



# PREDIS

## **Course on Waste Characterisation: “PRACTICAL-THEORETICAL TRAINING SESSION ON GENIE 2K & ISOCS”**

**21.-24.11.2022**

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## Course information

- Title:** PRACTICAL-THEORETICAL TRAINING SESSION ON GENIE 2K & ISOCS FOR WASTE CHARACTERIZATION
- Date:** November 21-24, 2022
- Location:** Jose Cabrera Nuclear Power Plant, Guadalajara, Spain
- Audience:** PREDIS partners and students (and potentially End User Group industry or external parties) having an interest on applying gamma spectrometry techniques for waste characterization.
- Maximum number of participants is 8.
- Objective:** Theoretical and practical course of Gamma spectrometry for the characterization of waste packages, large items, walls, soils, etc., Genie2k software is described for the management of ISOCS device.
- Main subjects: Gamma acquisition analysis, interactive peak location and area analysis. Energy and efficiency calibration, Minimum detectable Activity, Decision Threshold, Resolution, Detector characterization, Multi efficiency, Geometry Composer, Uncertainties, Quality Control, Case studies, Real Waste Measurements,
- Cost:** This course is **free** to attend and a certificate of attendance will be available on request. Note that travelling, accommodation and meals not specified in the programme should be covered by the participant.
- Registration:** [https://www.lyyti.in/GENIE\\_2K\\_ISOCS\\_21\\_241122](https://www.lyyti.in/GENIE_2K_ISOCS_21_241122) **DEADLINE 30 September 2022**
- Contact:** This course is being organised by ENRESA with the support of PREDIS WP3 (Knowledge Management). If you have any questions, please contact Alba Valls ([alba.valls@amphos21.com](mailto:alba.valls@amphos21.com)) and José Luis Leganes ([JLEN@enresa.es](mailto:JLEN@enresa.es)).
- Format:** 100% face to face. There is not possible to organize the course in an hybrid mode. The course consists on 2 days of theoretical lectures and 2 days of field work.

## Short Programme

Hour/day	21 November	22 November	23 November	24 November
9:00-10:30	Presentation	GENIE2K (III): Activity calculation, uncertainty, and characteristic limits	NPP projects: ENRESA-TECNASA (I)	Hands-On w/ISOCS Software (I)
	GENIE 2K Basics concepts			
10:30-11:30	GENIE 2K Basics concepts	Montecarlo method in ISOCS	NPP projects: ENRESA-TECNASA (II)	Hands-On w/ISOCS Software (II)
11:30-12:00	<i>BREAK</i>	<i>BREAK</i>	<i>BREAK</i>	<i>BREAK</i>
12:00-13:00	GENIE 2K (I): Detailed explanation and use of different GENIE 2K tools	ISOCS (I): General	Hands-On w/Gamma Analysis Software (I)	Questions and Answers
13:00-14:00	GENIE 2K (II): Important algorithms and methods	ISOCS (II): Commands explanation	Hands-On w/Gamma Analysis Software (II)	Questions and Answers

## Detailed agenda

### 21 November 2022 (Monday).

**9:00 – 9:15: PRESENTATION.** Participant's Arrival, Opening Remarks (Jose Luis Leganés and ALL Training Instructors) and participant's brief introduction.

**9:15-11:30. GENIE 2K BASICS CONCEPTS.**

- Interaction radiation - matter. possible effects.
- Classification of detector types:
  - Scintillation detectors.
  - Semiconductor detectors.
- Electrical signals produced by the detectors.
- Impulse shaping.
- Preamplifiers.
- Multichannel operation.
  - The analog approach: multichannel amplifiers and analyzers.
  - The digital approach: Digital spectrometers.
  - Types of multichannel.
- Other modules of interest.

**12:00-13:00. GENIE 2K (I).** Detailed explanation and use of different GENIE 2K tools:

- Gamma Acquisition & Analysis.
- Interactive Peak Fit.
- MCA Input definition Editor.
- Nuclide Library Editor.
- Quality Assurance (QA).

**13:00-14:00. GENIE 2K (II).** Important algorithms and methods.

- Location methods and calculation of peak areas applied to different types of detectors.
- Energy Calibration.
- Efficiency calibration.
- Selection and use of analysis libraries.
- Interference resolution.

### 22 November 2022 (Tuesday).

**9:00 – 10:30: GENIE 2K (III).** Activity calculation, uncertainty, and characteristic limits.

- Decision threshold and detection limit.
- MDA.
- ISO-11929.

Parameters and criteria for quality control process.

**10:30-11:30. MONTECARLO METHOD IN ISOCS**

- Brief history.
- Simple example comparing with R Studio.
- Linking the simple example with MonteCarlo method and ISOCS.

**12:00-13:00. ISOCS (I).** General:

- Software Description.
- Detector library and example operation.
- Collimator editor.
- Standard templates.
- Adaptation of templates to specific applications

**13:00-14:00. ISOCS (II).** Commands explanation:

- Detector interface and materials in the ISOCS templates.
- Source reference plane.
- Efficiency considerations in ISOCS systems:
  - Efficiency Calculation Options.
  - mass efficiency.
  - surface efficiency.
  - linear efficiency.
- Detector aiming line.
- Absorbers.
- Activity distribution.
- Collimators.

**23 November 2022 (Wednesday).**

**9:00 – 11:30: NPP projects: ENRESA-TECNASA (I) & (II).** Real examples data collection for GENIE 2K and ISOCS Hands-On.

- Declassification tape.
- Measurement trolley.
- Well & ground measurement.
- Box Counter

**12:00-14:00. Hands-On w/Gamma Analysis Software (I) & (II).** Analysing real spectra from previous NPP projects and others.

- PRACTICAL EXERCISES: Using ALL the tools and GENIE 2K theoretical concepts.

**24 November 2022 (Thursday).**

**9:00 – 11:30: NPP projects: Hands-On w/ISOCS Software (I) & (II).** Modelling from previous NPP projects and others.

- PRACTICAL EXERCISES: Using ALL the tools and ISOCS theoretical concepts.

**12:00-14:00. Questions & Answers.** Colloquium table where everyone solves doubts, concepts, etc.

## Registration schedule

30 September 2022	Registration deadline and Deadline for Mobility application to attend the course
21 October 2022	Communication of accepted participants and accepted mobility applications
21 November 2022	Beginning of the course