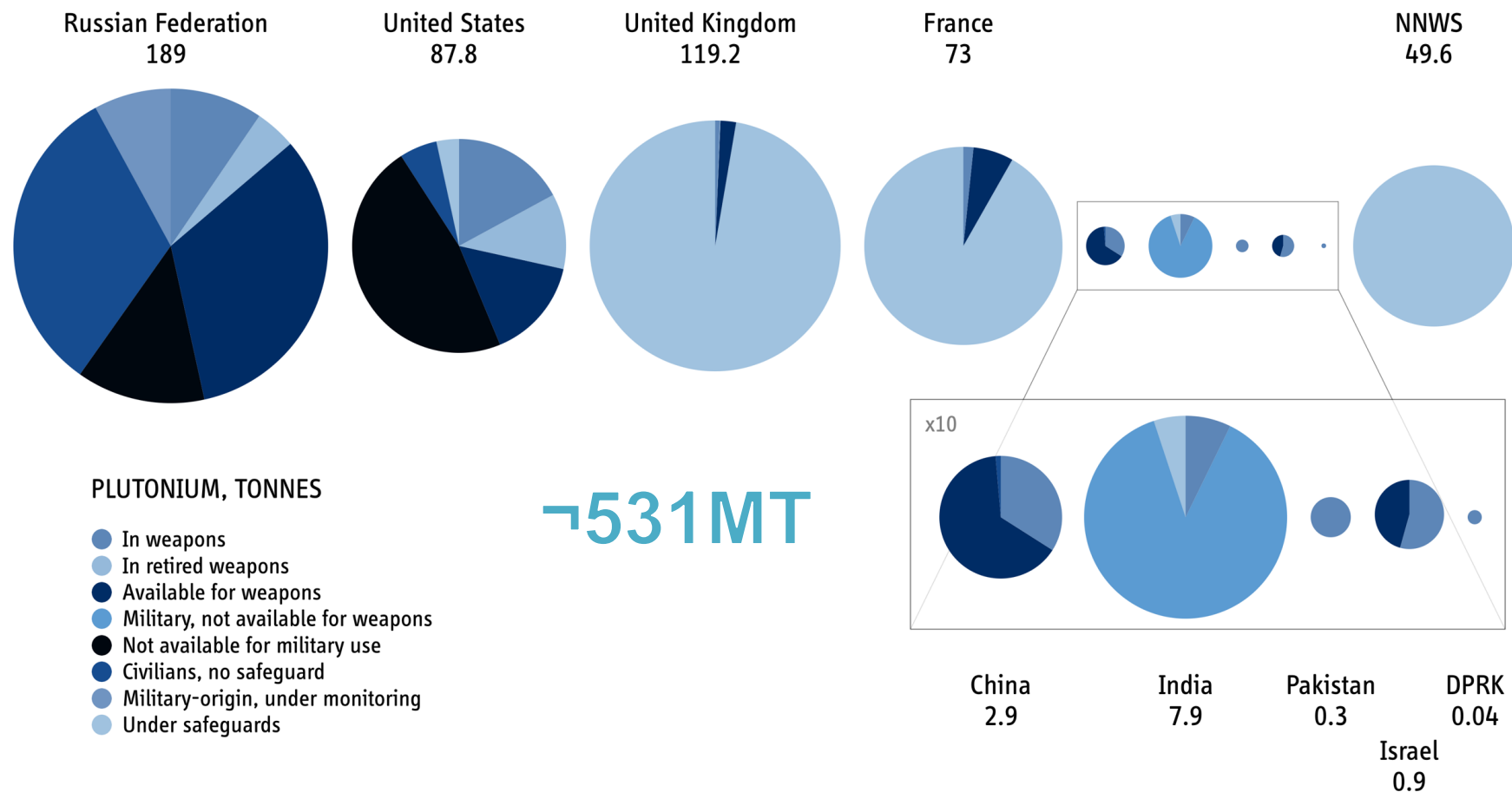




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# GLOBAL INVENTORY OF SEPARATED PLUTONIUM BY COUNTRY AND CATEGORY

(NNWS INDICATES NONNUCLEAR- WEAPON STATES)







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# NW DISMANTLEMENT VIS DISPOSAL

- There are no agreed-upon legal definitions neither of nuclear weapon **destruction or dismantlement or disposal** within international agreements\*, as set up, for example, in the CWC
- However, the TPNW requires nuclear-armed states to destroy their nuclear weapons as soon as possible, but no later than a deadline set by the first meeting of States Parties
- Nuclear weapon **dismantlement** is the process of breaking down a nuclear weapons system into its individual parts. The disassembly process is essentially the opposite of the assembly process. Once a nuclear weapon is dismantled, its component/parts—SNM and HE—are held in temporary storage at the dismantlement facility and then transported to other facilities for long-term monitored storage
- Nuclear weapons **disposal** possible way: decay, blend with other materials, burn in a nuclear reactor, geological disposal, storage in dry casks, storage in spent fuel pools

\*

Treaty on the Non-Proliferation of Nuclear Weapons (NPT)  
Treaty on the Prohibition of Nuclear Weapons (TPNW)  
Comprehensive Nuclear-Test-Ban Treaty (CTBT)  
IAEA Nuclear safeguards



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# IRREVERSIBILITY OF NW DISMANTLEMENT

A combination of these three measures below would bring a State further toward irreversibility in nuclear disarmament

- **Legal irreversibility** is achieved when a State makes “a legally binding commitment not to use particular material in weapons again.”
- **Political irreversibility** is achieved when a State makes “a political commitment not to return particular material to weapons use.”
- **Physical irreversibility** is achieved when it is “physically difficult and costly to recover material for use in weapons.”
  - down-blending of highly enriched uranium (HEU) to low-enriched uranium (LEU)
  - using plutonium in mixed oxide fuel (MOX)
  - using plutonium as heat and power source





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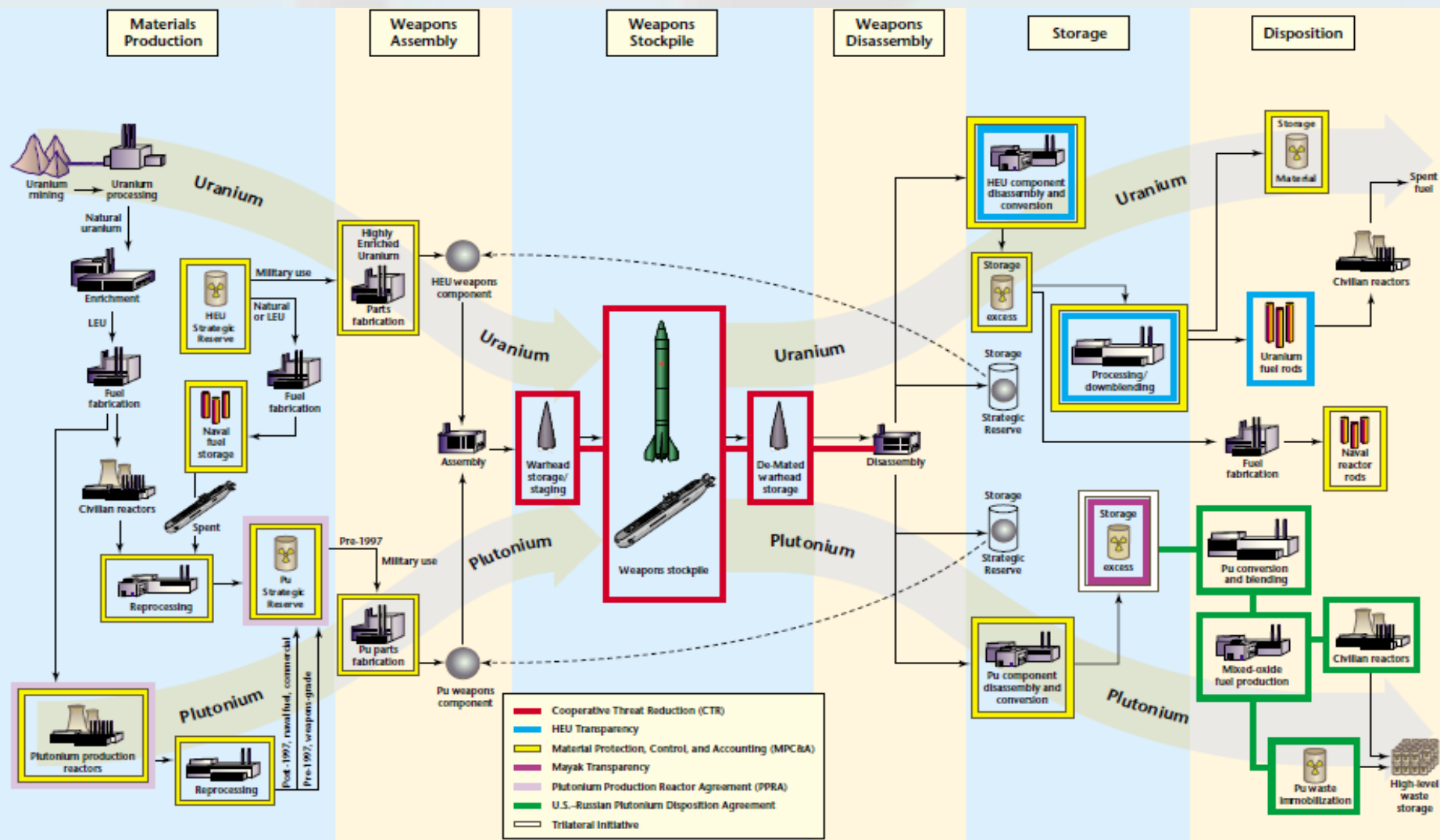
# DESTRUCTION OF NUCLEAR WEAPONS CARRIERS





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# POTENTIAL NUCLEAR WEAPONS LIFECYCLE





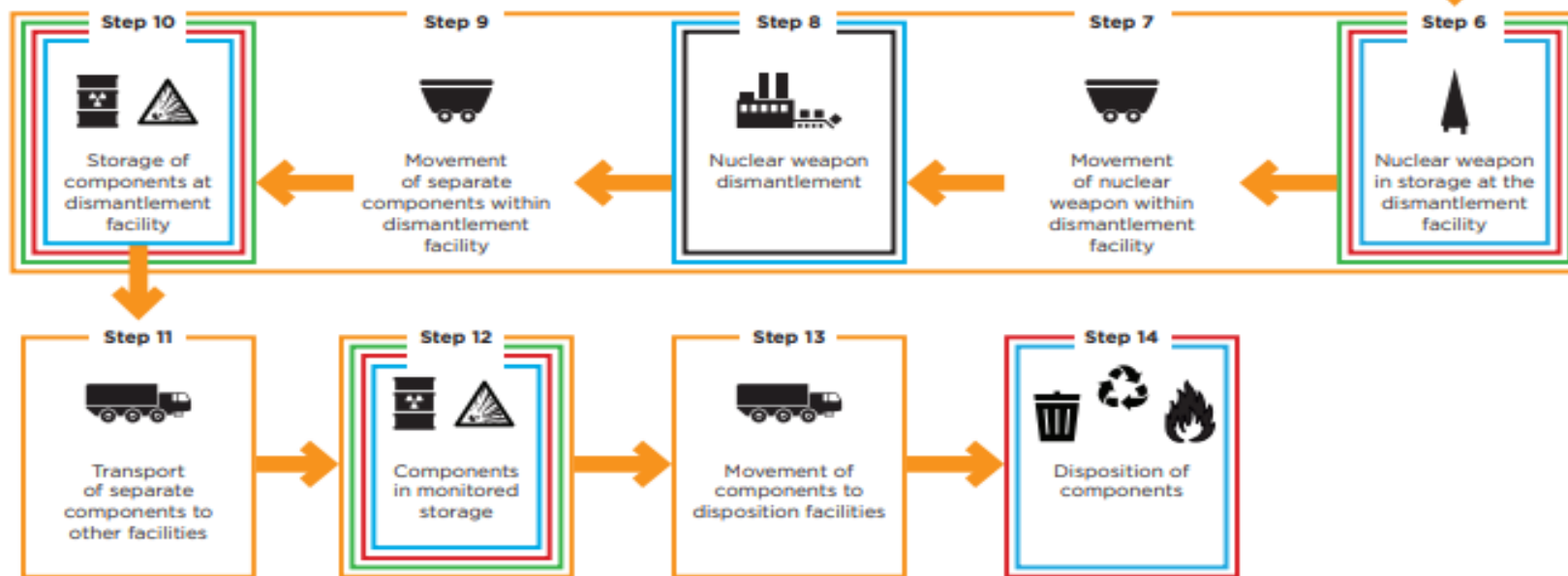


# NUCLEAR WEAPON DISMANTLEMENT

## Nuclear Weapon Staging Area



## IPNDV Basic Dismantlement Scenario



### Monitoring Options

- Inspections
- Chain of Custody
- Measurements
- Temporary Monitored Storage (Until Next Stage of Dismantlement Disposal)
- Restricted Dismantlement Area
- TBD

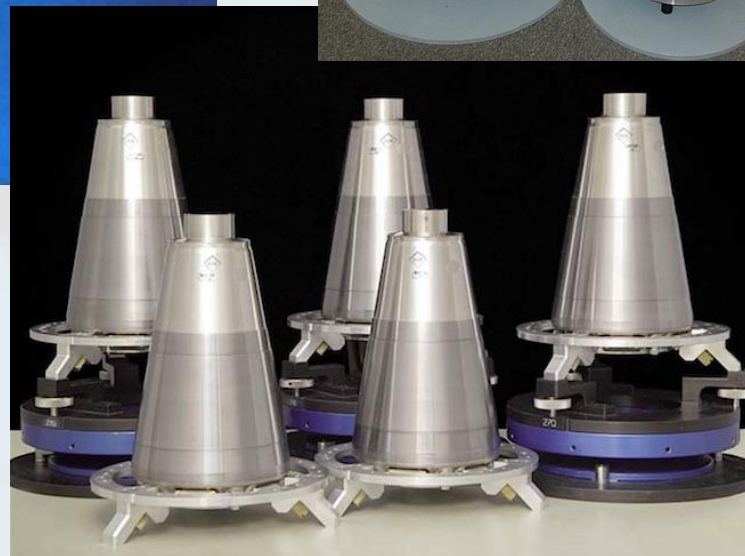
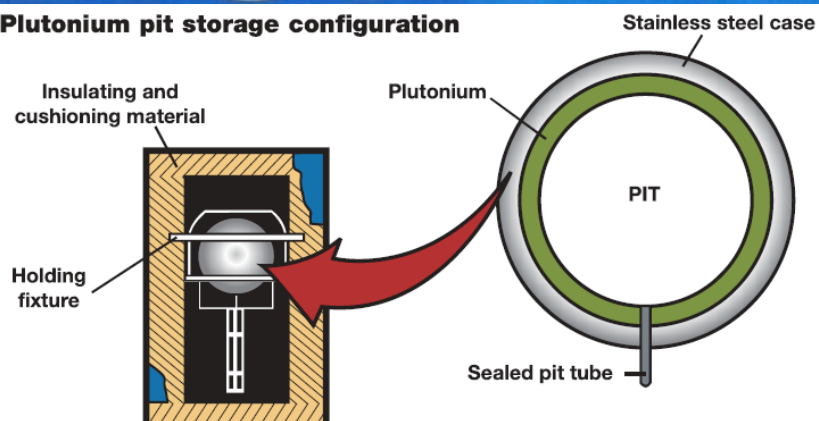


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# PLUTONIUM PIT STORAGE CONFIGURATION AFTER DISMANTLEMENT



**Plutonium pit storage configuration**







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# PLUTONIUM STORAGE IN RUSSIA

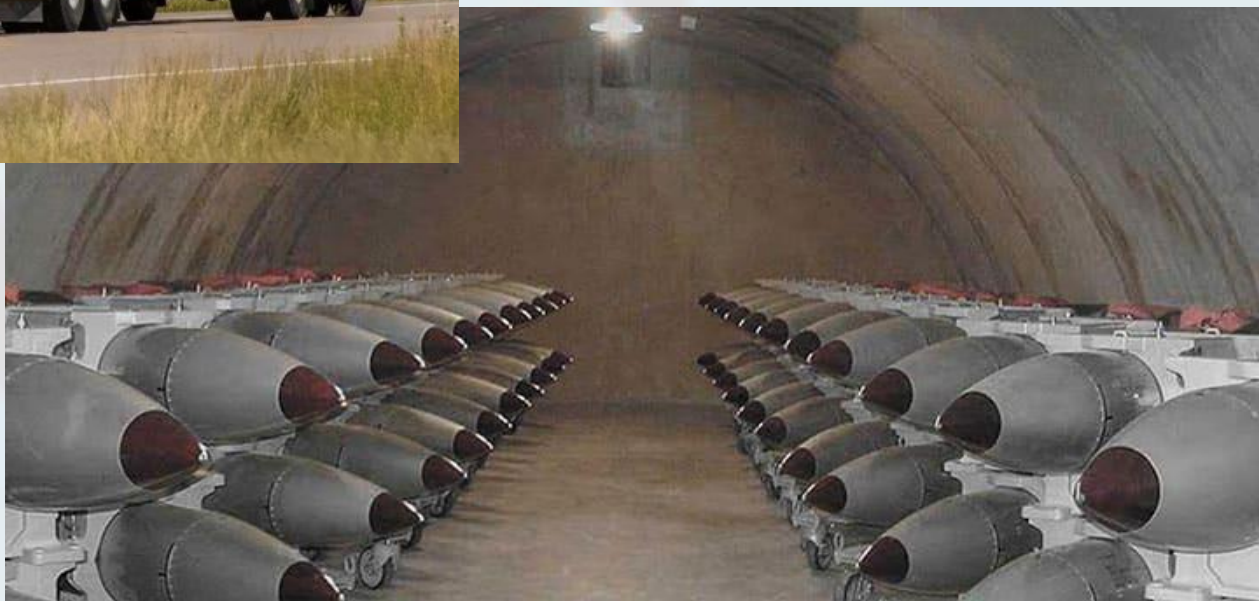






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# WARHEADS STORAGE







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# PLUTONIUM STORAGE IN USA



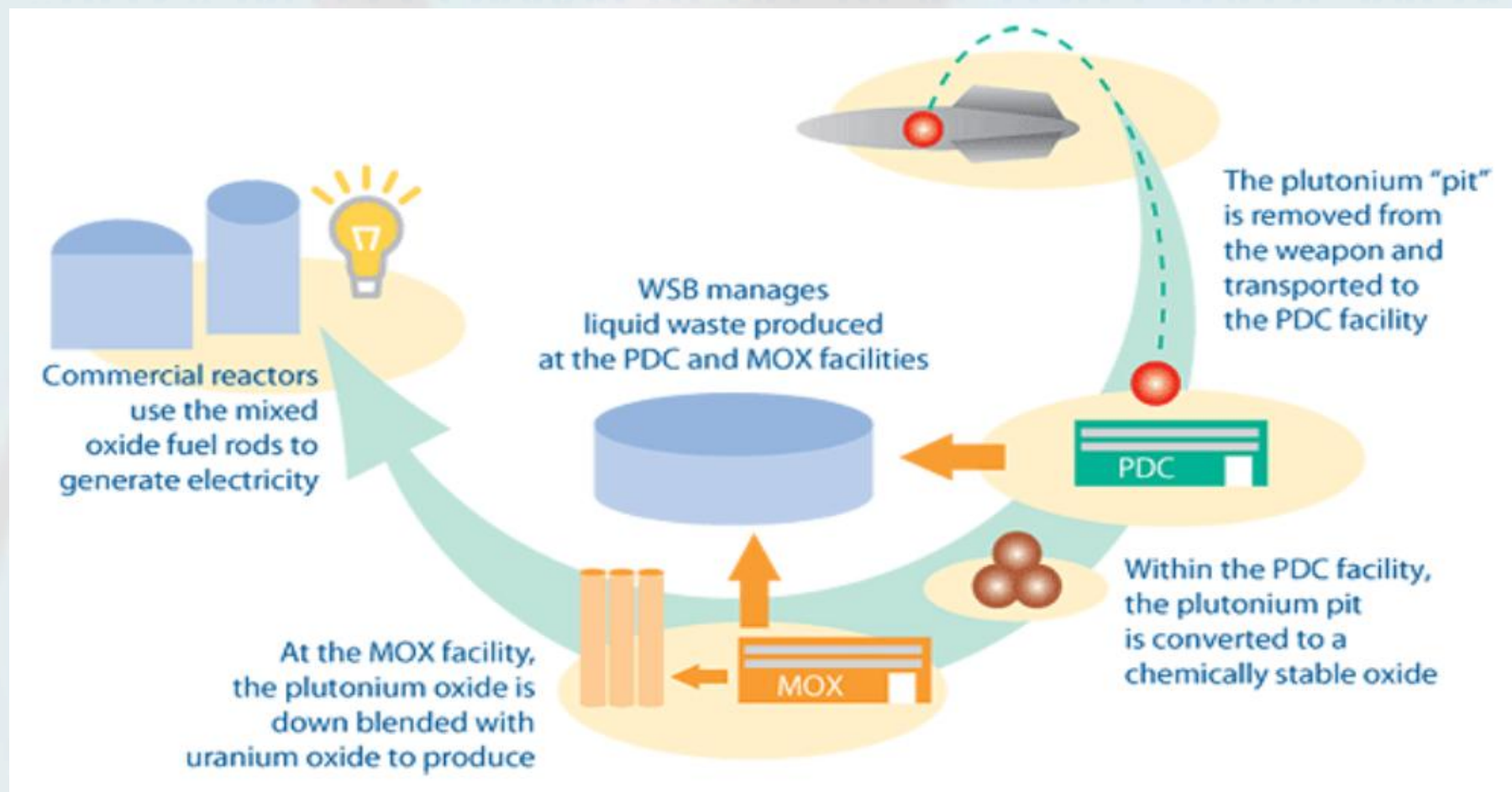
K-Area Material Storage (Savannah River):  
3 tons military non-pit Pu stored in drums





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# PROCESS OF CONVERTING PLUTONIUM "PITS" INTO COMMERCIAL REACTOR GRADE MOX



PDC - Pit Disassembly and Conversion; MOX – Mixed Oxide Fuel; WSB – Waste Solidification Building





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**THANK YOU AND  
GOOD LUCK**

**EU CBRN COE PROJECT 65 TEAM LEADER/PROJECT MANAGER**

**[WWW.CABICHEM.EU](http://WWW.CABICHEM.EU)**

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