

# The Management Information System (THEMIS) Inventory Database



McCord, S.L.<sup>1</sup>

<sup>1</sup>United States Transuranium and Uranium Registries, 1854 Terminal Drive, Richland, WA 99354

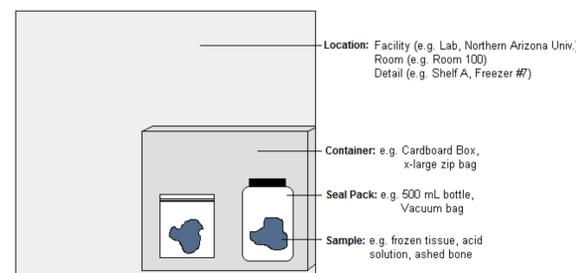
## Overview

Initiated in the 1960's with the mission of acquiring and providing precise information about the effects of plutonium and other transuranic elements in man, the United States Transuranium Registries (USTUR) have followed up to 'old age' 334 volunteer Registrants who worked at weapons sites and received measurable internal doses. An autopsy has been performed on each of these deceased Registrants and tissue samples obtained, preserved, and made available for radiochemical analysis and future research. The Management Information System (THEMIS) database integrates with a barcode scanner to inventory USTUR and National Human Radiobiological Tissue Repository (NHRTR) frozen and formalin-fixed tissues, as well as histopathologic slides, tissue blocks, and acid-dissolved tissues from previously analyzed samples. The software developer at RJ Lee Group has adapted their 'off-the-shelf' THEMIS software to meet USTUR's specific sample inventory and chain-of-custody needs.



The THEMIS system: computer, barcode printer, barcoded sample, portable scanner, USB scanner.

## Defining Sample Locations



The THEMIS software specifies how and where a sample is stored using four parameters: sample, seal pack, container, and location.

**Sample:** The *sample* is the inventoried item. We have a broad range of samples including frozen tissues, formalin fixed tissues, acid solutions, histopathology slides, and dried bones.

**Seal Pack:** The *seal pack* refers to how the sample is packaged. For example, an acid solution may be packaged in a 500 mL bottle or a tissue sample may be sealed in a vacuum bag.

**Container:** A *container* can hold multiple samples. Samples can be moved into or out of a container, or an entire container of samples can be moved from one location to the next.

**Location:** The *location* specifies where a sample or container can be found. Locations are broken into three components: **Facility**, **Room #**, and **Other Details**.

## Structured Query Language (SQL)

THEMIS data is stored in a SQL database on the "THEMIS server." The THEMIS server is dedicated exclusively to the THEMIS data files and is located at the laboratory. This setup is beneficial because:

**Stability:** SQL is more stable than M.S. Access given USTUR requirements.

**Data Backup:** THEMIS data is automatically backed up daily by the server.

**Speed:** Laboratory staff can access THEMIS through a direct link to the server. This connection is very fast.

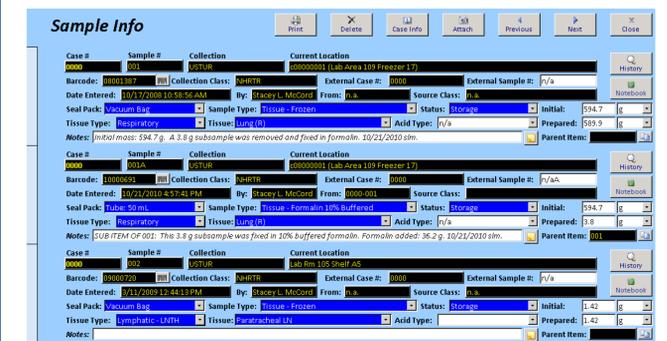
**Remote Access:** Office staff can access THEMIS data remotely.

Data is entered into and retrieved from the SQL database using an MS Access 'front-end' user-interface that utilizes linked tables.



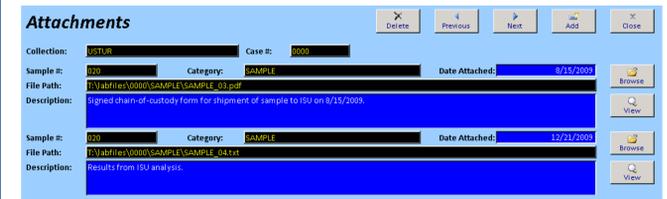
## Sample Information Screen

The 'Sample Info' screen displays details such as the type of sample, its mass, where the specimen is located, how it is stored, and who logged it in.



## Attach Documents and Images

Files such as signed chain-of-custody forms and photographs can be attached to sample and container records.



Two files have been attached to a thyroid sample (#020) record.

## Sample Report Generator

THEMIS efficiently builds customized sample reports. It allows the user to specify multiple search criteria and up to seven output fields.

**For Example Search Criteria**

USTUR Case #: "0000"

Tissue Type: "Respiratory"

**Output Fields**

Sample #

Tissue

This report would display the sample number and tissue name for all of case 0000's respiratory tract samples.

Criteria Fields (used to narrow results)	Output Fields (select up to seven)
<input type="checkbox"/> USTUR Case #	<input type="checkbox"/> Acid Type
<input type="checkbox"/> USTUR Sample #	<input type="checkbox"/> Barcode
<input type="checkbox"/> Container #	<input type="checkbox"/> Case #
<input type="checkbox"/> External Case #	<input type="checkbox"/> Class
<input type="checkbox"/> External Sample #	<input type="checkbox"/> Collection
<input type="checkbox"/> Sample Type	<input type="checkbox"/> Container #
<input type="checkbox"/> Seal Pack Type	<input type="checkbox"/> Detail
<input type="checkbox"/> Tissue Type	<input type="checkbox"/> External Case #
<input type="checkbox"/> Tissue	<input type="checkbox"/> External Sample #
<input type="checkbox"/> Work Site	<input type="checkbox"/> Facility
<input type="checkbox"/> Primary Isotope	<input type="checkbox"/> Initial Mass/Volume
<input type="checkbox"/> Entered By	<input type="checkbox"/> Isotope
<input type="checkbox"/> Received From	<input type="checkbox"/> Prepared Mass/Volume
<input type="checkbox"/> Facility	<input type="checkbox"/> Received By
<input type="checkbox"/> Room	<input type="checkbox"/> Received Date
<input type="checkbox"/> Detail	<input type="checkbox"/> Received From
<input type="checkbox"/> Status	<input type="checkbox"/> Room
<input type="checkbox"/> Prepared Unit	<input type="checkbox"/> Sample #
<input type="checkbox"/> Acid type	<input type="checkbox"/> Sample Notes
<input type="checkbox"/> Date Range	<input type="checkbox"/> Sample Type
	<input type="checkbox"/> Seal Pack Type
	<input type="checkbox"/> Source Class
	<input type="checkbox"/> Status
	<input type="checkbox"/> Tissue
	<input type="checkbox"/> Tissue Type
	<input type="checkbox"/> Work Site

## Sample Number Template

A template was created by assigning a unique sample number to each tissue that is collected at autopsy. This increased the speed and accuracy of data entry by correlating specific tissues with standardized sample numbers. When a sample number is entered, THEMIS automatically populates the tissue fields, and *vice versa*. For example, when sample number "001" is entered, THEMIS automatically 'knows' that the specimen is a right lung.



## Retrievable Chain of Custody

A chain-of-custody form is automatically generated whenever samples are moved. It documents the following:

- Case and sample numbers.
- Sample descriptions.
- Custody date.
- 'To' and 'From' custody locations.
- USTUR staff member who moved the sample.
- A description of the shipping container.

The chain-of-custody form also provides three signature lines for relinquishing and receiving samples.

United States Transuranium and Uranium Registries			
CHAIN OF CUSTODY DOCUMENT			
From Location	To Location	Custody Date	
1847R AIRPORT LAB RM 150 FREEZER K21	1847R AIRPORT LAB RM 150 FREEZER K21	11/20/2009 10:59 AM	
Containers Moved By STACEY L MCCORD			
Sample was moved from Freezer K21 to Freezer K21			
List of Containers Moved including the samples in each container:			
Container #	Container Type	USTUR Sample #	Sample Description
00000002	Zip Bag - Large	001	Tissue - Frozen - Lung (Right)
00000002	Zip Bag - Large	002	Tissue - Frozen - Lung (Right)
00000002	Zip Bag - Large	003	Tissue - Frozen - Lung (Right)
00000002	Zip Bag - Large	004	Tissue - Frozen - Lung (Right)
00000002	Zip Bag - Large	005	Tissue - Frozen - Lung (Right)
00000002	Zip Bag - Large	006	Tissue - Frozen - Lung (Right)
00000002	Zip Bag - Large	007	Tissue - Frozen - Lung (Right)
00000002	Zip Bag - Large	008	Tissue - Frozen - Lung (Right)
00000002	Zip Bag - Large	009	Tissue - Frozen - Lung (Right)
00000002	Zip Bag - Large	010	Tissue - Frozen - Lung (Right)
00000002	Zip Bag - Large	011	Tissue - Frozen - Lung (Right)
00000002	Zip Bag - Large	012	Tissue - Frozen - Lung (Right)
00000002	Zip Bag - Large	013	Tissue - Frozen - Lung (Right)
00000002	Zip Bag - Large	014	Tissue - Frozen - Lung (Right)
00000002	Zip Bag - Large	015	Tissue - Frozen - Lung (Right)
00000002	Zip Bag - Large	016	Tissue - Frozen - Lung (Right)
00000002	Zip Bag - Large	017	Tissue - Frozen - Lung (Right)
00000002	Zip Bag - Large	018	Tissue - Frozen - Lung (Right)
00000002	Zip Bag - Large	019	Tissue - Frozen - Lung (Right)
00000002	Zip Bag - Large	020	Tissue - Frozen - Lung (Right)
00000002	Zip Bag - Large	021	Tissue - Frozen - Lung (Right)
00000002	Zip Bag - Large	022	Tissue - Frozen - Lung (Right)
00000002	Zip Bag - Large	023	Tissue - Frozen - Lung (Right)
00000002	Zip Bag - Large	024	Tissue - Frozen - Lung (Right)
00000002	Zip Bag - Large	025	Tissue - Frozen - Lung (Right)
00000002	Zip Bag - Large	026	Tissue - Frozen - Lung (Right)
00000002	Zip Bag - Large	027	Tissue - Frozen - Lung (Right)
00000002	Zip Bag - Large	028	Tissue - Frozen - Lung (Right)
00000002	Zip Bag - Large	029	Tissue - Frozen - Lung (Right)
00000002	Zip Bag - Large	030	Tissue - Frozen - Lung (Right)
00000002	Zip Bag - Large	031	Tissue - Frozen - Lung (Right)
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00000002	Zip Bag - Large	043	Tissue - Frozen - Lung (Right)
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00000002	Zip Bag - Large	047	Tissue - Frozen - Lung (Right)
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00000002	Zip Bag - Large	050	Tissue - Frozen - Lung (Right)
00000002	Zip Bag - Large	051	Tissue - Frozen - Lung (Right)
00000002	Zip Bag - Large	052	Tissue - Frozen - Lung (Right)
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00000002	Zip Bag - Large	082	Tissue - Frozen - Lung (Right)
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00000002	Zip Bag - Large	098	Tissue - Frozen - Lung (Right)
00000002	Zip Bag - Large	099	Tissue - Frozen - Lung (Right)
00000002	Zip Bag - Large	100	Tissue - Frozen - Lung (Right)

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