Unified Command and Control

Mark Neate
Environment, Safety & Security Director
Our history

We have over 70 years of history and experience

- **1940s**: Munitions
  - At Sellafield, TNT was made and munitions shells filled.

- **1950s**: Nuclear deterrent
  - The remote nature of the site, along with its industrial workforce and experience in working for the Ministry of Supply, makes it the ideal location to produce plutonium for the country’s atomic weapons programme.

- **1960s**: Reactor construction and operation
  - The United Kingdom Atomic Energy Authority is formed. The world’s first commercial nuclear power station, Calder Hall, and the Windscale Advanced Gas-cooled Reactor are developed – both are forerunners of a fleet of nuclear power stations across the country.

- **1970s**: Commercial reprocessing
  - Plans are developed to commercialise reprocessing at Sellafield. The site also comes under the ownership of British Nuclear Fuels Ltd. The United Kingdom Atomic Energy Authority retains ownership of the Windscale site.

- **1980s**: Waste management
  - Construction commences on a new facility called the Thermal Oxide Reprocessing Plant (Thorp). The site is now the only nuclear site in the country that can safely manage all three forms of radioactive waste: low, intermediate and high.

- **1990s**: Multiple missions
  - Thorp and Magnox are established as key international players in the fuel cycle, and reprocessing helps meet the requirements of domestic power generation and overseas customers. First generation reactor decommissioning gets underway, and preparation for wider decommissioning activities starts. Ownership of the site moves to the newly-created Nuclear Decommissioning Authority. Sellafield Ltd becomes the nuclear site licensee.

- **2000s**: Risk and hazard reduction
  - Access to the waste and fuel stored in our sixty-year-old fuels storage ponds and waste silos starts, retrieving it and moving it to modern storage. In 2016 Sellafield Ltd becomes a subsidiary of the NDA.

- **2010s**: Legacy
  - Redundant munitions structures and facilities buried underneath the site.
  - First generation reactors requiring decommissioning.
  - High level nuclear waste requiring treatment, storage and, in the case of foreign owned waste, shipment back to the country of origin.
  - Pilot plants, Thorp and Magnox reprocessing facilities requiring decommissioning.
  - Aged pond and silo facilities remain with no waste removal capability. Investment in the assets is required to enable decommissioning.
  - Pond and silo waste storage facilities with large inventories, which do not meet modern standards.
Sellafield today

• Since the 1950s the UK has followed a policy of reprocessing spent nuclear fuel. Sellafield has been at the heart of this process since its beginning
• Reprocessing of nuclear fuel means that Uranium can be reused in fuel but also creates concentrated radioactive wastes and separated plutonium through a chemical process
• As a result the site is complex from a nuclear and chemical hazard standpoint, and provides many unique challenges
• Reprocessing concludes in 2020
• The site covers 2 square miles
• There are over 200 nuclear facilities and over 2,500 buildings in total
• 11,000 staff and over 3,000 contractors
• Sellafield continues to receive spent fuel to support nuclear power generation
Thinking differently about clean-up
The challenge

Our Greatest challenges is the legacy plants
Our approach to Nuclear Safety & Security

• Integrated approach to Nuclear Safety & Nuclear Security

• Based upon ‘Risk Informed’ decision making

• Balancing the nuclear & radiological risk with the security risk

• Unified Command & Control Model

• Based upon ‘Defence-in-Depth’ & ‘Graded Approach’
Corporate Risk Methodology

• Quantitative risk
  • Active Risk Management tools
  • Effective at a tactical, operational and project level

• Subjective risk
  • Strategic / Corporate risk is more subjective and therefore needs a different approach
  • Informed by quantitative risk
  • Contextualising the risk against a diverse range of risks
  • Balancing the totality of the risk, the legacy risk (hazard) against safety and security case risks, DBT, beyond DBT and Extreme events.
Significant Facilities - Risk Management Framework

- Facilities on site are graded according to their nuclear safety risk and potential consequences on a scale from A to E.
- The attached map (Official-Sensitive) shows the location of the key facilities at Sellafield.
- The framework guides prioritisation and regulatory oversight.
- The remainder of this section gives more detail on facilities that are or have been in region C – however it is important to bear in mind that there is also significant work on site to bring facilities in region B into region A.

ALARP = As Low As Reasonably Practicable
Ovals are intended to illustrate the level of confidence in the estimate of probability and impact, such that a longer shape implies a reduced confidence in accuracy and hence a potential range.
Complex Regulatory Environment

• Nuclear Installations Act 1965, Nuclear Site licence condition 11 – Emergency arrangements.

• Nuclear Security Industries Regulations 2003

• Radiation (Emergency Preparedness & Public information) Regulations 2001

• Control of Major Accident Hazard (COMAH) Regulations 1999.

• Carriage of Dangerous Goods Act.

• Fire Services Act 2001.

• Managed in a complex and hazard site environment, challenges of practicality.
The Office for Nuclear Regulation (ONR) has adopted security Assessment Principles (SyAPs). The move to SyAPs allows a much more outcome focused approach where high level goals are laid out, and the means by which these are met are developed and justified in detail by Sellafield Ltd as the dutyholder. For a large, complex site such as Sellafield with a wide range of materials, hazards and technologies, this change to an outcome focused approach for security presents a significant opportunity to articulate and demonstrate proportionate, integrated and effective security arrangements.

The overall NSSP is about more than defining and demonstrating security. The NSSP establishes the primacy of the dutyholder and, with the SyAPs, provides the basis for underpinning a comprehensive, interdependent and robust security management system. The strong starting point further enables the development of a regulatory relationship firmly based on proportionate and risk informed security outcomes.
Sellafield Security Enhancement Plan

The Sellafield Security Enhancement Programme (SSEP) was initiated in 2011. an £860m investment in security delivered over a number of years, concluding in 2020.

Replacing and upgrading existing ageing PPS assets.
Created new PPS capabilities, Intermediate (HSA) and inner Areas
Created new Command & Control digitised Hub

Established new operational and response capabilities, CNC and Guard Force. Enhanced.

Enhanced the operational and operational support capacity to create an enduring capability.
Security capability examples

- Civil Nuclear Constabulary
- Hostile Vehicle Mitigation
- Vehicle Access Control Point
- Civilian Guard Force
- Unmanned Aerial Vehicles (UAVs)
- Subterranea voids
- Specialist trained dogs
- Cyber Security Operations Centre
- Ballistic protected vehicles
- Emergency Duty Teams
- Sellafield Fire & Rescue Services
- Security vetting and access control
Drivers for the Unified Command

- Global events changing design basis
- Lessons driving joint emergency services approach
- New technology to overcome site issues
Project Delivery of the Outputs to Enable Unified Command and Control

The Sellafield Unified Command and Control framework is underpinned by the principles outlined in the UK Joint Emergency Services Interoperability Programme (JESIP) “Joint Doctrine: The Interoperability Framework”:

- CO-LOCATION;
- COMMUNICATION;
- CO-ORDINATION;
- JOINT UNDERSTANDING OF RISK; and
- SHARED SITUATIONAL AWARENESS
Command and Control – A Programmatic Approach

**CURRENT**
Geographically dispersed functional cells

**ENDSTATE**
C8 INCIDENT / EVENT ESCALATION DECISION MAKING MODEL

PLANNING ASSUMPTION / EVENT SCALE

OSCF

MSCF

DBE

EXTREME

BDBE

PLANNING ASSUMPTIONS – ESCALATION PROCESS FLOW DIAGRAM

INCIDENT / EVENT

ESTABLISH EMERGENCY DUTY TEAM

ESTABLISH MAIN SITE COMMAND FACILITY (MSCF)

ESCALATING INCIDENT / EVENT

SITE COMPROMISED +/or MSCF COMPROMISED

ESTABLISH OFF-SITE COMMAND FACILITY (OSCF)

ESCALATING INCIDENT / EVENT

SITE COMPROMISED +/or MSCF COMPROMISED

ESTABLISH OFF-SITE COMMAND FACILITY (OSCF)

OBJECTIVES

Manage ‘Incident / Event’
Maintain ‘Safe Site Condition’
Maintain ‘Security Site Condition’
RETURN TO BUSINESS AS USUAL

MSCF Model

Comms

MSCF

Good
Situation
Awareness

Objectives

OSCF Model

Comms

OSCF

Some
Situation
Awareness

Objectives

OBJECTIVES

Manage ‘Incident / Event Response’
Manage ‘Critical Safety Functions’ (Key Facilities)
Manage ‘Critical Security Functions’ (Key facilities)
Controlled Re-Entry to Site (MSCF or Control Base)
MAKE SITE AS SAFE & SECURE AS PRACTICALLY POSSIBLE
Main Site Command Facility (MSCF)


- High performance computing, software, alarms and sensor feeds protected by cyber security provide the platform for the management of daily operations, incidents and emergencies.
- It will be a digitised headquarters enabling a Common Operating Picture (COP), giving a joint understanding of risk, shared situational awareness and timely decision making.
- Establishing the MSCF is a national priority.
Unified Command and Control Benefits

**ENDSTATE**
Multiple interrelated benefits delivered through enhancements in processes, organisation, technology and information flows.

**CURRENT**

SSAU Project Scope

- **Current**
  - Improved Detection and Surveillance Capability
  - Security Management System (SMS)
  - Emergency Management System (EMS)

**Unified Command and Control**

- Extract from the SSEP Unified Command and Control Capability Benefits map.
  - DAMN – Detection Assessment Monitoring and Notification
  - Faster Decision Making
  - Improved Decision Making
  - Improved Joint Planning
  - More Proactive Decision Making

**Shared Situational Awareness**

- Colocation of CNC, EM, F&R, DMS, Intelligence, Cyber
- More Comprehensive Understanding
- Common Situational Understanding
- Increased Situational Information
Conclusion

• Sellafield is a complex site. Many facilities cannot simply be shutdown
• Significant progress has already been made with hazard and risk reduction
• Hazard profile is well characterised but still major
• Priorities focussed on high hazard and risk reduction
• Risk Management Framework supports effective safety and security management
• Enabling Regulation encourages progress in the key areas
• Skilled and competent workforce, leadership and supply chain are focussed on delivery
• Emergency preparedness and resilience is crucial and is available 24/7 and regularly tested

• **Unified Command and Control provides a different model for emergency planning and response – but also for ‘business as usual’?**
"I don't understand your question. Could you restate it as an answer?"