EM

ENVIRONMENTAL MANUAL

Wisconsin
Electric
Power Company

DOCUMENT TYPE: Administrative

REVISION: 14

EFFECTIVE DATE: December 23, 1999

APPROVAL AUTHORITY: Plant Manager

PROCEDURE OWNER (title): Group Head

OWNER GROUP: Nuclear Safety Analysis

TABLE OF CONTENTS

SECTION	TITLE	PAGE
1.0	RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ADMINISTRATION	5
1.1	Definition and Basis	5
1.1.1	Definition	5
1.1.2	Basis	5
1.2	Responsibilities for Program Implementation	6
1.2.1	Nuclear Safety Analysis (NSA) Functions	6
a.	Program scope	6
b.	Record keeping	6
c.	Data monitoring	7
d.	Data summary	7
e.	Contractor communications	7
f.	Reportable items	8
1.2.2	Non-NSA Functions	9
a.	Manual control and distribution	9
b.	Program coordination	9
1.3	Quality Assurance/Quality Control	10
1.4	Program Revisions	11
1.4.1	Documentation	11
1.4.2	Effective date	11
1.4.3	Submission to NRC	11

TABLE OF CONTENTS

SECTION	TITLE	PAGE
2.0	RADIOLOGICAL ENVIRONMENTAL MONITORING	12
2.1	Program Overview	12
2.1.1	Purpose	12
2.1.2	Samples	12
2.1.3	Monitoring sensitivity	12
2.2	Program Parameters	13
2.2.1	Contamination avoidance	13
2.2.2	Sample size	13
2.2.3	Lower limit of detection	14
2.2.4	Notification levels	15
2.2.5	Sampling locations	16
2.2.6	Sampling media and frequency	16
2.2.7	Sample labeling	17
2.2.8	Sample shipping	17
2.2.9	Sample analyses and frequency	18
2.2.10	Analytical laboratory	18
2.3	Assistance to the State of Wisconsin	18
2.4	Specification of Sampling Procedures	19
2.4.1	Vegetation	19
2.4.2	Thermoluminescent dosimeters (TLDs)	19
2.4.3	Lake water	20
2.4.4	Well water	20
2.4.5	Air	20
2.4.6	Milk	24
2.4.7	Algae	25
2.4.8	Fish	25
2.4.9	Soil	26
2.4.10	Shoreline Sediment	26
2.5	Milk Survey	27
3.0	NON-RADIOLOGICAL MONITORING	40

TABLE OF CONTENTS

SECTION	TITLE	PAGE
TABLE 2-1	RECOMMENDED MINIMUM SAMPLE SIZES	28
TABLE 2-2	SAMPLE TYPES AND ASSOCIATED LOWER LEVEL OF DETECTION (LLD) AND NOTIFICATION LEVEL VALUES	29
TABLE 2-3	RADIOLOGICAL ENVIRONMENTAL SAMPLING LOCATIONS	31
TABLE 2-4	PBNP RADIOLOGICAL ENVIRONMENTAL SAMPLE COLLECTION FREQUENCY	33
TABLE 2-5	PBNP RADIOLOGICAL ENVIRONMENTAL SAMPLE ANALYSIS AND FREQUENCY	34
TABLE 2-6	SAMPLES COLLECTED FOR STATE OF WISCONSIN	35
FIGURE 2-1a	RADIOLOGICAL ENVIRONMENTAL SAMPLING LOCATIONS	36
FIGURE 2-1b	RADIOLOGICAL ENVIRONMENTAL SAMPLING LOCATIONS	?
FIGURE 2-1c	RADIOLOGICAL ENVIRONMENTAL SAMPLING LOCATIONS	38
FIGURE 2-2	SAMPLING PROBLEM REPORTING FORM	39

1.0 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ADMINISTRATION

1.1 Definition and Basis

1.1.1 Definition

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 (REMP).

1.1.2 Basis

The REMP is part of the PBNP Radiological Effluent and Materials Control and Accountability Program (REMCAP). The REMP is designed to fulfill the requirements of 10 CFR 20.1302, PBNP GDC 17, GDC 64 of Appendix A to 10 CFR 50, and Sections IV.B.2 and IV.B.3 of Appendix I to 10 CFR 50.

No significant radionuclide concentrations of plant origin are expected in the plant environs because radioactivity in plant effluent is continuously monitored to ensure that releases are well below levels which are considered safe upper limits. The REMP is conducted to demonstrate compliance with applicable standards, to assess the radiological environmental impact of PBNP operations, and to monitor the efficacy of inplant effluent controls. The REMP, as outlined in Tables 2-2 through 2-5 is designed to provide sufficient sample types and locations to detect and to evaluate changes in environmental radioactivity.

Radioactivity is released in liquid and gaseous effluents. Air samplers and thermoluminescent dosimeters placed at various locations provide means of detecting changes in environmental radioactivity as a result of plant releases to the atmosphere. Because the land area around PBNP is used primarily for farming and dairy operations, sampling of vegetation is conducted to detect changes in radiological conditions at the base of the food chain. Sampling of area-produced milk is conducted 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, along with lake water 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.

1.2 Responsibilities for Program Implementation

1.2.1 Nuclear Safety Analysis (NSA) Functions

NSA together with Regulatory Services and Licensing (RSL) provides the Plant Manager with the technical, regulatory, licensing, and administrative support necessary for the implementation of the program. The NSA administrative functions relating to the REMP fall into the six broad areas outlined below.

a. Program scope

The scope of the REMP is determined by the cognizant NSA Radiological Engineer based on sound radiological principles for the fulfillment of PBNP Technical Specifications (TS) and the applicable Federal Regulations. Based on the scope, the Environmental Manual (EM) is written to accomplish the collection and analyses of the necessary environmental samples. The EM is revised as necessary to conform to changes in procedures and scope. The NSA Radiological Engineer monitors the REMP effectiveness and compliance with TS and with the procedures and directives in the EM. In order to verify compliance with TS, NSA or Organizational Assessment arranges for program audits and audits of the contracted radioanalytical laboratory.

b. Record keeping

The monthly radioanalytical results from the contracted laboratory are reviewed by the cognizant NSA Radiological Engineer and one copy of the monthly radioanalytical results from the contracted laboratory is kept for the lifetime of the plant.

c. Data monitoring

The cognizant NSA Radiological Engineer (RE) 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 RE. Inconsistencies are investigated by the cognizant RE with the cooperation of Radiation Protection (RP) and contractor personnel, as required. Unusual results as evidenced by radioactivity levels exceeding administrative notification levels are also investigated. Results of the investigation will be conveyed to the Plant Manager. The congnizant RE will promptly inform the Plant Manager of any sample exceeding Nuclear Regulatory Commission (NRC) regulatory notification levels and will initiate an investigation. A formal report shall be provided to the Plant Manager upon completion of the investigation.

d. Data summary

Results from the Radiological Environmental Monitoring Program shall be summarized annually for inclusion in the PBNP Annual Monitoring Report. This summary advises the Plant Manager 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 Radiological Engineering.

e. Contractor communications

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

f. Reportable items

1. NSA shall generate all technically-specified reports related to the operation of the Radiological Environmental Monitoring Program. The material included shall be sufficient to fulfill the objectives outlined in Sections IV.B.2 and IV.B.3 of Appendix I to 10 CFR 50. The following items and occurrences, are required to be reported in the PBNP Annual Monitoring Report:

   (a) Summary and discussion of monitoring results including number and type of samples and measurements, and all detected radionuclides, except for naturally occurring radionuclides;

   (b) Unavailable, missing, and lost samples and plans to prevent recurrence and comments on any significant portion of the REMP not conducted as indicated in Tables 2-3 through 2-5.

   (c) New or relocated sampling locations and reason for change;

   (d) LLDs that are higher than specified in Table 2-2 and factors contributing to inability to achieve specified LLDs;

   (e) Notification that the analytical laboratory does not participate in an interlaboratory comparison program and corrective action taken to preclude a recurrence; and

   (f) Results of the annual milk sampling program land use census "milk survey" to visually verify that the location of grazing animals in the vicinity of the PBNP site boundary so as to ensure that the milk sampling program remains as conservative as practicable.

2. The following items are required to be reported to the NRC within 30 days of occurrence pursuant to the criteria of Section 2.2.4:

   (a) Confirmed environmental radionuclide concentrations, attributable to PBNP effluents, in excess of notification levels;

   (b) Confirmed results of weighted sum calculations involving radionuclide concentrations, attributable to PBNP effluents, in environmental samples in excess of the specified notification level; and

(c) The report shall, to the extent possible, identify the cause(s) for exceeding the limit(s) and define the corrective actions taken to reduce radioactivity in effluents so that the potential dose to a member of the public will not exceed the annual limits.

3. The annual results from the contracted REMP analytical laboratory as well as the laboratories analytical QA/QC results, in-house blanks, interlaboratory comparisons, etc., shall be transmitted to the NRC, Region III, with, or as a separate concurrent submittal, the Annual Monitoring Report.

4. The Annual Monitoring Report for the previous 12 month period, or fraction thereof, ending December 31, shall be submitted to the NRC by May 1 of the following year.

1.2.2 Non-NSA 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 Plant Manager.

a. Manual control and distribution

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

b. Program coordination

The daily operation of the program is conducted by PBNP Radiation Protection personnel, and other qualified personnel as required, under the supervision of a Specialist - Nuclear Radiation Protection who consults, as needed, with the cognizant NSA RE. The daily administrative functions of the Cognizant Specialist - Nuclear Radiation Protection address those functions required for the effective operation of the PBNP Radiological Environmental Monitoring Program. These administrative functions include the following:

1. Ensuring that samples are obtained in accordance with the type and frequency in Table 2-4 following procedures outlined in this manual;

2. Ensuring adequate sampling supplies and calibrated, operable equipment are available at all times;

3. Ensuring that air sampling pumps are maintained, repaired and calibrated as required and that an adequate number of backup pumps are readily available at all times;

4. Formally reporting lost or unavailable samples as well as other potential deviations from the sampling regime in Table 2-4 to the cognizant NSA RE and logging the same in the appropriate PBNP file;

5. Assisting the State of Wisconsin in obtaining samples at co-located and other sampling sites based upon a yearly, renewable agreement; and

6. Assisting, as necessary, the cognizant RE with investigations into elevated radioactivity levels in environmental samples.

1.3 Quality Assurance/Quality Control

Quality assurance considerations are an integral part of PBNP's Radiological Environmental Monitoring Program. The program involves the interaction of NSA, Organizational Assessment (OA), and Teledyne Brown Engineering Environmental Services (TBEES).

The TBEES quality assurance and quality control program is described in the TBEES Quality Assurance Program Manual and the TBEES Quality Control Procedures Manual. Copies of these manuals may be reviewed by NSA and OA personnel prior to audits. The laboratory is audited periodically, either by PBNP or by an independent third party. When an independent third party is used, the audit is accepted after a satisfactory review of the audit report by OA. If PBNP performs the audit, the quality assurance portion of the audit is performed by OA and the technical portion is performed by NSA, with assistance from PBNP RP as appropriate. As part of its quality control program, TBEES participates in an environmental crosscheck program.

Quality control for the PBNP portion of the Radiological Environmental Monitoring Program is achieved by following the procedures contained in this manual. Radiation Protection Technologists (RPTs) collect, package and ship environmental samples under the supervision of Radiation Protection supervisors. They are advised by the Specialist - Nuclear Radiation Protection who has immediate responsibility for the overall technical operation of the environmental sampling functions. The RPTs 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 periodically as a means of monitoring program effectiveness and assuring compliance with program directives. The audit shall be performed by either NSA personnel, OA, 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 NSA, consistent with Technical Specification commitments. Program items or procedures periodically may be updated or changed, consistent with good radiologically 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 NSA with the approval of the Plant Manager pursuant to Technical Specification 15.7.8.

1.4.1 Documentation

Revisions to the Environmental Manual shall be documented and the reviews performed of the revision shall be retained pursuant to TS 15.7.8.6. The documentation shall contain sufficient information to support the changes together with the appropriate analyses or evaluations justifying the revision.

1.4.2 Effective date

Revisions shall become effective after review and acceptance pursuant to the appropriate PBNP administrative procedure. The date (e.g., month/year) of the revision shall be clearly indicated.

1.4.3 Submission to NRC

Revisions shall be submitted to the US Nuclear Regulatory Commission in the form of a complete, legible copy of the entire manual as part of or concurrent with the Annual Monitoring Report for the period of the report in which the revision was made. Each change shall be identified by markings in the margin of the effected pages, clearly indicating the area of the page that was changed.

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 radiological principles to the PBNP environment.

2.1.3 Monitoring sensitivity

The effectiveness of the Radiological Environmental Monitoring Program 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.

2.2 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 cannot 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

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

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 minutes;
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 particularradionuclide; and
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 analysis 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 the next PBNP Annual 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.

a. Regulatory notification levels

The regulatory notification levels listed in Table 2-2 represent the concentration levels at which NRC notification is required. If a measured level of radioactivity in any radiological environmental monitoring program sample exceeds the regulatory notification level listed in Table 2-2, 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. 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 needs to 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:

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

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.

b. Administrative notification levels

The administrative notification levels are the concentration levels at which the contracted analytical laboratory promptly notifies the cognizant NSA Radiological Engineer by phone, followed by a formal written communication. The administrative notification levels are set lower than the NRC regulatory notification levels 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, 2-1b, and 2-1c. 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 NSA Radiological 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 Annual Monitoring Report for the period in which the change occurred. Additional sampling locations may be designated if deemed necessary by cognizant company personnel. Figures and tables in this manual shall be revised to reflect the changes.

2.2.6 Sampling media and frequency

The sampling frequency for the environmental media required by the PBNP REMP is found in Table 2-4. In addition to samples required by the former Technical Specifications, the Radiological Environmental Monitoring Program also includes the sampling of soil and shoreline sediment. To ens that all samples are obtained at the appropriate times, a checklist is used. The checklist provides a month-by-month indication of all samples, except air, to be obtained at each sampling location (PBF-4121). This checklist also identifies the schedule for the annual milk survey and provides space for recording the date samples were shipped offsite for analysis. In addition, the checklist lists each sampling location to identify all samples, to be obtained and the collection date. Because the weekly air samples require additional information, a separate checklist is used for each individual air sampling location as shown in PBF-4078.

It is recognized that on occasions samples will be lost or that samples cannot be collected at the specified frequency because of hazardous conditions, seasonable unavailability, automatic sampling equipment malfunctions and other legitimate reasons. Reasonable efforts will be made to recover lost or missed samples if warranted and appropriate. If samples are not obtained at the indicated frequency or location, the reasons or explanations for deviations from the sampling frequency specified in Table 2-4 shall be logged at PBNP and shall be conveyed formally in writing to the cognizant NSA Radiological Engineer using the appropriate form (Figure 2-2). The cognizant engineer will evaluate the sampling problem to determine whether it constitutes a reportable deviation from the requirements in Table 2-4. If it does, 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 Annual Monitoring Report by the cognizant NSA Radiological Engi

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 (PBF-4026) must contain the following:

a. Sample type;

b. Sample location 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 Radiation Protection manager or the Cognizant Specialist - Nuclear Radiation Protection 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 REMP samples shall be analyzed for designated parameters at the frequency listed in Table 2-5. Gamma isotopic analysis means the identification and quantification of gamma-emitting radionuclides that may be attributable to effluents from PBNP. Typically, this entails the scanning of the spectrum from 80 to 2048 keV and decay correcting identified radionuclides to the time of collection. The analysis specifically includes, but is not limited to, Mn-54, Fe-59, Zn-65, Co-58/60, Zr-Nb-95, Ru-103, I-131, Cs-134/137, Ba-La-140, and Ce-141/144.

2.2.10 Analytical laboratory

The analyses shall be performed by a laboratory that participates in an interlaboratory crosscheck program. If the laboratory is not participating in such a program, a report shall be made pursuant to 1.2.1.f.1.(e). The current laboratory is:

Teledyne Brown Engineering Environmental Services
700 Landwehr Road
Northbrook, IL 60062-4517
(847) 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 an inter-laboratory comparison crosscheck program.

The contractor is responsible for providing prompt notification to the cognizant Radiological Engineer regarding any samples found to exceed the 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 Family Services of the State of Wisconsin as listed in Table 2-6. A checklist is used. 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 (PBF-4026). 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 cubitai 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:

State Lab of Hygiene
Radiochemistry Unit
2601 Agriculture Dr.
PO Box 7996
Madison, Wisconsin 53707-7996

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 an appropriate container, such as a plastic bag (tape the bag shut) and label the container 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 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."

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 period in a shielded enclosure in the Extension Building or other low background area, such as 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 data 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, or other appropriate containers, at each location and label as directed in Section 2.2.7.

Also, lake water is collected for the State of Wisconsin pursuant to Table 2 The sample is collected, labeled, and forwarded to the appropriate State 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 or other appropriate containers. Label as directed in Section 2.2.7.

2.4.5 Air

a. 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.

Some pumps are equipped with an elapsed time meter which reads in hours. Form PBF-4078 is used for recording pertinent air sampling data for each location. At a normal filter change, the following procedure will apply:

1. Record "date off" and "time off."

2. Record rotameter reading for end of period (R_2).

3. Turn off pump, if necessary, and record hour meter reading or actual time for end of period (t_2).

4. 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.

5. Remove particulate filter being careful to handle filter only by edges, place in envelope.

6. Remove charcoal cartridge, place in plastic bag, and label as directed in Section 2.2.7.

7. Install new charcoal cartridge and particulate filter being sure to check the charcoal cartridge for breaks and the particulate filter for holes in the filter surface. Discard unacceptable filter media.

8. Record "date on."

9. Record hour meter reading or time for beginning of period (t_1).

10. Turn pump on (if necessary).

11. Perform weekly gross leak test by blocking the air flow with a larg rubber stopper. (For this test only, the rotameter ball may registe zero or drop all the way to the bottom. The difference between zero and the bottom is not significant.)

12. Record rotameter reading for beginning of period (R_1).

13. Record correction factor as indicated on calibration sticker affixed to rotameter (C).

14. 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.

15. Calculate total volume for period and enter on data sheet (m^3). (This step may be performed at a later time.)

16. 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 si 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.

17. Perform field gross leak test using rubber stopper. The stopper is placed over the intake of the sampler after the new filters are in place to check for major leaks in the system. Ideally, the rotameter ball should drop to the bottom. However, a reading of "zero" which is a little above the position of the bottom is acceptable for the following reasons: a) the error is smaller than the error in reading the position of the ball, and b) the slight flow indicated by the ball, when it does not drop to the bottom when the main flow path is blocked by the stopper, will be insignificant compared to the main flow when the stopper is removed.

b. Air sampling system description

The air monitoring equipment for the PBNP air sampling program consists of a Regulated Rate Control System. The Regulated Rate Control System is used at PBNP 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, the appropriate filter holders and a minimum of tubing. Also, it may include an elapsed time meter. In this system, the total volume sampled can be calculated simply and accurately from the elapsed time 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 an Eberline WPH-1 (or equivalent) weatherproof housing and an iodine cartridge holder and mounting kit and may include an electric hour meter. Currently, all metallic and rigid plastic tubing and rigid fittings are used in lieu of tygon tubing and quick disconnects. 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.

c. 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 Form PBF-4020.

d. 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 Form PBF-4020. Weekly gross leak checks and quarterly leak tests shall be accomplished as indicated in the appropriate PBNP procedure.

For normal operation, the regulators should be adjusted to maintain a tr flow rate of 28-30 liters per minute. Adjustments are made by turning 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 as indicated in the appropriate PBNP procedure on all environmental air samplers and the results recorded on Form PBF-4020.

e. 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, or other appropriate containers, with water and freeze to h able to put one in each shipping container. Fill the containers with wa 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. 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 and turn them over to Ready Stores personnel for shipment. 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 wide-mouth poly bottle or other appropriate container and label the container as director 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 Decemb for the State of Wisconsin. Fish sampling 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.

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 three inches. If necessary, expand the area, instead of digging deeper, to obtain the required amount of sample. If an area larger than 6" x 6" is used, notify the cognizant Radiological Engineer of tl area used. The minimum acceptable quantity is 500 grams. Place the entire soil sample in a wide-mouth poly bottle or another appropriate container. If a plastic bag is used, 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 eight 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, or other appropriate container, and label as described above.

2.4.10 Shoreline Sediment

Shoreline sediment consisting of sand and smaller grain size material is sampled two 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 wide-mouth poly bottle or c appropriate container 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, RP personnel will notify the cognizant NSA RE in writing. To ensure performance of the annual verification, "milk review" is identified on the sampling checklist, PBF-4121.

TABLE 2-1
RECOMMENDED MINIMUM SAMPLE SIZES

Sample Type	Size
Vegetation	100-1000 gm
Lake Water	8 liters (2 gal)
Air Filters	250 m^3
Well Water	8 liters (2 gal)
Milk	8 liters (2 gal)
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 NRC (Regulatory)	NPBU(b) (Admin.)	WEIGHTED SUM ACTION LEVEL
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-50	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	---	5mR/7 days	---
Lakewater(g) and Well Water	pCi/1-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-Nb-95	15	400	40	100
		Ba-La-140	15	200	20	50
		Co-58	15	1,000	100	250
		Co-60	15	300	30	75

Table 2-2

SAMPLE TYPE	REPORTING UNIT	PARAMETER	LLD(a)	NOTIFICATION LEVELS NRC (Regulatory)	NPBU(b) (Admin.)	WEIGHTEL SUM ACTION LEVEL
Lakewater and Well Water (Continued)	pCi/1-T.S.(f)	Mn-54	15	1,000	100	250
		I-131(c)	2	---	2	---
		Other(c)	30	---	100	---
		H-3	3,000	30,000	3,000	7,500
		Sr-89(c)	10	---	50	---
		Sr-90(c)	2	---	20	---
Milk	pCi/1	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.
(g) No drinking water

TABLE 2-3
RADIOLOGICAL ENVIRONMENTAL SAMPLING LOCATIONS

Location Code	Location Description
E-01	Meteorological Tower
E-02	Site Boundary Control Center - East Side of Building
E-03	Tapawingo Road, about 0.4 Miles West of Lakeshore Road
E-04	North Boundary
E-05	Two Creeks Park
E-06	Point Beach State Park - Water and shoreline sediment samples at the Coast Guard Station; soil and vegetation from the Point Beach State Park campground area N of the Coast Guard Station and on the W side of County Road O.
E-07	WPSC Substation on County Rt. V, about 0.5 Miles West of Hwy. 42
E-08	G. J. Francar Property, at the Southeast Corner of the Intersection of Hwy. 163 and Zander Road
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 East of Site Boundary Control Center
E-15	Southwest Corner of Site
E-16	WSW, Hwy. 42, Bishop Residence, about 0.25 miles North of Nuclear Road
E-17	North of Mishicot, Hwy. 163 and Assman Road, Northeast Corner of Intersection
E-18	Northwest of Two Creeks at Zander and Tannery Roads
E-19	Local Dairy Farm, about 0.2 miles West of Hwy. 42 on the North Side of Two Creeks Road (L. Engelbrecht)
E-20	Reference Location, 17 miles Southwest, at Silver Lake College
E-21	Local Dairy Farm just South of Site (L. Strutz) on Lakeshore and Irish Roads
E-22	West Side of Hwy. 42, about 0.25 miles North of Johanek Road
E-23	Greenfield Lane, about 4.5 Miles South of Site, 0.5 Miles East of Hwy. 42
E-24	North Side of County Rt. V, near intersection of Saxonburg Road
E-25	South Side of County Rt. BB, about 0.5 miles West of Norman Road
E-26	804 Tapawingo Road, about 0.4 miles East of Hwy. 163, North Side of Road
E-27	Intersection of Saxonburg and Nuclear Roads, Southwest Corner, about 4 Miles WSW
E-28	TLD on light pole on the SW end of the upper parking lot and N of the former EIC.
E-29	On tree on bluff overlooking Lake Michigan NE of Microwave Tower and due East of MET Tower.
E-30	NE corner at Intersection of Tapawingo and Lakeshore Roads.
E-31	On utility pole North side of Tapawingo Road closest to the gate at the West property line

Table 2-3

Location Code	Location Description
E-32	On a tree located at the junction of property lines, as indicated by trees and shrubs, about 1000 feet east of the west gate on Tapawingo Road and about 1200 feet south of Tapawingo Road. The location is almost under the power lines between the blue and gray transmission towers.
E-33	Lake Michigan shoreline accessed from SE corner of KNPP parking lot. Sample south of creek.
E-34	On a tree at the beginning of the Nature Trail, on E side of trail.
E-35	Nature Trail, on tree on W side of trail near "Fossil Fuels" sign.
E-36	Nature Trail, on tree on W side of trail, near "Earth Home Building" sign.
E-37	NE side of Nature Trail, in clearing near "Brush Piles" sign.
E-38	Retention Pond fence, W side.
E-39	Retention Pond fence, E side.
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, -28, -29, -30, -31, -32, -34, -35, -36, -38, -39, -TC	Quarterly
Vegetation	E-01, -02, -03, -04, -06, -08, -09, -20, -37	3x/yr as available
Algae	E-05, -12	3x/yr as available
Fish	E-13	3x/yr as available
Well Water	E-10	Quarterly
Lake Water	E-01, -05, -06, -33	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, -37	2x/yr
Shoreline Sediment	E-01, -05, -06, -12, -33	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, -28, -29, -30, -31, -32, -34, -35, -36, -38, -39, -TC	TLD	Quarterly
Vegetation	E-01, -02, -03, -04, -06, -08, -09, -20, -37	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 portions 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
Lake Water	E-01, -05, -06 -33	Gross Beta H-3, Sr-89, 90 I-131 Gamma Isotopic Analysis (on total solids)	Monthly Quarterly composite of monthly collections Monthly Monthly
Milk	E-11, -19, -21	Sr-89, 90 I-131 Gamma Isotopic Analysis	Monthly
Air Filters	E-01, -02, -03, -04, -08, -20	Gross Beta I-131 Gamma Isotopic Analysis	Weekly (particulate) Weekly (charcoal) Quarterly (on composite particulate filters)
Soil	E-01, -02, -03, -04, -06, -08, -09, -20, -37	Gross Beta Gamma Isotopic Analysis	2x/yr
Shoreline Sediment	E-01, -05, -06, -12, -33	Gross Beta Gamma Isotopic Analysis	2x/yr

TABLE 2-6
SAMPLES COLLECTED FOR STATE OF WISCONSIN

	Sample Type	Location	Frequency
1.	Lake Water	E-01	Monthly
2.	Air Filters	E-07 E-08	Weekly
3.	Fish	E-13	Quarterly, As Available
4.	Precipitation	E-04 E-08	Twice a month, As Available
5.	Milk	E-11 E-19	Monthly

FIGURE 2-1a
RADIOLOGICAL ENVIRONMENTAL SAMPLING LOCATIONS

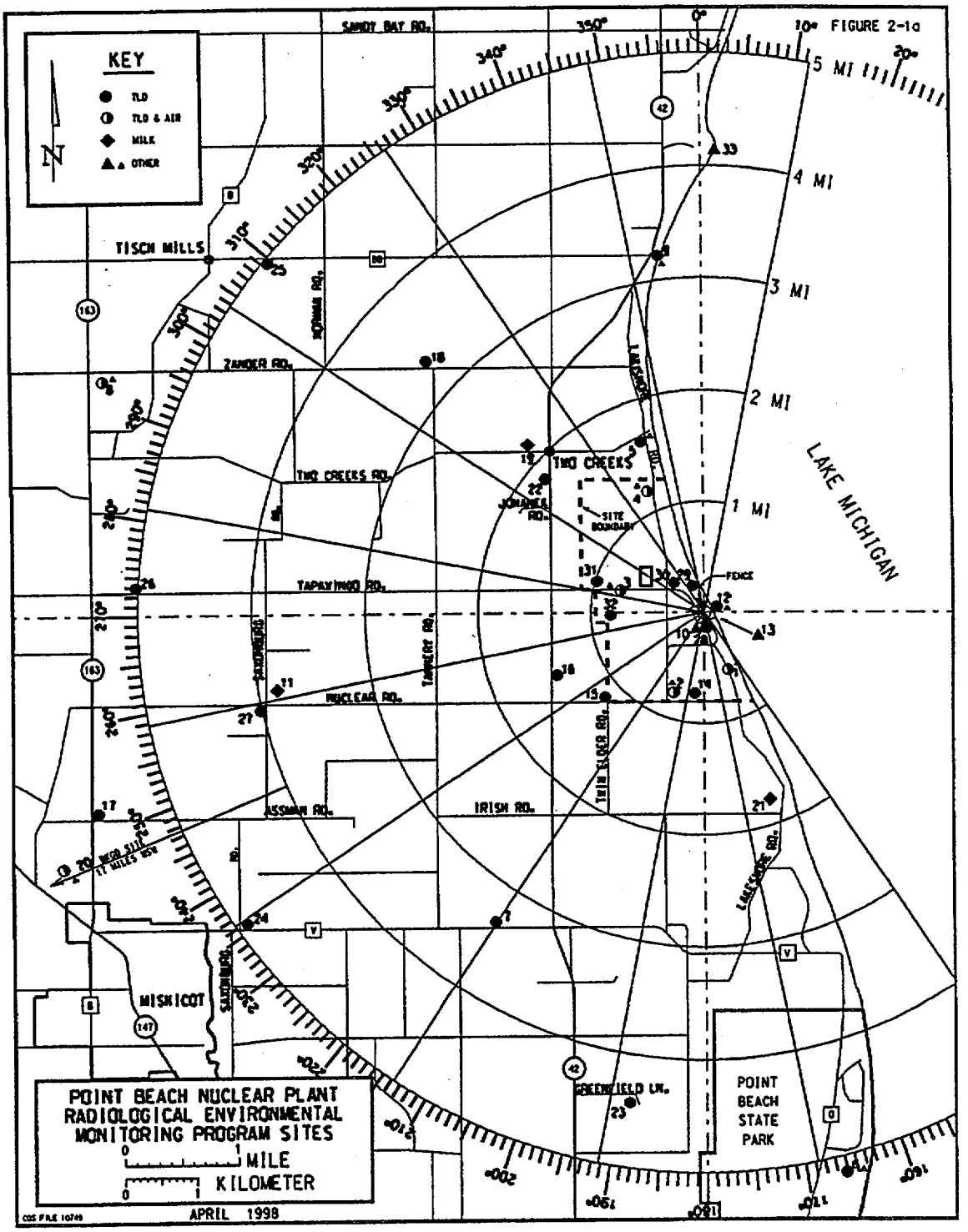

FIGURE 2-1b
RADIOLOGICAL ENVIRONMENTAL SAMPLING LOCATIONS

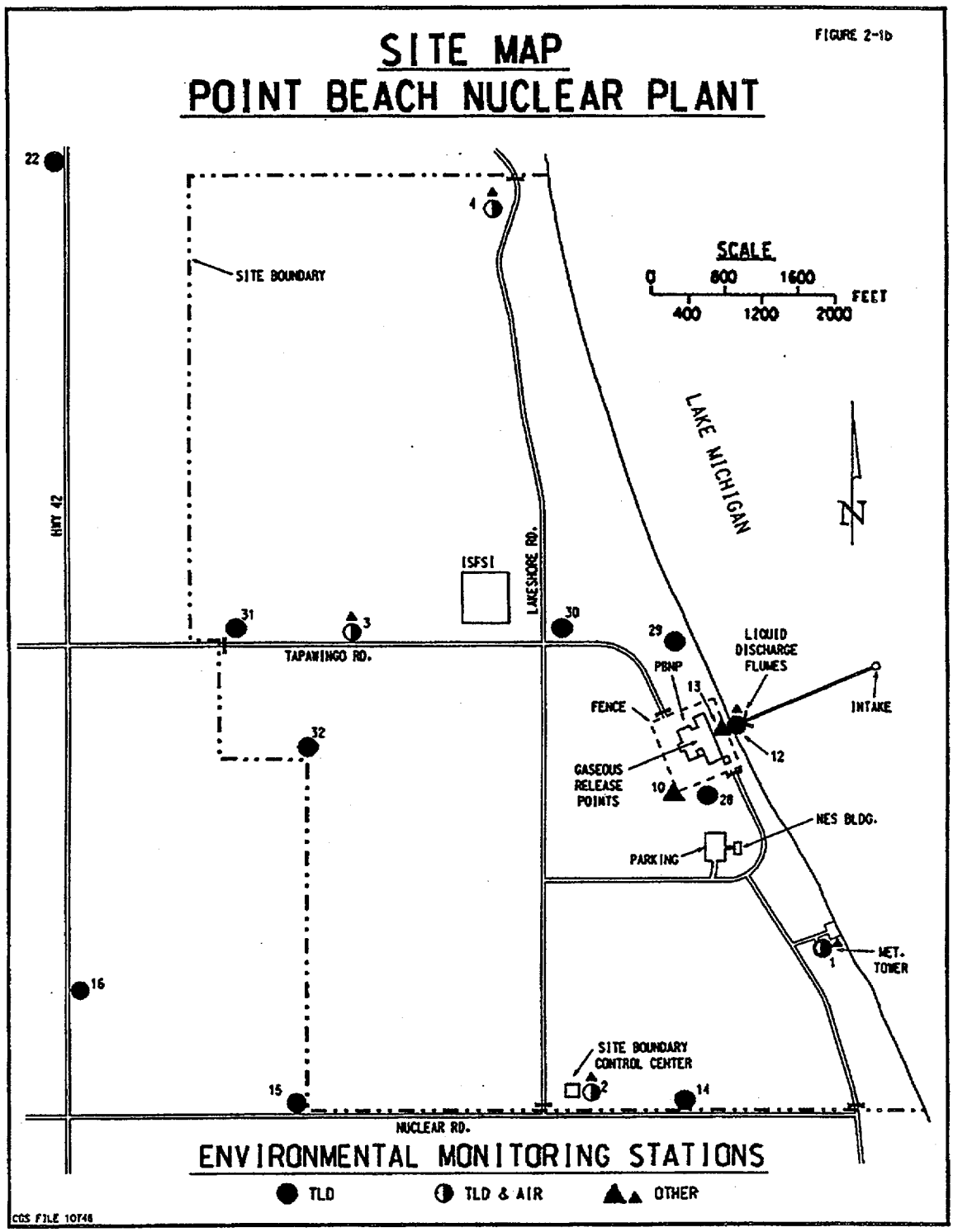

FIGURE 2-1c
RADIOLOGICAL ENVIRONMENTAL SAMPLING LOCATIONS

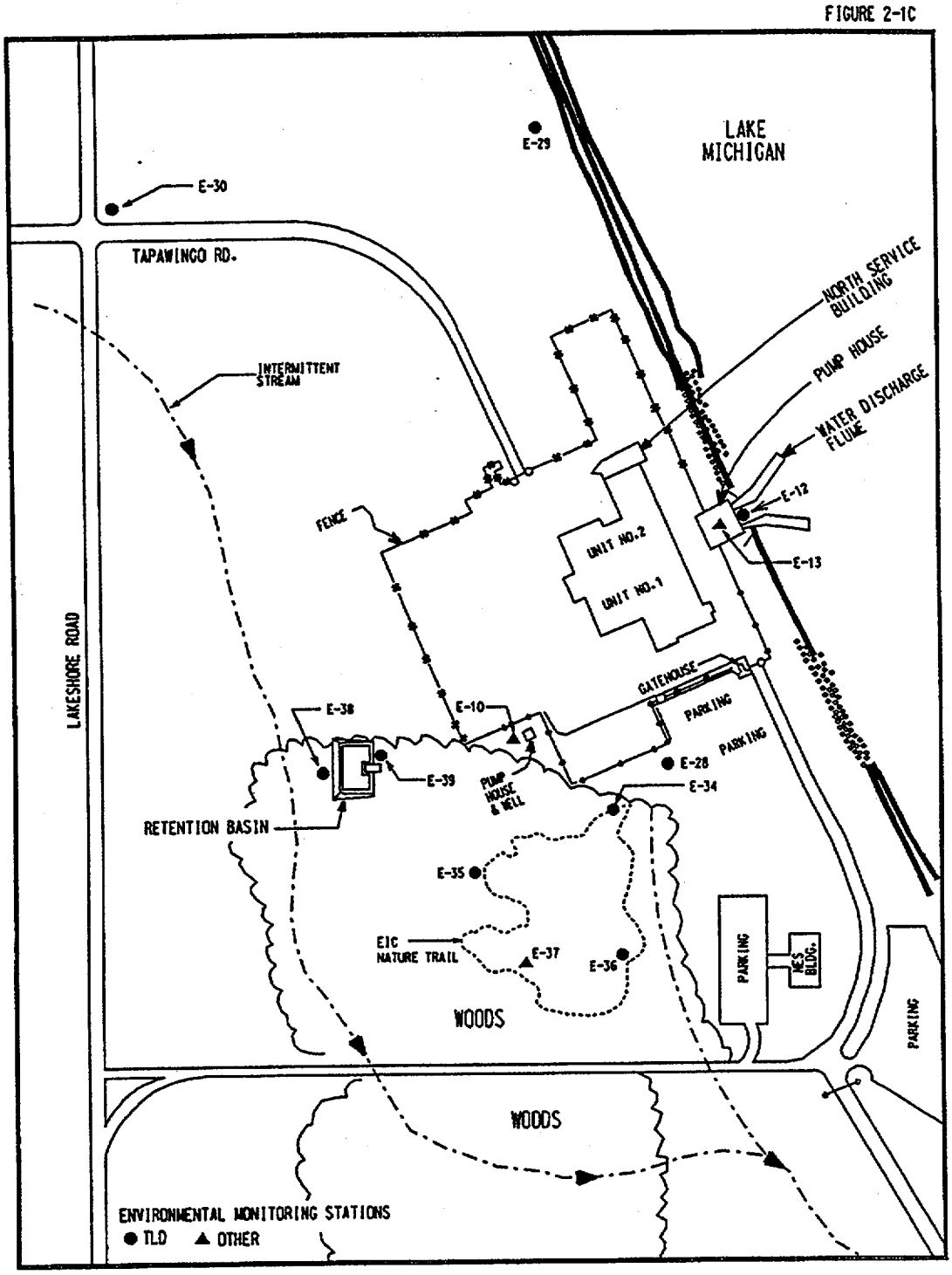

FIGURE 2-2
SAMPLING PROBLEM REPORTING FORM

POINT BEACH NUCLEAR PLANT

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM
SAMPLING PROBLEM REPORT FORM

Location Number and Description _____

Sample Type _____* 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 _____

*Sample Type Code

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