

Geological Disposal Facility Impacts Sub Group Report

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Tasks Partnership Work Programme Task 3b: "Whether the Partnership is confident that appropriate possibilities exist to assess and manage environmental, social and economic impacts appropriately if they occur."

This task was divided into Task 3b(i): "Understand the likely broad impacts (both positive and negative) of hosting a repository, and how they might be mitigated" and Task 3b(ii) "Define a specification for research to assess the likely extent of impacts."

Additionally, the first round of public and stakeholder engagement (PSE1) generated a further issue for the Partnership to address: "Review what transport infrastructure would be required and the associated lead-in times so that the Partnership can reach a view on how the delivery of transport infrastructure could be staged over time" (see Partnership Document 73).

Background At the October 2009 Partnership meeting, the Steering Group was tasked to develop a specification for a piece of research that would inform the Partnership of the likely extent of impacts of a GDF in West Cumbria. At this meeting members of the partnership carried out an exercise to identify what positive and negative impacts they might expect. The issues identified are listed in Partnership Document 55. At the same meeting, the NDA gave a presentation outlining the potential impacts of implementing geological disposal of radioactive wastes drawn from studies nationally and internationally (also see Partnership Document 55) and Cumbria County Council, on behalf of the Partnership, tabled a draft Schedule of Potential Impacts to be Assessed which was agreed by Partners for completion.

At the Partnership meeting in March 2010 a research proposal was agreed that sought to identify the perception of GDF development in West Cumbria (see Partnership Document 68). This research was designed to generate information to inform the Partnership about potential non physical impacts of GDF development and compliment the NDA's own

physical impacts research set out in their Generic Environmental and Sustainability Report published in February 2011.

The Partnership meeting in May 2010 adopted the report on PSE1 that included an action on the GDF Impacts Sub Group to progress an additional transportation impacts question (see Documents 61 and 73). This question was in turn passed to NDA for a response.

Meetings

The GDF Impacts Sub Group met in March 2010 and again in May 2010 to progress completion of the Schedule of Potential Impacts to be Assessed (see Appendix A). The Schedule aims to progress Partnership work under Criterion 3b(i) (see Partnership Document 13.1). The May 2010 meeting also finalised a GDF Impacts research specification to progress Partnership work under Criterion 3b(ii). Following a competitive tendering process consultants were appointed in December 2010 to undertake the work. The Sub Group met again in January 2011 to agree the work programme for the appointed GVA consultancy. All other Sub Group business has been conducted remotely via email and telephone.

Outputs

1. The Schedule of Potential Impacts to be Assessed at Appendix A. This has been completed by NDA and overseen by the GDF Impacts Sub Group and the Environment Agency. This Schedule identifies generic physical impacts assessable now, and those that will be assessable at a site specific level, should the MRWS process continue beyond Stage 3 in West Cumbria.

2. The GDF Impacts 'perceptions' research was undertaken by the GVA consultancy and the key findings are summarized in Appendix B. This research identifies perceptions of residents, visitors and businesses/investors towards GDF development in West Cumbria.

3. The NDA Transportation briefing at Appendix C. This is based on information contained in the NDA Generic Environmental and Sustainability Report and relevant principles from NDA Transport and Logistics Strategy. This briefing is strongly caveated by NDA who say that the range of options relating to GDF transport infrastructure (and, to some extent its phasing) will be location specific and therefore difficult to answer at this stage of the MRWS process.

These three outputs provide information that is intended to assist a) the Partnership in its PSE3 consultation b) the final report to the relevant local authorities c) the relevant local authorities in their decision about future participation in the MRWS process and d) any future Community Siting Partnership in their work.

For Decision The Partnership is asked to confirm that these tasks are now complete.

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Schedule of Potential Impacts to be Assessed

Note: Many of the activities associated with geological disposal and related environmental and socio-economic effects have been considered, at a relatively high level, in NDA-RWMD's generic assessment work^{1, 2}. Subject to continuation of the MRWS process, all of the issues raised would be addressed by the Strategic Environmental Assessment (SEA) during MRWS Stage 4 and by Environmental Impact Assessments (EIAs) during MRWS Stages 5 and 6. At each stage the assessment work would become more detailed and there would be less uncertainty associated with its findings.

Impact	Assessable prior to DTP?	Confident can be answered later?	Covered satisfactorily in NDA generic assessments ^{1,2} or commitment to address in SEA and EIA?	Further assessment likely to be necessary or desirable prior to DTP?	Assessment available from other source?	Comments
Air Quality: To avoid adverse impacts on air quality	Yes – at a generic level	Yes	Yes	No	N/A	Will be assessed as part of the SEA during MRWS Stage 4 and as part of the EIAs for surface based investigation and underground operations during MRWS Stages 5 and 6. Identified effects will be assessed by regulators at the planning and authorisation stages (application for a permit for surface based intrusive investigations onwards).

¹ Entec (October, 2010) *Geological Disposal: Generic Environmental and Sustainability Report for a Geological Disposal Facility – Main Report* (Entec Doc Reg No.: 26069-02)

² NDA (December 2010), *Geological Disposal: An overview of the generic Disposal System Safety Case*, (NDA-RWMD Report NDA/RWMD/010, ISBN 9781840293944)

Impact	Assessable prior to DTP?	Confident can be answered later?	Covered satisfactorily in NDA generic assessments ^{1,2} or commitment to address in SEA and EIA?	Further assessment likely to be necessary or desirable prior to DTP?	Assessment available from other source?	Comments
<p>Guide Questions:</p> <ul style="list-style-type: none"> • Will it result in the release of radionuclides that may adversely affect human health or biodiversity? • Will it contribute to an increase in the number or expansion of AQMAs? 	<p>Yes – at a generic level</p> <p>No</p>	<p>Yes</p> <p>Yes</p>	<p>Yes</p> <p>Yes</p>	<p>No</p> <p>No</p>	<p>N/A</p> <p>N/A</p>	<p>Any geological disposal facility would have to be compliant with the Guidance on Requirements for Authorisation³ issued by the regulators and would also have to be compliant with NDA's Radiological Protection Policy Manual⁴.</p> <p>For radiological protection, health detriment is measured in terms of dose and risk. NDA's design target (as defined in the RPPM) for members of the public is a dose of no more than 0.01mSv per year (effective whole body dose). This dose approximates to a risk of death for an individual of about 10⁻⁶ (1 in a million). To put this into context, the design target equates to about 1% of normal background radiation levels.</p> <p>NDA's safety case work aims to provide evidence to demonstrate that this design target and associated regulatory requirements can be met, that a GDF will be safe to operate and will remain safe after it has been closed.</p> <p>The safety case considers normal operation of the disposal system <i>and</i> potential hazards in the event of an accident⁵. For example, it considers the</p>

³ Environment Agency (February, 2009) *Geological Disposal Facilities on Land for Solid Radioactive Wastes: Guidance on Requirements for Authorisation*.

⁴ NDA-RWMD (September, 2010) *Radioactive Waste Management Directorate: Radiological Protection Manual (RWM02)*

⁵ NDA (December 2010), *Geological Disposal: An overview of the generic Disposal System Safety Case*, (NDA-RWMD Report: NDA/RWMD/010, ISBN 9781840293944) – see pages 26 and 27.

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						<p>consequences of an underground fire, dropping waste packages and earthquakes. In tests and modelling studies of the performance of waste packages they have remained intact during such incidents and modelled releases of radioactivity have been limited. Furthermore the GDF design includes necessary design features to reduce any off-site radiological impacts.</p> <p>Consideration of hazards and associated emergency preparedness and response are integral to the licensing process for a disposal facility. The Regulators will not licence a GDF unless they are satisfied that it meets all regulatory requirements and that it will not result in an unacceptable health risk – this licensing process will include consideration of accident scenarios and our ability to respond to them effectively.</p> <p>The scope of the SEA and EIAs will include consideration of radiological issues; although NDA's generic environmental and sustainability assessment work does not – or at least does so only by reference to NDA's generic Disposal System Safety Case².</p>

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Biodiversity and Ecosystem Services: To avoid adverse impacts on the integrity of wildlife sites of international and national importance To avoid adverse impacts on valuable ecological networks and ecosystem functionality To avoid adverse impacts on Priority Habitats and Species including European Protected Species	No	Yes	Yes	No	N/A	Will be assessed as part of the SEA during MRWS Stage 4 and as part of the EIAs for surface based investigation and underground operations during MRWS Stages 5 and 6. Identified effects will be assessed by regulators at the planning and authorisation stages (application for a permit for surface based intrusive investigations onwards).
Guide Questions: <ul style="list-style-type: none"> • Will it result in the loss of habitats of international/national importance? • Will it affect other statutory or non-statutory wildlife sites? • Will it result in harm to internationally or nationally important or protected species? • Will it adversely affect the achievement of favourable conservation status for internationally and nationally important wildlife 	No	Yes	Yes	No	N/A	<p>Many of these questions cannot be addressed at this, generic stage – they relate to site specific issues.</p> <p>Some of these guide questions could be more specifically identified during the Stage 4 SEA process (see asterisk). They will be assessed at that stage.</p>
	No	Yes	Yes	No	N/A	
	No	Yes	Yes	No	N/A	
	No	Yes*	Yes	No	N/A	
	No	Yes	Yes	No	N/A	

Impact	Assessable prior to DTP?	Confident can be answered later?	Covered satisfactorily in NDA generic assessments ^{1,2} or commitment to address in SEA and EIA?	Further assessment likely to be necessary or desirable prior to DTP?	Assessment available from other source?	Comments
<p>sites?</p> <ul style="list-style-type: none"> Will it affect the structure and function/ecosystem processes that are essential to restoring, securing and/or maintaining favourable condition of a feature of a site? Will the proposal enable the BAP targets for maintenance, restoration and expansion be met? Will the proposal result in changes to coastal evolution that is otherwise needed to sustain coastal habitats? <p>Will it result in the release of harmful substances for example oil, fuel and other pollution into waterbodies which could affect aquatic ecosystems?</p> <ul style="list-style-type: none"> Will it result in the accidental migration of radionuclides which could harm aquatic or terrestrial ecosystems? Will it result in changes to stream hydrology and 	<p>No</p> <p>No</p> <p>Yes – at a generic level</p> <p>Yes – at a generic level</p> <p>No</p> <p>No</p>	<p>Yes*</p> <p>Yes*</p> <p>Yes*</p> <p>Yes</p> <p>Yes*</p> <p>Yes*</p>	<p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p>	<p>No</p> <p>No</p> <p>No</p> <p>No</p> <p>No</p> <p>No</p>	<p>N/A</p> <p>N/A</p> <p>N/A</p> <p>N/A</p> <p>N/A</p> <p>N/A</p>	<p>Pollution prevention and control measures would be integral to the design for both surface based investigations and disposal facility construction. These would minimise the risk of a significant pollution incident occurring.</p> <p>The GRA notes that there are currently (February 2009) no internationally established criteria for determining radiological protection of the environment. NDA's Generic Environmental Safety Case notes that their approach to the assessment of radiological impacts on non-human species is currently being developed. Compliance with GRA Requirement R9 will have to be demonstrated and that "all aspects of the</p>

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<p>morphology that could affect aquatic or terrestrial ecosystems?</p> <ul style="list-style-type: none"> • Will it result in thermal discharges that could adversely affect aquatic ecosystems? • Will it result in soil contamination that could damage aquatic or terrestrial ecosystems? 	Yes – at a generic level	Yes*	Yes	No	N/A	<p><i>accessible environment are adequately protected</i>'.</p> <p>An illustrative assessment is presented in the Generic OESA⁶ which shows that radiological dose rates would be insignificant and would be unlikely to lead to any observable effects in populations of non-human species.</p>

⁶ NDA (2010), *Geological Disposal: Generic Operational Environmental Safety Assessment*, (NDA Report No. NDA/NDA/029, ISBN 978-1-84029-413-2) – see sections 6.3 and 7.4.

Impact	Assessable prior to DTP?	Confident can be answered later?	Covered satisfactorily in NDA generic assessments ^{1,2} or commitment to address in SEA and EIA?	Further assessment likely to be necessary or desirable prior to DTP?	Assessment available from other source?	Comments
Climate change: To minimise greenhouse gas emissions	Yes – at a generic level.	Yes	Yes	No	N/A	Will be assessed as part of the SEA during MRWS Stage 4 and as part of the EIAs for surface based investigation and underground operations during MRWS Stages 5 and 6. Identified effects will be assessed by regulators at the planning and authorisation stages (application for a permit for surface based intrusive investigations onwards).
Guide Questions: Will it take account of future effects and risks of climate change for example sea level rise?	Yes	Yes	Yes	No	N/A	Will be assessed by NDA's SEA and EIA's post DTP. Identified as an assessment topic in NDA's SEA Generic Scoping report.
Will future changes in weather patterns be considered?	Yes	Yes	Yes	No	N/A	Will be assessed by NDA's SEA and EIA's post DTP. Identified as an assessment topic in NDA's SEA Generic Scoping Report.
To what extent will the development be carbon neutral?	No	Yes	Yes	No	N/A	Carbon footprinting may be an area for independent assessment post DTP. NDA have also proposed a set of sustainable design objectives ⁷ , several of which are relevant, including:
Will it result in increased emissions from asset construction, maintenance and demolition, waste recycling and disposal or other activities?	No	Yes	Yes	No	N/A	<i>The carbon footprint of the operational facility will be minimised, as far as reasonably practicable.</i> See also NDA's generic carbon footprint analysis. ⁸

⁷ NDA-RWMD, (March 2010) *Geological Disposal: Sustainable Design Objectives for a Geological Disposal Facility*. (NDA Technical Note NDA/RWMD/1192365).

⁸ Entec (October, 2010) *Geological Disposal: Generic Carbon Footprint Analysis for a Geological Disposal Facility* (Entec Doc Reg No.: 26069rr002i5)

Impact	Assessable prior to DTP?	Confident can be answered later?	Covered satisfactorily in NDA Generic Assessments ¹ , or commitment to address in SEA and EIA?	Further assessment likely to be necessary or desirable prior to DTP?	Assessment available from other source?	Comments
Communities: population, employment and viability: To create employment opportunities To encourage the development of sustainable communities To avoid adverse impacts on property and land values and avoid planning blight	Yes – at a generic level	Yes	Yes	No	N/A	Will be assessed as part of the SEA during MRWS Stage 4 and as part of the EIAs for surface based investigation and underground operations during MRWS Stages 5 and 6. Identified effects will be assessed by regulators at the planning and authorisation stages (application for a permit for surface based intrusive investigations onwards).
Guide Questions: Will the facility create both direct temporary and permanent jobs and over what timeframe. What indirect jobs, temporary and permanent would be created. What multiplier effect will there be? Will it result in out-migration of population? Will it affect the population dynamics of nearby communities [age structure]? Will it result in in-migration or outward migration of population?	Yes Yes Yes Yes – at a generic level	Yes Yes Yes	Yes Yes Yes	No No No	N/A ? ? GVA Report	See NDA-RWMD manpower and skills analysis ⁹ . BECWC may be able to provide estimates. NDA asked to provide high level estimate of indirect employment created through GDF spend Important likely in-migration but not assessable at this stage

⁹ (NDA, May 2011) *Geological Disposal: Manpower and Skills Requirement* (NDA Report no.: NDA/RWMD/076)

Will it result in a decrease in property and land values as a result of a change in perceptions or blight?	Yes – at a generic level	Yes	Yes	No	GVA Report	<p>Many of these issues are addressed in a generic sense in the GVA report¹⁰. It notes that agents see housing demand increasing – particularly for mid-range and executive housing – and that just under half of existing residents could see no possible impact on house prices with the remainder evenly split between an increase and a decrease. It also concludes that there is significant opinion that a repository has the potential to generate large volumes of high quality, sustainable employment and to benefit existing businesses. It notes, however, that concern exists in relation to the trade off between a prosperous, nuclear driven economy and efforts to further develop tourism. It also notes a broad view that a repository could have a positive effect in retaining young people and in attracting new migrants.</p> <p>Most of these questions are quite specific and reasonably definitive answers may not be available until the EIA stage. However, issues will be addressed in socio-economic section of SEA.</p> <p>Important to recognise the level of uncertainty associated with any assessment work carried out - particularly at this early stage. This is likely to decrease during later stages of the process, but even with a relatively detailed EIA there will remain an element of uncertainty. Hence the need for monitoring during implementation to ensure that unforeseen effects can, if necessary, be addressed.</p>
Will it contribute to the nuclear reliance of the area and limit diversification?	Yes – at a generic level	Yes	Yes	No	GVA Report	
Will it be positive or negative to the perception of the area. Will it be a stigma for local businesses and/or the community that will harm the social and economic well being of the area?	Yes – at a generic level	Yes	Yes	No	GVA Report	
Will the local labour pool be able to meet the employment and skills needs? How should this be addressed?	Yes – at a generic level	Yes	Yes	No	GVA Report	
Will high wages distort the local employment market?	No	Yes	Yes	No	N/A	
What added value will there be in the local supply chain.	No	Yes	Yes	No	N/A	
Will it be a burden of liability across future generations?	Yes – at a generic level	Yes	Yes	No	GVA Report	
Will the direct benefits and the community benefit package outweigh any negative impact of the development on the area?	No	Yes	Yes	No	N/A	
Will it be a tourist attraction?	Yes – at a generic level	Yes	Yes	No	GVA Report	
Will perception of the proposal have a negative impact on tourism?	Yes – at a generic level	Yes	Yes	No	GVA Report	
Will it stimulate inward	Yes	Yes	Yes	No	GVA Report	

¹⁰ GVA (April 2011) *Impact of a Nuclear Repository Facility on Perceptions of West Cumbria* – Final Report(MRWP partnership Doc 168)

investment in West Cumbria? Will it stimulate/generate spin-off support industries [temporary and permanent] How will no solution to the waste issue impact on the Energy Coast Masterplan and the future economic well being of West Cumbria? How will no GDF in West Cumbria impact on the Energy Coast Masterplan and the future economic wellbeing of West Cumbria?	Yes – at a generic level	Yes	Yes	No	GVA Report	
	Yes – at a generic level	Yes	Yes	No	GVA Report	
	Yes – at a generic level	Yes	Yes	No	GVA Report	
	Yes – at a generic level	Yes	Yes	No	GVA Report	
	Yes – at a generic level	Yes	Yes	No	GVA Report	

Impact	Assessable prior to DTP?	Confident can be answered later?	Covered satisfactorily in NDA Generic Assessments ¹ , or commitment to address in SEA and EIA?	Further assessment likely to be necessary or desirable prior to DTP?	Assessment available from other source?	Comments
Communities: supporting infrastructure: To avoid adverse impacts on the function and efficiency of the strategic transport infrastructure	Yes – at a generic level	Yes	Yes	No	N/A	Will be assessed as part of the SEA during MRWS Stage 4 and as part of the EIAs for surface based investigation and underground operations during MRWS Stages 5 and 6. Effects on transport infrastructure will be identified by NDA-NDA's transport assessment work. Identified effects will be assessed by regulators at the planning and authorisation stages (application for a permit for surface based intrusive investigations onwards).
Guide Questions: Will it result in changes to services and service capacity in population centres? What will be housing needs from influx of workforce? Will it result in the direct loss of strategic road/rail/air/port infrastructure? Will it potentially provide infrastructure benefits? Will it result in increased congestion/pressure on key transport infrastructure? What are the impacts of transporting 70% of the county's nuclear waste elsewhere if GDF	No	Yes	Yes	No	N/A	<i>Potentially</i> – yes; associated with the infrastructure required to construct and operate a GDF and/or through an associated community benefits package. Reasonably definitive answers to many of these questions may only be possible at the EIA stage.

not built in West Cumbria? Will it result in loss or disruption to basic services and infrastructure [for example electricity, gas]?	No	Yes	Yes	No	N/A	
Will it place significant pressure on local/regional waste management facilities [non-nuclear waste]?	No	Yes	Yes	No	N/A	
Will it place significant pressure on the local aggregate supply pattern?	No	Yes	Yes	No	N/A	

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Human health and well-being: To avoid adverse impacts on physical health To avoid adverse impacts on mental health To avoid the loss of access and recreational opportunities, their quality and user confidence	Yes – at a generic level	Yes	Yes	No	N/A	Will be assessed as part of the SEA during MRWS Stage 4 and as part of the EIAs for surface based investigation and underground operations during MRWS Stages 5 and 6. NDA-RWMD's SEA and EIA work will include an integrated Health Impact Assessment (HIA). Identified effects will be assessed by regulators at the planning and authorisation stages (application for a permit for surface based intrusive investigations onwards).
Guide Questions: Will it adversely affect the health of local communities through accidental radioactive discharges or exposure to radiation? Will the storage or disposal of radioactive waste result in adverse physical and mental health effects for local communities? Will exposure to noise and vibration as a result of plant and other activities lead to physical and mental health impacts on nearby communities?	Yes – at a generic level. In relation to physical effects yes – at a generic level. No	Yes Yes Yes	Yes Yes Yes	No No No	N/A N/A N/A	See comment on guide questions under Air Quality above. Health clearly addressed as part of SEA process; also note HIA will be prepared and integrated

Will it adversely affect the health of the workforce?	Yes – at a generic level	Yes	Yes	No	N/A	<p>In terms of the health of the workforce, the NDA's design target is a dose of no more than 1 mSv per year for employees working with ionising radiation and 0.1 mSv per year for all other employees. These targets are in line with Basic Safety Objectives defined in the Health and Safety Executive's Safety Assessment Principles for Nuclear Facilities. It should be noted that the legal limits are significantly higher.</p> <p>The NDA's safety case work aims to provide evidence to demonstrate that this design target and associated regulatory requirements can be met, that a GDF will be safe to operate and will remain safe after it has been closed. The Regulators will not licence a GDF unless they are satisfied that it meets all regulatory requirements and that it will not result in an unacceptable health risk.</p> <p>NDA-RWMD's SEA and EIA work will include an integrated Health Impact Assessment (HIA).</p>
Will the perceptions of adverse risk as a result of activities lead to adverse impacts on mental health for nearby communities?	No	Yes	Yes	No	N/A	
Will it result in the loss of recreational and amenity land or loss of access?	No	Yes	Yes	No	N/A	
Will it adversely affect the ability of an individual to enjoy and pursue a healthy lifestyle?	No	Yes	Yes	No	N/A	

Impact	Assessable prior to DTP?	Confident can be answered later?	Covered satisfactorily in NDA Generic Assessments ¹ , or commitment to address in SEA and EIA?	Further assessment likely to be necessary or desirable prior to DTP?	Assessment available from other source?	Comments
Cultural heritage: To avoid adverse impacts on the internationally and nationally important features of the historic environment To avoid adverse impacts on the setting and quality of built heritage, archaeology and historic landscapes	No	Yes	Yes	No	N/A	Will be assessed as part of the SEA during MRWS Stage 4 and as part of the EIAs for surface based investigation and underground operations during MRWS Stages 5 and 6. Identified effects will be assessed by regulators at the planning and authorisation stages (application for a permit for surface based intrusive investigations onwards).
Guide Questions: Will it adversely affect historic sites of international/national importance and their setting? Will it adversely affect other historic sites of known value? Will it adversely affect landscapes of historic importance?	No	Yes	Yes	No	N/A	These questions cannot be addressed at this, generic stage – they relate to site specific issues.
	No	Yes	Yes	No	N/A	They will be assessed during SEA and EIA work.
	No	Yes	Yes	No	N/A	

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Landscape: To avoid adverse impacts on nationally important landscapes To avoid adverse impacts on landscape character, quality and tranquillity, diversity and distinctiveness	Yes – at a generic level	Yes	Yes	No	N/A	Will be assessed as part of the SEA during MRWS Stage 4 and as part of the EIAs for surface based investigation and underground operations during MRWS Stages 5 and 6. Identified effects will be assessed by regulators at the planning and authorisation stages (application for a permit for surface based intrusive investigations onwards).
Guide Questions: Will it adversely affect landscapes within or immediately adjacent to a National Park?	No	Yes	Yes	No	N/A	Given of the location of the LDNP within Copeland and Allerdale, the impact of the surface installations and associated infrastructure and potential mitigation measures will need to be explained to some extent prior to DTP. A generic assessment of landscape and visual amenity effects can be found in the NDA's Generic Environmental and Sustainability Report ¹¹ . As for LDNP above – where potential for proximity to Solway Coast AONB. Potential proximity to St Bees Heritage Coast to be taken into account.
Will it adversely affect landscapes in or immediately adjacent to an AONB or National Scenic Area?	No	Yes	Yes	No	N/A	
Will it adversely affect Heritage Coast or Preferred Conservation Zones?	No	Yes	Yes	No	N/A	
Will it adversely affect local landscapes/townscapes of value?	No	Yes	Yes	No	N/A	
Will it affect the levels of tranquility in an area?	No	Yes	Yes	No	N/A	

¹¹ Entec (October, 2010) *Geological Disposal: Generic Environmental and Sustainability Report for a Geological Disposal Facility – Main Report* (Entec Doc Reg No.: 26069-02) – see Section 4 and Tables 4.1 to 4.4, with further detail provided in Appendix D.

Will it adversely affect the landscape character or distinctiveness?	No	Yes	Yes	No	N/A	
Will it result in increased levels of light pollution?	No	Yes	Yes	No	N/A	
Will it adversely affect visual amenity	No	Yes	Yes	No	N/A	

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Soils, geology and land use: To avoid damage to geological resources To avoid the use of greenfield land and encourage the re-use of brownfield sites To avoid the contamination of soils and adverse impacts on soil functions	Yes – at a generic level	Yes	Yes	No	N/A	Will be assessed as part of the SEA during MRWS Stage 4 and as part of the EIAs for surface based investigation and underground operations during MRWS Stages 5 and 6. Identified effects will be assessed by regulators at the planning and authorisation stages (application for a permit for surface based intrusive investigations onwards).
Guide Questions: Will it result in the compaction and erosion of soils? Will it lead to the removal or alteration of soil structure and function? Will it lead to the contamination of soils which would affect biodiversity and human health? Will it compromise the future extraction/use of geological/mineral reserves? Will it result in the loss of agricultural land? Will it lead to damage to geological SSSIs and other geological sites? Will it result in the loss of	Yes – at a generic level Yes – at a generic level Yes – at a generic level Yes – at a generic level No No	Yes Yes Yes Yes Yes Yes	Yes Yes Yes Yes Yes Yes	No No No No No No	N/A N/A N/A N/A N/A N/A	These guide questions will be helpful in shaping the SEA scope - in particular with regards soil structure, compaction, contamination; availability of agricultural land; and future of any mineral/geological reserves. See generic assessment ¹ and BGS Report ¹²

¹² BGS (2010) *Managing Radioactive Waste Safely: Initial Geological Unsuitability Screening of West Cumbria* (Commissioned Report CR/10/072)

greenfield land? Will it adversely affect land under land management agreements?	No	Yes	Yes	No	N/A	
	No	Yes	Yes	No	N/A	

Impact	Assessable prior to DTP?	Confident can be answered later?	Covered satisfactorily in NDA Generic Assessments ¹ , or commitment to address in SEA and EIA?	Further assessment likely to be necessary or desirable prior to DTP?	Assessment available from other source?	Comments
Water: hydrology and geomorphology: To avoid adverse impacts on surface water hydrology and channel geomorphology [including coastal geomorphology]	Yes - at a generic level	Yes	Yes	No	N/A	Will be assessed as part of the SEA during MRWS Stage 4 and as part of the EIAs for surface based investigation and underground operations during MRWS Stages 5 and 6. Identified effects will be assessed by regulators at the planning and authorisation stages. Application for a permit for surface based intrusive investigations onwards.
Guide Questions: Will it result in the increased sedimentation of watercourses? Will it adversely affect channel geomorphology? Will hydrology and flow regimes be adversely affected by water abstraction? Will it result in demand for higher defence standards that will impact on coastal processes? Can the higher defence standards be achieved without compromising habitat quality and sediment transport?	No	Yes	Yes	No	N/A	Hydromorphology guide question could be explicitly included in SEA Scoping.
	No	Yes	Yes	No	N/A	
	No	Yes	Yes	No	N/A	
	No	Yes	Yes	No	N/A	
	No	Yes	Yes	No	N/A	

Impact	Assessable prior to DTP?	Confident can be answered later?	Covered satisfactorily in NDA Generic Assessments ¹ , or commitment to address in SEA and EIA?	Further assessment likely to be necessary or desirable prior to DTP?	Assessment available from other source?	Comments
Water: water quality [including surface, coastal and marine]: To avoid adverse impacts on surface water quality [including coastal and marine water quality] and assist achievement of Water Framework Directive objectives	Yes – at a generic level	Yes	Yes	No	N/A	Will be assessed as part of the SEA during MRWS Stage 4 and as part of the EIAs for surface based investigation and underground operations during MRWS Stages 5 and 6. Identified effects will be assessed by regulators at the planning and authorisation stages (application for a permit for surface based intrusive investigations onwards).
Guide Questions: Will it cause deterioration in surface water quality as a result of accidental pollution, for example spillages, leaks? Will it cause deterioration in coastal and/or marine water quality as a result of accidental pollution, for example spillages, leaks? Will it cause deterioration in surface water quality as a result of the disturbance of contaminated soil?	Yes – at a generic level	Yes	Yes	No	N/A	Some of these guide questions can be effectively used in shaping the SEA Scope.
	Yes – at a generic level	Yes	Yes	No	N/A	Pollution prevention and control measures would be integral to the design for both surface based investigations and disposal facility construction. These would minimise the risk of a significant pollution incident occurring. Potential pollution effects from routine activities and from accidental spillage are considered in the NDA's Generic Environmental and Sustainability Report ¹³ .
	No	Yes	Yes	No	N/A	

¹³ Entec (October, 2010) *Geological Disposal: Generic Environmental and Sustainability Report for a Geological Disposal Facility – Main Report* (Entec Doc Reg No.: 26069-02) – see Section 4 and Tables 4.1 to 4.4 (particularly “Geology and Soils” and “Water” sections), with further detail provided in Appendix D.

Will it cause deterioration in coastal and/or marine water as a result of the disturbance of contaminated soil?	No	Yes	Yes	No	N/A	
Will it affect designated Shellfish Waters?	No	Yes	Yes	No	N/A	
Will it affect Freshwater Fish Directive sites?	No	Yes	Yes	No	N/A	
Will it increase turbidity in water bodies?	No	Yes	Yes	No	N/A	
Will it increase the temperature of the water in water bodies?	No	Yes	Yes	No	N/A	

Impact	Assessable prior to DTP?	Confident can be answered later?	Covered satisfactorily in NDA Generic Assessments ¹ , or commitment to address in SEA and EIA?	Further assessment likely to be necessary or desirable prior to DTP?	Assessment available from other source?	Comments
Water: supply and demand: To avoid adverse impacts on the supply of water resources	Yes – at a generic level	Yes	Yes	No	N/A	Will be assessed as part of the SEA during MRWS Stage 4 and as part of the EIAs for surface based investigation and underground operations during MRWS Stages 5 and 6. Identified effects will be assessed by regulators at the planning and authorisation stages (application for a permit for surface based intrusive investigations onwards).
Guide Questions: Will it adversely affect water supply as a result of abstraction? Will it increase demand for water?	No No	Yes Yes	- -	No No	N/A N/A	

Impact	Assessable prior to DTP?	Confident can be answered later?	Covered satisfactorily in NDA Generic Assessments ¹ , or commitment to address in SEA and EIA?	Further assessment likely to be necessary or desirable prior to DTP?	Assessment available from other source?	Comments
Water: groundwater quality and flow: To avoid adverse impacts on groundwater quality, distribution and flow and assist achievement of Water Framework Directive objectives	Yes – at a generic level	Yes	Yes	No	N/A	Will be assessed as part of the SEA during MRWS Stage 4 and as part of the EIAs for surface based investigation and underground operations during MRWS Stages 5 and 6. Identified effects will be assessed by regulators at the planning and authorisation stages (application for a permit for surface based intrusive investigations onwards).
Guide Questions: Will it cause deterioration in groundwater quality as a result of accidental pollution, for example spillages, leaks? Will it cause deterioration in groundwater quality as a result of the disturbance of contaminated soil?	Yes – at a generic level No	Yes Yes	- -	No No	N/A N/A	Pollution prevention and control measures would be integral to the design for both surface based investigations and disposal facility construction. These would minimise the risk of a significant pollution incident occurring. Potential pollution effects from routine activities and from accidental spillage are considered in the NDA's Generic Environmental and Sustainability Report ¹⁴ .

¹⁴ Entec (October, 2010) *Geological Disposal: Generic Environmental and Sustainability Report for a Geological Disposal Facility – Main Report* (Entec Doc Reg No.: 26069-02) – see Section 4 and Tables 4.1 to 4.4 (particularly “Geology and Soils” and “Water” sections), with further detail provided in Appendix D.

Impact	Assessable prior to DTP?	Confident can be answered later?	Covered satisfactorily in NDA Generic Assessments ¹ , or commitment to address in SEA and EIA?	Further assessment likely to be necessary or desirable prior to DTP?	Assessment available from other source?	Comments
Flood risk: To avoid increased flood risk [including coastal flood risk] and seek to reduce risks where possible	Yes – at a generic level	Yes	Yes	No	N/A	Will be assessed as part of the SEA during MRWS Stage 4 and as part of the EIAs for surface based investigation and underground operations during MRWS Stages 5 and 6. Identified effects will be assessed by regulators at the planning and authorisation stages stages (application for a permit for surface based intrusive investigations onwards).
Guide Questions: Will it result in demand for higher defence standards that will impact on coastal processes?	No	Yes	-	No	N/A	

Impact of a geological disposal facility on perceptions of West Cumbria

Executive Summary

1. Introduction

In late 2010, the Managing Radioactive Waste Safely (MRWS) Partnership commissioned GVA to undertake qualitative research to understand the potential impact on perceptions of West Cumbria and other parts of the county, should plans for a geological disposal facility (GDF) progress. The aims of this research were to understand the perspectives of current and prospective residents, visitors, businesses and potential investors of any development of this nature covering a range of themes spanning 'place', 'prosperity' and 'people'.

The intention is that this research complements emerging quantitative research being undertaken by the Britain's Energy Coast Board and the Nuclear Decommissioning Authority's generic Strategic Environmental Assessment.

2. Approach and method

The findings of this report are driven primarily by primary research undertaken with residents, visitors and businesses across Cumbria between January and April 2011. A mix of engagement techniques were used to gather the perceptions of each group including:

- For **residents**:
 - An on-street survey of 377 residents of West Cumbria across nine main locations; these were 5-7 minute interviews exploring the impact of the GDF on: quality of life, employment, economy, housing, environment, transport, health, skills, migration, community cohesion and the availability of public services;
 - 5 residents focus groups covering similar themes in a number of locations and with different audiences spanning young people, older people and the rural community;
 - 8 interviews with local property agents and registered social landlords (RSLs) to explore the housing and commercial property impacts on the GDF; and
 - Focus groups with the police and health professionals to discuss perceived impact on these areas.
- For **visitors**:
 - An on-street survey of 363 visitors at a number of locations across Cumbria (including major Lake District hubs); these were 3-5 minute interviews exploring quality of destination, transport, environment, tourism levels and spend, and the availability of visitor services; and
 - 16 structured interviews with tourism attractions, representative groups and stakeholder organisations discussing similar themes.
- For **businesses and investors**:

- o Over 20 face-to-face and telephone interviews with business representative organisations exploring: general perception, impact on the economy; views on West Cumbria as a place to do business, supply chain effects and implications for skills, infrastructure and services; and
- o 7 business workshops attended by over 100 organisations operating across a variety of sectors covering similar themes.

The majority of this research was undertaken in February 2011, before the events that took place in Japan, and hence it is unlikely that these have skewed findings in any way.

This primary research has been complemented by the development of a series of case studies examining the perception of other major infrastructure projects, including several within the nuclear industry, including documenting how these were measured and opinion captured.

3. Resident perceptions

The residents of West Cumbria, and those representing specific elements of the community, held wide ranging perceptions in relation to the GDF. The table below summarises these views.

	Summary of views
General population	<ul style="list-style-type: none"> ▪ Current perception of quality of life is strong at present with around 75% of the sampled population believing West Cumbria is a 'good' or 'excellent' place to live. ▪ Around half of those interviewed believed that the GDF would have no impact on this, the other half split almost equally between those thinking it would enhance quality of life and those believing it would get worse. ▪ There was significant spatial variation between different parts of the area, with those living further north and east (e.g. in Wigton and Keswick) holding more negative views than those living in, for example, Egremont or Workington. ▪ Perceived impact on both the availability and quality of jobs was positive with 80% believing there would be more jobs, and 70% thinking these would be superior to those currently available. ▪ This translated into views on business, with 65% believing that there would be an improvement to general business performance, and 6 in 10 thinking that more new investment would flow into the area. ▪ Just under half of all residents could see no possible impact on house prices, but as many seeing an increase as a decrease as a result of the GDF. The ability to sell is more of a concern with a third of residents believing that could be an issue post GDF. ▪ Whilst over half of residents perceived no impact on the environment, 40% have some concerns around noise, ecology and the landscape. ▪ Views on transport and access were mixed. Whilst 40% could see

	<p>no impact, the rest of the sample was split between those believing that “there would have to be an investment” and hence roads and rail would improve, and others that could only see increased congestion.</p> <ul style="list-style-type: none"> ▪ The provision of skills, the retention of the existing population and attraction of new people were seen as being generally positive outcomes of the GDF. Over half of those sampled believed that it would help retain young people in the area and would attract new in-migrants. ▪ Around 70% of those interviewed could see no health issues. The vast majority could see no major impact on community cohesion or crime levels. ▪ Whilst most (70%) could see no real impact on public services, around 20% of interviewees believed that they would be improved as a result of investment in the area.
Young people	<ul style="list-style-type: none"> ▪ There is an expectation the nuclear industry will be the main source of good quality jobs in the future, and hence that GDF is an important component in attracting investment and retaining young people. ▪ The perception is that many of the top jobs will be imported, and that the emphasis needs to be on investment in the skills of local people. ▪ There is a slight concern, however, that the nuclear industry is considered the only option for the area, and that this will further ‘pigeon hole’ West Cumbria. ▪ There is only very limited concern about any health or environmental risk, with reference made to the long standing presence of Sellafield.
Older people	<ul style="list-style-type: none"> ▪ There is concern about the level of understanding of GDF and the ability of the public to take a view. ▪ Given past experience, the view is that it is imperative that the area learns lessons and addresses gaps in infrastructure, housing and public service provision. ▪ Linked to this, the ‘boom and bust’ of the 1980’s must be avoided – any benefits created should be sustainable and managed. ▪ Acknowledgement that local people will always place economic considerations above health and environmental factors, but also clear that the location is fundamental to its acceptance.
The rural community	<ul style="list-style-type: none"> ▪ There is a view that there is a general lack of information about the GDF or the MRWS process. ▪ General concerns about the impact on the landscape and on property and land prices. Particular concern in relation to leaks similar to the alleged contamination at Sellafield. ▪ Real and widespread fear that the jobs and investment created will flow out of the area and not be channelled to local people.

	<ul style="list-style-type: none"> There is a significant concern that other, non-energy, industries might suffer due to the ongoing link to the nuclear industry.
<p>Prospective residents (via agents and RSLs)</p>	<ul style="list-style-type: none"> In general, housing demand will increase as investment is injected into the area. This will increase owner occupation and rental demand, and release development sites and housing land. The perception is that the GDF will increase the demand for mid-range and executive housing related to highly skilled in migrants. There will also be a significant boost in rental demand in the construction phase, in the proximity of the development. Historically these have congregated around Workington and Whitehaven. Some agents suggested that property in the immediate proximity of the GDF would be harder to sell. These will both be tempered by a drop in 'lifestyle' in-migration, with fewer retirees and second homes.
<p>Police and health professionals</p>	<ul style="list-style-type: none"> GDF will increase population, which has implications for crime, community safety and health provision. Local communities are still suffering from the tensions and generational issues resulting from the 1980's 'boom years'. The Police would be concerned with increased demand due to ongoing budget cuts and resulting capacity issues, but risks can be mitigated with appropriate partnership working, adequate infrastructure investment and sufficient time to plan. The PCT indicated no direct health concerns, and perceived that the community would actually get healthier if employment levels rose and people were happier. The increased demand due to the population rise would be manageable if there was time to plan.

In summary, there is no general consistent view amongst residents in relation to the GDF. Each individual comes from a different background and has different priorities and knowledge of the subject matter.

The general population is divided, but agree on one main factor: employment. 77% of all respondents felt that the biggest advantage of the GDF was its ability to create employment in the local economy. When asked for a single largest disadvantage, some stated the impact on the environment (18%), some the effect on tourism (16%) and some the health implications (14%).

When looking at specific groups, perception is more polarised. Young people were generally positive, seeing the benefits of high quality sustainable jobs as key. Older people were more cautious, remembering the disruption of the construction period decades ago, stating the environmental and health risks, but being pragmatic and acknowledging the substantial economic opportunity. The rural population were understandably negative, seeing a direct impact on the landscape and on rural activities and tourism.

Consistent views across all groups include the need to:

- provide adequate road, rail and housing infrastructure for the GDF;

- ensure that jobs and supplier contracts are channelled to local people and businesses, by making sure that there is investment in skills and to support the local supply chain;
- continue to engage with the community in a partnership approach; and
- allow sufficient time and resources to plan public services carefully.

4. Visitor perceptions

The existing view of Cumbria as a place to visit is strong, with a world class destination in the Lake District, and high return rates for visitors. There exists, however, strong differentiation between the Lakes and the Coastal area. Views on how GDF would impact the views of visitors are summarised in the table below.

	Summary of views
Tourists	<ul style="list-style-type: none"> ▪ There is a strong baseline position with 99% of visitors having a strong perception of Cumbria and 75% a strong view of West Cumbria ▪ 36% of visitors feel that Cumbria would be negatively impacted by a GDF, whilst 42% feel that West Cumbria would be a worse place to visit. ▪ Around as many people (25%) believe that roads would be better as a result of the GDF (due to more investment) as believe increased congestion would be an issue. Conversely, the overwhelming majority saw no change in public transport. ▪ The environmental impact was a concern. 60% of those interviewed believed that there would be an adverse impact on noise, ecology and landscape. ▪ 4 in 10 visitors felt that the GDF would impact on the number of tourists, with 36% believing that there would be reduced tourism spend within the county. A third of all those surveyed felt that there would be an impact on the 'cultural heritage' of the area. ▪ Broadly, there was little perceived impact on tourism services. Over 15% expected that the provision of restaurants, hotels and retail would improve with increase investment in the local economy.
Tourism groups and stakeholders	<ul style="list-style-type: none"> ▪ Whilst agreeing that there could be an impact on tourism, there is also a general acknowledgement of the need to take responsibility for our waste storage in the UK. ▪ Views would clearly depend on the specific location of the GDF and its relative location to tourist hubs. There would be significant opposition to a facility within the national park. ▪ There is common feeling that the media would have a substantial impact on perception and hence on the visitor economy, and the management of messages is crucial. The protection of the Lake District brand is essential. ▪ The perception among many is that the nuclear industry could 'give something back' to counteract bad publicity. This could

	include investment in education or community facilities. Any benefits of the GDF should not just be felt in the immediate vicinity.
Accommod'n and tourism service providers	<ul style="list-style-type: none"> ▪ In this group there is, in general, a strong opposition to a GDF. The main argument is that the impact on the tourist industry in Cumbria would out-weigh any benefits felt in energy related sectors. ▪ There is a significant concern over the level of information people are receiving with which to make a decision. ▪ An alternative approach to economic growth on the Coast was consistently tabled: link the tourism offer in the Lake District to coastal areas better, diversifying the economy. A GDF could jeopardise this. ▪ Also common in this group was to highlight environmental concerns including the perception that tourists would have around safety and health risks. This view suggested that "nuclear anything" creates a ripple effect. ▪ A further common perception amongst this group was the fear that the construction period would bring with it significant disruption, noise and landscape impacts.

There is general concern amongst visitors, businesses operating in the tourism industry and wider stakeholder organisations in relation to the GDF. When asked about the single main advantage of the GDF, 48% of tourists referred to employment creation and the benefits to the economy. Stated 'largest' concerns included the impact on the environment (24%), health risks (23%) and the impact on the tourism industry (19%). These are the key reasons why around 4 in 10 people think the area will be a worse place to visit post the creation of a GDF.

Whilst the overall view of visitors and those that work with and represent them is more negative to those of residents, the strength of this perception is clearly driven by:

- the choice of a location for the GDF and the relationship between this and core visitor areas;
- the influence of the media and the way that communication in relation to the GDF is managed the local tourism 'brand' protected; and
- the strength of partnership working and engagement with key stakeholders and representative groups.

5. Business and investor perceptions

The overall perception of West Cumbria from a business perspective is that the nuclear industry remains the largest single attraction for inward investors, and its supply chain dominates the economy. Concerns exist, however, that the area is over reliant on nuclear, and that it lacks a diversity of skills base and negative external perception amongst the business community.

	Summary of views
Existing businesses	<ul style="list-style-type: none"> ▪ There is no overall consensus on the extent to which a GDF will create direct additional jobs for local people. A lack of understanding on the number and quality of employment and the extent to which labour will be important limits the depth of perceptions in relation to the economy. ▪ Providing that the jobs are there, businesses agree that this offers a huge opportunity for the local area, in terms of growing enterprises, retaining people and retaining wealth in West Cumbria. ▪ For the GDF to have the greatest impact interviewees suggest that there is the need to develop the capacity of existing businesses to be able to engage in the supply chain. ▪ The other main element is skills. In general, businesses feel that there need to be investment in skills in the form of tailored courses or apprentices programmes to ensure that the area is well equipped to supply the labour to the GDF.
Potential investors (via public and private stakeholder groups)	<ul style="list-style-type: none"> ▪ Reference was made to the fact that the GDF is part of a series of major schemes which have the potential drive significant and sustainable investment into West Cumbria over the next thirty years. ▪ Comment was made that there is the potential to tie the GDF closer to other proposals currently being worked up including the possible New Build and the University of Manchester Dalton Research Institute. This would create a coherent and attractive impression of a 'cradle to grave' sector rather than the development of a 'dump' in isolation. ▪ Also acknowledged, however, was that the GDF will attract a lot of negative publicity which will need to be managed. Investors would not be attracted to the 'nuclear coast'. ▪ It is generally thought that supporting infrastructure is key to this development and that the existing transport network is not fit for purpose. There are further opportunities to development related industries around the ports, roads, rail and broadband provision.

The GDF is seen perceived to be generally positive amongst the business community, with potential to boost the economy, strengthen supply chains and attract investment. The factors within this that have been identified as being particularly important are:

- The need for an honest dialogue with industry and the public with a clear presentation of the facts as they are established. Maintaining a dialogue with local businesses to support them to capitalise on the opportunities that emerging through the supply chain;
- Ensuring that the benefits to the local economy are maximised by creating an appropriately skilled workforce – and there must be clarity on the size of opportunities and the extent to which they are available to local businesses; and

- Providing suitable supporting infrastructure to minimise disruption and support the development of complementary sectors, ensuring that the reliance on the nuclear industry is not compounded.

6. Lessons from elsewhere

In order to understand some of the lessons learned elsewhere around the perceptions of major schemes, six projects of comparable scale and complexity have been analysed. Three of these projects were in the UK (Sizewell B, The Channel Tunnel and Ince Resource Recovery Park) and three overseas (Östhammar Nuclear Waste Repository – Sweden, Olkiluoto Nuclear Waste Repository – Finland, and Meuse and Haute Marne Underground Research Laboratory - France).

Taking these projects together, the combined lessons for West Cumbria are that:

- Areas with a strong nuclear or industrial heritage will be more hospitable to a GDF or similar scheme, but that support should not be taken for granted. A close partnership approach to working should be adopted from the outset;
- Open, honest and consistent communication, using a range of engagement techniques, and with all parties, is important in the process. This can help to generate support and balance the negative publicity that often accompanies major projects. Communication of how similar facilities overseas have been developed could also help.
- Rapid response to public concerns can help build faith in the process. This includes fully transparent technical appraisals relating to key issues around health, environmental and transport impacts;
- The technology proposed should be made clear and all other options for consideration presented. The more information that residents, businesses and visitors have the more able they are to take an informed view; and
- Once works begin, the engagement process needs to be maintained and monitored. The construction period is sensitive and ongoing assessment of perception is important.

Whilst this is a diverse range of projects, these consistent lessons provide a useful steer for West Cumbria. Full case studies accompany the main report.

7. Conclusions

This research has identified a wide range of positive and negative perceptions relating the GDF, driven by personal experience and circumstance and the level of knowledge and interest in the issues that a facility of this nature can influence.

From a 'place' perspective, the specific location of the site will be a key determining factor as to how people perceive the facility. For example, views on it will clearly differ if it is located in coastal areas, where nuclear related industries are broadly accepted and embraced, as opposed to inland, where they could be seen as a threat to tourism, farming and related industries. Amongst many, environmental issues are a concern, whilst others see the infrastructure and investment associated with the development as being a significant benefit.

When considering 'prosperity' it is clear that there is significant opinion that the GDF has the potential to generate large volumes of high quality, sustainable employment in a part of the country where new jobs are needed. Furthermore it is seen as

benefiting existing businesses, by providing supply chain opportunities and injecting cash into the local economy. There is caution, too, in regard to the economic contribution. Concerns exist in relation to the trade off between a prosperous nuclear-driven economy and efforts to further develop the tourism offer in West Cumbria and the rest of the County, and some are nervous that the area is becoming ever more reliant on one sector. Where there is consensus is in the need to ensure that the employment created is retained locally, with suitable investment in skills, and that local businesses are well equipped to exploit the opportunities that arise.

In terms of the 'people' dimension, there is a broad view that the GDF could have the positive effect of helping to retain young people and attract new migrants. Health concerns exist, however, in general amongst visitors rather than residents. There appears to be limited perceived impact on the level of crime, on community cohesion or the availability of key services.

Clearly partnership working is going to be critical the further development of proposals in relation to a GDF in West Cumbria, to ensure that the views of residents, visitors and businesses are accommodated. As well as building consensus, this will help to ensure that the benefits of a facility, if ultimately located in West Cumbria, are retained in the area, and that negative impacts are minimised.



Nuclear
Decommissioning
Authority

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15/3/11

Dear Stewart

Geological Disposal – Transport Infrastructure Requirements

I understand that the GDF Impacts Sub Group is tasked from the Partnership PSE 1 report (p29) to:

Review what transport infrastructure would be required and the associated lead-in times so that the Partnership can reach a view on how the delivery of transport infrastructure could be staged over time.

To help the Sub Group progress this task you asked if NDA-RWMD would pull together and summarise the strands of our transport infrastructure work. We hope that this letter provides the information you need.

This is a difficult issue to address at such an early stage in the MRWS process. The range of options relating to the transport infrastructure required for a GDF (and to some extent it's phasing) would be location specific and it is likely to be some time before a clear picture emerges on what might be required. It is also worth noting that we would work in partnership with the local community and other stakeholders to identify the most appropriate transport options for a particular site and to ensure that the subsequent selection, design and implementation of a transport system reflected local issues and concerns.

The information below is based on the NDA's Transport and Logistics Strategy¹, RWMD's Generic Environmental and Sustainability Assessment² and Generic Transport System Designs³.

Transport and Logistics Strategy

With regard to transport and logistics, current NDA strategy is to define a set of principles under which Site License Companies (SLCs) arrange and co-ordinate transport to maximise its effectiveness across the estate. These principles are:

- ensure the safety and security of material movements to protect people and the environment and consider the impact on the resulting Carbon Footprint
- optimise movements between sites whilst supporting strategies
- seek to reduce the adverse impact of all transport modes throughout the transport routes
- find common and reliable packaging and transport arrangements to support final movement and disposal requirements.
- use rail over road where practicable
- maximise the use of existing assets rather than develop new ones

Our current work on generic transport system designs for geological disposal is guided by these principles.

Surface based investigation

We anticipate that the new transport infrastructure required for surface based investigation would be minimal. For a particular borehole it is likely to be limited to a temporary access track. In some cases

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minor improvements may also be necessary to the local road network to facilitate access for Heavy Goods Vehicles and drilling rigs.

GDF construction materials and excavation spoil

Options for the movement of construction materials would be examined and assessed when a site-specific facility design is developed. The possible use of rail, road, sea or inland waterways, or any combination of these transport modes would be considered. Particular consideration would be given to the use of rail transport for bulk materials, including bulk powders, cement and aggregates. The use of sea or inland waterways transport for bulk materials may also be possible, although these options would probably require road or rail transport for some part of the journey.

For any off-site spoil disposal or end-use of spoil, it is likely that significant use would be made of rail transport, although it may be feasible to use road transport for the export of small quantities.

Our generic environmental and sustainability assessment work has assumed that, with the exception of excavation spoil, all construction materials, machinery and construction waste, and all buffer / backfill material would be transported by road. This has allowed the consideration of a "worst case" in terms of the carbon footprint of transport operations and in terms of other environmental issues. In practice, however, this scenario would be unlikely given the guiding principles in the NDA Transport and Logistics Strategy.

GDF personnel

The detailed requirements for personnel transport would be considered as part of a construction phase plan and operations management plans – and these would be developed in an environmentally sensitive, cost-effective manner, making due allowance for local needs and sensitivities.

Parking would probably be provided at a GDF for vehicles used by site personnel. However, depending on local provision, a significant proportion of personnel may travel by public transport - reducing the need for on-site parking.

Consideration would be given to the bussing of site personnel. This could include consideration of one or more remote car parks with an appropriate number of spaces and provision for pick-up and set-down with adequate shelter. The requirements for car parking spaces on-site would be reduced accordingly.

Such a bussing scheme could be extended to picking up personnel close to their homes, to avoid them having to drive to a remote car park before catching a bus. The details would, however, depend on the relative location of local population centres.

There would only be a need to consider the potential for personnel transport by air (fixed wing and helicopter) in the event that either an off-shore or, in particular, remote GDF site were to be selected. Hence, air transport would be a specific rather than a generic solution. If such types of GDF sites were to be identified, air transport for personnel would be addressed.

Radioactive waste

Our work on the safe transport of radioactive waste from the site of its production or interim storage to a GDF is, in some respects, more advanced than other aspects of the transport system. This is because radioactive wastes are already being produced, conditioned and packaged, and decisions about the radioactive waste transport system need to be integrated with these activities.

Our generic transport system for radioactive waste packages is designed to use any combination of rail and road transport. We have also considered sea transport, but in less detail. The possible use of inland waterways could be addressed at a future date when potential GDF sites have been identified. The use of air transport for waste is considered impractical because of the large numbers and weights of the packages to be transported.

Phasing

It is likely that the major components of the system for transporting materials and personnel to and from a site would have to be in place early during the construction phase of a GDF, e.g. road and rail links to the site, and appropriate transport infrastructure for site personnel traveling to and from work.

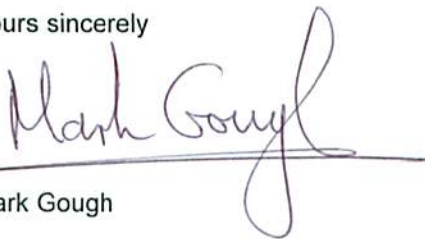
Components of the system specifically related to the transport of radioactive waste packages would have to be in place before the first emplacement of waste. These would include, for example, facilities and equipment for the receipt and handling of waste packages at the site and on-site infrastructure for the transport of waste underground.

Transport Movements

The number of transport movements associated with a GDF would depend on the design of the transport system and, in particular, how movements were distributed between different transport modes (e.g. road vs. rail). However, if we assume a scenario which focuses on the use of rail transport in preference to road we would expect, during normal operation, several rail movements per week and several hundred road movements – the latter largely associated with staff travel to and from the site. At certain times, during the early construction phase for example, the number of HGV movements on the local road network would probably increase significantly.

If you have any queries or need further information please let me know.

Yours sincerely



Mark Gough

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- 1 NDA (August 2010), *Transport and Logistics Strategy – Statement of Principles*
<http://www.nda.gov.uk/strategy/criticalenablers/transport/index.cfm>
 - 2 Entec (October, 2010) *Geological Disposal: Generic Environmental and Sustainability Report for a Geological Disposal Facility – Main Report* (Entec Doc Reg No.: 26069-02)
 - 3 NDA – RWMD (November 2010), *Geological Disposal: Generic Transport System Designs* (NDA/RWMD/046)