

NUCLEAR TERRORISM

Henry Sokolski
Executive Director
Nonproliferation Policy Education Center
www.npolicy.org

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QUESTIONS

- I. How has interest in nuclear terrorism ebbed and flowed since 1945?**
- II. Why are we so worried about nuclear terrorism by non-state actors?**
- III. How much of a threat is nuclear terrorism with nuclear weapons?**
- IV. What are some other frightening nuclear terrorism threats?**

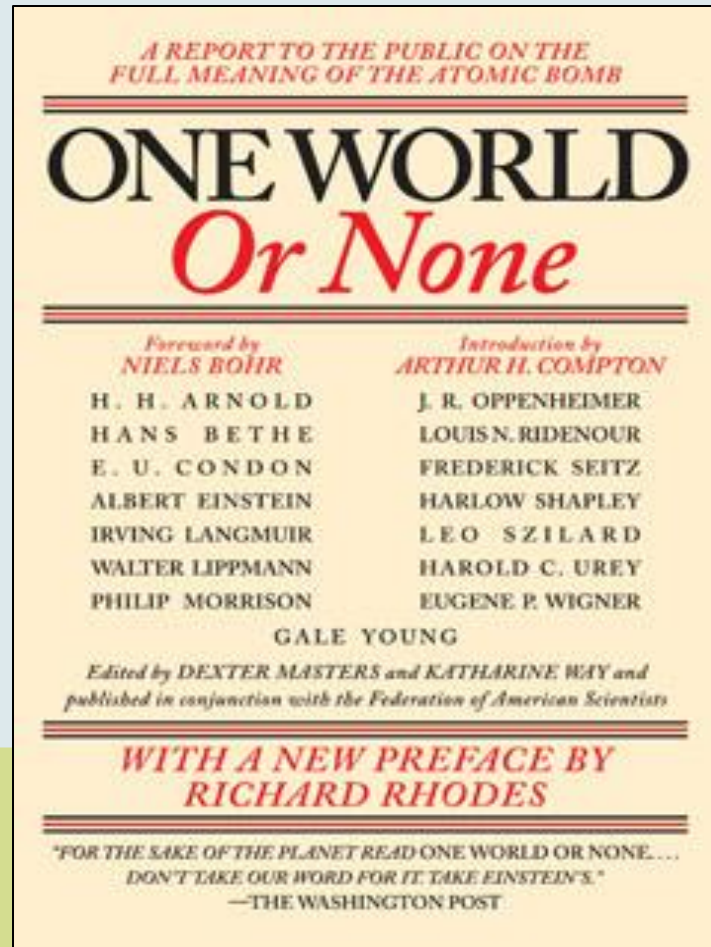
SHORT ANSWERS

- I. Interest in nuclear terrorism has peaked 4 times since 1945: mid-40s, mid-70s, early 90s, and post-9/11**
- II. It challenges the legitimacy not only of our government but its reliance on nuclear deterrence for our security**
- III. It is not as immediate or extreme a threat as we think**
- IV. Dirty bombs, attacks on civilian nuclear plants, and nuclear irredentism are at least as likely as terrorists using nuclear weapons**

I. HISTORY OF NUCLEAR TERRORISM

“THE NEW TECHNIQUE OF PRIVATE WAR”

E.U. CONDON, 1946



1970S: TELEVISED TERRORISM RAMPED UP



- 9,840 incidents recorded worldwide with more than 7,000 killed.
- 1,470 incidents within the nation's borders, 184 killed.
- In contrast, a total of 214 acts of terrorism were cataloged between 2002 to 2013 on U.S. soil, killing 61.
- terrorism deaths globally dropped by 27% in 2017

See, Brian Jenkins, "[The 1970s and the Birth of Contemporary Terrorism](#)," *The Hill*, July 30, 2015 and Ryan Browne, "US says worldwide terrorism deaths decreased 27% last year," *CNN*, September 28, 2018

NUCLEAR TERRORISM REDUX

**Theodore Taylor and Mason Willrich,
*Nuclear Theft: Risks and
Safeguards:* a report to the Energy
Policy Project of the Ford
Foundation, 1974.**

**Brian Jenkins “Will Terrorists Go
Nuclear?” November 1975, RAND
P-5541.**

NUCLEAR EMERGENCY SUPPORT TEAM



In late 1974, President Gerald Ford was warned FBI received a communication from an extortionist wanting \$200,000 after claiming a nuclear weapon had been placed somewhere in Boston. A team of experts rushed in from the United States Atomic Energy Commission but their radiation detection gear arrived at a different airport. Federal officials then rented a fleet of vans to carry concealed radiation detectors around the city but forgot to bring the tools they needed to install the equipment. The incident was later found to be a hoax.

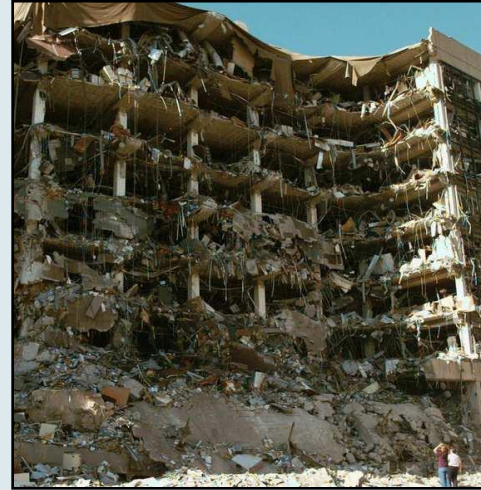
See, "[Nuclear Emergency Support Team](#)," *Wikipedia*, last updated February 28, 2018.

CONVENTION ON THE PHYSICAL PROTECTION OF NUCLEAR MATERIAL, 1979-1987: THE BUREAUCRATIC ORIGIN OF NUCLEAR SECURITY



Richard T. Kennedy, Commissioner
Nuclear Regulatory Committee, 1975-80

1992-2000 TERRORIST ACTS: INCREASINGLY MASSIVE



Top left: Siege in Waco Texas, 1993

Top middle: Aum Shinrikyo leader Shoko Asahara

Top right: Oklahoma City bombing, 1995

At left: U.S. Embassy bombings in Tanzania & Kenya, 1998

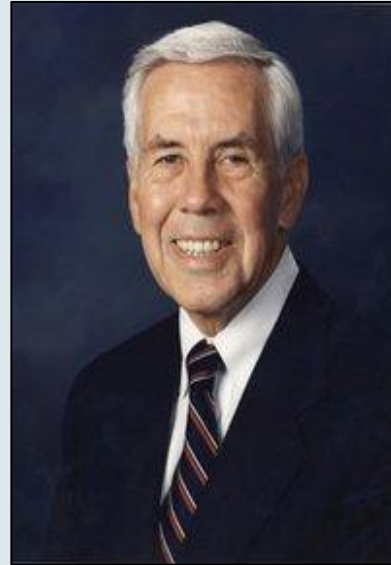
NUNN WMD HEARINGS FOLLOWED BY NUNN-LUGAR-DOMENICI DOMESTIC PREPAREDNESS PROGRAM



Senator Pete Domenici



Senator Sam Nunn



Senator Richard Lugar

9/11: PRESAGED THE SUM OF ALL OUR FEARS



POST 9/11: COUNTER TERRORISM GOES ON THE OFFENSIVE



Afghanistan



**US advisors in Iraq
helping fight ISIS**



Drones strikes



**2014 US airstrike against
ISIS in Syria**

“THE MOST IMMEDIATE AND EXTREME THREAT TO GLOBAL SECURITY”



Russia doesn't "pose the number-one national security threat to the United States. I continue to be much more concerned when it comes to our security with the prospect of a nuclear weapon going off in Manhattan..."

*- President Obama,
March 25, 2014*

COUNTERING WMD TERRORISM ON THE HOME FRONT

Defense Science Board January 2014 report backs domestic, big data collection to counter transnational groups, a new nuclear threat

Obama calls for big data collection and he and others call for tapping to counter nuclear developments



NSA Utah Data Center ("Bumblehive")

NUCLEAR SECURITY SUMMITS



**II + III. NON-STATE ACTORS,
NUCLEAR TERRORISM WORRIES:
HOW WELL FOUNDED?**

TERROR ATTACKS, HARDLY NEW: GERMAN V-2 STRIKES, ALLIED FIRE BOMBINGS, UKRAINE



NON-STATE NUCLEAR TERRORISM

It's a more popular concern because:

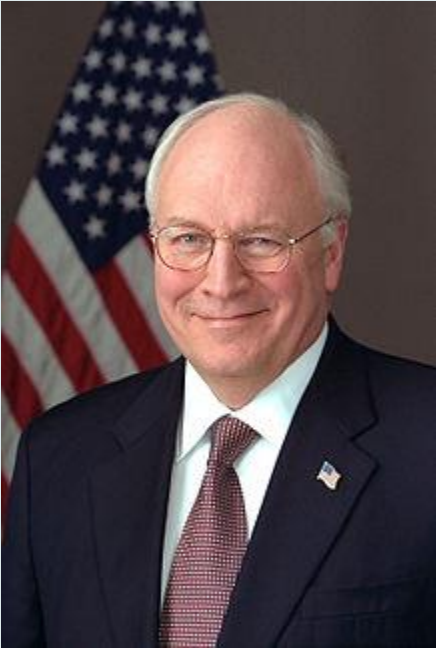
1. Not the amount of harm it might inflict but the legitimacy and credibility it challenges of:
 - A. Governments' ability to protect the public
 - B. Appropriate military responses (the lack of attribution might make government action difficult or impossible)
 - C. International security systems based on nuclear deterrence.

THE ODDS OF NUCLEAR TERRORISM: SOME GUESSES

- Harvard Professor Matthew Bunn calculates the odds of a nuclear terrorist attack within the next decade at 29%.
- In 2004, Graham Allison, author, *Nuclear Terrorism: The Ultimate Preventable Catastrophe*, gave the odds of a terrorist using a nuclear bomb in an American city as greater than 50%. The National Intelligence Council tagged the odds of a WMD event within five years at 50% in 2010.
- Terrorism expert Brian Jenkins conducted a survey of 180 experts asking what the chance was that a terrorist would successfully detonate a nuclear bomb somewhere in the world in the next decade. The survey had a median response of 10%. The range was from 1 to 1 in 10,000,000.

* These figures, and others, can all be found in Brian Jenkins, *Will Terrorists Go Nuclear*, New York: Prometheus Books, 2008, pp. 294-295.

FOR POLITICAL PURPOSES, THE REAL ODDS MAY NOT MATTER



"If there is a one percent chance" of a terrorist developing a nuclear weapon, "We have to treat it as a certainty in terms of our response"

– *Vice President Dick Cheney, November 2001*

UP TO A POINT, TERRORISM INCREASES PRESIDENTIAL POPULARITY

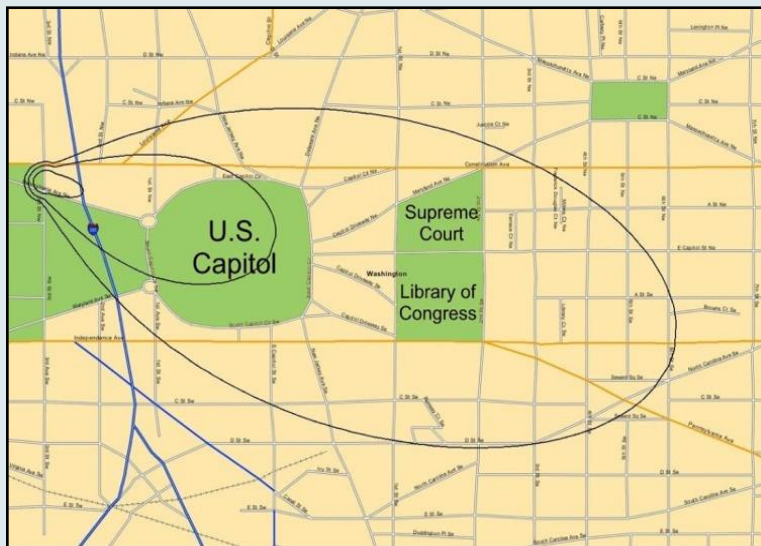
Bill Clinton: 46% job approval rating jumps to 56% right after Oklahoma City bombing in 1995

George W. Bush: ~50% job approval rating jumps to highest approval rating in Gallup history to 90% after 9/11

Francois Hollande: 19% job approval rating jumps to 40% after Jan. 2015 terror shooting of 17 in Paris

IV. NUCLEAR TERRORISM WITHOUT NUCLEAR USE

DIRTY BOMBS: MORE LIKELY, LESS DAMAGING, NOT EASY



Long-term Contamination Due to Cesium Bomb in Washington, DC.

Inner Ring: One cancer death per 100 people due to remaining radiation (5% increase)

Middle Ring: One cancer death per 1,000 people due to remaining radiation (0.5% increase)

Outer Ring: One cancer death per 10,000 people due to remaining radiation (0.05% increase): EPA recommends decontamination or destruction



Contamination Due to Americium Bomb in NYC.

Inner Ring: One cancer death per 100 people due to remaining radiation (500% increase)

Middle Ring: One cancer death per 1,000 people due to remaining radiation (50% increase)

Outer Ring: One cancer death per 10,000 people due to remaining radiation (5% increase): EPA recommends decontamination or destruction

DECREASING ORDER OF RADIOACTIVITY

Table 5: Reactor-Produced Radioisotopes that Pose the Greatest Security Risks

Radioisotope	Half-Life	Specific Activity (Ci/g)	High Energy Alpha Emissions	High Energy Beta Emissions	High Energy Gamma Emissions
Cobalt-60	5.3 years	1,100	N/A	Low Energy	Yes
Cesium-137 (Barium-137m) ^a	30 years (2.6 min)	88 (540 million)	N/A	Low Energy (Low Energy)	N/A (Yes)
Iridium-192	74 days	>450 (std) >1,000 (high)	N/A	Yes	Yes
Strontium-90 (Yttrium-90) ^b	29 years (64 hours)	140 (550,000)	N/A	Yes (Yes)	N/A (Low Energy)
Americium-241	433 years	3.4	Yes	No	Low Energy
Californium-252	2.7 years	536	Yes	No	Low Energy
Plutonium-238	88 years	17.2	Yes	No	Low Energy

^a When Cs-137 decays, it produces a metastable radioisotope barium-137m (Ba-137m), which has a short 2.6 min half-life. Ba-137m creates the external health hazard because of the energetic gamma ray it emits.

^b When Sr-90 decays, it produces a daughter radioisotope yttrium-90 (Y-90), which has a 64 hour half-life and decays by beta emission, which is the main health concern. The accompanying gamma ray is not very energetic, and thus it would not pose a significant health hazard.

TWO SPECIFIC CHECHEN DIRTY BOMB THREATS

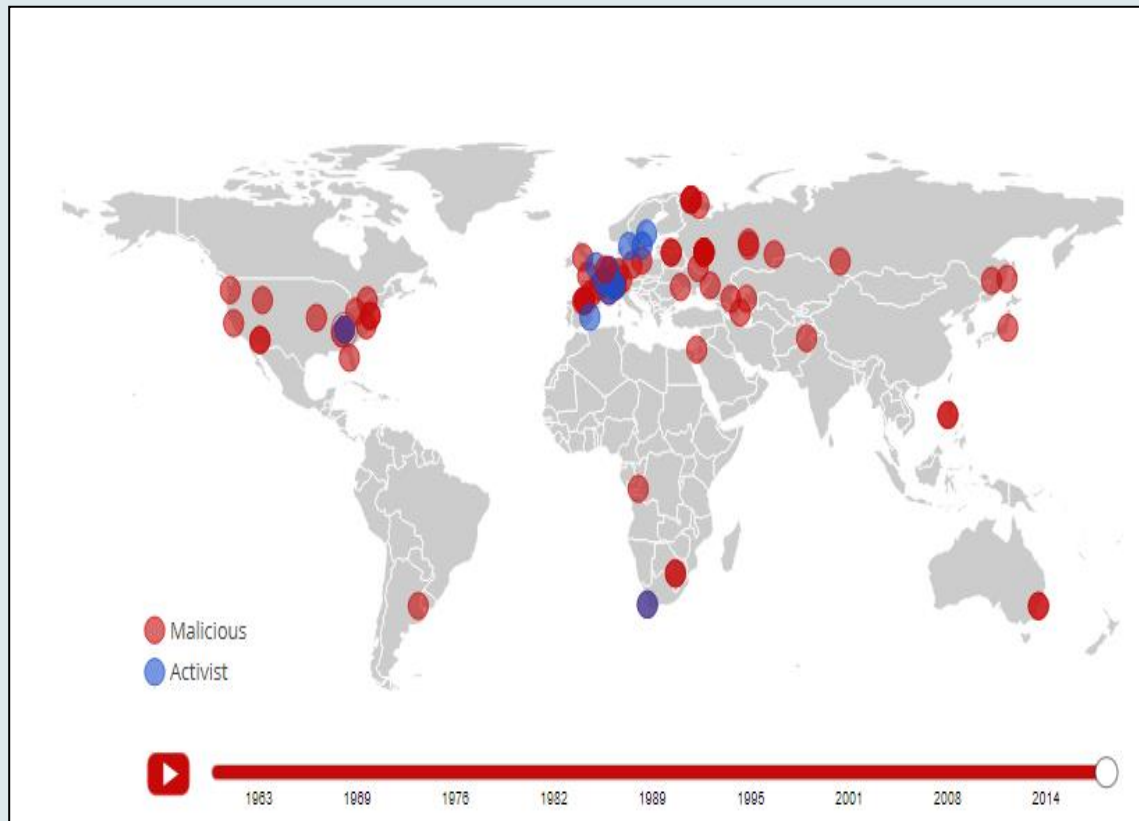


In 1995, Chechen separatists buried a cesium-137 source wrapped in explosives at the Izmaylovsky Park in Moscow. A Chechen rebel leader alerted the media, the bomb was never activated.



In 1998, Chechen security services discovered a container filled with radioactive materials attached to an explosive mine. The bomb was hidden near a railway line ten miles east of the Chechen capital of Grozny

NUCLEAR FACILITIES: VULNERABLE TO PHYSICAL ATTACKS



The START database records **80 attacks on nuclear facilities worldwide** from 1961-2014.

Source: <http://www.start.umd.edu/nuclear-facilities-attack-database-nufad>

NUCLEAR FACILITIES: VULNERABLE TO INSIDER THREATS



The nuclear power plant in Doel, Belgium

- In 2012, two employees at the nuclear plant in Doel quit and joined the Islamic State in Syria.
- In 2014, at the nuclear plant in Doel, an unidentified individual walked into the reactor No. 4 and drained 65,000 liters of oil used to lubricate the turbines. The ensuing friction nearly overheated the machinery, forcing it to be shut down.
- A suspect linked to the Nov. 13 Paris terrorist attackers was found with surveillance footage of a high-ranking Belgian nuclear official in 2016.
- The Belgian nuclear agency's computer system was hacked in 2016 and shut down briefly.
- In 2013, two individuals broke into Belgium's research reactor in the city of Mol and stole equipment.
- *Belgium initially responded by planning to phase out nuclear power by 2025*

See, Alissa J. Rubin and Milan Schreuer, "[Belgium Fears Nuclear Plants Are Vulnerable](#)," *The New York Times*, March 25, 2016.

TERRORISTS CAN TARGET THE GRID CRITICAL TO SAFE NUCLEAR OPERATIONS



- April 16, 2013, one or two individuals infiltrated the PG&E Metcalf power substation in California.
- These individual(s) cut fiber cables around the substation that knocked out some local 911 services, landline service to the substation, and cell phone service in the area.
- The intruder(s) fired more than 100 rounds from what two officials described as a high-powered rifle at several transformers in the facility. Ten transformers were damaged in one area of the facility, and three transformer banks — or groups of transformers — were hit in another.
- Cooling oil then leaked from a transformer bank, causing the transformers to overheat and shut down.

See, Shane Harris, “[‘Military-Style’ Raid on California Power Station Spooks U.S.](#),” *Foreign Policy*, December 27, 2013.

NUCLEAR PLANTS & GRIDS THEY DEPEND ON SUBJECT TO DRONE STRIKES



See, David Hambling, “Dozens More Mystery Drone Incursions Over U.S. Nuclear Power Plants Revealed,” *Forbes*, September 27, 2020

<https://www.forbes.com/sites/davidhambling/2020/09/07/dozens-more-drone-incursions-over-us-nuclear-power-plants-revealed/amp/>

And Dan Avery, “Modified drone was used to launch attack on Pennsylvania electricity substation in first known targeted attack on energy infrastructure, Homeland Security says,” *Daily Mail*, November 5, 2021. <https://www.dailymail.co.uk/sciencetech/article-10170525/Drone-attack-PA-substation-one-target-energy-grid-according-Homeland-Security.html>

NUCLEAR FACILITIES: VULNERABLE TO CYBER ATTACKS



Natanz, uranium enrichment plant in Iran was targeted by the Stuxnet computer virus and may have destroyed 1,000 centrifuges (10%) between Nov. 2009-Jan. 2010.

Source: <https://en.wikipedia.org/wiki/Stuxnet>



In 2017, hackers have been targeting administrative computer networks of companies that operate nuclear power stations and other energy facilities in the United States and other countries, including the company that operates the Wolf Creek Nuclear Power Plant in Kansas, pictured above.

Source:

<https://www.nytimes.com/2017/07/06/technology/nuclear-plant-hack-report.html>

SAUDIS CONSIDER A NUCLEAR PROGRAM DESPITE DANGEROUS CYBER ATTACKS



- August 2017- A Saudi petrochemical plant was hit with a cyber attack meant to sabotage the firm's operations and trigger an explosion that would have killed people.
- Cybersecurity researchers worry that the culprits could replicate it since thousands of industrial plants all over the world rely on the same American-engineered computer systems that were compromised.
- The attackers were most likely supported by a government according to cybersecurity experts.
- There have been a string of cyber attacks in Saudi Arabia against petrochemical companies and plants.

A Sadara Chemical Company in Saudi Arabia

See, Nicole Perlroth and Clifford Krauss, "[A Cyberattack in Saudi Arabia Had a Deadly Goal. Experts Fear Another Try.](#)" *The New York Times*, March 15, 2018

NUCLEAR WEAPONS IN RISKY PLACES: PAKISTAN AND TURKEY



Al Qaeda has attacked Pakistani nuclear weapons bases more than three times, including the Wah cantonment, a nuclear assembly plant pictured above. Source: <https://www.telegraph.co.uk/news/worldnews/asia/pakistan/6011668/Pakistans-nuclear-bases-targeted-by-al-Qaeda.html>



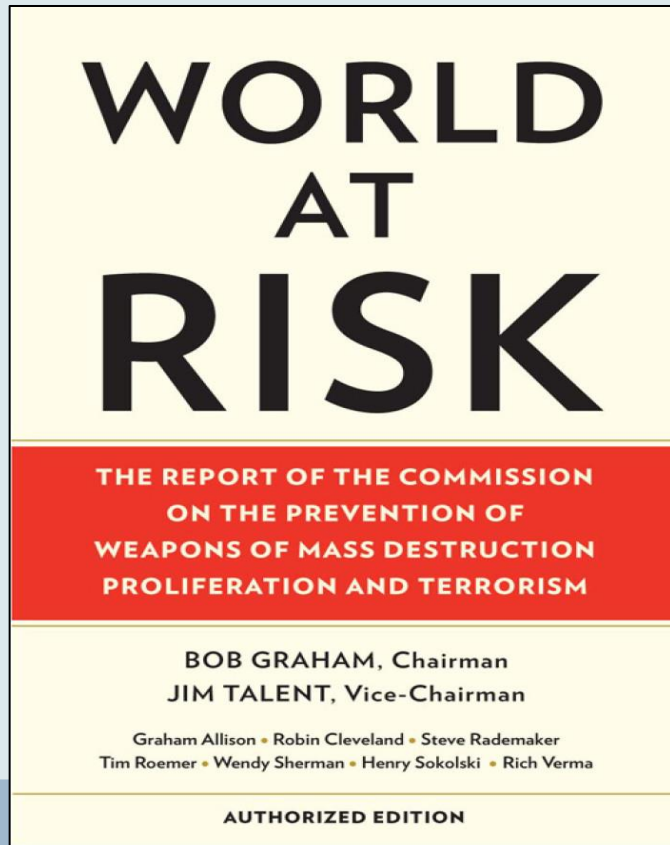
In 2014, according to Indian intelligence terrorists affiliated with Al Qaeda attempted to seize a Pakistani frigate, PNS *Zulfikar*, carrying a nuclear warhead.

Source: <https://thediplomat.com/2018/02/a-nuclear-angle-to-the-2014-pns-zulfikar-attack/>



Incirlik Air Base, Turkey, where the US stores as many as 50 B61 gravity nuclear bombs. July 2016, following a failed coup attempt, Turkey cut power to the base for nearly a week. Source: <https://www.armscontrol.org/act/2017-11/news/us-nuclear-weapons-turkey-raise-alarm>

WHAT ABOUT THE THREAT OF NUCLEAR WEAPONS THEFT?



As for the theft of nuclear weapons or serious terrorist assembly of nuclear weapons, there's no specific intelligence yet.

ADDITIONAL SLIDES

NUCLEAR FACILITIES: AERIAL TARGETS



Before and after picture of a suspected Syrian nuclear reactor hit by a 2007 Israeli air strike



Remains of the Iraqi Osirak nuclear reactor, which Israel bombed in 1981



Israel's nuclear facility in Dimona is vulnerable to attacks from Iran and its proxies



Iranian backed Houthies fire a missile towards Saudi Arabia, which is planning to start a nuclear power program



Iran's Bushehr Nuclear Plant was attacked by Iraq 7 times between 1984-88

NUCLEAR FACILITIES: VULNERABLE TO MISSILE ATTACKS?

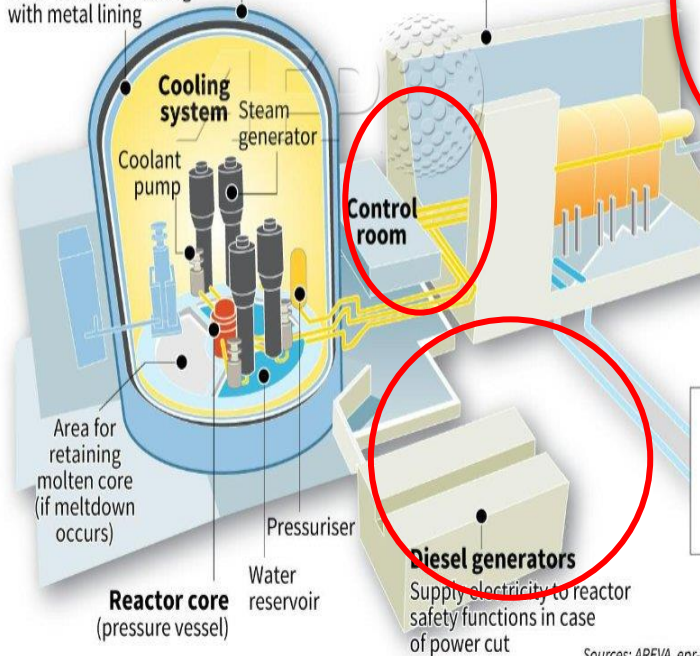
FOUR REACTOR VULNERABILITIES

EPR

Pressurised Water Reactor

Reactor containment building

Outer reinforced concrete shell
Inner concrete housing with metal lining



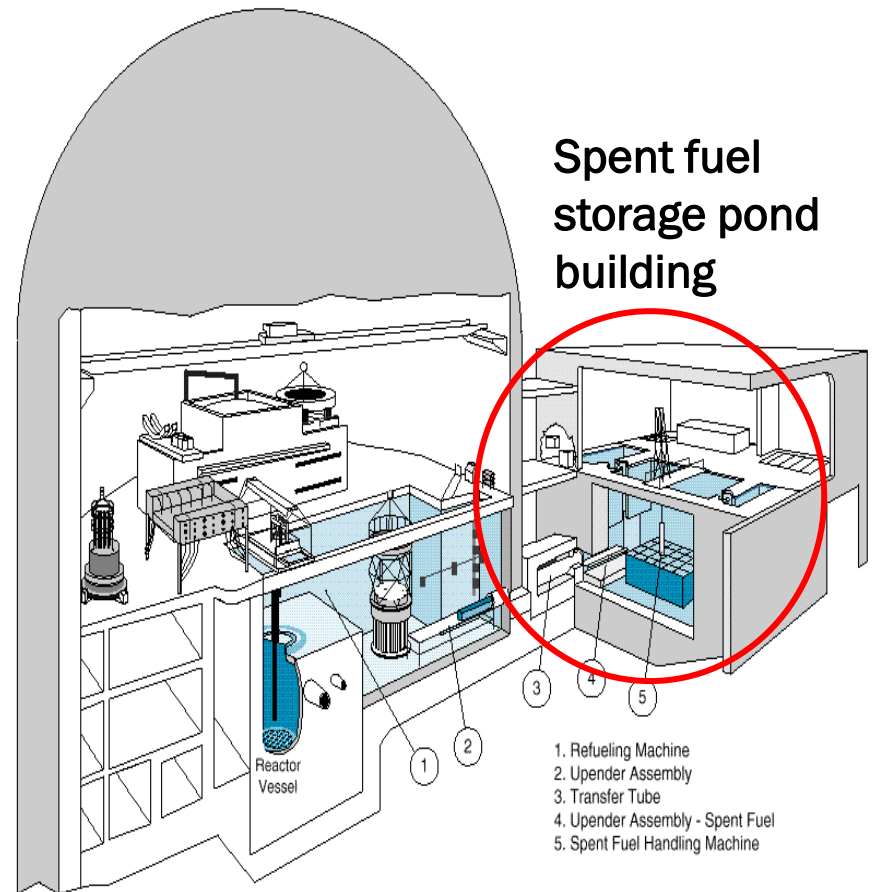
Power grid

Developed by
Areva (French)
EDF (French)
Siemens (German)

Sources: AREVA, epr-reactor.co.uk

© AFP

Spent fuel storage pond building



NUCLEAR FACILITIES: VULNERABLE TO MISSILE ATTACKS?

