arius Newsletter

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Editorial

So far, 2008 has turned out to be quite a fascinating year for those of us interested in global optimisation of waste disposal. In Europe, there is the hint of a fresh breeze blowing away some (but not all) of the old cobwebs and we have introduced a new section, specifically on European News. More, and more influential, voices are recognising regional solutions as inevitable. SAPIERR II is at the stage where the results and proposals for moving forward with a European regional repository organisation need to be discussed with senior politicians. By the time our next issue goes to press, the results of the first round of these meetings will be known. Already, we can report on a preliminary meeting with the European Commissioner for Energy and the Environment. Our Topical Article also looks at some of the extensive output of SAPIERR II: here, on community benefits.

There have also been some surprises this year: perhaps the most startling being Senator John McCain's espousal of an international repository for spent fuel (…but not in the United States). We hear of further potential new entries to the field of nuclear power regularly – in this issue, we report on the United Arab Emirates, focussing on its thinking about spent fuel and waste management.

There is also the usual bemusing spectacle of political posturing from both the southern and the northern hemisphere. We cover it all in Newsletter 17.

Neil Chapman
Baden-Dättwil

Arius Internal News

2008 Assembly of Members

In our last issue, our editorial highlighted the changes that we expect to take place in Arius over the next year or two as SAPIERR comes to a close and European initiatives take shape. This subject is clearly of considerable importance to the Association, so we shall be using our regular, end-of-year Extraordinary Assembly of Members to discuss it. This meeting had originally been planned to coincide with the Euradwaste Conference in Luxembourg in October, but will now take place later, in Switzerland, to allow more members to attend and more time for discussion.

SAPIERR II: completion and beyond

SAPIERR II, the 2-year project on development of a Strategic Action Plan for Implementation of European Regional Repositories, is coming to a close and looking to the future. The management studies are almost completed and a strategy for development of shared, regional repositories (via the establishment of a non-profit European Development Organisation: EDO) has been laid out.

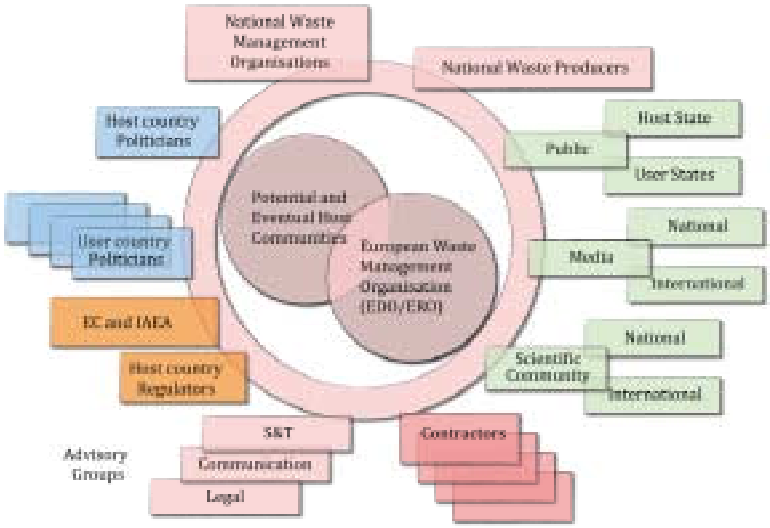
Detailed documents on the results obtained in the first three Work Packages (on the legal responsibilities and liabilities, organisational structures and economics of an EU regional waste management project) have been reviewed by the project team and members of the SAPIERR Interest Group (SIG) and are now available on the project's website (http://www.sapierr.net/). The remaining two documents, on security issues and on public and political attitudes, will be available in the next few weeks.

The next stage, post-SAPIERR, is the establishment of a Working Group to assess the SAPIERR proposals with a view to development of the EDO. The current plan is to set up this Working Group around the turn of the year so that it can carry out its deliberations during 2009. Further development and consensus on such a development strategy clearly requires bilateral discussions with interested Member States as well as the EC and, eventually, others. Invitations to join such discussions were sent out over the last two months to the European Commission and to twenty EU Members States (with and without nuclear power programmes). Consequently, although the project was originally scheduled to be completed in November 2008, an extension has been sought until 1st February 2009 to allow the initial round of bilateral discussions with interested countries to be concluded. Because considerations on regional solutions are matters of national strategy, an important factor in the discussions is that they involve decision-makers at government level.

On June 25th, the SAPIERR project leaders, together with Arius President, Hans Codee of COVRA, began the round of bilateral discussions with a meeting in Brussels with EU Commissioner for Energy and Transport, Andris Piebalgs. The Commissioner expressed his support for regional initiatives in waste disposal, which he regards as inevitable and necessary for securing the expansion of nuclear power in the EU. In parallel with the bilateral discussions, he also committed to contacting Ministers in key relevant Members States to move the

process forward.

Most replies are still open, but to date, several EU Member States have confirmed their interest in development of shared, regional repositories and no negative replies have been received. Even without bilateral discussions, some have already committed to joining the Working Group that is aimed at developing the framework for an EDO. The planning for bilateral discussions with relevant politicians of the interested countries will extend into the end of the autumn; some of the meetings with Ministers could be scheduled only in late September. When all the bilateral discussions have taken place, the SAPIERR project will present a viable strategy at the closing project seminar, which will take place in early 2009.



From the SAPIERR II study: the multiplicity of groups that would be involved in a European regional repository project. At the core, the partnership between the EDO and the communities.

Funding the EDO Working Group during 2009 could be a significant issue, even though requirements for funding a secretariat and some travel are modest. The SAPIERR co-ordinators submitted a small project proposal (EDOSA: EDO Support Action) in the latest round of EC 6th Framework RD&D funding opportunities but failed to attract sufficient support to be selected for the very limited funds that are still available in FP6. This is, perhaps, not surprising, as the EDO Working Group will not be directly involved with RD&D, as the results of SAPIERR II have moved deliberations forward to the strategic level.

The issue of providing EC support for such strategic initiatives was discussed with Commissioner Piebalgs. All parties concerned were aware that the Commission, unfortunately, has few mechanisms and little procedural flexibility for initiating such activities. Nevertheless the SAPIERR partners are exploring other routes to provide financial underpinning for the Working Group's activities.

As noted above, the implications of these major developments are considerable and will be discussed at the next Arius Assembly, which will take place in Switzerland towards the end of this year.

European News

High Level Group meets again in May

Earlier this year we reported on the establishment in 2007 of the "High-Level Group" on Nuclear Safety and Waste Management", tasked with developing a common understanding and reinforcing common approaches across the European Union in the fields of nuclear safety and nuclear waste management. At its first meeting, last October, EC Commissioner Andris Piebalgs, in his opening address to the group, had observed that:

> *"In an interdependent European Union, nuclear safety cannot be considered any longer from a purely national perspective. It requires common or shared approaches, built on solid and existing national and international experience".*

The Group met again on 30th May and agreed to work together to further improve radioactive waste and spent fuel management practices in the EU, to strengthen co-operation, and to monitor the enhancement of the financing of decommissioning safe management of spent fuel and radioactive waste. In the months to come discussions in the High Level Group should be held on establishment and implementation of radioactive waste management plan in all EU Member states.

It was recognized that EU citizens should be guaranteed that the best nuclear safety standards and a responsible management of radioactive waste are implemented everywhere in Europe. The Group has initiated a detailed study to find the pros and cons of potential other common arrangements to inform any future decisions.

The influence of the group on European nuclear policies is very large. Commissioner Piebalgs, in the SAPIERR discussion reported on earlier, indicated that he would consult with the Chairman of the High Level Group on the approach being taken in the project. The chairman is Andrej Stritar, Head of the Slovenian regulatory body. Chairman Stritar is on record as supporting regional repository developments. An article by him on this topic was reported on in Newsletter 13. It is worthwhile quoting again the concluding words of this article:

> *"It is definitely not optimal to look for 16 high-level waste repositories in 16 countries operating nuclear power plants in Europe, just as it is not optimal for Slovenia to make such a repository for its one and only reactor – this would be as ridiculous as asking France to make 59 repositories for its 59 reactors."*

Nuclear Energy Forum meets in Prague

Vítězslav Duda, managing director of the Czech Republic's Nuclear Waste Repository Authority (SÚRAO), gave an informative interview to Markéta Hulpachová of the *Prague Post* in April, a few weeks

before the European Nuclear Energy Forum (ENEF) met in the Czech capital. He explained about the difficulties being encountered in trying to locate a repository site in the country – largely owing to public opposition or simple lack of interest – and agreed with comments made about the same time by Martin Říman, the Czech Minister of Industry and Trade, who proposed pooling waste into several deep geological waste repositories serving the entire EU.

The Prague Post article quotes a March interview given by Minister Říman to a radio programme on *Frekvence 1*: *"It's exactly the type of problem the EU should engage itself in….. I consider it nonsense and ...a waste of economic resources for each (nuclear waste producing state) to spend billions on building its own repository. Two or three would suffice for the whole of Europe."* Vítězslav Duda agreed that a small number of repositories would be all that Europe needs, saying that the construction of two or three would be analogous to the situation in the United States.

In his interview with the *Prague Post*, Říman observed that the abundance of geologically favourable territory makes the country an ideal cand*idate for hosting a potential European repository – "It could very well happen that one of those two or three repositories ends up in the Czech Republic"*. Duda pointed out, however, that finding a host country will not be easy. While several member states, including Poland, the Netherlands, Slovenia and the Baltic states may express interest in a joint repository, few would agree to build it on their own land. *"When it comes to these types of sensitive questions, Europe's integration efforts have not advanced far enough to unite the interests of individual nations,"* he said.

ENEF held its second meeting the following month in Prague, on May 22nd – 23rd. The president of the European Commission, José Manual Barroso, opened the meeting, saying that "*Europe could become a real model if it succeeds in adopting a common legal framework on nuclear safety and waste management.*"

In more formal language than in his press interview, Martin Říman reiterated his views on sharing solutions in his address to the forum:

> *"In my opinion, however, there is an area in which the coordination of the activities of Member States by the European Union institutions is worth considering. It is found at the very end of the fuel cycle — the depositing of highly radioactive waste from spent nuclear fuel. Approximately 500 cubic meters of such waste are produced yearly in Europe, and the amount will multiply with the construction of new plants. With the exception of Sweden and Finland, which have undertaken serious steps to build an underground repository, most other Member States have thus far not proceeded beyond a debate on selecting a site.*
>
> *The European Union developed from an association of states that were willing to cooperate in the sphere of nuclear energy and material resources. I think that it should reclaim its origins and launch a debate about a joint project for a deposit for spent nuclear fuel. The EU and its institutions could serve as an ideal platform for such a debate".*

There is still, however, clearly considerable nervousness about the publicity given to comments such as those of the Czech Minister, at large, high-profile meetings. ENEF has a number of Working Groups and a paper produced by the 'Risks' Working Group reflects some of the concerns – based however on a false interpretation of how regional repository developments are envisaged to take place. The paper states:

> *There have indeed been several reasons to postpone the necessary decisions to develop and implement geological disposal, such as the possibility for multinational solutions and pending decisions regarding fuel cycle options. The possibility of multinational solutions, in particular for minimizing waste management costs, should not be used as an argument to postpone a decision or to establish a wait-and-see approach. Instead, as already mentioned, each Member State should actively develop solutions in its own territory. Despite the choice of the fuel cycle (closed or open) and potential future development (e.g. partitioning and transmutation) there will always be waste that needs to be disposed of. Consequently, there is no reason for postponing the decision to develop geological disposal.*

This contains an unjustified criticism of multinational solutions. We are not aware of any country that has used the possibility of there eventually being European regional repositories as justification for doing nothing about their waste problems. It is certainly not a key reason for programme delays, as readers might be led to believe. The real culprits are problems caused with national repository siting projects, or political fears about these, which prevent national programmes from receiving sufficient backing from governments. In fact, a SAPIERR-type proposal is designed to ensure that each Member State moves positively to *"actively develop solutions"* to its waste problems – without, however, insisting that these solutions be national.

European Nuclear Assembly tackles the same issues

While the events described in the previous article were taking place, the European Nuclear Assembly (organised by the trade association Foratom) was also facing the same issues at its 15th April conference in Brussels. Addressing the Assembly, Arius President, Hans Codee, spoke about the need for a European regional repository, pointing out that other areas of nuclear energy such as uranium enrichment and electricity supply – even power station ownership – are already handled on a cross-border basis. At Arius, we believe this last point to be only poorly understood by the public and the basis for much disingenuous positioning of countries. The European trade in 'nuclear electricity' is extensive and professed 'non-nuclear' countries (such as Italy or Denmark) could not manage without importing energy that started its journey at a nuclear power station.

At the same meeting, Bruno Lescoeur of EDF suggested that Europe needs an investment of 900 BEUR in its electricity generating market over the next 20-25 years. This puts the 10 BEUR SAPIERR estimate for the cost of a regional EU repository for the wastes from 14 countries into perspective.

Eurobarometer published again ….without a question on regional solutions

June saw the publication of the fourth special Eurobarometer survey of public attitudes and opinions in Europe with respect to radioactive wastes. The previous surveys were carried out in 1998, 2001 and 2005, over which period the EU has grown from 15 to 27 Member States.

There is a considerable amount of information in the survey, only a little of which is commented on here. The survey found a roughly equal split of opinion about nuclear power: 44% for and 45% against. However, of these numbers, most have moderate opinions, 33% being 'fairly in favour' and 28% being 'fairly opposed'. Interestingly, the poll shows 39% of those respondents currently opposed saying that a permanent, safe solution for radioactive wastes would make them change their opinions about nuclear power. This indicates the importance to Europe of getting its waste management act sorted out if nuclear power is to be credible to the population.

Nevertheless, it is probably disheartening for the nuclear industry to hear that, in most countries, the largest segment (56%) of the poll would remain opposed to nuclear energy, irrespective of whether solutions for the safe management of radioactive waste would be found. The split in opinion varies considerably from country to country. The countries that would be predominantly in favour of nuclear power if a waste solution were available are Finland, Slovenia, France, UK, Lithuania, Belgium and the Netherlands (all of which have operational nuclear power plants). Regardless of their views on nuclear power, 93% of Europeans believe that it is urgent to do something about radioactive waste today.

Disappointingly for Arius, it seems that pressures exerted by some countries opposed to working on regional disposal solutions at present led to a question on opinions on this option being excluded from the 2008 survey. The SAPIERR project had made strong representations to have a question included again this time, as in the first two surveys.

The 1998 and 2001 surveys had asked the question *"From an economic and environmental point of view, building an underground disposal site for the most hazardous category of radioactive waste, such as that from spent nuclear fuel, is a complex project. In your opinion, where should such sites be built? - In each EU country that produces this category of radioactive waste. - In only a few EU countries with access shared amongst co-operating."* The 2005 survey had not asked a question on the subject at all, but simply asked people to agree or disagree with a statement that radioactive waste was already disposed of in another country – 52% agreed, incorrectly, of course.

Instead, an ambiguous question to the effect that *'Each EU Member State should be fully responsible for the management of its own radioactive waste'* led to the predictable agreement from 61% of respondents. Of course, regional repository supporters can also completely agree with this statement, recognising that cooperating to develop a shared repository is a fully responsible approach! The 2008 Eurobarometer stated: *"The focus has…. been put on the evolution of public opinion since 2005, for reasons of comparability between the questionnaires that have been used over the years"*. There was, in fact, rather limited comparability between the 2005 and 2008 surveys and certainly little with the first two.

In late 2007, SAPIERR, after consulting with project members from various countries, had proposed a question to the Eurobarometer organisers along the following lines:

> *There is broad consensus that geological repositories can be used to safely dispose of radioactive wastes. While several countries will proceed with such developments within a national framework, the EC has suggested that safety and security of radioactive waste across the EU can be attained more efficiently by technical and economic cooperation between countries to develop one or more shared geological repositories. No country or community would be compelled to host a repository against its will.*
>
> *A. Do you agree that EC collaboration to develop shared repositories should be encouraged?*
>
> *B. Would you agree to your country participating technically and scientifically to develop shared repositories?*
>
> *C. Would you accept that your country export radioactive wastes, subject to proper controls and assurance of safety, to a shared repository in a willing EU country that would receive appropriate benefits?*
>
> *D. Would you support an initiative backed by the EC to set up a formal European Organisation to study further the different aspects related with shared repositories?*

This specific question (and anything at all on the same topic) was rejected. Nevertheless, and despite the missed opportunity to continue to track public opinion on this key issue, the 2008 survey covers a lot of ground and makes very interesting reading.

Italian waste export to USA: opposition stiffens in the USA and new legislation is proposed

In our last issue, we reported on the plans of an American company to import and dispose of radioactive waste from Italy. EnergySolutions Inc, is seeking to import about 20,000 tonnes of low-level waste. After processing in the company's plant at Oak Ridge, Tennessee, there would be about 1600 tonnes of residues to be transported to and disposed of at the company's Clive repository, about 80 miles west of Salt Lake City, in Utah. When we wrote this up in March, it had already caused considerable discussion in the USA and, shortly afterwards, this culminated in a bill being introduced to the US House of Representatives to ban imports of foreign radioactive

waste - with presidential authority to grant an exception if importation would serve a national or international policy goal. The bill was introduced by Congressman Bart Gordon of Tennessee, who's spokesperson said that he was *"…concerned that many countries would be all too happy to ship their waste to the United States"*.

There was also opposition from the low-level waste 'compact' to which Utah belongs. Compacts have to make arrangements between themselves for the disposal of LLW. The other states in the compact are Alaska, Hawaii, Idaho, Montana, Oregon, Washington and Wyoming. These states voted unanimously to prevent the import of the Italian wastes. EnergySolutions has offered to restrict imported waste volumes in order to ensure that sufficient capacity is available for US wastes. However, it has also asked for a legal judgement on the ban, as it says its Clive disposal facility was not established by the compact and the US Constitution does not allow the compact to discriminate between domestic wastes and identical foreign wastes.

The Utah attorney general then joined in the fight in June, filing a petition with the NRC (who would give a disposal license) opposing the project and saying, among other things that it would result in "economic harm" for Utah. There were even complaints concerning the possible transport of the wastes through the Port of New Orleans. The NRC has received many submissions on the subject, apparently overwhelmingly negative, and intends to reach a decision by September. A spokesman for EnergySolutions has pointed out that NRC has to make decisions on such permits on the basis of health and safety considerations, rather than public opinion, and pointed out the economic benefits to the state of Utah of this kind of business activity.

By the end of June the matter had escalated from the House of Representatives to the Senate, with the introduction of legislation parallel to the bill introduced in the House earlier in the year. If approved, it would ban the NRC from authorising import of certain low-level foreign-generated radioactive waste. The Senators introducing the legislation say that it is needed to clarify the legal situation nationally, now that the matter of the authority of the compacts has gone to court.

The whole episode illustrates vividly how a proposal intended to give an improved global environmental solution and initially welcomed in the State (including by the Governor) can be turned around by political reactions to vocal public opinion.

Scotland spins yet faster

Readers of the UK media during the last couple of years will have witnessed, perhaps with some ironic amusement, the contortions undergone by the Scottish Executive (the devolved government of Scotland) with respect to radioactive waste management. To the discomfort of Westminster, they pulled Scotland out of the CoRWM process at the last minute. This official exercise to recommend the fate of the UK's legacy wastes to government ultimately proposed geological disposal. Scottish Ministers took it upon themselves (without the benefit of CoRWM's public consultation insights) to assert that geological disposal was an 'out of sight, out of mind' solution that they did not want a part of and that Scotland would go its own way and look after its own wastes (presumably, by storing them indefinitely).

Now, Scottish Ministers have to face up to a real situation. Rosyth Royal Dockyard Ltd (near Edinburgh) has applied for a license to ship contaminated metal from decommissioned nuclear submarines to the Studsvik company in Sweden. There, it will be smelted and the decontaminated metal recovered for re-use. There is no equivalent facility available in the UK to carry out this operation. The considerably reduced volume of residual slag incorporating the radioactivity will be returned to Rosyth for disposal – in the UK LLW repository near Drigg, in England. The Scottish Environmental Protection Agency, the regulatory agency, have given approval for this transaction and passed the matter on to the Scottish Executive for a final decision. Meanwhile, the local authority in the Shetland Islands has complained about the exercise, for a variety of reasons, amongst which is the fact that disposal in England goes against Scottish government policy.

It will be interesting to see how the Scottish Executive manages to rationalise this challenging situation.

International News

United Arab Emirates look to nuclear power and fuel leasing

Looking to its future energy requirements and following a period of consultation with the IAEA and several larger nations, the government of the United Arab Emirates has announced a policy for the development of nuclear power.

The development would be spearheaded by a new implementation body known as the Emirates Nuclear Energy Corporation (ENEC), advised by a board made up of international experts on nuclear safety security and non-proliferation. A key component of the policy is formally to renounce the development of domestic enrichment or reprocessing facilities. Fuel leasing would lie at the heart of the nuclear power programme. Complete operational transparency is another key element of the proposal.

The policy document includes the following text:

> *In lieu of domestic enrichment and reprocessing, the UAE would seek to conclude long-term arrangements with reliable and responsible governments and contractors for the secure supply of nuclear fuel, as well as the safe and secure transportation and, if available, the disposal of spent fuel via fuel leasing or other emerging fuel supply arrangements……*

The UAE government hopes that this approach will be a model for other non-nuclear states to obtain full international backing of the development of peaceful nuclear energy for their populations.

In previous issues of the Newsletter (and in the article on GNEP on page 6 of this issue) we have discussed the importance of fuel-leasing schemes having concrete arrangements for managing the wastes from returned fuel, or for disposing of the fuel itself. This

requires the availability of what will effectively be multinational repositories – whether they are for non-returned LILW from reprocessing or for direct disposal of spent fuel taken back from leasing countries. The entry of high-profile new user countries such as the UAE into the nuclear energy sector reinforces the urgency to grasp this issue effectively.

Australia turns its back again.....

Following what appeared to be the dawn of an enlightened national debate on how it wants to see its role in the global nuclear fuel cycle, the new government of the world's second largest supplier of uranium appears ready to step back into the darkness and firmly close the doors.

Last September, the previous government signed Australia up to the GNEP agreement (as well as the Generation IV International Forum). For a country to be part of GNEP implies that it has an interest in its place in the global fuel cycle (see article on GNEP on this page). As has been frequently stated by many international and domestic commentators (including a past Prime Minister), Australia is one of the very few countries in the world that would be conferred the international trust to operate a full suite of fuel cycle facilities for use by other countries – to the considerable economic and political advantage of the nation.

The new government of Kevin Rudd is now looking again at the issue of 'nuclear'. On being challenged that involvement in GNEP might mean consideration of hosting an international repository, Resources Minister, Martin Ferguson, simultaneously capped both ends of the fuel cycle by saying that the Rudd government *"….categorically rules out accepting any waste from any other country and categorically rules out any enrichment programme in Australia"*. Asked whether Australia would continue to be part of GNEP, he firmly stated that he was 'not sure'.

...and squashes grassroots interest

Meanwhile, a June meeting in Sydney of Australian National party members from New South Wales seems rather to have shocked itself and other party members by voting in favour of a motion to the effect that they supported research into the development of a nuclear power industry and a commercial international nuclear waste facility in Australia.

When the motion reached the NSW parliament, three days later, a vote was taken that, among other things, condemned this policy and called upon the Liberal party either to over-rule or endorse their 'junior partner'. The vote was in favour. The leader of the NSW Nationals meanwhile distanced himself from his party members and said that the result of the original vote was 'not binding'. He also said that, what Australian politicians continue to refer to as a 'nuclear waste dump', is *"….electorally unpalatable ...the same as for nuclear power stations"*.

In 2006, the previous Prime Minister of Australia, John Howard had called for a 'full-blooded' debate on nuclear energy. It does not seem that this debate is being approached in a responsible manner by most politicians.

GNEP funding cut to zero

Although voting for a significant increase in the 2009 USDOE nuclear energy allocation, the US House of Representatives appropriations sub-committee on energy cut the specific component assigned to GNEP to zero. Whilst providing funding for the Advanced Fuel Cycle Initiative and an increased budget for the Yucca Mountain Repository project, the bill described GNEP as *"…counterproductive, poorly designed, and poorly executed…"* and accused DOE of 'bungling' the initiative. The bill still has to pass through Senate, where it is expected that amendments will be made to the allocations to specific programmes. Last year, a House-Senate compromise was required to assign any funding to GNEP. Before October, by which time the process should be completed, Presidential approval is also required.

Critical opinions on GNEP (including Arius comments in previous Newsletters on the waste aspects) have stated that it would increase proliferation risks from the spread of reprocessing technology, be prohibitively expensive, and fail to solve waste disposal problems. At the same time there is no certainty that the claimed technologies will ever be developed. Among the critics, the government's own GAO (Government Accountability Office) has challenged the administration's preferred 'technology path forward'. The report is available at the GAO website: http://www.gao.gov/new.items/d08483.pdf.

Below, we comment further on the promise and the reality of GNEP, with specific emphasis on its potential impacts on the international waste picture.

The US Department of Energy published its Global Nuclear Energy Partnership Strategic Plan (GNEP-167312, Rev 0) in January last year. The three goals stated were:

- Wider-scale use of nuclear energy
- Decreasing risks of proliferation and nuclear terrorism
- Addressing the challenges of disposal

All of these are of great importance for global environmental, safety and security reasons.

The plan concentrated strongly on technological issues associated with enhancing the US capabilities for undertaking key fuel cycle activities. It also highlighted the view that GNEP can postpone for a long time the need for a second repository in the USA, provided that the facilities for advanced fuel cycle operations are brought on line. Its key global aspect is the proposal that sensitive nuclear technologies such as enrichment and reprocessing should be restricted to a relatively small number of supplier countries. In return, user countries should have assured access to nuclear fuel and nuclear power technologies.

The strategy is, however, weak on the key point of how to win the support of other nations and thus achieve success in the area of enhancing global security. Why should small countries welcome a new regime that creates, even more firmly, a two-tier status in the nuclear world? Unless GNEP can offer greater incentives than at present there is little or no

reason for them to buy in to the initiative. Currently, for enrichment, fuel fabrication, reactor construction and reprocessing there is a already a sufficiently competitive market. With GNEP, this competitive market can only shrink. What extra incentives are being offered? The only tangible additional service offer is the take back of spent fuel. This could, in principle, be extremely attractive since deep geological repositories for limited amounts of wastes are very expensive and are also difficult to site for both technical and societal reasons. Removing the disposal problem from small nuclear programmes could outweigh the possible disadvantages that GNEP might bring them.

But can GNEP remove the problem? Currently the stated principles include 'taking back spent fuel for recycling'. Will the USA (and other Tier 1 GNEP countries) be able to accept foreign HLW for final disposal? The situation concerning radioactive wastes or spent fuel is, in fact, even more problematic than this. Small countries with existing modest inventories of spent fuel will have little incentive to send future spent fuel arisings to a foreign recycler if they have to implement a national deep repository anyway. Moreover, even those countries that initiate civilian nuclear programmes under a GNEP agreement for returning spent fuel (e.g. perhaps the UAE – see article on page 5) will have small quantities of other long-lived radioactive residues from activities in power production, research and industry – and these must also be disposed of in a geological repository.

Despite the reservations that some countries might have about GNEP, the USA has been successful in encouraging a total of 21 nations to sign up to the partnership. It has also established a GNEP steering group and subgroups on infrastructure development and on fuel cycle services. These groups have met and a productive exchange of views was reported. However, discussion on the most sensitive issue – waste management - was postponed. In practice, therefore, the back-end issues associated with GNEP are still so open that no global impact can be guaranteed. To achieve the laudable global environmental and security goals, the back-end must be directly addressed. Multinational geological repositories for all types of long-lived wastes must be made available either by Tier 1 fuel cycle supplier nations or by a third party country willing to implement such a facility (see, for example, the previous articles on Australia).

McCain suggests international repository

US Republican presidential candidate, Senator John McCain says he would seek to establish an international repository for spent fuel that could make it unnecessary to open the proposed Yucca Mountain repository. In a speech on May 27th at the University of Denver that covered a spectrum from nuclear weapons to nuclear security and non-proliferation and the international nuclear fuel cycle, McCain stated:

> *"I would seek to establish an international repository for spent nuclear fuel that could collect and safely store materials overseas that might otherwise be reprocessed to acquire bomb-grade materials. It is even possible that such an international center could make it unnecessary to open the proposed spent nuclear fuel storage facility at Yucca Mountain in Nevada."*

Subsequently, his aides and advisers elaborated a little further, saying that this might be more focussed on supporting Russia in establishing a site in Siberia for disposal of waste from Asia and Europe. The idea is first and foremost about what to do with spent fuel that resides in other countries, according to McCain's senior foreign policy adviser. However, he is willing *"to entertain the possibility that if the spent fuel repository is up and running, if the security and safeguards are sufficient that we could possibility send some of our spent fuel there too."*

Comment in Washington was muted, according to the US media, and the view was that the senator had, perhaps inadvertently, been mistaken when he commented that such an approach would remove the requirement for the Yucca Mountain repository. Various nuclear industry spokesmen commented that shipping US spent fuel abroad was an impractical suggestion and that international repositories were intended for 'smaller countries'.

This affair brought into immediate question McCain's views on Yucca Mountain (the Democratic candidate, Senator Obama, being opposed), although he was later careful to clarify his support for the project. The following day, in Reno, Nevada, he said that he backed both the US repository (provided it went through all necessary process) and reprocessing, saying that the matter required a 'little straight-talk'. But he also took the opportunity to reiterate his support for the international repository concept, although without repeating his comment that it would do away with the need for disposal at Yucca Mountain.

And finally…. a thought on repository costs

Before closing our news items for this issue, we note with interest that the US administration has published its latest estimate of the total lifetime cost of the Yucca Mountain repository. The estimate, the first since 2001, comes to over 90 BUSD – 9 BUSD already spent and the rest to take the project through implementation and up to closure in about 100 years time. This appears to work out at around 1.3 MUSD per tonne of spent fuel, or about twice the cost of the SAPIERR estimates for its 'large inventory' multinational repository scenario, which work out about 10 BEUR or about 0.6 MUSD per tonne of spent fuel (both concepts, of course, include other wastes too).

Would we be mischievous to think that Senator McCain might have been considering this when he made his Denver speech….?

International Meetings

Como Workshop: Expanding Nuclear Power to New States, 11th -14th June

This meeting was organized by the International Working Group – Landau Network Centro Volta and the Texas Engineering Experiment Station (TEES), in cooperation with several other organisations and was attended by Charles

McCombie of Arius. A total of 48 participants, from 14 countries (Argentina, France, Italy, Jordan, Malaysia, Mexico, Namibia, Nigeria, Russia, South Africa, Tunisia, UK, USA and Vietnam) and four international organisations, were present. A central area for discussion was multilateral approaches to nuclear power, including waste management.

While questionnaires on aspects of multinational approaches and on the requirements of new nuclear power nations was circulated during the meeting, the sample of countries was considered too small to be statistically meaningful (and the participants were not formal representatives of their country's policies). Nevertheless, some interesting results emerged. One of the findings of the meeting, as expressed in its final report, was that:

> *Geological repositories are essential and a global network of international repositories would assure that all countries would cope with their waste in a responsible manner. Noting that some of the participants expressed a willingness to consider hosting geological repositories, steps should be taken to explore how such an approach might be pursued, noting the very long time intervals involved and the need for a formal legal basis protecting the interests of the host country(ies) and the countries making use of such installations.*

In addition, the meeting concluded that.

> *Technically feasible solutions for spent fuel handling disposal do exist, but the problem is global and international solutions appear most practical. Further implementation of new nuclear power programs should not be delayed awaiting common or final solutions, as dry or wet storage for spent fuel is practical for the near term. International cooperation in geological repositories should be pursued as a means to provide alternatives to national repositories.*

Arius Publications

Nuclear Engineering International

In our last issue, our Topical Article concerned the difficulties in siting repositories, whether national or international. Arius has produced a much longer and more detailed paper outlining our currently suggested approach to siting a regional repository. The thinking has emerged from the SAPIERR experience and the paper, which is published as an article in the latest edition of *Nuclear Engineering International,* sets out in depth a staged approach and discusses the critical stakeholder interactions that will need to take place.

The article details are:

Neil Chapman & Charles McCombie (2008). *Staged Siting Strategy*. Nuclear Engineering International, **53** (May 2008), 26-33.

International High-Level Radioactive Waste Management 2008

The 2008 IHLRWM conference will take place in Las Vegas from 8th to 11th September. Arius has had two papers accepted for oral presentation, the details and abstracts for which are presented below:

A Nuclear Renaissance without Disposal?

Charles McCombie and Neil Chapman

Nuclear power is undoubtedly experiencing more rapid growth than it has for decades. This "nuclear renaissance" is heartening many experts who joined the industry back in its first heyday, expecting then to see a continuous rapid development of a powerful new technology. It didn't happen as was expected back then. Instead, nuclear energy production stagnated, in particular in the western world. Three prime problems were responsible for this: public concerns about reactor safety, business doubts about economics and no clear demonstration of a waste disposal route. What is the situation today? This paper asserts that the former two issues have been resolved to the satisfaction of the majority of stakeholders – but that waste disposal could again be a stumbling block to the expansion of nuclear power programmes around the world. It looks at how expanding and new nuclear nations can react to ensure that credible disposal solutions can be made available – either in a national or a multinational framework. It also addresses the key challenge – repository siting - in these two scenarios.

Security Concerns at the Back End of the Nuclear Fuel Cycle

Charles McCombie, Neil Chapman and Tom Isaacs[1]

The security and proliferation concerns associated with the spread of nuclear power in the first decade of this century are almost entirely focussed on enrichment technology at the front-end of the nuclear fuel cycle and on reprocessing. Although these are the highest risk areas, it is also important that the potential security problems associated with waste management (in particular with the storage and disposal of spent fuel and radioactive wastes) are not neglected in the "nuclear renaissance". The international community should continue to strengthen its efforts to highlight the risks and to facilitate solutions that reduce the threats. This crucial issue must not be ignored - either by the countries that are marketing and exporting nuclear power plants or fuel supply services, or by those countries anxious to expand their national nuclear energy programmes. This article examines some of the broader issues surrounding the security aspects of waste management and suggests some solutions.

[1]Stanford University and Lawrence Livermore National Laboratory, USA

Topical Article

One good turn deserves another….

Phil Richardson, Galson Sciences, UK

As part of the SAPIERR II project, a review was carried out of ways in which communities might benefit from hosting a European regional repository. Clearly, the benefits must be attractive enough to encourage communities to want to become involved in the process in the first place, as well as to consider accepting spent fuel and other wastes from other countries.

This article summarises some of the benefits that might be considered; the full details are available in

the project report on the economics of a regional repository[1] which is available from the SAPIERR website (www.sapierr.net).

Why would they want to?

All around the world, an important safeguard generally offered to potential repository host communities is that the community should not find itself worse off than before the process began. It has, therefore, become common to offer specific benefits packages to the community – not as compensation for bearing an increased risk, but rather as an expected consequence of being willing to provide a valuable, localised service to a widespread group of users. Such benefits comprise a mixture of direct financial contributions and other social and institutional measures designed to assist the community to take part and ensure enhanced well-being, over and beyond the lifetime of the facility.

Benefits are designed to respond to a number of ethical imperatives:

- no nation or community should be compelled to accept a facility against its will; communities that host facilities that provide services to others are entitled to receive compensation for this service;
- compensation is for performing a community service and is not any form of risk premium;
- financial and other potential benefits should not be used as leverage to encourage participation by poor communities.

The process of providing justified benefits for hosts of multinational facilities is especially sensitive because national practices in this area vary significantly. In various countries in Europe, however, successful approaches have been developed for designing fair benefits schemes. These national approaches consider the types of benefits, the level of any direct payments, the distribution of the benefits and also – very importantly – how to involve local populations in negotiations on these topics.

As part of the work in SAPIERR II, a SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis was carried out to look at some of the pros and cons of the different benefits that have been offered internationally.

This does not give us a guaranteed recipe for successful negotiations as such, but allows us to get a flavour of the kinds of things that will need to be considered, when and if efforts begin to find a community willing to host a multinational facility. It also allows us to make some comments on how benefits could be structured.

Cash Incentives

These tend to be exactly what the word implies; they are an incentive to a community to either become involved in a process, or to allow a development to continue, or both. Some examples of this type are fixed and not subject to negotiation, having been laid down within some pre-existing legal instruments.

Lump sums

These are paid up-front as a way of attracting volunteers.

- *Pros: The community receives a benefit straight away. They encourage discussions with the developer.*
- *Cons: They can appear to unfairly target poor communities and are open to accusations of bribery. A community could take the money and then pull out later.*

Comment: Community payments should be clearly specified in advance and efforts made to demonstrate that these are for 'community service' and not to mitigate risk. Huge figures, as have been seen in some past cases, should be avoided as they sent a false message about the potential impact on a community of hosting a repository. Payment should be linked to project milestones with no sharp geographical cut-off in the community receiving benefits.

Annual Payments

In many cases, agreements or incentive packages contain details of regular payments that are available, enabling local communities to estimate the benefit they could receive.

- *Pros: The community knows exactly what to expect and encourages local support.*
- *Cons: Unless these are linked to project milestones, there may be difficulties in changing levels or in final termination.*

Comment: It is important not to make these so large as to cause community dependence. As with lump sums, there should be no sharp geographical cut-off.

Expert Support Packages

Funding for the community to employ experts to take part in discussions with the developer.

- *Pros: Allows communities to challenge information from the developer and not feel dependent on them.*
- *Cons: Can allow opposition groups to bring in 'professional' nuclear objectors whose aims are not directly related to the localised issues of the siting community.*

Comment: This is a benefit to be stressed, allowing communities to gain access to a wide range of opinions. Controls on how funds are spent, while essential, must not be seen to exclude counter arguments.

Tax Revenue

Usually linked to the volumes and types of waste disposed of in the facility, plus some degree of local income tax.

[1] Chapman, N.A., McCombie, C. and Richardson, P. (2008). Economic Aspects of Regional Repositories. SAPIERR II, Work Package 3 Report. 91 pps.

- *Pros: Can provide a regular income for the community.*
- *Cons: Can make a community dependent on a single facility.*

Comment: An important benefit, but it is important to ensure that the national government does not gain the total revenue. The funds must be ring-fenced. Again, it is important not to make a community dependent on these for general expenditure.

Trust Fund for Future Generations

These can provide support for schools, scholarships etc.

- *Pros: Demonstrates a long-term commitment to the community.*
- *Cons: There are no benefits from these to the current generation who live near the site.*

Comment: An important component of any benefit package. Initial payment must be sufficiently large to demonstrate commitment to long-term value.

Profit Sharing

Here the community receives a share of any commercial profit from facility operation.

- *Pros: Provides funds for other community developments.*
- *Cons: If waste volumes decrease with time, the income drops but the facility is still there.*

Comment: This requires careful negotiation and agreement. Whilst it can instil a sense of local ownership, the community ought not to become dependent upon it.

'Social Benefit' measures

These are any measures which are intended directly to enhance the quality of life in the community and/or to offset any stigma, perceived or actual, regarding either the community's participation the siting process, or associated with the actual location, development and operation of the facility within the community or area.

Employment

Developers often guarantee to employ local people wherever possible.

- *Pros: Supports the community, encourages young people to stay and attracts other companies to relocate.*
- *Cons: Can make the community dependent on the facility. A large influx of outsiders can disrupt community cohesion.*

Comment: It is essential to ensure the maximum possible local hiring of industrial staff, with efforts made to ensure recruitment of young people for training, as they will become the experts of tomorrow.

Infrastructure Improvements

This includes roads, hospitals, schools etc., in order to cope with increases in demands on existing services.

- *Pros: These are highly visible to the community and may not otherwise have been provided.*
- *Cons: Local opposition may intensify if there are environmental impacts from new roads etc.*

Comment: Another important benefit. Funding should be limited to projects associated with the development. It is important to share the improvements with other neighbouring communities.

Property Value Protection

These are schemes designed to monitor property values during facility operations and to check for any impacts due to stigmatization.

- *Pros: Provides confidence that individuals will not suffer financially.*
- *Cons: Unless all properties in a community are included, some people will be bound to feel unfairly treated.*

Comment: This can be crucial to gaining local support. Agreed baseline values should be open to scrutiny by an independent body to avoid disputes.

Integrated Development Projects

These are projects designed to benefit the community, not only during the siting process and subsequent facility operation, but long into the future.

- *Pros: Allows the community to take control over its own future.*
- *Cons: Could conflict with existing development plans and cause local resentment.*

Comment: Essential to allow local people to contribute to development of ideas and plans for such projects, in order to gain community support. All views should be canvassed and decisions made transparently. Care must be taken not to alienate regional interests.

Relocation of Developer

As part of the benefits offered to local communities for agreeing to host a repository, it is becoming increasingly common for the facility operator to offer to relocate its main operational headquarters to the locality.

- *Pros: Demonstrates a long-term commitment by the developer and can allow the community to become a 'centre of excellence' with other new industries.*
- *Cons: members of small communities may resent a large influx of outsiders.*

Comment: This may be essential so as to guarantee other benefits, such as tax revenue and other income, in negotiation with the national government

concerned. Support should be given for the area to become a 'centre of excellence' if so desired, thereby attracting other specialist industries.

Discounts and services

In some countries it is recognised that, when a community fulfils a role considered to be in the national interest, there should be some tangible compensation, often in terms of reduced utility fees etc.

- *Pros: The community sees an immediate benefit from acting in the national or regional interest. If widely available they can encourage other industries to move into the area.*
- *Cons: The community can become reliant on these and if they cease, the community may suffer.*

Comment: Subject to national practices, this can also be used as an incentive for location of other developments. Careful negotiation of ramping down of benefit should be undertaken, to avoid community impact when the facility closes.

'Community Empowerment'

These types of measure can also be regarded as a form of incentive, designed as they are to allow a community to feel a sense of control over the siting, development and even operation of the facility. They usually include such things as establishment of local monitoring or review groups, especially where the community is a volunteer participant.

Local Involvement in Decisions

It is now becoming common for community partnerships to be established, involving local elected bodies, interest groups, citizen groups etc., which are given the opportunity to influence some of the details of the project, usually those associated with integrated economic development projects.

- *Pros: This can encourage local involvement and provide a feeling of control.*
- *Cons: Widening involvement can allow opportunities for opposition groups to disrupt the process. It can also be difficult to decide who should make decisions.*

Comment: This can be a powerful mechanism for developing a sense of project ownership. Care should be taken to balance the roles of elected and non-elected individuals. Final decisions should be taken by the most relevant level of local government.

Capacity Building

This includes measures designed to allow the oversight group or partnership to become more knowledgeable about the issues involved. This can include organisation of meetings, discussions with independent experts and visits to operating facilities. It can also assist a community to develop the capability to cope with additional demands on health and other social services that may be required.

- *Pros: This helps the community to understand what is happening and builds relationships with the developer.*
- *Cons: Those involved can be seen to be too close to the developer.*

Comment: An essential part of any benefit package. Local support can be lost overnight if the project does not move at a pace dictated by local concerns.

Local Partnership to Oversee Project

These are now often established in order to allow a sense of ownership and control to be developed locally. They are usually based on a contractual agreement between the local community and either government or the implementer.

- *Pros: These promote local confidence that the project will proceed according to local wishes and allow trust to be developed between the partners.*
- *Cons: There can be a danger of developing cliques who develop local power and influence. The inclusion of non-experts can also slow the process down.*

Comment: Negotiated contractual agreements should be introduced, with guarantees of ring-fenced funding agreed to by national government and placed outside the impact of normal spending rounds.

Involvement Support Packages

The various payments and funding arrangements described above are sometimes amalgamated into a single agreement, designed to allow local communities to take part in a siting process without being negatively financially impacted.

- *Pros: These can allow the community to become fully involved in all aspects of a project at no extra cost to local finances.*
- *Cons: There is a danger that local officials can be perceived as having been bribed to support the facility.*

Comment: These are essential to gaining local involvement unimpeded by lack of capabilities or funds. Careful design of these packages must ensure that other communities beyond the immediate area can become involved if they wish, including those along transport corridors.

Conclusions relevant to Arius

Looking through the range of options presented in Phil Richardson's article above, we can draw a number of conclusions relevant to the inclusive siting strategy for an international repository proposed by Arius in the Topical article in our previous Newsletter and in the NEI article described in this issue, on page 8.

Almost all of the above approaches to involving host communities in a fair way have been applied in various national repository-siting programmes throughout the world. In some cases, a multi-year collaboration between repository implementers and potential host communities has allowed time for mutual confidence to be built and for negotiations on

community benefits to be conducted. This has even led to local communities competing, to some extent, to be volunteer hosts for siting.

National disposal programmes have also been very open and very inventive in other countries in their proposals for community benefit packages. Some, countries, such as Japan, have defined major benefits in top level government documents; others, such as Belgium, Slovenia, Switzerland or Canada, have relied more on direct negotiations between the implementing organisation and potential host communities. In an increasing number of countries, experience is demonstrating that, when a repository project is recognised as both necessary and safe, then fair negotiations between implementer and potential host community can lead to a win-win situation in which the project progresses with both parties agreeing that it is bringing a net benefit to the community.

The lessons learned from national experience in this area are, of course, crucial for the Arius mission of developing multinational disposal facilities. As in the national case, the potential users of the repository must all recognise that a common need exists; as in the national case, all potential host communities (and countries) must recognise that safety and security are guaranteed; as in the national case, the implementer must be prepared to enter into negotiations that will ensure that hosting the repository results in net benefits for the host communities finally chosen.

Upcoming Conferences

Below, we highlight upcoming conferences that are specifically relevant to Arius activities and objectives.

September	
7th – 11th	2008 IHLRWM, Steps Toward Reality for Safe Disposal", Las Vegas, NV, USA (www.ans.org/meetings/index) ***Arius papers***
October	
13th – 18th	The 16th Pacific Basin Nuclear Conference (16PBNC) "Pacific Partnership toward a Sustainable Nuclear Future", Aomori, Japan (www.pbnc2008.org)
20th – 23rd	EURADWASTE'08: 7th European Commission Conference on the Management and Disposal of Radioactive Waste; Luxembourg (www.radwastegovernance.eu/) ***Arius and SAPIERR represented***
November	
17th – 18th	Next Generation Nuclear New-Build: 3rd Annual European Summit Sofia, Bulgaria ***Arius represented***