

Radioactive Waste Management

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**Cultural and Structural Changes
in Radioactive Waste Management Organisations**

Lessons Learnt

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NUCLEAR ENERGY AGENCY
ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

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FOREWORD

The Forum on Stakeholder Confidence (FSC) was created under a mandate from the OECD Nuclear Energy Agency's Radioactive Waste Management Committee to facilitate the sharing of international experience in addressing the societal dimension of radioactive waste management. It explores means of ensuring an effective dialogue amongst all stakeholders, and considers ways to strengthen confidence in decision-making processes.

In recent years the socio-political environment of radioactive waste management (RWM) has been changing in a significant way. Several radioactive waste management programmes were rejected when stakeholders were not actively involved in their development. As a consequence, in most OECD countries a cultural change has taken place: stakeholder dialogue has become a leading principle in radioactive waste management.

The issue of cultural and organisational change has been central to the work of the FSC since its creation. On the basis of the lessons learnt during Phase-1 (2000-2004), the Forum members decided to delve deeper into this area of study. The programme of work guiding Phase-2 (2005-2010) addresses the following questions:

- How does one measure cultural and organisational change? How does cultural change manifest itself?
- How has culture changed in RWM organisations? Are there organisations that have successfully changed from a technical- to a customer-focused culture?
- How can organisations balance the requirement of openness and the increasing concerns over the security of facilities?
- How are RWM organisations opening up their work to outside scrutiny, knowledge and critiques and/or trying to enable stakeholders to influence their work?

To answer such questions and share experience, the FSC undertook a four-step process. First, a desk study drew out a theoretical framework to aid in

considering such questions. A questionnaire survey conducted during May-August 2005 then allowed Forum members to detail the changes experienced in their organisations and to identify the internal and external forces leading to evolution. A Topical Session in 2006 brought together academics and practitioners from other sectors, providing background against which radioactive waste management experience could be placed. Lastly, the present report highlights the lessons learnt from the whole initiative and offers insight into issues of cultural and structural change that will be of interest to all those, in any sector, whose organisation must adapt to societal demand.

Acknowledgements

Professor Anna Vári was closely associated with all the stages of this initiative and was the main author of this report, to which FSC members and the NEA Secretariat contributed in detail.

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EXECUTIVE SUMMARY

For the purpose of better understanding recent cultural and structural changes taking place within radioactive waste management organisations, the Forum on Stakeholder Confidence initiated a four-step process. The process included a desk study, followed by a questionnaire survey of FSC members between May and August 2005 (Vári, 2007). A Topical Session on cultural and structural change in organisations belonging to various sectors was held in June 2006 and the Proceedings published (NEA, 2007). The present document summarises the main lessons drawn from the work carried out, and offers an organisational sciences perspective on the experience recounted by radioactive waste managers.

Theoretical background

Organisations are procedures, relationships, and practices created to coordinate human talents and efforts to attain common goals. They are called upon to change if there are evident problems in their ability to adapt to the environment, or if there are evident opportunities to be exploited through organisational change. Although crisis is not an indispensable factor of change, it often triggers organisational transformation. Research suggests that crisis management can create the momentum for change, if managers take advantage of the crisis to foster an adaptive learning process (Rochet, 2007).

During the transformation process organisations may need to update their mission, goals, strategies, and values. These provide an overall context for changes in organisational structure and systems, organisational culture and human resources, technologies, and output. Implementation of change can be difficult since in many cases the resistance of managers and/or employees has to be overcome. Typical causes of resistance include excessive focus on costs and burdens, failure to perceive benefits, and risk avoidance, among others.

Based on research studies it may be concluded that prospects for successful organisational change are enhanced if a well-considered, three-stage plan for collective decision making is established, which includes group processes for diagnosing the problem, propounding a solution, and designing implementation. Decision-making processes at the conclusion of each stage should be thoroughly evaluated (Rohrbaugh, 2007).

It is recommended that initiation of a significant change should be undertaken only after effective human relations (meeting high standards for internal cohesiveness) and goal attainment (meeting high standards for planning and productivity) have already been achieved. Chances for success are further improved if internal stakeholders at every level of the organisation learn the importance of open systems values (flexibility, adaptability) and practice their individual innovating and brokering skills. At the same time, senior managers need to pay attention to operational stability and control and exercise their important leadership roles. While they need to innovate, they also need to monitor and coordinate the changes (Rohrbaugh, 2007).

It should be emphasised that there is an important difference between sustaining change and organisational learning. Sustaining change means following a well-defined set of objectives, while organisational learning implies that objectives change over time. An effective way of learning can be achieved through the integration of stakeholder interests into organisational planning. Stakeholder integration may be interpreted as an interorganisational network, where trust and power symmetry are indispensable (Blättel-Mink, 2007). According to this interpretation, trust is not merely an objective of stakeholder involvement, but also a means of sustaining stakeholder integration, which helps organisations implement a learning culture.

Radioactive waste management: results of the FSC survey

Initiating change

The FSC members' survey indicates that in most queried organisations change was, directly or indirectly, triggered by the difficulties and failures in facility siting processes due to the lack of local acceptance. Other important triggers were: new laws, mandates and duties; external stakeholders' expectations for increased transparency, openness, efficiency, and/or consistency.

In most cases changes were initiated by top managers and implemented by middle-level management teams. In a few organisations, the necessity of change was first perceived by the staff and/or some middle managers, who convinced the senior management of this necessity. In all cases, senior management played a key role.

Changes in goals, values, policies, and structure

In the vast majority of the queried radioactive waste management organisations significant changes took place over the past decade. Changes in mission and main goals were observed in a few organisations, and changes in

values and culture in most of them. With few exceptions, a shift towards the open system model was detected in the observed organisations.¹

In several organisations the mission or main objectives changed from purely technical (safety) goals to technical and societal (e.g., acceptance, confidence) ones. Others modified their mission and main objectives according to societal expectations. The issue of stakeholder confidence and the related values of openness and flexibility came to the fore in most of the queried organisations.

In some cases increased emphasis on transparency and the involvement of (external) stakeholders were accompanied by an increasing emphasis on commitment, cohesion and morale achieved through the involvement of staff (internal stakeholders) and consensus building. These organisations recognised a synergy between strengthening their internal and external communication.

Several respondents gave account of policies and procedures established for implementing new goals and values, for example, selection and reward systems designed to attract, develop, and maintain a suitable work force. Training and organisational development tools were applied to developing skills and attitudes. Other systems for shaping employee values, attitudes and behaviour included rules, guidelines, and code of ethics.

Changes in organisational structure took place in most radioactive waste management organisations, as a result of changes in their status, role, mandate and duties. Several respondents reported significant structural changes regarding the communication function. In other organisations new resources for stakeholder dialogue were established. Strengthening of intra-organisational (primarily horizontal) linkages to promote cooperation and consistency (e.g., creating teams, working groups, task forces) was also reported by some respondents.

Sustaining change

In the majority of cases resistance had to be overcome before the implementation of change could begin. Resistance to change could be observed mostly on the part of the staff. This was related in part to the new professional requirements they had to meet in the wake of the transformation. Considerable resistance to changes in attitude was also noticeable on the part of employees, who considered the radioactive waste management issue as a purely scientific/technical one and refused to acknowledge the socio-political aspects as equally legitimate and relevant.

1. The following analysis focuses on organisations, where a shift toward the open system model has taken place. This terminology is defined in Part 2 of this document.

The tools applied to overcome resistance included the sustained repetition of strategic objectives supportive of public outreach, internal communication, consultation, and training. Involving staff in developing organisational visions and values also appeared to be instrumental in overcoming resistance. It was emphasised that considerable resources are needed for coordinating and monitoring the changes.

Creating a learning culture

Respondents called attention to the gradual nature of the changes in values, behaviour, structure and policy, which reflect a slow organisational learning process. In addition, attitudes and ways of thinking typically change at different rates in the different parts of the organisation.

A question may arise concerning the extent of stakeholder involvement in the transformation processes of the queried organisations. Based on the survey, two types of stakeholder involvement approaches may be distinguished. One group of the organisations focuses primarily on informing the public in the interest of increasing transparency of, and familiarity with, their activity. A second group, besides increased transparency, also aim at carrying on a dialogue with stakeholders, addressing their needs and concerns and taking them into consideration in decision making. By integrating stakeholders into all stages of organisational change, these organisations are implementing a learning culture.

1. INTRODUCTION

In recent years the socio-political environment of radioactive waste management (RWM) has been changing in a significant way. Several radioactive waste management programmes were rejected when stakeholders were not actively involved in their development. As a consequence, in most OECD countries a cultural change has taken place: stakeholder dialogue has become a lead principle in radioactive waste management.

The issue of cultural and organisational change has been central for the FSC from the very beginning. First, the 2000 August workshop offered views on the most important organisational-, mission- and behavioural features, which would characterise an organisation capable of achieving stakeholder confidence over long time periods (NEA, 2000). Then, at the 2004 June meeting a Topical Session on “Addressing Issues Raised by Stakeholders: Impacts on Process, Content and Behaviour in Waste Organisations” was organised, which focused on the responses given by regulators and implementers to stakeholders’ concerns and needs. Eleven papers were prepared by FSC delegates to analyse the experiences of institutional actors in OECD countries (NEA, 2004a). The papers described how stakeholders’ views have been taken into consideration and how they have influenced decision-making processes.² Less attention was paid, however, to issues of cultural and structural change.

The FSC Phase 1 Self-Evaluation and Way Forward Consultation indicated that FSC members are especially enthusiastic to further explore issues of cultural change and adaptability in their organisations. Following a series of discussions, organisational change was identified as one of the key topics of the Phase 2 programme of work.

For the purpose of better understanding recent cultural and structural changes taking place within radioactive waste management organisations, FSC initiated a four-step process. The process included a desk study and a

2. Issues of adaptation and stakeholder involvement in RWM decision-making processes were further explored in Phase 1 of FSC activities (NEA, 2004b; NEA, 2004c; Pescatore and Vari, 2006)

questionnaire survey of members between May and August 2005 (Vári, 2007), followed by a Topical Session on “Cultural and Structural Change in Radioactive Waste Management Organisations” in June 2006 (NEA, 2007). This document summarises the main lessons drawn from the work carried out and places them in a theoretical framework.

2. DEFINITION OF CONCEPTS OF ORGANISATION THEORY AND DESIGN³

2.1 Organisational goals, design, and effectiveness

Organisations are procedures, relationships, and practices created to coordinate human talents and efforts toward common goals. The overall goal of an organisation is called the mission.

Organisational design, including organisational culture and human resources, organisational structure, systems,⁴ technologies, and output⁵ should serve these goals in an external environment. If environmental circumstances change, very often new goals need to be selected and the organisation needs to be redesigned to achieve these goals.

Organisational effectiveness is the degree to which an organisation realises its goals. Due to the multiplicity of goals, effectiveness is a broad concept.⁶ There have been several attempts to create frameworks that integrate a variety of organisational goals and indicators of effectiveness. For example, the stakeholder approach focuses on the goals of various organisational stakeholders, including owners, customers, community, government, employees, suppliers, creditors, etc. (Tusi, 1990). The strength of this approach is that it acknowledges that the well-being of all stakeholders should be taken into consideration. The stakeholder approach also integrates effectiveness criteria related to organisational inputs, internal activities, and output.

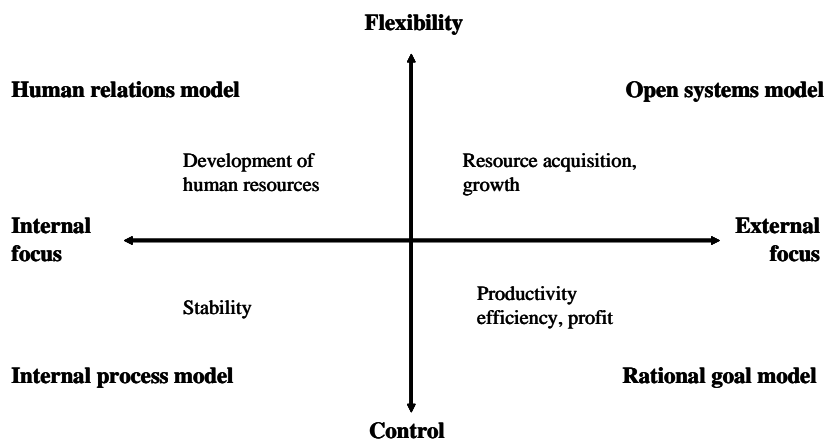
Another integrative framework, the Competing Values Approach (CVA) reflects the recognition that various effectiveness criteria are inherently competing (Quinn and Rohrbaugh, 1983; Quinn *et al.*, 1990). This approach defines two key dimensions of effectiveness criteria that represent management values in

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3. Based on Daft (1992), Northcraft and Neale (1990), and Narayanan & Nath (1993).
 4. Examples for systems include strategies, policies, control systems, information management, etc.
 5. In general, organisational outputs include products and services.
 6. Organisational *efficiency* is a more limited concept: it is defined as the amount of resources used to produce a unit of output.

organisations. The first dimension is related to organisational focus, the second one to organisational structure. Internal focus represents a management concern for the well-being and efficiency of the employees, whereas external focus reflects a concern for the well-being and efficiency of the organisation as a whole. The second dimension is organisational structure; it shows if stability and top-down control or flexibility and adaptation are the dominant values.

The value dimensions of focus and structure are illustrated in Figure 1. The combination of the two dimensions provides four models of organisational effectiveness, where each model reflects a different management perspective with regard to the basic values.

Figure 1. **The competing values framework: management models and effectiveness criteria** (Based on Quinn *et al.*, 1990)



The rational goal model reflects the combination of external focus and structural control. The primary goals are organisational productivity, efficiency, and – in the case of private organisations – profit. Goals are achieved in a controlled way, through goal clarification, analysis and planning.

The internal process model reflects the values of internal focus and structural control. The primary goal is a stable organisation that operates in a consistent, well-documented, and predictable way. Key activities include documentation and information management.

The human relations model reflects the combination of an internal focus and a flexible structure. The main goal is the development of human resources. Management works toward commitment, cohesion and morale, which are achieved through participation, conflict management and consensus building.

The open systems model reflects the values of an external focus and a flexible structure. The primary goals are resource acquisition and growth, which are achieved through a good relationship with the environment. Political adaptation, creative problem solving, and innovation management are the key activities in this model.

The strength of CVA is that while integrating diverse concepts of effectiveness, it also shows that competing values need to be met simultaneously and managers have to decide how to prioritise these values. In addition, CVA is sufficiently general to incorporate the well-being of various stakeholder groups. For example, the satisfaction of internal stakeholders (employees) is related to the human relations model, while the satisfaction of external stakeholders (e.g., the community, government) can be captured by the open systems model.

There are two key factors that determine which effectiveness criteria receive priority in a given organisation: environmental conditions and the influence of the management. The complexity and dynamics of the external environment have major implications for organisational values. For example, organisations working in a complex and rapidly changing environment must put a higher emphasis on adaptability than those working in a simple and stable environment. On the other hand, goals represent value judgements by managers; therefore, top level managers have major influence over the weights assigned to competing effectiveness criteria. The dominant values may change over time as organisations experience new environmental demands or new top management.

2.2 Organisational culture and human resources

Organisational culture is the set of values, beliefs, and patterns of thinking that is shared by the members of an organisation. The purpose of organisational culture is to provide members with a sense of organisational identity and to generate a commitment to organisational values, beliefs, and perspectives.

Culture manifests itself at two levels: at the surface there are observable symbols, language, rites, ceremonies, stories, physical settings, behaviours, etc. More important are, however, deeper values, assumptions, and ways of thinking, which they represent.

Organisational culture should reflect management goals and values. Denison (1990) conducted a study of culture and effectiveness and defined four categories of culture, which correspond to the four models of organisational effectiveness.

The mission culture emphasises a shared vision of organisational purpose and a desired future state. Employees are provided with a clear direction about

their roles and responsibilities. This culture fits the values incorporated in the rational goal model, and works well in an organisation that places high emphasis on serving an external environment that is fairly stable.

The consistency culture supports consistency, cooperation, reliability, and well-established practices. This culture fits the internal process model of organisational effectiveness and it is efficient in an organisation that has an internal focus in a stable environment.

The involvement culture focuses on the needs of the employees. Their involvement and participation create a sense of responsibility and ownership, and a high degree of commitment to the organisation. This culture fits the human relations model and works well in an organisation that has an internal focus in a changing environment.

The adaptability culture supports the capacity of the organisation to detect, interpret, and translate signals from the environment into new responses, e.g., to restructure or to adopt a new set of behaviours and processes for a new task. This culture fits the open system model and it is efficient in an organisation that has an external focus in a dynamic environment.

As we have noted in connection with organisational models, the values that the various cultures represent are not mutually exclusive, but may be present simultaneously. However, their weights may largely vary among organisations.

To develop a certain organisational culture, the values, attitudes and skills of individual employees need to be shaped. Selection and reward systems can be designed to attract, develop, and maintain an adequate force of employees. Training and organisational development tools can be applied to developing skills and attitudes. Other formal systems for shaping employee values, attitudes and behaviour include policies, rules, guidelines, code of ethics, etc.

2.3 Organisational structure

Organisational structure is reflected in the organisational chart. It has four major components: (i) allocation of tasks and responsibilities, (ii) formal reporting relationships, (iii) grouping together of individuals into departments and the grouping of departments into the total organisation, and (iv) mechanisms that ensure communication, coordination and integration of effort across departments.

There are various forms of departmental grouping. Employees can be grouped by their knowledge and skills (e.g., teachers at a university) or

functions (e.g., R&D, production, marketing, finance), by the type of outputs they produce (e.g., individual services, major projects, programs, products or product groups), by the type of client they serve (e.g., government, industry), by geographic region, or a combination of the above (hybrid and matrix structures).⁷ In general, the knowledge and skill and functional groupings work well in low uncertainty, stable environments. On the other hand, the output-, client-, and geographic-oriented groupings allow quick responses to changes in the output, in the client base, or in the targeted geographic region.⁸

There are two basic types of communication and coordination systems. Vertical linkages are used to coordinate activities between the top and bottom of the organisation. Horizontal linkages refer to the amount of communication and coordination horizontally across departments. Project teams, which break down barriers across functional departments, tend to be the strongest horizontal linkage mechanisms. Similarly, both task forces formed to accomplish temporary projects and managers appointed as coordinators also serve horizontal linkage functions.

2.4 Organisational change

If environments change considerably, organisations may also need to change to adapt to the new circumstances. At the strategic level, organisational goals, effectiveness criteria, and values are to be changed. These provide an overall context for changes in organisational structure and systems, organisational culture and human resources, technologies, and output.

The implementation of change can be difficult since in many cases the resistance of managers has to be overcome. Typical sources for resistance include an excessive focus on costs, failure to perceive benefits, and risk avoidance, among others.

7. Matrix structures have two hierarchies simultaneously.

8. An advantage of these latter forms is that they encourage departmental loyalty by focusing employees' attention on the attainment of a common goal (such as the success of a particular project, satisfying a particular customer, or serving a geographic region). The disadvantage of these structures is redundancy, since an organisation with an output-, client- or geographic-orientation must assign people in all functional areas to each output, client, or geographic area.

3. THE FSC SURVEY

Based on the above theoretical framework a questionnaire was developed to solicit views on various elements of organisational change (see Appendix). Responses were received from 17 organisations in 11 countries, including Belgium, Canada, the Czech Republic, Finland, France, Japan, Spain, Sweden, Switzerland, the United Kingdom and the United States. Queried organisations included 10 implementers (ONDRAF/NIRAS, NWMO, RAWRA, Posiva, Andra, NUMO, Enresa, SKB, Nagra, and Nirex), five regulators [Canadian Nuclear Safety Commission (CNSC), Swedish Radiation Protection Authority (SSI), Swiss Federal Nuclear Safety Inspectorate (HSK), the United Kingdom Environment Agency, and the United States Nuclear Regulatory Commission (NRC)], and two policy makers (Swiss Federal Office of Energy (SFOE) and Natural Resources Canada (NRCan)].

The size of queried organisations greatly varied. In the case of implementers it ranged from 14 to 350 full-time employees; in case of regulators and policy makers the number of employees working in the field of radioactive waste management varied between 3 and 100. In the survey, each organisation was represented by a single respondent, thus the sample is not representative of the radioactive waste management community. Therefore, in the following emphasis is put on a qualitative rather than a quantitative analysis of the responses, i.e., prototypical processes and phenomena are introduced and illustrated through case examples. In addition to questionnaire responses, the paper also builds on three case studies prepared for the Topical Session of June 2004 (De Preter, 2004; Atherton, 2004; Kotra, 2004), as well as other documents received from survey respondents.

3.1 Triggers of change

The responses reflect that it was primarily the difficulties and failures in facility siting processes due to the lack of local acceptance, which directly or indirectly triggered organisational change. Other important triggers have been: the local need for regulators to be available as expert authorities; new laws, mandates and duties; or external (e.g., shareholders, government, public) expectations for increased transparency, openness, efficiency, and/or

consistency. In the case of one organisation, changes were triggered by the fact that the radioactive waste management programme entered the stage of site investigations and construction of an URL.

3.2 Main agents of change

In most cases changes were initiated by top managers (e.g., the president, vice-president, directors, chief executives) and implemented by middle-level management teams. An example response for this top-down model is:

“It is difficult to identify whom, but our president ... and all the staff. The most important person to change an organisation’s behaviour is the president (top-down management).”

In a number of organisations the necessity of change was first perceived by the staff and/or some middle managers, who convinced the senior management of this necessity. This bottom-up model approach is exemplified by the following quotations:

- “... staff analysed the conclusions and recommendations resulting from a 10-year review by an independent federal environmental review panel ... and proposed new policies to the Government Senior management ... supported the proposal and the Minister ... brought forward the proposed new legislation for Government ... That leadership was instrumental in bringing changes and in moving effectively on this issue.”
- “The cultural change has been promoted from people working in the field, not from top management.”

In one case both technical staff dealing with stakeholders and top managers recognised the need for change around the same time. Finally, the surveyed organisations also offer examples for a fourth model, according to which changes are initiated by actors outside the organisation (e.g., shareholders). It is noteworthy, that in some cases outside agents also played important roles in changes that can be characterised by the top-down or bottom-up models. For example, in ONDRAF/NIRAS the need for change was first recognised by top management and the communication department, but change took place through the consultancy and help of university teams.

3.3 Resistance to change

The majority of respondents reported that resistance had to be overcome in order to implement changes. The origin of resistance, varied with the nature of the organisation.

In the case of implementers, resistance to change could be observed mostly on the part of employees. This was related in part to the new professional requirements they had to meet in the wake of the changes. At the same time, considerable resistance to changes in attitude was also noticeable. For example:

- “(resistance was experienced among) mostly pure technicians, i.e., people living in a technical world where the idea is vivid that the technicians should find a technical solution for a technical problem, who see the issue of radioactive waste management as a purely technical problem.”
- “(There was) internal resistance and scepticism on the part of employees who primarily considered the issue as purely scientific/technical. Resistance to acknowledging the socio-political aspects as equally legitimate and adequate as the traditional Research and Development (R&D) issues.”

In the case of regulators and policy makers, resistance was shown partly by their own staff and partly by other units, e.g., “other parts of the authority, where there is not the same need for external collaboration, or focus on environmental protection.” One respondent reported the resistance of attorneys, who feared that openness might weaken the organisation’s future legal positions in licensing and litigation processes.

The answers show the need for sufficient resources for implementing the changes and the communication it requires; on the other hand, frequent changes may lead to “change fatigue”:

“Staff had difficulty in balancing the conduct of day-to-day regulatory activities with the effort necessary to support the change programme. A lack of resources exclusively dedicated to implementing the changes resulted in difficulty to create the momentum necessary to minimise some of the resistance. There was insufficient line communication on the end state (vision), what it means in very concrete terms and the plan to get there. Also, there was “change fatigue” – the organisation has undergone a number of changes in the last few years.”

3.4 Ways of overcoming resistance

To the question of how resistance was overcome, most respondents gave the answer that involving staff was of key importance in developing organisational visions and values:

“To overcome resistance from ... staff, workshops and meetings were arranged to help them to identify for themselves what sort of organisation

they wanted ... to be and how they wanted the organisation to develop. These discussions were used to develop a set of visions and values for the organisation.”

Some regulators reported that internal communication, consultation, training, and a need for change in other parts of the organisation, as well as resources earmarked for the management of change proved to be instrumental in overcoming resistance:

- “Sustained repetition of strategic objectives supportive of public outreach, as well as the availability and popularity of practical public meeting and risk communication training have contributed to the ongoing cultural change.”
- “Time, better internal communication, and new needs for a more open and transparent approach in other parts of the organisation (for example concerning EMF/new mobile phone technology)”.
- “Overcoming “resistance” is an ongoing challenge and the goal is to have a critical mass within the organisation which supports the change effort. Some of the measures put in place include: increased “line communication” with a consultative approach with all staff; dedicated full time resources to manage various components of the programme, clarifying the vision and the associated plan to achieve that vision. Also, resistance is being overcome as staff gain experience with, and appreciate the need for better, more consistent approaches to planning and to regulatory oversight.”

3.5 Changes in organisational goals and mission

Most respondents reported substantive changes in organisational aims and values. In a few cases legislative changes affected even the status and/or fundamental roles of organisations.

In Canada, the Nuclear Fuel Waste Bureau was established within the Uranium and Radioactive Waste Division (URWD) of NRCan to administer the Nuclear Fuel Waste Act of 2002. Accordingly, a new mission of UWRD is to oversee that the nuclear industry fulfils its responsibilities under the Act. The Nuclear Fuel Waste Act also prescribed that the nuclear industry establish NWMO to conduct a study of long-term management approaches for used nuclear fuel, to propose to the government a recommended approach, and to implement the approach chosen by the government.

In France, in accordance with the Law of 30 December 1991, Andra became organisationally independent of the policy-making organisations

responsible for resolving radioactive waste management, and was put under the authority of three ministries (Environment, Industry and Research). According to this law, Andra's mission, in addition to operating the existing facilities, includes undertaking research and informing the general public.

In Spain, following the enactment of the Royal Decree Law of 11 March 2005, a change of the status of Enresa was announced by the Government. The legal process to convert Enresa into a public entity is now under way.

There are several organisations whose representatives report that their mission or main objectives have changed from purely technical (safety) goals to technical and societal (e.g., acceptance, confidence) goals. Others transformed their mission and main objectives according to societal expectations; Nirex is an example for this type of change (see Box 1).

Box 1. Nirex

Changes in Nirex's approaches started after the organisation had lost the public inquiry related to the rock characterisation facility in Sellafield. In order to understand stakeholder concerns and issues, Nirex has conducted a comprehensive dialogue with key players including the general public. As part of this dialogue, Nirex carried out several empirical studies aimed at learning about stakeholder views concerning Nirex's goals, structure, policies, and effectiveness:

"Nirex commissioned Environmental Resources Management (ERM) to conduct a series of face to face interviews with representatives from different stakeholder groups. The aim of the interviews was to provide a snapshot of stakeholder views on Nirex's Mission Statement and Objectives... policies on Transparency, Corporate Responsibility. and the Environment ... and investigate how people felt Nirex was performing against its policies and statements. The work first showed that:

- A large majority of interviewees stated that Nirex's current ownership damages Nirex's credibility with many stakeholders and limits its ability to carry out its mission...
- Many felt that a new independent organisation needs to be formed which retains Nirex's expertise but is set up in a different way.
- Nearly all interviewees felt that Nirex's mission was too constrained and should refer to radioactive waste management options rather than just disposal options.
- Almost all of those interviewed stated that the Mission should also be extended to cover high level radioactive waste and other radioactive materials, such as spent fuel, plutonium etc.
- There is strong support for the Transparency Policy, Environmental Policy and Corporate Responsibility Policy.

Box 1. Nirex (Cont'd)

There is widespread support for Nirex's increased focus on dialogue with stakeholders, and most interviewees commented that Nirex are fairly open and transparent." (Atherton, 2004, pp. 17-18).

Based on stakeholders' views, Nirex has transformed its mission. The old Nirex Mission (1999) was:

"Our purpose is to provide the United Kingdom with environmentally sound options for the disposal of radioactive waste generated by the Nation's commercial, medical research and defence activities. This will include all intermediate level radioactive waste and some low level waste."

The new Nirex Mission (from 2004) is:

"In support of Government policy, develop and advise on safe, environmentally sound and publicly acceptable options for the long-term management of radioactive materials in the UK."

In addition, Nirex has implemented several changes regarding its goals, structure and policies. Most importantly, in 2005 Nirex's shares transferred to the UK government and the company was made independent of the nuclear industry.

3.6 Changes in organisational values

3.6.1 Overall attitudes

Analysis of the responses indicates that over the last decade the issue of stakeholder confidence and the related values of openness and flexibility have come to the fore in the great majority of the queried organisations. Two types of approaches may be distinguished in these organisations. One group focuses primarily on providing information to the public in the interest of increasing transparency of, and familiarity with, their activity. Here, the most frequently applied communication tools include the web sites and publications (reports, brochures, etc.) of the respective organisations, exhibits, and face-to-face interaction with stakeholders (e.g., meetings, presentations, site visits, tours). These organisations also pay special attention to their relations with the media. Andra exemplifies this type of opening up:

"... the information mission 'shall meet the information and transparency requirements towards the public with regard to radioactive waste and its management' and shall consist mainly 'in providing clear and verifiable information on radioactive waste'..." (Andra's Ethical Charter for Public Relations).

Besides increased transparency, a second group of organisations also aim at carrying on a dialogue with stakeholders, addressing their needs and concerns and taking them into consideration in decision making. These organisations place great emphasis on public participation, the fairness of decision processes, and social and ethical issues in general. The following quote reflects the shift toward this approach:

“By consulting more with the public, and by acquiring more expertise, there has been somewhat of a shift in two areas: the move from the distinction previously made between actual risks described by experts versus risks perceived by the public; and the move from the goal of social acceptability to the concept of increasing and maintaining public confidence. On the former, the result has been to find ways to address “perceived risks” with mitigation measures rather than to ignore them or try to educate the public so that it comes around to acknowledging the “actual risks”. On the latter, efforts were re-directed to establishing fair decision-making processes and credible institutions rather than trying to “convince” all members of the public.”

In a couple of organisations no substantial change has been perceived by the respondents so far, although some changes are expected in the near future. Finally, in one organisation emphasis on stakeholder confidence and openness has recently decreased, while productivity and stability have come to the fore.

3.6.2 Pursuing multiple values

In some organisations increased emphasis on transparency and stakeholder involvement (i.e., a shift towards the open systems model), has been accompanied by an increasing emphasis on commitment, cohesion and morale achieved through involvement of staff and consensus building (i.e., a shift towards the human relations model). These organisations have recognised a synergy between strengthening their internal and external communication.

For instance, SKB based its stakeholder communication strategy on the recognition that the triad of the company’s (communication) profile, identity and image are closely linked to each other. It is assumed that in the long run, the image of the company cannot be very different from its identity, and therefore, in order to achieve coherence internal communication needs to be strengthened.⁹

In addition to increased transparency and responsiveness, a number of organisations also put a great emphasis on other values, like competence, scientific rigour, consistency, accountability and efficiency (i.e., values related

9. See SKB (2005).

to the internal process and rational goal models). Most respondents do not see any conflict between these aspirations. One of the respondents, however, expressed his concern about the excessive weight given to political expediency and the expectations of the public, which may undermine the scientific-technical soundness of decisions.

A related issue is the balance between openness and security. Responses on this question reflect three different approaches. According to one, almost all issues should be fully open for dialogue. This is the predominant view of the Finnish, Swedish, French and Swiss organisations. Another viewpoint is that this is a legally regulated question and regulations should be followed. This view is held by some organisations of the United Kingdom and Canada. A third view proposes that consultations with experts should be conducted to find a solution in each case. This is the Japanese organisation's position, where special expert committees have been set up for this purpose.¹⁰ A special example for the latter approach is the United States, where information published on NRC's website has been reviewed for security purposes several times since 9/11.

3.6.3 Values, policies and procedures

Several respondents reported policies and procedures established for implementing goals and values, as well as monitoring practices in their organisations.

In Canada, "Among the policies and procedures established for the Nuclear Waste Management Organisation (NWMO) were a Code of Conduct and a policy on Information Disclosure, which established guidelines for the organisation in meeting its objective for transparency in its operations, while safeguarding sensitive information.

"From its inception, the NWMO has committed itself to adhering to the highest ethical standards both in its procedures and activities, and in its assessment of management options. To guide it in this matter, the NWMO created a Roundtable on Ethics in 2003. To assist NWMO in achieving its ethical goals, the Roundtable on Ethics has constructed a framework of questions designed to guide the organisation's deliberations and ultimate recommendations. These questions aim to identify basic values, principles, and issues."

"As part of the commitments made in its Transparency Policy, Nirex has established an Independent Transparency Review Panel. The key objectives of the Panel are (i) to review, scrutinise and comment on Nirex's progress in meeting the commitments made in the Company's Transparency Policy; (ii) to

10. Fair Information Disclosure Committee and Information Disclosure Review Board

review and investigate appeals from stakeholders under the Company's Code of Practice on Access to Information; (iii) to provide independent advice to Nirex on matters related to Transparency."

3.7 Changes in organisational culture

The respondents were queried about how employees' key values, norms, beliefs and ways of thinking have changed. The great majority of organisations described a move from a predominantly technocratic perspective towards an attitude more sensitive to societal concerns. Such cultural changes are exemplified by the following statements:

- "A prevailing former attitude of ... staff members could be summarized as follows: "We are the experts, let us do our job". Now the staff members generally agree that their work needs to be explained to and understood by the public. This implies more communication with the public."
- "In the early stages often the technical view of radioactive waste management dominated. Today, however our work is characterised by a more comprehensive way of thinking and implementing. The attitude that openness, transparency and fairness are intrinsic to every step of the process has consolidated."
- "...has changed from being an organisation that works on behalf of the nuclear industry to being one that is working on behalf of society. ...Staff are more aware of the social dimension of their work and seek input on those aspects. Staff are evaluated on their performance and the work they complete, as well as how they undertake the work and their behaviour."

In one of the organisations, however, a move in the opposite direction was noted:

"It seems, that employees are not as communication oriented as before. This comes from the fact that the focus of work is on construction. Working safety is one of the values emphasised along the construction."

Tools facilitating cultural changes included:

- Involving employees in field work (e.g., in public consultations).
- Organising training courses for staff and management (particularly in communication and media relations).
- Developing codes of ethics, handbooks, guidelines, charters and reward policies.

A combination of several tools is illustrated by the following example:

“In November 2002, a new Awards and Recognition Policy was put in place ... with tools to acknowledge the work of staff in a tangible and public fashion... To implement the Values and Ethics Strategy ..., leaders and staff have been provided with training and practical tools, case studies and advisory services to guide their ethical decision-making.”

Turning to the question ‘what qualities does your organisation look for in its staff?’, most respondents emphasised the following qualities: scientific/technical competence, competence in communication, intercultural competence, skills in presentation techniques, awareness of stakeholder involvement, openness and open-mindedness, broad interest, aptitude for thoughtful critical analysis, competence in project-oriented work, flexibility, and ability to co-operate. In addition to educating technical staff, several organisations have also hired new staff members specialised in communication and/or social sciences.

3.8 Changes in organisational structure

Changes in organisational structure have taken place in most organisations, as a result of changes in their status, role, mandate and duties over the last decade. Several organisations reported significant recent structural changes regarding the communication function. In other organisations the main objective has been the development of new resources for stakeholder dialogue. In some of these organisations another important goal of restructuring has been the strengthening of intra-organisational (primarily horizontal) linkages to promote cooperation and consistency.

“Nirex has established four working groups on International Relations, Internal Communications, Corporate Materials, and Nirex Literature. They report to the Communication Strategy Group, which coordinates all communication efforts.”

“The UK Environment Agency has recently formed four groups on Stakeholder Relations, Customer and Community Relations, Government Relations, and EU and International Relations to promote transparency and stakeholder involvement. A Process Group has also been set up to help ensure consistency across technical units and area offices.”

“In SKB a new team is focusing on political contacts and a new resource is working on internal communication. In addition, a new coordinator is working with strategic aspects of communication and long-term planning.”

“In CNSC the Outreach Working Group and the Internal Communications and Consultation Working Group have been established. Also, the Corporate Committee on Communications has been formed recently.”

A further example for organisational restructuring in response to a changing environment is the recent development of ONDRAF/NIRAS (see Box 2).

In contrast to the above-mentioned cases, one organisation moved in the opposite direction by turning its Communications Department, at least temporarily, into a one-man function.

Box 2. ONDRAF/NIRAS

An example for organisational restructuring in response to a changing environment is the recent development of ONDRAF/NIRAS. De Preter (2004, p.103) describes this restructuring as follows:

“At the beginning of the nineties the waste management issue in general was still seen as a mainly technical and scientific issue. The long-term waste management issue (disposal) was considered to be a challenge for (hydro)geologists, engineers, modellers and assessors. There was a general conviction that the necessary Research, Development and Demonstration work would automatically lead to all the answers and arguments needed to convince all stakeholders. Also, the idea lived that by striving to the best technical solution and by trying to find the perfect site, people would be convinced and accept the solution presented to them. ... At that time disposal and communication teams of ONDRAF/NIRAS were separate entities without any integration; interactions were only on the level of checking communication messages to be sent to the outside world...”

After the failure of this top-down approach aimed at finding a technically optimal RWM method and site, a fundamentally different approach, based on co-management and co-decision with the local communities during the project development was proposed. To implement this approach, ONDRAF/NIRAS created three partnerships with nuclear communities. In order to meet the requirements for this collaboration, significant organisational changes have taken place in ONDRAF/NIRAS (De Preter, 2004, p.105-106):

“The partnerships have asked (and are asking) for a large amount of additional information. It is essential for the trust that people can have in ONDRAF/NIRAS to react promptly to all these questions. Defined actions have to be executed on short timescales. For this an integrated, flexible and matured organisation that can respond quickly but with high quality is crucial. Heavy hierarchical structures and cumbersome organisations will experience difficulties in achieving this responsiveness and alertness.

Box 2. ONDRAF/NIRAS (Cont'd)

“The partnerships have asked (and are asking) for a large amount of additional information. It is essential for the trust that people can have in ONDRAF/NIRAS to react promptly to all these questions. Defined actions have to be executed on short timescales. For this an integrated, flexible and matured organisation that can respond quickly but with high quality is crucial. Heavy hierarchical structures and cumbersome organisations will experience difficulties in achieving this responsiveness and alertness.

The information streams through the managing team are important and have to be organised and streamlined to a certain level. A lot of feed-back from meetings and discussions, fast or last minute reviews and checks are needed and have to be integrated into team organisation. Everybody must be well-informed about everything in order to have an overview of the situation. This means that a lot of short and well-focused coordination meetings are required, at least in an early phase of the project. Every team member is an antenna to pick up signals and send them to the rest of the team.”

“There is no clear-cut separation within the waste management organisation of technical and communication functions. Communication in and to a partnership is not the monopoly of a communication team. The technical people also have to acquire the skills of dialogue and communication (listening capacity, openness to other opinions and to feelings expressed, receptiveness, capacity to give clear and honest answers ...). This requires training, exercise, practice and experience to be built up. The organisation has to foster this dialogue experience of the staff. The integration in one managing team of all the disciplines, technical and non-technical, remains a prerequisite”.

De Preter (2004, p.106), however, emphasises that a balance between various effectiveness criteria, i.e., consistency, commitment, and flexibility has to be maintained:

“For an organisation that evolves from a closed, defensive approach towards an approach of collaboration with other stakeholders it is necessary to avoid chaos within the team by a strict organisation with clear and well-defined responsibilities and a strong, always-present coordination team. This strict organisation must, however, not substantially degrade the required flexibility and enthusiasm of the managing team. A small integrated team presents a clear advantage.”

3.9 Stepwise processes of change

Several respondents call attention to the gradual nature of the changes in values, behaviour, structure and policy, which reflect a slow organisational learning process:

“In brief, it is possible to conclude that technical, organisational and cultural changes all happened concurrently, thus allowing the Agency to evolve

gradually not only towards a recognisable improvement in the quality and exemplariness of the work, but also towards an enhanced concern for explanation and dialogue.”

“Attitudes and ways of thinking are changing, but it is a gradual process and has progressed at different rates in different parts of the organisation.”

The stepwise process of changes is exemplified by the U.S. NRC (see Box 3).

Box 3. U.S. NRC

During the development of new, site-specific regulations for the proposed geologic repository at Yucca Mountain, Nevada, NRC took a series of measures to improve its dialogue processes. The first steps included simple changes, such as assigning a project manager for each public meeting and providing expert coaching for all speakers in risk communication techniques. In the next stage, more profound structural changes took place. NRC established a High-level Waste (HLW) public outreach team, which brings together technical and administrative professionals from various offices, including NRC’s Spent Fuel Project Office, the Office of Public Affairs, and NRC’s contractors at the Center for Nuclear Waste Regulatory Analyses. The team defines clear messages and identifies key concepts for “plain language translation”. It organises preparation for public meetings, develops handouts and displays, and serves as a resource to the broader staff. Activities of this team also include the development of a HLW communication plan, better coordination with other NRC offices, and participation in international fora (Kotra, 2004).

Changes in agency culture are reflected by the fact that senior technical staff have been appointed for regulatory communication, and excellence in stakeholder interaction about the HLW regulatory programme is acknowledged and rewarded. Changes taking place in the HLW regulatory programme triggered changes in the agency as a whole. These changes emerged, and continue to be applied, in the context of evolving agency concern for increasing stakeholder confidence:

“As NRC’s HLW regulatory programme pursued greater effectiveness in engaging stakeholders, the NRC as a whole was coming to grips with the need to improve the quality of its interactions with stakeholders and to place greater importance on inspiring their confidence and trust. Communications plans are now required for all major programme initiatives”. (Kotra, 2004, p. 10)

Box 3. U.S. NRC (Cont'd)

“In 2003, the Chairman of the NRC chartered a task force on external communications, and a report of its findings and recommendations were issued in a public report later that year. In 2004, NRC issued guidelines for agency staff for interacting with stakeholders and published the technical basis for these guidelines. In 2005, NRC issued similar guidelines for improving internal risk communication. All of these documents are available to the public.

Agency policy with regard to notification for, accessibility to, and documentation of public meetings was updated and made available to all staff. Feedback from website users and attendees at NRC meetings are collected and analysed. Also, in 2005, the Commission directed NRC staff to publicize the results of research projects in understandable terms...”

3.10 Evaluation of change

Organisational changes have been evaluated in most organisations by using qualitative methods (analysing comments expressed by the public, conducting interviews with stakeholders), and/or quantitative measurements (questionnaire surveys conducted with national or local populations). Based on these investigations, in the majority of cases moderate or little improvement has been detected in terms of awareness of, and trust in, the radioactive waste management organisation in question. In one case (i.e., the organisation that had decreased communication efforts with the affected community), it was found that confidence both in the organisation and the project had declined.¹¹ The instability of public opinion and its sensitivity to communication efforts is indicated by the following example:

“Opinion polls show increased trust and confidence in the two municipalities where we have site investigations. On a national level, both knowledge and trust has decreased which we see as a result of some years with a strong local focus in our information activities.”

Several respondents mention a general methodological difficulty of evaluation, namely that awareness of both the radioactive waste management problem and radioactive waste management organisations is very low in the

11. In case of some organisations, respondents reported the fact of evaluation, but results were not presented.

broader public.¹² In spite of such reservations, the majority of respondents express the view that relationships with stakeholders and mutual trust have improved considerably.

Respondents felt that a large variety of recently implemented tools and elements could be transferred to other organisations. In this way, the following elements and tools could be recommended as best practice to organisations seeking to adapt better to their stakeholder environment:

3.10.1 Organisational culture, human resources

- Employing staff with different professional backgrounds.
- Providing training and support for staff to enable them to make changes to their working practices.
- Encouraging broadening of academic expertise for staff leading to interdisciplinary skills.
- Comprehensive meeting preparation that includes rehearsal and revision of materials to simplify the language.
- Active work on issues regarding corporate identity/cultural change. These have to be well discussed and widely accepted before launched.
- Ensuring greater participation of staff during public consultations.
- Creating platforms where many employees can participate in public communications work.
- Increased focus on the need for internal information and discussion prior to important decisions/events.
- Making media coverage well known within the company.
- Ensuring senior management support and drive for initiatives.
- Rigorous management.
- Clearly defining the organisation's role and mission.

3.10.2 Decision-making/stakeholder involvement processes

- Making sure that decision-making processes are clear, transparent and credible.
- Communicating early, regularly and transparently.
- Developing and updating communication plans.

12. It is noted that awareness is higher in affected local populations, but these may be sharply divided between proponents and opponents of nuclear energy, and it is rather difficult to improve trust among the latter.

- Involving affected parties, politicians, authorities, local and regional governments, journalists, and the public (also in neighbouring countries).
- Attentiveness to the different arguments and allowing discussion to grow.
- Establishing a direct two-way link with the public through a local web site managed by the organisation in question.
- Incident management which focuses on maintaining public trust in the management system.
- Regular forum/seminar for all stakeholders (local and national politicians etc) to encourage networking and knowledge-sharing. Allow opponents to present their case at these events.
- Co-decision making (with stakeholders).
- Using a neutral organisation or person as a facilitator.

3.10.3 Adopting specific tools

- Tools and elements developed for the Canadian Nuclear Safety Commission's Values and Ethics Strategy.
- The Building Trust with Communities toolkit and the guide to writing standards developed by the UK Environment Agency.

To the question of what would be the conditions for transferring the above tools to other organisations, one respondent emphasised “the dedication of the individuals applying them and the sensitivity of those individuals to the need to select, tailor and apply any, or all, or none (!) in a manner that is responsive to and respectful of, the needs and interests of the stakeholders.”

3.11 Summary of results

The survey indicates that important recent changes have taken place in the vast majority of the queried organisations. Changes in mission and main goals were observed in a few organisations, and changes in values and culture in most of them. A shift towards the open system model was detected in many organisations, while a move in the opposite direction was seen in one.

Several organisations have recognised the interdependence between internal and external communication. Structural changes to strengthen external and internal communication functions and/or horizontal linkages were reported in some organisations. On the other hand, in one organisation the communication unit was drastically reduced reflecting a new focus on actual facility construction activities. The results of the survey suggest a strong

correlation between the shift towards the open systems model and the increase in stakeholder confidence. Data also confirm that maintaining stakeholder confidence requires a continued effort.

Responses have drawn a very rich picture of changes in a variety of contexts. Similar changes have been reported by implementers, regulators and policy makers. There are, however, remarkable variations among countries. For example, stakeholder dialogue appears to be greatly emphasised in one group of countries, while organisations of several other countries focus rather on one-way communication. No significant changes have been detected in a couple of countries, while in one country the radioactive waste management organisation reported a recent decrease in stakeholder interaction. These differences reflect not only idiosyncratic cultural and political traditions,¹³ but also variations regarding the stage of radioactive waste management programmes. For example, in Canada and the United Kingdom programmes have returned to a concept setting stage, where there is more opportunity for the public to influence the decisions, whereas the Finnish programme is in a stage where many important choices have already been taken.¹⁴ Further investigations would be needed to answer the question as to the extent to which various factors – cultural context, political and social environment, legal and policy changes, local aspects, etc. – influence changes in radioactive waste management organisations.

13. See for example the research by Hofstede (2003) comparing countries in terms of organisational culture.

14. The interaction between the stage of the decision making process and the practice of public involvement is discussed by Stirling (2005).

4. CONCLUSIONS

Organisations are procedures, relationships, and practices created to coordinate human talents and efforts to attain common goals. They are called upon to change if there are evident problems in their ability to adapt to the environment, or if there are evident opportunities to be exploited through organisational change. Although crisis is not an indispensable factor of change, it often triggers organisational transformation. Research suggests that crisis management can create the momentum for change, if managers take advantage of the crisis to foster an adaptive learning process.

During the transformation process organisations may need to update their mission, goals, strategies, and values. These provide an overall context for changes in organisational structure and systems, organisational culture and human resources, technologies, and output. Implementation of change can be difficult since in many cases the resistance of managers and/or employees has to be overcome. Typical causes of resistance include excessive focus on costs and burdens, failure to perceive benefits, and risk avoidance, among others.

Based on research studies it may be concluded that prospects for successful organisational change are enhanced if a well-considered, three-stage plan for collective decision making is established, which includes group processes for diagnosing the problem, propounding a solution, and designing implementation. Decision-making processes at the conclusion of each stage should be thoroughly evaluated.

It is recommended that initiation of a significant change should be undertaken only after effective human relations (meeting high standards for internal cohesiveness) and goal attainment (meeting high standards for planning and productivity) have already been achieved. Chances for success are further improved if internal stakeholders at every level of the organisation learn the importance of open systems values (flexibility, adaptability) and practice their individual innovating and brokering skills. At the same time, senior managers need to pay attention to operational stability and control and exercise their important leadership roles. While they need to innovate, they also need to monitor and co-ordinate the changes.

The survey of radioactive waste management organisations indicates that recent changes taking place in these organisations are in many respects congruent with key findings of research on organisational change. For example, in most cases the triggers of change are crises and the dominant direction of change is the open systems model. Adaptation to the expectations of stakeholders is frequently accompanied by efforts to strengthen cohesion among employees. At the same time, coordination and monitoring by senior management appear to be key elements of the transition in most organisations.

However, notwithstanding similarities, remarkable deviations from the general patterns can also be observed. For example, in most radioactive waste management organisations the increased concern with security issues limits transparency and the adoption of the open system model. Another specificity is the multi-level multi-stakeholder nature of radioactive waste management decision processes, which requires leadership to deal with questions of considerable complexity.

There are significant variations among countries, as well. In some countries learning from and with stakeholders appears to be the goal of radioactive waste management organisations, while in other countries organisations tend to focus on one-way communication. No significant deviation from top-down approaches has been detected in a couple of countries, while in one country the queried radioactive waste management organisation reported a recent decrease in stakeholder interactions. These differences reflect not only idiosyncratic cultural and political traditions, but also variations regarding the stage of radioactive waste management programmes. In sum, in addition to general trends, various factors –cultural context, political and social environment, legal and policy changes, local aspects, etc. – also appear to influence changes in radioactive waste management organisations.

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Appendix 1

QUESTIONNAIRE OF THE FSC INITIATIVE ON CULTURAL AND ORGANISATIONAL CHANGE

As the first step in preparing a desk study on changes in radioactive waste management organisations, a set of guiding questions was developed in order to provide homogeneity and comparability of the information to be analysed and summarised.

The main objective of the initiative was to share the experiences of radioactive waste management organisations; therefore respondents were asked to provide as much information as possible. Links to relevant documents (code of ethics, reports, internal guidelines, etc.) were also requested.

The questions are outlined below.

1. General questions

- 1.1 What is the role of your organisation in radioactive waste management (policy maker, regulator, implementer, etc.)?
- 1.2 Since when has been the organisation responsible for these task and duties?
- 1.3 What is the size of the organisation (how many employees)?
- 1.4 Who are the main “customers/clients” and partners in everyday business?

2. History of organisational changes¹⁵

2.1 Factors of change

What have been the most important events or processes that triggered changes in your organisation? What were the impacts of these events/processes on your organisation?

15. Organisational changes include changes in organisational goals, mission, values, practices, culture, and structure.

2.2 Agents of change

Who were the first who recognised that changes were needed? What have they done to promote these changes? Who were the key agents of changes?

2.3 Resistance to change

Who were opposed to the changes? Have you experienced resistance on the part of senior management? If yes, what were the reasons? How was resistance overcome?

2.4 The process of change

Please describe the process of organisational change. Please explain key steps of the process. For example, have changes started with changes in organisational goals and mission (radioactive waste management strategy), which were later followed by changes in working practices (opening up the organisation to stakeholder dialogue)? When did cultural changes and/or restructuring take place?

3. Details of organisational changes

3.1 Organisational goals and mission

Have the main goals and mission of your organisation changed? If yes, how? (Please describe main goals and mission before and after the changes.)

3.2 Values and practices

Please illustrate with examples how various principles of good governance (transparency, openness, objectivity, fairness, consistency, competence, etc.) are reflected in your organisation's values and practices? How are transparency and openness (access to information) implemented? How are consistency and competence of communication ensured? How are the requirements of openness and the increasing concerns over security balanced?

3.3 Cultural changes¹⁶

Have key values, norms, attitudes, beliefs and way of thinking of employees changed? If yes, please describe dominant values before and after the changes. How can these changes be observed?

16. Organisational culture is the set of values, beliefs, and patterns of thinking that is shared by the members of an organisation. The purpose of organisational culture is to provide members with a sense of organisational identity and to generate a commitment to organisational values, beliefs, and perspectives.

3.4 Tools facilitating cultural changes

What kind of tools (policies, rules, reward systems, selection, training, code of ethics, guidelines, charts, etc.) have been applied to promote/facilitate the above cultural changes? Please give examples, e.g., citations from charts, guidelines, etc. if possible.

3.5 Human resources

What qualities does your organisation look for in its staff during appointment, promotion, training and appraisal? How have these qualities changed?

3.6 Structural changes¹⁷

Please, present an overall organisational chart of your organisation. Please, describe major recent structural changes, if any.

3.7 Restructuring of communication systems

How have systems of internal and external communication been changed? Have new elements (e.g., new departments, teams, task forces, coordinators) been introduced in the field of communication?

4. Evaluation of changes

4.1 Evaluation by stakeholders

How are the impacts of organisational changes measured and evaluated? Are stakeholders involved in the evaluation process? If yes, please outline the main results of stakeholder evaluations.

4.2 Evaluation by the author

How would you evaluate the changes and their impacts? In your opinion, have relations between your organisation and the stakeholders improved?

5. Transferability of new tools and elements to other organisations

5.1 In your opinion, which of the recently implemented tools and elements could be applied in other organisations as best practice?

What would be the conditions for applying these tools and elements in other organisations?

17. Organisational structure is reflected in the organisational chart. It has four major components: (i) allocation of tasks and responsibilities, (ii) formal reporting relationships, (iii) grouping together of individuals into departments and the grouping of departments into the total organisation, and (iv) mechanisms that ensure communication, coordination and integration of effort across departments.

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