5.6 Radiation safety

Many of the statements and viewpoints draw attention to the health detriments posed by radiation and the level of assessment respective to radiation safety and related grounds in general as presented in the EIA Report. In particular, comments have been made in the statements in regard to long-term safety. In a few of the pronouncements, the need for follow-up and the related programme as these pertain to final disposal-based environmental and health impact are especially noted. These are dealt with in section 5.11.

In the view of *the Ministry of the Environment*, the results of analysis arising from the long-term safety-related comprehensive assessment are described on a very general level; nor have the significance of release barriers and the aspects affected by, as well as on, long-term efficiency been actually examined at all, making the assessment on the basis of the EIA Report of the long-term safety of the project more difficult.

The Municipality of Lappi criticized the grounds of assessment in regard to safety and health impact as being based, in the main, on assumptions and hypotheses. *The Finnish Association for Nature Conservation* is of the view that the effects of radiation over the long run have been underestimated. *The City of Äänekoski* notes the disparity which arises from the fact that part of the environmental influence is examined more precisely (e.g., land use, landscape, mining, etc.) than the harder-to-assess health impact resulting from final disposal in general.

> *The STUK* is of the opinion that the assessment of potential radiation effect is sufficiently detailed in the EIA Report, as it embraces the central project-related nuclear and radiation safety issues in those aspects presented in regard to both the short and the long term within the decree on EIA, the EIA programme and in the Ministry of Trade and Industry's pronouncement on the EIA programme of Posiva Oy. The STUK stresses, however, that not all details linked with long-term safety have yet seen resolution during the EIA phase; rather, research shall be needed at a later stage in respect to the conditions and depths involved where the repository is to be specifically built. On the basis of the assessment of environmental impact, there are, however, no apparent obstacles associated with nuclear and radiation safety which would actually prevent the project from being taken forward. The research supports the perception that, also in unfavourable circumstances, the radiation dosages shall remain below the set limits—at maximum to the level of nature's own background radiation—and that such dosages would only be local in character. In the view of the STUK, the safety requirements, broad investigations and safety analyses, together with the related findings and factors of uncertainty, have been dealt with in sufficient magnitude within the EIA Report.

The Provincial State Offices of Oulu and *West Finland* both regard the study of health impact in the EIA Report as rich in various detail as well as appropriate. In connection with the effects on health, however, *the Provincial State Office of Southern Finland* remarks that in defining the limit values of radiation, permanent and leisure habitation should be regarded on equal terms, and that in ensuring the quality of household water consideration must also be given to individual wells rather than only essential groundwater areas.

In its own pronouncement provided on the EIA programme, the Ministry declared that the changes centred on groundwater conditions should be given attention within the assessment in reference to water acquisition on the part of individual households as well. The areas of lowered groundwater table are graphically presented in the EIA Report by means of surface maps of the final disposal areas, according to which the water situation in respect to individual wells can also be checked on the basis of the well-site. The risk of drying in respect to individual wells has been inspected in the report on the basis of, among other things, the experiences derived within areas of mining. In the background material concerning the subject matter, habitation in the alternative final disposal localities as well as, among other aspects, the possible drying of various types of wells is examined in a more detailed manner. Permanent settlement has been noted amongst the areas respective to the planned final disposal sites for the most part only in Loviisa, particularly if the facility is intended for location on the mainland. In the view of the Ministry, the effects of groundwater table lowering have been inspected, in respect to the assessment procedure for environmental impact inclusive of the background data, in sufficient detail within the EIA Report.

It is noted that the inspections, assurances and requirements set in regard to the facility, both during the period of operation and as pertaining to long-term safety, shall be focused on in ever-increasing detail during the course of the project.

5.7 Health impact beyond that caused by radiation

As affirmed in the EIA Report, the construction and operation of a final disposal facility may engender the normal environmental and health impact incurred by industrial construction and related functions in terms of, for example, dust, noise, vibration and increased transportation. Within the statements and views provided on the EIA programme, considerable attention was given to the potential psycho-social, indirect influence on health, which may be brought about by prejudices and fears directed

towards the project in addition to the changes caused to the social environment. In this respect, health impact and its origination cannot be clearly separated from the general subject area related to social influence (section 5.8). In the statements and positions submitted as obtained on the basis of the EIA Report, there are no actual comments presented which would require mention in regard to the psycho-social aspects, though *the Municipality of Eura* regards such aspects as downplayed in the report. Neither have the direct physiological effects on health beyond those connected with radiation been addressed in these statements or viewpoints—or then they have been included under the general term "health impact," therefore referring in the same connection, either indirectly or specifically, to the effects on health caused by radiation.

In the statements issued by *the Ministry of Social Affairs and Health* as well as *the Provincial State Offices of Oulu* and *Western Finland*, the impact on health is regarded as having been handled appropriately in the EIA Report. In the pronouncement made by *the City of Äänekoski* as well as in the positions put forward by some *private individuals*, the view as echoed suggests that—either intentionally or due to the relative ease and simplicity of the matter—there is considerable attention given in the EIA Report to the handling of details associated with health impact non-respective to that resulting from radiation.

5.8 Social impact

Many statement providers, particularly the neighbouring municipalities, give particular attention to the civic and social changes incurred by the final disposal facility, as well as the consequential influence of these changes and the role of image factors pertaining to them. In some of the statements, there is general mention of the significance of pure natural environs, which may in the final analysis be interpreted as the accumulative effects of radiation-linked detriment on human health derived from the food chain. In respect to the same, this question is also connected with the sphere of examination relative to health impact (sections 5.6 and 5.7). The opinions of private persons in referring to the purity of nature actually relate to the entire question of nuclear energy, not the EIA Report.

The Municipalities of Eura and *Lappi* attach significance, namely, to the inadequate conceptualisation in the EIA Report relative to the effects of final disposal on the image of the region as a generater of food items. *The Employment and Economic Centre of Uusimaa* does not see any particular hazard arising from the project or limitation in respect to basic production, fishing, agriculture or any other form of commercial activity.

The handling of social impact is regarded in most of the statements as adequate or it is not specifically mentioned. *The Provincial State Offices of Western Finland* and *Oulu* declare the treatment of social effects to be appropriate, and *the Provincial State Office of Southern Finland* sees the handling of such impact respective to the report as comprehensive.

What is regarded as the excessively narrow geographical focus of the EIA area is a subject of note in a few of the statements. It is affirmed that, in actual fact, many of the effects extend to the entire economic region, the province and, in the final analysis, the entire Finnish nation (the position of *a private citizen*), and that consideration should be given in choosing the final disposal site to a wider cross section of opinion in the region rather than being limited solely to the position taken by the site locality (*Municipality of Lappi*). *The Municipality of Lappi* also regards the study and inspection of social, economic and functional impact as inadequate, especially on the part of the surrounding municipalities, and considers that there is excessive concentration on the specific municipality for final disposal.

The Municipality of Eura declares that the social influence and impact on living conditions and general well-being has been downplayed, and that a broader assessment would be required in terms of the desirability of the Rauma region as, among other things, an area of residence and work as well as a tourist area. The perspective of *the City of Lieksa* is that the conceivably positive effects of a final disposal facility on the economy, employment, etc., would be focused primarily on Kuhmo alone (assuming the facility is to be in Kuhmo), but its negative influence would extend to the region of Lieksa as well, since Upper Karelia and Kainuu are, as areas, associated with pristine nature, natural products and nature-related tourism. *The Finnish Environmental Institute* observes in its own pronouncement that the dialogue engaged in on the national level has not been set out in the EIA Report.

Impact on image is, in most of the statements, linked as a peripheral aspect through its association with other types of influence. Conversely, *the Municipality of Eura* states generally that the report lacks a broader assessment of mental images ("a regional graveyard for nuclear wastes") as well as the effects of such images on the final disposal-specific and neighbouring municipalities. *The Municipality of Lappi* refers to the affirmations in the report, according to which the study of image-related impact is associated with method and information-related uncertainties, declaring in addition that the effects of mental images can be even greater in the surrounding municipalities than in the site municipality for final disposal itself.

> The Ministry of Trade and Industry pointed out in the introduction to its pronouncement on the assessment programme that, according to EIA decree, the methods utilized in respect to the Environmental Impact Assessment Report should be precisely described in its related annex reports. It was also stated in the EIA programme statement that the assessment of social impact should extend to a consideration of the municipalities neighbouring the potential municipal site for the final disposal facility, and that the justification for the periphery of the areas impacted should be outlined.
>
> Reference is made in the examination of social influence described in the EIA Report to, among other matters, employment, business functions, tourism, community structure and infrastructure, as well as both the site municipality and general

site-related area of the facility. Those calculations and conclusions which clearly focus only on the municipal site of the facility are regarded as lucidly indicated and justified. In like manner, the so-called method and knowledge-related uncertainties are seen as having been brought forward and explained.

5.9 Transport

In many of the opinions expressed during the EIA programme stage, attention was given to the safety of fuel transport. The scope or adequacy of the examination into transport as presented in the EIA Report is not dealt with in the pronouncements received. Conversely, in many of the statements attention has been directed to transportation in general as one of the stages in the final disposal process. In the statements provided within the EIA Report, the perspectives linked with transport are, for the most part, used as criteria in the assessment of the rank order particular to the alternative localities for final disposal. Attention has mainly been given in the statements to the importance of minimizing transportation-related risk, on which basis the shortest possible transport journey is regarded as optimal. In a few of the statements and opinions, reference is also made to haulage costs (e.g., *the Municipality of Laukaa*).

On the basis of that mentioned above, support has been given in the statements to the emplacement of the final disposal facility in the nuclear power plant-based localities, i.e., Olkiluoto or Loviisa, and in some of the pronouncements the possibility of transport by sea is affirmed as an aspect strengthening the rank order of the above-mentioned site alternatives. As a result of the aforementioned transportation-related considerations in regard to Eurajoki or Loviisa, pronouncements offering them their recommendation have been offered by *the Regional Environment Centre of Southwest Finland, the Provincial State Office of Oulu, Uusimaa Employment and Economic Development Centre* and certain *neighbouring municipalities round Kuhmo* and *Äänekoski (the Municipalities of Viitasaari, Konnevesi, Laukaa* and *Saarijärvi),* as well as *private citizens* from the environs of the above-mentioned areas in addition to the citizens' movement *Romuvaara-liikkeen tuki.* In respect to these, *the Southwest Finland Regional Environment Centre* proposes consideration of the idea that final disposal be realized in both Eurajoki and Loviisa, whereby transportation as such would be avoided altogether.

The Ministry of Transport and Communications affirms in its pronouncement that the regulations in effect concerning the haulage of risk substances are taken into account in the report. As an additional point, the Ministry mentions that a statutory order became valid on 1 March 1999, according to which enterprises delivering and hauling dangerous substances, or whose operations affect the transportation-related safety of these substances, must name one or more competent security advisors to monitor the observation of transport-related rules. *The Ministry of Defence* stresses the importance in general of risk management in connection with the conveyance of nuclear waste.

The Radiation and Nuclear Safety Authority, in its statement, assessed the environmental impact arising from the carefully executed transportation of nuclear wastes in

terms of nuclear and radiation safety as minimal. The STUK declares that, globally speaking and in Finland as well during a period of 15 years, considerable experience has been derived in the transportation of radioactive materials and that no transport-related accidents exerting significant environmental impact have occurred. The STUK furthermore avers that transport safety should be first and foremost established on the basis of the transport packaging, which has been confirmed to withstand, for example, violent collision, fires and immersion.

> The statements provided focus primarily on aspects which are not, by their nature, relevant to the sphere of environmental impact assessment or the adequacy of the EIA Report. For instance, the significance of minimizing the number of transports as well as the route distances in the selection of the final disposal site are to be resolved in connection with the decision-in-principle deliberations. Many questions dealt with in the EIA Report, or in the statements submitted on the basis of the same which are linked with transportation, also include general examination of the risks of accident during the operational stage of the facility (section 5.10).

5.10 Accidents during the operational phase of the facility

Accidents, along with their probability, prevention and control, in addition to the relevant rescue services, are given particular attention in some of the statements. The type of accident in mind is not always assigned an exact characterization, but the positions taken in these as well as in other cases point specifically to radiation-based accidents, either at the final disposal facility or during transportation. In particular, private individuals put forth doubts in regard to the degree of readiness of the canister-related technology or its reliability in view of the radiation hazard.

The Ministry of Defence states in its pronouncement that the project may exert influence on the tasks associated with security and rescue operations. In addition, the Ministry calls attention to the possible susceptibility of the waste-handling chain to either intentional or accidental weapons-related impact or destructive action under, for example, circumstances of war. Furthermore, the Ministry remarks that there may have been reason to estimate the emissions from radioactive elements from the final disposal areas, originating as a result of accidents, in a set of circumstances in which the filtering system does not function as planned. *The Provincial State Office of Western Finland* broadly proposes that situations posing the danger of radiation should be included as one of the types of accident respective to the areas of collaborative rescue operations as well as the rescue service plans of the municipalities.

In the view of *the Finnish Association for Nature Conservation*, the accident-related scenarios linked with the encapsulation phase are inadequate. The Association also notes that the costs and social impact arising from accidents are not presented in the EIA Report. *The Provincial State Office of Oulu* would have wished, in the EIA Report, a graphic diagram in regard to the normal radiation criteria in effect at the present time,

as well as modelled or tested situations of disturbance or accident which an untrained layperson would have been better able to understand in terms of the nature of the matter and its significance.

In some of the views, the potential danger relative to a situation of disturbance and its particular handling has been seen as an issue that varies, depending on the location of the final disposal site: *the Municipality of Laukaa* perceives that a situation of disorder in the periphery of the country would be preferable to that at a location 'inside' Finland, and contrary to the statement previously cited, Olkiluoto is stated, in the opinion of *a private person*, to be geographically disadvantageous – especially in case of a conflict – as a place for final disposal.

In the viewpoint of *the STUK* as to the present set of circumstances, under competent supervision the risk of radiation-related accidents is very small, but in the long run perhaps more probable in reference to negative economic and social conditions. During the operational phase of the final disposal facility, the STUK regards an environmental catastrophe as unfeasible due to the fact that the fuel is handled at the facility only in small quantities each time. Moreover, the STUK points out that the safety of facility use shall also, of course, rest on the fact that the safety regulations in the design, construction and functions of the facility, including transportation, shall be observed and that the control and prevention of vandalism and terrorism shall also be anticipated.

According to the statement provided in respect to the EIA programme, it was required that the assessment report would examine the radiation-related safety of the final disposal facility as well as accident-based risk and more important uncertainties linked to these at all stages of the final disposal activity. Inspection of the durability respective to the canisters was also made mandatory. The success of the canister-related technology and the question of radiation hazard connected with the same is naturally associated with the use of the final disposal facility in the examination of subsequent long-term safety (section 4.5). The previously mentioned aspects and demands are, in the view of the Ministry, taken sufficiently into account in the EIA Report. Radiation safety questions in regard to the final disposal facility have been assessed in accordance with the Nuclear Energy Act as of the beginning of the 1980s, under the supervision of the Ministry of Trade and Industry as well as the Radiation and Nuclear Safety Authority. This assessment shall continue on an intensive basis until approval has been granted for the licence for the facility as well as during its subsequent operation.

The presentation of costs engendered by accidents is not required of the EIA Report in the EIA-related decree, EIA programme or contact authority's pronouncement. Social impact is handled in the EIA Report as this relates to the psycho-social influence on health incurred by accidents.

Within the continuing planning and the construction license phase, the assurances and plans relative to radiation safety shall continue to become more specific. In this manner, the filtering system of the facility shall also be checked in terms of the effects of operational disturbance on radiation emissions. The assessment of accident-related probability during a war-related or other state of emergency as well as its impact on the acceptability of the alternative final disposal sites are relevant to the sphere of the application for decision-in-principle.

5.11 Scientific level and reliability of environmental impact assessment

The level of expertise or correctness of the theoretical foundation used in the EIA Report and in assessing environmental impact, either in general or as applicable to some details, has been given attention in some of the statements. Most comments are directed towards the technical and natural sciences-related research, whereas the scientific standard of the social research is not addressed in these statements to a corresponding degree. Many of the comments provided focus, however, on the entire final disposal project rather than the adequacy of the EIA Report as such.

The criticism of details connected with the expert knowledge set forth in the EIA Report is centred on, among other things, the research concerning the bedrock or the management of encapsulation technology. Many of the following positions could also be seen as relevant to the matter concerning the radiation safety of the project as a whole.

The Municipality of Eura avers that additional research findings are needed for the report in addition to scientific as well as technical examples and further study of the rock structure. Some *private individuals* present doubts in regard to, for example, whether or not all matters have been taken into consideration in respect to interpreting the durability of the rock structures, the effects of heat in the rock, groundwater flows, etc. In the view of *the Finnish Association for Nature Conservation / Satakunta Chapter*, the effect of weathering in the bedrock is not taken into sufficient regard, nor is the rise in the water surface caused by the greenhouse effect along with its particular consequences. *The Finnish Association for Nature Conservation* considers that the rock in the particular final disposal site has not been analysed nor taken into account by reference to the different behaviour of excavated rock as compared to unexcavated rock. The view of the citizens' movement *Kivetty-liike* is that the information concerning the rock itself is not as reliable as the party responsible for the project let on. The movement *Romuvaara-liikkeen tuki* regards the lack of discussion amongst experts as a broad problem in general. On the other hand, in some of the positions as adopted, the expertise and study concerned are stated to be of an indisputably high standard.

The Geological Survey of Finland views the level of research, keeping the selection of the final disposal site in mind, as sufficient, and makes reference to ensuing more exact studies during the continuing stages of the project. *The Radiation and Nuclear Safety Authority* declares in its pronouncement that the durability of the canisters as well as the

role of both the tunnel back-fill material and bedrock movement are included to a sufficient degree in the EIA Report, and that even disadvantageous and improbable initial defaults have been utilized in the inspections. Additionally, the modelling of groundwater flows and the studies on the salinity of the groundwater are seen as appropriate. Furthermore, the STUK maintains that a more precise treatment of the above-mentioned matters is included in the application for decision-in-principle, and that additional research shall be carried out during the subsequent site-specific investigation stage within the depths of the rock in the final disposal area.

The management of spent nuclear fuel and the related research activity by the nuclear power plants and Posiva Oy are supervised by the Radiation and Nuclear Safety Authority, which has annually reviewed the plans and work completed as well as the reported findings in connection with the research carried out on the disposal sites, in addition to the technology-related solutions, safety studies and analyses. To backup its supervisory effort, the Radiation and Nuclear Safety Authority has performed its own investigations as well as having the same performed on its behalf, making use of national and international specialists as well. A basis of comparison for the EIA-related studies, implementation and research findings by Posiva Oy on the theoretical foundations utilized is also provided by *JYT2001,* a publicly administrated nuclear waste management research programme, as well as the previous independent inspections of Posiva performed within the sphere of the JYT programmes. In the JYT2001 Project, presently in progress, sociological research has also been given stronger emphasis than previously.

Posiva Oy has now taken, in four different localities, the inspections and environmental impact assessment procedure through in their entirety towards the selection of the final disposal site. The future detailed investigations shall be focused after this on one particular final disposal site, by reference to which it shall be possible to concentrate more precisely than previously on research concerning the bedrock under the specific conditions prevailing in the rock environment.

5.12 Need for final disposal safety and environmental impact follow-up

The Ministry of the Environment regards it as important that the behaviour of the fuel canisters placed in the repository is monitored during the operation of the final disposal facility. Moreover, the Ministry of the Environment proposes that—taking into account the factors of uncertainty bearing on the impact assessment in regard to long-term safety and opening the final disposal facility—there shall be reason to review and supplement the EIA Report in 10 and 20 years' time for possible area-related planning and permit procedure. *The Advisory Committee on Nuclear Energy* remarks that it would be

appropriate to check the findings of the Environmental Impact Assessment Report prior to processing the construction license if, for instance, the bedrock research or other significant criteria offers reason to do so.

The Technical Research Centre of Finland criticizes what it regards as the casual character, in the long run, of the follow-up plan in respect to environmental impact. According to the outlook of the Technical Research Centre, the follow-up programme should be expanded, made more exact and concretised. In implementing the follow-up programme, active interaction with the local residents should, according to the Centre, continue. In the annex to its pronouncement, the Centre avers that the formulation of a more detailed follow-up programme would have been useful already during the environmental impact assessment procedure.

The Municipality of Luvia states that the follow-up programme for environmental impact is quite modest compared to the magnitude of the project, stating moreover that the operational period respective to monitoring the effects of radiation has been disclosed but that other follow-up has been bypassed with a mere list of matters which should be monitored. In the statement by *the Finnish Association for Nature Conservation / Satakunta Chapter*, it is pointed out that due to the fact that the impact assessment are based merely on theory, it is important to execute long-term follow-up in the final disposal area. The importance of monitoring the environmental effects of the final disposal and the repository follow-up is also stated by some private citizens. In the pronouncements of a few municipalities, special mention is made of the role of information distribution in regard to the results of follow-up (see section 5.13).

> According to the decree on EIA, 12 §, a proposal of the follow-up programme for the project must be presented in the assessment report to the sufficient extent. The Ministry noted in its statement submitted in respect to the EIA programme that a corresponding project-related perspective should be reflected in the assessment report also in respect to the need for follow-up after the sealing of the repository together with a description, in general terms, of the plan for follow-up on the impact exerted by the final disposal facility. The follow-up programme respective to the project is general in character and includes, among other things, radiation-related observations, elevation of groundwater table plus the monitoring of social impact till the point of sealing of the final disposal facilities as well as after this, mainly in regard to the monitoring of the bedrock in the final disposal area.

5.13 Communications quality and success of interaction

There was, to some extent, comment made within the statements submitted about the communications and interaction respective to the environmental impact assessment procedure. Part of the commentary could be regarded as relevant also to the entire project in general as well as to the information services of Posiva Oy or the nuclear

power plants themselves. In these particular observations, the technique and standard of such communications are broadly criticized and evaluated, while conversely the actual volume of communication appears to be regarded as sufficient. What follows is a collation of viewpoints presented within the statements which, one way or another, are related to success in communications. They apply not only to the information method implemented during the period of EIA procedure and the accessibility of data, its comprehensibility and management but also to the ensuing need for information.

In some of the statements–mainly those respective to *private persons* and *civic movements*–the information associated with the EIA procedure is characterized as manipulative and one-sided and thereby driven by the benefits related to the project, which on its part is said to reduce the confidence of the citizenry in the company concerned (among others, the movement *Kivetty-liike*). *A private individual* is of the view that many of the matters studied within the context of the environmental impact assessment procedure (birds, noise, visual aspects, etc.) are, relatively speaking and in this sort of facility-based project, quite insignificant, and points out that the decisions in regard to the project are being made on the basis of other criteria and identifying the emphasis on so-called minor points as intentionally misleading.

According to the pronouncement of *the Ministry of the Environment*, the EIA procedure has been implemented in adequate interaction with the inhabitants in the surroundings of all four localities. The Ministry considers that the report provides a generally comprehensible foundation for the project and its assessment of environmental impact for the project-related decision-in-principle deliberations. Nevertheless, the Ministry wishes to draw attention to the fact that in the advertising campaign on behalf of the project, citizens having a doubtful attitude towards the project became 'labelled'—which does not serve to promote the interaction intended by the EIA-related legislation.

The City of Kuhmo, in its statement, takes up the amount and significance of knowledge and information distribution as well as the problems of information management. The city regards it as necessary to develop, in large and important projects, the assessment and control of both facilitated and received information. It identifies, as one particular problem, the large amount of information from the layman's point of view, against which the perception of essential data and the differentiation between real specialist knowledge and mere opinion or groundless assumptions is particularly difficult. In the view of the city, subject-based public involvement in the EIA process on the part of the citizenry is, in these circumstances, difficult to achieve. Indeed, the city proposes that the experiences derived from the EIA procedure concerned in regard to the relationship between information and interaction should be broadly utilized in developing legislation in the field, so that improvement could be rendered in the real possibilities for actual citizen public involvement.

The Regional Council of East Uusimaa considers the EIA process, including the public involvement in the same, as having succeeded. *The Provincial State Office of Southern Finland* mentions that local specialists should also be involved in the assessment of social impact in both the interview context and in management and monitoring groups, and that representatives of the social authorities in each municipality should be included in the assessment procedure.

The Finnish Environmental Institute affirms that the parsing of dialogue engaged in during the assessment procedure is a task belonging, above all, to the party responsible for the assessment, but the handling of feedback is, in part, the responsibility of the contact authority as well. In addition, it proposes that final decision-making should be supported by the present feedback-based materials and that, for instance, a segmentation founded on media analysis in regard to the social advantage of the nuclear waste management alternatives as well as the differences in perspective linked with the assessment of advantage.

The Provincial State Office of Western Finland proposes, with the future in mind, that in reference to all research connected with final disposal the citizenry should be briefed sufficiently and that various administrative fields should be informed at suitable intervals during the various stages. *The Municipality of Lapinjärvi* on its part presents, as a general wish, continuing follow-up and information distribution in regard to, among other matters, the technical inspections in the chosen areas as well as changes in people's mental images. *The Municipalities of Luvia* and *Nakkila* also emphasize the importance of information in the follow-up findings during both the final disposal period and subsequent to the sealing of the facilities, particularly in the area of the neighbouring municipalities. The Municipality of Nakkila also proposes that in the event the project advances in Olkiluoto, the Ministry of Trade and Industry, Regional Council of Satakunta and Posiva Oy should agree on an open and adequate information programme.

The Radiation and Nuclear Safety Authority states that, aside from its own safety communications, it has followed the comprehensiveness and accuracy of the communications from Posiva Oy on the part of radiation and issues affecting nuclear safety. The STUK regards the communications of Posiva Oy in this respect as being based on the results of technical and natural science-related research, as well as having brought forward, from the point of view of safety, fundamental issues.

> The Ministry of Trade and Industry on its part has endeavoured to promote public discussion by offering civic organizations financial assistance for information distribution associated with the environmental impact of the final disposal project. In addition, the nuclear waste research programme 'JYT,' financed by the Ministry, has been funded and promoted for final disposal-related safety research, as well as for the study of social and civic environmental impact, in a manner independent from the party responsible for the project. Some of the latter-mentioned subject areas have been especially emphasized in the research content relevant to the on-going programme period, 1997–2001. The research programme reports are all public.
>
> The viewpoint of the Ministry is that the wishes expressed in the statements in regard to the control and segmentation of 'information overload' represent perspectives worthy of attention. In addition, the Ministry considers that, in the

assessment of environmental impact, there is good reason to utilize the expertise of local officials and specialists in the EIA procedure as efficiently as possible.

5.14 Other perspectives and observations in regard to the EIA Report

Various comments concerning details within the EIA procedure and report which do not in all respects relate directly to the success or adequacy of the environmental impact assessment were brought forward in the statements and views submitted on the basis of the EIA Report.

The Technical Research Centre of Finland (VTT) sets forth, as a general reminder, that the accuracy of the oft-used affirmation in the EIA Report, "no significant environmental impact," is frequently based specifically on the implementation of successful measures for the mitigation of environmental influence. In the annex to its pronouncement, *VTT* provides several specifications and instructions for mitigating impact. VTT also presents expert views in the annex in regard to details in the report as well as the findings of environmental impact-related studies, which relate to the assessment of the effects on employment and the municipal economy. Moreover, it sets out, for example, a more exact system of analysis in regard to the impact of the waste quantity to be stored and storage-specific alternative excavating implementations.

The Regional Council of Satakunta deals in its statement with the zoning situation in Olkiluoto and declares that there is no obstacle, as confirmed on the basis of Regional Plan 5, in respect to final disposal in Olkiluoto. At the time of formulation respective to Olkiluoto's central vicinity (1973), however, there was no allowance made for final disposal of nuclear wastes in the area. The Regional Council of Satakunta states that possible change-related requirements and the compatibility of various forms of land-use in the plans have not been dealt with in the EIA Report, and that if construction plan has to be altered, the regional plan shall act as the basic guideline. *The Ministry of the Environment* remarks that underground facilities should also be indicated in the layout. Formulation of the zoning plan would be carried out in accordance with the new Land Use and Building Act (132/1999).

The City of Kuhmo points out that it has, in its statement issued in regard to the EIA programme, necessitated reference in the EIA report to 'Särkän kämppä' ('Särkkä's cabin,' preserved) and 'Romuvaaran metsäsauna' ('Romuvaara forest sauna,' protected). The City notes that this, however, has not been acted upon.

On the basis of the EIA-related decree, the Ministry's previously issued pronouncement on the EIA programme demanded of the party in charge of the project that potential restrictions and other impact on the land use in the surroundings as posed by the final disposal facility should be examined in the EIA Report. Inspection of the details concerning both habitation and the zoning situation was required. The observations in respect to zoning made by the Regional Council of Satakunta

> and the Ministry of the Environment shall, in the continuing planning of the project, be taken into account according to need.
>
> According to the decree on EIA and the statement provided by reference to programme, the effects on buildings should be presented. 'Särkän kämppä' and 'Romuvaaran metsäsauna,' as cited by the City of Kuhmo, are specifically noted in the EIA Report in the map containing cultural, building and landscape objects, in which the potential location of the final disposal area can also be seen. In the event that the EIA Report is used in the future as support material for the completion of the resolution on the final disposal project alternative in which the final disposal facility would be in Kuhmo, the permit officials should take such sites into consideration according to need in processing the applications and plans.

Both *the Municipality of Eura* and that of *Kiukainen* propose in their pronouncements that an adequate number of formal statements from independent foreign specialists should be requested. Eura bases its proposal on the ownership relations specific to Posiva Oy, which is in charge of the project, as well as the fact that the final disposal method and technology as outlined are new; nor are use-related experiences yet available. The Municipality of Kiukainen anticipates the viewpoint of such specialists in respect to whether or not Olkiluoto has had, as a site for a nuclear power plant, a potentially privileged position in the assessment of the best possible final disposal site or area for nuclear wastes. The second central question for the municipality in respect to these specialists would concern the adequacy of our national legislation if the intention is to ensure that it is only nuclear waste originating from Finland that is incorporated for final disposal by the final disposal facility. *The Regional Council of East Uusimaa* presents the question in regard to how relinquishment of the use of nuclear power in Europe would affect the foundations of the EIA Report.

> The Radiation and Nuclear Safety Authority carried out a foreign expert assessment in 1999 concerning the long-term safety of the final disposal project. This was completed by 10 international specialists who represented several areas of expertise linked with the safety of the final disposal technology to be rendered within the rock. The objects of assessment were, among other things, the detailed safety analyses and other research findings generated by final disposal-related research. The estimation concerned covered the components respective to natural scientific investigation, whereas social questions did not belong to its sphere. The assessment report was completed in October 1999 and shall thereby be applied by the STUK in readying its own safety estimate, in accordance with the Nuclear Energy Act, for the project-based decision-in-principle deliberations.

Concerning the questions wished to be addressed to international experts as mentioned in the statements issued resultant to the EIA Report, the Ministry declares that the purpose of the final disposal-related research and the assessment of the same—in like manner to the goal behind the assessment of environmental impact—has not been to establish the alternative final disposal sites into ranking order.

The questions affecting the site municipality for the final disposal facility shall be taken up in the decision-in-principle procedures.

Also, the question concerning the final disposal in Finland of nuclear wastes originating abroad is irrelevant to the sphere of EIA. This matter is also referred to previously, in section 5.5.

The EIA Report contains a short description of the international collaboration engaged in by Posiva Oy as respective to its final disposal-related research, as well as the international assessment carried out in regard to the nuclear waste management programme in 1993.

5.15 Statements of neighbouring nations in regard to the Environmental Impact Assessment Report

Sweden

Sweden's pronouncements on the EIA Report have been provided by *Naturvårdsverket,* which has acquired the stated positions from other authorities and organizations in regard to the matters concerned. It has also made announcement of the matter in a press release, 8 June 1999.

As concerns the treatment of the technique and site alternatives within the EIA Report, it is noted that Naturvårsdverket has proposed to Finland's Ministry of the Environment during the EIA programme phase of the final disposal project that the alternative methods for final disposal should be handled more thoroughly than presented in the programme. According to Sweden's formal statement, this has been undertaken and it regards the EIA Report as adequate in this respect.

The estimates by Sweden's authorities of potential environmental impact in Sweden have been presented, in their statement, as follows:

- Statens strålskyddsinstitut SSI declares that in the event the Radiation and Nuclear Safety Authority affirms, in its final estimate, the safety of human life (now and in the future) to be appropriately guaranteed, it is probable that the safety level respective to those living in Sweden would also be adequate. This sort of estimate cannot, however, be rendered until the application concerning the final disposal

facility is narrowed down to a specific location and all relevant data is available for the use of the Finnish authorities.

- Statens kärnkraftinspektion SKI states that the final disposal of spent nuclear fuel cannot be allowed to incur unacceptable health and environmental impact in so far as the final disposal facility is implemented in the manner described in the EIA Report and the safety regulations in effect in Finland are observed.

- Sveriges meteorologiska och hydrologiska institut SMHI proposes that it is essential to assess whether or not the bedrock in the site suggested is suitable for final disposal as well as to evaluate the appropriateness of the alternatives based on the so-called 'hydraulic cage,' in addition to the potential effect on the groundwater, which could flow into the Gulf of Bothnia.

- Boverket makes note of accident-related risks of transport and considers that the matter should be clarified on the part of the various sites and transport mode alternatives.

> The Ministry points out that the continuing investigations into the bedrock shall be directed during the next phase towards the chosen site for disposal and depth concerned. This group of subjects has been handled previously in, among other contexts, section 5.11. The hydraulic cage-based final disposal technique is examined in section 5.3. Transport-related and other accident risks are reviewed in sections 5.9 and 5.10.

Russia

According to the pronouncement from Russia, the assessment of environmental impact has been carried out in a fully comprehensive manner. Russia notes in its formal statement on the matter that it has had the possibility to avail itself of the general summary of EIA Report in Russian and it is not, in all respects, adequately informative.

Estonia

A formal statement has been provided by Estonia's Ministry of the Environment. Based on the views of Estonian specialists, the Ministry is of the view that significant environmental impact shall not be incurred within the area of Estonia, nor has Estonia anything specific to observe in regard to the EIA Report. In addition, it is noted in the statement that the effort which has gone into the EIA-related program phase and procedure is considerable. According to Estonia's view, the abundant experience gained within the EIA procedure may potentially be used to advantage by work on nuclear safety in Estonia.

5.16 Perspectives on the relationship between final disposal project EIA procedure and the final disposal-related decision-making process

Some of the statement providers directed attention to certain areas of critique in their pronouncements in respect to the relationship between the EIA procedure and the project-related decision-making process, schedule and other details:

The Ministry of the Environment draws notice to the fact that the project-related EIA procedure has not reached its end prior to submission of the application for decision-in-principle. Additionally, the Ministry suggests that if aspects come to the fore in the statements arising from the assessment report which have significance for decision-in-principle deliberations, the decision-in-principle application must, in these respects, be supplemented.

The City of Loviisa expresses disappointment on its behalf over the fact that the application for decision-in-principle concerning the final disposal facility, in which Eurajoki's Olkiluoto is proposed as a place for disposal, was submitted before it was feasible for Loviisa and other candidate localities to make comment on the EIA Report. The City perceives vague economic links between the project and the Municipality of Eurajoki. For the above-mentioned reasons, the City views the EIA project as having culminated during its final stage in a credibility crisis. In the opinion of *the Regional Council of East Uusimaa* as well, in addition to *private individuals*, there is suspicion expressed in regard to unacceptable economic commitments contracted between the party responsible for the project concerned and the Municipality of Eurajoki.

The position of the EIA procedure in the decision-in-principle procedure is characterized in sections 3.2 and 3.3. One of the main purposes of environmental impact assessment is to increase information acquisition on the part of the citizenry as well as the participatory possibilities in respect to project-planning and related decision-making. The submission of the application for decision-in-principle to the Council of State simultaneously with the submission of the Environmental Impact Assessment Report on alternative sites to the contact authority is not in contradiction with the regulations affecting decision-in-principle procedure, nor with EIA-related legislation. The EIA Report, intended as one of the annexes with the application, must nevertheless cover both the full scope of the project presented in the application and the environmental assessment concerned. As an addendum to the EIA Report, the annex material for the application is also supplemented by the formal statement of the contact authority submitted in regard to the report.

5.17 Issues raised in regard to general energy policy and final disposal

In many of the statements provided, views have been presented not only in respect to evaluating the EIA Report but also, among other aspects, the final disposal of nuclear wastes, the acceptability of nuclear energy use or other questions concerning energy policy, which are not confined to the sphere of EIA Report assessment; rather, the questions concerned are to be handled later in connection with the decision-in-principle

procedure. The strongest of these general positions as taken have been put forth by private citizens and civic organizations.

In the formal statements of the municipalities as well as those of the authorities, the opinions respective to the sphere of the decision-in-principle procedure for final disposal are limited mainly to estimates of rank-order based on site-related transportation perspectives (section 5.9). In actual fact, *the Regional Environment Centre of Southwest Finland* proposes, for consideration during the decision-in-principle phase, that final disposal would occur in both Eurajoki's Olkiluoto and Loviisa's Hästholmen areas. The position of *the Regional Council of East Uusimaa* on its part is that the final disposal site should be the best possible—not just good enough—and that on the basis of the EIA Report Loviisa is, of the four alternatives presented, the best.

The positions as held by private individuals has been brought to the fore in, among other contexts, the following:

- The operations connected with the use of nuclear energy and nuclear wastes should be halted.
- Rather than using nuclear energy, other modes of energy are to be preferred.
- Alternative energy sources should be studied.
- The parties responsible for nuclear power do not care about the radiation hazard.
- Nuclear wastes should be interim-stored until there is sufficient knowledge to transform into a non-hazardous form.
- Nuclear waste should be disposed of in a power plant municipality which has the moral responsibility for the risks e.g. because of the benefits the plant has brought to the municipality.
- Nuclear wastes should be sent to processing plants in Russia to thereby obtain compensation for debts outstanding.
- Nuclear wastes should be delivered to countries from which uranium is purchased.
- The final disposal project is worrying, as there is no experience in the world of the method concerned.
- There should be a public vote on the issue, in which those with the right to vote would live in a 50-kilometre radius of the final disposal site.
- The entire damage caused by the final disposal is not understood.
- Nuclear wastes should not be permanently deposited in Eurajoki, due to its geographical position.

STATEMENT PROVIDERS

Ministry of the Environment
Ministry of Transport and Communications
Ministry of Defence
Ministry of Social Affairs and Health
Provincial State Office of Western Finland
Provincial State Office of Oulu
Regional Council of East Uusimaa
Regional Council of Satakunta
Finnish Environmental Institute (SYKE)
Radiation and Nuclear Safety Authority (STUK)
Technical Research Centre of Finland (VTT)
Advisory Committee on Nuclear Energy
Geological Survey of Finland
Uusimaa Employment and Economic Development Centre
Finnish Association for Nature Conservation
Finnish Association for Nature Conservation, Satakunta Chapter
Kivetty-liike (citizens´ movement against nuclear waste)
Romuvaara-liikkeen tuki (citizens´ movement against nuclear waste)
Municipality of Eura
Municipality of Eurajoki
Municipality of Hyrynsalmi
Municipality of Kiukainen
Municipality of Konnevesi
City of Kuhmo
Municipality of Lappi
Municipality of Lapinjärvi
Municipality of Laukaa
City of Lieksa
City of Loviisa
Municipality of Luvia
Municipality of Nakkila
City of Nurmes
Municipality of Pernaja
Municipality of Pyhtää
City of Rauma
City of Saarijärvi
Municipality of Sotkamo
City of Suolahti
Municipality of Suomussalmi
Municipality of Uurainen
City of Viitasaari

Private citizens:
Esa Aallas, Loviisa
Soili Häkkinen, Porvoo
Paavo Majaneva, Eurajoki

Ritva Maliniemi, Eurajoki
Tuula Mäkelä, Kajaani
Daniel Patosalmi, Turku
Maija and Teuvo Piitulainen, Kari and Liisi Aaltonen, Martti and Hilkka Apponen, Suolahti
Pirkko Pämppi, Eurajoki
Thomas Rosenberg, Loviisa
Reino Välkkynen, Kokemäki

Neighbouring states:
Sweden
Russia
Estonia

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