



ENVIRODYNE
ENGINEERS

12161 Lackland Road,
St. Louis, Missouri 63146
(314) 434-6960

May 13, 1985

Mr. Burce Mallett
U.S. Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, IL 60137

Re: NRC License Amendment Request
NRC License No. 24-17152-02

Dear Mr. Mallett:

I would like to amend our license so that it will represent our current situation. We have expanded and upgraded our laboratory and sample storage and receipt areas. We also now have extensive data showing that we have had no personnel exposure.

Attached is the amendment to our license. It supercedes the letters dated August 19, 1983, and September 22, 1983.

The \$60.00 amendment fee is enclosed.

If you have any questions or comments, please call.

Sincerely,

T. Will Solomon
T. Will Solomon
Radiation Safety Officer

TWS/lav

III

Applicant	May 22
Check No.	2788660
Amount	See Encl.
Type of Fee	CPaid
Date Check Rec'd	5/20/85
Received By	[Signature]

8507230565 850708
REG3 LIC30
24-17152-02 PDR

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REGION III

MAY 15 1985

CONTROL NO. 78951

1. The samples will be received from:

E.I. duPont de Nemours
Savannah River Plant
Aiken, South Carolina 29801
Plant Contact: Mr. Jeff Bransford

The samples will be collected from a waste pit which was used for disposal of low level radioactive wastes and non-radioactive hazardous waste chemicals from laboratory operations. All unused samples will be returned to Savannah River Plant (SRP) for disposal at the conclusion of the project. In addition, any laboratory waste which is generated and contains low level radioactive contamination will be returned to SRP.

2. Prior to shipment of these samples from SRP, all samples will be surveyed for activity by SRP personnel. This preliminary survey will include exposure ratio and gross activity for each sample (and sample container) as well as a survey of the exterior of the shipping container prior to shipment. The data for these surveys will be transmitted to Envirodyne Engineers, Inc. (EEI) prior to receipt of the samples at our laboratory and will be used to assist us in our initial survey of shipping containers and sample containers for exterior contamination and to monitor gross activity in each of the sample maintained in EEI's possession.

The detailed list of potential isotopes which may be contained in these samples has already been submitted to NRC (Attachment 1, letter to NRC of June 28, 1983). However detailed information about the activity of each of the isotopes which may be contained in these samples is not currently available.

3. The estimates of the maximum activity which we will maintain in our laboratory and the maximum activity expected in a given sample were derived as follows.

Approximately 280 samples will be collected from this site. The only isotope for which specific activity data are presently available is ^{137}Cs . The maximum expected activity expected due to ^{137}Cs in these samples is 37,000 picocuries per gram (pc/g). The cumulative activity for all other potential isotopes contained in these samples is not expected to exceed that of ^{137}Cs . We will receive approximately 1,000 g of dry soil for each sample. Therefore, the maximum activity expected in any sample is:

$$1,000 \times 75,000 \text{ pc/g} = 75 \text{ microcuries uc/sample}$$

Since we will receive a maximum of 280 samples during the course of this project (approximately 4 months), the maximum activity we expect to maintain in our possession is:

$$280 \text{ samples} \times 75 \text{ uc/sample} = 21 \text{ millicuries (mc)}$$

This assumes that all 280 samples contain the maximum expected activity. We do not believe this will be the case. Additionally, the maximum amount of

sample will be used for any one analyses will be 100 g so that the maximum activity in a sample which is prepared and analyzed in the laboratory is:

$$100 \text{ g} \times 75,000 \text{ pc/g} = 0.75 \text{ uc}$$

As a result of the above discussion, we request our license amendment restrict us to maintain a maximum of 50 mc total activity in our possession. This provides us with approximately a 2.5 fold safety factor over the maximum total activity we expect in these samples.

5. As discussed in Item 4, all shipping and sample containers will be surveyed for external radioactive contamination upon receipt. The gross activity for each sample will be provided by SRP personnel and will be verified by EEI upon receipt of samples. For a detailed description of the appropriate EEI Standard Operating Procedure (SOP) (see Attachment 1). The instrument used to perform this survey is a Ludlum Model 3 Survey Meter (Ludlum Measurement, Inc., Sweetwater, Texas). The Model 3 will be equipped with the following probes:

Ludlum Probe

<u>Model No.</u>	<u>Description</u>
44-6	Rotary beta shield 1000 mg/cm ² stainless steel and 30 mg/cm ² stainless steel wall
44-7	1.5 - 2.0 mg/cm ² window, mica

The 44-6 and 44-7 probes will be used for surveying surfaces (exterior of shipping and sample containers, laboratory bench tops, etc.). This instrument will be calibrated at least every 12 months. The instruments will be calibrated by:

R.M. Wester & Associates
#1 Lone Eagle Trail
St. Charles, MO 63301
(314)441-0240

This firm is licensed by NRC to provide the required instrument calibration.

6. As discussed in Item 4, all shipping and sample containers will be surveyed for external radioactive contamination upon receipt. The gross activity for each sample will be provided by SRP personnel and will be verified by EEI upon receipt of samples. For a detailed description of the appropriate EEI Standard Operating Procedure (SOP) (see Attachment 1, "EEI Standard Operating Procedures for Sample Receipt, Amendment 1, Receipt of Samples Containing Low Level Radioactivity").

7. All safety procedures utilized by EEI laboratory personnel during this project will conform to the requirements of the EEI laboratory safety program and USNRC, 10 CFR, Parts 19 and 20.

a. Containment of Radioactive Materials - All samples received during the course of this project will be maintained in refrigerated storage. EEI

SOP for sample storage and tracking will apply (see Attachment). The refrigerated storage area will be posted with sign reading "Caution - Radioactive Materials" [as required by USNRC, 10 CFR, Section 20.203(f)].

All solid waste (wipes, broken glassware, etc.) will be segregated in waste containers designated for disposal of potentially radioactive wastes. Waste liquids (solvents) will be stored in waste containers designated for storage of radioactive material. Liquid washings (i.e. washing of glassware used on this project) will be directed to sanitary sewers in conformance with USNRC, 10 CFR, Part 20, Section 20.203. Containment of radioactive contamination from laboratory spills is discussed in sub-item 6.

b. Procedures for Preventing Spread of Contamination to Laboratory Work Surface/Personnel in Event of Sample Spillage - In the event of an accident involving sample spillage, the following procedures will apply:

1) The affected area will be evacuated and the Radiation Safety Officer (RSO) and Corporate Safety Officer (CSO) will be notified.

2) The RSO and CSO will evaluate the situation, identify the affected area, and delineate the boundary of the area to be cleaned with yellow tape.

3) The RSO and CSO will determine whether any personnel contamination has occurred and taken the appropriate corrective action.

4) The RSO and CSO will supervise the cleanup of the affected area and spilled materials and verify that all waste is disposed in the appropriate designated waste containers.

5) The RSO and/or CSO will conduct a general radioactive survey, including wipe tests of the affected area to ensure that no residual radioactive contamination exists as a result of the spill.

6) After the RSO and CSO have determined that the affected area is free of any radioactive contamination, the boundary markers will be removed and work will be allowed to resume.

7) A detailed accident report will be prepared by the RSO and will be submitted to the CSO and EEI Vice President. This report will include a summary of the accident, names of personnel involved, summary of cleanup and post-cleanup radiation survey, and any recommendations to avoid similar accidents in the future.

c) Procedures for Eliminating Inhalation Exposure via Air Borne Particulate and Cases Class A - All sample containers will be inspected upon receipt in a fume hood. All sample aliquoting (i.e. removal of samples from sample containers, weighing of dried soil samples) will also be conducted in a Class A fume hood. These hoods have a nominal face velocity of 100 to 150 FPM.

After initial sample aliquoting, samples will be contained in closed containers (screw cap glass container, volumetric glassware, etc.) which will eliminate introduction of airborne dust into the laboratory. The exhaust from the fume hood will be monitored monthly during project activities to ensure that levels of radioactive emissions from these hoods are below background. This monitoring work will be conducted by R. Wester and Associates (see Item 4).

d) Radiation Surveys - Two types of radiation surveys will be conducted of work areas during the course of this project and will include a personnel monitoring program. These two items are described below.

1) Personnel Monitoring: All personnel who work in the laboratory where project activities are conducted will be monitored for exposure using a TLD program furnished by Radiation Detection Company (162 Wolfe Road, Sunnyvale, California 94086) and coordinated by the EEI RSO. The TLDs will be exchanged monthly during project activities and all personnel monitoring records will be maintained by the EEI RSO. TLD to monitor the laboratory work areas will be mounted in those areas where project activities are conducted. These site monitor TLDs will be exchanged monthly.

2) Radiation Surveys: All work areas will be surveyed daily the RSO or CSO. This survey will be conducted at the end of each working day and the results of this survey will be maintained by the RSO and also posted in the laboratory work area.

Wipe tests of all active laboratory work areas will be conducted weekly. The results of these wipe tests will be maintained by the RSO and will be provided to all laboratory supervisors.

8. Sketches of the laboratory work areas to be used during this project are attached. The sample storage area and fume hoods used for sample inspection and sample aliquoting are identified (see Attachment 2). We plan to operate our laboratory in compliance with the requirements for an unrestricted area except for the sample storage area.

9. The RSO is T. Will Solomon. The duties and responsibilities of the EEI RSO are attached (see Attachment 3).

10. Prior to initiation of this project, the personnel assigned to the project will be instructed in safe handling of samples which contain low-level radioactive contamination. The training will be conducted by the EEI RSO with assistance from the CSO. The training will be repeated at least annually during the course of the project and any new employees assigned to the project will be instructed as above. The training program will consist of:

a. Review of source of samples, potential levels of radioactivity and nature of contamination.

b. Instruction in application and use of all radiation survey instrumentation.

c. Review of EEI Laboratory Safety Procedures.

d. Review of EEI Emergency Procedures (i.e. procedures to be followed in event of an accident involving spillage of potentially contaminated materials, see Item 7b).

e. Review of EEI SOP for sample receipt, storage, tracking, preparation and analysis.

f. Review of the TLD personnel monitoring program.

g. Review of the SOP for radiation survey during the course of this project.

At the conclusion of the training, the RSO will prepare a memorandum identifying the attendees and content of the training. The RSO will also hold monthly safety meetings with all project personnel to review safety procedures, identify any specific to the project and provide direction to project personnel to solve those problems. The safety meeting will be documented (including attendees) and maintained in the Project Safety File by the RSO.

11. Spill containment procedures were discussed in Item 7b.

ATTACHMENT 1

EEI SOP for Sample Receipt Storage and Handling

EEI STANDARD OPERATING PROCEDURE FOR
SAMPLE RECEIPT

1. The project manager of document control officer will notify the sample custodian when to expect to receive samples. If samples are expected to arrive after 5 p.m. Monday-Friday or on the weekend, the project manager will make arrangements with the laboratory manager to have the sample custodian or a designated alternate present to receive the samples.

a. Samples arriving during normal working hours will be received according to the procedures described beginning with Item 2.

b. Samples arriving after 5 p.m. will be placed in the SAS sample area in the walk-in cooler. The sample custodian or his alternate will remove the airbills, record his initials, date the time received. These samples will be received and logged on the next day working day according to the procedures described beginning with Item 2.

2. The sample custodian will examine the shipping container and record the following information on the sample log-in sheet [sample attached, Figure 1, one case per form(s)].

a. Presence/absence of custody seal(s) on the shipping container(s).

b. Condition of custody seal (i.e., intact, broken).

c. If no custody seals are present, note whether there are any other seals, tape or locks on the shipping container and if it appears that the container seals remained intact during shipment.

3. The sample custodian will open the shipping container in a hood, remove the enclosed sample documents and record the following information on the sample log-in sheet:

a. Presence/absence of the chain-of-custody record(s).

b. Presence/absence of the Sample Management Office (SMO) forms (Traffic Reports, Chronicles).

c. Presence/absence of airbills and/or bills of lading documenting shipment of samples. He will initial these airbills with the date and time samples were received. These airbills are placed in the case file.

4. Remove sample containers in a hood and record on sample log-in sheet:

a. Condition of samples (intact, broken, leaking, etc.).

b. Presence/absence of sample tags.

If sample tags are present:

c. Record sample tag numbers on sample log-in sheet (each sample will have a unique SMO sample number; each container of a sample will have a sample tag and sample tag number)

d. Compare with chain-of-custody record(s) - if tag numbers are listed on custody record, compare the sample tag numbers with the sample numbers listed on the chain-of-custody forms.

1) Document whether these numbers agree, or if there is a discrepancy between tag numbers received and those listed on the chain-of-custody record. Record on sample log-in sheet.

2) If sample tag numbers are not listed on the chain-of-custody record, record this fact.

5. Compare the following documents to verify agreement among the information contained on them:

a. Chain-of-custody records.

b. Sample tags.

c. SMO forms.

d. Airbills and bills of lading.

Document both agreement among the forms and any discrepancies found. Be sure to check the location of sites as recorded on the chain-of-custody records for agreement with sample tags. If discrepancies are found, notify document control officer or the project manager so they can contact SMO for clarification.

6. If all samples recorded of the chain-of-custody record were received by the lab and there are no problems observed with the sample shipment, the custodian will sign the chain-of-custody record in the "received for laboratory by:" box on the document.

If problems are noted, sign for shipment and note problems in remarks box or reference to other form detailing the problems. Be sure to mark the correct date and time of taking custody.

The National Enforcement Investigations Center (NEIC) of EPA defines custody of evidence in the following ways:

a. It is in your actual possession, or

b. It is in your view, after being in your physical possession, or

c. If was in your possession and then you locked or sealed it up to prevent tampering, or

d. it is in a secure area.

7. Log-in of Samples - The custodian, after inspecting samples and containers and recording observations, will log-in samples using the form shown in Figure 1. One copy of the sample log-in sheet will be distributed to each of the following:

a. GC/MS lab (MCW)

b. Extraction supervisor (DOK)

c. Document control officer (JLS)

The custodian will keep the original and place it with the case file.

8. Remove the sample tag/label from each sample and place these in the case file. If the tag/label is suspected of being contaminated, is wet, or in the case of an adhesive label, cannot be removed, place a memo in the file indicating where the tag/label can be found and why it is not in the file. All tags/labels must be accounted for.

9. If there was both a tag and label, the label is left on the sample for identification. If only an adhesive label or a tag was used, when these are removed, label the sample container with the SMO sample number (SMO #_____). If more than one container/sample was received, also record the tag number (Tag #_____).

10. The sample custodian will also initiate the EEI laboratory chain-of-custody record which will track the samples or extracts through the laboratory (see Figure 2).

11. A sample sign-out form will also be initiated for the group of samples received. The sample custodian will maintain these forms and is responsible for ensuring that the analysts sign for samples.

12. The document control officer will maintain a bound master sample log-in book for the project. Information contained will include data received, sample number, tag number, type of sample, analyses requested.

SAMPLE CUSTODIAN SIGNATURE: _____

DATE _____

CIRCLE THE APPROPRIATE RESPONSE

DOCUMENT CONTROL # _____

DATA REQUIRED BY _____

1. Custody Seal present/absent
 intact/not intact
2. Chain-of-Custody present/absent
3. Sample Tags present/absent
 Sample Tag Numbers listed/not listed on chain-of-custody
4. SMO Forms present/absent

CASE NUMBER _____

AIRBILL NUMBER _____

DATE RECEIVED	TIME RECEIVED	CHAIN-OF- CUSTODY RECORD NUMBER	SMO SAMPLE NUMBERS	CORRESPONDING SAMPLE TAG NUMBERS	ANALYSIS REQUESTED	DOES INFORMATION ON CUSTODY RECORDS, TRAFFIC REPORTS, AND SAMPLE TAGS AGREE?	REMARKS: CONDITION OF SAMPLE SHIPMENT, ETC.

CONTROL NO. 70951

Project No. _____

description of Shipment:

Piece(s) Consisting of Cooler(s), (other)

[illegible][illegible]

VL- Vial

Other-

[illegible]

EEI STANDARD OPERATING PROCEDURE FOR SAMPLE RECEIPT

AMENDMENT 1 - RECEIPT OF SAMPLES WHICH
CONTAIN LOW LEVEL RADIOACTIVE CONTAMINATION

1. After inspection of presence and condition of chain of custody seals on shipping container, the exterior of the container will be surveyed for radioactive contamination using the Ludlum Model 3 survey meter equipped with Model 44-6 and 44-7 probes. The results of our survey will be recorded in the appropriate place on the chain-of-custody and survey form.
2. After opening the shipping container and verifying information on sample chain of custody (and shipping documents), the exterior of the sample containers will be surveyed for external radioactive contamination (as described in Item 1 above).
3. All samples containing low-level radioactive contamination will be stored in the designated area of the restricted refrigerated storage area.
4. Upon inspection of the shipping documents, any sample which has been identified by site personnel to contain radioactivity greater than 75 uc will be identified by the sample custodian. Sample custodian will notify RSO regarding any such samples.

EEI STANDARD OPERATING PROCEDURE FOR
SAMPLE TRACKING

A system for tracking the sample through preparation and analysis is needed because of the evidentiary nature of the sample analysis results. The laboratory records may be used in court as evidence in enforcement proceedings. Consequently, the following procedure will be used to track sample analyses.

1. Sample tracking begins when samples are received and logged in according to the Sample Receipt SOP. Copies of the sample log-in sheet are distributed to sample preparation and analysis personnel as well as the document control officer so as the samples and resulting data move through the lab, the people in each area will know which samples they are expected to work on.

If there is a discrepancy between the samples being analyzed or the data reported and the samples received the analyst or document control officer will identify the reason for the discrepancy and if a sample has not been included for analysis, analysis of the sample will be initiated. If there is a problem with sample identification, the situation will be corrected by verification with the EEI laboratory work request form or the chain-of-custody forms received with the sample shipment.

2. An EEI custody sheet will also accompany samples through the laboratory. When analyses are complete, it is placed in the case file. A sample sign-out sheet is also maintained at the walk-in cooler and at the refrigerator in the Regulated Access Area.

3. The EEI custody form will be maintained with the sample extract. When the sample is returned to the walk-in cooler after extraction, the sample custodian will retake custody of the samples and sign them back in on the sample sign-out sheet. The extraction supervisor will maintain custody of the extracts and will indicate that this is an extract next to the sample number with "EX". When the extracts are transferred to the GC/MS lab for analysis, the custody sheet will be transferred with the extracts and the GC/MS operator will accept custody.

4. Both the preparation and the analysis of the sample will be documented. All analysts will use bound laboratory notebooks and these notebooks will contain analytical information from only one case per page. All SMO laboratory chronicles, notebook pages, bench sheets, graphs, computer printouts, chromatograph tracings, and other laboratory documents will show the EPA case/sample number, date, signature (initials) of the analyst and other pertinent information.

5. Organic sample preparation and analysis records will be completed on a daily basis, as each step of sample preparation and analysis is completed. All sample preparation information will be documented in laboratory notebooks and on the SMO laboratory extraction chronicles. All sample analysis data will be documented using SMO laboratory analysis chronicles, instrument log-books, computer printouts, chromatograph tracings, analyst's laboratory notebooks, and/or other laboratory documents. When sample preparation or analysis is finished by an individual, the completed documents will be placed in the appropriate sample and/or case files.

6. Instrument logs will be maintained for the GC/MS and GC. Examples of information required in these logs are given at the end of this section (Figures 1 and 2).

7. Upon completion of analysis, data will be filed in the appropriate case of sample files. These data will include copies of notebook pages, bench sheets, chromatographs, computer printouts, instrument logs and QA/QC data.

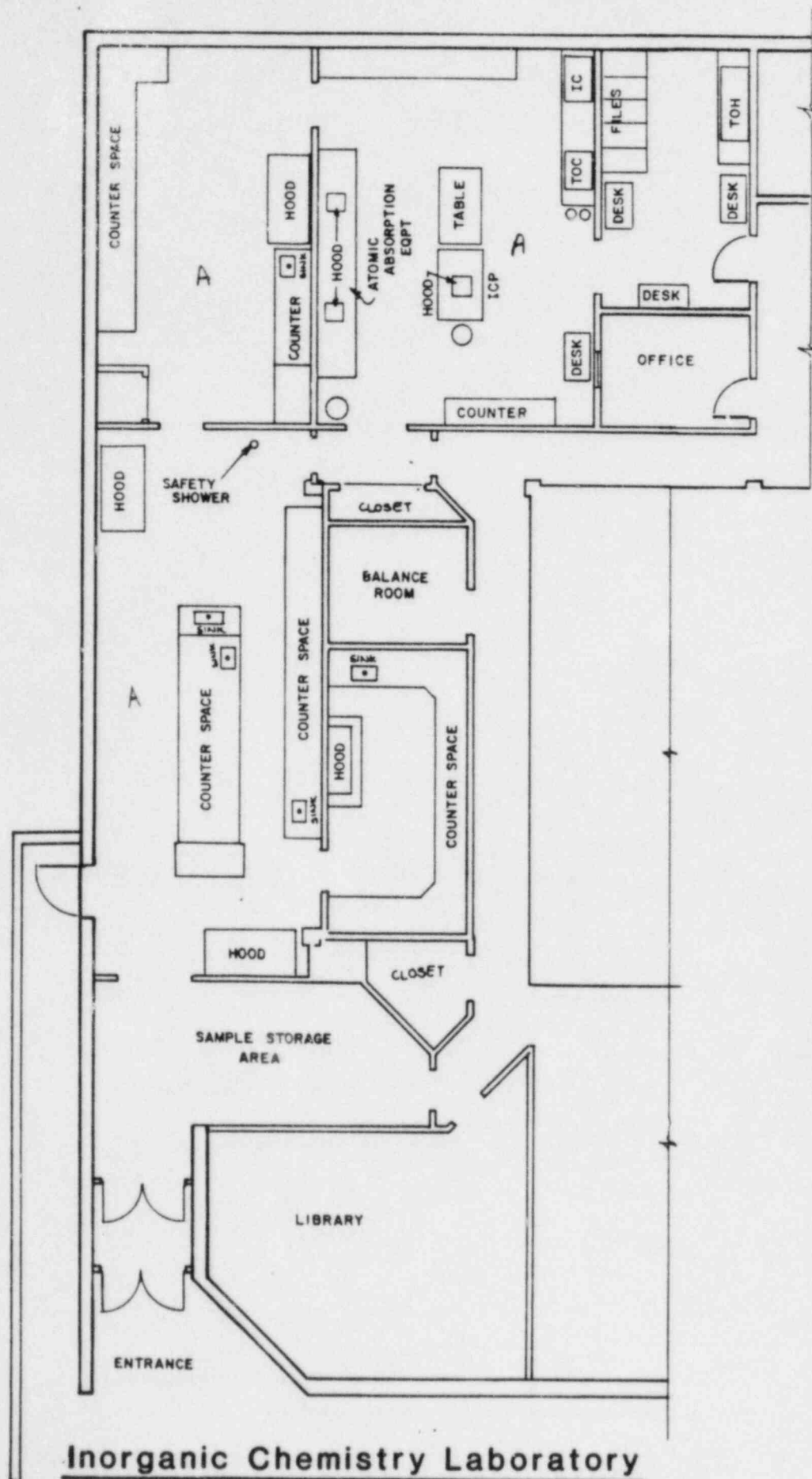
FIGURE 2 (Continued)

[illegible]

ATTACHMENT 2

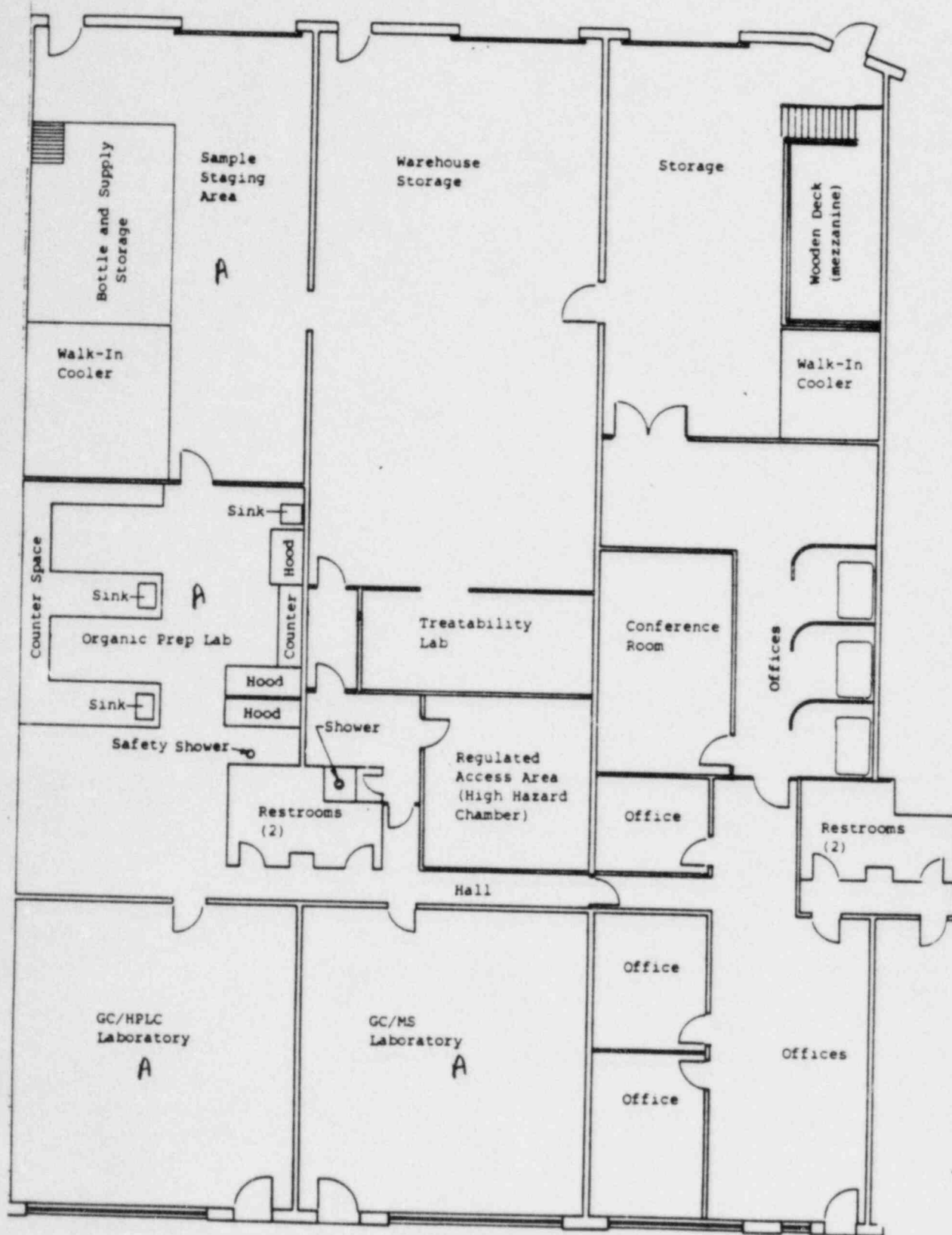
Laboratory Facilities to be used to store, prepare and analyze environmental samples containing low level radioactive contamination.

NOTE: Those areas used for this project are designated with an "A".

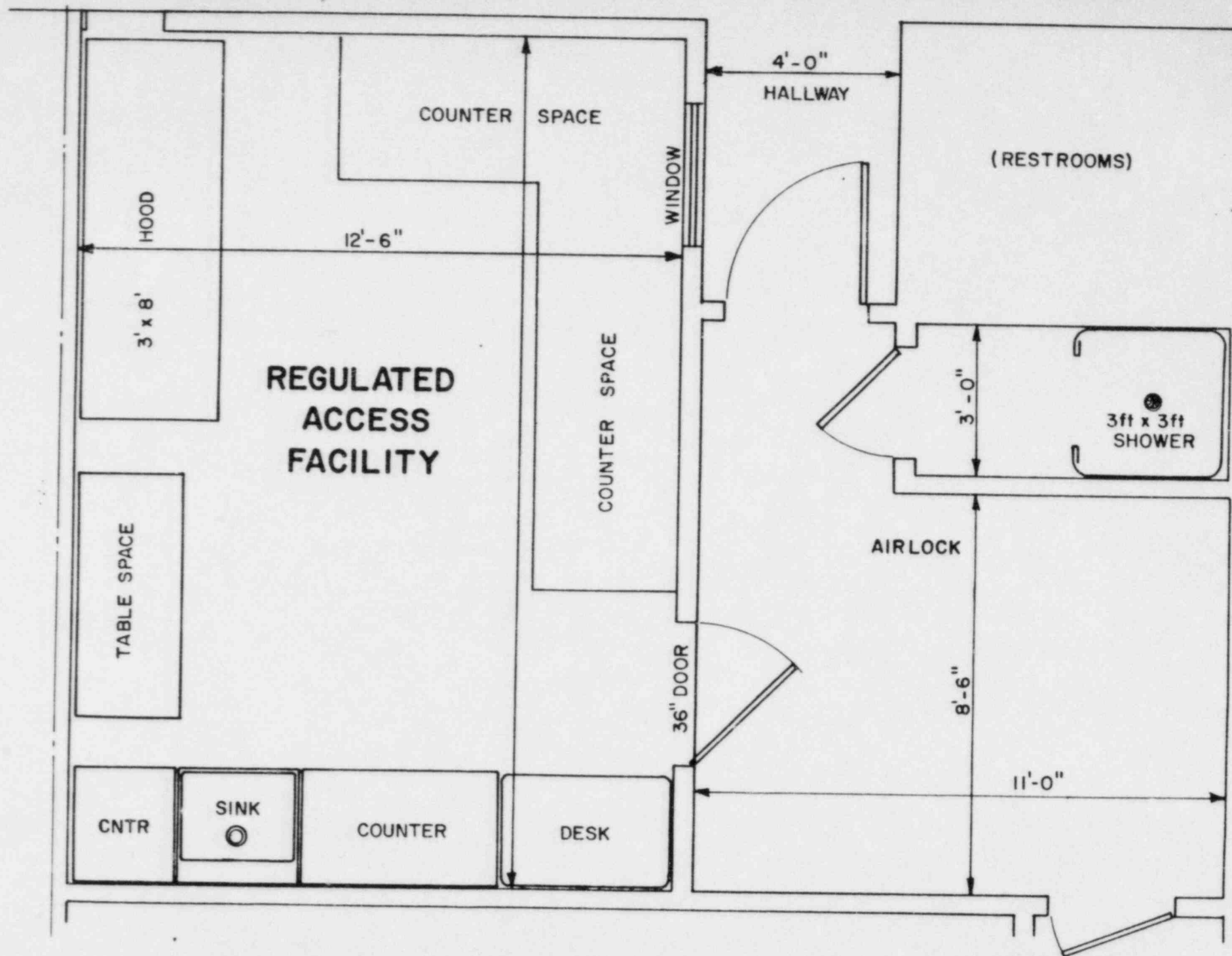


Inorganic Chemistry Laboratory
Envirodyne Engineers St. Louis

CONTROL NO. 78951



Organic Chemistry Laboratory
Envirodyne Engineers St. Louis



ATTACHMENT 3

Duties and Responsibilities of EEI
Radiation Safety Officer

DUTIES AND RESPONSIBILITIES OF
EEI RADIATION SAFETY OFFICER

1. Ensure that all EEI laboratory operations are in conformance with USNRC, Code 10, Parts 19 and 20 and are consistent with the current license restrictions of EEI NRC license.
2. Instruct all project personnel in safe handling of samples containing low-level radioactive contamination.
3. Assure that radiation surveys are done in all laboratory work areas used to prepare and analyze samples containing low-level radioactive contamination.
4. Supervise TLD personnel monitoring program.
5. Schedule monitoring of fume hood exhaust during course of project.
6. Hold monthly safety meetings with all project personnel. Report minutes of these meetings to EEI-Vice President.
7. Supervise cleanup and post-cleanup radiation monitoring after any laboratory accident involving spillage of materials which may contain low-level radioactive materials.
8. Maintain a record of total activity contained in samples received by EEI to ensure conformance with maximum licensed possession limit.
9. Maintain a record of all radiation surveys.