

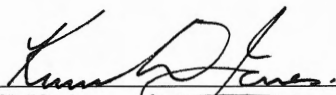


SNS-OPM 6.U-9  
 SNS Sample Management Procedure

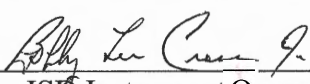
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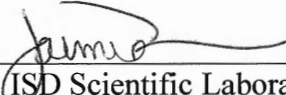
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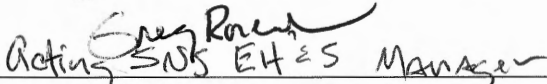
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Approved:  12.18.2014  
 SNS Operations Manager Date

Approved:  12-16-14  
 NScD Directorate Operations Manager Date

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Approved:  12/03/14  
 ISD Scientific Laboratories Team Leader Date

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 N&S EH&S/Operations Manager Date

Approved:  DEC 11 2014  
 SNS Radiation Safety Officer Date

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[SNS-OPM Editor](#)

**SNS-OPM 6.U-9**  
**SNS Sample Management Procedure**

1. **Purpose**

- 1.1 This procedure defines the Sample Management Process. This process includes:
- The approval of samples proposed for neutron scattering experiments.
  - The sample delivery, receipt, and tracking processes.
  - Performing or requesting sample activation calculations and gamma spectroscopy analysis.
  - Post irradiation sample handling activities including removal from the beam, removal from the RMA, on site transportation and sample manipulation activities.
  - The final disposition of the samples – offsite shipping, disposal, long term storage, and lastly the user check out process.

2. **Responsibilities**

- 2.1 Personnel performing this procedure are responsible for reading, understanding, and following this procedure, and for reporting problems encountered with this procedure to their appropriate line manager.
- 2.2 ISD Science Support is responsible for the implementation and maintenance of this procedure.

3. **Prerequisites**

- 3.1 None.

4. **Precautions**

- 4.1 None.

5. **Procedure**

5.1 Sample Approval

- 5.1.1 The User/Scientist proposes an experiment through the [Integrated Proposal Tracking System \(IPTS\)](#) and submits proposal for review and approval. No sample may be irradiated without an approved IPTS number.
- 5.1.2 Once the proposal has been approved, the User/Scientist is to confirm the sample information in the proposal system. Samples that have not been confirmed prior to arrival on site will be subject to delay.

## 5.2 Sample Delivery (Shipping, Hand-Carry, Creation, or Existing)

**NOTE:**

**There are four ways a sample may be presented for experimentation: postal delivery, hand carried, an existing onsite sample, or created from materials onsite prior to exposure.**

5.2.1 Postal Delivery: See guidance for [Sample Handling and Shipping](#).

5.2.1.1 Samples should arrive at ORNL 3 business days (7 business days preferred) prior to scheduled experiment.

5.2.1.2 Prior to shipping, confirm sample(s) is in the IPTS System.

5.2.1.3 Individually label each internal sample packaging with the sample constituents/formula, beam line name/number, and the IPTS number. A detailed packing list is required to be included for any additional materials and equipment included with sample shipments.

5.2.1.4 Include MSDS Sheets in packaging for all chemicals and known samples constituents. For novel materials, a MSDS may be created using the form: [Create MSDS](#).

5.2.1.5 Include any special handling requirements in the “Attention” line as shown in the shipping addresses given below.

- Non-Radioactive Sample

Attention: Special Requirements (ex. Store in freezer)  
To: Neutron Sciences User Sample IPTS#XXXX  
Oak Ridge National Laboratory/ SNS Site  
Chestnut Ridge Road, Bldg 8920  
Oak Ridge, TN 37830

- Radioactive Sample

Attention: Special Requirements (ex. Store in freezer)  
To: Neutron Sciences User Sample IPTS#XXXX  
Oak Ridge National Laboratory/ SNS Site  
Bethel Valley Road, Bldg 7001  
Oak Ridge, TN 37831

5.2.2 Hand Carry on Site.

- 5.2.2.1 Prior to bringing sample(s) to ORNL, confirm sample(s) in the IPTS.
- 5.2.2.2 Individually label each sample packaging with the sample constituents/formula, beam line name/number, and the IPTS number.
- 5.2.2.3 Package samples as appropriate with respect to any chemical, biological, and physical hazards present. Label packaging accordingly and include applicable MSDS. For novel materials, a MSDS may be created using the form: [Create MSDS](#).
- 5.2.2.4 Upon arrival on site, samples (and chemicals) shall be taken directly to the user lounge area and placed in the “Incoming User Samples and Chemicals” bin. Samples arriving outside of normal business hours (7:30 am- 5 pm) that are scheduled for irradiation the same day may be taken directly to the beam line and given to Instrument Staff. The Instrument Staff will take custody of the sample(s) and perform the steps in Section 5.3.

5.2.3 Existing Samples Stored at ORNL, actions initiated by Instrument Staff.

- 5.2.3.1 Using [Inventory Tracking of Equipment, Material and Sample database \(ITEMS\)](#), identify the sample and “Request Delivery”. This sends a request to the custodian of the control area where the sample resides.

**NOTE:**

**Consult the ITEMS and Sample Management Manual for instruction on the use of [ITEMS](#), The manual can be accessed by selecting the “HELP” tab in the [ITEMS](#) program.**

- 5.2.3.2 Only accept the transfer to an [ITEMS](#) control area when you physically have the sample.

5.2.4 New Sample(s) Created on Site.

- 5.2.4.1 Notify the beam line Scientific Associate or Scientific Laboratories Staff of the intent to create samples for neutron scattering experiments, provide the IPTS number, beam line name/number, and the chemical constituents/formula for the sample(s) to be created.

### 5.3 Sample Receiving

**NOTE:**

**Unless otherwise noted, the following steps apply to designated sample management staff members and Instrument Staff who contact/interact with samples.**

**All samples shall be entered into the [ITEMS](#) prior to irradiation and have an associated IPTS number. ITEMS is also used to track Material and Equipment that are used to support neutron scattering experiments, and are subject to irradiation.**

**Samples may be manufactured at ORNL, entered into the ITEMS program for tracking, but not subject to irradiation, and therefore not associated with an IPTS number.**

- 5.3.1 If the sample is marked as radioactive or released from a neutron facility, the person unpacking or controlling the sample must notify the RCT (Radiological Control Technician) to perform a Radioactive Material Receipt Survey if an RCT determines it is needed. Other facilities' release criteria may not match DOE criteria for Radioactive Material Control.
- 5.3.2 Using the [ITEMS](#) [Create Sample(s) from proposal] function, verify the samples to be irradiated are associated with an approved IPTS experiment, and that the samples have been confirmed. If so, proceed to Step 5.3.3. If not approved:

**NOTE:**

**Staff have flexibility to enter samples that do not exactly match the IPTS using criteria that includes but is not limited to:**

- 1) **The chemical composition has minor variations in dopants amounts or concentration of constituents;**
- 2) **The quantity of the particular sample is different.**  
**Example- the IPTS record listed 5 duplicates of a sample, yet the user sent 7. All 7 duplicates may be entered if the quantity satisfies scientific ethics and raises no new safety related concerns; or**
- 3) **Mass variations.**

- 5.3.2.1 If the sample(s) does not match the approved sample(s) description, staff requests the User/Scientist to enter the sample information as “new” in the IPTS sample confirmation area. The IPTS System generates an e-mail notification requesting immediate review to the Group Leader (or designee) and NScD ESH Support (or designee) to be completed and approved prior to the start of the experiment.
- 5.3.2.2 The User/Scientist may not use unapproved samples. The Science Support Staff retains sample custody until the approvals have been completed and communicated.
- 5.3.2.3 The Group Leader (or designee) gives approval/disapproval for the User/Scientist to proceed with the research using the changed sample(s).
- If approved, the Group Leader (or designee) replies to the IPTS generated email to communicate approval to the NScD ESH Support and Instrument Staff. Proceed to Step 5.3.2.4.
  - If disapproved, the Group Leader (or designee) provides the explanation for the disapproval to the User/Scientist and communicates the explanation in an email to the Instrument Staff and User Office. Science Support Staff retains custody of the sample until final disposition (ships to User destination, waste, return to archive).
- 5.3.2.4 The NScD ESH Support (or designee) gives approval/disapproval for the User/Scientist to proceed with the research using the changed sample(s).
- If approved, the EHS Support (or designee) replies to the IPTS generated email to communicate approval to the Group Leader, Instrument Staff and User Office. Proceed to Step 5.3.2.5.
  - If disapproved, the EHS Support (or designee) provides the explanation for the disapproval to the User/Scientist and communicates the explanation in an email to the Instrument Staff, User Office, and Group Leader. Science Support Staff retains custody of the sample until final disposition (ships to User destination, waste, return to archive).

5.3.2.5 Science Support Staff verifies (via IPTS) that the Group Leader (or designee) and NScD ESH Support Staff (or designee) have both approved the sample variance and reprints the Experiment Safety Sheet to reflect the new approved sample. Proceed to Step 5.3.3.

5.3.3 Enter sample(s) into **ITEMS**. The **ITEMS** record shall include:

5.3.3.1 Owner's name (defaults to principal investigator unless otherwise specified).

5.3.3.2 Descriptive sample name.

5.3.3.3 Chemical formula of sample composition.

5.3.3.4 Creation date of sample.

5.3.3.5 Applicable Special Requirements.

**NOTE:**

**All special handling instructions must be specified in the Special Requirements. If none are specified, handling at room temperature in air will be considered acceptable.**

5.3.3.6 Sample disposition identified as either "Sample Return" or "Sample Disposal."

**NOTE:**

**Sample will be stored for a maximum of 180 days post irradiation. The sample will then be disposed or returned unless approved for long term storage by the cognizant manager. Approval is granted on a case-by-case basis; see Section 10, 11, 12 for Sample Shipping, Disposal, and Storage.**

5.3.3.7 For samples that will be returned, confirm correct:

- Return shipping address for receiving radiological materials at the User's institution.
- The name of the Radiological Safety Officer (RSO) at the User's institution.

5.3.3.8 Identify all known hazards using the Hazards Present fields.

5.3.3.9 Include appropriate MSDS(s) using one or more of the following methods:

- Enter the RECID number for the applicable MSDS(s) found in the HMMIS database.
- Attach a scanned image of the associated MSDS(s) provided by the User.

- If an MSDS for the exact sample composition is not available, then select MSDS(s) for:
  - ✓ Constituents/ingredients of the sample, using compounds rather than elements when possible (e.g., Fe<sub>0.5</sub>Co<sub>0.5</sub>Zr<sub>7</sub>B<sub>4</sub> can be approximated by iron boride, cobalt boride, and zirconium boride).
  - ✓ Compounds with near-equivalent hazards and chemical properties.

5.3.4 Print label from [ITEMS](#), affix to an appropriately sized container/bag, and place the sample in the container/bag. For samples that will be created during the experiment, provide the container/bags and labels to the User/Scientists.

5.3.4.1 Ensure label contains ITEMS number, owner's name (principal investigator), sample composition, and the sample creation date.

5.3.5 Place the sample into the proper control area (locked storage cabinet, bin, etc).

5.3.6 If the sample is pre-existing, ensure that the [ITEMS](#) records are updated to reflect the current IPTS proposal and are transferred to the appropriate control area as necessary, see Section 5.4: Sample Tracking (ITEMS Transfer/Delivery).

#### 5.4 Sample Tracking (ITEMS Transfer/Delivery)

**NOTE:**

**Sample tracking is required in order to maintain accurate inventories of the sample control areas and to identify the location of a sample at any given time. The [ITEMS](#) database, along with good sample management practices and due diligence on the part of the Staff and Users, is used for this purpose. Manual entry inventory records are permissible to track sample transfer provided [ITEMS](#) is updated to reflect permanent transfer periodically (end of cycle). For detailed instructions on using [ITEMS](#), see ITEMS and Sample Management Manual help file.**



#### 5.4.1 Sample Transfers between Control Areas (or sub control areas).

- 5.4.1.1 Sample Custodian logs into [ITEMS](#) and;
- 5.4.1.2 Selects/enters the ITEMS sample number for transfer and selects “Transfer Selected Samples” then;
- 5.4.1.3 Selects the control/sub control area for where the sample will be transferred. The ITEMS database automatically sends an e-mail notification of the pending transfer to the custodian of the receiving control.
  - The email notification only occurs if the individual’s preferences indicate “yes” to email notification. These preferences are set by the ITEMS administrator via request of an individual. Otherwise, a custodian will see these as “Transfers I need to Accept” in the ITEMS home screen.
- 5.4.1.4 The sample status is automatically changed to “transfer pending”.
- 5.4.1.5 Physically transfer the sample to the incoming bin of the new control/sub control area, following the guidance given in the applicable sections of this procedure.
- 5.4.1.6 Only after the sample has been physically transferred, the receiving custodian will accept the transfer. The ITEMS record is automatically updated to reflect the new control/sub control area.

#### 5.4.2 Sample Delivery Request.

- 5.4.2.1 Any NScD Staff Member logs into [ITEMS](#) and;
- 5.4.2.2 Selects/enters the ITEMS sample number for transfer, the “Request Delivery” designation, and the control/sub control area for where the sample will be delivered.
- 5.4.2.3 ITEMS will automatically send an e-mail notification to the custodian of the receiving control area and the designated Sample Management Staff of the pending transfer.
  - The email notification only occurs if the individual’s preferences indicate “yes” to email notification. These preferences are set by the ITEMS administrator via request of an individual. Otherwise, a custodian will see these as “Delivery Requests” in the ITEMS home screen.
- 5.4.2.4 The Sample Status is automatically changed to Pending.

- 5.4.2.5 Sample custodian will arrange for delivery to new control area by bringing it personally or by requesting Science Support Staff to deliver it. This can be communicated through [ITEMS](#).
- 5.4.2.6 Only after the sample has been physically transferred, the receiving custodian will accept the transfer. The ITEMS record is automatically updated to reflect the new control/sub control area).

5.5 Sample Activation Calculations (SAC) and Gamma Spectroscopy Analysis and Release for radiological controls.

**NOTE:**

**The Sample Activation Calculator (SAC) is a tool that is used for determining the activation resulting from the exposure of elements to the specific neutron beam flux produced at the various Instrument Stations. The calculator is a useful tool in helping to determine sample specific handling requirements, shipping declarations, and holding/decay times for release. Typical usage would be for release of a sample to User's institution or to a waste stream.**

- 5.5.1 Science Support Staff will perform the SAC using the correct parameters.
- 5.5.2 The SAC can be accessed using a [UCAMS/XCAMS](#) login.
- 5.5.3 In order to obtain accurate sample activation calculations the following information is needed by the calculator.
  - 5.5.3.1 Sample composition.
  - 5.5.3.2 Sample mass or sample area, thickness, and density.
  - 5.5.3.3 Beam line(s) used.
  - 5.5.3.4 Specific beam characteristics, beam power, normalization factor, energy range of neutron spectrum (the default values are provided in the calculator).
  - 5.5.3.5 Irradiation time.
  - 5.5.3.6 Decay time.
- 5.5.4 For release or handling of a sample that has higher than predicted activity, Science Support Staff will request a Gamma Spectroscopy Analysis.

- 5.5.5 Release from radiological controls.
  - 5.5.5.1 Sample may be released from radiological control only by an RCT.
  - 5.5.5.2 RCTs will follow internal procedure NRPD-IG-2210 or NRPD-IG-2208 when determining if a sample may be released.
  - 5.5.5.3 Staff will be asked to provide process knowledge that may include a sample activation calculation.
  - 5.5.5.4 Release paperwork must accompany sample all the way to the waste stream as samples will not meet the “no rad added” policy and will likely be considered low level radioactive waste.
  - 5.5.5.5 Samples meeting release criteria (as determined by an RCT) may be handled without radiological constraints. This is equivalent to a non-radioactive sample but includes the requirement to maintain the release paperwork.
  - 5.5.5.6 All samples will be controlled under other applicable regulations such as chemical hazards or Department of Transportation regulations.

5.6 Sample Removal/Movement from Beam

**NOTE:**  
**The following steps apply to the Sample Environment staff, User/Scientist, Scientific Associates, Instrument Staff and RCTs.**

- 5.6.1 Precautions for sample removal/movement that must be observed at all times:
  - 5.6.1.1 If the sample appears damaged, ruptured, or leaking; do NOT approach the sample and contact an RCT immediately.
  - 5.6.1.2 Sample containers of powder or liquid samples must remain closed.
- 5.6.2 Removing samples from beam following irradiation:
  - 5.6.2.1 Ensure the beam shutter is closed.
  - 5.6.2.2 Prior to removing sample, follow all precautions contained in the associated Experiment Safety Summary (Users) or Research Safety Summary (Staff).
  - 5.6.2.3 Measure the activity level using a RadEye G Instrument.

**NOTE:**

**If you are not trained on the operation of the RadEye G, contact the RCT. Do not attempt to make the measurement without assistance from qualified staff members. At any time when the meter alarms, back away and contact an RCT.**

- If not already provided, obtain a RadEye G from the RCT.
- Press and hold the ON button of the RadEye G.
- Verify the Instrument is displaying the expected background (varying from 5  $\mu\text{R/hr}$  to 20  $\mu\text{R/hr}$  depending on location) in dose rate units (mR/hr or  $\mu\text{R/hr}$ ). If not, contact the RCT.
- Measure the contact (or near contact) dose rate with the + symbol on the back pointed toward the sample. Allow 30 seconds for the Instrument reading to stabilize and then read the displayed value.
- Turn off the RadEye G by pressing the MENU button 3 times.

5.6.2.3.1 If the measured activity from the activated sample is less than 2mR/hr,

- The sample may be removed from the sample position (or sample stick/sample environment as appropriate).
- Place the sample in the corresponding container/bag affixed with the ITEMS label.
- Apply an adhesive “Caution Radioactive Material” label to the sample container.



5.6.2.3.2 If the measured activity of the activated sample is greater than 2mR/hr, then:

- DO NOT move the sample, and contact an RCT who shall:
- ✓ Survey and remove the sample from the beam (or sample stick/sample environment as appropriate);
- ✓ Place the sample in the corresponding container/bag with ITEMS label; AND
- ✓ Apply an adhesive “Caution Radioactive Material” label to the sample container.

5.6.2.4 RCT and/or Instrument Staff will ensure the sample is properly stored at the beam line with respect to the measured dose rate (i.e. placed in the sample storage cabinet, placed in the outgoing sample bin, or in the designated radiation area for additional decay).

5.6.2.5 If the sample will be immediately relocated from the beam line (transferred between areas, shipped off site, or for disposal), initiate a sample transfer in ITEMS to the receiving control area. See Section 5.4.

## 5.7 Removing Samples from a Radioactive Material Area (RMA)

### 5.7.1 Samples removed from RMA:

5.7.1.1 Must remain in the container/bag affixed with the ITEMS label.

5.7.1.2 Will have a sample transfer initiated in ITEMS to the receiving control area or will be signed out on the Control Area Sample Inventory log sheets. See Section 5.4.

5.7.1.3 Cannot leave the ORNL site until released in accordance with Step 5.11.

5.7.1.4 Must follow additional requirements in Step 5.8 to be transported by vehicle within the ORNL Site.

### 5.7.2 Measure the sample dose rate as defined in Section 5.6.2.3.

#### 5.7.2.1 If the sample is greater than 2 mR/hr, then:

5.7.2.1.1 An RCT must survey the sample and apply the appropriate radiological marking or label prior to moving the sample outside the RMA.

5.7.2.2 If the sample is less than 2 mR/hr AND has NOT been surveyed and cleared for unrestricted release by the RCT, then:

5.7.2.2.1 The sample may ONLY be moved to another RMA.

5.7.2.2.2 The sample or sample container must be labeled “Caution Radioactive Material.”



5.7.2.2.3 The sample may be moved by:

- Staff Members with ORNL “Radiological Worker I,” OR
- Users with “Radiological Worker Training for HFIR and SNS Users.”

5.7.3 If the sample has been surveyed and cleared from radiological controls by an RCT, then Staff Members or Users may remove the sample from the RMA providing associated release documentation (including but not limited to: green tags, signed sample activation calculations and gamma spectroscopy results) accompanies it. The documentation needs to be scanned and attached to the ITEMS record.

5.8 Transporting samples by vehicle within the ORNL site to another RMA.

5.8.1 If asking Science Support Staff to transport samples, initiate a transfer in ITEMS (see Section 5.4) and place in the “Transport to HFIR” bin located in the gray cabinet on the south side of 8700 mezzanine near Beam Line 3. Expect the transport to happen within 3 business days. If needed sooner, contact Science Support Staff directly.

5.8.2 If transporting samples in person, initiate a transfer in ITEMS (see Section 5.4) and transport the samples in accordance with [SBMS Subject Area: On-Site Transportation of Hazardous Material](#).

- 5.8.2.1 For all samples,
- Individuals transporting samples must:
    - ✓ Be ORNL Staff Members,
    - ✓ Have completed Materials of Trade (MOT) Training, AND
    - ✓ Be qualified to operate a government vehicle: possess a valid driver's license (or a temporary driver's license) and are at least eighteen (18) years old.
  - The individual shall contact Transportation Management Organization (TMO) Staff, or other DOT trained staff approved by TMO to verify the materials qualify as Materials of Trade (MOT), prior to the transfer.
  - The responsible individual shall coordinate with the facility Science Support Staff to ensure:
    - ✓ Other processes (experiment safety summaries, job hazard analyses, etc.) have been used to identify chemical, biological, and physical hazards and implement appropriate controls.
    - ✓ The sample(s) is packaged in an appropriate container to prevent spillage/breakage.
    - ✓ ITEMS has been updated to reflect the location change.
  - The responsible individual must use a government vehicle to transport samples.

- 5.8.2.2 In addition to 5.8.2.1, for samples that have not been released from radiological controls,
- The responsible individual shall contact an RCT prior to transporting ANY irradiated sample(s), and must have RAD Worker I or II Training.
  - The RCT shall survey the sample and ensure appropriate radiological markings or labels and that the package exterior dose rate is less than 0.5 mrem/hr.
  - The responsible individual shall notify the RCT at the receiving facilities prior to transport.

5.9 Sample Handling/Manipulation Activities (Post Irradiation of Non Dispersible Solids, Dispersible Solids, and Liquids)

**NOTE:**

**All irradiated samples will be treated as low level radioactive materials unless they are released from radiological controls. All documentation (including but not limited to: green tags, signed SACs, gamma spectroscopy results) for release must accompany the sample to the eventual waste stream as it will not meet the “no rad added” requirement.**

**Contact an RCT prior to performing any sample handling activities not covered in this section to identify appropriate sample constraints and radiological handling requirements.**

**Stop work and contact an RCT if the sample becomes compromised (i.e., crystal shatters, dusty outer layer has formed).**

5.9.1 Non-dispersible solids (e.g. crystals, solid matter) not yet released from radiological controls (see Section 5.5.5).

5.9.1.1 Authorized Personnel/Training Requirements:

- Staff Members with Rad Worker I or II Training.
- Users with HFIR/SNS User Training.

5.9.1.2 PPE Requirements:

- PPE requirements are specific to the work location and sample composition.
  - ✓ Follow the PPE requirements for the work location as identified on laboratory postings and;
  - ✓ Follow the PPE requirements for chemical, biological, and physical hazards as specified on the Research Safety Summary (ORNL Staff), Hazard Analysis, Chemical worksheets, and/or Experiment Safety Summary (Users).

5.9.1.3 Sample Constraints:

- Contact Dose Rate < 2mR/h (Refer to Section 5.6.2.3 for the measurement procedure).
- Sample specific constraints identified on the Research Safety Summary (ORNL Staff), Hazard Analysis, Chemical worksheets, and/or Experiment Safety Summary (Users). These safety summaries’ are used to identify chemical, biological, and physical hazards and implement the appropriate controls.



- 5.9.1.4 Authorized Activities:
- Manipulations that do not involve grinding, cutting, polishing, heating, or destructive activities that could change the sample form or create dust.

- 5.9.1.5 Locations identified will have scheduled surveys and decontamination, they are:
- Designated Bench in 8700 sample prep labs.
  - Sample Processing Lab.
  - Designated bench at Instrument groupings.

- 5.9.2 Dispersible solids (e.g. powders, friable matter, or dusty matter) and liquids not yet released from radiological controls (see Section 5.5.5).

**NOTE:**

**Contact an RCT prior to performing any sample handling activities not covered in this section to identify appropriate sample constraints and radiological handling requirements.**

**Stop work and contact an RCT if the sample containment becomes compromised.**

- 5.9.2.1 Training Requirements/Authorized Personnel:
- Only ORNL Staff Members with Rad Worker II Training.
  - Laboratory Training and Access.
  - On the Radiation Work Permit (RWP) for the activity.
- 5.9.2.2 PPE Requirements:
- Follow PPE requirements as identified on the RWP.
  - Follow PPE requirements for chemical, biological, and physical hazards as identified on the Research Safety Summery (ORNL Staff), Hazard Analysis, Chemical worksheets, and/or Experiment Safety Summary (Users).

5.9.2.3 Sample Constraints:

- Sample specific constraints as identified on the Research Safety Summary (ORNL Staff), Hazard Analysis, Chemical worksheets, and/or Experiment Safety Summary (Users). These safety summaries' are to be used to identify chemical, biological, and physical hazards and implement the appropriate controls.
- Follow the "General Guidance for SNS & HFIR Samples – Not Beam line Specific" flow chart. See Figure 1.

5.9.2.4 Location:

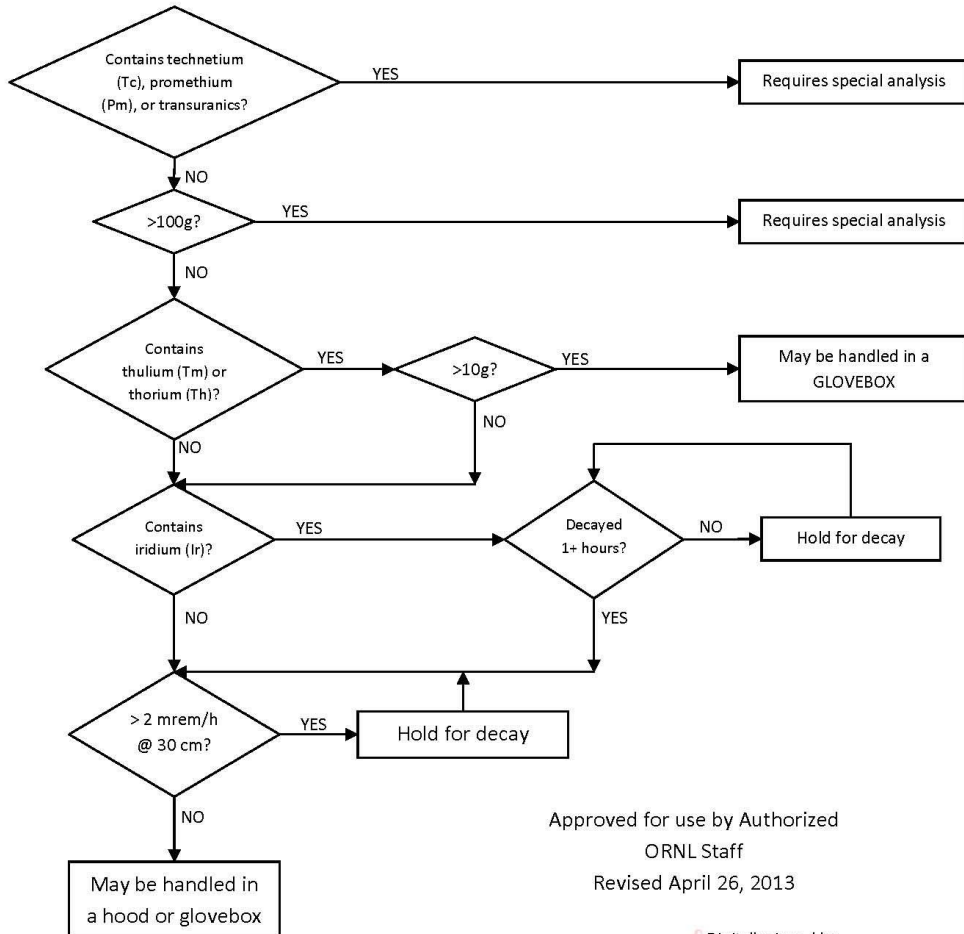
- Must be handled in the hood or glove box in the Sample Processing Lab.
- Samples requiring 'special analysis' according to Figure 1 will require a specific analysis by RPO to determine whether they can be safely handled in a hood.
- Samples require a survey by an RCT prior to removal from the lab work area following handling activities.

5.9.2.5 The Authorized Activities are:

- Transfer from one container to another container.
- Work inside the chemical fume hood or glove box.
- Dialysis or solvent exchange.
- Dilutions.
- Manipulation using lab equipment (sonicator, centrifuge, IR, HPLC and vacuum oven) provided exhaust or dust is sent to the hood or glovebox.
- Transfer to container for disposal.

General Guidance for SNS & HFIR Samples – not beamline specific  
WORK IN HOOD OR GLOVEBOX BY AUTHORIZED ORNL STAFF

**ALL ASSUME LESS THAN 2 WEEKS IRRADIATION AND AT LEAST 1 MINUTE DECAY TIME**



Approved for use by Authorized  
ORNL Staff  
Revised April 26, 2013

Digitally signed by  
Scott O. Schwahn (sus)  
Date: 2013.04.26  
09:53:13 -04'00'

**Figure. 1**

## 5.10 Sample Disposition

- 5.10.1 If samples have been consumed or destroyed in the experiment process, update the ITEMS record status to indicate “Sample Consumed.”
- 5.10.2 Move samples away from the beam line (storage, shipping, and container exchange, waste) once the samples are no longer in use and are ready to be stored or processed.
  - 5.10.2.1 Update all ITEMS information:
    - “Has been exposed to Neutron Beam” indicator.
    - Add any attachments.
    - Add comments and keywords where needed.
    - Assure that the ITEMS record is correct with respect to contents and container.
    - Make sure the Special Handling Requirements indicate environmental sensitivities.
  - 5.10.2.2 Place labeled, contained samples in the “To sample processing” bin.
- 5.10.3 Scientific Laboratories Staff will retrieve samples from the bin and transfer them to the sample processing area where they will await further workflow requests.
- 5.10.4 Scientific Support Staff will request one of the following workflow steps:
  - 5.10.4.1 Initiate Transfer to SNS-Ship As Is.
    - Samples will be shipped to location designated in the ITEMS record. Ensure that the location information is correct before request is made.
    - Samples will be shipped in the current container.
    - Transfer will only be accepted when the ITEMS record contains the required information to complete the task (MSDS, Hazard information, Shipping address, SAC (or equivalent)).
    - Scientific Laboratories Staff will complete the shipment with ORNL Transportation Management and update the ITEMS record.

5.10.4.2 Initiate Transfer to SNS-Empty then Ship,

- Samples will be shipped to location designated in the ITEMS record. Ensure that the location information is correct before request is made.
- Samples will be removed from the current container and placed in a glass vial unless otherwise instructed.
- Special handling requirements must be indicated or the sample manipulations will be done in ambient air.
- Transfer will only be accepted when the ITEMS record contains the required information to complete the task (MSDS, Hazard information, Shipping address, SAC (or equivalent)).
- Scientific Laboratories Staff will complete the shipment with ORNL Transportation Management and update the ITEMS record.
- Cans or cells will be cleaned and free of surface contamination. They are then returned to the beam line specific storage area by Scientific Laboratories Staff.

**NOTE:**

**Samples requested as “waste as is” and “empty then waste” will not be required to have sample activation calculations attached. If release paperwork exists, it will accompany the sample to disposal, but is not required.**

5.10.4.3 Initiate Transfer to SNS-Waste As Is,

- Samples will be added to an ORNL waste stream.
- Samples will be discarded in the current container.
- Transfer will only be accepted when the ITEMS record contains the required information to complete the task (MSDS, Hazard information).
- Scientific Laboratories Staff will facilitate the disposal with the WSR (Waste Services Representative) and update the ITEMS record.

5.10.4.4 Initiate Transfer to SNS- Empty then Waste,

- Samples will be added to an ORNL waste stream.
- Samples will be removed from the current container and placed in a glass vial unless otherwise instructed.
- Transfer will only be accepted when the ITEMS record contains the required information to complete the task (MSDS, Hazard information).
- Scientific Laboratories Staff will facilitate the container exchange and the disposal with the WSR and update the ITEMS record.

- Cans or cells will be cleaned and free of surface contamination. They are then returned to the beam line specific storage area by Scientific Laboratories Staff.

5.10.4.5 Initiate Transfer to Storage.

**NOTE:**

**It is the expectation of NScD Management that User-owned sample(s) will be returned as soon as possible after the completion of the experiment. NScD will not serve as a repository for User-owned sample(s) in order to prevent loss of process knowledge and additional legacy waste. Long-term storage (greater than six months) of non-NScD-owned samples is discouraged.**

- The Scientific Support Staff will initiate the transfers.
- Transfer will only be accepted when the ITEMS record contains the required information to complete eventual disposal (MSDS, Hazard information including time sensitive information).
- The Science Group Leaders are responsible for reviewing the NScD Staff-owned samples in long-term storage on an annual basis. They will receive annual inventory reports from Scientific Laboratories Staff. It is also the Science Group Leaders' responsibility to indicate if there are samples that their group no longer wishes to retain. These will be disposed of at their cost.
- Samples that are approved for long term storage are to be transferred to the appropriate designated long term storage cabinet.

5.11 Off Site Shipping (releasing samples for transport off ORNL site in accordance with [SBMS Subject Area: Off-Site Transportation of Nonhazardous, Hazardous and Radioactive Materials, and Hazardous Waste Shipments](#)). Scientific Laboratories Staff will complete the process below upon initiation of the shipping workflow through ITEMS (Section 5.10).

- 5.11.1 Provide the RCT with applicable process knowledge, gamma spectroscopy results or a sample activation calculation (SAC).
- 5.11.2 The RCT shall survey the sample in accordance with NRPD-IG-2210, [Clearance of Potentially Activated Items and Material from ORNL Facilities](#) and provide a copy of the completed survey report to the responsible individual.

- 5.11.3 The responsible individual shall coordinate with the Sample Management Staff to ensure:
  - 5.11.3.1 The sample(s) is packaged in an appropriate container to prevent spillage/breakage.
  - 5.11.3.2 If manipulation of samples is required, other processes (experiment safety summaries, research safety summaries, job hazard analyses, etc.) are used to identify chemical, biological, and physical hazards and implement appropriate controls.
  - 5.11.3.3 [ORNL-19](#) or [ORNL-28](#) (Radioactive Material) Shipping Order has been completed and signed and the sample(s) has been placed in secure inner packaging. DOT packaging will be done by TMO.
  - 5.11.3.4 The sample is delivered to ORNL Transportation Management Group for shipment using the radioactive (8700) or non-radioactive (8600 G-201) pick-up areas.
  - 5.11.3.5 ITEMS entries are completed to reflect the final disposition of the sample and the shipping and release forms are uploaded.

## 5.12 User Hand Carry Samples Offsite

- 5.12.1 Samples that Users wish to carry offsite will have to meet the criteria below.
  - 5.12.1.1 U.S. Department of Transportation non-regulated.
  - 5.12.1.2 Released from radiological control.
- 5.12.2 Scientific Support Staff will initiate the completion of the Hand Carry Form.
  - 5.12.2.1 Requires that the DOT Hazard Review has been completed and samples have been determined to be U.S. Department of Transportation non-regulated. Takes 1-2 business days minimum per TMO.
  - 5.12.2.2 Radiological certification of release paperwork.
- 5.12.3 Scientific Support will attach the ITEMS record and update status to “User transports offsite.”

6. **Documentation**

6.1 None.

7. **References**

- 7.1 Integrated Proposal Tracking System (IPTS)  
(<http://www.ornl.gov/sci/iums/ipts/login.shtml>)
- 7.2 Sample Handling and Shipping  
([http://www.ornl.gov/adm/User\\_facilities/shipsamples/](http://www.ornl.gov/adm/User_facilities/shipsamples/))
- 7.3 Creation Form for MSDS  
([http://www.ornl.gov/adm/User\\_facilities/shipsamples/MSDSform.pdf](http://www.ornl.gov/adm/User_facilities/shipsamples/MSDSform.pdf))
- 7.4 Inventory Tracking of Equipment, Material and Sample (ITEMS):  
(<http://snsapp1.sns.ornl.gov/ITEMS>)
- 7.5 UCAMS/XCAMS Login  
(<https://sac.ornl.gov/>)
- 7.6 SBMS Subject Area: On-Site Transportation of Hazardous Material  
(<https://sbms.ornl.gov/sbms/SBMSearch/subjarea/onsite/sa.cfm>)
- 7.7 SBMS Subject Area: Off-Site Transportation of Nonhazardous, Hazardous and Radioactive Materials, and Hazardous Waste Shipments  
(<https://sbms.ornl.gov/sbms/SBMSearch/SubjArea/OffSiteTrans/pro1.cfm>)
- 7.8 ORNL-19  
(<https://portal02.ornl.gov/sites/forms/repository/ORNL-19.pdf>)
- 7.9 ORNL-28  
(<https://portal02.ornl.gov/sites/forms/repository/ORNL-28.pdf>)



8. **Attachments**

8.1 None.

9. **Revision History**

- Rev. 00 August 23, 2013 – Original version.
- Rev. 01 November 19, 2014 – Deleted “?” in 5.2.1.2, added “is” after sample(s) in 5.2.1.2, added note before 5.10.4.2 about SACs requirements, on pg.1 changed “ISD Science Support Group Leader” to “ISD Scientific Laboratories Team Leader” and contact from “Chrissi Schnell” to “Jaimie Werner”, accepted comment to change 5.6.2.4 and 5.6.2.5 to 5.6.2.3.1 and 5.6.2.3.2, accepted comment to change 5.7.3 and 5.7.4 to 5.7.2.1 and 5.7.2.2.

10. **Training**

- This will be distributed as a required reading for individuals that interact with samples at the SNS beam lines. This includes but is not limited to Scientific Associates, Instrument Scientists, Scientific Laboratory Staff, Instrument Hall Coordinators, Sample Environment Staff, and Radiation Control Technicians assigned to SNS.