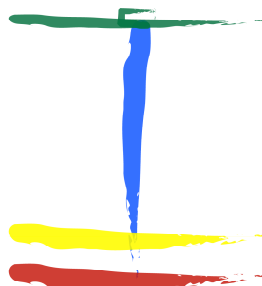




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SAPIERR II

**Strategic Action Plan for Implementation of European Regional
Repositories: Stage 2**

**Work Package 1
Legal & Business Options for Developing a
Multinational/Regional Repository**

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Legal and Business Options for Developing a Multinational/Regional Repository

1 Introduction

Soon after the peaceful use of nuclear energy began to spread in the 1960s and 70s there were proposals for multinational solutions to providing fuel cycle services to power plant operators (IAEA, 2004). However, for the final steps in the cycle, the management and disposal of spent fuel or radioactive wastes, it was only reprocessing services that were actually implemented multinationally. These were provided by countries such as France, the UK and Russia. These countries originally also provided a disposal service since they did not return any reprocessing wastes to their customers. With time, however, a waste return clause was included in new reprocessing contracts – mainly as a reaction to public and political pressures in the reprocessing countries.

Interest revived in the late 1990s, driven both by the high costs of geological repository programmes and also by the security concerns associated with the prospect of fissile material being widely distributed across the world. Although several initiatives were proposed, none led to success, partly because the proposed approaches were judged to be premature and too commercial. Accordingly, in 2002, the not-for-profit organisation, Arius (Association for Regional and International Underground Storage), was established to help partner organisations from various countries explore the possibilities of shared disposal facilities. The current growing worldwide interest in initiating or expanding nuclear power programmes also emphasises the need for all countries to have a credible disposal strategy. For many, especially new or small programmes multinational cooperation leading to shared facilities could be an attractive option.

In Europe the Parliament and the EC have both expressed support for concepts that could lead to regional shared facilities being implemented in the EU. The EC has funded two projects that can form the first steps of a staged process towards the implementation of shared regional or international storage and disposal facilities. In the period 2003 to 2005, the EC funded the project SAPIERR I (Support Action: Pilot Initiative for European Regional Repositories), a project devoted to pilot studies on the feasibility of shared regional storage facilities and geological repositories, for use by European countries. The SAPIERR I project looked at the basic technical and economic feasibility of implementing regional, multinational geological repositories in Europe. The studies [Stefula 2006, Boutellier and McCombie 2004, Chapman et al.2005] indicated that shared regional repositories are feasible and that a first step could be to establish a structured framework for the future work on regional repositories.

The present SAPIERR II project (Strategic Action Plan for Implementation of Regional European Repositories) examines in more detail specific issues that directly influence the practicability and acceptability of such facilities. If these are to become a reality a dedicated organisation will be required that can work towards the goal on the extended timescales that

national disposal programmes have shown to be necessary. Specific terminology is introduced in the SAPIERR II project to describe the organisations that may eventually be formed for performing the work leading to implementation of a regional repository in Europe. The terms introduced are a European Development Organisation (EDO) and a European Repository Organisation (ERO). The definitions of EDO and ERO are as follows:

- **EDO (European Development Organisation):** the initiating, non-profit organisation for a shared geological disposal facilities project. Its objective is to establish the systems, structures and agreements and carry out all the work necessary for putting in place a shared waste management solution and geological repository (or repositories). This work would continue through the investigation of potential sites and up to the point of license application to begin the construction of a repository. It is assumed that this takes about 10+ years. At this point the EDO may decide to transform into or separately establish the ERO.
- **ERO (European Repository Organisation):** the implementing organisation for waste disposal. The ERO would be the license holder for the repository and responsible for all subsequent operational activities in a host country that has agreed to dispose of wastes from other European countries. The form for the ERO will be chosen at a future date by the members of the EDO, assuming that they come to the conclusion that the EDO organisation needs to be altered. The choice will also be strongly influenced by the preferences of the country or countries that have been identified as repository hosts. The ERO could be either non-profit or commercial in structure.

The goal of SAPIERR II (2006-2008) is to develop possible practical implementation strategies and organisational structures that will enable a formalised, structured European Development Organisation (EDO) to be established after 2008 for working on shared EU radioactive waste storage and disposal activities. The tasks in the SAPIERR II project are listed below. Each task translates into a Work Package , as follows:

1. Preparation of a management study on the **legal and business options** for establishing a European Development Organisation (EDO).
2. A study on the **legal liability issues** of international waste transfer within Europe.
3. A study of the potential **economic implications** of European regional storage facilities and repositories.
4. Outline examination of the **safety and security impacts** of implementing one or two regional stores or repositories relative to a large number of national facilities.
5. A review of **public and political attitudes** in Europe towards the concept of shared regional repositories.
6. Development of a **Strategy and a Project Plan** for the work of the EDO.
7. **Management and dissemination** of information.

1.1 Objectives and Scope of the report

The primary goals of this Work Package are to review the possible forms for an organisation that would take over the development of projects leading ultimately to siting, constructing and operating a shared European deep geological repository for the disposal of spent nuclear fuel (SNF) and high level radioactive waste (HLW). As indicated above, it cannot be assumed that

a single organisational form will be most suited to all phases of the multi-year implementation process. Most emphasis is, therefore, put on assessing the benefits and challenges associated with different options for a body that would manage the work over the coming several years, possibly up to the stage of identifying a suitable site or sites for which a license application can be prepared. In this Work Package a range of potential organisational and legal forms for the EDO is examined and, a limited set that appears more suitable is proposed as options to be put before potential participants in the organisation to be established. In addition, the requirements on the internal structure and staffing of a repository development organisation are discussed. The final decision on legal form and organisation has to be left to the actual partners establishing the EDO as it will depend on the national laws of the partners. Following this introduction, Chapter 2 sets out a framework in which an initial EDO might be established, discusses how this might evolve with time and lays out objectives that it would address. The broad characteristics of an organisation that could address these goals are also examined. Chapter 3 then considers the various specific legal or business forms that the organisation might take. The specific key internal organisational features of a potential multinational disposal entity are discussed in Chapter 4. Chapter 5 looks at recent high level recommendations made by an Expert Group of the IAEA [IAEA, 2005] on the requirements on multinational initiatives in the nuclear fuel cycle. Chapter 6 gives examples from the past of major multinational nuclear organisations established to provide enrichment or reprocessing services. The final Chapter 7 assesses which of the possible forms laid out in Chapter 3 are most appropriate for such an entity.

2 Requirements for Development of European Regional Repository

2.1 Participating organisations

Which types of European countries and which types of organisations within these countries might conceivably become partners in a shared repository development scheme?

In principle, the minimum number of countries that is needed for a repository to be labelled as multinational or regional is two, but such a bilateral arrangement would be regarded as an “add-on” option in the terminology of the IAEA, i.e. one country augments its disposal inventory by accepting wastes from another [IAEA 2004]. With three and more countries participating, the facility becomes multinational, or regional if the partners are geographically close. Most likely candidate countries are those with small nuclear programmes or new nuclear programmes. The high cost of geological disposal and the clear economies of scale in constructing and operating common repositories identified in the SAPIERR I project make the option of sharing economically attractive. Often overlooked is the fact that countries with no nuclear power plants are also potential partners since these countries also have small quantities of radioactive wastes from medicine, industry and research that can be safely disposed of only in a deep geological repository.

An important point is that European countries need not decide at an early stage between the options of a national or a multinational disposal programme. Keeping both options open in a “dual track” strategy is a prudent route. This approach can be followed for a long time, since implementation of a national repository for a small nuclear programme will in any case be many years in the future as the inventory of spent fuel grows only very slowly and the SNF and HLW needs decades of on-surface cooling before it may be put in a final repository. During this period the options are:

- to wait and see what possibilities emerge
- to start an extended national development programme
- or to participate in a multinational effort (while maintaining an adequate level of national expertise in waste management)
- or to combine the latter two (a so-called “dual track” approach).

A multinational repository will have users from various countries and may actually belong to national and/or private organisations from the different countries. Depending on which of the organisational structures that are described later is finally implemented, the users and partners may be:

- National governmental waste management (WM) bodies – in many countries radioactive waste disposal is the responsibility of the government, which normally then establishes a dedicated organisation for the purpose.
- National private WM bodies – in some countries the waste producers remain directly responsible for waste management up to and including disposal. The dedicated bodies formed by the waste producers could also be partners in a regional repository, although this would certainly require government endorsement.
- Industrial enterprises and concerns – in some implementation models, companies that produce radioactive wastes or firms that specialise in radioactive waste management could be direct customers of a regional repository, or even partners.

- Finally, it could be advantageous if the EC and/or other international organisations would take a direct role in running or overseeing a European regional repository or storage facility.

Whatever the ultimate composition of the regional repository organisation, there will be a strong requirement for an extensive network of connections to national WM bodies, national waste producers, national regulators, the EC and the IAEA. This is illustrated later in Chapter 4.

The provocative question that is often posed to the multinational approach is whether one or more potential host countries must be identified at the outset for the concept to be credible. The correct response to this question can best be derived from examining the national geological disposal programmes that have been operating for decades. None of these started out by having a site identified for disposal. Experience has shown that, within a country, the geographical and political stakeholders who are potential hosts (e.g. municipalities, counties, regions, States) must first agree that a joint solution to a common problem is required. An extended siting process then follows with the objective of ending with a host region and community that understands the potential impacts, both positive and negative, that the repository project will bring and which is willing to accept a repository. This experience can be directly transferred to the multinational case, in which a group of countries agrees that a common solution would be beneficial and should be explored. Identification of a host country cannot be expected for some years into the project, and should not be an initial goal of the undertaking.

2.2 Different structures for different phases

The development of a geological repository, whether as a national or multinational undertaking, is an extended, phased process that lasts for two decades or more. Both the organisational form of the responsible body and its internal structure and staffing can vary throughout these phases. This has been observed in national disposal programmes and will be the same in international ones. The priorities and the capabilities of an organisation charged with developing repository concepts, seeking public and political acceptance and identifying suitable sites may differ from that of an implementing body that will construct and operate the facilities.

For multinational, shared repositories, it is more likely that changes will be necessary than it is for purely national projects. After the choice of a site or sites, implementation will be in specific host countries that have their own legal and political requirements concerning the participation in and operation of a disposal organisation. The primary aim of the current study is to consider suitable legal and organisational forms for the *initial phase*, in the life of an EDO - that is, for those stages up to identification of a repository site and formulation of concrete implementation plans. For the licensing, construction and operation phases, the EDO itself will have to decide whether to stay with its original form or to adopt new structures, staffing and financing for the implementing body, which is labelled in this study as European Repository Organisation (ERO). In any case, the form chosen will depend on the legal framework in the host and user countries and thus cannot yet be specified. The ERO is given only very short consideration in Chapter 2 of this project.

In principle, the ERO may be a private or governmental national body in a host country simply providing a service to foreign customers. It is more likely, however, to be some sort of multinational body. Recently, a group of Experts, working under the auspices of the IAEA, has produced a report on multinational approaches (MNA) to fuel cycle facilities [IAEA 2005]. The report discusses past examples of these and also lays out requirements to be met.

These issues laid out by the Expert Group are more directed towards enrichment facilities than repositories. However, they will certainly be relevant to the later implementing body (the ERO).

2.3 Objectives of the EDO and ERO

The assumption in this report is that the EDO would probably need to exist for about 10 years before repository license application and the possibility of establishing the ERO are likely. In this model, the main objectives of the EDO would be to:

- **develop a shared, multi-national repository programme in Europe, win partners for the project, and enhance acceptability in potential user and host countries as well as in countries that have opted for national disposal**

In order to reach these main objectives, the tasks of the EDO would be to:

1. interact with national governments and waste owners from partners and from all other potential repository user, transfer and host countries;
2. review, develop and assess design concepts for European geological repositories;
3. evaluate and publish strategic environmental and economic impacts of a European regional repository;
4. identify and present to EDO Members the most suitable organisational type, staffing levels, location and budget for the ERO, including establishment of transparent and equitable financing schemes for the construction and operation phases;
5. agree and publish siting criteria and requirements
6. prepare a platform for negotiations with potential hosts on benefits packages;
7. establish a budget for the EDO including a robust mechanism for estimating and updating repository development costs;
8. establish and implement a siting programme – culminating with agreement on a site or sites for which a repository construction license is to be sought.

As for national repository programmes, the siting effort will be the most challenging activity for the EDO. When the EDO is established, the partners firstly have to work together and agree on a complete list of tasks. The choice of whether and how to be involved in siting should not be forced upon participants at the outset.

As in national repository development, the task becomes more straightforward once a site has been agreed. The objectives of the ERO are then to:

- **organise the financing of the project, continue with site characterisation and technical design work, obtain the necessary licenses, and then construct, operate and close the facility – ensuring at all times that safety is assured and that an open and interactive information policy is maintained.**

The work of the ERO will extend for decades into the future and will therefore require robust partnering agreements between participants.

2.4 Characteristics of the EDO and the ERO

Before looking at the options that are available for the organisational type and internal structure of the EDO and the ERO, it is worthwhile to set out the characteristics that such entities should have. These characteristics are determined by the activities to be carried out, the timescales over which repository projects develop, the multinational nature of the organisation and the sensitive nature of the undertaking, which certainly requires some level of international oversight.

The initial tasks involve establishing a long-term repository programme to be implemented by experts from a wide range of technical disciplines, persons familiar with controversial societal aspects and generalists who can effectively manage large projects of this type. After the planning phase and the build up of a credible organisation comes the most challenging task – identifying one or more countries that are prepared to consider hosting a multinational repository. At this stage political and public influences are dominant and the EDO must be structured and staffed in such a way that the partners work together in a system that all agree to be open and fair for all those involved. The involved stakeholders include not only the circle of partners who are potential users of a shared repository, but also other countries that may provide services in the planning and implementation stages, as well as international organisations. Both the EC (since this is a major European project) and the IAEA (which also has a responsibility for safeguards and transport issues at present) are clearly important in this regard.

The basic form of the EDO and the ERO could be that of a commercial or a not-for-profit organisation. It may be an incorporated enterprise with own legal personality with liability restricted to the enterprise's assets or it may be a union of partners without its own legal personality and full or restricted liability of each member. The EDO and ERO may be structured as private undertakings or as true intergovernmental or even supranational organisations. This study suggests that the EDO, with its primarily promotion and, research and development orientated work programme should be a not-for-profit organisation, but that the ERO could be either a not-for-profit or a fully commercial organisation.

EDO Model - proposed characteristics:

1. Not-for-profit; common aims and objectives
2. Equal voice for all Members; open to new participants beyond founders
3. Members are only the potential user and host countries (i.e. representative organisations from those)
4. Suppliers of services and others can be part of an Interest Group
5. Funding mechanisms to be agreed – e.g. equal contributions for all members, contributions according to potential waste inventories or economic status weighted contributions
6. Agreed mechanisms for later accounting for total investments up to ERO formation
7. Direct support and possibly seed funding from EC
8. Legal structure allowing transformation to another form at time of siting
9. 'Neutral' European domicile that does not prejudice siting (e.g. Luxembourg, Brussels, Strasbourg, Switzerland)
10. Staffing: board, administration and project staff may be by delegation from Members

ERO Model 1, Non-profit - proposed characteristics:

1. Not-for-profit, for Members use only; no non-user members
2. Based on binding intergovernmental agreement(s) or private agreements with governmental approval
3. Cost sharing according to planned waste inventories
4. Potentially accounting for contributions in former EDO
5. Domiciled in host State
6. Agreed benefits packages to host State and community
7. Safety and security primarily being subject to the legislation of the host country and international standards (such as IAEA, EC)
8. Insight and full information guaranteed for user country regulators
9. IAEA as overview trustee
10. Host country majority on board or with veto rights
11. Permanent dedicated staff

ERO Model 2, Commercial - proposed characteristics:

1. Commercial aims and objectives as well as common aim of members/owners
2. Members may be host and user countries as well as third parties
3. Commercial disposal service offered to members and third parties
4. Preferential rates, accounting for contributions in former EDO and/or profit sharing for members/owners
5. Host State negotiates benefits for the State and also for the host community
6. Founders always retain majority shareholding (may be difficult to execute)
7. Host country majority on board or with veto rights
8. Based on binding intergovernmental agreement(s) or private agreements with governmental approval.
9. Safety and security primarily being subject to the legislation of the host country and international standards (such as IAEA, EC)
10. Domiciled in host State
11. IAEA as overview trustee
12. Permanent dedicated staff

3 Potential legal forms for an EDO

Both an EDO and an ERO need a formal organisational and legal structure and an independent identity. They should be formed as legal entities that can act in a legally binding fashion and that have clearly regulated liabilities. Company law is basically a national matter for individual States, which poses several challenges when establishing a multinational undertaking. The EU has recognised these challenges and has introduced two forms of European companies: the European Company (Societas Europaea, SE) and the European Cooperative Society (Societas Cooperativa Europaea SCE). Both are described below. These forms were created mainly for international collaboration between EU Member States.

The different States in principle recognise four basic forms of companies: sole proprietorship, partnership (general, limited, limited-liability), corporation, and cooperative. Basic forms to be considered for an EDO and, to a certain extent, for an ERO are briefly described below. The information given cannot at this time be more than a broad outline as the details differ considerably from State to State.

3.1 An Association

This is one of the least formal types of organisation. Basically, an **association** (also sometimes called an **unincorporated association** or a **voluntary association**) is a group of individuals or legal entities that voluntarily enter into an agreement to form a body for some purpose.

In many countries, no formalities are necessary to start an association. Some jurisdictions require that the association registers with the authorities in order to inform the public of the association's existence and objects. In many jurisdictions, an association or a registered association has the status of a juristic person, i.e. it is a legal subject, and often the members are not responsible personally for the financial acts and debts of the association. In countries requiring registration, a non-registered association would not have this legal status, and the members of the association might have, not limited, but full personal liability. In some countries, there is a minimum number of members required to start an association.

Associations may take the form of a not-for-profit organisation; in some countries this is even a requirement. This does not mean that the association cannot make profits from its activity, but only that all profits must be reinvested in the association. Associations that are organized for profit or financial gain are sometimes called partnerships.

Most associations have some kind of document that records the object(s) of the association and regulates the management, the rights and duties of the members and the finances of the association. This document is commonly referred to as the association's bylaws, regulations, constitution or agreement of association.

The organisation, ARIUS, which is charged with promoting the general concept of regional and international repositories, has the legal form of a Swiss association – which in its domiciled country, Switzerland, is called Verein (German) / association (French) / associazione (Italian). In Switzerland, a Verein has its own separate legal personality, no matter whether it is registered or not. Registration in principal is voluntary. Members basically are personally liable to pay their constitutional contributions only, but not for the association's liabilities. A Swiss association may have ideal objectives only and may not be

incorporated for commercial purposes. Most Swiss NGOs or the Swiss sections of international NGOs are established as a Verein (e.g. Amnesty International, WWF).

3.2 A Cooperative

A cooperative is a legal entity owned and controlled by its members. It generally is incorporated to pursue directly a common objective of its members. A defining characteristic of a cooperative is that the members have a close association with the cooperative as producers or consumers of its products or services, or as its employees. However, it is the principle of "one member - one vote", i.e. the democratic structure, and the common interest (not primarily financial) of the members, which separate cooperatives from capital stock corporations and other commercial enterprises. Cooperatives do have a share capital, but control and distribution of the net profit are on an equitable basis.

In the European Union, since August 2006, the European Cooperative Statute has provided a European legal form for cooperatives with individual or corporate members in at least two of the EU member States. This is the SCE (Societas Cooperativa Europaea), which is regulated in the Council Regulation on the Statute for a European Cooperative Society [EC 2003]. The SCE is based on common principles and the Regulation aims to enable establishment of a SCE by physical persons resident in different Member States or legal entities established under the laws of different Member States, and to enable operation of the cooperatives outside their national borders in all or part of the territory of the Community. Key points extracted from the Regulation are reproduced below.

"A European cooperative society (hereinafter referred to as "SCE") should have as its principal object the satisfaction of its members' needs and/or the development of their economic and/or social activities, in compliance with the following principles:

- *its activities should be conducted for the mutual benefit of the members so that each member benefits from the activities of the SCE in accordance with his/her participation,*
- *members of the SCE should also be customers, employees or suppliers or should be otherwise involved in the activities of the SCE,*
- *control should be vested equally in members, although weighted voting may be allowed, in order to reflect each member's contribution to the SCE,*
- *there should be limited interest on loan and share capital,*
- *profits should be distributed according to business done with the SCE or retained to meet the needs of members,*
- *there should be no artificial restrictions on membership"*

Some further important details are as follows:

An SCE may be formed by five or more natural persons or five natural persons plus legal bodies, or by legal bodies only, in each case from at least two different Member States, further by a merger of cooperatives or by conversion of a cooperative in a Member State (Art.2 para 1 of the Regulation). The subscribed capital shall not be less than EUR 30'000 and shall be divided into shares (Art.3 para 1 and Art.1 para 2). The liability of the members may be limited or not limited (Art.1 para 2). A SCE has own legal personality, which it acquires on the day of its registration in the Member State in which it has its registered office (Art.1 para 5 and Art.18 para 1).

The structure provided by the Council Regulation requires a general meeting and either a supervisory organ and a management organ (so called two-tier system) or an

administrative organ (so called one-tier system), depending on the form adopted in the statutes of the SCE (Art.36). In principle, each member has one vote. The statutes of the SCE may allow for a member to have a (limited) number of votes determined by his/her participation in the cooperative activity other than by way of capital contribution (Art.59 para 1 and 2), provided that the law of the Member State in which the SCE has its registered office so permits.

In Switzerland, the national waste organisation, Nagra, is organised as a cooperative (Genossenschaft in German) for its current activities. When plans were made to apply for a construction licence for a L/ILW repository, the same form was chosen for the implementing repository organisation, the Genossenschaft für nukleare Entsorgung Wellenberg (GNW).

3.3 A European Economic Interest Grouping

A European Economic Interest Grouping (EEIG) is a form of an association between companies or other legal bodies, firms or individuals from different EU countries who operate together across national frontiers. It is regulated in the Council Regulation (EEC) No 2137/85 of 25 July 1985 on the European Economic Interest Grouping (EEIG) [EC 1985]. The EEIG provides an alternative approach to establishing links with firms in other Member States. It is particularly interesting for businesses and smaller firms for which some options such as mergers, joint ventures or take-overs may be too expensive and complicated. The purpose of the grouping is to facilitate or develop the economic activities of its members by pooling resources, activities or skills without loss of individual identity and independence. The activities of an EEIG must relate to the economic activity of its members but must be ancillary to them. The term “economic activity” is interpreted widely.

An EEIG may be set up in any EU Member State and operate in any part of the EU. It may also enter into arrangements with organisations from non-EU countries, although these may not themselves become members of an EEIG. An EEIG must be formed in accordance with the rules described in the Council Regulation. The Regulations require and permit Member States to make certain provisions under national law in respect of EEIGs. As a result, there are differences between EEIGs incorporated in the different Member States, mainly in areas such as legal capacity, management and auditing requirements.

An EEIG can be formed by companies, firms and other legal entities governed by public or private law which have been formed in accordance with the law of a Member State and which have their registered office in the Community. It can also be formed by individuals carrying on an industrial, commercial, craft or agricultural activity or providing professional or other services in the Community. An EEIG must have at least two members from different Member States (Council regulation No 2137/85 Article 4).

For the formation, a contract containing at least the prescribed items must be concluded and filed at the registry designated by each Member State and a notice must be published in the Member State and in the Official Journal of the EC. Registration confers full legal capacity throughout the EU, which means that the EEIG has the right to enter into contracts and to sue or be sued. Within the Member States, their national law determine whether an EEIG registered there has a legal personality or not (Art.1 para 2 and 3).

An EEIG has no capital requirements. It may be financed by capital invested by members or by loans or donations from members or third parties. Contributions of members may be

financial and/or through provision of services and skills. An EEIG may not, however, seek funds from the public (Art.23). Although no minimum amount of capital is required, each member of an EEIG has unlimited joint and several liability (Art.24). This means that there is no limit to the financial liability of any member for the activities of the EEIG and that in addition each member can individually be held fully liable for those activities.

It is not intended that an EEIG should make profits for itself and this may not be its objective (Art.3 para 1). If it does make profits as a consequence of its normal operations, they are apportioned among the members and taxed accordingly. The portion of profit or loss accruing to each member may be determined by the formation contract. If this says nothing, the members are apportioned equal shares (Art.21).

An EEIG must have at least two organs, the members acting collectively and the manager(s) (Art.16). The way the members act collectively is normally set out in the contract of formation. There is no requirement for regular meetings and decisions may be made by any means of communication. Each member has at least one vote. The formation contract may allot more votes to certain members provided that no member holds a majority of the votes (Art.17 para 1).

The members appoint one or more managers who run the daily business and represent the EEIG in dealings with third parties.

An EEIG may not employ more than 500 persons (Art.3 para 2d).

The HADES underground laboratory in Belgium is an example of a cooperative activity organised as an EEIG.

3.4 An Intergovernmental Organisation (IGO)

An intergovernmental organisation (IGO) is an organisation with international membership, scope or presence, with sovereign States or other IGOs as members. An IGO may be established by a constituent document such as a charter, a treaty or a convention, which, when signed by the founding members, provides the IGO with legal recognition. IGOs so established are subjects of international law, capable of entering into agreements among themselves or with States. Thus IGOs in a legal sense must be distinguished from mere groupings of States, such as the G – 8 and the G - 77, which are task groups, and from treaties such as GATT (General Agreement on Tariffs and Trade), Treaty of London (1949, forming the Council of Europe) or the bilateral treaties between Switzerland and the EU. Neither task groups nor treaties establish an international organisation.

IGOs differ in purpose, function, membership and membership criteria and organisation. There are no standardised rules on IGOs and they are subject to international law.

There are very many IGOs in various fields in existence, including the EU itself, financial entities such as the World Bank and the EBRD (European Bank for Reconstruction and Development), economic groupings such as the OECD (Organisation for Economic Co-operation and Development) or the WTO (World Trade Organisation) and others such as INTERPOL (International Criminal Police Organisation) and FIFA (Fédération Internationale de Football Association). The most relevant examples here, however, may be the intergovernmental organizations set up for technological development of activities that can be much more effectively carried out by pooling national efforts. In this respect, a useful model is the European Space Agency (ESA). This was established through a Convention in 1975 as

an intergovernmental organization dedicated to the exploration of space; it currently has 17 member states. Its mission includes objectives and duties of a similar nature to those envisaged by an EDO that could be established for a shared repository (for example: “*space activities are pursued for the benefit of citizens, and citizens are asking for a better quality of life on earth and for greater security*”). ESA operates common research centres and launch sites, so also offering an organizational model for carrying out joint operations. ESA is an entirely independent organization, although it maintains close ties with the EU through an ESA/EC Framework Agreement. The ESA Council is the Agency's governing body and provides the basic policy guidelines within which the Agency develops European space programmes. Each Member State is represented on the Council and has one vote, regardless of its size or financial contribution. ESA's mandatory activities are funded by financial contributions from all of the Agency's Member States, calculated in accordance with each country's gross national product. New members can enter ESA by accession to the Convention. In fact, ESA is one of the seven large European intergovernmental scientific research organisations that have become partners in the EIRO forum, in order to pursue joint initiatives, combine resources, and share best practices. The others are CERN (European Organisation for Nuclear Research), EFDA (European Fusion Development Agreement), EMBL (European Molecular Biology Laboratory), ESO (European Organisation for Astronomical Research in the Southern Hemisphere), ESRF (European Synchrotron Radiation Facility) and ILL (Institut Laue Langevin).

If the form of an IGO were to be chosen for an EDO, members might be national Waste Management Organisations and national R&D Institutions for Waste Management.

3.5 A Joint Technology Initiative (JTI)

Joint Technology Initiatives (JTIs) are novel legal entities, which are proposed as a new way of realising public-private partnerships within the EU's 7th Research Framework Programme. JTIs are identified as an effective means of meeting the needs of a limited number of large-scale initiatives that have achieved a particularly ambitious scale and scope. They are so large that they require the mobilisation of large public and private investments as well as substantial research resources to implement their strategic research agendas and therefore cannot be implemented efficiently using the other R&D funding mechanisms available. Their legal base is Article 171 of the Treaty establishing the European Community, which allows the European Community to set up any structure necessary for the efficient execution of research, technological development and demonstration programmes. JTIs are implemented via a Council Regulation in agreement with Member States (Article 172 EC Treaty).

The European Commission has set out a number of qualification criteria for JTIs, involving the following:

- strategic importance of the topic and presence of a clear deliverable;
- existence of market failure;
- concrete evidence of European Community added value;
- evidence of substantial, long-term industry commitment;
- inability of existing Community instruments to achieve the objective
- importance of the contribution to broader policy objectives including benefit to society.

A JTI focuses on one specific industrial area, has a well-defined objective and is funded by a combination of private and public investments. Six areas were identified where a JTI could have particular relevance: fuel cells and hydrogen (FCH), aeronautics and air transport (Clean Sky), innovative medicines (IMI), nano-electronics technology (ENIAC), embedded computing systems (ARTEMIS) and global monitoring for environment and security

(GMES). At the present stage, it is not intended to propose further initiatives. So far, two JTIs have been set up: ARTEMIS and IMI.

Any legal entity established in a Member State or country associated to the 7th Framework Programme is eligible to become a member of a JTI during its operation. In all JTIs, the Community (represented by the Commission) is a founding member and is involved in the decision-making process.

3.6 A Consortium

A **consortium** is an association of two or more individuals, companies, organisations or governments (or any combination of these entities) formed with the objective of participating in a common activity or pooling their resources to undertake an enterprise or transaction that is beyond the means of any one member. A consortium is formed by contract, which delineates the rights and obligations of each member. Each participant retains its separate legal status. Consortia are more common in the not-for-profit sector.

EUROCHEMIC, which is discussed in detail later, was a Consortium set up in 1957 by 13 governments, then members of the European Nuclear Energy Agency (which became OECD NEA in 1972). It was conceived as a facility that would provide nuclear services to its owners and others, i.e. for needs not very different from those for a regional repository and was structured as an international shareholding company, open to participation also by industry. EUROCHEMIC carried out a research programme at its site at Mol in Belgium, trained large numbers of specialists, and built an industrial pilot plant, commissioned in 1966, to process a wide variety of fuel types.

3.7 A Joint Venture (JV)

A Joint Venture (JV) is a contractual agreement that takes the form of a short-term partnership or conglomerate formed between two or more parties to jointly undertake a particular business transaction for their mutual benefit. The term generally refers to the *purpose* of the entity and not to a type of organisation. Therefore, a joint venture may have various legal structures. The parties agree to create a new entity by contributing assets and sharing control of the enterprise, revenues, expenses and risks. Joint ventures can involve any type of business transaction; they may be for one specific project only or a continuing business relationship. The “persons” involved may be individuals, groups of individuals, companies or corporations. A JV is conceptually a business-oriented association and widely used by companies to gain entrance into foreign markets.

The boundaries between a consortium and a joint venture are blurred and the two forms and functions overlap.

Examples of JVs are Equilon (between Texaco and Royal Dutch Shell), Strategic Alliance (between Northwest Airlines and KLM Royal Dutch Airlines), Sony Ericsson (between Sony and Ericsson), and the CW Television Network (between CBS Corporation and Time Warner).

3.8 A Corporation, or European Company

3.8.1. Corporation

A corporation may be established as a business corporation or as a not-for-profit corporation. A business corporation, sometimes also previously called a joint stock company or

shareholding company is a capital company with distinctive legal characteristics: legal personality; in general, commercial objectives; fixed capital, divided into shares; transferability of ownership interests and perpetual succession capacity; a functional managerial hierarchy; limited shareholder liability. Membership is not based on personal efforts of the members but on their shares in the capital. A corporation is a pooling of capital and not of common personal efforts.

Corporations may also be formed for political, educational or charitable purposes (so called not-for-profit corporations), or for government programmes. A not-for-profit corporation is not intended to provide a profit to the owners or members. A not-for-profit corporation is usually organized as a non-stock corporation. This means that the corporation does not have stockholders, but members who have voting rights in the corporation. In many countries these entities may be in certain circumstances subject to exemption from various taxes.

A business corporation is a capital company, i.e. it has a defined capital. The capital is split into shares. These shares are transferable. The shares may be dealt with publicly at the stock market but also may be privately (closely) held, meaning that no ready market exists for the trading of the shares. This transferability of the member's shares renders the corporation independent of its proprietors and makes it perpetual. Death or liquidation of a member does not affect its status as a legal entity. Further, membership and corporate assets cannot be withdrawn by its shareholders (only a sale of shares is possible) and therefore a change in membership does also not influence the assets of the corporation.

A corporation has its own legal identity (technically, a juristic person), separate from its members. As such, it may hold assets in its own name, enter into contracts, sue and be sued, is subject to tax etc.

Corporations are managed by special organs, not by the members themselves. Management and control in general are determined by a board of directors, elected by the shareholders. Some jurisdictions, such as Germany, divide the control of the corporation into two tiers with a supervisory board (in Germany half the members are representatives of the employees) which elects a managing board. The members of a corporation may exercise their rights at the member's assembly.

Unlike any form of partnership, the shareholder's liability for the corporation's debts and obligations is limited to the amount, which they contributed to the corporation as dues or paid for shares. As a consequence, the liability of the corporation is limited to its assets.

3.8.2. The European Company (Societas Europaea)

As there is a wide diversity of forms for corporations throughout Europe and as the disparity and the limited territorial application of national company law form considerable obstacles to the creation and management of companies with a European dimension, the European Commission has passed a Statute for a European company, called Societas Europaea or SE [EC 2001].

According to this Council Regulation a SE may be set up within the territory of the Community as a public limited-liability company. It must have a capital that shall be divided into shares. The capital shall not be less than EUR 120'000 (Art.1 section 2 and Art.4). An SE shall have legal personality, which it acquires on the date on which it is registered (Art.1 para 3 and Art. 16). No shareholder shall be liable for more than the amount he has subscribed (Art.1 para 2).

The Council Regulation provides basically four ways of forming a SE. A SE may be formed by merger (by public limited-liability companies only), by forming a holding company (of public as well as private limited-liability companies), by formation of a subsidiary or by transformation (conversion) of a public limited-liability company having at least one subsidiary in another Member State (Art.2, 17 – 37). Participation of companies whose head office is not in the Community is restricted (Art.2 para 5). The SE has to be registered in the State of the head office, which has to be located within the Community, whereby a transfer to another Member State is possible (Art.7 and 8, 12). The formation itself is governed by the law applicable to public limited-liability companies in the Member State in which the SE establishes its registered office (Art. 15).

A SE comprises a general meeting of the shareholders and either a supervisory organ and a management organ (two-tier system) or an administrative organ (one-tier system) (Art.38). In the two-tier system, the management organ is responsible for managing the SE and the supervisory organ supervises the work of it. In the one-tier system, the administrative organ manages the SE. The general meeting decides on matters for which it is given responsibility by the Council Regulation, by legislation in implementation of Directive 2001/86/EC or by the law regarding the public limited-liability company of the Member State in which the SE's registered office is situated.

Different traditions of worker involvement in the Member States have held back the adoption of the Regulation for over a decade. As a compromise, the Regulation was complemented by the Council Directive 2001/86/EC of 8 October 2001 supplementing the Statute for a European company with regard to the involvement of employees, which establishes rules on worker involvement in the management of the SE. Every SE must conclude an agreement or arrangement for employee involvement pursuant to the provisions of the Directive (Art.1 para 4, Art.12 para 2 – 4)

The Council Regulation provides common rules for the SE, but still there is no uniform legal form for all Member States as national law has a large influence on the precise form. Many matters are still regulated by the laws of the Member State in which a SE is registered. Examples are the preparation of the SE's annual and, where appropriate, consolidated accounts including the annual report and the auditing, the formation, winding up, liquidation and insolvency of a SE, its taxation, further areas of law such as competition, intellectual property etc.

There is little experience with establishing a SE as the Council Regulation entered into force only on 8 October 2004. Examples of SEs are Allianz SE (Germany, insurances), Strabag SE (Austria, construction firm). BASF AG (Germany, chemicals, agricultural products, oil and gas) agreed to its transformation into BASF SE on 26 April 2007 and plans registering as a SE during the first quarter of 2008.

All of the forms of public companies in the EU can be transformed into a SE, whose headquarters can then be freely moved between Member States. This could be an important consideration if an EDO were to be formed, with the intention of later moving the domicile to the host State where the repositories is to be sited.

4 Organisation and key internal features of the EDO

4.1 Introduction

Assuming that a group of countries agrees to establish an EDO, then they need to decide not only the legal/organisational form, but also the staffing levels, the internal structures and the required budget. In doing so, they have to consider the different tasks and interests involved. Based on the examples of national disposal organisations, some observations on these issues are made in this Chapter.

The structure of any waste management organisation depends upon a number of factors, the more important of which are:

- the scope of activities to be covered;
- the linkages to other stakeholders;
- the depth of detail handled directly within the organisation;
- the size of the organisation's staff and budget.

A multinational organisation faces much wider challenges than does a national waste management body, not least because of the extended range of stakeholders. The figure below gives an impression of the multiple stakeholders to be managed.

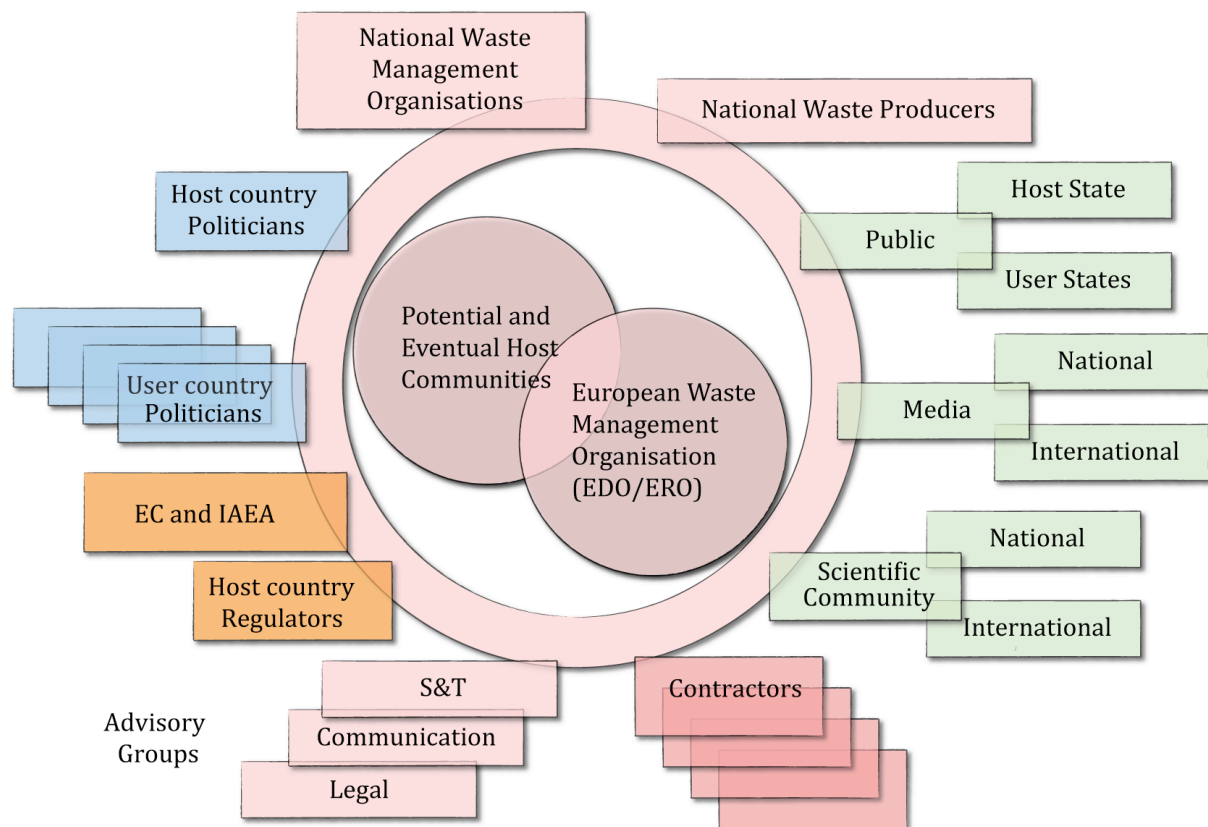


Figure 1: Interfaces to be managed by an EDO (and ERO)

For a European facility, the interface to the EC is, of course, particularly important. Contacts could run through the Technological Platform on Geological Disposal that has been launched in Europe.

If the organisation is to be successful, then it must fulfil not only the prime goal of working successfully towards implementation of safe, accepted repositories; it must also aspire to further goals. These include being cost-effective in its work, gaining the acceptance of a sufficiently large fraction of the local community and the national public, being recognised as competent - even by those opposing its mission - and providing an inspiring and rewarding place of work for its wide range of personnel.

4.2 Staffing the EDO

For any nuclear waste management organisation – and particularly for a multinational one - a sense of mission is crucial; only a dedicated team, which believes strongly in its goals, has a chance of succeeding in this naturally hostile environment. A corresponding set of values must be agreed to - and lived up to; typical goals here are technical excellence, openness and transparency.

The key characteristics of a staff that can function well are diverse. It is essential to have a broad strategic overview at the top and technical and financial competence throughout. A diversity of backgrounds is important given the breadth of the work. The EDO should tolerate neither macro-management (in which the organisation concentrates on form rather than content) nor micro-management (in which the staff lose themselves in detail). A speciality of any organisation working in controversial areas where there is organised opposition to the goals is the crucial requirement to identify good communicators. These should be sought out from anywhere in the organisation and given appropriate further training.

A further crucial question to be answered is what size of organisation is needed to ensure that all necessary skills are represented. In the report on Work Package 3, specific suggestions are made for the starting size and progressive growth of an EDO. In the early years of an EDO, there are strong arguments in favour of a modestly sized organisation. These include flexibility (to allow for uncertainties in project evolution or for delays); ease of interdisciplinary communication; focus on project management goals; engendering a team spirit; good cost control accountability. For an EDO formed by organisations from different European countries, there are advantages in staffing the organisation at least in part by delegation of manpower from its members. This simplifies the flow of information and know-how back to the member countries. However, the long time scales associated with repository implementation imply that stability in the EDO is also necessary. This can be achieved by a core of permanent staff and by multi-year secondment of further members. Eventually, however, the EDO, and even more so an ERO, will have its own dedicated staff that can look for long term career opportunities in the organisation.

4.3 Internal organisational structure

Independently of the legal form of an EDO, its internal structure will be determined by its goals and activities. A typical structure for a national waste management organisation is illustrated below. Its basics may be taken over certainly by an ERO, and the concept is applicable already at the EDO stage. Upper level control entities such as a Board of Directors are not shown here as they will depend on the legal form chosen.

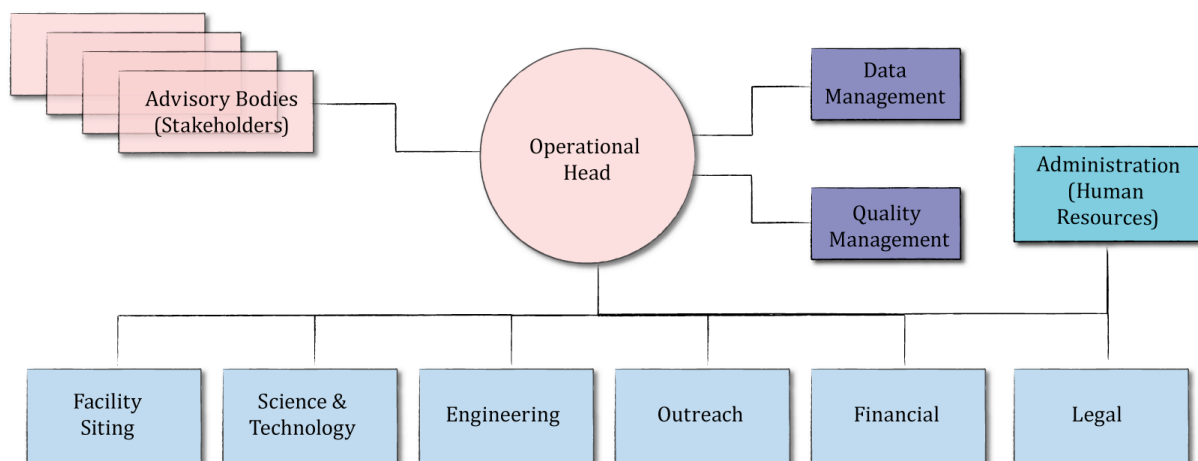


Figure 2: Typical structure for a national waste management organisation

Some brief comments can be made on the functional units illustrated in the figure.

- Advisory bodies: efforts should be made to include all stakeholders; the bodies should include representatives of all user countries but also persons selected for their individual competence in the natural or social sciences areas relevant to the EDO activities.
- Operational Head: his/her role is to provide overall vision and leadership and to ensure that all program elements are compatible, that the organisation is technically competent and socially responsible, and that budget and schedule targets are met.
- Data Management: the development of a deep repository, the sensitive consultation and siting process generate a vast amount of facts, data, results, estimations, value judgements and viewpoints. Data and knowledge management are necessary to structure all this information as transparently as possible and make it accessible during the long lead and operational times of the repository.
- Quality Management (QM): should be implemented from the outset; the QM programme should be sufficient, but not overdone, as has been the case in some national programmes.
- Facility Siting: this group must be interdisciplinary and it requires generalists as well a specialists; before potential host regions are chosen, this group would usefully include experts on the situation in the partner countries; more local participation could be appropriate thereafter.
- Science & Technology: the EDO must be highly focussed on project-relevant science and should make maximum use of the enormous information base available from 30 years European R&D that is already available. Eventually, the EDO will have to carry out concept and site-specific science and safety studies.
- Engineering: both conventional and nuclear engineering specialists are needed and the initial programme is likely to focus on comparing design options for the member's specific inventories and eventually for potential siting options.
- Communication/outreach: although this is identified as a separate unit, it should be closely integrated with all staff activities; in a multinational organisation dealing with a variety of national cultures, this is a key area. It should be staffed with personnel

familiar with the political and social situations as well as the languages spoken in all partner countries, especially (potential) host countries.

- Financial: the focus here will be on managing the EDO's multinational budget and planning for conversion to an ERO, which includes developing a fair pricing system for all users at all stages.
- Legal: initially, this group will be dedicated to exploring the legal aspects of liabilities and regulations within the user countries and potential host countries. Later on, it must additionally propose appropriate legal forms for the ERO.
- Administration/HR: this section has to fulfil all the general administrative and HR functions and especially to take account of the multinational character of the enterprise and staff, involving different languages, work permits, international social security and tax matters, relocations etc.

4.4 Budget requirements

Implementing a geological repository is a phased process lasting many years. The costs vary strongly between phases. As detailed in Work Package 3 of this project, the costs of constructing and operating the repository are highest and run into billions of Euros. They are to a considerable extent dependent on the size of the proposed inventory. In the present context, concern is more with the funding needed for the initial phases of the EDO. This funding is independent of the inventory; it depends on the extent of the specific programmes run in the technical and social science areas and, most importantly, on the site selection and characterisation strategy. Comparison with national budgets in the early phase leading up to site investigation work indicates that a lean EDO could run its baseline programme on an annual budget of some millions of Euros. The siting costs depend upon the number of sites that are characterised, which depends on the specific strategy chosen (e.g. volunteering, successive narrowing in). A site characterisation programme usually lasts for 2 to 5 years and can typically cost 10-50 million Euros a year.

5 Recommendations of the IAEA's MNA Group

5.1 Issues raised by the MNA group

The report of the IAEA on multinational approaches (MNA) to fuel cycle facilities [IAEA 2005] lays out key points affecting nuclear facilities used by a number of Member States. Although the questions raised are more specifically aimed at enrichment, fuel fabrication or reprocessing facilities, they can also be asked in connection with potential shared repositories that provide a disposal service to a number of States. Relevant texts from the report are reproduced below since they provide a useful guide on decisions that need to be taken before finalising a structure for an EDO or ERO.

“The establishment and operation of an MNA needs to be founded on an appropriate legal base. Such a facility could have as its legal basis:

- a. an international agreement alone (as exemplified by EUROCHEMIC*);*
- b. national legislation (as exemplified by EURODIF*);*
- c. any combination of a and b (as exemplified by URENCO*).*

In practical terms, there is little difference between a legal basis consisting of an international agreement alone and one consisting of an international agreement and national legislation.....This is so because, normally, national legislation is needed to implement the terms of an international agreement...”

* see below

The MNA Expert Group highlighted some issues that need to be addressed if an international agreement were to be made. The most relevant issues and questions in the present multinational repository context are:

- 1. “whether all States would be entitled to become parties to the agreement (i.e. a universal agreement) or only those States in a given region (or, for that matter, whether it could be bilateral); and in that context, whether regional agreements could be concluded and brought into force more quickly than a universal agreement;*
- 2. whether it would be feasible to have an approach based on an agreement between the States in which the relevant facilities are located, together with separate agreements between that group of States and each State in which persons or entities within the latter's territory are to receive the services of the facility or facilities*
- 3. what entities may participate in or benefit from the MNA (e.g. governments; governmental entities; private entities);*
- 4. the application of appropriate IAEA safeguards*
- 5. an undertaking by each State to prohibit within its territory activity “parallel” to that of the facility*
- 6. the conditions upon withdrawal from the agreement for legitimate reasons must be agreed upon;*
- 7. how joint decisions are to be taken with respect to the supply of material or services, and agreed circumstances justifying a denial of supply;*
- 8. whether the MNA should be treated as an independent international legal entity, and, if so, the nature and extent of any privileges and immunities that are to be accorded to it in the host State and in other participating States;*
- 9. how and by whom decisions relating to the operation of the MNA are to be taken; how and by whom the activities of the MNA are to be financed.”*

Many of these points have been touched upon in the discussion on organisational forms in Chapter 3. However, a few are worthy of further discussion. Point 1 raises the issue of whether bilateral arrangements should be initiated as soon as one country agrees to accept waste from a partner, or whether public and political acceptance could be greater for truly multinational initiatives with EC backing. Point 5 leads to the interesting question of how commercial competition might arise if radioactive waste import/export were to become a normal business transaction, as is the case for chemotoxic wastes. The security of supply of service addressed in point 7 is a critical issue. States that come to rely on a service allowing wastes to be exported will not want to suddenly be faced with the withdrawal of this route and the resulting necessity to initiate national facilities after already having paid for disposal of part of their inventories. This scenario arose in the past when Russia withdrew its take-back service for spent fuel from Eastern European countries. A European regional repository would have to supply guarantees that this would not occur – or else multiple regional repositories could assure this by keeping alternatives open.

5.2 Options for MNAs

The following categories of options were discussed by the MNA expert group:

- (a) Options involving assurances of services not involving ownership of facilities
- (b) Options involving the conversion of national facilities to multinational facilities
- (c) Options involving the construction of new facilities.

Again, these are looked at primarily with facilities in mind that supply material such as nuclear fuel or else services such as enrichment or reprocessing, but the questions raised can be asked also for the supply of a disposal service. They are, however, more relevant to the ERO stage than to the initial EDO stage that is the focus of the present report. Nevertheless, some comments can be made on the options of the MNA group as applied to disposal services.

In case (a), a concern, as mentioned above, is the impact of a host State withdrawing disposal services or a user State ceasing waste shipments. This can be mitigated by long-term contracts or choice of supplier – or possibly by a back-up system organised by the EC and IAEA.

Option (b) would be relatively straightforward for a repository if a host country agreed to such a process. This might occur if the host country wishes to share responsibilities and also costs with the international community. In practice, however, pressure to implement such a solution may come more likely from the user countries in order to enhance their confidence that international oversight will ensure that state-of-the art technology is employed. In the case of a geological repository, some of the most advanced national programmes in Europe have been so concerned that this type of solution might be forced on them that they have enacted national laws prohibiting import of radioactive wastes for disposal.

For option (c), the MNA report uses the examples of URENCO and EURODIF, which are both described in more detail in Chapter 6 below. The challenges in constructing new multinational disposal facilities would, in some respects, be less than for enrichment or reprocessing plants since there are fewer problematic issues related to preventing access to technologies that are commercially confidential or are in a nuclear safeguards sense very sensitive. The most problematic similar issues concerning implementing of a new multinational disposal facility in any host country may be the potential value of disposed material and the continued assurance of full safeguards.

6 Examples of European multinational implementing organisations

In the past, multinational nuclear organisations have been set up in Europe. Although the examples summarised below are more relevant for an ERO than an EDO, they could be analysed in more depth to consider which positive or negative lessons might be drawn from their history.

6.1 EUROCHEMIC

EUROCHEMIC was set up in 1972 by thirteen of the NEA/OECD Member governments as an international shareholding company, open to participation by industry. Legally, EUROCHEMIC was based on the International Convention “On the Constitution of the European Company for the Chemical Processing of Irradiated Fuels (EUROCHEMIC)”, signed in Paris on 20th December 1957, entering in force July 27, 1959. The object of the Company was mainly to carry out any research or industrial activity connected with the processing of irradiated fuels and the use of products arising therefrom and to contribute to the training of specialists in this field. It aimed at serving as the nucleus of a European reprocessing industry. The Company constructed at Mol in Belgium a pilot plant to process a wide variety of irradiated fuel types as well as facilities for nuclear chemistry research. EUROCHEMIC facilitated the sharing of the technology of spent fuel recycling among advanced countries in Western Europe and reprocessed fuels from its member countries’ reactors in its own plant.

Due to the small size of the plant and the situation of the reprocessing market, where the Company found itself in the faced with competition from larger national reprocessing projects, achievement of the original objective appeared impossible and operations came to an end in 1974. The Company’s installations were progressively taken over by the host country, Belgium. International co-operation within the EUROCHEMIC Company however continued for several more years, in a substantial programme of managing the radioactive wastes that had been produced. This was the first time a reprocessing plant had been decommissioned and it reflected the determination of the participating governments to take the responsibility for keeping the site safe. The Convention finally was annulled on November 28 1990.

Termination of the EUROCHEMIC plant operation has frequently been offered as proof of the weakness and improbability of effective multinational arrangements. This point of view however does not account for the real objectives of EUROCHEMIC. In particular L. Scheinman challenges this view in his history of EUROCHEMIC [Scheinman 2004]. He points out that EUROCHEMIC was established to serve as a training centre in which reprocessing technologies could be acquired, various fuel types and techniques could be explored, and industrial experience could be developed. It was not designed as a means of averting the spread of reprocessing technology, or as an alternative to national development, even though some of its members (particularly the smaller states) might have hoped for the eventual emergence of a single European reprocessing consortium, which would provide a partnership of a magnitude beyond their purely national capabilities. In terms of its mandate, concludes Scheinman, EUROCHEMIC was a success. It facilitated and launched the basis for industrial capability in a new technological field. If it did not evolve into Europe's commercial industrial reprocessing enterprise, this must be measured against its mandate.

6.2 EURODIF

EURODIF (European Gaseous Diffusion Uranium Enrichment) is today a subsidiary of the French company AREVA and operates a uranium enrichment plant established at the Tricastin nuclear site in Pierrelatte, Département Drôme, France.

In 1973, France, Belgium, Italy, Spain and Sweden formed EURODIF as a joint stock company. Sweden withdrew from the project in 1974. In 1975 Sweden's 10 per cent share in EURODIF passed to Iran as a result of an agreement between France and Iran. The French government subsidiary company Cogema and the Iranian Government established the Sofidif enterprise (Société franco-iranienne pour l'enrichissement de l'uranium par diffusion gazeuse), with 60 % and 40 % shares respectively. Sofidif acquired a 25 per cent share in EURODIF and this gave Iran its 10 per cent share in EURODIF.

EURODIF is intended to serve the domestic fuel requirements of its members. The level of investment of each member corresponds to its percentage share of the product. Sensitive technology is provided and held by only one member, France. Other non-sensitive technology is shared, and non-sensitive equipment procurement is allocated among the members. Thus, while excluding the transfer or sharing of sensitive technology, EURODIF provides shareholders with security of supply, an equity share in a production enterprise utilising proven advanced technology, and industrial spin-off benefits in all but the directly sensitive technology sectors.

EURODIF is simple and straightforward, since management, operations and technology all remain under the national control of the host State. On the other hand, precisely because of the managerial, operational, and technological limitations this approach imposes on all but the host State, its appeal may be limited to States which have little interest in participation in management-related activities or in access to advanced technology, but are content to have assured access to fuel supply on a timely, predictable and economically attractive basis.

EURODIF has had some problems of a type that could occur also with a multinational repository company. Changes in national nuclear programmes affected the timing of requirements for enriched uranium. This was particularly the case for Italy, which took a 23 percent share in the EURODIF production at the time the organisation was created. Unable to absorb its share of EURODIF production, but required to take it and pay for it, Italy sought to alter its relationship to the company. After intensive discussions, Italy's share in EURODIF was reduced in the summer of 1980 when the French partner purchased half of Italy's interest giving it majority control of the company and further reducing its multinational character. This experience highlights economic sensitivities of multinational arrangements, which may serve as a lesson for nations contemplating similar ventures.

The EURODIF experience could give useful pointers to the organisation of a multinational repository that is set up in one country and run primarily under the national legislation and regulation of that country.

6.3 URENCO

URENCO is an independent global energy and technology group. Its focus is on providing uranium enrichment services for civil-power generation, and its aim is to become the leading supplier in the extended global enrichment market. URENCO is a purely commercial enterprise owned 1/3 each by BNFL (UK government), UCN (Dutch government) and jointly by RWE AG and E.ON AG (Germany). The Treaty of Almelo, concluded by the governments

of Germany, the Netherlands and the United Kingdom, provides the regulatory regime. When operating, URENCO further is regulated by appropriate government authorities. The international safeguards inspectorates of Euratom and the IAEA carry out regular inspections.

URENCO carries out two distinct principal business activities: the enrichment of uranium and the supply of enrichment technology. Accordingly URENCO is organised in two business groups: enrichment of uranium by the Enrichment Group (UEC) that operates centrifuge enrichment plants and markets the enriched uranium produced to nuclear utilities worldwide, and supply of enrichment technology by the Technology Group (ETC) that owns the centrifuge technology. ETC is a joint venture between URENCO and the French company AREVA. It provides enrichment capacity to UEC, AREVA and to the National Enrichment Facility in the USA.

URENCO is a rather complex organisation. Head of the group is URENCO Ltd, a company with limited liability incorporated under the laws of England and Wales domiciled in the Netherlands. It comprises the Enrichment Technology Company Ltd with entities in the UK, the Netherlands and Germany, the URENCO Enrichment Company Ltd. consisting of URENCO (Capenhurst) Ltd, URENCO Nederland B.V. and URENCO Deutschland GmbH, the URENCO Finance N.V., the URENCO Investments Inc., and the LES/NEF Project.

Production is from plants (gas centrifuge enrichment facilities) in Germany, the Netherlands and the United Kingdom, and in the near future in New Mexico, USA, all using URENCO's own centrifuge technology. The Capenhurst site, located near Chester in the north west of England, became a wholly owned subsidiary of URENCO Limited in 1993. The Almelo site is located in the east of the Netherlands and was founded in 1970. The German site at Gronau, in the north west of Germany has operated since 1985. A fourth enrichment plant is under construction in Eunice, New Mexico, USA. This National Enrichment Facility (NEF) is being built and will be operated by LES, a wholly owned subsidiary of URENCO. First production from the NEF is scheduled for mid-2009.

URENCO helps to coordinate research and development, assures equal access to developments in centrifuge technology by any of the members, and executes contracts for the sale of services to third countries, based on the unanimous agreement of the participants.

Industrial-operational and political responsibilities are kept separate. An intergovernmental Joint Committee, on which each of the participating governments has equal representation and voting rights, and which operates on the principle of unanimity, deals with all political aspects of URENCO activities. This includes such issues as membership, supervision, and control of the dissemination of centrifuge technology, and safeguards and non-proliferation conditions associated with contracts for enrichment services.

URENCO has faced difficulties both in terms of technology and investment [Scheinman 2004]. It was originally intended that URENCO would develop a single centrifuge technology that would be exploited on a centralised basis. All of the participants, however, already had made heavy investments in technology development at the time URENCO was established, and they proved unwilling to forego this investment in favour of a common technological approach. As a result, it was decided in 1974 to permit each of the shareholders to continue developing its own technology and to determine which technology it will use in building new facilities. Insofar as investment was concerned, URENCO plants were to be built with equal ownership and investment by the three partners, regardless of location. By the mid-1970s that formula was revised in favour of a two-thirds national, one-third partners investment arrangement, in response to differences among the shareholders regarding the timeliness of constructing new facilities and the appropriate marketing philosophy. At the present time, the

formula has been revised again to reflect a 90 percent national ownership in URENCO facilities. This change has also affected the management distribution, making each of the plants far less multinational than originally intended. All facilities, however, operate under the provisions and constraints of the Treaty of Almelo, and no shareholder has the ability to take any significant action without the approval of the other two partners.

In a repository development model in which multinational repositories are situated in more than one country, lessons can be learned from the URENCO history.

7 Conclusions and Recommendations

7.1 Pros and cons of the possible legal/organisational forms of an EDO

In Chapter 3, the numerous possibilities for the legal form of a multinational European organisation were identified. The table below identifies, for an EDO, some of the main arguments for and against the models described. For an ERO, the attributes will be weighted differently. In both cases, it is clear that there are considerable overlaps in the attributes of the various organisational forms.

Table 1: Advantages and drawbacks of possible legal/organisational forms of an EDO

Advantages	Drawbacks
Association	
Easily established. Commonly known. Very adaptive. Precedent exists (Arius)	Too informal: probably not attractive to governments of potential member countries
Cooperative	
Demonstrates clearly “self-help” intentions of a group of countries. Serves directly and mainly the need of its members. Little capital needed. Legal regulation on European level exists. Relevant precedent exists (Nagra)	The one member-one vote rule, which is fixed in many national laws, may inhibit control and administration according to financial contribution and/or interest.
European Economic Interest Group (EEIG)	
Legal regulation on European level exists. No capital requirements. Relevant precedent exists (HADES project)	May be more suited for cooperation in research than to a development project. Membership of non EU States not possible. Unlimited financial liability of members.
Intergovernmental Organisation (IGO)	
Many well-known precedents in finance, political institutions, science and engineering Positive image. Adaptive, no standardised rules.	Requires intergovernmental agreements and participation of sovereign States, already at time of start-up (an EDO would not necessarily need these until the time of siting)
Joint Technological Initiative (JTI)	
Allows mixing of public and private funding and national and EC funding	Restricted to participation in EU’s 7 th Research Framework Programme. An EDO might not fit into any of the identified areas and not meet the identification criteria. Too large scale. Principally aimed at coordinating R&D across Europe rather than at eventually implementing facilities
Consortium	
Flexible Relevant precedent (EUROCHEMIC)	No own legal subject. No defined structure. If established as a EU <i>Joint Undertaking</i> model, it requires not only the blessing of the EU, but a formal (hence unanimous) approval by the Council

Joint Venture	
Flexible Best suited for a single project	No own legal subject. No defined structure. If established as a EU <i>Joint Undertaking</i> model, it requires not only the blessing of the EU, but a formal (hence unanimous) approval by the Council Less adaptable to multiple host scenario
Corporation or Shareholding company	
Clear legal structure. Limited financial liability of members/shareholders. Many precedents for commercial multinational organisations Legal regulation on European level exists for a SE.	Interest of members/shareholders is mainly financial, not achievement of a common objective. Many formal requirements (accounting, auditing, management etc.) SE: public company. Participation of non EU-companies restricted. Public and political distrust can be engendered by a premature attempt to establish a purely commercial venture

7.2 Recommended options for evaluation by potential EDO partners

The range of options for an EDO can be narrowed based on the pros and cons in the table in section 7.1. The aim of the present report at this stage is not to make a single choice, but to make focussed suggestions to potential member countries. The countries that agree to establish an EDO with the objectives outlined in this report will make the final decision as to how best to proceed. The choice may also be dependent on the national legislation and EU membership of the country of domicile selected for the EDO by the founding members.

Nevertheless, some of the options listed are clearly less suitable for an EDO, particularly in the light of the earlier proposal that the most appropriate form of the EDO should be a not-for-profit organisation. A **for-profit corporation or shareholding company**, but also a full **business oriented Joint Venture and Consortium** may be too commercial. In addition, a Joint Venture and a Consortium organised as a European Joint Undertaking that requires unanimous EC approval could encounter problems from a minority of countries that are opposed in principle to multinational solutions.

The EU instruments, **EEIG** and **JTI**, both appear to be more suited for research initiatives than for an organisation whose prime objective is the eventual realisation of a facility. Membership of non-EU countries is not possible, or only under certain conditions. Formation of an JTI is intended for research, especially in the EU's FP7 and its use therefore restricted.

An **Association**, whilst flexible and easy to establish, might appear to be too informal to be attractive to governments, although it should not be ruled out entirely at this stage.

The remaining options (**IGO**, **Co-operative** and not-for-profit **Consortium**) appear most feasible. The governmental level commitments needed to initiate an IGO may make the process longer and more complex, although the final result may be the most acceptable politically and publicly. In any case, intergovernmental agreement is likely to be essential at some time during the lifetime of the EDO. The flexible options of a consortium may be more attractive than the more rigid requirements on the structure and membership rights of a co-operative. On the other hand, the clearer legal rules on co-operatives provide for more confidence and sureness. Both are worth further consideration.

The form of the ERO will be chosen at a future date by the members of the EDO and the stakeholders of the ERO, assuming that they come to the conclusion that the EDO

organisation needs to be altered. The choice will also be strongly influenced by the preferences of the country or countries that have been identified as repository hosts. It may even be the case that the members of an ERO differ from the EDO membership. National governments may prefer not to be direct partners if a commercial form is chosen for the ERO. The government of the host country may, in any case, have to distance itself from the ERO in order to demonstrate that there is no conflict of interest with its regulatory functions. Given all of these unknowns, it is clearly premature to identify a definitive ERO structure.

7.3 Next steps to initiating the EDO

The considerations in this report represent just one aspect of the issues to be examined when a group of countries decides whether and how to form an EDO. The economics, liabilities, security and - above all – societal implications will also play a crucial role. To work towards the critical decision, several steps are to be taken. Firstly, the present and other SAPIERR II reports are being reviewed by the SAPIERR II partners and the SAPIERR Interest Group¹. The finalised documents will be distributed to appropriate governmental organisations in all potential participant countries in Europe.

Through 2008, bilateral discussions will be proposed between the SAPIERR II project management and government bodies or their nominated organisations in countries that wish to explore the possibility of a shared European repository solution. The intention will be to provide further details and clarifications as input for decisions in principle as to whether these countries support the EDO initiative.

Assuming that sufficient potential EDO participant countries come forward, a full planning meeting will be convened after the end of the SAPIERR project. A forward programme will then be established through 2009 for the partners to decide on a concrete starting form, structure and staffing for an EDO and set up an implementation group to formally establish the EDO.

¹ The SAPIERR Interest Group (SIG) includes organisations from a number of European and non-European countries which follow and comment on the Project work.

8 References

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