



**NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF QUALITY ASSURANCE
ENVIRONMENTAL LABORATORY CERTIFICATION PROGRAM
ON-SITE LABORATORY EVALUATION
RADIOCHEMISTRY PROCEDURES**

Tritium Analysis -- Liquid Scintillation

- Method(s):** EPA 906.0
 SM 7500-³H B
 Other: _____

Laboratory ID	
Laboratory Name	
Analyst(s)	
Auditor	
Date(s) of Audit	
Type of Audit	<input type="checkbox"/> Initial <input type="checkbox"/> Biennial <input type="checkbox"/> Special <input type="checkbox"/> ELCP <input type="checkbox"/> TNI/NELAP
Notes:	

Question	Reference	Yes	No	N/A	Comments
Analytical Method & SOP					
Does the laboratory maintain an SOP for each accredited method?	TNI V1M2 4.2.8.5(e) N.J.A.C. 7:18-6.6(b)				
Are the SOPs complete and acceptable?	TNI V1M2 4.2.8.5 N.J.A.C. 7:18-6.6(b)				
On each SOP, does it clearly indicate the effective date of the document, revision number, and signature(s) of approving authority?	TNI V1M2 4.2.8.5(c) N.J.A.C. 7:18-6.6(b)4				
Are all relevant SOPs readily available to all personnel?	TNI V1M2 4.2.8.5(b) N.J.A.C. 7:18-6.6(b)2				
Sample Control					
Is the laboratory involved in sampling? (If not, the skip next two questions)	N/A				
Does the laboratory provide necessary sampling equipment and/or supplies to its clients?	N/A				
Does the laboratory have a sampling plan and procedures for sampling?	TNI V1M2 5.7.1 N.J.A.C. 7:18-9.3				
Does the laboratory have a procedure for chain of custody (COC) of samples?	TNI V1M2 5.8.8 N.J.A.C. 7:18-9.3.4				
Does the laboratory maintain a COC form for each sample?	TNI V1M2 5.8.7.5 N.J.A.C. 7:18-9.3.4.i				
Does the laboratory utilize a permanent chronological record to document receipt of all sample containers (e.g., LIMS database)?	TNI V1M2 5.8.7.3 N.J.A.C. 7:18-9.3.3.iv				
Does the laboratory assign a unique laboratory ID code to each sample, which is linked to its field ID code?	TNI V1M2 5.8.7.3(b)i N.J.A.C. 7:18-9.3.4.iii.(2)				
Does the laboratory assign unique ID extension to subsamples? (applies primarily to bulk samples)	TNI V1M2 5.8.5a)				
Does the laboratory implement procedures for checking chemical preservation prior to or during sample preparation or analysis?	TNI V1M6 1.7.4(b) N.J.A.C. 7:18-9.4				
Sample Collection and Preservation					
Is a representative sample collected from its natural state?	EPA 906.0 Section 3.1				
Are samples stored in glass containers?	NJAC 7:18-				

Question	Reference	Yes	No	N/A	Comments
	9.4 Table 9.3				
Are samples not acid preserved?	NJAC 7:18-9.4 Table 9.3				
Are samples analyzed within 6 months, if preserved?	40 CFR Part 136 Table 2				
Is the detection limit 1000 pCi/L (or 1 pCi/mL) with a sensitivity of 1 pCi/mL?	EPA 906.0 Section 1.2				
Is the concentration counted with a precision of $\pm 100\%$ at the 95% confidence level?	40 CFR 141.25 (c)				
Laboratory Facilities and Equipment					
Are bench surfaces of an impervious material covered with absorbent paper?	NJAC 7:18-6.2 (a) 2i				
Are trays constructed of stainless steel, plastic, or fiberglass and lined with absorbent paper?	NJAC 7:18-6.2 (a) 2ii				
<u>Liquid Scintillation System</u>					
Make:					
Model:					
Year:					
Serial #:					
Is the liquid scintillation system in working order?	NJAC 7:18-6.3 (b) 1				
Is each counting instrument properly grounded?	NJAC 7:18-6.2 (a) 1				
Does each counting instrument have a regulated power supply, either internal or external?	NJAC 7:18-6.2 (a) 1				
Are counting instruments <i>not</i> located in a room in which samples and standards are prepared or other types of chemical analyses are performed?	NJAC 7:18-6.2 (a) 1				
Are 20-mL, low potassium glass liquid scintillation vials available?	SM 7500 B.2b				
Is only "Class A" volumetric glassware used?	NJAC 7:18-3.3 (a) 8i				
Does the laboratory store radioactive standards, samples, and wastes in an enclosed and properly labeled area?	NJAC 7:18-6.5(a)1				
Does the laboratory store standards, samples, and radioactive wastes safely in containers that protect against flammability and against contamination of the laboratory?	NJAC 7:18-6.5(a)1				
Does the laboratory prepare standards and samples in an area specifically designated for and exclusively used for the preparation of radioactive standards and samples?	NJAC 7:18-6.5(a)2				
Does the laboratory monitor the work	NJAC 7:18-				

Question	Reference	Yes	No	N/A	Comments
area for radioactivity?	6.5(a)5				
Liquid Scintillation System Calibration					
Are the initial instrument calibration procedures included or referenced in the method SOP?	TNI V1M6 1.7.1(a)i				
Is sufficient raw data records retained to permit reconstruction of the initial instrument calibration?	TNI V1M6 1.7.1(a)ii				
Are samples results quantitated from the initial instrument calibration, not from any continuing instrument calibration verification?	TNI V1M6 1.7.1(a)iii				
Are performance checks for detection efficiency performed on a day-of-use basis (if a batch of samples lasts for more than one day then check may be performed at beginning and end as long as time interval is no greater than one week)?	TNI V1M6 1.7.1(b)iii				
Are background measurements performed each day of use?	TNI V1M6 1.7.1(c)iv				
Does the laboratory maintain a written procedure for monitoring radiation measurement instrumentation for radioactive contamination?	TNI V1M6 1.7.1(d)				
Does the procedure indicate the frequency of the monitoring and indicate criteria which initiate corrective action?	TNI V1M6 1.7.1(d)				
Standards and Reagents					
Are all reagents used analytical reagent-grade or better?	TNI V1M6 1.7.2.5(a)				
Does the source of water meet the required standard of quality for the method?	NJAC 7:18- 3.3 (a) 9				
Is the source of water monitored daily and a record kept?	TNI V1M6 1.7.2.5(b)				
Does background water have a tritium activity below the minimum detectable activity?	EPA 906.0 Section 6.2				
Are reference standards obtained from and/or traceable by NIST?	TNI V1M6 1.7.2.5(c)				
Are reference standards accompanied by a certificate of calibration?	TNI V1M3 1.7.6.1(c)				
Are all reagents and reagent solutions properly labeled? a) Identity b) Titer c) Strength or concentration d) Recommended storage requirements e) Preparation	NJAC 7:18- 6.5(a)3				

Question	Reference	Yes	No	N/A	Comments
f) Expiration date g) Any other pertinent information					
Does the laboratory immediately discard any reagent or reagent solution that is past its expiration date?	NJAC 7:18-6.5(a)4				
Demonstration of Capability (DOC)					
Has the laboratory conducted an initial DOC prior to using any method and at any time there is a change in instrument type, personnel, or method or any time it hasn't been performed in a 12 month period?	TNI V1M6 1.6.2				
Does the laboratory have a documented procedure for on-going DOC?	TNI V1M6 1.6.3.1				
Quality Control					
Is a method blank analyzed per preparation batch (max of 20 samples)?	TNI V1M6 1.7.2.1(b)				
Is there no subtraction of the method blank from the sample results?	TNI V1M6 1.7.2.1(c)				
Is a LCS analyzed at a minimum of one per preparation batch?	TNI V1M6 1.7.2.2(b)				
Is the activity of the LCS at least 10 times the MDA and at a level comparable to that of routine samples?	TNI V1M6 1.7.2.2(e)				
Is the LCS prepared with similar aliquot size to that of routine samples?	TNI V1M6 1.7.2.2(i)				
How frequently are matrix spikes run?					
Is the activity of matrix spike analytes greater than 5 times the MDA?	TNI V1M6 1.7.2.3(a)v				
Are duplicates performed on replicate aliquots of actual samples?	TNI V1M6 1.7.2.3(b)iii				
Each day, are 10% duplicate analyses performed? (For radon)	NJAC 7:18-6.6(c)3				
Are the precision and accuracy assessed and expressed as percent recovery (%R) and relative percent difference (RPD)?	TNI V1M6 1.7.3.3(a)i				
Is corrective action taken when %R and RPD are outside established criteria?	TNI V1M6 1.7.3.3(a)ii				
Procedures					
Is a 100 mL aliquot of sample used?	EPA 906.0 8.1				
Is sample solution distilled at 100 to 105°C?	SM 7500-H B.4				
Is the first 10 mL distillate discarded?	SM 7500-H B.4				
Are low-background water and standard tritium solution prepared in the same manner as samples?	SM 7500-H B.4				
Are samples, background, and standards kept in the dark for 3 hr before counting?	SM 7500-H B.4				
Are samples containing less than 200	SM 7500-H				

Question	Reference	Yes	No	N/A	Comments
pCi/mL counted for 100 min?	B.4				
Are sample containing more than 200 pCi/mL counted for 50 min?	SM 7500-H B.4				
Proficiency Testing (PT)					
Does the laboratory obtain performance efficiency (PE) samples from USEPA's radiological performance testing (PT) program, or from the Department's designated PT program?	NJAC 7:18-2.13(e)				
Does the laboratory participate in the appropriate field of proficiency testing (FoPT) for initial and continued accreditation?	TNI V1M1 4.0				
Is PT analyses <i>not</i> contracted out to another laboratory?	TNI V1M1 5.1.2				
Does the laboratory report results for accreditation on or before the closing date of the study?	TNI V1M1 5.2.2				
Does the laboratory have plans for resolving analytical problems when it receives a "not acceptable" performance score from a PT Provider?	TNI V1M1 6.1				
Does the laboratory have two consecutive, acceptable PT scores out of three within the last 18 months?	TNI V1M1 4.2.1a)				
Reports					
Are the reports complete and accurate?	TNI V1M2 5.10.2				
Are there any data qualifiers on reports?	TNI V1M2 5.10.2(g)				
Does the report have authorized signatures?	TNI V1M2 5.10.2(j)				
Is the following information included in the report: a) Identity of sample b) Sampling station c) Date of collection d) Volume of sample e) Type of test f) Time of counting g) Tritium, ³ H, concentration (pCi/mL or nCi/L) h) Counting error i) Kind and amount of radioactivity	SM 7500-H B.5a,b				
Records					
Does the laboratory establish and maintain procedures for identification, collection, indexing, access, filing, storage, maintenance and disposal of quality and technical records?	TNI V1M2 4.13.1.1				
Do quality records include reports from	TNI V1M2				

Question	Reference	Yes	No	N/A	Comments
internal audits and management reviews and records of corrective and preventive actions?	4.13.1.1				
Does the laboratory retain records concerning analyses including raw data records, quality control data records, chain-of-custody forms, and laboratory reports for at least five years?	N.J.A.C. 7:18-6.7(a)				