

POINT BEACH NUCLEAR PLANT
UNITS 1 AND 2

ENVIRONMENTAL MANUAL

WISCONSIN ELECTRIC POWER COMPANY

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1.0 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ADMINISTRATION

1.1 Definition of Radiological Environmental Monitoring

Radiological environmental monitoring is the measurement of radioactivity in samples collected from the atmospheric, aquatic, and terrestrial environment around the Point Beach Nuclear Plant (PBNP). Monitoring radioactivity in effluent streams at or prior to the point of discharge to the environment is not part of the Radiological Environmental Monitoring Program.

1.2 Responsibilities for Program Implementation

1.2.1 Nuclear Plant Engineering and Regulation Section Functions

The General Superintendent and the staff of the Nuclear Plant Engineering and Regulation Section (NPERS) provide the Manager, PBNP, with technical, regulatory, licensing, and administrative support necessary for the implementation of the program. The NPERS administrative functions relating to the Radiological Environmental Monitoring Program fall into the six broad areas outlined below.

1.2.1.1 Program Scope

The scope of the Radiological Environmental Monitoring Program is determined by NPERS. Based on the scope, NPERS prepares the program manual, including sampling procedures, and revises the manual, as necessary to conform to changes in program procedures and scope. NPERS monitors the program effectiveness and compliance with Radiological Effluent Technical Specifications (RETS). In order to verify compliance with RETS, NPERS arranges for a program audit at least once every 12 months and an audit of the analytical contractor at least once every 36 months.

1.2.1.2 Record Keeping

Monthly results of contractor analyses are sent to both PBNP and NPERS. However, the analytical results maintained by NPERS are regarded as the official results. These records are kept for the lifetime of the plant.

1.2.1.3 Data Monitoring

The cognizant NPERS Engineer reviews and interprets all program analytical results on a monthly basis as they are reported. Trends, if any, are noted. Any resulting corrections, modifications, and additions to the data are made by the cognizant NPERS Engineer. Inconsistencies are investigated by the cognizant NPERS Engineer with the cooperation of PBNP and contractor personnel, as required. Unusual results as evidenced by radioactivity levels exceeding NPERS Administrative Notification Levels are investigated in the same manner. Results of the investigation will be conveyed to the Manager, PBNP. NPERS will promptly inform PBNP of any sample exceeding Nuclear Regulatory Commission (NRC) Regulatory Notification Levels and both NPERS and PBNP will initiate an investigation. A formal report shall be provided to the Manager, PBNP, by NPERS upon completion of the investigation.

1.2.1.4 Data Summary

Results from the Radiological Environmental Monitoring Program shall be summarized semiannually for inclusion in the PBNP Semiannual Monitoring Report. This summary advises the Manager, PBNP, of the radiological status of the environment in the vicinity of PBNP. The summary shall include the numbers and types of samples as well as the averages, statistical confidence limits, and the ranges of analytical results. Methods used in summarizing data are at the discretion of NPERS.

1.2.1.5 Contractor Communications

Communication with the contractor regarding data, analytical procedures, lower limits of detection, notification levels and contractual matters are normally conducted by NPERS. Communication regarding sample shipment may be done by either PBNP or NPERS, as appropriate.

1.2.1.6 Reportable Items

NPERS shall generate all technically specified reports related to the operation of the Radiological Environmental Monitoring Program. The following items and occurrences are required to be reported in the PBNP Semiannual Monitoring Report:

- a. Summary of monitoring results including number and type of samples.
- b. Unavailable, missing, lost samples, and plans to prevent recurrence.
- c. New or relocated sampling locations.
- d. LLDs that are higher than specifications, and factors contributing to inability to achieve specified LLDs.
- e. Notification that the analytical laboratory does not participate in an interlaboratory comparison program.

The following items are required to be reported to the NRC within 30 days of occurrence:

- a. Confirmed environmental radionuclide concentrations, attributable to PBNP effluents, in excess of notification levels, and
- b. Confirmed results of weighted sum calculations involving radionuclide concentrations, attributable to PBNP effluents, in environmental samples in excess of the specified notification level.

1.2.2 PBNP Functions

The primary responsibility for the implementation of the Point Beach Nuclear Plant (PBNP) Radiological Environmental Monitoring Program and for any actions to be taken at PBNP based on the results of the program resides with the Manager, PBNP. The responsibility for ensuring that PBNP portions of the Semiannual Monitoring Report are correct, complete, and transmitted to NPERS in a timely manner resides with the General Superintendent-Operations.

1.2.2.1 Manual Control and Distribution

The distribution of the PBNP Environmental Manual is the responsibility of PBNP.

1.2.2.2 Program Coordination

The daily operation of the program is conducted by PBNP health physics personnel, and other qualified personnel as required, under the supervision of a Specialist - Nuclear Health Physics who consults, as needed, with the cognizant NPERS Engineer. The daily administrative functions of the cognizant Specialist - Nuclear Health Physics address those functions required for the effective operation of the PBNP Radiological Environmental Monitoring Program. These administrative functions include the following:

- a. Ensuring the samples are obtained in accordance with the applicable Technical Specifications following procedures outlined in this manual,
- b. Ensuring adequate sampling supplies and calibrated, operable equipment are available at all times,
- c. Ensuring that air sampling pumps are maintained, repaired, and calibrated as required and that an adequate number of back-up pumps are readily available at all times,

- d. Formally reporting lost or unavailable samples as well as other deviations from the technically specified sampling regime to the cognizant NPERS Engineer and logging the same at PBNP,
- e. Assisting the State of Wisconsin in obtaining samples at co-located and other sampling sites based upon a yearly, renewable agreement,
- f. Assisting, as necessary, the cognizant NPERS engineer with investigations into elevated radioactivity levels in environmental samples.

1.3 Quality Assurance/Quality Control

Quality assurance considerations are an integral part of Wisconsin Electric's Radiological Environmental Monitoring Program. The program involves the interaction of the Nuclear Plant Engineering and Regulation Section (NPERS), Point Beach Nuclear Plant (PBNP), Wisconsin Electric's Quality Assurance Section (QAS), and Teledyne Isotopes Midwest Laboratory (TIML).

The TIML quality assurance and quality control program is described in the TIML Quality Assurance Program Manual and the TIML Quality Control Procedures Manual. Copies of these manuals are maintained by NPERS and QAS. Amendments and revisions of these documents are reviewed by responsible NPERS and QAS personnel as they are issued. The contractor is audited by Wisconsin Electric personnel periodically at intervals which do not exceed three years. The quality assurance portion of the audit is performed by QAS, and the technical portion of the audit is performed by NPERS. As part of its quality control program, TIML participates in the environmental crosscheck program operated by the Intercomparison and Calibration Section, Quality Assurance Branch, Environmental Monitoring and Support Laboratory, U.S. Environmental Protection Agency, Las Vegas, Nevada.

Quality control for the PBNP portion of the radiological Environmental Monitoring Program is achieved by following the procedures contained in this manual. Health Physics Technologists (HPTs) collect, package and ship environmental samples under the supervision of Health Physics Supervisors and the Health Physicist. They are advised by the Specialist - Nuclear Health Physics who has immediate responsibility for the overall technical operation of the environmental sampling functions. The HPTs receive classroom training as well as on-the-job training in carrying out these procedures.

An audit of the PBNP Radiological Environmental Monitoring Program and its results shall be completed at least once every 12 months as a means of monitoring program effectiveness and assuring compliance with program directives. The audit shall be performed by either NPERS personnel, QAS, or a qualified consulting firm.

1.4 Program Revisions

This manual describes the current scope of the PBNP Radiological Environmental Monitoring Program. The program and the manual are maintained by NPERS consistent with Technical Specification commitments. Program items or procedures periodically may be updated or changed, consistent with good radiological monitoring practices, either to reflect new conditions or to improve program effectiveness. Technical and program features described in this manual may be changed at the discretion of NPERS with the concurrence of the PBNP Manager's Supervisory Staff.

2.0 RADIOLOGICAL ENVIRONMENTAL MONITORING

2.1 Program Overview

2.1.1 Purpose

No significant or unexpected radionuclide concentrations of plant origin are expected because each normal effluent pathway at PBNP is monitored at or before the release point. However, the Radiological Environmental Monitoring Program is conducted to verify that plant operations produce no significant radiological impact on the environment and to demonstrate compliance with applicable standards.

2.1.2 Samples

Samples for the Radiological Environmental Monitoring Program are obtained from the aquatic, terrestrial and atmospheric environment. The sample types represent key indicators or critical pathways identified by applying sound radioecological principles to the PBNP environment.

2.1.3 Monitoring Sensitivity

The effectiveness of the Radiological Environmental Monitoring Program in fulfilling its purpose depends upon the ability to accurately determine the nature and origins of fluctuations in low levels of environmental radioactivity. This requires a high degree of sensitivity so that it is possible to correctly discriminate between fluctuations in background radiation levels and levels of radioactivity that may be attributable to the operation of PBNP. Therefore, personnel actively participating in the monitoring program should make every effort to minimize the possibility of contaminating environmental samples and to obtain samples of the appropriate size.

2.1.4 Technical Specifications

A copy of the PBNP Technical Specifications applicable to the Radiological Environmental Monitoring Program is located in Appendix A of this manual. These specifications are part of the Radiological Effluent Technical Specifications (RETS).

2.2 Program Parameters

2.2.1 Contamination Avoidance

Contamination prevents the accurate quantification of environmental radioactivity and the correct differentiation between fluctuating background radioactivity and levels of radioactivity attributable to the operation of PBNP. Therefore, it is necessary that all personnel associated with collecting and handling radiological environmental samples take the appropriate precautions to minimize the possibility of contaminating the samples. Some of the precautions that should be taken and which will help to minimize contamination are listed below:

- a. Equipment which has been on the controlled side, even if released clean, should not be used in conjunction with radiological environmental monitoring,
- b. Store sampling equipment in radiologically clean areas only,
- c. Store radiological environmental samples only in radiologically clean areas when samples can not be shipped to the contractor on the same day they are collected,
- d. Treat each sample as a possible source of contamination for other samples so as to minimize the possibility of cross-contamination,
- e. Radiological environmental monitoring equipment should be repaired in clean-side shops,
- f. Contamination avoidance for environmental TLDs is covered in Section 2.4.2, and
- g. Do not enter the controlled zone prior to leaving to collect environmental samples.

2.2.2 Sample Size

Sample size affects the sensitivity achievable in quantifying low levels of environmental radioactivity. Therefore sampling personnel must attempt to attain the quantities of sample specified in Table 2-1. When a range is given, every effort should be made to obtain a quantity at the upper part of the range.

2.2.3 Lower Limit of Detection

The sensitivity required for a specific analysis of an environmental sample is defined in terms of the lower limit of detection (LLD). The LLD is the smallest concentration of radioactive material in a sample that will yield a net count, above system background, that will be detected with a 95% probability and have only a 5% probability of falsely concluding that a blank observation represents a real signal. Mathematically, the LLD is defined by the formula

$$LLD = \frac{4.66 S_b}{E \times V \times 2.22 \times Y \times \text{EXP}(-\lambda \Delta t)}$$

where

LLD = the a priori lower limit of detection in picocuries per unit volume or mass, as applicable,

S_b = the standard deviation of the background counting rate or the counting rate of a blank sample, as appropriate, in counts per minute,

E = counting efficiency in counts per disintegration,

V = sample size in units of volume or mass, as applicable,

2.22 = number of disintegrations per minute per picocurie,

Y = the fractional chemical yield as applicable,

λ = the radioactive decay constant for the particular radionuclide,

Δt = the elapsed time between sample collection, or the end of the collection period, and the time of counting.

Typical values of E, V, Y, and Δt are used to calculate the LLD. As defined, the LLD is an a priori limit representing the capability of a measuring system and not an a posteriori limit for a particular measurement.

The required analyses for each environmental sample and the highest acceptable LLD associated with each analysis are listed in Table 2-2. Whenever LLD values lower than those specified in Table 2-2 are reasonably achievable, the analytical contractor for the radiological environmental samples will do so. When the LLDs listed in Table 2-2 are not achieved, a description of the factors contributing to the higher LLD shall be reported in the next PBNP Semiannual Monitoring Report.

2.2.4 Notification Levels

The notification level (NL) is that measured quantity of radioactivity in an environmental sample which, when exceeded, requires a notification of such an occurrence be made to the appropriate party. Regulatory and administrative notification levels are listed in Table 2-2.

2.2.4.1 Regulatory Notification Levels

The regulatory notification levels listed in Table 2-2 represent the concentration levels at which NRC notification is required by PBNP Technical Specification requirements. If a measured level of radioactivity in any environmental medium exceeds the regulatory notification level listed in Table 2-2, re-sampling and/or reanalysis for confirmation shall be completed within 30 days of the determination of the anomalous result. If the confirmed measured level of radioactivity remains above the notification level, a written report shall be submitted to the NRC. If more than one of the radionuclides listed in Table 2-2 are detected in any environmental medium, a weighted sum calculation shall be performed if the measured concentration of a detected radionuclide is greater than 25% of the notification levels. For those radionuclides with LLDs in excess of 25% of the notification level, a weighted sum calculation need be performed only if the reported value exceeds the LLD. Radionuclide concentration levels, called Weighted Sum Action Levels, which trigger a weighted sum calculation are listed in Table 2-2.

The weighted sum is calculated as follows:

$$\frac{\text{concentration (1)}}{\text{notification level (1)}} + \frac{\text{concentration (2)}}{\text{notification level (2)}} + \dots = \text{weighted sum}$$

If the calculated weighted sum is equal to or greater than 1, resampling and/or reanalysis for confirmation shall be completed within 30 days of the determination of the anomalous result. If the confirmed calculated weighted sum remains equal to or greater than 1, a written report shall be submitted to the NRC. This calculation requirement and report is not required if the measured level of radioactivity was not the result of plant effluents.

2.2.4.2 Administrative Notification Levels

The NPERS administrative NLs are the concentration levels at which the contracted analytical laboratory promptly notifies the cognizant NPERS engineer by phone, followed by a formal written communication. The NPERS administrative NLs are set lower than the NRC regulatory NLs and lower than, or equal to, the weighted sum action levels so that the nature and origin of the increased level of environmental radioactivity may be expeditiously ascertained and corrective actions taken if required.

2.2.5 Sampling Locations

A list of sampling locations and the corresponding location codes appear in Table 2-3. The locations also are shown in Figures 2-1a and 2-1b. It is conceivable that samples may become unavailable from specified sample locations. If this were to occur, new locations for obtaining replacement samples shall be identified and added to the Radiological Environmental Monitoring Program. If milk or vegetation samples become unavailable from the specified sampling locations, new sampling locations will be identified within 30 days. The specific locations where samples were unavailable may be deleted from the monitoring program. A formal, written reason for the new site and its location shall be transmitted to the cognizant NPERS Engineer who will make the appropriate changes to the Environmental Manual. Any significant changes in existing sampling location and the criteria

for the change shall be reported in the Semiannual Monitoring Report for the period in which the change occurred. Additional sampling locations may be designated if deemed necessary by cognizant Company personnel.

2.2.6 Sampling Media and Frequency

The sampling frequency for the environmental media required by PPN[®] Technical Specifications is found in Table 2-4. In addition to samples required by technical specifications, the Radiological Environmental Monitoring Program also includes the sampling of soil and shoreline sediment. To ensure that all samples are obtained at the appropriate times, two different checklists are used. A yearly checklist provides a month-by-month indication of all samples, except air, to be obtained at each sampling location (Figure 2-2). This checklist also identifies the schedule for the annual milk survey and provides space for recording the date the samples were shipped offsite for analysis. In addition, a separate checklist is provided for each sampling location to identify all samples, including weekly air samples, to be obtained and the collection date (Figure 2-3). Because the weekly air samples require additional information, a separate checklist is used for each individual air sampling location as shown in Figure 2-4.

It is recognized that on occasions samples will be lost or that samples cannot be collected at the specified frequency because of hazardous conditions, seasonal unavailability, automatic sampling equipment malfunctions, and other legitimate reasons. Reasonable efforts will be made to recover lost or missed samples if warranted and appropriate. The reasons or explanations for deviations from the sampling frequency specified in Table 2-4 shall be logged at PENP and shall be conveyed formally in writing to the cognizant NPERS Engineer using the appropriate form (Figure 2-6). A description of the reasons for not conducting the sampling as specified and, when appropriate, plans for preventing a recurrence shall be identified in the next Semiannual Monitoring Report by the cognizant NPERS Engineer.

2.2.7 Sample Labeling

All samples must be properly labeled to ensure that the necessary information is conveyed to the analytical contractor and that the results are associated with the correct geographical location. Each label (Figure 2-5) must contain the following:

- a. Sample type;
- b. Sample location including both the location code and location description from Table 2-3;
- c. Date and time (as appropriate) collected;
- d. Air samples must show the total volume in m^3 ; volumes for water and milk are in gallons; vegetation, sediment, soil, and algae are indicated as ≤ 1000 grams; and fish ≥ 1000 grams;
- e. Analyses for routine samples are indicated as "per contract." For special samples, the Health Physicist or the cognizant Specialist - Nuclear Health Physics will designate the analyses required and;
- f. Name of person collecting the sample.

A permanent or indelible ink type felt-tip marker shall be used.

A separate sample label is needed for each sample type and location. Labels are securely attached to each sample container. In addition to sample labels, other identifying markings may be placed on sample containers as appropriate.

2.2.8 Sample Shipping

All environmental samples are shipped to a contractor for analysis. The samples shall be packaged and shipped in such a way as to minimize the possibility of cross-contamination, loss, spoilage, and leakage. Each sample shipment shall have a typed cover letter and, when appropriate, a contractor data collection sheet. Included in the letter shall be the same information required for the sample labels as well as the specific

analyses required. The original cover letter and data collection sheet shall be sent to the contractor under separate cover; one copy of each is to be used as a packing list; and, a copy of each shall be kept in the appropriate PBNP file."

2.2.9 Sample Analyses and Frequency

The PBNP Radiological Environmental Monitoring Program samples shall be analyzed for designated parameters at the frequency listed in Table 2-5.

2.2.10 Analytical Laboratory

The analyses are performed by a contractor. The current contractor is

Teledyne Isotopes Midwest Laboratory
700 Landwehr Road
Northbrook, IL 60062-4517
(708) 564-0700.

This laboratory, formerly named Hazleton Environmental Sciences Corporation, performs the analyses in such a manner as to attain the desired LLDs. The contracted laboratory participates in the interlaboratory comparison crosscheck program conducted by the U.S. Environmental Protection Agency, Intercomparison and Calibration Section, Quality Assurance Branch, Environmental Monitoring and Support Laboratory, Las Vegas, Nevada.

The contractor is responsible for providing prompt notification to NPERS regarding any samples found to exceed the NPERS administrative notification levels as identified in Table 2-2.

2.3 Assistance to the State of Wisconsin

As a courtesy and convenience, PBNP personnel obtain certain environmental samples for the Section of Radiation Protection, Department of Health and Social Services of the State of Wisconsin as listed in Table 2-6. A checklist is used as shown in Figure 2-3. In addition, a State of Wisconsin air sampling data sheet is submitted with each sample obtained at Wisconsin air sampling locations serviced by PBNP personnel.

State of Wisconsin precipitation samples collected twice a month (or as available) require a State sample tag to be placed in a box with the quart cubitainer. State supplied labels for air particulate filters require start and stop time, date, and beginning and ending volume. Fish sent to the State identify only the quarter and the year using a PBNP label (Figure 2-5). The monthly lake water composite is picked up by State personnel and therefore requires only that the date and location be written on the box for the cubitainer. The State provides a sample tag for the quarterly lake water sample.

Samples obtained for the State of Wisconsin are either given directly to State personnel or shipped as required. The department address is:

Radiation Protection Laboratory
Room 111
State Laboratory of Hygiene
465 Henry Mall
Madison, Wisconsin 53706

2.4 Specification of Sampling Procedures

General radiological environmental sampling procedures follow the directives presented in Sections 2.1 and 2.2. Specific information for handling individual sample types follow.

2.4.1 Vegetation

Vegetation samples consist of green, growing grasses and weeds and are obtained three times per year, as available, from specified locations. New growth, not dead vegetation, should be used because these samples are indicators of recent atmospheric deposition. Use a scissors or other sharp cutting tool to cut the grasses and weeds off as close to the ground as possible. Do not include plant roots and take care not to contaminate the sample with soil. Total sample collected should exceed 500 grams and ideally should be 1000 grams. Place entire sample in a plastic bag, tape the bag shut, and label the bag as described in Section 2.2.7.

2.4.2 Thermoluminescent Dosimeters (TLDs)

TLDs capable of multiple, independent measurements of the same exposure are posted at the twenty-two (22) locations specified in Table 2-4 and are changed quarterly. The utmost care in handling is required to minimize unnecessary exposure during transit, storage, and posting because the TLDs begin recording all radiation from the moment they are annealed (heated to rezero) at the contractor's laboratory. Packages of TLDs in transit should be marked "DO NOT X-RAY, CONTAINS DOSIMETERS".

A transportation control (E-TC) shall accompany the new batch in transit from the contractor's laboratory to the plant. The control shall accompany the batch during brief storage and subsequent posting. The same control shall accompany the "old" or exposed batch on its way back to the contractor. Therefore each control represents the sum of approximately half the in-transit exposure of the two batches. This control system is able to identify any unusual in-transit exposure.

Environmental TLDs should never be brought into the plant controlled zone or any other area with elevated radiation, but may be stored for brief periods in a shielded enclosure in the Extension Building or other low background area, such as the basement of the Energy Information Center or the Site Boundary Control Center. The contractor is to time shipments to coincide as closely as possible with the beginning of a calendar quarter. TLDs should be shipped back to the contractor immediately or within 24 hours of removal. The contractor is instructed to process the samples immediately upon receipt. The contractor shall report removal date and cumulative readings in mR for all locations and control, correct for in-transit exposure and express results in net mR/7 days. Labels of the exposed set for shipment to contractor should show both posting and removal dates.

2.4.3 Lake Water

Lake water samples are obtained monthly at specified locations. As a special case, the water sample at the discharge flume is composited weekly for monthly analysis. The contractor is responsible for the compositing for quarterly analyses. Collect approximately 8000 ml of lake water in the required number of cubitainers at each location, and label as directed in Section 2.2.7

Lake water is collected at the request of the State of Wisconsin. These samples are collected, labeled, and forwarded to the appropriate agency.

2.4.4 Well Water

Well water samples are obtained quarterly from the single onsite well. Collect approximately 8000 ml of well water using the required number of cubitainers. Label as directed in Section 2.2.7.

2.4.5 Air

2.4.5.1 Sample Collection

Air filters are changed weekly at specified locations. Take precautions to avoid loss of collected material and to avoid contamination when handling filters. Washing hands before leaving the plant to change filters is a recommended practice.

Both particulate filters and charcoal cartridges are employed at each sampling location. Particulate filters are analyzed for gross beta activity after waiting for at least 24 hours to allow for the decay of short-lived radon and thoron daughter products. The contractor makes quarterly composites of the weekly particulate samples for gamma isotopic analyses.

A regulated pump (Eberline Model RAS-1 or equivalent) is used at each air sampling location. Because of the automatic flow regulation, rotameter readings at the beginning and ending of the sampling period should be nearly identical. Substantial differences in readings usually require some investigation

to determine the cause. The rotameters attached to the pumps are calibrated in liters per minute. When new filters are installed, flow rate should be about 28-30 lpm. Flow rates less than 26 lpm or greater than 32 lpm require that the pump regulator be readjusted. The correct flow rate is determined by multiplying the rotameter reading by the correction factor indicated on the calibration sticker affixed to the rotameter.

The pumps are equipped with an elapsed time meter which reads in hours. Elapsed time in hours for the sample is obtained by subtracting the meter reading at start time from the reading at the end of the sampling period. The form shown in Figure 2-4 is used for recording pertinent air sampling data for each location. At a normal filter change, the following procedure will apply:

- a. Record "date off" on the air sampling data sheet.
- b. Record rotameter reading for end of period (R_2).
- c. Turn off pump and record hour meter reading for end of period (t_2).
- d. Calculate total volume for period and enter on data sheet (m^3).
- e. Before removing the filter, label the envelope as directed in Section 2.2.7. Also enter any other pertinent information at this time. Always write data on the envelope before the particulate filter is in the envelope.
- f. Remove particulate filter being careful to handle filter only by edges, place in envelope.
- g. Remove charcoal cartridge, place in plastic bag, and label as directed in Section 2.2.7.

-
- h. Install new charcoal cartridge and particulate filter being sure to check the charcoal cartridge for breaks and holes in filter surface. Discard cartridges with holes and breaks.
 - i. Record "date on" on a new line of the data sheet.
 - j. Record hour meter reading for beginning of period (t_1).
 - k. Turn pump on.
 - l. Record rotameter reading for beginning of period (R_1).
 - m. Record correction factor as indicated on calibration sticker affixed to rotameter (C).
 - n. Observe that the starting rotameter reading (R_1) is close to the previous ending reading (R_2). A substantial difference indicates need for further investigation because the regulator will generally maintain constant flow regardless of filter loading
 - o. Any unusual conditions or observations should be referenced under (*) and recorded under "*NOTES" at the bottom of the data sheet.

Air samples are collected for the State of Wisconsin at three locations, one of which is co-located with a PBNP air sampling site. They are handled in a manner similar to PBNP samples except that no charcoal cartridges are involved. However, State samplers are equipped with volume integrating meters. Therefore, clock time must be recorded in addition to the ending and beginning volumes. Label and forward samples to the State.

2.4.5.2 Air Sampling System Description

The air monitoring equipment for the PENP air sampling program consists of a regulated rate control system. The regulated rate control system is used at PENP because of its simplicity and reliability. It is designed to minimize both calibration difficulties and the potential for leaks. The regulated rate control system includes a pump, a flow regulator, an electrical hour meter, the appropriate filter holders and a minimum of tubing. In this system, the total volume sampled can be calculated simply and accurately from the elapsed time indicated on the hour meter and the flow rate which is kept constant by the regulator regardless of filter loading.

The air samplers are Eberline Model RAS-1 (or equivalent) and have built in rotameters which read in liters per minute. The systems also include a 1000-hr elapsed time meter, an Eberline WPH-1 (or equivalent) weatherproof housing, and an iodine cartridge holder and mounting kit. Currently, all metallic and rigid plastic tubing and rigid fittings are used in lieu of tygon tubing and quick dis-connects. Glass fiber, 47 mm diameter, particulate filters capable of collecting 95% of 1 micron diameter particles and iodine impregnated charcoal cartridges (Scott or equivalent) constitute the filter media.

2.4.5.3 Calibration

Calibrate the pump rotameter at initial installation and at yearly intervals thereafter by connecting a laboratory-quality reference flow meter with NBS traceable calibration to the filter face with the particulate filter and charcoal cartridge in position. Upon completion, a calibration sticker indicating the correction factor is affixed to, or near, the built-in rotameter. The results are recorded on the form shown in Figure 2-7.

2.4.5.4 Inspection and Maintenance

Initially, and at quarterly intervals, not to exceed 16 weeks, thereafter, the assembled system should be checked for leaks by attaching the reference flow meter across the face of the filter holder with the filters in position. Leakage in this configuration is indicated by a higher reading on the built-in rotameter than on the reference flow meter. Because leakage is indicated by disagreement between the two flow measuring devices, remember to apply the calibration correction factor to the built-in rotameter reading. Leak tests are to be recorded on the form shown in Figure 2-7.

For normal operation, the regulators should be adjusted to maintain a true flow rate of 28-30 liters per minute. Adjustments are made by turning the screw marked FLOW ADJUST located on the side of the regulator body: counterclockwise increases flow, clockwise decreases flow. Flow rates should be observed at all filter changes. Flow rates less than 26 lpm or more than 32 lpm require readjustment of the regulator. Particular attention should be paid to flow rate readings with the "old", loaded filter and with new, unused filters in position. Because of the regulator, the difference in flow should be barely perceptible, perhaps no more than one lpm. Significant differences in flow rates require further investigation to determine the cause.

Preventive maintenance shall be performed on all environmental air samplers and the results recorded on the form shown in Figure 2-7.

2.4.5.5 Pump Repair and Replacement

The pumps can operate for long periods of time with minimal or no maintenance. The vane assembly of the pump is most susceptible to failure, indicated by excessive noise or inability to maintain sufficient flow across loaded filters. At least one standby pump should be available for temporary service

during the repair period. In the event of motor failures due to causes other than defective connections, complete replacement of the unit may be necessary. All pump repairs should be done in a clean-side shop with clean tools.

2.4.6 Milk

Because of iodine decay and protein binding of iodine in aging milk samples, speed is imperative in processing and samples must be kept cool to avoid degradation and spoilage of the samples. Milk samples are obtained monthly in conjunction with the State of Wisconsin milk sampling program from three individual dairy farmers located north, south, and west of the site. Because two of the three sites are co-located, the PBNP pickup is coordinated to coincide with the State arranged schedule. The pickup usually will be the first Wednesday of the month.

The following sequence should be followed:

- a. After verifying the State milk pickup date with the Manitowoc Public Health Department (Mr. Alan Troullier, phone number 683-4454) notify Mr. Leon Strutz (755-2060) of the pickup date. This must be done because the Strutz farm (PBNP sampling location E-21) is not a State of Wisconsin sampling site.
- b. Because the milk must be kept cool, but not frozen, fill enough cubitainers with water and freeze to be able to put one in each shipping container. Fill the cubitainers with water and freeze the day preceding the pickup.
- c. The milk from the Strutz farm (E-21) must be picked up before 0900 because that is the time the Strutz milk is shipped. A late arrival may mean a missed sample. Milk from sites E-11 and E-19 may be picked up any time after the Strutz pickup.

- d. Identify yourself and the nature of your business at each milk pickup site. Collect two one-gallon samples from each site, using a funnel if necessary. Place each gallon in a one-gallon box liner for shipment. If shipment cannot occur on the collection day, store the milk in a clean-side refrigerator overnight. DO NOT FREEZE.
- e. Complete a PBNP sample tag according to Section 2.2.7 for each gallon sample and place in the box with the sample. Do not seal the box. Place the samples in insulated containers (found on the Ready Stores receiving dock) and take them to Ready Stores. Make sure that the cover letter and, as appropriate, the contractor data collection sheets are sent according to Section 2.2.8 of this manual.

2.4.7 Algae

Filamentous algae are collected from pilings or rocks three times per year, as available, from two locations. The long, grassy, dark green algae can normally be cut with scissors. The shorter, light green algae normally must be scraped from rocks or pilings. When scraping algae, be careful not to include pieces of rock in the sample. The sample can be lightly rinsed in the same medium in which it is growing. This rinse will help rid the sample of pieces of rock and gravel that may have been inadvertently collected with the sample. Because rocks and sediment contain naturally occurring radioactive materials, their inclusion may give false sample results. Collect between 100 and 1000 gm of algae. A sample greater than 500 gm is preferred. Place the algae in a 1000 ml cubitainer and label the container as directed in Section 2.2.7. The algae must be kept cool to prevent spoilage.

2.4.8 Fish

Fish are obtained three times per year (March, August, and December) as available either from the traveling screens as washed into the fish basket or by other methods as required. For any given sampling period, three fish or a sufficient number to yield at least 1000 gm of fillets should be provided.

Place fish in plastic bags and tape and/or tie tightly closed. Fish are stored briefly in a radiologically clean freezer. It may be desirable in warm weather to coordinate milk and fish sampling, thereby allowing simultaneous shipment in insulated containers. Pack fish samples with ice if needed. Label bags as directed in Section 2.2.7, being sure to indicate fish species when possible. Following packaging of fish, remove and discard any fish left in the freezer. This avoids sending fish that are not representative of the sampling period.

Fish are obtained four times per year (March, June, September, and December) for the State of Wisconsin. Fish sampling performed for the State is performed in the same manner as that for the plant. Approximately four fish should be sent to the state at each sampling period.

In March and December split samples are sent to Teledyne and the State of Wisconsin. Each fish is bisected with one half going to Teledyne and the other half to the State.

2.4.9 Soil

Soil integrates atmospheric deposition and acts as a reservoir for long-lived radionuclides. Although soil sampling is a poor technique for assessing small incremental releases and for monitoring routine releases, it does provide a means of monitoring long-term trends in atmospheric deposition in the vicinity of PBNP. Therefore soil samples are obtained two times per year from specified locations.

Clear the vegetation from a 6" x 6" area, being careful to leave the top layer of soil relatively intact. Remove root bound soil by shaking the soil onto the cleared area or into the sample container before discarding the roots. When necessary, it is preferable to leave some roots in the soil rather than to lose the top layer of soil.

Remove the soil to a depth of 3 inches. If necessary, expand the area, instead of digging deeper, to obtain the required amount of sample. If an area larger than 6"x6" is used, notify the cognizant NPERS Engineer of the area used. The minimum acceptable quantity is 500 grams. Place the entire soil sample in a 1000 ml plastic bag and seal the bag with tape. Label the sample as directed in Section 2.2.7.

This procedure assumes that the samples are obtained from undisturbed land, land that has not been plowed within, approximately, the last 25 years. If the land has been plowed, the soil should be sampled to the plow depth which typically is 8 inches. Place the soil in a clean bucket or appropriate size plastic bag, homogenize the soil, and place 1000 grams of the well mixed soil sample in a plastic bag and label as described above.

2.4.10 Shoreline Sediment

Shoreline sediment consisting of sand and smaller grain size material is sampled 2 times per year from specified locations. The 1000 gram sample is collected, from beach areas near the water ridge. At each location collect representative samples of sediment types roughly in proportion to their occurrence. For example, at E-06 avoid collecting a sample which consists exclusively of the dark-brown to black sediments which occur in layers up to several inches thick. Package the sample in a 1000 ml cubitainer and label as described in Section 2.2.7.

2.5 Milk Survey

In accordance with PBNP Technical Specifications, the milk sampling program is reviewed annually, including a visual verification of animal grazing in the vicinity of the site boundary, to ensure that sampling locations remain as conservative as practicable. The verification is conducted each summer by cognizant PBNP personnel. Because it is already assumed that milk animals may graze up to the site boundary, it is only necessary to verify that these animals have not moved onto the site. No animal census is required. Upon completion of the visual check, PBNP personnel will notify NPERS in writing. To ensure performance of the annual verification, "milk review" is identified on the sampling checklist, Figure 2-2.

TABLE 2-1RECOMMENDED MINIMUM SAMPLE SIZE

<u>Sample Type</u>	<u>Size</u>
Vegetation	100-1000 gm
Lake Water	8 liters
Air Filters	250 m ³
Well Water	8 liters
Milk	8 liters
Algae	100-1000 gm
Fish (edible portions)	1000 gm
Soil	500-1000 gm
Shoreline Sediment	500-1000 gm

TABLE 2-2

SAMPLE TYPES AND ASSOCIATED LOWER LEVEL OF DETECTION (LLD) AND
NOTIFICATION LEVEL VALUES

SAMPLE TYPE	REPORTING UNIT	PARAMETER	LLD(a)	NOTIFICATION LEVELS		WEIGHTED SUM ACTION LEVEL
				NRC (Regulatory)	NPERS(b) (Admin.)	
Vegetation	pCi/g wet	Gross Beta(c)	0.25	-	60	-
		Cs-137	0.08	2	0.40	0.50
		Cs-134	0.06	1	0.20	0.25
		I-131	0.06	0.1	0.06	0.06
		Other(d)	0.25	-	2.0	-
Shoreline Sediment and Soil (e)	pCi/g dry	Gross Beta	2.0	-	100	-
		Cs-137	0.15	-	20	-
		Other(d)	0.15	-	20	-
Algae	pCi/g wet	Gross Beta	0.25	-	12	-
		Cs-137	0.25	10	1	2.5
		Cs-134	0.25	10	1	2.5
		Co-58	0.25	10	1	2.5
		Co-60	0.25	10	1	2.5
		Other(d)	0.25	-	1	-
Fish	pCi/g wet	Gross Beta(c)	0.5	-	125	-
		Cs-137	0.15	2	0.40	0.50
		Cs-134	0.13	1	0.20	0.25
		Co-58	0.13	30	3	7.5
		Co-60	0.13	10	1	2.5
		Mn-54	0.13	30	3	7.5
		Fe-59	0.26	10	1	2.5
		Zn-65	0.26	20	2	5.0
		Other(d)	0.5	-	6	-
TLDs	mR/7 days	Gamma Exposure	1mR/TLD	-	5 mR/7 days	-

TABLE 2-2
(Continued)

SAMPLE TYPE	REPORTING UNIT	PARAMETER	LLD(a)	NOTIFICATION LEVELS		WEIGHTED SURFACE ACTION LEVEL
				NRC (Regulatory)	NPERS(b) (Admin.)	
Lakewater and Well Water	pCi/l-T.S.(f)	Gross Beta	4	-	100	-
		Cs-134	15	30	15	15
		Cs-137	18	50	18	18
		Fe-59	30	400	40	100
		Zn-65	30	300	30	75
		Zr-Mr 95	15	400	40	100
		Ba-La-140	15	200	20	50
		Co-58	15	1000	100	250
		Co-60	15	300	30	75
		Mn-54	15	1000	100	250
		I-131(c)	2	-	2	-
		Other(c)	30	-	100	-
		H-3	3,000	30,000	3000	7500
		Sr-89(c)	10	-	50	-
Sr-90(c)	2	-	20	-		
Milk	pCi/l	Sr-89(c)	5	-	100	-
		Sr-90(c)	1	-	100	-
		I-131	0.5	3	0.5	0.75
		Cs-134	15	60	15	15
		Cs-137	18	70	18	18
		Ba-La-140	15	300	30	75
		Other(d)	15	-	30	-
Air Filter	pCi/m ³	Gross Beta	0.01	-	1.0	-
		I-131	0.07	0.9	0.09	0.2
		Cs-137	0.06	20	2.0	5.0
		Cs-134	0.05	10	1.0	2.5
		Other(d)	0.1	-	1.0	-

- (a) The LLDs in this column are the maximum acceptable values.
 (b) The values in this column are not technical specifications.
 (c) This parameter and associated LLD and Notification Level are not Technical Specifications items.
 (d) Other refers to non-tech spec identifiable gamma emitters.
 (e) These sample types and associated values are not required by the technical specifications.
 (f) T.S. = total solids.

TABLE 2-3
RADIOLOGICAL ENVIRONMENTAL SAMPLING LOCATIONS

<u>Location Code</u>	<u>Location Description</u>
E-01	Meteorological Tower
E-02	Site Boundary Control Center - E side of Building
E-03	Tapawingo Road, about 0.4 miles W of Lakeshore Road
E-04	North Boundary
E-05	Two Creeks Park
E-06	Point Beach State Park - Coast Guard Station
E-07	WPSC Substation on County Rt. V about 0.5 miles W of Hwy 42
E-08	G. J. Francar property, at the SE corner of the intersection of Hwy 163 and Zander Rd.
E-09	Nature Conservancy
E-10	PBNP Site Well
E-11	Dairy Farm (W. Funk), about 3.75 Miles West of Site
E-12	Discharge Flume/Pier
E-13	Pumphouse
E-14	South Boundary about 0.2 miles E of Site Boundary Control Center
E-15	Southwest Corner of Site
E-16	WSW, Hwy. 42, Bishop Residence about 0.25 miles N of Nuclear Road
E-17	North of Mishicot, Hwy. 163 and Assman Road, NE Corner of Intersection
E-18	Northwest of Two Creeks at Zander and Tannery Roads
E-19	Local Dairy Farm about 2.7 Miles North of Site (R. Lehrmann)
E-20	Reference Location, 17 miles SW, at Silver Lake College
E-21	Local Dairy Farm Just South of Site (L. Strutz) on Lakeshore and Irish Roads
E-22	W side of Hwy. 42, about 0.25 miles N of Johaneck Road
E-23	Greenfield Lane, about 4½ Miles South of Site, 0.5 Miles East of Hwy. 42
E-24	N side of County Rt. V near intersection of Saxonburg Road
E-25	S side of County Rt. BB about 0.5 miles W of Norman Road
E-26	804 Tapawingo Road, about 0.4 miles E of Hwy. 163 N side of road
E-27	Intersection of Saxonburg and Nuclear Roads, SW Corner, about 4 Miles WSW
E-TC	Transportation Control; Reserved for TLDs

TABLE 2-4

PBNP RADIOLOGICAL ENVIRONMENTAL SAMPLE COLLECTION FREQUENCY

SAMPLE TYPE	SAMPLE CODES	COLLECTION FREQUENCY
Environmental radiation exposure	E-01,-02,-03,-04,-05, -06,-07,-08,-09,-12, -14,-15,-16,-17,-18, -20,-22,-23,-24,-25, -26,-27	Quarterly
Vegetation	E-01,-02,-03,-04,-06, -08,-09,-20	3x/yr as available
Algae	E-05,-12	3x/yr as available
Fish	E-13	3x/yr as available
Well water	E-10	Quarterly
Lakewater	E-01,-05,-06,-09,-12	E-12 collected weekly for monthly composite. Others collected monthly.
Milk	E-11,-19,-21	Monthly
Air filters	E-01,-02,-03,-04,-08, -20	Weekly particulate filters and charcoal canisters by continuous air sampler.
Soil	E-01,-02,-03,-04,-06, -08,-09,-20	2x/yr
Shoreline sediment	E-01,-05,-06,-09,-12	2x/yr

TABLE 2-5

PBNP RADIOLOGICAL ENVIRONMENTAL SAMPLE ANALYSIS AND FREQUENCY

SAMPLE TYPE	SAMPLE CODES	ANALYSES	FREQUENCY
Environmental radiation exposure	E-01,-02,-03,-04,-05, -06,-07,-08,-09,-12, -14,-15,-16,-17,-18, -20,-22,-23,-24,-25, -26,-27,-TC	TLD	Quarterly
Vegetation	E-01,-02,-03,-04,-06, -08,-09,-20	Gross beta Gamma isotopic analysis	3x/yr as available
Algae	E-05,-12	Gross beta Gamma isotopic analysis	3x/yr as available
Fish	E-13	Gross beta Gamma isotopic analysis (analysis of edible por- tions only)	3x/yr as available
Well water	E-10	Gross beta, H-3 Sr-89,90, I-131 Gamma isotopic analysis (on total solids)	Quarterly
Lakewater	E-01,-05,-06,-09,-12	Gross beta H-3, Sr-89,90 I-131 Gamma isotopic analysis (on total solids)	Monthly Quarterly composite of monthly collec- tions Monthly Monthly
Milk	E-11,-19,-21	Sr-89,90 I-131 Gamma isotopic analysis	Monthly

TABLE 2-5
(Continued)

SAMPLE TYPE	SAMPLE CODES	ANALYSES	FREQUENCY
Air filters	E-01,-02,-03,-04,-08, -20	Gross beta I-131 Gamma isotopic analysis	Weekly (particulate) Weekly (charcoal) Quarterly (on composite par- ticulate filters)
Soil	E-01,-02,-03,-04,-06, -08,-09,-20	Gross beta Gamma isotopic analysis	2x/yr
Shoreline sediment	E-01,-05,-06,-09,-12	Gross beta Gamma isotopic analysis	2x/yr

TABLE 2-6SAMPLES COLLECTED FOR STATE OF WISCONSIN

<u>Sample Type</u>	<u>Location</u>	<u>Frequency</u>
1. Lake Water	E-12 E-05	Weekly, Compositied Monthly Quarterly
2. Air Filters	E-07 E-08 Buechert Residence	Weekly
3. Fish	E-13	Quarterly As Available
4. Precipitation	E-01 E-04 E-07 E-08	Twice a month, As Available

Figure 2-1a

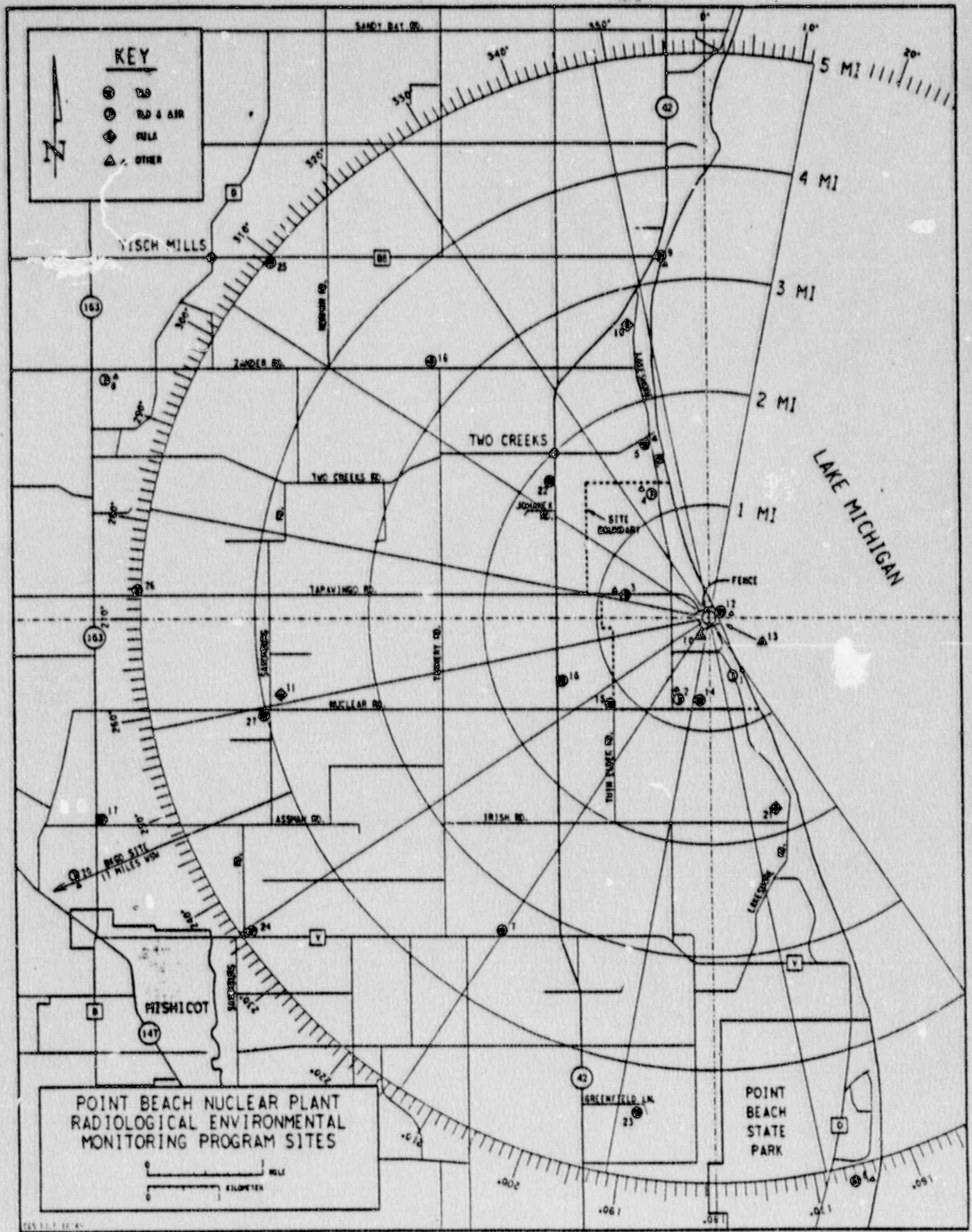
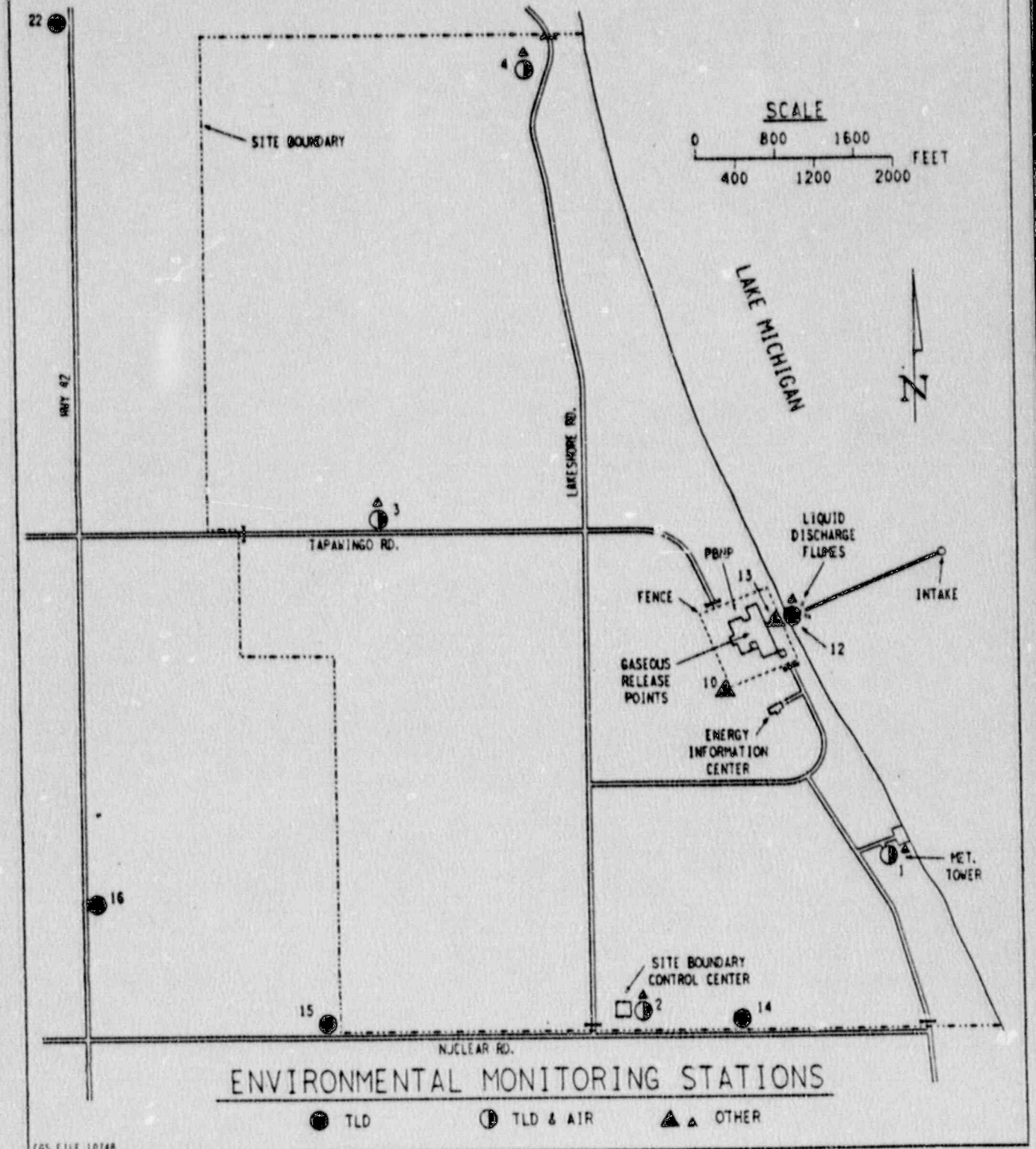


Figure 2-1b

SITE MAP POINT BEACH NUCLEAR PLANT



POINT BEACH NUCLEAR PLANT
 RADIOLOGICAL ENVIRONMENTAL SAMPLING CHECKLIST

YEAR

SAMPLE TYPE	LOCATION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
VEGETATION (20%)	E-01					/	/	/			/		
	E-02					/	/	/			/		
	E-03					/	/	/			/		
	E-04					/	/	/			/		
	E-05					/	/	/			/		
	E-06					/	/	/			/		
	E-07					/	/	/			/		
	E-20					/	/	/			/		
SHORELINE SRT (20%)	E-01				/						/		
	E-02				/						/		
	E-03				/						/		
	E-07				/						/		
	E-12				/						/		
SOIL (20%)	E-01					/					/		
	E-02					/					/		
	E-03					/					/		
	E-04					/					/		
	E-05					/					/		
	E-06					/					/		
	E-07					/					/		
	E-20					/					/		
ALGAE (20%)	E-05					/	/		/		/		
	E-12					/	/		/		/		
FISH (Teleostei) State of Wisc.	E-12						/		/				
							/		/				
MILK REVIEW (mussel) Offsite													

• = Split Samples

Figure 2-2

RADIOLOGICAL ENVIRONMENTAL SAMPLING CHECKLIST

YEAR

SAMPLE TYPE	LOCATION	YEAR															
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC				
MILK (Monthly)	B-11	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
	B-19	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
	B-20	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
WELL WATER	B-10	/															
LAKE WATER	B-01	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
	B-03	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
	B-06	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
	B-09	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
Composite weekly for monthly analysis	B-12	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
	1	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
	2	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
	3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
Diox. Shipped	4	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
		/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
Scientific Collector's annual report																	/
Air Sampler Calibration										/							
Air Sampler Leak Check		/							/								/
Permits for milk and electricity										/							
TSOSF ILDA		/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/

Figure 2-2

**POINT BEACH NUCLEAR PLANT
ENVIRONMENTAL SAMPLE IDENTIFICATION TAG**

Sample Type _____

Sample Location _____

Date Taken _____ Time Taken _____

Sample Volume _____

Analyze For _____

Collector _____

PBF-4026
(12-89)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM
SAMPLING PROBLEM REPORT FORM

Location Number and Description _____

Sample Type _____^o Date _____

Type of Problem (Check One)

- _____ Lost in Field
- _____ Lost in Transit to Contractor Laboratory
- _____ Sample Not Available
- _____ Other (Explain) _____

Cause of Sampling Problem: _____

Description of Sampling Problem: _____

Suggestions (if any) for Preventing Recurrence: _____

Reported By _____ Date _____

Reviewed By _____ Date _____

^oSample Type Code

- | | |
|-----------------------------------|--|
| AP - Airborne Particulates | F - Fish |
| AI - Airborne Iodines | SL - Slime, Aq. Vegetation |
| TLD - Thermoluminescent Dosimeter | SS - Shoreline Sediment |
| ML - Milk | SP - Special Sample (Indicate what kind) |
| WW - Well Water | SO - Soil |
| G - Grasses and Weeds | LW - Lakewater |

3.0 NON-RADIOLOGICAL MONITORING

The measurement of meteorological data is the only non-radiological environmental monitoring currently required by PBNP Technical Specifications. In accordance with Amendment Nos. 69 and 74 to Facility Operating Licenses DPR-24 and DPR-27, respectively, dated March 11, 1983, all other non-radiological environmental monitoring has been deleted. The meteorological data are kept on site for review by the NRC upon request.

APPENDIX A

RADIOLOGICAL ENVIRONMENTAL MONITORING TECHNICAL SPECIFICATIONS

15.7.7 OPERATIONAL ENVIRONMENTAL MONITORING PROGRAM

Applicability

This section applies to operational environmental radioactivity monitoring and sampling.

Objective

To verify that plant operations have no significant radiological effects on the environment.

Specifications

A. Environmental Monitoring Program

1. Environmental monitoring samples shall be taken at locations specified in the PBNP Environmental Manual according to the sampling and collection frequencies given in Table 15.7.7-1.
2. Deviations from the required sampling schedule as specified in Table 15.7.7-1, are permitted if hazardous conditions, seasonal unavailability, automatic sampling equipment malfunctions, and other legitimate reasons make the sample unobtainable. If the radiological environmental monitoring program is not being conducted as specified in Table 15.7.7-1, a description of the reasons for not conducting the program and the plans for preventing a recurrence will be submitted with the next Semiannual Monitoring Report.
3. If milk or vegetation samples become unavailable from one or more of the sample locations specified in the PBNP Environmental Manual, identify locations for obtaining replacement samples and add them to the radiological environmental monitoring program within 30 days. The specific locations from which samples were unavailable may then be deleted from the monitoring program. The cause of the unavailability of samples and replacement samples shall be

TABLE 15.7.7-3 RADIOLOGICAL ENVIRONMENTAL MONITORING ANALYSIS

NOTIFICATION LEVELS

<u>Analysis</u>	<u>Vegetation (pCi/g wet)</u>	<u>Airborne (pCi/m³)</u>	<u>Milk (pCi/l)</u>	<u>Well Water & Lake Water (pCi/l)-T.S.</u>	<u>Algae (pCi/g wet)</u>	<u>Fish (pCi/g wet)</u>
H-3				30,000		
I-131	0.1	0.9	3			
Cs-137	2	20	70	50	10	2
Cs-134	1	10	60	30	10	1
Co-58				1,000	10	30
Co-60				300	10	10
Ba-La-140			300	200		
Zr-Nb-95				400		
Fe-59				400		10
Zn-65				300		20
Mn-54				1,000		30

NOTES FOR TABLE 15.7.7-2

1. For gamma isotopic analysis of environmental samples, the spectrum is scanned over the energy range of 80 to 2048 KeV for gamma ray emitting radionuclides which may be attributable to Point Beach Nuclear Plant effluents. The analysis specifically includes, but is not limited to Mn-54, Fe-59, Zn-65, Co-58, Co-60, Zr-Nb-95, Ru-103, Ru-106, I-131, Ba-La-140, Cs-134, Cs-137, Ce-141, and Ce-144.
2. The environmental TLbs have an LLD of 1 mrem/chip.
3. No drinking water
4. T.S. = total solids

TABLE 15.7.7-2 RADIOLOGICAL ENVIRONMENTAL MONITORING ANALYSIS¹
 LOWER LIMIT OF DETECTION (LLD)²

<u>Analysis</u>	<u>Vegetation (pCi/g wet)</u>	<u>Airborne (pCi/m³)</u>	<u>Milk (pCi/l)</u>	<u>Well Water & Lake Water (pCi/l)-T.S.⁴</u>	<u>Algae (pCi/g wet)</u>	<u>Fish (pCi/g wet) :</u>
Gross Beta		0.01		4	0.25	
H-3				3,000		
Gamma Scan						
I-131	0.06	0.07	0.5			
Cs-137	0.08	0.06	18	18	0.25	0.15
Cs-134	0.06	0.05	15	15	0.25	0.13
Co-58				15	0.25	0.13
Co-60				15	0.25	0.13
Ba-La-140			15	15		
Zr-Nb-95				15		
Fe-59				30		0.26
Zn-65				30		0.26
Mn-54				15		0.13

TABLE 15.7.7-1 (Continued)

SAMPLE TYPE	NUMBER & LOCATION OF SAMPLES	COLLECTION FREQUENCY	ANALYSIS TYPE AND FREQUENCY
Well water	1 - Onsite well	Quarterly	H-3 quarterly with gamma isotopic analysis performed quarterly on total solids
Lake water	1 - Discharge flume 2 - N of discharge 0.5 to 5 miles from PBNP 2 - S of discharge 0.5 to 5 miles from PBNP	Monthly (discharge flume is collected weekly and composited for monthly analysis)	Monthly gross beta and gamma isotopic analysis of total solids. H-3 analysis quarterly on composite
Air filters	1 - Reference location as described above 4 - In the general area of the site boundary 1 - About 6 miles W of PBNP	Weekly by continuous air sampler	Radiiodine weekly on charcoal canisters. Gross beta weekly on particulate filters after at least 24 hours decay. Gamma isotopic analysis quarterly on particulate filter composites.
Milk	3 - Dairy farms about 2-6 miles N, W, and S of PBNP	Monthly	Monthly gamma isotopic analysis and radiiodine analysis
Fish	1 - Travelling screens	3x/yr as available	Gamma isotopic analysis 3x/yr as available. Analysis of edible portions only
Algae	2 - Along shore within 5 miles N and S of discharge	3x/yr as available	Gross beta and gamma isotopic analysis 3x/yr as available

TABLE 15.7.7-1

OPERATIONAL RADIOLOGICAL ENVIRONMENTAL PROGRAM

SAMPLE TYPE	NUMBER & LOCATION OF SAMPLES	COLLECTION FREQUENCY	ANALYSIS TYPE AND FREQUENCY
Direct environmental	<p>23 TLDs are distributed as follows: (Each TLD contains 2 chips)</p> <p>9 - In the general area of the site boundary in the nine meteorological sectors around the Point Beach Nuclear Plant</p> <p>1 - On the Lake Michigan side of PBNP</p> <p>11 - In a ring around PBNP at a distance of 3 to 6 miles from the plant</p> <p>1 - Background reference in a low D/Q area greater than 16 miles from PBNP</p> <p>1 - Transport control</p>	Quarterly	Gamma dose quarterly
Vegetation	<p>8 samples of vegetation obtained as follows:</p> <p>1 - Background reference as described above</p> <p>4 - In the general area of the site boundary</p> <p>3 - At locations N, W and S of PBNP at 3-6 miles from the plant</p>	3x/yr as available	Radiiodine and gamma isotopic analysis performed 3x/yr as samples are available

The land in the area of Point Beach Nuclear Plant is used primarily for farming and dairy operations. Therefore, radiological environmental sampling of vegetation is conducted to detect changes in radiological conditions at the base of the food chain. Sampling of area-produced milk is carried out because dairy farming is a major industry in the area.

Water, periphyton, and fish are analyzed to monitor radionuclide levels in Lake Michigan in the vicinity of PBNP. Periphyton, attached algae, concentrate radionuclides from the surrounding lake water. Therefore, algae samples, along with lakewater samples, provide a means of detecting changes which may have a potential impact on the radionuclide concentrations in Lake Michigan fish. Because of the migratory behavior of fish, fish sampling is of minimal value for determining radiological impact specifically related to the operation of the Point Beach Nuclear Plant. However, fish sampling is carried out as a conservative measure with emphasis on species which are of intermediate trophic level and which exhibit minimal migration in order to monitor the status of radioactivity in fish.

Vegetation, algae, and fish sampling frequencies are qualified on an "as available" basis recognizing that certain biological samples may occasionally be unavailable due to environmental conditions.

the confirmed calculated weighted sum remains equal to or greater than 1, a written report shall be submitted to the NRC in accordance with Section 15.7.8.4.B within thirty (30) days of the confirmation. This calculation requirement and report is not required if the measured level of radioactivity was not the result of plant effluents.

3. All detected radionuclides shall be reported in the Semiannual Monitoring Reports. Naturally occurring nuclides such as Be-7, K-40, and the U-238 and Th-232 decay series radionuclides shall not be included in this requirement.

D. Land Use Census

1. The milk sampling program shall be reviewed annually, including a visual verification of animals grazing in the vicinity of the site boundary, to ensure that sampling locations remain as conservative as practicable.

E. Interlaboratory Comparison Program

1. The environmental sampling analyses shall be performed by a laboratory participating in an Interlaboratory Comparison Program.
2. If the analytical laboratory is not participating in the Interlaboratory Comparison Program, a description of the corrective actions to be taken to preclude a recurrence shall be submitted in the Semiannual Monitoring Report.

Basis

The operational radiological environmental monitoring program as outlined in Table 15.7.7-1 provides sufficient sample types and locations to detect and to evaluate changes in environmental radioactivity. Although radioactivity in plant effluents is continuously monitored and releases are well below levels which are considered safe upper limits, radiological environmental monitoring is a conservative measure undertaken to determine whether the operation of the Point Beach Nuclear Plant produces any significant radiological change in the surrounding environment.

Radioactivity is released in liquid and gaseous effluents. Air particulate samples and thermoluminescent dosimeters placed at various locations provide means of detecting changes in environmental radioactivity as a result of plant releases to the atmosphere.

identified in the next Semiannual Monitoring Report. Figures and tables in the Environmental Manual are to be revised reflecting the new sample locations.

B. Detection Capabilities

1. Environmental samples shall be analyzed as specified in Table 15.7.7-2.
2. The required detection capabilities for environmental sample analyses are tabulated in terms of the lower limits of detection (LLDs).
3. If circumstances render the stated LLDs in Table 15.7.7-2 unachievable, the contributing factors shall be identified and described in next Semiannual Monitoring Report.

C. Notification Levels

1. If a measured level of radioactivity in any environmental medium exceeds the notification level listed in Table 15.7.7-3, resampling and/or reanalysis for confirmation shall be completed within 30 days of the determination of the anomalous result. If the confirmed measured level of radioactivity remains above the notification level, a written report shall be submitted to the NRC in accordance with Section 15.7.8.4.B within thirty days of the confirmation. This report is not required if the measured level of radioactivity was not the result of plant effluents.
2. If more than one of the radionuclides listed in Table 15.7.7-3 are detected in any environmental medium, a weighted sum calculation shall be performed if the measured concentration of a detected radionuclide is greater than 25% of the notification levels. For those radionuclides with LLDs in excess of 25% of the notification level, a weighted sum calculation need only be performed if the reported value exceeds the LLD.

The weighted sum is calculated as follows:

$$\frac{\text{concentration (1)}}{\text{notification level (1)}} + \frac{\text{concentration (2)}}{\text{notification level (2)}} + \dots = \text{weighted sum}$$

If the calculated weighted sum is equal to or greater than 1, resampling and/or reanalysis for confirmation shall be completed within 30 days of the determination of the anomalous result. If