



**WorleyParsons**  
resources & energy

## INSC Project MC3.01/13

EC Contract N° NSI/2014/343-969

“Training and Tutoring for experts of the NRAs and their TSOs for developing or strengthening their regulatory and technical capabilities”

## Training Course

# Nuclear Fuel Cycle and Uranium Mining From a Regulatory Perspective

organized by ITER-Consult

Ljubljana – November 16 – 20, 2015

Jozef Stefan Institute, Nuclear Training Centre

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## Course Objective

The module will provide a presentation of the front-end of the fuel cycle: ore extraction, conversion and enrichment, fuel fabrication and use in the power plant, spent fuel reprocessing and recycling of re-enriched reprocessed U and Pu as MOX in PWR. It will provide a description of the nuclear fuel cycle technologies, from the point of view of the nuclear and radiation safety and the key issues related to RW and SF management, storage and disposal activity, radiological protection of people and environmental protection. MOX technology, reprocessing aspects and other relevant aspects of fuel cycle will be considered. An overview of the uranium mining process discussing differences among applied technologies and related safety aspects will be presented.

Implications for transportation and radioactive waste treatment and conditioning will be discussed. Security aspects and requirements coming from International Conventions will be considered. Elaboration of practical cases will be included in the training program.

## Course Daily Program

### Monday 16<sup>th</sup> November 2015

08.30 - 8.45	Registration
8.45 - 12.30	Welcome , Organizational Aspects, Training Objective, Training Program
	EU legal framework for Nuclear and Radiation safety - <i>I. Grlicarev (URSJV), A. Madonna (ITER)</i>
	Role and functions of NRA and TSO - <i>I. Grlicarev (URSJV), A. Madonna (ITER)</i>
	Introduction to Nuclear Fuel Cycle and EU infrastructure for Safety and Security of the Nuclear Fuel Cycle - <i>T. Žagar, (ARAO/JSI)</i>
12.30 - 13.30	Lunch
13.30- 17.30	Geology and mining of uranium& thorium - <i>M. Markič, (Geological Survey of Slovenia/JSI)</i>
	Conversion of uranium ore to nuclear fuel (chemical forms) - <i>G. Tavčar (JSI)</i>
	Processes for uranium enrichment - <i>I. Jenčič (JSI)</i>

### Tuesday 17<sup>th</sup> November 2015

8.45 - 12.30	Regulatory requirements for radiation protection, safety and security aspects of mining, conversion and enrichment - <i>V. Slapar Borišek (JSI)</i>
	Environmental impact from mining, conversion and enrichment activities - <i>N. Železnik (ITER)</i>
	Fuel Fabrication and operation for PWR & BWR nuclear power reactors - <i>R. Istenič (JSI)</i>
12.30 - 13.30	Lunch
13.30- 17.30	Recycle of actinides from spent fuel (partitioning and transmutation) - <i>I. Lengar (JSI)</i>
	Management of Spent fuel: wet and dry storage - <i>T. Skobe, Lengar (JSI)</i>
	Decommissioning of nuclear power plants - <i>L. Kegel (ARAO/JSI)</i>

### Wednesday 18<sup>th</sup> November 2015

8.45 - 12.30	RW production from NPP operation (classification and management) - <i>N. Železnik (ITER)</i>
	Environmental protection requirements for spent fuel management, reprocessing and disposal - <i>N. Železnik (ITER)</i>
	Reprocessing of spent fuel and safety requirements - <i>I. Jenčič, I. Lengar (JSI)</i>
12.30 - 13.30	Lunch
13.30- 17.30	Transportation of nuclear fuel and high level waste - <i>M. Koželj (JSI)</i>
	Radiation protection aspects of transportation, reprocessing and disposal - <i>M. Koželj (JSI)</i>
	Practical application: Safety case of the Finnish Onkalo spent fuel repository - <i>Uršič, Cizelj (JSI)</i>

### Thursday 19<sup>th</sup> November 2015

8.45 - 12.30	Legal framework and institutional practice of the Slovenian public service for radioactive waste management - <i>M. Kralj (ARAO/JSI)</i>
	Visit to Slovenian Central Storage Facility for LILW - <i>M. Kralj, (ARAO/JSI)</i>
	Remediation, long-term monitoring and maintenance of the closed Uranium mine Žirovskivrh, Slovenia, <i>M. Kralj (ARAO/JSI)</i>
12.00 - 13.00	Lunch
13.00 - 17.30	Visit to the closed Slovenian Uranium mine at Žirovskivrh. Includes visit to the disposal site of the uranium mining and milling waste - <i>M. Kralj (ARAO/JSI)</i>
	Departure by bus 13:00 - Return to hotel by 17:30

### Friday 20<sup>th</sup> November 2015

8.45 - 12.30	Licensing aspects of transportation, reprocessing and disposal of spent fuel and HLW - <i>P. Tavčar (URSJV)</i>
	Disposal of spent fuel and of HLW from operation and reprocessing of NF - <i>N. Železnik (ITER)</i>
	Near surface disposal of LILW and regulatory licensing aspects - <i>G. Pino (ITER)</i>
12.30 - 13.30	Lunch
13.00 - 17.30	Course summary
	Questionnaire
	Opinion from trainees
	Training Minutes