

# UK nuclear weapons: An introduction to the risks

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[www.sgr.org.uk](http://www.sgr.org.uk)

Presentation given at public meetings in Preston/ Lancaster (UK) on 30 July/ 22 September 2016, organised by the International Campaign for the Abolition of Nuclear Weapons (ICAN).

Data is from a range of academic, government and NGO sources. Most of these are listed in the 2016 SGR report, *UK nuclear weapons: a catastrophe in the making?* Links to this report and additional references are listed in the final slide.

## About SGR

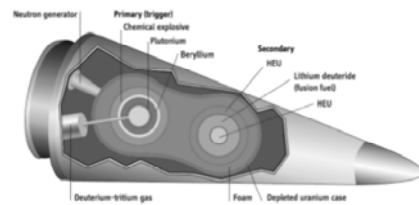
- Scientists for Global Responsibility is:
  - UK organisation of 750 scientists, engineers and others
  - Promotes science, design and technology which contributes to peace, social justice and environmental sustainability
- Published reports, books and articles on threats from nuclear weapons since 1980s



- During 1980s, we were known as Scientists Against Nuclear Arms – merged with other organisations in 1992 to form SGR

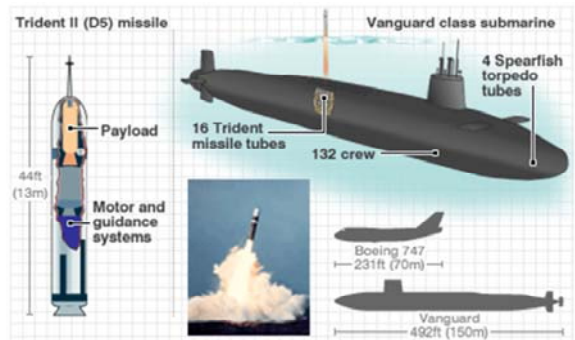
# What is a nuclear weapon?

- Nuclear weapons harness forces deep inside atoms to create huge explosions
- Nuclear warheads
  - ‘Critical mass’ of ‘fissile material’ is brought together to create ‘nuclear chain reaction’
  - Critical mass is **few kilograms**
  - Fissile material is commonly **plutonium** and/or **uranium**
- Modern warheads are very sophisticated



# UK nuclear weapons system: Trident

- 4 submarines
  - one on patrol constantly
- 1 submarine carries:
  - Up to 8 missiles
  - Up to 40 warheads



## UK government plans for Trident

- To replace current fleet of 4 'Vanguard class' submarines with 4 'successors' by early 2030s
  - Parliamentary approval just given
  - Designed to remain operational until 2060s
- To upgrade nuclear warheads
- To work with USA in upgrading nuclear missiles
- Total costs: around £200bn

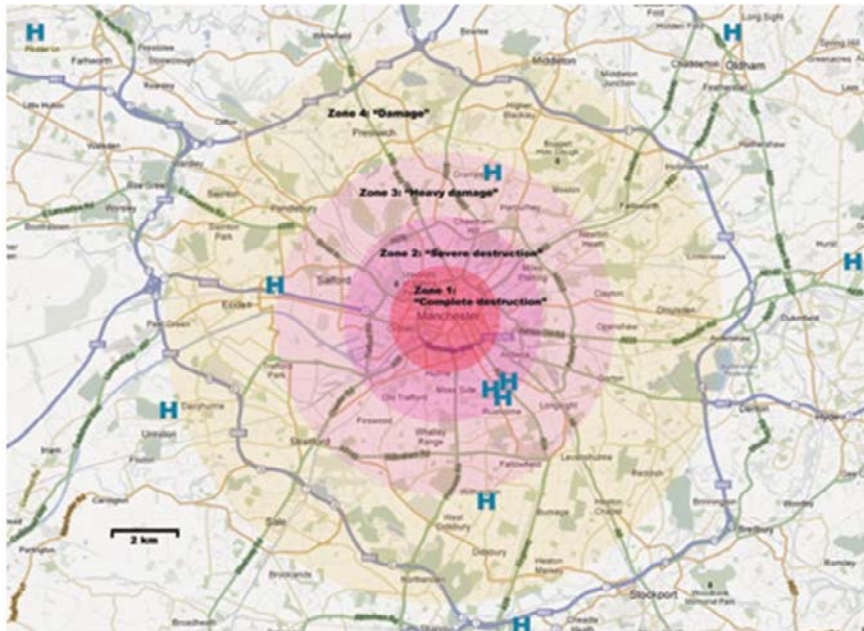
Cost estimate by CND (2016), compiled from Ministry of Defence data.

## How does a nuclear weapon kill?

- Heat
- Blast
- Radioactivity
- Also
  - Blinding flash of light
  - Electromagnetic pulse
- Weapon of mass destruction



## What could **1 Trident warhead** do?



- Each warhead has explosive power equivalent to 100,000 tonnes of TNT
- In less than one minute of devastation: approx. 81,000 dead, 212,000 injured – many of the injured would die within a few months

## What could **1 Trident submarine** do?

- Total explosive power of 40 warheads is equal to:
  - 4,000,000 tonnes of TNT
  - about 300 Hiroshima bombs
  - more than all bombs dropped in World War II
- Would produce enough smoke to cause a 'nuclear winter'
  - catastrophic climate cooling





## Main risks of nuclear weapons

- **Missile launch**
  - Political/ military confrontation
  - Cyber-security (hacking) breach
  - Technical failure or human error
- **Warhead development/ storage**
  - Laboratory accident or terrorist attack
- **Warhead transportation: road convoys**
  - Road accident or terrorist attack
- **Probability of these events is very low but damage caused could be extremely high**



On cyber-security threat, see also: British American Security Information Council (2016).

## Nuclear convoys: some basics

- Transport of warheads by large lorries
- Warheads manufactured at Atomic Weapons Establishment
  - 50 miles west of London
- Warheads loaded onto missiles/ submarines at Clyde Naval Base
  - 25 miles west of Glasgow
- For maintenance/ dismantling, warheads returned to AWE



ICAN-UK (2016)

## Nuclear road convoy risks

- Nuclear warheads transported under guard
  - fully assembled but not ‘armed’
- Road accident or terrorist attack could cause impact damage and/or intense fire
- Possibility of ‘conventional explosion’ and/or wide dispersal of plutonium from warhead
- Plutonium is highly radioactive & toxic
- Nuclear explosion impossible?



- Further details in ICAN-UK (2016) and references therein
- Plutonium is carcinogenic at the milligram scale if (e.g.) inhaled

## Key references

Scientists for Global Responsibility (2016). UK nuclear weapons: a catastrophe in the making?  
<http://www.sgr.org.uk/resources/uk-nuclear-weapons-catastrophe-making>

British American Security Information Council (2016). A Primer on Trident's Cyber Vulnerabilities.  
<http://www.basicint.org/publications/aleem-datoo-paul-ingram-executive-director/2016/primer-trident%E2%80%99s-cyber-vulnerabilities>

CND (2016). Trident and jobs: the employment implications of cancelling Trident replacement.  
[http://cnduk.org/images/stories/Trident\\_and\\_Jobs\\_2016.pdf](http://cnduk.org/images/stories/Trident_and_Jobs_2016.pdf)

ICAN-UK (2016). Nukes of hazard: the nuclear bomb convoys on our roads.  
<http://nukesofhazard.gn.apc.org/wp-content/uploads/2016/09/NoH-Report-Final.pdf>