

# National Argon Map: an AuScope Initiative

## $^{40}\text{Ar}/^{39}\text{Ar}$ Geochronology Laboratory Sample Submission Form

This form must be completed and returned to Marnie Forster ([Marnie.Forster@anu.edu.au](mailto:Marnie.Forster@anu.edu.au)) before any work can be commenced in the Argon Laboratories.

<b>Person submitting samples:</b> Joel Fitzherbert
<b>Affiliation:</b> GSNSW
<b>Project Title:</b> Cobar Basin geochronology
<b>Sample Number(s) (including IGSN if one exists):</b> NSWJAF0270.01A
<b>Mineral separation required? Yes or No:</b> Yes
<b>Date submitted:</b>

<b>GEOGRAPHIC AREA/ PROVINCE/ BASIN :</b> Cobar Basin, Mount Hope Trough	
<b>1:250k SHEET NAME:</b>	<b>NUMBER:</b>
<b>1:100k SHEET NAME:</b> Mount Allen	<b>NUMBER:</b> 8032
<b>LOCATION METHOD: (GPS: WGS84 / AGD66 / AGD84 / GDA94)</b> GDA94	
<b>ZONE:</b> 55	
<b>EASTING:</b> 378814.419	<b>NORTHING:</b> 6386977.097
<b>LATITUDE:</b> -32.648070649613	<b>LONGITUDE:</b> 145.70788611449

<b>STRATIGRAPHIC UNIT FORMAL NAME *:</b> Mount Kennan Volcanics
<b>STRATIGRAPHIC UNIT INFORMAL NAME:</b>
<b>LITHOLOGY:</b> Thick package of volcanogenic mass flow with occasional limestone blocks within a siltstone-rich package.

<b>DRILLHOLE ID (if applicable):</b> WTRCD141
<b>PROSPECT (if applicable):</b> Southern Nights
<b>DEPTH FROM (metres):</b> 660.20
<b>DEPTH TO (metres):</b> 660.50

\* Stratigraphic Unit names can be searched and checked within the Australian Stratigraphic Units Database via the following link: <https://asud.ga.gov.au/>

### Dating Objective

**What is the geological question  $^{40}\text{Ar}/^{39}\text{Ar}$  analysis will address?**

The Wagga Tank-Southern Nights prospects are as yet to be dated. Pb model ages suggest a 380 Ma age for mineralisation (Fitzherbert and Downes 2020), but recent company models imply a VHMS origin (Edgecombe and Soinenen 2019), which would imply an age of ~420 Ma, similar to the host volcanic sequences.

**What type of age(s) are expected? (e.g. magmatic crystallisation, metamorphism, fluid alteration/mineralisation, cooling, shearing etc):**

White mica = alteration/mineralisation, K-feldspar = magmatic

**Mineral target(s) for dating:**

White Mica

**Estimated  $^{40}\text{Ar}/^{39}\text{Ar}$  age (e.g. Cenozoic, Mesozoic, Paleozoic, Proterozoic, Archean – provide estimated numerical age range if possible):**

Paleozoic 420-380 Ma

### Sample Information

**Location description (e.g. a sample of x was collected from y, z km from abc town):**

Sample taken from drill core through the Southern Nights orebody west of Mount Hope township.

**Lithological characteristics (rock description):**

Intensely sericite altered polymictic conglomerate (mass flow). Clasts include rhyolitic volcanics, limestone and abundant intrabasinal sedimentary rock clasts. Host lithology is overprinted by zoned of intense sericitic alteration, galena/sphalerite-rich mineralisation and quartz veining (see photos below).

***Relative age constraints (pertinent geological relationships with surrounding rock units and any previous geochronology):***

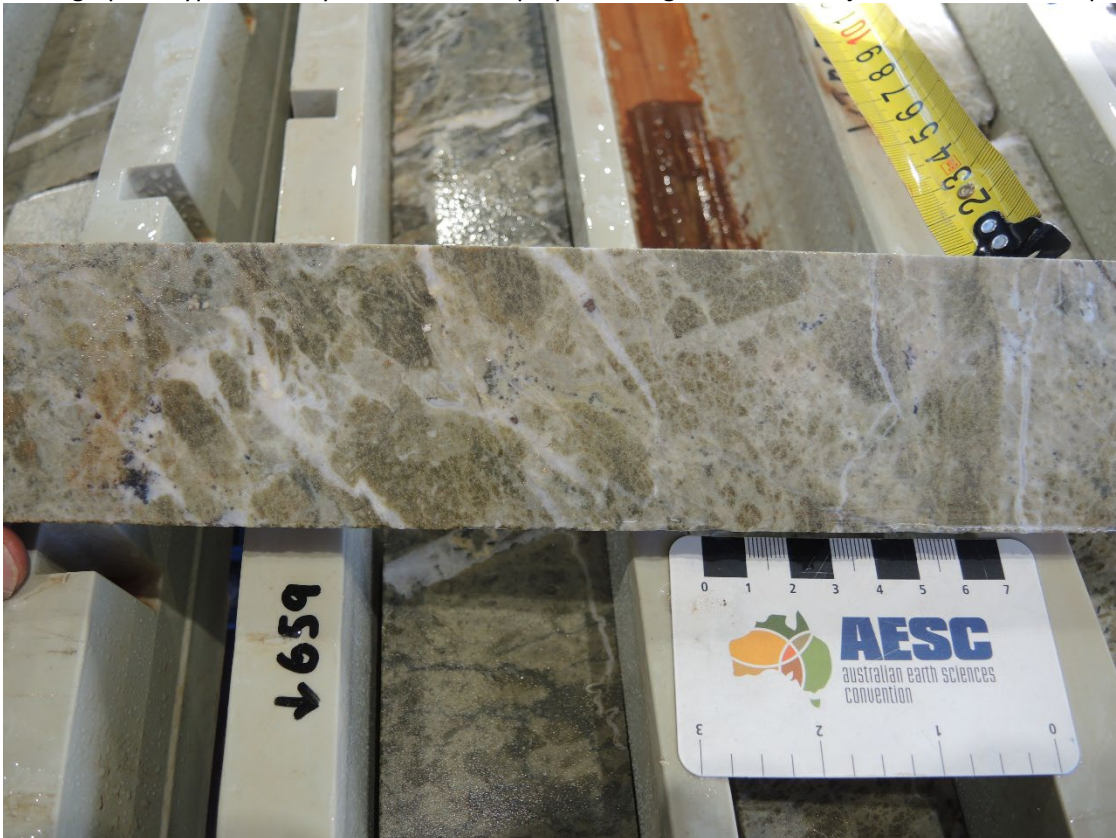
A foliation (likely Tabberabberan) overprints the sericitic alteration.

***Thin section description (if available):***

***Photograph(s) e.g. field site, hand-specimen, photomicrograph:***



Photograph of typical weakly sericite altered polymict conglomerate from just beneath the sample interval.



Photograph of intensely sericite altered, brecciated and quartz veined interval of the conglomerate (mass flow).

**Relevant bibliographic references:**

Fitzherbert, J.A. and Downes, P.N. 2020. A mineral system model for Cu–Au–Pb–Zn–Ag systems of the Cobar Basin, central Lachlan Orogen, New South Wales. Geological Survey of NSW report, GS2021/0042.

Edgecombe D. & Soininen L. 2019. Wagga Tank / Southern Nights and Mallee Bull, evolving stories. Mines and Wines 2019 – Discoveries in the Tasmanides, Sydney Mineral Exploration Discussion Group, (published online at <https://www.smedg.org.au/papers-2019.html>).