Decommissioning Experience of Destroyed Nuclear Facilities and Sites in Iraq

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1- INTODUCTION

The radioactive waste resulting from the former nuclear activities in Iraq has the potential to cause significant radiological issues to the environment and to the public living in the neighbourhood of these nuclear sites. The destruction of the former nuclear facilities during the 1991 Gulf war, and the looting of the sites and facilities during the 2003 events, aggravated the problem. As a result of these events, many of these nuclear facilities have lost their containment of the radioactive material and it now has an increased potential to be dispersed into the environment. All sites and facilities require decommissioning in order to ensure both radiological and non-radiological safety. However, it is not possible to undertake the decommissioning of all sites and facilities at the same time. Therefore, a risk- based prioritization methodology has been developed in order to aid the decision-making process. This initial risk-based order of priority is changed when modifying factors are taken into account like Iraq's isolation from the international nuclear community over the last two decades and the lack of experienced personnel. A master decommissioning plan has been developed to decommissioning all nuclear facilities and sites in Iraq started from January 2008 till December 2025 the plan consist of three phases the first phase (2008-2010) to decommission three low radiological risk facilities to build the staff capacity and experience, the second phase (2011-2015) to decommission five high radiological risk facilities using the experience gained in phase-1and third phase (2016-2025) to decommission the remaining nuclear facilities and sites based on radiological risk prioritization scheme.

2- DECOMMISSIONING PROGRAM IN IRAQ

The strategic plan to decommission all nuclear facilities and sites in Iraq consists of three phase's Fig. (1). These phases were developed based on many key factors including the lack of decommissioning experience, the lack of radioactive waste treatment and storage and the security situation in Iraq.

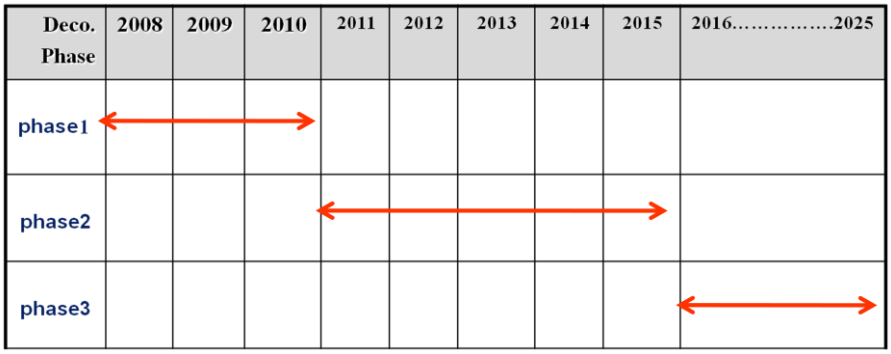

Fig. 1 Master Decommissioning Schedule

Phase One: Already in progress, Phase One consists of a short term 3 years, (2008-2010) strategic plan in which three low radiological risk facilities are to be decommissioned. The intent of this phase is to build decommissioning capabilities, to rehabilitate the exit of radioactive waste treatment facility and to design, build an interim storage and disposal facility.

Phase Two: Phase Two planed for five years (2011-2015) strategic plan in which five high radiological risk facilities are to be decommissioned based on prioritization results. The intent of this phase is to use the experience gained from Phase One in decommissioning of complex, high risk facilities.

Phase Three: Phase Three planed for ten years (2016-2025) strategic plan in which all remaining facilities and sites will be decommissioned base on prioritization results.

3- DCOMMISSIONING OF LOW REDIOLOGICAL RISK FACILITIES (Phase-1)

The following facilities were chosen as low radiological risk and low radioactive waste to be generated from decommissioning.

3-1 LAMA Facility

The LAMA facility Fig. (2) at Al-Tuwaitha site has been assessed as a low risk facility. Its operational history leads to the expectation that there is very little contamination remaining, and hence low volumes of radioactive waste. It will allow the development of dismantling and decommissioning experience and expertise on a full scale building within a relatively safe environment, although with significant challenges relating to structural safety. Likewise, it will allow the development of the regulatory interface and processes, including the clearance regime. The decommissioning of this facility is completed

Fig. 2 Decommissioning of the Destroyed LAMA Facility

3-2 Geo Pilot Plant

The decommissioning of this relatively small scale facility Fig. (3) located in central Baghdad will release the building for re-use by the owner. It represents a different type of challenge, being a well-defined and undamaged research-type rig with uranium contamination. Relatively small volumes of waste was resulted.

The Geo pilot plant was designed to produce yellowcake using Uranium ore from Abu skhair mine in Iraq. The decommissioning in this site was completed and the resulted radioactive waste was transfered to Tuwaitha site.

Fig. 3 Decommissioning of Geo Pilot Plant

3-3 Italian Radioisotope Production Facility

The Italian Radioisotope production Facility Fig. (4) was completely destroyed during the second Gulf War 1991.The facility was mainly used to produce radioisotope for medical purpose. The remaining of this facility is two hot cells and four tanks containing radioactive liquid waste, the level of contamination is low. It was planned to finish the decommissioning of the facility by the end of 2011.

Fig.4 Decommissioning of Radioisotope production facility

4- CONCLUSIONS

The programme will form the basis of the initial hands-on work on the decommissioning programme, and will provide a good platform for building experience.

In phase-1 decommissioning programme three low risks projects were chosen to be decommissioned this programme will allow capacity building of the decommissioning workers and the regulatory staff as well as allowing the building of radioactive waste storage and disposal facilities.

The phase-2 decommissioning programme is to implement the strategic decommissioning plane based on radiological risks assessment, the high risks facilities has to be addressed first according to the results of prioritisation using the experience gained in phase-1.

The Phase-3 decommissioning programme will follow the prioritization scheme. The estimated termination of the programme will be in 2025.

The radioactive waste resulted from decommissioning of LAMA facility and Geo Pilot Plant site were placed in drums and cargo containers as a temporary solution till the waste treatment and storage facilities be completed.

Lessons Learned from the work in the early part of the Iraqi decommissioning programme will be applied to the later phases of the programme.