National Argon Map: an AuScope Initiative
$^{40}Ar/^{39}Ar$ Geochronology Laboratory Sample Submission Form

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

Person submitting samples: Joel Fitzherbert
Affiliation: GSNSW
Project Title: Cobar Basin geochronology
Sample Number(s) (including IGSN if one exists): NSWSJAF0270.01B
Mineral separation required? Yes or No: Yes
Date submitted:

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

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

DRILLHOLE ID (if applicable): WTRCD141
PROSPECT (if applicable): Southern Nights
DEPTH FROM (metres): 644.45
DEPTH TO (metres): 644.75

* 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 $^{40}Ar/^{39}Ar$ 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 Soininen 2019) , which would imply and 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 $^{40}Ar/^{39}Ar$ 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.

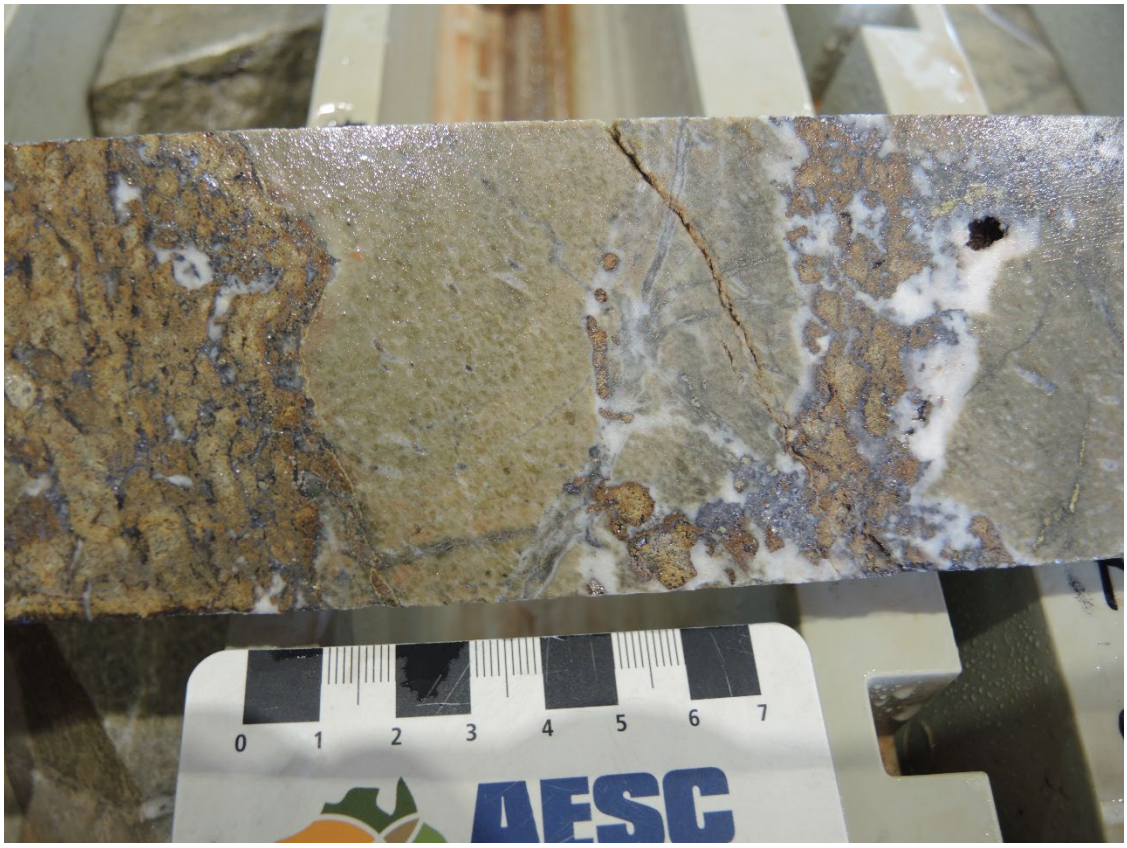
Lithological characteristics (rock description):

Intensely sericite altered amygdular rhyolite adjacent to the Southern Nights orebody. Samples is brecciated and mineralised. Rhyolite is likely a clast or block within the sequence.

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:



Sampled section through the Southern Nights mineralisation. Strongly sericite altered rhyolite (yellow) is crosscut by sphalerite-galena rich veins. Only the sericite altered rhyolite was sampled.

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).