

# The Cost Estimation for Decommissioning of a Nuclear Fuel Cycle Facility Using CERREX Based on ISDC Structure

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## 1. Introduction

CERREX(Cost Estimation for Research Reactors in Excel) was developed in line with the IAEA recommendations for decommissioning costing and fully implements ISDC(International Structure for Decommissioning Cost) structure and costing methodology. The purpose of this work is to calculate the decommissioning cost of a nuclear fuel cycle facility by using CERREX based on ISDC structure.

## 2. ISDC

The ISDC was developed as a common platform of systematized typical decommissioning activities that cover all types of activities identified in any decommissioning project for any type of nuclear installation, regardless of its size, composition/complexity of systems and structures and radiological conditions. The typical representative decommissioning activities are composed of 11 sections. Special features of the ISDC-based costing is that the ISDC cost categories(labor cost, investment cost, expense and contingency) are calculated at the level elementary decommissioning activities and aggregated at upper level as shown on Fig. 1.

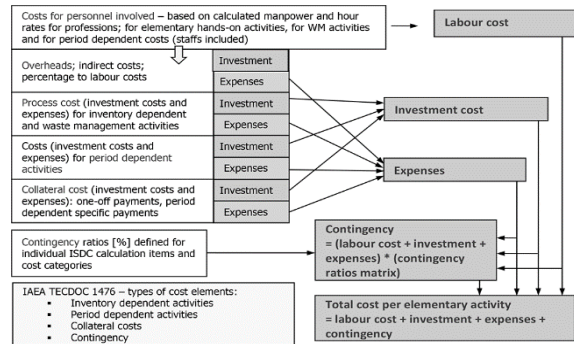


Fig. 1. The principle of ISDC cost calculation methodology.

## 3. CERREX

The CERREX is short for cost estimation for research reactors in excel and is a simplified costing model for research reactors. One of the IAEA missions is the support for decommissioning of research reactors around the world. The target users of CERREX are countries with limited experience in decommissioning costing and its purpose is to estimate the preliminary cost for research reactors. The cost calculation structure of CERREX is the generic ISDC definition. As shown in Fig. 2., the principles of definition of waste streams for processing in CERREX are partitioned with inventory items and historical/legacy waste items in presented as Fig. 3.

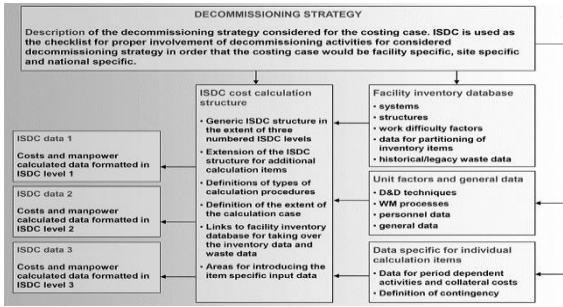


Fig. 2. The principal scheme of CERREX.

## 5. Discussion

The CERREX has a disadvantage of data reliability about the cost calculation results according to waste types, materials, and processes. That is why grouping functions of waste types, materials, and process do not automatically work in the CERREX and users input in detail the data into the CERREX.

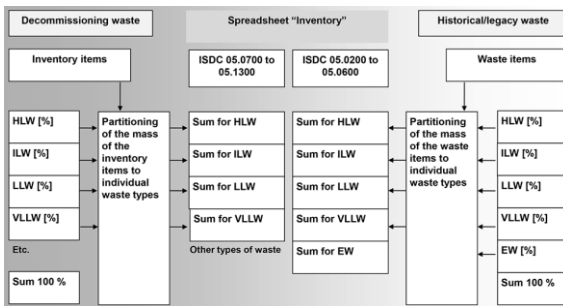


Fig. 3. The waste streams of CERREX.

## ACKNOWLEDGEMENT

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## 4. The cost calculation for decommissioning of a RWTF using CERREX

Fig. 4 shows the decommissioning cost calculation of RWTF (Radioactive Waste Treatment Facility). As shown in Fig. 4, the workforce of RWTF decommissioning is about 176,677 man/hour and the decommissioning cost is about 11 M(USD) including its labor cost is about 5.4 M(USD), its investment cost is about 0.63 M(USD), its expense cost is about 2.5 M(USD), and its contingency is about 2.5 M (USD).

Case: Sae-bit Fuel Science Building		Currency: USD					
Reactor: Radioactive Waste Treatment Facility		Total/ calculated data		Calculated cost categories			
Operations: International Atomic Energy Agency		Workforce (man.h)	Costs (USD)	Labour costs (USD)	Investment (USD)	Expenses (USD)	Contingency (USD)
ISDC No.	ISDC Name	176,677	11,023,140	5,421,816	626,168	2,438,363	2,546,111
01	Pre-decommissioning actions	24,752	1,635,161	967,551	0	290,285	377,345
02	Facility shutdown activities	0	0	0	0	0	0
03	Additional activities for safe enclosure or entombment	0	0	0	0	0	0
04	Dismantling activities within the controlled area	6,754	323,526	188,448	2,533	57,885	74,660
05	Waste processing, storage and disposal	74,598	5,466,423	2,396,822	483,032	1,425,086	1,261,482
06	Site infrastructure and operation	0	0	0	0	0	0
07	Conventional dismantling and demolition and site restoration	70,577	3,608,038	1,993,095	140,603	665,716	832,624
08	Project management, engineering and support	0	0	0	0	0	0
09	Research and development	0	0	0	0	0	0
10	Fuel and nuclear material	0	0	0	0	0	0
11	Miscellaneous expenditures	0	0	0	0	0	0

Fig. 4. The decommissioning cost calculation of a RWTF using CERREX.