

SUPPLEMENTAL FILE 1

CRITICAL DATA FOR OUTFLOW IGNIMBRITE COOLING UNITS IN SELECT STRATIGRAPHIC SECTIONS IN THE CENTRAL NEVADA IGNIMBRITE FIELD

Section descriptions begin in “outflow alley” between the Indian Peak-Caliente and Central Nevada caldera complexes on the east and progress westward into the Central Nevada complex. For additional data (locations, complete chemical and modal analyses, etc.) see other Supplemental Files in this article and in Best et al., [2013b].

Explanation of terms

Stratigraphic unit: Name of the stratigraphic unit or brief description if not named. Units erupted from the Central Nevada caldera complex unless otherwise noted--(I) from the Indian Peak-Caliente caldera complex described in Best et al. (2013b); and (wNV) for Western Nevada field (Henry and John, this themed issue). The Wells Station section contains the Nine Hill Tuff (formerly unit D of Bates Mountain Tuff) which has a source in western Nevada (Deino, 1985)

Sample: For stratigraphic units in the Central Nevada field, the first letter denotes the stratigraphic unit (see Table 1 for letter symbols); the second and any additional letters/numbers are specific for that sample/site. Letters are capitalized for an unquestionable stratigraphic identity or correlation (e.g., YG); lower case for uncertain or only possible correlation/identity (yj). For stratigraphic units derived from the Indian Peak-Caliente caldera complex, sample numbers are mnemonic for the topographic quadrangle followed by a number for the sample site and a letter for position in the stratigraphic sequence, beginning at the base (e.g., SHNG-1E is sample in the Shingle Pass quadrangle at site 1, fifth unit up from base of section).

PM sample: Paleomagnetic sample site from Gromme and Hudson (this themed issue).

Thick: Thickness in meters of the entire cooling unit at the site. Measured in the field by M.G. Best where no geologic map is available. Where only a partial section is exposed, the thickness in meters is indicated as, e.g., >24. Where the thickness is variable as, e.g., ~30. Where the identity of the unit is uncertain as, e.g., 45?

Mode: Modal proportions (volume % of phenocrysts) are listed in the following order: plagioclase/quartz/sanidine/biotite/hornblende/clinopyroxene/orthopyroxene/opaque//volume % of total phenocrysts in whole rock. Mode is underlined if it is an average for unit; otherwise mode is specific for sample in this stratigraphic section. Modes for the Lower Tuff Member of the Shingle Pass Formation include 1-2 % altered Fe-rich olivine. Modes for the Lund Formation and Silver King Tuff include a trace of titanite.

Age: $^{40}\text{Ar}/^{39}\text{Ar}$ ages in millions of years referred to Fish Canyon Tuff sanidine irradiation monitor at 28.20 Ma. If \pm (one sigma) is indicated, the age is for the sample from this section; otherwise, cited age is weighted mean for unit from Table 1.

SUPPLEMENTAL TABLE 1.1

Stratigraphic section in Milk Ranch Canyon in the southern Egan Range on the Brown Knoll, Nevada 7.5 minute topographic map at approximately 38°45' 20"N, 114°54' 20"W.

<u>Stratigraphic unit</u>	<u>Sample</u>	<u>PM</u> <u>sample</u>	<u>Thick</u>	<u>Mode</u>	<u>Age</u>
Sandstone and conglomerate, clasts of Paleozoic rocks					
Pahranagat Formation	AE	0-20		<u>31/28/35/5/0/0/0/1//20</u>	22.93
Sandstone and conglomerate, clasts of Paleozoic rocks					
Shingle Pass Formation					
Upper Tuff Member (?)	zc		<10	<u>54/<1/32/8/1/1/2//8</u>	26.36
Lower Tuff Member of	XD		35	<u>34/10/48/2/<1/1/2/3//14</u> 27.16	
Wah Wah Springs Formation (I)		4L121	0-30	<u>59/5/0/10/19/3/0/4//32</u>	30.06
Cottonwood Wash Tuff (I)			~ 5	<u>55.6/11.6/2.6/12.2/12.1/0.8/0/5.1//39.1</u>	31.13
Windous Butte Formation	WE	4L113	90	<u>51/20/13/10/3/1/<1/2//30</u>	31.73
Intermediate composition lava flows			>100		
Conglomerate, clasts of Paleozoic rock		~5			
Stone Cabin Formation					
Upper Tuff Member	SA	4L129		31/42/20/7/0/0/0/<1//33 35.77	
Middle Tuff Member	SP		~60	36/29/27/7/0/0/0/<1//29 35.87	
Bedded tuff, limestone, and conglomerate of Paleozoic rocks					
Paleozoic rocks					

SUPPLEMENTAL TABLE 1.2

Stratigraphic section at Shingle Spring in the southern Egan Range on the Shingle Pass, Nevada 7.5 minute topographic map at approximately 38° 33' 00"N, 114° 56' 00"W.

Stratigraphic unit	Sample	PM sample	Thick	Mode	Age
Pahranagat Formation	AZ	7L435	20	31/29/34/5/tr/0/0/1//18	22.96±0.05
Condor Canyon Formation (I)					
Bauers Tuff Member		7L425	10	<u>49/0/44/6/0/<1/0/1//15</u>	23.07±0.08
Conglomerate, clasts of Wah Wah Springs Formation			~10		
Shingle Pass Formation					
Upper Tuff Member	ZX	7T533, 7T541	40	51-57/<1/27-31/8-10/2-3/2-4/0/2-4//5-6	26.34±0.09
Lower Tuff Member	XU	7T415, 7T525	35	26-35/9-14/51-55/0/<1/<2/1-2/1//13	27.16
Wah Wah Springs Formation (I)		7T517	60	<u>59/5/0/10/19/3/0/4//32</u>	30.06
Cottonwood Wash Tuff (I)		7L405	120	<u>55.6/11.6/2.6/12.2/12.1/0.8/0/5.1//39.1</u>	31.13
Windous Butte Formation	WAP	7L389	165	48/10/16/16/6/<1/0/3//17	31.81±0.10
	WAQ	7L396		39/32/19/7/2/0/0/1//44	
Conglomerate, clasts of Paleozoic rock			~400		
Dacitic lava flow		7L378	~200		
Currant Tuff(?)			~80		
Paleozoic rocks					

SUPPLEMENTAL TABLE 1.3

Stratigraphic section east of Wells Station in the eastern Grant Range on the Curren, Nevada 15 minute topographic map at approximately 38° 36' 20"N, 115° 16' 20"W.

<u>Stratigraphic unit</u>	<u>Sample</u>	<u>PM</u> <u>sample</u>	<u>Thick</u>	<u>Mode</u>	<u>Age</u>
Nine Hill Tuff (wNV)	CRNT-1E		>5	1/<1/88/<1/0/6/0/4//3	25.48
Shingle Pass Formation					
Upper Tuff Member	ZF	7T501	10	<u>54/<1/32/8/1/1/2//8</u>	26.36
Hancock Tuff Member	HC		5	<u>31-40/18-32/35-36/2-4/0-1/0/0/1//11-23</u>	26.82
Lower Tuff Member	XG	7T509	10	<u>34/10/48/2/<1/1/2/3//14</u>	27.16
Wah Wah Springs Formation (I)	CRNT-1A	7L368	60	<u>59/5/0/10/19/3/0/4//32</u>	30.06
Windous Butte Formation	WG	7L346, 7L358	280	<u>51/20/13/10/3/1/<1/2//30</u>	31.73
	WH	7L325	>260		
Stone Cabin Formation					
Upper Tuff Member	SD, SEaup	7L336, 2P053	>120	<u>15/47/33/3/<1/0/0/<1//36</u>	35.76±0.07
Middle Tuff Member	SQ	2P041, 2P049	180	<u>37/37/18/8/<1/0/0/<1//35</u>	
Paleozoic rocks					

SUPPLEMENTAL TABLE 1.4

Stratigraphic section in the Golden Gate Range at approximately 38° 13'N, 115° 18'W. See also Figure 7 in Best et al. (2013a).

<u>Stratigraphic unit</u>	<u>Sample</u>	<u>PM sample</u>	<u>Thick</u>	<u>Mode</u>	<u>Age</u>
Mafic lava					
Pahranagat Formation	AAG		~60	36/26/31/5/1/1/0/1//29	22.93
Condor Canyon Formation (I)					
Bauers Tuff Member	WATERNE-1J		15	<u>49/0/44/6/0/<1/0/1//15</u>	23.04
Shingle Pass Formation					
Upper Tuff Member	ZU		30	<u>54/<1/32/8/1/1/1/2//8</u>	26.36
Hancock Tuff Member	HJ		116	<u>31-40/18-32/35-36/2-4/0-1/0/0/1//11-23</u>	26.82
Lower Tuff Member	XR		40	31-38/14-17/40-49/0/0/<1/<1/2-4//12-14	27.16
Monotony Tuff	MO		55	<u>60/15/7/18/6/4/1/2//34</u>	27.57
Lund Formation (I)	WATERNE-1-12m		100	53/4-15/3-6/13-16/10-17/0/0/5//10-18	29.20
Silver King Tuff (I)	WATERNE-1C				
	1P380,		50	45-61/15-28/3-7/13-16/2-4/0/0/2-3//27-37	29.40
	1P388				
Wah Wah Springs Formation (I)	1P372		30	<u>59/5/0/10/19/3/0/4//32</u>	30.06
Cottonwood Wash Tuff (I)	1P364		20	<u>55.6/11.6/2.6/12.2/12.1/0.8/0/5.1//39.1</u>	31.13
Paleozoic rocks					

SUPPLEMENTAL TABLE 1.5

Stratigraphic section about 0.7 km southeast of Hancock Summit at the north end of the Pahrangat Range on the Hancock Summit, Nevada 7.5 minute topographic maps at approximately 37°26'N 115°22'W. The section parallels Nevada State Highway 375. Going down stratigraphically through the gently north-dipping units, the section extends from about the 1800 m contour on the north side of hill 1841 to its top and then down the south side to the gully at the bottom of the hill. See also Figure 49.

<u>Stratigraphic unit</u>	<u>Sample</u>	<u>PM sample</u>	<u>Thick</u>	<u>Mode</u>	<u>Age</u>
Shingle Pass Formation					
Upper Tuff Member	ZM	7T853	~100	48-73/0-4/19-38/4-11/1-2/<1/1/2-5//5-11	26.36
Tikaboo Tuff Member	YG	7T845	32	55-58/1-4/20-32/6-14/0-2/0-3/1/1-4//7-9	26. XX±0.06
Hancock Tuff Member	HF	7T804, 7T812	64	31-40/18-32/35-36/2-4/0-1/0/0/1//11-23	26.82 ±0.09
Lower Tuff Member	XK	7T820	40	26-33/10/48-60/<2/<1/1-2/<1/2-6//12-16	27.16
Isom Formation					
Bald Hills Member (I)		7T828	6	83/<1/<1/0/0/4/8/5//13	27.90-27.25
Monotony Tuff	MI	7T836	120	57/16/5/13/8/1/0/1//45	27.69±0.09
Paleozoic rocks					

SUPPLEMENTAL TABLE 1.6

Stratigraphic section southeast of Coyote Summit on Nevada State Highway 375 on the Tempiute Mountain South, Nevada 7.5 minute topographic map. Beginning about 300 m east of the summit, the contact of paleomagnetic unit A of the Monotony Tuff with underlying Paleozoic rocks lies about 150 m north of the highway. The section proceeds southward stratigraphically upward in the gently south-dipping units along a longitudinal meridian of about 115° 39' 53" W for about 1.3 km to a saddle wherein lies a fault, then offsetting 0.5 km to the west and continuing southward towards the top of hill 5581.

<u>Stratigraphic unit</u>	<u>Sample</u>	<u>PM sample</u>	<u>Thick</u>	<u>Mode</u>	<u>Age</u>
Dacitic lava flow					
Pahranagat Formation	AAC	1P346	60	19-31/33-50/22-37/1-3/0/0/0/<1//26-32	22.93
Tuff of Lunar Cuesta					
High-silica rhyolite facies	BE		~20	38/32/21/8/0/0/0/1//22	25.70
Shingle Pass Formation					
Sawmill Canyon Tuff	TEMPMS -1A				
Member(?)		1P342	20	34/14/49/2/0/0/0/0//17	25.99±0.05
Upper Tuff Member, upper cooling unit	ZYu		~10	65/0/19/14/1/0/0/1//4	26.35±0.04
Bedded tuff			A few cm		
Shingle Pass Formation					
Upper Tuff Member, lower cooling unit	ZYI	1P334	~15	56/0/33/8/1/0/0/3//6	26.42 ±0.04
Tikaboo Tuff Member	YR	1P326	~75	48/2/19/8/20/3//13	26.78 ±0.04
Hancock Tuff Member	HK		60	22/46/28/3/0/0/0/<1//32	26.82
Isom-type tuff	IL	1P318	1	<u>83/<1/<1/0/0/4/8/5//13</u>	26.87±0.06
Shingle Pass Formation					
Lower Tuff Member	XW	1P310	60	38/17/42/0/0/0/0/3//13	27.16
Monotony Tuff					
Unit B	MQ	1P294	~125	60/14/2/15/5/3/<1/2//44	27.56±0.06
Unit A	MP	1P302	250	53/18/6/13/6/4/0/2//54	27.64
Paleozoic rocks					

SUPPLEMENTAL TABLE 1.7
Composite stratigraphic section in the Lunar Crater, Nevada quadrangle
(Snyder et al., 1972; see also Askren, 1992, and Askren et al., 1997).

<u>Stratigraphic unit</u>	<u>Sample</u>	<u>PM sample</u>	<u>Thick</u>	<u>Mode</u>	<u>Age</u>
Quaternary basaltic lava flows and cinder deposits					
Pahrnagat Formation	AH	7T869	110	20-25/30-50/20-40/b/tr/tr/0/0.5//20-30	22.91±0.06
Isom-type tuff of Black Beauty Mesa					
Upper cooling unit	ICd	8P725	30	75-85/0-2/0/0/tr/0-6/10-12/5//15-17	
Lower cooling unit	ICc	8P717	30	69-80/2-6/0-2/tr/tr/0-7/6-10/4-10//11	
Tuff of Buckwheat Rim					
Upper cooling unit	JA, JB	9P034	0-110	50-63/6-19/0-1/11-16/9-17/tr/0/2-3//30-44	24.74±0.11
Lower cooling unit	JC	9P042	0-40	35-64/3-13/9-43/3-12/4-7/2/0-1/2-4//20-36	24.68±0.06
Andesite lava and flow breccia of Citadel Mountain			0-365	69-75/0/0/0/0/16-22/7//8-30	
Dacite lava and flow breccia of Citadel Mountain			0->215	24-50/15-25/0-36/15/1-20/0/0/2//30-55	
Tuff of Buckskin Point					
Upper part	KA	9P026	75	50-61/13-20/0-1/11-16/10-12/0/0/2//30-40	
Lower part				63-80/0-3/0-15/2-7/2/4-7/3-5/3//9-16	
Tuff of Lunar Cuesta	LB	9P050	120	45-75/12-20/7-15/10-15/3-6/0/0/2//20-35	25.67±0.05
Shingle Pass Formation					
Upper Tuff Member	Zgm	8P500	30	30-35/15/25-47/7/1-2/<1/0/1//12-32	26.36
Isom-type tuff	IE	8P492	10		
Shingle Pass Formation					
Tikaboo Tuff Member	YF	8P468, 8P476, 8P484	30	50-65/0/25-37/4-8/1/0/0/1//9	
Monotony Tuff	ME	8P709	200	46-63/10-32/5-12/15/2/0-5/0/<1//30-55	27.57
Tuff of Palisade Mesa	ED	8L211	160	32-46/25/18-33/7/0-3/tr/0/<1//23-47	30.04±0.06
Tuff of Hot Creek Canyon	TH	8L201	>170	20-41/21-45/26-42/1-10/1/0/0/<1//23-41	30.00

SUPPLEMENTAL TABLE 1.8

Composite stratigraphic section in the Moore Station, Nevada quadrangle map (Ekren et al., 1973a).

Stratigraphic unit	Sample	PM sample	Thick	Mode	Age
Basalt lava			~30		10.2 ± 0.9 (K-Ar)
Rhyolite [lava] of Big Sand Springs Valley			<300		25.8 ± 1.3 (K-Ar)
Tuff of Lunar Cuesta			>35	43-66/12-27/3-26/6-18/0-2/0/0-2//10-35	25.70
Shingle Pass Formation					
Upper Tuff Member(?)	zr		6	52-65/0-3/19-25/9-20/1-3/1/0/1-3//6-8	26.36
Tikaboo Tuff Member	yj		22	25/25-34/36/3-9/0/0/3//8	26.78
Lower Tuff Member	XO		21	31-37/5-15/47-56/1/tr/0-2/0-2/1-2//9-15	27.16
Tuff of Orange Lichen Creek	RB	0P248	120	20-32/22-47/25-44/1-10/tr/0/0/0-2//15-40	27.11
Tuff of Pott Hole Valley			33	24/26/45/3/0/0/0/2//20	27.31
Monotony Tuff			0-305	50-60/15-28/5-12/10-20/3/3/0/1///40-55	27.57
Tuffaceous rocks of slanted Buttes		0->305			
Tuff of Palisade Mesa [tuff of					
Moore Station Buttes]	EC	8P693	0-305	45-72/10-20/7-24/7-14/1-5/0-1/0-1/0-2//20-32	
Tuff between tuff of Moores			0-275	30-52/23-43/11-30/1-10/1-7/0/0/tr-1//24-41	
Station Buttes and tuff of The Needles					
Tuff of The Needles	TC		0-305	15-25/41/27-36/1-5/tr/0/0/tr//28-41	29.99± 0.05
Tuff and debris beds			<30		
Tuff of The Needles Area	TB		>460	42-54/17-22/14-30/5-10/tr/0/0/tr//20-40	30.01± 0.06
Lacustrine sedimentary rocks and tuff			~90		
Brecciated tuff			>90		
Tuff of Hot Creek Canyon	TA, TD	3P001, 0P240	~460	30-55/17-41/15-39/6/1-7/1/0/1//30-50	29.97±0.06 30.01±0.06
Tuffs of Chaos Creek			0-180		
Gilmore Gulch Formation (bedded sed. rocks)			>60		
Tuffaceous sedimentary rocks			>120		
Windous Butte Formation	WAC		>2000	25-55/20-40/2-45/1-12/0-10/0-2/tr/0-2//25-55	
Silicic lavas and tuff			<305		
Paleozoic rocks					

SUPPLEMENTAL TABLE 1.9

Composite stratigraphic section in the Pritchards Station, Nevada quadrangle map (Dixon et al., 1972). The upper part of the section from the tuff of Cottonwood Canyon upwards is found in the northwestern part of the quadrangle on Crested Wheat Ridge and the part (lacking the Cottonwood Canyon) below the Windous Butte Formation lies near Pritchards Station in the south central part of the quadrangle. The Nine Hill Tuff was formerly unit D of Bates Mountain Tuff and has a source in the Carson Sink area in the Western Nevada field (Henry and John, 2013)

<u>Stratigraphic unit</u>	<u>Sample</u>	<u>PM</u> <u>sample</u>	<u>Thick</u>	<u>Mode</u>	<u>Age</u>
Tuff of Clipper Gap	CE	0P256	20	7/16/73/2/0/0/3//5	25.01±0.06
Nine Hill Tuff		8P685	10	1/<1/88/<1/0/6/0/4//3	25.48
Shingle Pass Formation					
Upper Tuff Member	ZV	8P669	5	54/<1/32/8/1/1/2//8	26.36
Lower Tuff Member	XS	8L241	12	34/10/48/2/<1/1/2/3//14	27.16
Tuff of Pott Hole Valley	VA	8L221	100	23/21/51/2/0/0/3//16	27.31±0.07
Tuff of Palisade Mesa	EE		150	39/26/23/7/3/2/0/<1//38	30.00±0.06
[unit B of tuff of Crested Wheat Ridge]					
Wah Wah Springs Formation (I)			~15	59/5/0/10/19/3/0/4//32	30.06
Windous Butte Formation	WAE	8L261	550	51/20/13/10/3/1/<1/2//30	31.72±0.06
Tuff of Cottonwood Canyon	UA	8L251	0-55	54/14/15/11/5/<1/0/2//23	32.41±0.07
Tuff of Pritchards Station	UD	7T901	0-150	55/22/5/13/4/<1/<1/1//33	34.46±0.07
Intermediate composition lava flows			100s		
Stone Cabin Formation					
Upper Tuff Member	SW		150	22-35/22-39/31- 35/7/0/0-3/0/0//20-37	35.78±0.09
Bedded tuff and rhyolite lava flow		0->150			
Paleozoic rocks					