Öppen

Rapport

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Projekt Clink - Anläggningskonfigurationsfas - Hantering av IAEA-krav i Clink F-PSAR

Inledning

Syfte och mål

Syftet med denna rapport är att redovisa tolkning av krav som är hänförliga de IAEA Safety Standards som identifierats som tillämpliga i Clink F-PSAR och dess uppfyllelse.

Målet med rapporten är att redovisa de krav som anläggningen Clink förväntas uppfylla utifrån IAEA Safety Standards för att erhålla tillstånd för anläggningen Clink samt hur SKB avser tillämpa kraven och var inom F-PSAR och anläggning Clink tillämpning och uppfyllande redovisas.

Omfattning och struktur

Rapporten omfattar endast krav som är hänförliga de IAEA Safety Fundamentals och Safety Requirements som angetts som tillämpliga på anläggningen enligt F-PSAR Allmän del kapitel 3.

I rapporten redovisas generellt sett endast de paragrafer som är formulerade som krav (d v s, som innehåller formuleringar som ”shall” eller liknande). Tabeller, figurer och fotnoter som ingår i paragraferna återges i anslutning till respektive paragraftext, medan bilagor (Appendix och Annex) generellt sett inte redovisas i F-PSAR. För referenser som anges i paragraftexterna hänvisas till referenslistan i respektive standard.

Redovisningen av kraven i denna rapport är strukturerad enligt följande:

- **Krav som specificeras i Safety Fundamentals redovisas i kapitel 1.**
- **Krav som specificeras i Safety Requirements redovisas i kapitel 2.**

I respektive kapitel redovisas kraven i tabeller som består av följande kolumner (från vänster till höger): 1) paragrafnummer; 2) paragraftexten i sin helhet; 3) tolkning och tillämpning; som omfattar

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hur kraven tolkas för tillämpning och var inom F-PSAR och anläggning Clink uppfyllande redovisas.

För krav som bedöms vara täckta av svenska författningar görs generellt sett ingen utförlig tolkning och tillämpning av IAEA-kravet. För tolkning och tillämpning av denna typ av krav hänvisas till den paragrafvisa redovisningen av motsvarande krav i den svenska författningen.

OBS att kravverifieringen i F-PSAR inte är fullt utvecklad.

För att informationen om var tillämpningen görs ska bli lättåskådlig används i tabellerna i denna rapport följande förkortningar för de dokument som hänvisas till:

- F-PSAR Allmän del kapitel 1 anges som **F-PSAR Kapitel 1**
- F-PSAR Allmän del kapitel 2 anges som **F-PSAR Kapitel 2**
- F-PSAR Allmän del kapitel 3 anges som **F-PSAR Kapitel 3**
- F-PSAR Allmän del kapitel 4 anges som **F-PSAR Kapitel 4**
- F-PSAR Allmän del kapitel 5 anges som **F-PSAR Kapitel 5**
- F-PSAR Allmän del kapitel 6 anges som **F-PSAR Kapitel 6**
- F-PSAR Allmän del kapitel 7 anges som **F-PSAR Kapitel 7**
- F-PSAR Allmän del kapitel 8 anges som **F-PSAR Kapitel 8**
- Bilaga C – Avvecklingsplan för Clink anges som **Bilaga C**
- Bilaga E – Organisation, ledning och styrning – Uppförande och driftsättning anges som **Bilaga E**
- MKB – Miljökonsekvensbeskrivning – Mellanlagring, inkapsling och slutförvaring av använt kärnbränsle anges som **MKB**
- Bilaga AH, Verksamheten och de allmänna hänsynsreglerna – slutförvarssystemet anges som **Bilaga AH**

Utöver dokumenten som anges ovan görs även mer generella hänvisningar till anläggningens framtida säkerhetstekniska driftförutsättningar (STF) och SKB:s ledningssystem, etc. För krav som tillämpas i referenser till F-PSAR Allmän del görs hänvisningen från denna rapport till respektive huvudkapitel F-PSAR Allmän del, varifrån referenserna anges.

Innehållsförteckning

Revisionsförteckning

Version	Datum	Revideringen omfattar	Utförd av	Granskad	Godkänd
1.0	2014-10-22	Uppdaterat efter sakgranskning, se kommentarer och bemötanden i SKBdoc ID 1438217 (SG nr 1) och 1451820 (SG nr 2). Justerat hänvisningar till Bilaga J istället för Kapitel 3. Nytt dokument.	Jeanette Carmström Kristina Gillin	Se sidhuvud	Se sidhuvud

1 Safety Fundamentals

1.1 SF-1 – Fundamental Safety Principles

IAEA:s *Fundamental Safety Principles* (SF-1) är toppdokumentet i IAEA Safety Standards. Syftet med rapporten är att definiera de säkerhetsmål, säkerhetsprinciper och koncept som utgör grunden för IAEA:s säkerhetsstandarder och säkerhetsrelaterade program. I standarden fastställs ett grundläggande säkerhetsmål samt tio säkerhetsprinciper för att uppnå säkerhetsmålet. Säkerhetsprinciperna omfattar bl a generella krav på ansvar, ledning och styrning, strålskydd, fysiskt skydd samt förebyggande av och beredskap för olyckor.

Såväl säkerhetsmål som säkerhetsprinciper är på övergripande nivå och tolkas och tillämpas därför inte paragrafvis i F-PSAR, eftersom säkerhetsmål och principer uppfylls indirekt genom att Clink kommer att uppfylla strålsäkerhetskraven i tillämpliga SSMFS.

2 Safety Requirements

2.1 GSR Part 4 – Safety Assessment for Facilities and Activities

Safety Assessment for Facilities and Activities (GSR Part 4) ingår i IAEA Safety Standards bland de kravstandarder som anger generella krav på kärntekniska anläggningar och verksamheter. Syftet med standarden är att specificera generella krav på säkerhetsredovisningar, härledda från IAEA:s *Fundamental Safety Principles* (SF-1), se avsnitt 1.1.

I standarden fastställs 24 generella krav på en säkerhetsredovisning, vilka bl a omfattar krav på syfte, omfattning, ansvar och ledning. I standarden ingår även krav på bedömning av bl a strålskydd, säkerhetsfunktioner, anläggningens egenskaper och MTO, samt krav angående djupförsvar och säkerhetsmarginaler, säkerhetsanalys, dokumentation och oberoende granskning.

De generella kraven på säkerhetsredovisningar i denna standard bedöms huvudsakligen gälla PSAR och SAR. I F-PSAR har standarden därför endast tillämpats på övergripande nivå, så en paragrafvis tolkning och tillämpning av standarden görs inte i detta skede.

2.2 GSR Part 5 – Predisposal Management of Radioactive Waste

Predisposal Management of Radioactive Waste (GSR Part 5) ingår i IAEA Safety Standards bland de kravstandarder som anger generella krav på kärntekniska anläggningar och verksamheter. Syftet med standarden är att specificera generella krav som gäller för alla steg i avfallshanteringen – från det att avfallet uppstår till slutförvaring. Kraven i standarden är härledda från IAEA:s *Fundamental Safety Principles* (SF-1), se avsnitt 1.1.

I standarden fastställs 22 generella krav på avfallshantering, vilka bl a omfattar krav inom följande områden:

- Skydd av människor och miljö.
- Ansvar för avfallshanteringen.
- Behandling och lagring av avfall.
- Utveckling och drift av avfallsanläggningar och -verksamheter.

De generella kraven på avfallshantering i denna standard bedöms uppfyllas indirekt genom att Clink kommer att uppfylla strålsäkerhetskraven i tillämpliga SSMFS. I F-PSAR har standarden därför endast tillämpats på övergripande nivå, så en paragrafvis tolkning och tillämpning av standarden görs inte i detta skede.

2.3 NS-R-3 – Site Evaluation for Nuclear Installations

§	NS-R-3 – Site Evaluation for Nuclear Installations	Tolkning och Tillämpning
	1. INTRODUCTION	
	Avsnitt 1 av dokumentet innehåller inga paragrafer som omfattar explicita krav på anläggningen eller SKB:s ledningssystem.	
	2. GENERAL REQUIREMENTS	
	OBJECTIVE	
2.1	The main objective in site evaluation for nuclear installations in terms of nuclear safety is to protect the public and the environment from the radiological consequences of radioactive releases due to accidents. Releases due to normal operation should also be considered. In the evaluation of the suitability of a site for a nuclear installation, the following aspects shall be considered: (a) The effects of external events occurring in the region of the particular site (these events could be of natural origin or human induced); (b) The characteristics of the site and its environment that could influence the transfer to persons and the environment of radioactive material that has been released; (c) The population density and population distribution and other characteristics of the external zone in so far as they may affect the possibility of implementing emergency measures and the need to evaluate the risks to individuals and the population.	Paragraf 2.1 – 2.3 gäller den övergripande platsvalsprocessen för anläggningen. Platsvalet ingår inte i F-PSAR utan redovisas som en del av tillståndsansökan. Försiktighetsprincipen och lokaliseringsprincipen redovisas i: - **Bilaga AH** Förläggningsplatsen redovisas i: - **F-PSAR Kapitel 2** Beskrivning av miljökonsekvenserna redovisas i: - **Bilaga MKB** - Säkerhetsanalyser redovisas i: - **F-PSAR Kapitel 8**
2.2	If the site evaluation for the three aspects cited indicates that the site is unacceptable and the deficiencies cannot be compensated for by means of design features, measures for site protection or administrative procedures, the site shall be deemed unsuitable.	Se paragraf 2.1.
	USES FOR SITE EVALUATION	
2.3	In addition to providing the technical basis for the safety analysis report to be submitted to the nuclear regulatory body, the technical information obtained for use in complying with these safety requirements will also be useful in fulfilling the requirements for the environmental impact assessment for radiological hazards.	Se paragraf 2.1.

§	NS-R-3 – Site Evaluation for Nuclear Installations	Tolkning och Tillämpning
	GENERAL CRITERIA	
2.4	Site characteristics that may affect the safety of the nuclear installation shall be investigated and assessed. Characteristics of the natural environment in the region that may be affected by potential radiological impacts in operational states and accident conditions shall be investigated. All these characteristics shall be observed and monitored throughout the lifetime of the installation.	Förläggningsplatsens egenskaper och förutsättningar ska redovisas. De egenskaper och förutsättningar som kan leda till en inledande händelse ska identifieras och händelseklassas samt analyseras i den deterministiska analysen. De egenskaper och förutsättningar som utgör del för att kunna bedöma radiologiska konsekvenser vid utsläpp ska också redovisas. Redovisningen av förläggningsplatsen ska kontinuerligt revideras om egenskaperna och förutsättningarna förändras. En miljökonsekvensbeskrivning ska upprättas och omfatta de effekter, direkta och indirekta, som verksamheten medför på människor och miljö. Kraven på beskrivning av förläggningsplatsen finns i SSMFS 2008:1 4 kap. 2 §, bilaga 2. Kraven på inventering av yttre händelser finns i SKB:s egna säkerhetskrav på konstruktion och utförande av anläggningen 11 §. Redovisningen hålls aktuell. Krav på kontinuerliga mätningar av radiologiska utsläpp till luft och vatten finns i SSMFS 2008:23. Krav på kontinuerliga mätningar av väderförhållanden finns i SSMFS 2008:15. Kraven på en miljökonsekvensbeskrivning som omfattar de direkta och indirekta effekter som verksamheten medför på människa och miljö och på hushållningen med naturresurser finns i Miljöbalken 6 kap 3 §. Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J** De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J** Bästa möjliga teknik, BAT, och ALARA redovisas i: - **Bilaga AH** Miljökonsekvensbeskrivningen redovisas i: - **MKB**
2.5	Proposed sites for nuclear installations shall be examined with regard to the frequency and severity of external natural and human induced events and phenomena that could affect the safety of the installation.	En metodik för händelseklassning av inventerade händelser på anläggningsplatsen är framtagen, se tillämpning av SSMFS 2008:1 4 kap. 1 §. De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J** Metodikerna redovisas i: - **F-PSAR kapitel 8**

§	NS-R-3 – Site Evaluation for Nuclear Installations	Tolkning och Tillämpning
2.6	The foreseeable evolution of natural and human made factors in the region that may have a bearing on safety shall be evaluated for a time period that encompasses the projected lifetime of the nuclear installation. These factors, particularly population growth and population distribution, shall be monitored over the lifetime of the nuclear installation. If necessary, appropriate measures shall be taken to ensure that the overall risk remains acceptably low. There are three means available to ensure that risks are acceptably low: design features, measures for site protection (e.g. dykes for flood control) and administrative procedures. Design features and protective measures are the preferred means of ensuring that risks are kept acceptably low.	Förläggningsplatsens redovisning ska vara framåtblickande. I redovisningen av förläggningsplatsen ska regionens förväntade utveckling ingå. Förläggningsplatsen redovisas i: - **F-PSAR Kapitel 2**
2.7	The hazards associated with external events that are to be considered in the design of the nuclear installation shall be determined. For an external event (or a combination of events) the parameters and the values of those parameters that are used to characterize the hazards should be chosen so that they can be used easily in the design of the installation.	En metodik för urval av yttre händelser är framtagen, se tillämpning av SSMFS 2008:1 4 kap. 1 §. Kombinationer av händelser definieras med övriga analysförutsättningar i metodiker för säkerhetsanalys. De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J** Metodikerna redovisas i: - **F-PSAR kapitel 8**
2.8	In the derivation of the hazards associated with external events, consideration should be given to the effects of the combination of these hazards with the ambient conditions (e.g. hydrological, hydrogeological and meteorological conditions).	Inledande händelser kombineras med 100-års extremvärden enligt metodik för säkerhetsanalys. Metodiker redovisas i: - **F-PSAR Kapitel 8** Verifierande analyser kommer att redovisas i PSAR. Systemuppbyggnad redovisas i: - **F-PSAR Kapitel 5**
2.9	In the analysis to determine the suitability of the site, consideration shall be given to additional matters relating to safety such as the storage and transport of input and output materials (uranium ore, UF_6, UO_2, etc.), fresh and spent fuel and radioactive wastes.	Hantering av transportbehållare redovisas vid inventering av händelser. Förvaring av transportbehållare redovisas i anläggningsbeskrivningen. Inventering av händelser redovisas i: - **F-PSAR Kapitel 8** Systemuppbyggnad redovisas i: - **F-PSAR Kapitel 5**
2.10	The possible non-radiological impact of the installation, due to chemical or thermal releases, and the potential for explosion and the dispersion of chemical products shall be taken into account in the site evaluation process.	De händelser som påverkar omgivningen och som inte är av radiologisk natur redovisas inte i säkerhetsredovisningen. Detta tas omhand i ansökan enligt miljöbalken. Effekter på människors hälsa och miljö, hushållning av mark etc. redovisas i: - **MKB**

§	NS-R-3 – Site Evaluation for Nuclear Installations	Tolkning och Tillämpning
2.11	The potential for interactions between nuclear and non-nuclear effluents, such as the combination of heat or chemicals with radioactive material in liquid effluents, should be considered.	Kravet bedöms främst vara riktat mot andra sorters kärntekniska anläggningar än ett bränsleförvar, såsom bränsle-fabriker och upparbetsningsanläggningar. Processen i anläggningen innebär att det högaktiva avfallet endast interagerar med vatten i bassängereller med atmosfären i torra delen av anläggningen, I övrigt är bränslet placerat i kapsel alternativt befinner sig i transportbehållaren, med en kontrollerad atmosfär. Anläggningens driftmiljö kontrolleras med avseende på renhet och närvaro av oönskade material. Krav på driftmiljön ställs bland annat i SSMFS 2008:13 2 kap. 5 §. De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J**
2.12	For each proposed site the potential radiological impacts in operational states and in accident conditions on people in the region, including impacts that could lead to emergency measures, shall be evaluated with due consideration of the relevant factors, including population distribution, dietary habits, use of land and water, and the radiological impacts of any other releases of radioactive material in the region.	Kontroll och mätning av anläggningens påverkan på omgivningen under normaldrift kravställs i 2008:23, se specifikt 11 §. Omgivningskonsekvenser vid olyckor analyseras med framtagen metodik. Metodiker för analys och inventering av inledande händelser redovisas i: - **F-PSAR Kapitel 8** Verifierande analyser kommer att redovisas i PSAR. Systemuppbyggnad redovisas i: - **F-PSAR Kapitel 5** De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J** Hushållning av mark och effekter av transporter etc. redovisas i: - **MKB**
2.13	For nuclear power plants, the total nuclear capacity to be installed on the site should be determined as far as possible at the first stages of the siting process. If it is proposed that the installed nuclear capacity be significantly increased to a level greater than that previously determined to be acceptable, the suitability of the site shall be re-evaluated, as appropriate.	Paragrafen tillämpas ej eftersom anläggningen inte är en kärnkraftsreaktor.

§	NS-R-3 – Site Evaluation for Nuclear Installations	Tolkning och Tillämpning
	CRITERIA FOR HAZARDS ASSOCIATED WITH EXTERNAL NATURAL AND HUMAN INDUCED EVENTS	
2.14	Proposed sites shall be adequately investigated with regard to all the site characteristics that could be significant to safety in external natural and human induced events.	Kravet tolkas som att samtliga förhållanden på förläggningsplatsen ska beskrivas så att förutsättningarna vid utvärdering av olika händelser är kända. Kravet på redovisning av förläggningsplatsen och dess omgivning återfinns i SSMFS 2008:1 4 kap. 2 §, bilaga 2. De förhållanden som beaktas vid analys av olika händelser redovisas i framtagna metodiker för deterministisk analys. Förläggningsplatsen redovisas i: - **F-PSAR Kapitel 2** Metodiker för analys och inventering av inledande händelser redovisas i: - **F-PSAR Kapitel 8** Verifierande analyser kommer att redovisas i PSAR. De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J** Effekter på människors hälsa och miljö, hushållning av mark etc. redovisas i: - **MKB**
2.15	Possible natural phenomena and human induced situations and activities in the region of a proposed site shall be identified and evaluated according to their significance for the safe operation of the nuclear installation. This evaluation should be used to identify the important natural phenomena or human induced situations and activities in association with which potential hazards are to be investigated.	Samtliga mänskliga och naturliga aktiviteter som kan påverka förläggningsplatsen ska redovisas. Redovisningen ska användas vid identifiering av inledande händelser med efterföljande analyser. Redovisning av markanvändning, demografi och kritisk grupp påvisas. En metodik för analys och inventering av inledande händelser är framtagen enligt SSMFS 2008:1 4 kap. 1 §. Förläggningsplatsen redovisas i: - **F-PSAR Kapitel 2** Metodik för analys och inventering av inledande händelser redovisas i: - **F-PSAR Kapitel 8** De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J** Effekter på människors hälsa och miljö, hushållning av mark etc. redovisas i: - **MKB**

§	NS-R-3 – Site Evaluation for Nuclear Installations	Tolkning och Tillämpning
2.16	Foreseeable significant changes in land use shall be considered, such as the expansion of existing installations and human activities or the construction of high risk installations.	Ändringar i regionen ska bevakas och om förutsättningar för genomförda analyser ändras ska nya analyser genomföras. I redovisningen av förläggningsplatsen ska regionens förväntade utveckling ingå. Vid förändringar som innebär att analysförutsättningar förändras ska analyser uppdateras så att dessa hålls aktuella enligt krav i SSMFS 2008:1 4 kap. 1 §. Förläggningsplatsen redovisas i: - **F-PSAR Kapitel 2** De identifierade kravkällorna för anläggningen anges i: - **Bilaga J** Hushållning av mark och effekter av verksamhet ska redovisas i: - **MKB**
2.17	Prehistorical, historical and instrumentally recorded information and records, as applicable, of the occurrences and severity of important natural phenomena or human induced situations and activities shall be collected for the region and shall be carefully analysed for reliability, accuracy and completeness.	Vid inventering av inledande händelser ska empirisk data användas i så stor utsträckning som möjligt. Studerat underlag får endast användas om källan bedöms vara av tillräcklig kvalitet. Statistiskt underlag för omgivningen tas fram och redovisas för förläggningsplatsen. En metodik för analys och inventering av inledande händelser är framtagen enligt SSMFS 2008:1 4 kap. 1 §. Förläggningsplatsen och statistiskt underlag för omgivningen redovisas i: - **F-PSAR Kapitel 2** Metodik för inventering av inledande händelser redovisas i: - **F-PSAR Kapitel 8**
2.18	Appropriate methods shall be adopted for establishing the hazards that are associated with major external phenomena. The methods shall be justified in terms of being up to date and compatible with the characteristics of the region. Special consideration should be given to applicable probabilistic methodologies. It should be noted that probabilistic hazard curves are generally needed to conduct probabilistic safety assessments for external events.	En metodik för urval av yttre händelser är framtagen, se tillämpning av SSMFS 2008:1 4 kap. 1 §. Metodik för urval av yttre händelser redovisas i : - **F-PSAR Kapitel 8**
2.19	The size of the region to which a method for establishing the hazards associated with major external phenomena is to be applied shall be large enough to include all the features and areas that could be of significance in the determination of the natural and human induced phenomena under consideration and for the characteristics of the event.	Redovisningen av förläggningsplatsen ska också beakta förläggningsplatsens omgivning och de fenomen som kan uppstå där. Redovisningen av förläggningsplatsen kravställs i SSMFS 2008:1 4 kap. 2 §, bilaga 2. Förläggningsplatsen redovisas i: - **F-PSAR Kapitel 2** De identifierade kravkällorna för anläggningen anges i: - **Bilaga J**

§	NS-R-3 – Site Evaluation for Nuclear Installations	Tolkning och Tillämpning
2.20	Major natural and human induced phenomena shall be expressed in terms that can be used as input for deriving the hazards associated with the nuclear installation; that is, appropriate parameters for describing the hazard should be selected or developed.	Dimensionerande parametrar ska definieras för de händelser som identifieras. Metodiker för händelseurval och deterministisk analys tas fram enligt tillämpning av 2008:1 4 kap. 1 § och egna säkerhetskrav på konstruktion och utförande av anläggningen 11 §. Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J** De identifierade kravkällorna för anläggningen anges i: - **Bilaga J**
2.21	In the determination of hazards, site specific data shall be used, unless such data are unobtainable. In this case, data from other regions that are sufficiently relevant to the region of interest may be used in the determination of hazards. Appropriate and acceptable simulation techniques may also be used. In general, data obtained for similar regions and simulation techniques may also be used to augment the site specific data.	I de fall där statistisk data inte finns tillgänglig kan data extrapoleras från andra liknande regioner eller simuleras om en tillförlitlig metodik används. Metodiker för urval av yttre händelser tillämpas och redovisas i: - **F-PSAR Kapitel 8**
	CRITERIA FOR DETERMINING THE POTENTIAL EFFECTS OF THE NUCLEAR INSTALLATION IN THE REGION	
2.22	In the evaluation of a site to determine its potential radiological impact on the region for operational states and accident conditions that could lead to emergency measures, appropriate estimates shall be made of expected or potential releases of radioactive material, with account taken of the design of the installation and its safety features. These estimates shall be confirmed when the design and its safety features have been confirmed.	Radiologiska utsläpp under normaldrift och vid inledande händelser ska uppskattas som underlag till omgivnings-konsekvensberäkningar. Uppmätning och uppskattningar av utsläpp under drift kravställs i SSMFS 2008:23, se specifikt 11 §. En metodik för utsläppsanalys finns enligt tillämpning av SSMFS 2008:1. De identifierade kravkällorna för anläggningen anges i: - **Bilaga J** Metodik för utsläppsanalyser redovisas i: - **F-PSAR Kapitel 8** Bästa möjliga teknik beaktas och ALARA principen följs redovisas i: - **Bilaga AH** Effekter på människors hälsa och miljö ska redovisas i: - **MKB**

§	NS-R-3 – Site Evaluation for Nuclear Installations	Tolkning och Tillämpning
2.23	The direct and indirect pathways by which radioactive material released from the nuclear installation could potentially reach and affect people and the environment shall be identified and evaluated; in such an evaluation specific regional and site characteristics shall be taken into account, with special attention paid to the function of the biosphere in the accumulation and transport of radionuclides.	Spridningsvägar som leder till exponering av radiologiska utsläpp för allmänheten identifieras. Detaljerade beskrivningar och antaganden om spridningsvägar görs som en del av säkerhetsanalyserna, som inte är fullständiga i F-PSAR. Förläggningsplatsen redovisas i: - **F-PSAR Kapitel 2** Metodiker för analys och inventering av inledande händelser redovisas i: - **F-PSAR Kapitel 8** Bästa möjliga teknik beaktas och ALARA principen följs redovisas i: - **Bilaga AH** Verifierande analyser kommer att redovisas i PSAR.
2.24	The site and the design for the nuclear installation shall be examined in conjunction to ensure that the radiological risk to the public and the environment associated with radioactive releases is acceptably low.	Kravet sammanfaller med anläggningens säkerhetsmål. Anläggningen ska förhindra radiologiska olyckor för att skydda människor och miljö från skadlig verkan av joniserande strålning. Detta så långt som är rimligt och möjligt samt med beaktande av principen att ta tillvara bästa möjliga teknik. Säkerhetsmålet och principer för hur det uppfylls beskrivs i: - **F-PSAR Kapitel 3** Bästa möjliga teknik beaktas och ALARA principen följs redovisas i: - **Bilaga AH** Effekter på människors hälsa och miljö ska redovisas i : - **MKB**
2.25	The design of the installation shall be such as to compensate for any unacceptable potential effects of the nuclear installation on the region, or otherwise the site shall be deemed unsuitable.	Kravet sammanfaller med anläggningens säkerhetsmål. Anläggningen ska förhindra radiologiska olyckor för att skydda människor och miljö från skadlig verkan av joniserande strålning. Detta så långt som är rimligt och möjligt samt med beaktande av principen att ta tillvara bästa möjliga teknik. Säkerhetsmålet och principer för hur det uppfylls beskrivs i: - **F-PSAR Kapitel 3** Bästa möjliga teknik beaktas och ALARA principen följs redovisas i: - **Bilaga AH** Effekter på människors hälsa och miljö ska redovisas i: - **MKB**

§	NS-R-3 – Site Evaluation for Nuclear Installations	Tolkning och Tillämpning
	CRITERIA DERIVED FROM CONSIDERATIONS OF POPULATION AND EMERGENCY PLANNING	
2.26	The proposed region shall be studied to evaluate the present and foreseeable future characteristics and the distribution of the population of the region. Such a study shall include the evaluation of present and future uses of land and water in the region and account shall be taken of any special characteristics that may affect the potential consequences of radioactive releases for individuals and the population as a whole.	För att kunna bedöma konsekvenserna av en olycka på förläggningsplatsen ska områdets demografi och viktiga funktioner redovisas och utvärderas. Hänsyn ska tas både till nuläge och till förväntad utveckling. Förläggningsplatsredovisningen omfattar indata till utsläppsanalyser i form av demografi, markanvändning, vatten-användning samt definierar den kritiska gruppen. Redovisningen är framåtriktad så att konservativa data används som indata till analyserna. Förläggningsplatsen redovisas i: - **F-PSAR Kapitel 2** Försiktighets- respektive lokaliseringsprincipen redovisas i: - **Bilaga AH** Effekter på människors hälsa och miljö ska redovisas i: - **MKB**
2.27	In relation to the characteristics and distribution of the population, the combined effects of the site and the installation shall be such that: (a) For operational states of the installation the radiological exposure of the population remains as low as reasonably achievable and in any case is in compliance with national requirements, with account taken of international recommendations; (b) The radiological risk to the population associated with accident conditions, including those that could lead to emergency measures being taken, is acceptably low.	SSMFS 2008:23 ställer krav på maximalt tillåtna utsläpp och på optimering av utsläppen. Acceptanskriterier för omgivningskonsekvenser i olika händelseklasser definieras i egna säkerhetskrav på konstruktion och utförande av anläggningen. Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J** De identifierade kravkällorna för anläggningen anges i: - **Bilaga J** Bästa möjliga teknik beaktas och ALARA principen följs redovisas i: - **Bilaga AH**
2.28	If, after thorough evaluation, it is shown that no appropriate measures can be developed to meet the above mentioned requirements, the site shall be deemed unsuitable for the location of a nuclear installation of the type proposed.	Förläggningsplatsen är vald efter omfattande platsutvärdering, inklusive miljökonsekvensbeskrivning och värdering av alternativa förläggningsplatser. Förläggningsplatsen redovisas i: - **F-PSAR Kapitel 2**
2.29	The external zone for a proposed site shall be established with account taken of the potential for radiological consequences for people and the feasibility of implementing emergency plans, and of any external events or phenomena that may hinder their implementation. Before construction of the plant is started, it shall be confirmed that there will be no insurmountable difficulties in establishing an emergency plan for the external zone before the start of operation of the plant.	Kraven på beredskap vid olyckor utvecklas i SSMFS 2008:15. Kritisk grupp definieras i samband med beskrivningen av demografin på förläggningsplatsen. Förläggningsplatsen redovisas i: - **F-PSAR Kapitel 2** De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J**

§	NS-R-3 – Site Evaluation for Nuclear Installations	Tolkning och Tillämpning
	3. SPECIFIC REQUIREMENTS FOR EVALUATION OF EXTERNAL EVENTS EARTHQUAKES AND SURFACE FAULTING[2] [2] See Refs [2, 3]. **Earthquakes**	
3.1	The seismological and geological conditions in the region and the engineering geological aspects and geotechnical aspects of the proposed site area shall be evaluated.	Samtliga möjliga förhållanden och fenomen som anges i paragraf 3.1-3.55 ska beaktas i säkerhetsredovisningen av anläggningen. De förhållanden och fenomen som har säkerhetsbetydelse för anläggningen – antingen som förhållande vid konstruktion av anläggningen eller som inledande händelse ska beskrivas och redovisas som en del av beskrivningen av förläggningsplatsen och dess omgivning. Händelser som hotar anläggningen ska ingå i urvalsprocessen för yttre händelser och händelseklassas samt analyseras för aktuell anläggning. Förhållanden som finns på förläggningsplatsen eller som bedöms sannolika att inträffa inom händelseklass H1-H4 beskrivs. En metodik för urval av yttre händelser finns framtagen enligt tillämpning av egna säkerhetskrav på konstruktion och utförande av anläggningen. Händelser händelseklassas enligt metodik framtagen enligt tillämpning av egna säkerhetskrav på konstruktion och utförande av anläggningen. Förläggningsplatsen redovisas i: - **F-PSAR Kapitel 2** Metodik för och resultat av urval av yttre händelser redovisas i: - **F-PSAR Kapitel 8** Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J** Bästa möjliga teknik beaktas och ALARA följs redovisas i: - **Bilaga AH** Effekter på människors hälsa och miljö, hushållning av mark etc. redovisas i: - **MKB**
3.2	Information on prehistorical, historical and instrumentally recorded earthquakes in the region shall be collected and documented.	Se paragraf 3.1.
3.3	The hazards associated with earthquakes shall be determined by means of seismotectonic evaluation of the region with the use to the greatest possible extent of the information collected.	Se paragraf 3.1.

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3.4	Hazards due to earthquake induced ground motion shall be assessed for the site with account taken of the seismotectonic characteristics of the region and specific site conditions. A thorough uncertainty analysis shall be performed as part of the evaluation of seismic hazards.	Se paragraf 3.1.
	Surface faulting	
3.5	The potential for surface faulting (i.e. the fault capability) shall be assessed for the site. The methods to be used and the investigations to be made shall be sufficiently detailed that a reasonable decision can be reached using the definition of fault capability given in para. 3.6.	Se paragraf 3.1.
3.6	A fault shall be considered capable if, on the basis of geological, geophysical, geodetic or seismological data, one or more of the following conditions applies: (a) It shows evidence of past movement or movements (significant deformations and/or dislocations) of a recurring nature within such a period that it is reasonable to infer that further movements at or near the surface could occur. In highly active areas, where both earthquake data and geological data consistently reveal short earthquake recurrence intervals, periods of the order of tens of thousands of years may be appropriate for the assessment of capable faults. In less active areas, it is likely that much longer periods may be required. (b) A structural relationship with a known capable fault has been demonstrated such that movement of the one may cause movement of the other at or near the surface. (c) The maximum potential earthquake associated with a seismogenic structure is sufficiently large and at such a depth that it is reasonable to infer that, in the geodynamic setting of the site, movement at or near the surface could occur.	Se paragraf 3.1.
3.7	Where reliable evidence shows the existence of a capable fault that has the potential to affect the safety of the nuclear installation, an alternative site shall be considered.	Se paragraf 3.1.
	METEOROLOGICAL EVENTS	
3.8	The extreme values of meteorological variables and rare meteorological phenomena listed below shall be investigated for the site of any installation. The meteorological and climatological characteristics for the region around the site shall be investigated (see Ref. [4]).	Se paragraf 3.1.
	Extreme values of meteorological phenomena	
3.9	In order to evaluate their possible extreme values, the following meteorological phenomena shall be documented for an appropriate period of time: wind, precipitation, snow, temperature and storm surges.	Se paragraf 3.1.

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3.10	The output of the site evaluation shall be described in a way that is suitable for design purposes for the plant, such as the probability of exceedance values relevant to design parameters. Uncertainties in the data shall be taken into account in this evaluation.	Se paragraf 3.1.
	Rare meteorological events	
	Lightning	
3.11	The potential for the occurrence and the frequency and severity of lightning shall be evaluated for the site.	Se paragraf 3.1.
	Tornadoes	
3.12	The potential for the occurrence of tornadoes in the region of interest shall be assessed on the basis of detailed historical and instrumentally recorded data for the region.	Se paragraf 3.1.
3.13	The hazards associated with tornadoes shall be derived and expressed in terms of parameters such as rotational wind speed, translational wind speed, radius of maximum rotational wind speed, pressure differentials and rate of change of pressure.	Se paragraf 3.1.
3.14	In the assessment of the hazard, missiles that could be associated with tornadoes shall be considered.	Se paragraf 3.1.
	Tropical cyclones	
3.15	The potential for tropical cyclones in the region of the site shall be evaluated. If this evaluation shows that there is evidence of tropical cyclones or a potential for tropical cyclones, related data shall be collected.	Se paragraf 3.1.
3.16	On the basis of the available data and the appropriate physical models, the hazards associated with tropical cyclones shall be determined in relation to the site. Hazards for tropical cyclones include factors such as extreme wind speed, pressure and precipitation.	Se paragraf 3.1.
3.17	In the assessment of the hazards, missiles that could be associated with tropical cyclones shall be considered.	Se paragraf 3.1.
	FLOODING[3] [3] See Ref. [5].	
	Floods due to precipitation and other causes	
3.18	The region shall be assessed to determine the potential for flooding due to one or more natural causes such as runoff resulting from precipitation or snow melt, high tide, storm surge, seiche and wind waves that may affect the safety of the nuclear installation. If there is a potential for flooding, then all pertinent data, including historical data, both meteorological and hydrological, shall be collected and critically examined.	Se paragraf 3.1.

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3.19	A suitable meteorological and hydrological model shall be developed with account taken of the limits on the accuracy and quantity of the data, the length of the historical period over which the data were accumulated, and all known past changes in relevant characteristics of the region.	Se paragraf 3.1.
3.20	The possible combinations of the effects of several causes shall be examined. For example, for coastal sites and sites on estuaries, the potential for flooding by a combination of high tide, wind effects on bodies of water and wave actions, such as those due to cyclones, shall be assessed and taken into account in the hazard model.	Se paragraf 3.1.
3.21	The hazards for the site due to flooding shall be derived from the model.	Se paragraf 3.1.
3.22	The parameters used to characterize the hazards due to flooding shall include the height of the water, the height and period of the waves (if relevant), the warning time for the flood, the duration of the flood and the flow conditions.	Se paragraf 3.1.
3.23	The potential for instability of the coastal area or river channel due to erosion or sedimentation shall be investigated.	Se paragraf 3.1.
	Water waves induced by earthquakes or other geological phenomena	
3.24	The region shall be evaluated to determine the potential for tsunamis or seiches that could affect the safety of a nuclear installation on the site.	Se paragraf 3.1.
3.25	If there is found to be such a potential, prehistorical and historical data relating to tsunamis or seiches affecting the shore region around the site shall be collected and critically evaluated for their relevance to the evaluation of the site and their reliability.	Se paragraf 3.1.
3.26	On the basis of the available prehistorical and historical data for the region and comparison with similar regions that have been well studied with regard to these phenomena, the frequency of occurrence, magnitude and height of regional tsunamis or seiches shall be estimated and shall be used in determining the hazards associated with tsunamis or seiches, with account taken of any amplification due to the coastal configuration at the site.	Se paragraf 3.1.
3.27	The potential for tsunamis or seiches to be generated by regional offshore seismic events shall be evaluated on the basis of known seismic records and seismotectonic characteristics.	Se paragraf 3.1.

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3.28	The hazards associated with tsunamis or seiches shall be derived from known seismic records and seismotectonic characteristics as well as from physical and/or analytical modelling. These include potential draw-down and runup[4] that may result in physical effects on the site. [4] Draw-down is a falling of the water level at a coastal site. Runup is a sudden surge of water up a beach or a structure.	Se paragraf 3.1.
	Floods and waves caused by failure of water control structures	
3.29	Information relating to upstream water control structures shall be analysed to determine whether the nuclear installation would be able to withstand the effects resulting from the failure of one or more of the upstream structures.	Se paragraf 3.1.
3.30	If the nuclear installation could safely withstand all the effects of the massive failure of one or more of the upstream structures, then the structures need be examined no further in this regard.	Se paragraf 3.1.
3.31	If a preliminary examination of the nuclear installation indicates that it might not be able to withstand safely all the effects of the massive failure of one or more of the upstream structures, then the hazards associated with the nuclear installation shall be assessed with the inclusion of all such effects; otherwise such upstream structures shall be analysed by means of methods equivalent to those used in determining the hazards associated with the nuclear installation to show that the structures could survive the event concerned.	Se paragraf 3.1.
3.32	The possibility of storage of water as a result of the temporary blockage of rivers upstream or downstream (e.g. caused by landslides or ice) so as to cause flooding and associated phenomena at the proposed site shall be examined.	Se paragraf 3.1.
	GEOTECHNICAL HAZARDS[5] [5] See Ref. [2]. **Slope instability**	
3.33	The site and its vicinity shall be evaluated to determine the potential for slope instability (such as land and rock slides and snow avalanches) that could affect the safety of the nuclear installation.	Se paragraf 3.1.
3.34	If there is found to be a potential for slope instability that could affect the safety of the nuclear installation, the hazard shall be evaluated by using parameters and values for the site specific ground motion.	Se paragraf 3.1.

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	Collapse, subsidence or uplift of the site surface	
3.35	Geological maps and other appropriate information for the region shall be examined for the existence of natural features such as caverns, karstic formations and human made features such as mines, water wells and oil wells. The potential for collapse, subsidence or uplift of the site surface shall be evaluated.	Se paragraf 3.1.
3.36	If the evaluation shows that there is a potential for collapse, subsidence or uplift of the surface that could affect the safety of the nuclear installation, practicable engineering solutions shall be provided or otherwise the site shall be deemed unsuitable.	Se paragraf 3.1.
3.37	If there do seem to be practicable engineering solutions available, a detailed description of subsurface conditions obtained by reliable methods of investigation shall be developed for the purposes of determination of the hazards.	Se paragraf 3.1.
	Soil liquefaction	
3.38	The potential for liquefaction of the subsurface materials of the proposed site shall be evaluated by using parameters and values for the site specific ground motion.	Se paragraf 3.1.
3.39	The evaluation shall include the use of accepted methods of soil investigation and analytical methods to determine the hazards.	Se paragraf 3.1.
3.40	If the potential for soil liquefaction is found to be unacceptable, the site shall be deemed unsuitable unless practicable engineering solutions are demonstrated to be available.	Se paragraf 3.1.
	Behaviour of foundation materials	
3.41	The geotechnical characteristics of the subsurface materials, including the uncertainties in them, shall be investigated and a soil profile for the site in a form suitable for design purposes shall be determined.	Se paragraf 3.1.
3.42	The stability of the foundation material under static and seismic loading shall be assessed.	Se paragraf 3.1.
3.43	The groundwater regime and the chemical properties of the groundwater shall be studied.	Se paragraf 3.1.
	EXTERNAL HUMAN INDUCED EVENTS[6, 7] [6] Wilful actions that may potentially affect the site area are excluded from consideration here. [7] See Ref. [6]. **Aircraft crashes**	
3.44	The potential for aircraft crashes on the site shall be assessed with account taken, to the extent practicable, of characteristics of future air traffic and aircraft.	Se paragraf 3.1.
3.45	If the assessment shows that there is a potential for an aircraft crash on the site that could affect the safety of the installation, then an assessment of the hazards shall be made.	Se paragraf 3.1.

§	NS-R-3 – Site Evaluation for Nuclear Installations	Tolkning och Tillämpning
3.46	The hazards associated with an aircraft crash to be considered shall include impact, fire and explosions.	Se paragraf 3.1.
3.47	If the assessment indicates that the hazards are unacceptable and if no practicable solutions are available, then the site shall be deemed unsuitable.	Se paragraf 3.1.
	Chemical explosions	
3.48	Activities in the region that involve the handling, processing, transport and storage of chemicals having a potential for explosions or for the production of gas clouds capable of deflagration or detonation shall be identified.	Se paragraf 3.1.
3.49	Hazards associated with chemical explosions shall be expressed in terms of overpressure and toxicity (if applicable), with account taken of the effect of distance.	Se paragraf 3.1.
3.50	A site shall be considered unsuitable if such activities take place in its vicinity and there are no practicable solutions available.	Se paragraf 3.1.
	Other important human induced events	
3.51	The region shall be investigated for installations (including installations within the site boundary) in which flammable, explosive, asphyxiant, toxic, corrosive or radioactive materials are stored, processed, transported and otherwise dealt with that, if released under normal or accident conditions, could jeopardize the safety of the installation. This investigation shall also include installations that may give rise to missiles of any type that could affect the safety of the nuclear installation. The potential effects of electromagnetic interference, eddy currents in the ground and the clogging of air or water inlets by debris shall also be evaluated. If the effects of such phenomena and occurrences would produce an unacceptable hazard and if no practicable solution is available, the site shall be deemed unsuitable.	Se paragraf 3.1.
	OTHER IMPORTANT CONSIDERATIONS[8] [8] See Ref. [7].	
3.52	Historical data concerning phenomena that have the potential to give rise to adverse effects on the safety of the nuclear installation, such as volcanism, sand storms, severe precipitation, snow, ice, hail, and subsurface freezing of subcooled water (frazil), shall be collected and assessed. If the potential is confirmed, the hazard shall be assessed and design bases for these events shall be derived.	Se paragraf 3.1.

§	NS-R-3 – Site Evaluation for Nuclear Installations	Tolkning och Tillämpning
3.53	In the design of systems for long term heat removal from the core, site related parameters, such as the following, should be considered: (a) Air temperature and humidity; (b) Water temperatures; (c) Available flow of water, minimum water level and the period of time for which safety related sources of cooling water are at a minimum level, with account taken of the potential for failure of water control structures.	Se paragraf 3.1.
3.54	Potential natural and human induced events that could cause a loss of function of systems required for the long term removal of heat from the core shall be identified, such as the blockage or diversion of a river, the depletion of a reservoir, an excessive amount of marine organisms, the blockage of a reservoir or cooling tower by freezing or the formation of ice, ship collisions, oil spills and fires. If the probabilities and consequences of such events cannot be reduced to acceptable levels, then the hazards for the nuclear installation associated with such events shall be established.	Se paragraf 3.1.
3.55	If the hazards for the nuclear installation are unacceptable and no practicable solution is available, the site shall be deemed unsuitable.	Se paragraf 3.1.

§	NS-R-3 – Site Evaluation for Nuclear Installations	Tolkning och Tillämpning
	4. SITE CHARACTERISTICS AND THE POTENTIAL EFFECTS OF THE NUCLEAR INSTALLATION IN THE REGION[9] [9] See Ref. [8]. ATMOSPHERIC DISPERSION OF RADIOACTIVE MATERIAL	
4.1	A meteorological description of the region shall be developed, including descriptions of the basic meteorological parameters, regional orography and phenomena such as wind speed and direction, air temperature, precipitation, humidity, atmospheric stability parameters, and prolonged inversions.	Meteorologiska förhållanden ingår i redovisningen av förläggningsplatsen och dess omgivningar. Förläggningsplatsen redovisas i: - **F-PSAR Kapitel 2**
4.2	A programme for meteorological measurements shall be prepared and carried out at or near the site with the use of instrumentation capable of measuring and recording the main meteorological parameters at appropriate elevations and locations. Data from at least one full year shall be collected, together with any other relevant data that may be available from other sources.	Kraven på mätutrustning för meteorologiska parametrar tillämpas enligt 2008:15 33-34 §§. De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J**
4.3	On the basis of the data obtained from the investigation of the region, the atmospheric dispersion of radioactive material released shall be assessed with the use of appropriate models. These models shall include all significant site specific and regional topographic features and characteristics of the installation that may affect atmospheric dispersion.	Spridningsberäkningar genomförs enligt framtagen metodik för utsläppsberäkningar, se tillämpning av SSMFS 2008:1 4. kap 1 §. De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J**
	DISPERSION OF RADIOACTIVE MATERIAL THROUGH SURFACE WATER	
4.4	A description of the surface hydrological characteristics of the region shall be developed, including descriptions of the main characteristics of water bodies, both natural and artificial, the major structures for water control, the locations of water intake structures and information on water use in the region.	Grundläggande spridningsvägar redovisas för förläggningsplatsen. Förläggningsplatsen redovisas i: - **F-PSAR Kapitel 2**
4.5	A programme of investigation and measurements of the surface hydrology shall be carried out to determine to the extent necessary the dilution and dispersion characteristics for water bodies, the reconcentration ability of sediments and biota, and the determination of transfer mechanisms of radionuclides in the hydrosphere and of exposure pathways.	Mätning och uppföljning av radiologiska utsläpp till omgivningen kravställs i SSMFS 2008:23, se specifikt 11-12 §§. De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J**

§	NS-R-3 – Site Evaluation for Nuclear Installations	Tolkning och Tillämpning
4.6	An assessment of the potential impact of the contamination of surface water on the population shall be performed by using the collected data and information in a suitable model.	Omgivningspåverkan från normaldriftutsläpp till kritisk grupp analyseras och redovisas enligt tillämpning av 2008:23 5 §. De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J** ALARA redovisas i: **- Bilaga AH** Effekter på människors hälsa och miljö, hushållning av mark etc. redovisas i: - **MKB**
	DISPERSION OF RADIOACTIVE MATERIAL THROUGH GROUNDWATER	
4.7	A description of the groundwater hydrology of the region shall be developed, including descriptions of the main characteristics of the water bearing formations, their interaction with surface waters and data on the uses of groundwater in the region.	Grundvattenregimen på förläggningsplatsen undersöks och redovisas. Förläggningsplatsen redovisas i: - **F-PSAR Kapitel 2**
4.8	A programme of hydrogeological investigations shall be carried out to permit the assessment of radionuclide movement in hydrogeological units. This programme should include investigations of the migration and retention characteristics of the soils, the dilution and dispersion characteristics of the aquifers, and the physical and physicochemical properties of underground materials, mainly related to transfer mechanisms of radionuclides in groundwater and their exposure pathways.	Mätning och uppföljning av radiologiska utsläpp till omgivningen kravställs i SSMFS 2008:23, se specifikt 11-12 §§. De identifierade kravkällornaför anläggningen redovisas i: - **Bilaga J** Mätsystem för utsläpp till luft och vatten redovisas i: - **F-PSAR Kapitel 6**
4.9	An assessment of the potential impact of the contamination of groundwater on the population shall be performed by using the data and information collected in a suitable model.	Omgivningspåverkan från normaldriftutsläpp till kritisk grupp analyseras och redovisas enligt tillämpning av 2008:23 5 §. De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J**
	POPULATION DISTRIBUTION	
4.10	The distribution of the population within the region shall be determined.	Demografin beskrivs runt förläggningsplatsen. Förläggningsplatsen redovisas i: - **F-PSAR Kapitel 2**
4.11	In particular, information on existing and projected population distributions in the region, including resident populations and to the extent possible transient populations, shall be collected and kept up to date over the lifetime of the installation. The radius within which data are to be collected should be chosen on the basis of national practices, with account taken of special situations. Special attention shall be paid to the population living in the immediate vicinity of the installation, to densely populated areas and population centres in the region, and to residential institutions such as schools, hospitals and prisons.	Redovisningen av förläggningsplatsen är framåtriktad. Kritisk grupp definieras som den grupp av människor som till följd av levnadsvanor, ålder eller vistelseort får högre dostillskott än andra till följd av utsläpp av radioaktiva ämnen till omgivningen. Förläggningsplatsen och kritisk grupp redovisas i: - **F-PSAR Kapitel 2**

§	NS-R-3 – Site Evaluation for Nuclear Installations	Tolkning och Tillämpning
4.12	The most recent census data for the region, or information obtained by extrapolation of the most recent census data, shall be used in obtaining the population distribution. In the absence of reliable data, a special study shall be carried out.	Redovisningen av förläggningsplatsen är framåtriktad. Förläggningsplatsen redovisas i: - **F-PSAR Kapitel 2**
4.13	The data shall be analysed to give the population distribution in terms of the direction and distance from the plant. An evaluation shall be performed of the potential radiological impacts of normal discharges and accidental releases of radioactive material, including reasonable consideration of releases due to severe accidents, with the use of site specific parameters as appropriate.	Konsekvenserna av normaldriftutsläpp tillämpas enligt SSMFS 2008:23 5 §. En metodik för utsläppsanalys vid olika händelser används för att verifiera att acceptanskriterier för omgivningskonsekvenser innehålls. Metodiken tas fram enligt tillämpning av SSMFS 2008:1 4 kap. 1 § och acceptanskriterierna för analyserna utveckas i egna säkerhetskrav på konstruktion och utförande av anläggningen. Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J** De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J** Metodik för utsläppsanalyser redovisas i : - **F-PSAR Kapitel 8**
	USES OF LAND AND WATER IN THE REGION	
4.14	The uses of land and water shall be characterized in order to assess the potential effects of the nuclear installation in the region and particularly for the purposes of preparing emergency plans. The investigation should cover land and water bodies that may be used by the population or may serve as a habitat for organisms in the food chain.	Nyttjande av markområden redovisas för förläggningsplatsen. Förläggningsplatsen redovisas i: - **F-PSAR Kapitel 2** Lokaliseringsprincipen redovisas i : - **Bilaga AH** Effekter på människors hälsa och miljö, hushållning av mark etc. redovisas i: - **MKB**
	AMBIENT RADIOACTIVITY	
4.15	Before commissioning of the nuclear installation the ambient radioactivity of the atmosphere, hydrosphere, lithosphere and biota in the region shall be assessed so as to be able to determine the effects of the installation. The data obtained are intended for use as a baseline in future investigations.	Då platsvalet redan är gjort och det finns tre ytterligare anläggningar inom samma förläggningsplats bedöms det inte vara rimligt eller möjligt att genomföra en korrekt bedömning av bakgrundsstrålningen för referens. Det kan konstateras att det finns acceptanskriterier för dosrater från normaldrift i SSMFS 2008:23 5 § samt för allmänhet och personal i verksamhet med joniserande strålning i 2008:51 som ska innehållas. De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J** - Effekter på människors hälsa och miljö, hushållning av mark etc. redovisas i: - **MKB**

§	NS-R-3 – Site Evaluation for Nuclear Installations	Tolkning och Tillämpning
	5. MONITORING OF HAZARDS	
5.1	The characteristics of the natural and human induced hazards as well as the demographic, meteorological and hydrological conditions of relevance to the nuclear installation shall be monitored over the lifetime of the nuclear installation. This monitoring shall be commenced no later than the start of construction and shall be continued up until decommissioning. All the hazards and conditions that are considered in this Safety Requirements publication and that are pertinent to the licensing and safe operation of the installation shall be monitored.	Miljöövervakningssystemet, inklusive omgivningskontroll, är samordnat med övrig kärnteknisk verksamhet på Simpevarps-halvön. Meteorologiska, hydrologiska, geologiska och seismologiska observationer i anslutning till förläggningsplatsen redovisas i: - **F-PSAR Kapitel 2** Anläggningens utsläpp redovisas i: - **F-PSAR Kapitel 6** Hänvisning till SSMFS 2008:23 10§
	6. QUALITY ASSURANCE[10] [10] See Ref. [9].	
6.1	An adequate quality assurance programme shall be established to control the effectiveness of the execution of the site investigations and assessments and engineering activities performed in the different stages of the site evaluation for the nuclear installation.	Paragraf 6.1 – 6.9 anger övergripande krav för kvalitetssäkring. Kvalitetssäkring kravställs och uppfylls genom att verksameten under alla anläggningens skeden följer SKB:s ledningssystem. Organisation, styrning och ledning under drift redovisas i: - **F-PSAR Kapitel 4** Förberedelse för drift av Clink redovisas i: - **Bilaga E**
6.2	The quality assurance programme shall cover the organization, planning, work control, personnel qualification and training, verification and documentation for the activities to ensure that the required quality of the work is achieved.	Se paragraf 6.1.
6.3	The quality assurance programme is a part of the overall quality assurance programme for the nuclear installation. However, since activities for site investigation are normally initiated long before the establishment of a nuclear project, the quality assurance programme should be established at the earliest possible time consistent with its application in the conduct of site evaluation activities for the nuclear installation.	Se paragraf 6.1.
6.4	The results of the activities for site investigation should be compiled in a report that documents the results of all in situ work, laboratory tests and geotechnical analyses and evaluations.	Se paragraf 6.1.
6.5	The results of studies and investigations shall be documented in sufficient detail to permit an independent review.	Se paragraf 6.1.
6.6	A quality assurance programme shall be implemented for all activities that may influence safety or the derivation of parameters for the design basis for the site. The quality assurance programme may be graded in accordance with the importance to safety of the individual siting activity under consideration.	Se paragraf 6.1.

§	NS-R-3 – Site Evaluation for Nuclear Installations	Tolkning och Tillämpning
6.7	The process of establishing site related parameters and evaluations involves technical and engineering analyses and judgements that require extensive experience and knowledge. In many cases the parameters and analyses may not lend themselves to direct verification by inspections, tests or other techniques that can be precisely defined and controlled. These evaluations shall be reviewed and verified by individuals or groups (e.g. by peer review) who are separate from those who did the work.	Se paragraf 6.1.
6.8	In accordance with the importance of engineering judgement and expertise in geotechnical engineering, the feedback of experience is an important aspect. For the assessment of matters such as the liquefaction potential, the stability of slopes and the safety in general of earth and of buried structures, information from the feedback of experience of failures in comparable situations shall be documented and analysed in order to be able to provide evidence that similar failures will not occur.	Se paragraf 6.1.
6.9	Records shall be kept of the work carried out in the activities for site evaluation for the nuclear installation.	Se paragraf 6.1.

2.4 NS-R-5 – Safety of Nuclear Fuel Cycle Facilities

§	NS-R-5 – Safety of Nuclear Fuel Cycle Facilities	Tolkning och Tillämpning
	1. INTRODUCTION *I avsnitt 1 av dokumentet innehåller endast paragraf (1.14) explicita krav på anläggningen eller dess ledningssystem.*	
1.14	The implementation of the safety requirements for any fuel cycle facility shall be commensurate with its potential hazards (the 'graded approach'). The facility type and the following facility specific attributes shall be taken into account: (a) The nature and the physical and chemical forms of the radioactive materials that are used, processed and stored at the facility; (b) The scale of operations undertaken at the facility (i.e. the 'throughput' of the facility) and the inventory of hazardous material, including products and waste in storage; (c) The processes, technologies and hazardous chemicals that are used; (d) The available routes for the disposal of effluents and the storage of radioactive waste.	Se tillämpning av paragraf 2.7 i denna standard.
	2. THE SAFETY OBJECTIVE, CONCEPTS AND SAFETY PRINCIPLES SAFETY OBJECTIVE	
2.1	The Fundamental Safety Principles [1] state that "the fundamental safety objective is to protect people and the environment from harmful effects of ionizing radiation."	SF-1 ingår i F-PSAR men behandlas endast översiktligt, se avsnitt 1.1 i denna rapport.
2.2	To achieve this safety objective, "measures have to be taken: (a) To control the radiation exposure of people and the release of radioactive material to the environment; (b) To restrict the likelihood of events that might lead to a loss of control over … source[s] of radiation; [and] (c) To mitigate the consequences of such events if they were to occur" [1]. In the context of fuel cycle facilities, the control of events initiated by chemical hazards can have a significant bearing on achieving the fundamental safety objective. Events initiated by chemical hazards shall be considered in the design, commissioning and operation of the facility. Activities at fuel cycle facilities may also include industrial processes that pose additional hazards to site personnel and the environment. Purely industrial hazards are outside the scope of this publication, but they shall be considered by the operating organization. Guidance relating to the management of specific chemical hazards may be found in the IAEA Safety Guides associated with this publication or in chemical industry standards.	Paragrafen avser innehåll i och tolkning av SF-1. Kraven kopplade till kemiska olyckor bedöms i första hand vara tillämpliga på andra typer av anläggningar i bränslecykeln, t ex upparbetningsanläggningar. F-PSAR omfattar endast krav med avseende på strålsäkerhet, men i anläggningens säkerhetsredovisning tas hänsyn till att inledande händelser kan orsakas av kemiska ämnen. Metodiker för analys och inventering av inledande händelser redovisas i: - **F-PSAR Kapitel 8** Verifierande analyser kommer att redovisas i PSAR. Systemuppbyggnad redovisas i: - **F-PSAR Kapitel 5**
	SAFETY PRINCIPLES	
2.3	The ten safety principles established in Ref. [1] apply to fuel cycle facilities, existing and new, throughout their entire lifetime. These principles provide the basis for the requirements for the safety of these facilities.	Paragrafen avser innehåll i och tolkning av SF-1. SF-1 ingår i F-PSAR men behandlas endast översiktligt, se avsnitt 1.1 i denna rapport.

<table>
<tr><th>§</th><th>NS-R-5 – Safety of Nuclear Fuel Cycle Facilities</th><th>Tolkning och Tillämpning</th></tr>
<tr><td></td><td>DEFENCE IN DEPTH</td><td></td></tr>
<tr><td>2.4</td><td>The concept of defence in depth shall be applied at the facility for the prevention and mitigation of accidents (Principle 8 of Ref. [1]). Defence in depth is the application of multiple levels of protection for all relevant safety activities, whether organizational, behavioural or equipment related [5, 6]. Application of the concept of defence in depth throughout the design and operation of a fuel cycle facility provides multilayer protection against a wide range of anticipated operational occurrences[1] and accident conditions, including those resulting from equipment failure or human error within the facility, and from events that originate outside the facility.

[1] Anticipated operational occurrences: see Annex III, para. III–12.</td><td>Den aktuella paragrafen har samma innebörd som SSMFS 2008:1 2 kap. 1 §.

De identifierade kravkällorna för anläggningen redovisas i:
- Kapitel J</td></tr>
<tr><td>2.5</td><td>The strategy for defence in depth shall be twofold: first, to prevent accidents, and second, if prevention fails, to limit the potential radiological and associated chemical consequences and to prevent any evolution to more serious conditions. Defence in depth is generally structured in five different levels, as set out in Table 1, which is adapted from Ref. [5]. If one level fails, the subsequent level comes into play.

TABLE 1. LEVELS OF DEFENCE IN DEPTH
<table><tr><th>Level</th><th>Objective</th><th>Essential means</th></tr><tr><td>Level 1</td><td>Prevention of abnormal operation and failures</td><td>Conservative design and in construction, commissi and operation (including management aspects)</td></tr><tr><td>Level 2</td><td>Control of abnormal operation and detection of failures</td><td>Control, limiting and prote and systems and other su features</td></tr><tr><td>Level 3</td><td>Control of accidents within the design basis</td><td>Engineered safety feature accident procedures</td></tr><tr><td>Level 4</td><td>Control of accident conditions beyond the design basis, including prevention of accident progression and mitigation of the consequences of such accident conditions</td><td>Complementary measure accident management[3]</td></tr><tr><td>Level 5</td><td>Mitigation of radiological consequences of significant releases of radioactive materials</td><td>On-site and off-site emergency response</td></tr></table>[2] In the context of fuel cycle facilities, commissioning is the process by means of which systems and components, having been constructed, are made operational and verified to be in accordance with the design and to have met the required performance criteria. Commissioning may include both non-nuclear and/or non-radioactive and nuclear and/or radioactive testing.

[3] In the context of fuel cycle facilities, accident management is the taking of a set of actions during the evolution of a beyond design basis accident: to prevent the escalation of the event into a more severe accident; to mitigate the consequences of such beyond design basis accidents; and to achieve a long term safe and stable state.</td><td>NS-R-5 avser både radiologiska och kemiska olyckor. Kraven kopplade till kemiska olyckor bedöms i första hand vara tillämpliga på andra typer av anläggningar i bränslecykeln, t ex upparbetningsanläggningar.
Definitionen av djupförsvarets fem nivåer är likvärdiga med motsvarande definition i Allmäna Råd till 2008:1 2 kap. 1 §.

Se SSMFS 2008:1 2 kap. 1 §.

De identifierade kravkällorna för anläggningen redovisas i:
- Bilaga J</td></tr>
</table>

§	NS-R-5 – Safety of Nuclear Fuel Cycle Facilities	Tolkning och Tillämpning
2.6	The design features, controls and arrangements necessary to implement the defence in depth concept shall be identified mainly by means of a deterministic analysis (which may be complemented by probabilistic studies) of the design and operational regime. The analysis shall be justified by the application of sound engineering practices based on research and operational experience. This analysis, which is usually called a safety analysis, shall be carried out during the design stage to ensure that the regulatory requirements can be met.	Anläggningens säkerhetsanalyser ska genomföras och redovisas enligt krav ställda i SSMFS 2008:1 4 kap. 1 §. De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J**
2.7	Defence in depth shall be implemented by taking into account the graded approach as described in Section 1. The amount and type of radioactive material present, the potential for dispersion, the potential for nuclear, chemical or thermal reactions, and the kinetics of such events shall all be considered in determining the required number and strength of lines of defence.	Hänvisningen till ”graded approach” asver paragraf 1.14. ”Graded approach” ska innebära att omfattningen av de säkerhetskrav som ställs och tillämpas på anläggningen ska utgå ifrån de risker som anläggningen kan utsättas för. Riskkällorna ska identifieras och en balanserad riskprofil ska utarbetas. Denna ”graded approach” har främst genomförts i samband med kravställningarna i SKB:s egna säkerhetskrav på konstruktion och utförande av anläggningen, där grundläggande konstruktionsprinciper och analysförutsättningar tolkas och tillämpas med avseende på processen i aktuell anläggning. Kravet på att identifiera och analysera potentiella händelser och scenarier som kan påverka hanteringen av riskkällorna detaljeras i de krav som ställs på inventering av händelser och deterministisk analys mot uppsatta acceptanskriterier i SSMFS 2008:1 4 kap. 1 §. Den aktuella processen i anläggningen ligger som grund till valda krav, genomförda tolkningar och tillämpningar som redovisas i egna säkerhetskrav på konstruktion och utförande av anläggningen. Exempel på processegenskaper som använts i tolkningen är: långa ledtider vid bortfall av kylkapacitet, avsaknad av högenergisystem i anläggningen och hantering av högaktivt avfall i torrt tillstånd. De valda kraven och genomförda tolkningar och tillämpningar utgör grunden för de konstruktionsprinciper och analysförutsättningar som används för att bygga upp det djupförsvar som ska verifieras med uppfyllande av SSMFS 2008:1 4 kap. 1 §. Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J** De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J**

§	NS-R-5 – Safety of Nuclear Fuel Cycle Facilities	Tolkning och Tillämpning
2.8	The degree of application of each level of defence in depth shall be commensurate with the potential hazards of the facility and shall be established in the facility's licensing documentation.	Tolkningen av vilka djupförsvarsnivåer som ska tillämpas för anläggningen redovisas i SSMFS 2008:1 2 kap. 1 §. Utförandet av tekniska och administrativa åtgärder i varje djupförsvarsnivå bestäms av de deterministiska analyserna som utförs enligt SSMFS 2008:1 4 kap. 1 §. Kraven på vad som ska redovisas i anläggningens säkerhetsredovisning redovisas i SSMFS 2008:1 4 kap. 2 §. De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J**
	LICENSING DOCUMENTATION	
2.9	The operating organization shall establish and justify the safety of its facility through a set of documents known as the 'licensing documentation' (or 'safety case').[4] The licensing documentation shall provide the basis for the safe siting, construction, commissioning, operation and decommissioning of the facility, including the justification for changes. The licensing documentation shall be considered in determining whether the authorizations necessary under national legislative requirements are to be granted, and thus it forms an important link between the operating organization and the regulatory body. [4] In the context of fuel cycle facilities, the licensing documentation (or safety case) is a collection of arguments and evidence in support of the safety of a facility or activity. This will normally include the findings of a safety assessment, and a statement of confidence in these findings.	Paragrafen utvecklas i kommande skeden i tillståndsprocessen.
2.10	The content of the licensing documentation for a facility may vary between States but at least the safety analysis report and the operational limits and conditions or equivalent shall be included. Consideration of the application of the principle of optimization of protection (Principle 5 of Ref. [1]) in the design and operation of the facility shall be included in the licensing documentation.	Paragrafenutvecklas i kommande skeden i tillståndsprocessen.
2.11	The safety analysis report shall provide a detailed demonstration of the safety of the facility. It shall give a detailed description of those aspects having safety significance, such as information on the input feed and the products of the facility and the corresponding limits (e.g. limits on burnup and enrichment), and it shall discuss the application of the safety principles and criteria in the design for the protection of operating personnel, the public and the environment. The safety analysis report shall contain an analysis of the hazards associated with the operation of the facility and shall demonstrate compliance with the regulatory requirements and criteria. It shall also contain safety analyses of accident sequences and of the safety features incorporated in the design for preventing accidents or minimizing the likelihood of their occurrence and for mitigating their consequences.	Paragrafen utvecklas i kommande skeden i tillståndsprocessen.

§	NS-R-5 – Safety of Nuclear Fuel Cycle Facilities	Tolkning och Tillämpning
2.12	The safety functions and the structures, systems and components (SSCs) important to safety shall be identified in the safety analysis report to the extent appropriate and in accordance with a graded approach. The SSCs important to safety provide means for the prevention of the occurrence of postulated initiating events, the control and limitation of accident sequences and mitigation of the consequences.	De deterministiska analyserna som genomförs enligt SSMFS 2008:1 4 kap. 1 § avgör nödvändig uppbyggnad av säkerhetsfunktionerna enligt analysförutsättningar som har definierats i egna säkerhetskrav på konstruktion och utförande av anläggningen. För indelningen av systemen, se även F-PSAR:s definitionslista samt tillämpningen av egna säkerhetskrav på konstruktion och utförande av anläggningen. De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J** Definitioner av begrepp som används i F PSAR redovisas i: - **F-PSAR Kapitel 1** Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J**
2.13	The operational limits and conditions are the set of rules that establish parameter limits, the functional capability and the performance levels of equipment and personnel for the safe operation of a facility.	STF tas fram i samband med att PSAR tas fram.
2.14	The licensing documentation shall also define the required intervals for periodic testing and inspection of SSCs important to safety.	Paragrafen utvecklas i kommande skeden i tillståndsprocessen.
2.15	The licensing documentation shall be maintained and updated during the operational lifetime of the facility on the basis of the experience and knowledge gained and in accordance with the regulatory requirements, with account taken of modifications[5] to the facility. [5] In the context of this publication, a modification is a deliberate change in or an addition to the existing facility configuration, with potential safety implications, intended for continuation of the facility's operation. It may involve safety systems, safety related items or systems, procedures, documentation or operating conditions.	Paragrafen utvecklas i kommande skeden i tillståndsprocessen.

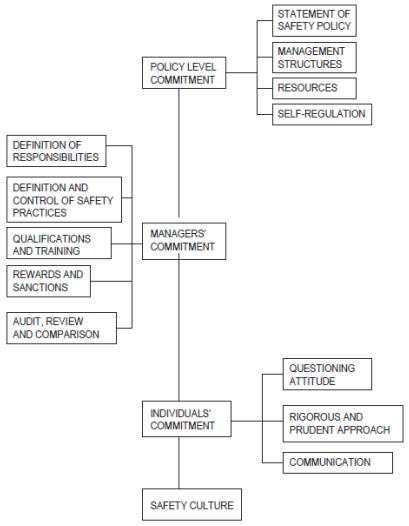
§	NS-R-5 – Safety of Nuclear Fuel Cycle Facilities	Tolkning och Tillämpning
	3. LEGAL FRAMEWORK AND REGULATORY SUPERVISION	
	GENERAL	
3.1	This section outlines requirements relating to general aspects of the legal and governmental infrastructure for the safety of fuel cycle facilities. Further general requirements are established in Ref. [7]. Guidance on the application of the requirements in Ref. [7] is provided in the IAEA Safety Guides associated with that publication (Refs [8–11]).	Paragrafen innehåller inga explicita krav på anläggningen eller SKB:s ledningssystem.
	LEGAL FRAMEWORK	
3.2	The government shall ensure that an adequate legal framework and regulatory basis are available for ensuring the safety of a facility and assessing its safety implications. The government shall adopt legislation that assigns the prime responsibility for safety to the operating organization. Legislation shall be enacted to provide for the establishment of a regulatory body that is effectively independent of organizations or bodies charged with the promotion of nuclear technologies or responsible for facilities or activities. The regulatory body shall be structured and resourced in a manner commensurate with the potential magnitude and nature of the hazard to be controlled. The government shall make arrangements to ensure that the regulatory body is adequately funded to fulfil the national safety requirements and legislative requirements assigned to it.	Paragrafen innehåller inga explicita krav på anläggningen eller SKB:s ledningssystem.
3.3	Safety, health and environment related regulatory requirements are influenced by industrial, chemical and toxic hazards in addition to the radiological hazards. The government shall ensure cooperation with and between the relevant authorities where nuclear, environmental, industrial safety and occupational health aspects are separately regulated. The construction, adjacent to a facility site, of installations that could prejudice the safety of the facility shall be monitored and controlled by means of planning requirements for land use.	Paragrafen innehåller inga explicita krav på anläggningen eller SKB:s ledningssystem.
	REGULATORY BODY	
3.4	To be effective, the regulatory body shall be provided with the legal powers and statutory authority necessary to ensure that it can discharge its responsibilities and perform its functions. Such powers normally include the authority to review and assess safety information submitted by the operating organization in the authorization process and to administer the relevant regulations, including carrying out regulatory inspections and audits for compliance with the regulations, taking enforcement actions, and providing information to other competent authorities and to the public, as appropriate.	Paragrafen innehåller inga explicita krav på anläggningen eller SKB:s ledningssystem.
3.5	“In order to fulfil its statutory obligations, the regulatory body shall define policies, safety principles and associated criteria as a basis for its regulatory actions” (Ref. [7], para. 3.1). These policies, principles and criteria shall set targets and limits on the radiological consequences for the workforce, members of the public and the environment.	Paragrafen innehåller inga explicita krav på anläggningen eller SKB:s ledningssystem.

§	NS-R-5 – Safety of Nuclear Fuel Cycle Facilities	Tolkning och Tillämpning
	AUTHORIZATION PROCESS	
3.6	Every project for a new fuel cycle facility shall follow an authorization process that comprehensively addresses all safety aspects.	Paragraf 3.6 – 3.10 anger övergripande krav för en nations tillståndsprocess och innehåller inga explicita krav på anläggningen eller SKB:s ledningssystem. Tillståndsansökan för anläggningen följer svensk lagstiftning.
3.7	The authorization steps and procedures may vary among States. This authorization can be a step by step process starting at the site planning and feasibility study stage and continuing up to and including the decommissioning of the facility. Alternatively, the authorization can be granted for the entire project, but conditions may need to be attached in order to apply control in subsequent stages.	Se paragraf 3.6.
3.8	An authorization from the regulatory body, which shall take the form of a licence, is required by the operating organization of any fuel cycle facility before taking into its possession or processing any radioactive substances (Ref. [12], paras 2.12 and 2.13).	Se paragraf 3.6.
3.9	Irrespective of the differences between national practices, a detailed demonstration of safety in the form of licensing documentation (see paras 2.9–2.15 of this publication) shall be submitted by the operating organization, and shall be reviewed and assessed by the regulatory body before progress of the project to the next stage is authorized. The degree of scrutiny and assessment maintained by the regulatory body shall be commensurate with its judgement of the degree of potential hazards posed by the facility.	Se paragraf 3.6.
3.10	The regulatory body shall ensure that the operating organization has made adequate arrangements for keeping the licensing documentation up to date throughout the lifetime of the facility so as to reflect the current status of the experience and knowledge gained of the facility and in accordance with the regulatory requirements. The regulatory body shall also ensure that the licensing documentation includes adequate references to supporting documents and that the operating organization maintains the reference material readily available upon request. In addition, the operating organization shall not limit or prevent adequate review and assessment by classifying the reference material.	Se paragraf 3.6.
	REGULATORY INSPECTION AND ENFORCEMENT	
3.11	The regulatory body shall establish a planned and systematic programme of regulatory inspection (including provisions for unannounced regulatory inspections as necessary). The scope and frequency of the regulatory inspections under this programme shall be commensurate with the potential hazards posed by the facility.	Paragrafen innehåller inga explicita krav på anläggningen eller SKB:s ledningssystem.
3.12	In addition to ensuring compliance with safety requirements, the programme shall take into account issues such as the safety culture of the operating organization, the adequacy of its resources (including the size of the workforce), the use of contractors and the arrangements put in place to ensure that workers are suitably qualified and experienced to perform their safety related tasks.	Paragrafen innehåller inga explicita krav på anläggningen eller SKB:s ledningssystem.

§	NS-R-5 – Safety of Nuclear Fuel Cycle Facilities	Tolkning och Tillämpning
	4. THE MANAGEMENT SYSTEM AND VERIFICATION OF SAFETY	
	GENERAL	
4.1	To fulfil its prime responsibility for safety throughout the lifetime of a fuel cycle facility, the operating organization shall establish, implement, assess and continually improve a management system that integrates safety, health, environmental, security, quality and economic elements to ensure that safety is properly taken into account in all the activities of an organization. Requirements for the management system are established in Ref. [13].	Paragraferna i avsnitt 4 omfattar krav på anläggningens drift, inklusive organisation, ledning, beredskap och fysiska skydd. I F-PSAR hanteras dessa krav på övergripande nivå. Organisation, styrning och ledning under driftskedet redovisas i: - **F-PSAR Kapitel 4** Förberedelse för drift av Clink redovisas i: - **-Bilaga E**
4.2	The operating organization: (a) Shall establish and implement safety, health and environmental policies in accordance with national and international standards and shall ensure that these matters are given the highest priority; (b) Shall establish an organizational structure to enable these policies to be carried out with a clear definition of responsibilities and accountabilities, lines of authority and communication; (c) Shall specify and implement a management system covering all stages of the facility's lifetime; (d) Shall develop and maintain an effective safety culture; (e) Shall prepare accident management procedures and on-site emergency plans (in accordance with the hazard potential); (f) Shall perform a safety assessment of the facility; (g) Shall design and implement the physical protection of the facility.	Se paragraf 4.1.
4.3	The key aspects of each of these safety requirements are discussed in the following subsections. They are considered in terms of the main arrangements and procedures necessary for achieving and maintaining an effective organization. Arrangements specific to siting, construction, commissioning, operation and decommissioning are addressed in the corresponding sections of this publication.	Se paragraf 4.1.
4.4	The operating organization shall allocate suitable financial resources to fulfil its prime responsibility for safety and to implement these foregoing safety requirements.	Se paragraf 4.1.
4.5	The operating organization may delegate to other organizations work necessary for discharging its responsibilities, in accordance with the regulatory requirements, but the overall responsibility and control shall be retained by the operating organization.	Se paragraf 4.1.

§	NS-R-5 – Safety of Nuclear Fuel Cycle Facilities	Tolkning och Tillämpning
	SAFETY, HEALTH AND ENVIRONMENTAL POLICIES	
4.6	An essential step in setting the necessary standards for the health and safety of operating personnel and the public and for the protection of the environment are the statements by the operating organization of its safety, health and environmental policies. These policy statements shall be provided to staff as a declaration of the organization's objectives and the public commitment of corporate management. To put these policies into effect, the operating organization shall also specify and put in place organizational structures, standards and management arrangements capable of meeting the organization's objectives and public commitments under the policy.	Se paragraf 4.1.
	ORGANIZATIONAL PROVISIONS	
4.7	The operating organization shall clearly specify the responsibilities and accountabilities of all staff involved in conducting or controlling operations that affect safety. The person with the responsibility for direct supervision shall be clearly identified at all times. This applies throughout the lifetime of the facility, from its siting to its decommissioning.	Se paragraf 4.1.
4.8	The management structure shall define clear lines of communication and shall provide the necessary infrastructure for facility operations to be conducted safely.	Se paragraf 4.1.
4.9	The operating organization shall maintain the capability in terms of staffing, skills, experience and knowledge to undertake competently all activities throughout the lifetime of the facility from siting to decommissioning. Where the resources and skills necessary to fulfil any part of these undertakings are provided by an external organization, the operating organization shall nevertheless retain within its organization the capability to assess the adequacy of the external organization's capabilities for ensuring safety.	Se paragraf 4.1.
4.10	The operating organization shall specify the necessary qualifications and experience for all staff involved in activities that may affect safety. It shall also specify appropriate requirements on training and its assessment and approval. The operating organization shall additionally ensure that the qualifications and training of contractors are adequate for the activities to be performed and that adequate control and supervision are in place. Records of the training provided to staff or to contractors shall be maintained.	Se paragraf 4.1.
	MANAGEMENT SYSTEM PROCESSES[6] [6] The term 'management system' has been adopted in Refs [13, 14] instead of the term 'quality assurance'. The term management system includes all aspects of the management of a nuclear facility, such as a fuel cycle facility, and brings the safety, health, environment and quality assurance related requirements together in one integrated system.	
4.11	The operating organization shall establish and implement generic processes in a management system [13, 14] aligned with internationally recognized standards, for ensuring facility safety by providing necessary assurance that the siting, design, construction, commissioning, operational and decommissioning requirements are defined and executed in accordance with the necessary standards and degree of rigour.	Se paragraf 4.1.

§	NS-R-5 – Safety of Nuclear Fuel Cycle Facilities	Tolkning och Tillämpning
4.12	From the outset, the design process shall be developed, managed and, as necessary, modified to achieve a safe design of the facility.	Se paragraf 4.1.
4.13	Throughout all stages in the lifetime of the fuel cycle facility, safety related work (including that of contractors) shall be planned and performed in accordance with established codes, standards, specifications, practices and administrative controls. Items and services important to safety shall be identified and controlled to ensure their proper use.	Se paragraf 4.1.
4.14	To ensure that all items and services important to safety under procurement meet established requirements and perform as specified, such items and services shall be subject to an appropriate management system. Suppliers shall be evaluated and selected by the operating organization on the basis of specified criteria. Requirements on reporting deviations from procurement specifications and on corrective actions shall be specified in the procurement documents. Evidence that purchased items and services meet procurement specifications shall be available before they are used.	Se paragraf 4.1.
4.15	The use of computer codes for the safety justification of the facility, and their verification and validation (e.g. tests and experiments), shall be subject to the management system.	Se paragraf 4.1.
4.16	Where the facility generates products, including waste products, any safety implications of these products shall also be covered by the management system.	Se paragraf 4.1.
	SAFETY CULTURE[7] [7] "The attitudes of individuals are greatly influenced by their working environment. The key to an effective Safety Culture in individuals is found in the practices moulding the environment and fostering attitudes conducive to safety. It is the responsibility of managers to institute such practices in accordance with their organization's safety policy and objectives" (Ref. [15], para. 35).	
4.17	Fuel cycle facilities may require special considerations to achieve high safety, health and environmental standards by virtue of their size and the number of their staff, the distribution and the movement of radioactive material and other hazardous material throughout the installation, the frequent changes in operations, and the reliance on operator action in normal operation. The awareness by individuals of safety matters and the commitment of individuals to safety are therefore essential. The operating organization shall adopt and implement the necessary principles and processes to achieve an effective safety culture [15].	Se paragraf 4.1.

§	NS-R-5 – Safety of Nuclear Fuel Cycle Facilities	Tolkning och Tillämpning
4.18	The operating organization shall address the major components of safety culture as illustrated in Fig. 1 [15].  *FIG. 1. Illustration of the presentation of safety culture (see Ref. [15], fig. 1, text in Ref. [14]).*	Se paragraf 4.1.
4.19	The operating organization shall report incidents significant to safety to the regulatory body in a timely manner.	Se paragraf 4.1.
	ACCIDENT MANAGEMENT AND EMERGENCY PREPAREDNESS	
4.20	The prevention of accidents is the first priority for safety of the operating organization. Nevertheless, as there can be no guarantee that measures to prevent accidents will always be totally successful, the operating organization and the regulatory body have to make preparations to deal with accidents. Requirements for emergency preparedness and response are established in Ref. [3].	Se paragraf 4.1.
4.21	The operating organization shall prepare accident management procedures and on-site emergency procedures, taking into account the potential hazards of the facility, before the introduction of hazardous material. Where necessary, in accordance with the degree of the hazards, the operating organization shall prepare off-site procedures in coordination with the relevant off-site organizations and competent authorities. The off-site procedures shall be consistent with national and international practices.	Se paragraf 4.1.
4.22	Periodic exercises for on-site and off-site emergencies shall be carried out to the extent necessary to ensure the preparedness of the responsible organizations.	Se paragraf 4.1.
4.23	When necessary, the emergency procedures shall be updated on the basis of the lessons learned from these exercises.	Se paragraf 4.1.

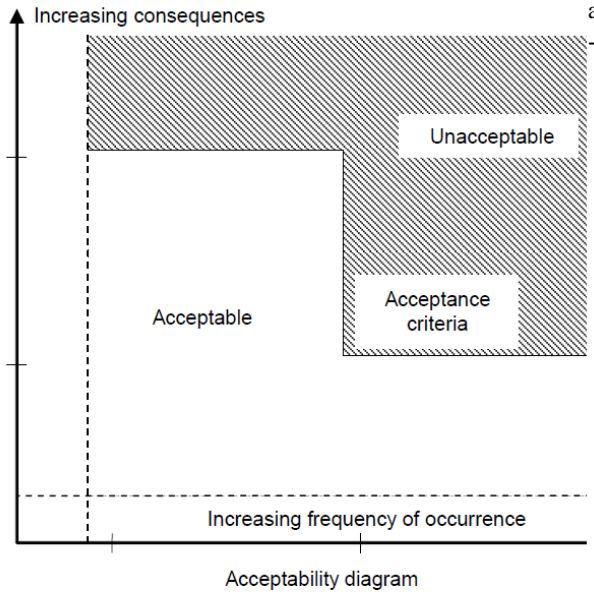
§	NS-R-5 – Safety of Nuclear Fuel Cycle Facilities	Tolkning och Tillämpning
	VERIFICATION OF SAFETY	
4.24	The operating organization shall be responsible for verifying the safety of the facility at all times. It shall establish or shall have access to an appropriate capability for safety analysis for ensuring that the necessary justifications are generated and maintained throughout the lifetime of the facility. It shall ensure that events that are significant to safety are reviewed in depth and that, when necessary to prevent the recurrence of accidents, equipment is modified, procedures are revised, qualifications of personnel are reassessed and training is updated and provided.	Se paragraf 4.1.
4.25	When available, information about incidents and events at other installations of the same type as the facility shall also be investigated and the lessons learned shall be considered.	Se paragraf 4.1.
4.26	In accordance with the national regulatory requirements, the operating organization shall carry out periodic safety reviews to confirm that the licensing documentation remains valid and that modifications made to the facility, as well as changes in its operating arrangements or utilization, have been accurately reflected in the licensing documentation. In conducting these reviews, the operating organization shall expressly consider the cumulative effects of changes to procedures, modifications to the facility and the operating organization, technical developments, operating experience and ageing.	Se paragraf 4.1.
	PHYSICAL PROTECTION	
4.27	Appropriate measures shall be taken, in accordance with national laws and regulations, to prevent unauthorized actions, including acts of sabotage, that could jeopardize safety at the fuel cycle facility, and to respond to such actions if they do occur.	Se paragraf 4.1.
4.28	International recommendations on the physical protection of nuclear facilities and nuclear material are provided in Ref. [16].	Se paragraf 4.1.
4.29	The physical protection of the facility shall take account of the safety requirements and shall be in accordance with the facility's emergency plan.	Se paragraf 4.1.

§	NS-R-5 – Safety of Nuclear Fuel Cycle Facilities	Tolkning och Tillämpning
	5. SITING OF THE FACILITY INITIAL SITE EVALUATION AND SITE SELECTION	
5.1	The main safety objective in the siting of a facility shall be the consideration of external hazards and the protection of the public and the environment from the impacts of authorized discharges and accidental releases of radioactive and chemically hazardous materials.	Platsutvärdering och platsval av inkapslingsdelen ingår i miljökonsekvensbeskrivningen som redovisas i: - **MKB**
5.2	The basis for the selection of a site for a facility will depend on a number of factors, including public acceptance.	Se paragraf 5.1.
5.3	In particular, the design of the facility and its intended purpose will have a bearing upon its siting. Certain facilities may require minimal siting constraints because they inherently pose a limited potential hazard to the public and would be relatively unaffected by site related, external initiating events. Other facilities may pose a greater potential hazard to the public or may be more vulnerable to external events.	Se paragraf 5.1.
5.4	The operating organization shall carry out a site evaluation, to the extent that it is appropriate for the potential hazards presented by the facility, on the basis of the requirements established in Ref. [17]. In particular in this site evaluation, consideration shall be given to the suitability of a particular site for such a facility, the site characteristics that may affect safety aspects of the facility, and the ways in which these site characteristics will influence the design and operating criteria for the facility.	Se paragraf 5.1.
5.5	The site evaluation, with due consideration of the potential hazards posed by the facility, shall constitute the first part of the development of the licensing documentation for a new facility. For the site evaluation, the following requirements apply:	Se paragraf 5.1.
(a)	Appropriate radiological monitoring of the site shall be conducted prior to carrying out any site activities in order to establish baseline levels of radiological parameters for assessing the future impact of the facility at the site. Natural and artificial radioactivity at the site in the air, the water and the ground and in flora and fauna shall be investigated and recorded.	Se paragraf 5.1.
(b)	Environmental characteristics of the area that may potentially be affected by the radiological impacts and the associated chemical impacts of the facility in operational states and in accident conditions[8] shall be investigated. An appropriate monitoring system shall be designed to verify the results obtained using the mathematical models of the radiological impacts and the associated chemical impacts. [8] Accident conditions: see Annex III, para. III–12.	Se paragraf 5.1.
(c)	The possible locations near the facility where radioactive material and other hazardous material could be discharged or could pass to the environment shall be investigated. Hydrological and hydrogeological investigations shall be carried out to assess, to the extent necessary, the dilution and dispersion characteristics of water bodies. The models used to evaluate the possible impacts of the contamination of surface water and groundwater on the public and the environment shall be described.	Se paragraf 5.1.

§	NS-R-5 – Safety of Nuclear Fuel Cycle Facilities	Tolkning och Tillämpning
(d)	Models used to assess the dispersion of radioactive material and other hazardous material released to the environment in operational states and in accident conditions shall be in accordance with the requirements of the operating organization and of the regulatory body.	Se paragraf 5.1.
(e)	Information shall be collected which, together with the anticipated discharges of radioactive material and other hazardous material from the facility and with the transfer behaviour of the radioactive material, permits an assessment of doses to the public and of the contamination of biological systems and food chains.	Se paragraf 5.1.
(f)	Site characteristics (e.g. soil properties, geology, hydrogeology) that may affect safety aspects of the facility shall be assessed, in particular the likelihood and the potential severity of natural phenomena (e.g. earthquakes, tsunamis, flooding, high winds, extreme temperatures, lightning) or external human induced events such as accidental aircraft crashes, impacts, fires (e.g. forest fires) and explosions (e.g. at a nearby gas terminal). Such events shall be considered in the design basis of the facility.	Se paragraf 5.1.
(g)	For a new facility, geological, hydrogeological and meteorological data concerning the site shall be collected and incorporated in the facility licensing documentation. The choice of the site can eliminate or reduce the risk due to the above events.	Se paragraf 5.1.
(h)	The potential for accidental aircraft crashes, including impacts, fires and explosions on the site, shall be evaluated, with account taken of the foreseeable characteristics of air traffic, the locations and types of airports, and the characteristics of aircraft, including those with special permission to fly over or near the facility such as firefighting aircraft and helicopters.	Se paragraf 5.1.
(i)	In the analysis of the suitability of the site, consideration shall be given to the storage and transport of radioactive material, processing chemicals, radioactive waste and chemical wastes, and to the existing site infrastructure (e.g. the power supply and its reliability).	Se paragraf 5.1.
(j)	Foreseeable natural and human-made changes in the area that may have a bearing on safety shall be evaluated over a period that encompasses the projected lifetime of the facility.	Se paragraf 5.1.
(k)	The influence of the siting decision on the need for, or the extent of, mitigatory actions such as accident management measures or emergency measures (e.g. the use of the firefighting service) that may be required in the event of an accident at the facility shall be considered.	Se paragraf 5.1.
5.6	The operating organization shall collect information in sufficient detail to support the safety analysis to demonstrate that the facility can be safely operated at the proposed site. For facilities that present a very limited hazard potential, the amount of detail necessary could be substantially less than is required for a facility of medium or high hazard potential.	Se paragraf 5.1.

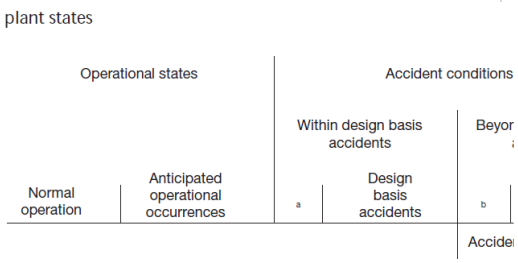
§	NS-R-5 – Safety of Nuclear Fuel Cycle Facilities	Tolkning och Tillämpning
5.7	A site shall be deemed suitable only if the evaluation results lead to the conclusion that radioactive releases in operational states are within authorized limits and that the radiological consequences for the public of releases in accident conditions, including conditions that may lead to mitigatory actions being taken, are within acceptable limits and in accordance with national requirements. The investigations and assessments shall be such as to provide adequate results to allow for a discussion and for conclusions to be drawn on the suitability of the site for the proposed facility.	Se paragraf 5.1.
5.8	The evaluation results shall be documented and shall be presented in sufficient detail in the licensing documentation.	Se paragraf 5.1.
	ONGOING SITE EVALUATION	
5.9	The operating organization shall establish a programme of monitoring throughout the lifetime of the facility (including the decommissioning stage) to evaluate natural and human-made changes in the area and their impacts on the site characteristics and to compare them with the original predictions of such possible changes.	Se paragraf 5.1.
5.10	If the ongoing site evaluation identifies new information with regard to site characteristics, safety precautions, such as engineering controls and emergency preparedness arrangements, may need to be reviewed and changed.	Se paragraf 5.1.

§	NS-R-5 – Safety of Nuclear Fuel Cycle Facilities	Tolkning och Tillämpning
	6. DESIGN OF THE FACILITY GENERAL	
6.1	A fuel cycle facility shall be designed in such a way that the fundamental safety objective quoted in Section 2 of this publication is achieved.	Paragrafen avser följande formulering i paragraf 2.1: "the fundamental safety objective is to protect people and the environment from harmful effects of ionizing radiation." Kravet motsvarar det grundläggande syftet med lagen (1984:3) om kärnteknisk verksamhet och utgör en del av anläggningens säkerhetsmål: "Det övergripande säkerhetsmålet för anläggningen ska vara att, så långt som är rimligt och möjligt, samt med beaktande av principen att ta tillvara bästa möjliga teknik, förhindra radiologiska olyckor för att skydda människor och miljö från skadlig verkan av joniserande strålning." Anläggningen konstrueras och redovisas i säkerhetsredovisningen på sådant sätt att alla licensieringsgrundande krav verifieras vara omhändertagna. Verifikaten av att identifierade licensierings-grundande krav är omhändertagna redovisas i F-PSAR i enlighet med de verifieringshänvisningar som anges.**OBS att kravverifieringen inte är fullständig och endast görs i form av dokumentation i F-PSAR och övriga bilagor till ansökan för anläggningen eftersom denna ansökan är på konceptuell nivå.** En samlad bedömning av anläggningens säkerhet redovisas i: - **F-PSAR Kapitel 1**
6.2	The design requirements established in this section shall be applied commensurate with the potential hazards of the facility. These requirements shall be implemented in all stages of design, with account taken of the feedback from the results of the accompanying safety analysis (see also Section 4).	Paragrafen gäller samtliga skeden under anläggningens livstid. I F-PSAR har SKB specificerat egna säkerhetskrav på konstruktion och utförande av anläggningen. Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J**
6.3	In the design and safety justification for the facility, not only the facility itself but also the interfaces with other facilities and installations that may affect its safety shall be considered.	Närheten till de tre kärnkraftreaktorerna på Simpevarpshalvön ska beaktas. Delade system får inte påverka säkerheten för anläggningen. Analys och mätning av utsläpp till omgivningen (normaldrift) och beredskapssamordning kravställs i SSMFS 2008:23 respektive SSMFS 2008:15. Delade system med OKG redovisas i: - **F-PSAR Kapitel 2 och 5** De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J**

§	NS-R-5 – Safety of Nuclear Fuel Cycle Facilities	Tolkning och Tillämpning
	DESIGN BASIS	
6.4	Within these requirements and the general framework presented in Section 2, the operating organization shall establish explicit criteria for the level of safety to be achieved. The operating organization shall set limits on the radiological consequences and associated chemical consequences for the workforce and the public of direct exposures to radiation or authorized discharges of radionuclides to the environment. These limits shall apply to the consequences of operational states and the possible consequences of accident conditions at the facility and shall be set equal to, or below, international and national standards to ensure compliance across the full range of operating conditions and throughput. For new designs, targets shall be considered that are below these limits, since it is generally more effective to incorporate enhanced safety provisions at the design stage.	Acceptanskriterier för normaldrift och för händelser ska utveckas och innehållas av anläggningen. Målvärden som är betydligt under acceptanskriterierna ska användas för att optimera strålskyddsverksamheten. Krav på optimering av strålskydd och utsläpps-begränsande åtgärder återfinns i SSMFS 2008:26 4 § respektive SSMFS 2008:23 4 §. Acceptanskriterier för omgivningskonsekvenser definieras i egna säkerhetskrav på konstruktion och utförande av anläggningen. Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J** De identiferade kravkällorna för anläggningen redovisas i: - **Bilaga J**
6.5	Limits and acceptance criteria shall be defined. As an example, in setting limits related to accident conditions, the risks from adverse events could be characterized as tolerable risks or unacceptable risks such that if the consequences for the public and the workforce increase, the acceptability in terms of the frequency or probability of occurrence has to decrease. Such limits may be represented in the form of an acceptability diagram (Fig. 2). Additional provisions can be made in accordance with the defence in depth principle.  *FIG. 2. Example of an acceptability diagram.*	Händelseklassning ska baseras på sannolikhet och mindre påverkan ska accepteras för händelser med högre sannolikhet än för händelser med lägre sannolikhet. Händelseklassning och acceptanskriterier för omgivningspåverkan och barriärpåverkan redovisas i egna säkerhetskrav på konstruktion och utförande av anläggningen. Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J**

§	NS-R-5 – Safety of Nuclear Fuel Cycle Facilities	Tolkning och Tillämpning
6.6	The following hierarchy of design measures shall be used to the extent practicable in protecting against potential hazards: (1) Selection of the process (to eliminate the hazard); (2) Passive design features; (3) Active design features; (4) Administrative controls.	Lösningshierarkin som beskrivs i kravet kopplar till konstruktionen av anläggningen och tolkas här som likställande med texten ”så långt det är rimligt och möjligt”. Konstruktionsprinciper för säkerhetssystem och viktiga säkerhetsrelaterade funktioner framgår avegna säkerhetskrav på konstruktion och utförande av anläggningen. Valet av lösning för säkerhetsfunktionerna kommer att verifieras mot inledande händelser i deterministiska analyser enligt kraven i SSMFS 2008:1 4 kap. 1 §. Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J** De identifierade kravkällorna för anläggningen redvisas i: - **Bilaga J**
6.7	The availability and reliability of the design measures and the administrative controls shall be commensurate with the significance of the potential hazards to be managed.	Konstruktionsprinciper för att upprätthålla hög tillgänglighet och hög tillförlitlighet för både säkerhetssystem och viktiga säkerhetsrelaterade system redovisas i egna säkerhetskrav på konstruktion och utförande av anläggningen. Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J**
6.8	The operating organization shall identify postulated initiating events that could lead to a release of radiation and/or significant amounts of radioactive material and associated chemical substances. The resulting set of identified postulated initiating events shall be confirmed to be comprehensive and shall be defined in such a way that the events cover credible failures of the SSCs of the facility and human errors that could occur in any of the operating conditions of the facility. The set of postulated initiating events shall include both internally and externally initiated events. Examples of postulated initiating events are provided in Annex I.	En inventering av händelser ska genomföras och generella analysförutsättningar gällande t ex fel i för säkerheten viktiga komponenter ska sammanställas. Händelserna ska innefatta både yttre och inre händelser. Händelseinventering kravställs i SSMFS 2008:1 4 kap. 1 § och utvecklas i egna säkerhetskrav på konstruktion och utförande av anläggningen. Generella analysförutsättningar såsom enkelfel, CCF och följdfel av olika slag utvecklas i egna säkerhetskrav på konstruktion och utförande av anläggningen. Säkerhetsfunktionerna kravställs till och med händelser i händelseklass H4. Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J** De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J**

§	NS-R-5 – Safety of Nuclear Fuel Cycle Facilities	Tolkning och Tillämpning
6.9	A design basis accident approach (see Annex III), or an equivalent methodology, shall be used to identify significant accident sequences. For each accident sequence identified, the safety functions, the corresponding SSCs important to safety and the administrative safety requirements that are used to implement the defence in depth concept shall be identified.	En metodik för händelseinventering, en metodik för händelseklassning samt flera metodiker för genomförande av olika typer av analyser av inledande händelser finns framtagna och redovisas enligt krav i SSMFS 2008:1 4 kap. 1 §. De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J** Metodikerna redovisas i: - **F-PSAR Kapitel 8**
	DESIGN ASSESSMENT	
6.10	The responsibility for the production of a safe facility design shall lie with the operating organization. The operating organization may be supported by a facility designer; if so, the facility designer shall demonstrate that the established safety requirements can be met. A close liaison shall be maintained between the facility designer and the operating organization for achieving the safe design of the facility; however, the operating organization shall implement an internal safety review of the facility design, as independently as possible from the designer. The designer shall arrange for the orderly preparation, presentation and submission of design documents to the operating organization for its use in the preparation of the licensing documentation. The evolution of the design may proceed concurrently with the development of the licensing documentation. (For further details, see Annex III.)	Paragrafen utvecklas i kommande skeden i tillståndsprocessen
	GENERAL SAFETY REQUIREMENTS **Criteria and rules**	
6.11	Design criteria for all relevant parameters shall be specified for each operational state of the facility and for each design basis accident or equivalent. Design criteria for SSCs important to safety may be in the form of engineering design rules. Engineering design rules include requirements in relevant codes and standards and may be set and required explicitly by the regulatory body by requiring the use of applicable standard engineering practices already established in the State or used internationally. Design rules shall provide for safety margins[9] over and above those foreseen for operations to provide reasonable assurance that no significant consequences would occur even if the operational limits were exceeded within the safety margin. [9] A safety margin is the difference between a safety limit and an operational limit.	Vid utformning och konstruktion av utrustning av betydelse för säkerheten ska beprövade och verifierade konstruktionsguider användas. Genom att säkerhetsklassa samtlig utrustning i anläggningen utefter deras betydelse för säkerheten kan design, konstruktion, provning och kvalitetskontroller styras så att tillräckliga säkerhetsmarginaler byggs in i utrustningen. Ett system för säkerhetsklassning och underliggande kvalitetsklassning, elektrisk funktionsklassning o s v redovisas i egna säkerhetskrav på konstruktion och utförande av anläggningen Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J**

§	NS-R-5 – Safety of Nuclear Fuel Cycle Facilities	Tolkning och Tillämpning
	Codes and standards	
6.12	The operating organization shall identify the codes and standards applicable to SSCs important to safety and shall justify their use. In particular, if different codes and standards are used for different aspects of the same item or system, consistency between them shall be demonstrated. Typical areas covered by codes and standards are: (a) Mechanical design, including design of pressure retaining components; (b) Structural design; (c) Selection of materials; (d) Thermohydraulic design; (e) Electrical design; (f) Design of instrumentation and control systems; (g) Software design and control; (h) Inspection, testing and maintenance as related to design; (i) Criticality; (j) Shielding and radiation protection; (k) Fire protection; (l) Chemical hazard protection; (m) Seismically qualified design; (n) Other designs for protection against natural phenomena.	Via säkerhetsklassningen och underliggande kvalitetsklassning, elektrisk funktionsklass, etc, kommer konstruktionskoder och konstruktionsstandarder att väljas. Krav på säkerhetsklassning och underliggande klassning redovisas i egna säkerhetskrav på konstruktion och utförande av anläggningen. Valda konstruktionsstandarder redovisas i: - **F-PSAR Kapitel 3** Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J**
	Availability and reliability	
6.13	The operating organization shall ensure that the necessary levels of availability and reliability of SSCs important to safety, as established in the licensing documentation, are attained. The design principles stated in Annex II shall be applied as appropriate to achieve the required availability and reliability of SSCs important to safety in operational states and in accident conditions.	Hög tillgänglighet och tillförlitlighet hos viktiga funktioner ska säkerställas med ett systematiskt användande av ett antal konstruktionsprinciper vid design av säkerhetssystem och säkerhetsrelaterade system. ”All operational states and in accident conditions” tolkas som att händelseklasserna H1-H5 omfattas, enligt definitionen av ”plant states” i IAEA Safety Glossary (se bild nedan). Det har för anläggningen gjorts tolkningen att konstruktionsprinciperna tillämpas i olika omfattningar på olika utrustning beroende på deras betydelse för säkerheten. Generellt är säkerhetsfunktionerna hårdast kravställda eftersom de måste utföra sin funktion då inledande händelser inträffat.  Tillämpning redovisas för respektive konstruktions-princip som anges i Annex II på efterföljande rader i denna tabell.

§	NS-R-5 – Safety of Nuclear Fuel Cycle Facilities	Tolkning och Tillämpning
II-1 II-2	REDUNDANCY The principle of redundancy will need to be applied as a design principle for improving the reliability of systems important to safety. The design will need to ensure that no single failure can result in a loss of capability of SSCs important to safety to perform their intended safety functions. Multiple sets of equipment that cannot be tested individually cannot be considered redundant. The degree of redundancy adopted will also need to reflect the potential for undetected failures that could degrade reliability.	Se § 6.13. Enkelfelstålighet kravställs i egna säkerhetskrav på konstruktion och utförande av anläggningen. Redundans tillämpas dock också på utvalda säkerhetsrelaterade system samt på aktiva komponenter i konsekvenslindrande system i syfte att konstruera ett mer robust djupförsvar på nivå 1 respektive djupförsvarsnivå 4. Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J**
II-3	INDEPENDENCE The principle of independence (as functional isolation, or as physical separation by means of distance, barriers or layout of process equipment or components) will need to be applied, as appropriate, to enhance the reliability of systems, in particular with regard to common cause failures.	Se § 6.13. Fysisk och funktionell separation kravställs både mellan redundant utrustning i säkerhets- och säkerhetsrelaterade system i egna säkerhetskrav på konstruktion och utförande av anläggningen samt mellan säkerhetsklassad utrustning och driftklassad utrustning. Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J**
II-4	DIVERSITY The principle of diversity can enhance reliability and reduce the potential for common cause failures. It will need to be adopted for safety significant systems wherever appropriate and reasonably practicable.	Se § 6.13. Diversifiering kravställs i egna säkerhetskrav på konstruktion och utförande av anläggningen. Diversifiering kravställs endast på säkerhetssystem och anpassade analysförutsättningar och acceptanskriterier accepteras. Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J**
II-5	DOUBLE CONTINGENCY Process designs will need to incorporate sufficient safety factors to require at least two unlikely, independent and concurrent changes in process conditions before a criticality accident is possible (II–1).	Se § 6.13. Dubbel eventualitetsprincip tillämpas enligt egna säkerhetskrav på konstruktion och utförande av anläggningen En kriticitetsolycka ska inte inträffa även om två oberoende osannolika händelser inträffar. Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J**
II-6	FAIL-SAFE DESIGN Where practicable, the fail-safe principle will need to be applied to components important to safety, i.e. if a system or component should fail, the fuel cycle facility will pass into a safe state without the need to initiate any protective or mitigatory actions.	Se § 6.13. Fail-safe utgör en av de kravställda grundläggande konstruktionsprinciperna enligt egna säkerhetskrav på konstruktion och utförande av anläggningen. Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J**

§	NS-R-5 – Safety of Nuclear Fuel Cycle Facilities	Tolkning och Tillämpning
II-7	TESTABILITY All SSCs important to safety will need to be designed and arranged so that their safety functions can be adequately inspected and tested, and the SSCs important to safety can be maintained, as appropriate, before commissioning and at suitable and regular intervals thereafter in accordance with their importance to safety. If it is not practicable to provide adequate testability of a component, the safety analysis will need to take into account the possibility of undetected failures of such equipment.	Se § 6.13. Driftklarheten hos anläggningens komponenter och system styrs via anläggningens STF. Driftklarheten för säkerhetssystem ska vara möjlig att övervaka, både vid påkallad säkerhetsfunktion och vid stand-by läge enligt egna säkerhetskrav på konstruktion och utförande av anläggningen. Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J**
6.14	For SSCs important to safety for which no appropriate established codes or standards exist, an approach derived from existing codes or standards for similar equipment may be applied. In the absence of such codes or standards, lessons learned from experience, tests including tests at pilot plants, analyses and expert committee recommendations or a combination thereof may be applied. Such application shall be justified.	Vid kvalificering av komponenter som inte omfattas av kända och beprövade konstruktions- och beräkningsstandarder ska tillräcklig utprovning eller utvärdering i förhållande till komponentens betydelse för säkerheten genomföras. Kravet på utprovning och utvärdering av nya typer av komponenter finns i SSMFS 2008:1 3 kap. 2 §. De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J**
	Ergonomics and human factors	
6.15	Human factors and human–machine interfaces shall be considered throughout the design process. Human factors are an important aspect of the safety of fuel cycle facilities as the state of the process changes frequently and operators have relatively greater access to the process operations. Ergonomic principles shall be applied in the design of control rooms and panels. Operators shall be provided with clear displays and audible signals for those parameters that are important to safety.	SSMFS 2008:1 3 kap. 3 § ställer krav på att anläggningens konstruktion ska vara anpassad till personalens förmåga att på ett säkert sätt kunna övervaka och hantera anläggningen. De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J**
6.16	The design shall minimize the demands on operators in normal operations and in anticipated operational occurrences and accident conditions, for example through automating appropriate actions to promote the success of the operation. The need for appropriate control devices (e.g. interlocks, keys, passwords) to anticipate foreseeable human errors shall be taken into account in the design.	Automatiseringsgraden i anläggningen anpassas till de rådrum som finns vid olika inledande händelser. Kravet på automatisering och rådrumsanalys utvecklas i egna säkerhetskrav på konstruktion och utförande av anläggningen. Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J**

§	NS-R-5 – Safety of Nuclear Fuel Cycle Facilities	Tolkning och Tillämpning
	Material selection and ageing	
6.17	In the design stage, design safety margins shall be adopted so as to accommodate the anticipated properties of materials at the end of their useful life. This is particularly important for fuel cycle facilities because of the range and characteristics of chemical and radiation conditions experienced in operational states and in accident conditions. Where details of the characteristics of materials are unavailable, a suitable material surveillance programme shall be implemented by the operating organization. Results derived from this programme shall be used to review the adequacy of the design at appropriate intervals. This may require provisions in the design for the monitoring of materials whose mechanical properties may change in service owing to factors such as fatigue (e.g. from cyclic mechanical or thermal loadings), stress corrosion, erosion, chemical corrosion or the induction of changes by irradiation.	Anläggningen förväntas ha en livslängd på uppemot 100 år. Hänsyn måste tas till detta vid konstruktion och underhållsprogram för åldringsbenägna skador måste upprättas. Kontroll av driftmiljöer för mekaniska komponenter kravställs i SSMFS 2008:13 2 kap. 4 §. SSMFS 2008:1 5 kap. 3 § ställer krav på underhåll av anläggningen. De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J** Åldringsprogram redovisas i: - **F-PSAR Kapitel 4**
	Provision for maintenance, inspection and testing	
6.18	SSCs important to safety shall be designed to facilitate maintenance, inspection and testing for their functional capability over the lifetime of the facility.	Krav på anläggningens drift och underhåll finns i SSMFS 2008:1 5 kap. 3 §. Driftklarhetsövervakning av komponenter kravställs i egna säkerhetskrav på konstruktion och utförande av anläggningen. Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J** De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J**
6.19	The design and layout of SSCs important to safety shall include provision to minimize exposures arising from maintenance, inspection and testing activities. The term maintenance includes both preventive and corrective actions.	”Exposures” tolkas här som utsättning av personal för stråldoser. Optimering av strålskyddet, både vid design av anläggningen och det operativa strålskyddet, kravställs i SSMFS 2008:26 4 §. De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J**

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	Use of computer based systems as SSCs important to safety	
6.20	If a computer based system is important to safety or forms part of a system important to safety, appropriate standards and practices for the development and testing of computer hardware and software shall be established and shall be implemented throughout the lifetime of the system, in particular at the software development stage. The entire development shall be subject to an appropriate management system. The level of reliability necessary shall be commensurate with the importance of the system to safety [18].	Där mjukvarubaserade kontroll- och övervakningssystem används för säkerhetssystem ska dessa mjukvaror konstrueras enligt godkända och beprövade konstruktionsstandarder. Mjukvarutester ska implementeras under hela komponentens livstid. Eventuell mjukvara som används för aktiveringar och övervakning av säkerhetssystem konstrueras utefter beprövad och verifierad teknik. Anläggningens kontrollsystem redovisas i: - **F-PSAR Kapitel 5** Valda konstruktionsstandards för mjukvara redovisas i: - **F-PSAR Kapitel 3**
	Design for accident conditions	
6.21	SSCs important to safety shall be designed to withstand the effects of extreme loadings and environmental conditions (e.g. extremes of temperature, humidity, pressure, radiation levels) arising in operational states and in relevant design basis accident (or equivalent) conditions.	Händelser ska inventeras och nödvändiga komponenter ska verifieras att de klarar de identifierade händelserna. Komponenter ska vara miljökvalificerade för förhållandena då deras funktion erfordras. Egna säkerhetskrav på konstruktion och utförande av anläggningen anger exempel på laster som ska beaktas. Vidare anges att metodiker för inventering av inre och yttre händelser finns. Omfattningen av yttre händelser och förhållanden som ska beaktas finns utvecklade i IAEA NS-R-3. Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J** De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J** Metodiker för inventering av inre och yttre händelser redovisas i: - **F-PSAR Kapitel 8**

§	NS-R-5 – Safety of Nuclear Fuel Cycle Facilities	Tolkning och Tillämpning
6.22	If an emergency shutdown of the facility or part(s) thereof is necessary, the interdependences between different processes shall be considered. In cases where it is impractical to stop the process immediately (e.g. in a gaseous diffusion enrichment facility), the design shall provide for the means to attain a safe and stable operational state.	Samfunktion mellan olika processer i anläggningen ska beaktas då den tas till stabilt sluttillstånd. Stabilt sluttillstånd utgör slutmålet för säkerhetsanalysen. Säkerhetsfunktionerna används för att ta anläggningen till stabilt sluttillstånd. Dessa funktioner i djupförsvarsnivå 3 ska vara oberoende från ordinarie driftsystem enligt djupförsvarsprinciper som kravställs i SSMFS 2008:1 2 kap. 1 §. Kravet på att kunna nå stabilt sluttillstånd utvecklas i egna säkerhetskrav på konstruktion och utförande av anläggningen. Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J** De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J**
6.23	The design and arrangements for process control shall incorporate provisions for bringing the process operations to a safe and stable state.	Säkert läge ska definieras för anläggningen och det ska vara möjligt att ta anläggningen till detta läge. Säkert läge etableras enligt de STF som kravställs i SSMFS 2008:1 5 kap. 1 §. De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J**
6.24	Where prompt, reliable action would be required in response to postulated initiating events, the design of the facility shall include the means to actuate automatically the necessary safety systems.[10] In some cases, in accident conditions, it may be necessary for the operator to take further action to place the facility in a safe and stable long term state. [10] A safety system is a system important to safety, provided to ensure the safe shutdown of a facility or to limit the consequences of anticipated operational occurrences and design basis accidents.	Kravet tolkas som att det ska finnas tillräckligt med automatisering alternativt rådrum för att kunna vidta nödvändiga åtgärder för att ta anläggningen till stabilt sluttillstånd vid en inledande händelse. Vid olycksscenarier ska det finnas erforderliga störningsinstruktioner för att klara av att ta anläggningen till ett stabilt sluttillstånd. Krav på automatisering och rådrumsbedömning utvecklas i egna säkerhetskrav på konstruktion och utförande av anläggningen. Störningsinstruktioner kravställs i SSMFS 2008:1 5 kap. 2 §. Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J** De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J**

§	NS-R-5 – Safety of Nuclear Fuel Cycle Facilities	Tolkning och Tillämpning
6.25	Manual operator action shall be sufficiently reliable to bring the process to a safe state provided that: (a) Adequate time is available for the operator to take actions for safety; (b) The information available has been suitably processed and presented; (c) The diagnosis is simple and the necessary action is clearly specified; (d) The demands imposed on the operator are not excessive. If any of these conditions may not be met, the safety systems shall be such as to ensure that the facility attains a safe state.	Kravet berör rådrumsbedömning. Krav på rådrumstider och automatiseringsgrad för anläggningen utvecklas i egna säkerhetskrav på konstruktion och utförande av anläggningen. Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J**
6.26	A capability shall be provided for monitoring all essential processes and equipment during and following an accident. If necessary, a remote monitoring and shutdown capability shall be provided.	Anläggningens instrumentering till och med händelser i händelseklass H5 utvecklas i egna säkerhetskrav på konstruktion och utförande av anläggningen. Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J**
6.27	The principle of independence (see Annex II) shall be specifically addressed with respect to the segregation for purposes of operational control between SSCs important to safety and also within SSCs important to safety as appropriate.	Krav på att driftklassad utrustning inte ska påverka säkerhetsklassad utrustning finns utvecklat i egna säkerhetskrav på konstruktion och utförande av anläggningen. Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J**
6.28	SSCs important to safety either shall be capable of performing their safety functions in spite of a loss of support systems, e.g. electrical power systems, compressed air systems or systems for the supply of cooling or heating fluids, or, if not, shall be designed to fail to a safe configuration.	”SSC:s important to safety” tolkas här som säkerhetssystem och utvald säkerhetsrelaterad utrustning. Endast sådan säkerhetsrelaterad utrustning som betraktas som extra viktig för att t ex förhindra uppkomst av inledande händelser utrustas med stödsystem utöver ordinarie stödsystem. Fail safe implementeras i den mån det är rimligt och möjligt och bedömning görs utefter systemets betydelse för säkerheten. Stödsystem för säkerhetssystem kravställs i och med kravställning av säkerhetsfunktioner i egna säkerhetskrav på konstruktion och utförande av anläggningen. Försörjning av stödsystem ochfail-safe kravställs i egna säkerhetskrav på konstruktion och utförande av anläggningen. Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J**

§	NS-R-5 – Safety of Nuclear Fuel Cycle Facilities	Tolkning och Tillämpning
6.29	The loss or excess of process reagents and diluent gases shall be considered during the safety assessment.	Kontroll över anläggningens driftmiljö kravställs i SSMFS 2008:13. Utrustning av betydelse för säkerheten samt viss driftutrustning ska vara miljökvalificerade enligt egna säkerhetskrav på konstruktion och utförande av anläggningen. Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J** De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J**
	Design for emergency planning	
6.30	Specific design features for emergency planning purposes shall be considered, in accordance with the potential hazards presented by the facility. Such features may include simple escape routes with reliable emergency lighting, reliable means of communication and dedicated instrumentation for monitoring radiation levels and hazardous chemicals. Depending on the potential hazards posed by the facility, consideration shall also be given to providing an on-site emergency control centre in a location separate from the operations area to maintain the chain of command and communication.	Kraven på beredskap mot olyckor utvecklas i SSMFS 2008:15. De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J**
	Design for radioactive waste management	
6.31	To the extent that is practicable at the design stage, the operating organization shall take measures to avoid or to optimize the generation of radioactive waste with the aim of minimizing the overall environmental impact. The predisposal and disposal routes for waste shall be considered with the same aim of minimizing the overall environmental impact.	Kravet tolkas som att det är riktat både mot hantering av lågaktivt driftavfall och optimering av strålskyddet vid hantering av sådant avfall. Kravet på hantering av kärnavfall kravställs i SSMFS 2008:1 6 kap. Optimering av strålskydd kravställs i SSMFS 2008:26 4 §. De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J**
6.32	Requirements on the generation, processing and storage of radioactive waste are established in section 5 of Ref. [2].	Kravet bedöms täckas in av SSMFS 2008:1 6 kap. De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J**
	Design for the management of aerial and liquid radioactive discharges	
6.33	Design provisions shall be established for ensuring that aerial and liquid radioactive discharges to the environment are in compliance with authorized limits and to reduce doses to the public and effects on the environment to levels that are as low as reasonably achievable.	Kraven på tillåtna radioaktiva utsläpp till omgivningen och optimering av dessa utvecklas i 2008:23 4-5 §§. De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J**
6.34	Design provisions shall be established for monitoring aerial and liquid radioactive discharges to the environment.	Kraven på kontroll och mätning av radioaktiva utsläpp till omgivningen under normaldrift utvecklas i SSMFS 2008:23 12 §. De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J**

§	NS-R-5 – Safety of Nuclear Fuel Cycle Facilities	Tolkning och Tillämpning
	Design for decommissioning	
6.35	In the design of a fuel cycle facility, consideration shall be given to facilitating its ultimate decommissioning, so as to keep the exposure of personnel and the public, arising from decommissioning, as low as reasonably achievable and to ensure adequate protection of the environment, as well as to minimize the amount of radioactive waste generated.	En plan för avveckling av anläggningen kravställs i SSMFS 2008:1 9 kap. 1 §. De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J**
6.36	While ensuring the safe operation of the facility, to the extent practicable, the designer: (a) Shall minimize the number and size of contaminated areas to facilitate cleanup in the decommissioning stage; (b) Shall choose materials that can be stored in the facility, that are resistant to all chemicals in use and that have sufficient wear resistance, to facilitate their decontamination at the end of their lifetime; (c) Shall design the facility to avoid undesired accumulations of chemical or radioactive materials; (d) Shall design the facility to allow remote decontamination where necessary; (e) Shall consider the amenability to treatment, interim storage, transport and disposal of the waste to be generated during the decommissioning stage; (f) Shall pay specific attention to keeping the design documentation and records available throughout the lifetime of the facility.	En plan för avveckling av anläggningen kravställs i SSMFS 2008:1 9 kap. 1 §. De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J**
	DESIGN FOR PROTECTION AGAINST RADIOLOGICAL HAZARDS **Contamination control and protection against internal exposure**	
6.37	Consideration shall be given to protecting workers, the public and the environment against releases of hazardous material in both operational states and accident conditions.	Acceptanskriterier för omgivningskonsekvenser definieras i egna säkerhetskrav på konstruktion och utförande av anläggningen. Acceptanskriterier för dos till personal i verksamhet med joniserande strålning utvecklas i SSMFS 2008:51. Optimering av strålskydd för personal utvecklas i SSMFS 2008:26. Optimering av doser till omgivningen under normaldrift kravställs i SSMFS 2008:23. Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J** De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J**

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6.38	The main design features for the control of contamination are confinement and leak detection. Confinement is achieved by means of physical barriers (static containment) and/or dynamic containment (e.g. by ventilation). The nature and number of the barriers and their performance, as well as the performance of air purification systems, shall be commensurate with the degree of the potential hazards, with special attention paid to the potential dispersion of alpha emitters.	Tillämpning av inneslutande barriärer för det använda kärnbränslet i anläggningen redovisas i SSMFS 2008:1 2 kap. 1 §. Krav på hanteringen av annat avfall i anläggningen ställs i SSMFS 2008:1 6 kap. 1 §. Anläggningen utrustas med ett ventilationssystem som skapar undertryck i utrymmen med hög risk för luftkontaminering i enlighet med strålningsklassningen av utrymmen i anläggningen, se SSMFS 2008:26 29 §. De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J**
6.39	Areas shall be classified according to foreseeable levels of surface contamination and atmospheric contamination, and equipment shall be installed in accordance with this classification (see Appendix I of Ref. [12]). Means of monitoring and appropriate alarm systems for atmospheric contamination shall be installed. The need for appropriate provisions for specific operations in contaminated areas shall be taken into account in the design.	Indelningen och klassningen av områden inom anläggningen kravställs i SSMFS 2008:26, se specifikt 11 §. Krav på mätning i utrymmen och persondosmätning ställs i SSMFS 2008:26 14 § respektive 17 §. Planering av arbeten på kontrollerad sida genomförs enligt optimering av strålskyddet som kravställs i SSMFS 2008:26 4 §. De identifierade kravkällornaför anläggningen redovisas i: - **Bilaga J**
	Protection against external exposure	
6.40	Protection against radiation exposure shall be achieved by means of engineered provisions such as adequate shielding and the use of remote handling equipment.	Strålskärmning utgör ett av momenten vid optimering av strålskyddet vid anläggningsdesignen och kravställs och tillämpas enligt SSMFS 2008:26 4 §. De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J**
6.41	The designer shall classify areas by taking into consideration the magnitude of the expected normal exposures, the likelihood and magnitude of potential exposures, and the nature and extent of the required protection and safety procedures. Access to areas where radiation levels may cause exposures that give rise to high doses for workers shall be restricted and the level of control applied shall be commensurate with the hazards (see Appendix I of Ref. [12]).	Indelningen och klassningen av områden inom anläggningen kravställs i SSMFS 2008:26, se specifikt 5 § (designstrålklasser) och 11 § (strålningsklassning av utrymmen). De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J**
6.42	Radiation levels shall be monitored so that any abnormal conditions would be detected and workers may be evacuated. Areas of potential exposure for workers shall be appropriately identified and marked.	I områden där kontinuerligt arbete pågår och risker för ökande stråldoser föreligger ska fast larmande utrustning finnas. Krav på kontinuerlig provtagning ställs i SSMFS 2008:26 29 §. Uppmärkning av kontrollerat område kravställs i SSMFS 2008:26 11 §. De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J**

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	Criticality	
6.43	Criticality accidents can result in high radiation doses to nearby personnel and widespread contamination. As far as reasonably practicable, criticality hazards shall be controlled by means of design.	Då risken för kriticitetshändelser kravställs med dubbel eventualitetsprincip bedöms sannolikheten för kriticitetsolyckor så låg att inga kriticitetslarm behövs i anläggningen. Dubbel eventualitetsprincip ska tillämpas vid kriticitetsanalyser enligt tillämpning av egna säkerhetskrav på konstruktion och utförande av anläggningen. Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J**
6.44	The achievement of criticality depends upon: (a) The properties of the fissile material; (b) The mass of fissile material present and its distribution among the components of the system in which it is present; (c) The mass, properties and distribution of all other materials associated with or surrounding the fissile material.	Säkerhetsfunktionen förhindra kriticitet kravställs i egna säkerhetskrav på konstruktion och utförande av anläggningen Metodik för kriticitetsanalyser är framtagen enligt krav i SSMFS 2008:1 4 kap. 1 §. Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J** De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J** Metodik för kriticitetsanalyser redovisas i: - **F-PSAR Kapitel 8**
6.45	For the prevention of criticality by means of design, the double contingency principle (see Annex II) shall be the preferred approach.	Dubbel eventualitetsprincip ska tillämpas vid kriticitetsanalyser enligt tillämpning av egna säkerhetskrav på konstruktion och utförande av anläggningen. Metodik för kriticitetsanalyser är framtagen enligt krav i SSMFS 2008:1 4 kap. 1 §. Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J** De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J** Metodik för kriticitetsanalyser redovisas i: - **F-PSAR Kapitel 8**

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6.46	The most important factors in preventing criticality are mass, geometry, moderation, reflection, interaction, neutron absorption and concentration. These factors shall be considered both alone and in combination for a proper design.	Säkerhetsfunktionen förhindra kriticitet kravställs i egna säkerhetskrav på konstruktion och utförande av anläggningen. Metodik för kriticitetsanalyser är framtagen enligt krav i SSMFS 2008:1 4 kap. 1 §. Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J** De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J** Metodik för kriticitetsanalyser redovisas i: - **F-PSAR Kapitel 8**
6.47	Criticality evaluations and calculations shall be performed on the basis of making conservative assumptions.	Säkerhetsfunktionen förhindra kriticitet kravställs i egna säkerhetskrav på konstruktion och utförande av anläggningen. Metodik för kriticitetsanalyser är framtagen enligt krav i SSMFS 2008:1 4 kap. 1 §. Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J** De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J**
6.48	Specific attention shall be paid to those system interfaces for which there is a change in the method of criticality control.	Anläggningens säkerhetsfunktion förhindra kriticitet säkerställs med geometriskt säkra konfigurationer genom hela processen. De geometriskt säkra konfigurationerna är passiva system och deras funktion kommer att verifieras och redovisas i de deterministiska analyserna enligt krav i SSMFS 2008:1 4 kap. 1 §. De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J** Deterministiska analyser redovisas i: - **F-PSAR Kapitel 8**
6.49	Methods of ensuring criticality safety in any process shall include, but shall not be limited to, any one of or a combination of the following: (a) Passive engineered control involving equipment design; (b) Active engineered control involving the use of process control instrumentation; (c) Chemical means, such as the prevention of conditions that allow precipitation; (d) Reliance on a natural or credible course of events, such as a process the nature of which is to keep the density of fissile material lower than the theoretical minimum necessary for a criticality event to occur; (e) Administrative controls to ensure compliance with operating procedures.	Anläggningens säkerhetsfunktion förhindra kriticitet säkerställs med geometriskt säkra konfigurationer genom hela processen. De geometriskt säkra konfigurationerna är passiva system och deras funktion kommer att verifieras och redovisas i de deterministiska analyserna enligt krav i SSMFS 2008:1 4 kap. 1 §. De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J**

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6.50	States have adopted various approaches to mitigatory measures for, and consequence assessments of, criticality accidents. The need for the following measures shall be assessed for their suitability: (a) The installation of a criticality detection and alarm system to initiate immediate evacuation; (b) The identification and marking of appropriate evacuation routes and regrouping areas; (c) The provision of appropriate emergency equipment and the adoption of emergency procedures.	Då risken för kriticitetshändelser kravställs med dubbel eventualitetsprincip bedöms sannolikheten för kriticitetsolyckor så låg att inga kriticitetslarm behövs i anläggningen. Dubbel eventualitetsprincip ska tillämpas vid kriticitetsanalyser enligt tillämpning av egna säkerhetskrav på konstruktion och utförande av anläggningen. Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J**
6.51	Further guidance on criticality control is provided in Ref. [19].	En metodik för analys av kriticitetsanalyser sammanställs och samtliga analyser redovisas enligt SSMFS 2008:1 4 kap. 1 §. De identifierade kravkällorna för anläggningen redovisas i: - **Bilaga J**
	Radioactive decay heat	
6.52	The generation of heat by radioactive decay, if not adequately controlled, may result in the release of radioactive material. Heat generation shall be taken into account as appropriate in the facility design.	Anläggningen utrustas med säkerhetsfunktionen resteffektkylning, enligt krav i egna säkerhetskrav på konstruktion och utförande av anläggningen. Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J**
	Radiolysis	
6.53	Radiolysis, if not adequately controlled, may result in the release of hydrogen with the risk of explosions. Radiolysis shall be taken into account as appropriate in the facility design.	Radiolys bedöms ej som en betydande risk för anläggningen då placeringen av högaktivt material sker i öppna bassänger med ventilerat utrymme ovanför vattenytan.
	NON-RADIOLOGICAL HAZARDS	
6.54	Chemical, toxic, flammable or explosive substances can affect nuclear safety. To prevent this from occurring, the following shall be considered in the design: (a) Design requirements and guidance contained in international and national standards and guidance on chemical safety; (b) The chemical compatibility of materials that are likely to come into contact; (c) The safe storage of hazardous process materials; (d) The initial process configuration and/or credible changes to it that may lead to the release of chemical compounds or toxic materials (e.g. hydrogen, solvents), fires or explosions; (e) The detection and alarm capability for chemical or toxic releases; (f) The minimization of inventories; (g) Personnel protective equipment to protect against exposures to chemical compounds or toxic materials.	F-PSAR omfattar endast krav med avseende på strålsäkerhet, men i anläggningens säkerhetsredovisning tas hänsyn till att inledande händelser kan orsakas av den typen av ämnen som omnämns i paragrafen. Metodiker för analys och inventering av inledande händelser redovisas i: - **F-PSAR Kapitel 8** Systemuppbyggnad redovisas i: - **F-PSAR Kapitel 5**

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6.55	The operating organization shall make design provisions for fire safety on the basis of a fire safety analysis and the implementation of the concept of defence in depth (i.e. for prevention, detection, control and mitigation).	Uppbyggnaden av ett djupförsvar mot brand kravställs i egna säkerhetskrav på konstruktion och utförande av anläggningen. Egna säkerhetskrav på konstruktion och utförande av anläggningen redovisas i: - **Bilaga J**
	7. CONSTRUCTION OF THE FACILITY	
7.1	Before the construction of a fuel cycle facility begins, the operating organization shall satisfy the regulatory requirements regarding the safety of the facility design.	I F-PSAR ingår endast en övergripande beskrivning av anläggningens uppförande. Uppförande av anläggningen beskrivs i: - **Bilaga E**
7.2	For large or complex facilities, authorization by the regulatory body may be granted in several stages. Each stage may have a hold point and regulatory agreement may be necessary to proceed to the next stage. The extent of involvement by the regulatory body during construction shall be commensurate with the potential hazards of the facility.	Se paragraf 7.1.
7.3	Before construction begins, the operating organization shall make adequate arrangements with the selected contractor(s) concerning the responsibility for ensuring safety during construction and the identification and control of any adverse impacts of the construction activities on facility operations and vice versa. The impact of construction of the facility on the local population and the environment and on any adjacent operating plants and services shall be considered. In particular, hazards associated with vibration, movements of heavy loads and dust generation shall be assessed.	Se paragraf 7.1.
7.4	The operating organization shall implement a management system, as described in Section 4, in the construction stage to ensure that the design requirements and intent are properly met in the construction stage since, for certain SSCs important to safety, the verification of compliance after construction and installation may be more difficult.	Se paragraf 7.1.
7.5	Records shall be maintained in accordance with the management system to demonstrate that the facility and its equipment have been constructed in accordance with the design specifications.	Se paragraf 7.1.
7.6	The operating organization shall specify a formal procedure for design changes such that those made to the facility during construction are accurately recorded and their impacts are assessed.	Se paragraf 7.1.
7.7	‘As built’ drawings of the facility shall be provided to the operating organization. Following construction of the facility, the operating organization shall review the as built drawings to confirm that, as far as can be assessed, the design intent has been met and the safety functions specified will be fulfilled. The operating organization shall, as required, seek agreement by the regulatory body to proceed to the commissioning stage.	Se paragraf 7.1.

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	8. COMMISSIONING OF THE FACILITY	
	COMMISSIONING PROGRAMME	
8.1	Before the commencement of commissioning, an adequate commissioning programme shall be prepared for the testing of a facility to demonstrate that it meets the design objectives and the performance criteria. The commissioning programme, agreed as required with the regulatory body, shall cover the organization for and responsibilities for commissioning, the stages of commissioning, the suitable testing of SSCs on the basis of their importance to safety, the test schedule, the commissioning procedures and reports, the methods of reviewing and verification, the treatment of deviations and deficiencies, and the requirements for documentation.	I F-PSAR ingår endast en övergripande beskrivning av anläggningens driftsättning Förberedelse för drift av anläggningen beskrivs i: - **Bilaga E**
8.2	The requirements in this section shall also apply to the restart of existing processes after a lengthy shutdown period.	Se paragraf 8.1.
	ORGANIZATION AND RESPONSIBILITIES	
8.3	The involvement of the operating organization, designers and manufacturers in the preparation of the commissioning programme shall be established by the operating organization to familiarize the future operating personnel with the particular characteristics of the facility and its process operations, and to ensure the adequate transfer of knowledge and the feedback of lessons learned from experience to the facility staff.	Se paragraf 8.1.
8.4	The commissioning period shall be used to train the operators in all aspects of operation and maintenance of the facility. Integral to this training process shall be the verification of the operational documentation, including operating procedures, maintenance procedures, emergency procedures, administrative procedures and operational limits and conditions.	Se paragraf 8.1.
8.5	The handover from the commissioning workforce to the operating workforce shall be carefully managed to ensure that knowledge and experience are not lost. Commissioning is also an opportunity for the operating organization to become familiar with the facility and for the management to develop a safety culture, including positive behaviour and attitudes.	Se paragraf 8.1.
8.6	At all stages of commissioning, the operating organization shall ensure that the person or organization responsible for safety is clearly identified. When the responsibility for safety is transferred, the arrangements for the transfer of responsibility shall be clearly specified.	Se paragraf 8.1.
8.7	The operating organization shall establish a safety committee (see para. 9.15) to review the commissioning programme and the results of commissioning tests and to provide technical advice to the operating organization.	Se paragraf 8.1.
8.8	Close liaison shall be maintained between the regulatory body and the operating organization throughout the commissioning process. In particular, the operating organization shall ensure that the results of tests directly concerning safety and their analyses are made available to the regulatory body for review and approval as appropriate.	Se paragraf 8.1.

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	COMMISSIONING TESTS AND STAGES	
8.9	The commissioning programme shall be divided into stages. These stages shall include, as necessary, individual equipment tests, integrated facility tests and system tests relating to cold processing (i.e. without radioactive material) and hot processing (i.e. with radioactive material).	Se paragraf 8.1.
8.10	Commissioning tests shall be arranged in functional groups and in a logical sequence, and, so far as is reasonably practicable, shall cover all planned operating aspects.	Se paragraf 8.1.
8.11	The operating organization shall specify a formal procedure for design change so that all modifications made to the facility are accurately recorded and their possible impacts are assessed.	Se paragraf 8.1.
8.12	At the commissioning stage, the operating organization shall specify the point at which the safety evaluation of modifications is transferred from a design stage evaluation process to an operation stage evaluation process.	Se paragraf 8.1.
	COMMISSIONING PROCEDURES AND REPORTS	
8.13	The commissioning programme shall include provisions and procedures for audits, reviews and verifications to confirm that the tests have been conducted as planned and that the programme objectives have been fully achieved. Provision shall also be made for remedying any deviation or deficiency that is discovered in the commissioning tests.	Se paragraf 8.1.
8.14	The effective testing of facilities and their equipment and systems without introducing the full chemical or radiological challenge to the facility may require the introduction of temporary commissioning aids into the software or hardware systems. The operating organization shall ensure that formal records of such aids are kept. The records shall be used to ensure that all the aids are removed on completion of the tests before the facility or system is brought into operation.	Se paragraf 8.1.
8.15	Commissioning activities shall be performed in accordance with written procedures. The procedures shall cover the purpose of the tests, the expected results and the criteria for success, the safety provisions required during the tests, the necessary precautions and prerequisites, and the test instructions.	Se paragraf 8.1.
8.16	If necessary, procedures shall include hold points for the notification and involvement of the safety committee (see para. 9.15), outside agencies, manufacturers and the regulatory body.	Se paragraf 8.1.
8.17	Reports covering the scope, sequence, expected results and criteria for the success of these tests shall be prepared in accordance with the management system and in appropriate detail. The test report shall include: a description of the test programme and the test results; a summary of the data collected and their analyses; an evaluation of the results with a comparison with acceptance criteria and a statement on the success of the test; the identification of deviations and deficiencies; and any corrective actions and the justifications for the corrective actions.	Se paragraf 8.1.
8.18	All commissioning test results, whether obtained by a member of the operating organization or a manufacturer, shall be available to the operating organization and the regulatory body and shall be retained for the lifetime of the facility.	Se paragraf 8.1.

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	9. OPERATION OF THE FACILITY BACKGROUND	
9.1	Section 4 establishes the requirements that are common from the design stage to the decommissioning stage. These requirements also apply to operation, in particular the requirements on organizational matters and safety culture.	Paragrafen innehåller inga explicita krav på anläggningen eller SKB:s ledningssystem.
9.2	Section 9 concerns organizational matters and safety culture and establishes specific requirements for operation.	Paragraferna i avsnitt 9 omfattar krav som endast avser anläggningens driftskede. I F-PSAR hanteras dessa krav på övergripande nivå. Anläggningens drift beskrivs i: - **F-PSAR Kapitel 4** Förberedelse för drift av anläggningen redovisas i: - **Bilaga E**
	GENERAL REQUIREMENTS DURING OPERATION **Structure and responsibilities of the operating organization**	
9.3	The operating organization shall have the overall responsibility for the safety of the facility during operation. The operating organization shall establish an appropriate management structure for the facility and shall provide the necessary infrastructure for operations to be conducted safely.	Se paragraf 9.2.
9.4	The operating organization shall ensure that relevant functions relating to the safe operation and utilization of the facility, such as maintenance, radiation protection, criticality safety, the application of the management system and other relevant supporting activities, are adequately covered, and shall take into account industrial and chemical safety.	Se paragraf 9.2.
9.5	The operating organization shall be responsible for all safety aspects of any change in the facility design or any change in control, arrangements made, utilization or management of the facility. This responsibility shall not be delegated.	Se paragraf 9.2.
	Interface arrangements	
9.6	The operating organization shall ensure that safety related interdependences between facilities on the same site are considered. Boundary responsibilities shall be clearly specified and effective communication routes shall be established.	Se paragraf 9.2.
9.7	As necessary, and in accordance with national regulations and international standards, a dedicated organization and specific rules for on-site transports shall be established.	Se paragraf 9.2.
	Qualification and training of personnel	
9.8	Minimum qualifications for personnel shall be specified, and these minimum qualifications shall be commensurate with the assigned functional responsibility and authority. The training of personnel working at the facility shall be commensurate with their assigned functional responsibilities, their authorities and their safety related activities. A training programme for personnel working at the facility shall be organized, staffed and managed to facilitate planning, direction, evaluation and control for fulfilling the training objectives. The training given shall be graded and shall be based on a competency framework.	Se paragraf 9.2.

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9.9	Training shall include the retraining of previously trained and qualified personnel. The training programme shall include the following aspects: analysis and identification of functional areas for which training is required; position training requirements; development of the basis for training, including objectives; evaluation of trainee learning; on the job training; and systematic evaluation of the effectiveness of the training.	Se paragraf 9.2.
9.10	Training shall cover the operational states of the facility, including emergency procedures (see paras 9.62–9.67 of this publication), and it shall be ensured that operators have sufficient understanding of the facility and its safety features. The primary importance of safety in all aspects of facility operation shall be emphasized.	Se paragraf 9.2.
9.11	As the response time is crucial for firefighting in the event of a fire or an explosion, the operating team shall be properly and regularly trained in firefighting, and drills and exercises shall be carried out on a regular basis.	Se paragraf 9.2.
9.12	With respect to training, special attention shall be paid to radiological hazards that may involve manual intervention. Workers shall be made aware of the hazards associated with the activities they are performing.	Se paragraf 9.2.
9.13	Facility modifications shall be reflected in the training programme in a timely manner.	Se paragraf 9.2.
	Minimum staffing	
9.14	The operating organization shall define the minimum staffing levels for the various technical and functional areas necessary to ensure the safety of the facility in operational states, including inter-campaign periods, and in accident conditions, for persons and organizations involved in the implementation of the emergency plan.	Se paragraf 9.2.
	Safety committee	
9.15	The operating organization shall establish one or more internal safety committees to advise the management of the operating organization on safety issues related to the commissioning, operation and modification of the facility. Such committees shall have among their membership the necessary breadth of knowledge and experience to provide appropriate advice. The membership shall, to the extent necessary, be independent of the operations management raising the safety matter.	Se paragraf 9.2.
	Feedback of operating experience	
9.16	Arrangements shall be made so that available technical information on abnormal occurrences, incidents and accidents that have occurred at the facility or at similar facilities is analysed for the feedback of lessons learned from experience and for preventive actions if necessary.	Se paragraf 9.2.
	Document management	
9.17	The operating organization shall maintain, and shall ensure that the personnel use, a complete and up-to-date set of safety documentation, including the licensing documentation and procedures. Duplicates of essential documents shall be stored separately and shall be maintained as appropriate.	Se paragraf 9.2.

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9.18	The operating organization shall make arrangements for generating and controlling records and reports that have safety significance for the operation and decommissioning stages, including: (a) The complete collection of revisions to the licensing documentation; (b) Periodic safety reviews; (c) Commissioning documents; (d) Procedures and operating instructions; (e) History of and data on modifications; (f) Operational data for the facility; (g) Data from maintenance, testing, surveillance and inspection; (h) Reports on events and incidents; (i) Radiation protection data, including personal monitoring data; (j) Data on amounts and movements of nuclear and other radioactive material; (k) Records of the discharges of effluents; (l) Records of the storage and transport of radioactive waste; (m) Results of environmental monitoring; (n) Records of the main work activities performed in each location of the facility.	Se paragraf 9.2.
	Control of organizational changes	
9.19	The operating organization shall put in place arrangements to ensure that changes to the organizational structure are considered in terms of their potential impacts on safety and on any actions necessary to mitigate consequences, as appropriate.	Se paragraf 9.2.
	Communication with the regulatory body	
9.20	In accordance with national requirements and practices, the operating organization shall develop and implement procedures for informing the regulatory body of proposals for modifications having major safety significance, and in case of anticipated operational occurrences or accident conditions (see para. 9.16).	Se paragraf 9.2.
	SPECIFIC REQUIREMENTS FOR OPERATION **Operating instructions**	
9.21	Operational limits and conditions shall be prepared before operation of the facility commences.	Se paragraf 9.2.
9.22	Operating instructions shall be developed by the operating organization, in cooperation with the designer and manufacturer if necessary. Safety related operating instructions shall be prepared before operations commence. Operating instructions shall clearly describe the methods of operating, including all checks, tests, calibrations and inspections necessary to ensure compliance with the operational limits and conditions (see paras 2.9–2.15).	Se paragraf 9.2.
9.23	Operators shall be made aware of the special safety significance of the instructions and procedures necessary to ensure compliance with the operational limits and conditions and of the requirements for strict compliance with them.	Se paragraf 9.2.
9.24	Operating instructions and procedures shall be reviewed and updated periodically and shall be made accessible to users as necessary.	Se paragraf 9.2.

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9.25	Arrangements shall be made to ensure that significant deviations from operating instructions are identified, and, where appropriate, an investigation is carried out into the cause and appropriate actions are taken to prevent recurrence. Such arrangements shall include notification to the regulatory body if the deviations result in the breach of an operational limit or condition.	Se paragraf 9.2.
9.26	The operating instructions shall provide for the facility to be brought into a safe operational state after an anticipated operational occurrence, which could necessitate shutting down the facility.	Se paragraf 9.2.
9.27	When an activity not covered by existing instructions is planned, appropriate instructions shall be prepared and reviewed, and shall be subject to appropriate approval before the activity is started. Additional training of relevant operating personnel on the instructions shall be provided.	Se paragraf 9.2.
	MAINTENANCE, CALIBRATION, PERIODIC TESTING AND INSPECTION	
9.28	Maintenance, calibration, periodic testing and inspection shall be performed to ensure that SSCs important to safety are able to function in accordance with the design intent and with safety requirements. In this context, the term maintenance includes both preventive and corrective actions. Maintenance, calibration and periodic testing shall also be carried out on the equipment necessary for implementation of the on-site emergency plan.	Se paragraf 9.2.
9.29	All maintenance, calibration, periodic testing and inspection shall be performed in accordance with a programme based on approved, written procedures. Before operation of the facility commences, the operating organization shall prepare and obtain approval for the programmes for maintenance, calibration, periodic testing and inspection of SSCs important to safety. These procedures shall specify any changes from the normal operational status of the facility and shall make provision for restoration of the normal configuration upon completion of the activity. A system of work permits in accordance with the management system shall be used for maintenance, calibration, periodic testing and inspection. Resumption of normal operation shall be permitted only after the person responsible for coordinating the maintenance work has approved the results of the maintenance assessment.	Se paragraf 9.2.
9.30	The frequency of maintenance, calibration, periodic testing and inspection of SSCs important to safety shall be in accordance with the facility licensing documentation.	Se paragraf 9.2.
9.31	Equipment and items used for maintenance, calibration, periodic testing and inspection shall be identified and controlled to ensure their proper use.	Se paragraf 9.2.
9.32	The results of maintenance, testing and inspection shall be recorded and assessed.	Se paragraf 9.2.
9.33	The maintenance, calibration, periodic testing and inspection programmes shall be reviewed at regular intervals to incorporate the lessons learned from experience.	Se paragraf 9.2.
9.34	Special attention shall be paid to subordinate operations such as decontamination, washing and preparation for maintenance or testing, as there are many occurrences at facilities while such operations are taking place.	Se paragraf 9.2.

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	CONTROL OF MODIFICATIONS	
9.35	The operating organization shall establish a process whereby its proposals for changes to the design, equipment, feed material characteristics, control or management are subject to a degree of assessment and scrutiny appropriate to the safety significance of the change, so that the direct and wider consequences of the modification are adequately assessed (by the safety committee; see para. 9.15). The process shall include a review of possible consequences to ensure that a foreseen modification or change in one facility will not adversely affect the operability or safety of associated or adjacent facilities.	Se paragraf 9.2.
	RADIATION PROTECTION DURING OPERATION	
9.36	The measures for protection against radiation exposure of operating personnel, including contractors, and members of the public shall comply with the requirements of the regulatory body and with the requirements established in Ref. [12].	Se paragraf 9.2.
9.37	For all operational states the radiation protection measures shall be such as: (a) To ensure that exposures are kept below regulatory limits; (b) To optimize radiation protection.	Se paragraf 9.2.
	Radiation protection programme	
9.38	The operating organization shall establish and implement a radiation protection programme to ensure that all activities involving potential radiation exposure are planned, supervised, executed and monitored. All documentation and activities relating to radiation protection shall conform to the integrated management system of the organization (Section 4).	Se paragraf 9.2.
9.39	The radiation protection programme shall specify responsibilities and arrangements for: (a) Monitoring of radiation and contamination levels on and off the site, and alerting operators to any abnormalities; (b) Control of radiation exposures, due to the operations of the facility, of persons present on the site; (c) Control of off-site radiation exposures; (d) Preparation, in accordance with the hazards posed by the facility, for the management of site emergencies; (e) Control of the on-site and off-site transport of radioactive material.	Se paragraf 9.2.
9.40	All operating personnel shall be individually responsible for putting into practice the measures for exposure control in the course of their work, as specified under the radiation protection programme.	Se paragraf 9.2.
9.41	The operating organization shall run the facility in such a manner as to optimize protection against external and internal exposures of the workforce. During operation, external and internal exposures shall be managed in accordance with the principle of optimization of protection, with an appropriate balance of rules and practices on: (a) Housekeeping and decontamination of equipment and areas; (b) Maintenance and modifications; (c) Operation.	Se paragraf 9.2.

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9.42	For potential accident conditions, the radiological consequences shall be kept low by means of engineered safety features, accident management procedures, and measures provided in the emergency plan.	Se paragraf 9.2.
9.43	The monitoring results from the radiation protection programme shall be compared with the operational limits and conditions, and corrective actions shall be taken if necessary. In addition, goals for annual doses shall be determined annually. Results shall be compared with these goals and any divergences shall be investigated.	Se paragraf 9.2.
	Radiation protection personnel	
9.44	The radiation protection programme shall include the establishment within the operating organization of a radiation protection group with the appointment of qualified radiation protection officers who are technically competent in radiation protection matters and knowledgeable about the radiological aspects of the design, operation and hazards of the facility.	Se paragraf 9.2.
9.45	The radiation protection personnel shall provide advice to the operating personnel and shall have access to the levels of management within the operating organization with the authority to establish and enforce operational procedures.	Se paragraf 9.2.
	Control of occupational exposures	
9.46	All operating personnel who may be occupationally exposed to radiation at levels of significance for the purposes of radiation protection shall have their doses measured, recorded and assessed, as required by the regulatory body and in accordance with Ref. [12]. These records shall be made available to those exposed and to the regulatory body or any other body designated by the regulatory body. Arrangements shall be put in place to retain these records for the period required under national legislation.	Se paragraf 9.2.
	Contamination control	
9.47	The spread of radioactive contamination shall be controlled and minimized as far as reasonably practicable. Access to areas where contamination levels may lead to high doses for workers shall be restricted and the level of control applied shall be commensurate with the hazard (see Appendix I of Ref. [12]).	Se paragraf 9.2.
9.48	In particular, where there is a likelihood of exposure, the workforce shall be provided with personal protective equipment to protect against the hazards likely to be encountered.	Se paragraf 9.2.
	CRITICALITY CONTROL DURING OPERATION	
9.49	All operations with fissile material shall be performed in such a way as to prevent a criticality accident.	Se paragraf 9.2.
9.50	All operations to which nuclear criticality safety is pertinent shall be governed by written procedures. The procedures shall specify all the parameters that they are intended to control and the criteria to be fulfilled.	Se paragraf 9.2.
9.51	Deviations from procedures and unforeseen changes in process conditions that affect nuclear criticality safety shall be reported to the management and shall be investigated promptly. The regulatory body shall also be informed. Action shall be taken to prevent their recurrence.	Se paragraf 9.2.

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	Criticality staff	
9.52	Where relevant, the operating organization shall appoint qualified nuclear criticality staff who are knowledgeable about the physics of nuclear criticality and the associated safety standards, codes and best practices, and who are familiar with the facility operations. This function shall, to the extent necessary, be independent of the operations management.	Se paragraf 9.2.
9.53	The nuclear criticality staff shall give assistance for the training of personnel; shall provide technical guidance and expertise for the development of operating procedures; and shall check and validate all operations that may require criticality control (see Ref. [20]).	Se paragraf 9.2.
	MANAGEMENT OF RADIOACTIVE WASTE AND EFFLUENTS IN OPERATION	
9.54	A facility shall be operated so as to control and minimize, as far as reasonably practicable, the generation of radioactive waste of all kinds, to ensure that radioactive releases to the environment are as low as reasonably achievable, to facilitate the handling and disposal of waste, and to facilitate the decommissioning of the facility.	Se paragraf 9.2.
9.55	The management of solid, liquid and gaseous waste within, and its ultimate removal from, the facility shall fulfil the requirements established in Ref. [2].	Se paragraf 9.2.
9.56	More generally, all activities concerning radioactive and hazardous chemical effluents and waste (including those arising from decontamination activities) shall be conducted in accordance with an integrated waste management policy, the management system and regulatory requirements.	Se paragraf 9.2.
9.57	Discharges of radioactive and hazardous chemical effluents shall be monitored and the details recorded in order to verify compliance with the applicable regulatory requirements. The details shall be reported periodically to the regulatory body in accordance with its requirements.	Se paragraf 9.2.
	MANAGEMENT OF INDUSTRIAL AND CHEMICAL SAFETY IN OPERATION	
9.58	Depending on the nature of the facility, the degree of risk to the public or the workforce posed by chemical and industrial hazards may be greater or less than that posed by radioactive material. The operating organization shall, as appropriate, have access to the necessary safety expertise and shall introduce arrangements to minimize the risks posed by chemical and industrial hazards to the public, the workforce and the environment.	Se paragraf 9.2.
9.59	The operating organization shall make arrangements for ensuring fire safety on the basis of a fire safety analysis, which shall be reviewed periodically and updated as necessary. Such arrangements shall include: control of combustibles (limitation) and ignition sources (separation) in accordance with the licensing documentation; assessment of the potential impacts of modifications on the fire safety analysis or fire protection systems; maintenance, testing and inspection of fire protection measures; establishment of a manual firefighting capability; and training of facility personnel.	Se paragraf 9.2.

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9.60	In particular: (a) Written procedures and monitoring shall be used to ensure that the concentration in air of flammable gases (e.g. hydrogen) is below the corresponding lower flammability limit in air, with an adequate margin. (b) The operating team shall be properly and regularly trained. (c) Drills shall be carried out on a regular basis.	Se paragraf 9.2.
9.61	Together with the conventional fire safety concerns associated with an industrial installation, fire safety issues relating to nuclear materials shall be assessed (e.g. for uranium metal).	Se paragraf 9.2.
	EMERGENCY PREPAREDNESS	
9.62	The operating organization, taking into account the potential hazards of the facility, shall develop an emergency plan in coordination with other bodies having responsibilities in an emergency, including public authorities; shall establish the necessary organizational structure; and shall assign responsibilities for managing emergency response. Requirements on planning for emergency preparedness and response are established in Ref. [3].	Se paragraf 9.2.
9.63	The emergency plan of the operating organization shall include: (a) The designation of persons who will be responsible for directing on-site activities and for ensuring liaison with off-site organizations; (b) The requirements for personnel training; (c) A listing of possible accidents and, if relevant, descriptions of the accidents and their foreseeable consequences; (d) The conditions under which, and criteria according to which, an emergency shall be declared, a list of job titles and/or functions of the persons empowered to declare an emergency, and a description of suitable means for alerting response personnel and public authorities; (e) The arrangements for assessment of radiological conditions on and off the site (for water, vegetation and soil and by air sampling); (f) Provisions for minimizing the exposure of persons to radiation and for ensuring the medical treatment of casualties; (g) Assessment of the state of the facility and the actions to be taken on the site to limit the extent of radioactive releases and the spread of contamination; (h) The chain of command and communication, including a description of related facilities and procedures; (i) An inventory of the emergency equipment to be kept in readiness at specified locations; (j) The actions to be taken by persons and organizations involved in the implementation of the emergency plan; (k) Provisions for declaring the termination of an emergency.	Se paragraf 9.2.

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9.64	The emergency plan shall, as necessary, include arrangements for responses to emergencies involving a combination of non-radiological and radiological hazards, such as a fire in conjunction with significant levels of radiation or contamination, or toxic and/or asphyxiating gases in conjunction with radiation or contamination, with account taken of the specific site conditions.	Se paragraf 9.2.
9.65	The emergency plan shall include a means of informing all persons on the site of the actions to be taken in the event of an emergency.	Se paragraf 9.2.
9.66	The emergency plan shall be approved by the regulatory body as appropriate and shall be tested in an exercise before radioactive material is introduced into the facility. There shall thereafter be exercises of the emergency plan at suitable intervals, some of which shall be observed by the regulatory body. Some of these exercises shall be integrated with local, regional and national response organizations, as appropriate, and shall involve the participation of as many as possible of the organizations concerned. The plans shall be subject to review and to updating in the light of the experience gained.	Se paragraf 9.2.
9.67	Instruments, tools, equipment, documentation and communication systems to be used in emergency responses shall be maintained in good operating condition and shall be kept available in such a manner that they are unlikely to be affected by, or made unavailable by, the occurrence of postulated accidents.	Se paragraf 9.2.
	VERIFICATION OF SAFETY	
	Periodic safety review	
9.68	The operating organization shall carry out a systematic reassessment of the safety of the facility at regular intervals, and in accordance with national regulatory requirements, to deal with the cumulative effects and implications of ageing, modifications, technical developments, operating experience (see para. 4.26) and changes in the site characteristics (see paras 5.9 and 5.10).	Se paragraf 9.2.
9.69	The results of the periodic safety reviews shall be presented by the operating organization to the regulatory body and shall be reflected in updates of the facility licensing documentation.	Se paragraf 9.2.
	Audit and review	
9.70	Central to the management and verification of safety is the ability of an organization to establish effective review and improvement as an ongoing process. To establish this process, the operating organization shall periodically conduct a review of the facility's operational and safety performance to identify, investigate and correct adverse trends that may have an impact on safety. Such a process shall also cover safety culture, and the improvement of attitudes and the operating environment for safe operation.	Se paragraf 9.2.
9.71	To assist in this process, the operating organization shall carry out a selfassessment programme, including audits and inspections, with the possible use of appropriate performance indicators.	Se paragraf 9.2.
9.72	Guidance on audit and review for nuclear power plants is provided in Ref. [21].	Se paragraf 9.2.

§	NS-R-5 – Safety of Nuclear Fuel Cycle Facilities	Tolkning och Tillämpning
	10. DECOMMISSIONING OF THE FACILITY	
	GENERAL	
10.1	The operating organization shall put in place arrangements for the eventual decommissioning of the facility (including funding arrangements), which shall be subject to approval by the regulatory body, well in advance of the shutdown of the facility. Requirements for the decommissioning of a facility are established in Ref. [22].	Paragrafen gäller samtliga skeden under anläggningens livstid. En avvecklingsplan ingår i tillståndsansökan. Avvecklingsplan redovisas i: - **Bilaga C**
	DECOMMISSIONING PLAN	
10.2	"The operating organization shall prepare and maintain a decommissioning plan throughout the lifetime of the facility, unless otherwise approved by the regulatory body" (Ref. [22], para. 5.1). Although some existing facilities may not have been designed or operated with eventual decommissioning in mind, all operational activities, including maintenance, modification and experiments, shall be conducted by the operating organization in a way that will facilitate eventual decommissioning.	Paragraferna i detta avsnitt avser krav på avvecklingsplaner för anläggningen. I F-PSAR hanteras dessa krav på en övergripande nivå. En avvecklingsplan ingår i tillståndsansökan. Avvecklingsplan redovisas i: - **Bilaga C**
10.3	The decommissioning plan shall take into account the storage, treatment, transport and disposal of the waste that is generated during the decommissioning stage.	Se paragraf 10.2.
10.4	To facilitate the implementation of the decommissioning plan and completion of the decommissioning, the operating organization: (a) Shall retain the necessary resources, expertise and knowledge for design and operation for decommissioning, and shall keep records and documentation relevant to the design, construction, operation and decommissioning processes so that such information can be transferred to any supporting or successor operating organization. (b) Shall ensure the maintenance of records and documentation for a period of time as specified by the regulatory body following the completion of decommissioning, including key information such as the results of the final radiological survey. (c) Shall report to the regulatory body on a scheduled basis any safety related information as required by the terms of the licence.	Se paragraf 10.2.
10.5	The decommissioning plan shall be reviewed regularly and shall be updated as required to reflect, in particular, changes in the facility or in regulatory requirements, advances in technology and, finally, the needs of the decommissioning operation. If an abnormal event occurs, a new decommissioning plan or modification of the existing decommissioning plan shall be required.	Se paragraf 10.2.
	DECOMMISSIONING OPERATION	
10.6	When it has been decided to shut down a facility, the organization legally responsible for its decommissioning shall submit an application for permission to decommission the facility to the regulatory body, together with the final decommissioning plan [2, 22].	Paragraferna i detta avsnitt avser krav inför och under rivning av anläggningen.

§	NS-R-5 – Safety of Nuclear Fuel Cycle Facilities	Tolkning och Tillämpning
10.7	If it is intended to shut the facility down and defer decommissioning, it shall be demonstrated in the final decommissioning plan that such an option is safe and that possible occurrences during this shutdown period are taken into account in developing the decommissioning plan. It shall be demonstrated that no undue burdens will be imposed on future generations. An adequate maintenance and surveillance programme, which shall be subject to the approval of the regulatory body, shall be developed to ensure safety during the period of deferment.	Se paragraf 10.6.
10.8	If the shutdown of a facility is sudden, as, for example, in the event of an accident, the facility shall be brought to a safe state before decommissioning is commenced in accordance with an approved decommissioning plan.	Se paragraf 10.6.
10.9	Decommissioning activities may generate large volumes of waste over short time periods, and the waste may vary greatly in type and activity and may include large objects. The operating organization shall ensure that appropriate means are available to manage the waste safely. Dismantling and decontamination techniques shall be chosen such that the generation of waste and airborne contamination are minimized.	Se paragraf 10.6.
10.10	Decommissioning activities such as decontamination, cutting and handling of large equipment and the progressive dismantling or removal of some existing safety systems have the potential for creating new hazards. The impacts on safety of these activities shall be assessed and managed so that these hazards are mitigated.	Se paragraf 10.6.
10.11	The operating organization shall ensure the protection of both workers and members of the public against exposure, not only in decommissioning but also as a result of any subsequent occupancy or use of the decommissioned site. The operating organization shall apply national radiation protection requirements, established in accordance with Ref. [12].	Se paragraf 10.6.
10.12	Personnel who carry out the decommissioning of the facility shall be properly trained and qualified for such work. The operating organization shall ensure that personnel clearly understand and implement the relevant environmental, health and safety standards.	Se paragraf 10.6.
	COMPLETION OF DECOMMISSIONING	
10.13	Before a site may be released for unrestricted use, a survey shall be performed to demonstrate that the end point conditions, as established by the regulatory body, have been met. (See Ref. [22], para. 9.2.)	Paragraferna i detta avsnitt avser krav i samband med avslutning av anläggningens rivningsskede.
10.14	If a site cannot be released for unrestricted use, appropriate control shall be maintained to ensure protection of human health and the environment. (See Ref. [22], para. 9.6.)	Se paragraf 10.13.
10.15	A final decommissioning report, including any necessary final confirmation survey, shall be prepared and retained with other records, as appropriate.	Se paragraf 10.13.