

OUTLINE QUOTATION

REVIEW OF THE NAGRA PROPOSALS AND HSK TECHNICAL
REVIEW FOR A RADIOACTIVE WASTE DISPOSAL FACILITY IN THE
OPILINUS CLAY STRATA AT BENKEN IN THE ZÜRCHER WEINLAND

ENTSORGUNGSNACHWEIS PROJECT

RISK AND HAZARD ASSESSMENT

LARGE & ASSOCIATES
Consulting Engineers, London

Client: **KLAR!SCHWEIZ**

Ref N° Q3140-A1

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NAGRA PROPOSALS & HSK TECHNICAL REVIEW
RADIOACTIVE WASTE DISPOSAL FACILITY AT BENKEN IN THE ZÜRCHER WEINLAND

BACKGROUND

All practices relating to the preparation, interim management and eventual disposal of radioactive wastes in Switzerland are subject to the *Nuclear Energy Act 2005*. This Act specifically places the responsibility of the safe management and interim storage of radioactive waste generated at Swiss nuclear power plants with the NPP operators, although the responsibility for conditioning, storage and disposal of other forms of radioactive waste arising from medicine, industry and research is transferred to the Federal State. Even though the spent fuel/high level waste repository is not required for several decades in the future, the *Act* requires such repository to be demonstrated feasible now.

In December 2002 NAGRA - National Cooperative for the Disposal of Radioactive Waste – submitted proposals to the Swiss Government to demonstrate the feasibility of the ultimate disposal of irradiated (spent) nuclear fuel, high-level vitrified waste and other forms of intermediate-level radioactive wastes (the so-called Entsorgungsnachweis Project) at a site in the north of Canton Zurich at around the locality of Benken. From about that time, HSK – Swiss Federal Nuclear Safety Inspectorate – has undertaken a technical review of the proposal which was concluded in August 2005 and, following public consultation, on the basis of the HSK review the Federal Council is expected to take a decision on the way to proceed sometime during 2006.

LARGE & ASSOCIATES APPROACH

John Large of Large & Associates is to conduct the Review by examining those documents and reports available from NAGRA and HSK, being published up until the HSK August 2005 Review.¹ Generally, the Review will be set against the requirements of the *Nuclear Energy Act 2005* and include the following elements:

- 1 **Literature Review:** Comprising relevant technical, scientific and policy publications, including the *Nuclear Energy Ordinance* and the detailed HSH guidelines, such as *HSK-R-7/11/14/15/25*.
- 2 **Radioactive Waste Inventory:** Analysis of the Swiss radioactive waste register (ISRAM) in terms of the present stockpiles and projected arisings of spent fuel and high-level wastes and matching of these wastes (HAA, SMA and ATA) to the waste packaging designations.
- 3 **Licensing:** The *General, Construction and Operation* (UVEK), and *Transport Handling* (BFE) licenses will be examined in terms of the context of the irradiated fuel and high-level radioactive wastes consignment destined for the repository. Also, the likely requirements and specification of the UVEK construction licence will be assessed.
- 4 **Risk and Hazard Assessment:** Generally, the effectiveness of the proposed licensing system and regulatory framework for radioactive waste management will be applied to the following:
 - i) Normal operation of the proposed repository, including intentional discharges;
 - ii) transportation of radioactive waste to the repository so far as public radiation exposure;
 - iii) i) and ii) above when subject to
 - a) accidental events
 - b) malevolent and terrorist acts.
 - iv) and for iii) a) and b) assessment of on- and off-site emergency organisation and protective measures.
- 5 **Institutional, Post-Institutional and Closure of Repository:** Assessment of the time spans envisaged for institutional and post-institutional operation for the repository, its eventual abandonment and, generally, the overall sustainability of the proposal.
- 6 **Report:** Interim and Final Stage reports in consideration of items 1), 2), 3), 4) and 5) foregoing.

¹ Only documents, etc available in English will be reviewed.

- 7 **Presentation:** If required, a clear and instructive presentation² will be prepared and pitched at two levels for a) the elected members of the Canton and Federal State, as appropriate, and, separately, b) for the general public of the Canton.

LARGE & ASSOCIATES PREPARATION

It would be helpful to provide Large & Associates with the following information, as such is available:

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- a) Identification of specific areas and/or topics of concern that should be included in the Review.
- b) Copies of any technically-based documents, reports etc that, other than those publicly available to Large & Associates from HSK and NAGRA, etc
- c) If an interactive web page, providing access to the papers, etc under review, snippets and general progress is required on the largeassociates.com website, either i) openly accessible to all-comers or ii) accessible to password holders only.
- d) Copies of the Public Consultation exchanges to date.

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- e) Identification of specific areas and/or topics of concern that should be included in the Review.
- f) Copies of any Canton specific directives relating to the proposed repository.

REPORTING FORMAT

Reporting language (UK) English and draft and final Reviews will be provided in electronic (*.pdf) format.

TIME SCALES TO REPORTING

Approximately, completion to the following timescales:

WEEK N°	TASK – PROJECT STAGE	COMMENTS
4	Further and detailed outline of Review content	If appropriate, this will note if there are shortfalls in the availability of papers, etc in certain technical topics
10	1 st Draft Review	For comment
12	Final Review + Summary + Press Release Briefing Note	
12/14	Presentations if required	

The Review should be available in or about March 2006, although should the Federal Council decide to move earlier then the Review date could be brought forward at the sacrifice of certain elements of the work.

LARGE & ASSOCIATES³ – QUALIFICATION AND EXPERIENCE

John Large is a Chartered Engineer, a Consulting Engineer, a Fellow of the Institution of Mechanical Engineers, Member of the Institution of Civil Engineers, Member of the British Nuclear Engineering Society, and Fellow of the Royal Society of Arts. From the mid-1960s through to the late 1980s, John Large was a full-time member of the Academic Staff at Brunel University and, transferring his academic interests, he founded Large & Associates in 1986 specialising in the nuclear and hazard analysis fields.

John Large has prepared and given evidence to the Court of Human Rights at Strasbourg, to a number of House of Commons Select Committees on Energy and the Environment, quite frequently he provides expert evidence

² If required and the costs of preparing and attending such presentations will be in addition to the contracted price,

³ For further information go to <http://www.largeassociates.com>

on aspects of system failure and technical issues in the UK Crown and Civil courts. He has given evidence on nuclear matters to overseas governments and agencies, including the governments of New Zealand, the Russian Federation, Finland, Bulgaria and to the US Nuclear Regulatory Commission on the risk of nuclear terrorism. Through Large & Associates, John Large has been involved in a number of national and international risk and hazard assessment projects, including overall responsibility for the nuclear reactor and weaponry hazard assessments for the recovery of the nuclear powered submarine *Kursk* and the repairs to the Royal Navy nuclear powered submarine HMS *Tireless* at Gibraltar. John Large was awarded a commemorative medal for his contribution to the *Kursk* salvage by the Russian authorities.⁴

Specifically relating to disposal of irradiated nuclear fuel and high-level radioactive wastes, John Large undertook a comprehensive review of the Swedish SKB disposal proposals in the late 1990s, he has visited and reported upon the waste policy and stockpiles in Taiwan, and he has inspected and reviewed certain of the military industrial complex nuclear material and radioactive waste streams in the Russian Federation for an international agency.

OUTLINE FEES & EXPENSES AND TERMS

Projects Costs & Terms of Engagement

As policy, Large & Associates does not undertake work on a fixed price basis and, in line with this, the work is to be charged at quantum with costs and essential disbursement in addition.

For budgeting purposes the overall fee and disbursements, etc., for this project will not unless otherwise agreed exceed CHF [REDACTED] excluding VAT. Invoices, accompanied by a detailed listing of times spent (see attached example – **APPENDIX I**) and detailed expenditure, are issued monthly – full settlement is to be within 30 days of the date of invoice submission else no further work is undertaken until full settlement of the outstanding amount is made - no dispute over any invoice will be accepted past the 30 day settlement period.

The following ex VAT (Reg N° 697 3287 77) quantum hourly, unit expenses and day rates will be applied to the Audit:

[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

This quotation and offer remains open for 30 days from the closing date of 22 December 2005.

Terms are nett monthly E&OE and interest is charged at 3% above Barclays Bank rate for accounts over 1 month outstanding - no further work will be undertaken on overdue projects until outstanding accounts are settled – a fully detailed breakdown of times and expenses is generated with each invoice. UK VAT is charged at the appropriate rate to UK-based clients, for consultancy services invoices to EU and overseas based clients are subject to 0% VAT rate.

CONFIDENTIALITY

Client confidentiality is paramount with all reported work, etc., being transferred to full copyright and intellectual ownership of the client (unless otherwise agreed) upon full and final settlement of the agreed invoice amounts.

PROFESSIONAL INDEMNITY COVER

Projects involving high hazardous products are not covered by professional indemnity insurance. If required,

⁴ <http://www.largeassociates.com/KurskRINA.pdf>, <http://www.largeassociates.com/TirelessKurskForensic.pdf>, <http://www.largeassociates.com/kurskpaper.pdf>

professional indemnity cover will be obtained for the requisite period into the future (usually the statute barred period) at an extra over cost to the project.

FREEDOM OF INFORMATION ACT 2000

The information made available in this quotation Ref Q3140-A1 is considered to be exempt from disclosure under the UK *Freedom of Information Act 2000*, it is to be treated as Reserved Information on the grounds for exemption that its disclosure to third parties would prejudice the commercial interests of Large & Associates and it must remain reserved information until 1 May 2006 or until the completion of the contract by whichever organisation/person has undertaken and completed the contract, whichever date is the later.

**JOHN H LARGE
LARGE & ASSOCIATES**

PROPOSAL