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Submarine
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For the attention of Councillor Struan Mackie (Chair of Dounreay Stakeholder Group)

VULCAN RESPONSE TO DSG QUESTION FOR THE POTENTIAL FOR VULCAN FACILITIES TO BE UTILISED FOR PRODUCING MEDICAL ISOTOPES

1. At the Dounreay Stakeholder Group (DSG) Public meeting in October 2023, a member of the public asked if it was possible for the Vulcan facilities to be used to produce medical isotopes[1]. A brief response was provided at the meeting outlining the significant challenges that this suggestion generates, as requested I am now writing with a more detailed response.

2. Medical isotopes are primarily generated either using a nuclear reactor or an accelerator, the most common of which being a cyclotron. The majority of medical isotopes are produced using nuclear reactors; thus I am considering the question to relate to the production of medical isotopes by *nuclear reactor*. At Vulcan this results in two options, restart one of the existing reactors or build a new bespoke facility using where practicable the existing support services.

3. As you are aware nuclear reactor operations ceased at Vulcan in 2015, with the shutdown of the Shore Test Facility; the DSMP1 reactor having been shutdown in 1984. Both reactors are defueled. If it was decided to refuel and restart[2] either of these reactors there are significant engineering substantiation and revalidation activities to be completed with associated significant technical challenges that would need to be overcome. The revalidation activities are likely to require a large number of components and major vessels to be replaced. The reactor would also need substantial modification to permit production of the correct isotope. The likely costs, and timescales of all this activity would be comparable to, or even greater than, building a new bespoke facility.

[1] It is assumed that this individual meant the production of radioisotopes for use by medical professionals to diagnose and treat health conditions.

[2] It should be noted that on the final shutdown of both reactors, the plan was and remains that they would be decommissioned. Thus, no action was taken to preserve the systems for a future restart.

4. Whilst in theory it would be possible to build a new bespoke facility at Vulcan, this presents a number of challenges. These include the complexities of Regulations as it would be sited on a Defence Authorised Site regulated by DNSR, whilst the design of the reactor would be regulated by ONR. It also includes there being no physical footprint available at Vulcan to build such a facility without impacting on current activities; as you are aware these are key to support the operation of the Royal Navy's submarines in the medium to long term.

5. Therefore it is judged, taking into account the practicalities, costs and timescales as not feasible to restart Vulcan's reactors for this purpose. It is also judged not feasible to build a new bespoke facility. I thank the DSG for raising this question and hope that this additional detail is helpful in clarifying the initial response provided in the meeting.

I Walker
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