Progress in Nuclear Energy 84 (2015) 41–49

Contents lists available at ScienceDirect

Progress in Nuclear Energy

journal homepage: www.elsevier.com/locate/pnucene

Licensing documentation and licensing process for dismantling and decontamination projects in Lithuania

Eugenijus Uškpuras, Sigitas Rimkevičius, Egidijus Babilas*

Lithuanian Energy Institute, Breslaujos g. 3, LT-44403 Kaunas, Lithuania

ARTICLE INFO

Article history:
Received 10 March 2014
Received in revised form
11 September 2014
Accepted 19 March 2015
Available online 20 April 2015

Keywords:
Licensing
Dismantling
Decontamination

ABSTRACT

One of the main tasks of any decommissioning project is the licensing process, which allows implementation of developed strategies in the real nuclear power plant. The Lithuanian laws on nuclear energy and radioactive waste management require that dismantling and decontamination projects shall be licensed by the Lithuanian State Nuclear Power Safety Inspectorate and other Authorities. Licensing is an inseparable part of the Lithuanian regulatory and supervisory system for safety of nuclear facilities. The licensing process starts when the nuclear power plant submits the first licensing document(s) to the Authorities. Usually the licensing documents cover Basic Design, Safety Assessment, Environmental Impact Assessment and Civil Design reports. Safety Assessment Report is a major document, which justifies that the proposed activities will be implemented in compliance with design and regulatory requirements. Licensing process is completed when all the licensing documents are approved by the Authorities and authorization to start dismantling and decontamination activities is received by the nuclear power plant.

Current paper discusses the main steps of the licensing process adopted for the first dismantling and decontamination projects at Ignalina Nuclear Power Plant and provides examples of safety assessment in the case of bounding initiating events that can be caused by dismantling and decommissioning activities.

1. Introduction

Authorizing specific activities and/or nuclear installations or parts of them, through a process of licensing, is one of the principal functions of a regulatory body. This licensing process could result in the granting of one or more licenses during the lifetime of the nuclear installation, depending on national regulations and laws.

A license is a legal document issued by the regulatory body granting authorization to create a nuclear installation and/or to perform specified activities, such as decommissioning, or more specifically as it is discussed in this paper – to perform dismantling and decontamination (D&D) of nuclear power plant (NPP) equipment. The regulatory body is an authority or a system of authorities designated by the government as having legal authority for conducting the regulatory process, including issuing authorizations (International Atomic Energy Agency, 2007). A license is a product of an authorization process generally covering a particular stage of the lifetime of a nuclear installation. The term 'licensing process' is often used for nuclear installations; it includes all licensing and/or authorization processes for a nuclear installation and its activities. Authorization may take different forms, such as certification, granting a permit, agreement, consent, regulatory approval or granting another similar regulatory instrument, depending on the governmental and regulatory framework.

The licensing process should be understood by concerned parties and should be predictable (i.e. well-defined, clear, transparent and traceable). Usually the licensing process is established in a systemic way to facilitate efficient progression of regulatory activities. The steps in the licensing process are discrete and follow a logical order. The licensing process starts when NPP submits the first licensing document(s) to the Authorities. It is completed when all the licensing documents are approved by the Authorities and authorizations to start envisage works is received by NPP.

Existing safety standards require that an appropriate safety assessment be performed to support any activities related to the sitting, operation, modifications and decommissioning of nuclear facilities. The main purpose of the safety assessment is to demonstrate that residual risks have been reduced to As Low As Reasonably Achievable (ALARA) and to nationally prescribed safety criteria. Dismantling and decontamination activities at any nuclear

* Corresponding author. Tel.: +370 68697694.
E-mail address: Egidijus.Babilas@lei.lt (E. Babilas).

http://dx.doi.org/10.1016/j.pnucene.2015.03.020
0149-1970/

facilities significantly increase radiological and non-radiological hazards to the workers, public and environment. During justification that proposed D&D activities will be implemented in the safe way and established safety criteria will be not violated safety assessment plays major role. Considering that it can be stated that the Safety Assessment Report (SAR) is one of the main licensing documents for the dismantling and decontamination activity. The SAR describes the fundamental assumptions and criteria upon which the strategy of dismantling activity and the D&D systems and methods are based; the assumptions regarding the range of conditions under which the activities may be performed, the hazards, which may occur during D&D activities and adequacy of their means of control. Since 1995 experts of Lithuanian Energy Institute supports Ignalina NPP in development of different safety assessments related to the safe operation of Ignalina NPP (Ušpuras, 2010). Accumulated experience in preparation of safety analysis for operating NPP was successfully adopted for safety assessment of D&D activities at Ignalina NPP.

In addition, to the existing safety assessment practice, a special method for identification and evaluation of the potential hazards, raised due to proposed D&D activities, was used. A wide range of different methods, such as Hazards and Operability Study (HAZOP), Failure Mode and Effect Analysis (FMEA), Fault Tree Analysis, are used for the hazards identification and analysis. In the nuclear industry HAZOP method is used rather often (Hashemi-Tilehnoee et al., 2010; Jeong et al., 2008; John Garrick, 1988; Nelson et al., 2007). The same HAZOP method was employed during safety assessment of first D&D project at Ignalina NPP.

Current paper discusses the main steps of the licensing process applied to authorized activities under first separate D&D projects at Ignalina NPP and presents the examples of consequences assessment of major bounding initiating events, which are analyzed within the SAR.

2. Overview of activities related with licensing process of D&D projects at Ignalina NPP

Ignalina Nuclear Power Plant (INPP) was an important part of Lithuania's Energy Sector since 1983 (Unit 1 – started operation in 1983, Unit 2 – in 1987, design lifetime was envisage up to 2013 for Unit 1 and up to 2017 for Unit 2). As a result of the political dialogue leading up to European Union (EU) enlargement, Lithuania agreed to the early shutdown of its reactors: Unit 1 shutdown in 2004 and Unit 2 shutdown in 2009. The INPP issued Preliminary Decommissioning Plan (PDP) in 2000. Later, in 2001, the report "Selection of the Decommissioning Strategy for INPP" was issued. In November 2002, in accordance with the Decree of the Government of Republic of Lithuania, an Immediate Dismantling option to prevent heavy long-term social, economical, financial and environmental consequences was selected. According to the INPP Final Decommissioning Plan, the INPP decommissioning process is split into several D&D projects. Each of these D&D projects covers a particular building, system or field of activity, for example, initial primary circuit decontamination or dismantling of equipment using "room by room" or "system by system" approach. Each of the discussed D&D projects includes development of a set of documentation needed for licensing process and implementation of D&D works. The licensing process used in Lithuania usually covers approval by the Authorities following documents – D&D Basic Design, D&D Safety Assessment, D&D Environmental Impact Assessment Reports, General Data Set on radioactive waste disposal plan and Design for Construction Works. The D&D documents such as Strategy, Detail Design including D&D working procedures, Operational and Maintenance Manual and Training programs may be inspected by the Authorities, but do not require approval from them.

At the time of the first D&D projects development there was no precedent for the licensing (authorization) process of the Decontamination and Dismantling activities in a nuclear facility in Lithuania, therefore additional effort in order to establish this procedure was required. All activities related to the decommissioning project licensing used in Lithuania presented in Fig. 1. As it is shown in Fig. 1, the development of Ignalina NPP decommissioning projects was divided into three Sections. Section 1 mainly covers development of all required documents, such as Basic Design or Safety Assessment Report, etc. During Section 1, based on the proposed Strategy, the decision about the type of Civil Design (i.e. Design for construction works) was taken. This has major influence on the scope and complexity of Civil Design. Section 1 includes the first discussion with the expert team from NPP and with authorities about the content and further results of developed documentation. This is done via the so called Knowledge transfer sessions. Knowledge transfer sessions enable to put together D&D projects developer's ideas and view on the final reports and reviewers expectations. This during D&D projects development leads to the speed up of review process.

Section 2 presents a licensing phase of the developed D&D documentation. The licensing process applied in Lithuania involves different authorities and expert teams (see Table 1). As it is presented in Fig. 1, not all documents developed during decommissioning project is subjected for the authority approval. Usually Detail Design documents which include detailed working procedures and work schedule do not require approval from authority but can be submitted to them for information according to request. A similar situation is with the supporting documents of Safety Assessment Report, such as hazards identification reports. Process of hazards identification is applied to identify the possible hazards arising during implementation of different D&D strategies. The results of this process are used to compare the strategies and to develop a fault schedule. Further during development of Safety Assessment Report, identified faults or accidents are analyzed in more detail. As it is presented in Fig. 1, after receiving all authorizations from the authorities, the authorization to start D&D works is issued. With this authorization Section 3 is launched – i.e., D&D works implementation phase. Table 1 summarizes the licensing actions and lists authorities involved in each step of the licensing process.

3. Licensing process of environmental impact assessment report

The licensing process of the Environmental Impact Assessment Report is regulated in Lithuania by the Law on the EIA (Law on Environmental Impact, 1996) and Regulation (EIA, 2005). In the Law (Law on Environmental Impact, 1996) the following participants of the EIA process are defined:

1) Responsible institution: Ministry of Environment or other institution authorized by the government;
2) Subjects of environmental impact assessment of proposed economic activity: state institutions responsible for public health, fire safety, protection of cultural heritage, institutions of district and municipality;
3) Undertaker (client) of proposed economic activities;
4) Developer of documentation on environmental impact assessment;
5) Public.

The subjects of the environmental impact assessment can include other state institutions which are not specified in item 2 above if they are invited to participate by the responsible