

CYBER SECURITY AND NUCLEAR ENERGY

Roger Brunt
Grosmont Howe Ltd

Director of the UK's Office for Civil
Nuclear Security from 2004 to 2011

WHAT MAKES THE NUCLEAR SECTOR DIFFERENT?

- Potential consequences
- The role of the International Community
- Vulnerabilities
- Threat



POTENTIAL CONSEQUENCES

Photo: Daily Post



BUNCEFIELD OIL STORAGE DEPOT, UK

Aftermath of the explosions
and fire in December 2005

Photo: Royal Chiltern Air Support Unit



CHERNOBYL NUCLEAR POWER PLANT, UKRAINE

- April 1986, a catastrophic power increase led to explosions in the core and a massive release of radioactivity
- 31 deaths
- 350,000 people evacuated



International Atomic Energy Agency

IAEA

'Atoms for Peace'

THE ROLE OF THE INTERNATIONAL COMMUNITY

INTERNATIONAL ATOMIC ENERGY AGENCY

- Security is the responsibility of Member States
- The IAEA provides guidance for 'consideration by States, competent authorities and operators'
- Aim is to prevent the theft of nuclear or other radioactive material and/or the sabotage of associated nuclear facilities

IAEA NUCLEAR SECURITY GUIDANCE

NSS 20: Nuclear Security Fundamentals

NSS13: Nuclear Security Recommendations on the Physical
Protection of Nuclear Materials and Nuclear Facilities

NSS 17: Computer Security at Nuclear Facilities



Third Nuclear Security Summit after Washington 2010 and Seoul 2012

NUCLEAR SECURITY SUMMITS

Photo: NSS14.com

- Reactor protection system
- Process control system
- Work permit and work order system
- Physical access control system
- Document management system
- Email



VULNERABILITIES TO CYBER ATTACK

Photo: Wikipedia

10

GHL Oct 14



Unprecedented reliance on digital systems but
unparalleled opportunities for Security by Design

NUCLEAR NEW BUILD

Photo: EDF Energy



Scenario 1: Gathering Information to support a malicious act

Scenario 2: Attack disabling or compromising one or several computer systems

Scenario 3: Computer system compromise as a tool of coordinated attack

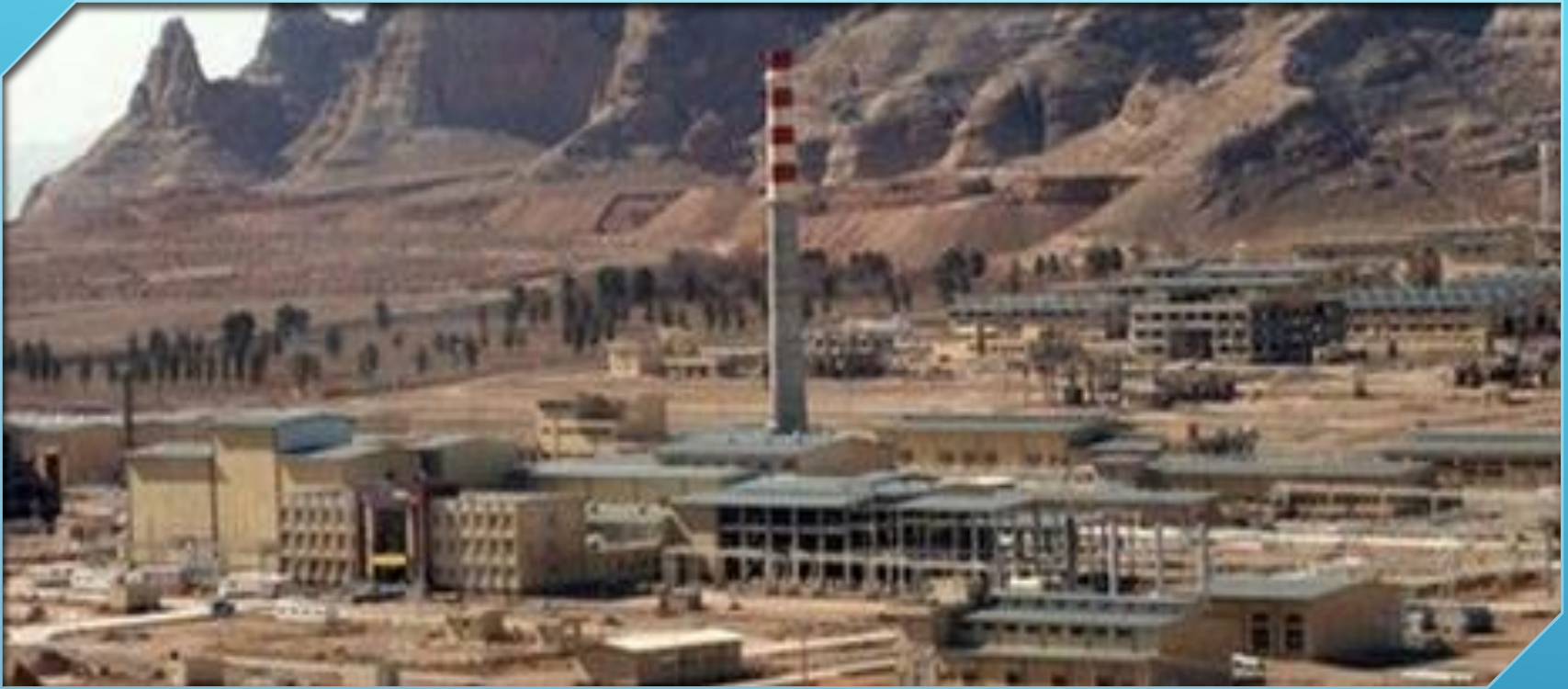
CYBER ATTACK SCENARIOS

- ▶ Covert Agent
- ▶ Disgruntled Employee/User

INTERNAL THREATS

- ▶ Recreational Hacker
- ▶ Militant opponent to nuclear power
- ▶ Disgruntled Employee/User (no longer employed)
- ▶ Organised Crime
- ▶ Nation State
- ▶ Terrorist

EXTERNAL THREATS



Natanz Nuclear Plant, Iran

STUXNET ATTACK

Photo: BBC News

15

GHIL Oct 14

Hacking Britain

**Cyber crime costs UK
up to £27bn a year**



44m Number of cyber attacks
in 2011 in the UK



£18bn - £27bn Estimated annual
cost to Britain



80pc Proportion preventable
through computer 'hygiene'



Top 4 Among biggest risks
to UK security in 2010



£121bn Value of UK's internet-
based economy in 2010



8pc Proportion of UK GDP coming
from web-based business



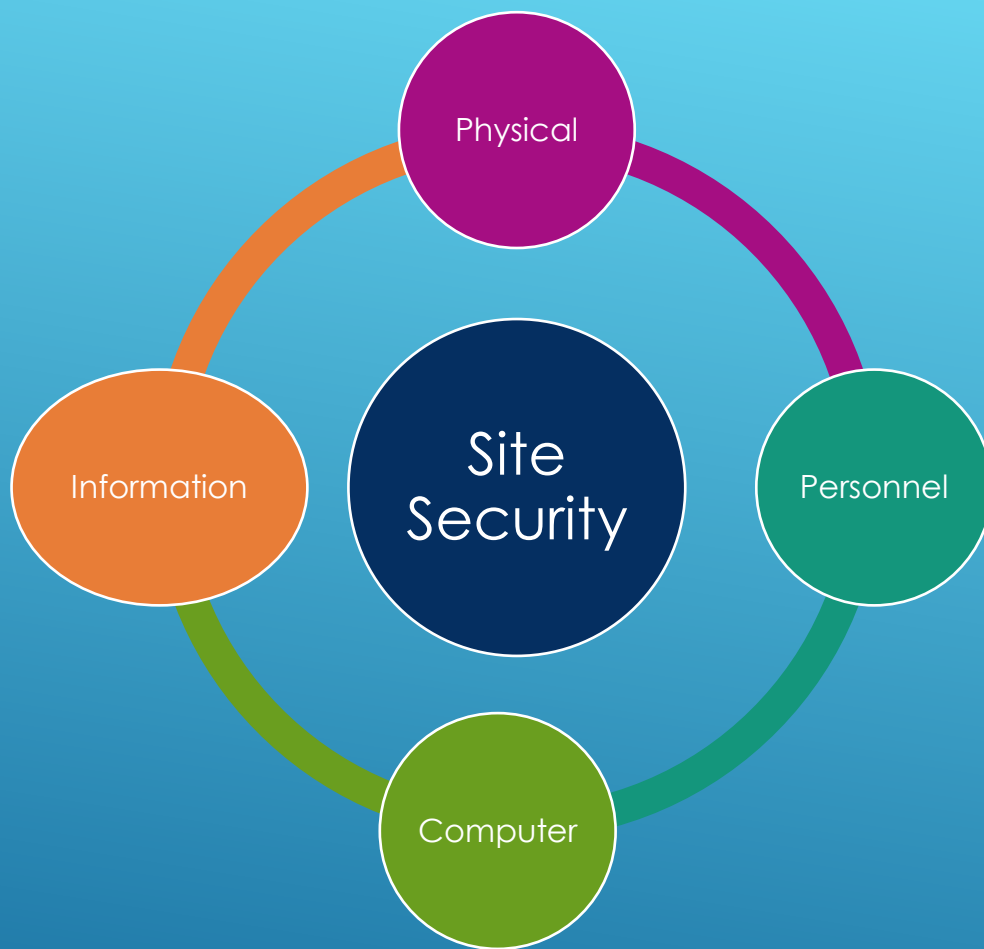
Source: Cabinet Office
The Cost of Cyber

IMPACT ON UK

Photo : UK Cabinet Office

16

GHL Oct 2014



RESPONSE

Computer Security Policy:

- Enforceable
- Achievable
- Auditable

RESPONSE

Computer Security Plan

- Organisation and Responsibilities
- Asset Management
- Risk, Vulnerability and Compliance Assessment
- System Security Design and Configuration Management
- Operational Security Procedures
- Personnel Management

RESPONSE

- Penetration Testing
- Detect, Delay, Respond
- Post-incident Forensics
- Training
- Nuclear Security Culture

RESPONSE

"I was navigating by sight because I knew the depths well
and I had done this manoeuvre three or four times,"

*Captain Francesco Schettino
Master, Costa Concordia*



and to conclude.....

AVOID COMPLACENCY!

NSS20

- ▶ http://www-pub.iaea.org/MTCD/Publications/PDF/Pub1590_web.pdf

NSS 13

- ▶ http://www-pub.iaea.org/MTCD/publications/PDF/Pub1481_web.pdf

NSS 17

- ▶ http://www-pub.iaea.org/MTCD/Publications/PDF/Pub1527_web.pdf

IAEA NUCLEAR SECURITY SERIES

International Conference on Computer Security in a Nuclear World

Vienna, Austria, 1 to 5 June 2015

[http://www-
pub.iaea.org/iaeameetings/46530/International-
Conference-on-Computer-Security-in-a-Nuclear-
World-Expert-Discussion-and-Exchange](http://www-pub.iaea.org/iaeameetings/46530/International-Conference-on-Computer-Security-in-a-Nuclear-World-Expert-Discussion-and-Exchange)

IAEA COMPUTER SECURITY CONFERENCE 2015

23

GH1 Oct 14