(3) The reactor air cavity flow shall be periodically analyzed to minimize Argon-41 releases to the environment while maintaining a negative pressure within the reactor cavity to minimize radioactive hazards to reactor personnel.

3.4.4 Air Particulate Monitor

The reactor cell environment shall be monitored by at least one air particulate monitor, capable of audibly warning personnel of radioactive particulate airborne contamination in the cell atmosphere.

3.4.5 Liquid Effluents Discharge

(1) The liquid waste from the radioactive liquid waste holding tanks shall be sampled and the activity measured before release to the sanitary sewage system which is allowed per 10 CFR 20.2002.

(2) Releases of radioactive liquid waste from the holding tanks/campus sanitary sewage system shall be in compliance with the limits specified in 10 CFR 20, Appendix B, Table 3, as specified in 10 CFR 20.2003.

3.4.6 Solid Radioactive Waste Disposal

Solid radioactive waste disposal shall be accomplished in compliance with applicable regulations and under the control of the Radiation Control Office of the University of Florida.

3.4.7 Bases

The area radiation monitoring system, stack monitoring system and air particulate detector provide information to the operator indicating radiation and airborne contamination levels under the full range of operating conditions. Audible indicators and alarm lights indicate (via monitored parameters) when corrective operator action is required, and (in the case of the area radiation monitors) a warning light indicates situations recommending or requiring special operator attention and evaluation. Argon-41 discharges are limited to a monthly average which is less than the effluent concentration limit in 10 CFR 20, Appendix B, Table 2, and liquid and solid radioactive wastes are regulated and controlled to assure compliance with legal requirements.

3.5 Limitations on Experiments

Applicability: These specifications apply to all experiments or experimental devices installed in the reactor core or its experimental facilities.

Objectives: The objectives are to maintain operational safety and prevent damage to the reactor facility, reactor fuel, reactor core, and associated equipment; to prevent exceeding the reactor safety limits; and to minimize potential hazards from experimental devices.

Specifications:

(1) General

The reactor manager and the radiation control officer (or their duly appointed representative) shall review and approve in writing all proposed experiments prior to their performance. The reactor manager shall refer to the Reactor Safety Review Subcommittee (RSRS) the evaluation of the safety aspects of new experiments and all changes to the facility that may be necessitated by the requirements of the experiments and that may have safety significance. When experiments contain substances that irradiation in the reactor can convert into a material with significant

Amendment 16
Amendment 17
Amendment 19
Amendment 20

Attachment 1

University of Florida Wastewater Treatment Plant and Lake Alice Recharge Well System

The University of Florida wastewater treatment and discharge facilities include the treatment plant, Lake Alice, and the recharge wells receiving drainage from Lake Alice. The location of these facilities is shown in Figure 1. The facilities are used to treat and dispose of effluent from the UF campus (including classrooms, offices, laboratories, student family housing apartments, student dormitories), Shands Hospital, J. Hillis Miller Medical Center complex, and Athletic Association facilities.

Wastewater Treatment Plant Description

The treatment system consists of two contact stabilization plants and a trickling filter plant operated in parallel. The present capacity of the treatment system is 3.1 MGD. Figure 2 is a diagram of the plant layout. Figure 3 is a schematic flow diagram for the facility.

Effluent from the treatment units is discharged into Lake Alice.

Lake Alice Description

Lake Alice is located in the southwestern corner of the University of Florida Campus. The present Lake Alice resulted from the damming of the outflow from a low marshy area, plus the addition of treated effluent and cooling water. The cooling water input is about 0.5 MGD. Treated effluent input is about 1.83 MGD (average daily flow) with a peak daily flow of 2.33 million gallons.

Recharge Wells

Two recharge wells were constructed in 1959 for the purpose of controlling the water level in Lake Alice, and preventing flooding of the adjoining road and portion of the wastewater treatment system.

New Wastewater Treatment Plant

A new wastewater treatment plant is under construction and will replace the existing facility in a couple of years. The capacity of the new facility will remain the same as the current facility.

Attachment 2

RADIATION CONTROL TECHNIQUE #21

INSTRUCTIONS FOR UTILIZING, SAMPLING AND DISCHARGING LIQUID WASTE HOLDUP TANKS

I. PURPOSE

To establish a procedure for the utilization, circulation, sampling, and discharging of waste water contained in the UFTR/Nuclear Sciences Center liquid waste holdup tanks.

II. PREREQUISITES

A. Keys to: gate of the holdup tank facility, room 110 NSC, and the pump breaker.
B. Plumbing system diagram (attached)
C. 1 gallon container
D. Rubber gloves

III. NOTE

Section 6.6.1, Operating Reports, Paragraph (5) of the UFTR Technical Specifications requires that each annual operating report shall include: "a summary of the nature and amount of radioactive effluents released or discharged to the environs beyond the effective control of the facility operators as determined at or before the point of such release or discharge (The summary shall include to the extent practicable an estimate of individual radionuclides present in the effluent. If the estimated average release after dilution or diffusion is less than 25% of the concentration allowed, a statement to this effect is sufficient.)".

IV. PROCEDURE

A. Circulation of Tank Contents

1. Obtain keys to room 110 NSC, the pump breaker and the gate of the holdup tank facility.
2. Check the water level in the tanks by removing the small red plate (located on the north side of each pump housing) looking into tank and using a dip stick

NOTE: The tank must be isolated and pumped before the water level rises to within three and one half feet of the top of the tank.

3. To circulate the contents of a tank, close either valve E2 or valve W2 (discharge valves to sewage system). Open valve E1 or valve W1 depending on which tank is to be circulated. The post indicator valve for the tank to be circulated (A for the East, B for the West) should be SHUT and the opposing indicator valve must be OPEN.
4. Proceed to room 110 NSC and locate the holding tank pump breaker box. Position the pump main circuit breakers in the ON position. Turn the pump selector switch to WEST or EAST depending on which tank is to be circulated. The green indicator lamp and the red breaker lamp should light. If the green indicator lamp does not light, verify that the main circuit breaker is ON, then push the RESET button (on the pump controller to the left and below the pump selector switch).
5. Allow the pump to operate until the equivalent of two tank volumes has circulated (about 2 hours).

B. Sampling Tank Contents

1. After proper circulation, a sample can be collected using a 1 gallon sample container. Fill the sample container by opening the sampling valve (circulating pump running) located near valve W1 or E1. Flush the sampling line by collecting 1 gallon of liquid. (This liquid should be poured back into the tank.) After the sample (1 gallon) has been obtained, the pump selector switch can be turned off.
2. Prepare the sample for analysis in accordance with Radiation Control Technique #7. Analysis of the sample shall be performed using Radiation Control Technique #8.

C. Adding Dilution Water

1. If tank is not full, remove tank cover plate and add dilution water to bring tank contents up to about three and one half feet of the top of the tank.
2. Record dilution water volume on the Release Authorization form.

D. Emptying West Tank and Rerouting Flow to East Tank

1. After the sampling analysis has been completed, assure that the concentration is below 25% of the limits specified by the MPC tables (10D91.429) and that the LLD for the sample is less than 1% of the MPC values before aligning the system to pump into the campus sewage system.
2. Assure that the estimated average release concentration is less than 25% of the concentration allowed or that an estimate of individual radionuclides present in the tank contents has been documented.
3. Obtain Radiation Control Officer and UFTR Director or Reactor Manager approval prior to emptying tank.
4. To empty the west tank and reroute flow to the east tank, open valve A by turning the wrench handle until indicator reads OPEN, shut valve B by turning handle until indicator reads SHUT. Open valve W2, close W1. Close valve E2, open valve E1, turn on the west pump as instructed in III B.4 of this procedure. The pumping of the west tank is automatically terminated when the tank is empty.
5. Return pump controller switch to the OFF position and lock OPEN pump breakers.

E. Emptying East Tank and Rerouting Flow to West Tank

1. See section IV: steps E.1, E.2., and E.3.
2. To empty the east tank and reroute flow to the west tank, open valve B by turning the wrench handle until indicator reads OPEN, shut valve A by turning handle until indicator reads SHUT. Open valve E2, close valve E1. Close valve W2, open valve W1. Turn on the east pump as instructed in IV B.4. The pumping of the east tank is automatically terminated when the tank is empty.
3. Return pump controller switch to the OFF position and lock OPEN pump breakers.

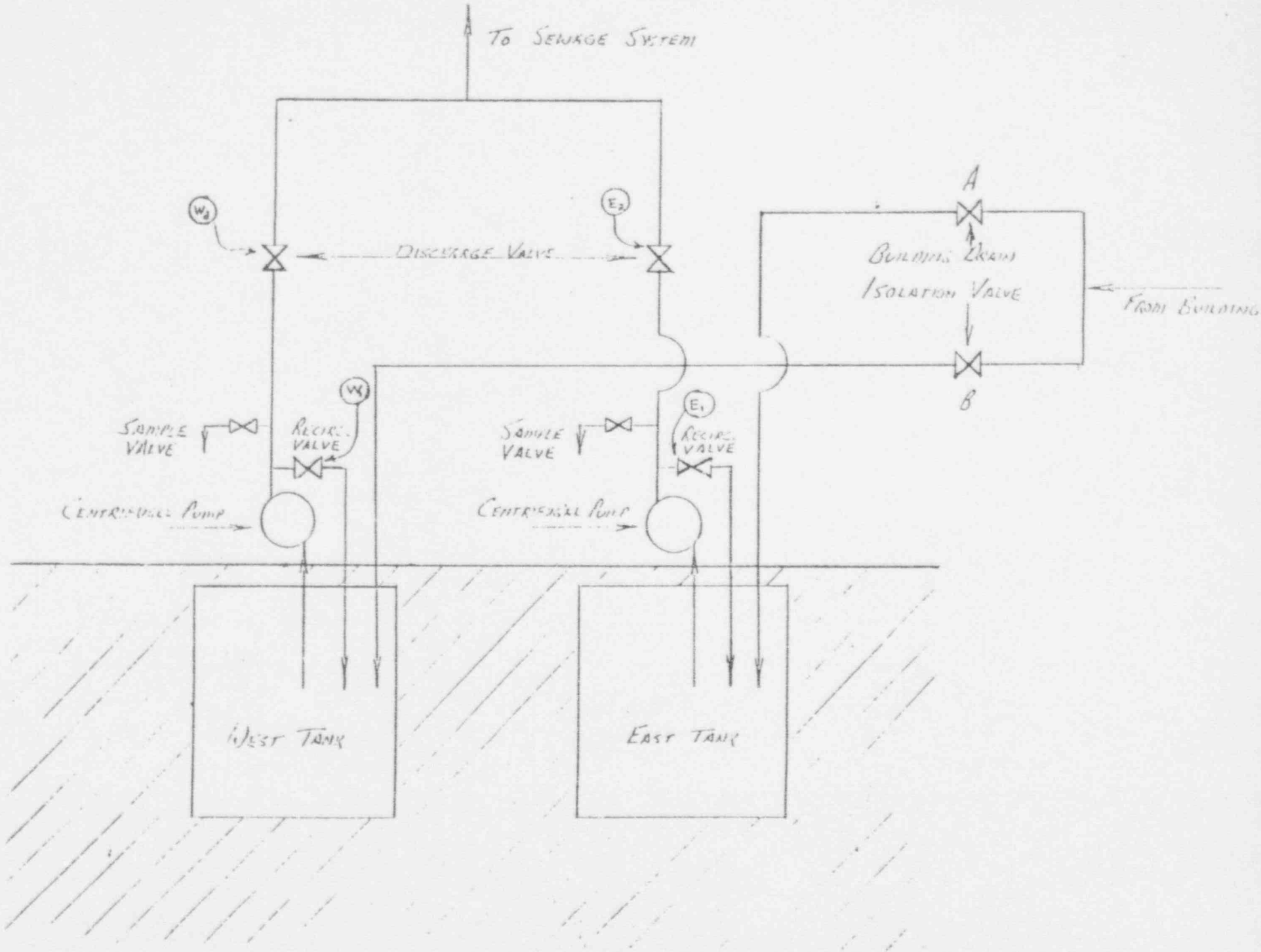
V. <u>RECORDING</u>

A. Record liquid sample analysis results obtained by performing Radiation Control Techniques #7 and #8 on the proper forms.

B. Complete the NSC Holding Tank Release Authorization form.

VI. REFERENCES

1. NRC Regulatory Guide 4.16, Monitoring and Reporting Radioactivity in Releases of Radioactive Materials in Liquid and Gaseous Effluents form Nuclear Fuel Processing and Fabrication Plants and Uranium Hexafluoride Production Plants.
2. 10D-91, State of Florida Control of Radiation Hazard Regulations.
3. UFTR, R-56 License Technical Specifications


TO SEWAGE SYSTEM
W_2
E_2
DISCHARGE VALVE
A
BUILDING DRAIN ISOLATION VALVE
FROM BUILDING
B
W_1
E_1
SAMPLE VALVE
RECIRC. VALVE
SAMPLE VALVE
RECIRC. VALVE
CENTRIFUGAL PUMP
CENTRIFUGAL PUMP
WEST TANK
EAST TANK

UFTR/NSC HOLDUP TANK
RELEASE AUTHORIZATION

TANK:_____EAST _____WEST

VOLUME OF TANK CONTENTS:_____LITERS(GALLONS)

RECIRCULATION TIME:_____HOURS

SAMPLE ANALYSIS

Attach Liquid Sample Activity and LLD Calculation form(s).

Sample Summary:

1) Isotope			
2) LLD(uCi/ml)*			
3) Activity(uCi/ml)			
4) Isotope MPC(uCi/ml)			
5) Max Release/day(uCi)			
6) Total Tank Contents(uCi)**			
7) Diluted Activity (uCi/ml)			

Dilution Volume Added:_____Liters(Gallons)

Date(s) released:_____
Pumped By:_____

Total Activity Released to Date For Year

1) Isotope			
2) Activity			

RCO Signature:_____ Date:_____

UFTR Director or Reactor Manager Acknowledgement:
Signature:_____ Date:_____

* LLD must be less than 1% of appropriate MPC value
** Use larger of 2) or 3) to calculate. If 2) is used, report as <LLD (uCi).

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RADIATION CONTROL TECHNIQUE #38

INSTRUCTION FOR MONITORING THE WASTEWATER TREATMENT PLANT EFFLUENT FOR RADIONUCLIDES

I. PURPOSE

To establish a standard technique for obtaining and analyzing samples from: The effluent of the Wastewater treatment plant for the presence of radioactivity and; the local environment to determine if bioaccumulation of radionuclides is occurring.

II. PREREQUISITES

A. Sample containers
B. Record Forms
C. Map of sample locations
D. Sample collection record book.

III. SAMPLE COLLECTION AND ANALYSIS OF LIQUID SAMPLES

1. Collect on a quarterly frequency, 4 liter samples at the designated sampling stations. (see attached map)

2. Rinse container with sample prior to collecting sample.

Designated liquid sample stations are:

At treatment plant;

1) campus influent
2) health center influent
3) stage two digester
4) chlorine contact chamber outflow

At Lake Alice;

5) east side board walk or shoreline
6) injection well inlet

Other;

7) citrus park irrigation well

3. Log collection time, date, location in sample collection log book.

4. Return samples to lab. Refrigerate samples.

5. Perform GEM analysis of each sample for designated radionuclides in accordance with RCT 39.

6. Perform gross beta analysis in accordance with RCT #7.

7. Perform H-3 and C-14 analysis in accordance with RCT #7.

8. Count times for each sample analysis for LLD determination shall be sufficient to ensure LLD is equal to or less than .001 MPC for the nuclide of interest.

IV. COLLECTION AND ANALYSIS OF SEDIMENT SAMPLES

1. Collect on a quarterly frequency .5 liter samples at designated stations.
2. Designated sediment stations are:

    1) Lake Alice bottom sediment
    2) Treated waste canal

3. Log collection time, date, and location of samples in sample collection record book.
4. Perform gamma spectroscopy analysis of sample.
5. Oxidize samples for analysis for H-3 and C-14 in accordance with RCT 36 and RCT 8.

V. COLLECTION AND ANALYSIS OF VEGETATION SAMPLES

1. Collect on a quarterly frequency .5 liter samples at designated stations.
2. Designated vegetation sampling stations are:

    1) Lake Alice bottom sediment
    2) Treated waste canal

3. Log collection time, date, and location of samples in sample collection record book.
4. Perform gamma spectroscopy analysis of sample.
5. Oxidize samples for analysis for H-3 and C-14 in accordance with RCT 36 and RCT 8.

VI. RECORDING

A. Gamma Spectroscopy Analysis Results

1. Record specific activity of each nuclide of interest, LLD.

B. Gross Beta Analysis Results

1. Record specific activity, background, LLD.

C. H-3 and C-14 Analysis Results

1. Record specific activity of H-3 and C-14, LLD, and background cpm.

VII. DATA ANALYSIS

1. Review data for current samples and compare to data for previous samples to determine if bioaccumulation is occurring.

2. The action level for each isotope monitored will be 1% of the applicable MPC listed in 10D-91.429, Table I Column 2. The appropriate action levels for the major radionuclides are:

Radionuclide	MPC uCi/ml	Action Level uCi/ml
H-3	1.0E-01	1.0E-03
C-14	2.0E-02	2.0E-04
P-32	5.0E-04	5.0E-06
S-35	2.0E-03	2.0E-05
Ca-45	3.0E-04	3.0E-06
Cr-51	5.0E-02	5.0E-04
Co-57	2.0E-02	2.0E-04
I-125	4.0E-05	4.0E-07
I-131	6.0E-05	6.0E-07
gross alpha/beta	4.0E-07	4.0E-09

The MPC used is applicable to sanitary sewage system disposal.

3. When sample analysis indicates a radionuclide activity at or greater than the action level the following actions will be taken:

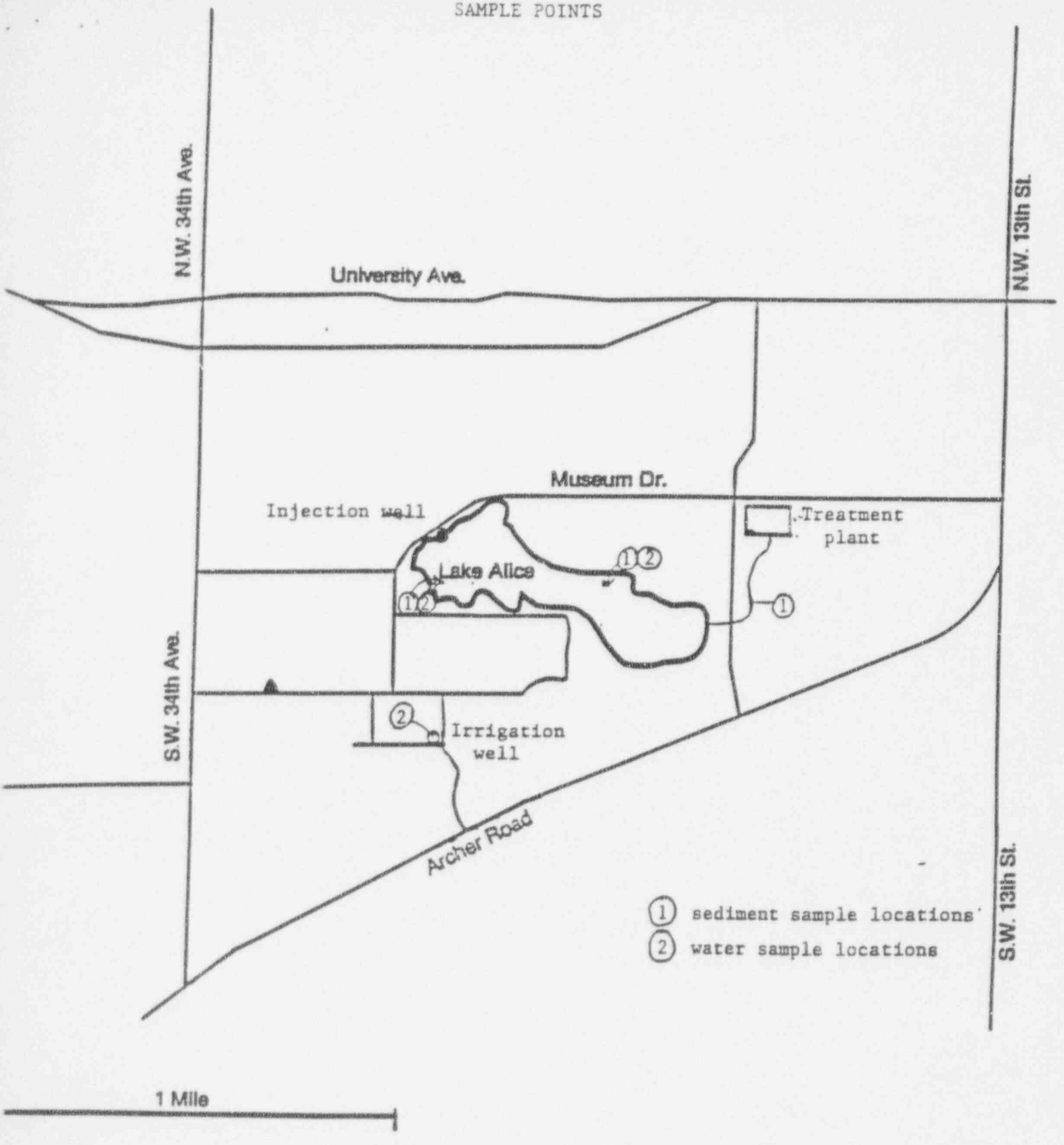
   a. Discontinue discharge of radioactivity into the sanitary sewage system. Since the Radiation Control Department will be responsible for introducing radioactivity into the sanitary sewage system, this will be immediately enforceable.

   b. Obtain additional environmental samples and perform analyses to verify the initial results of radionuclide activity at or greater than the action level.

   c. Determine if radioactivity is due to individuals undergoing medical diagnosis or therapy. For example, I-131 is used in medical therapy.

   d. If additional sample analysis does not support the initial results or if sample radioactivity is due to medical diagnosis or therapy, discharge of radioactivity may continue.

ENVIRONMENTAL MONITORING PLAN
SAMPLE POINTS



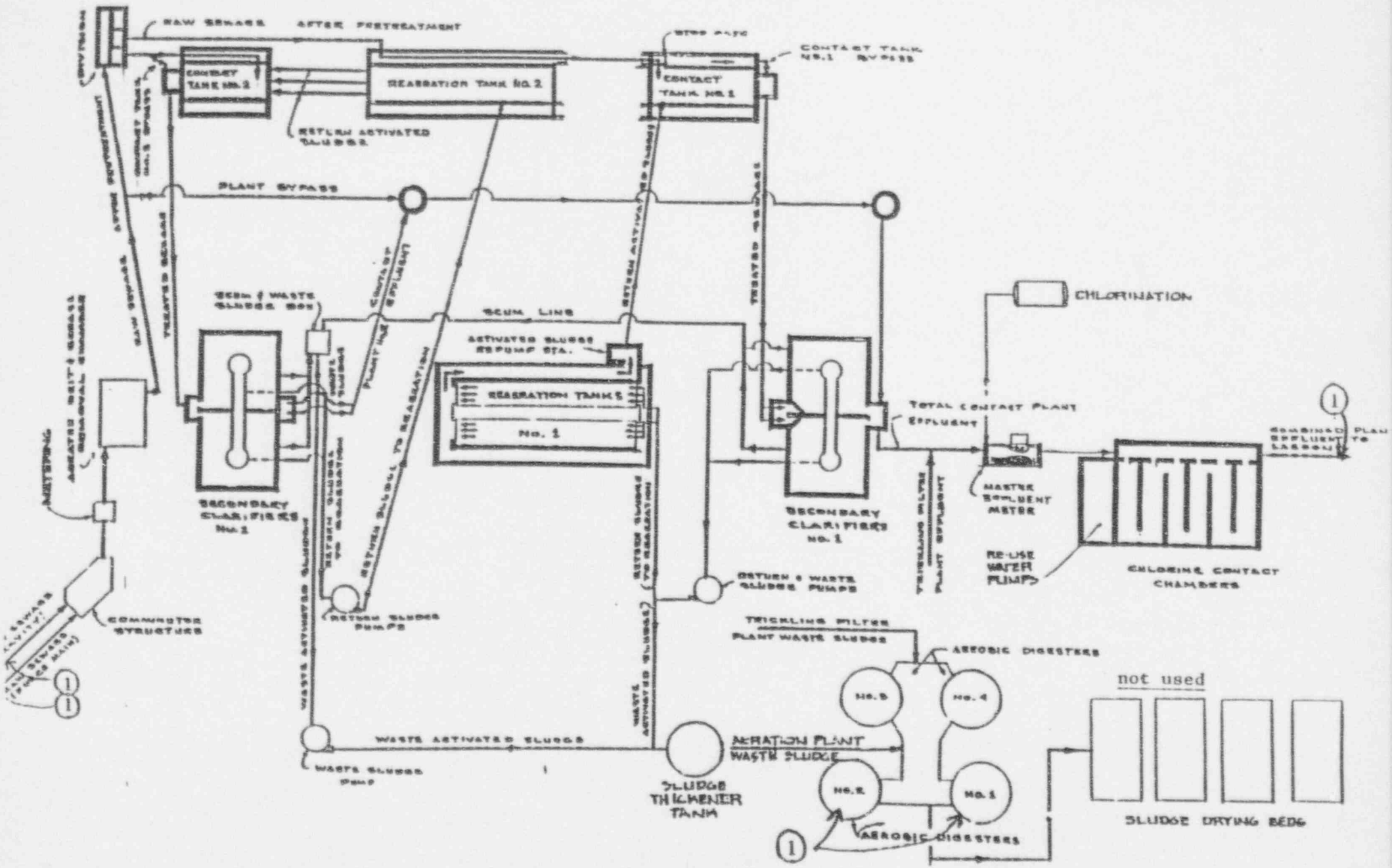
ENVIRONMENTAL MONITORING PLAN

SAMPLE POINTS

PHYSICAL PLANT DIVISION
UNIVERSITY OF FLORIDA
GAINESVILLE, FLORIDA

(1) Liquid sample locations

CONTACT STABILIZATION PROCESS
SCHEMATIC FLOW DIAGRAM



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