LACROSSE*SOLUTIONS*

10 CFR 50.36(a)(2)

March 8, 2022 LC-2022-0007

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

La Crosse Boiling Water Reactor
Facility Operating License No. DPR-45
NRC Docket Nos. 50-409 and 72-046

Subject: La Crosse Boiling Water Reactor (LACBWR) Annual Radiological Environmental Operating Report, Supplemental Letter

In accordance with the Quality Assurance Program Description (QAPD), Appendix C, Section 2.5.1, "Annual Radiological Environmental Monitoring Report," and Section 2.5.2, "Annual Radioactive Effluent Release Report," the 2021 reports for Facility Operating License No. DPR-45 and the Independent Spent Fuel Storage Installation are required to be submitted prior to March 1. On February 28, 2022, LaCrosse*Solutions* notified the NRC that the shipment of environmental TLDs for the site were delayed due to supplier issues and that the reports would be submitted once the results were received. The purpose of this letter is to provide the 2021 Annual Radiological Environmental Operating Report, which includes the Radiological Environmental Monitoring Report and the Radioactive Effluent Release Report.

There are no new regulatory commitments in this submittal.

If there are any questions regarding this report, please contact me at (860) 462-9707.

Respectfully,

Gerard van Noordennen

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LACROSSE SOLUTIONS

2021 ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT FOR THE LACROSSE BOILING WATER REACTOR (LACBWR)

DATE: 03/03/2022

APPROVED BY: Scott Zoller

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ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

FOR THE
LA CROSSE BOILING WATER REACTOR (LACBWR)

(January 1, 2021 to February 09, 2022)

LACROSSE*SOLUTIONS*
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GENOA, WI 54632

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SECTION A

RADIOACTIVE EFFLUENT REPORT

INTRODUCTION

The La Crosse Boiling Water Reactor (LACBWR), also known as Genoa Station No. 2, was located on the east bank of the Mississippi River near Genoa, Vernon County, Wisconsin. The plant was designed and constructed by the Allis-Chalmers Manufacturing Company. It was completed in 1967 and had a generation capacity of 50 MW (165 $MW_{(th)}$). The reactor is owned by Dairyland Power Cooperative (DPC).

The reactor went critical in July 1967 and first contributed electricity to the DPC system in April 1968. After completing full power tests in August 1969, the plant operated between 60% and 100% full power, with the exception of plant shutdowns for maintenance and repair until 1987.

In April of 1987 plant operation was ceased. The reactor was defueled and placed in a SAFSTOR mode. In August of 1987 a possession-only license was received. In 2007 the reactor vessel was removed from the site and buried at the Barnwell waste repository. In 2012 all spent fuel was placed in dry storage and placed at the LACBWR Independent Spent Fuel Storage Installation (ISFSI).

In June of 2016 DPC, working with the selected decommissioning contractor LaCrosse*Solutions* LLC, transferred their NRC License to LaCrosse*Solutions* LLC for the purposes of decommissioning the site to unconditional release criteria, per the license termination plan. At the conclusion of CY 2018 all facilities inside the radiological restricted area were demolished and the contents placed into radioactive waste shipping containers. The focus in CY 2019 was to finish minor decommissioning work in the radiologically restricted area as needed, complete the final status surveys for the LACBWR site, and demobilize equipment and personnel. As of October 2019, all LACBWR site field decommissioning work was completed including final status surveys (FSS) and Oak Ridge Associated Universities (ORAU) independent verification of final status surveys at NRC direction. Surveillances of excavation bases and after backfilling the excavations were performed in 2021 to confirm the results of the FSS were

unchanged. The excavations were performed to install various utilities to support the decommissioning of the G-3 coal fired power plant and ancillary buildings.

In accordance with LC-RP-PG-004, "Radiological Environmental Monitoring Program and Preparation of the Annual Radiological Environmental Operating Report," this document provides the Annual Radiological Environmental Operating Report (AREOR) for the Period January 1, 2021 through February 09, 2022. All LACBWR site required effluent and environmental monitoring, other than for the LACBWR ISFSI, has been terminated as of October 2019. The termination of environmental monitoring followed completion of both the final status surveys field work and independent verification survey field work by ORAU of the radiologically restricted area.

EFFLUENT AND WASTE DISPOSAL REPORT

(Supplemental Information)

FACILITY: La Crosse Boiling Water Reactor LICENSEE: LaCrosse*Solutions*

LICENSE NO. DPR-45

DOCKET NO. 50-409 & 72-046

1.0 REGULATORY LIMITS

1.1 Airborne Effluent Release Limits:

LACBWR airborne particulates, with half-lives greater than 8 days, released to areas beyond the Effluent Release Boundary shall be limited to </= 7.5 mRem to any organ per calendar quarter and </= to 15 mRem to any organ per calendar year(10 CFR 50 Appendix I). The cumulative dose contributions from airborne particulate effluent releases are determined in accordance with the LaCrosse*Solutions*, LLC Offsite Dose Calculation Manual (ODCM) and consideration of 10 CFR 20 Appendix B Table 2 Column 1 concentration values. Additionally, gaseous effluents of beta radiation in the form of tritium, beyond the Effluent Release Boundary, shall be limited to 10 mRad per calendar quarter and 20 mRad per calendar year (10 CFR 50 Appendix I).

Also, in accordance with the provisions of 40 CFR 190, the restrictions for total dose to any member of the public from all LACBWR related sources and dose pathways are evaluated quarterly and on an annual basis during active decommissioning. No samples for airborne radioactivity were obtained in 2021 since active decommissioning ceased in 2019.

1.2 Liquid Effluent Release Limits:

LACBWR's liquid effluent release limitations are those concentrations specified in 10 CFR 20 Appendix B, Table 2, Column 2. The values reported are either based on dilution of the effluent with the Genoa Station No. 3 condenser cooling water flow or no

condenser cooling water flow prior to discharge to the Mississippi River. No credit is taken for further dilution in the mixing zone of the Mississippi River.

Also, in accordance with 10 CFR 50, Appendix I, the dose commitment to a member of the public from radioactive materials released in liquid effluents to areas beyond the Effluent Release Boundary are limited to less than 1.5 mRem whole body and 5.0 mRem organ dose per calendar quarter, and less than 3.0 mRem whole body and 10 mRem organ dose per calendar year via the critical ingestion pathway. The cumulative dose contributions from liquid effluent releases are determined in accordance with the LaCrosse*Solutions*, LLC Offsite Dose Calculation Manual.

In accordance with the provisions of 40 CFR 190, the restrictions for total dose to any member of the public from all LACBWR related sources and dose pathways are evaluated quarterly and on an annual basis during active decommissioning. There were no liquid discharges from the LACBWR site in 2021, and no monitoring or sampling was performed.

1.3 Solid Radioactive Waste

All solid radioactive wastes are handled in accordance with a Process Control Program as defined by LaCrosse*Solutions*, LLC procedures, in order to assure that all applicable transportation and burial site disposal requirements are met. There were no shipments of radioactive waste in 2021.

2.0 EFFLUENT RELEASE CONCENTRATION LIMIT

The Liquid Effluent Release Concentration used to calculate permissible release rates are obtained from 10 CFR 20, Appendix B, Table 2, Column 2.

3.0 AVERAGE ENERGY

The release rate limits for LACBWR are not based on average energy.

4.0 ANALYTICAL METHODS

4.1 Liquid Effluents

Liquid effluent measurements for gross radioactivity are performed by HPGe gamma isotopic analysis of representative samples from each monitor tank or pump down release prior to discharge. In addition, each batch monitor tank or pump down sample is analyzed for tritium activity concentrations using site approved bench top analysis equipment. A composite sample is created by collecting representative aliquots from each tank batch or pump down release discharged during a calendar quarter. This composite is analyzed for: Iron-55, Strontium-90, Nickel-59, Nickel-63, Americium-241, Plutonium-238, Plutonium 239/240, and Plutonium -241 by an off-site contractor on a quarterly basis.

4.2 Airborne Particulates

Airborne particulate releases are determined by HPGe gamma isotopic analysis and gross beta and gross alpha analyses of glass fiber filter paper taken from four low volume air samplers placed either in prevailing downwind locations or in representative sampling locations on HEPA exhaust systems. The filter paper is changed out weekly and analyzed approximately one week later.

5.0 RELEASES

5.1 Airborne

To demonstrate compliance with the limits in Section 1.1 dose contributions have been calculated using a bounding assessment as described in Regulatory Guide 1.21. This analysis is summarized in the current Offsite Dose Calculation Manual. Routine low volume air sampling is in place at four locations outside the RCA in the predominant typical downwind locations, to be used to demonstrate compliance with dose limits in Section 1.1 during remediation activities. Any HEPA system exhausting to the outside environment has representative air sampling performed of the exhaust air following passing thru the HEPA system also for the purposes of demonstrating compliance with Section 1.1 during remediation activities. No monitoring for airborne activity was performed in 2021 since all LACBWR site required effluent and environmental monitoring, other than for the LACBWR ISFSI, has been terminated as of October 2019.

5.2 Liquid

All liquid effluent releases at LACBWR are batch releases or pump down releases as described in the ODCM. No liquid effluent was released in 2021.

6.0 ABNORMAL RELEASES

There were no abnormal releases of radioactivity in plant effluents which exceeded release limits.

7.0 ESTIMATED TOTAL ANALYTICAL ERROR

There is no estimated error in this report.

8.0 OFFSITE DOSE CALCULATIONS SUMMARY AND CONCLUSIONS:

8.1 Particulate/Gaseous Effluent Releases

The maximum quarterly offsite dose to any organ from the release of all radionuclides in particulate form with half-lives greater than 8 days was 0 mRem. The cumulative 2021 annual maximum organ dose from these radionuclides was also 0 mRem. The maximum quarterly offsite dose from gaseous beta emitters in the form of tritium is 0 mRad/quarter and overall for the year released a total of 0 mRad.

8.2 Liquid Effluent Releases

The maximum quarterly organ dose from liquid releases was 0 mRem. The cumulative 2021 annual organ dose was 0 mRem. The maximum quarterly total body dose for liquid releases was 0 mRem, and the cumulative 2021 annual total body dose was 0 mRem.

8.3 Conclusion

All calculated offsite doses were below all ODCM limits for airborne and liquids releases for CY 2021.

9.0 OFFSITE DOSE CALCULATION MANUAL (ODCM) REVIEW

No revisions were made to the ODCM in 2021.

10.0 PROCESS CONTROL PROGRAM (PCP) REVIEW

The LaCrosse*Solutions*, LLC PCP was not revised in 2021.

11.0 ERRATA DATA

None.

SECTION B

ANNUAL RADIOLOGICAL ENVIRONMENTAL MONITORING REPORT

INTRODUCTION:

The Radiological Environmental Monitoring (REM) Program is conducted to comply with the requirements of the ODCM and in accordance with 10 CFR 50 Part 50.36a and 10 CFR 72.104. The REM Program provides measurements of radiation and of radioactive materials in those exposure pathways and for those radionuclides which could potentially lead to radiation doses to Members of the Public resulting from plant effluents. Environmental samples were taken within the surrounding areas of the plant and in selected background locations.

The monitoring program at the LACBWR facility includes monitoring of liquid and airborne particulate releases from the plant, as well as collecting environmental samples of surface air, river water, river sediment, and ambient radiation.

The REM program therefore supplements the Radioactive Effluent analyses by verifying that the measurable concentrations of radioactive materials and levels of radiation are not higher than expected on the basis of the effluent measurements and modeling of the environmental exposure pathways using the methodology of the Offsite Dose Calculation Manual (ODCM).

An Interlaboratory Comparison Program is provided to ensure that independent checks on the precision and accuracy of the measurements of radioactive material in environmental samples are performed.

All LACBWR site required environmental monitoring, other than for the LACBWR ISFSI, has been terminated as of October 2019. The termination of environmental monitoring followed completion of both the final status surveys field work and independent verification survey field work by ORAU of the radiologically restricted area.

1.0 SAMPLE COLLECTION

Environmental samples are collected from the area surrounding LACBWR at the frequencies outlined in the ODCM and the Environmental Monitoring Program. A series of figures and tables are included in this report to explain the LACBWR environmental program in 2021.

FIGURE 1	This map includes the plant exclusion boundary, roads, other generation plants, and the relationship of the plant to the nearest local community.
FIGURE 2	This map shows the location of ISFSI environmental TLDs.
TABLE 1	This table logs the environmental TLD locations at the ISFSI.
TABLE 2	This table shows the sampling frequency of the various environmental samples and the analyses performed on these samples
TABLE 3	Quarterly Environmental TLD results for ISFSI Area

2.0 RESULTS OF THE 2021 ENVIRONMENTAL MONITORING SURVEYS

During 2021, activity levels in the local environment were trending normal.

2.1 PENETRATING RADIATION

The environmental penetrating radiation dose is measured by environmental TLDs.

2.1.1 ISFSI – These environmental TLDs are exchanged on a quarterly basis. Table 3 summarizes the results for 2021. Please note that due to supplier issues, the environmental TLDs were not exchanged in the fourth quarter until February 09, 2022. As such, the dose associated with the fourth quarter also includes the period from January 01, 2022 to February 09, 2022.

2.2 AIR PARTICULATE

Air samples were collected continuously from various sites around LACBWR during decommissioning. Low volume particulate air samplers were used to collect air samples. The air filter consists of a glass fiber filter with an associated pore size of approximately 0.45 µm. The particulate filters were analyzed bi-weekly for gross beta activity with an internal proportional counter, as well as analyzed by gamma spectroscopy for individual isotopic concentration. No air sampling was conducted in 2021.

2.3 RIVER WATER

River water is collected semi-annually. River water samples before the intake structure, at plant outfall, and below the plant outfall are collected and are gamma analyzed for isotopic concentration and tritium analysis. No samples of river water were collected in 2021.

2.4 SEDIMENT SAMPLES

Sediment samples were collected semi-annually before the intake structure, at plant outfall, and below the plant outfall. These samples were analyzed via gamma spectroscopy. No sediment samples were collected in 2021.

3.0 CONCLUSIONS

All environmental samples collected and analyzed during 2021 exhibited no significant contribution from LACBWR or ISFSI operations. Also, in accordance with 40 CFR 190 requirements, all pathway doses to the environment for LACBWR Site for calendar year 2021 were evaluated and the summary for CY 2021 is:

Whole Body Dose: 0.18 mRem which is 0.72% of the annual limit

4.0 INTERLABORATORY COMPARISON PROGRAM RESULTS

No interlaboratory comparison samples were analyzed in 2021, as the onsite laboratory was demobilized from the site in October of 2019.

FIGURE 1 - LACBWR PROPERTY MAP

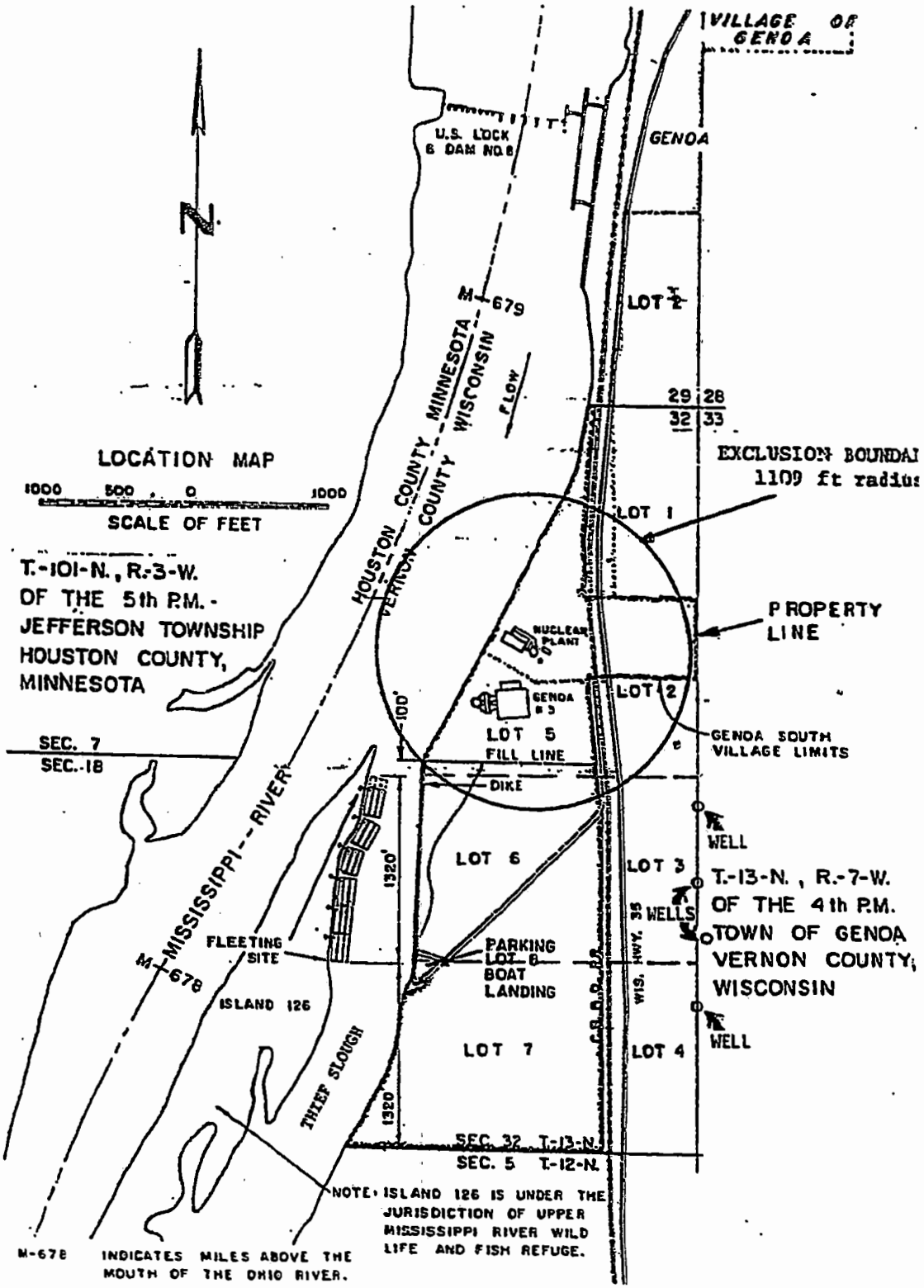

FIGURE 2 - ISFSI ENVIRONMENTAL TLD LOCATIONS

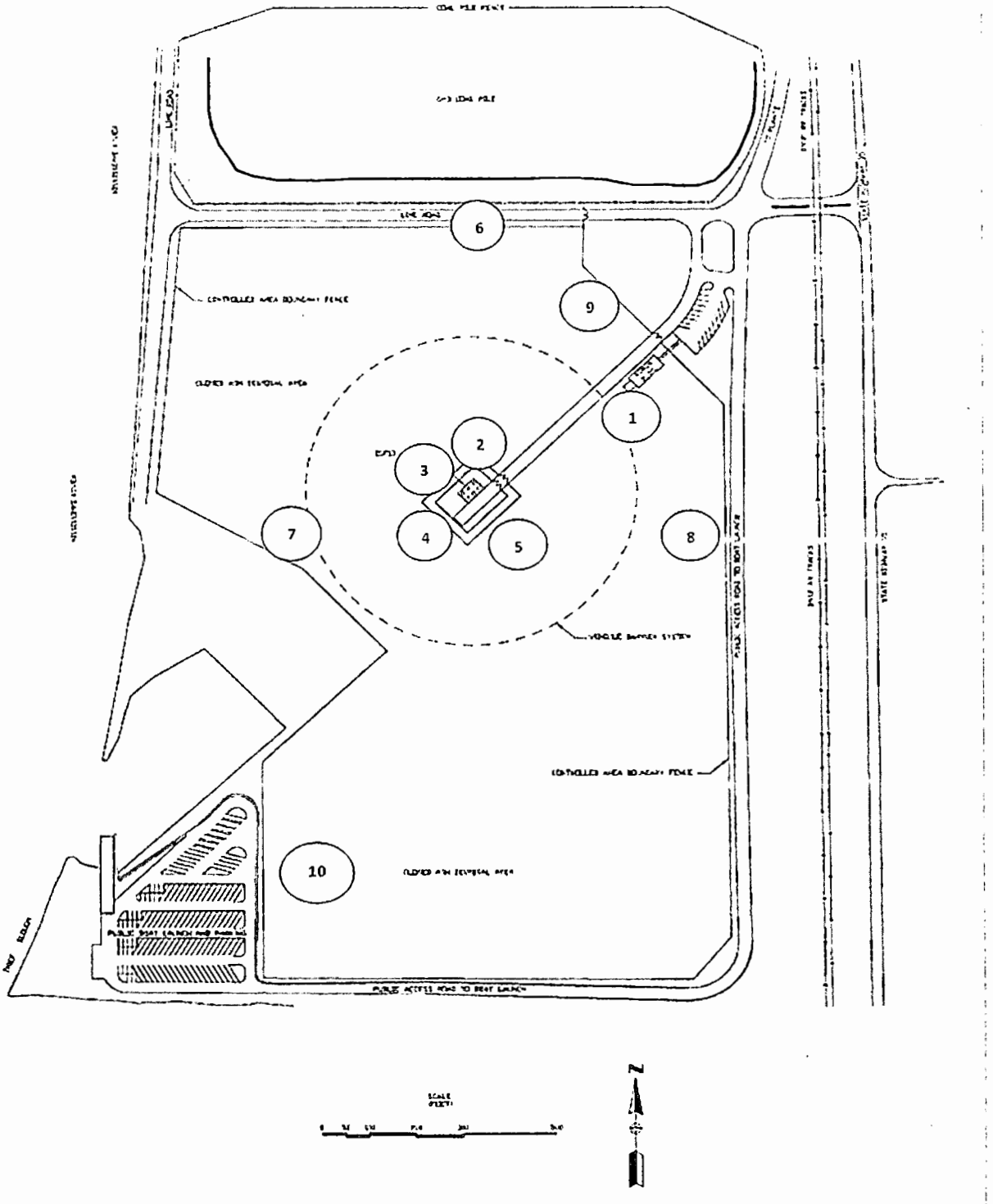

TABLE 1

ISFSI ENVIRONMENTAL TLD LOCATIONS

LOCATION NO.	LOCATION
1	ISFSI ADMINISTRATIVE BUILDING WEST
2	ISFSI PROTECTED AREA NORTH EAST SIDE
3	ISFSI PROTECTED AREA NORTH WEST SIDE
4	ISFSI PROTECTED AREA SOUTH WEST SIDE
5	ISFSI PROTECTED AREA SOUTH EAST SIDE
6	ISFSI OWNER CONTROLLED FENCE NORTH
7	ISFSI OWNER CONTROLLED FENCE WEST
8	ISFSI OWNER CONTROLLED FENCE EAST
9	ISFSI OWNER CONTROLLED FENCE NORTH EAST BY HEAVY HAUL PATH
10	ISFSI OWNER CONTROLLED FENCE WEST BY BOAT LANDING

TABLE 2

SAMPLE FREQUENCY AND ANALYSIS OF RADIOLOGICAL ENVIRONMENTAL SAMPLES

SAMPLE	FREQUENCY	ANALYSIS PERFORMED
Environmental TLDs	Quarterly	Dose in mRem
Particulate Air - Glass Fiber Filters	Bi-Weekly	Gross Beta and Gamma Spectroscopy
River Sediment	Semi-annually	Gamma Spectroscopy
River Water	Semi-annually	Gamma Spectroscopy and Tritium (Liquid Scintillation Analyzer)

NOTE:

All LACBWR site required effluent and environmental monitoring, other than for the LACBWR ISFSI, has been terminated as of October 2019. The termination of environmental monitoring followed completion of both the final status surveys field work and independent verification survey field work by ORAU of the radiologically restricted area.

TABLE 3

QUARTERLY ENVIRONMENTAL TLD RESULTS FOR ISFSI AREA

JANUARY 2021-FEBRUARY 09,2022

STATION NO.	1st QUARTER mRem	2nd QUARTER mRem	3rd QUARTER mRem	4TH Quarter mRem
1	</=BKG	3.0	2.0	5.0
2	24.0	20.0	20.0	37.0
3	73.0	77.0	70.0	67.0
4	16.0	15.0	13.0	6.0
5	21.0	25.0	26.0	37.0
6 (*)	</=BKG	0.01	0.01	0.04
7(*)	0.01	0.02	0.01	0.06
8 (*)	0.02	0.03	0.02	0.05
9 (*)	</=BKG	0.02	0.02	</=BKG
10 (*)	0.02	0.05	0.04	0.07

ALL BACKGROUND CORRECTED AND THOSE ON OWNER CONTROLLED AREA FENCE LINE IDENTIFIED WITH (*) HAD OCCUPANCY FACTOR CORRECTION APPLIED IF> BACKGROUND TLD RESULTS