INTERNATIONAL TECHNOLOGY CORPORATION

IT CORPORATION

STANDARD OPERATING PROCEDURE

NUMBER: RPP-006

TITLE: Sample Screening and Classification

APPROVED: _____ DATE: 9-27-96
Corporate Director of
Health and Safety

APPROVED: _____ DATE: 9/23/96
Health Physics Professional

APPROVED: _____ DATE: 26Sep96
Corporate Director of
Quality Assurance

CONTROLLED COPY NO.: ____

REVISION NO.	DATE
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1 PURPOSE AND OBJECTIVES

The purpose of this procedure is to assure that samples received at the IT Fixed Facilities have been properly screened and classified prior to receipt and that unlicensed Fixed Facilities receive no samples that are classified higher than a Category I. This procedure applies to all samples that have the potential to be contaminated with radioactive materials.

2 RESPONSIBILITIES

2.1 The Fixed Facility Director ensures that sample types covered by this procedure are properly classified and that only the appropriate classifications of samples are handled by the facility.

2.2 The Radiation Safety Officer (RSO) or his designee determine which samples require screening.

2.3 Project Managers shall identify clients that may have samples contaminated with radioactive materials and notify the RSO.

3 REFERENCES

3.1 Requirements and Specifications

3.1.1 IT Corporation Policy No. HS-700, "Radiation Protection Program Plan"

3.2 Related Procedures

3.2.1 IT Corporation Procedure No. RPP-010, "Radiation Protection Records"

3.3 Others

3.3.1 International Atomic Energy Agency, Safe Handling of Radionuclides, Safety Series No. 1, IAEA, Vienna (1973).

3.3.2 International Atomic Energy Agency, Manual on Safety Aspects of the Design and Equipment of Hot Laboratories, Safety Series No. 30, IAEA, Vienna (1981).

3.3.3 Oak Ridge National Laboratory, Operating Guide for Radiochemical Laboratories at Various Activity Levels, ORNL Health Physics Manual, Procedure A-7, (1987).

3.3.4 Westinghouse Hanford Company, Selecting Workplaces, WHC-CM-4-9, (1988).

4 DEFINITIONS

4.1 Approval - An act of endorsing or adding positive authorization or both.

4.2 Authorized User (AU) - Individuals who, by virtue of training and/or experience, have been authorized by the RSO to use or directly supervise the use of radioactive materials under the requirements of a specific radioactive materials license or IT work plan.

4.3 Health Physics Professionals (HPP) - Individuals who, by virtue of their education, and experience, approve and provide oversight for work involving or pertaining to radioactivity. The HPP shall be Certified by the American Board of Health Physics (Comprehensive).

4.4 May - The word may is used to denote permission.

4.5 Radiation Safety Officers (RSO) - Individuals who, by virtue of training and/or experience, have been authorized to develop, administer and implement a radiation protection program. Fixed facility RSOs are specified by federal or state license requirements, and are authorized to use or directly supervise the use of radioactive materials under the specifications of a specific radioactive materials license. Project RSOs shall be selected by the HPP.

4.6 Shall - The word shall is to be understood as a requirement.

4.7 Should - The word should is to be understood as a recommendation.

5 EQUIPMENT/MATERIALS REQUIRED

Appropriate detection equipment (alpha/beta smear counters, friskers, gamma spectroscopy systems)

6 METHODOLOGY

6.1 Selection of Samples for Screening

6.1.1 Sample screening and classification is required for samples listed in Attachment 1 as "Sample Types Requiring Radiological Screening".

6.1.2 Sample screening and classification is not required for samples listed in Attachment 1 as "Sample Types Not Requiring Radiological Screening".

6.1.3 Irrespective of the requirements listed above, the Fixed Facility RSO has the final authority to determine which samples will be screened.

6.2 Selection of Approved Screening Methods

6.2.1 The sample screening method selected shall be appropriate for the types of radiological contaminants present in the sample.

6.2.2 The analytical detection limit for the screening method selected shall be adequate to detect the quantity of radioactive material defined as the upper limit of a Category I sample. Specifically, the detection limits shall be sufficient so that the radioactive concentration multiplied by the sample volume (or mass) is less than 0.01 microcurie (uCi) gross alpha and less than 0.1 uCi gross beta.

6.2.3 Sample screening performed by a client or others outside of the IT fixed facility must be approved by the RSO.

6.3 Classification of Samples

6.3.1 Samples shall be classified based on the total activity of the sample, the specific activity, and the contact exposure rate.

6.3.2 Total sample gross alpha and gross beta activity shall be based on the total quantity of radioactive material per sample container or per sample aliquot that will be handled as an individual sample.

6.3.3 Samples shall be classified according to the requirements specified in Attachment 2.

6.3.4 Samples classified as Category I may, in some cases, be transferred to unlicensed laboratories. These samples are of sufficiently low activity to require no special handling procedures. Transfer of any potentially radioactive sample to an unlicensed facility must be approved by the RSO or designee.

Samples which have a specific activity greater than 0.002 microcurie per gram shall not be classified as Category I.

7 RECORDS

7.1 All records pertinent to this procedure shall be maintained pursuant to RPP-010,"Radiation Protection Records".

7.2 Sample screening and classification records shall be maintained by the RSO and maintained in the project files.

7.3 Documentation of approval of client screening programs and screening waivers shall be maintained by the RSO and filed in the radiation safety files.

8 ATTACHMENTS

8.1 Attachment 1 - Selection of Samples for Screening
8.2 Attachment 2 - Classification of Samples

ATTACHMENT 1

SELECTION OF SAMPLES FOR SCREENING

I. SAMPLE TYPES REQUIRING RADIOLOGICAL SCREENING

A. TYPES OF FACILITIES - Samples received at an IT Fixed Facility from the following types of facilities and clients will be subject to screening under the provisions outlined below unless it can be proven that radioactive materials are not used at the facility in forms that could contaminate sample materials.

1. **DOE Regulated Facilities** - Clients who are prime or subcontractors to the DOE that submit samples from DOE facilities.

2. **NRC or Agreement State Licensed Facilities** -Facilities licensed by the NRC or by an agreement state to receive, possess, store, use, or transfer radioactive material.

3. **Other** - Facilities that use materials containing elevated or enhanced quantities of Naturally Occurring Radioactive Materials,(NORM), such as refractory plants, fertilizer manufacturers, and petroleum companies. Also included are samples from facilities that handle source (uranium or thorium) material.

B. TYPES OF SAMPLES - The following types of samples from facilities listed above must be screened prior to acceptance by the laboratory:

1. **Samples from regulated facilities unless excepted in section II below, such as bioassay and biota samples.**

2. **Radioactive material shipments** - Samples shipped as "Radioactive material" under Department of Transportation regulations. This includes limited quantity, low specific activity, Type A, and Type B shipments which are labeled as radioactive material, LSA, Radioactive White I, Yellow II, or Yellow III.

> Samples that are radioactive as defined by the Department of Transportation (i.e. >0.002 μCi/g) cannot be received at the Middlebrook Laboratory.

3. **Waste samples** - Materials that are classified as radioactive waste. These materials are usually contained in drums, tanks, or ponds. A wide variety of matrices are encountered including liquids (often multiphased), sludges, and heterogenous solids.

4. **Process samples** - Samples of materials from process streams where radioactive materials are utilized.

5. **On-site environmental** - Environmental samples from within the controlled area of a regulated facility. These samples include soil, sludges, sediments, and water.

6. **Sample container** - Any removable surface contamination on the sample container or contact exposure rate measured on the sample container that exceeds the action levels given below:

a. Removable Surface Contamination Limits

Alpha contamination - 20 dpm/sample container

Beta/gamma contamination - 200 dpm/sample container

b. Contact Exposure Rate Screening Action Level

Two (2) times the ambient background

II. SAMPLE TYPES NOT REQUIRING RADIOLOGICAL SCREENING

Notwithstanding the fact that samples received from the types of facilities described above require screening, the following sample types do not require screening prior to analysis:

A. **AIR SAMPLES** - Filters, charcoal tubes, impinger solution, etc. from samples collected to measure ambient or breathing zone concentrations of airborne contaminants;

B. **BIOASSAY SAMPLES** - Samples of human feces, urine, tissue, or blood;

C. **BIOTA** - Samples of plant or animal life;

D. **OFF-SITE ENVIRONMENTAL** - Environmental samples including soil, sediments, and water from the environs outside a facility's regulated area;

E. **DRINKING WATER SAMPLES.**

ATTACHMENT 2

CLASSIFICATION OF SAMPLES*

Sample Category	Total Activity (μCi)	Total Specific Activity (μCi/g)	Contact Exposure Rate (mR/hr)
I	gross alpha ≤0.01 μCi/sample gross beta ≤0.1 μCi/sample	≤0.002 μCi/gram	≤0.1 mR/hr
II	Gross Alpha ** ≥0.01 but ≤0.1μCi Gross Beta** ≥0.1 but <1 μCi	≤0.01 μCi/gram	≤0.1 mR/hr
III	Gross Alpha ** ≥0.1 μCi Gross Beta** ≥1 μCi	≥0.01 μCi/g	>0.1 mR/hr

*Sample classification is determined by comparing sample screening results to category limits. If screening results exceed any of the limits for a given category, the results should then be compared to the limits of the next higher category.

**If the radiological contaminants in the sample are known to be only U-natural, U-238, Th-natural, Th-232, (or their daughters) or H-3, the classification should be based on 10 times the limits given above. For example, Category III limits for U-238 would correspond to a gross alpha activity of 1 μCi or a gross beta activity of 10 μCi.