


 Submarine Delivery Agency

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**Presentation to
Dounreay Stakeholder
Group**

11 March 2020




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Vulcan Naval Reactor Test Establishment

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Navy
Director Nuclear Propulsion


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Agenda

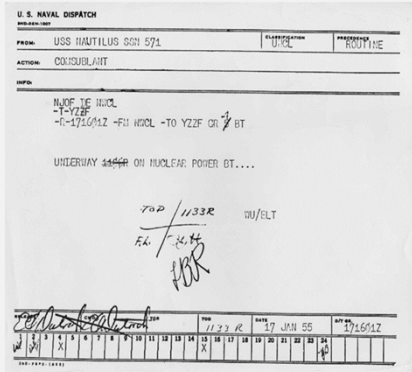


- Naval Nuclear Propulsion Programme
- Vulcan History
- Vulcan Achievements
- Prototyping Requirement
- Vulcan Challenges
- Current Activities
- The Plan for the Future
- Questions



Naval Nuclear Propulsion Programme

- Early 1950s US designed a nuclear powered submarine
- MoD aspired to place nuclear reactors into submarines for propulsion and electrical power.
- 17 Jan 1955 USS Nautilus signalled underway on nuclear power
- 1954 – UKAEA started to design a reactor for submarines.
- 1957 – Vulcan Test Establishment began construction.



U. S. NAVAL DISPATCH

FROM: USS NAUTILUS SSN 571

ACTION: CONSULTANT

INFO:

INFO OF IG NAVAL
 -T-YZEF
 -T-171691Z -FM NAVAL -TO YZEF ON 1/17 BT

UNDERWAY 145500 ON NUCLEAR POWER BT....

700 / 1133R
 EL 14.45
 JWS

17 JAN 55 171691Z

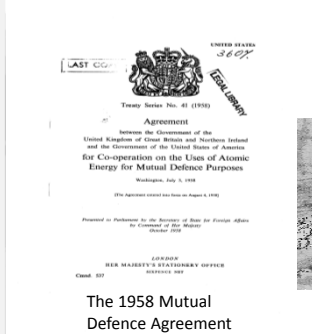
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| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Naval Nuclear Propulsion Programme

- 1958 – Agreement with US to purchase a submarine reactor and the capability to develop our own.
- 1963 – HMS Dreadnought commissioned.



Admiral Lord Mountbatten and Capt Hyman G Rickover



The 1958 Mutual Defence Agreement



HMS Dreadnought (1963)

Dounreay Submarine Prototype



- 1957 – Construction began on the Dounreay Submarine Prototype (DSMP).
- 1965 – Naval Reactor Plant critical for the first time.
- 1984 – DSMP shut down.

Shore Test Facility



PWR2 Reactor Plant arrives at Sandside Bay



..... almost home in STF

- Early 1980s – STF construction commences
- 1987 – STF critical for the first time.
- 2015 – STF shut down.

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Vulcan Achievements...

- Prototyped 5 different reactor cores.



Note: this is a civilian Reactor Core

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Vulcan Achievements...

- Provided data for 7 different classes of submarines

Pressurised Water Reactor 1 – DSMP1

Valiant Class

Churchill Class

Resolution Class

Swiftsure Class

Trafalgar Class

PWR2 - STF

Vanguard Class


Astute Class

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Vulcan Achievements...

Trained generations of Naval Operators



Future of Prototyping

- 2011 - Government approval for the nuclear deterrent successor programme (Dreadnought)
- Replacement for the Vanguard Class
- New reactor plant design selected (PWR3)
- Major Review of Prototyping undertaken
- Nov 11 decision taken to not prototype PWR3:
 - Modern modelling techniques
 - Understanding of technology required
 - Wide international knowledge base



Artist Impression Dreadnought Class

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Vulcan Challenges – Fuel Element Breach

- 2014 - Secretary of State for Defence announced that a “Microscopic breach in a small area of the metal cladding that surrounds one fuel element” had occurred at STF.
- Programme Review commenced (inc past decisions)
- Precautionary decision taken to refuel HMS Vanguard
- March 2015 - decision not to prototype PWR3 confirmed
- July 2015 PWR2 operation at Vulcan ceased.

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Current Activities

- Post Operations Phase has commenced:
 - Preparations for and to defuel STF
 - Post operational activities in support of programme
- Post Operational Clear Out (POCO)
 - Preparations for decommissioning of the site
 - Reduce the site's radioactive inventory
 - Support wider programme utilising unique facilities

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Site Regulation

- All activities are carefully controlled and regulated by:
 - Statutory bodies
 - Radioactive Waste Disposal - SEPA
 - Environmental Protection and Waste - SEPA
 - Conventional Health and Safety - HSE via ONR
 - Ionising Radiation Regulations – ONR
 - Non-Statutory bodies
 - Authorisation (equivalent to Nuclear Licencing) - DNSR

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Inside STF



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Future of Vulcan Site

- MOD, through the Defence Infrastructure Organisation (DIO), has surveyed all of its sectors to determine if a future use for the Vulcan site could be identified.
- DIO has confirmed that there is no identified requirement for the site beyond completion of current work streams
- MOD will, therefore, decommission the site:
 - Remove Fuel
 - Reduce radioactive inventory
 - Conduct POCO Work
 - Surrender Lease to NDA at mutually agreed point

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Future Activities – Current Plan

- Prior Information Note has been issued to industry
- Market Engagement activities commence in 2020
- Commercial Competitive tendering process
- Contract Award
- Decommission of the site commences 2023
- Decommissioning will be coherent with DSRL's programme to:
 - Ensure essential services are maintained to Vulcan
 - Ease the process of lease surrender to NDA

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Statutory Consultation

- Vulcan (and the MoD) has welcomed the views of the DSG throughout its operational life, this will continue during its post operational phase and into Decommissioning
- The MOD will undertake all statutory consultations, including Town and Country Planning and Environmental consultation for the decommissioning activities



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Questions

