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## **New scintillation liquids without Nonylphenol Ethoxylates: comparative study of their behavior with classic scintillation liquids**

Céline AUGERAY<sup>(1)</sup>, Audrey BACCHETTA<sup>(2)</sup>, Lionel BEC ESPITALIER<sup>(3)</sup>, Yvan LOSSET<sup>(4)</sup>, Nicolas BAGLAN<sup>(5)</sup>, Véronique LABED<sup>(5)</sup>, Marielle CROZET<sup>(5)</sup>

<sup>(1)</sup> Institut de Radioprotection et de Sécurité Nucléaire (IRSN), PSE/ENV/SAME, F-78110, Le Vésinet, France

<sup>(2)</sup> EDF DIPNN, CNPE de Chinon, BP 23, 37420 Avoine, France

<sup>(3)</sup> Orano CE Tricastin, France

<sup>(4)</sup> CEA/DAM/CVA, 21120 Is-sur-Tille, France

<sup>(5)</sup> CEA, DES, ISEC, DMRC, Univ. Montpellier, Marcoule, France

Monitoring of the environment of nuclear installations and/or their effluents is carried out by French laboratories in compliance with applicable regulations using proven methods (technical standardization, development and validation of analytical methods when appropriate, verification/qualification of products and consumables that may have an impact on the measurement results, compliance with the performances required by the nuclear safety authority or customers, etc.).

This monitoring involves in particular the quantification of beta emitters, carried out via liquid scintillation measurements requiring the use of cocktail scintillation liquids (CSL). A SL is essentially composed of solvents, fluorescent solutes and surfactants, including Nonylphenol Ethoxylates (NPE). These ensure miscibility with aqueous samples. NPE are today considered as SVHC (Substance of Very High Concern) in the European regulations REACH. NPE free CSL without NPE are therefore under development by suppliers.

In order to ensure the continuity of the control regulations carried out on the different matrices analyzed by the French laboratories, it is important to know the behavior of these new CSL NPE free in comparison with those used actually, in order to allow:

- to characterize the performances achievable by laboratories following the use of these new cocktails;
- to anticipate or rule out possible changes in practices which may be necessary to ensure compliance with the technical and regulatory requirements in force with progressive national use of these new cocktails.

In this context, the French Commission for establishment of analytical methods (CETAMA) organized an interlaboratory qualification exercise to study the performance of two new CSL without NPE. This exercise takes place in two phases:

• Phase 1: Screening

- Step 1: Definition of the stability conditions of the reference water / scintillating liquid mixtures, by determining the most efficient ratios  $V_{\text{reference water}}/V_{\text{SL}}$  under the laboratory conditions,
- Step 2: Measurement of light attenuation on the best mixtures and study of their stability.

• Phase 2: Study of the parameters of importance for the measurement, in the case of tritium.

The results obtained during this exercise will be presented as well as the perspectives.