GENESIS SOLAR WIND SAMPLE CURATION DOCUMENTATION. J. H. Allton[1], [1]NASA/Johnson Space Center, 2101 NASA Parkway, MC XI2, Houston, TX, USA, 77058, judith.h.allton@nasa.gov.

Introduction: A scientist with experience as a sample science analyst, provider of flight hardware for multiple missions, and senior engineer in an ISO 2000-rated manufacturing plant has described the timeline of key participants in any PI-led sample return mission, the breadth of the organizations involved [1,2], and, of interest to this meeting, choosing the types of data to preserve and issues of future data accessibility. This work broadens that perspective by giving similar lessons from Genesis sample curation point-of-view. Curation participation regarding data gathering was part of the mission review process from the beginning. Genesis' story illustrates outcome of several choices about types of data to record and preserve. Precision analysis of solar wind atoms captured in pure, ultraclean substrates is the driving science goal; therefore, detailed documentation was captured from all mission and curation phases and from investigator laboratories because these processes affect the final analytical results [3].

Pre-flight: *Design and fabrication of the spacecraft*. Like many modern small sample return missions, Genesis was a tightly managed team integrated across science, engineering and curation. Communication across the team was excellent, and, for the most part, the hands-on engineering technicians understood the impacts of "small choices" they routinely make, and the eyes-on oversight of manufacturing processes by scientists was mindful of details. The payload was designed by the Jet Propulsion Laboratory and the spacecraft by Lockheed Martin. Solar wind collectors and instruments were fabricated by multiple vendors and laboratories. The main portion of the payload was assembled at JSC. Fabrication procedures and contamination-control data (with witness coupons) were stored primarily at JSC.

The original composition, dimensions and configuration of components, results of thermal testing, etc. are still needed for interpretation of analytical data. At times, these must be estimated from secondary information acquired pre-flight. Moreover, some files (e.g., original 3-D models and early Powerpoint) cannot be opened using software. Archived curation data includes 2-D drawings, material usage lists, QA documentation and analyses of consumables used during fabrication. Important chemical information still resides in archived hardware, paints and lubricants, material coupons, cleaning coupons, environmental witness plates and reference materials from manufacturing facilities.

Purity and cleanliness of collector substrates. Semi-conductor vendors provided surface cleanliness data and some purity data. Purity for specific elements of interest was verified by science team members in their laboratories [4]. Curation archived procurement and shipping records, analysis reports, and non-proprietary fabrication data. A physical archive of flight collector reference materials is maintained for future use so additional data can be collected as analytical techniques improve. These are of increased value due to the hard landing upon re-entry.

Cleaning and cleanliness assessments of flight hardware. Cleaning of the science canister payload was performed at JSC in a dedicated ISO 4 cleanroom using ultrapure water (UPW). The cleanliness of this UPW was monitored throughout processing. The archive for the clean lab also includes airborne particle counts, airborne molecular and inorganic contamination measurements as well as cleanroom construction material coupons and witness coupons. Hardware cleanliness was assessed by particle counts in rinse water batches. This information is recorded in batch cleaning forms and logbooks, and are, perhaps, of decreased value due to the hard landing.

Post-flight: *Curation-generated data.* The curation handling history of each Genesis sample is documented in a typical astromaterials sample database which captures sample location, physical description and characterization data. Samples have a "shelf life". Crucial to the preservation of samples is ongoing documentation of the sample environment, initially under curatorial control but is now a separate facility function which requires coordination.

PI-generated data. Data on sample characterize-ation and cleaning techniques continues to be generated by sample users [5]. These are often captured in LPSC abstracts, but these "engineering" results often are not publishable as stand-alone papers. We are actively looking for ways to make this information more accessible to users. Ion implants into samples have aided science return and can be shared among investigators. These (and similar) materials should be added to the curatorial collection with appropriate process and characterization data generated externally.

Summary: Complete data archives for returned astromaterial samples must be broad in types and formats, and inclusive of environmental monitoring.

References: [1] Jurewicz A. J. G (2021) this workshop. [2] Jurewicz A. J. G. (2011) *SSSR Workshop,* Abstract #5053 (LPI). [3] Allton J. H. *et al.* (2018) 49th LPS, Abstract #1671. [4] Jurewicz A. J. G *et al*. (2003) *Space Sci. Rev*. 105, 535-560. [5] Jurewicz A. J. G. *et al.* (2021) *JAAS* 36:194-209.