

BNFL - PROJECT SUMMARY

INTRODUCTION

MoD's issue of an extended Pre-Qualification Questionnaire for the ISOLUS project provides industry with the opportunity to assist MoD in developing the very best technical solution and commercial framework to ensure safe, timely, and cost-effective delivery of the project, within a framework appropriately sensitive to wider public and stakeholder interests.

In particular, we welcome the fact that MoD is already seeking to create a partnering culture even in these preliminary stages of the project. Although the technical requirements of the project are well within existing capabilities, the long duration of the proposed contract, the level of interest amongst the public, regulators/other stakeholders and the strategic issues relating to future use of the Dockyards all serve to underscore the absolute need to establish a truly effective partnering relationship between MoD, the preferred service providers and other key stakeholders (e.g. regulators and the public).

As with approaching any challenging task, when determining the optimum solution to such an important project as ISOLUS it is imperative that the basic and fundamental steps are clearly identified, well bounded and thoroughly understood. It is only by this rigorous 'front end' definition that the essential capabilities and skills necessary to ensure the ultimate delivery can be established. Matching this capability requirement to those organisations and companies with the best possible corresponding skillbase and by assigning risks and responsibilities to those best placed to manage them will naturally drive the selection of the optimum solution.

It was with this belief and philosophy that the below outline concept was identified as being the optimum national solution for the execution and successful completion of the ISOLUS project.

The attached responses in this section have been made at a level of detail which will allow the public to participate in an informed manner and aid the consultation process planned by the MoD. To aid the reader the responses have been made against a number of categories and specific issues with a view to focusing consideration on those aspects felt most important from the extremely successful and beneficial Front End Consultation already undertaken to date on the ISOLUS project.

Further consultation planned by the MoD during the forthcoming convergence phase of the project will allow industry to respond to public concerns and adjust, as appropriate, the options which will be progressed throughout the next phases of the procurement process.

The below responses have been made against an initial outline concept, based on the beliefs and philosophies outlined above, which constitutes:

Cut out and removal of the submarine Reactor Pressure Vessel (RPV) at existing dockyard(s).

Transport of these RPVs in specifically designed, manufactured and licensed packages

Interim storage of these specially packaged RPVs in a purpose built and dedicated store at Sellafield where the majority of the similar waste generated in the UK to date is safely and effectively managed. This approach would also benefit from the consolidation of the ISOLUS project wastes with other radioactive arisings from the UK submarine programme at one geographical location.

Options

Q. Does your proposal involve storage intact or cutting up and packaging?

Our outline concept is to remove and package the Reactor Pressure Vessel (RPV), to remove and separately package all other Intermediate Level Waste (ILW) and to transport the packages to Sellafield for interim storage prior to final processing and disposal when a National Waste Repository becomes available. Remaining Low Level Waste will be identified, removed, packaged and dispatched for disposal at the Drigg site in West Cumbria. The remainder of the vessel will be dismantled with toxic and special wastes being managed in accordance with the relevant legislation. The remainder of the structure will be disposed of to land fill or re-cycled as deemed appropriate.

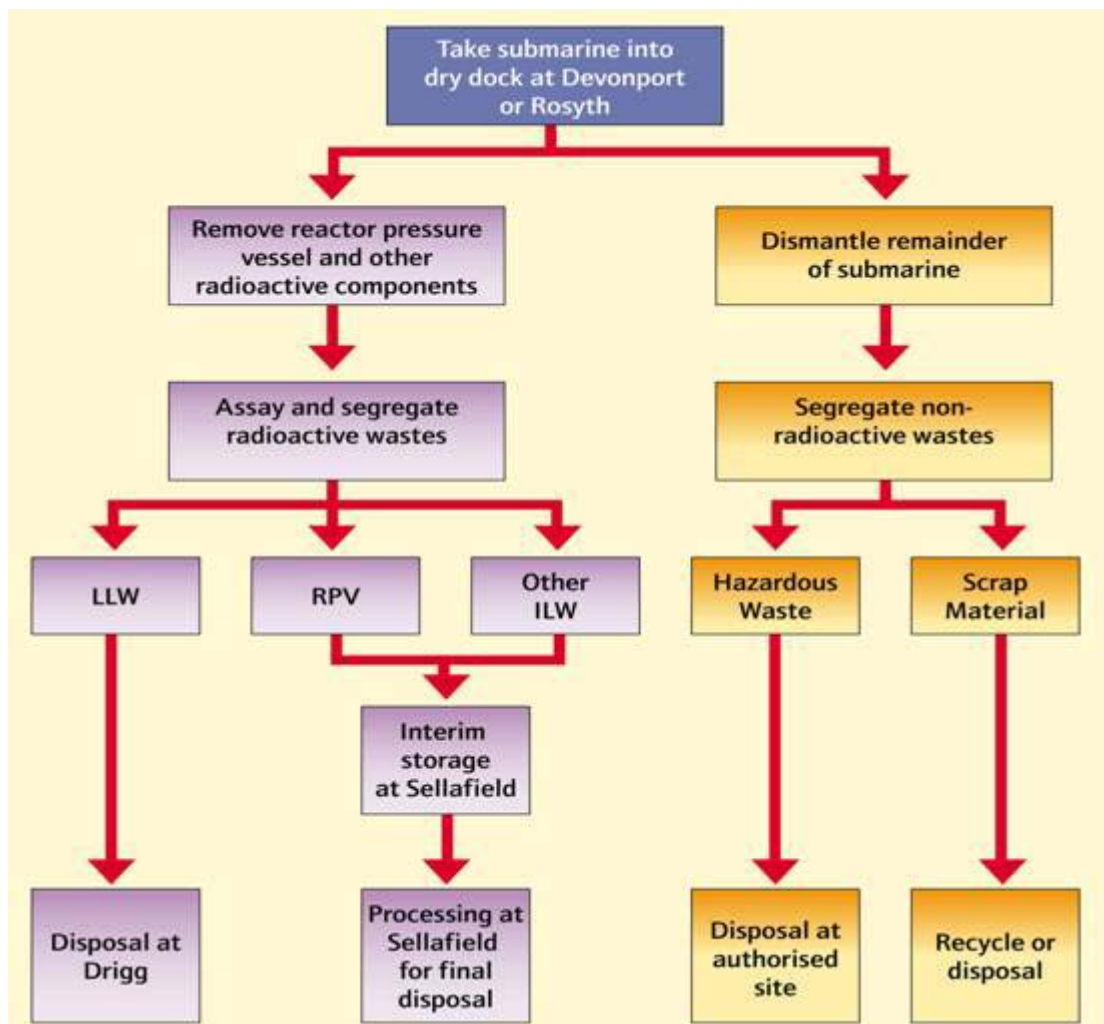


Figure 1. Summary of Outline Concept

Q. What is the rationale for your selected option(s)?

The rationale behind the selection of the outline concept of removal of the Reactor Pressure Vessel (RPV) as opposed to storage of the intact Reactor Compartment (RC) is as follows:

Removal of the RPV:

Reduces the remaining visual legacy to that of the processing and storage facilities only. Visibly demonstrates that the problem is being dealt with in an engineered manner.

Can be achieved with existing technology with no significant additional workforce radiation exposure. This also satisfies the philosophy of intergenerational equity by not leaving problems for future generations when, in technological and safety terms, they can easily be overcome today.

Readily transportable within purpose built packages to Sellafield by existing and proven sea or rail routes

Provides storage at Sellafield where the infrastructure and workforce needed to ensure its safe keeping already exists and will be maintained long into the future.

Removal and storage of the reactor compartment (RC):

Would produce only a relatively small visible reduction in size

Would mean a substantial change in use of the dockyards if used for reactor compartment storage

Would represent a major logistical problem if reactor compartments were to be transported to another location for storage

Would require a large storage facility if 'open-air' storage was not acceptable to the regulators.

Although recognised as the approach adopted by the US this also constitutes the final disposal form under their legislation. This is not the strategic intention in the UK and further size reduction would be required in the future.

The use as a storage medium was never the intended use of the RC. Although a case could possibly be made in engineering terms it is felt that such a physical inventory would require significant care/maintenance and possible intervention throughout the interim storage period. A specifically designed, engineered and purpose built solution is considered a far more robust long term storage medium.

Further dismantling of the RPV prior to interim storage would involve major capital investment whilst not producing significant reduction in the amount of ILW due to the 'nested' construction of the RPV. In addition this size reduction would generate increased potential hazards nor is it considered to meet ALARP criteria for workforce radiation exposure.

The apparent absence of safety criteria and safety related aspects within the above rationale should not, under any circumstances, be confused with a disregard for safety. Safety is at the cornerstone of all nuclear operations and as such this rationale is based on the philosophy that whichever solution is ultimately adopted it will have to comply with the relevant mandatory safety principles, strict criteria and statutory legislation. Considering this parity of requirements across all solutions it is deemed that safety has no differentiating effect between the various methodologies under consideration.

Q. How has your proposal taken account of international experience and of the scope for international collaboration?

During the development of our proposal consideration was given to US submarine decommissioning experience which constitutes final disposal of reactor compartments by shallow burial in a desert. It concluded that, whilst the US approach is appropriate for their particular circumstances, it would not be compatible with UK geography, regulatory requirements and government policy for radioactive waste disposal.

Our proposal does take account of international experience in the wider field of nuclear facilities decommissioning across all aspects of the ISOLUS project capability requirements (see below) and is considered consistent with current best practice in all these areas.



Figure 2. Summary of ISOLUS Capability Requirement

Q. To what extent could your proposal be said to conform to “best possible” practice. Outline your view of current “best possible” practice in nuclear safety.

Best possible practice in nuclear safety is considered to be "defence in depth", provided by appropriate engineered safeguards, supplemented by a strong safety culture, provided by a "values-driven" approach to management in which safe behaviours are promoted and delivery processes are continuously improved through effective monitoring, review and learning. This proposal espouses both the use of appropriate engineered safeguards and a "values-driven" approach to managing operations, which recognises and reinforces safe behaviours.

Q. How will your proposals address the ALARP concept in your optioning?

The proposal is based on indications of the likely radiation levels in the reactor compartment. These indicate that manual methods, with appropriate local shielding, for removal of the RPV would satisfy the ALARP principle. As part of the project development further assessment will be made in terms of the benefits from possible decontamination and the optimum sequencing of plant removal to drive down background dose rates. If future surveys indicate that radiation levels may be significantly higher, then more remote removal methods could be employed by adapting equipment already in use for decommissioning other nuclear facilities.

ALARP principles are embedded in all nuclear industry operations and processes and are routinely used in development and identification of optimum solutions to a wide range of technical challenges. These proven processes will be employed to the benefit of the ISOLUS project.

Q. How robust are the options to changes such as the closure of Drigg and/or future government policy on Radwaste?

The proposal does not foreclose any options. In fact by size reduction to RPV level it provides prompt disposal of the vast majority of waste via existing, approved disposal routes whilst they still remain available. Also this strategy of disposing of the vast majority of waste early is in line with current Radwaste policy. The only waste which is likely to be susceptible to changes in government policy, regulatory requirements, facility availability, etc will be the relatively small volume of ILW intended to be stored at Sellafield. This will be stored in a form which would allow its future retrieval and possible further processing to meet whatever acceptance criteria are eventually specified for the national repository.

Siting

Q. Which specific sites or general locations does your proposal identify, if any?

Our proposal requires the use of either or both of the naval dockyards (at Devonport and Rosyth) for size reduction and the Sellafield and Drigg sites for interim storage of Intermediate Level Waste and disposal of Low Level Waste.

Q. What is your rationale for proposing these sites?

The rationale is as follows:

To carry out the decommissioning activities anywhere other than at the existing naval dockyards would increase the number of submarine movements and would require duplication of the facilities and skills already available at Devonport and Rosyth. It could also require the creation of new nuclear licensed sites and/or subsequent increase in radioactive waste arisings – which is deemed undesirable in any lifecycle waste management approach.

Sellafield is the most appropriate site to store the ILW since the amount in question will represent only a small addition to the existing inventory and the site already has the infrastructure and workforce needed to ensure the safe keeping of the waste and its eventual processing for final disposal. Fuel and other wastes from the submarine programme are already managed at Sellafield and this approach would consolidate all waste management aspects at a single geographical location. This proposal removes any requirement for the creation of a new licensed site for the future interim storage of ILW.

Q. Is the site/s an existing licensed nuclear site?

All these sites are existing licensed nuclear sites and neither does our proposal require any significant change in use of these sites – another important aspect which needs to be considered.

Q. Is the site in or near existing residential or commercial areas?

Yes; however, the locations selected in this proposal are already nuclear-licensed sites at which laid up submarines and/or radioactive wastes are already stored. The proposed approach provides benefits to these areas by providing long-term business and employment opportunities, whilst ensuring that the existing burden of laid-up submarines is removed in a carefully controlled, safe, and environmentally responsible manner.

The proposed approach will be discussed with stakeholders, including the local community, at the earliest opportunity.

Q. In proposing these sites/locations, how does your proposal take into account longer-term risks relating to the sites including those relating to geological stability and the potential impact of climate change?

The long-term risks will relate predominantly to Sellafield, since the activities on this site will continue over a longer timescale than those proposed at the dockyards. The construction and operation of a new store for submarine ILW will require its own safety case and environmental assessment and these will be required to consider this type of long term environmental risk. These risks are already well understood since they are addressed and regularly revisited in the necessary safety cases and environmental assessments for the array of existing facilities on the Sellafield site. These same considerations will apply to any new operations or activities at the dockyards.

There is already an existing infrastructure and capability dedicated to managing these aspects on the Sellafield site. The fractional increase in inventory from the ISOLUS project would place little or no additional site wide demand on this capability.

Q. How will external hazards be handled?

All new facilities will be required to have a safety case approved by the regulators. The process of developing the safety case includes a Hazard and Operability Study (or “HAZOP”) which assesses the design against all credible hazard scenarios. The standard hierarchy of hazard management which has been successfully employed across an extensive range of nuclear projects; Avoid, Transfer, Mitigate or Control would also be applied at all stages of project development.

Q. How does your proposal minimise the transport of radioactive wastes generated by decommissioning?

The transport of radioactive material is essentially driven by the technical solution adopted and the actual amount of waste generated. The diagram below gives an indication of the likely waste arisings from a ‘typical’ submarine based on the outline concept of removing, packaging and transporting the RPV for interim storage.

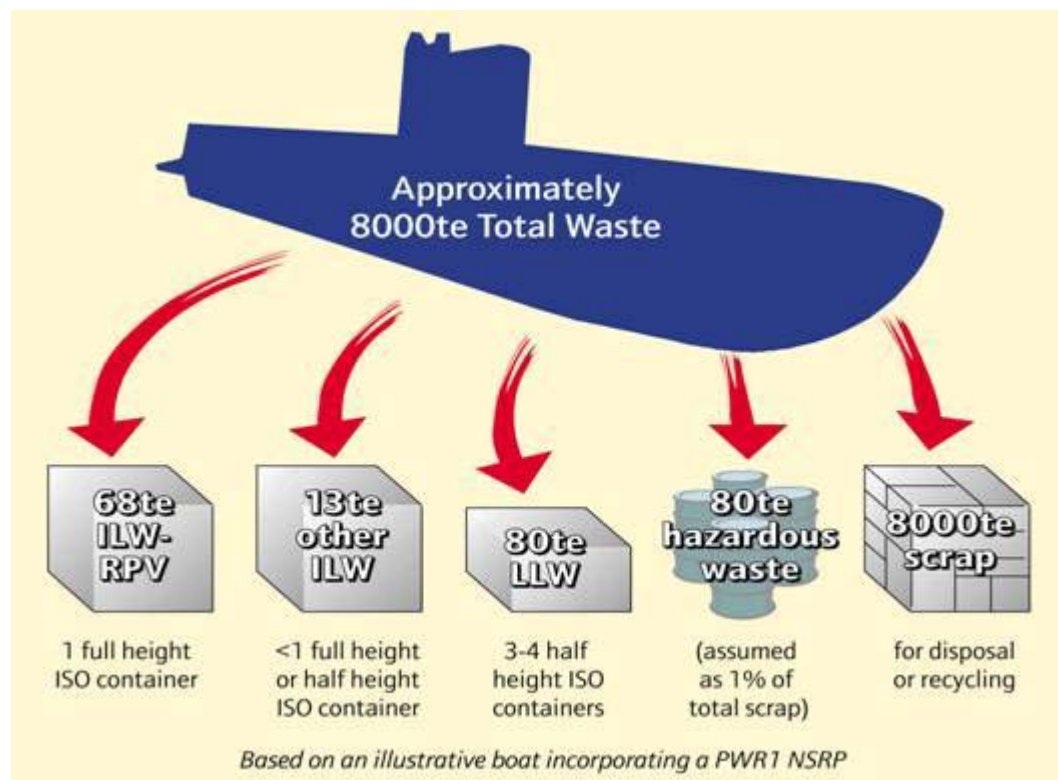


Figure3. Illustration of Indicative Waste Arisings

The principle methodologies for minimising the volumes/masses of radioactive waste are:

Minimising the volume of waste by optimum segregation into the appropriate waste streams and the maximisation of packing efficiencies at source.

Minimising the volume of waste by employing dismantling methods that prevent the spread of contamination to previously clean items

Using proven equipment and methods for assessing contamination levels of items so that clean waste is not unnecessarily consigned as radioactive waste.

Using transport routes and packages that minimise the number of journeys and handling operations.

As can be seen from the above table in overall terms the actual number of radioactive waste consignments are fairly limited and only constitute a fraction of the radioactive waste consignments that are undertaken safely and routinely every year.

Q. What financial arrangements have you considered for your proposal?

In addition to prime contracting with payments against milestones, we have considered Private Finance Initiative (PFI) and other forms of Public Private Partnership (PPP). We have held initial discussions with potential lenders and their initial assessment is that a PFI or PPP structure would be achievable. However clearly the ultimate cash flow dictated by the preferred technical solution(s) developed during convergence and public consultation will dictate the attractiveness or otherwise of these options.

In addition to the standard financial deliverables and performance measures, we would be pleased to include safety and environmental performance targets within any suite of incentivisation arrangements for the contract.

Safety

Q. How does your proposal ensure that safety and environmental protection will not be compromised by cost and profit considerations?

The major safety and environmental issues will be identified during the convergence phase and the strategies for addressing these issues will be agreed with MoD prior to contract award.

These strategies will be incorporated in the design of facilities and will form the basis of the eventual contract with the MoD and subsequent necessary regulatory approvals. Any failure to comply with these pre-set strategies will then not only be at odds with any contract but would also be in breach of the site licence or other regulations. Consequently the necessary authorisations would not be granted and the project would not be allowed to proceed.

Q. What are the most significant risks to health, safety and environment in your proposal and how will these be managed?

A robust and proven prior risk assessment process will be used to identify significant risks to health, safety and the environment. This same process would then be used to identify the most appropriate control measures for their management.

In respect of radiological protection there is potential risk from routine exposure to radiation. This risk will be managed through a proactive programme of task planning, dose budgeting, monitoring and control. This programme would be overseen by experienced professional Radiation Protection Advisors to ensure that the planning and execution of work reduces exposures to as low as reasonably practicable.

Exposure to toxic or harmful substances will also provide a potential risk to personnel. These risks will be identified via a risk assessment process and appropriately experienced professionals will provide advice which, through the appropriate management systems and physical controls, will ensure their elimination or mitigation.

From a conventional safety point of view the most significant potential risks will come from slips, trips and falls, dropped loads and confined space working. Once again, appropriately experienced professionals will provide advice which, through the appropriate management systems and physical controls, will ensure their elimination or mitigation.

The unintentional release of quantities of radioactive, toxic or harmful substances to the environment is also a possibility. The risk assessment process will identify the accident scenarios that could allow such releases so that appropriate barriers (managerial and physical) can be put into place to prevent them.

The risk assessment process will also be used to identify what contingency plans need to be generated to ensure that the effects of any accident are reduced to as low as reasonably practicable.

Risks to health, safety and the environment are currently, and will continue to be, managed by working within a quality framework. High safety standards are maintained throughout the conduct of all operations in particular by ensuring that they are adequately resourced and carried out by suitably qualified and experienced people with high regard to nuclear and conventional safety at all times. We inform, train and develop the people who work for us and ensure competent health, safety and environmental advice is available at all times.

Q. What arrangements do you envisage for monitoring radiation?

The requirement for monitoring radiation comes from several different legislative sources including the Ionising Radiations Regulation 1999 (IRRs), the Radioactive Substances Act 1993 (RSA93), the Nuclear site licence and The Transport of Radioactive Materials Regulations.

Controlled and supervised areas will be designated as specified in the IRRs. These areas will be equipped with radiation and contamination monitoring equipment as appropriate.

A programme of radiation and contamination monitoring (both within and without the designated areas) will be generated following advice from the RPA. This monitoring regime will be undertaken by qualified and experienced personnel using appropriate

and properly calibrated instruments. The results of the programme will be retained and reviewed to ensure that the designation remains appropriate and that controls are still functioning. The monitoring regime itself will be routinely reviewed to ensure it remains appropriate.

Personnel routinely working in these areas will be Classified Persons and their radiation doses continually assessed (see next question below)

Additional monitoring requirements will be necessary for the transport of radioactive materials. These will be instituted under a quality plan to demonstrate compliance with package categorisation and safety criteria.

It is unlikely that the existing environmental monitoring programmes undertaken at the proposed nuclear licensed sites will need to be changed as a result of the decommissioning activities but they will be revisited to ensure that this is the case.

The contingency plans generated from the risk assessment process noted above may also identify further radiation monitoring and dosimetry at specific points throughout the execution of the project. These will supplement the routine programme, will enhance the management/control of the selected tasks and will be carried out at the appropriate time.

Q. What steps do you envisage to record, review and assess worker and public doses?

Radiation doses to members of the workforce will be operationally monitored using appropriate, modern dosimetry techniques, and will be subject to monitoring and recording in accordance with the statutory requirements of the Ionising Radiations Regulations 1999. These doses will be assessed and recorded by an Approved Dosimetry Service and regularly reviewed by the project team.

If appropriate, personal air samplers or other techniques will be used to assess internal dose.

Where appropriate, Electronic Personal Dosimeters (EPDs) will be issued on a daily and task specific basis. While these are not statutory results, they will be used to identify any deviation from dose budgets to allow the dose planning process to be revisited to ensure that doses remain ALARP.

Doses to members of the public, which are expected to be minimal as a result of this project, will be assessed for the safety case in accordance with industry standard techniques for the effects of airborne and aquatic releases and direct radiation. Any environmental discharges will be rigorously monitored to demonstrate conformance with Discharge Authorisations issued under the Radioactive Substances Act 1993, and regular radiation surveys during operations will ensure that the safety case control requirements are delivered.

Q. What arrangements do you envisage for independent peer review of monitoring results?

Monitoring results will be subject to review and inspection by the Nuclear Installations Inspectorate and the Environment Agency. The Naval Nuclear Regulatory Panel (the client's independent internal regulator) will also be invited to review the approach to, and results of, monitoring. Independent internal review of monitoring results will also be undertaken.

Q. How will non-radioactive toxic substances be managed?

The comprehensive existing inventories of non-radioactive toxic substances used in the construction and operation of submarines will be used to plan controlled removal and appropriate safe packaging using approved techniques, by competent and professionally supervised personnel, in accordance with all requirements of applicable legislation. All works will be subject to a suitable and sufficient risk assessment, and personnel exposures will be minimised, so far as is reasonably practicable, by control measures endorsed by suitably qualified and experienced EHS professionals. Disposal to appropriate facilities will be subject to control through management arrangements which conform with consents issued under Environmental Protection legislation.

Q. How will non-radioactive toxic substances be monitored?

Monitoring of non-radioactive toxic substances will be appropriate to the nature of the potential hazards. Established industrial techniques will be implemented by suitably qualified and experienced persons to demonstrate conformance to the requirements of the applicable health, safety and environmental regulations and any associated discharge or disposal consents.

Q. Is the free release of slightly contaminated material proposed?

The term slightly contaminated material is possibly not the most appropriate nomenclature as it has to be recognised that almost all metals/materials in everyday use, even when first made, are radioactive to some degree. Any material subject to free release, e.g. for recycling or routine disposal, will be subject to monitoring to ensure that it meets strict de-minimus levels agreed by the Environment Agency. In parallel with this it is also essential to ensure that the systems and equipment controlling the free release of material are managed in accordance with the strict legislative guidelines to give confidence in the process, satisfy all the legal requirements and to minimise the risk of unwarranted adverse publicity.

Q. How will public concerns about free release of such materials be addressed?

As above it should be noted that almost all metals/materials in everyday use at work and at home, even when first made, are radioactive to some degree. Appropriate proactive publicity about the ISOLUS project, and the wider aspects of the nuclear

industry, will be developed as part of the proposed communications and media handling strategy. With regard to any free release materials the intention will be to demonstrate that any impact from them is no different in comparison to naturally occurring radioactivity, and the radioactivity arising from everyday domestic and industrial activity.

Q. To what extent can the proposed storage facility contain releases of radioactive material? Can it be temporarily sealed?

The proposed storage facility will be purpose-built. Waste will be stored dry, within sealed packages specifically designed for transportation and interim storage for the time periods required. The store itself will be weatherproofed and designed to prevent degradation of the packages. The nature of the stored RPV predominately involves fixed radioactivity, this already contained within the sealed pressure vessel itself. By placing this within purpose designed, built and sealed packages there will be no release of radioactive material during normal operations. Again given the inventory it is also hard to envisage credible scenarios that could give rise to any significant radiological releases. The safety case for the store will address the design features needed to provide adequate containment during any abnormal conditions.

Q. What measures do you envisage at the site/s to prevent unauthorised access?

All operations are to be carried out on existing licensed nuclear sites which already have the necessary security arrangements in place. In respect of the longer term project timescales for interim ILW storage this will form part of the extensive programme of work already planned at Sellafield to further condition and package existing wastes for disposal at the National Repository when it becomes available. Consequently the current arrangements and infrastructure will be required for the foreseeable future – certainly far in excess of the timescales required for the ISOLUS project.

Q. What arrangements do you envisage for independent auditing of security arrangements?

Auditing is already carried under the terms of the site licences by a significant number of independent authorities. These existing arrangements will continue throughout the ISOLUS project and supplemented on a local or project level as deemed necessary.

Since the September 11th incident, public concerns regarding security and potential terrorist activity have been greatly heightened. In response to these potential threats the necessary security arrangements at existing nuclear licensed sites have adapted accordingly. In the future all communications programmes will need to take account of this increased sensitivity and must demonstrate the robustness of security arrangements against possibly changing circumstances.

Q. How will wastes and their facilities be monitored to ensure that early degradation of waste/facilities is picked up?

The monitoring and inspection requirements will be developed in parallel with design of the store/waste packages and will be included within the operational safety case which will underpin the whole interim storage philosophy. The methodology for specifying the requirements is as follows:

- Identify degradation mechanisms for the waste, the package and the store structure
- Identify the dependency of these mechanisms on the condition of the waste and the environment within the store
- Establish the requirements for monitoring and controlling the store environment to achieve an acceptable degradation rate
- Establish the waste package sample frequency to give statistical confidence
- Establish the waste package monitoring methods

Approached in this logical and proven manner it is felt that any degradation will be eliminated or discovered and rectified far in advance of any detrimental effects becoming manifest.

Q. What level of response is planned in the event that degradation is found and how will it be resourced?

Given the inert nature of the ILW, degradation is not expected to be a problem under normal operating conditions – please also see above. Any degradation that does occur is likely to be gradual rather than sudden, allowing time for a considered course of action. This may be either to repair the package or to transfer the waste to a new package. The resource to do this will be provided by the Sellafield site operators and it is within the capabilities required to deliver the extensive array of operations currently required on the site now and into the future.

Q. What defence in depth is provided in terms of the number and types of barriers to be provided between the waste, operational areas and the environment?

The majority of the activity will be associated with the RPV. After disconnection, all openings will be sealed so that the RPV itself is the primary containment barrier. The specifically designed and manufactured waste package will provide the next barrier and the waste store structure and any environmental conditioning will provide the final barrier.

Scrutiny

Q. What arrangement do you envisage for independent audit of management and security procedures and practices?

As explained in response to an earlier question auditing is already carried under the terms of the site licences by a significant number of independent authorities and

regulatory bodies and is an integral part in ensuring the safety of all nuclear work. These existing arrangements will continue throughout the ISOLUS project and supplemented on a local or project level as deemed necessary. As all operations are also carried out in accordance with approved QA procedures regular, independent audits of these procedures and their implementation are routinely carried by Lloyds Register to maintain the appropriate accreditation. In addition we would expect MoD to carry out regular checks of management and security arrangements at all sites as part of their own quality assurance system.

Q. What steps do you envisage to obtain peer review of your proposals?

As part of the current legislation governing Nuclear Licensed Sites the respective regulatory bodies already require organisations conducting such work to subject their safety justifications to independent peer review. Indeed as part of existing procedures these regulators routinely conduct further review and assessment of selected proposals themselves. To supplement this ongoing process we expect to hold peer reviews throughout the convergence and negotiation phases to engage the views of all relevant stakeholders. These reviews will involve all major participants in the project, including MoD and the relevant regulatory bodies. During delivery of the project the requirement for any additional peer reviews will be discussed and agreed with the MoD and the relevant regulatory bodies and factored into the programme accordingly.

Q. What provision for whistle blowing is made within your proposals?

There will be a written policy governing the reporting of serious concerns. This will take account of both the Public Interest Disclosure Act 1998 and the Official Secrets Act. The policy will encourage all persons engaged on the project to report any serious concerns to nominated individuals outside the project and will protect those individuals against reprisals.

Openness

Q. What steps would you take to make information available to the public during the implementation of your proposals?

Appropriate proactive publicity materials about the approach to and progress with the ISOLUS Project will be developed. These will be delivered through appropriate media, including targeted literature, press statements, photographs, and an appropriate website. Information requests from stakeholders will be professionally handled in an open manner, within the constraints of national security.

Q. What steps do you envisage to take to inform local communities of the risks involved?

The nature of the ISOLUS project, and its small, carefully controlled risks and substantial benefits to local populations, will be subject to the usual information

requirements for local communities, including the use of existing local liaison arrangements. Information in accordance with the REPPIR regulations will be supplied to any persons who may be affected by an incident during the dismantling, packaging, transport and storage of decommissioning wastes.

Q. What steps do you envisage to take to publish the results of radiation monitoring?

Q. How often do you envisage the results be published?

Q. What steps will you take to publish information about worker and public doses?

Q. What public information do you envisage you will provide about the management of non-radioactive toxic wastes?

A policy will be agreed with the existing site licensees and the MoD on the publication of information. This policy will consider the intended stakeholder groups, the most effective communications media and the preferred frequency. However, we believe that a proactive approach to demonstrating that radiation exposures from the ISOLUS project are small and that all wastes are being carefully and responsibly managed, are key to maintaining public confidence. As a Company, we produce Annual Corporate Social Responsibility and Environment, Health and Safety reports; contributions arising from the ISOLUS project will be included in these reports as appropriate.

It is suggested that these aspects are further explored during the proposed convergence and consultation phases to ensure that, wherever possible, stakeholder concerns are addressed either within this policy or indeed in any future Communications Plan.

Q. What steps will you take to ensure release of safety case material is maximised taking account of commercial confidentiality and security?

A brief summary of the safety case will be developed which can be freely released to members of the public, and potentially published on an appropriate website. Consideration will be given (within the constraints of commercial confidentiality and security and in discussion with the existing site licensees and the MOD) to making an edited copy of the safety case available in a public reading room close to the nuclear licensed sites involved.

Transport

Q. What transport of radioactive materials does your proposal entail, including details of mode of transport, frequency, time-scale, and distance?

As explained in response to an earlier question the ultimate transport arrangements will depend of the final decision on whether to use one or both of the existing Naval dockyards to undertake removal, packaging and the actual technical methodology adopted. With submarines currently laid up at both the adoption of one site for size reduction would necessitate the transportation of these de-fuelled and redundant

vessels. Justification and licensing of this towing operation to a designated site would need to be undertaken to support a single dismantling site strategy.

It is proposed that the final decision with respect to single versus dual site dismantling is made following the capture of all stakeholders input during the planned convergence phase and hence any sea transfers of de-fuelled vessels are excluded as this stage. On the assumption that the technical philosophy adopted is that of removing the RPV, packaging and transfer to Sellafield for interim storage – as outlined in Figure 5.3 – the resultant wastes would be radioactive wastes will be transported as follows:-

LLW will be transported from Devonport, and possibly from Rosyth, to Drigg. The preferred means of transport is either road or rail and would be via proven routes.

ILW including the RPV will be transported from Devonport, and possibly from Rosyth, to Sellafield. The preferred means of transport is rail, although sea/rail and sea/road may be possible if deemed preferable following further project development.

Average frequency of both types of consignment will be once per year until about 2035.

The distance from Devonport and Rosyth to Sellafield is approximately 400 miles and 180 miles respectively.

Q. Give details of any proposed transport through centres of population?

Our solution requires only the use of routes already proven for transport of used nuclear fuel and other nuclear materials.

Materials generated as a consequence of the ISOLUS project can be transported either by land or sea. Two initial options have been identified (outlined below) although these will be subjected to rigorous and comprehensive optioneering studies as the project develops and further public consultation is undertaken.

There are existing transport routes from both Devonport and Rosyth, which could be utilised to transport radioactive materials. These rail routes from Devonport and Rosyth have been used for the past 30 years to transport used nuclear fuel and other materials to Sellafield for processing and or interim storage. The controls and procedures in place for this process are well defined and tried and tested. This route is currently proposed for the yearly consignments of ILW. With respect to LLW this is routinely consigned to Drigg and transported via road. Again this existing route is proposed for the consignment of LLW generated during the ISOLUS project.

Another option for transport of ILW is to move it from the decommissioning site (Devonport or Rosyth) to facilities at Barrow by sea, and from there on the existing route to Sellafield. Again, the route from Barrow is routinely used for movement of nuclear materials predominately used fuel destined for reprocessing at Sellafield. Although not currently or routinely used for radioactive shipments within the UK transport by sea would be possible if deemed necessary following further public consultation.

Q. What steps will be taken to minimise transport requirements?

The main steps to minimise transport requirements are as discussed above and under the section entitled “Siting”.

Q. How will transport risks be minimised?

Transport risks will be minimised by:

Minimising the number of journeys as discussed above

Using rail or sea transport where practicable, rather than road

Transporting radioactive wastes only in purpose designed, manufactured and licensed packages using experienced carriers

Workforce

Q. What skills, knowledge and experience will be required over the period of your proposals?

The skills, knowledge and experience required over the period of the proposals are amongst those already in existence at the various sites indicated in this outline proposal. They are described in detail within Figure 2, Summary of ISOLUS Capability Requirement, and can be summarised as follows:

Those engineering and technical aspects specifically related to decommissioning and working with radioactive materials. These include for example:

Radiological protection and best practice safety management

Front end definition and engineering processes

Technical capability and safety case management

Dismantling of radioactive systems

Radioactive waste assay

Design and licensing of radioactive waste packages and transport

Design, construction, licensing and operation of Interim Radioactive waste stores

A thorough understanding of nuclear site management, the associated legislation and mandatory procedures/processes.

Knowledge and experience of effective stakeholder engagement, public inquiries and planning requirements

Project, risk and interface management to ensure successful co-ordination and implementation of all project phases.

Q. How will these skills, knowledge and experience be maintained over time?

Maintenance of these skills, knowledge and experience is a requirement of the respective site licences and there are numerous existing management arrangements that ensure compliance with this mandatory licence condition. In terms of the initial dismantling phase and with the proposal to undertake this work at the existing dockyards this skillbase will be maintained in parallel to the infrastructure required to support the ongoing operational submarine flotilla. On the cessation of any such UK submarine programme dismantling of the last submarine is part of the natural close out, manage exit strategy and possible decommissioning of previously required sites.

As explained previously with respect to Sellafield the interim storage of packaged RPVs would constitute only a small percentage increase to existing and planned interim storage commitment that will need to be managed. This is proposed at a site where the infrastructure and workforce needed to ensure its safe keeping already exists and will be maintained long into the future.

Q. Approximately how many jobs do you expect to be created at each site?

It terms of definitive numbers it is difficult to state how many jobs will be created at this stage and will ultimately be dependent on the dismantling strategy adopted. However, it is fair to say that during the decommissioning phase of the project, the socio-economic benefits will have a positive impact on the local community and economy at either or both of the dockyard sites. It will provide employment for a significant number of personnel for a period of approximately 30 years. This use of the local and existing skill base will help to ensure that these skills are not lost over the duration of the project. This is vital, as once these skills are lost it will be very difficult to resurrect the skill base again so continuity of work at the proposed sites is seen as an essential project driver.

There are a number of key activities that are used in the refitting and refuelling process that will be relevant to decommissioning and it is envisaged that wherever possible local labour will be used with obvious advantages.

With respect to Sellafield it is expected that the construction of the necessary facilities and waste store will provide work for a significant number of people during the first few years of the project. Once commissioned and operational, this requirement will drop off but nevertheless personnel will be required to manage this facility, receive waste consignments and maintain the necessary monitoring regimes throughout the duration of interim storage. Resource requirements will then increase as the National Waste Repository becomes available (at a location yet to be determined) and possible further processing and consignment is required

Environment & Sustainability

Q. How does your proposal take into account considerations of intergenerational equity?

The initial outline concept involving early removal of the Reactor Pressure Vessel (RPV) and other ILW is very much consistent with current Environment Agency philosophy. This philosophy encourages minimising waste volumes and promotes sustainable development, i.e. not foreclosing future options for further reductions in the amount of waste, and not postponing the dismantling and packaging of the waste to succeeding generations. Factors that will need to be taken into account when considering intergenerational equity include the existence of a waste disposal route, the availability of technology and a skilled workforce at sites at which the work is proposed both now and into the future. Given that all those three exist today and are possibly at risk in the future would give early indications that this is a sound strategy.

In a wider context, the concept of sustainable development can be regarded as ensuring a better quality of life for everyone, now and for generations to come. So as well as providing a solution that is sustainable in terms of the environment and waste minimisation, the preferred solution needs to look to optimise the resources that are already available i.e. using an existing refitting/refuelling facility for the decommissioning of nuclear submarines.

By promptly dismantling the reactor compartment and safely disposing of all radioactive waste, hazardous waste and scrap materials, other than the RPV itself, our proposal minimises the burden placed on subsequent generations.

Q. Is the site in or near areas of high landscape, amenity, or scientific value?

The proposed sites are all within a few miles of areas of high landscape, amenity, or scientific value. However, all operations other than transport will be carried out within the existing boundaries of the nuclear licensed sites and they will not extend the currently proposed operating lifetime of any those sites.

Development

Q. What scope is there for your proposed storage facility to be expanded to take wastes from more submarines than currently envisaged?

The store will be of simple, optimised and purpose built construction. Similar designs to date have incorporated the ability to be extended along one axis and it is the intention to design this store with a similar degree of flexibility. This aspect would be integrated into all decisions with respect to the geographical siting of the store and the surrounding areas.

Q. What is the proposed lifetime of the storage facility?

The proposed design lifetime is 100 years. However the proposed simple design and fabrication would facilitate future enhancements or refurbishment should a longer timescale be required.

Q. What potential is there for life extension in the event of a long-term management option not materialising as expected or for other reasons?

In addition to the above the store will be designed to allow refurbishment if necessary, in line with Government White Paper Command 2919.