Illinois Department of Nuclear Safety

1035 Outer Park Drive Springfield, Illinois 62704 (217) 546-8100

Philip F. Gustafson
Director

September 3, 1982

B.J. Holt
Material Licensing Branch
U.S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, Illinois 60137

RE: License #12-20084-01
Control #05845

Dear Ms. Holt:

The following information is submitted in clarification of our letter to your agency dated January 21, 1982.

1. As discussed with you by telephone (telecon with Mr. James Blackburn, Chief, Division of Environmental Monitoring, August 16, 1982) concerning additional information regarding the handling of environmental and effluent samples, the radioactivity contained in environmental and effluent samples routinely collected by the Department is within the limits established for exempt quantities and/or concentrations. This Department cannot be in a position, however, where its regulatory activities can be thwarted because of inadquate possession limits on our NRC license. As such, we are requesting possession limits for isolated samples up to 100 millicuries each. As indicated, however, such samples will be obtained by, or in the physical presence of, individuals fully cognizant to the radiation hazards associated with such activities.

2. As previously indicated, the majority of samples collected and handled by the Department are from unrestricted areas. Samples from restricted areas are also routinely gathered, however, from the following areas:

a. Water samples taken at nuclear generating facilities from liquid effluent discharges to unrestricted areas.

b. Fish samples taken from the intake screens at such nuclear generating facilities.

c. Water taken from on-site at the Sheffield Nuclear Disposal Site.

d. Sampling cartridges (particulates and iodine) from the isotopic gaseous monitoring system being installed at nuclear generating facilities.

3. The maximum concentrations and/or quantities obtained from these on-site sampling locations above are as follows:

	Amount	Nuclide	Location	Date
A.	0.206E5 ± 0.375E3 pCi/l	H^3	Zion Water - Z.N.P.S. Unit #2 Effluent	3/ 4/80
B.	0.563E4 ± 0.131E4 pCi/kg	K^{40}	Zion Fish off Z.N.P.S. Intake Screens	2/25/82
C.	0.507E6 ± 0.137E4 pCi/l	H^3	Sheffield Water from Trench 18 Sump	7/23/81

Although the isotopic effluent monitoring system will be continuously sampling from the station vent and the stand-by gas treatment system (once operational), since these samples will be automatically analyzed utilizing intrinsic germanium detectors with multi-channel gamma spectroscopy, both the activity and the involved nuclides will be known prior to physical handling of the samples themselves. As such, appropriate health physics measures will be taken prior to handling any sample containing licensable quantities of radioactive material.

Due to the low concentrations routinely encountered, no health physics precautions are necessary in handling such samples. For samples where there is a reasonable doubt as to the potential for approaching the limits established for exempt concentrations and/or quantities, the sample collection will be performed wearing rubber or plastic gloves. In addition, should the radionuclide involved be a beta/gamma emitter, a preliminary survey will be performed on the sample using appropriate instrumentation. The anticipated activity in a specific sample will be inferred by past analyses of samples taken at that sampling location as well as the operating status of the facility (i.e., normal operation versus accident conditions).

4. Due to the radioactive concentrations being handled by Department staff, bioassays have not been indicated or performed. Should staff handle samples containing radioactivity in excess of the values as indicated in Table I of Regulatory Guide 8.20, appropriate bioassays will be instituted.

5. The on-the-job training given to environmental sample technicians consists of individualized instruction in the safe handling of radioactivity as well as orientation in the detailed Standard Operating Procedures. Two sample procedures are enclosed. It is requested that such procedures not be incorporated by reference into our NRC license but serve as an illustrative example of such procedures. In this way, such procedures can be upgraded and altered as deemed necessary without violating NRC license conditions or seeking a license amendment for each such alteration.

6. The temporary storage of environmental and effluent samples at 1035 Outer Park Drive, Springfield, is requested only to allow completion of required paper work in preparation for transferring such samples to the Public Health Laboratory for analysis. Due to the levels of activity being handled (see #3 above), routine radiation surveys have not been performed, Should samples containing licensable quantities of radioactivity be stored at this facility, radiation surveys utilizing appropriate instrumentation (i.e., Eberline PRM 5-3 with HP260 probe) will be accomplished.

7. Leak test samples which may be temporarily stored at 1035 Outer Park Drive to allow for completion of proper paper work prior to transfer to the Department of Public Health Laboratory will be kept in their respective sample envelopes.

8. Any sealed sources which may be stored at 1035 Outer Park Drive will be stored such that radiation levels to which non-occupational personnel would be exposed would be within regulatory limits.

9. Please VOID Item 1 of our January 21, 1982, letter. We desire to retain Xenon 133 (Item 6.D.) on our license.

10. Please add the following authorized user:

James M. Ewan - Items 6.A.,B.,C.,D.,E.,F.
(Resumé enclosed)

11. We wish to clarify our letter of December 10, 1981, in support of the application for our present NRC license. We are currently using our Radium 226 source to perform instrument calibrations. The instruments will be calibrated using the Cesium 137 sources listed in Item 6.B. and 6.C. of our license at some time in the future. As stated previously, the National Bureau of Standards is setting up a State Regional Calibration Laboratory in Illinois. At the present time the constant potential x-ray unit is being tested and procedures developed. At such time as this portion is completed, the Cesium sources will be installed in the calibration set-up.

12. Reference: Letter of December 10, 1981, Page 3
Sealed Source - Leak Test Program

We wish to replace the present text in this section with the following:

> Leakage/contamination wipes from sealed sources will be transferred to the Illinois Department of Public Health Laboratory for analysis (License 12-08948-01). The procedure utilized will be capable of detecting 0.005 microcurie as required by Condition 16.D. of our license.
>
> In all cases, results of analyses are returned to the Department of Nuclear Safety, reviewed for results, and placed in permanent file if results are negative. If the results are positive, the source will be sent to the manufacturer for repair or disposed of in radioactive waste.

13. We request amendment to our waste disposal procedures to include authorization for us to also dispose of radioactive material by decay, if applicable, or as radioactive waste to an appropriately U.S. NRC or Agreement State licensed waste disposal firm.

If you have any questions regarding the above, please feel free to contact us at (217) 546-8100. Your time and help in processing our amendment request, as well as in answering our questions, are appreciated.

Sincerely,

Paul D. Eastvold

Paul D. Eastvold
Radiation Safety Officer

PDE/mfm

cc: Philip F. Gustafson, Director, DNS
J. A. Blackburn
License File

BIOGRAPHICAL SUMMARY

JAMES M. EWAN [redacted]

Born: [redacted] Home
(217) 546-8100 - Office

EXPERIENCE —

St. John's Hospital (1973 - 1982)
Springfield, Illinois

Supervisor, Nuclear Medicine Department - Unit manager responsible to both administrative and medical directors for management and performance of clinical nuclear medicine procedures.

Work includes:

— Fiscal management, both operating and capital budgets.
-- Determination of physical plant requirements.
-- Implementation of investigations and new clinical procedures.
-- Establishment of systems for safe use of radioactive materials.
-- Responsibility for staffing and the application of hospital personnel policy.
-- Faculty member, Lincoln Land Community College, Springfield, Il., program in radiologic technology.

Moved department twice, with no loss in service.

Organized and implemented a clinical internship for nuclear medicine technology students.

Maintained institutional radioactive materials licenses.

Managed the development of a nuclear cardiology service capable of bedside data acquisition.

Wesley Medical Center (1971 - 1973)
Wichita, Kansas

Staff Technologist, Nuclear Medicine Department - Responsible to laboratory manager for a variety of clinical procedures. Involved in didactic and clinical instruction of student technologists; refined a series of kinetic procedures based on compartmental dynamics.

EDUCATION--

MBA - Sangamon State University, Springfield, Il., 1979

BS - University of Iowa, 1971

AA - Eastern Iowa Community College, Clinton, Ia., 1968

TRAINING IN PROFESSIONAL AREAS (included in above)--

Course of Study	Semester Hours	Contact Hours
Biology	8	128
Radiation Biology	2	32
Chemistry	16	256
Radiation Chemistry	4	64
Physics	8	128
Radiation Physics	4	64
Mathematics	6	96
Statistics	6	96
Radiation Instrumentation	4	64
Public Health	12	192
Computer Science	2	32

HANDLING EXPERIENCE--

Unsealed material - multicurie quantities of Tc99m, Mo99, Xe133; millicurie quantities of Ga67, Tl201, I131, I123, In111, P32, Hg203, Hg197, Sr85; microcurie quantities of I125, Co57, Cr51, Co60.

Sealed sources - millicurie quantities of Cs137, Au198, Co57; microcurie quantities of Ra226, Ba133, Cd109.

MILITARY STATUS--

USAF 1962 - 1966, Honorable Discharge

PROFESSIONAL ORGANIZATIONS--

Nuclear Medicine Technology Certification Board, Certified Nuclear Medicine Technologist

American Registry of Radiological Technologists, Registered Nuclear Medicine Technologist

American Soceity of Clinical Pathologists, Registered Nuclear Medicine Technologist

Society of Nuclear Medicine

PROFESSIONAL ORGANIZATIONS (Cont'd)

Technologist Section, Society of Nuclear Medicine

Central Illinois Associates and Technical Affiliates

ACTIVITIES AND INTERESTS--

Jogging, industrial history, model railroading, reading.

REFERENCES--

On request

ILLINOIS DEPARTMENT OF NUCLEAR SAFETY

Procedure #200 Revision # 0

Prepared by Melanie Atherton

Reviewed by Frank J. Goberis

Division Chief James A. Blackburn

Issue Date 08/20/82

CALIBRATION OF THE IDNS TLD SYSTEM FOR ENVIRONMENTAL MONITORING OF DIRECT RADIATION

OBJECTIVE:

Calibration of the TLD system is required to establish the relationship between the temperature input/light output and the dose characteristics of the Harshaw TLD-100 lithium flouride (LiF) crystals being read. A complete calibration should be performed on newly installed equipment, whenever there is doubt as to the accuracy of the TLD system, and after repair or replacement of components of the system that would effect the previous calibration. Partial calibration of the TLD system should be performed for every batch of annealed TLD crystals.

REFERENCES:

1. Eberline TLD Reader Model TLR-5 Manual.
2. "Use of the Harshaw Model 200 for Thermoluminescence Analysis of Environmental Background Level Dose Measurements," W. B. White (1973).
3. "New Solid Lithium Flouride Thermoluminescent Dosimeters," F. Morgan Cox (1968).

4. IDNS Procedure 210, "Preparation, Placement, and Analysis of Harshaw TLD-100 Lithium Flouride Crystals for the IDNS Environmental Direct Radiation Surveillance Program."
5. Calculator Decision-Making Sourcebook, Texas Instruments Inc. (1977).

APPARATUS AND MATERIALS:

1. Eberline Model TLR-5 Reader, N_2 gas tank, and flow meter.
2. Harshaw TLD-100 LiF crystals.
3. Teflon-coated tweezers or vacuum pump.
4. 14.5 mCi 226Ra source.
5. TLD irradiation platform and "L-shaped" wires.
6. Ring stand and calibration chain.
7. Black plastic TLD holders.
8. Film and ring badge dosimeters.
9. Eberline RØ3 Radiation Survey Meter.
10. Stop watch.
11. One-foot long tongs
12. 3/4" self-sticking round labels.
13. Envelopes
14. Victoreen Model 885-1 audible integrating dosimeter (or equivalent)
15. TI-55 calculator.
16. Forms 200.1 and 200.2.
17. High Radiation Area Sign.

CAUTIONS:

1. LiF crystals are sensitive to UV light: eliminate unnecessary exposure of crystals to UV light.
2. Minimize exposure time and maximize distance between the technician and radiation source: keep radiation exposure as low as reasonably achievable.

PROCEDURE:

I. Prior to Irradiation:

A. Schedule the use of the calibration lab with the instrumentation calibration personnel (Art Carlson).

B. Prepare annealed LiF crystals for irradiation. Make sure TLD crystals are annealed less than 24 hours before calibration.

1. Obtain copies of Forms 200.1 and 200.2.
2. Obtain a set of 36, a set of 15, and a set of 9 TLD-100 LiF crystals from the annealed batch of crystals.

   During a partial calibration only 18 TLD-100 crystals are needed. For the calibration curve make three holder/crystal combinations labelled 10, 30, and Background. For quality control make five holder/crystal combinations labelled 10, 20, 30, 40, and Background. Ignore Step P in the Procedures.

   Record the TLD crystal batch ID# on Form 200.1.
3. Obtain a set of 12, a set of 5, and one black plastic TLD holder. (See above note.)
4. Place 3 LiF crystals in each of the first two sets of TLD holders according to Section I of IDNS Procedure

210 and place 9 LiF crystals in the last TLD holder.

5. Label the set of 12 holders with the following exposures: 10, 20, 30, 40, 50, 75, 200, 500, 650, and 1000mR and 2 of "Background." (See above note.)
6. Label the set of 5 holders with 10, 20, 30, 40, and "Background."
7. Label the last TLD holder that contains 9 LiF crystals with "heat test."
8. Place the labelled holders in an envelope.

II. Irradiation of TLD crystal/holder:

A. Prior to entering the instrumentation calibration room:

1. Place the film badge dosimeter on upper torso and the ring badge on the index finger of the hand used to pick up the source.
2. Obtain a properly calibrated Eberline RØ3 radiation survey meter.
3. Obtain the audible pocket dosimeter, turn it "ON" and check the battery.
4. Obtain the key to the storage drawer containing the 14.5mCi 226Ra source.
5. Obtain the set of 12 and the "heat test" labelled TLD crystal/holders to be irradiated.
6. Record the time of entrance into the calibration room on Form 200.1
7. Obtain a High Radiation Area Sign.

B. Enter the calibration room and measure the background radiation level at the center of the irradiation table, recording it on Form 200.1.

If the background radiation level is greater than .1mR/hr perform the following actions:

a. Consult with Art Carlson, James Blackburn, or Melanie Hamel about the possible sources of radiation contributing to the background level.

b. Shield the sources of radiation.

c. Survey the background radiation levels again.

C. Insert the "L-shaped" wires into the 10, 20, 30, 40, 50, 75, 200, 500, 750, 1000, and HEAT TEST position marks on the irradiation platform. (See note on page 3.)

D. Place each labelled TLD crystal-holder on its respective "L-shaped" wire, positioning the flat face of the TLD holder perpendicular to the source location to enable a direct line of radiation. NOTE: The TLD labelled "10" should be the furthest from the ring stand that will hold the irradiation source.

E. Adjust the ring stand with the height adjustment chain to assure that the Radium source will be level with the center of the TLD holders.

F. Remove the "background" TLD crystal/holders from the irradiation room, recording the removal time on Form 200.1.

G. Post the door of the calibration room with the "CAUTION: HIGH RADIATION AREA" sign.

H. Open the storage drawer which contains the 14.5mCi 226Ra source. Log retrieval time in the record log and initial.

I. Retrieve the 226Ra source with the tongs. CAUTION: The radiation exposure at 1 foot from the source is approximately 133mR/hr. At contact the radiation exposure is in excess of 120R/hr.

> Maximize the distance between the source and the technician. If the audible pocket dosimeter is rapidly beeping, unnecessary exposure is being obtained. Remember, distance reduces radiation exposure.

J. Immediately place the Radium source on the ring stand. Make sure the source is on the same plane as the center of the TLD holders.

K. Place the radiation survey meter at the 30mR irradiation platform location and take the reading. If the meter reading is not between 28 and 32: Replace the source in the storage drawer; log replacement time and initial record log; leave room; and consult Melanie Hamel or James Blackburn.

L. If meter reading is within the acceptable range, leave the calibration room and record the 226Ra source retrieval time on Form 200.1

M. Irradiate the TLD holders for exactly one hour.

N. Reenter the calibration room and using the tongs, replace the source in the storage drawer. Lock the drawer and record the return time in the record log and initial.

O. For the Quality Control LiF crystals repeat steps C-N for the set of 5 TLD crystal/holders. (See note page 3.)

P. Store the irradiated TLD crystal/holders in a lead container until they are analyzed.

III. Calibration of the TLR-5 reader:

A. Set up the TLR-5, perform the operation check, and leave system "ON" according to IDNS Procedure 210. After the reader has been turned on, wait at least 24 hours before analyzing the TLD crystals. This waiting time provides optimum stability of the photomultiplier tube.

B. Wait 24 hours after the irradiation before analyzing the TLD crystals. The 100°C glow peak fades considerably during the first 24 hours following irradiation.

C. Remove the instrument cover from the TLR-5 reader.

D. Turn the Dose Range knob to "LO."

E. Test the "PREHEAT" time setting: Pull out the heater slide to its limit with the pan up, i.e., in the light source reading position; simultaneously depress the "READ" switch and start a timer. Stop the timer when numbers start to appear on the count display. This is the preheat time. If the "PREHEAT" time is not 10 sec. adjust the time by rotating the potentiometer (POT)(t_1 on the circuit board) clockwise to increase the time or counterclockwise to decrease the time as desired. Repeat timing and adjustment until preheat time is 10±1 sec.

F. Observe the pyrometer reading during the preheat time. Adjust the "PREHEAT" temperature to 140°C by moving the "PREHEAT TEMP" POT inside the reader clockwise to increase and counterclockwise to decrease the temperature. Record the adjusted "PREHEAT TEMP" on Form 200.1.

G. Test the Integration Time by depressing the "READ" switch and starting the timer when numbers start to appear on

the count display. Stop the timer when the count stops changing. This is the integration time. If the Integration Time is not 10 sec. adjust the time by rotating the POT (t_2 on the curcuit board) clockwise to increase or counter-clockwise to decrease the time as desired. Repeat the timing and adjustment until the Integration Time is 10±1 sec. Record the Integration Time on Form 200.1.

H. Find the optimum Integration Temperature:

1. Select the "heat test" labelled crystal/holder.
2. Set the integration temperature at 200°C. The integration temperature is changed by adjusting the "HI POT" next to the "PREHEAT TEMP."
3. READ-OUT an irradiated LiF crystal according to IDNS Procedure 210.
4. Observe the count on the TLR-5 reader display. Record on Form 200.2 the Light Unit count at the end of the Integration Time.
5. Repeat Steps 2 through 4 for 210°C to 280°C in 10°C increments.
6. Examine the data on Form 200.2. Record on Form 200.1 the lowest integration temperature that eliminates the most light from the TLD crystal.
7. Set the HI POT to that temperature.

IV. <u>Generation of the exposure (mR) vs. Light Unit Output curve:</u>

A. READ-OUT the second set of 12 irradiated TLD crystals according to IDNS Procedure 200.

B. Record all the pertinent calibration data on Form 200.1

C. Follow the Linear Regression Steps in Attachment A. Record the calculated values on Form 200.1.

D. File Forms 200.1 and 200.2 in the appropriate file.

CONCLUSION:

The calibration of the IDNS TLD system for environmental monitoring of direct radiation has now been completed. All forms must be submitted to and approved by the Section Chief before filing. The generated calibration curve can now be used to calculate the exposure of the TLD crystals having the same batch ID#.

TLD CALIBRATION AND IRRADIATION DATA

Date: _____ ____ Prepared by: _____

TLD Crystal Batch ID#: _____ Approved by: _____

BACKGROUND:

Time of Entrance into Calibration Room: _____

Background Reading at Center of Irradiation Platform: _____

IRRADIATION TIMES:

Time 226Ra source was retrieved: _____

Time 226Ra source was stored: _____

READ-OUT TIME	EXPOSURE (MR)	LIGHT UNITS (LU) (GROSS/NET)	MEAN NET LU ± STANDARD DEVIATION (S.D.)
	10		
	20		
	30		
	40		
	50		
	75		
	200		
	500		
	750		
	1000		
	Background		
	Background		

Instrumentation Settings:

Preheat Time: _____ sec.

Preheat Temp: _____ °C

Integration Time: _____ sec.

Integration Temp: _____ °C

Calibration Equaption Parameters

Slope: _____

Intercept: _____

Correlation Coefficient: _____

INTEGRATION TEMPERATURE CALIBRATION

Date: _____ Prepared by : _____

Approved by: _____

TEMPERATURE °C	READ-OUT TIME	END LIGHT-UNIT COUNT
200		
210		
220		
230		
240		
250		
260		
270		
280		

Instrumentation Settings:

PREHEAT TIME: _____ Sec. INTEGRATION TIME: _____ Sec.

PREHEAT TEMP: _____ °C INTEGRATION TEMPS: _____ °C

IDNS Form No. 200.2

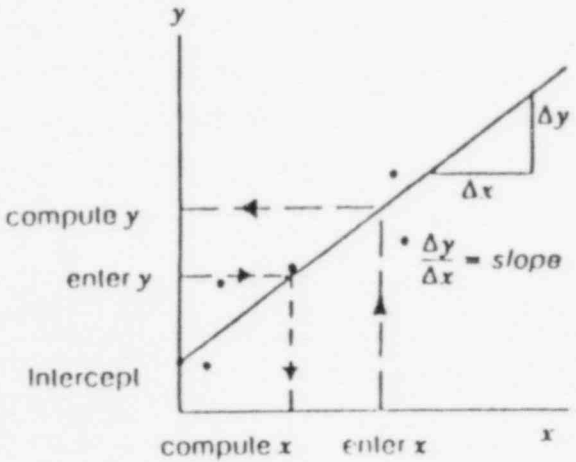
Linear Regression – "Telling the Future"

"Linear Regression" may sound like a highly technical or threatening title to you – but it's a process that your calculator makes very easy to use. And – it's one that deals with one of the oldest problems in the world for the businessman – predicting the future. With the linear regression keys on your calculator you can take data about past performance or relationships and use it to make forecasts of future performance (assuming that whatever relationship is at work keeps on working). *Chapter 2* goes into detail on how to use linear regression and what it's all about, so we'll just briefly discuss here the keys you'll be using.

In the linear regression situation, you usually have data expressed as pairs of variables that you could plot on a graph. We usually label a pair of points like this with the letters (x,y) (x may be dollars in advertising while y is unit sales or x may be a test score and y a performance record in the field, etc.). You want to make a prediction. For any given *x value that you select* – what will happen to y (or vice versa)? Your calculator can do this for you by mathematically drawing the "best straight line" through your data points. You may then use the straight line to make predictions. Here are the simple steps you follow to do this:

- First, press [2nd] [CLR] – do this when starting any statistical calculation.
- Enter an "x" value and press [x:y]
  – then –
- Enter the corresponding "y" value, and press [Σ+]
- Continue until all data points are entered.

Your calculator is now ready to draw the best straight line through your points, and give you the following information from it:



- Press [2nd] [m] to calculate the slope of the calculator's line through your points.
- Press [2nd] [b] to calculate the y intercept of the calculator's line.

To estimate a y value for any given x value you select:

- Enter x and press [2nd] [y'] – the corresponding y value is displayed.

To estimate an x value for any y value you select:

- Enter y and press [2nd] [x'] – the corresponding x value is displayed.

To get a feel for how well the two sets of variables are related:

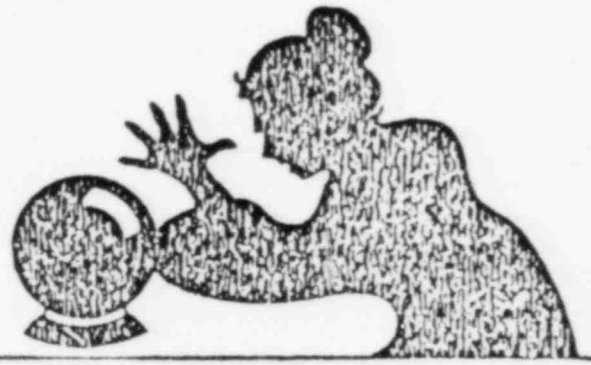
- Press [2nd] [COR] – the calculator displays the *correlation coefficient* of the data. A value close to one indicates a "good" relationship between the sets of data, a value near zero indicates that there's little relationship between your x and y values.

Note: If, as you're entering your data, you need to *remove* any data points use the following key sequence:

- Re-enter the undesired x value
- Press [x:y]
- Re-enter the undesired y value
- Press [2nd] [Σ-]

After your data is entered, you can get some further information: [2nd] [MEAN] , [2nd] [Sx] , [2nd] [Var] calculates the mean, standard deviation and variance of your y data points. [INV] [2nd] [MEAN] , [INV] [2nd] [Sx] , [INV] [2nd] [Var] calculates the mean, standard deviation and variance of your x data points.

Standard deviation is computed with N-1 weighting and variance is computed with N weighting.



Taken from "Calcul-tor Decision-Making Sourcebook," Texas Instruments Inc. (1977).

Illinois Department of Nuclear Safety

Procedure No: 100 Revision No: 0

Prepared By: Frank J. Kolaian

Reviewed By: Melanie A. Hazel

Division Chief: Gary N. Wright

Issue Date: Feb, 82.

Airborne Particulate and Radioiodine Sampling Technique

OBJECTIVE: Since air is a primary exposure pathway to man from radionuclides released to the atmosphere, environmental air sampling is conducted to evaluate potential doses to environmental populations from inhaled or ingested radionuclides. Three categories of airborne radionuclides normally require measurement: particulates, halogens (principally radioiodine) and noble gases. The first two categories' sampling techniques will be included in this procedure.

Sampling and measurement of airborne particulates can provide a means of evaluating the inhalation dose from radiotoxic nuclides as ^{90}Sr, ^{239}Pu and other fission and activation product nuclides. Sampling of air particulates is performed by continuously pumping ambient air through a high efficiency glass fiber air filter.

Iodine can enter the milk via the air-pasture-cow pathway. Radioiodine in milk is particularly important in that it preferentially exposes infants because of their usually greater intake of milk and smaller thyroid, the critical organ, than in adults. The airborne radioiodines are sampled by pumping ambient air through impregnated charcoal cartridges placed behind a particulate filter.

APPARATUS & MATERIALS:

Eberline-RAS-1 vacuum pump and air flow regulator
Gelman-Glass fiber particulate filter
Scott-Iodine filter cartridge
Translucent bags
7x10 manila folders
Pair of tweezers
Screwdriver-flathead
Form sheets and labels
Pen or marker and clipboard
Shelter house key

PROCEDURE:

I. Prior to Traveling to the Sampling Site

A. Obtain the following items: (Note 1)

1. Tweezer*
2. Flat head screwdriver*
3. Last week's Form No. 100.1*
4. Current week's Form No. 100.1*
5. Pen or marker
6. Two translucent bags*
7. Labels
8. Clipboard
9. Charcoal filter cartridge*
10. Gelman-type A-E Glass Fiber Filter*
11. Manila envelope (7"x10")*
12. Shelter house key

II. Obtaining Last Week Sample

1. Open with key the shelter door to obtain access to the RAS-1, regulated air sampler.

2. Turn the air sampler pump OFF.

3. Remove the paper clamp from the filter paper holder by turning the outer ring counter-clockwise.

4. Carefully remove with the tweezers the particulate filter paper from the filter holder.

5. Place the filter in a translucent bag.

6. Locate the screw knob two inches behind the filter paper holder. Turn the knob counter-clockwise until it releases the top half from the bottom half of the iodine cartridge case.

7. Remove the iodine cartridge.

8. Obtain last week's Form No. 100.1 and labels.

9. Complete Form No. 100.1 and labels.

10. Attach one label to the iodine cartridge and the other to the bag that contains the air particulate filter.

III. Inserting New Air Filters

1. Place the iodine cartridge, lip down into the case.
2. Close the case and turn the case knob clockwise to tighten.
3. Place the new particulate filter in the cap of the particulate case with the threaded side up.
4. Place the cap with the filter paper back on the filter holder.
5. Snap on the cap.
6. Turn on the sampler pump.
7. Record start date/time, flow rate, meter reading (if appropriate), and operators' name on Form 100.1. (NOTE 2)
8. If flow rate is not equal to 30lpm, adjust the flow rate to 30lpm. The flow rate is adjusted by turning the screw located on the side of the regulated air pump under the Flow Adjustment arrow.
9. Record the adjusted flow rate on the Form 100.1. (NOTE 2)
10. Lock the sample house door.

IV. Sample Submittal

1. Place the Form 100.1, the particulate filter and the iodine cartridge in a manila envelope.
2. Place address label on envelope with postage. Mail first class. (NOTE 3)
3. Mail the envelope.

CONCLUSIONS: Last week's air particles are sent to:

Department of Nuclear Safety
1035 Outer Park Drive
Springfield, Illinois 62704

Any remarks or complications may be addressed to either party listed below at phone number - (217) 546-8100.

Frank Melchiorri - Extension 30

or

Melanie Hamel Extension 28

NOTE:

1. Asterisked items are supplied by Department of Nuclear Safety.

2. In the remark section note pump condition and flow rate adjustment and any other comments.

3. Postage is 54¢ for 2.75 ounces.

MH/FM/ah

DIVISION OF ENVIRONMENTAL MONITORING
1035 'TER PARK DR. SPFLD ILL 62704

AIR SURVEILLANCE NETWORK

City Nearest Sampling Site

Nearest Nuclear Facility

Date Collected

Name of Sample Collector

Sample I.D. Number

Address of Sample Collector

Weekly Weather

REMARKS: _____

Date		Time		Meter Reading (hour)		Flow Rate (lpm)	
Start	Stop	On	Off	Start	End	Start	End

Total Sampling Time (min):
T = 60 (Meter Reading End - Meter Reading Start)
T = _____ (min)

Average Flow Rate (lpm):
$F = \frac{(\text{Flow Rate Start} + \text{Flow Rate End})}{2}$

F = _____ (lpm)

Volume of Air Sampled (cc):
V = T * F * 1000
(V = _____ (cc))

FORM 100.1