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MEDICAL PHYSICS
SHIELDING RECOMMENDATIONS

RADIATION PHYSICS
EMERGENCY CONSULTATION



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June 6, 1995

STC Corporation
4483 James Madison Parkway
Suite 3
King George, Virginia 22485

Attn: Mr. Harry Barrick

Dear Mr. Barrick:

This letter is a follow up to our recent telephone conversation, in which we discussed possible consultation support by Physics Associates to the STC Corporation.

You had asked about routine safety services, such as wipe tests, training for personnel, and open ended consultation services. This is precisely the type of services that we do provide.

To give you a little background, Physics Associates has been in existence, headquartered in the Roanoke, Virginia area, since approximately 1963.

We provide the complete spectrum of Health Physics/Radiation Physics services to our clients; although the majority of our clients are medically oriented, we also provide services to industrial clients as well. These industrial clients include Merck & Company, Dupont, General Electric, and Ross Laboratories. We have also provided services in the past for IT&T.

We perform leak tests of sealed sources, wipe tests of appropriate areas, and/or analyze such wipes in our offices. The charges for these depend upon how many wipes are performed at any given time. A good ballpark is around \$50/wipe. This actually varies from \$25 to \$100, depending upon circumstances.

Mr. Harry Barrick
STC Corporation
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Our normal consultation with Industrial Clients is to provide at least one day on site each year, during which time an in-service on Radiation Safety can be given to the facility employees, as appropriate. The charge for one day of consultation is approximately \$1,000.

In addition to the routine services mentioned above, we also provide assistance in preparing license applications, license amendments, and other regulatory items.

We also provide emergency consultation in the case of unexpected serious problems. Such consultation in the past have included searching for lost sources, responding to serious contamination situations, etc. Our rates for emergency operations are normally \$150 per hour, portal to portal.

I would note that we do have a calibrated Americium-241 source in our office, which would be appropriate for the analysis of leak tests or wipe tests for operations using Americium-241.

We also have other standard sources available. We use a PC based Sodium Iodide detector with a multi-channel analyzer for normal wipe tests analysis in the office.

I believe I mentioned to you that I was flying into the Fredericksburg area twice in recent days.

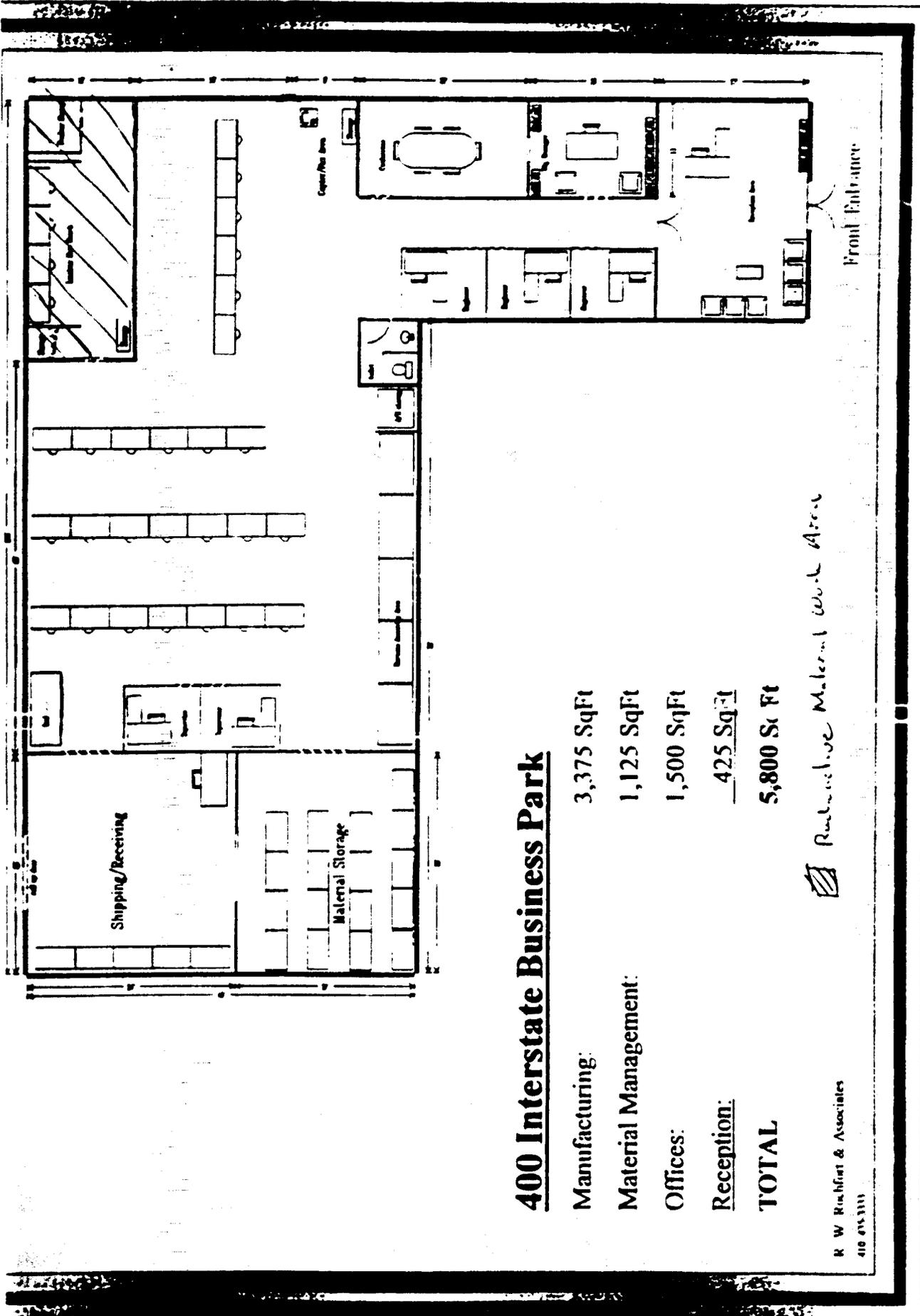
We touched on some of the highlights of our services; let me now mention the fact that the appropriate credentials are held in our group; (1) Certified Health Physicist (Comprehensive) by the American Board of Health Physics; (2) Certified Radiological Physicist (includes Diagnostic Radiology, Nuclear Medicine, and Radiation Therapy Physics) by the American Board of Radiology; and (3) Certified Medical Physicist by the American College of Medical Physics. There are various lesser certificates also held.

If it seems that you would like to pursue this further, please let me know and I shall be happy to answer any further questions you may have.

Sincerely,

Lee S. Anthony
Lee S. Anthony, Ph.D.
C.H.P., C.M.P.; C.R.P.

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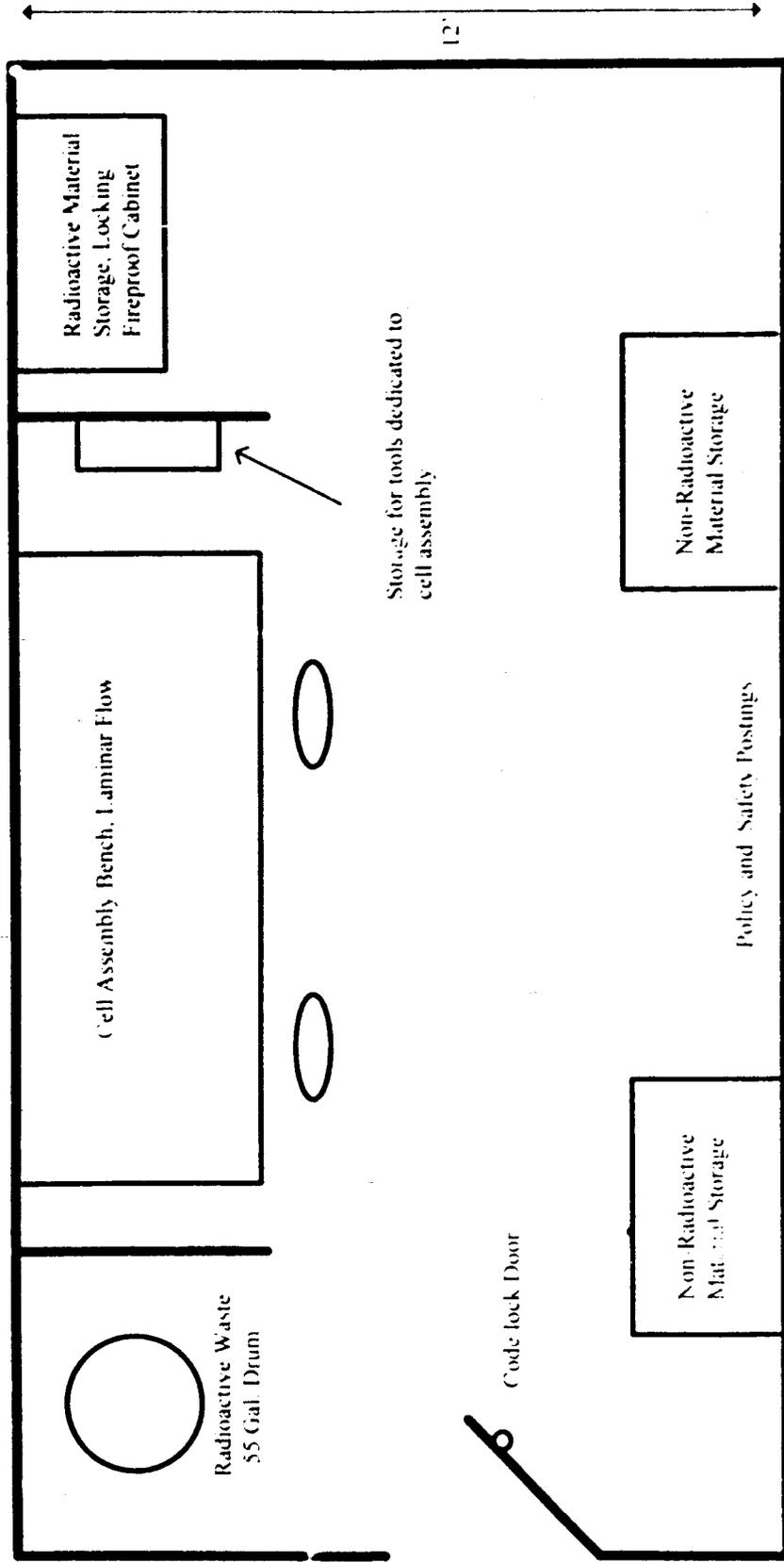
400 Interstate Business Park

| | |
|----------------------|--------------------|
| Manufacturing: | 3,375 SqFt |
| Material Management: | 1,125 SqFt |
| Offices: | 1,500 SqFt |
| Reception: | <u>425 SqFt</u> |
| TOTAL | 5,800 Sq Ft |

Preliminary Material Work Area

R W Richfort & Associates
410 615-1111

Attachment 4 (Page 2)
STC Cell Assembly/Radioactive Material Room
Restricted Access Area



IPDS Radiation Safety Program

1. Scope

The IPDS Radiation Safety Program defines the responsibilities and procedures for procurement, receipt, storage, handling, control, and disposal of radioactive material used in the manufacture of the Improved Point Detection System (IPDS).

2. Purpose

This document serves as the formal policy to be understood and complied with by those persons involved in the manufacture of the IPDS.

3. General

The IPDS is a Chemical Agent detection system developed by the US Navy for permanent installation on ships. The system uses an Americium 241 (Am^{241}) radioactive source to ionize air samples which allow for subsequent detection and identification of the compounds of interest. A single source is installed in each cell module. Once installed in the cell module there is no physical contact or direct line of sight possible with the source. The cell module is not sealed; air enters the cell, passes over the source, and exits the cell. Each system contains a 2 detector unit which houses two cell modules.

Each source contains 100 microcuries of Am^{241} . Each detector unit contains two cells and each IPDS system contains two Detector Units for a total of 400 microcuries for each system. Am^{241} is primarily an alpha emitter, with a small percentage of radiation in the form of low energy X and gamma. Although Am^{241} is considered a relatively low energy radioactive material, proper precautions are necessary to avoid prolonged exposure and particularly ingestion of material which can result in collection of the material in body organs and long term radiation exposure to internal organs.

Am^{241} in the quantities used in the IPDS is a regulated material and requires compliance with all Federal, State, and/or local government regulations for control of radioactive materials.

4. Radioactive Material Safety Policy and Procedures

4.1 Responsibilities

The Radiation Safety Officer (RSO) maintains overall responsibility for radioactive materials. The radiation safety officer reports directly to the STC president on all issues regarding worker safety and regulatory compliance. The RSO establishes and revises all policies and procedures related to the proper use and handling of Radioactive Material. The RSO is responsible for maintaining the Radioactive Material License (RML) including ensuring compliance and applying for amendments as required. The RSO retains responsibility for inventory and control

of all radioactive material. The RSO will be responsible for assigning an assistant to resume the responsibilities of the RSO during his/her absence. The specific duties of the RSO are further defined in the following paragraphs.

4.2 Radioactive Material Procurement

The Radiation Safety Officer authorizes the procurement of radioactive materials in accordance with authorized material and quantities specified by the RML. The RSO ensures that vendors are provided a current copy of the RML. All radioactive material will be shipped to the attention of the RSO.

4.3 Radioactive Material Receipt

Radioactive material will be received by the RSO. The RSO will inspect the shipping package and internal contents for any signs of damage that may have occurred during shipping. Any damage noted will be assessed by the RSO. In the event of visual or potential damage to the source material, the vendor will be notified and the shipment returned. If any radioactive material can be found to have been released from the damaged package, the vendor will be notified and required to collect the package and local authorities notified.

Incoming radioactive materials will be inventoried on the Master Radioactive Material Inventory Database.

4.4 Radioactive Material Storage

Radioactive materials will be stored in a fire-proof, locking cabinet. The RSO shall maintain possession of the key or combination. Additional keys or knowledge of the combination will be maintained by the appointed RSO assistant and the plant security officer.

Radioactive material will remain in the storage cabinet until required for assembly in an IPDS. The RSO will release only those sources required for the cells to be fabricated in that lot. Sources are to be installed during that work day or returned to the RSO for storage in the cabinet.

The RSO will log the source serial number out of storage and assign it to the specific IPDS cell serial number.

4.5 Radioactive Material Handling Procedures for IPDS Cell Assembly

Handling of radioactive materials for IPDS pertains to the operations of inserting the source material into the cell, sealing the cell, and performing a leak test to verify the outside of the cell is free of removable radioactive material. All source assembly will take place in the cell assembly area. Specific safe handling and worker safety guidelines are shown in Appendix A and are to be posted within the cell assembly area. The source will be released by the RSO for assembly in the cell to the trained assembler. Sources released are to be assembled in cells during that work period; no bare sources will be left out of the storage area after the work period ends. Sources will be handled by gloved hands or tongs. No assembler is

to touch the source with the bare hand. Source assembly will be performed over absorbent, disposable material. Following each installation period the work area will be surveyed using a hand-held monitor for removable contamination. Worker's gloves, packing material, and other disposable materials that have had direct contact with the radioactive source are to be treated as a hazardous waste and disposed of in a separate container than non hazardous waste generated in the area.

An Emergency Plan is included in Appendix B. It shall be considered an emergency any time radioactive material is known or believed to be released from the radioactive source and/or IPDS unit in an uncontrolled manner.

4.6 Radioactive Material Monitoring

Radiation sources and cell modules containing radiation sources will be leak tested on intervals not to exceed six months to determine the presence of removable radioactive material. The RSO or designate will conduct the leak tests which will consist of wiping the inactive areas and the area surrounding the source. The wipes will be analyzed using certified measurement techniques capable of detecting less than 0.005 microcuries of material.

Furthermore, wipe tests will be conducted prior to delivery of the system to the Government. The external surface of each cell module (approx. surface area of 100 sq. cm) will be wipe tested following source installation. The wipes will be analyzed using certified.

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Appendix A

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Safety Policy for IPDS Cell Assembly

1. All handling of radioactive material and unassembled cell modules containing radioactive sources shall take place in the designated radioactive material area.
2. Food and drinks are not allowed in the cell assembly area. No eating, drinking, or smoking is permitted within the cell assembly area.
3. Assemblers are to wear protective cotton gloves when handling the radiation sources or performing cell assembly. Sources are not to be handled with bare fingers. Sources are to be handled using forceps and/or gloved hand.
4. Sources will be provided to assemblers by the RSO. The RSO will assign specific source serial numbers to specific cell modules. Source and cell inventory will be controlled by the RSO.
5. Sources are to be installed in cells or returned to the storage cabinet following each work period. Sources are not to be left on work benches at the end of the day.
6. Any tools used to handle the sources should be stored in a separately from other tools in their own container.
7. The radioactive material work area should be surveyed using a Geiger counter for evidence of contamination following any period when sources were installed or cells were opened for repair.
8. Gloves/ towels and any other waste that were in contact with the source will be treated as hazardous waste and contained in a 4 mil (min.) polyethylene trash bag within the 55 gal disposal drum. This waste will be stored separately from other waste. This waste will be removed when full by the RSO and disposed as radioactive waste in accordance with regulatory guidelines.
9. Cells/Sources are to be wipe tested every six months by the RSO or designate. Surface areas including table tops, and floors beneath the cell assembly area will also be wiped and tested for contamination.
10. The RSO should be consulted prior to any changes in the cell assembly process regarding the radioactive source. Any questions, concerns, or problems associated with the handling of radioactive materials shall be directed immediately to the RSO.

POST IN CELL ASSEMBLY AREA

Appendix B

IPDS Radioactive Material Emergency Procedure

1. Emergency procedures shall be employed whenever radioactive material is known or believed to be released in an uncontrolled manner. Release may result from a damaged radioactive source, IPDS cell module, or unit.
2. The underlying philosophy is to prevent the spread of contamination by preventing entry or immediate exit of personnel or equipment from the area of contamination.
3. Once the actual or potential release has been realized, workers shall immediately notify the RSO. The RSO shall direct all activities related to the emergency situation, including directing the monitoring of personnel, equipment, and the facility.
4. Workers shall remain in the area of the incident to prevent contamination of other areas or personnel.
5. Persons not involved in the area of contamination shall stay out.
6. Workers shall attempt to isolate the specific areas of contamination. Do not remove any equipment, including personal belongings, from within area of contamination. The immediate contamination area shall be roped off.
7. All personnel known or believed contaminated with radioactive materials will be instructed to remove contaminated garments and thoroughly wash areas of skin that may have been contaminated using a detergent solution.
8. The RSO will determine the extent of the contamination through analysis and radiation surveys.
9. All contamination suspect equipment will be disposed of or quarantined by the RSO until radiation measurements (wipe tests) have shown the equipment is clean.
10. The RSO will document facts concerning the incident and make the required notifications to the NRC pursuant the regulatory requirements of Paragraphs 20.403 and 20.404 of 10 CFR Part 20.

POST IN CELL ASSEMBLY AREA

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