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## Performance Evaluation (PE) Samples as Part of Laboratory Quality Control.

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Role of PE samples in the Laboratory Quality control is briefly discussed. Eckert & Ziegler Analytics (EZA) capabilities are outlined. New Fission products Mixture (FM) is introduced. This mixture of radionuclides represents real fission products resulted from the irradiation of natural or enriched Uranium with thermal neutrons. Analysis of this mixture is real challenge and it can be very valuable tool for training and proficiency testing. Fission mixture has several advantages over existing EZA activation/fission mixture:

- FM contains same array of radionuclides as post-accident samples,
- Over 20 isotopes with reasonable half-lives can be certified,
- Liquid FM samples can test laboratory ability to handle samples properly prior to analysis. Improper sample container, preservation, storage conditions etc. can significantly alter analytical results.
- Gamma spectrometry of this mixture requires extensive knowledge of the methodology and particularly the correct application of software used for gamma analysis. Analytical laboratory will need to:
  - analyze complex isotope mixture, properly identify isotopes using key gamma lines and correctly apply interferences,
  - properly apply coincidence summing corrections,
  - decay results for the reference date,
  - properly recognize and calculate parent/progeny pairs like Zr-95/Nb-95, I-132/Te-132, Mo-99/Tc-99 etc.,
  - identify additional radionuclides.
- FM can be used to identify non gamma emitting radionuclides like Sr-89, Sr-90, Pu-239 etc. based on fission yields, nuclear reactions and irradiation conditions.

Fission mixture samples can be delivered as liquid samples and other configurations like filters and cartridges.

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