Mika Kari Matti Kojo Tapio Litmanen

COMMUNITY DIVIDED

Adaptation and Aversion towards the Spent Nuclear Fuel Repository in Eurajoki and its Neighbouring Municipalities

Mika Kari – Matti Kojo – Tapio Litmanen

COMMUNITY DIVIDED

Adaptation and Aversion towards the Spent Nuclear Fuel Repository in Eurajoki and its Neighbouring Municipalities

UNIVERSITY OF JYVÄSKYLÄ ♦ UNIVERSITY OF TAMPERE

ISBN 978-951-39-4148-2 (paperback)
ISBN 978-951-39-4149-9 (PDF)

Cover design: Laura Konttinen

Abstract

The report introduces the results of a survey conducted in the municipality of Eurajoki, the first municipality in the world to approve of the final disposal of spent nuclear fuel (SNF) within its own boundaries, and its neighbouring municipalities regarding issues connected to SNF repository project. Furthermore, two approaches to interpret the rationality of a nuclear community are discussed. The nuclear oasis approach suggests that local acceptance is based on the heavy dependency of a small, peripheral municipality on the powerful nuclear industry. The challenging industry awareness approach interprets the readiness to accept the siting of a SNF disposal repository from the perspective of cultural adaptation. A community and its residents have close relations to the nuclear industry, which produces cultural adaptation, integration and understanding of nuclear activities.

The findings indicate that those residents of Eurajoki who perceived the impacts of the repository to be positive to the general socio-cultural development of the municipality were more willing to accept an SNF repository in Olkiluoto. The importance of economic and employment factors behind the acceptance were identified, but the value of these issues was weaker than more general socio-cultural satisfaction factors. Such findings speak on behalf of the industry awareness approach. However, the picture is more complicated as the residents' cultural adaptation to the nuclear industry is neither harmoniously advanced nor homogenously dispersed.

There is a latent social cleavage in the area studied. This means that there is a hidden division or dividing line of members into two factions or groups, among which there is a potential for conflict. For instance, there is a discrepancy between women and men in most issues. From the political point of view the findings suggest that residents in favour of the final disposal plan are most likely to be found among the supporters of the Coalition Party, the Centre Party and in some cases also the Social Democratic Party. Residents with a negative attitude towards the final disposal plan are more likely to be found among the supporters of the Green League and the Christian Democrats. The analysis of the data also indicates that the attitudes of those with higher income, better education, and occupational status are considerably more positive towards the final disposal than of those with lower income, less education, and lower occupational status. In some cases the differences are quite remarkable. People with higher incomes seem to deny or tolerate the risks of nuclear waste disposal or in some cases to hesitate about the risks.

Both the Finnish Radiation and Safety Authority (STUK) and the nuclear industry have succeeded in establishing a fairly trusted position as an information provider in the localities, but still the very same social division can be seen among the receivers of the information. This means that there are also local people who do not trust these actors as sources of information. Comparing the present findings to those drawn from the survey of 1994 one can say that the need for information seems to have changed from issues concerning safety towards issues concerning environmental and health effects.

The report is based on a resident survey conducted in June 2008 (Sample size 3000, response rate 20%, N=606). The research project was funded by the Finnish Research Programme on Nuclear Waste Management, KYT2010 (www.ydinjatetutkimus.fi).

Key words: *Spent nuclear fuel*, *nuclear waste*, *final disposal*, *opinions*, *Eurajoki*, *Finland*.

Tiivistelmä

Eurajoki oli ensimmäinen kunta maailmassa, joka hyväksyi käytetyn ydinpolttoaineen loppusijoituksen alueelleen. Tämä raportti esittelee Eurajoella ja sen naapurikunnissa toteutetun käytetyn ydinpolttoaineen loppusijoitusprojektia koskevan mielipidekyselyn tuloksia. Lisäksi raportissa käsitellään myös kahta erilaista lähestymistapaa, joiden avulla voidaan tulkita ydinteollisuuspaikkakunnan suhdetta loppusijoitukseen. Ydinkeidas -lähestymistapa esittää, että paikallinen hyväksyntä käytetyn ydinpolttoaineen loppusijoituslaitokselle perustuu pienen, syrjäinen kunnan suureen riippuvuuteen voimakkaasta ydinvoimateollisuudesta. Haastava teollisuustietoisuus -näkökulma tulkitsee valmiutta hyväksyä loppusijoituslaitos kulttuurisen sopeutumisen näkökulmasta. Yhteisöllä ja sen asukkailla on läheiset suhteet ydinvoimateollisuuteen, mikä synnyttää kulttuurista sopeutumista, integroitumista ja ymmärrystä ydinteollisuuden toiminnalle.

Tulokset osoittavat, että ne Eurajoen asukkaat, jotka kokevat loppusijoituslaitosprojektin vaikutukset myönteisiksi kunnan yleiselle sosio-kulttuuriselle kehitykselle, ovat valmiimpia hyväksymään käytetyn ydinpolttoaineen loppusijoituslaitoksen Olkiluotoon. Taloudellisten ja työllisyys tekijöiden havaittiin olevan merkittäviä hyväksynnän kannalta, mutta näiden tekijöiden painoarvo oli heikompi kuin yleisten sosio-kulttuuristen tekijöiden. Tämän kaltaiset havainnot puhuvat teollisuustietoisuus-lähestymistavan puolesta. Todellisuus on kuitenkin monimutkaisempi, koska asukkaiden kulttuurinen sopeutuminen ei etene harmonisesti, ilman säröjä, eikä levittäydy tasaisesti.

Tutkimuksessa havaittiin piilevä sosiaalinen jakautuneisuus. Tämä tarkoittaa, että piilossa oleva jako erottelee jäsenet kahteen leiriin tai ryhmään, joiden välillä on olemassa konfliktin mahdollisuus. Esimerkiksi naisten ja miesten mielipiteet eroavat useimpien loppusijoitusasioiden suhteen. Puoluepoliittisesta näkökulmasta tulokset viittaavat siihen, että loppusijoitukseen suopeasti suhtautuvia löytyy todennäköisimmin Kansallista Kokoomusta, Suomen Keskustaa ja joissakin tapauksissa myös Suomen Sosialidemokraattista Puoluetta kannattavien riveistä. Loppusijoitukseen kielteisesti suuntautuvia asukkaita löytyy todennäköisemmin Vihreän liiton ja Suomen Kristillisdemokraattien kannattajien joukosta. Aineiston analyysi osoittaa myös, että suurempi tuloisten, paremmin koulutettujen ja paremmassa ammattiasemassa olevien asenteet ovat huomattavasti myönteisempiä loppusijoitusta kohtaan kuin heidän, joilla on matalammat tulot, alhaisempi koulutustaso ja heikompi ammattiasema. Jossain tapauksissa erot ovat todella huomattavia. Henkilöt, joilla on suuremmat tulot, näyttävät kieltävän tai sietävän loppusijoituksen riskit tai jossain tapauksissa epäröivän riskien suhteen.

Sekä Säteilyturvakeskus (STUK) ja ydinvoimateollisuus ovat onnistuneet vakiinnuttamaan melko luotetun aseman tiedonlähteinä paikallistasolla, mutta silti edellä mainittu sosiaalinen jako voidaan havaita myös tiedon vastaanottajien keskuudessa. Tämä tarkoittaa sitä, että paikallisissa asukkaissa on myös niitä, jotka eivät luota näihin toimijoihin tiedonlähteinä. Kun nykyisiä havaintoja verrataan vuonna 1994 tehdyn kyselyn havaintoihin, voidaan todeta että tiedon tarve näyttää siirtyneen turvallisuusasioista ympäristö- ja terveysvaikutusten suuntaan.

Raportti perustuu kesäkuussa 2008 toteutettuun asukaskyselyyn (Otos 3000, vastausprosentti 20%, N= 606). Tutkimusprojektia rahoitti Kansallinen ydinjätetutkimusohjelma, KYT2010 (www.ydinjatetutkimus.fi).

Avainsanat: *Käytetty ydinpolttoaine*, *ydinjäte*, *loppusijoitus*, *mielipiteet*, *Eurajoki*, *Suomi*.

Referat

I denna rapport introduceras resultaten från en enkätundersökning som genomfördes i Euraåminne (på finska Eurajoki) och dess grannkommuner angående använt kärnbränsle. Euraåminne var den första kommunen i världen som godkänd slutförvaring av använt kärnbränsle inom sin egen kommungräns. Vidare diskuteras två olika tolkningsätt av rationaliteten i en kärnkraftkommun. Enligt kärnkraftsoas-tolkningen anses ett lokalt godkännande i en liten kommun basera sig på ett starkt beroende av kärnkraftsindustrin. Industrimedvetenhetstolkningen i sin tur föreslår att lokalbefolkningens villighet att acceptera slutförvaringsanläggningen sker genom kulturell anpassning. En kommun och dess invånare har ett mycket nära förhållande till kärnkraftsindustrin, vilket leder till kulturell anpassning, integration samt förståelse gentemot kärnkraftverksamhet.

Resultaten från enkätundersökningen tyder på att de invånare i Euraåminne som anser att slutförvaringsanläggningen har en positiv inverkan på kommunens sociokulturella utveckling är mer villiga att acceptera slutförvaringsanläggningen för använt kärnbränsle i Olkiluoto. Vikten av ekonomiska och sysselsättningsfaktorer i godkännandet av slutförvaringsanläggningen identifierades också, men dessa faktorer var svagare än belåtenhet gentemot mer generella sociokulturella faktorer. Dessa resultat försvarar det industrimedvetna tolkningssättet. Helhetsbilden är dock mångfasetterad eftersom den kulturella anpassningen gentemot kärnkraftindustrin varken framskrider enhetligt eller sprider sig homogent.

En latent social klyfta kan upptäckas i det studerade området. Detta tyder på en osynlig fördelning eller splittring bland invånare till grupper och organisationer inom vilka konflikter kan möjligen uppstå. Till exempel kan man se skillnader i kvinnors och mäns åsikter i de flesta frågorna. Resultaten visar även att de invånare som ser positivt på projektet, tillhör sannolikt Samlingspartiet, Centern i Finland och även i vissa fall Finlands Socialdemokratiska parti. De invånare som ställer sig negativt gentemot slutförvaringen av kärnbränsle, är högst antagligen anhängare av De Gröna och Finlands kristdemokrater. Analysen antyder även att invånare med högre inkomster, utbildning och arbetsposition inställer sig mer positivt gentemot slutförvaringen än de med lägre inkomster, utbildning och arbetsposition. I vissa fall är skillnaderna stora. Invånare med högre inkomster verkar dessutom förneka eller tolerera riskerna av kärnavfallshanteringen, eller i vissa fall ställa sig tveksamma mot riskerna.

Både Strålsäkerhetscentralen (STUK) och kärnkraftsindustrin har lyckats etablera sig som förtroendehavande informatörer i kommunerna, men även bland invånarna som tar emot informationen är den sociala klyftan synbar. En del av den lokala befolkningen litar alltså inte på dessa institutioner som informationskällor. När man jämför de nuvarande resultaten mot resultaten från enkätundersökningen som genomfördes år 1994, kan man se att informationsbehovet har skiftat från frågor gällande säkerhet till frågor om miljö och hälsa.

Denna rapport baserar sig på en enkätundersökning som genomfördes i juni 2008 (Urvalsstorlek 3000, svarsfrekvens 20%, N=606). Forskningsprojektet har finansierats av det Nationella kärnavfallshanterings forskningsprogrammet KYT2010 (www.ydinjatetutkimus.fi).

Nyckelord: *Använt kärnbränsle*, *kärnavfall*, *slutförvaring*, *opinion*, *Euraåminne*, *Finland*.

Contents

Figures and Tables

Abbreviations and terms

COGEMA	Compagnie Générale des Matières Nucléaires. Industrial group involved in all stages of the uranium fuel cycle. Subsequently AREVA NC a part of the AREVA Group (NC in the name meaning nuclear cycle).
DiP	Decision-in-Principle. According to Finnish Nuclear Energy Act (1987/990 §11-15,§18) the construction of a nuclear facility of considerable general significance requires in Finland a government decision-in-principle (by the Council of State, ratified by Parliament) that the project is in line with the overall good of society. The Government has to also ascertain that the municipality is in favour of the facility. After DiP a construction licence may be granted if other prerequisites set in Nuclear Energy Act are met.
E.ON	E.ON AG. Power and gas company. Part owner of Fennovoima (see Fennovoima).
EIA	Environmental Impact Assessment. Assessment of the possible impact that a proposed project may have on the environment, consisting of the natural, social and economic aspects. Required of all nuclear facilities including final disposal facility (see Final disposal facility).
Fennovoima	Fennovoima Oy. Power company. A newcomer to the Finnish energy markets and to the Finnish nuclear industry.
Final disposal	Permanent disposal of nuclear waste (see Nuclear waste).
Final disposal facility	Entirety comprising the rooms for the final disposal of the nuclear waste and the adjoining underground and aboveground auxiliary facilities. (See Final disposal and Nuclear waste.)
Fortum	Fortum Power and Heat Ltd. Energy company. An established actor in Finnish energy markets and in Finnish nuclear industry (formerly IVO, Imatran Voima Oy), a part of the Fortum Consortium. Fortum owns Posiva together with TVO (see Posiva and TVO).
IVO	Imatran Voima Oy. Former state-owned power company, subsequently (after privatisation) Fortum Power and Heat Ltd a part of the Fortum Consortium.
JYT2	Julkishallinnon ydinjätetutkimusohjelma, Public Sector's Research Programme on Nuclear Waste Management, 1994–1996.
JYT2001	Julkishallinnon ydinjätetutkimusohjelma, Public Sector's Research Programme on Nuclear Waste Management, 1997–2001.
KYT2010	Kansallinen ydinjätehuollon tutkimusohjelma, Finnish Research Programme on Nuclear Waste Management, 2006–2010.
MEE	Ministry of Employment and the Economy, former MTI Ministry of Trade and Industry.
MTI	Ministry of Trade and Industry, subsequently MEE Ministry of Employment and the Economy.
MW	Megawatt. Measure of power, equals one million watts.
NGO	Non-Governmental Organisation. A voluntary organisation which is not created by a government, with no governmental status or function and whose agenda is not set by a government.
NIMBY	Not-In-My-Backyard. Phrase used to illustrate the phenomenon of serious opposition to locating something considered undesirable in one's neighbourhood.

NPP	Nuclear power plant. Nuclear power production facility or facility complex which may include several adjacent NPP units, nuclear power plant units producing nuclear power.
Nuclear fuel	Material that can be used in a nuclear reactor to derive nuclear energy. The fuel most widely used by nuclear plants for power generation is uranium (see Uranium).
Nuclear waste	The Finnish Nuclear Energy Act (1987/990 §3) defines nuclear waste as radioactive waste in the form of spent nuclear fuel or in some other form, generated in connection with or as a result of the use of nuclear energy. The term is used in this report in a limited sense as a more convenient way expressing spent nuclear fuel. (See also SNF.)
Posiva	Posiva Oy. An expert organisation for the final disposal of spent nuclear fuel. Owned by Fortum and TVO (see Fortum and TVO).
Repository	Term meaning a place where things (in this case radioactive material) are deposited or stored and also a burial place. Used in this report as a synonym for (and more convenient way to express) final disposal facility (see Final disposal facility). [Although we use a broad interpretation of the term it can also be used more narrowly to refer only to underground parts of the facility or even only to the actual storage space(s) underground, but we saw no reason for such a strict interpretation in this context.]
SEURA	Seurantahanke käytetyn ydinpolttoaineen loppusijoituslaitoksen sosio-ekonomisista vaikutuksista ja tiedonvälityksestä Eurajoen ja sen naapurikuntien asukkaiden näkökulmasta, Follow-up research regarding the socio-economic effects and communication of final disposal facility of spent nuclear fuel in Eurajoki and its neighbouring municipalities.
SNF	Spent nuclear fuel. Fuel discharged from a nuclear reactor. (see Nuclear waste.)
STUK	Säteilyturvakeskus, The Finnish Radiation and Nuclear Safety Authority.
TKS report	Tutkimus, kehitys, suunnittelu, research and technology development report. A licensee under a waste management obligation has to submit periodically to the authorities (see MEE and STUK) about the planned nuclear waste management activities, a sufficiently detailed report containing plans for the following year and covering the next few years is to be updated every three years.
TEKY	Teollisuustietoisuus ja käytetyn ydinpolttoaineen loppusijoituksen hyväksyttävyys tutkimusprojekti, Industry awareness and acceptance of final disposal of spent nuclear fuel research project.
tU	Tons of uranium. Uranium is radioactive heavy metal used as nuclear fuel. (See also Nuclear fuel and SNF.)
TVO	Teollisuuden Voima Oyj. Energy company. An established actor in Finnish energy markets and in Finnish nuclear industry. TVO owns Posiva together with Fortum (see Posiva and Fortum).
TWh_e	Terawatt-hours of electricity. Major energy production is usually expressed as terawatt-hours for a given period. A terawatt-hour is the amount of energy equivalent to a steady power of 1 terawatt (TW) running for 1 hour (1TW = 1,000,000 MW [see MW]).
VTT	Valtion teknillinen tutkimuskeskus, Technical Research Centre of Finland
YJT	Voimayhtiöiden ydinjätetoimikunta, Nuclear Waste Commission of Finnish Power Companies

Foreword

As a small, typical rural municipality located in south-western Finland Eurajoki has gone through a great transformation. In the 1970s the municipality became the second location in Finland to host two nuclear power plant (NPP) units. The transformation process from a tranquil Eurajoki to a more lively nuclear community has not been without controversy. The problem of spent nuclear fuel (SNF) has been topical in the municipality ever since the 1970s. Until 1993 the municipality was negatively disposed towards the disposal of high-level nuclear waste in its area, but the next year, in 1994, the local council of Eurajoki removed the sentence forbidding the final disposal of nuclear waste in Eurajoki from the municipal report. In 1995, the municipality started more serious cooperation with the power company Teollisuuden Voima Oyj (TVO) on issues of nuclear waste management. On the grounds of the cooperation the municipality issued a positive statement to Posiva Oy's (Posiva) application in January 2000 for a Decision-in-Principle (DiP) for the construction of a final disposal facility for spent nuclear fuel. When Parliament ratified the DiP in May 2001, Eurajoki became a pioneering community by accepting the siting of the repository for the disposal of SNF. The siting decision has now been taken and the project has proceeded to the so called post site selection phase. This phase started with the planning, research and development work and it is expected to continue until 2020, when the repository should start its operations. The operational phase should continue at least until 2120. It will end with the decommissioning of the aboveground encapsulation plant and sealing of the repository.

Our report focuses on how the residents of Eurajoki and its neighbouring municipalities perceive their unique situation as test subjects of nuclear waste management. Ten years after the local decision-making, 17 years after the first sign of a change in the official opinion and over forty years of nuclear history, the local residents are still continuously assessing their commitment. The timeline, however, is short compared to the operation of the disposal repository, around 80–100 years, not to mention the timeline of the final disposal, which is thought to last tens of thousands of years, even hundreds of thousands years. A decision of such a great societal importance as this one certainly requires different kinds of analyses. Various stakeholders such as politicians, journalists, decision-makers, authorities, representatives of industry and the general public are curious: how local people in the area perceive different aspects of the repository project, and what are their opinions concerning final disposal of SNF in general at the moment, as once again Eurajoki is in the focus of wide international interest. Parliament ratified the positive Decision-in-Principle regarding the fourth NPP unit (Olkiluoto 4) and the expansion of the SNF repository at Olkiluoto Island in Eurajoki in July 2010. In addition to the Olkiluoto 3 NPP unit which is already under construction, this means that considerably more spent nuclear fuel will be generated and the timeline of the final disposal will also be changed. While various stakeholders have an interest in analyses at this stage of the project, one can surmise that future generations will also assess the decision from their own perspective, which increases the importance of analysing and documenting present attitudes towards this complex issue. In this report we offer an in-depth review of local attitudes in 2008.

The authors want to express their gratitude to several people and bodies for supporting and helping the conduct of the SEURA research project "Follow-up research regarding the socio-economic effects and communication of final disposal facility of spent nuclear fuel in Eurajoki and its neighbouring municipalities". The engagement in the Finnish Research

Programme on Nuclear Waste Management, KYT2010 (www.ydinjatetutkimus.fi) gave us an opportunity to realize our research ambition.

First and foremost, during the research process we could always count on the sociological and statistical expertise of Senior Lecturer Pertti Jokivuori (University of Jyväskylä). Energy policy experts, Professor Ilkka Ruostetsaari (University of Tampere) and research fellow Miikka Salo (University of Jyväskylä) have been good debate partners. Researchers Anne Pylkkönen and Anna Nurmi (both University of Jyväskylä) conducted their individual research projects alongside this main project, and latter also helped in the editing of this report. We appreciate discussions with the mentor group set up by the KYT research programme. Members of the group, Jaana Avolahti (MEE), Timo Seppälä (Posiva), Esko Eloranta (STUK), Heikki Leinonen (Carrum Ltd) and Mauri Vieru (MEE), have been our first hand contacts to the KYT research programme. In the space of three years two mentor meetings were held.

Finally we want to express our deepest gratitude to the residents of Eurajoki and its neighbouring municipalities. People in this area have been in the spotlight of researchers for decades and they are still willing to assist academic research by completing questionnaires. We are truly grateful. Thank You!

Jyväskylä, 9 December 2010

Mika Kari, Matti Kojo and Tapio Litmanen

1 Introduction

The final disposal of spent nuclear fuel (SNF) is approaching one milestone in Finland as the nuclear waste management company Posiva Oy (Posiva) is preparing to submit an application to the Council of State for permission to build an SNF repository by 2012. Due to the approaching new stage of nuclear waste management, updated information regarding opinions of the local residents is needed for the use of authorities and decision-makers. Furthermore, the revival of nuclear power in Finland has raised new issues regarding Finnish nuclear waste policy. One of the questions is where to dispose of SNF generated by the newcomer, Fennovoima Oy (Fennovoima), in Finnish nuclear industry.

The main objectives of the SEURA[1] research project were to study residents' opinions in the municipality of Eurajoki and its neighbouring municipalities regarding

1) socio-economic and socio-political impacts of the final disposal facility and
2) information needs and ways of obtaining information regarding the final disposal plan.

The SEURA research project was launched in 2008 as a cooperation between the University of Jyväskylä (Department of Social Sciences and Philosophy) and the University of Tampere (Department of Political Science and International Relations). The project was funded by the Finnish Research Programme on Nuclear Waste Management (KYT2010, www.ydinjatetutkimus.fi) 2008–2009. In 2010 the funded project was called TEKY[2]. Assistant Professor Tapio Litmanen (University of Jyväskylä) acted as the project manager and Matti Kojo Lic.Soc.Sc. (University of Tampere) and Mika Kari M.Soc.Sc (University of Jyväskylä) worked as researchers in both projects. Furthermore, Anne Pylkkönen M.Soc.Sc. and Anna Nurmi B.Soc.Sc (both University of Jyväskylä) worked as research assistants.

The main objectives of this SEURA final report are:

1) to present the results of the 2008 survey in one research report
2) to compare the results of the 2008 survey to some earlier survey results
3) to examine some possible explanations for attitudes towards final disposal

[1] SEURA stands for "Seurantahanke käytetyn ydinpolttoaineen loppusijoituslaitoksen sosio-ekonomisista vaikutuksista ja tiedonvälityksestä Eurajoen ja sen naapurikuntien asukkaiden näkökulmasta", in English "Follow-up research regarding the socio-economic effects and communication of final disposal facility of spent nuclear fuel in Eurajoki and its neighbouring municipalities".
[2] TEKY stands for "Teollisuustietoisuus ja käytetyn ydinpolttoaineen loppusijoituksen hyväksyttävyys", in English "Industry awareness and acceptance of final disposal of spent nuclear fuel".

Before this report the results of the resident survey were presented at a number of international conferences (Kojo, Kari and Litmanen 2008; Kojo, Kari and Litmanen 2009a; Kojo, Kari and Litmanen 2009b[3]; Kari 2009; Kari 2010a; Kari 2010b; Kojo and Kari 2010[4]; Litmanen and Kari 2010). So far two conference papers have been partly rewritten and published as articles in international reviewed journals (Kojo, Kari and Litmanen 2010; Litmanen, Kojo and Kari 2010). Three separate working reports on public meetings in the field of nuclear issues were published in the project (Pylkkönen, Litmanen and Kojo 2008; Nurmi, Kojo and Litmanen 2009; Nurmi 2010).

Residents' opinions in the candidate municipalities for the SNF repository have been a subject of interest earlier in Finland. Finnish power companies have funded a follow-up study "Energy Attitudes of the Finns" annually since 1983. Currently, the survey is conducted by the Finnish Energy Industries and Yhdyskuntatutkimus Oy (Kiljunen 2009). According to the Finnish Energy Industries "the research series has been used to clarify and follow people's attitudes towards questions on energy policy". The study also covers a few questions regarding nuclear waste management and an independent sample consisting of residents of Eurajoki has been included in the survey since 1984. This is the only long-term follow-up survey available in Finland. Regrettably, as the number and also the wording of the statements in the survey have varied to some extent since the early 1980s, there is only one statement regarding nuclear waste which have been asked annually since 1983 and one which has been asked since 1984. In the energy attitude survey some 230 people represent the population of the specific municipalities of the study, namely Eurajoki and Loviisa. Since the survey of 2004 the sample size in these two municipalities was increased to 320 people.

Since 1994, when the first nuclear waste resident survey was conducted in Eurajoki (Kurki 1995) by the researcher Osmo Kurki (University of Jyväskylä[5]), four other resident surveys have been carried out before this one; one in 1996 as part of the Public Sector's Research Programme on Nuclear Waste Management 1994–1996 JYT2 (Harmaajärvi, Litmanen and Kaunismaa 1998), one in 1999 as a part of Posiva's application process for a Decision-in-Principle (DiP[6]) (Posiva 1999a), and two in 2007, one as part of land-use planning in Olkiluoto area and one as part of Johanna Aho's[7] master's thesis (Aho 2008). The results of these surveys were reported in Posiva's environmental impact assessment (EIA[8]) report on repository expansion (Posiva 2008). Our survey was conducted in June 2008 as a part of the KYT2010 research programme, as already mentioned.

Moreover, Posiva commissioned two surveys of Corporate Image Oy which focused on image, the first of these was done 1998 and the follow-up survey 2006 (Ala-Lipasti, Karjalainen and Pohjola 1999; Posiva 2007; Seppälä 2010). These surveys targeted four municipalities which were at the time of the first survey candidates for the final disposal (Eurajoki, Kuhmo, Loviisa and Äänekoski) and for purposes of comparison one additional municipality (Naantali). The Department of Political Science and International Relations, University of Tampere conducted a survey focusing on local policymakers (e.g. Ponnikas 1998; 2000) and the chairs of local associations (Kojo 1999) in the same four candidate

[3] Copyright the American Society of Mechanical Engineers, ASME.
[4] Copyright © by WM Symposia, Inc. All Rights Reserved. Reprinted with permission.
[5] Later Osmo Kurki worked as a communications manager in Posiva in 1996–2000.
[6] See Abbreviations and terms.
[7] Aho worked as a project coordinator in the Posiva communications department.
[8] See Abbreviations and terms.

municipalities as part of the JYT2001[9] research programme in 1997. In 2007 the University of Tampere and the University of Jyväskylä conducted a nation-wide survey focusing on energy issues in Finland (Litmanen et al. 2010) which also included some questions on nuclear waste policy and uranium mining in Finland (Litmanen 2009; Jartti 2010).

The interests of the energy industry and public administration in researching local opinions can be understood by the fact that according to the Finnish Nuclear Energy Act of 1987 a host municipality of a nuclear facility is vested with the right of veto. The veto can be overruled neither by the government nor Parliament. According to the legislation the right of veto is in the hands of the municipal council of the candidate municipality. The possible use of veto is expressed when the municipal council gives the Ministry of Employment and the Economy (MEE) its statement on the DiP application. The favourable statement of the municipal council is also required in the case of expanding the SNF repository. Surveys can also be seen as part of the changed approach to nuclear waste management. A general change from a technical approach towards a more participatory approach has been identified in a number of European countries (Bergmans et al. 2008). Since the early 1980s the opinions of the residents living in the host municipalities have carried more weight.

In the report of the 1994 survey Kurki (1995, 4) described the situation faced by nuclear industry as follows:

> "So that TVO [Teollisuuden Voima Oyj] could proceed in time schedule of nuclear waste management more than half of the local councillors have to be in favour of construction of final disposal facility in next decade. In practise this means that at least one out of two of residents have to be in favour of construction of final disposal facility."[10]

Thus resident surveys are a tool for monitoring local opinion and effectiveness of implemented communications activities in a political system based on representative democracy.

Although local decision-making is respected, it is interesting to note that in Finland the focus has been on monitoring local opinion and not so much in engaging the public and developing novel public participation approaches at local level. For example, in Sweden there are a number of examples of dialogue projects conducted in the field of nuclear waste management since the early 1990s. In some of the projects candidate municipalities have had an active role. (Elam et al. 2008, 30–41.) In Finland citizen engagement was discussed to some extent in the late 1990s before the implementation of the EIA procedure in 1997–99, but no real effort was ever made. One explanation for this may have been lack of funding instruments[11] for the candidate municipalities, but also a lack of competence in public participation arrangements and, furthermore, local decision-makers did not favour new approaches beside representative decision-making (Ponnikas 1998, 21–23,26–29). In a survey focused on the policymakers of the candidate municipalities 79% of policymakers in Eurajoki agreed that the

[9] See Abbreviations and terms.
[10] Original in Finnish. Translation by the authors.
[11] For example, in Sweden candidate municipalities could apply for funding from the Nuclear Waste Fund. In Finland candidate municipalities were offered a chance to propose social scientific research subjects as part of a publicly funded research programme (JYT2001) in the late 1990s, but the municipalities could not apply for funds for their own use.

final word in the local decision regarding the nuclear waste siting should be given by the municipal council (Ponnikas 1998, 27).

In the survey of 1994 a questionnaire (Kurki 1995, 11–12) was sent to 600 respondents in the municipalities of Kuhmo and Äänekoski and to 300 respondents in the municipality of Eurajoki. Respondents were selected by random sampling based on address information provided by the Population Register Centre. The survey was conducted in November 1994 and reminders were sent in December. The response rate in Äänekoski was 58% and in Eurajoki and Kuhmo 49%. The results of the survey were reported in several publications (Kurki 1995; Litmanen 1996; Harmaajärvi et al. 1997; Litmanen 1999; Lahtinen 1999).

In the survey of 1996 (Harmaajärvi, Litmanen and Kaunismaa 1998), the questionnaire was sent to 600 residents in Eurajoki, to 1,200 residents both in Kuhmo and Äänekoski corresponding to about 10% of the inhabitants in these three municipalities, and to a further 600 residents living elsewhere in Finland. The response rate of the survey was 51%. In Eurajoki the response rate was somewhat less than 50% but the exact figure was not given. The survey was conducted in December 1996 by VTT the Technical Research Centre of Finland, Communities and Infrastructure and the University of Jyväskylä with funding from the Public Sector's Research Programme on Nuclear Waste JYT2. The focus of the survey was on residents' opinions regarding the importance of certain environmental impacts of final disposal of SNF. (Harmaajärvi, Litmanen and Kaunismaa 1998.) The results of the survey were also reported in the Final Report of the JYT2 research programme (Vuori 1997).

In early 1999 an opinion poll by telephone was conducted by Suomen Gallup Oy in the municipalities of Eurajoki, Kuhmo, Loviisa and Äänekoski. All the municipalities were host candidates at that time. The focus of the opinion poll was on the general acceptability of the final disposal project among the inhabitants of the research area. The sample covered ten percent of the population in each host candidate municipality. (Posiva 1999a, 167.) The opinion poll was funded by Posiva, who submitted the DiP application to the Council of State in May 1999.

The survey conducted by Aho in autumn 2007 was carried out as a postal questionnaire. It was sent to 400 residents of Eurajoki. The response rate was 49%. (Aho 2008, 24.) The objective was to study the trust of the residents in safe final disposal, the generation of trust and division of trust into different trust types. Some of the results were also reported in Posiva's EIA report (Posiva 2008, 111).

As part of a partial master plan for land use in Olkiluoto area, the consultants Ramboll Finland Oy conducted a survey focused on neighbouring residents and workers of Olkiluoto site in 2006–2007 (Posiva 2008, 113). Residents of the municipality of Eurajoki at large and residents of the municipality of Rauma were, however, also targeted by the survey. Overall the questionnaire was sent to 1,500 recipients. The response rate was 52%. Some of the results were reported in Posiva's EIA report. (Posiva 2008, 95.) Despite requests to TVO the Ramboll Report was never delivered to the SEURA research group.

The structure of the report at hand is as follows. In Chapter 2 milestones of Finnish nuclear waste policy are introduced in brief. The chapter is partly based on an article published in the Journal of Progress in Nuclear Energy (Kojo, Kari and Litmanen 2010). The chapter was updated to cover the decisions regarding the nuclear power plant (NPP) applications in 2010. In Chapter 3 target population, sampling, the respondents of the survey and methods used in

the study are introduced. The non-response analysis is also introduced. In Chapter 4 the focus is on the sources people consult to obtain information on final disposal issues, how satisfied they are with he quantity and the reliability of the information provided by different actors and what kind of information needs they have in relation to these issues. In Chapter 5 the focus is on how people in the area perceive the effects of the construction of the final disposal facility and whether they feel that it poses some kind of threat. In Chapter 6 the main theme is to find out how willing or reluctant the respondents are to accept final disposal of SNF and its possible expansion for the needs of different nuclear power companies. In Chapter 7 the focus is only on respondents living in the municipality of Eurajoki. Chapter 7 is based on an article published in the International Journal of Nuclear Governance, Economy and Ecology (Litmanen, Kojo and Kari 2010) and a conference paper presented at the international "Managing Radioactive Waste" conference held in Gothenburg, Sweden, 15-17 December 2009 (Kari 2009). In Chapter 8 we conclude by pointing out some results which could be of general interest, characterizing the opinions from the point of view of the developments of the last decades and taking a look at rationality of nuclear community.

2 Milestones of nuclear waste policy in Finland

2.1 The nuclear power programme and the status quo

Currently in Finland there are four NPP units in operation. The NPP's are located at two sites, at Hästholmen in Loviisa some 100 kilometres east of the capital, Helsinki, and at Olkiluoto in Eurajoki, some 240 kilometres northwest of Helsinki (Figure 1).

Figure 1.
Nuclear power plants and other reactors in Finland and nearby (STUK 2006)[12].
Possible sites for a new Finnish nuclear power plant facility added to the map.

[12] "Leningrad" (subsequently St.Petersburg) refers to Sosnovyi Bor NPP. Ignalina has been closed down.

All four reactors have been upgraded and their operating licences have been extended. In 2006 the four NPP units produced 22 TWh_e, which was 28 percent of electricity production in Finland, making nuclear power the largest source of electricity nationally. By 2006 the four reactors had generated 1700 tU of spent fuel. In 1981–1996 spent nuclear fuel generated in the Loviisa NPP was shipped to the Soviet Union and Russia. The return was based on the agreement between the governments of Finland and the Soviet Union in 1969 regarding the use of nuclear energy in peacetime. The rest of the spent nuclear fuel is stored in interim storage at the reactor sites in Loviisa and in Eurajoki (Olkiluoto). The four units produce 35 tU of spent fuel annually.

In May 2002 Parliament ratified the DiP application of Teollisuuden Voima Oyj (TVO) regarding a new 1600 MW European Pressurized Reactor. This new NPP unit (Olkiluoto 3) is under construction in Olkiluoto, but it is over 36 months behind schedule. In 2007 the nuclear power utilities TVO and Fortum Power and Heat Ltd. (Fortum) announced their plans to construct new NPP units. TVO submitted a DiP application in April 2008 and Fortum in February 2009. TVO proposed Olkiluoto as the site for the new unit and Fortum proposed Loviisa.

A brand new company, Fennovoima, also submitted an application in January 2009. The new company, partly owned by E.ON AG (E.ON), had two site alternatives in the municipalities of Pyhäjoki and Simo in the northern part of Finland. Both sites are greenfield sites. When Fennovoima launched the site selection process for NPP in the summer 2007, the company had about 30 site alternatives. In October and December 2007 Fennovoima announced that it would start the EIA procedure in four municipalities. In June 2007 during the EIA procedure the company rejected the site in the municipality of Kristiinankaupunki (Pylkkönen, Litmanen and Kojo 2008, 15-18.) In December 2009 the company rejected the site in the municipality of Ruotsinpyhtää which was merged with the town of Loviisa. Thus there was a competition between the power companies for a favourable decision-in-principle regarding the new NPP unit.

However, the leading ministers had differing views on the number of new NPP units needed. During the debate on additional nuclear energy in 2008 and 2009 the ministers of the Centre Party of Finland, for example Prime Minister Matti Vanhanen and Minister of Economic Affairs Mauri Pekkarinen, seemed to be ready to accept one unit, whereas Minister of Finance Jyrki Katainen and the National Coalition Party called for approval for all three new applications (MTV3, 8 February 2008; Hufvudstadsbladet, 16 March 2009; MTV3, 19 March 2009; Kaleva, 17 August 2009; YLE, 17 August 2009; YLE, 10 September 2009). The Green League, which is the second minor party in the government, strongly opposed the expansion of nuclear power. In the government's new long-term climate and energy strategy for Finland, approved in November 2008, the nuclear option was left open by stating that the additional construction of nuclear energy generation would be necessary in the next few years, i.e. during the term of the present government. However, this was based on the premise that nuclear power would not be constructed in Finland for the purposes of permanent export of electricity (Government Report 2008). The nuclear option was mentioned in the government programme of 2007, too (Government Programme 2007, 40). In the negotiation on the government programme of 2007 the political parties agreed that the Green League could vote against a new build of nuclear power if the Government took a DiP on nuclear power.

Minister Pekkarinen introduced the Government's proposal on 21 April 2010. According to the proposal, the Government would make favourable decisions on the construction of additional nuclear power based on the DiP applications submitted by TVO and Fennovoima. The application by Fortum would be rejected. In the same context, a positive DiP would be made on Posiva's application regarding the management of SNF from TVO's new unit (Olkiluoto 4). The corresponding application by Fortum would meet with a negative decision. (MEE 2010a.) Furthermore, as a precondition of Fennovoima it was determined that the company should introduce either a co-operation agreement with Posiva on SNF management or an EIA programme of its own regarding a final disposal facility for SNF. The precondition must be fulfilled in six years after the ratification of the DiP by Parliament. The government took the decision on 6 May 2010 after a vote. The ministers of the Finnish Green League voted against approval of the applications (MEE 2010b). On 1 July 2010, Parliament voted 120-72 in favour of the DiP approving the construction of the Olkiluoto 4 unit by TVO. The favourable DiP regarding Fennovoima's application to construct a new NPP unit in Simo or Pyhäjoki was also approved, by 121 votes to 71. (MEE 2010c).

The nuclear waste management company Posiva submitted a DiP application to expand the final disposal repository at the same time as its main shareholder TVO in April 2008. Posiva's application covered the disposal capacity of a maximum of 9000 tU. Furthermore, Posiva implemented an EIA procedure for the further expansion of the repository in 2008 because of the NPP application of Fortum. A new DiP application was submitted by Posiva in March 2009. The aim was to expand the capacity of the repository to a maximum of 12,000 tU.

Fennovoima in its statement on the Posiva EIA programme of 2008 proposed that capacity should cover disposal of 18,000 tU. The contact authority of the EIA procedure, the Ministry of Employment and the Economy (MEE), however, did not require capacity of 18,000 tU in its statement on the Posiva EIA programme (MEE 2008). However, Posiva declared that the company would only take care of SNF produced by its owners, that is, TVO and Fortum. According to the managing director of TVO, Jarmo Tanhua, Fennovoima had to organise SNF management by it self (YLE, 17 September 2009). Thus Posiva rejected the idea of disposing of spent fuel produced by Fennovoima. Fennovoima based its NPP plan on joint nuclear waste management with Posiva, but the competing companies have not even been able to start negotiations on the issue. Posiva has even gone so far as to deny the very existence of national nuclear waste management (Satakunnan Kansa, 12 August 2008; see also Kojo 2010). According to the managing director of Posiva, Reijo Sundell, a second SNF repository will be needed in Finland in future as the disposal capacity of the one under construction at Olkiluoto will not be enough for more than the disposal of spent fuel generated by seven NPP units (YLE, 26 March 2010).

According to the Nuclear Energy Act, the nuclear waste producers, the utilities, are responsible for the management and all costs of nuclear waste management. The Finnish Radiation and Nuclear Safety Authority (STUK) is responsible for safety aspects. According to the Nuclear Energy Act the Government shall ascertain that the municipality where the nuclear facility is to be located is in favour of the facility and that no facts indicating a lack of sufficient prerequisites for constructing a nuclear facility have arisen. Thus the local council of a proposed site of a nuclear facility is vested with the right of veto. A preliminary safety assessment from STUK is also required. The Ministry of Employment and the Economy (MEE, until 31 December 2007 the Ministry of Trade and Industry, MTI) prepares the policy decisions regarding nuclear waste management.

2.2 Nuclear waste policy in brief

The four NPP units in operation were built in the 1970s. In 1978 the Atomic Energy Act, dating from 1957, was amended to take account of nuclear waste management. According to the amendments the licence holder of an NPP unit assumes responsibility for all measures and costs relating to nuclear waste management. Under the Atomic Energy Act, detailed regulations were incorporated into the licences issued to NPP units (Posiva, 1999a, 3).

Nuclear waste policy for waste generated in Loviisa NPP was based on returning the fuel to the Soviet Union, as mentioned in Chapter 2.1 above. TVO negotiated for a reprocessing contract with the British company British Nuclear Fuels and the French company COGEMA[13] The board of TVO abandoned reprocessing plans in the early 1980s for purely financial reasons. Foreign policy has also been seen as a reason for change in nuclear waste policy (Suominen 1999). The economic viability of reprocessing was assessed in 1990, but neither the circumstances nor the costs had changed significantly (Posiva 1999a, 12–13). In February 2008 TVO argued on economic aspects as the company rejected the vision of reprocessing as a part of Finnish nuclear waste management in coming decades (Satakunnan Kansa, 20 February 2008). The return of reprocessing was proclaimed by Jukka Laaksonen, the director general of the Radiation and Nuclear Safety Authority, in an interview (Loviisan Sanomat, 15 February 2008; see also Virtanen 2009; Satakunnan Kansa, 23 April 2010). Thus the possible revival of nuclear power programmes in Europe and elsewhere and rising uranium prices might pose new challenges for Finnish nuclear waste policy in the form of a global nuclear fuel cycle.

Although the utilities have each had their own nuclear waste policies since the early days of nuclear power production in Finland, there has been some co-operation, too. In 1978 the companies set up the Nuclear Waste Commission of Finnish Power Companies (Ydinjätetoimikunta, YJT) to coordinate research and development activities. Due to the cooperation the first nuclear waste management programme was completed in September 1978. However, it took until 1995 before the utilities established a joint company, Posiva, for spent nuclear fuel management.

The main input for closer cooperation was the amendment in 1994 to the Nuclear Energy Act of 1987. According to this amendment nuclear waste produced in Finland "shall be handled, stored and permanently disposed of in Finland" (Nuclear Energy Act 990/1987). Thus the spent fuel policy of Loviisa NPP was changed. In 1983 the Council of State took the decision-in-principle on the aims and schedules relating to the implementation of nuclear waste management and associated research and planning. The decision of 1983 also included the overall schedule for nuclear waste management in Finland. The Government's timetable was based on the schedule presented in the TVO programme (Raumolin 1982, 5,7) for the final disposal of spent fuel (Table 1).

[13] See Abbreviations and terms.

Table 1.
Timetable of 1982 for spent fuel final disposal by TVO[14].

1980 – 1982	Suitability study with safety analyses
1983 – 1985	Preparation for the preliminary site characterization
1986 – 1992	Preliminary site characterization in chosen areas (5–10 sites)
1993 – 2000	Additional siting studies (2–3 sites)
2001 – 2010	Detailed studies of chosen disposal site and preplanning of the siting and the encapsulation plant
2011 – 2020	Planning and construction of the disposal site and the encapsulation plant
2021 – 2050	Final disposal facility is operational
2050 – 2060	Closing of disposal site

Posiva submitted the application for the repository for SNF in May 1999. The amount of waste applied for was a maximum of 9000 tU. This amount covered the SNF produced in six NPP units. However, due to the TVO application of 2000 regarding the new NPP unit (Olkiluoto 3, which is currently under construction) Posiva changed its application in November 2000. The company asked the Council of State to decide on the disposal of SNF produced in TVO's new unit, approximately 2500 tU, at the same time as TVO's reactor application. Disposal capacity was also decreased as the updated application covered only SNF produced by four NPP units in operation, approximately 4000 tU. The Council of State made the DiP in December 2000. Parliament ratified the decision in May 2001. The favourable DiP regarding the expansion was taken in January 2001. The expansion of the repository was approved by Parliament in May 2002 when Parliament voted for the construction of the new NPP unit.

According to the survey by Finnish Energy Industries, Finns' attitudes towards the statement "Nuclear waste can be disposed of safely in the Finnish bedrock" have become more confident in 25 years (Figure 2). In 1983, when the survey was conducted for the first time, 57% of respondents disagreed with the statement and only 14% agreed. It was only in the year 1992 that the number of those respondents disagreeing was under 50%. It is noteworthy that at nearly the same time, between 1993 and 1994, the number of those agreeing increased by nine percentage points. In September 1993 Parliament rejected the application for further construction of nuclear power and in 1994 the amendment to the Nuclear Energy Act of 1987 was enacted. According to the amendment, import and export of nuclear waste were prohibited and power companies were obliged to dispose of nuclear waste in a permanent manner in Finland. Thus the idea of national nuclear waste model was introduced.

[14] Source: Raumolin (1982, 7).

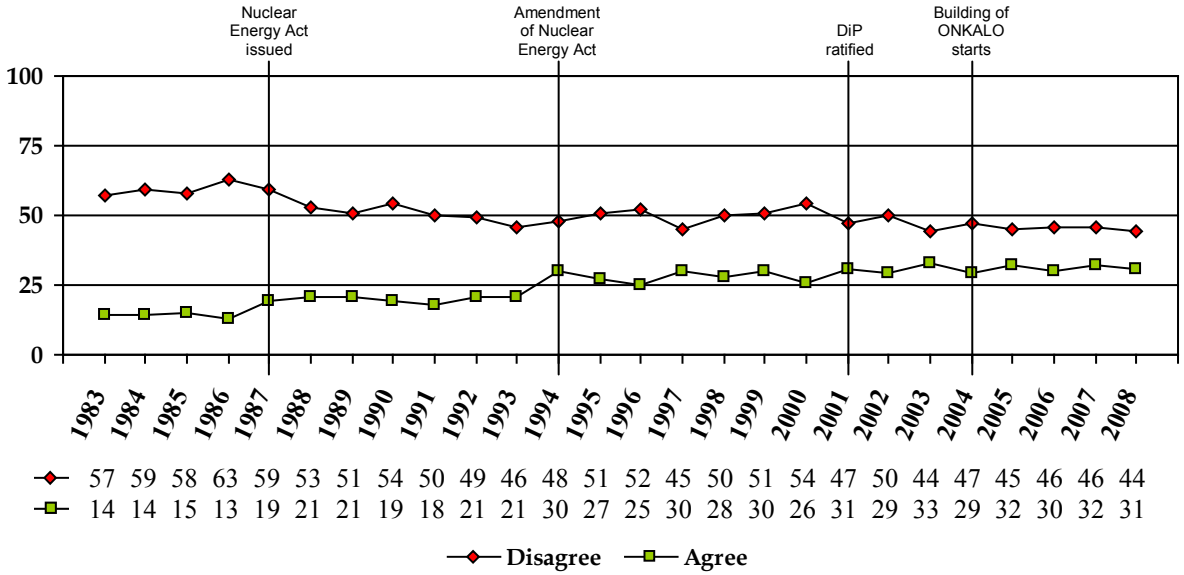

Figure 2.
Finns disagreeing and agreeing with the view that final disposal in the Finnish bedrock is safe (%). Based on data from the annual Energy Attitudes of the Finns (1983-2008) study[15].

The debate on new build of nuclear power in 1997–2000 seems to have increased the feeling of mistrust regarding safe disposal as in 2000 the number of those respondents disagreeing with the statement "Nuclear waste can be disposed of safely in the Finnish bedrock" was again over 50%. However, the number of those agreeing decreased only a few percentage points. Since the approval by Parliament of Posiva's DiP application for final disposal of spent nuclear fuel in May 2001 the numbers of those disagreeing and agreeing remained more or less constant. After more than two decades of investigations and national as well as local decisions on final disposal, 44% of Finns disagreed with the statement and 31% agreed. The number of those disagreeing decreased 13 percentage points and those agreeing increased 17 percentage points. The number of those who did not know was 25% in 2008, whereas in 1983 the figure was 29%.

Despite of the fact that Finns tend to have positive perceptions of the value of nuclear energy and that Finns' trust in nuclear safety authorities and nuclear power industry is very high in the European context, the trust in the safety of the disposal of radioactive waste is not, however, at the same level (Eurobarometer 2007). Surprisingly, the share of those who agreed with the statement "The disposal of radioactive waste can be done in a safe manner" was 45% while 51% disagreed. The question was asked as part of the section eliciting perceptions of the risks associated with nuclear energy. Among the 27 European countries Finns' trust in the safety of disposal was neither among the highest nor the lowest when the shares of those agreeing with the statement were compared. (Eurobarometer 2007, 29; see Figure 3.)

[15] More on the study in Chapter 1.

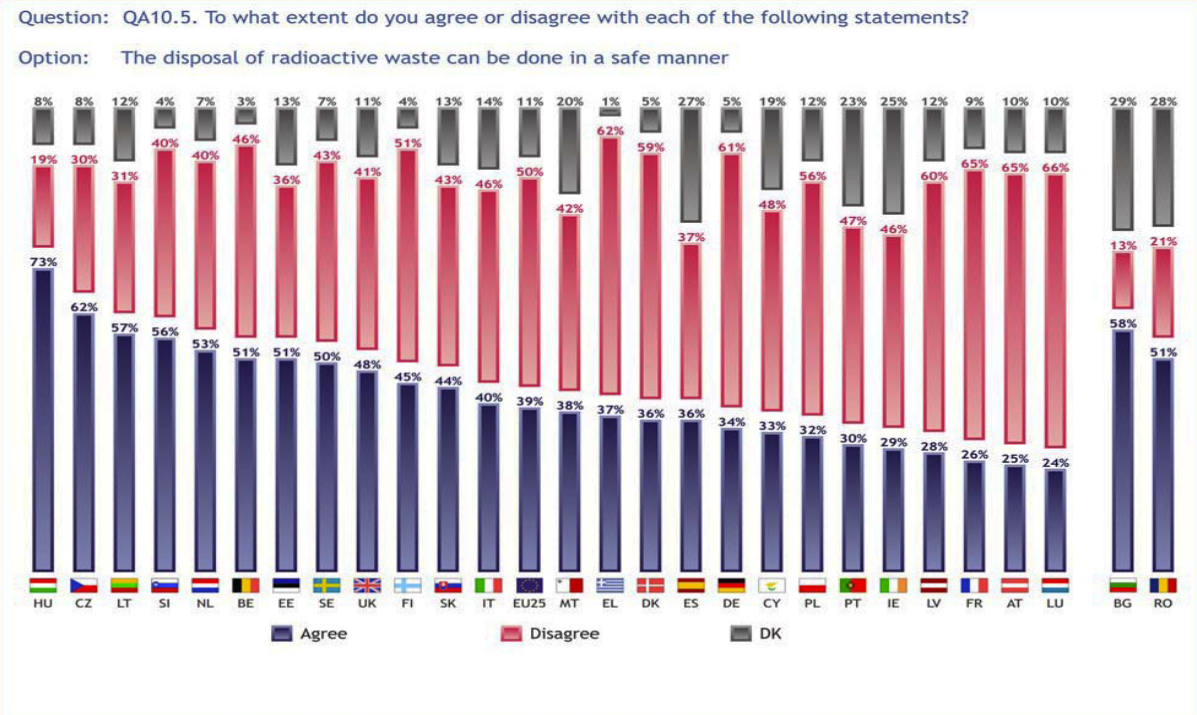

Figure 3.
Europeans disagreeing and agreeing with the view that disposal of radioactive waste can be done safely. According to Eurobarometer 2007.

The timetable of 1983 set by the Council of State has so far been changed only once. In 2003 the Ministry of Trade and Industry (MTI) decided that the companies must submit the final applications for the construction licence by 2012 at the latest. As shown in Table 1, originally the aim was to submit the application in 2010. The change in the timetable was argued for by ensuring the safety of the repository. The DiP of 2000 is valid until 2016. (Kojo 2004, 232.)

Since 2003 Posiva has prepared three three-year plans for the nuclear waste management of the Olkiluoto and Loviisa nuclear power plants. These TKS reports[16] have included plans for future research, technical design and development work as well as assessments of the state of nuclear waste management, with particular regard to the preparations for the disposal of SNF. TKS-2003 covered the research period extending from 2004 to 2006, TKS-2006 covered the period extending from 2007 to 2009 and TKS-2009 covered a detailed plan extending from 2010 to 2012 and a general plan covering the subsequent three-year period from 2013 to 2015. The latest report (TKS-2009) also provided a direct response to the requirements concerning the report to be submitted to MEE as stated in Section 28 of the Nuclear Energy Act. (Posiva 2010a, 3.) At the same time as the TKS-2009 programme MEE was provided with a construction licence readiness report, the final disposal facility's pre-licence material for the construction licence application. The material shows the current readiness of the reports required for the licence application, and specifies what parts of the material required for the licence still need to be supplemented. (Posiva, 30 October 2009.)

Posiva is obliged to submit the construction licence application for the SNF repository by 2012 and the operating licence application by 2018. The final disposal is scheduled to start in

[16] See Abbreviations and terms.

2020. According to Posiva's current plans, the final disposal would end in 2112 and the repository would be sealed up by 2120. (Posiva 2010b; see Figure 4.) As Parliament agreed to the granting of the new NPP licences in July 2010, the schedule will be changed.

The Finnish legislation concerning nuclear energy was reformed in 2008. Parliament approved the Government's legislative proposal for amending the Nuclear Energy Act (Government Bill 117/2007) on 7 May 2005, and the amended Act entered into force on 1 June 2008. As part of the legislative reform, a number of the relevant Government decisions were replaced with Government decrees. The decrees entered into force on 1 December 2008. For example, the Government Decision 478/1999 regarding the safety of disposal of SNF was replaced with Government Decree 736/2008, issued 27 November 2008. (See Posiva 2010a, 10.)

The passing of the amendment to the Nuclear Energy Act and Government Decree 736/2008 saw a partial redefinition of the relevant terminology. According to the Nuclear Energy Act, the term *nuclear facility* refers to facilities necessary for obtaining nuclear energy, including research reactors, facilities performing extensive disposal of nuclear waste, and facilities used for extensive fabrication, production, use, handling or storage of nuclear material or nuclear waste. Section 2 of Government Decree 736/2008 divides the facilities and buildings required for the disposal of spent nuclear fuel into two separate nuclear facilities – the encapsulation plant and the actual disposal facility. The term *disposal facility* refers to an entirety comprising the rooms for disposal of the waste packages (*repository facilities*) and the adjoining underground and aboveground auxiliary facilities. (Posiva 2010a, 10.) For our use of various terms used in this report please refer to Abbreviations and terms section at the beginning of the report.

During the last few years the option of reprocessing SNF has been repeatedly taken into the discussion by STUK (e.g. Loviisan Sanomat, 15 February 2008; Virtanen 2009; Satakunnan Kansa, 23 April 2010). According to STUK director general Jukka Laaksonen, (Satakunnan Kansa, 23 April 2010) technology could develop so that the direct final disposal of SNF would be abandoned and fuel would be recycled over time.

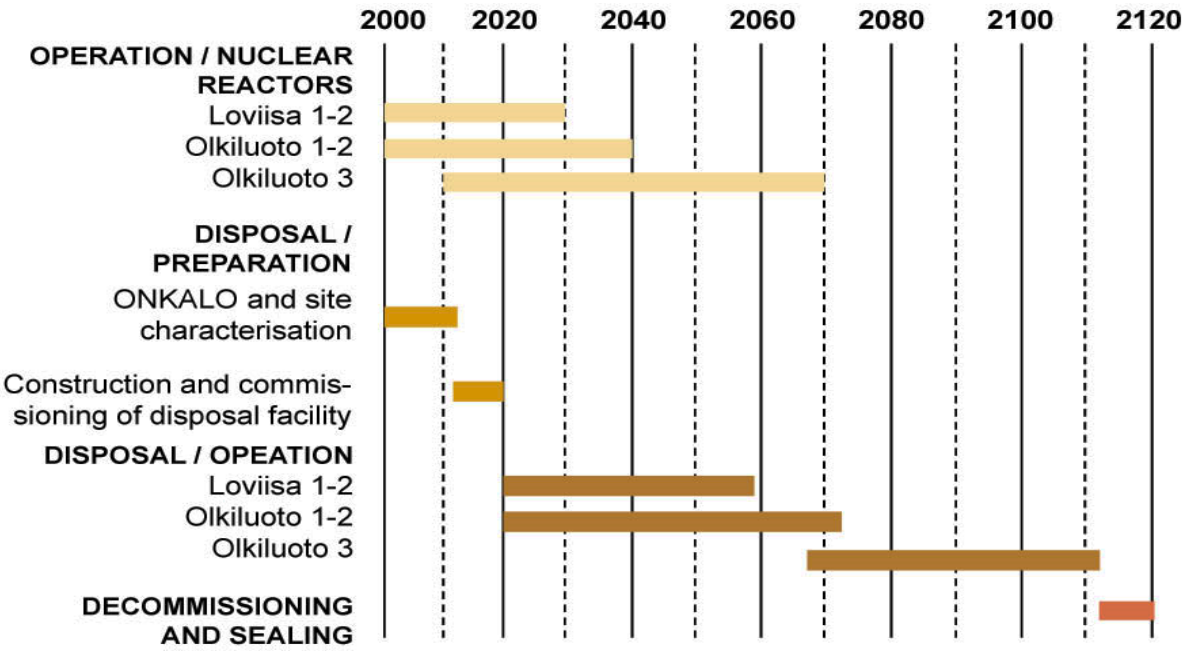

Figure 4.
Timetable of final disposal. According to Posiva (2010b).

The nuclear waste management company Posiva submitted a DiP application for expanding the final disposal repository at the same time as its main shareholder, TVO, in April 2008. Posiva's application covers the disposal capacity of a maximum of 9000 tU. Furthermore, Posiva implemented an EIA procedure for the further expansion of the repository in 2008 because of the NPP application of Fortum. A new DiP application was submitted by Posiva in March 2009. However, as the DiP application for a new NPP unit by Fortum was rejected by the government, Parliament approved only the expansion of the final disposal repository for SNF arising from TVO's Olkiluoto 4 project. The DiP in favour of Posiva's plan was ratified by 159 – 35 votes (MEE 2010c).

A whole new chapter in Finnish nuclear waste policy will begin if Fennovoima decides to apply for a DiP for a second SNF repository. As mentioned earlier, this option was introduced in the government's prerequisite to Fennovoima in May 2010. In practice a second repository would provide additional disposal capacity of thousands of tons of uranium. According to STUK director general Laaksonen the safety of the repository would not be a concern. Furthermore, it was noted by a STUK director that hundreds of candidate sites had already been identified in the 1980s. Those sites just needed to be further investigated. (Satakunnan Kansa, 23 and 24 April 2010).

2.3 The site selection process

The concept of site selection strategy partly helps to understand why the siting process of a final repository for SNF was so smooth in Finland. The formation of nuclear waste policy was described in brief in Chapter 2.2. There we explained how the policy setting changed and how the utilities started to cooperate in SNF management based on direct geological disposal. The reprocessing alternative was finally rejected in the mid 1990s. Chapters 2.3 and 2.4 focus on

explaining the chain of events by which the municipality of Eurajoki became the site of the final disposal repository. Firstly, the siting programme is analysed with the help of the concept of site selection strategy in 2.3 and secondly, the local decision-making process is introduced in 2.4.

According to Sundqvist (2002, 110)

> "…a site selection strategy is the base from which the surrounding world is interpreted, and also identifies the tasks that have to be carried out. The strategy is used as a tool for understanding, interpreting and manipulating reality, and will therefore shape the identity of the organization as well as its view of the external world."

While analysing Swedish nuclear waste policy Sundqvist has identified two different kinds of siting strategies: systematic, referring to a strategy based on the use of specific criteria and systematic comparisons between different regions, areas and sites, in a sequential order of distinct siting phases and flexible, referring to voluntariness and local acceptance by a municipality. The latter strategy is characterized by the possibility of "muddling through" without being constrained by excessively detailed requirements (Sundqvist 2002, 125).

The site selection strategy in Finland gradually changed from systematic to more flexible in the 1980s–1990s (see Kojo 2009, 168–174). According to Anttila (1995, 7) the elimination of potential sites was based on purely geological criteria in Finland. Thus siting followed a classic elimination process (Richardson 1998, 10). The site selection strategy was thus initially systematic. Litmanen (1994, 23,139–141) and Anttila (1995), however, already concluded in the mid 1990s that the purely geological elimination process was in a state of change in Finland and that environmental and social criteria were being emphasised instead of purely geological criteria. For example, Litmanen (1994) was the first scholar to pay attention to local siting conflicts in Finland. Although the nature of the local conflicts and their feedback on the siting process were not as dramatic as in some other countries, the local conflicts did indeed affect the site selection strategy applied. Gradually the informing and involvement activities of local residents were emphasized (Kojo 2005; Hokkanen, 2007) and the nuclear industry negotiated in closer partnership with the local politicians regarding the siting of the repository.

Deviation from the systematic siting strategy occurred in the early stages of the research. Litmanen (1994, 23) notes that geological criteria were applied to the selection of the areas, but that investigation sites were not chosen on strictly geological principles. Anttila (1995) makes the same comment as Litmanen on the site selection. Anttila states that in recent years the selection of the final disposal site the importance of environmental and social factors clearly exceeded geological criteria. In the mid 1980s STUK emphasised the importance of selecting different geological environments (McEwen and Äikäs 2000, 48), but at the end of the 1990s no ranking of the four candidate sites in the municipalities of Eurajoki, Kuhmo, Loviisa and Äänekoski was required by the authorities. Posiva concluded in its DiP application that in all four areas researched it was possible

> "…to show sufficiently large and sufficiently integrated rock capacities, where the conditions are chemically and mechanically sufficiently suitable and stable to provide a sufficient barrier to prevent the release of radioactive substances, and which are suitable for the construction of final disposal facilities." (Posiva 1999b, App. 5 p.28).

Posiva (1999b, App. 5 p.35) also stated that the containment capacity of the final disposal facility would be effective without the influence of the bedrock and Nature. The conclusion of the safety analysis was that "no surveyed area can be regarded as clearly safer than the others, neither does the safety analysis give any reason to discard any of the alternatives" (Posiva 1999b, App. 5 p.40). Thus the conclusions of Posiva were in line with the recommendation of an international expert group who had proposed in 1993 that "choice of a site should not aim at finding the "best possible site", but a "suitable" site that complies with the safety criteria of a final disposal facility built in line with multi barrier principle." (Posiva 1999b, 8.) The strategy applied called for a more sensitive approach on local level, too.

2.4 Local decision-making in Eurajoki

In the 1970s Eurajoki became a nuclear community, that is, a municipality where nuclear facilities, like NPP units and waste storage facilities, are located. Until 1993 the municipal report included a sentence forbidding the disposal of nuclear waste in Eurajoki. In the early days of TVO's nuclear power production spent nuclear fuel management was based on the plan to reprocess waste using a foreign reprocessing service. Indeed, under some pressure, TVO in 1980 gave a written undertaking not to dispose of spent nuclear fuel in the Olkiluoto area. The company, however, needed to reconsider its nuclear waste policy towards the end of 1980s. As explained in Chapter 2.2 the reprocessing option was assessed to be too expensive. Later on the reprocessing option became illegal in Finland because of the 1994 amendment to the Nuclear Energy Act. Thus TVO was in search of a site for a repository.

The siting process was launched in the early 1980s (McEwen and Äikäs 2000; Kojo 2009). In 1985 TVO announced a list of 102 sites suitable for further investigation. Of these 101 were "a result of the systematic selection and elimination process" (Vieno et al. 1992, 22). The Olkiluoto site in Eurajoki was included in the list as an exception. According to the company's safety analysis, the site of the NPP was in a special position because of its short transport distance. The other reason given was that because of the rock block identification method, coastal areas were sparsely represented as the method used was not suitable for coastal areas. (McEwen and Äikäs 2000, 9,46.) One screening phase took place in 1992–93. As the local opponents knew this, they tried to push the company by sharpening the forbidding sentence in the municipal report. At first the opponents were successful, but in 1994 the local council after a vote removed the sentence and neutralized the stance of the municipality regarding the siting. In 1995 the municipality signed a cooperation agreement with TVO. One aim of TVO was to safeguard the development of nuclear waste management in Olkiluoto. The main interest of the municipality in signing was to safeguard its level of tax revenue as the taxation system was reformed in the early 1990s. The idea of compensation was also introduced in the agreement.

The cooperation between the municipality and TVO was further developed during the late 1990s. Some time around 1996–97 TVO raised the siting issue. A series of discussions and negotiations was launched which resulted in a new municipal strategy, including the Olkiluoto vision, and signing of the Vuojoki Agreement in 1999. In the Olkiluoto vision the municipality issued a positive statement on both the further construction of nuclear power and on siting the repository in Olkiluoto. In 1999–2000 the municipality negotiated a package of economic benefits with TVO and Posiva which helped the municipality to overcome the liquidity problems it faced due to the reimbursement of the real estate tax of the TVO nuclear facilities granted in 1993–94. (Kojo 2009, 177–185). Thus, in a relatively short period, 1994–

1998, the municipality of Eurajoki experienced a total change in its stand regarding the siting of a repository. The negative statement was neutralized and finally a positive signal was given. The local council of Eurajoki approved a positive statement on Posiva's DiP application in January 2000. As a precondition it was stipulated that only nuclear waste generated in Finland should be disposed of in Olkiluoto. Another precondition, not written in the statement, but stated in the compensation negotiations, was the requirement for compensation regarding the real estate tax of the TVO nuclear facilities of 1994 (Kojo 2009, 184).

The Council of the State granted the DiP in December 2000 after rejecting of appeals against the positive statement of the municipality by the Supreme Administrative Court. Two appeals were first submitted to the Administrative Court in February 2000 and later in May 2000 to the Supreme Administrative Court. Parliament ratified the DiP in June 2001 by 159–3 votes (Raittila and Suominen 2002). What then happened in Eurajoki in the post site-selection phase, that is, after the political decisions to approve the site selection? A year later, in May 2002, Parliament approved the expansion of repository capacity as TVO's DiP application regarding the new NPP unit was approved. A new procedure for repository expansion was launched in 2008 as mentioned in Chapter 2.1 due to the new NPP applications (see also Nurmi, Kojo and Litmanen 2009).

New build has been under construction at Olkiluoto since 2005 as TVO selected the Olkiluoto site for the new NPP unit, Olkiluoto 3, in October 2003. According to the latest estimations the Olkiluoto 3 unit should be operational by 2012, more than three years behind schedule (Lampinen 2009). For the municipality the delay yielded more tax revenue. The total tax revenue of 32 M€ for the fiscal year 2009 included 10 M€ of real estate tax and roughly 5 M€ of income tax paid by the construction workers of the Olkiluoto 3 unit. A surplus of roughly 12 M€ is extremely high and exceptional, yet for 2010 a surplus of 5.6 M€ is expected (Satakunnan Kansa, 2 December 2009). Due to the new build at Olkiluoto the share of real estate tax has increased as in the early 2000s it was around 20% of total municipal tax revenue. The annual real estate tax of the repository is estimated to be 3.5 M€ in 2020.

Posiva moved its headquarters to Eurajoki in 2002. In 2002, 15 actors, the municipality of Eurajoki and Posiva among them, established the Vuojoki Foundation to develop the use of the Vuojoki Mansion. The mansion, which was used as old people's home until 2003 and owned by the municipality was in a central role in the compensation negotiations between the company and the municipality in the late 1990s. The new health and social service centre was built in Eurajoki on the funding compensation by Posiva. (Kojo 2009.) Renovation of the Vuojoki Mansion was started in 2004. The budget was 4.3 M€ including the financing from the municipality of 660,000 € and public funding (European union and the State of Finland). Posiva paid the rest of the costs, roughly 2.6 M€. The opening of the renovated mansion was in November 2005. In 2006–2007 the west annex (the orangery) of the manor was renovated as conference facilities. Funding of the European Fund for Regional Development covered one third of the costs of 0.95 M€, and the municipality and Posiva the rest.

In May 2003 Posiva submitted the construction licence for ONKALO to the municipality of Eurajoki (on land use planning see Posiva 2008, 77–80). ONKALO is a rock characterization facility which consists of one access tunnel, a personnel shaft and two ventilation shafts. In it bedrock is studied with methods from geology, hydrology and geochemistry, but it is not solely a rock laboratory, as ONKALO is planned to be part of the future SNF repository. The licence for ONKALO was granted in August 2003. STUK reviewed the plans, issued a

positive statement in 2004 and the construction work started in summer 2004. At the time of writing this report excavations at Olkiluoto have advanced four kilometres to a depth of almost 407 metres. Also the expansion of the interim storage for spent nuclear fuel (KPA storage) at the Olkiluoto is currently under construction (TVO 2010). According to Posiva planned final disposal depth - 420 metres - will be reached this year. According to the current timetable, Posiva should submit application for the construction licence for the repository by 2012 and for the operation licence by 2018 to the Council of State.

The expansion of the SNF repository was approved by the local council of the Municipality of Eurajoki without a vote in connection with the TVO NPP project (Olkiluoto 4) in December 2008 (one dissenting opinion), and again in August 2009 by 22 votes to 4 in connection with the Fortum NPP project (Loviisa 3 unit). Although the local council of Eurajoki approved the repository expansion for the needs of Posiva's shareholders, in March 2010 the local government reported to the Minister of Economic Affairs, Mauri Pekkarinen (Finnish Centre Party), who is in charge of nuclear energy policy that the municipality was concerned about the way issues related to municipal decision-making in accordance to the Nuclear Energy Act were handled in the case of Fennovoima. The municipality was especially concerned that the municipality was not given a chance to issue its statements although the Fennovoima application for a DiP gave the impression that SNF generated by company would be disposed of in Olkiluoto. The local government noted that the municipal council have the right of veto which cannot be overruled by either Government or Parliament. According to the municipality the procedure is also of great importance in building and strengthening openness and confidence between the applicant, the municipality and the residents. (Local government of Eurajoki 2010.)

Local opinion in Eurajoki has also gradually become more positive towards the final disposal of nuclear waste in the Finnish bedrock as shown in Figure 5 illustrating residents' perceptions regarding the safety of final disposal. Although the statement in Figure 5 is not directly about the acceptance of siting at Olkiluoto (see Kojo 2006, 67; see also Chapter 6) the figure reflects how nuclear energy and waste policy-making, site selection strategy, local decisions and implementation influenced the local opinions 1984–2008. As Olkiluoto was selected among the five candidate sites for preliminary site characterization in 1987, the local reaction was not rejection, but greater confidence in safe bedrock disposal. Neither does the Chernobyl accident of 1986 seem to have caused feelings of rejection at local level towards final disposal. Due to the Chernobyl accident the application for the construction of a new NPP unit was withdrawn by the industry in 1986.

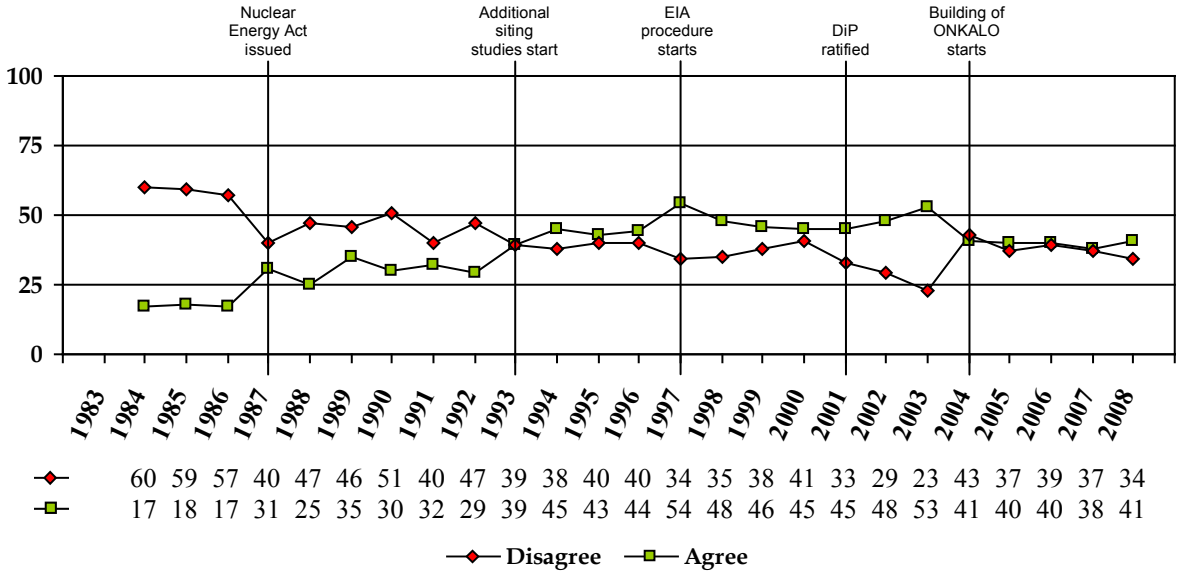

Figure 5.
Residents of Eurajoki disagreeing and agreeing with the view that final disposal in the Finnish bedrock is safe (%). Based on data from the annual Energy Attitudes of the Finns (1983-2008) study.

When the next phase of site selection process – additional siting studies – started in 1993, the number of those disagreeing and agreeing with the view that final disposal in the Finnish bedrock was safe were already nearly equal among residents of Eurajoki. In 1993 Parliament rejected the DiP application for further construction of nuclear power and in 1994 the Nuclear Energy Act was amended with a prohibition to import and export nuclear waste. At the same time the local council of Eurajoki changed its attitude on siting the repository at Olkiluoto. The decision was influenced by the economic dependence of the municipality on the tax revenue from TVO (Kojo 2009). For the first time the majority of residents of Eurajoki agreed in the mid 1990s with the statement regarding safe final disposal.

The next major change in opinion took place in 1997. The establishment of Posiva was promoted with nation-wide newspaper advertisements in 1996 and the EIA procedure for final disposal was launched in 1997 (Kojo 2005; Hokkanen 2007). In 1997 Posiva also announced that it had chosen Loviisa as a new candidate site. Public engagement in the EIA procedure and competition over the repository and benefits offered by nuclear industry (see Kojo 2009) maintained the very positive opinions towards final disposal. In 2003, after the ratification of the Decisions-in-Principle concerning final disposal and the new NPP unit (Olkiluoto 3), the number of those disagreeing with the statement was at its lowest. Only one out of four (23%) disagreed with the statement "Nuclear waste can be disposed of safely in the Finnish bedrock". Twenty years earlier the figure had been 60%. However, after 2003 something happened and local opinions became more critical. One explanation could be the fact that the excavation for the rock characterization facility ONKALO was launched in summer 2004 at Olkiluoto and thus the project came out of the Posiva drawing boards.

3 Survey and methods used

3.1 The target population, sampling and the respondents[17]

The target population of the survey consisted of 16 to 75 year-old residents of Eurajoki and neighbouring municipalities whose native language is Finnish. Age wise, the aim in dropping the lower limit a few years under 18 was to be able to some extent compare the opinions of the rising generation to those of the older generations. The survey was limited to those with Finnish as their first language as the questionnaire was to be implemented only in Finnish. The main focus of the survey was the municipality of Eurajoki, which was selected as the site for the repository but the neighbouring municipalities were also covered as they have a role in the EIA and the DiP processes.

The survey was carried out as postal survey. Three thousand recipients were chosen by stratified sampling conducted by Population Register Centre[18], which supplied the addresses. The reason for stratified sampling was pragmatic. Postal survey response rates tend to be low without several postings and/or some sort of additional incentive to respond. Moreover, as a nuclear community Eurajoki is an especially heavily studied area. On that account it made good sense to be prepared for possible survey fatigue and a low response rate. The aim was to allocate resources efficiently to ensure that there would be at least an adequate number of respondents from Eurajoki and decent representation from all neighbouring municipalities (Eura, Kiukainen, Lappi, Luvia, Nakkila and Rauma).

The four-page questionnaire was sent to recipients on June 2008. Questionnaires returned in time for data entry amounted to 616 and of those 606 qualified for analysis. As 3,000 questionnaires was sent this gives us a return rate of 21% and a response rate of 20%. Those reporting that they were residents of Eurajoki numbered 245, which is 20% of strata used in sampling. Table 2 shows that the number of respondents from each municipality corresponded well with the stratified sample sizes. As anticipated above, the response rate was not very high but satisfied our preset conditions (see 3.3.1).

[17] These have been reported earlier by the authors on a number of occasions (for more information about presentations, papers and articles see Chapter 1).
[18] Due to an error in translation earlier papers indicate that sampling would have been conducted and addresses supplied by Statistics Finland.

Table 2.
Sample sizes and respondents (n,%).

	Sample sizes		Respondents		
	n	%	n	%	Valid %
Eurajoki	1200	40	245	40	41
Other municipalities	1800	60	353	58	59
Eura	300	10	51	08	09
Kiukainen	300	10	59	10	10
Lappi	300	10	61	10	10
Luvia	300	10	55	09	09
Nakkila	300	10	60	10	10
Rauma	300	10	67	11	11
Missing			8	1	
Total	3000	100	606	100	100

3.2 Socio-demographic background and non-response analysis

In addition to the location of residency covered in the previous chapter (Table 2) respondents were asked a number of background questions relating to gender, age, relationship status, children, level of education, type of education, socio-economic group, line of work, political affiliation and income. A non-response analysis was performed on the acquired data by comparing categorized frequency distributions of responses to these questions with information obtained from the Official Statistics of Finland, Statistics Finland, the Finnish National Board of Education and municipality of Eurajoki. (Tables 3-12.)

Table 3.
Respondents by gender (n,%) and population in the area by gender (n,%)[19].

	Respondents		Area	
	n	%	n	%
Men	279	47	33435	49
Women	315	53	34227	51
Total	594	100	67662	100

[19] Source of comparison data: Statistics Finland's PX-Web database - Väkiluku sukupuolen mukaan alueittain sekä väestömäärän muutos 31.12.2007 (Population by gender and area 31.12.2007 and increase of population).

Table 4.
Respondents by birth cohort (n,%) and 15-75 year old population in the area by birth cohort (n,%)[20].

	Respondents		Area	
	n	%	n	%
– 1935	32	05	2229	04.4
1936 – 1940	39	07	3496	06.8
1941 – 1945	71	12	4165	08.2
1946 – 1950	85	15	5927	11.6
1951 – 1955	66	11	5331	10.4
1956 – 1960	48	08	4588	09.0
1961 – 1965	53	09	4568	08.9
1966 – 1970	38	07	4215	08.3
1971 – 1975	32	05	3578	07.0
1976 – 1980	35	06	3751	07.3
1981 – 1985	27	05	3745	07.3
1986 – 1990	37	06	3792	07.4
1991–	21	04	1678	03.3
Total	584	100	51063	100

Table 5.
Respondents by relationship status (n,%) and 15-75 year old population by marital status (n,%)[21].

	Respondents		Population	
	n	%	n	%
Unmarried	96	16	1579170	39.2
Common-law marriage	114	19	–	– [1]
Marriage / registered relationship	377	56	1855599	46.0
Divorced, separated or widowed	55	09	596761	14.8 [2]
Total	594	100	4031530	100

[1] Common-law marriage is not an official marital status, classified as unmarried
[2] Separated are nowadays classified as being married or in registered relationship

Table 6.
Respondents by under-aged children (n,%).

	n	%
Under-aged children	164	29
No under-aged children	406	71
Total	570	100

[20] Source of comparison data: Statistics Finland's PX-Web database - Väestö iän (1-v.) ja sukupuolen mukaan alueittain 1980 – 2007 (Population according to age (1-year) and gender by area 1980 – 2007).
[21] Source of comparison data: Statistics Finland's PX-Web database - Väestö iän (1-v.), siviilisäädyn ja sukupuolen mukaan 1990 – 2007 (Population according to age (1-year), marital status and gender 1990 – 2007).

Table 7.
Respondents by level of education (n,%) and population aged 15 or over by level of education in Satakunta region (n,%)[22].

	Respondents		Satakunta	
	n	%	n	%
No qualification after basic education	133	22	74736	39
Upper-secondary school	42	07	9649	05
Vocational qualification	200	34	66156	34
College-level qualification	110	18	21135	11
Polytechnic degree	48	08	12822	07 [1]
University degree	60	10	7958	04 [2]
Total	593	100	192456	100

[1,2] Lower level university degrees are combined with polytechnic degrees in official statistics

Table 8.
Respondents by type of primary education (n,%) and population aged 15 or over with degree after basic education by type of education (n,%)[23].

	Respondents		Population	
	n	%	n	%
General education	90	18	337877	12
Education and teaching	21	04	85059	03
Humanities, arts and culture	22	04	125072	04
Business, administration and social sciences	72	15	531726	19
Natural sciences and computing	11	02	61324	02
Technology and transport	128	26	862534	30
Agriculture and forestry	35	07	133486	05
Health and welfare	71	14	369483	13
Services and security	29	06	346346	12
Other	12	02	1454	00 [2]
Total	491 [1]	100	2854361	100

[1] Those who selected more than one primary type of education are counted missing
[2] "Some other or unknown" in official statistics

[22] Source of comparison data: Finnish National Board of Education WERA web information service - Väestön koulutusrakenne 10-vuotisikäryhmittäin 2007 (Educational structure of population by 10-year age groups 2007).
[23] Source of comparison data: Statistics Finland's web page - Perusasteen jälkeisiä tutkintoja suorittanut väestö koulutusalan ja -asteen mukaan 2007 (Population's post-comprehensive school educational qualifications and degrees 2007).

Table 9.
Respondents by socio-economic group (n,%) and 15-75 year old population by socio-economic group, in thousands (n,%)[24].

	Respondents		Population	
	n	%	n	%
Senior executives	15	03	129	03
White-collar workers etc.	60	10	465	12
Pink-collar workers etc.	50	08	819	21
Blue-collar workers	177	30	761	20
Self-employed / employers	38	06	314	08
Farmers	18	03		
Students	56	09	318	08
Retirees	160	27	781	20
Doing domestic work	10	02	91	02
Unemployed	13	02	183	05
Total	597	100	3861 [1]	100

[1] Categories 'conscripts', 'others' and 'unknown' from official statistics are excluded from these figures

Table 10.
Respondents by line of work (n,%) and 15-75 year old population by line of work, in thousands (n,%)[25].

	Respondents		Population	
	n	%	n	%
Agriculture, forestry etc.	35	06	113	03
Manufacturing and mining	82	14	466	12
Energy, heat and water supply	29	05		
Construction	31	05	174	04
Wholesale and retail trade	27	05	311	08
Accommodation and food services	11	02	84	02
Transport, storage and communication	23	04	175	04
Finance, real estate and business support services	22	04	359	09
Public administration and defence	10	02	117	03
Education, health and social services	84	15	539	14
Other civil and personal services	27	05	150	04
Not currently in the working life	185	33	1489	37
Total	566 [1]	100	3977	100

[1] Those who selected more than one primary line of work are counted missing

[24] Source of comparison data: Official Statistics of Finland -Työvoimatilasto 2007 (Labour force statistics 2007). Helsinki: Statistics Finland, 2008.
[25] Sources of comparison data: Statistics Finland's PX-Web database - Työvoima ja työvoimaan kuulumaton väestö 1989 – 2007 (Labour force and persons not in labour force 1989 – 2007) and Työlliset toimialoittain 1990 – 2007 (Employed persons by industry 1990 – 2007).

Table 11.
Respondents by political affiliation (n,%) and support for parties in the area in parliamentary elections 2007 (n,%) [26] and support for parties corrected according to sampling (%).[27]

	Respondents		Area		Corrected
	n	%	n	%	%
Finnish Centre Party	90	15	8417	15	23
National Coalition Party	68	12	7334	13	11
Finnish Social Democratic Party	107	18	12839	23	22
Left Alliance	23	04	3251	06	06
Green League of Finland	19	03	1401	03	02
Finnish Christian Democrats	14	02	1032	02	01
Swedish People's Party	0	00	00	00	00
True Finns Party	32	05	1340	02	02
Some other	7	01	362	01	01
Not able to say	110	19			
Do not want to say	69	12			
Would not vote - Did not vote	51	9	19339	35	32
Total	590	100	55315	100	100

Table 12.
Respondents by personal income (n, %) and income earners by income group (n, %)[28].

	Respondents		Income earners	
	n	%	n	%
Under 10000€	99	19	1144779	26
10000 - 19999€	116	22	1141202	26
20000 - 29999€	131	25	989281	22
30000 - 39999€	97	18	576976	13
40000 - 59999€	56	11	399899	09
60000€ or over	29	05	190620	04
Total	528	100	4442757	100

Overall, based on the comparison, the survey data represents the target population fairly well. However, three biases were observed that should be taken into consideration. Firstly, those who were married or in registered relationships were overrepresented by 10 percentage points. Secondly, supporters of the Centre Party were underrepresented by 8 percentage points. Thirdly, respondents were better educated than the inhabitants of the Satakunta region as a whole. In addition, it seems that those in the low income group were somewhat underrepresented, although the extent of underrepresentation is difficult to assess; as many as 13% of respondents declined to report their income.

[26] Source of comparison data: Statistics Finland's PX-Web database - Eduskuntavaalit 2007, äänestystiedot (Parliamentary elections 2007, data on voting) and Eduskuntavaalit 2007, puolueiden kannatus (Parliamentary elections 2007, support for parties).
[27] For more on the Finnish parliamentary parties see Chapter 3.3.2.
[28] Source of comparison data: Statistics Finland's PX-Web database - Tulonsaajien luku, veronalaiset tulot ja verot iän, sukupuolen ja veronalaisten tulojen mukaan 2007 (Number of income recipients, taxable income and taxes by age, gender and taxable income 2007).

Regarding the deviation observed in the case of socio-economic groups, it seems plausible that a high share of those working in pink-collar etc. occupations do not identify themselves as such workers as difference between categories used in Finland 'alempi toimihenkilö'[29] translated here roughly as 'pink-collar worker etc.' and 'työntekijä' translated here as 'blue-collar worker' is rather vague and not so easy to discern. People identify them selves readily as 'työntekijä' meaning 'just a regular worker' without any special status, "just a regular working guy [or girl]". The experience of the authors is that, for example, office workers and salespersons often feel that they are such "regular workers", whereas in official classifications they are classified as 'alempi toimihenkilö' (i.e. 'pink-collar worker etc.').

3.3 Methods used

3.3.1 Sampling and examining respondents' socio-demographic background

Stratified sampling was used as sampling method for the survey. In stratified sampling a random sample of specified size is drawn from each stratum of a population. As mentioned earlier (Chapter 3.1), the aim was to ensure an adequate number of respondents from Eurajoki and a decent representation from all neighbouring municipalities. The size of each sample was determined according to the following procedure; to the number of respondents deemed acceptable by the research group was added the number of recipients estimated to cover a normal share of non-respondents and an appropriate safety margin, after which the number was rounded up to a suitable round number. In the case of Eurajoki the acceptable number of respondents was set at 200 and in the case of neighbouring municipalities at 40 per municipality, which were also reached (see Table 2).

This way each individual strata formed a simple random sample of residents of one municipality included in the target population. Regarding Eurajoki the number of respondents in the data is large enough to allow its thorough analysis, also as an individual sample which, in turn, allows us to draw conclusions concerning the opinions of residents of Eurajoki (as defined in Chapter 4.1). Regarding the neighbouring municipalities of Eurajoki no such analysis is possible as the number of respondents in each individual municipality is so small. Instead the data are combined so as to form a non-probability sample of neighbouring municipalities as one bloc. This procedure allows an analysis of opinion climate around the municipality of Eurajoki without the largest municipalities (Rauma and Eura) dominating the view. By comparing these two samples it is in turn possible to examine differences between the opinions of Eurajoki residents and those of neighbouring municipalities.

The socio-demographic backgrounds of the respondents are described in Chapters 3.1 and 3.2 through frequency tables (Tables 2-12). The tables include frequency and percentage frequency of respondents belonging to each category and in addition frequency and percentage frequency figures from appropriate comparison data, when available. The comparison information used in the tables was obtained from the Official Statistics of

[29] Statistics Finland defines 'alemmat toimihenkilöt' (plural of 'alempi toimihenkilö') as lower-level employees with administrative and clerical occupations. The class contains following subcategories: 1 supervisors, 2 clerical and sales workers, independent work, 3 clerical and sales workers, routine work, 4 other lower-level employees with administrative and clerical occupations and 5 lower-level employees, unspecified.

Finland, Statistics Finland, the Finnish National Board of Education and the municipality of Eurajoki.

Overall frequency tables are used in research to summarise categorical, nominal, and ordinal data or continuous data divided up into groups. This is one of the easiest ways to analyse categorical data. In this case the tables illustrate the proportion of respondents belonging to each background category and the proportions of those belonging to each background category in the comparison data, which in turn provides a convenient and explicit way to assess differences between the respondents and the target population.

3.3.2 Data analysis

Because the research is descriptive and comparative in nature, that is, the purpose is to form a picture of Eurajoki as a community from a certain viewpoint, and analyse how well the data fits to the predetermined theoretical standpoints, the analysis methods are kept straightforward.

Frequency analysis and frequency tables are used throughout Chapters 4-6 to illustrate the distribution of opinions among all respondents, respondents living in Eurajoki and respondents living in neighbouring municipalities. This allows us both to examine opinion climate in the whole surveyed area and assess differences in opinions between those living in the municipality of Eurajoki and those living in neighbouring municipalities.

Cross tabulations are used throughout Chapters 4-6 to produce figures on the attitudes of different respondent groups and to examine differences between those groups. The groups are formed on the basis of background questions and statistical significances of the differences between the groups are tested. The background groupings formed on the basis of gender, age, relationship status, number of children, level of education, type of education, socio-economic group, line of work, political affiliation and personal income are systemically tested and statistically highly significant ($p \leq .001$) and statistically significant ($.001 < p \leq .010$) differences between groups are reported. Cross tabulations based on age are a special case because calculations were made with two different groupings 'age group' and 'generation group'. Differences between the groups are reported for the grouping revealing more statistically highly significant or significant differences, and then if there is additional statistically highly significant or significant differences revealed by the another grouping these are reported in addition. Otherwise group differences for the grouping with fewer statistically highly significant or significant differences are not reported.

Generation groups used in analysis are based on classification by Statistics Finland, which in turn is partly based on the classification by J.P. Roos[30]. First four generations 1) the Generation of war and depression (-1939), 2) the generation of the transformation (1940-1949), 3) the suburban generation (1950-1959) and 4) the welfare generation (1960-1969) are from Roos, 5th the media generation (1970-1979) and 6th the new generation (1980-[1989]) were added by Statistics Finland and 7th the rising generation (1990-) was added by us. Age groups used in analysis are: 24 or under, 25-34, 35-44, 45-54, 55-64 and 65 or over. Other groups used in analysis were formed according to the classifications used in Chapter 3.2 to examine respondents' socio-economic backgrounds (see Tables 3,5-12). No results are

[30] See (in Finnish) http://tilastokeskus.fi/meta/luokitukset/sukupolvi/index.html and http://tilastokeskus.fi/meta/luokitukset/sukupolvi/001-2002/kuvaus.html.

reported for the groups based on number of children because there were no statistically highly significant or statistically significant differences between those who had children and those who did not in the cases examined in this context. In the case of political affiliation the reported results focus on those groups oriented towards parliamentary parties but other groups (see Table 11) were also included in analysis.

Finnish parliamentary parties in order of support in 2007 elections[31].
1) *Finnish Centre Party*. Liberal-conservative centrist party which political influence is greatest in small and rural municipalities. (Originally an agrarian party the Agrarian League.)
2) *National Coalition Party*. Liberal conservative political party which has strongest support in cities in Southern Finland. (Founded on the basis of the Old-Finnish party.)
3) *Finnish Social Democratic Party*. Moderate social democratic party which has a close relationship with the Finnish Trade Unions. (Founded as the Finnish Labour Party.)
4) *Left Alliance*. Left-wing party which wants to be associated with the 'New Left' and Green socialism. (Founded by merging the Democratic League for the Finnish People, the Finnish Communist Party and the Democratic League of Finnish Women.)
5) *Green League of Finland*. Environmentalist party whose ideology is a mixture of green politics, traditional centre-left ideology and criticism of conventional political thinking with the rejection of the classification "left" or "right".
6) *Finnish Christian Democrats*. Traditional Christian-democratic conservative party whose roots are in the Christian faction of the conservative National Coalition Party. (Originally Finnish Christian League.)
7) *Swedish People's Party*. Liberal party which represents the Swedish-speaking minority in Finland and thus draws support mainly from the Swedish-speaking minority. (In the 2007 elections no one in Eurajoki or in the neighbouring municipalities voted for this party.)
8) *True Finns Party*. A populist party with the ideology of nationalism and Euroscepticism. (Founded on the basis of the Finnish Agrarian Party, an offshoot of the Finnish Centre Party.)

Chi-square test (Pearson's chi-square, χ^2) is used to test statistical significance of observed group differences in cross tabulations. The chi-square test is a widely used nonparametric test to test differences between two samples or groups. The test compares expected values to observed values and calculates probability (p) to that to which one variable is unrelated (or only randomly related) to the second variable. Advantages of this test are that it also detects non-linear associations and the variables used can be nominal.

Kendall's correlation test (Kendall's tau-b, $\tau_{Ken,b}$) is used in Chapter 7 to explore the relationship between different variables presumably related to the acceptance of final disposal and variables actually measuring acceptance of final disposal. Kendall's tau-b is a non-parametric measure of association which measures rank correlation and takes ties into account. For the most part only the highest correlation coefficients are reported. The focus in the chapter is exclusively on those respondents residing in the municipality of Eurajoki.

[31] Members of the Finnish Parliament are elected every four years in general elections.

4 Obtaining information regarding the final disposal

When we make assessments or form opinions about something we essentially interpret the information we have gathered from various sources. In first part of this research we asked about the sources people consult to obtain information on final disposal issues, how satisfied they are with the quantity and reliability of information provided by various actors and what kind of information needs they have in relation to these issues.

4.1 Obtaining information

The first aim of this research was to update knowledge of the sources local residents use to obtain information concerning the final disposal of SNF. The question used in the survey was: "Information of the final disposal can be obtained different ways. To what extent do you consult different sources of information to obtain this knowledge?" Eleven different information sources were listed and respondents were asked to indicate how actively they consult them on a five-step scale from "I do not consult at all" to "I consult actively". In addition the respondents were asked specifically about their overall "Internet usage in matters related to the final disposal project". Respondents were presented with seven types of Internet activities and asked to indicate how frequently they engage in these activities in relation to the final disposal project on the six step scale from "Not at all" to "Several times in a week". (For the questionnaire [in Finnish], see Appendix.)

As Figure 6 demonstrates the most consulted information sources were *newspapers*, *television* and *TVO News leaflet*. Around 45–50% of respondents consulted these fairly actively or actively in relation to the final disposal. The number of respondents consulting *radio* at least fairly actively was also close to 40%, and the percentage consulting *friends*, *relatives etc.* and the *Posiva Investigates leaflet* this way was roughly 25%. Other sources were consulted at least fairly actively only by 15% or under.

Table 13 shows percentage share of those respondents who consult each information source actively. The most intently consulted information sources were the *TVO News leaflet*, *newspapers* and the *Posiva Investigates leaflet,* which were consulted actively by 15–18% of the respondents. *Television* was consulted actively by 12%, and *friends*, *relatives etc.*, *radio* and *own workplace or education* was actively used as an information source by 6–8% of respondents. Other sources were consulted actively only by 3% or under. Even if these figures are quite modest, it is noteworthy that the information sources which are most intently

followed have in fact a larger share of respondents consulting them actively than many information sources have fairly active and active followers combined.

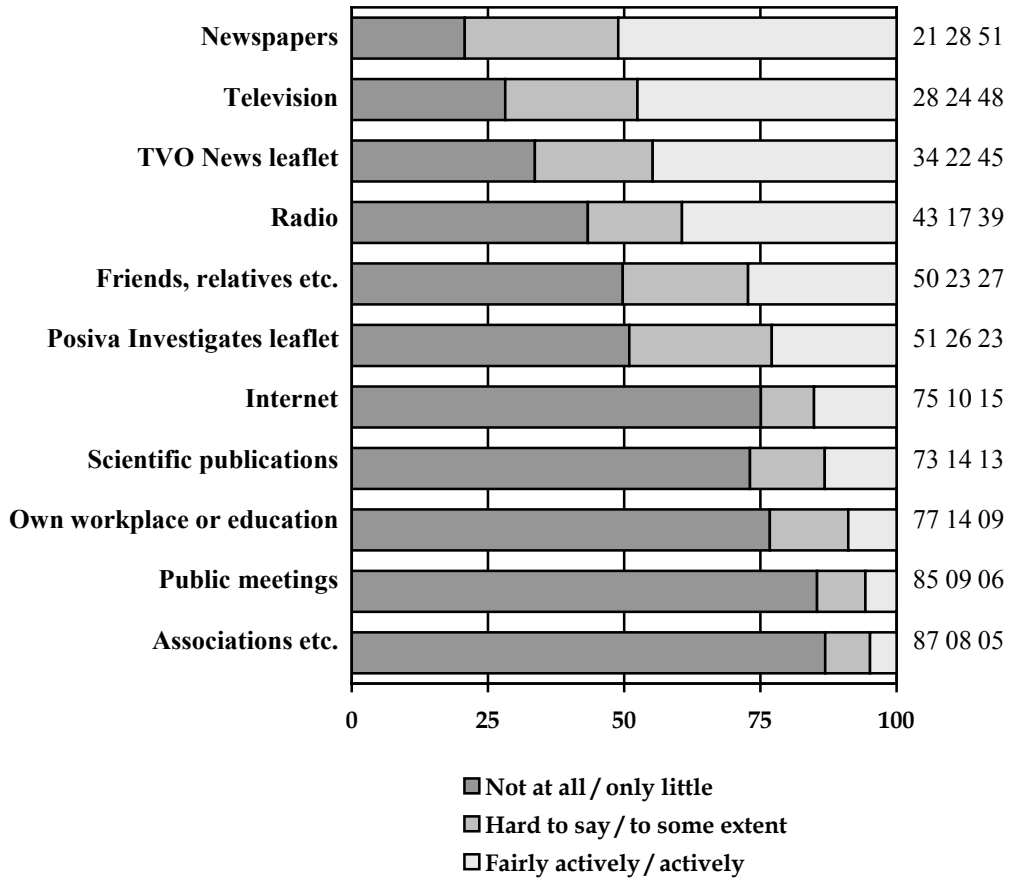

Figure 6.
Consulting different information sources to obtain information on final disposal (%).

Table 13.
Consulting different information sources actively to obtain information on final disposal (%).

TVO News leaflet	18
Newspapers	16
Posiva Investigates leaflet	15
Television	12
Friends, relatives etc.	08
Radio	07
Own workplace or education	06
Internet	03
Public meetings	02
Scientific publications	02
Associations etc.	01

According to our survey the "TVO News" information leaflet is the most frequently actively consulted source of information on the final disposal issue among the respondents in Eurajoki and neighbouring municipalities, surpassing even newspapers (Table 13). TVO has published

the TVO News (prior to 2000 Olkiluoto News) four times a year since the late 1970s. The leaflet is delivered free of charge to every household in Eurajoki and all neighbouring municipalities. The "Posiva Investigates" information leaflet has also gathered quite many active readers but on the other hand more than half of the respondents indicate that they do not consult Posiva's leaflet at all or only little. However, this is largely explained by the fact that the leaflet is not delivered directly to households in the municipalities of Kiukainen and Nakkila. Almost half of the respondents from these municipalities do not read the leaflet at all. Overall, the information leaflets of the nuclear industry seem to have gained their places as channels of information over the years. Informal social networks are also quite an important source of information. Almost one out of ten respondents reported that friends, workmates and relatives were an actively consulted source of information in nuclear waste issues. The importance of Posiva personnel was also emphasized by Aho (2008) in her master's thesis on the building of trust in the safety of final disposal. Aho concluded that trust of the inhabitants of Eurajoki is mainly based on an image of the expertise of Posiva and its personnel, likewise their capabilities, honesty and the predictability of operations. The inhabitants assess disposal through the reputation of individuals and the company.

Regarding coverage, however, the mass media, namely newspapers and television, are still unsurpassable. Only 6% of respondents reported not consulting newspapers at all for information on final disposal, and with television the same figure was still only 11% (no tables). Thus these cover the local population very well.

The survey results show how certain sources of information are rarely used fairly actively or actively. The top 5 list of sources not used includes associations, organisations etc., public meetings, workplace or education, scientific publications and Internet. Of these public meetings have experienced a lack of participants since the early 1990s, when the public hearing of the Perusvoima NPP application was organised in Eurajoki (Säynässalo and Borg 1992). The number of participants observed in the EIA meetings of Posiva in the late 1990s and in 2008 shows a declining trend (Hokkanen 2007, 171,179; Nurmi, Kojo and Litmanen 2009). Nevertheless, the public meetings certainly have their role in interaction in the future, too, as the meetings are the only arenas in which the different stakeholders can exchange views face to face.

The figures regarding the use of Internet are interesting. As popular as Internet is at present, it seems that as an information source on final disposal it is not very popular. Two thirds of the respondents reported using Internet "only little" or "not at all". "Heavy users" are also quite rare in this context as only 3% of respondents reported using Internet actively as an information source. The previous survey on information acquisition was carried out in 1994, over ten years ago (Kurki 1995). At that time Internet was not even mentioned as a possible source of information. Because the popularity of Internet as a media and of its growing importance as an information source today we, however, took a special interest in the issue. The survey therefore included one question devoted exclusively to Internet usage in relation to the final disposal, as described at the beginning of the chapter.

Figure 7 clearly shows that the great majority of respondents (63% to 91% depending on activity) did not use Internet at all for activities related to final disposal. In addition, only a very small minority (1% to 3% depending on activity) used Internet actively, that is weekly, for the activities in question. It is fairly obvious that a large proportion of such people probably have some kind of role in either in decision-making regarding nuclear waste management and/or their job is some other way related to SNF management. Judging by the

percentage of those respondents using Internet for each activity at least monthly, the most frequent uses of Internet were visiting the *pages of the municipality of Eurajoki* (14%) and the *pages of the industry* (TVO, Fortum, Posiva) (9%), and *exchange of opinions or information* (8%).

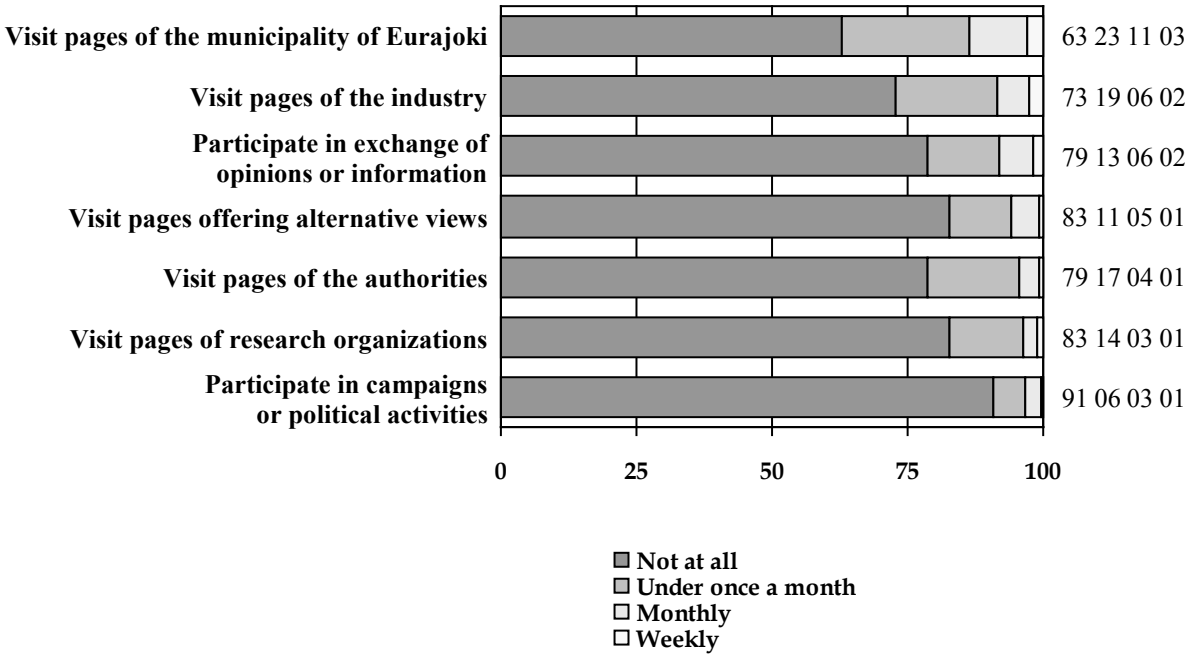

Figure 7.
Frequency of certain Internet activities in relation to nuclear waste disposal issues. (%).

Comparison between the residents of Eurajoki and the residents of neighbouring municipalities (Table 14) revealed rather unsurprisingly that the residents of Eurajoki tend to follow information sources more actively than those of neighbouring municipalities in relation to final disposal. With all eleven information sources the percentage of those consulting "Not at all / only little" was smaller and the percentage of those consulting "Fairly actively / actively" was larger among the residents of Eurajoki, even if, with four information sources, *scientific publications* ($p=$ .441) *Internet* ($p=$ .378) *television* ($p=$ .220) and *newspapers* ($p=$ .137) the difference was statistically non-significant. Differences between the groups were clearest for consulting *Posiva Investigates leaflet* (χ^2 (2, N=576) = 30.67, $p=$ .000), *TVO News leaflet* (χ^2 (2, N=585) = 21.56, $p=$ .000) and using *friends*, *relatives etc.* (χ^2 (2, N=578) = 13.08, $p=$ .001) as information source.

Table 14.
Six most "fairly actively or actively" consulted information sources (%). Comparison between Eurajoki and neighbouring municipalities.

		Not at all / only little	Hard to say / to some extent	Fairly actively / actively
Eurajoki	**TVO News leaflet**	27	17	56
	Newspapers	17	28	55
	Posiva Investigates leaflet	31	17	52
	Television	25	24	51
	Radio	48	18	34
	Friends, relatives etc.	43	27	30
Neighbours	**Newspapers**	23	29	48
	Television	30	25	45
	TVO News leaflet	38	25	37
	Posiva Investigates leaflet	52	17	31
	Radio	51	27	22
	Friends, relatives etc.	56	26	18

Table 14 illustrates how residents of Eurajoki rely relatively more in the industry's leaflets as an information source than do people in neighbouring municipalities, who in turn placed relatively more emphasis on newspapers and television when measured by source consulted fairly actively or actively. As noted earlier in this chapter (p. 31) industry leaflets are more efficiently distributed in Eurajoki than in the neighbouring municipalities as a whole, however.

When the survey data was examined in relation to other socio-demographic background variables, a number of statistically highly significant ($p \leq .001$) and statistically significant ($.001 < p \leq .010$) differences were observed.

The difference between men and women was statistically highly significant for using *Posiva Investigates leaflet* (χ^2 (2, N=575) = 16.21, $p = .000$) as an information source. 48% of men and 32% of women consulted the leaflet fairly actively or actively.

There were statistically highly significant differences between different generations[32] in consulting the *TVO News leaflet* (χ^2 (12, N=572) = 97.60, $p = .000$), *radio* (χ^2 (12, N=563) = 64.74, $p = .000$), *Posiva Investigates leaflet* (χ^2 (12, N=565) = 61.97, $p = .000$) and *Internet* (χ^2 (12, N=542) = 58.07, $p = .000$). The rising generation and the new generation included a high percentage (86%/65%) of those who consult the TVO leaflet not at all or little, whereas among the generation of war and depression and the generation of the transformation the percentage was low (13%/19%). Of the rising generation only 8% and of the new generation 20% consult TVO's leaflet fairly actively or actively. With other generations percentages were between 43% and 58%. For Posiva's leaflet the percentage share of those who do not consult at all or only little remained the same (86%) among the rising generation and with the new generation (69%) it even rose a little, but the difference was not so great, because even the lowest percentage among the generations was as high as 28%. The share of those who consulted the Posiva leaflet fairly actively or actively among the new generation (21%), was again essentially the same as in the case of the TVO leaflet but in the rising generation the

[32] For used classification see Chapter 3.3.2.

share dropped very low (3%). Radio is more popular among the generations born before 1960; the share of respondents consulting radio fairly actively or actively being from 32% to 40% while with the generations from 1960 onwards, the share of respondents consulting radio fairly actively or actively ranged from 12% to 18%. Internet on other hand was quite expectedly more popular among the younger generations than the older generations. Of the younger generations 18% of the media generation, 29% of the new generation and 36% of the rising generation consulted Internet fairly actively or actively. Of the older generations, 6 % of the generation of war and depression, 6% of the generation of the transformation, 13% of the suburban generation and 7% of the welfare generation consulted Internet fairly actively or actively.

Relationship status related to statistically highly significant differences in consulting *TVO News leaflet* (χ^2 (6, N=589) = 44.88, p= .000), *Posiva Investigates leaflet* (χ^2 (6, N=581) = 31.58, p= .000) and *Internet* (χ^2 (6, N=558) = 28.47, p= .000). For leaflets the percentage of those consulting them fairly actively or actively increased gradually, moving from those who were single (with 30% consulting TVO's and 22% consulting Posiva's leaflet this way), to those living in a common-law marriage (38%/37%), to those who were married or living in a registered relationship (49%/44%), and finally to those who were divorced, separated or widowed (55%/47%). In the case of Internet the trend was exactly the opposite, between the divorced, separated or widowed (6%) and the married or those living in a registered relationship (11%) and those living in a common-law marriage (13%) and finally to those who were single (26%).

Level of education was related to statistically highly significant differences in using *own workplace or education* (χ^2 (10, N=568) = 43.60, p= .000) and *Internet* (χ^2 (10, N=558) = 28.65, p= .001) as an information source. In addition, there was a statistically significant difference in consulting the *TVO News leaflet* (χ^2 (10, N=584) = 27.71, p= .002). The number of those using their own workplace or education as an information source fairly actively or actively was highest among those with polytechnic (31%), university (30%) and upper-secondary school (24%) education and lowest among those with no qualification after basic education (8%) and with vocational training (9%). For Internet the highest usage percentages were among those with upper-secondary school (26%) or polytechnic (25%) education and lowest again among those with no qualification after basic education (8%). The TVO leaflet is fairly evenly used as an information source across the education groups, depending on the group 43% to 53% used it fairly actively or actively – except in the case of group with upper-secondary education, where the percentage was considerably lower 24%.

Type of education was also related to a statistically significant difference in using *own workplace or education* (χ^2 (18, N=476) = 36.41, p= .006) as an information source. Those whose education was in education and teaching, health and welfare, and agriculture and forestry reported the lowest level of using own workplace or education fairly actively or actively as an information source (5%/6%/6%) whereas those with education in natural sciences and computing, and technology and transport reported the greatest amount of those using own workplace or education as information source this way (36%/28%).

Socio-economic group related to numerous statistically highly significant differences in using *TVO News leaflet* (χ^2 (16, N=584) = 103.79, p= .000), *Posiva Investigates leaflet* (χ^2 (16, N=576) = 81.15, p= .000), *own workplace or education* (χ^2 (16, N=567) = 71.57, p= .000), *Internet* (χ^2 (16, N=554) = 67.87, p= .000) and *radio* (χ^2 (16, N=575) = 56.94, p= .000) as information source. There was also a statistically significant difference in consulting

newspapers (χ^2 (16, N=585) = 35.61, p= .003). Only 5% of those unemployed or doing domestic work consulted TVO's and 9% Posiva's leaflets fairly actively or actively to obtain information on final disposal. Among students 9% consulted TVO news and 7% Posiva investigates fairly actively or actively. In both cases those consulting most actively were farmers, 72% of them consulted the TVO and 61% the Posiva leaflets fairly actively or actively. Otherwise the share of those consulting TVO news fairly actively or actively in different socio-economic groups were from 40% to 54% and of those consulting Posiva investigate from 41% to 50%. By own workplace or education, 37% white-collar workers etc, 27% of senior executives, 25% of students and 24% of pink-collar workers etc. consulted information sources in this category fairly actively or actively. In other socio-economic groups the share of those using own workplace or education fairly actively or actively as in information source was between 2% and 11%. Internet was consulted fairly actively or actively for information by 33% of students and 27% of senior executives, otherwise percentages varied from 6% (farmers) to 19% (white-collar workers etc). Radio was used fairly actively or actively as an information source mostly by retirees (42%) and farmers (39%) while those unemployed or doing domestic work, and also students used radio very little for this purpose (5%/11%). With other socio-economic groups the share was from around one fourth (22%) to one third (33%). Among those unemployed or doing domestic work almost half (45%) do not consult newspapers at all or only little to obtain information on final disposal, whereas generally among other socio-economic groups around half or even more (46% to 66%) consulted newspapers fairly actively or actively to obtain information with the exception of students, of whom around third (34%) consulted newspapers that way.

Line of occupation was related to statistically highly significant differences in using *own workplace or education* (χ^2 (22, N=539) = 92.23, p= .000) and *Internet* (χ^2 (22, N=525) = 54.43, p= .000) as an information source. Those with energy, heat and water supply, public administration and defence, and finance, real estate and business support services as their occupation were among the heaviest users of own workplace or education as information source (62%/40%/32% using fairly actively or actively) whereas those working in the wholesale and retail trades, agriculture, forestry etc., and construction were among the lightest users of own workplace or education as information source (4%/6%/7% using fairly actively or actively), those whose line of occupation was in education, health and social services, and those not currently in the working life came close to them (10%/10% using fairly actively or actively). Those working in energy, heat and water supply were also the heaviest users of Internet as an information source (31% using fairly actively or actively), followed by those working in public administration and defence, and accommodation and food services (20%/20% using fairly actively or actively). Those working in agriculture, forestry etc., and construction were the lightest users of Internet as an information source (3%/3% using fairly actively or actively).

Political affiliation was related to two statistically significant differences, in using the *TVO News leaflet* (χ^2 (20, N=577) = 41.72, p= .003) and *own workplace or education* (χ^2 (20, N=560) = 38.74, p= .007) as an information source. The number of those consulting TVO News fairly actively or actively was highest among those oriented towards the National Coalition Party (57%) and the Finnish Centre Party (56%) and lowest among those oriented towards the Finnish Christian Democrats (14%) and the Green League of Finland (28%). Regarding own workplace or education, those oriented towards the National Coalition Party were also the heaviest users of these as an information source (32% using fairly actively or actively). Those oriented towards the Green League of Finland were the lightest users (6% using fairly actively or actively) of own workplace or education as an information source,

those oriented towards other parliamentary parties having only little higher shares than that (9% to 14% using fairly actively or actively).

Personal income related to four statistically highly significant differences, in using the *TVO News leaflet* (χ^2 (10, N=518) = 35.18, p= .000), *Posiva Investigates leaflet* (χ^2 (10, N=513) = 33.67, p= .000), *own workplace or education* (χ^2 (10, N=506) = 38.95, p= .000) and *Internet* (χ^2 (10, N=496) = 33.25, p= .000) as an information source. There was also one statistically significant difference, in consulting *newspapers* (χ^2 (10, N=516) = 26.13, p= .004). With leaflets the percentage of those consulting them fairly actively or actively consulting them was highest among those with personal income between 40,000 and 59,999 euros a year, with 62% consulting TVO's and 56% consulting Posiva's leaflets fairly actively or actively. Those with personal income under 10,000 euros a year were much less active, 26% in this income group consulted TVO's and 19% Posiva's leaflets fairly actively or actively. Using own workplace or education as an information source was more frequent in groups with incomes higher than 40,000 euros a year, the percentage being 32% in the income group earning 40,000 to 59,999 euros and 38% in the income group earning 60,000 euros or more a year, while in groups with lower incomes the percentage varied from 8% to 16%. Internet on other hand was used fairly actively or actively as an information source by 21% of those in the lowest income group earning under 10,000 euros a year while the percentage varied between 6% and 11% with other income groups earning under 40,000 euros a year. Those earning 60,000 euros or more a year were the most active users of Internet, as 28% of this income group consulted Internet to obtain information on final disposal issues. In the group earning 40,000 to 59,999 euros a year the percentage share of those using Internet fairly actively or actively (19%) was approximately on the same level as for those earning less than 10,000 euros a year. Looking at the extent of consulting newspapers, the percentage of those consulting them fairly actively or actively was highest among those with personal income between 40,000 and 59,999 euros a year (70%) and lowest in the lowest income groups earning under 10,000 euros and 10,000 to 19,999 euros a year (41%/43%). In other income groups around half (53% to 55%) consulted newspapers fairly actively or actively.

4.2 Quantity of information provided by different actors

After ascertaining the use of information sources, the second aim of the research was to determine how local people perceive the information provided by different actors in the field. The question used in the survey consisted of two parts. In the first part, which is addressed in this chapter, respondents were asked about the quantity of information: "How satisfied or dissatisfied are you regarding quantity […] of information disseminated by different parties concerning final disposal?" Ten different information providers were listed and respondents were asked to indicate level of their satisfaction to them on a five-step scale from "Highly dissatisfied" to "Highly satisfied". (For the questionnaire [in Finnish], see Appendix.)

As Figure 8 demonstrates, residents were most satisfied with the quantity of information disseminated by *Posiva*, *TVO, Fortum*, and *STUK*. Around one third of respondents (31% to 36%) were satisfied or highly satisfied with information provided by these nuclear waste management actors in relation to final disposal. Only these actors had more satisfied or highly satisfied respondents than highly dissatisfied or dissatisfied with the quantity of information disseminated by them. 22% were satisfied or highly satisfied with quantity of information provided by *research institutes* and 17% with that provided by *universities*. Less than 15%

were satisfied or highly satisfied with the information provided by other nuclear waste management actors. In addition, over half (55%) were dissatisfied or highly dissatisfied with quantity of information disseminated by *political parties* and more than two out of five with information disseminated by *local authorities* (44%) and *other ministries (than MTI/MEE)* (44%).

Table 15 shows the percentage share of those respondents highly dissatisfied with the quantity of information from different nuclear waste management actors. As can be seen, the share of those highly dissatisfied with the quantity of information provided by the *political parties* is high; more than quarter of respondents (28%) were highly dissatisfied with it. This is more than there were dissatisfied and highly dissatisfied combined in the cases of information provided by *Posiva* and by *TVO and Fortum* (Figure 8). Furthermore, quite a few were also highly dissatisfied with the quantity of information presented by *local authorities* (18%) and *NGOs* (17%). At first sight these figures do not look very high but given that six out of ten actors did not get this many satisfied and highly satisfied respondents combined (Figure 8) they seem pretty high.

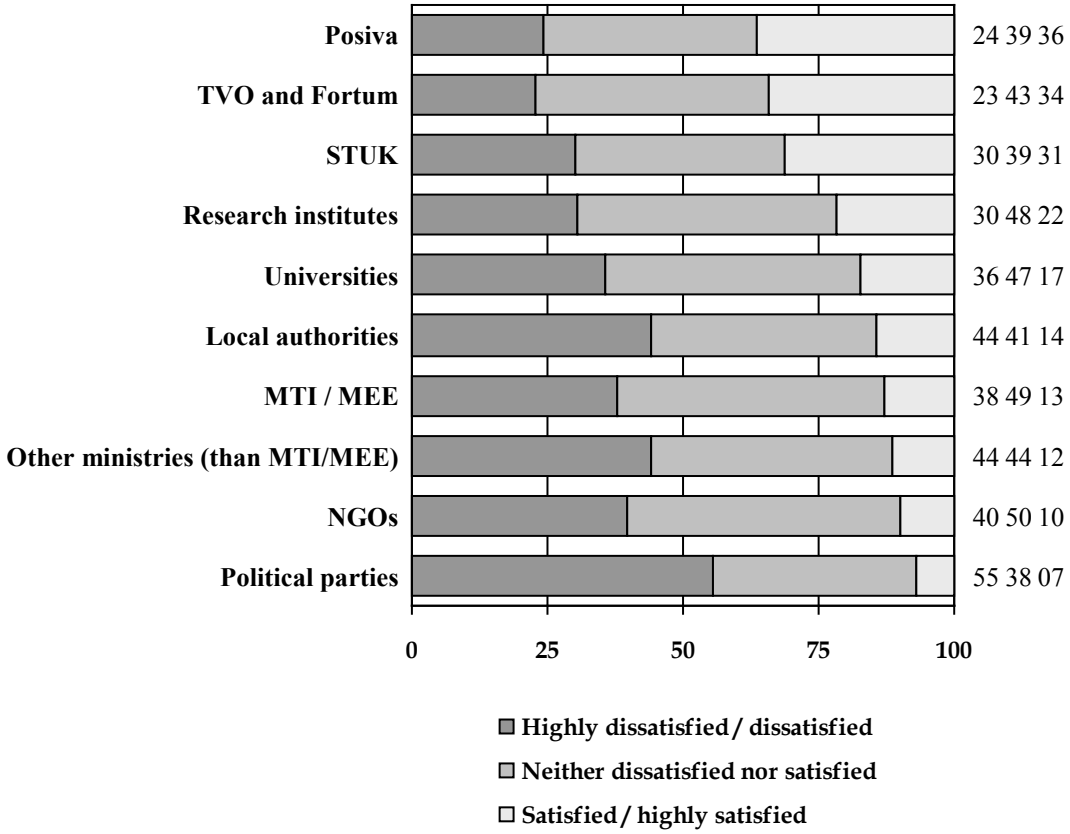

Figure 8.
Satisfaction regarding quantity of information disseminated by certain main actors in Finnish nuclear waste management (%).

Table 15.
Those highly dissatisfied with the quantity of information disseminated by certain main actors in Finnish nuclear waste management (%).

Political parties	28
Local authorities	18
NGOs	17
Other ministries (than MTI/MEE)	15
Universities	13
MTI / MEE	12
STUK	10
Research institutes	10
TVO and Fortum	09
Posiva	08

Comparison between the residents of Eurajoki and those of neighbouring municipalities (Table 16) reveals that, in line with Figure 8, regarding the quantity of information, in both groups there are only three information providers with whom the residents are more satisfied than dissatisfied (the share of those "satisfied / highly satisfied" is greater than of those "highly dissatisfied / dissatisfied"). These are TVO and Fortum, Posiva, and STUK. While satisfaction with quantity of information for all three of them is on the same level (30–31%) in neighbouring municipalities, in Eurajoki the residents are clearly most satisfied with Posiva as an information provider, as almost half (46%) of respondents are either satisfied or highly satisfied with quantity of information disseminated by Posiva. (Table 16.) The difference in satisfaction with quantity of information disseminated by *Posiva* between Eurajoki and its neighbouring municipalities is statistically highly significant (χ^2 (2, N=566) = 16.99, p= .000).

Table 16.
Four information providers found most satisfactory ("satisfied / highly satisfied" > 20%) quantity wise among certain main actors in Finnish nuclear waste management (%). Comparison between Eurajoki and neighbouring municipalities.

		Highly dissatisfied / dissatisfied	Neither dissatisfied nor satisfied	Satisfied / highly satisfied
Eurajoki	**Posiva**	22	32	46
	TVO and Fortum	24	38	38
	STUK	31	37	32
	Research institutes	33	46	21
Neighbours	**TVO and Fortum**	22	47	31
	STUK	29	40	30
	Posiva	26	44	30
	Research institutes	29	50	21

When the survey data was examined in relation to other socio-demographic background variables, a number of statistically highly significant ($p \leq .001$) and statistically significant ($.001 < p \leq .010$) differences were observed.

The difference between men and women was statistically highly significant in the case of *Posiva* (χ^2 (2, N=560) = 13.52, p= .001) and statistically significant in the cases of *TVO and Fortum* (χ^2 (2, N=567) = 10.32, p= .006) and *STUK* (χ^2 (2, N=564) = 9.30, p= .010). In all these cases men were more satisfied with the quantity of disseminated information. 44% of men but only 29% of women were highly satisfied or satisfied with quantity of information provided by Posiva. For TVO and Fortum the shares were 41% of men and 28% of women and for STUK 37% of men and 25% of women.

There was a statistically highly significant difference between age groups in satisfaction with the quantity of information provided by *political parties* (χ^2 (10, N=554) = 31.86, p= .000). Those aged 35–44 and 45–54 were less satisfied with the quantity of information provided (0%/3% "satisfied / highly satisfied") by political parties than others (7% to 13% "satisfied / highly satisfied"), with those aged 24 or under being most satisfied.

Level of education, however, was again related to statistically highly significant differences in satisfaction with quantity *political parties* (χ^2 (10, N=564) = 31.51, p= .000). The share of those satisfied or highly satisfied with the quantity of information was higher among those with upper-secondary education (17%) than others (3% to 8%) and the share of those neither dissatisfied nor satisfied was high among those with university (60%) and polytechnic (48%) education compared to others (31% to 48%).

Type of education was related to a statistically significant difference in satisfaction with the quantity of information provided by *Posiva* (χ^2 (18, N=467) = 39.75, p= .002). Those with natural sciences and computing, and technology and transport in their education were those most frequently satisfied or highly satisfied with the quantity of information provided by Posiva (64%/49%) and those with health and welfare, and humanities, arts and culture in their education were those least frequently satisfied or highly satisfied (17%/23%).

Like type of education, line of occupation was related to a statistically significant difference in satisfaction with the quantity of information provided by *Posiva* (χ^2 (22, N=536) = 42.21, p= .006). Those working in finance, real estate and business support services were most frequently satisfied, with 57% of them satisfied or highly satisfied with the quantity of information provided by Posiva, followed by those working in manufacturing and mining (55% satisfied or highly satisfied) and those working in energy, heat and water supply (48% satisfied or highly satisfied). Those working in education, health and social services and in "other civil and personal services"[33], and those who are not currently in working life were least often (24%/27%/29%) satisfied or highly satisfied with quantity of information provided by Posiva. The share of those highly dissatisfied or satisfied was highest among those working in public administration and defence (40%) or in accommodation and food services (40%).

Political affiliation was related to two statistically highly significant differences in satisfaction with quantity of information provided by *local authorities* (χ^2 (20, N=553) = 47.15, p= .001) and by *Posiva* (χ^2 (20, N=558) = 46.50, p= .001) and to two statistically significant differences in satisfaction with quantity of information provided by *TVO and Fortum* (χ^2 (20, N=563) = 41.62, p= .003) and by *political parties* (χ^2 (20, N=558) = 38.51, p= .008). Of those oriented towards the three biggest parties, the Finnish Centre Party, the National Coalition Party and the Finnish Social Democratic Party, just over 20% (22%/21%/23%) were satisfied

[33] Other than public administration and defence, or education, health and social services (see Table 10).

or highly satisfied with information disseminated by local authorities and of those oriented towards the True Finns Party 13%. Whereas those oriented towards other parties were not at all satisfied, as none (0%) among those oriented towards the Left-Wing Alliance, the Green League of Finland, the Finnish Christian Democrats or the other parties without representation in Parliament were satisfied on highly satisfied with information provided by local authorities.

Personal income was related to one statistically significant difference, in satisfaction with quantity of information provided by *Posiva* (χ^2 (10, N=503) = 24.64, p= .006). Those earning less than 40,000 euros a year were less satisfied with the quantity of information disseminated by Posiva than those earning more. The most satisfied were those earning 60,000 euros or more a year, 68% in this income group were satisfied or highly satisfied with the quantity of information provided by Posiva. In the income group earning from 40,000 to 59,999 euros 52% were satisfied or highly satisfied with quantity of information from Posiva. Whereas with those groups earning less than 40,000 a year, share of those who were satisfied varied between 29% and 39%.

4.3 Confidence in information provided by different actors

As stated in the previous chapter the second aim of the research was to determine how local people perceive the information provided by different actors in the field. When the first part of the question used addressed the subject of satisfaction with quantity of information, the second part of the question, which is examined in this chapter, addressed the subject of satisfaction regarding confidence in information. The question used in the survey was: "How satisfied or dissatisfied are you regarding […] confidence in information disseminated by different parties concerning final disposal?" As in the first part of the question ten different information providers were listed and respondents were asked to indicate their level of their satisfaction with them on a five-step scale from "Highly dissatisfied" to "Highly satisfied". (For the questionnaire [in Finnish], see Appendix.)

As Figure 9 shows, residents considered *STUK* the most reliable source of information. 42% of respondents reported being satisfied or highly satisfied regarding confidence in information disseminated by *STUK* in relation to final disposal. Around thirty percent were also satisfied or highly satisfied with information provided by *Posiva* (32%), *research institutes* (31%), *TVO and Fortum* (30%), and *universities* (28%). Only 20% or less were satisfied or highly satisfied with information provided by other nuclear waste management actors. The *political parties* were given the clearly poorest ratings as 58% of respondents reported that they were dissatisfied with the political parties as sources of information. In addition, almost half of respondents were highly dissatisfied or dissatisfied with information disseminated by *NGOs* (47%), more than two out of five with information disseminated by *other ministries (than MTI/MEE)* (41%) and almost two out of five with information disseminated by *local authorities* (39%).

Table 17 shows the percentage share of those respondents highly dissatisfied regarding information disseminated by different nuclear waste management actors. The share of those highly dissatisfied regarding confidence in information provided by *political parties* was high, around one third of the respondents (32%) were highly dissatisfied with it. This was more than the combined percentages for dissatisfied and highly dissatisfied respondents for *STUK*,

research institutes and *universities* (21%/24%/27%, see Figure 9). Additionally, 22% of respondents were highly dissatisfied with information provided by *NGOs* and 17% with information provided by *local authorities*. Again (as with quantity of information) at first sight these figures do not necessarily look very high, but considering that half of the ten actors listed had only 20% or less of respondents satisfied or highly satisfied (combined) they seem quite high.

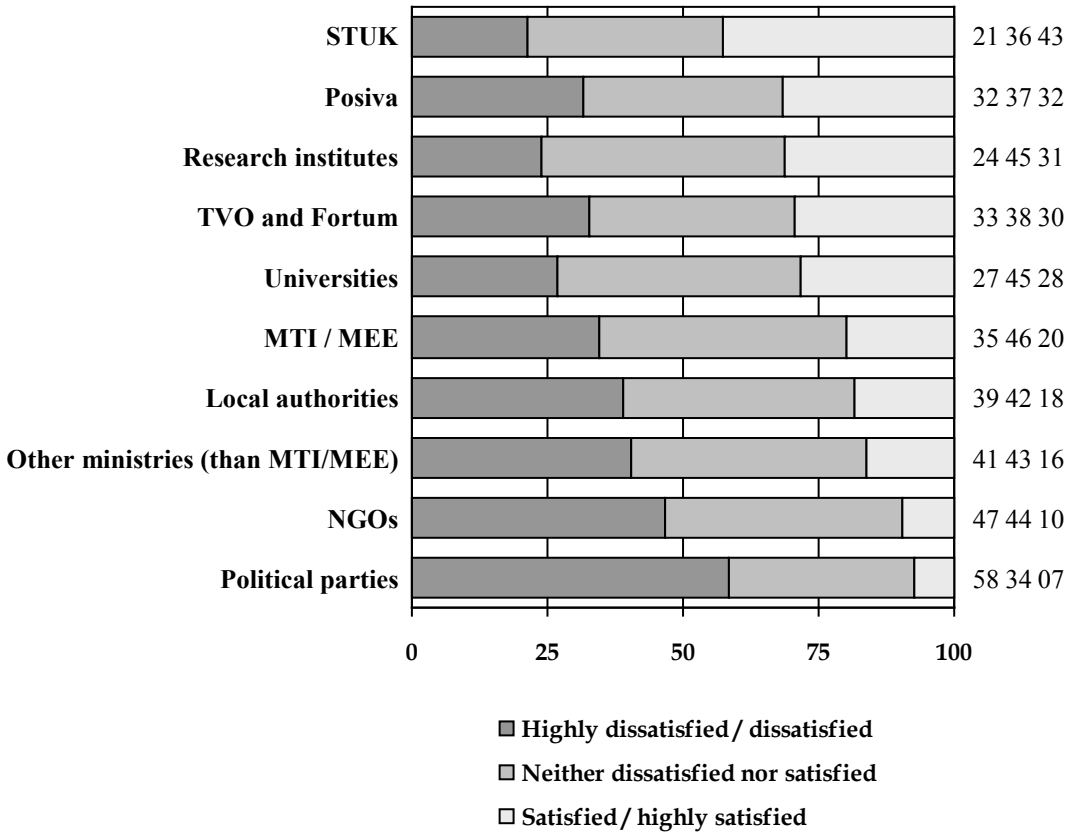

Figure 9.
Satisfaction regarding confidence in information disseminated by certain main actors in Finnish nuclear waste management (%).

Table 17.
Those highly dissatisfied regarding confidence in information disseminated by certain main actors in Finnish nuclear waste management (%).

Political parties	32
NGOs	22
Local authorities	17
MTI / MEE	15
Other ministries (than MTI/MEE)	15
TVO and Fortum	14
Posiva	13
Universities	10
STUK	10
Research institutes	09

Comparison between residents of Eurajoki and residents of neighbouring municipalities (Table 18) reveals that the information providers which were found most satisfactory were the same in both groups – only the order was different. In both cases respondents were most satisfied with confidence in information disseminated by *STUK* but residents of Eurajoki were somewhat more satisfied with confidence in information provided by *Posiva* and *TVO and Fortum* than residents of neighbouring municipalities. Table 18 shows that residents of neighbouring municipalities rated *research institutes* second with 31% and *universities* third with 29% satisfied or highly satisfied with confidence in information disseminated by them, *Posiva* comes fourth with 28% and *TVO and Fortum* fifth with 26% satisfaction rate, whereas residents of Eurajoki rated *Posiva* second with 37% and *TVO and Fortum* third with a 34% satisfaction rate (9%/8% [percentage points] increase) leaving *research institutes* (30%) and *universities* (26%) fourth and fifth (only 1%/3% [percentage points] decrease). Differences in (satisfaction with) confidence in information with information disseminated by *TVO and Fortum* (χ^2 (2, N=542) = 9.96, p= .007) and *Posiva* (χ^2 (2, N=546) = 9.14, p= .010) were statistically significant (.001<p≤ .010).

Table 18.
Five information providers found most satisfactory ("satisfied / highly satisfied" > 25%) regarding confidence among certain main actors in Finnish nuclear waste management (%). Comparison between Eurajoki and neighbouring municipalities.

		Highly dissatisfied / dissatisfied	Neither dissatisfied nor satisfied	Satisfied / highly satisfied
Eurajoki	**STUK**	26	30	44
	Posiva	33	30	37
	TVO and Fortum	36	30	34
	Research institutes	27	43	30
	Universities	32	42	26
Neighbours	**STUK**	18	41	41
	Research institutes	22	47	31
	Universities	23	47	29
	Posiva	31	42	28
	TVO and Fortum	30	43	26

When the survey data was examined in relation to other socio-demographic background variables, a number of statistically highly significant ($p \leq .001$) and statistically significant ($.001 < p \leq .010$) differences was observed.

The difference between men and women was statistically highly significant in the case of *TVO and Fortum* (χ^2 (2, N=542) = 14.32, $p = .001$) and statistically significant in the case of *Posiva* (χ^2 (2, N=544) = 12.04, $p = .002$). 39% of the women were highly dissatisfied or dissatisfied and 24% were satisfied or highly satisfied, whereas 36% of the men were satisfied or highly satisfied and 25% highly dissatisfied or dissatisfied regarding confidence in information disseminated by TVO and Fortum. Regarding Posiva 37% of women were highly dissatisfied or dissatisfied and 26% were satisfied or highly satisfied, and 38% of the men were satisfied or highly satisfied and 25% highly dissatisfied or dissatisfied.

There were many statistically highly significant differences between different age groups, in satisfaction regarding confidence in information disseminated by *MTI / MEE* (χ^2 (10, N=529) = 32.84, p= .000) *other ministries (than MTI/MEE)* (χ^2 (10, N=521) = 30.01, p= .001) *local authorities* (χ^2 (10, N=524) = 34.46, p= .000) *political parties* (χ^2 (10, N=527) = 57.63, p= .000) and *research institutes* (χ^2 (10, N=522) = 34.59, p= .000). There were also statistically significant differences in satisfaction with information provided by *Posiva* (χ^2 (10, N=536) = 27.32, p= .002) and *STUK* (χ^2 (10, N=530) = 26.56, p= .003) In addition to these differences based on age, comparison between different generations revealed statistically significant differences in the case of *universities* (χ^2 (12, N=522) = 28.68, p= .004). Of the different age groups those aged 25-34 were most satisfied with information provided by MTI / MEE with 37% being satisfied or highly satisfied with confidence regarding ministry's information, followed by those aged 24 or under (24%) and those aged 45-54 (21%). In other age groups percentages were between 15% and 17%. With other ministries (than MTI/MEE) those aged 25-34 and 24 or under were again the most satisfied (28%/26% "satisfied / highly satisfied") other age groups being clearly less satisfied (11 to 15% "satisfied / highly satisfied"). This trend continues for local authorities, of 25-34 olds 30% and those aged 24 or under 23% were satisfied or highly satisfied and of others 14 to 18%. With political parties, research institutes and STUK differences was better characterised by absence of dissatisfaction. In the case of confidence in information disseminated by political parties, the share of those highly dissatisfied or dissatisfied with confidence was 27% in the age group 24 or under and 40% in the age group 25-34, whereas in other age groups share was between 65% and 73%. With research institutes the share of highly dissatisfied or dissatisfied in age group 24 or under was only 8% and in the age group 25-34 even less at 5%. In other groups the share was between 15% and 33%. With STUK share was 11% in the age group 24 or under, 5% in the age group 25-34 and between 18% and 31% in other age groups. In the case of information provided by Posiva 25-34 olds stand out, as 52% this age group were satisfied or highly satisfied with confidence regarding the information while in other groups share of those satisfied or highly satisfied was between 25% and 35%. Regarding confidence in information disseminated by universities, the older generations were more dissatisfied than the younger generations. Of older generations 44% of the generation of war and depression, 34% of the generation of the transformation, 28% of the suburban generation and 24% of the welfare generation were highly dissatisfied or dissatisfied with confidence regarding information disseminated by universities but of younger generations 18% of the media generation, 15% of the new generation and only 9% of the rising generation were highly dissatisfied or dissatisfied.

Relationship status was related to a statistically significant difference in the case of *political parties* (χ^2 (6, N=539) = 17.13, p= .009). Single respondents were less dissatisfied with confidence in information disseminated by political parties (42% "highly dissatisfied / dissatisfied") than other groups (55% to 65% "highly dissatisfied / dissatisfied").

Level of education was related to numerous statistically highly significant differences in confidence, in the cases of *political parties* (χ^2 (10, N=535) = 41.36, p= .000), *MTI / MEE* (χ^2 (10, N=537) = 38.29, p= .000), *other ministries (than MTI/MEE)* (χ^2 (10, N=528) = 34.93, p= .000), *Posiva* (χ^2 (10, N=543) = 33.04, p= .000), *research institutes* (χ^2 (10, N=531) = 31.63, p= .000), *TVO and Fortum* (χ^2 (10, N=541) = 31.34, p= .001) and one statistically significant difference in case of *local authorities* (χ^2 (10, N=531) = 26.15, p= .004). Those with polytechnic and upper-secondary education were most satisfied (20%/15% "satisfied / highly satisfied") regarding confidence in information disseminated by political parties and those with university and college-level education were least satisfied (2%/2% "satisfied / highly satisfied"). In other groups, among those with vocational training and those with no

qualification after basic education the figures also remained rather low (7%/8%). Those with polytechnic degree also had great confidence in MTI / MEE as 48% of those with this degree were either satisfied or highly satisfied regarding confidence in information provided by MTI / MEE. However, among those with college-level education only 10% and those with vocational education 16% shared this view, while in other groups the percentage remained between 20% and 27%. Other ministries (than MTI/MEE) were again most trusted by those with polytechnic education (36% "satisfied / highly satisfied") followed this time by those with upper-secondary education (33% "satisfied / highly satisfied") while those with college-level and vocational education were least confident (10%/11% "satisfied / highly satisfied") and those with no qualification after basic education and those with university education falling in between (16%/20%). The greatest confidence in information disseminated by Posiva was again found among those with polytechnic education (64% "satisfied / highly satisfied") while the lowest was found among those with vocational training (24%). In other groups 30% to 34% of the respondents were satisfied. Regarding research institutes, the confidence level was highest among those with polytechnic education (47% "satisfied / highly satisfied") followed by those with upper-secondary education (41% "satisfied / highly satisfied"), lowest among those with college-level and vocational training (25%/27% "satisfied / highly satisfied"), with those with university education and those with no qualification after basic education falling in between (31%/33%). In the case of information disseminated by TVO and Fortum the highest confidence level was found, once again, among those with polytechnic education (60% "satisfied / highly satisfied") and the lowest confidence level was found among those with vocational training (22% "satisfied / highly satisfied"), while other groups fall in between (28% to 37% "satisfied / highly satisfied"). In the case of information disseminated by the local authorities, 33% of those with polytechnic education were either satisfied or highly satisfied regarding confidence in information provided, while among other groups percentage was between 13% and 23%.

The socio-economic group was related to statistically significant or highly significant differences in all cases. There were highly significant differences in satisfaction regarding confidence in information disseminated by *political parties* (χ^2 (16, N=535) = 51.56, p= .000), *STUK* (χ^2 (16, N=539) = 49.54, p= .000), *other ministries (than MTI/MEE)* (χ^2 (16, N=529) = 45.43, p= .000), *local authorities* (χ^2 (16, N=532) = 43.84, p= .000), *TVO and Fortum* (χ^2 (16, N=543) = 41.83, p= .000), *research institutes* (χ^2 (16, N=531) = 40.19, p= .001), and statistically significant differences regarding confidence in information disseminated by *NGOs* (χ^2 (16, N=532) = 37.37, p= .002), *universities* (χ^2 (16, N=531) = 37.06, p= .002) and *Posiva* (χ^2 (16, N=545) = 32.42, p= .009). As many as four out of five farmers distrusted the information provided by political parties (82% "highly dissatisfied / dissatisfied") whereas among students and those unemployed or doing domestic work distrust was at considerably lower level (25%/43% "highly dissatisfied / dissatisfied") and in other groups somewhat lower level (50% to 69% "highly dissatisfied / dissatisfied"). Information provided by STUK, on other hand, was quite highly trusted by farmers (56% "satisfied / highly satisfied") and most trusted by white-collar workers (66% "satisfied / highly satisfied"). The least satisfied regarding confidence in information from STUK were those unemployed or doing domestic work (19% "satisfied / highly satisfied"). Among other groups trust was at reasonable level (36% to 47% "satisfied / highly satisfied"). Regarding other ministries (than MTI/MEE) those most satisfied with the information provided by them were white-collar workers and students (33%/30% "satisfied / highly satisfied") and least satisfied those unemployed or doing domestic work, and senior executives (5%/8% "satisfied / highly satisfied"), other groups falling in between (12%/21% "satisfied / highly satisfied"). Also regarding the information provided by local authorities those most satisfied were white-collar

workers and students (33%/25% "satisfied / highly satisfied") and least satisfied those unemployed or doing domestic work, and senior executives (0%/8% "satisfied / highly satisfied"). In the case of the information provided by TVO and Fortum those most satisfied were white-collar workers and self-employed people or employers (50%/47% "satisfied / highly satisfied") and least satisfied those unemployed or doing domestic work, and farmers (10%/12% "satisfied / highly satisfied"). With information provided by research institutes, students and self-employed people or employers were most satisfied (45%/41% "satisfied / highly satisfied") and those unemployed or doing domestic work least satisfied (10% "satisfied / highly satisfied"). In the case of NGO's, people were rather dissatisfied regarding confidence in information produced by these. Farmers and self-employed people or employers were significantly dissatisfied (71%/59% "highly dissatisfied / dissatisfied") while those unemployed or doing domestic work were not very dissatisfied (14% "highly dissatisfied / dissatisfied"). This was the only group where fewer than 30% of respondents were dissatisfied, whereas in rest of the groups 31% to 51% were at least somewhat dissatisfied ("highly dissatisfied / dissatisfied"). In the case of universities, those most satisfied regarding confidence in information disseminated by them were white-collar workers, senior executives, and self-employed people or employers (45%/38%/38% "satisfied / highly satisfied"), and least satisfied those who were unemployed or doing domestic work, and retirees (10%/19% "satisfied / highly satisfied"). Those most satisfied with information disseminated by Posiva were white-collar workers and self-employed people or employers (53%/44% "satisfied / highly satisfied"), and least satisfied were those who were unemployed or doing domestic work (14% "satisfied / highly satisfied").

Line of occupation was related to a statistically significant difference in satisfaction regarding confidence in information disseminated by *TVO and Fortum* (χ^2 (22, N=520) = 43.60, p= .004). Those working in energy, heat and water supply and those working in finance, real estate and business support services were most satisfied (59%/50% "satisfied / highly satisfied"), whereas those working in education, health and social services and in agriculture, forestry etc. were least satisfied (16%/17% "satisfied / highly satisfied").

Political affiliation was related to four statistically highly significant differences in satisfaction regarding confidence in information provided by *local authorities* (χ^2 (20, N=525) = 75.16, p= .000), *MTI / MEE* (χ^2 (20, N=531) = 49.61, p= .000), *other ministries (than MTI/MEE)* (χ^2 (20, N=522) = 49.37, p= .000), *STUK* (χ^2 (20, N=531) = 47.22, p= .001) and to three statistically significant differences, in the cases of information provided by *TVO and Fortum* (χ^2 (20, N=536) = 42.34, p= .002), *NGOs* (χ^2 (20, N=524) = 41.60, p= .003) and *Posiva* (χ^2 (20, N=538) = 40.68, p= .004). Of those oriented towards the National Coalition Party 36% and of those oriented towards the Finnish Centre Party 26% were satisfied or highly satisfied with information disseminated by local authorities, whereas those oriented towards the Green League of Finland or the Left-Wing Alliance were not at all satisfied, as none (0%) of these were satisfied or highly satisfied with information provided by local authorities. In the case of information provided by MTI / MEE it was again those oriented towards the two biggest parties, the Finnish Centre Party and the National Coalition Party, with high level of satisfaction (24%/38% "satisfied / highly satisfied") and again those oriented towards the Green League of Finland and the Left-Wing Alliance who were least satisfied (0%/5%), of those oriented towards parliamentary parties. With information provided by other ministries (than MTI/MEE) the same trend continues. The highest figures are found among those oriented towards the National Coalition Party (35%) and the Finnish Centre Party (20%) and the lowest among those oriented towards the Left-Wing Alliance (0%) and the Green League of Finland (6%), with those oriented towards the True Finns Party

coming very close (7%). Regarding confidence in information disseminated by STUK, a large number of those oriented towards the three biggest parties, the Finnish Centre Party, the National Coalition Party and the Finnish Social Democratic Party were satisfied (41%/62%/48% "satisfied / highly satisfied") while those oriented towards the Green League of Finland were not very satisfied (12% "satisfied / highly satisfied"), the figures for those oriented towards other parliamentary parties were between 21% and 33%. With information disseminated by TVO and Fortum, and Posiva those oriented towards the National Coalition Party again had the highest percentage of those who were satisfied or highly satisfied regarding confidence in their information. In the case of the TWO and Fortum 52% of those oriented towards the National Coalition Party and none (0%) of those oriented towards the Green League of Finland were satisfied or highly satisfied with information, and in the case of Posiva 51% of those oriented towards the National Coalition Party and none (0%) of those oriented towards the Green League of Finland were satisfied or highly satisfied. With information provided by NGO's, however the situation was different. Of those oriented towards the parliamentary parties, those oriented towards the Left-Wing Alliance were most satisfied regarding confidence in information provided by NGO's (29% "satisfied / highly satisfied") and those oriented towards the National Coalition Party and the True Finns Party were the least satisfied (3%/3% "satisfied / highly satisfied").

Personal income was related to three statistically significant differences, in the cases of *TVO and Fortum* (χ^2 (10, N=489) = 28.04, p= .002), *MTI / MEE* (χ^2 (10, N=486) = 26.35, p= .003) and *Posiva* (χ^2 (10, N=491) = 25.34, p= .005). In all these cases those belonging to the highest income group earning 60,000 euros or more a year were most satisfied regarding confidence in information disseminated by these actors. With both TVO and Fortum, and Posiva 70% and with MTI / MEE 52% of those in the highest income group were either satisfied or highly satisfied. Those least satisfied in the case of the TVO and Fortum, and MTI / MEE were those belonging to the second lowest income group earning 10,000 to 19,999 euros a year (22%/13% "satisfied / highly satisfied") and in the case of Posiva those earning the least, under 10,000 euros a year (23% "satisfied / highly satisfied").

4.4 Information needs

The third aim of the research was to discern what kind of information needs people in the area have in relation to SNF final disposal. The question used in the survey was: "What kind of information needs do you have regarding final disposal related issues?" Thirteen different final disposal related information areas were listed and respondents were asked to indicate the level of their need for information in these areas on a five-step scale from "No need for information" to "Very great need for information". (For the questionnaire [in Finnish], see Appendix.)

As Figure 10 shows, in spite of relatively low dissatisfaction with quantity of information offered by three major actors in siting process, namely Posiva, TVO and Fortun, and STUK (Figure 8), residents clearly articulate a need for information regarding various final disposal related issues. Areas were information is most needed are *environmental effects*, 72% of the residents indicating substantial or very great need for information, *health effects*, 71% indicating substantial or very great need for information, and *safety after closure*, 64% indicating substantial or very great need for information.

Table 19 further indicates how great the need is, as regarding *environmental effects* and *health effects* around half of respondents (48%/48%) reported a very great need for information in these areas and regarding *safety after closure* almost 40 percent (37%). All in all, within the 13 areas elicited there were only four areas where under a quarter of respondents reported a very great need for information.

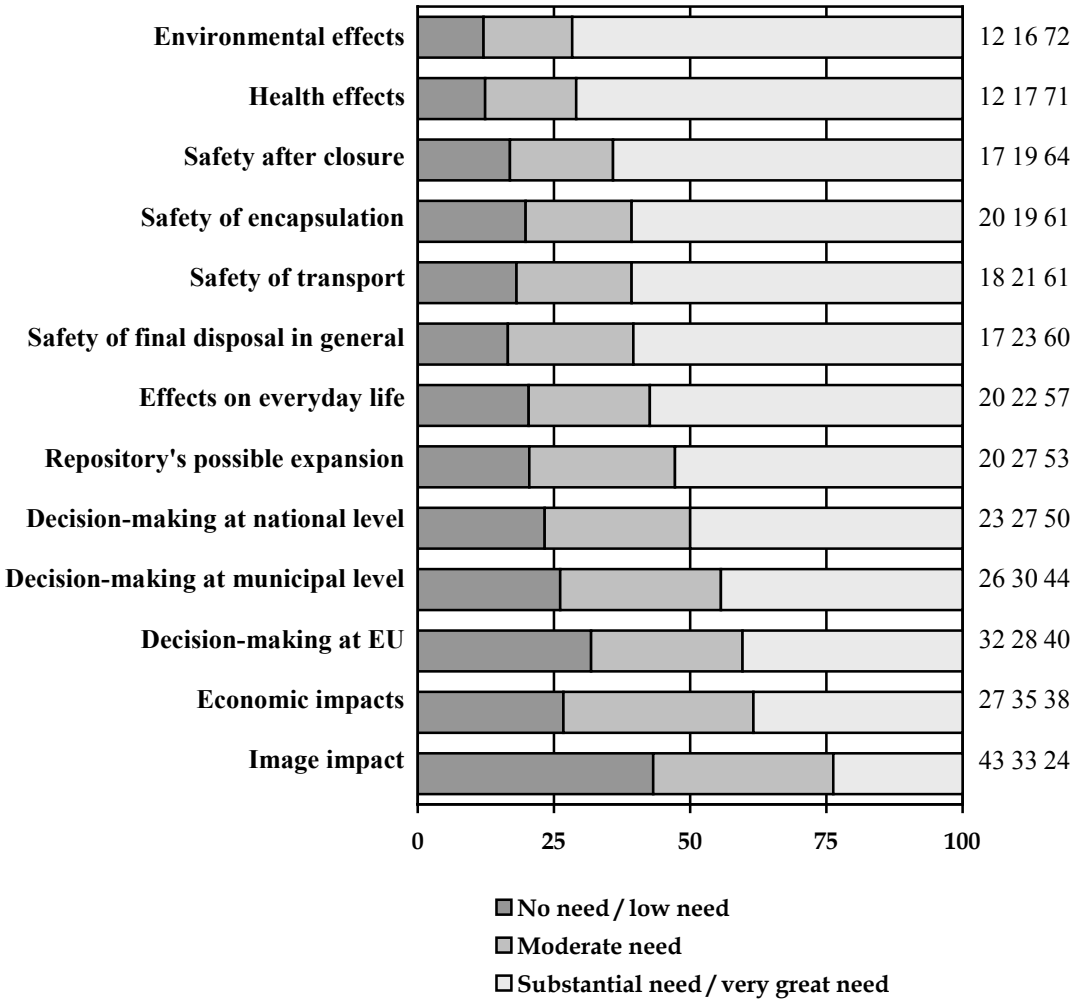

Figure 10.
Information needs regarding certain issues related to final disposal of spent nuclear fuel (%).

Table 19.
Those experiencing very great need for information regarding certain issues related to final disposal of spent nuclear fuel (%).

Health effects	48
Environmental effects	48
Safety after closure	38
Safety of transport	32
Safety of encapsulation	32
Safety of final disposal in general	30
Effects on everyday life	28
Repository's possible expansion	27
Decision-making at national level	26
Decision-making at municipal level	22
Decision-making at EU	22
Economic impacts	13
Image impact	10

Comparison between the residents of Eurajoki and those of neighbouring municipalities (Table 20) revealed that, in the six cases where the greatest overall needs for information were detected, need for information was approximately at the same level in Eurajoki and in the neighbouring municipalities. Regarding *environmental effects*, *health effects* and *safety after closure* there was hardly any difference at all, and while in other cases there was some differences between the groups, these were not statistically significant.

Table 20.
Six issues where reported need for information ("substantial need / very great need") was greatest (%). Comparison between Eurajoki and neighbouring municipalities.

		No need / low need	Moderate need	Substantial need / very great need
Eurajoki	**Environmental effects**	12	17	71
	Health effects	13	17	70
	Safety of transport	18	18	65
	Safety after closure	18	18	64
	Safety of encapsulation	18	18	64
	Safety of final disposal in general	17	21	62
Neighbours	**Environmental effects**	12	16	72
	Health effects	12	17	71
	Safety after closure	16	20	64
	Safety of final disposal in general	17	24	59
	Safety of encapsulation	21	20	58
	Safety of transport	18	24	58

When the survey data was examined in relation to other socio-demographic background variables, a number of statistically highly significant ($p \leq .001$) and statistically significant ($.001 < p \leq .010$) differences were observed.

The difference between men and women was statistically highly significant in the case of *environmental effects* (χ^2 (2, N=585) = 18.21, p= .000) and statistically significant in the cases of *health effects* (χ^2 (2, N=587) = 11.73, p= .003) and *effects on everyday life* (χ^2 (2, N=583) = 10.06, p= .007). In all these areas the share of women experiencing substantial or very great need for information (79%/77%/64%) was greater than the share of men experiencing the same kind of need for information in these areas (63%/64%/51%).

There were statistically highly significant differences in information needs between different generations regarding *decision-making at national level* (χ^2 (12, N=571) = 32.97, p= .001) and statistically significant differences regarding *decision-making at EU* (χ^2 (12, N=574) = 27.06, p= .008) and *safety of transport* (χ^2 (12, N=575) = 26.54, p= .009). In all of these those belonging to the rising generation were most numerous in experiencing no need or little need for information (49%/58%/41%). In relation to decision-making at national level and decision-making at EU those reporting the smallest share of those experiencing no need or little need for information were those belonging to the generation of the transformation (16%/23%), and in the case of the safety of transport those belonging to the generation of war and depression and to the suburban generation (14%/14%).

Relationship status was related to three statistically significant differences in information needs regarding *health effects* (χ^2 (6, N=594) = 21.36, p= .002), *decision-making at national level* (χ^2 (6, N=588) = 19.40, p= .004) and *repository's possible expansion* (χ^2 (6, N=587) = 19.22, p= .004). The share of those reporting little or no need for information about health effects was greatest among those who were single or living in a common-law marriage (20%/19%), whereas of those who were married or living in a registered relationship, and those who were divorced, separated or widowed a much lower share (10%/4%) reported little or no need for information in this area. Regarding decision-making at national level, 36% of single respondents reported little or no need for information in this area, whereas only 13% of divorced, separated or widowed respondents reported little or no need, those living in a common-law marriage and those who were married or living in a registered relationship falling in between (20%/23%). Regarding the repository's possible expansion, the share of those reporting little or no need for information was greatest among single respondents (33%), followed by those living in a common-law marriage (24%), while among respondents who were married or living in a registered relationship and divorced, separated or widowed respondents shares of those reporting little or no need for information in this area were somewhat lower (17%/14%).

Level of education was related to one statistically significant difference regarding *decision-making at national level* (χ^2 (10, N=582) = 23.74, p= .008). Those with polytechnic education reported less need for information (27% "substantial need / very great need") than others (40% to 55%).

Type of education was related to two statistically significant differences concerning need for information, in the case of *environmental effects* (χ^2 (18, N=487) = 37.09, p= .005) and *health effects* (χ^2 (18, N=488) = 35.77, p= .008). Those with education in agriculture and forestry, and technology and transport reported the greatest share (24%/20%) of those perceiving little or no need for information regarding environmental effects, followed closely by those with education in the humanities, arts and culture (18%) and those belonging to the group "other" with no specified type of education (18%). Among other groups the share of those reporting little or no need for information about environmental effects was low (0% to 10%). Likewise with health effects, the greatest numbers of those reporting little or no need for information

were found among those with education in technology and transport, and in agriculture and forestry (20%/18%) this time followed closely only by those with education in the humanities, arts and culture (14%), others accounting for only a small share of those with no need or low need for information in this area (4% to 11%).

Socio-economic group was related to one statistically significant difference regarding *decision-making at national level* (χ^2 (16, N=584) = 36.11, p= .003). Almost 40% of those respondents who were unemployed or doing domestic work (39%) and students (38%) reported little or no need for information regarding decision-making at national level, whereas under 15% of retirees (13%), and senior executives (13%) reported little or no need for this kind of information.

Personal income was related to one statistically significant difference, namely *safety of transport* (χ^2 (10, N=522) = 23.67, p= .009). Those earning 60,000 euros or more a year and those earning less than 10,000 euros a year reported a greater share of those perceiving little or no need for information on safety of transport (45%/24%) compared to the other income groups (12% to 18%)

4.5 Discussion

In the survey of 1994 the respondents were asked to name the most important source of information in nuclear waste issues of six alternatives given (Kurki 1995, Fig. 5). Over 60% of respondents in Eurajoki named newspapers as the most important source of information in nuclear waste issues. However, at the same time over 50% of the respondents named TV as the most important source. The TVO Information leaflet or Internet were not among the given options. (Table 21.)

Table 21.
The most important sources of information in nuclear waste issues among respondents in Eurajoki 1994 (%). According to Kurki (1995, Fig. 5).

Newspapers	62
TV	53
Local newspapers	31
Radio programmes of Public Broadcasting Company YLE	14
Literature	10
Local commercial radios	07

When the results of the 1994 survey are compared with the results of our 2008 survey (Table 20) it is clear that the mass media has retained its position as a primary source of information in nuclear waste issues. In 1994 newspapers were the most important information source and in 2008 newspapers were still the most followed information source. However, if one focuses on those consulting different information sources "actively", the 2008 survey reveals that the TVO News leaflet surpasses newspapers as most consulted media. Furthermore, the list of six most "fairly actively or actively" consulted information sources among residents of Eurajoki (Table 14) ranked both the TVO News leaflet and the Posiva leaflet higher than television. Although industry leaflets were not mentioned in the survey of 1994, it seems that TVO and

Posiva have succeeded in positioning their own leaflets among the most actively used information sources in Eurajoki. Thus the nuclear industry controls a direct information channel to local residents which is free from interpretations of the media. It is presumable that in the long run this has influences on residents' opinions and way of framing the issue.

One interesting issue is respondents' self-reflections concerning the level of information they have obtained (Table 22). Although one must keep in mind the varying wording of the statements used to elicit opinions, one could conclude that among residents of Eurajoki the number of respondents reporting that they have insufficient information decreased in ten years. In 1996 around 50% of the residents of Eurajoki estimated that they knew too little about final disposal of nuclear waste. Roughly one third responded that according to their view they knew enough. The question used was "How much do I estimate that I know about final disposal of nuclear waste?" Options given were too little, a little and enough. (Harmaajärvi, Litmanen and Kaunismaa 1998, 43.) In 2008 only one third of respondents in Eurajoki disagreed with the statement "In my opinion I have enough information regarding the plan for final disposal" whereas around one third also agreed with the statement. (Table 22.)

At the national level, the share of those estimating that they have insufficient information seems to be much higher compared to Eurajoki. In 2007 in a nation-wide survey (Litmanen et al. 2010), in which Finns were posed a statement "In my opinion I know enough regarding the Finnish nuclear waste management", 58% of the respondents reported that they did not have enough information. According to the same survey, in Satakunta region, the share of those reporting that they did not have sufficient information was 57%. As Table 22 indicates this places it near the national level and further from the municipalities neighbouring Eurajoki which makes sense. Correspondingly the share of those estimating that they had sufficient information was highest among residents of Eurajoki and lowest at national level, residents of neighbouring municipalities with residents of Satakunta region placed in between. In the survey by Aho (2008, 35–36) the share of those who agreed with the statement "I have obtained enough information concerning final disposal of spent nuclear fuel" in Eurajoki was exceptionally high (56%). (Table 22.)

Table 22.
Sufficiency of information regarding final disposal according to respondents. (%). Comparison between different studies.

	Eurajoki 1996 (Harmaajärvi et al.)[1]	Eurajoki 2007 (Aho)[2]	Eurajoki 2008 (Our survey)	Neighbours of Eurajoki 2008 (Our survey)	Satakunta 2007 (Litmanen et al.)[3]	Finns 2007 (Litmanen et al.)[3]
Not enough	53	31	33	45	57	58
Hard to say	13	12	34	29	25	28
Enough	34	56	34	26	18	13

[1] Harmaajärvi, Litmanen and Kaunismaa (1998, 29), numbers estimated from a figure.
[2] Aho (2008, 35).
[3] Litmanen et al. (2010).

Thus it is clear that after a long site selection process (started in Eurajoki in the mid 1980s) and after a decade of post site selection phase, the residents of Eurajoki still want more information regarding the final disposal of SNF. In the survey of 1996 (Harmaajärvi, Litmanen and Kaunismaa 1998) there were six issues which especially raised the interest of the respondents. Approximately 90% of the respondents wanted to have a lot or somewhat

more information about the following questions, in the following order: general safety of the nuclear waste facility, the safety of transportation, the safety of encapsulation, the safety of final disposal, health impacts and environmental and ecological impacts. The surveys of 1994 and 2007 (Kurki 1995; Aho 2008) – both funded by the energy industry – were focused on the reliability and sufficiency of diverse information sources, not on issues of possible further information needs of residents.

In the survey of 2008 the top six issues which raised concern were different from those of 1996 as environmental effects and health effects were now at the top before safety issues (such as safety after closure, of encapsulation, of transport, of final disposal in general) (Table 20). In 1996 approximately 75% of respondents in Eurajoki requested a lot or somewhat more information about economic impacts and in 2008 73% needed more information about these issues. With these figures economic impacts took the second last position among 13 pre-structured issues concerning needs of information regarding final disposal of SNF in the survey of 2008. In the survey of 1996 economic impacts was in seventh place (Harmaajärvi, Litmanen and Kaunismaa 1998). Thus the needs for information seem to have changed from safety issues towards environmental and health effects. In both of the surveys (of 1996 and 2008) the method was the same (pre-structured lists of issues) which is important to take into account when evaluating the results.

From the point of view of confidence in some main information providers the residents of Eurajoki have become more critical. In 1994 around every fifth (22%) of the respondents in Eurajoki disagreed with the statement "I obtain reliable information regarding nuclear waste from the power companies (TVO, IVO[34])", whereas almost two thirds (62%) of the respondents agreed with the statement (Kurki 1995, Fig. 9c). In 2008 figures indicating confidence in the power companies as information providers were quite different as 36% were highly dissatisfied or dissatisfied and only 34% were satisfied or highly satisfied with confidence in information provided by TVO and Fortum (Table 18). In 1994 attitude towards environmental movements was more critical than towards the power companies as around two fifths (41%) disagreed with the statement "I obtain reliable information regarding nuclear waste from the environmental movement" and around third (30%) agreed with the statement (Kurki 1995, Fig. 9d). In 2008 47% of the respondents of Eurajoki were highly dissatisfied or dissatisfied regarding confidence in information disseminated by NGOs and only 10% were highly satisfied or satisfied (Figure 9). Thus, power companies still enjoyed more confidence although general attitude had become more critical towards them, too.

[34] See Abbreviations and terms.

5 Perceived impacts and threats

After eliciting about information issues, the second part of the research concentrated on the actual views of the people in the area. The SNF repository project is an undertaking of great magnitude. Consequently it is almost inevitable that it affects various aspects of life in the area. As stated earlier (Chapter 2.4) the repository has been under construction for a while already, and if everything goes according plan the project will continue for several decades (and, of course, after the project itself has ended, the repository will remain even longer). What we were interested in was how people in the area perceive the effects of constructing the final disposal facility and whether it poses some kind of threat.

5.1 Impacts of the repository

The first aim of the second part of the research was to examine how local people perceive the effects of repository project. The question used in the survey was: "How constructing the final disposal facility in the area in your opinion affect the following issues?" A list of twenty different issues was presented to respondents and they were asked to assess effect to each of these issues on a five-step scale from "Negatively" to "Positively". (For the questionnaire [in Finnish], see Appendix.)

As Figure 11 shows, 42% of the residents estimate that the final disposal facility has a somewhat positive or positive impact on the *development of the area generally* but at the same time 31% estimate that the construction of the repository has a negative or somewhat negative effect to the *functioning environment / atmosphere in the area*. This sends a rather mixed message about people's opinions concerning the effects of the project. While many estimate effects of the repository to be positive in issues like the *employment in the area* (63% "somewhat positive / positive"), *economic development in the area* (61% "somewhat positive / positive") and issues concerning infrastructure (e.g. *traffic connections in the area* 41%) it seems that people also realise that this kind of development comes at a cost. Over 50% perceive the effects of the repository to be negative or somewhat negative in issues of *state of nature surrounding the final disposal facility* (54%), *rural non-farm livelihoods* (52%) and *outsiders' image of the area* (52%), followed by such issues as *own image of the area* (40%) and recreational opportunities in the area (39%).

According to the municipal image study by Corporate Image Oy (Posiva 2007; see also Seppälä 2010) the residents of Eurajoki estimated the influence of final disposal on their

municipality of domicile clearly more favourably than consumers elsewhere in Finland. The attractiveness of Eurajoki as a domicile and as a business location, as well as its attraction to tourists were alternatives for which the respondents gave positive estimates clearly more than negative. Eurajoki was perceived by the residents of the municipality as a developing, business friendly and agriculture and forestry intensive municipality and a good place to live more often than the other municipalities included in the study. The study by Corporate Image Oy, funded by Posiva, was conducted in October-December 2006 by interviewing 500 consumers, 200 representatives of businesses and 200 residents of Eurajoki over the telephone.

Tables 23 and 24 show the percentage shares of those respondents who perceive the effects of the repository to be outright positive and those who perceive the effects to be outright negative. The results are consistent with those above, as *employment in the area* and *economic development in the area* are the issues in which the greatest share of respondents (22%/21%) assessed the impact of the repository to be "positive" while the *state of nature surrounding the final disposal facility* and *rural non-farm livelihoods* are the issues in which greatest share of respondents (30%/23%) assessed impact of the repository to be "negative".

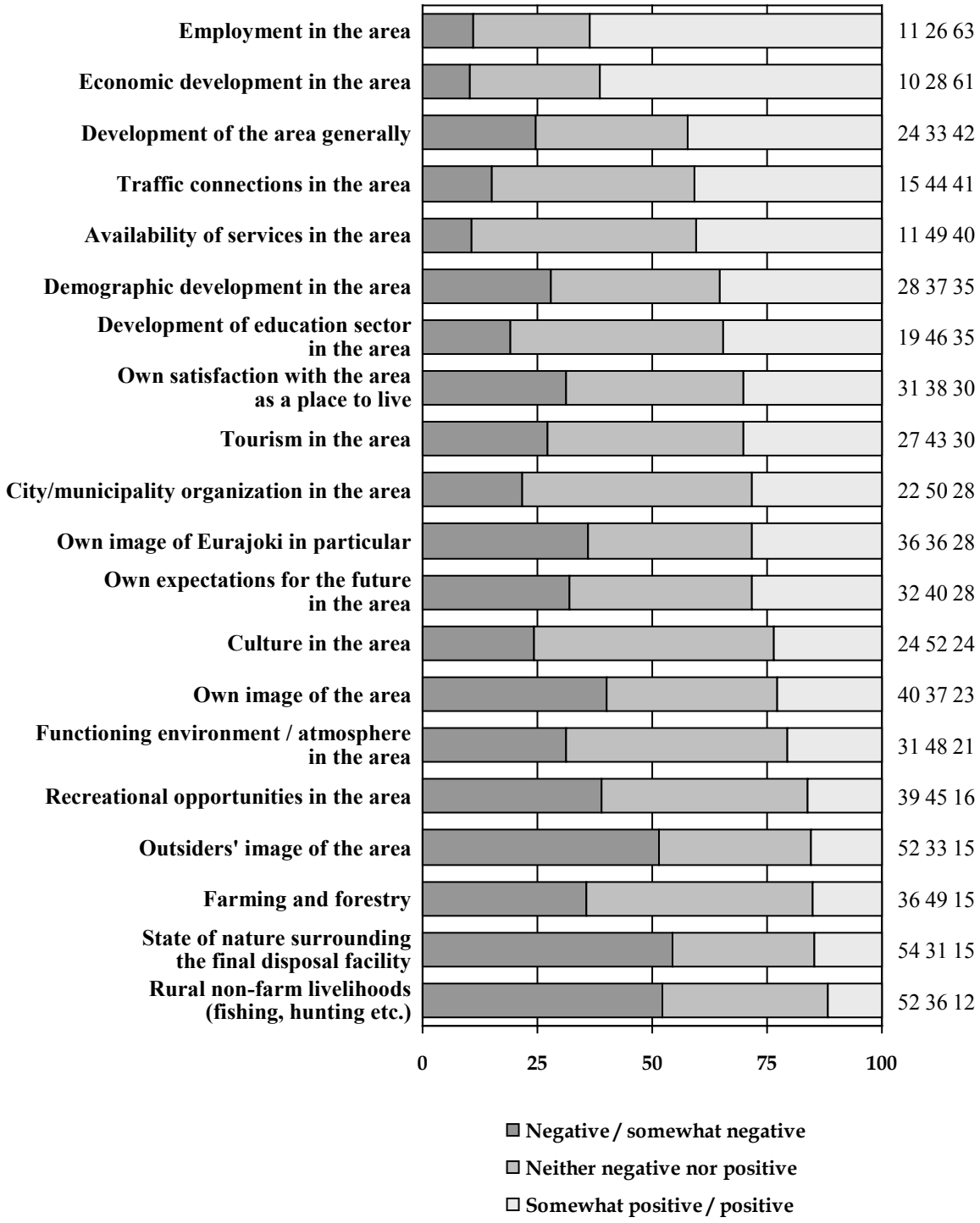

Figure 11.
Perceived impact of final disposal facility on certain issues (%).

Table 23.
Four issues where the number of those assessing impact to be "positive" was greatest (%).

Employment in the area	22
Economic development in the area	21
Own satisfaction with the area as a place to live	13
Development of the area generally	13

Table 24.
Five issues where the number of those assessing the impact to be "negative" was greatest (%).

State of nature surrounding the final disposal facility	30
Rural non-farm livelihoods (fishing, hunting etc.)	23
Outsiders' image of the area	21
Own image of the area	19
Own image of Eurajoki in particular	18

Comparison between residents of Eurajoki and residents of neighbouring municipalities revealed that there is pretty much consensus on the top three issues where the effects of the repository are greatest (Tables 25 and 26). This applies to both negative and positive effects. On the positive side, the greatest share of both those living in Eurajoki and those living in neighbouring municipalities estimate that the construction of the repository has most effects on *employment in the area* (66%/62% "somewhat positive / positive") and *economic development in the area* (63%/61% "somewhat positive / positive") and *development of the area generally* (45%/40% "somewhat positive / positive"). On the negative side, the majority of both assess that the construction of the repository has most effects on the *state of nature surrounding the final disposal facility* (56%/53% "negative / somewhat negative"), *rural non-farm livelihoods* (51%/53% "negative / somewhat negative") and *outsiders' image of the area* (51%/52% "negative / somewhat negative").

Table 25.
Five issues on which the greatest numbers of respondents perceived impact to be on the positive ("somewhat positive / positive") side (%). Comparison between Eurajoki and neighbouring municipalities.

		Negative / somewhat negative	Neither negative nor positive	Somewhat positive / positive
Eurajoki	**Employment in the area**	13	21	66
	Economic development in the area	13	25	63
	Development of the area generally	26	29	45
	Availability of services in the area	12	44	45
	Traffic connections in the area	17	39	45
Neighbours	**Employment in the area**	10	28	62
	Economic development in the area	09	30	61
	Development of the area generally	23	36	40
	Traffic connections in the area	14	48	38
	Availability of services in the area	10	53	37

Table 26.
Six issues on which the greatest numbers of respondents perceived the impact to be on the negative ("negative / somewhat negative") side (%). Comparison between Eurajoki and neighbouring municipalities.

		Negative / somewhat negative	Neither negative nor positive	Somewhat positive / positive
Eurajoki	**State of nature surrounding the final disposal facility**	56	28	16
	Rural non-farm livelihoods	51	37	11
	Outsiders' image of the area	51	33	16
	Own image of the area	40	35	25
	Own image of Eurajoki in particular	38	28	34
	Own expectations for the future in the area	37	30	33
Neighbours	**State of nature surrounding the final disposal facility**	53	32	14
	Rural non-farm livelihoods	53	35	12
	Outsiders' image of the area	52	33	15
	Recreational opportunities in the area	41	45	14
	Own image of the area	41	39	21
	Farming and forestry	35	51	14

When the survey data was examined in relation to other socio-demographic background variables, a number of statistically highly significant ($p \leq .001$) and statistically significant ($.001 < p \leq .010$) differences was observed.

The difference between men and women was statistically highly significant regarding perceived impacts of the repository on *state of nature surrounding the final disposal facility* (χ^2 (2, N=576) = 40.81, p= .000), *own image of the area* (χ^2 (2, N=583) = 34.86, p= .000),

own image of Eurajoki in particular (χ^2 (2, N=582) = 30.70, p= .000), *own satisfaction with the area as a place to live* (χ^2 (2, N=580) = 28.25, p= .000), *own expectations for the future in the area* (χ^2 (2, N=578) = 25.94, p= .000), *functioning environment / atmosphere in the area* (χ^2 (2, N=573) = 24.93, p= .000), *development of the area generally* (χ^2 (2, N=576) = 19.91, p= .000), *development of education sector in the area* (χ^2 (2, N=576) = 15.74, p= .000), *rural non-farm livelihoods* (χ^2 (2, N=576) = 14.99, p= .001), and statistically significant for *farming and forestry* (χ^2 (2, N=578) = 11.81, p= .003). In all these cases, a greater share of women than men perceived the effect of the repository to be negative and a greater share of men than women perceived the effect of the repository to be positive. 66% of women assessed effect of the repository to be negative or somewhat negative and 8% somewhat positive or positive on the state of nature surrounding the final disposal facility, whereas 41% of men assessed the effect to be negative or somewhat negative and 22% assessed it to be somewhat positive or positive. Regarding own image of the area, the share of women perceiving the effect of the repository to be negative or somewhat negative was 49% and the share of women perceiving the effect to be somewhat positive or positive was 14%, while for men the corresponding figures were 31% and 33%. Regarding effect on own image of Eurajoki in particular, women's assessments were 43% negative or somewhat negative and 19% somewhat positive or positive, and men's assessments 28% negative or somewhat negative and 39% somewhat positive or positive. Regarding effect on own satisfaction with the area as a place to live women's assessments were 41% negative or somewhat negative and 23% somewhat positive or positive, and men's 22% negative or somewhat negative and 38% somewhat positive or positive. Regarding effect on own expectations for the future in the area, the figures for women were 40%/21% and for men 23%/36%. For functioning environment / atmosphere in the area the figures were 36%/13% and 26%/30%, for development of the area generally 27%/33% and 21%/52%, for development of the education sector in the area 23%/28% and 15%/43%, for rural non-farm livelihoods 60%/10% and 44%/14%, and finally for farming and forestry 42%/13% and 29%/16%.

There were three statistically highly significant differences between age groups regarding perceived impacts of the repository on *tourism in the area* (χ^2 (10, N=568) = 37.46, p= .000), *farming and forestry* (χ^2 (10, N=570) = 44.34, p= .000), *recreational opportunities in the area* (χ^2 (10, N=567) = 29.90, p= .001), and two statistically significant differences regarding *rural non-farm livelihoods* (χ^2 (10, N=568) = 28.35, p= .002) and *outsiders' image of the area* (χ^2 (10, N=567) = 23.22, p= .010). In all these cases, except the last, those belonging to the age group 65 or over reported the greatest share of those assessing the effects of the repository as somewhat positive or positive. Regarding tourism in the area, around half (48%) of those aged 65 or over and around third (34%) of those aged 55-64 assessed the effect of the repository to be somewhat positive or positive, while the share of those aged 35-44 agreeing with this assessment was around one sixth (17%). Other age groups fall between these groups with around a quarter (21% to 26%) perceiving the effect to be somewhat positive or positive. Regarding farming and forestry the share of those aged 65 or over perceiving the effect to be on the positive side was 29%, whereas among those aged 35-44 and 45-54 only few saw the effects in a positive light (4%/5% "somewhat positive / positive"), in other age groups the shares of those seeing effects in a positive light being between 10% and 18%. Regarding recreational opportunities in the area, the share of those perceiving the effect of the repository to be somewhat positive or positive in the group aged 65 or over was 23% and of those in groups aged 45-54 and 24 or under 10% in both cases, in other groups the shares being between 13% and 19%. Regarding rural non-farm livelihoods those perceiving the effects most positively were those aged 65 or over (19% "somewhat positive / positive") and those aged 55-64 (17% "somewhat positive / positive") with others being rather less positive (4% to

9% "somewhat positive / positive"). In the last case, outsiders' image of the area, those aged 24 or under were the most positive group, with 20% perceiving effect of the repository to be somewhat positive or positive, the positivity of those aged 65 or over being on a comparable level (19%). However, those aged 65 or over were the least negative group as 34% of them assessed the effect to be negative or somewhat negative, while in other groups, the share of those assessing the effect to be negative or somewhat negative was between 48% and 61%.

Level of education was related to three statistically highly significant differences concerning the perceived effects of the repository, in cases of *recreational opportunities in the area* (χ^2 (10, N=576) = 36.16, p= .000), *farming and forestry* (χ^2 (10, N=582) = 33.30, p= .000) and *rural non-farm livelihoods* (χ^2 (10, N=579) = 28.92, p= .001). Regarding recreational opportunities in the area the situation is quite interesting, as those with vocational training perceived the effect of the repository most negatively (47% "negative / somewhat negative") and at the same time most positively (20% "somewhat positive / positive"), after those with no qualification after basic education (21% "somewhat positive / positive"). This derives from the fact that those with vocational training reported the lowest share, 32%, of those assessing the effects to be neither negative nor positive, whereas those with upper secondary education reported the highest share at 67% while the shares of other groups ranged from 44% to 60%. The situation with the repository's perceived effects on farming and forestry was in fact rather similar with regard to vocational training as in this area too, those respondents with vocational training perceived the effect of the repository most negatively (43% "negative / somewhat negative") and at the same time most positively (15% "somewhat positive / positive"), after those with no qualification after basic education (24% "somewhat positive / positive"). What may be most noteworthy regarding perceived impact on farming and forestry, however, is how positive those with no qualification after basic education were (24% "somewhat positive / positive") compared to others, including also those with vocational training (7% to 15% "somewhat positive / positive"). Regarding the repository's perceived effects on rural non-farm livelihoods those with no qualification after basic education were also most positive (21% "somewhat positive / positive") compared to others (2% to 14% "somewhat positive / positive").

Type of education was related to five statistically significant differences concerning the perceived effects of the repository, namely on *city/municipality organization in the area* (χ^2 (18, N=479) = 38.17, p= .004), *development of education sector in the area* (χ^2 (18, N=484) = 37.86, p= .004), *own satisfaction with the area as a place to live* (χ^2 (18, N=482) = 37.63, p= .004), *own image of the area* (χ^2 (18, N=485) = 36.68, p= .006) and *non-farm livelihoods* (χ^2 (18, N=484) = 35.60, p= .008). Those with education in technology and transport, and those belonging to the group "other" with no specified type of education reported the greatest share (43%/42%) of those assessing the effect of the repository as somewhat positive or positive for the city/municipality organization in the area, whereas those with education in the humanities, arts and culture, likewise business, administration and social sciences reported the smallest shares (14%/14% "somewhat positive / positive"), others falling in between (23% to 36% "somewhat positive / positive"). Those with education in the humanities, arts and culture also reported the greatest share of those assessing the effect of the repository to be negative or somewhat negative (41%). With development of the education sector in the area, those belonging to the group "other" with not specified type of education and those with education in technology and transport again reported a rather large share (58%/45%) of those assessing the effect of the repository as somewhat positive or positive, while other groups had a more modest share of those assessing the effect to be positive (27% to 35% "somewhat positive / positive"). Those with education in the humanities, arts and culture reported the greatest share

of those assessing the effect of the repository to be negative or somewhat negative (45%). Regarding own satisfaction with the area as a place to live those with education in technology and transport and those with education in the humanities, arts and culture stood out, the former having the greatest share (41%) of those assessing the effect of the repository to be somewhat positive or positive and the latter the greatest share of those assessing the effect of the repository to be negative or somewhat negative (55%). Regarding own image of the area, those with education in the humanities, arts and culture reported the greatest share (35%) of those assessing the effect of the repository to be positive, but this time the group assessing the effect of the repository most negatively was those with education in the natural sciences and computing (73% "negative / somewhat negative"). Regarding non-farm livelihoods what stands out was that those having just general education were more positive than others (21% "somewhat positive / positive").

Socio-economic group was related to one statistically highly significant difference regarding perceived effects of the repository, regarding *farming and forestry* (χ^2 (16, N=581) = 50.17, p= .000), with two statistically significant differences in cases of *own image of the area* (χ^2 (16, N=585) = 32.44, p= .009) and *tourism in the area* (χ^2 (16, N=579) = 32.14, p= .010). Regarding farming and forestry and tourism in the area the greatest share of those seeing the effects of the repository as positive was found among retirees (29%/43% "somewhat positive / positive") and regarding own image of the area among self-employed people or employers (45% "somewhat positive / positive"). While in all of these three cases the smallest share of those seeing effects of the repository as somewhat positive or positive was found among those unemployed or doing domestic work (0% with farming and forestry, 4% with own image of the area, 17% with tourism in area).

Political affiliation was related to numerous statistically highly significant differences regarding; *development of the area generally* (χ^2 (20, N=574) = 70.11, p= .000), *own image of the area* (χ^2 (20, N=578) = 59.33, p= .000), *economic development in the area* (χ^2 (20, N=580) = 57.75, p= .000), *own image of Eurajoki in particular* (χ^2 (20, N=578) = 55.88, p= .000), *own expectations for the future in the area* (χ^2 (20, N=575) = 52.51, p= .000), *own satisfaction with the area as a place to live* (χ^2 (20, N=577) = 50.13, p= .000), *state of nature surrounding the final disposal facility* (χ^2 (20, N=574) = 49.57, p= .000), *functioning environment / atmosphere in the area* (χ^2 (20, N=570) = 46.76, p= .001), *demographic development in the area* (χ^2 (20, N=575) = 45.28, p= .001), *city/municipality organization in the area* (χ^2 (20, N=569) = 44.90, p= .001), *availability of services in the area* (χ^2 (20, N=576) = 44.64, p= .001), and three statistically significant differences regarding *rural non-farm livelihoods* (χ^2 (20, N=572) = 41.72, p= .003), *employment in the area* (χ^2 (20, N=574) = 41.25, p= .003) and *recreational opportunities in the area* (χ^2 (20, N=572) = 37.89, p= .009). In all cases where differences were statistically highly significant with the exception of availability of services in the area, those oriented towards the National Coalition Party and the Finnish Centre Party reported the largest share of those who perceived repository's impact as somewhat positive or positive among those oriented towards the parties represented in Parliament. Furthermore, in all of these cases (where those oriented towards the National Coalition Party and the Finnish Centre Party had the largest share) except one, the share of those perceiving the effects positively was larger among those oriented towards the National Coalition Party than those oriented towards the Finnish Centre Party. Regarding perceived effects on demographic development in the area, the share of those assessing the effect of the repository as somewhat positive or positive was the same among those oriented towards the National Coalition Party and among those oriented towards the Finnish Centre Party (46% "somewhat positive / positive"). Regarding availability of services in the area, those oriented

towards the National Coalition Party still reported the largest share (59%) of those perceiving the repository's impact as somewhat positive or positive, but instead of those oriented towards the Finnish Centre Party (43%), it was those oriented towards the Finnish Social Democratic Party who reported (although just barely), the second largest share of those assessing the effect of the repository as somewhat positive or positive (44%). With statistically significant differences, in the case of rural non-farm livelihoods, those oriented towards the Finnish Social Democratic Party and the Finnish Centre Party reported the greatest share of those perceiving repository's effects in a positive light (17%/16% "somewhat positive / positive") among those oriented towards the parliamentary parties. Regarding employment in the area, those reporting the greatest share of those perceiving repository's effects in a positive light were those oriented towards the National Coalition Party and the Finnish Centre Party (76%/72% "somewhat positive / positive"), and regarding recreational opportunities in the area, those oriented towards the Left-Wing Alliance and the Finnish Social Democratic Party (29%/25% "somewhat positive / positive"). In 11 cases out of these 14 listed, those oriented towards the Green League of Finland reported the smallest share of those who perceived repository's impact as somewhat positive or positive among those oriented towards the parliamentary parties. Regarding economic development in the area, those oriented towards the Finnish Christian Democrats reported the smallest share (29% "somewhat positive / positive"), regarding state of nature surrounding the final disposal facility, those oriented towards the Left-Wing Alliance (0% "somewhat positive / positive") and regarding the demographic development in the area, those oriented towards the Left-Wing Alliance and the Finnish Christian Democrats (14%/14% "somewhat positive / positive").

Personal income was related to two statistically highly significant differences concerning perceived effects of the repository, regarding *own image of Eurajoki in particular* (χ^2 (10, N=521) = 30.32, p= .001) and *own image of the area* (χ^2 (10, N=522) = 29.97, p= .001), and one statistically significant difference regarding *state of nature surrounding the final disposal facility* (χ^2 (10, N=516) = 27.77, p= .002). Those with income of 60,000 euros or more a year reported more (62%) and those with income under 10,000 euros a year less (17%) of those who perceived repository's impact as somewhat positive or positive on their own image of Eurajoki in particular compared to other income groups (27% to 36%). Regarding own image of the area the situation remained basically the same. Those with income of 60,000 euros or more a year reported the greatest share (48%) and those with income under 10,000 euros a year reported for the smallest share (10%) of those who perceive repository's impact to be somewhat positive or positive, other income groups falling in between (20% to 32%). However, regarding state of nature surrounding the final disposal facility differences between groups were clearer when shares of those assessing the effects of the repository to be negative or somewhat negative were compared. Those with income of 60,000 euros or more a year and those in the income group earning from 40,000 to 59,999 euros a year reported for the smallest share (25%/36%), and those with income of 10,000 euros or less and those belonging to the income group from 20,000 to 29,999 euros a year reported for the greatest share (65%/62%) of those perceiving the impact of the repository to be negative or somewhat negative.

5.2 Threats

Study on risk perception has established that there is a discrepancy between the views of the experts and the general public's perception of the risks associated with SNF. The research has

shown that general public tend to fear nuclear technology, the radiation risks are perceived differently than other risks and strong negative cognitive images are associated with nuclear wastes. (e.g Desvousges et al. 1993; Easterling and Kunreuther 1995, 131-132; Slovic 1987; Slovic, Layman and Flynn 1993.) The second aim of the second part of the research was to examine how local people perceive possible threats. The question used in the survey was: "Do you perceive the final disposal facility to cause a threat to any of these?" A list of nine risk dimensions was presented to respondents and they were asked to assess the level of threat perceived to these on a four-step scale from "I do not perceive [threat]" to "I perceive high [threat]" with extra option of "hard to say". (For the questionnaire [in Finnish], see Appendix.)

Figure 12 demonstrates the magnitude of the risk perception in various risk dimensions. It illustrates that the residents perceive that the repository poses the greatest threat on the risk dimensions involving future generations. Over half of the respondents perceived an explicit threat or high threat over the health of future generations (56%), the safety of future generations (55%) and the well-being of future generations (52%), whereas on the other dimensions the share of those who perceived at least explicit threat was somewhat lower (45% to 32%). What comes to perceived threat to present generations, it is easy to discern, considering shares of those perceiving at least explicit threat, that people are more concerned about health issues than well-being and safety issues. The share of those perceiving threat to health in this level was consistently larger than share of those perceiving threat to well-being, and share of those perceiving a threat to well-being was consistently larger than share of those perceiving a threat to safety.

Table 27 shows the percentage shares of those respondents who perceive that repository poses high threat. When the shares of those perceiving a high threat in each dimension are compared, it is obvious the risk dimensions involving future generations still stand out.

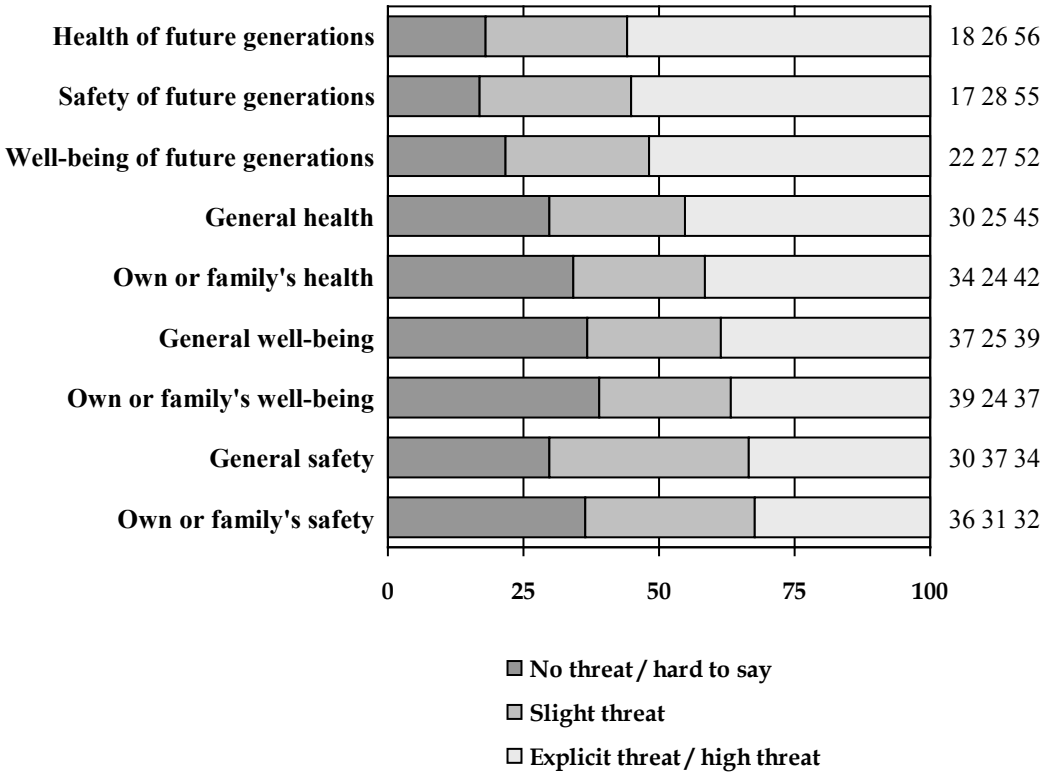

Figure 12.
Extent of perceived threat posed by repository on certain risk dimensions (%).

Table 27.
Those perceiving repository to pose "high threat" on certain risk dimensions (%).

Health of future generations	39
Safety of future generations	36
Well-being of future generations	35
General health	24
Own or family's health	23
General safety	18
General well-being	18
Own or family's well-being	17
Own or family's safety	16

Comparison between residents of Eurajoki and residents of neighbouring municipalities revealed that there really is not much difference between them, as Table 28 shows. Regarding risk dimensions where greatest numbers of respondents perceived at least explicit threat, the share of respondents perceiving this kind of threat was at the same level in both groups. This is true in all four risk dimensions.

Table 28.
Four risk dimensions on which greatest numbers of respondents perceived that substantial threat ("explicit threat / high threat") was posed by repository (%). Comparison between Eurajoki and neighbouring municipalities.

		No threat / hard to say	Slight threat	Explicit threat / high threat
Eurajoki	**Health of future generations**	20	23	57
	Safety of future generations	18	27	56
	Well-being of future generations	24	24	51
	General health	32	22	46
Neighbours	**Health of future generations**	17	28	55
	Safety of future generations	16	29	55
	Well-being of future generations	19	29	52
	General health	29	27	44

When the survey data was examined in relation to other socio-demographic background variables, a number of statistically highly significant ($p \leq .001$) and statistically significant ($.001 < p \leq .010$) differences was observed.

The difference between men and women was statistically highly significant in all cases, *safety of future generations* (χ^2 (2, N=582) = 40.12, p= .000), *health of future generations* (χ^2 (2, N=587) = 39.79, p= .000), *general health* (χ^2 (2, N=586) = 38.34, p= .000), *own or family's well-being* (χ^2 (2, N=583) = 33.69, p= .000), *own or family's health* (χ^2 (2, N=580) = 32.39, p= .000), *general safety* (χ^2 (2, N=587) = 30.79, p= .000), *own or family's well-being* (χ^2 (2, N=582) = 27.99, p= .000), *general well-being* (χ^2 (2, N=578) = 25.50, p= .000) and *own or family's safety* (χ^2 (2, N=587) = 17.33, p= .000). In all of these women accounted for a larger share than men of those judging the repository as an explicit or high threat. Nonetheless both women and men assessed substantial threat ("explicit threat / high threat") to be highest on the same risk dimensions, the health of future generations (68%/42%), safety of future generations (67%/41%), well-being of future generations (62%/39%), general health (54%/34%) and own or family's health (51%/31%).

There were four statistically significant differences in perceived threat between different age groups, regarding *own or family's well-being* (χ^2 (10, N=573) = 26.63, p= .003), *own or family's health* (χ^2 (10, N=570) = 25.70, p= .004), *general well-being* (χ^2 (10, N=569) = 25.46, p= .005) and *general health* (χ^2 (10, N=576) = 23.72, p= .008). In all these cases those in the age group 55-64 reported the greatest and those belonging to the age group 65 or over reported the second greatest share of those perceiving explicit threat or high threat. Furthermore, in all of these cases, except in the case of general well-being, those aged 24 or under reported the lowest and those aged 25-34 the second lowest share of those perceiving at least explicit threat, while with general well-being order was the other way around.

Type of education was related to one statistically highly significant difference regarding perceived threats posed by repository, regarding *health of future generations* (χ^2 (18, N=488) = 41.29, p= .001), and three statistically significant differences regarding *general health* (χ^2 (18, N=487) = 39.08, p= .003), *general safety* (χ^2 (18, N=488) = 36.67, p= .006) and *well-being of future generations* (χ^2 (18, N=483) = 35.51, p= .008). In all these, those with education in technology and transport reported the greatest share of those perceiving no threat or finding it hard to say if they perceived any. Regarding the health of future generations and

well-being of future generations, those reporting the greatest share of those perceiving explicit threat or high threat were those with education in education and teaching (81%/75%), and those with education in health and welfare (73%/65%)). Regarding general health, the order between these two is the reverse, as the share of those perceiving at least explicit threat was greatest (60%) among those with education in health and welfare and second greatest (57%) among those with education in education and teaching. In the case of the general safety, those with education in health and welfare stood out with greatest share of those perceiving this kind of threat (48% perceived "explicit threat / high threat").

Line of occupation was related to one statistically highly significant difference concerning perceived threat, regarding *general well-being* (χ^2 (22, N=551) = 54.61, p= .000), and four statistically significant differences regarding *own or family's health* (χ^2 (22, N=555) = 45.28, p= .002), *own or family's well-being* (χ^2 (22, N=555) = 43.15, p= .005), *health of future generations* (χ^2 (22, N=560) = 42.47, p= .005) and *general health* (χ^2 (22, N=558) = 42.05, p= .006). Regarding general well-being, those working in finance, real estate and business support services and those working in transport, storage and communication reported the greatest share of those who did not necessarily see the repository as a threat (64%/57% "no threat / hard to say"). Regarding own or family's health the order of these groups was reversed, those working in transport, storage and communication reported the greatest share (57%) and those working in finance, real estate and business support services the second greatest (50%). In addition, regarding general well-being there were two groups in which over half assessed the repository to pose a slight threat, those working in accommodation and food services (60%) and those working in "other civil and personal services"[35] (58%). Regarding own or family's health, as many as 70% of those working in accommodation and food services assessed the repository to pose a slight threat. Regarding own or family's well-being the same trend continued; those working in transport, storage and communication and those in finance, real estate and business support services reported the greatest share of those who do not necessarily see the repository as a threat (61%/59% "no threat / hard to say") and a large share (73%) of those working in accommodation and food services assessed the repository to pose a slight threat. Regarding the health of future generations almost three out of four (74%) of those working in education, health and social services perceived the repository as a substantial threat ("explicit threat / high threat"), whereas 38% of those working in energy, heat and water supply estimated that the repository does not necessarily pose a threat ("no threat / hard to say"). Regarding general health around three out of five (58%) of those working in education, health and social services perceived the repository as an explicit threat or high threat, whereas among those working in energy, heat and water supply, those working in transport, storage and communication and among those working in manufacturing and mining there were many who did not necessarily see the repository as a threat (48%/48%/43% "no threat / hard to say").

Statistically significant or highly significant differences in perceived threat were found between groups with different political affiliations within all risk dimensions. There were statistically highly significant differences regarding *general safety* (χ^2 (20, N=582) = 57.99, p= .000), *own or family's safety* (χ^2 (20, N=582) = 49.12, p= .000), *safety of future generations* (χ^2 (20, N=578) = 48.49, p= .000), *general health* (χ^2 (20, N=582) = 51.40, p= .000), *own or family's health* (χ^2 (20, N=576) = 54.71, p= .000), and statistically significant differences regarding *general well-being* (χ^2 (20, N=575) = 42.56, p= .002), *health of future generations* (χ^2 (20, N=581) = 41.63, p= .003), *well-being of future generations* (χ^2 (20,

[35] Other than public administration and defence, or education, health and social services (see Table 10).

N=578) = 41.48, p= .003) and *own or family's well-being* (χ^2 (20, N=577) = 41.37, p= .003). In all cases those oriented towards the Green League of Finland made up the greatest share (63%-95%) of those perceiving explicit threat or high threat among those oriented towards the parties represented in Parliament. Regarding own or family's health and general well-being, the second largest share of those perceiving explicit threat or high threat was found among those oriented towards the Finnish Christian Democrats (64%/62%), while in other cases those oriented towards the Left-Wing Alliance (55%-73%) occupied the second place. Moreover, those oriented towards the National Coalition Party reported the smallest share of those perceiving explicit threat or high threat among those oriented towards the parliamentary parties (15%-40%) in all of these cases, except own or family's well-being where those oriented towards the Finnish Centre Party made up the smallest share (26%).

Personal income was related to five statistically significant differences concerning perceived threat, regarding *health of future generations* (χ^2 (10, N=522) = 28.11, p= .002), *safety of future generations* (χ^2 (10, N=519) = 27.92, p= .002), *own or family's well-being* (χ^2 (10, N=520) = 27.00, p= .003), *own or family's health* (χ^2 (10, N=515) = 23.84, p= .008) and *general well-being* (χ^2 (10, N=515) = 23.21, p= .010). In all of these, the greatest share of those who do not necessarily perceive the repository as a threat ("no threat / hard to say") was found among those earning 60,000 euros or more a year, and the second greatest among those earning from 40,000 to 59,999 euros a year. Regarding the health of future generations, 52% of those earning 60,000 euros or more and 27% of those earning from 40,000 to 59,999 euros perceived no threat or found it hard to say if they perceived any, while in other income groups the percentage varied between 15% and 17%. Regarding the safety of future generations, 48% of those earning 60,000 euros or more and 25% of those earning from 40,000 to 59,999 euros perceived no threat or found it hard to say if they perceived any, while in other income groups the percentage varied between 13% and 17%. With own or family's well-being the shares were 79% of those earning 60,000 euros or more, 50% of those earning from 40,000 to 59,999 euros and 31% to 41% of other income groups. Regarding own or family's health, 69% of those earning 60,000 euros or more, 45% of those earning from 40,000 to 59,999 euros and 27% to 35% of other income groups did not perceive the repository as a threat ("no threat / hard to say"). And finally regarding general well-being, 69% of those earning 60,000 euros or more, 47% of those earning from 40,000 to 59,999 euros and 32% to 38% of other income groups did not perceive the repository as a threat ("no threat / hard to say") to general well-being.

5.3 Discussion

The study of how respondents in Eurajoki perceived the impacts of the repository indicated that, e.g., residents perceive that repository has positive impact on the employment (66%) and economic development (63%) (Table 25). In 1994 residents also saw these issues very positively. Nearly 70 percent (68%) of the respondents shared the view that the construction of a final disposal facility would bring more workplaces and sources of livelihood to the host community (Kurki 1995, Fig. 29; Litmanen 1996, 163).

However, residents of Eurajoki still have to balance between positive and negative effects, because, e.g., over half of the respondents in Eurajoki perceived that the repository has negative or somewhat negative effects on the state of nature surrounding the final disposal facility (56%) (Table 26). In contrast to these figures, the attitudes in 1994 were slightly

different as far as it is possible to say on the basis of the statement "I am afraid that the final disposal repository of nuclear waste will produce serious problems on the nature of host community". Only 38% of respondents agreed with the statement and 45% disagreed (Kurki 1995, Fig. 30; Litmanen 1996, 170-171). The other statement which was used in 1994 was "The disadvantages to people and living nature the entombing of high level nuclear waste will bring are minor". 41% agreed or somewhat agreed with the statement and 34% disagreed or somewhat disagreed (Kurki 1995, Fig. 35; Litmanen 1996, 159-160). On the ground of the figures from 1994 it is possible to say that the share of concerned people was over 40 percent and not concerned below 40 percent. Even though we hesitate to draw any firm conclusions, today's picture seems to be somewhat different as over half of the residents seem to think that the final disposal facility will have negative effects on the nature surrounding it. Could it be that over a decade ago the possibility of siting and construction of the facility was seen to be far in the future, but the 2001 decision-in-principle and nearing of 2012 deadline for construction license have made the project more concrete for the residents?

Local people worried about the image of the host municipality. In 1994 the share of those who were concerned (33%) over the image of Eurajoki because of the final disposal facility was almost the same as those who were not concerned (35%). The statement which measured the effect to the image was "The final disposal facility would be deleterious to the reputation of the host municipality" (Kurki 1995, Fig. 46; Litmanen 1996, 176-177). In contrast to these figures today's figures show that the majority of respondents in Eurajoki perceived that the facility has negative or somewhat negative effect on outsiders' image of the area (51%) whereas one third (33%) did not perceive any effects at all and 16% perceived the effects to be positive (Table 26). Here it is seen that the worries about the image of the municipality have not vanished. From these figures it is difficult to discern any trend in time because of the incomparability, but it is certain local people have been worried and still worry about how the repository affect the image of their home locality.

Table 29 shows how respondents in different studies have perceived the safety of final disposal of spent nuclear fuel in to the bedrock. In our survey one third (32%) of the respondents in Eurajoki agreed with the view that final disposal to Finnish bedrock is safe and 42% disagreed. Fourteen years before our survey the trust in the safety of final disposal was higher as nearly half (49%) of the respondents in Eurajoki agreed with the view that final disposal is safe and only one fourth disagreed with it. In the data gathered in Eurajoki 2007 the share of those who disagreed and agreed with the view was almost the same (37%/38%). The figures were almost the same in the region of Satakunta as in Eurajoki municipality. (Table 29.)

Our data of 2008 shows that in neighbouring municipalities of Eurajoki the amount of those who share the view that the final disposal is safe is almost the same as in Eurajoki, but the opposition to the view is greater (49%). When these figures are compared to the 2007 national survey (Litmanen et al. 2010) one can see that the acceptance of the view that final disposal is safe is larger among the whole population than in Eurajoki. From these figures one might draw the conclusion that people living near the nuclear waste disposal site are more concerned about the safety of the disposal plans. Still one has to be cautious, because our secondary analysis of Energy Attitudes of the Finns (1983-2008) survey data from the same year than Limanen et al.'s national survey (2007) shows that in that data situation is reversed (Table 29; see also Figures 13-17).

Table 29.
Those agreeing and disagreeing with the view that final disposal in bedrock is safe (%). Comparison between different studies.

	Eurajoki 1994 (Kurki)[1]	Eurajoki 2007 (Energy att.)[2]	Eurajoki 2008 (Our survey)	Neighbours of Eurajoki 2008 (Our survey)	Satakunta 2007 (Energy att.)[2]	Finns 2007 (Energy att.)[2]	Finns 2007 (Litmanen et al.)[3]
Disagree	25	37	42	49	38	46	31
Hard to say	26	25	26	21	23	22	29
Agree	49	38	32	30	39	32	40

[1] Kurki (1995, Fig. 33).
[2] Secondary analysis of Energy Attitudes of the Finns (1983-2008) 2007 survey data.
[3] Litmanen et al. (2010)

In light of the comparison of these different surveys one can say that there is quite much ambivalence on the safety of final disposal at the local, regional, and national level. Even though the determined planning of the final disposal has continued over two decades and there is an official decision-in-principle on the final disposal the majority of people are at least hesitant on the safety of the decision. (See also Figures 13-17.)

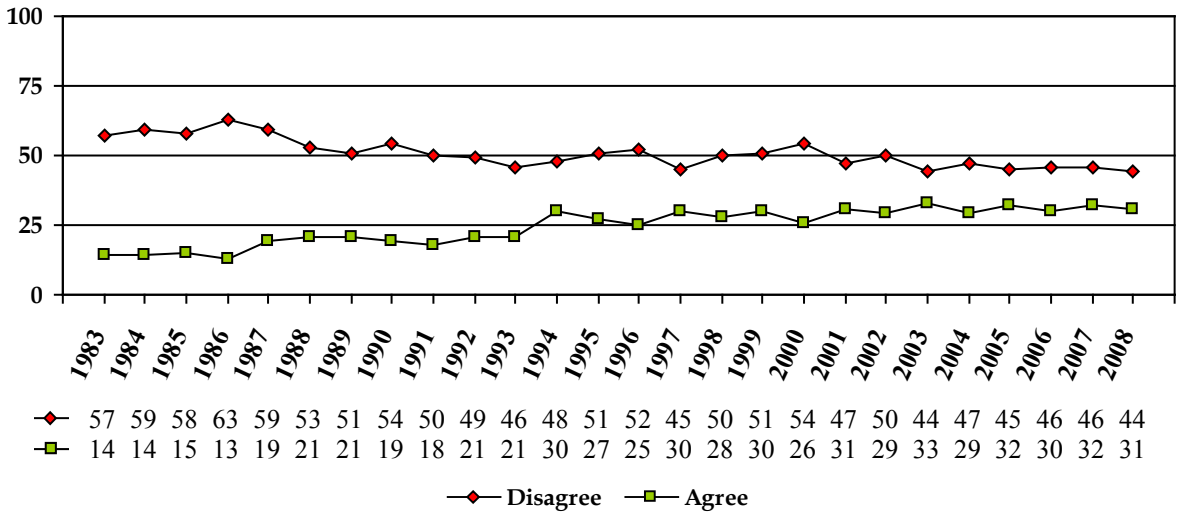

Figure 13.
Finns disagreeing and agreeing with the view that final disposal in the Finnish bedrock is safe (%) Based on data from the annual Energy Attitudes of the Finns (1983-2008) study.

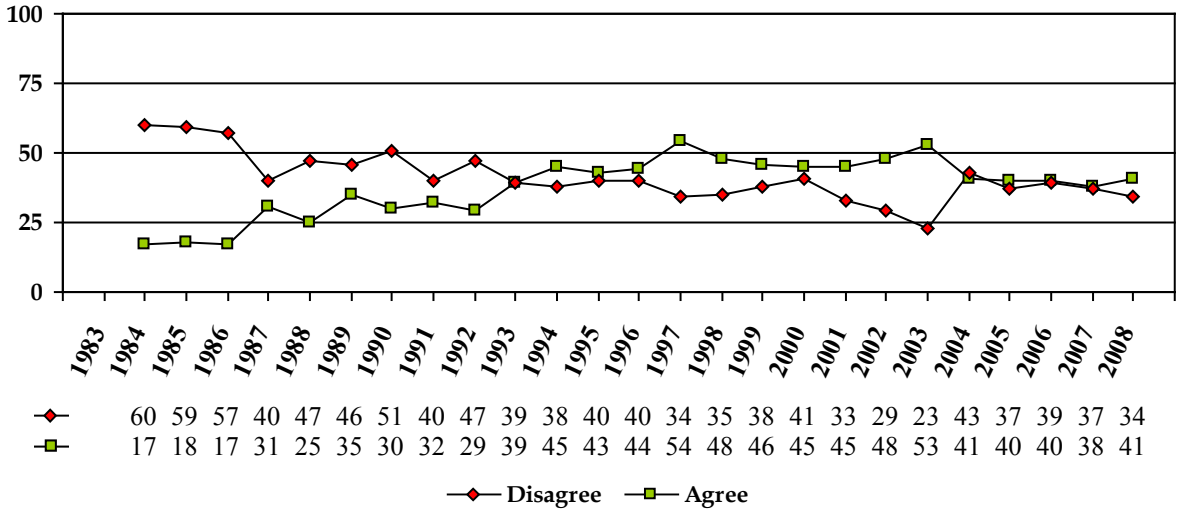

Figure 14.
Residents of Eurajoki disagreeing and agreeing with the view that final disposal in the Finnish bedrock is safe (%) Based on data from the annual Energy Attitudes of the Finns (1983-2008) study.

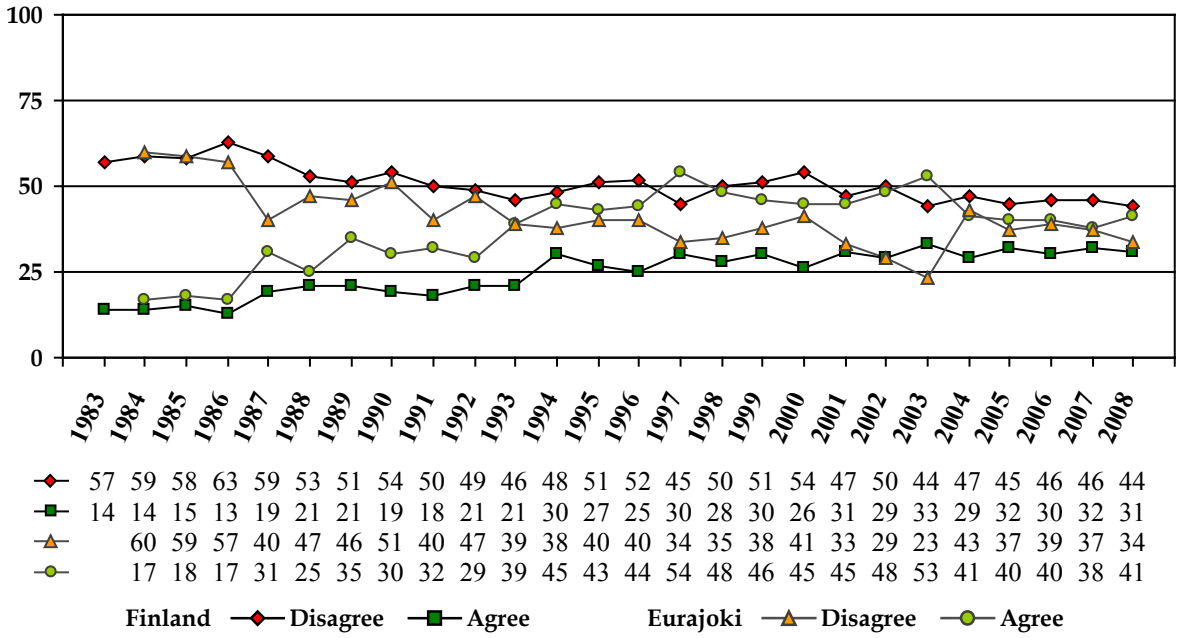

Figure 15.
Those disagreeing and agreeing with the view that final disposal in the Finnish bedrock is safe (%). Comparison between Finland and Eurajoki. Based on data from the annual Energy Attitudes of the Finns (1983-2008) study.

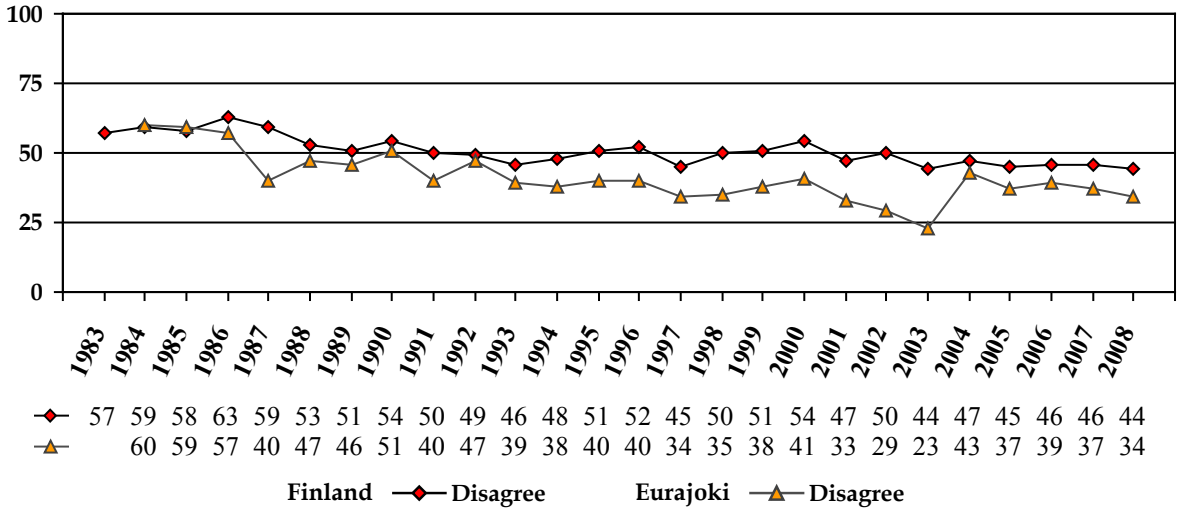

Figure 16.
Those disagreeing with the view that final disposal in the Finnish bedrock is safe (%). Comparison between Finland and Eurajoki. Based on data from the annual Energy Attitudes of the Finns (1983-2008) study.

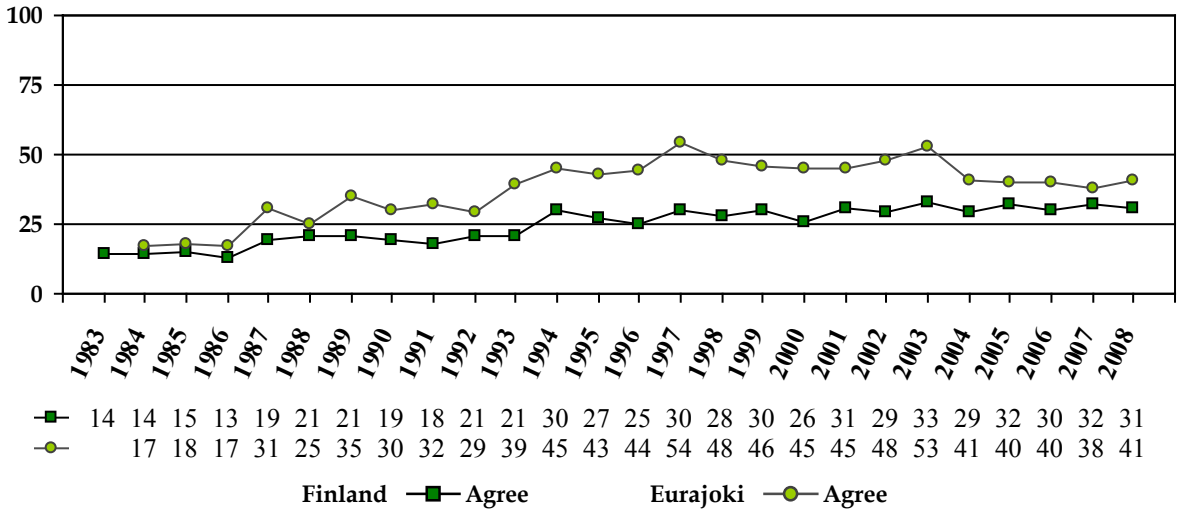

Figure 17.
Those agreeing with the view that final disposal in Finnish bedrock is safe (%). Comparison between Finland and Eurajoki. Based on data from the annual Energy Attitudes of the Finns (1983-2008) study.

Another way to analyse the feeling of safety among residents is to look at how threatened people in Eurajoki feel living near the disposal site. In 1994, 38% of the respondents from Eurajoki agreed with the statement "I would be afraid to live near a disposal site" (Kurki 1995, Fig. 44). According to Aho (2008, 34) in 2007 45% of the respondents from Eurajoki shared the view that "Siting of the planned spent nuclear fuel repository in my home municipality makes me afraid", whereas 50% disagreed with the statement (Aho 2008, 34). The figures are not totally comparable because of the different statements used in the surveys, but at least they indicate that there has been and still are plenty of people in Eurajoki who are afraid of the final disposal in their home municipality. The findings of our own secondary analysis of Energy Attitudes of the Finns (1983-2008) survey data from the same year than Aho's survey 2007 also seem to confirm this (see Figures 18-22). The statement used in the Energy Attitudes survey was "Nuclear waste constitutes a constant threat to the life of future

generations." Both in Eurajoki and the national sample a large majority (63%/68%) of respondents agreed with the statement, whereas 22% of respondets in Eurajoki and 15% of respondents in the national sample disagreed. In addition, our own survey and Energy Attitudes survey's figures from 2008 seems to concur with this conclusion (see Figures 12,18-22).

The feeling of safety can be divided into different components. For instance, the time dimension is an important factor in the case of nuclear waste because of the long lived hazardousness of the waste. Above was described mainly through findings of Kurki (1995) and Aho (2008) how the residents perceived living near the disposal site from the contemporary perspective. In our survey we asked the respondents also to assess the threat to future generations. Over half of the respondents perceived explicit threat or high threat over the health of future generations (56%), the safety of future generations (55%) and the well-being of future generations (52%) (Figure 12). We also asked respondents to express their opinion of the statement "Nuclear waste constitutes a constant threat to the life of future generations" also used in other surveys. In three different surveys the figures concerning the perceived continuous threat to future generations was roughly the same. 1) In our survey 58% of the respondents in Eurajoki and 60% in its neighbouring municipalities agreed with the statement. The share of those who disagreed was 24% in Eurajoki and 22% in neighbouring municipalities. 2) The 2007 national survey (Litmanen et al. 2010) indicated further that 64% of Finns agreed with the statement and in Satakunta region 59%. The share of those who disagreed was at the national level 16% and in Satakunta region 12%. Again 3) 2007 data from the nationwide annual Energy Attitudes of the Finns (1983-2008) survey validates the findings as among Finns, as mentioned above, 68% agreed and 15% disagreed with this view. Among respondents of Satakunta region 62% agreed and 23% disagreed. The statement was exactly the same in all of these three surveys.

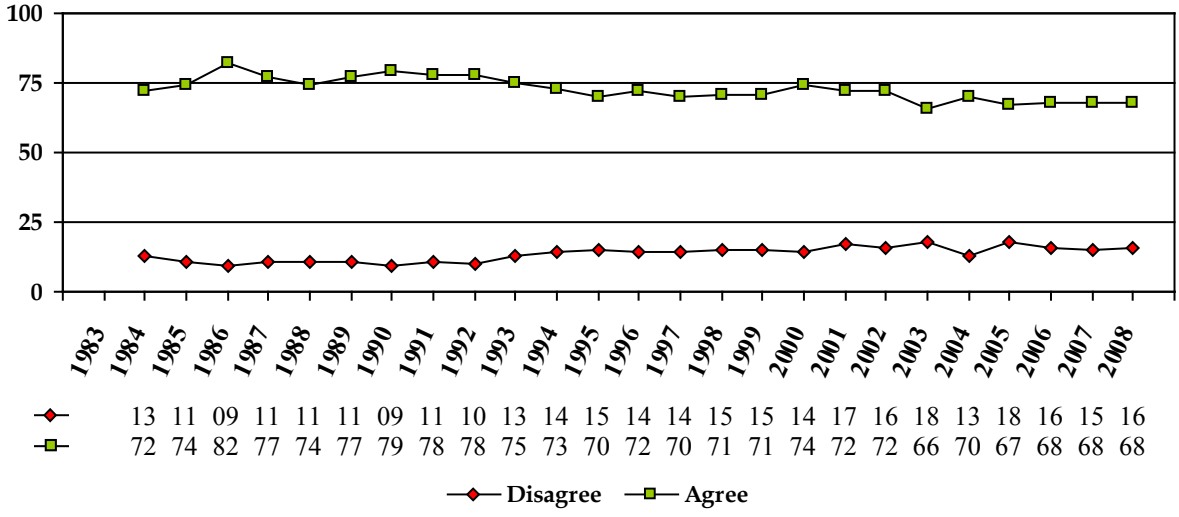

Figure 18.
Finns disagreeing and agreeing with the view that nuclear waste constitutes threat to future generations (%) Based on data from the annual Energy Attitudes of the Finns (1983-2008) study.

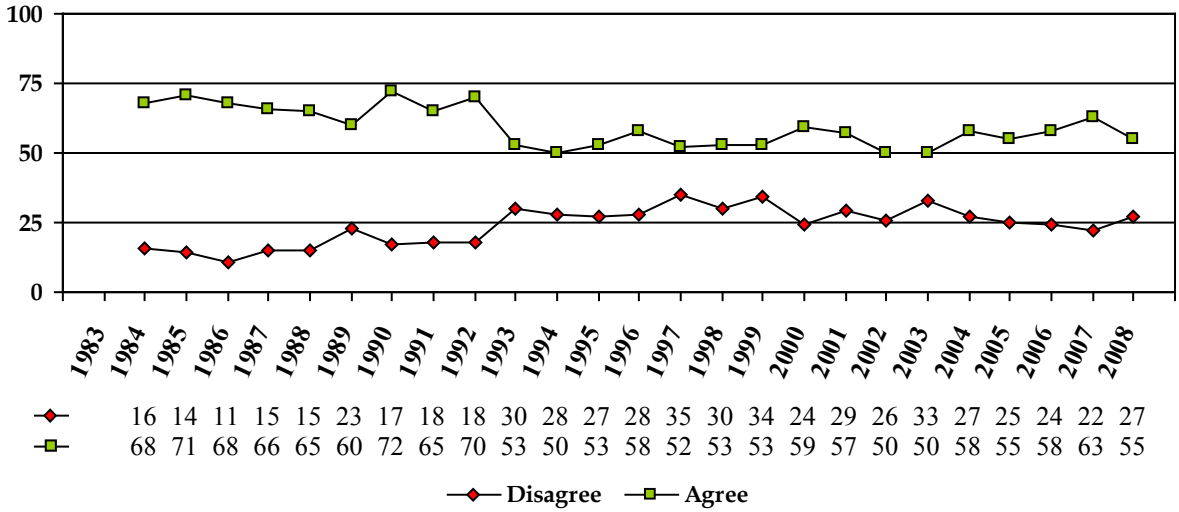

Figure 19.
Residents of Eurajoki disagreeing and agreeing with the view that nuclear waste constitutes threat to future generations (%) Based on data from the annual Energy Attitudes of the Finns (1983-2008) study.

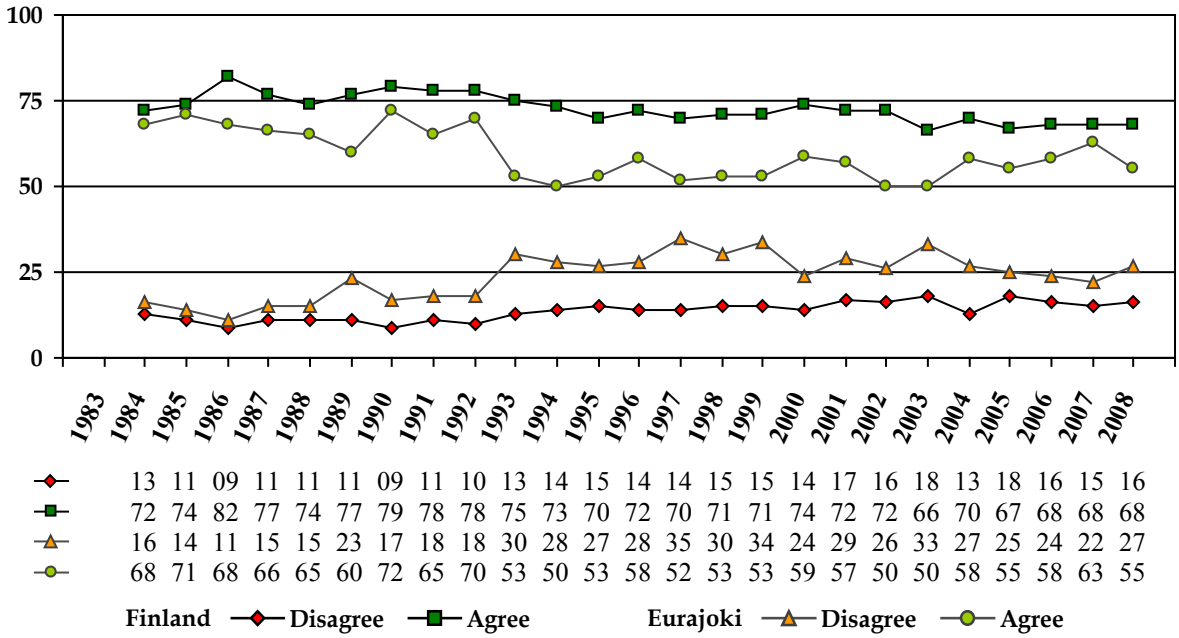

Figure 20.
Those disagreeing and agreeing with the view that nuclear waste constitutes threat to future generations (%). Comparison between Finland and Eurajoki. Based on data from the annual Energy Attitudes of the Finns (1983-2008) study.

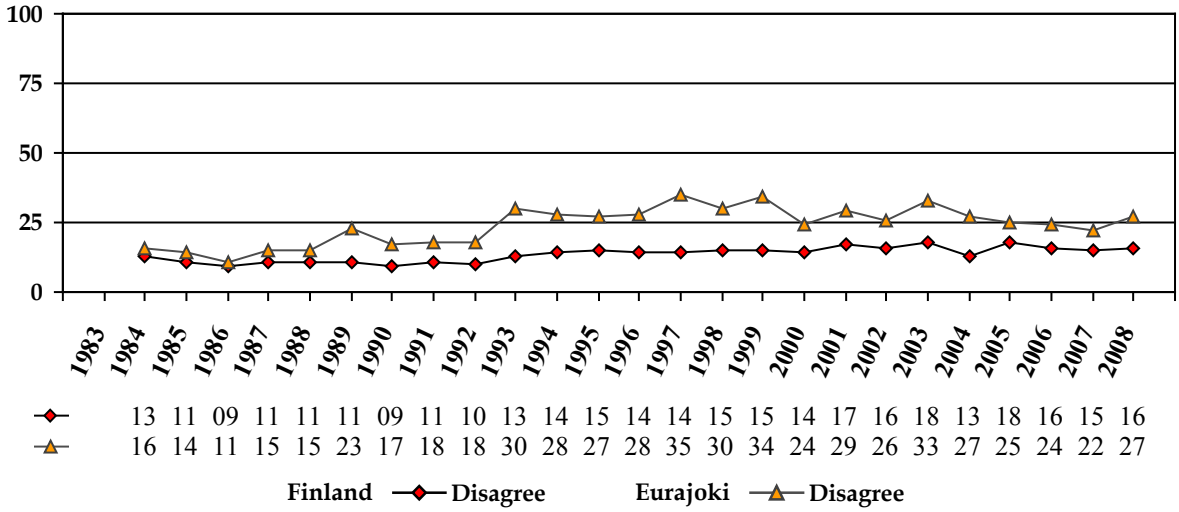

Figure 21.
Those disagreeing with the view that nuclear waste constitutes threat to future generations (%). Comparison between Finland and Eurajoki. Based on data from the annual Energy Attitudes of the Finns (1983-2008) study.

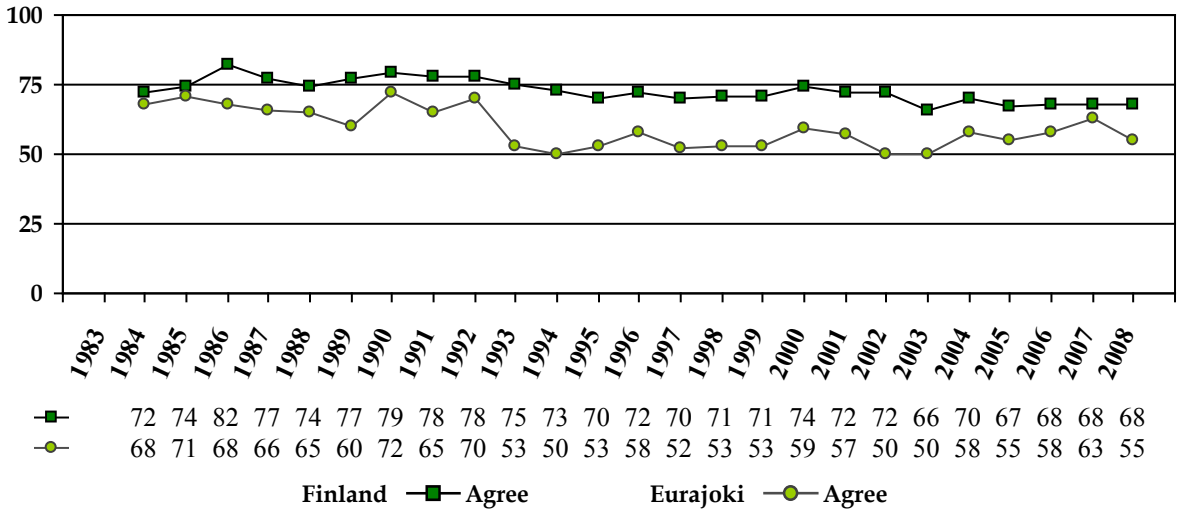

Figure 22.
Those disagreeing with the view that nuclear waste constitutes threat to future generations (%). Comparison between Finland and Eurajoki. Based on data from the annual Energy Attitudes of the Finns (1983-2008) study.

By comparing these Finnish results with the figures of the 2008 Eurobarometer, which focused on public opinions on nuclear waste in 27 European Union Member States, it is clear that there are similarities in the figures, as the report (Eurobarometer 2008, 28) states that

> "…41% of Europeans on average totally agree that there is no safe way of getting rid of high level radioactive waste, while just under a third (31%) tend to agree. Only 14% disagree and a similar share does not know nor has any opinion about it. In Greece, Sweden, France, Germany and Finland around eight in ten respondents

(totally or tend to) agree that there is no safe way of getting rid of high level radioactive waste."

Regarding the deep underground disposal of high level nuclear waste the public opinion seems rather divided in the European Union. When the respondents were asked to evaluate the statement "Deep underground disposal represents the most appropriate solution for long-term management of high level radioactive waste" people from countries with operational nuclear power plants were generally more likely to think that deep underground disposal is the most appropriate solution for long-term management of high level radioactive waste, than people from other countries. In Finland (65% agree, 29% disagree and 6% don't know), Sweden (63%, 23% and 14%) and Hungary (63%, 25% and 12%) this idea gets more support than anywhere else in the EU27 (Eurobarometer 2008, 33.)

6 Acceptance of final disposal and expanding the repository

In the third part of the research the respondents' opinions about final disposal (and in some cases nuclear power) were elicited with several opinion statements. The main theme in this part was to find out how willing or unwilling the respondents were to accept final disposal of SNF.

6.1 Where should domestic SNF be disposed of and whose waste are to be accepted

What we wanted to know was where waste produced by domestic NPPs should be disposed of according to respondents, and if they would be willing to expand the final disposal repository for different actors. The statements used to elicit opinions were: "Nuclear waste produced by TVO and Fortum should be disposed of in Finland", "Nuclear waste produced by TVO and Fortum should be disposed of in Olkiluoto", "I accept expansion of the final disposal repository for the needs of TVO and Fortum", "I accept expansion of the final disposal repository also for the needs of other Finnish actors" and "I accept expansion of the final disposal repository for the purpose of importing SNF from abroad". The respondents were asked to indicate their opinion on a five-step scale from "totally agree" to "totally disagree".

As Figure 23 shows, around half concur (49% agree / totally agree) that nuclear waste produced by current NPP operators TVO and Fortum should be disposed of in Finland. Support for the final disposal decreased by little over 10 percentage points (to 36%) when respondents were asked whether SNF should be disposed of in their vicinity. However, the share of those totally disagreeing or disagreeing with disposal rose only by 8 percentage points (from 30% to 38%), which can hardly be interpreted as serious Not-In-My-Backyard phenomenon (NIMBY[36]). What is obvious, however, is that the acceptance level is noticeably lower when statements refer to the possibility of a repository housing SNF of some other actor than TVO or Fortum, especially if that actor is foreign.

Table 30 shows the percentage share of those respondents who totally disagree with the statements. The results are clearly in line with those presented above, as the share of those totally disagreeing rises considerably when statements refer to the possibility of a repository housing the SNF of some other actor than TVO or Fortum.

[36] See Abbreviations and terms.

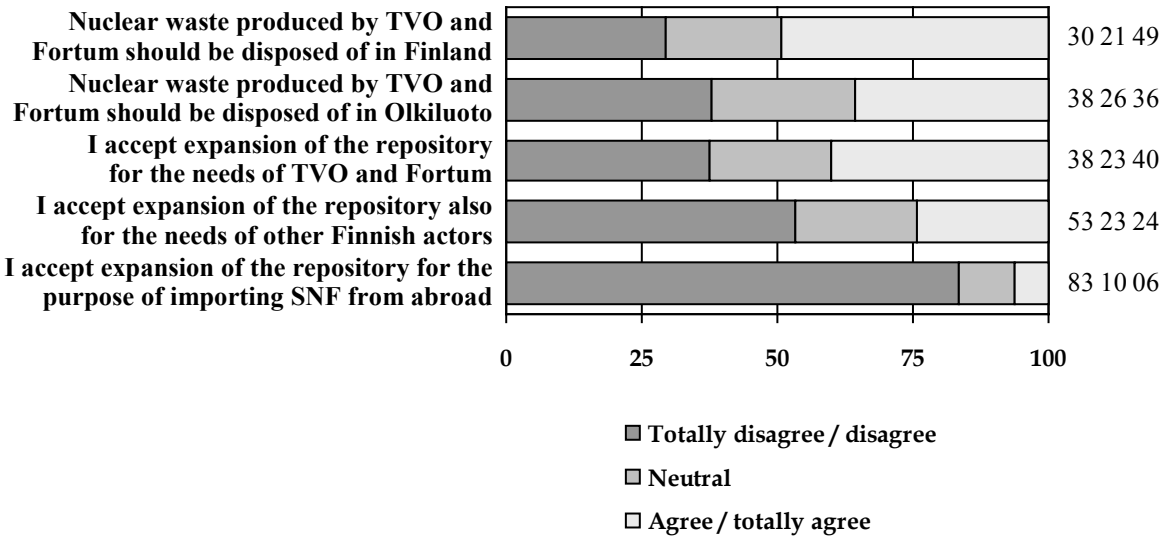

Figure 23.
Those disagreeing and agreeing with certain statements regarding final disposal (%).

Table 30.
Those totally disagreeing with certain statements regarding final disposal (%).

I accept expansion of the repository for the purpose of importing SNF from abroad	73
I accept expansion of the repository also for the needs of other Finnish actors	36
I accept expansion of the repository for the needs of TVO and Fortum	24
Nuclear waste produced by TVO and Fortum should be disposed of in Olkiluoto	23
Nuclear waste produced by TVO and Fortum should be disposed of in Finland	18

Comparison between residents of Eurajoki and residents of neighbouring municipalities (Table 31) revealed that those residing in neighbouring municipalities are more critical ("totally disagree / disagree") towards the final disposal of SNF produced by current actors than those living in Eurajoki. At the same time, however, those residing in neighbouring municipalities are clearly less critical than those living in Eurajoki of other actors than TVO or Fortum.

Table 31.
Those agreeing with certain statements regarding final disposal (%). Comparison between Eurajoki and neighbouring municipalities.

		Totally disagree / disagree	Neutral	Agree / totally agree
Eurajoki	**Nuclear waste produced by TVO and Fortum should be disposed of in Finland**	24	24	52
	Nuclear waste produced by TVO and Fortum should be disposed of in Olkiluoto	36	23	42
	I accept expansion of the repository for the needs of TVO and Fortum	39	19	42
	I accept expansion of the repository also for the needs of other Finnish actors	62	19	20
	I accept expansion of the repository for the purpose of importing SNF from abroad	89	07	05
Neighbours	**Nuclear waste produced by TVO and Fortum should be disposed of in Finland**	34	19	47
	Nuclear waste produced by TVO and Fortum should be disposed of in Olkiluoto	40	29	31
	I accept expansion of the repository for the needs of TVO and Fortum	37	25	39
	I accept expansion of the repository also for the needs of other Finnish actors	48	25	28
	I accept expansion of the repository for the purpose of importing SNF from abroad	79	13	07

When the survey data was examined in relation to other socio-demographic background variables, some statistically highly significant ($p \leq .001$) and statistically significant ($.001 < p \leq .010$) differences were observed.

The difference between men and women was statistically highly significant in all statements, *I accept expansion of the final disposal repository for the needs of TVO and Fortum* (χ^2 (2, N=580) = 28.33, p= .000), *nuclear waste produced by TVO and Fortum should be disposed of in Olkiluoto* (χ^2 (2, N=582) = 25.31, p= .000), *I accept expansion of the final disposal repository also for the needs of other Finnish actors* (χ^2 (2, N=580) = 24.07, p= .000), *I accept expansion of the final disposal repository for the purpose of importing SNF from abroad* (χ^2 (2, N=582) = 18.11, p= .000) and *nuclear waste produced by TVO and Fortum should be disposed of in Finland* (χ^2 (2, N=577) = 14.49, p= .001). In all these cases men reported a larger share of those who agree or totally agree with the statement, than women. Regarding the statement "I accept expansion of the final disposal repository for the needs of TVO and Fortum" 52% of men and 31% of women agreed or totally agreed. Regarding the statement "Nuclear waste produced by TVO and Fortum should be disposed of in Olkiluoto" 46% of men and 26% of women agreed or totally agreed. Regarding the statement "I accept expansion of the final disposal repository also for the needs of other Finnish actors" 33% of men and 16% of women agreed Regarding "I accept expansion of the final disposal repository for the purpose of importing SNF from abroad" 9% of men and 3% of women, and with "Nuclear waste produced by TVO and Fortum should be disposed of in Finland" 58% of men and 42% of women agreed.

There was a statistically significant difference in attitude towards the statements between different generations, regarding the statement *I accept expansion of the final disposal*

repository for the purpose of importing SNF from abroad (χ^2 (12, N=573) = 31.04, p= .002). Those belonging to the rising generation reported the lowest share, 56%, of those totally disagreeing or disagreeing with the statement whereas others reported a substantially higher share, 78% to 88%, of those totally disagreeing or disagreeing. Moreover, in accordance with this, those belonging to the rising generation reported the greatest share of those taking a neutral stance to the statement, 31%, and greatest share of those agreeing or totally agreeing with the statement, 14%. Among other generations share of those taking a neutral stance to the statement was between 3% and 14% and while the share of those agreeing or totally agreeing with the statement among those belonging to the generation of war and depression rose to 10% with other generations share remained between 4% and 8%.

Level of education was related to one statistically highly significant difference concerning attitude towards the statements, regarding the statement *nuclear waste produced by TVO and Fortum should be disposed of in Finland* (χ^2 (10, N=582) = 29.24, p= .001), and one statistically significant difference, regarding the statement *I accept expansion of the final disposal repository also for the needs of other Finnish actors* (χ^2 (10, N=584) = 26.88, p= .003). Regarding the statement "Nuclear waste produced by TVO and Fortum should be disposed of in Finland", those with upper secondary education reported the greatest share of those taking a neutral stance to the statement (41%) and at same time the lowest share of those totally disagreeing or disagreeing with the statement (17%), whereas those with a polytechnic education reported the lowest share of those taking a neutral stance to the statement (8%) and at same time the highest share of those who agree or totally agree with the statement (65%). Regarding the statement, "I accept expansion of the final disposal repository also for the needs of other Finnish actors", again those with a upper secondary school education reported the greatest share of those taking a neutral stance to the statement (50%) and at same time the lowest share of those totally disagreeing or disagreeing with the statement (31%), whereas this time those with college-level education reported the lowest share of those taking a neutral stance to the statement (15%) and at same time the greatest share of those who agree or totally agree with the statement, together with those with university education (30%/30%).

Type of education was related to three statistically significant differences concerning attitude towards the statements, regarding the statements *nuclear waste produced by TVO and Fortum should be disposed of in Finland* (χ^2 (18, N=484) = 39.80, p= .002), *I accept expansion of the final disposal repository for the needs of TVO and Fortum* (χ^2 (18, N=485) = 38.22, p= .004) and *nuclear waste produced by TVO and Fortum should be disposed of in Olkiluoto* (χ^2 (18, N=487) = 38.05, p= .004). Regarding the statement "Nuclear waste produced by TVO and Fortum should be disposed of in Finland", those belonging to the group "other" with not specified type of education reported the greatest share and those with technology and transport as line of education the second greatest share of those agreeing or totally agreeing with the statement (75%/65%), whereas, those with education in health and welfare reported the greatest share of those who totally disagree or disagree with the statement. Regarding the statement "I accept expansion of the final disposal repository for the needs of TVO and Fortum", those with education in services and security reported the greatest share of those agreeing or totally agreeing with the statement (62%) and, as with the previous statement, those with education in technology and transport reported the second greatest share of those agreeing or totally agreeing with the statement (53%). Those with education in education and teaching reported the smallest share of those agreeing or totally agreeing with the statement (19%). Regarding the statement "Nuclear waste produced by TVO and Fortum should be disposed of in Olkiluoto", those with education in technology and transport reported the

greatest share of those who agree or totally agree with the statement (50%) and those with education in health and welfare reported the greatest share of those who totally disagree or disagree with the statement (51%).

There was a statistically significant difference between different socio-economic groups regarding the statement *Nuclear waste produced by TVO and Fortum should be disposed of in Olkiluoto* (χ^2 (16, N=586) = 32.33, p= .009). White-collar workers reported the greatest share of those agreeing or totally agreeing with the statement (50%) and blue-collar workers reported the greatest share of those totally disagreeing or disagreeing with the statement (48%).

There were two statistically highly significant differences between groups with different political affiliations concerning attitude towards the statements *I accept expansion of the final disposal repository for the needs of TVO and Fortum* (χ^2 (20, N=577) = 57.75, p= .000) and *nuclear waste produced by TVO and Fortum should be disposed of in Olkiluoto* (χ^2 (20, N=579) = 45.49, p= .001), and a statistically significant difference in the case of the statement *I accept expansion of the final disposal repository also for the needs of other Finnish actors* (χ^2 (20, N=579) = 41.55, p= .003). With all of these cases those oriented towards the National Coalition Party reported the largest share (65%/57%/49%) and those oriented towards the Finnish Centre Party reported the second largest share (49%/48%/29%) of those who agree or totally agree with the statement, among those oriented towards the parties represented in Parliament.

Personal income was related to three statistically significant differences regarding attitude towards the statements, in case of statements *Nuclear waste produced by TVO and Fortum should be disposed of in Finland* (χ^2 (10, N=517) = 25.78, p= .004), *Nuclear waste produced by TVO and Fortum should be disposed of in Olkiluoto* (χ^2 (10, N=521) = 25.64, p= .004) and *I accept expansion of the final disposal repository also for the needs of other Finnish actors* (χ^2 (10, N=579) = 24.97, p= .005). Regarding the statement "Nuclear waste produced by TVO and Fortum should be disposed of in Finland", three out of five or more of those belonging to income groups earning 30,000 to 39,999 euros a year, 60,000 euros or more a year, or 40,000 to 59,999 euros a year agreed or totally agreed with the statement (60%/62%/70%). The share of those agreeing or totally agreeing with the statement being between 39% and 49% in other income groups. Regarding the statement "Nuclear waste produced by TVO and Fortum should be disposed of in Olkiluoto", the greatest shares of those agreeing or totally agreeing with the statement were found among those earning 60,000 euros or more a year, and 40,000 to 59,999 euros a year (66%/52%) while the share of those agreeing or totally agreeing with the statement within other income groups was considerably lower (26% to 40%). Regarding the statement "I accept expansion of the final disposal repository also for the needs of other Finnish actors", the greatest shares of those agreeing or totally agreeing with the statement were also found among those earning 60,000 euros or more a year, and 40,000 to 59,999 euros a year (55%/34%), the share of those agreeing or totally agreeing with the statement being lower in other income groups (15% to 25%).

6.2 Discussion

The findings of our survey show that nearly half (49%) of the respondents shared the view ("agree / totally agree") that nuclear waste produced by current NPP operators TVO and

Fortum should be disposed of in Finland. But when asked about willingness to accept SNF disposal in their vicinity the figure was 10 percentage points lower (36%) and the share of those people who disagreed or totally disagreed was 38%. (Figure 23.)

Concerning Eurajoki, in 1994 the respondents in Eurajoki considered that Finland has to take care of its own nuclear waste. The share of those who agreed with the statement was 84%, whereas share of those who disagreed was only 6% (Kurki 1995, Fig. 25). In contrast to these figures the acceptance of disposal in the respondents' home community, Eurajoki, was much lower. The size of this so-called NIMBY phenomenon can clearly be seen in the figures produced by Kurki. The share of those who agreed with the statement "Nuclear waste can be disposed of in Finland, but rather somewhere else than in my home domicile" was 28% and the share of those who disagreed was 33%. From these figures we can see how attitudes among the residents of Eurajoki were now divided as nearly the same amount of people would accept and deny the disposal in their vicinity. It is also noteworthy that as many as 39% of respondents neither agreed nor disagreed. (Kurki 1995, Fig. 23)

When this same issue was approached in a slightly different way the figures were somewhat different. The share of those who agreed with statement "Even though the disposal of nuclear waste in the bedrock would be safe, I do not want it in my domicile" was 38% and the share of those who disagreed with the statement was 37% (Kurki 1995, Fig. 47; Table 32). From these figures we can see that the emphasis on the safety of final disposal in statement increased the acceptance among residents of Eurajoki, but it also increased the number of those who would reject the disposal plans. This can be explained by looking at the share of those who did not take sides. Whereas in this case only 26% were neutral (neither agreed nor disagreed) in the previous case of the statement above the share of the same group were as much as 39% (Kurki 1995, Fig. 23 and 47).

Table 32.
Attitudes towards final disposal in Olkiluoto (%). Comparison between different studies.

	Eurajoki 1994 (Kurki)[1]	Eurajoki 2007 (Aho)[2]	Eurajoki 2008 (Our survey)	Neighbours of Eurajoki 2008 (Our survey)	Satakunta 2007 (Litmanen et al.)[3]	Finns 2007 (Litmanen et al.)[3]
Negative	38	34	36	40	24	21
Neutral	26	26	23	29	31	37
Positive	37	40	42	31	45	42

[1] Kurki (1995, Fig. 47).
[2] Aho (2008, 31,77).
[3] Litmanen et al. (2010).

In Table 32 we have gathered figures regarding attitudes towards the final disposal in Olkiluoto. In our survey we posed a statement to the respondents that "Nuclear waste produced by TVO and Fortum should be disposed of in Olkiluoto" and asked them to express their opinion. Interesting to note was that the share of those who agreed with the statement was higher among the respondents in Eurajoki (42%) than among the respondents of neighbouring municipalities (31%). Still the disapproval of the idea was nearly at the same level, in the case of neighbouring municipalities at 40% and in the case of Eurajoki at 36%. Aho (2008, App. 1) asked respondents "what is your own attitude to the final disposal of spent nuclear fuel at Olkiluoto". Respondents could choose their answer on the 5-step scale from

"very negative" to "very positive" with additional option of "I cannot say". Aho's figures came very close to ours even though asking questions and posing statements are somewhat different approaches. The comparison of the figures of the surveys in Table 32 indicate that the opposition towards final disposal in the locality is over one third (varying from 34% to 40%) and the support of the plans is around 40-42% in Eurajoki alone, but in neighbouring municipalities the support is about 10 percentage points weaker (31%).

Comparing these recent findings to the findings of 1994 (Table 32), we see that the number of those supporting and those opposing are almost at the same level. On the ground of this kind of unorthodox comparison one can suggest a preliminary conclusion that the attitude structures are quite enduring. If this, indeed, is the case, then the effects of the DiP in 2001 and earlier the positive decision of the municipality of Eurajoki seem to be minor on the level of acceptance. Besides the formal decision making there has been continuous PR-work to promote the idea of final disposal (see e.g. Kojo 2006). In addition to these there has also been the determined work of Posiva to advance the planning and create more knowledge and understanding for the implementation of the project. And still it seems that these advances in research and planning have not had a major, lasting effect on the acceptance of the project. The findings of the secondary analysis of the Energy Attitudes of the Finns (1983-2008) survey data regarding attitude towards final disposal to one's own municipality (Figures 24-28) indicate that this holds true among the whole population (see e.g. Figure 24) but not necessarily completely in the case of Eurajoki (see e.g. Figure 25). However, the time series stops at the year 2000 so it is hard to say anything certain about the recent developments.

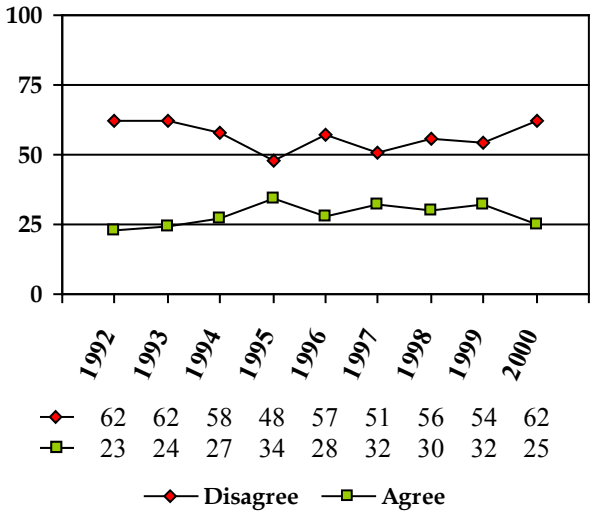

Figure 24.
Finns disagreeing and agreeing with final disposal to one's own municipality if research showed it to be safe (%) Based on data from the annual Energy Attitudes of the Finns (1983-2008) study.

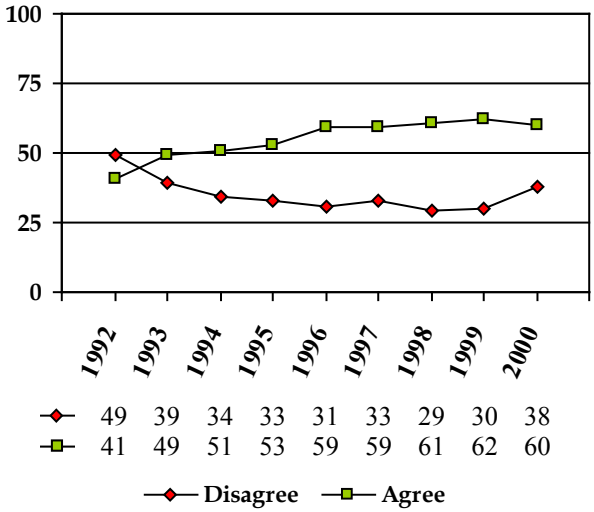

Figure 25.
Residents of Eurajoki disagreeing and agreeing with final disposal to one's own municipality if research showed it to be safe (%) Based on data from the annual Energy Attitudes of the Finns (1983-2008) study.

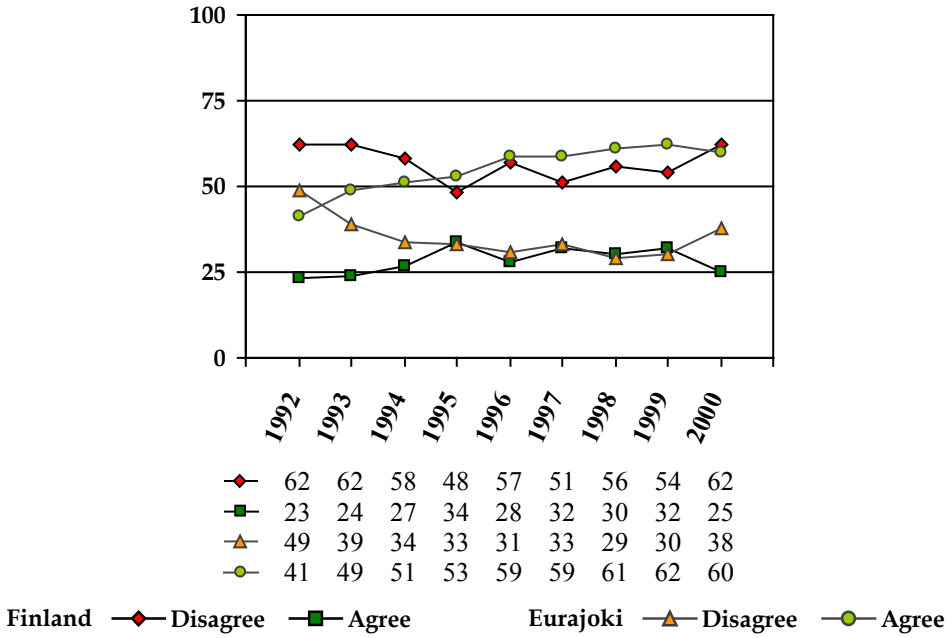

Figure 26.
Those disagreeing and agreeing with final disposal to one's own municipality if research showed it to be safe (%). Comparison between Finland and Eurajoki. Based on data from the annual Energy Attitudes of the Finns (1983-2008) study.

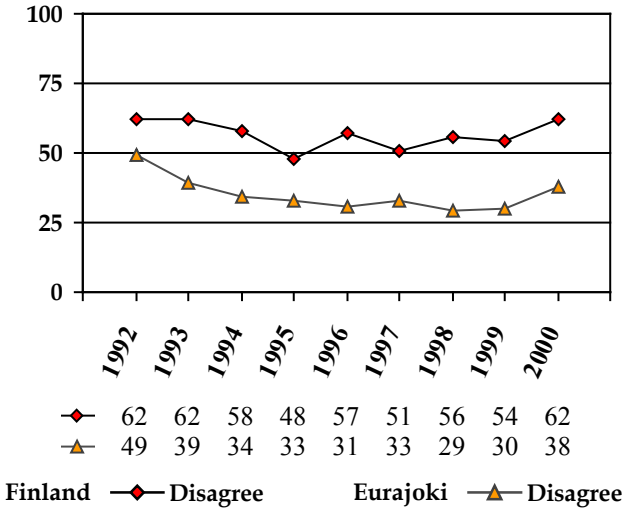

Figure 27.
Those disagreeing with final disposal to one's own municipality if research showed it to be safe (%). Comparison between Finland and Eurajoki. Based on data from the annual Energy Attitudes of the Finns (1983-2008) study.

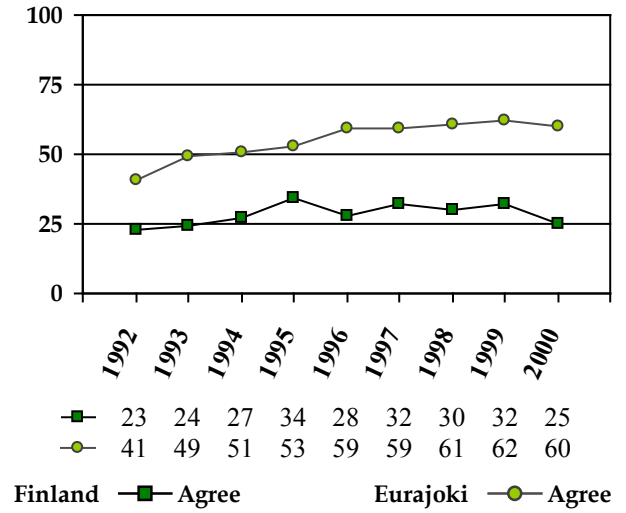

Figure 28.
Those agreeing with final disposal to one's own municipality if research showed it to be safe (%). Comparison between Finland and Eurajoki. Based on data from the annual Energy Attitudes of the Finns (1983-2008) study.

In contrast to the today's local acceptance it is interesting to examine how people in Satakunta region and how Finns generally accept the final disposal of nuclear waste in Olkiluoto. The two last columns in the Table 32 show that the acceptance is nearly at the same level in both of the cases. Among the Finns 42% and among the residents of Satakunta region 45% accept the final disposal in Olkiluoto. The share of those who disagreed with the final disposal was approximately one fifth (Satakunta 24% and Finland 21%). It is noteworthy that in both of these cases the share of those who hesitated or were not able to make their mind was over 30% (Satakunta 31% and Finland 37%). It is especially interesting that there were so many

people who were not able to express their views on the issue. The statement used to elicit opinions in the national survey which produced the figures for Finns and Satakunta region was "Nuclear waste produced in Finland should be disposed of in Olkiluoto" (Litmanen et al. 2010).

Our survey indicated clearly that the present nuclear power companies' additional wastes are more welcome than the newcomers', let alone the case if nuclear waste were to be imported into Finland. Statistically significant results tell that among men the acceptance of different nuclear waste activities tend to be greater than among women.

7 Focus on Eurajoki

7.1 Some frequently used explanation types for attitudes towards final disposal

There is a number of diverse aspects that have to be taken into consideration when trying to understand the rationality of a nuclear community. Here we look at acceptance of expanding the repository among those residing in Eurajoki in relation to the assumptions of six explanation types often used in the research literature when studying the acceptance of different kinds of risks, and especially risks related to nuclear wastes and nuclear power.

This chapter is an abridged version of the authors' article "The rationality of acceptance in a nuclear community: analysing residents' opinions on the expansion of the SNF repository in the municipality of Eurajoki, Finland" published in International Journal of Nuclear Governance, Economy and Ecology (Litmanen, Kojo and Kari 2010).

The problem of nuclear waste has been the Achilles heel of nuclear power for decades. While Europeans stress that there is an urgent need to find a solution to the problem rather than leaving it unsolved for later generations, the vast majority of people also share the view that there is no safe way of disposing of high-level radioactive waste (Eurobarometer 2008, 24; see also OECD 2009). Many countries are currently considering their nuclear power policy and addressing the need to increase the share of nuclear power in electricity production. From this perspective, the societal questions surrounding Finnish nuclear waste management are interesting, as Finland has already reached a decision regarding the actual site of the SNF repository. While many countries are still debating the appropriate means of dealing with their nuclear waste, the nuclear industry in Finland is asking permission to expand its disposal capacity.

The Olkiluoto site in the municipality of Eurajoki was chosen as the site for further investigation in accordance with the Decision in Principle (DiP) of the Finnish Government in 2000. The DiP was ratified by Parliament in May 2001. The local residents have thus lived through the post-site selection phase for nearly one decade and the residents have experienced years of risk communication after the site selection. The original DiP application of Posiva was approved by the local council in 2000, and expansion of the SNF repository has moreover been approved by the local council of the municipality of Eurajoki to date. Expansion of the repository was approved without a vote in connection with the TVO NPP project in December 2008 (one dissenting opinion), and again in August 2009 by 22 votes to 4 in connection with

the Fortum NPP project. According to the Nuclear Energy Act, the local council has the right of veto.

As a theoretical framework, we apply the concept of nuclear community constituted by the municipality of Eurajoki with two operating NPP units and the repository of intermediate and low-level nuclear waste in the Finnish context. Furthermore, a new 1600 MW European Pressurized Reactor and the Underground Rock Characterization Facility which is to be a part of the SNF repository are under construction in Olkiluoto. Eurajoki is defined as a nuclear community as it is a municipality which is economically heavily dependent on and politically interrelated with the operations of the nuclear industry (see more about the case of Eurajoki in Kojo 2009; see also Bergmans et al. 2008). Due to its economic dependency, long history and close cooperation with the nuclear industry, the majority of the population of a nuclear community are more positively disposed towards nuclear power than the general public (Easterling and Kunreuther 1995, 162; Eiser, van der Pligt and Spears 1995; Kiljunen 2007; van der Pligt 1992, 75–89).

Easterling and Kunreuther (1995, 123) identified four factors that determine whether or not an individual opposes or tolerates a proposed repository. The factors are as follows:

1 the extent of risk that the repository appears to impose on the health of nearby residents
2 anticipated impacts on the physical environment and the local economy
3 the degree to which building the repository appears appropriate from the social welfare standpoint
4 the perceived fairness of the siting process

Nevertheless, a favourable view of these factors does not automatically guarantee local acceptance. Krannich, Little and Cramer (1993) concluded in a study of attitudes of rural Nevada residents that responses to the proposed SNF repository appeared to be influenced by a complex set of factors, ranging from the unique sociocultural settings to widely divergent experiences linked to past and present nuclear testing and to cross-generational risk perceptions. Thus, a number of diverse aspects have to be taken into consideration when trying to understand the rationality of a nuclear community.

Instead of focusing on broader societal and political issues, we concentrate on the rationality of the residents of the nuclear community. The local acceptance figures for Eurajoki are analysed in relation to the assumptions of the six explanation types often used in the research literature when studying the acceptance of different kinds of risks.

The first assumption used in analysis is information deficit (e.g. Slovic 1987; Wynne 1995; Desvousges et al. 1993). According to this assumption, opposition to the SNF repository is due to lack of correct information among the local lay people. The second assumption is social trust in the main actors responsible for disposal safety (e.g. Desvousges et al. 1993; Mushkatel, Nigg and Pijawka 1993). In Finnish SNF management, the Radiation and Nuclear Safety Authority (STUK) and the developer Posiva play the key roles with regard to safety issues. The third assumption is the respondent's personal benefit-cost calculation (e.g. Fischhoff et al. 2009). According to conventional compensation theory, "to win the support of a prospective host municipality, the compensation offered has to be large enough to offset the net disutility imposed by the facility" (Frey, Oberholzer-Gee and Eichenberger 1996, 1299). The literature (Vari, Reagan-Cirincione and Mumpower 1994; Jenkins-Smith and Kunreuther 2001; Chung, Kim and Rho 2008; Kojo 2009; Kojo and Richardson 2009) suggests that

economic compensation may play an important role in the siting process. However, one should be aware of disagreement regarding how far the cost-benefit analysis should be extended into the realm of social and political consequences (van der Pligt 1992, 164). There have also been a number of cases where proposals of compensation have caused a bribe effect, resulting in a negative disposition (Frey, Oberholzer-Gee and Eichenberger 1996). The fourth assumption focuses on moral responsibility. The moral and ethical questions regarding SNF issues have been investigated from many perspectives (e.g. Krannich, Little and Cramer 1993; Easterling and Kunreuther 1995; Frostenson 2008). Here, the moral aspect is based on the assumption that the residents of a nuclear community may feel a moral responsibility to manage nuclear waste because a NPP is located in the municipality. The fifth assumption addresses perceived risks and threats. Studies of the perception of nuclear waste risks have revealed that there is a discrepancy between the public's perception of the risks associated with SNF repositories and the view of the experts. The radiation risks are perceived qualitatively differently than other health risks and strong negative cognitive images are associated with nuclear wastes (e.g. Desvousges et al. 1993; Easterling and Kunreuther 1995, 131-132; Slovic 1987; Slovic, Layman and Flynn 1993). The sixth assumption focuses on the attitude to nuclear power. One useful factor in explaining peoples' attitudes toward repository issues is their overall view of nuclear energy (e.g. Dunlap et al. 1993, 147; Desvousges et al. 1993, 206). Given that siting issues are related to other nuclear issues, the acceptance of expanding the final disposal facility is also compared to support for nuclear power.

Expansion statements used in the analysis are **Expansion statement 1**: "I accept the expansion of the final disposal repository for the needs of TVO and Fortum" and **expansion statement 2**: "I accept the expansion of the final disposal repository also for the needs of other Finnish actors".

The relationship between the aforementioned assumptions and expansion statements regarding acceptance of the repository is investigated using correlation analysis. The focus is exclusively on those respondents residing in the municipality of Eurajoki (N=245). The reported correlation coefficients are Kendall's rank correlation coefficients (Kendal's tau-b, $\tau_{Ken,b}$). In cases where multiple variables are used to measure the relationship between assumptions and expansion statements, only the highest correlations are reported. (About used methods see Chapter 3.3.2.)

7.1.1 Information deficit

Respondents' views on whether they had sufficient information on the final disposal project in general were evenly distributed. One third (34%) agreed ("agree / totally agree") with the statement "In my opinion I have enough information regarding the plan for final disposal", one third (33%) disagreed ("totally disagree / disagree") and one third (34%) was neutral. Table 33 shows that there is indeed a correlation between information deficit variables and two expansion statements. Regarding the first expansion statement the greatest correlations are with health effects, effects on everyday life and environmental effects. Regarding the second expansion statement the greatest correlations are with the general safety of SNF and the safety of transport. People needing more information on these issues are less likely to be willing to accept the expansion of repository. However, the correlations in both cases are rather weak and in the case of expansion statement 2 even weaker than in the case of expansion statement 1.

Table 33.
Correlation between information deficit and acceptance of the repository expansion ($\tau_{Ken,b}$).

Stated information deficit regarding…	Acceptance of the expansion for… TVO and Fortum (Expansion statement 1)	Other domestic operators (Expansion statement 2)
General safety of SNF	-.200 (p= .001, N=237)	-.190 (p= .001, N=239)
Safety of transport	-.184 (p= .002, N=236)	-.174 (p= .004, N=237)
Safety of encapsulation	-.228 (p= .000, N=236)	-.155 (p= .010, N=236)
Health effects	-.278 (p= .000, N=238)	-.150 (p= .012, N=238)
Environmental effects	-.236 (p= .000, N=238)	-.157 (p= .009, N=239)
Effects on everyday life	-.242 (p= .000, N=236)	-.157 (p= .008, N=238)
Municipal decision-making		-.156 (p= .009, N=237)
Safety after closure	-.226 (p= .000, N=237)	
Image impact	-.204 (p= .000, N=235)	-.190 (p= .001, N=239)

7.1.2 Social trust

Trust in the nuclear waste management company Posiva is polarized, as exactly the same percentage, 39%, of residents of Eurajoki indicated trust ("agree / totally agree") and distrust ("totally disagree / disagree") when asked to state their opinions on statement "I trust Posiva regarding the risk assessment of the final disposal project". An interesting finding is that trust in the authorities in risk assessment is lower than in the case of Posiva; 32% of respondents stated that they agreed or totally agreed with the statement "I trust the authorities regarding the risk assessment of the final disposal project", with 39% of respondents totally disagreeing or disagreeing with the statement. As Table 34 shows, both expansion statements correlate with trust in both Posiva and the authorities. A fairly strong correlation can be found between trust and expansion statement 1 and a weaker but still noteworthy correlation can be found between trust and expansion statement 2.

Table 34.
Correlation between trust and acceptance of the repository expansion ($\tau_{Ken,b}$).

Trust in…	Acceptance of the expansion for… TVO and Fortum (Expansion statement 1)	Other domestic operators (Expansion statement 2)
Posiva's expertise	.581 (p= .000, N=238)	.333 (p= .000, N=238)
Authorities' expertise	.527 (p= .000, N=240)	.310 (p= .000, N=241)

7.1.3 Benefits and other impacts

Some residents have reservations concerning benefits of the final disposal project in general. Almost half (47%) concur (agree / totally agree) with the statement "The economic benefits of the final disposal of nuclear waste will not compensate the non-economic costs", whereas, around quarter (24%) disagree or totally disagree with the statement. From a slightly different perspective the shares are more evenly divided as 39% disagree or totally disagree with the statement "The benefits of the final disposal of nuclear waste will exceed the costs", while 31% agree or totally agree with the statement. Table 35 indicates how strongly residents'

positive understanding of their own home community correlates with expansion statement 1. Seeing the repository's impact as positive for the area as a place to live, to their own expectations for the future of the area and to the own image of the area clearly relates to increased acceptance of the repository expansion for the needs of TVO and Fortum. With expansion statement 2 this kind of correlation is weaker and the correlation to benefits exceeding the costs relatively stronger. However, even in this case, it can be seen that respondents valued overall benefits over economic benefits. Nevertheless, a negative correlation can be found between the economic statement and expansion statements 1 and 2. If a person considers that the economic benefits do not compensate for other drawbacks, this correlates with opposition to the repository expansion. (Effects of the final disposal facility on regional and municipal economy have been recently assessed for Posiva by Laakso et al. 2007.)

Table 35.
Correlations between certain benefits or impacts and acceptance of the repository expansion ($\tau_{Ken,b}$).

	Acceptance of the expansion for…	
Stated benefit of or impact on…	**TVO and Fortum** (Expansion statement 1)	**Other domestic operators** (Expansion statement 2)
Respondents' own image of their area	.567 (p= .000, N=235)	.394 (p= .000, N=236)
Respondents' own expectations for the future of their area	.582 (p= .000, N=236)	.356 (p= .000, N=237)
Respondents' own satisfaction with the area as a place to live	.592 (p= .000, N=235)	.384 (p= .000, N=236)
Attitude to the statement…		
Economic benefits of final disposal of nuclear waste will not compensate the non-economic costs	-.544 (p= .000, N=235)	-.374 (p= .000, N=236)
Benefits of final disposal of nuclear waste will exceed the costs	.553 (p= .000, N=228)	.415 (p= .000, N=229)

7.1.4 Moral responsibility

One dimension of residents' perceptions of their own municipality's responsibility can be seen in Table 36. Acceptance of the expansion is to some extent more likely to be found among people reporting (agree / totally agree) a moral responsibility to approve the disposal of SNF in Eurajoki because there are NPPs located in Eurajoki. Regarding the extent of agreeing with moral responsibility, 43% of the residents of Eurajoki share the view of a moral obligation, but 33% do not acknowledge a moral responsibility.

Table 36.
Correlation between perceived moral responsibility and acceptance of the repository expansion ($\tau_{Ken,b}$).

	Acceptance of the expansion for…	
Attitude to the statement…	**TVO and Fortum** (Expansion statement 1)	**Other domestic operators** (Expansion statement 2)
The Municipality of Eurajoki has a moral responsibility to approve the disposal of SNF as it has approved the location of NPPs in its area	.498 (p= .000, N=229)	.364 (p= .000, N=230)

7.1.5 Risks / threats

As Table 37 illustrates, the safer individuals perceive the final disposal to be, the more willing they are to accept the repository expansion, and conversely, the more people associate risks with the repository, the greater is the opposition to the idea of the expansion. The correlation between expansion for the needs of other companies and perceived safety is weaker than for the needs of TVO and Fortum. Overall, the majority of respondents, 58%, share the view that "Nuclear waste constitutes a constant threat to the life of future generations", whereas, around one out of four (24%) disagrees or totally disagrees with the statement. Another statement stating that "Nuclear waste can be disposed of safely in the Finnish bedrock" changes the figures such that 42% totally disagree or disagree and 32% agree or totally agree.

Table 37.
Correlations between risks/threats and acceptance of the repository expansion ($\tau_{Ken,b}$).

	Acceptance of the expansion for…	
Perceived risk or threat to…	**TVO and Fortum** (Expansion statement 1)	**Other domestic operators** (Expansion statement 2)
General safety	-.531 (p= .000, N=239)	-.381 (p= .000, N=241)
Own or family's safety	-.502 (p= .000, N=239)	-.345 (p= .000, N=240)
Safety of future generations	-.477 (p= .000, N=239)	-.336 (p= .000, N=240)
Health of future generations	-.504 (p= .000, N=240)	-.338 (p= .000, N=241)
General health	-.480 (p= .000, N=238)	
Attitude to the statement…		
Nuclear waste constitutes a constant threat to the life of future generations	-.544 (p= .000, N=235)	-.374 (p= .000, N=236)
Nuclear waste can be safely disposed of in Finnish bedrock	.553 (p= .000, N=228)	.415 (p= .000, N=229)

7.1.6 Attitude towards nuclear power

There are slightly more of those who disagree with the general idea of constructing more nuclear power facilities than those who agree with the idea as 42% totally disagree or disagree and 37% agree or totally agree with the statement "The construction of more nuclear power in Finland should be allowed". The figures also remain almost the same when respondents are asked more specifically about further construction in the vicinity, although, there is slight increase in those disagreeing (47% totally disagree / disagree, 38% agree / totally agree) with the statement "The fourth NPP unit should be constructed in Olkiluoto". The correlation between the attitude towards nuclear power and the idea of expansion of the repository is shown in Table 38. It indicates how especially the favourable attitude towards the construction of more nuclear power in the respondents' vicinity relates to an increase in the acceptance of the repository expansion for the needs of TVO and Fortum. The correlation between general positive attitude towards nuclear power and acceptance of the expansion for the needs of TVO and Fortum is slightly lower and both nuclear power statements' correlations to expansion for other companies considerably lower.

Table 38.
Correlation between attitude to nuclear power and acceptance of the repository expansion ($\tau_{Ken,b}$).

Attitude to the statement…	Acceptance of the expansion for… TVO and Fortum (Expansion statement 1)	Other domestic operators (Expansion statement 2)
The construction of more nuclear power in Finland should be allowed	.634 (p= .000, N=229)	.382 (p= .000, N=230)
The fourth NPP unit should be constructed in Olkiluoto	.644 (p= .000, N=229)	.418 (p= .000, N=231))

7.1.7 Summary

The survey indicated that less than half (42%) of the residents of the municipality of Eurajoki are willing to accept the expansion of the repository for the needs of the 'older' nuclear operators, TVO and Fortum. The disposal needs of possible newcomers are less tolerated. The assumption that the nuclear community's residents' lack of information on final disposal issues explains their acceptance of or opposition to the expansion of the SNF repository is not very accurate. Although there is a correlation, the correlation is rather weak when compared to the other factors analysed. More explanatory power can be found among the factors of social trust, perceived benefits, perceived risks and, in particular, attitudes to nuclear power. How individuals perceive the moral responsibility of a nuclear community to accept certain new nuclear waste management activities is also closely related. These results reinforce the findings of some other studies (see Dunlap et al. 1993; Slovic, Layman and Flynn 1993) that other factors than knowledge and information about nuclear waste have a more important bearing on the way that the residents of nuclear communities rationalise the acceptability of different nuclear waste activities. Nonetheless, the question of information and knowledge cannot be ignored. As Desvousges et al. (1993) stress, there is a need for two-way communication to enable information flow also from the public in order to create more dialogue. After the early 1990s, nuclear waste management has indeed passed through a ‘participatory turn' in a number of countries (Bergmans et al. 2008).

An intriguing finding is the connection between 'self-respect' or respect for one's own community and acceptance of the expansion. The more that people value the final disposal facility as a positive part of their local district and its future, the more likely they are to accept the expansion for the needs of TVO and Fortum. This finding is in line with the findings of other studies in which the residents of nuclear communities have given more support for the SNF repository siting than residents of other communities. For instance, Krannich, Little and Cramer (1993, 284) indicated that opposition and concern were strongest in the communities farthest from Yucca Mountain, and lowest among those located nearest to the repository site. Even though familiarity with nuclear activities may increase acceptance of a repository siting or expansion of a repository, one must keep in mind that ambivalence towards nuclear waste management will exist among the local population (Dunlap et al. 1993, 166).

In general, if, after cost-benefit analysis an individual draws the conclusion that the disadvantages outweigh the benefits, he or she is more likely to be opposed to the repository expansion. Perceived risks do correlate with acceptance of the repository expansion. Those perceiving SNF disposal as safe are more likely to support the expansion, but those who perceive risks are more likely to reject the idea. These findings concur with those of earlier

studies on the acceptance of repository siting (e.g., Easterling and Kunreuther 1995, 162; Krannich, Little and Cramer 1993, 278). Another curious finding is that a general attitude towards nuclear power has a weaker explanatory power than acceptance of an NPP unit in the vicinity of Eurajoki. We can surmise, therefore, that familiarity with the nuclear industry, as associated with the 'self-respect' of a nuclear community, has considerable explanatory power with respect to such findings.

7.2 A nuclear oasis or something else?

This chapter contains an abridged version of the conference paper "Nuclear oasis or something else? Analysing Eurajoki as nuclear community" (Kari 2009) prepared for the international "Managing Radioactive Waste" conference held in Gothenburg, Sweden, 15-17 December 2009, modified for this report and with some additional information provided.

As a rule, the communities that have gone furthest in considering a final disposal facility for SNF and where the progress in siting has been fastest already have some type of nuclear installation or installations within their areas (NEA 2003, 25). This is also true in the case of Eurajoki. There are two operational NPP units and one NPP unit under construction in Eurajoki and if TVO's application for a new NPP is approved by the Government that would bring yet another NPP unit to the area. Looking at nuclear waste management, there is interim storage for SNF, and also a low and intermediate level radioactive waste repository on the site. Communities like these are usually addressed as 'nuclear communities' or 'nuclear oases', but the Nuclear Energy Agency's (NEA) report (2007, 41) suggests that "[t]hese may be called communities with 'industry awareness'."

Essentially the communities in question are just communities which have nuclear activities in their areas. However, the presence of the nuclear industry is considered to be such a weighty issue that it somehow defines the whole community and so we speak of 'nuclear communities'. It is assumed that nuclear activity is not just something that is going on in the area, but instead being "nuclear" becomes part of the community's identity. In fact, 'nuclear communities' can be characterised as "communities who host nuclear activities and are conscious of their nuclear identity" (NDA 2007, 89). Communities hosting nuclear activity where waste is already stored or produced have a level of familiarity with the subject and knowledge of the benefits, risks and impacts inherent in nuclear facilities.

While it is evident that in communities that host nuclear installations the nuclear industry is somehow an essential part of the community, there are different theories about how a community is influenced by nuclear activity and why there is heightened readiness to accept radioactive waste management facilities in these communities.

The predominant 'nuclear oasis' approach was introduced by Andrew Blowers at the turn of the 1990s. Blowers pointed out that, nuclear waste repositories had been rejected in greenfield locations. He concluded that places that already host existing nuclear facilities are the only places where repositories may be welcome. Making them resemble oases in the desert for the nuclear industry, which is trying to make final disposal projects to survive in hostile surroundings. Although Blowers states that greater readiness to accept repositories may be in some small part due to familiarity with the industry and growth within the nuclear culture, he stresses such aspects as dependency, unequal power relations and the process of peripheralization. Blowers' theory emphasises industry's economic leverage and dependent

workforce, and therefore dependency, as a reason for greater acceptance of SNF repositories in nuclear communities. (Blowers 2002, 72-74; Blowers, Lowry and Solomon 1991; Marshall 2005, 3; Kojo, Kari and Litmanen 2009b, 2.)

The NEA report of 2007, however, promotes exactly the opposite view to that presented by Blowers. The report offers a challenging 'industry awareness' interpretation, claiming that readiness to consider hosting a repository should not be seen as a sign of dependency. Instead, the reason for readiness arises from cultural integration. This means more than mere familiarity. According to the theory presented in the report, those communities with nuclear installations already within their areas have integrated the industrial activity and cognitive understanding into their culture and thus have an existing cultural basis for facility development. The report states that developing joint solutions builds on and adds to that cultural basis. The cognitive understanding mentioned refers to the idea that we tend to interpret issues through schemes we develop in relation to our cultural surroundings. This means, for example, that where others perceive threats, residents of these communities are better equipped to perceive something that solves a problem related to a familiar energy source. From this point of view the SNF facility could even be something to be proud of. (Kojo, Kari and Litmanen 2009b, 2; NEA 2007, 41-42; see also Kojo and Kari 2010.) Thus, the challenging 'industry awareness' interpretation, emphasises close relationships and cultural integration, and therefore shared understanding, as a reason for greater acceptance for SNF repositories in nuclear communities.

Olkiluoto fits the description of 'nuclear oasis' in that the SNF facility was not rejected and there is already nuclear activity in the area. As Eurajoki is also a municipality which is economically heavily dependent on and politically interrelated with the nuclear industry (e.g. Kojo 2009) it clearly has features indicating that it could be categorized as one of the 'nuclear oases'. In fact, the theory has been used in explaining the decision-making in Eurajoki regarding the repository (e.g. Kojo and Richardson 2009; Litmanen 1994). On the other hand the view emphasising unequal power relations and dependency is challenged by a new 'industry awareness' interpretation focusing on the cultural capacity of a municipality to understand and approve nuclear activities (Kojo, Kari and Litmanen 2009b, 2). The development of a close partnership between the industry and the municipality since the late 1990s (e.g. Kojo 2009.) suggests that Eurajoki may be, or may be moving towards being a 'community with industrial awareness'.

Our aim here is to examine how well the term nuclear oasis actually fits Eurajoki in the light of the survey, what indications there are of features that would fit the challenging industry awareness interpretation and what insights in general the views of the local residents bring to the discussion. As in the Chapter 7.1 the focus of the analysis is exclusively on those respondents residing in the municipality of Eurajoki (N=245) and the reported correlation coefficients are Kendall's rank correlation coefficients (Kendal's tau-b, $\tau_{Ken,b}$). (About used methods see Chapter 3.3.2.)

7.2.1 Analysis

As it was seen in Chapter 6.1 (Table 31), over half, 52%, of the residents of Eurajoki agree or totally agree that the SNF of TVO and Fortum should be disposed of in Finland. When asked about disposal in their home community support decreases only 10 percentage points; 42% of the residents agree or totally agree that the SNF of TVO and Fortum should be disposed of in Olkiluoto. Even though support decreases, the acceptance of final disposal to Olkiluoto is

quite strong, and it can be concluded that according to the survey there really is no substantial NIMBY phenomenon to speak of in the community. Regarding the enlargement of the repository, exactly the same proportion of residents (42%) that accept (agree / totally agree) with final disposal in the area of their home community is also ready to accept expanding the repository for the needs of the current actors TVO and Fortum. However, attitudes start to change when people are asked about other actors. Around three out of five (62%) are not ready (totally disagree / disagree) and one out of five (20%) is ready (agree / totally agree) to accept the expansion of the repository for possible other Finnish actors, and the idea of importing SNF to Olkiluoto is very firmly rejected as 89% of residents totally disagree or disagree with it. (See also Kojo, Kari and Litmanen 2009b.)

These results show that we should at least consider other than purely economic reasons for acceptance of final disposal. For example, accepting imported SNF could bring very substantial economic benefits to the community but it is nevertheless clearly not accepted. When acceptance of possible other domestic actors is also much lower than current actors, it can be deduced that being already present in the community somehow affects the acceptability of final disposal. However, Blowers specifically mentions workforce issues in connection with the leverage that the nuclear industry has over the community. This could explain why those operators already within the community are better accepted. That, however, means that the perceived impacts of the repository on employment would have to be very closely related to acceptance of the disposal of SNF produced by TVO and Fortum at Olkiluoto. In one sense this also seems to be the case. In the survey respondents were asked about how constructing the final disposal facility in the area in their opinion would impact on certain issues (see Chapter 5.1). When the relation of the repository's perceived impacts on employment in the area and acceptance of the disposal of SNF produced by TVO and Fortum to Olkiluoto is analysed it is clear that these things do indeed correlate and the correlation is statistically highly significant ($\tau_{Ken,b}$ =.274, p= .000, N=235) On the other hand, this result appears in a totally different light when put to context and it is pointed out that respondents were presented with 20 different issues regarding repository's impacts, and regardless of the statistically highly significant correlation observed, among 20 different impact – acceptance correlations examined in relation to acceptance of the disposal of SNF produced by TVO and Fortum at Olkiluoto, this correlation was only the 15th strongest (Table 39.)

Table 39.
Correlations between certain impacts named in the survey and attitude towards the statement "Nuclear waste produced by TVO and Fortum should be disposed of in Olkiluoto" in order of the strength of correlation ($\tau_{Ken,b}$).

	Perceived impact to…	Correlation to the statement
1	**Own image of Eurajoki in particular**	.455 (p= .000, N=237)
2	**Own satisfaction with the area as a place to live**	.442 (p = .000, N=234)
3	**Own expectations for the future in the area**	.424 (p= .000, N=236)
4	**Own image of their area**	.421 (p= .000, N=235)
5	**Functioning environment / atmosphere in the area**	.414 (p= .000, N=234)
…		
11	**Economic development in the area**	.302 (p= .000, N=236)
…		
15	**Employment in the area**	.274 (p= .000, N=235)
…		

In addition, respondents were also asked about their information needs in 13 different issues related to final disposal (Chapter 4.4). Presented issues did not cover employment in particular, but respondents were asked more generally about the information needs relating to economic impacts. The respondents did not, however, indicate any special interest in economic issues. The number of those reporting great need for information on the economic impacts of final disposal was fairly high (45%), but again this should be put into context. When asked about information needs related to final disposal, need for information about economic impacts was second lowest of 13 issues presented in the survey (for the greatest needs see Table 20).

We can conclude that in the analysis, some issues were found that did not support the notion of economic issues and dependency of workforce being central to the acceptance of SNF disposal, as Blowers essentially asserts. In light of Table 31, on other hand, it is quite reasonable to suggest that a close relationship between the community and those actors currently operating in the area could have a positive effect on the acceptance of disposal, which in turn is what the industry awareness theory essentially claims. But is there anything else in the survey data that supports the challenging interpretation?

The notion of industry awareness is based on a close relationship which involves sharing and integration. These are things that need trust, so residents of the community should demonstrate this, a serious imbalance in the power relations could also manifest as lack of trust. This means that if the industry awareness approach is right, trust should be closely related to acceptance of the disposal of SNF produced by TVO and Fortum in Olkiluoto. According to the correlation analysis trust and acceptance of final disposal are indeed related, and the correlation is statistically highly significant ($\tau_{Ken,b}$ =.443, p= .000, N=236). When we put that into context we can see that the correlation in this case is clearly higher than the correlation in the case of perceived impact on employment mentioned earlier. (In fact comparing this trust – acceptance correlation to the greatest impact – acceptance correlations in Table 39 reveals that this correlation strength would have earned second place in the list.) In addition, no overwhelming lack of trust was observed as the same proportion (39%) of respondents agree or totally agree and totally disagree or disagree with the statement "I trust Posiva regarding the risk assessment of the final disposal project" as already mentioned in Chapter 7.1.2.

Of course if building the repository really is, as the industry awareness approach presumes, seen as the development of a joint solution to existing nuclear activities and if it builds on the existing cultural basis, this means that final disposal and its effects should be seen somehow as part of the whole package (which comes with being "nuclear") rather than an independent project. In the survey this theme was approached by asking respondents' opinions about how difficult it is to estimate the effects of final disposal as a whole, apart from other nuclear activities. Around half, 49%, found it either very difficult (21%) or difficult (29%) to distinguish final disposal from other nuclear activities and around one in four, 26%, found it either easy (18%) or very easy (8%). In other words, it does indeed appear that it is not very easy for residents of Eurajoki to distinguish final disposal from existing activities, instead, the final disposal project seems to blend in with other ongoing projects.

7.2.2 Summary

Analysis of the survey indicated that there are some reasons to take a critical stance towards the predominant 'nuclear oases' approach, which emphasises economic leverage and dependent workforce, and therefore dependency, as a reason for greater acceptance of SNF repositories in nuclear communities. The results demonstrated that in Eurajoki the SNF of new nuclear waste management actors are not as welcome as the SNF of those actors already operating in the community, even though it is quite clear that this could mean new economic benefits. The data also demonstrated that the relation of perceived impacts to employment and acceptance of the disposal of SNF was clear, but not as strong as could have been expected, as the relation was not among the strongest compared to other impact – acceptance relations observed in the survey. Moreover, residents of Eurajoki did not feel any special need for information about the economic impacts of the repository as information need on this issue was the second lowest information need of those presented in the survey

If residents of Eurajoki thought that their community is economically dependent or that the community's workforce is dependent on the nuclear industry to the extent that the community is relatively powerless or subject to economic risk, it would make sense that they would be very tempted by possible new economic opportunities which new nuclear waste management actors could possibly offer. It would also make sense that residents would be very interested in getting information about the economic impacts of the repository and that repository's impact on employment would have a fundamental effect on the acceptance of a repository. Because this was not the case in Eurajoki, the results imply that we should also consider other explanations than those offered by 'nuclear oases' theory for the heightened readiness to accept an SNF repository in Eurajoki and also in other communities that already have nuclear facilities.

Analysis of the survey also suggested that the 'industry awareness' approach emphasizing close relationships and cultural integration and therefore shared understanding, as reasons for greater acceptance for SNF repositories in nuclear communities, could indeed be a viable option or addition to the 'nuclear oases' approach. The results demonstrated that if an nuclear waste management actor is already present in the community then residents are more willing to accept final disposal of that actor's SNF, but willingness does not readily extend to other actors within the industry. It was also concluded that trust and acceptance of final disposal are related and that the relation is considerably stronger than that between impacts on employment and acceptance of disposal and in same range as the strongest of the impact – acceptance relations mentioned earlier. And last but not least it was shown that the final disposal project seems to blend in with other ongoing nuclear activities.

All these results fit the challenging 'industry awareness' interpretation. Being present in some form is of course a prerequisite for a relationship. To establish such a relationship that it involves shared understanding or integration into cultural basis of the community, as the theory implies, the presence would have to be very significant indeed. It is consistent with the 'industry awareness' interpretation that this kind of relationship could be formed with certain actor(s) present within the community without it spreading to the industry as a whole. Trust on the other hand is both a prerequisite and outcome of shared understanding and easily damaged if one party thinks that the other is using unequal power relations to its advantage. This means that the connection identified between trust and acceptance of the final disposal of the SNF and quite high support for the notion that the SNF of nuclear waste management actors currently present within community should be disposed in Olkiluoto is more consistent

with the 'industry awareness' interpretation than the 'nuclear oases' interpretation. The most telling of results, however, is that the final disposal project seems to blend in with other ongoing nuclear activities, for this should indeed somehow be the case if the final disposal project is built on and adds to the existing cultural basis and cognitive understanding and is therefore part of the ongoing process within the community.

All in all, the results imply that we should consider 'industry awareness' as an explanatory model when examining the acceptance of the disposal of SNF in nuclear communities. What has to be remembered, however, is that the survey involved residents of the community not its decision-makers, to whom economic considerations may be more tangible. Nevertheless, regarding the what comes to cultural basis, the decision-makers of community share the same cultural base as the rest of the community, which, according to the 'industry awareness' theory, through cognitive understanding integrated into the culture, would make some decisions culturally more viable than others.

8 Conclusions

The main objectives of the SEURA research project behind this report were to study residents' opinions in the municipality of Eurajoki and its neighbouring municipalities regarding the socio-economic and socio-political impacts of the final disposal facility and information needs and ways of obtaining information regarding the plan for final disposal. In this report we have presented the results of the 2008 survey compared those of other surveys and, in addition, in Chapter 7 also examined some possible explanations for attitudes towards final disposal. We conclude by characterizing the opinions from the point of view of the developments of the last decades and returning to the themes of research project by examining the rationality of nuclear community and taking a look at information issues.

8.1 Mounting confidence about safety

First, let us consider how Finnish attitudes to nuclear waste have developed over the years and how Finns perceive these issues in the European context. Local people's attitudes can be related to a long-term trend in general trust in the safety of the Finnish nuclear waste management model. Our secondary analysis of data gathered for the annual Finnish energy attitudes study showed that in Finland the confidence in the safety of final disposal has grown very slowly over the last 25 years. The magnitude of the shift was from one fifth to one fourth when the respondents were asked about disagreeing and agreeing with the view that final disposal in the Finnish bedrock is safe (Figure 2).

Examination of the time-series revealed four phases regarding the share of those confident about the safety of nuclear waste management: 1) 1983–86 around 15% were confident, 2) 1987–93 around 20%, 3) 1994–2000 confidence fluctuated between 25% and 30%, and 4) 2001–08 confidence stabilised around 30%. At the same time the share of sceptics, those dubious about the safety, decreased. The analysis indicated that this time series also had four phases: 1) 1983–86 ever so slightly increasing scepticism from 57% to 63%, 2) 1987–93 generally decreasing trend down to 46%, 3) 1994–2000 scepticism fluctuated between 45% and 54%, and 4) 2001–08 scepticism stabilised to around 45%. In the European context according to Eurobarometer (2007, 29; see also Chapter 2.2) confidence in the safety of the disposal of radioactive waste among Finns is on the average level at 45% (see Figure 3), not at all on such a high level as one might have supposed on the basis of other nuclear power attitudes. After all, according to Eurobarometer (2007, 25) 77% of the Finns thought that it was possible to operate NPPs safely.

The comparison of several surveys in Chapter 6.2 revealed that among the Finnish general public there was less opposition to the plans for final disposal than at the local level. Both in Eurajoki and its neighbouring municipalities the plan for final disposal in Olkiluoto was opposed by over one third (between 34% and 40%) of the residents. It is interesting that the support for final disposal in the near vicinity, in the municipality of Eurajoki, was stronger than in neighbouring municipalities. In Eurajoki around 40% of respondents were in favour of the project, but in the neighbouring municipalities the share of those in favour was around 10 percent units lower. The obvious explanation is that the nuclear waste management company has long mostly focused its co-operation, communication and public relation activities on stakeholders in Eurajoki. Furthermore, support indicates that the company has managed to some extent to persuade the residents of Eurajoki to host the repository. However, even in Eurajoki there is a clear difference between the local political elite and the residents. The local councillors are more in favour of the project than the residents of Eurajoki. For example, in 2009 only four local councillors out of 27 voted against the expansion of the repository. Thus only 15% of local councillors opposed whereas according to our study 39% of local residents were against the expansion.

8.2 Rationality of nuclear community and social cleavage

The first main objective of the SEURA research project was to study residents' opinions in Eurajoki and its neighbouring municipalities regarding the socio-economic and socio-political impacts of the final disposal of spent nuclear fuel. Roughly speaking, what we found out was that even though the majority of people tend to assess socio-economic impacts as positive nuclear waste has created quite a remarkable social cleavage in the area.

In Chapter 7 we discussed two competing approaches to interpret the rationality of a nuclear community. The nuclear oasis approach suggests that local acceptance is based on the heavy economic dependence of a small, peripheral municipality on the powerful nuclear industry. The challenging industry awareness approach interprets the readiness to accept the siting of a SNF disposal repository from the perspective of cultural adaptation. The community and its residents have close relations to the nuclear industry, which produces cultural adaptation, integration and understanding of nuclear activities. A result of this closeness, partnership and coexistence is a greater acceptance of the for industry's aspirations among the residents of the nuclear community. Even though the data was not originally planned to test these approaches, the analysis yielded some interesting findings. For instance, those residents of Eurajoki who perceived the impacts of the repository to be positive for the general socio-cultural development of the municipality were more willing to accept an SNF repository in Olkiluoto. The importance of the economic and employment considerations behind the acceptance were identified, but these factors were not as strongly correlated with acceptance as other general socio-cultural satisfaction factors. Such findings speak on behalf of the industry awareness approach.

However, the picture is more complicated. According to our findings, there was both trust (39% of respondents) and distrust (39%) among the residents of Eurajoki on Posiva's expertise on nuclear waste management (Chapter 7.1.2). The time-series analysed in Chapter 2 revealed that the long-term presence of nuclear industry in the locality together with national nuclear waste policy had increased the share of those who are confident that disposal of into the bedrock is safe. As noted above, at the national level the development of trust in

general safety of nuclear waste management has been fairly linear and coherent, but at the local level the development is more fluctuating than linear. Therefore one cannot conclude that the dominant perspective among the residents is the cultural integration of nuclear industry in community. The residents' cultural adaptation to the nuclear industry is neither harmoniously advanced nor homogenously dispersed.

For instance, in our survey the general picture in socio-economic issues at the local level was ambivalent. Residents did indeed acknowledge the economic benefits of the project for the municipality, but they also voiced doubts that it may have some negative effects. On the one hand residents of the area estimated the effects of the repository to be positive in economic and community development issues. The majority of the respondents perceived positive impacts on employment in the area (63% "somewhat positive / positive") and economic development in the area (61%) and many also on issues pertaining to infrastructure (e.g. traffic connections in the area, 41%). On the other hand people were concerned over the negative effects of the final disposal facility. Over half of the residents perceived the effects to be negative or somewhat negative on issues such as the state of nature surrounding the final disposal facility (54%), rural non-farm livelihoods (52%) and outsiders' image of the area (52%) and over one third also on issues such as own image of the area (40%) and recreational opportunities in the area (39%). (Chapter 5.1.)

Indeed, it would be more accurate to conclude that both perspectives, the nuclear oasis and industry awareness, are correct, because the analysis of the data revealed that there is a latent social cleavage in the area. To call this cleavage latent means that there is a hidden division or dividing line of society into two factions or groups among which conflict potentially exists (see Choe 2003, 7). For instance, a more detailed study to identify those perceiving certain issues positively and negatively reveals a discrepancy between women and men. In issues such as 1) state of nature surrounding the final disposal facility, 2) own image of the area, 3) own image of Eurajoki in particular, 4) own satisfaction with the area as a place to live, 5) own expectations for the future in the area, 6) functioning environment / atmosphere in the area, 7) development of the area generally, 8) development of the education sector in the area, 9) rural non-farm livelihoods, 10) farming and forestry: a bigger share of women than men perceived the effects to be negative. The converse is also true i.e., more men than women perceive the effects of the repository to be positive. (Chapter 5.1.)

This social cleavage could also be found in the local political life. Quite often supporters of the National Coalition Party and the Centre Party of Finland shared the view that an SNF repository would have a positive effect on the socio-economic development of the area. Among the supporters of the National Coalition Party the repository project was most welcome, whereas among the supporters of the Centre Party there was also hesitation about the positive socio-economic effects. Nevertheless, among the supporters of these two parties one will most likely find positive attitudes. In some cases the supporters of the Social Democratic Party also agreed with the supporters of these first two parties. The orientation towards the Green League and the Christian Democrats is likely to predict more negative attitude towards social-economic effects of the repository. It is likely that the supporters of the Left Alliance are wavering between these two extreme positions. The findings suggest that those who have the most positive attitudes towards the effects are most likely supporters of the National Coalition Party and the Centre Party and in some cases also supporters of the Social Democratic Party. Negative attitudes are most likely found among the supporters of the Green League and the Christian Democrats. (Chapter 5.1.) These findings are also in line with

those of a survey among local policy-makers of candidate sites in the late 1990s (Ponnikas 2000, 37–39).

The analysis of the data also indicates that the attitudes of affluent people and more disadvantaged people can be quite extreme. For instance, in the cases of 1) own image of Eurajoki in particular and 2) own image of the area and 3) state of nature surrounding the final disposal facility this can be found (Chapter 5.1). Those with higher incomes tend to see the impacts of the repository to be more positive than those with lower incomes. This is also the case in assessing risks and acceptance of the project. For instance, in the cases of 1) health of future generations, 2) safety of future generations, 3) own or family's well-being, 4) own or family's health and 5) general well-being the perception of risk was the lowest among the two highest income groups (Chapter 5.2). People with higher incomes seem to deny or tolerate the risks of nuclear waste disposal or in some cases hesitate about the risks. These findings correlate with the findings of acceptance. People with higher incomes accept the disposal more easily than people with lower incomes. In the cases of statements 1) "Nuclear waste produced by TVO and Fortum should be disposed of in Finland", 2) "Nuclear waste produced by TVO and Fortum should be disposed of in Olkiluoto" and 3) "I accept expansion of the repository also for the needs of other Finnish actors" more people belonging to the highest income groups expressed acceptance than people with lower incomes (Chapter 6.1).

This kind of social cleavage can certainly cause tensions inside the communities. It is difficult to know in what kind of situations this discord can manifest itself or if it is an issue which people prefer to "forget" in everyday interaction in order to maintain social cohesion and avoid social division. One might assume that incongruities like these can bring tension, for instance, to different social formations, such as families, workplaces, associations and clubs, where both women and men act and take part. It would be an interesting, new research theme to study this tension more, for instance, using qualitative methods. Are these differences of opinion discussed in everyday life and when? Are they causing any problems in running things? How are the families handling conflicting views in order to be able to live a normal, harmonious life? This social cleavage is certainly dividing people in small communities, but one has to remember that it has not raised any single issue social groups with this kind of collective identity. A local anti-nuclear group was organized last time in Eurajoki in 2000–2001 (see Kojo 2004, 236–237). Another kind of social division is documented at the European level. Among the Europeans the strongest socio-demographic factors predicting certain attitudes towards nuclear energy are gender and level of education. A more positive attitude towards nuclear energy is found among males and those with a high level of education (Eurobarometer 2007, 59).

Because the Finnish nuclear policy is currently at a state of flux, we asked the respondents about their willingness to accept the expansion of the repository not only for the new needs of established nuclear operators, TVO and Fortum, but also for the needs of possible newcomers.[37] Less than a half (40%) of the respondents (42% of the respondents in Eurajoki) were willing to accept expansion for the needs of TVO and Fortum, but newcomers were less well tolerated. When studying the willingness to accept the expansion of the repository, it was found that the more people value the final disposal facility as a positive part of the general wellbeing of their local district and its future, the more likely they are to accept the expansion for the needs of TVO and Fortum. This may even mean that among the residents there are

[37] In May 2010 the Government took a decision-in-principle in favour of the NPP of the new nuclear power company Fennovoima. The decision was ratified by Parliament in July 2010.

people, who think that different kinds of nuclear activities are part of their community and its identity and are proud of them.

Kojo and Kari (2010) have further elaborated this finding arguing that the municipality of Eurajoki is entering a new phase in the nuclear community life-cycle. The relationship of the nuclear community and nuclear industry no longer seems to be defined through dependence, but instead through co-operation and added value for the contracting parties. Thus the once firmly rejected siting of the SNF repository is turning, at least partly, into a project of local pride. However, Kojo and Kari emphasize that a split in attitudes towards the siting of the SNF repository also has to be acknowledged as clearly not all residents view the repository with pride. Also, one has to keep in mind that not all nuclear operators are equally well tolerated. The findings suggest that the present owners of Posiva are

> "…perhaps already part of the local culture and, thus, more readily regarded as a subject of local pride, whereas a newcomer is evaluated initially in terms of possible benefits. The outsider needs to earn its place and respect in the eyes of the local residents." (Kojo and Kari 2010, 12).

The newcomers are much less readily accepted than established actors. (Kojo and Kari 2010, 12)

8.3 Information issues

The second main objective of the SEURA research project was to study residents' opinions in the municipality of Eurajoki and its neighbouring municipalities regarding information needs and ways of obtaining information regarding the final disposal. To summarize the findings concerning this second research task one could say that both the Finnish Radiation and Safety Authority (STUK) and the nuclear industry have succeeded in establishing a fairly trusted position as an information provider in the localities, but among the recipients of the information the very same social division as explained in Chapter 8.2 can be seen. This means that there are also local people who do not have confidence in these actors as sources of information.

The analysis of the information channels used and the satisfaction with the quantity of and confidence in the information provided by different actors (Chapter 4) revealed several interesting things. First, the nuclear industries' own information dissemination and briefing is both recognized and consulted actively by the local people even though the most important information channels are newspapers and television. To characterize those who are the readers of the nuclear industry's information leaflets, one can draw a caricature: affluent middle-aged or older males supporting the National Coalition Party or the Centre Party. Those who do not tend to consult these information channels seem to belong to following groups: youngest generations, small incomes, unemployed or doing domestic work, and supporters of the Green League and the Christian Democrats. (Chapter 4.1; see also Chapter 4.5.)

Second, both Internet and public meetings are not very much used ways of getting information about nuclear waste management. Even though the Internet is not so much used, there is variation in the population. Particularly younger generations and also people with lowest and highest incomes seem to use the Internet more as an information source. The most common ways of using the Internet, among the ways mentioned in the questionnaire, were

visiting the pages of the municipality of Eurajoki, the pages of the industry and the pages of the authorities, but it was also used in debating and changing opinions. (Chapter 4.1.) Regarding public meetings, these used to gather people, but there has been a decreasing trend of active participation in public meetings at the local level (see e.g., Säynässalo and Borg 1992; Hokkanen 2007; Nurmi, Kojo and Litmanen 2009). A similar phenomenon can also be seen in our figures. This type of active participation in public debate seems to have changed to perhaps a more passive observation of the developments and also towards occasional change of opinions in the Internet.

In general the respondents tend to be fairly satisfied with the quantity of information provided by Posiva, TVO, Fortum, and STUK. On the other hand, the respondents were dissatisfied with the quantity of information provided by the political parties. (Chapter 4.2.) Regarding confidence in the information provided (Chapter 4.3) the greatest satisfaction was felt with information provided by STUK (43% satisfied/ highly satisfied), Posiva (32%), research institutes (31 %), TVO and Fortum (30 %), and universities (28%). Most dissatisfaction was felt regarding confidence in information provided by the political parties (58% highly dissatisfied/dissatisfied), NGOs (47%), other ministries than the MTI/MEE (41%), local authorities (39%) and the MTI/MEE (35%). Still, the general picture is more complex when we ask who are satisfied and who are not. For instance, among men more satisfaction is felt with information provided by Posiva and nuclear power companies than among women, as women tend to be more dissatisfied regarding confidence in information provided by these actors. Among different socio-economic groups those who are most satisfied regarding confidence in information provided by TVO and Fortum and also Posiva are white-collar workers and self-employed/employers. Least satisfied with information provided by these two nuclear power companies are unemployed people, those staying at home doing domestic work and farmers. Among the highest income groups (earning 60,000 euros a year or more) there was satisfaction with the information provided with TVO and Fortum, MTI/MEE and Posiva. Those with the smallest incomes gave a completely different answer. They were dissatisfied with the information of these actors. (Chapter 4.3.)

From the perspective of the development of nuclear waste management Eurajoki is in what we call "the post site selection phase". The site selection process started in Eurajoki in the mid 1980s and now the municipality has lived with the positive municipal decision for one decade. Nevertheless, after decades of determined planning and information disseminations residents request more information regarding the final disposal of SNF. According to our survey (Chapter 4.4), people need more information on environmental effects (72% of the residents indicating substantial or very great need for information), health effects (71%), and safety after closure (64%). Comparing the present findings to the findings from the survey of 1994 by Kurki (1995) one can say that the focus of the information needs seem to have changed from safety related issues towards environmental and health effects. Not so much information is needed on economic issues as it was in the 1990s. In the case of information needs, too, the analysis with socio-demographic background variables indicates clear differences among the different groups of respondents as to who needs what kind of information. For instance, women seem to demand more information than men on environmental and health effects and effects on everyday life.

The overall picture of how people think about the information regarding final disposal shows that the nuclear industry has succeeded in establishing a fairly trusted position in the localities when measured by how much its own leaflets are consulted and how satisfied people are with its information. The leaflets are frequently used information sources in Eurajoki and also in its

neighbouring municipalities. Although local people actively consult what newspapers, television and radio report on nuclear waste issues, the industry has its own well functioning direct messaging channel to residents. The industry is able to inform local communities without being interpreted by journalists in general. Presumably this can have an influence on residents' opinions and their ways of framing the issue in the long term. Nevertheless, on the grounds of the study of how local people value the information provided by the different actors, one can conclude that there seem to be rather distinct groups who appreciate the PR and information work of nuclear industry. More affluent people give their support to the work of the nuclear industry, but more disadvantaged people tend to reject or criticize the information produced and distributed by the nuclear industry. Another clearcut line is between genders. Women tend to be more reserved or critical towards the information from the industry, whereas among men there is more confidence to be found in the industry's information.

References

Aho, J. 2008. *Käytetyn ydinpolttoaineen turvallista loppusijoitusta koskeva informaatio ja luottamus Eurajoen kuntalaisten keskuudessa*. (Information on safe final disposal of spent nuclear fuel and trust among the residents of Eurajoki). Unpublished master's thesis. May 2008. University of Tampere, Department of Information Studies, Tampere.

Ala-Lipasti, J., Karjalainen, P. and Pohjola J. 1999. *Kuntaimagotutkimus 1998*. (Municipal Image Study 1998). Posiva Working Report 99-23. Posiva Oy, Olkiluoto.

Anttila, P. 1995. *Käytetyn polttoaineen loppusijoitus – loppusijoituspaikan valintaperusteet.* (Final disposal of spent nuclear fuel – basis for site selection). Report YJT-95-07. May 1995. IVO International Oy, Helsinki.

Bergmans, A., Elam, M., Kos, D., Polic, M., Simmons, P., Sundqvist, G. and Walls, J. 2008. *Wanting the unwanted. Effects of public stakeholder involvement in the long term management of radioactive waste and the siting of repository facilities*. Final Report on CARL Project. CARL. http://webhost.ua.ac.be/carlresearch/docs/20080222112500ZGYI.pdf

Blowers, A., Lowry, D. and Solomon, B.D. 1991. *The International politics of nuclear waste*. Macmillan, London.

Blowers, A. 2002. Inequality and Community and the Challenge to Modernization: Evidence from the Nuclear Oases. In Agyeman, J., Bullard, R. and Evans, B. (Eds.) *Just Sustainabilities: Development in an Unequal World.* Earthscan, London. 72–74. http://www.ebrary.com

Choe, Y. 2003. *Social Cleavage and party support. A Comparison of Japan, South Korea and the United Kingdom.* Research Reports 2002, No. 5. Södertörn University College, Huddinge. http://sh.diva-portal.org/smash/get/diva2:16106/FULLTEXT01

Chung, J.B., Kim, H-K. and Rho, S.K. 2008. Analysis of local acceptance of a radioactive waste disposal facility. *Risk Analysis, 28(4)*. 1021–1032.

Desvousges, W.H., Kunreuther, H., Slovic, P. and Rosa, E.A. 1993. Perceived risk and attitudes toward nuclear wastes: national and Nevada perspectives. In Dunlap, R.E., Kraft, M.E. and Rosa, E.A. (Eds.) *Public Reactions to Nuclear Waste: Citizens' Views of Repository Siting.* Duke University Press, Durham. 175–208.

Dunlap, R.E., Rosa, E.A., Baxter, R.K. and Mitchell, R.C. 1993. Local attitudes towards siting a high-level nuclear waste repository at Hanford, Washington. In Dunlap, R.E., Kraft, M.E. and Rosa, E.A. (Eds.) *Public Reactions to Nuclear Waste: Citizens' Views of Repository Siting.* Duke University Press, Durham. 136–172.

Easterling, D. and Kunreuther, H. 1995. *The Dilemma of Siting a High-Level Nuclear Waste Repository*. Kluwer Academic Publishers, Boston.

Eiser, R.J., van der Pligt, J. and Spears, R. 1995. *Nuclear Neighbourhoods: Community Responses to Reactor Siting*. University of Exeter Press, Exeter.

Elam, M., Lidberg, M., Soneryd, L. and Sundqvist, G. 2008. *Demonstration and Dialogue: Mediation in Swedish Nuclear Waste Management*, Deliverable D10, ARGONA, Arenas for Risk Governance (Contract Number: FP6-036413). http://www.argonaproject.eu/docs/argona_wp3_report1.pdf

Energy Attitudes of the Finns, 1983-2008. *Survey Data.* [Electronic Data].

Hoikka, P., Kiljunen, P. and Pehkonen, J.: *Energy Attitudes of the Finns 1983* [computer file]. FSD1062, version 1.1 (2003-12-02). Imatran Voima [producer]. Finnish Social Science Data Archive [distributor], Tampere.

Hoikka, P., Kiljunen, P. and Pehkonen, J.: *Energy Attitudes of the Finns 1984* [computer file]. FSD1063, version 1.1 (2003-12-02). Imatran Voima [producer]. Finnish Social Science Data Archive [distributor], Tampere.

Hoikka, P., Kiljunen, P. and Pehkonen, J.: *Energy Attitudes of the Finns 1985* [computer file]. FSD1064, version 1.1 (2003-12-02). Imatran Voima [producer]. Finnish Social Science Data Archive [distributor], Tampere.

Kiljunen, P.: *Energy Attitudes of the Finns 1986* [computer file]. FSD1065, version 1.1 (2003-12-02). Imatran Voima [producer]. Finnish Social Science Data Archive [distributor], Tampere.

Kiljunen, P.: *Energy Attitudes of the Finns 1987* [computer file]. FSD1066, version 1.0 (2001-06-14). Imatran Voima [producer]. Finnish Social Science Data Archive [distributor], Tampere.

Kiljunen, P.: *Energy Attitudes of the Finns 1988* [computer file]. FSD1067, version 1.0 (2001-06-15). Imatran Voima [producer]. Finnish Social Science Data Archive [distributor], Tampere. 2001.

Kiljunen, P. *Energy Attitudes of the Finns 1989* [computer file]. FSD1068, version 1.0 (2001-06-18). Imatran Voima [producer]. Finnish Social Science Data Archive [distributor], Tampere.

Kiljunen, P.: *Energy Attitudes of the Finns 1990* [computer file]. FSD1069, version 1.1 (2003-12-02). Imatran Voima [producer]. Finnish Social Science Data Archive [distributor], Tampere. 2003.

Kiljunen, P.: *Energy Attitudes of the Finns 1991* [computer file]. FSD1070, version 1.1 (2003-12-02). Imatran Voima [producer]. Finnish Social Science Data Archive [distributor], Tampere.

Hoikka, P., Kiljunen, P. *Energy Attitudes of the Finns 1992* [computer file]. FSD1071, version 1.1 (2003-12-02). Imatran Voima [producer]. Finnish Social Science Data Archive [distributor], Tampere.

Hoikka, P., Kiljunen, P.: *Energy Attitudes of the Finns 1993* [computer file]. FSD1072, version 1.1 (2003-12-02). Imatran Voima [producer]. Finnish Social Science Data Archive [distributor], Tampere.

Energy Attitudes of the Finns 1994 [computer file]. FSD1307, version 1.0 (2004-01-22). Yhdyskuntatutkimus [data collection], 1994. Imatran Voima & Teollisuuden Voima [producers]. Finnish Social Science Data Archive [distributor], Tampere.

Energy Attitudes of the Finns 1995 [computer file]. FSD1308, version 1.0 (2004-01-08). Yhdyskuntatutkimus [data collection], 1995. Imatran Voima & Teollisuuden Voima [producers]. Finnish Social Science Data Archive [distributor], Tampere.

Energy Attitudes of the Finns 1996 [computer file]. FSD1309, version 1.0 (2004-01-08). Yhdyskuntatutkimus [data collection], 1996. Imatran Voima & Teollisuuden Voima [producers]. Finnish Social Science Data Archive [distributor], Tampere.

Energy Attitudes of the Finns 1997 [computer file]. FSD1310, version 1.0 (2004-01-08). Yhdyskuntatutkimus [data collection], 1997. Imatran Voima & Teollisuuden Voima [producers]. Finnish Social Science Data Archive [distributor], Tampere. 2004.

Energy Attitudes of the Finns 1998 [computer file]. FSD1311, version 1.0 (2004-01-09). Yhdyskuntatutkimus [data collection], 1998. Imatran Voima & Teollisuuden Voima [producers]. Finnish Social Science Data Archive [distributor], Tampere.

Energy Attitudes of the Finns 1999 [computer file]. FSD1312, version 1.0 (2004-01-28). Yhdyskuntatutkimus [data collection], 1999. Fortum & Teollisuuden Voima [producers]. Finnish Social Science Data Archive [distributor], Tampere.

Energy Attitudes of the Finns 2000 [computer file]. FSD1313, version 1.0 (2004-01-30). Yhdyskuntatutkimus [data collection], 2000. Fortum & Teollisuuden Voima [producers]. Finnish Social Science Data Archive [distributor], Tampere.

Energy Attitudes of the Finns 2001 [computer file]. FSD2187, version 1.0 (2006-06-07). Yhdyskuntatutkimus [data collection], 2001. Fortum & Teollisuuden Voima [producers]. Finnish Social Science Data Archive [distributor], Tampere.

Energy Attitudes of the Finns 2002 [computer file]. FSD2186, version 1.0 (2006-06-08). Yhdyskuntatutkimus [data collection], 2002. Fortum & Teollisuuden Voima [producers]. Finnish Social Science Data Archive [distributor], Tampere.

Energy Attitudes of the Finns 2003 [computer file]. FSD2192, version 1.0 (2006-06-08). Yhdyskuntatutkimus [data collection], 2003. Fortum & Teollisuuden Voima [producers]. Finnish Social Science Data Archive [distributor], Tampere.

Energy Attitudes of the Finns 2004 [computer file]. FSD2362, version 1.0 (2008-09-02). Yhdyskuntatutkimus [data collection], 2004. Fortum & Teollisuuden Voima [producers]. Finnish Social Science Data Archive [distributor], Tampere.

Energy Attitudes of the Finns 2005 [computer file]. FSD2240, version 1.0 (2007-01-26). Yhdyskuntatutkimus [data collection], 2005. Fortum & Teollisuuden Voima [producers]. Finnish Social Science Data Archive [distributor], Tampere.

Energy Attitudes of the Finns 2006 [computer file]. FSD2358, version 1.0 (2008-08-13). Yhdyskuntatutkimus [data collection], 2006. Fortum & Teollisuuden Voima [producers]. Finnish Social Science Data Archive [distributor], Tampere.

Energy Attitudes of the Finns 2007 [computer file]. FSD2433, version 1.0 (2009-08-31). Lempäälä. Yhdyskuntatutkimus & Vantaa. ÅF-Consult [data collection], 2007. Finnish Energy Industries (ET) & Fortum Oyj & Teollisuuden Voima Oyj (TVO) [producers]. Finnish Social Science Data Archive [distributor], Tampere.

Energy Attitudes of the Finns 2008 [computer file]. FSD2478, version 1.0 (2009-11-03). Lempäälä. Yhdyskuntatutkimus & Vantaa. ÅF-Consult [data collection], 2008. Finnish Energy Industries (ET) & Fortum Oyj & Teollisuuden Voima Oyj (TVO) [producers]. Finnish Social Science Data Archive [distributor], Tampere.

Eurobarometer, 2007. *Europeans and Nuclear Safety*. Special Eurobarometer 271, Wave 66.2. TNS Opinion & Social. European Commission. http://ec.europa.eu/public_opinion/archives/ebs/ebs_271_en.pdf [Accessed 10 May 2010].

Eurobarometer, 2008. *Attitudes Towards Radioactive Waste*. Special Eurobarometer 297, Wave 69.1. TNS Opinion & Social. European Commission. http://ec.europa.eu/public_opinion/archives/ebs/ebs_297_en.pdf

Fischhoff, B., Slovic, P., Lichtenstein, S., Read, S. and Combs, B. 2009. How safe is safe enough? A psychometric study of attitudes towards technological risks and benefits. In Löfsted, R.E. and Boholm, Å. (Eds.) *The Earthscan Reader on Risk.* Earthscan, London. 87–112.

Frey, B., Oberholzer-Gee, F. and Eichenberger R. 1996. The old lady visits your backyard: a tale of morals and markets. *Journal of Political Economy, 104(6)*. 1297–1313.

Frostenson, M. 2008. Bortom argumenten – etiska grunder och moralisk legitimitet i den svenska slutförvarsdiskussionen. (Beyond the arguments – ethical grounds and moral legitimacy in the Swedish final repository discussion). In *Samhällsforskning 2008: Betydelse för människor, hembygden och regionen av ett slutförvar för använt kärnbränsle.* (Social research 2008: Implications of a spent nuclear fuel repository for people, community and the region). Swedish Nuclear Fuel and Waste Management Company, Stockholm. 40–63. http://www.skb.se/upload/publications/pdf/Samhallsforskning%202008%2027.10Webb.pdf

Government Programme, 2007. *Government Programme of Prime Minister Matti Vanhanen's second Cabinet*. 19 April 2007. http://www.valtioneuvosto.fi/tietoarkisto/aiemmat-hallitukset/vanhanenII/hallitusohjelma/pdf/en.pdf [Accessed 5 August 2010].

Government Report, 2008. *Long-term Climate and Energy Strategy. Government Report to Parliament 6 November 2008.* VNS 6/2008 vp. Finnish Government. http://www.tem.fi/files/20587/Climate_Change_and_Energy_Strategy_2008_summary.pdf [Accessed 20 May 2010].

Harmaajärvi, I., Tolsa, H., Vuori, S. and Litmanen, T. 1997. *Ydinjätehuollon ympäristövaikutusten arviointi ja sosiopoliittiset kysymykset.* (Environmental impact assessment and sociopolitical issues of nuclear waste management). VTT Research Notes 1855. VTT Technical Research Centre of Finland, Espoo.

Harmaajärvi, I., Litmanen, T. and Kaunismaa, M. 1998. *Ydinjätehuollon ympäristövaikutukset. Kysely Eurajoen, Äänekosken ja Kuhmon asukkaille 1996.* (Environmental impacts of nuclear waste management. An inquiry for inhabitants in Eurajoki, Äänekoski and Kuhmo). VTT Research report 434. VTT Technical Research Centre of Finland, Communities and Infrastructure, Espoo.

Hokkanen, P. 2007. *Public participation in environmental impact assessment.* Acta Universitatis Tamperensis 1285. Tampere University Press, Tampere.

Hufvudstadsbladet, 16 March 2009. *Pekkarinen tror på noll eller en reaktor*. (Pekkarinen believes in zero or one reactor). [Newspaper article]. http://www.hbl.fi/text/inrikes/2009/3/16/d24809.php

Jartti, T. 2010. *Suomalaiset arvottamassa ydinvoima- ja uraanitaloutta.Ydinvoima- ja uraanikaivosasenteiden tarkastelua moraalitaloudellisesta näkökulmasta.* (Finns valuing nuclear and uranium economy. Study of nuclear power and uranium attitudes from the perspective of moral economy). Master's thesis in sociology. University of Jyväskylä, Department of Social Sciences and Philosophy, Jyväskylä. http://urn.fi/URN:NBN:fi:jyu-201005041623

Jenkins-Smith, H. and Kunreuther, H. 2001. Mitigation and benefits measures as policy tools for siting potentially hazardous facilities: determinants of effectiveness and appropriateness, *Risk Analysis, 11(2)*. 371–382.

Kaleva, 17 August 2009. *Valtiovarainministeri: Ydinvoimala tulee antaa kaikille kolmelle hakijalle*. (Minister of Finance: Nuclear power plant to be licensed for all three applicants). [Newspaper article]. http://www.kaleva.fi/plus/juttu809492_page0.htm [Accessed 17 August 2009].

Kari, M. 2009. Nuclear oasis or something else? Analysing Eurajoki as nuclear community. Paper presented at *Managing Radioactive Waste - Conference*. 15–17 December 2009. CEFOS, University of Gothenburg, Sweden.

Kari, M. 2010a. In spite of the perceived risks… Analysing acceptance of spent nuclear fuel repository in the Municipality of Eurajoki, Finland. Oral presentation at *SRAE 2010, Risk, Governance & Accountability conference, the 19th SRA-Europe meeting*. 21–23 June 2010. King's College, London, UK.

Kari, M. 2010b. Analysing acceptance of spent nuclear fuel repository in the Municipality of Eurajoki, Finland. Oral presentation at *4S 2010, STS in Global Contexts Conference, the 35th 4S Annual Meeting*. 25–29 August 2010. University of Tokyo, Japan.

Kiljunen, P. 2007. *Energy Attitudes 2006. Results of a follow-up study concerning Finnish attitudes towards energy issues 1983–2006.* Research Report 26 June 2007. Yhdyskuntatutkimus Oy. Finnish Energy Industries. http://www.sci.fi/~yhdys/eas_06/english/eng_luku2-3.htm [Accessed 10 March 2009].

Kiljunen, P. 2008. *Energy attitudes 2007. Results of a follow-up study concerning Finnish attitudes towards energy issues 1983–2007.* Research report 2 July 2008. Yhdyskuntatutkimus Oy. Finnish Energy Industries. http://www.sci.fi/~yhdys/eas_07/english/eas-etied_07.htm

Kiljunen, P. 2009. *Energy attitudes 2008. Results of a follow-up study concerning Finnish attitudes towards energy issues 1983-2008*. Research report 15 June 2009. Yhdyskuntatutkimus Oy. Finnish Energy Industries. http://www.sci.fi/~yhdys/eas_08/english/eas-etied_08.htm [Accessed 5 May 2010].

Kojo, M. 1999. *Ydinjätteen aktivoimat. Paikallinen yhdistyskenttä ja ydinjätteiden loppusijoitus.* (Activated by the nuclear waste question. The local association field and the final disposal of nuclear waste). Research Reports 9/1999. JYT2001 research. University of Tampere, Department of Political Science and International Relations, Tampere.

Kojo, M. 2004. Yhteenveto. (Summary). In Kojo, M. (Ed.) *Ydinvoima, valta ja vastarinta.* (Nuclear Power, Power and Resistance). Like, Helsinki. 231–258

Kojo, M. 2005. Changing Approach: Local Participation as a Part of the Site Selection Process of the Final Disposal Facility for High-Level Nuclear Waste in Finland. *Conference Proceeding of the 10th International Conference on Environmental Remediation and Radioactive Waste Management (ICEM'05)*. Session 15: Local Participation in Decision Making. 4–8 September 2005. Scottish Exhibition & Conference Centre. Glasgow, Scotland.

Kojo, M. 2006. *Carl Country Report Finland*. May 2006. http://webhost.ua.ac.be/carlresearch/docs/20060614144716PSUZ.pdf

Kojo, M. 2009. The Strategy of Site Selection for the Spent Nuclear Fuel Repository in Finland, In Kojo, M. and Litmanen, T. (Eds.) *The Renewal of Nuclear Power in Finland.* Palgrave Macmillan, Basingstoke. 161–191.

Kojo, M. (2010) Ydinjätepolitiikassa kamppaillaan vallasta, (Struggle over power in nuclear waste policy). *Kanava 38(8)*. 38–41.

Kojo, M., Kari, M. and Litmanen, T. 2008. The Socio-Economic and Communication Challenges of Spent Nuclear Fuel Management in Finland. *Proceedings of the Energy Challenges in Northern Europe. Pan-European Institute 20th anniversary conference*. 27–29 November 2008. Turku, Finland.

Kojo, M., Kari, M. and Litmanen, T. 2009a. Extension of the repository under excavation. The opinions of the local residents in the municipality of Eurajoki. *Proceedings of the VAlues in Decisions On Risk symposium VALDOR 2009*. 8–11 June 2009. Paper: Or 27. Stockholm, Sweden.

Kojo, M., Kari, M. and Litmanen, T. 2009b. Threats and Benefits. Updated information on local opinions regarding the spent nuclear Fuel repository in Finland. *Proceedings of the 12th International Conference on Environmental Remediation and Radioactive Waste Management* ICEM2009. 11–15 October 2009. Liverpool, UK.

Kojo, M. and Kari, M. 2010. Pride-effect in a nuclear community. Local perceptions regarding spent nuclear fuel repository in the municipality of Eurajoki, Finland. Paper presented at *Waste Management 2010*. 7–11 March 2010. Paper: 10192. Phoenix, Az, USA.

Kojo, M., Kari, M. and Litmanen, T. 2010. The socio-economic and communication challenges of spent nuclear fuel management in Finland. The post site selection phase of the repository project in Eurajoki. *Progress in Nuclear Energy, 52(2)*. 168–176.

Kojo, M. and Richardson, P. 2009. *The Role of Compensation in Nuclear Waste Facility Siting. A Literature Review and Real Life Examples,* ARGONA Arenas for Risk Governance (Contract Number: FP6-036413), Deliverable 16b of the sub Work Package 5.3. University of Tampere and

Galson Sciences Ltd. http://www.argonaproject.eu/docs/argona-del16b-compensation.pdf [Accessed 2 November 2009].

Kurki, O. 1995. *Ydinjätteiden loppusijoittamista koskevan informaation vastaanotto ja hankinta Eurajoella, Kuhmossa ja Äänekoskella.* (Reception and obtainment of information related to final disposal of nuclear waste in Eurajoki, Kuhmo and Äänekoski). Information project work report TIETO-95-02. October 1995. Teollisuuden Voima Oy, Nuclear Waste Office, Helsinki.

Krannich, R.S., Little, R.L. and Cramer, L.A. 1993. Rural community residents' views of nuclear waste repository siting in Nevada. In Dunlap, R.E., Kraft, M.E. and Rosa, E.A. (Eds.) *Public Reactions to Nuclear Waste: Citizens' Views of Repository Siting*. Duke University Press, Durham. 263–287.

Lahtinen, S. 1999. Riskiyhteiskunnan nuoret. Eurajoen, Kuhmon, Loviisan ja Äänekosken nuorten ydinjäteasenteet. (The youth of the risk society. Attitudes of young people towards the nuclear waste in Eurajoki, Kuhmo, Loviisa and Äänekoski). In Litmanen, T., Hokkanen, P. and Kojo, M. (Eds.) *Ydinjäte käsissämme. Suomen ydinjätehuolto ja suomalainen yhteiskunta*. (Nuclear waste in our hands. The Finnish nuclear waste management and the Finnish society). SoPhi, Jyväskylä. 86–107.

Laakso, S., Kuisma, H., Kilpeläinen, P. and Kostiainen, E. 2007. *Käytetyn ydinpolttoaineen loppusijoituslaitoksen aluetaloudelliset, sosioekonomiset ja kunnallistaloudelliset vaikutukset*. (The Effects of the Final Disposal Facility for Spent Nuclear Fuel on Regional and Municipal Economy Assessment of Socio-Economical Impacts). Posiva Working Report 2007-94. Kaupunkitutkimus TA Oy. Posiva Oy, Olkiluoto. http://www.posiva.fi/files/426/TR2007-94web(1).pdf

Lampinen, A. 2009. An Analysis of the Justification Arguments in the Application for the New Nuclear Reactor in Finland. In Kojo, M. and Litmanen, T. (Eds.) *The Renewal of Nuclear Power in Finland.* Palgrave Macmillan, Basingstoke. 41–68.

Litmanen, T. 1994. *Kallion uumenissa, satojen metrien syvyydessä. Paikalliset ydinjätekiistat Suomessa.* (In the bowels of the bedrock, hundreds of meters deep: Local nuclear waste conflicts in Finland). Unpublished licentiate thesis in sociology. University of Jyväskylä, Department of Social Sciences and Philosophy, Jyväskylä.

Litmanen, T. 1996. Ydinjätteet – Kiitos, ei tänne! Paikkakuntalaisten asennoituminen ydinjätteisiin Äänekoskella, Kuhmossa ja Eurajoella. (Nuclear waste – Thanks, but not here! Residents' attitudes towards nuclear waste in Äänekoski, Eurajoki and Kuhmo). In Konttinen, E. and Litmanen, T. (Eds.) *Ekokuntia ja ökykuntia. Tutkimuksia ympäristöhallinnan paikallisesta eriaikaisuudesta*. (Ecological and non-ecological municipalities. Studies in differences in local environmental management). SoPhi, Jyväskylä. 148–190.

Litmanen, T. 1999. Cultural Approach to the Perception of Risk. Analyzing Concern about the Siting of a High-Level Nuclear Waste Facility in Finland. *Waste Management & Research, 17(3)*. 212–219.

Litmanen, T. 2009. The utmost ends of the nuclear fuel cycle. How Finns perceive the risks of uranium mining and nuclear waste management. Paper presented at *Managing Radioactive Waste - Conference*. 15–17 December 2009. CEFOS, University of Gothenburg, Sweden.

Litmanen, T., Kojo, M. and Kari, M. 2010. The rationality of acceptance in a nuclear community: analysing residents' opinions on the expansion of the SNF repository in the municipality of Eurajoki, Finland. *International Journal of Nuclear Governance, Economy and Ecology, 3(1)*. 42–58.

Litmanen, T. and Kari, M. 2010. The utmost ends of the nuclear fuel cycle. How Finns perceive the risks of uranium mining and nuclear waste management. Paper presented at *SRAE 2010, Risk, Governance & Accountability conference, the 19th SRA-Europe meeting*. 21-23 June 2010. King's College, London, UK.

Litmanen, T., Ruostetsaari, I., Salo, M., Kari, M. and Kojo, M. 2010. Energiapoliittinen vallankäyttö Suomessa – kansalaisten näkemyksiä energiapolitiikan hallinnasta ja vallankäytöstä. (Power wielding in Finnish energy policy. Citizens' views concerning governance and power wielding in energy

policy). Unpublished manuscript. University of Jyväskylä, Department of Social Sciences and Philosophy, Jyväskylä.

Local government of Eurajoki, 2010. *Eurajoen kunnan kannanotto elinkeinoministeri Mauri Pekkariselle ja energiaosaston osastopäällikkö Taisto Turuselle*. (The statement of the municipality of Eurajoki to Minister Mauri Pekkarinen and head of the energy department Taisto Turunen). Municipal government §85, 9 March 2010. http://ptk.eurajoki.fi/kokous/2010402-8.HTM [Accessed 18 March 2010].

Loviisan Sanomat, 15 February 2008. *STUK:n pääjohtaja Laaksonen uskoo uraanin kierrätykseen."Käytettyä ydinpolttoainetta ei pidä loppusijoittaa pysyvästi Suomen kallioperään"*. (STUK director general Laaksonen believes in recycling of uranium. "Spent nuclear fuel should not be permanently disposed of into the Finnish bedrock"). [Newspaper article]. http://www.loviisansanomat.net/paauutiset.php?id=2736

Marshall, A. 2005. The Social and Ethical Aspects of Nuclear Waste. *Electronic Green Journal, 1(21)*. http://repositories.cdlib.org/uclalib/egj/vol1/iss21/art4

MEE, 2008. *Ministry of Employment and the Economy's statement on environmental impact assessment programme for extension of Posiva Oy's planned final disposal repository for spent nuclear fuel*. TEM 820/815/2008. 22 August 2008. Ministry of Employment and the Economy. http://www.tem.fi/files/20314/Statement_by_the_contact_authority_22.8.2008.pdf [Accessed 30 March 2010].

MEE, 2010a. *Government decides on policies for nuclear power and promotion of renewable energy production*. Press release, 21 April 2010. Ministry of Employment and the Economy. http://www.tem.fi/?89521_m=98874&l=en&s=2471 [Accessed 3 May 2010].

MEE, 2010b. *Government decision on two new nuclear power plant units.* Press release, 6 May 2010. Ministry of Employment and the Economy. http://www.tem.fi/?89521_m=99003&l=en&s=2471 [Accessed 10 May 2010].

MEE, 2010c. *Parliament approves construction of two new nuclear power plant units*. Press release, 1 July 2010. Ministry of Employment and the Economy. http://www.tem.fi/?89521_m=99639&l=en&s=2471 [Accessed 6 August 2010].

McEwen, T. and Äikäs, T. 2000. *The site selection process for a spent nuclear fuel repository in Finland - Summary report*. Posiva 2000-15. Posiva Oy, Helsinki.

MTV3, 8 February 2008. *Vanhanen: Kuusi ydinvoimalaa maksimimäärä*. (Vanhanen: Six nuclear power plant units is the maximum). Broadcasting Company MTV3. http://www.mtv3.fi/uutiset/kotimaa.shtml/arkistot/kotimaa/2008/02/609006 [Accessed 8 February 2008].

MTV3, 19 March 2009. *Kokoomus haluaa kolme ydinvoimalaa*. (The Finnish National Coaltion Party wants three nuclear power plants). Broadcasting Company MTV3. http://www.mtv3.fi/uutiset/kotimaa.shtml/arkistot/kotimaa/2009/03/840942 [Accessed 20 March 2009].

Mushkatel, A., Nigg, J.M. and Pijawka, D.K. 1993. Nevada urban residents' attitudes toward a nuclear waste repository, in Dunlap, R.E., Kraft, M.E. and Rosa, E.A. (Eds.) *Public Reactions to Nuclear Waste: Citizens' Views of Repository Siting.* Duke University Press, Durham. 239–262.

NDA, 2007. *Managing Radioactive Waste Safely: Literature Review of International Experiences of Community Partnerships*. TN-17086. Nuclear Decommissioning Authority. http://www.nda.gov.uk/documents/upload/TN-17086-Managing-Radioactive-Waste-Safely-Literature-Review-of-International-Experiences-of-Partnerships-pdf-version_v1.pdf

NEA, 2003. *Forum on Stakeholder Confidence (FSC). Canadian Site Visit and Workshop - Summary and International Perspective*. NEA/RWM/FSC (2003)8. OECD. http://www.nea.fr/html/rwm/docs/2003/rwm_fsc_2003_8.pdf

NEA, 2007. *Fostering a Durable Relationship Between a Waste Management Facility and its Host Community. Adding Value Through Design and Process*. NEA No. 6176, June 2007.OECD. http://www.nea.fr/html/rwm/reports/2007/nea6176-fostering.pdf

Nuclear Energy Act 1987/990. Available at: Finlex® - State of Finland legislation database. http://www.finlex.fi/fi/laki/ajantasa/1987/19870990 [In Finnish].
http://www.finlex.fi/en/laki/kaannokset/1987/19870990 [In English].

Nurmi, A. 2010. *Piristysruiske vai surmanisku? Fennovoima Oy:n ydinvoimalan periaatepäätösvaiheen kuulemistilaisuuksien yleisöpuheenvuorojen analyysi*. (Stimulant or deathblow? An analysis of the discourse in the public hearings concerning Fennovoima Oy's nuclear power plant project at the Decision-in-Principle stage). Working Reports of Sociology. Fall 2010. University of Jyväskylä, Department of Social Sciences and Philosophy, Jyväskylä.

Nurmi, A., Kojo, M. and Litmanen, T. 2009. *Yleisökysymyksiä vailla vastauksia. Käytetyn ydinpolttoaineen loppusijoituslaitoksen laajennushankkeen yleisötilaisuudet Eurajoella 2008–2009.* (Questions from the public without answers: Public meetings concerning the spent nuclear fuel disposal facility expansion project in Eurajoki 2008–2009). Working Reports of Sociology 1/2009. University of Jyväskylä, Department of Social Sciences and Philosophy, Jyväskylä.

OECD, 2009. *Radioactive waste management programmes in OECD/NEA member countries*. Available at: http://www.nea.fr/html/rwm/profiles/welcome.html [Accessed 9 March 2010].

Ponnikas, J. 1998. *Kuka päättää, otammeko ydinjätteitä*? (Who decides if we accept nuclear waste?) Research Reports 5/1998. JYT2001 research. University of Tampere, Department of Political Science and International Relations, Tampere.

Ponnikas, J. 2000. *Kansalaisosallisuus ja ydinjätteet. Kunnalliset vaikuttajat ja loppusijoituksen paikalllinen päätöksenteko* (Citizen particiaption and nuclear waste. Local policy-makers and local decision-making regarding final disposal). Research Reports 12/2000. JYT2001 research. University of Tampere, Department of Political Science and International Relations, Tampere.

Posiva, 1999a. *The final disposal facility for spent nuclear fuel. Environmental impact assessment report.* Posiva Oy, Helsinki.

Posiva, 1999b. *Käytetyn ydinpolttoaineen loppusijoituslaitoksen periaatepäätöshakemus. (The Application for a decision-in-principle on the facility for spent nuclear fuel).* Posiva Oy, Helsinki.

Posiva, 2007. *Municipal Image Study 2006*. Posiva working report 2007-73. Corporate Image Oy, Posiva Oy, Olkiluoto. http://www.posiva.fi/files/436/WR2007-99_web.pdf

Posiva, 2008. *Expansion of the Repository for Spent Nuclear Fuel - Environmental Impact Assessment Report 2008*. Posiva Oy, Eurajoki. http://www.posiva.fi/files/519/Posiva_YVA_selostusraportti_en_lukittu.pdf [Accessed 8 December 2009].

Posiva, 2010a. *TKS-2009. Nuclear Waste Management at Olkiluoto and Loviisa Power Plants Review of Current Status and Future Plans for 2010 –2012*. February 2010. Posiva Oy, Olkiluoto. http://www.posiva.fi/files/1078/TKS2009_Eng_web_rev1_low.pdf

Posiva, 2010b. *General Time Schedule for Final Disposal*. http://www.posiva.fi/en/final_disposal/general_time_schedule_for_final_disposal [Accessed 18 March 2010].

Posiva, 30 October 2009. *Posiva aiming to submit a construction license application in 2012*. [www news release]. http://www.posiva.fi/en/news/other_topical_issues/posiva_aiming_to_submit_a_construction_licence_application_in_2012.html [Accessed 7 October 2010].

Pylkkönen, A., Litmanen, T. and Kojo, M. 2008. *Uuden ydinkeitaan etsintää. Fennovoiman ydinvoimalahankkeen YVA-ohjelmavaiheen yleisötilaisuudet Kristiinankaupungissa, Ruotsinpyhtäällä, Pyhäjoella ja Simossa.* (In search for a new nuclear oasis. The public meetings of EIA assessment phase of Fennovoima nuclear power plant project in Kristiinankaupunki, Ruotsinpyhtää, Pyhäjoki and

Simo). Working Reports of Sociology. University of Jyväskylä, Department of Social Sciences and Philosophy, Jyväskylä.

Raittila, P. and Suominen, P. 2002. Keskustelu ydinjätteen loppusijoitusta koskevasta periaatepäätöksestä eduskunnassa ja mediassa. (Debate on the decision-in-principle on the final disposal of nuclear waste in Parliament and media). In Raittila, P., Hokkanen, P., Kojo, M. and Litmanen, T. (Eds.) *Ydinjäteihme suomalaisittain* (The Finnish nuclear waste miracle). Tampere University Press, Tampere. 92–113.

Raumolin, H. 1982. *TVO:n ydinjätehuollon toimintaohjelma ja aikataulut.* (Programme and Schedules for TVO's Nuclear Waste Management). Report YJT-82-55. Teollisuuden Voima, Helsinki.

Richardson, P.J. 1998. *Raportti Suomen ydinjätesijoitukseen liittyvistä ongelmista. (Report on the problems related to the final disposal of nuclear waste in Finland)*. Copies of the Finnish Association for Nature Conservation 4/98. The Finnish Association for Nature Conservation, Helsinki.

Satakunnan Kansa, 12 August 2008. *Fennovoima Oy vaatii Suomen kaikkien ydinjätteiden sijoittamista Olkiluotoon*. (Fennovoima Oy demands final disposal of all nuclear waste produced in Finland at Olkiluoto). [Newspaper article].

Satakunnan Kansa, 20 February 2008. *TVO luottaa ydinjätehuollossa edelleen Suomen vankkaan kallioperään. Ydinvoima: Käytetyn ydinpolttoaineen jälleenkäsittely ei todennäköinen vaihtoehto.* (TVO still trusts the solid bedrock of Finland for nuclear waste management. Nuclear power: Reprocessing of spent nuclear fuel not a likely alternative). [Newspaper article].

Satakunnan Kansa, 2 December 2009. *Olkiluoto on nostanut Eurajoen kuntatalouden omaan luokkaansa.* (Olkiluoto has raised the municipal economy of Eurajoki to the level of its own). [Newspaper article].

Satakunnan Kansa, 23 April 2010. *Suomeen ehkä uusi paikka ydinjätteelle.* (Possible new site for nuclear waste in Finland). [Newspaper article].

Satakunnan Kansa, 24 April 2010. *Ydinjätteelle löytyy 350 mahdollista sijoituspaikkaa.* (350 alternative disposal sites for nuclear waste). [Newspaper article].

Seppälä, T. 2010. Boon or Bane? A Repository's Effects on the Local Community. *Radwaste Solutions, 17(1)*. 34–37.

Slovic, P. 1987. Perception of risk. *Science, New Series, 236(4799)*. 280–285.

Slovic, P., Layman, M. and Flynn, J.H. 1993. Perceived risk, trust, and nuclear waste: lessons from Yucca Mountain. In Dunlap, R.E., Kraft, M.E. and Rosa, E.A. (Eds.) *Public Reactions to Nuclear Waste: Citizens' Views of Repository Siting*. Duke University Press, Durham. 64–86.

STUK, (2006). *Nearby NPPs.* Radiation and Nuclear Safety Authority. http://www.stuk.fi/ydinturvallisuus/ydinvoimalaitokset/en_GB/lahialueet/

Sundqvist, G. 2002. *The Bedrock of Opinion. Science, Technology and Society in the Siting of High-Level Nuclear Waste*. Kluwer Academic Publishers, Dordrecht / Boston / London.

Suominen, P. 1999. *Ydinjätepolitiikan muotoutuminen Suomessa*. (The development of nuclear waste policy in Finland). In Litmanen, T., Hokkanen, P. and Kojo, M. (Eds.) Ydinjäte käsissämme. Suomen ydinjätehuolto ja suomalainen yhteiskunta. (Nuclear waste in our hands. Finnish nuclear waste management and Finnish society). SoPhi, Jyväskylä. 15–42.

Säynässalo, E. and Borg, O. 1992. *Viidennen ydinvoimalan rakentamishanke lähialueiden kuntien ja asukkaiden näkökulmasta.* (The building project of the fifth nuclear power plant from the point of view of the nearby municipalities and residents). Research; 119. University of Tampere, Department of Political Science and International Relations, Tampere.

TVO, 2010. *Interim storage for spent fuel to be expanded in Olkiluoto*. Press release, 22 September 2010. Teollisuuden Voima. http://www.tvo.fi/www/page/3469/ [Accessed 24 September 2010].

Van der Pligt, J. 1992. *Nuclear Energy and the Public*. Blackwell, Oxford.

Vari, A., Reagan-Cirincione, P. and Mumpower, J.L. (Eds.) 1994. *LLRW Disposal Facility Siting. Success and Failures in Six Countries*. Kluwer Academic Publishers, Dordrecht.

Vieno, T., Hautojärvi, A., Koskinen, L. and Nordman H. 1992. *Käytetyn ydinpolttoaineen loppusijoituksen turvallisuusanalyysi TVO-92*. (Safety analysis of spent nuclear fuel disposal TVO-92). VTT Technical Research Centre of Finland, Nuclear Engineering Laboratory.

Virtanen, H. 2009. Ydinvalvonta tiivistää yhteistyötään. (Closer co-operation in nuclear regulation). *Alara 18(4)*. 8–10.

Vuori, S. (Ed.) 1997. *Publicly Administrated Nuclear Waste Management Research Programme 1994-1996 : final report.* Studies and Reports 22/1997. Ministry of Trade and Industry. Edita [distributor], Helsinki.

Wynne, B. 1995. Public understanding of science, in Jasanoff, S., Markle, G., Peterson, J. and Pinch, T. (Eds.) *Handbook of Science and Technology Studies*. Thousand Oaks, London. 361–388.

YLE, 17 August 2009. *Kataisen ydinvoimaesitys ei innosta hallituskumppaneita*. (Government partners are not inspired by Katainen's nuclear power proposal). Finnish Public Broadcasting Company YLE. http://www.yle.fi/uutiset/talous_ja_politiikka/2009/08/kataisen_ydinvoimaesitys_ei_innosta_hallituskumppaneita_932695.html [Accessed 17 August 2009].

YLE, 10 September 2009. *Pekkarinen: Suomi tarvitsee vain yhden uuden ydinreaktorin.* (Pekkarinen: Finland needs only one new nuclear reactor). Finnish Public Broadcasting Company YLE. http://www.yle.fi/uutiset/talous_ja_politiikka/2009/09/pekkarinen_suomi_tarvitsee_vain_yhden_uuden_ydinreaktorin_991435.html [Accessed 10 September 2009].

YLE, 17 September 2009. *Fennovoiman ydinjäte ei sovi TVO:n luolaan*. (The TVO cave won't have room for nuclear waste produced by Fennovoima). Finnish Public Broadcasting Company YLE. http://www.yle.fi/uutiset/talous_ja_politiikka/2009/09/fennovoiman_ydinjate_ei_sovi_tvon_luolaan_1009108.html [Accessed 18 September 2009].

YLE, 26 March 2010. *Posiva: Suomi tarvitsee toisen loppusijoitustilan.* (Posiva: Finland needs a second final disposal facility). Finnish Public Broadcasting Company YLE. http://www.yle.fi/alueet/satakunta/2010/03/posiva_suomi_tarvitsee_toisen_loppusijoitustilan_1560758.html [Accessed 26 March 2010].

Appendix: Questionnaire [in Finnish]

Tässä kyselyssä vastaus sijoitetaan useimmiten valmiiksi annetulle asteikolle. Asteikoille on joko annettu ääripäät jolloin keskimmäinen vaihtoehto ei kallistu kumpaankaan suuntaan tai tarvittaessa jokainen kohta on selitetty erikseen. Ympyröikää mielestänne sopivimman kohdan numero.

Hyvä vastaaja, olemme kiinnostuneita teidän näkemyksistänne
Eurajoen Olkiluodon käytetyn ydinpolttoaineen (ydinjätteen) loppusijoitushankkeesta.

Olkiluodossa on muutakin ydinvoimaan liittyvää toimintaa kuin loppusijoitushanke (kuten uuden ydinvoimalaitoksen rakentaminen).

1. Kuinka helppoa tai vaikeaa mielestänne on arvioida loppusijoituksen vaikutuksia omana kokonaisuutenaan erillään tästä muusta ydinvoimaan liittyvästä toiminnasta?

Erittäin vaikeaa 1 2 3 4 5 Erittäin helppoa

2. Tietoa loppusijoituksesta voi saada eri tavoin. Missä määrin seuraatte eri tiedonlähteitä saadaksenne tätä tietoa?

Lehdet	En seuraa ollenkaan	1	2	3	4	5	Seuraan aktiivisesti
Televisio	En seuraa ollenkaan	1	2	3	4	5	Seuraan aktiivisesti
Radio	En seuraa ollenkaan	1	2	3	4	5	Seuraan aktiivisesti
Internet	En seuraa ollenkaan	1	2	3	4	5	Seuraan aktiivisesti
Tieteelliset julkaisut, tietokirjallisuus	En seuraa ollenkaan	1	2	3	4	5	Seuraan aktiivisesti
TVO:n Olkiluoto uutiset	En seuraa ollenkaan	1	2	3	4	5	Seuraan aktiivisesti
Posiva tutkii -tiedote	En seuraa ollenkaan	1	2	3	4	5	Seuraan aktiivisesti
Yleisötilaisuudet, keskustelutilaisuudet	En seuraa ollenkaan	1	2	3	4	5	Seuraan aktiivisesti
Oman työn tai koulutuksen kautta saatava tieto	En seuraa ollenkaan	1	2	3	4	5	Seuraan aktiivisesti
Järjestö- ja yhdistystoiminan kautta saatava tieto	En seuraa ollenkaan	1	2	3	4	5	Seuraan aktiivisesti
Tuttavien, työtoverien, suvun ym. kautta saatava tieto	En seuraa ollenkaan	1	2	3	4	5	Seuraan aktiivisesti

3. Internetin käyttönne loppusijoitushankkeeseen liittyvissä asioissa? *Yleisesti ottaen*

	En ollenkaan	Harvemmin kuin kerran kuukaudessa	Kuukausittain	Useita kertoja kuukaudessa	Viikoittain	Useita kertoja viikossa
Käyn viranomaisten sivustoilla (KTM/TEM, STUK)	1	2	3	4	5	6
Käyn Eurajoen kunnan sivustoilla	1	2	3	4	5	6
Käyn teollisuuden sivustoilla (Posiva, TVO, Fortum)	1	2	3	4	5	6
Käyn tutkimuslaitosten sivustoilla (VTT, yliopistot)	1	2	3	4	5	6
Käyn vaihtoehtoisia näkemyksiä tarjoavilla sivustoilla	1	2	3	4	5	6
Osallistun mielipiteiden- tai tiedonvaihtoon	1	2	3	4	5	6
Osallistun kampanjoihin tai poliittiseen/järjestötoimintaan	1	2	3	4	5	6

4. Millainen on tiedontarpeenne loppusijoitukseen liittyvissä asioissa?

Loppusijoituksen yleinen turvallisuus	Ei tiedon tarvetta	1	2	3	4	5	Erittäin suuri tiedon tarve
Kuljetusten turvallisuus	Ei tiedon tarvetta	1	2	3	4	5	Erittäin suuri tiedon tarve
Kapseloinnin turvallisuus	Ei tiedon tarvetta	1	2	3	4	5	Erittäin suuri tiedon tarve
Laitoksen sulkemisen jälkeinen turvallisuus	Ei tiedon tarvetta	1	2	3	4	5	Erittäin suuri tiedon tarve
Terveysvaikutukset	Ei tiedon tarvetta	1	2	3	4	5	Erittäin suuri tiedon tarve
Ympäristövaikutukset	Ei tiedon tarvetta	1	2	3	4	5	Erittäin suuri tiedon tarve

Taloudelliset vaikutukset	Ei tiedon tarvetta	1	2	3	4	5	Erittäin suuri tiedon tarve
Vaikutukset jokapäiväiseen elämään	Ei tiedon tarvetta	1	2	3	4	5	Erittäin suuri tiedon tarve
Imagovaikutukset	Ei tiedon tarvetta	1	2	3	4	5	Erittäin suuri tiedon tarve
Laitoksen mahdollinen laajentaminen	Ei tiedon tarvetta	1	2	3	4	5	Erittäin suuri tiedon tarve
Kunnallinen päätöksenteko	Ei tiedon tarvetta	1	2	3	4	5	Erittäin suuri tiedon tarve
Valtakunnallinen päätöksenteko	Ei tiedon tarvetta	1	2	3	4	5	Erittäin suuri tiedon tarve
Euroopan unionin (EU) päätöksenteko	Ei tiedon tarvetta	1	2	3	4	5	Erittäin suuri tiedon tarve

5. Kuinka tyytyväinen tai tyytymätön olette eri tahojen tarjoaman tiedon määrään ja luotettavuuteen loppusijoituksesta?

	Tyytyväisyys tiedon määrään					**Tyytyväisyys tiedon luotettavuuteen**				
	Erittäin tyytymätön				Erittäin tyytyväinen	Erittäin tyytymätön				Erittäin tyytyväinen
TVO ja Fortum (ydinvoimalaitosten omistajat)	1	2	3	4	5	1	2	3	4	5
Posiva (loppusijoituksesta huolehtiva yhtiö)	1	2	3	4	5	1	2	3	4	5
Kauppa- ja teollisuusministeriö /Työ- ja elinkeinoministeriö	1	2	3	4	5	1	2	3	4	5
Muut ministeriöt (mm.ympäristö- sekä sosiaali- ja terveysministeriö)	1	2	3	4	5	1	2	3	4	5
Säteilyturvakeskus (STUK)	1	2	3	4	5	1	2	3	4	5
Paikallisviranomaiset	1	2	3	4	5	1	2	3	4	5
Poliittiset puolueet	1	2	3	4	5	1	2	3	4	5
Tutkimuslaitokset	1	2	3	4	5	1	2	3	4	5
Yliopistot/korkeakoulut	1	2	3	4	5	1	2	3	4	5
Kansalaisjärjestöt	1	2	3	4	5	1	2	3	4	5

Loppusijoitushanke sijoittuu Eurajoen Olkiluotoon. Olemme kuitenkin kiinnostuneita **ALUEESTA**, johon kuuluvat Eurajoen lisäksi sen naapurikunnat Eura, Kiukainen, Lappi, Luvia, Nakkila ja Rauma.

6. Miten loppusijoituslaitoksen rakentaminen alueelle mielestänne vaikuttaa seuraaviin seikkoihin?

Omaan mielikuvaanne alueesta	Kielteisesti	1	2	3	4	5	Myönteisesti
Omaan mielikuvaanne erityisesti Eurajoesta	Kielteisesti	1	2	3	4	5	Myönteisesti
Omiin tulevaisuuden odotuksiinne alueella	Kielteisesti	1	2	3	4	5	Myönteisesti
Omaan tyytyväisyyteenne alueeseen asuinpaikkana	Kielteisesti	1	2	3	4	5	Myönteisesti
Ulkopuolisten mielikuvaan alueesta	Kielteisesti	1	2	3	4	5	Myönteisesti
Toimintaympäristöön/Ilmapiiriin alueella	Kielteisesti	1	2	3	4	5	Myönteisesti
Luonnon tilaan loppusijoituslaitoksen ympäristössä	Kielteisesti	1	2	3	4	5	Myönteisesti
Alueen kehitykseen yleisesti ottaen	Kielteisesti	1	2	3	4	5	Myönteisesti
Väestökehitykseen alueella	Kielteisesti	1	2	3	4	5	Myönteisesti
Työllisyyteen alueella	Kielteisesti	1	2	3	4	5	Myönteisesti
Talouskehitykseen alueella	Kielteisesti	1	2	3	4	5	Myönteisesti

Palvelujen saatavuuteen alueella	Kielteisesti	1	2	3	4	5	Myönteisesti
Matkailuun alueella	Kielteisesti	1	2	3	4	5	Myönteisesti
Kulttuuriin alueella	Kielteisesti	1	2	3	4	5	Myönteisesti
Koulutussektorin kehitykseen alueella	Kielteisesti	1	2	3	4	5	Myönteisesti
Maa- ja metsätalouteen alueella	Kielteisesti	1	2	3	4	5	Myönteisesti
Luontaiselinkeinoihin alueella (kalastus, metsästys ym.)	Kielteisesti	1	2	3	4	5	Myönteisesti
Vapaa-ajan mahdollisuuksiin alueella	Kielteisesti	1	2	3	4	5	Myönteisesti
Kaupunki/kuntarakenteeseen alueella	Kielteisesti	1	2	3	4	5	Myönteisesti
Liikenneyhteyksiin alueella	Kielteisesti	1	2	3	4	5	Myönteisesti

7. Koetteko loppusijoituslaitoksen aiheuttavan uhkaa jollekin näistä?

	En koe	Koen lievää	Koen selkeää	Koen suurta	En osaa sanoa
Yleinen turvallisuus	1	2	3	4	0
Oma tai perheenne turvallisuus	1	2	3	4	0
Tulevien sukupolvien turvallisuus	1	2	3	4	0
Yleinen terveys	1	2	3	4	0
Oma tai perheenne terveys	1	2	3	4	0
Tulevien sukupolvien terveys	1	2	3	4	0
Yleinen hyvinvointi	1	2	3	4	0
Oma tai perheenne hyvinvointi	1	2	3	4	0
Tulevien sukupolvien hyvinvointi	1	2	3	4	0

8. Seuraavassa esitetään joukko mielipiteitä/väittämiä, joista haluamme tietää mielipiteenne.

Ydinjätteet muodostavat jatkuvan uhan tulevien sukupolvien elämälle.	Täysin samaa mieltä	1	2	3	4	5	Täysin eri mieltä
Ydinjätteen loppusijoituksen taloudelliset hyödyt eivät korvaa ei-taloudellisia haittoja.	Täysin samaa mieltä	1	2	3	4	5	Täysin eri mieltä
Eurajoen naapurikuntien tulisi hyötyä taloudellisesti loppusijoituksesta, jos siitä aiheutuu niille haittoja.	Täysin samaa mieltä	1	2	3	4	5	Täysin eri mieltä
TVO:n ja Fortumin tuottama ydinjäte tulee loppusijoittaa Suomeen.	Täysin samaa mieltä	1	2	3	4	5	Täysin eri mieltä
TVO:n ja Fortumin tuottama ydinjäte tulee loppusijoittaa Olkiluotoon.	Täysin samaa mieltä	1	2	3	4	5	Täysin eri mieltä
Hyväksyn loppusijoituslaitoksen laajentamisen TVO:n ja Fortumin tarpeisiin.	Täysin samaa mieltä	1	2	3	4	5	Täysin eri mieltä
Hyväksyn loppusijoituslaitoksen laajentamisen muidenkin suomalaisten toimijoiden tarpeisiin.	Täysin samaa mieltä	1	2	3	4	5	Täysin eri mieltä
Hyväksyn loppusijoituslaitoksen laajentamisen käytetyn polttoaineen tuontiin ulkomailta.	Täysin samaa mieltä	1	2	3	4	5	Täysin eri mieltä
Mielestäni minulla on riittävästi tietoa loppusijoitushankkeesta.	Täysin samaa mieltä	1	2	3	4	5	Täysin eri mieltä
Luotan Posivaan loppusijoitushankkeen riskien arvioinnissa	Täysin samaa mieltä	1	2	3	4	5	Täysin eri mieltä
Luotan viranomaisiin loppusijoitushankkeen riskien arvioinnissa.	Täysin samaa mieltä	1	2	3	4	5	Täysin eri mieltä
Ydinjätteet voidaan turvallisesti loppusijoittaa Suomen kallioperään.	Täysin samaa mieltä	1	2	3	4	5	Täysin eri mieltä

Ydinjätteen loppusijoituksen hyödyt ovat suurempia kuin haitat.	Täysin samaa mieltä	1	2	3	4	5	Täysin eri mieltä
Eurajoen kunnalla on moraalinen velvollisuus hyväksyä ydinjätteen loppusijoitus, koska se on hyväksynyt ydinvoimalat alueelleen.	Täysin samaa mieltä	1	2	3	4	5	Täysin eri mieltä
Suomeen tulisi rakentaa lisää ydinvoimaa.	Täysin samaa mieltä	1	2	3	4	5	Täysin eri mieltä
Olkiluotoon tulisi rakentaa neljäs ydinvoimalaitosyksikkö.	Täysin samaa mieltä	1	2	3	4	5	Täysin eri mieltä

VASTAAJAN TAUSTATIEDOT valitkaa yksi tilannetta kohdallanne parhaiten kuvaava vaihtoehto

9. Sukupuolenne? 1 Mies 2 Nainen

10. Onko teillä alaikäisiä lapsia? 1 Kyllä 2 Ei

11. Syntymävuotenne? *Nelinumeroisena* ☐☐☐☐

12. Siviilisäätynne?

1 Naimaton
2 Avoliitossa
3 Avioliitossa tai rekisteröidyssä suhteessa
4 Eronnut, asumuserossa tai leski

13. Asuinkuntanne?

1 Eura
2 Eurajoki
3 Kiukainen
4 Lappi
5 Luvia
6 Nakkila
7 Rauma

14. Asuinpaikkanne arvioitu etäisyys Olkiluodosta? *Linnuntietä*

1 Alle 10 km
2 10 - 30 km
3 Yli 30 km

15. Koulutuksenne?

1 Ei perusasteen jälkeistä tutkintoa
2 Lukio
3 Ammattikoulu tai kouluasteen ammatillinen tutkinto
4 Opistoasteen tutkinto
5 Ammattikorkeakoulututkinto
6 Yliopisto- tai tiedekorkeakoulututkinto

16. Koulutusalanne?

1 Yleissivistävä koulutus
2 Kasvatustieteellinen ja opettajankoulutus
3 Humanistinen, taide- ja kulttuurialojen koulutus
4 Kaupan, hallinnon ja yhteiskuntatieteiden koulutus
5 Luonnontieteen ja tietojenkäsittelyn koulutus
6 Tekniikan ja liikenteen alojen koulutus
7 Maa- ja metsätalousalan koulutus
8 Terveys- ja sosiaalialan koulutus
9 Palvelu- ja suojelualojen koulutus
10 Jokin muu, mikä? _____

17. Ammattiryhmänne?

1 Johtavassa asemassa toisen palveluksessa
2 Ylempi toimihenkilö
3 Alempi toimihenkilö
4 Työntekijä
5 Yrittäjä tai yksityinen ammatinharjoittaja
6 Maatalousyrittäjä
7 Opiskelija
8 Eläkeläinen
9 Kotiäiti/koti-isä
10 Työtön

18. Toimialanne?

1 Maa- ja metsätalous, kala- ja riistatalous
2 Teollisuus ja kaivostoiminta
3 Energia-, lämpö- ja vesihuolto
4 Rakentaminen
5 Kauppa
6 Majoitus- ja ravitsemustoiminta
7 Kuljetus, varastointi ja tietoliikenne
8 Rahoitustoiminta, kiinteistö-, vuokraus- ja tutkimuspalvelut, tietojenkäsittely ja muu liike-elämää palveleva toiminta
9 Julkinen hallinto ja maanpuolustus
10 Koulutus, terveydenhuolto- ja sosiaalipalvelut
11 Muut yhteiskunnalliset ja henkilökohtaiset palvelut
12 En ole mukana työelämässä

19. Mitä puoluetta äänestäisitte, jos eduskuntavaalit pidettäisiin nyt?

1 Suomen Keskusta
2 Kansallinen Kokoomus
3 Suomen Sosialidemokraattinen Puolue
4 Vasemmistoliitto
5 Vihreä liitto
6 Suomen Kristillisdemokraatit
7 Ruotsalainen kansanpuolue
8 Perussuomalaiset
9 Jokin muu, mikä? _____
10 En osaa sanoa
11 En halua sanoa
12 En äänestäisi lainkaan

20. Henkilökohtaiset vuositulonne veroja vähentämättä? *Arvio*

1 Alle 10000€ 2 10000 - 19999€ 3 20000 - 29999€ 4 30000 - 39999€ 5 40000 - 59999€ 6 60000 - 79999€ 7 80000€ tai enemmän