

PRIME Lab: Purdue Rare Isotope Measurement Laboratory - Physics Department

Accelerator mass spectrometry of ^{10}Be , ^{14}C , ^{26}Al , ^{36}Cl , ^{41}Ca , ^{129}I

For Users

Title: SAMPLE CHAIN OF CUSTODY

Maintainer: Marc Caffee (to whom changes and suggestions should be sent)

Chain of Custody is a legal term that refers to the ability to guarantee the identity and integrity of the sample from collection through AMS measurement to billings. It is a process used to maintain and document the chronological history and critical data of the samples, and to ensure that the sample has been in possession of, or secured by, and treated by a responsible person at all times.

The sample related data are stored in our PostgreSQL database. The database administrator must keep the database running smoothly to ensure the data are searchable and accurate.

Information Provided by Submitters

[Directions for sample submission](#) are on the [PRIME Lab home page](#). In general, after the sample submission agreement is electronically signed, professional information about the submitter, scientific information about the samples, and sample payment information will be requested. Examples of submitter information include mailing address, e-mail address, and phone number. The scientific information necessarily includes information about the project and funding agency. PRIME Lab is an NSF facility and NSF samples receive a measurement subsidy. Other information includes the isotope to be measured, sample type (rock etc.), the sample identification assigned by submitter, etc.

PRIME Lab chain of Custody

Sample Arrival

Package is opened, samples are inspected, and samples are compared to the sample submission paperwork. Any questions on what processes/procedures are to be performed or questions on billing will be communicated to the submitter before input into the PRIME Lab database system.

Sample Database Input

All information about the samples including Name, Location, Submitter, Sample Type (water, rock, etc.), estimated Isotopic Ratio, Billing, and other relevant information are input into the PRIME Lab database. After input, the assigned unique nine-digit PRIME Lab identification number traces each sample during processing, AMS measurement, and billing.

Typical internal custody chains are:

For rock needing beryllium-10 and aluminum-26 measurements: Physical Processing Technician who performs crushing, pulverizing, sieving, and then all steps to extract and purify quartz; Chemical Technician who performs quartz dissolution, isolation and purification of isotopes, and packs the resultant oxides into holders; AMS Engineer/Operator who performs the AMS measurement on the packed holders. Physical data collected during this

process: date samples crushed, date samples finished physical processing, date samples start chemical processing, sample mass, carrier concentration and mass, all masses related to the measurement of aluminum native to the sample, date samples finish chemical processing, holder number, AMS wheel position for the holder.

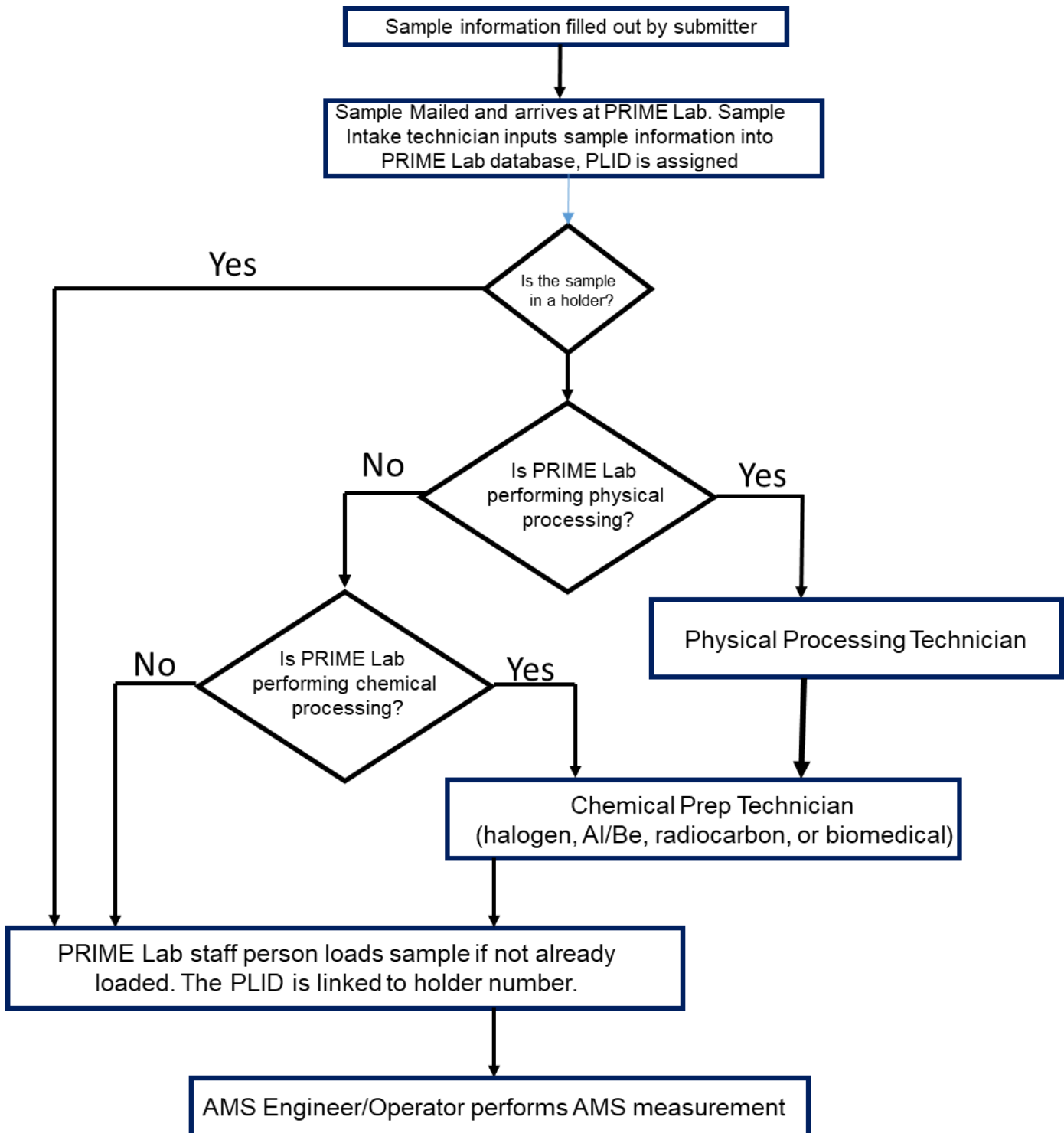
For whole rock needing chlorine-36 measurements: Chemical Technician who performs crushing, pulverizing, sieving, and then rock dissolution, isolation and purification of the isotope, and packs the resultant silver chloride into holders; AMS Engineer/Operator who performs the AMS measurement on the packed holders. Physical data collected during this process: date samples crushed, date samples start chemical processing, sample mass, carrier concentration and mass, yield of silver chloride, date samples finish chemical processing, holder number, AMS wheel position for the holder.

For water needing chlorine-36 measurements: Chemical Technician who performs the isolation and purification of the isotope, and packs the resultant silver chloride into holders; AMS Engineer/Operator who performs the AMS measurement on the packed holders. Physical data collected during this process: date samples start chemical processing, sample mass, carrier concentration and mass, yield of silver chloride, date samples finish chemical processing, holder number, AMS wheel position for the holder.

For water needing iodine-129 measurements: Chemical Technician who performs the isolation and purification of the isotope, and packs the resultant silver iodide into holders; AMS Engineer/Operator who performs the AMS measurement on the packed holders. Physical data collected during this process: date samples start chemical processing, sample mass, carrier concentration and mass, yield of silver iodide, date samples finish chemical processing, holder number, AMS wheel position for the holder.

What follows is a flow chart that summarizes the PRIME Lab chain of custody for every sample.

PRIME Lab Sample Custody Flow Chart

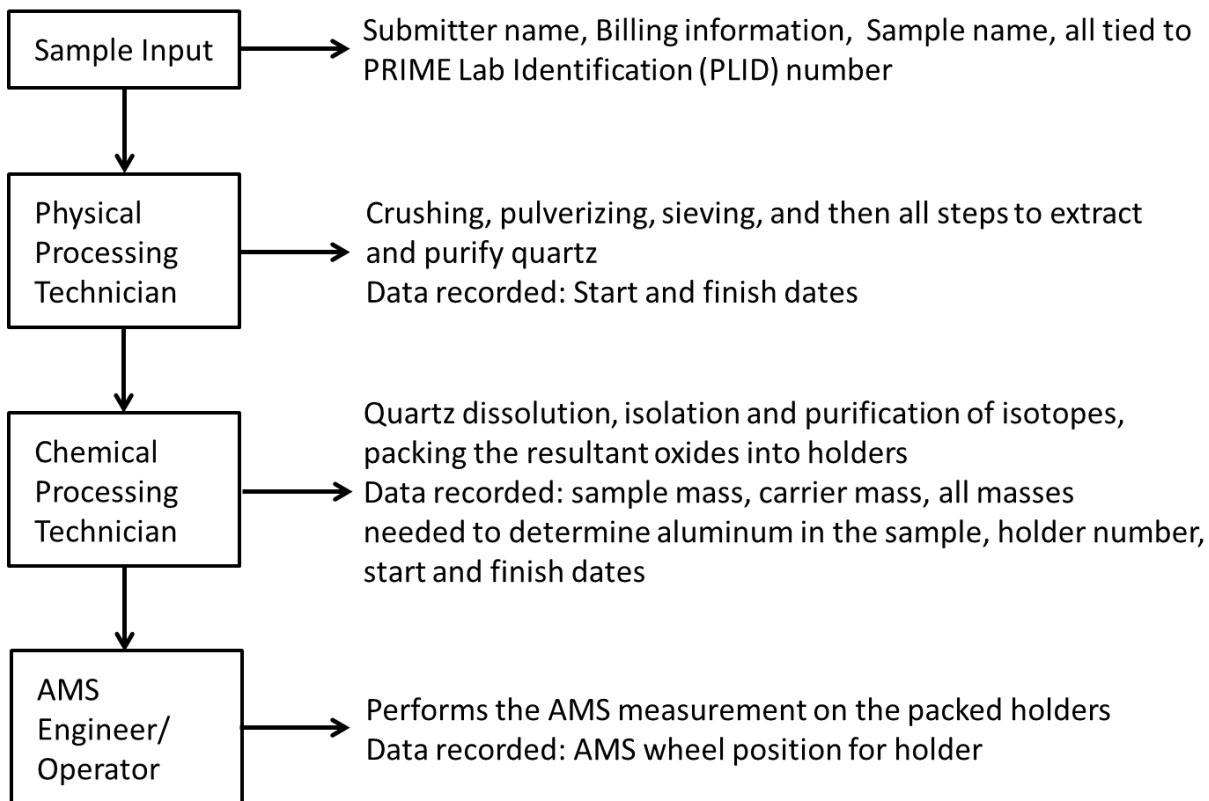


Sample Holder

Holder information: If sample arrives already loaded into a holder, the PRIME lab personnel who have custody of the sample are the Sample Intake Technician who inputs all relevant information into the PRIME Lab database and AMS Engineer/Operator who performs the AMS measurement on the packed holders. All holders are numbered and the number is unique for the holder. This provides another unique ID that is associated with the sample and input into the database.

Note that the final sample is destroyed during AMS measurement; PRIME Lab will not send back measured holders to a submitter due to the presence of corrosive cesium hydroxide on the holder.

An example of a typical chain of custody for aluminum and beryllium samples appears below –



[email your suggestions
to Marc Caffee](#)

Purdue University, West Lafayette, Indiana 47907 USA, Phone: (765) 494-4600

[Copyright © 2021, Purdue University, all rights reserved.](#) Purdue University is [an equal access/equal opportunity university](#). If you have trouble accessing this page because of a disability, please contact the Physics Webmaster at www@physics.purdue.edu.