



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA ST., N.W., SUITE 3100
ATLANTA, GEORGIA 30303

Report Nos. 50-269/80-36, 50-270/80-32 and 50-287/80-29

Licensee: Duke Power Company
422 South Church Street
Charlotte, NC 28242

Docket Nos. 50-269, 50-270 and 50-287

License Nos. DPR-38, DPR-47 and DPR-55

Inspection at Oconee Site near Seneca, South Carolina

Inspector: D. M. Montgomery

2/3/81
Date Signed

Accompanying Personnel: P. C. McPhail

Approved by: A. F. Gibson
A. F. Gibson, Section Chief, FF&MS Branch

2/3/81
Date Signed

SUMMARY

Inspection on December 8-12, 1980

Areas Inspected

This routine, unannounced inspection involved 53 inspector-hours onsite in the areas of quality control and confirmatory measurements including: review of the laboratory quality control program; review of chemistry and radiochemistry procedures; review of quality control records and logs; and comparison of the results of split samples analyzed by the licensee and the NRC RII Mobile Laboratory.

Results

Of the 4 areas inspected, no violations or deviations were identified in 3 areas; 2 violations were found in 1 area.

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DETAILS

1. Persons Contacted

Licensee Employees

- *J. E. Smith, Plant Manager
- *J. A. Long, Support Functions Coordinator
- *S. L. Morgan, Counting Room Supervisor
- *C. L. Harlen, Associate Health Physicist
- *T. Matthews, Licensing Coordinator
- *T. E. Cribbe, Licensing Coordinator
- *R. T. Bond, Technical Services Supervisor
- T. B. Owen, Superintendent of Technical Services
- B. Fender, Primary Chemistry Unit Coordinator

Other licensee employees contacted included 3 technicians.

NRC Resident Inspector

- *D. O. Myers

2. Exit Interview

The inspection scope and findings were summarized on December 12, 1980, with those persons indicated in Paragraph 1 above. The Plant Manager acknowledged the item of noncompliance regarding failure to follow procedures and agreed to address the items identified by the inspector in Paragraphs 6.b - 6.e. Licensee representatives agreed to perform the analyses referred to in Paragraph 9.b. On December 22, 1980, the inspector notified the Plant Manager by telephone that the failure to have an approved procedure for radiostrontium analysis of liquid and gaseous effluents would be carried as a violation rather than an unresolved item. The Plant Manager indicated that the issue of procedures for contracted services would have to be discussed within the Duke organization since it appears to be a generic issue that could affect other areas. The inspector reiterated that the time required to receive access to the plant during this inspection was excessive and that either an abbreviated site specific training with unescorted access or escorts for the NRC inspectors is necessary. The Plant Manager stated that Duke Power would revise the training requirements so that unescorted access could be granted with a short site specific training session and that this should be available by July 1981 (269/80-26-09, 287/80-32-09, 287/80-29-09).

3. Licensee Action on Previous Inspection Findings

(Closed) Infraction (269/79-08-02, 270/79-08-02, 287/79-08-02) Failure to Follow the Approved Procedure for Calibration of GeLi Detectors. The inspector reviewed the calibration program and noted that calibration standards had been purchased and that the approved procedure HP/O/B/1003/09 was being utilized for calibrations.

(Closed) Deviation (269/79-08-03, 270/79-08-03, 287/79-08-03) Use of Calibration Standard that was not Representative of Contamination Being Measured. The inspector verified that Cs-137 was being used for calibration of the beta-gamma counters used for counting smears.

(Closed) Unresolved Item (269/79-08-04, 270/79-08-04, 287/79-08-04) Certification of Tritium Standard. The inspector verified that the licensee was utilizing a certified standard for tritium calibration of the liquid scintillation counter.

(Closed) Unresolved Item (269/79-08-05, 270/79-08-05, 287/79-08-05) Use of Cross Calibration Technique for Efficiency Calibration of GeLi Counters. Licensee has discontinued use of the cross calibration technique and certified solutions from vendors participating in the NBS measurement assurance program are being utilized.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Laboratory Quality Control Program

a. The inspector reviewed the licensee's Quality Control Program for radiochemical measurements in the following areas:

(1) Assignment of Responsibility and Authority to Manage and Conduct the QC Program

The chemistry and health physics procedures do not specifically address the assignment of authority to manage and conduct the QC program. The Health Physics Counting Room Supervisor has the responsibility for quality control associated with the counting room instrumentation as designated by his job description. The responsibility for the chemistry quality control program is delegated to the Supervisors of the various chemistry sections. Chemistry procedures do not specifically address the assignment of responsibility and duties associated with operation of the chemistry QC program.

(2) Provisions for Audits/Inspections

The inspector noted that there are no provisions for audits/inspections by the station health physics and chemistry staff. Technical Specification 6.1.3.1 specifies that the Nuclear Safety Review Board shall provide independent review and audits in chemistry, radiochemistry, and radiological safety. Periodic audits are carried out by the Duke Power Company Quality Assurance Department in accordance with Procedure QA-210.

- (3) Methods for Assuring Deficiencies and Deviations in the Program are Recognized, Identified, and Corrected.

The inspector noted that there are no specific methods for identifying deficiencies in the QC Program at the plant level in so far as there are no provisions for management review. The audits by the Quality Assurance Department provide for corrective actions for deficiencies that are recognized during audits.

- (4) Quality Control of Purchased or Contracted Analyses

The vendor performing radiochemical analyses for radiostrontium and H-3 had been audited by Corporate Quality Assurance and placed on the approved vendor list as per Chapter 2.9 of the Duke Power Company Administrative Policy Manual for Nuclear Power Plants.

The inspector noted that licensee's quality control program for chemistry and radiochemistry did not meet NRC Regulatory Guide 4.15, Quality Assurance for Radiological Monitoring Programs-Effluent Streams and The Environment, February 1979, in two areas. These were: (1) Specification of Organizational Structure and Responsibilities of Managerial and Operational Personnel, and; (2) Audits.

The inspector stated that the QC program should specify the organizational structure and various responsibilities within the structure. There should also be provisions for audits/inspections by Station Management to ensure the QC program is being implemented and to review the general adequacy of the program. The Corporate Quality Assurance Department performs periodic audits but these audits are apparently not performed by individuals qualified in chemistry and radiochemistry and do not address the adequacy of the program. The inspector noted that the licensee does not have any specific regulatory requirements for laboratory quality control. Licensee representatives agreed to review the quality control program for chemistry and radiochemistry and consider addressing the areas of organizational responsibility and audits. (269/80-26-01, 270/80-32-01, 287/80-29-01). No violations were identified.

6. Review of Chemistry and Radiochemistry Procedures

a. The inspector reviewed the following procedures:

- (1) HP/O/B/1003/09, Procedure for Calibration of GeLi Detectors on the ND 6600 System, 12/27/79, Rev. 2
- (2) HP/O/B/1003/08, Calibration Procedure for the Beckman LS-100 Liquid Scintillation System, 10/16/79.
- (3) HP/O/B/1000/60A, Procedure for Gaseous Waste Sampling, 4/4/80
- (4) HP/O/B/1000/67, Procedure for Quality Assurance for Radiological Monitoring Systems, Rev. 1.

- (5) CP/O/A/400/1, Chemistry Procedure for Determination of Gross Beta Activity, 7/7/80.
- (6) CP/O/B/100/3, Instrument and Reagent Checks and Calibrations, 11/19/80.
- (7) CP/O/A/300/10, Chemistry Procedure for Determination of Fluoride, 6/19/79.

The results of the procedure reviews were discussed with licensee representatives as noted in Paragraphs 6.b. through 6.e.

- b. The inspector noted that the following deficiencies in Procedure HP/O/B/1000/67, Quality Assurance for Radiological Monitoring Systems:

- (1) Paragraph 4.1.1.2 - No daily performance checks and acceptance criteria for count rates in photopeaks are provided; resolution check with acceptance criteria is not provided; and acceptance criteria for linearity check is not provided.
- (2) Paragraph 4.1.2.1 - Replicate analyses should also reflect the validity of the sampling technique and acceptance criteria for replicate analyses should be provided.
- (3) Paragraph 4.1.2.2 - Background counts should be more frequent.
- (4) Paragraph 4.4.3, Acceptance criteria for interlaboratory comparisons should be specified. Recommendations set by General Office Laboratory Services are not specified.

Licensee representatives agreed to address these items and revise the procedures as necessary. (269/80-26-02, 270/80-32-02, and 287/80-29-02).

- c. The inspector noted that calibration procedures for counting equipment did not specify the radionuclides to be used for calibration. Licensee representatives agreed to revise the applicable procedures and specify the radionuclides. (269/80-26-03, 270/80-32-03, and 287/80-29-03).
- d. The inspector noted that Procedure HP/O/B/1000/60A, Gaseous Waste Sampling did not provide for removal of noble gases from the tritium sample. This may result in overestimation of tritium releases. Licensee representatives agreed to modify the procedure to correct this problem. (269/80-26-04, 270/80-32-04 and 287/80-29-04).
- e. The inspector noted that there was no approved procedure for the analysis of radiostrontium in liquid and gaseous radioactive wastes. Technical Specification 3.9.8 and 3.10.9 requires sampling and analysis of liquid and gaseous radioactive wastes in accordance with Table 4.1.3 which provides for monthly radiostrontium analyses. A licensee representative stated that radiostrontium analyses were performed by a vendor that had been approved by Duke Power Company's Quality Assurance

Department. The inspector stated that this did not relieve them of the responsibility to review and approve the procedure as required by Technical Specification 6.4.1 and 6.2.1. A licensee representative stated that the procedures may have been reviewed at the Corporate level. On December 19, 1980, the inspector discussed this matter by telephone with M. Birch, Duke General Office Health Physics Staff, and T. Cribbe, T. Owen, and C. Yongue of the Oconee Nuclear Station. M. Birch stated that there were no approved radiostrontium methods since these analyses were performed by a vendor that was on the Duke list of approved vendors. The inspector restated that vendor approval did not relieve the plant staff of the responsibility of reviewing and approving this procedure. The inspector informed the plant manager by telephone on December 23, 1980, that failure to have approved radiostrontium procedures for analysis of liquid and gaseous waste is a violation. (269/80-26-05, 270/80-32-05 and 287/80-29-05).

7. Review of Records and Logs

a. The inspector reviewed the following records and logs:

- (1) 1980 Quarterly Interlaboratory Comparison of Counting Room Equipment for Liquid Scintillation Counter, Ge(Li) detectors, and GM Counters.
- (2) 1980 Background Counts for Ge(Li) Detectors.
- (3) 1980 Interlaboratory Comparison for Ge(Li) Detectors.
- (4) Semi-Annual Calibration of Counting Room Equipment: Ge(Li) Detectors, GM Counter, and Liquid Scintillation Counter, 1980.
- (5) GM Performance Logs, 1/1/80 to 12/10/80.
- (6) Liquid Scintillation Logs, 1/6/80 to 12/10/80.
- (7) Calibration Certificates for Ge(Li) Detectors including the following geometries: 4-L Marinelli, Charcoal Cartridge, Particulate Filter, 500 cc bottle, and 60 cc bottle, 7/18/80.
- (8) Analytical Balance Calibration, 1980.
- (9) pH Meter Calibrations, 11/1/79 to 12/10/80.
- (10) Boron Titrator Calibrations, 11/1/79 to 12/10/80.
- (11) Fluoride Probe Calibration, 11/1/79 to 12/10/80.
- (12) Spectronic 70 Calibrations, 11/1/79 to 12/08/80.
- (13) Conductivity Meter Calibrations, 11/1/79 to 12/6/80.

(14) Quality Assurance Audits, QA-O-80-8, September 19, 1980 and QA-O-79-5, June 11, 1979.

The inspector discussed the record review with licensee representatives as discussed in Paragraphs 7.b. and 7.c.

- b. The inspector noted that the daily check counts for ^3H and gross beta by liquid scintillation were not recorded during the period of September 10, 1980, to December 10, 1980, as required by Procedure HP/O/B/1000/67. A licensee representative stated that the QC check had been changed due to problems in preparing a stable source and a temporary change had been made to Procedure HP/O/B/1001/11, Operating Procedure for the Beckman LS-100 Liquid Scintillation System, but Procedure HP/O/B/1000/67 had not been changed. The inspector noted that the change resulted in a QC check that was not as comprehensive as that required by Procedure HP/O/B/1000/67. The inspector informed licensee representatives that failure to follow Procedure HP/O/B/1000/67 was a violation of Technical Specification 6.4.1 that requires the station to be operated in accordance with approved procedures. (269/80-26-06, 270/80-32-06, and 287/80-29-06).
- c. The inspector noted that the accuracy performance check for boron analysis exceeded the control limits on 2/6/80, and the performance check was not repeated as required by Procedure CP/O/B/100/3. In addition, the precision control charts for phosphate, boron, and chloride analysis were not dated as required by Procedure CP/O/B/100/3. The inspector stated that the documentation of quality control data was sloppy and in some cases illegible and that it appeared that the data was not being carefully reviewed by the responsible supervisor. The inspector informed licensee representatives that this was another example of failure to follow procedures which is a violation of Technical Specification 6.4.1.

8. Review of South Carolina NRC Contract for Environmental Monitoring in Vicinity of Oconee Nuclear Plant

The inspector met with Nolan Bivens, South Carolina Department of Health and Environmental Control and J. J. Sevic, Oconee Plant Environmentalist, to discuss implementation of the NRC Contract with the State of South Carolina to split environmental samples with the Oconee Plant for a crosscheck of radiological analyses. The inspector re-emphasized the necessity for co-operation from the licensee in splitting samples and expeditious reporting of Oconee data so that the state can submit a timely annual report. The details of the latest contract including type of samples, sampling location, collection, and analyses were reviewed. Both parties were in agreement that there would be no problems in fulfilling the contract requirements.

9. Confirmatory Measurements

- a. The results of samples collected during the period of February 15-23, 1980, were discussed with the licensee. The results are presented in

Table 1 and show agreement or possible agreement except for Co-60 in the liquid waste sample and Co-58, Co-60, Ru-106, and Cs-134 in the charcoal cartridge/particulate filter sample. Licensee results that were in disagreement were higher than the NRC values and would have resulted in overestimation of station releases. The previous calibrations were done by a calculational-comparative technique rather than an empirical calibration with radionuclides. The reason for the disagreement was not apparent. Since the results from the liquid and charcoal cartridge from the current sample split were in agreement, this item is considered closed. (269/79-08-01, 270/79-08-01, 287/79-08-01)

- b. Liquid and gaseous samples were collected during this inspection and counted by the licensee and NRC RII Mobile Laboratory to verify the licensee's capability to measure radionuclides in effluent and reactor coolant samples. Samples were analyzed by gamma-ray spectroscopy and included: a liquid waste sample, reactor coolant sample, crud filter sample, waste gas decay tank sample, and a charcoal cartridge sample from the station vent. The crud filter sample was counted in place of a particulate filter since a particulate filter sample of sufficient activity was not available. An aliquot of the liquid waste sample was sent to the NRC contract Laboratory for tritium and radiostrontium analyses. The results will be compared to licensee results in a subsequent inspection report (269/80-26-07, 270/80-32-07 and 287/80-29-07.)

The comparisons of licensee and NRC results are presented in Table 2 with acceptance criteria in Attachment 1. The results showed agreement for all samples except the gas sample where the Xe-133 result was outside of the acceptance criteria. This is apparently due to the licensee calibration technique which uses a resin matrix that has a much higher density than gas. This results in the attenuation of low energy gamma-rays and a lower efficiency that causes over reporting of Xe-133. The inspector stated that this calibration technique was not acceptable, and a licensee representative agreed to use gas standards for the calibration of gas geometries. (269/80-26-08, 270/80-32-08 and 287/80-29-08).

TABLE 1
RESULTS OF CONFIRMATORY MEASUREMENTS
AT OCONEE NUCLEAR PLANT FEBRUARY, 1979

SAMPLE	ISOTOPE	Concentration, $\mu\text{Ci/cc}$		RATIO ONP/NRC	COMPARISON
		ONP	NRC		
Liquid Waste 3/15/79 10:00	Co-58	8.8 E-7	5.8 + 1.0 E-7	1.5	Agreement
	Co-60	8.4 E-7	2.0 + 0.5 E-7	4.2	Disagreement
	Cs-134	7.8 E-7	1.11 + 0.08 E-6	.7	Agreement
	Cs-137	1.29 E-6	1.6 + 0.1 E-6	.8	Agreement
	H-3	2.23 E-1	2.68 + 0.01 E-1	.83	Agreement
	Sr-89	4.3 E-8	1 + 1 E-8	-	NC
	Sr-90	<7 E-9	1 + 3 E-9	-	NC
Particulate + Charcoal 3/23/79 10:00	Ag-110m	9.0 E-10	2.3 + 0.2 E-10	3.9	Disagreement
	Mn-54	1.32 E-10	6.6 + 0.9 E-11	2.0	Agreement
	Co-58	2.52 E-9	1.30 + 0.03 E-9	1.9	Disagreement
	Co-60	9.39 E-10	5.14 + 0.2 E-10	1.8	Disagreement
	Ru-103	1.67 E-10	1.4 + 0.2 E-10	1.2	Agreement
	Ru-106	3.06 E-9	1.9 + 0.1 E-9	1.6	Disagreement
	Cs-134	1.17 E-9	5.9 + 0.2 E-10	2.0	Disagreement
Cs-137	1.97 E-9	1.36 + 0.08 E-9	1.4	Possible Agreement	
Gas Sample 3/26/80 0915	Kr-85	1.74 E-3	2.0 + 0.2 E-3	.87	Agreement
	Xe-133	1.91 E-1	2.04 + 0.08 E-1	.94	Agreement

NC - No Comparison

TABLE 2

RESULTS OF CONFIRMATORY MEASUREMENTS
AT OCONEE NUCLEAR PLANT DECEMBER 8-12, 1979

SAMPLE	ISOTOPE	Concentration, $\mu\text{Ci/cc}$		RATIO ONP/NRC	RESOLUTION	COMPARISON
		ONP	NRC			
Liquid Waste 12/10/80 @ 1115	Mn-54	$2.3 \pm 1.2 \text{ E-7}$	ND			
	Co-58	$8.3 \pm 0.3 \text{ E-6}$	$6.2 \pm 0.4 \text{ E-6}$	1.3	15	Agreement
	Co-60	$2.0 \pm 0.2 \text{ E-6}$	$1.4 \pm 0.2 \text{ E-6}$	1.4	7	Agreement
	I-131	$4.5 \pm 0.2 \text{ E-6}$	$4.2 \pm 0.4 \text{ E-6}$	1.07	10	Agreement
	Cs-134	$1.19 \pm 0.04 \text{ E-5}$	$1.12 \pm 0.06 \text{ E-5}$	1.06	26	Agreement
	Cs-137	$2.01 \pm 0.04 \text{ E-5}$	$1.81 \pm 0.07 \text{ E-5}$	1.11	26	Agreement
	Cs-136	$5.8 \pm 1.1 \text{ E-7}$	ND			
RCS Liquid 12/10/80 @ 1614	Na-24	$4.3 \pm 0.3 \text{ E-3}$	$3.8 \pm 0.3 \text{ E-3}$	1.13	13	Agreement
	Mn-54	$6.0 \pm 0.2 \text{ E-3}$	ND	-	-	NC
	Co-58	$2.3 \pm 0.2 \text{ E-3}$	$1.9 \pm 0.2 \text{ E-3}$	1.21	9.5	Agreement
	I-131	$5.95 \pm 0.04 \text{ E-2}$	$5.82 \pm 0.05 \text{ E-2}$	1.02	116	Agreement
	I-132	$8.0 \pm 0.2 \text{ E-2}$	$8.55 \pm 0.3 \text{ E-2}$	.95	29	Agreement
	I-133	$2.36 \pm 0.01 \text{ E-1}$	$2.38 \pm 0.01 \text{ E-1}$	.99	238	Agreement
	I-135	$1.80 \pm 0.03 \text{ E-1}$	$1.77 \pm 0.04 \text{ E-1}$	1.02	44	Agreement
	Sr-92	$3.47 \pm 1.4 \text{ E-3}$	ND	-	-	NC
	Tc-99m	$3.5 \pm 0.4 \text{ E-3}$	$2.7 \pm 0.4 \text{ E-3}$	1.30	6.8	Agreement
	Cs-134	$6.2 \pm 0.9 \text{ E-4}$	ND	-	-	NC
	Cs-137	$6.9 \pm 1.7 \text{ E-4}$	ND	-	-	NC
Crud Filter 12/9/80 @ 815:00	Cr-51	$2.8 \pm 0.4 \text{ E-4}$	$2.8 \pm 0.1 \text{ E-4}$	1.0	28	Agreement
	Mn-54	$3.7 \pm 0.3 \text{ E-5}$	$3.9 \pm 0.2 \text{ E-5}$	.95	19	Agreement
	Co-58	$2.60 \pm 0.02 \text{ E-3}$	$2.49 \pm 0.01 \text{ E-3}$	1.04	249	Agreement
	Fe-59	$2.1 \pm 0.1 \text{ E-4}$	$2.33 \pm 0.05 \text{ E-4}$	.91	47	Agreement
	Co-60	$7.2 \pm 0.5 \text{ E-5}$	$7.4 \pm 0.6 \text{ E-5}$	.97	12	Agreement
	I-131	$5.76 \pm 0.09 \text{ E-4}$	$5.38 \pm 0.04 \text{ E-4}$	1.07	134	Agreement
	Nb-95	$1.4 \pm 0.4 \text{ E-5}$	$1.8 \pm 0.2 \text{ E-5}$	.78	9	Agreement
	Tc-99m	$9.6 \pm 0.9 \text{ E-4}$	$1.16 \pm 0.04 \text{ E-3}$	.83	29	Agreement
	Cs-134	$5.4 \pm 0.6 \text{ E-5}$	$4.2 \pm 0.2 \text{ E-5}$	1.04	21	Agreement
	Cs-137	$6.9 \pm 0.4 \text{ E-5}$	$6.4 \pm 0.2 \text{ E-5}$	1.08	32	Agreement
	Ba-140	$8.6 \pm 2.1 \text{ E-5}$	$4.6 \pm 0.9 \text{ E-5}$	1.90	5	Agreement
Waste Gas Decay Tank 12/10/80 @ 1143:13	Kr-85	$2.8 \pm 0.5 \text{ E-3}$	ND			
	Xe-131m	$1.19 \pm 0.06 \text{ E-3}$	$9.8 \pm 0.2 \text{ E-3}$	1.21	49	Agreement
	Xe-133	$1.39 \pm 0.01 \text{ E-2}$	$9.9 \pm 0.02 \text{ E-3}$	1.40	495	Disagreement

TABLE 2
(Cont.)

Charcoal	I-131	$2.34 \pm 0.05 \text{ E-11}$	$2.38 \pm 0.08 \text{ E-11}$	.98	30	Agreement
Cartridge Station Vent	I-133	$4.7 \pm 0.3 \text{ E-12}$	$5.6 \pm 0.6 \text{ E-12}$	.84	9	Agreement

12/10/80
@ 0025:00

NC - No Comparison

ND - Not Detected

Attachment 1

CRITERIA FOR COMPARING ANALYTICAL MEASUREMENTS

This attachment provides criteria for comparing results of capability tests and verification measurements. The criteria are based on an empirical relationship which combines prior experience and the accuracy needs of this program.

In these criteria, the judgment limits are variable in relation to the comparison of the NRC Reference Laboratory's value to its associated uncertainty. As that ratio, referred to in this program as "Resolution", increases, the acceptability of a licensee's measurement should be more selective. Conversely, poorer agreement must be considered acceptable as the resolution decreases.

$$\text{RATIO} = \frac{\text{LICENSEE VALUE}}{\text{NRC REFERENCE VALUE}}$$

<u>Resolution</u>	<u>Agreement</u>	<u>Possible Agreement A</u>	<u>Possible Agreement B</u>
<3	0.4 - 2.5	0.3 - 3.0	No Comparison
4 - 7	0.5 - 2.0	0.4 - 2.5	0.3 - 3.0
8 - 15	0.6 - 1.66	0.5 - 2.0	0.4 - 2.5
16 - 50	0.75 - 1.33	0.6 - 1.66	0.5 - 2.0
51 - 200	0.80 - 1.25	0.75 - 1.33	0.6 - 1.66
>200	0.85 - 1.18	0.80 - 1.25	0.75 - 1.33

"A" criteria are applied to the following analyses:

Gamma Spectrometry where principal gamma energy used for identification is greater than 250 Kev.

Tritium analyses of liquid samples.

"B" criteria are applied to the following analyses:

Gamma Spectrometry where principal gamma energy used for identification is less than 250 Kev.

⁸⁹Sr and ⁹⁰Sr Determinations.

Cross Beta where samples are counted on the same date using the same reference nuclide.