NUMO International Technical Advisory Committee

Short Record of the ITAC-4 Meeting
Tokyo, 21-23 January 2003

Introduction

This short note summarises the main points discussed during ITAC-4 and complements a CD containing all material presented at the meeting. It is based strongly on the overheads presented by Charles McCombie in the final wrap-up session of this meeting and subsequent discussion.

The meeting itself had a somewhat different format from previous ITACs, containing a session with an international overview of site selection/ characterisation experience and a brainstorming session on key challenges facing NUMO at present. The general consensus seemed to be that both these experiments were very successful and should be repeated at future meetings (as noted in the wrap-up, maybe next time with a special secretary or facilitator). The interpreters/communicators were clearly very valuable for such brainstorming exercises and should also be included in the future.

1 Opening and Japanese programme overview

In his welcoming address, President Tomon reported on the successful initiation of the NUMO call for volunteers (ITAC members were presented with the full set of Japanese documents used in this process). Masuda-san then provided a general update on the Japanese national programme. Of particular interest were the NSC note on "environmental factors" (provisional translation distributed), the NSC public hearing workshops and the fact that there had been already some responses (requests for more information) to the call for volunteers. Masuda-san also mentioned that, in the review of the Level 2 documents, the HLW working group from METI had emphasised , in addition to transparency, the need for a solid scientific basis – and this had led NUMO to expand the discussions on long-term safety.

2 Comments on solicitation documentation

2.1 Levels 1 and 2 (Kitayama-san)

Overall, ITAC considered that the structure and content of final documentation was good and fit for purpose. It was rewarding to see that they reflected many ITAC comments (including suggestion for a Level 1 document) and NUMO's explanation of the rationale for what was not taken over was appreciated. It was encouraging that NUMO has had 30 queries so far, but this highlighted the need to have ready a set of responses to different types of potential query (see later brainstorming session output). It was considered a good idea to follow-up in municipalities with videos (they look good but, based on international

experience, it may be worth testing them out on a trial audience and/or monitoring local responses to them as a guide for future projects of this type).

International interest is in the NUMO volunteering process is high and it would be good to have English versions quickly (e.g. on NUMO Website), especially when trade press articles appear (individual ITAC members are available to help with "smoothing" English). Kitayama-san requested the advice of ITAC on informing the international community . The English language materials could also be used as the basis for papers in some of the major conferences in 2003 (ITAC particularly suggested HLRWM Las Vegas, ICEM, PIME) and also journal papers. It was agreed that the ITAC Chairman should help establish contacts with the editor of "Nuclear Fuel".

2.2 Level 3 RC / PA (Umeki-san)

The aims and audience for RC level 3 are clearly identified, but it was noted that the dual aims (support and forward looking) make production more challenging. Nevertheless, the content and structure look appropriate to support the Level 2 RC document. Some additional points noted are:

- Status of H-12; this is a good reference point, but it is a generic "research" concept so it is important not to "freeze it in"- i.e. maintain flexibility for NUMO (as an implementer) to develop its own environment-specific concept(s)
- The new Chapter 7 is a good idea but the flexibility and alternatives it describes need to be mentioned and introduced earlier in the report (see comments below on Ch. 2). It is important to make the message clear that this will need an R&D programme, new designs and design tools, and this may involve optimisation to reduce the cost of the national programme (To clarify the point raised by Umeki-san in the final wrap-up session, this does not require further work at present but only a preview of future trends)
- Chapter 2 needs to expand upon the basic stepwise strategy of the repository implementation programme: this very important and was considered to merit a new Chapter that incorporates current Section 2.3 and introduces the concepts of continuous learning and flexibility described in Chapter 7. A report on staging will be published by the National Research Council of the USA at the beginning of February and this could provide useful input; Charles McCombie agreed to arrange that NUMO receive a copy as soon as the report is released.
- A position on retrievability should be stated (even if this is not yet definitive)
- The weighting given to operational safety is considered to be under-emphasised and could be usefully expanded on
- Present section 2.4 (maybe in new chapter recommended above): explain what is meant by safety case and what the elements of it will likely be (PA results, indicators, analogues, evidence for stability... – N.B. many of these elements could benefit from stakeholder discussion and feedback). It should be noted that this is a developing area internationally without any standardised terminology and an area in which the Japanese

regulatory side is very interested. (ITAC can help as the programme develops and some input already provided).

The exact relationship of the PA document to the main RC report is unclear, as are its aims, objective and audience[1]. ITAC identified possible objectives, such as to:

- Show that NUMO has the methodology to analyse repository safety
- Show that different types of site can be safe
- Show how different types of site provide safety in different ways
- Show how different barriers contribute to safety.

In any case, it is important to present results in a graphical way (including clear explanation of uncertainty and site variability of this level of analysis) that avoids over-interpretation of performance of different environments. The report should also note that NUMO is developing new methodologies for evaluating a range of environments, which could then be applied to specific sites. It was also recommended to:

- Include section on how models will be validated in future PAs (even if the content of this section will reproduce material already in H-12)
- Explain why a specific PA approach has been chosen from among those available internationally (e.g. deterministic rather than probabilistic)
- Make biospheres consistent with repository concept and geography (which may mean extending them beyond H-12 models).

2.3 Level 3 SF (Tsuchi-san & Kondo-san)

This document is very well organised and planned and ITAC recorded only a few minor comments:

- There is a need to explain the FFs (no text at all has been seen yet) and include references to other national studies to show why (and under what circumstances) they are important/useful and how
- The clarification on mineral resources as an exclusion factor was good and needs to be included in final document (also in FFs)
- For sites close to volcanoes, NUMO should consider operational safety implications in FFs (e.g. pyroclastic flows)
- Biosphere variability impacts should be discussed in FFs (even if this is played down a bit to avoid over-interpretation – a risk noted by Tsuchi-san in the final wrap-up session).

[1] Umeki-san subsequently clarified this, noting that this presentation referred to performance assessment as presented in the Level 3 RC report (Chapter 6), which will be summarised in a simpler form in the planned "Level 2.5" performance assessment document

3 NUMO's current programme

3.1 Site characterisation (Tsuchi-san)

The stepwise approach illustrated is good and the steps shown are logical. It may, however, be worth showing that steps will be carried out iteratively (with feedback of experience gained), both in planning and in execution of SC work. The "supplementary area" idea is an essential and appropriate response to issues raised at the last ITAC due to the rather restrictive formal definition of a PIA. However, issues of compensation, access, etc. will need to be cleared up soon. Stakeholder views need to be taken into account in this respect, as they may help to determine or may constrain a SC programme (e.g. borehole locations). A strategy will be needed at some stage on how to do this. A procedure for optimisation and prioritisation of the site characterisation programme will also be critical. Finally, development of a SC "menu" is a useful concept and an area where ITAC can help provide information on national experiences (a special topic at this ITAC).

In a session on "Approaches to Site Selection and Characterisation: international experience", ITAC members presented overviews from the programmes in:

- Finland
- Sweden
- France
- USA
- Switzerland.

The documentation provided (extensive sets of overheads from all presenters) should be valuable for future NUMO planning. It might be useful to follow up with ITAC-NUMO discussions on specific site characterisation programmes at a later date. To derive a general message from these presentations, it was noted that there were some commonalties between national programme experiences, e.g.:

- Staged approach
- Use of exclusion and favourable factors
- Avoidance of terminology "best" or "safest" site
- Importance of local acceptance recognised .... neglected earlier but recognised now
- PA is an important guide for site characterisation; it is required for checking that sites are acceptable from a safety angle – but not generally useful as a site selection discriminator (uncertainties involved make it difficult to distinguish unambiguously "safer" sites).

However, there were also some marked differences, e.g.:

- Scope of SI at each stage (surface/underground)
- Emphasis on geological diversity when choosing a set of sites

- Involvement of local people in SC programme
- Ability and mechanisms to drop sites
- Extent of regulatory involvement.

3.2 Site selection (MAA)

NUMO has to decide on its approach and be prepared to explain it to communities. Both quantitative and qualitative multi-attribute evaluation techniques will be essential as a decision aid (but, it is emphasised, not a decision mechanism!). There certainly is a need for a transparent approach that shows how NUMO will select and weight all the factors that will be considered. Neil Chapman gave a short overview of the MAA work that NUMO has been carrying out with his advice. The ITAC agreed that it is good that NUMO has made a start with MAA and, in the future, qualitative and quantitative selection techniques can be explored further.

3.3 The 2nd RC workshop

This summary covers only the discussion following a presentation on the 2nd RC workshop. Unfortunately, a planned overview of NUMO work since the workshop to illustrate application of the matrix / overlay technique (carried out by Ueda-san) was not presented (no time: but should be taken up by ITAC later). It was noted that the output from this approach emphasised priority of R&D needs from a technical, but not from timing viewpoint. This latter point is very important for NUMO who may want to postpone a lot of R&D until closer to repository implementation, when boundary conditions will be better defined. Nevertheless, an early start to long-term experiments or demonstrations can build confidence and this should also be borne in mind. In any case, it was emphasised that NUMO needs to maintain flexibility and be aware that concepts can (and will) evolve with time. These points also need to be communicated outside NUMO so that later adaptations of concepts are properly perceived as steps towards optimisation and not as signals that earlier concepts were wrong.

4 Volunteer Scenarios Brainstorming

The brainstorming session was structured by a presentation identifying a few bounding scenarios which led to the discussion of how these might affect NUMO, considering the specific areas of

- Site Investigation
- R&D
- Resource impacts
- Cost impacts

- Achievability
- Pitfalls
- Impact on decision process

The scenarios are grouped as :

- CENTRAL: A few (2 to 3) suitable[2] volunteers
  - C1: in similar environments[3]
  - C2: in three different environments
  - C3: in mixed environments (multiple choices at one site)

- BOUNDING:
  - B1: only one suitable volunteer
  - B2: 10 or more ("lots") volunteers
  - B3: no volunteers –deferred programme

The resulting matrix is appended, but it was decided in the wrap-up that it was worth expanding on this to provide some further explanation so that it can also be used by people who did not attend this session (**Action: I. McKinley**). Also appended is a figure illustrating the various evolution scenarios for possible volunteer PIAs. This may be of some use in developing ideas for how and when volunteer sites may need to be rejected as unsuitable or put into a "reserve" category because other sites are allocated higher priority.

A further output was a list of generic risks which apply to the volunteering process:

- "On your own": a volunteer site is in an "unusual" environment with no international parallels; there is an increased risk if there are only a few volunteers
- The "late arrival at the dinner party"; with 2 possible negative cases, i.e. a marginal site needing "wasted" effort to bring up to the same level as the others or an obviously far better site, that may make early front-runner volunteers unhappy
- A requirement to prove that none of the alternatives is "safer", e.g. a potential demand from regulator or public to show that an "obviously better alternative" has not been overlooked (justify your weightings!)
- Someone "moves the goalposts": for example
  - regulatory change or development
  - changed international treaties (e.g. offshore)
  - NUMO asked to accommodate other types of waste.

NUMO should bear these points in mind when developing scenarios for the long-term development of their siting programme.

[2] i.e. they get past the nationwide and site specific screening stage
[3] environment = geography, geology and demography

5 Future Activities Brainstorming

In this session, a less structured form of brainstorming was attempted – here termed "freewheeling" – in which input from the participants was solicited on items which should be considered when planning NUMO's future activities. Such input was grouped under 3 headings, although the boundaries between them were sometimes unclear:

- Preparation for future dialogue with volunteers
- Technical issues
- Topics partially outside NUMO control.

The purpose of freewheeling is to collect ideas and not to debate the validity of suggestions. Accordingly, the output of this session is simply tabulated here without further comment.

5.1 Topics to be considered in preparation for future dialog with Volunteers

- Explain level of community's commitment / when can they pull out?
- Outline of studies to be carried out (literature studies / PIA site studies)
- Providing information on past work
- How will selection be conducted – MAA?
- Special topics if one site only volunteers? (What would have happened if no volunteers or if single site withdraws?)
- What are NUMO's procedures for communicating with the community and documenting work? Openness of procedures?
- What are roles of NGO's? (e.g. Greenpeace)
- Can H12 really answer all safety concerns of stakeholders?
- Are there independent technical reviewers of NUMO's programme?
- How big a site will NUMO need / level of access?
- What really happens in flexible staging?
- Will there be a community (Stakeholder) committee?
- What are the possible final land use options?

5.2 Technical topics to be considered by NUMO

- QA / data management / storage (considering longevity of information)!!!!!
- Preparation of site investigation programme menus
- How (and when) will NUMO include local experts?

- NUMO needs to quantify expected costs and time resources for PIA work which requires a fairly good idea of how PIAs will be characterised?
- NUMO development and co-ordination of the R&D programme supporting PIA programme (NUMO and other R&D organisations)
- Co-ordinate Design / PA / Site Characterisation sub-programmes for multiple sites.
- Develop ideas on retrievability / monitoring?
- NUMO should evaluate limits on availability of site investigation equipment
- What is technical publication protocol?
- Need strategy for implementing PIA characterisation
- What to do technically for difficult access – e.g. ocean drilling
- How do you know you have completed / have sufficient data?
- Training of staff
- Confirm all roles of organisations – METI / NUMO in operational terms
- All parts of NUMO need to participate on the international stage
- Should NUMO develop its own "repository concept"?
- Presentation of the flexible staging message
- How to approach EIA/EIS issues with the government?
- Formal integration (or co-ordination) with other Japanese disposal programmes (JNFL, RANDEC, etc.)
- Emphasise flexibility in RC designs.

5.3 Topics partially outside NUMO control

- Consider repository with all waste forms
- Consider 2nd repository
- Regulations
- What is repository programme cost ceiling? 3 trillion yen?
- When will NUMO take control of all R&D programmes?
- How will NUMO promote more efficient communication / collaboration with other Japanese agencies
- How can NUMO push back on METI decisions & develop freedom to do its own technical job (same issues true with power companies)
- What would be impact of international repository proposals?
- How will NUMO deal with the age balance in staff?
- Consider attachment of staff to NUMO from abroad and vice versa

- How to co-operate with other Asian countries?
- Formal integration of NUMO-related technical programmes being carried out by other Japanese organisations

6 General remarks

6.1 Documentation and QA

It was strongly recommended that NUMO should establish technical documentation series which could include reports for:

- Internal distribution (but may become public)
- Eternal distribution.

These could include contractor and NUMO reports and each would require a distribution policy to be developed along with associated QA and "disclaimer" frameworks. It was emphasised that report QA should be part of an overall NUMO Quality System. The latter is an extremely important topic which could be a focus for a future ITAC meeting.

6.2 Future of ITAC

6.2.1 Role and composition

The role of ITAC to date has been specified to be advisory, principally on technical issues. Additional roles include:

- Providing a major (internal) international review function
- Reviewing and advising on strategy, going beyond purely technical issues
- Providing information (national programme experience).

However, ITAC is clearly not an independent (external) international review group.

Some examples of specific ITAC contributions to NUMO's programme include:

- Helping develop the structure of solicitation documentation
- Refining the content of solicitation documentation
- Aiding development of strategy for repository programme
- Refining PIA definitions and selection approach
- Presentation of the international context of HLW management to DTAC
- Providing a motivation for staff to get important material together; acting as a sounding board for NUMO presentations; encouraging production of useful external (English) documents.

This can be compared with the full range of different requirements NUMO may have from international group(s):

1) Advice on technical programme
2) Strategic advice
3) External, independent review (for improving credibility)
4) Experience transfer from other programmes
5) Internal technical review (data, documents, projects)
6) International advocacy for NUMO programme.

ITAC considers that it currently contributes in all areas, except number three – although, even there, the credibility of the programme may well be enhanced by NUMO's demonstrated readiness to obtain wide international advice. Nevertheless, ITAC identified a number of ways in which NUMO could go further with international groups:

- **Option 1: retain ITAC with internal review and advisory roles:**
  - 1a: no change: define activities & frequency
  - 1b: extend ITAC membership
  - 1c: 1a + an external review group
  - 1d: 1a + carry out external "milestone" reviews (e.g. by NEA)

- **Option 2: disband ITAC: get advice on an *ad hoc* basis from consultants and bilaterals:**
  - 2a: establish a standing external review group
  - 2b: and/or add "milestones" reviews

Potential future activities (over the next 1 – 2 years) were listed as:

- Help plan the SC menu and specific programmes
- Review and advise on QA and technical documentation
- Review and advise on R&D programme
- Interact with DTAC
- Advise further on the site selection process.

ITAC recommendations can be summarised as:

- Keep ITAC as it is: match frequency to needs and specific activities of programme (2 - 4 / year for the intensive phase over the next couple of years): no need to broaden
- Establish an external review mechanism
- *ad hoc* review at milestones best matches current needs and NUMO resources (Option 1d)
- Completely independent reviews could be initiated by METI or NSC (improves "independence", but may complicate logistics)

- Use ITAC to help prepare for and respond to *ad hoc* reviews
- Revisit need for a standing external review group at start of PIA phase, with involvement of communities.

In the final wrap-up session, Masuda-san indicated that NUMO was considering the future of ITAC, but would exclude options 1a and 2, as listed above. NUMO also presented a list of potential topics for future ITAC meetings:

- Plan for Literature Survey
- General overview of PI programme / considerations on Siting Factors for Selection of DIAs + Relevant R&D
- Environmental assessment programme
- Alternative RC + Relevant R&D
- Integration of SC, design and PA
- QA system
- --------further issues to be specified when sites volunteer

As can be seen, there is a good overlap of this list with that proposed by ITAC.

6.2.2 Documentation of ITAC meetings

Until now, ITAC meetings have been recorded in short meeting records in English (like this one) which is associated with a set of copies of the overheads presented. Such records are all internal, unregistered documents. For the future, it may be useful to consider making these records available - as a part of NUMO's policy of openness and transparency. These records (with or without associated overheads) could be produced as internal or external numbered documents or, indeed, even published on the NUMO home page (possibly in an edited form).

Various home page options were listed:

- Summarise ITAC 1-3(4?) in 2-3 pages
- From ITAC 4 (5?) onwards:-
- Individual record in NUMO report series
- Highlights note for home page
- General article for home page (composition and aims of ITAC) which is occasionally updated.

It is clear that the earlier ITAC meetings were heavily biased towards documentation review, and hence of less general (external) interest. Nevertheless, the existence of ITAC is now quite widely known (in both Japan and abroad) and it is to be expected that questions about what it actually does will eventually arise. In any case, an outline article for the

NUMO home page will be drafted (**Action: I. McKinley**) and then NUMO can decide how they want to proceed further in this matter.

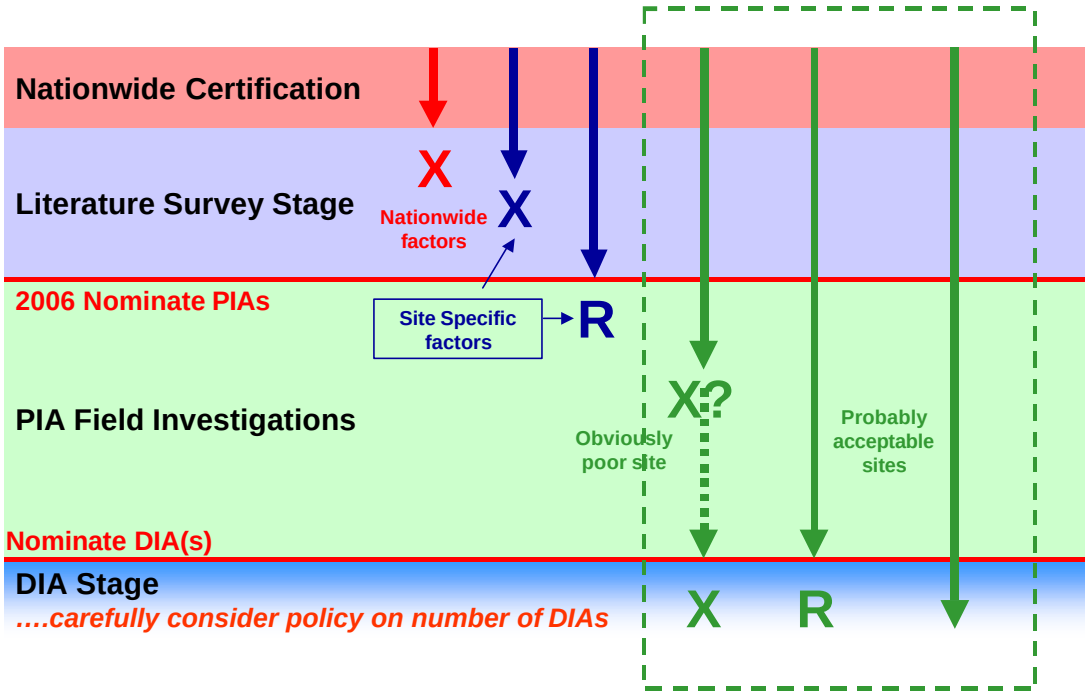
6.3 Wrap-up

Most of the points raised during the final wrap-up session have been integrated as clarification into the text above. The only remaining point was setting the dates of the **next ITAC meetings**:

- ➔ Week 31 (28 July 2003)
- ➔ Week 51 (15 December 2003)

To allow enough time for preparation during a year which promises to be very busy, exact meeting dates, a meeting format (specifying any special sessions) and a draft programme should be prepared at least 2 months in advance of the meetings (**Action: I. McKinley / T. Ashida**). During planning of the meeting, it was recommended to consider encouraging the involvement of a wider range of NUMO staff in ITAC meetings.

Propagation models for volunteers



18 February 2003
Dr. I. McKinley / Dr. C. McCombie/plf
(H:daten\isp\J\itac\ITAC-4record-FinalDraft-McKMcCnumo.doc)

	C1: 3 Similar	C2: Different	C3: Mixed	B1: 1 Volunteers	B2: Too many	B3: No volunteers
Site investigation	Simplifies but it is simple already for H12	Complicates ➢ Separate site teams ➢ Phased characterisation ➢ How to get same level of detail?	May create conflicts at site	Easier		
R&D	Reduces but may wish to keep options open	Increases	Slight increase	➢ Radical RC needed? ➢ R&D focuses		Revise RC
Resources impact	Concentrates limited human resources	Large pool of experts needed → site "teams"	Neutral	Helps		
Schedule impact	Likely to help	➢ Prioritise? ➢ Phase characterisation	May need to prioritise	Helps		
Cost impact	Reduce ➢ Common RC ➢ Common R&D	Increase, but maybe not by x3 factor	Small increase	➢ May need compensation at each step ➢ Harder to optimise	Needs screening	Reverse Dutch auction?
Achievability	Common mode "success"	➢ Avoids common mode failure ➢ Increases flexibility ➢ Increases chance of success	Increases flexibility	➢ Hit on miss ➢ Leverage is all with volunteer	NUMO has more leverage	
Pitfalls?	➢ Common mode failure ➢ "Similar" is relative in Japan	➢ Sites compete with each other ➢ Possible lack of common safety assessment (data, models, assumptions)	Need to choose Bad option at site → "bad site"	A lonely single site might withdraw		
Impact on decision process	➢ (+) Comparison easier ➢ (-) Validity of decision may be questioned	➢ Comparison harder ➢ Validity of decision may be more accepted	If one option dropped, adaptation might raise concerns	NUMO must form close partnership with community	➢ Ranking is easy ➢ Selection is harder	Need to work with communicators: NGOs, politicians