#5

PGS 2/19/97 ~~Main Drift and~~ * South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+00.09-60+01.86	FZ	236	80	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NA	NR	NR	fracture zone, average azimuth is 236, average dip is 80
60+00.21	F	053	16	0.44	0.00	0.43	0.01	2	Rk	Rk	P	11	4	0	0	NA	S	<1mm	UT is 0.05m above tapeline
60+00.40	F	314	78	0.00	0.48	0.40	0.33	2	Rk	Yf	P	12	4	0	0	NA	M	<1mm	UT is 0.13m below tapeline
60+00.40	F	110	61	0.39	0.06	0.43	0.02	2	Rk	Tf	P	11	3	0	0	NA	S	<1mm	No comments
60+00.42	F	205	77	1.90	1.60	1.80	2.30	2	Yf	Rk	P	12	4	0	0	NA	M	<1mm	fracture is discontinuous
60+00.52	F	268	90	0.00	1.90	1.60	1.10	1	Rk	O	P	12	4	0	0	NA	M	<1mm	UT is 0.26m below tapeline
60+00.55	F	268	90	0.20	0.55	0.70	0.30	2	Yf	Yf	P	12	4	0	0	NA	M	<1mm	no roughness profile available
60+00.81	SH	150	76	2.90	4.10	3.20	4.70	1	Yf	In	P	12	5	0	0	0.02	M	<1mm	normal offset

9803040412 970219
PDR MISC
9803040412 PDR

PGS 2/19/97 *
Traceline Location: ESF Tunnel, ~~Main Drift and~~ South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
Compiled by: Sheldon K Johnson

* NOTE: Main Drift ends and the South Ramp starts at Station 56+54. This correction only noted on Page 1. Title designation does not affect data
PGS 2/20/97

DF03
1/1
NMSS

Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+00.82	F	171	78	0.35	0.09	0.29	0.15	1	Yf	Air	C	11	3	0	0	NA	S	patchy	fracture face, unable to measure radius
60+00.83	F	176	73	0.30	0.00	0.06	0.28	1	Air	Rk	P	15	4	0	0	NA	M,S	trace, patchy	LT is 0.02m above tapeline
60+00.94	F	170	25	0.00	0.85	0.05	0.84	2	Yf	Tf	I	11	4	0	0	NA	M	trace	UT is 0.18m below tapeline
60+01.20	F	140	77	0.00	0.52	0.07	0.48	2	Rk	Tf	I	11	3	0	0	NA	M	trace	UT is 0.15m below tapeline
60+01.39	F	154	75	0.35	4.40	2.20	3.80	1	Rk	In	P	12	5	0	0	NA	M,V	<1mm, 0-2mm	No comments
60+01.85	F	350	15	0.00	0.66	0.07	0.66	2	Rk	VPP	P	12	5	0	0	NA	M,V	<1mm, 0-2mm	UT is at 60+02.50 and is 0.12m below tapeline
60+01.87	CJ	235	87	1.15	2.55	3.10	2.10	1	Rk	O	P	12	4	0	5	NA	V,Bx	0-2mm, 0-10mm	breccia at lower part of fracture
60+01.91	CJ	149	76	10.50	2.50	5.70	4.70	2	Yf	Yf	P	12	5	0	0	NA	M	<1mm	No comments

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+01.93	F	204	88	0.72	0.03	0.69	0.08	2	Yf	Yf	P	11	4	0	0	NA	M	patchy	No comments
60+01.93	F	204	88	0.69	0.03	0.67	0.23	2	Rk	Rk	P	11	4	0	0	NA	M	coating <1mm	No comments
60+01.95	F	160	84	0.00	0.35	0.15	0.23	2	Yf	Tf	P	11	4	0	0	NA	S,M	trace, patchy	UT is at tapeline
60+02.26	F	150	77	0.00	4.60	2.10	3.20	1	Rk	O	P	12	5	0	0	NA	M	<1mm	UT is 0.04m below tapeline
60+02.40	F	142	65	0.38	0.00	0.21	0.29	2	Rk	Rk	P	11	3	0	0	NA	C	trace	LT is 0.02m above tapeline
60+02.56	F	156	71	2.90	4.80	3.60	5.50	1	Yf	O	P	12	5	0	0	NA	M,V	<1mm, 0-2mm	60+01.85 termination is 0.16m below tapeline, UT is at 60+02.50, LT is at 60+01.85
60+03.08	F	165	83	0.00	0.32	0.07	0.32	2	Rk	Tf	P	11	4	0	0	NA	M	coating <1mm	UT is 0.09m below tapeline
60+03.53	VPP	355	27	0.47	0.00	0.01	0.45	2	Rk	Rk	I	11	2	0	0	NA	V	1-6mm	LT is at tapeline

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+03.61	F	165	33	0.51	0.00	0.02	0.48	2	Rk	Tf	P	11	4	0	0	NA	C	0-1mm	LT is 0.15m above tapeline
60+03.78	F	114	81	0.32	0.26	0.56	0.18	2	Rk	Rk	I	11	4	0	0	NA	M	coating <1mm	No comments
60+04.20	F	135	76	0.80	1.46	1.42	1.60	2	Yf	Ysh	P	11	4	0	0	NA	M,C	<1mm, 0-5mm	No comments
60+04.24	F	118	12	0.00	0.46	0.07	0.43	2	Tf	Rk	P	11	4	0	0	NA	C	trace	UT is 0.13m below tapeline
60+04.25	F	145	82	3.10	0.00	2.80	1.30	2	Rk	Rk	P	11	4	0	0	NA	M	<1mm	LT is 0.28m above tapeline
60+04.50	F	170	80	0.74	0.00	0.18	0.71	2	Yf	Tf	C	11	5	0	0	NA	M	coating <1mm	LT is 0.24m above tapeline, cannot measure radius
60+04.90	F	105	88	1.62	0.40	1.88	0.32	2	Tf	Rk	P	11	4	0	0	NA	M	<1mm	No comments
60+05.15	SH	105	90	1.40	0.90	2.00	0.42	2	Ysh	Ysh	P	21	4	0	0	0.09	Br	10-100mm	normal offset
60+05.25	SH	115	90	2.30	2.65	4.30	2.50	1	Yf	In	P	11	4	0	0	0.09	Br	10-100mm	normal offset
60+05.32	F	279	83	0.00	0.38	0.36	0.13	2	Yf	Ysh	P	11	4	0	0	NA	M	coating <1mm	UT is 0.04m below tapeline

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+05.75	F	230	88	0.63	0.90	1.30	0.92	2	Yf	Yf	P	11	4	0	0	NA	M	<1mm	No comments
60+05.99	F	247	80	0.39	0.37	0.71	0.19	2	Yf	Tf	I	11	3	0	0	NA	C	trace	No comments
60+06.50	F	142	85	1.00	2.65	3.00	4.10	2	Rk	Yf	P	11	4	0	0	NA	M	<1mm	No comments
60+06.86	F	045	81	0.26	0.11	0.33	0.01	2	Rk	Rk	I	11	4	0	0	NA	C,M	trace, <1mm	upper 0.1m of fracture curves
60+06.90	F	148	72	2.76	0.00	2.00	1.30	2	Rk	Rk	P	11	4	0	0	NA	M	<1mm	LT is 0.07m above tapeline
60+07.39	F	151	77	0.03	0.73	0.42	0.69	2	Rk	Rk	P	11	5	0	0	NA	M	coating <1mm	No comments
60+07.41	F	228	72	0.08	0.26	0.30	0.15	2	Rk	Rk	C	11	5	0	0	NA	M	coating <1mm	dip changes along curvature, radius 0.61m
60+07.50	VPP	328	17	0.18	0.15	0.02	0.32	2	Rk	Rk	I	11	2	0	0	NA	C,V	1mm, 3-7mm	No comments
60+07.77	F	145	80	1.06	2.95	3.00	4.10	2	Rk	Rk	P	11	4	0	0	NA	M,C	<1mm, 1-3mm	No comments
60+08.50	F	120	75	1.60	0.00	1.50	0.14	2	Tf	Rk	P	11	4	0	0	NA	M,C	<1mm, 1mm	LT is at tapeline

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+08.58	F	118	77	0.31	0.02	0.30	0.17	2	Tvpp	Rk	P	11	5	0	0	NA	M,U	coating <1mm, 0-2mm	No comments
60+08.63	F	240	11	0.00	0.32	0.01	0.32	2	Rk	Rk	P	11	4	0	0	NA	S (?)	1mm	UT is 0.21m below tapeline, infilling could be calcite, no reaction with HCl
60+08.86	F	130	49	0.00	0.34	0.16	0.30	2	Rk	Rk	P	11	4	0	0	NA	S	<1mm	UT is 0.08m below tapeline
60+09.30	F	070	84	1.02	0.83	1.80	0.11	2	Yf	Rk	I	11	3	0	0	NA	M,C	<1mm, 1mm	No comments
60+09.90	F	150	78	2.30	4.70	5.80	4.10	1	In	Yf	P	11	4	0	0	NA	M,C	<1mm, 2-5mm	No comments
60+09.93	F	350	22	1.04	0.00	0.06	1.02	2	Tf	Tf	P	11	4	0	0	NA	C	<1mm	LT is 0.2m above tapeline
60+10.06	VPP	345	14	0.00	0.71	0.05	0.69	2	Tf	Tf	I	11	3	0	0	NA	C,V	0-1mm, 5-8mm	UT is 0.06m below tapeline

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
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Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+10.21	F	322	82	1.65	0.80	1.80	0.81	2	Yf	Tf	P	11	4	0	0	NA	M,C	<1mm, 1-2mm	No comments
60+10.45	F	140	84	0.00	1.10	0.69	0.90	2	Tvpp	Yf	I	11	3	0	0	NA	M	<1mm	UT is 0.17m below tapeline
60+10.46	F	142	85	0.82	0.30	0.75	0.70	2	Yf	Rk	P	11	4	0	0	NA	M	<1mm	No comments
60+10.82	F	257	74	1.06	0.55	1.50	0.20	1	Air	Tf	P	11	5	0	0	NA	C	<1mm	No comments
60+10.83	F	141	83	0.26	0.51	0.61	0.50	2	Yf	Tf	P	11	5	0	0	NA	M	coating <1mm	No comments
60+10.87	F	256	80	0.46	0.53	0.96	0.17	2	Rk	Tf	P	21	4	0	0	NA	C,Br	0-1mm, 0-9mm	No comments
60+10.90	F	155	81	0.36	0.00	0.25	0.29	2	Rk	Tf	P	11	5	0	0	NA	M	coating <1mm	LT is 0.14m above tapeline
60+10.98	F	196	74	0.64	0.54	0.90	0.70	2	Tf	Tsh	P	11	4	0	0	NA	M	<1mm	No comments
60+11.23	F	215	81	0.62	0.00	0.60	0.18	1	Air	Rk	P	11	5	0	0	NA	M	coating <1mm	LT is 0.02m above tapeline
60+11.48	F	190	80	0.50	0.85	0.60	1.06	2	Tf	Tf	P	11	3	[illegible]	0	NA	C	1-2mm	No comments
60+11.84	F	220	85	0.95	0.70	1.45	0.44	2	Yf	Tf	P	11	4	0	0	NA	M	<1mm	No comments

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
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Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+11.98	F	185	77	0.35	0.00	0.17	0.27	2	Rk	Yf	P	11	5	0	0	NA	M	coating <1mm	LT is 0.17m above tapeline
60+12.05	F	119	80	0.24	0.61	0.73	0.47	2	Tf	Yf	P	11	5	0	0	NA	M	coating <1mm	No comments
60+12.15	F	142	82	0.66	3.80	2.80	3.50	1	Rk	St	P	11	4	0	0	NA	M	<1mm	No comments
60+12.38	VPP	350	10	0.00	0.35	0.01	0.34	2	Rk	Yf	I	11	1	0	0	NA	V	2-15mm	UT is 0.22m below tapeline
60+12.68	F	348	14	0.00	0.65	0.08	0.63	2	Rk	Rk	P	11	5	0	0	NA	M	trace	UT is 0.26m below tapeline
60+12.80	F	140	78	1.80	3.47	3.30	3.40	1	Yf	St	P	11	4	0	0	NA	M,C	<1mm, 2-5mm	No comments
60+13.38	F	148	88	0.00	0.34	0.11	0.27	2	Rk	Yf	P	11	4	0	0	NA	M	patchy	UT is 0.10m below tapeline
60+13.45	F	274	84	1.25	0.60	1.75	0.23	2	Yf	Yf	U	11	3	0	0	NA	M	patchy	amplitude 0.03m, wavelength 0.92m
60+13.46	F	170	85	0.44	0.00	0.15	0.34	2	Rk	Yf	P	15	3	0	0	NA	M,S	trace, patchy	LT is 0.08m above tapeline

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
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Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+13.68	F	340	60	0.00	0.31	0.15	0.15	1	Tf	Air	P	11	4	0	0	NA	M,S	trace	fracture face, UT is 0.16m below tapeline
60+13.89	F	130	82	0.00	0.34	0.03	0.33	2	Rk	Yf	P	11	3	0	0	NA	M,S	patchy, trace	UT is 0.17m below tapeline
60+14.04	CJ	115	85	10.00	0.55	6.00	8.00	1	St	Rk	P	12	5	0	20	NA	V,M	0-2mm, <1mm	trace length, height and width are estimated
60+14.20	F	211	79	0.46	0.34	0.45	0.45	2	Tf	Rk	P	12	5	0	0	NA	M	<1mm	planarity is planar except upper end is curved, radius 0.15m
60+14.26	F	297	80	0.25	0.04	0.02	0.28	2	Tf	Rk	P	11	3	0	0	NA	M	<1mm	No comments
60+14.70	F	190	75	1.60	0.00	0.40	1.30	2	Tf	Yf	P	12	5	0	0	NA	M,V	<1mm	LT is at tapeline
60+14.83	F	200	83	0.30	0.00	0.14	0.29	2	Rk	Tf	P	11	4	0	0	NA	M	<1mm	LT is 0.04m above tapeline

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
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Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+14.90	F	240	90	0.70	0.30	0.90	0.45	2	Yf	Rk	P	12	4	0	0	NA	V,M	0-1mm, <1mm	No comments
60+15.15	F	165	68	1.00	0.00	0.65	0.65	2	Yf	Yf	P	12	4	0	0	NA	V,M	0-1mm, <1mm	LT is at tapeline
60+15.25	F	165	75	1.10	0.90	1.10	1.60	1	Tf	St	P	12	4	0	0	NA	M,V	<1mm, 0-1mm	No comments
60+15.40	F	160	68	0.10	0.70	0.55	0.80	1	Yf	St	P	12	4	0	0	NA	V,M	<1mm	no roughness profile available
60+15.83	F	244	84	0.27	0.15	0.34	0.01	2	Rk	Rk	U	11	3	0	0	NA	M	<1mm	amplitude 0.01m, wavelength 0.19m, pipe clamps along curve
60+15.93	F	108	90	0.53	0.14	0.60	0.15	2	Tf	Rk	C	12	4	0	0	NA	M	<1mm	radius 1.0m, no roughness profile available
60+16.07	F	263	86	0.28	0.47	0.71	0.14	2	Rk	Rk	C	11	3	0	0	NA	NA	NA	radius 0.36m

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Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+16.09	F	178	48	0.00	0.40	0.00	0.40	2	Tf	Tf	P	12	4	0	0	NA	M,V	<1mm	UT is at 60+16.09, LT is at 60+16.50, UT is 0.05m below tapeline
60+16.10	F	260	88	0.40	0.00	0.38	0.03	1	Air	Yf	P	15	3	0	0	NA	S	<1mm	LT is 0.26m above tapeline
60+16.47	F	127	81	0.10	0.44	0.52	0.13	2	Rk	Yf	I	11	3	0	0	NA	M	patchy	No comments
60+16.81	F	190	85	0.00	0.45	0.03	0.37	2	Yf	Yf	P	11	4	0	0	NA	M	<1mm	UT is at tapeline
60+16.85	F	315	76	0.03	0.40	0.05	0.40	2	Yf	Rk	P	15	3	0	0	NA	M	patchy	No comments
60+17.07	F	272	85	0.37	0.00	0.37	0.03	2	Rk	Tf	P	11	3	0	2	NA	NA	NA	LT is 0.07m above tapeline
60+17.10	F	240	88	2.75	0.70	3.20	0.60	1	Rk	St	P	12	4	0	1	NA	M,V,Bx	<1mm, 0-1mm, 0-40mm	No comments
60+17.18	F	175	86	0.31	0.00	0.25	0.17	1	Air	Tf	P	11	4	0	0	NA	S	patchy	LT is 0.10m above tapeline, fracture face

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
Compiled by: Sheldon K Johnson

Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+17.20	F	150	82	0.00	1.95	0.50	1.90	2	Tf	Yf	P	11	4	0	0	NA	C	0-5mm	UT is 0.27m below tapeline
60+17.40	F	155	62	0.70	0.00	0.35	0.48	2	Yf	Rk	P	12	4	0	0	NA	M	<1mm	LT is 0.2m above tapeline
60+17.41	F	025	82	0.50	0.00	0.49	0.06	2	Yf	Tf	P	15	3	0	0	NA	S	patchy	LT is 0.12m above tapeline
60+17.50	F	253	73	0.33	0.31	0.56	0.19	2	Yf	Yf	C	11	3	0	0	NA	M	trace	radius 1.4m
60+17.56	VPP	135	84	0.59	0.00	0.58	0.10	2	Tf	Tf	P	11	3	0	0	NA	V,M	<1mm, trace	LT is 0.11m above tapeline
60+17.60	F	168	59	8.00	0.00	2.50	2.50	2	Rk	Rk	P	12	4	0	0	NA	M	<1mm	fracture is "U" shaped, stationing is for bottom of "U" as is LT which is 0.04m above tapeline
60+17.65	F	160	86	0.41	0.00	0.32	0.17	1	Air	Tf	P	11	4	0	0	NA	M,S	trace	fracture face, LT is 0.04m above tapeline

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
Compiled by: Sheldon K Johnson

Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+17.73	F	173	71	0.00	1.37	0.43	1.32	1	Air	Yf	P	11	4	0	0	NA	C,M	trace	UT is at tapeline
60+17.77	F	235	80	1.10	0.00	1.00	0.20	1	Rk	St	I	11	3	0	0	NA	S	spotty	LT is 0.28m above tapeline
60+18.02	F	150	89	0.40	0.07	0.25	0.26	1	Air	Tf	P	11	4	0	0	NA	M	patchy	fracture face
60+18.05	F	190	84	0.00	0.44	0.42	0.37	2	Rk	Yf	C	11	3	0	0	NA	NA	NA	UT is 0.27m below tapeline, dip varies along curve, can't measure radius
60+18.13	F	154	82	0.00	0.98	0.50	0.86	2	Tf	Yf	P	11	5	0	0	NA	M	coating <1mm	UT is 0.12m below tapeline
60+18.60	VPP	030	10	0.35	0.00	0.30	0.02	1	Yf	St	I	11	3	0	0	NA	V	0.02mm	LT is 0.14m above tapeline
60+18.76	F	266	85	0.07	0.31	0.36	0.12	1	Air	Rk	P	11	4	0	0	NA	C	<1mm	No comments
60+18.80	F	185	81	0.55	0.00	0.19	0.40	2	Rk	Yf	P	11	5	0	0	NA	M	coating <1mm	LT is at tapeline
60+18.90	F	140	72	1.90	0.40	1.70	1.50	0	St	Air	P	11	3	0	0	NA	S,C	patchy	No comments

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+18.92	F	116	84	0.00	0.32	0.30	0.17	2	Yf	Yf	P	11	3	0	0	NA	M	trace	UT is 0.29m below tapeline
60+18.94	F	262	86	0.80	0.90	1.66	0.29	1	St	Tf	I	21	3	5	10	NA	Br	5-10mm	No comments
60+18.94	F	163	79	0.00	0.38	0.22	0.35	1	Air	Rk	P	11	4	0	0	NA	Io,S	trace	UT is 0.02m below tapeline
60+19.05	F	130	73	0.00	0.49	0.23	0.38	1	Yf	St	P	11	4	0	0	NA	M	coating <1mm	UT is 0.21m below tapeline
60+19.17	F	245	89	0.89	0.05	0.83	0.05	2	Yf	Tf	P	11	3	0	0	NA	S	<1mm	No comments
60+19.40	F	150	78	0.00	1.70	0.50	1.60	2	Yf	Yf	P	11	4	0	0	NA	M,S	<1mm, spotty	UT is at tapeline
60+19.62	F	150	89	0.00	0.34	0.26	0.36	2	Yf	Yf	P	11	3	0	0	NA	M	trace	UT is at tapeline
60+20.05	F	180	81	0.00	0.33	0.11	0.28	1	Air	Yf	P	11	4	0	0	NA	M,Io	coating <1mm, trace	UT is 0.3m below tapeline
60+20.14	F	148	67	0.39	0.00	0.21	0.29	2	Yf	Yf	P	11	4	0	0	NA	Io, M	trace	LT is 0.12m above tapeline
60+20.17	F	179	77	0.05	0.51	0.53	0.18	2	Tf	Yf	P	11	3	0	10	NA	NA	NA	No comments

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+20.20	F	185	79	0.75	0.00	0.21	0.70	1	Air	Rk	P	11	4	0	0	NA	M	coating <1mm	LT is 0.05m above tapeline
60+20.20	F	158	67	0.49	0.00	0.25	0.40	2	Yf	Rk	P	11	4	0	0	NA	Io,M	trace	LT is 0.11m above tapeline
60+20.32	F	155	80	0.40	2.60	1.83	2.80	2	Yf	Ysh	P	11	4	0	0	NA	M,C	<1mm, 2-5mm	No comments
60+20.36	F	080	74	0.25	0.26	0.49	0.09	2	Yf	Tf	P	11	4	0	0	NA	C,M	0-5mm, coating <1mm	No comments
60+20.93	F	119	88	0.11	0.57	0.60	0.25	2	Yf	Rk	I	11	3	0	0	NA	S	<1mm	No comments
60+21.00	F	155	84	0.25	3.50	1.93	3.40	1	Yf	St	P	11	4	0	0	NA	M	<1mm	No comments
60+21.30	F	273	83	0.65	0.00	0.62	0.12	2	Yf	Rk	I	11	3	0	0	NA	S	<1mm	LT is 0.06m above tapeline
60+21.30	F	070	64	0.00	0.56	0.56	0.18	2	Yf	Rk	P	11	3	0	0	NA	M	<1mm	UT is 0.27m below tapeline
60+21.61	F	128	87	0.41	0.42	0.73	0.31	1	Rk	St	P	11	3	0	0	NA	C	<1mm	No comments
60+21.62	F	152	83	0.17	0.33	0.33	0.37	1	Yf	St	P	11	4	0	0	NA	M	coating <1mm	No comments

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+21.65	F	080	88	0.48	1.50	1.82	0.38	2	Rk	Tf	I	11	3	0	0	NA	S	1-2mm	No comments
60+21.79	F	140	80	1.03	1.08	0.80	1.70	2	Rk	Yf	P	11	4	0	0	NA	M	<1mm	No comments
60+22.11	F	100	85	0.20	1.20	1.30	0.13	1	St	Tf	I	11	3	0	0	NA	M	<1mm	No comments
60+22.15	F	140	88	0.00	1.27	0.86	0.98	2	Yf	Yf	P	11	4	0	0	NA	M	<1mm	UT is 0.90m below tapeline
60+22.28	F	146	82	0.41	0.00	0.23	0.29	1	St	Rk	C	11	4	0	0	NA	M	coating 21mm	LT is at tapeline, radius 0.5m
60+22.54	F	165	77	0.36	0.00	0.14	0.31	2	Rk	Tf	U	11	4	0	0	NA	M	coating <1mm	LT is at tapeline, wavelength 0.18m, amplitude 0.01m
60+22.72	F	298	88	0.68	0.55	1.15	0.15	2	Rk	Rk	P	11	3	0	0	NA	U	<1mm	No comments
60+22.84	F	193	88	0.01	0.34	0.23	0.24	2	Tf	Tf	P	11	5	0	0	NA	M	coating <1mm	No comments

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+22.87	F	260	90	0.79	0.00	0.70	0.12	2	Rk	Rk	U	11	4	0	0	NA	M	<1mm	LT is at tapeline, strike and dip change, amplitude 0.31m, wavelength 0.7m
60+23.10	F	150	80	0.00	3.80	2.12	3.70	1	Yf	St	P	11	4	0	0	NA	M	<1mm	UT is at tapeline
60+23.27	F	085	88	0.28	0.40	0.65	0.03	2	Yf	Yf	P	11	4	0	0	NA	M	<1mm	No comments
60+23.29	F	160	87	0.00	0.80	0.40	0.63	2	Yf	Yf	P	11	4	0	0	NA	M	<1mm	UT is 0.03m below tapeline, fracture face
60+23.42	F	195	85	1.06	0.30	1.20	1.00	0	St	St	I	11	4	0	0	NA	M	<1mm	within intensely fractured zone
60+23.47	F	098	87	0.00	0.35	0.32	0.23	2	Tf	Yf	P	11	4	0	0	NA	M	<1mm	UT is 0.08m below tapeline
60+23.78	F	143	73	0.53	0.47	0.76	0.73	2	Yf	Tf	U	11	5	0	0	NA	M	coating <1mm	wavelength 0.46m, amplitude 0.03m

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+23.98	F	105	83	0.26	0.17	0.37	0.12	2	Yf	Rk	I	11	5	0	0	NA	M	stain	LT is "hook" or "J" shaped
60+24.07	F	255	83	0.60	0.00	0.47	0.16	2	Yf	Yf	P	11	3	0	0	NA	S	<1mm	LT is 0.25m above tapeline
60+24.15	F	223	87	0.30	0.26	0.56	0.18	1	Air	Yf	P	11	5	0	0	NA	M	stain	No comments
60+24.15	F	132	76	0.29	0.09	0.34	0.19	1	Air	Tf	U	11	5	0	0	NA	M	stain	wavelength 0.23m, amplitude 0.02m
60+24.24	F	205	72	0.00	1.30	0.70	1.10	1	Yf	St	I	11	4	0	0	NA	M	<1mm	UT is 0.14m below tapeline, within intensely fractured zone
60+24.25	F	082	88	0.92	0.40	1.20	0.50	1	St	Ysh	I	21	4	5	10	NA	Br	5-10mm	within intensely fractured zone
60+24.50	F	140	82	0.40	3.60	1.88	3.51	0	St	St	P	22	4	0	0	NA	M	<1mm	No comments
60+24.70	F	122	80	0.70	3.50	1.96	3.40	0	St	St	P	11	4	0	0	NA	M,S	<1mm, patchy	No comments

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+24.71	F	210	68	0.82	0.70	1.00	0.98	1	St	Ysh	P	11	5	0	0	NA	M,S	<1mm, patchy	within intensely fractured zone
60+25.05	F	205	82	0.70	0.45	0.70	0.62	1	St	Yf	I	11	3	0	0	NA	M	<1mm	within intensely fractured zone
60+25.30	F	190	80	0.00	1.06	0.24	1.00	2	Yf	Ysh	P	11	4	0	0	NA	M	<1mm	UT is at tapeline, within intensely fractured zone
60+25.70	F	142	70	0.80	3.40	1.50	3.30	2	Ysh	Ysh	I	11	3	0	0	NA	M	<1mm	No comments
60+26.22	F	150	88	0.84	2.05	1.65	2.30	0	St	St	I	11	4	0	0	NA	M,C	<1mm, 2-4mm	No comments
60+27.90	F	345	72	1.50	0.00	0.17	1.38	2	Ysh	Tf	I	11	3	0	0	NA	M,S	<1mm	LT is at tapeline, within intensely fractured zone
60+28.53	F	100	88	0.00	0.38	0.35	0.14	2	Yf	Yf	P	11	3	0	0	NA	M	<1mm	UT is 0.15m below tapeline

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+28.86	F	080	85	0.80	0.62	1.20	0.40	1	Ysh	St	I	11	4	0	0	NA	M	<1mm	within intensely fractured zone
60+28.90	F	285	88	0.00	0.58	0.55	0.31	2	Yf	Yf	P	11	4	0	0	NA	M	<1mm	UT is 0.25m below tapeline
60+29.07	F	105	90	0.90	0.50	1.10	0.60	0	St	St	P	11	4	0	0	NA	S	coating <1mm	No comments
60+29.45	F	242	80	0.30	0.25	0.42	0.15	2	Tf	Tf	P	11	3	0	0	NA	M	<1mm	No comments
60+29.66	F	240	76	0.32	0.17	0.40	0.21	2	Yf	Tf	P	11	4	0	0	NA	S	1mm	No comments
60+29.67	F	145	78	0.56	0.75	0.48	1.20	2	Ysh	Ysh	I	11	4	0	0	NA	M	<1mm	within intensely fractured zone
60+30.01	F	140	60	0.90	0.00	0.40	0.70	2	Yf	Yf	P	11	4	0	0	NA	M	<1mm	LT is 0.29m above tapeline
60+30.07	F	152	66	0.84	0.00	0.39	0.70	2	Yf	Tf	P	11	4	0	0	NA	M	<1mm	LT is at tapeline
60+30.12	F	142	64	0.92	0.00	0.46	0.80	2	Yf	Yf	P	11	4	0	0	NA	S	1mm	LT is 0.22m above tapeline

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+32.00	F	130	86	0.00	1.03	0.80	0.10	1	St	Yf	I	11	3	0	0	NA	C	1-2mm	UT is 0.21m below tapeline
60+32.23	F	256	80	0.00	0.40	0.39	0.11	1	St	Yf	I	11	3	0	0	NA	NA	NA	UT is at tapeline
60+32.82	F	196	55	0.00	0.47	0.20	0.36	2	Yf	Tf	I	11	3	0	0	NA	M	<1mm	UT is 0.15m below tapeline
60+33.04	F	248	87	0.00	1.37	1.14	0.50	2	Yf	Yf	P	11	4	0	4	NA	NA	NA	UT is at tapeline
60+33.11	F	208	74	0.34	0.00	0.24	0.30	2	Yf	Yf	P	11	4	0	0	NA	M	<1mm	LT is 0.15m above tapeline
60+33.13	F	096	88	0.43	0.21	0.54	0.32	1	St	Yf	I	11	3	0	0	NA	S	1mm	No comments
60+33.30	F	237	71	0.56	1.60	1.60	0.72	1	St	Tf	C	11	4	0	5	NA	M,Br	trace, 0-10mm	radius 1.0m
60+33.30	F	080	82	0.50	0.00	0.49	0.08	1	St	Yf	I	11	3	0	0	NA	S	1-2mm	LT is at tapeline
60+33.37	F	266	42	0.42	0.00	0.20	0.10	2	Yf	Yf	P	11	4	0	0	NA	M	<1mm	LT is 0.15m above tapeline

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+33.38	F	064	70	0.20	1.40	1.30	0.75	2	Yf	Yf	U	11	4	0	0	NA	M	trace	wavelength 0.6m, amplitude 0.02m
60+33.55	F	282	76	0.34	0.00	0.32	0.15	2	Yf	Yf	I	11	4	0	0	NA	M	<1mm	LT is at tapeline
60+33.60	F	270	76	0.36	0.00	0.34	0.11	2	Yf	Yf	P	11	3	0	0	NA	M	<1mm	LT is at tapeline
60+33.82	F	240	82	0.52	1.35	1.69	0.95	2	Yf	Tf	U	11	5	0	20	NA	M	trace	wavelength 0.35m, amplitude 0.02m
60+33.84	F	100	86	0.43	0.60	0.98	0.50	0	St	St	P	11	3	0	0	NA	S	1-2mm	No comments
60+34.27	F	236	76	0.18	0.20	0.18	0.25	0	St	St	P	11	3	0	0	NA	M	<1mm	No comments
60+34.36	F	290	88	0.00	0.33	0.20	0.30	2	Tf	Yf	P	11	4	0	0	NA	NA	NA	UT is 0.15m below tapeline
60+34.60	F	268	70	0.20	0.30	0.44	0.30	1	St	Yf	P	11	3	0	0	NA	M	<1mm	No comments
60+35.05	F	195	80	0.60	1.34	1.30	1.14	0	St	St	P	11	4	0	0	NA	S,M	patchy	No comments
60+35.26	F	265	32	0.15	0.15	0.22	0.30	1	Rk	Air	P	11	3	0	0	NA	M	<1mm	No comments

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
Compiled by: Sheldon K Johnson

Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+35.27-60+44.00	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NA	NA	NA	No DLS, steel lagging
60+44.21	F	225	76	0.52	1.20	1.68	0.73	1	St	Rk	P	12	3	0	0	NA	NA	NA	No comments
60+44.29	F	230	74	0.20	0.79	0.97	0.43	2	Rk	Rk	P	12	3	0	0	NA	M	<1mm	patchy MnO
60+44.34	F	240	73	0.51	0.42	0.80	0.24	1	St	Yf	P	12	3	0	0	NA	NA	NA	No comments
60+44.39	F	265	74	0.46	0.00	0.44	0.10	1	St	Yf	P	11	3	0	0	NA	NA	NA	LT is 0.08m above tapeline
60+44.45	F	061	40	0.75	0.24	0.90	0.21	1	Yf	St	P	12	3	0	0	NA	NA	NA	No comments
60+45.07	F	095	25	0.70	0.35	0.20	0.90	2	Tf	Yf	P	11	3	0	0	NA	NA	NA	No comments
60+45.36	F	170	19	0.00	0.58	0.10	0.56	2	Tf	Tf	I	12	3	0	0	NA	C	>1mm	UT is 0.11m below tapeline
60+45.40	F	201	50	0.45	0.00	0.41	0.40	2	Tf	Yf	P	12	3	0	0	NA	C	trace	LT is at tapeline
60+45.54	F	080	26	0.74	0.00	0.31	0.72	2	Yf	Tf	I	12	3	0	0	NA	NA	NA	LT is 0.04m above tapeline
60+45.77	F	087	66	0.32	0.82	1.10	0.38	2	Tf	Tf	P	12	3	0	0	NA	NA	NA	No comments
60+45.92	F	090	68	0.20	0.42	0.55	0.26	2	Tf	Tf	P	11	3	0	0	NA	NA	NA	No comments

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
Compiled by: Sheldon K Johnson

Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+46.02	F	100	56	0.23	0.10	0.27	0.09	2	Tf	Tf	P	11	3	0	0	NA	NA	NA	No comments
60+46.10	F	265	50	0.32	1.02	1.21	0.33	2	Tf	Rk	P	11	3	0	0	NA	C	<1mm	No comments
60+46.21	F	263	58	0.25	0.37	0.56	0.30	2	Tf	Yf	P	11	3	0	0	NA	C	<1mm	some patches of calcite
60+46.80	F	140	62	0.31	0.48	0.40	0.80	2	Yf	Ysh	P	11	4	0	0	NA	M	<1mm	No comments
60+46.83	F	145	72	0.00	0.50	0.37	0.40	2	Yf	Yf	P	11	4	0	0	NA	M	<1mm	UT is 0.18m below tapeline
60+47.18	F	240	85	0.60	0.30	0.82	0.15	1	St	Ysh	P	11	4	0	0	NA	M	<1mm	No comments
60+47.20	F	238	85	0.54	0.20	0.70	0.18	1	St	Ysh	P	11	4	0	0	NA	S	1mm	No comments
60+47.32	SH	235	88	0.50	0.44	0.93	0.20	1	St	Yf	P	11	3	0	0	UNK	Br	55mm	offset unknown
60+48.15	F	228	64	0.10	1.00	0.90	0.40	1	St	Tf	I	11	3	0	0	NA	M	<1mm	No comments
60+48.93	F	270	80	0.00	0.44	0.42	0.18	1	St	Tf	P	11	3	0	0	NA	S	2mm	UT is 0.20m below tapeline 3mm alteration margin
60+49.50	F	174	80	0.15	0.23	0.31	0.30	1	Rk	Air	P	11	3	0	0	NA	NA	NA	No comments
60+50.00	F	178	80	0.30	0.16	0.25	0.34	0	Air	Air	P	11	3	0	0	NA	NA	NA	No comments

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+50.00	F	110	75	0.73	0.86	1.15	0.84	2	Tf	Tf	P	12	3	0	0	NA	NA	NA	this section begins at new tapeline
60+50.00	F	125	64	0.00	1.10	0.91	0.80	2	Yf	Tf	I	11	3	0	0	NA	NA	NA	UT is at tapeline
60+50.32	F	005	38	0.50	0.60	1.05	0.60	2	Tf	Tf	P	12	3	0	0	NA	NA	NA	No comments
60+50.45	F	110	80	3.50	0.60	3.10	0.60	2	Tf	Tf	I	12	3	0	0	NA	NA	NA	this section from 60+50.00 to 60+50.45 is along old tapeline
60+50.45	CJ	190	79	3.70	1.00	3.45	1.50	2	Tf	Yf	P	12	4	0	0	NA	V,M	<1mm, patchy	No comments
60+50.60	F	120	73	1.02	0.00	0.90	0.27	2	Yf	Rk	P	12	4	0	0	NA	C	trace	LT is 0.20m above tapeline
60+50.90	F	275	75	2.50	0.30	2.55	0.31	2	Yf	Tf	P	11	3	0	0	NA	C	<1mm	No comments
60+51.21	F	230	77	0.75	2.75	2.66	1.80	1	Yf	In	P	12	4	0	0	NA	M	<1mm	No comments
60+51.28	F	245	87	0.66	2.37	2.50	1.30	1	Yf	In	P	22	3	0	0	NA	Br	<5mm	No comments
60+51.63	F	240	89	1.03	0.30	1.32	0.24	2	Yf	Yf	P	11	4	0	0	NA	M	<1mm	No comments

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+51.83	F	190	80	0.42	1.27	1.20	1.41	2	Tf	Tf	P	11	3	0	0	NA	C	spotty <1mm	No comments
60+52.68	F	100	88	3.75	1.30	4.85	0.88	2	Yf	Tf	P	11	3	0	0	NA	C	<1mm	No comments
60+52.68	F	180	73	0.00	1.28	0.58	1.04	2	Tf	Rk	P	12	3	0	0	NA	M	coating	UT is 0.12m below tapeline
60+53.31	F	200	78	0.75	0.27	0.80	0.72	2	Yf	Tf	P	12	3	0	0	NA	NA	NA	No comments
60+53.82	F	238	66	0.90	0.72	1.50	0.52	1	Air	Yf	P	11	4	0	0	NA	M	<1mm	No comments
60+53.91	F	210	82	0.44	1.63	1.70	0.60	2	Yf	Tf	P	21	4	0	15	NA	M	<1mm	No comments
60+54.05	F	235	87	0.62	0.54	1.04	0.22	1	Air	Yf	P	11	4	0	0	NA	M	<1mm	No comments
60+54.69	F	288	65	0.84	0.32	1.15	0.28	1	Air	Yf	P	11	2	0	0	NA	S	patchy	No comments
60+55.06	F	225	87	0.64	2.50	2.80	1.38	1	Tf	In	P	21	4	0	7	NA	M	<1mm	possible shear, some offset in some spots (0.08m)
60+55.79	F	236	76	0.15	1.15	1.20	0.42	2	Tf	Rk	I	11	3	0	0	NA	NA	NA	No comments
60+55.98	F	245	75	0.00	1.23	1.14	0.17	2	Tf	Tf	P	11	3	0	4	NA	S	patchy	UT is at tapeline

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+56.05	F	139	73	1.19	0.08	0.80	0.97	1	Air	Tf	P	12	5	0	0	NA	M,S	<1mm, trace	No comments
60+56.16	F	249	83	0.40	1.28	1.68	0.70	1	Air	Tf	P	21	5	0	0	NA	Br	15mm	No comments
60+56.63	F	236	79	0.00	1.30	1.14	0.74	1	Air	Tf	P	12	3	0	0	NA	S	trace	UT is 0.17m below tapeline
60+56.63	F	144	77	0.10	1.13	0.53	1.18	2	Rk	Yf	P	12	5	0	0	NA	M	<1mm	No comments
60+57.15	F	135	74	4.10	0.00	3.10	1.60	2	Yf	Yf	P	12	5	0	0	NA	M,S	<1mm	LT is 0.26m above tapeline
60+57.50	F	124	80	0.63	0.84	1.02	0.92	2	Yf	Yf	U	12	5	0	1	NA	M	<1mm	wavelength 0.9m, amplitude 0.03m
60+57.59	CJ	115	83	4.40	2.05	3.60	2.20	1	Rk	O	P	12	5	0	2	NA	S,M	1mm, <1mm	No comments
60+58.42	F	161	69	0.80	0.40	0.46	0.78	1	Air	Yf	P	11	4	0	0	NA	M,C	trace	No comments
60+58.68	F	199	73	0.26	1.10	0.93	0.78	2	Rk	Yf	P	11	3	0	0	NA	S	trace	No comments
60+59.21	F	195	78	0.53	1.28	1.12	1.06	1	Air	Yf	P	12	4	0	0	NA	M,C	<1mm, trace	No comments
60+59.58	CJ	284	89	0.74	1.23	1.97	0.82	1	Air	Yf	P	11	5	0	0	NA	S	1-2mm	No comments

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+59.63	F	279	89	0.79	1.10	1.62	0.72	1	Air	Tf	P	11	5	0	2	NA	M,S	trace	aperture maybe caused by TBM
60+59.72	F	170	69	0.00	1.21	0.29	1.17	2	Tf	Yf	P	11	4	0	0	NA	M,C	trace	UT is 0.1m below tapeline
60+60.00	F	216	88	0.00	0.80	0.78	0.34	2	Tf	Tf	P	12	3	0	0	NA	NA	NA	UT is at tapeline
60+60.70	F	121	84	3.70	2.05	3.85	2.10	2	Yf	Rk	U	11	4	0	0	NA	M,S	<1mm	wavelength 1.45m, amplitude 0.07m
60+60.72	F	198	82	0.00	1.07	0.87	0.83	2	Yf	Yf	P	11	4	0	1	NA	C,M	trace	UT is 0.23m below tapeline
60+60.90	CJ	106	82	2.20	0.00	2.00	0.35	2	Rk	Tf	P	11	4	0	5	NA	Io,S	trace, 1mm	LT is 0.13m above tapeline
60+61.40	F	146	79	0.41	1.75	0.65	1.72	2	Yf	Tsh	P	11	5	0	2	NA	C,M	trace, <1mm	No comments
60+61.64	F	213	72	0.57	0.57	0.93	0.73	1	Air	Yf	P	11	3	0	3	NA	C,Io	patchy, trace	No comments
60+61.74	F	121	84	1.45	0.92	2.20	0.90	2	Rk	Yf	P	11	5	0	2	NA	M,Io,C	trace	No comments
60+62.03	F	251	89	0.74	0.32	0.74	0.14	2	Yf	Tf	P	11	5	0	4	NA	M	<1mm	No comments

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht(m)	Wd(m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+62.04	F	005	86	0.86	0.00	0.81	0.08	2	Yf	Tf	P	11	4	0	0	NA	M,C	trace	LT is 0.07m above tapeline
60+62.31	F	202	85	2.13	0.22	1.96	0.60	2	Yf	Yf	U	11	4	0	0	NA	M,C, Io,Br	trace, trace, trace, 1-6mm	No comments
60+62.75	F	200	80	0.70	0.85	1.20	0.80	2	Ysh	Tsh	I	11	3	0	0	NA	S	1-2mm	No comments
60+63.06	F	045	80	2.30	0.26	2.00	0.31	2	Yf	Ysh	P	11	3	0	0	NA	M	<1mm	No comments
60+63.29	SH	210	70	3.00	0.20	2.80	0.56	2	Ysh	Ysh	P	21	4	0	10	0.04	C,Br	0-5mm, 0-30mm	reverse offset
60+63.75	F	192	88	1.10	0.57	1.60	0.82	2	Yf	Yf	I	11	3	0	0	NA	S	spotty <1mm	No comments
60+63.95	F	205	86	0.60	1.00	1.10	0.52	2	Rk	Ysh	I	11	3	0	0	NA	S	<1mm	No comments
60+64.32	F	070	85	1.00	0.10	1.00	0.22	2	Yf	Yf	P	11	3	0	0	NA	M	<1mm	No comments
60+64.83	F	215	88	0.84	0.57	1.23	0.50	2	Yf	Rk	P	11	4	0	0	NA	M	<1mm	No comments
60+65.10	F	348	72	0.16	1.00	0.28	0.88	2	Yf	Yf	I	11	3	0	0	NA	C	1-2mm	No comments
60+65.30	F	276	88	2.62	0.50	2.73	0.30	2	Yf	Ysh	P	11	4	0	0	NA	M,C	<1mm, 1-2mm	No comments

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+65.63	SH	235	85	0.64	0.45	1.09	0.21	2	Ysh	Ysh	P	21	4	0	0	UNK	M,Br	<1mm, 40mm	offset unknown
60+65.88	SH	255	76	0.54	1.43	1.88	0.38	2	Ysh	Tsh	P	21	4	0	0	0.02	M,Br	<1mm, 0-40mm	reverse offset
60+66.00	F	210	76	2.70	0.00	2.50	0.31	2	Yf	Yf	P	11	3	0	0	NA	S	1-2mm	LT is 0.26m above tapeline
60+66.01	F	268	82	0.00	1.30	1.28	0.19	2	Rk	Yf	P	11	4	0	0	NA	M	<1mm	UT is 0.17m below tapeline
60+66.10	F	130	88	0.18	0.90	0.80	0.70	2	Yf	Yf	I	11	3	0	0	NA	S	1mm	No comments
60+66.49	F	235	66	0.64	0.40	0.90	0.34	2	Yf	Yf	I	11	3	0	0	NA	M	<1mm	No comments
60+67.38	F	215	74	2.53	0.00	2.24	0.82	2	Tf	Yf	P	11	3	0	0	NA	S	1-2mm	LT is at tapeline
60+67.43	F	235	72	1.27	0.80	1.90	0.80	2	Yf	Yf	I	11	3	0	0	NA	S	1-2mm	No comments
60+68.70	F	355	80	1.14	0.00	0.23	1.08	2	Yf	Yf	P	11	3	0	0	NA	C,M	1mm, spotty <1mm	LT is 0.21m above tapeline
60+69.07	F	212	66	1.00	2.03	2.33	1.60	2	Yf	Tf	P	11	4	0	0	NA	C,M	2mm, <1mm	No comments

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+69.23	F	212	75	1.10	0.00	0.97	0.18	2	Yf	Yf	P	11	4	0	0	NA	M	21mm	LT is 0.26m above tapeline
60+69.37	F	252	76	1.04	1.30	2.20	0.90	2	Yf	Tf	I	11	3	0	0	NA	S	1-2mm	No comments
60+69.43	F	150	75	1.10	0.00	0.13	1.07	2	Yf	Yf	P	11	4	0	0	NA	M	<1mm	LT is 0.17m above tapeline
60+69.44	F	152	75	1.10	2.30	0.60	3.10	2	Tf	Tf	P	11	4	0	0	NA	M	<1mm	No comments
60+70.50	F	164	68	0.45	1.30	0.34	1.60	2	Yf	Rk	P	11	4	0	0	NA	M	<1mm	No comments
60+70.77	F	152	74	1.10	0.00	0.27	1.13	2	Yf	Tf	P	11	4	0	0	NA	S,Io	patchy	LT is 0.26m above tapeline
60+70.90	F	208	89	0.28	1.85	1.90	1.00	1	Tf	Air	U	11	4	0	0	NA	M	<1mm	amplitude 0.07m, wavelength 0.50m
60+71.00	F	203	79	1.41	0.00	1.33	0.21	1	Air	Tf	P	21	4	0	0	NA	M,Io	patchy, <1mm	LT is at tapeline
60+71.00	F	164	80	1.20	0.00	0.38	0.99	2	Tf	Tf	I	11	4	0	0	NA	M	<1mm	fracture face, LT is 0.20m above tapeline

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+71.04	F	163	75	0.00	1.36	0.21	1.34	2	Rk	Tf	I	11	3	0	0	NA	V	<1mm	UT is at tapeline
60+71.95	F	295	84	0.41	0.64	1.00	0.15	2	Tf	Tf	P	11	3	0	0	NA	V	<1mm	No comments
60+71.95	F	160	75	0.00	1.40	0.45	1.52	2	Yf	Yf	I	11	3	0	0	NA	V	<1mm	UT is at tapeline
60+72.30	F	210	69	0.53	0.56	1.01	0.53	2	Tf	Yf	I	11	4	0	0	NA	M	patchy	No comments
60+72.75	F	180	70	0.22	1.47	1.20	1.33	2	Yf	Yf	P	12	3	0	0	NA	M	<1mm	No comments
60+74.00	F	110	89	0.32	0.77	0.95	0.58	2	Yf	Tf	P	12	3	0	0	NA	M	<1mm	No comments
60+74.84	F	210	74	2.25	0.00	2.20	0.32	2	Rk	Tf	P	11	3	0	0	NA	NA	NA	LT is 0.09m above tapeline
60+76.00	F	244	85	1.18	0.00	1.10	0.20	2	Tf	Tf	P	11	4	0	0	NA	NA	NA	LT is 0.24m above tapeline
60+76.13	F	238	82	1.45	0.00	1.40	0.23	2	Tf	Tf	P	11	4	0	0	NA	NA	NA	LT is 0.23m above tapeline
60+77.06	F	237	78	0.00	1.00	0.95	0.52	2	Yf	Tf	P	11	3	0	0	NA	NA	NA	UT is 0.18m below tapeline
60+77.80	F	260	88	0.90	0.98	1.64	0.77	2	Yf	Tf	P	11	3	0	0	NA	NA	NA	No comments
60+78.78	F	268	82	0.72	0.44	1.10	0.25	2	Yf	Tf	P	11	4	0	0	NA	M	<1mm	No comments

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
Compiled by: Sheldon K Johnson

Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+78.87	F	282	90	0.30	0.94	1.10	0.50	2	Yf	Tf	P	11	4	0	0	NA	M	<1mm	No comments
60+79.00	F	186	76	1.90	0.80	1.90	1.60	2	Yf	Yf	I	11	3	0	0	NA	M	<1mm	No comments
60+79.65	F	195	82	1.15	0.70	1.33	0.85	2	Yf	Yf	P	11	5	0	0	NA	M	<1mm	No comments
60+79.71	F	186	69	0.20	0.80	0.68	0.91	2	Yf	Tf	P	12	3	0	0	NA	M	trace	No comments
60+79.76	F	260	72	1.10	0.00	1.00	0.41	2	Yf	Yf	P	11	5	0	0	NA	M	<1mm	LT is 0.24m above tapeline
60+79.97	F	215	74	1.27	0.00	1.10	0.44	2	Yf	Yf	P	11	4	0	0	NA	M	<1mm	LT is at tapeline
60+80.03	F	175	82	1.50	0.00	1.10	1.00	2	Yf	Yf	P	11	5	0	0	NA	M	<1mm	LT is 0.20m above tapeline
60+80.17	F	268	72	0.50	1.35	1.70	0.55	2	Yf	Yf	P	11	4	0	0	NA	M	<1mm	No comments
60+80.18	F	280	80	0.00	1.70	1.51	0.90	1	Yf	O	I	11	3	0	0	NA	S	1-2mm	UT is 0.11m below tapeline
60+80.55	F	250	70	0.40	0.80	1.10	0.50	2	Yf	Yf	I	11	3	0	0	NA	M	<1mm	No comments
60+81.30	F	195	80	1.04	1.30	1.73	1.40	2	Yf	Yf	P	11	4	0	0	NA	M	<1mm	No comments
60+81.85	F	185	78	1.06	1.74	1.68	2.52	1	Air	Tf	P	12	5	0	0	NA	M	<1mm	No comments
60+81.90	F	095	81	0.28	0.88	1.05	0.52	2	Rk	Yf	P	12	5	0	0	NA	M	<1mm	minor manganese

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
Compiled by: Sheldon K Johnson

Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+82.45	F	190	78	0.81	0.35	1.13	0.90	1	Air	Yf	I	12	5	0	0	NA	M	<1mm	No comments
60+82.57	F	175	78	0.35	2.28	2.45	2.05	1	Air	Yf	I	13	3	0	0	NA	V	<1mm	has appearance of high angle vapor phase parting
60+83.88	F	220	76	1.03	0.87	1.76	0.60	2	Rk	Tf	P	13	4	0	0	NA	V	<1mm	2mm alteration margin
60+84.13	F	185	78	2.37	1.06	3.12	1.80	2	Tf	Tf	I	12	5	0	0	NA	M	<1mm	No comments
60+84.28	F	192	76	1.16	0.70	1.76	0.93	1	Air	Yf	P	12	5	0	0	NA	M	<1mm	No comments
60+84.55	F	202	73	1.65	0.00	1.63	0.52	2	Yf	Rk	P	12	5	0	0	NA	M,V	<1mm	LT is 0.14m above tapeline
60+84.78	F	208	75	1.38	0.00	1.35	0.20	2	Tf	Rk	P	12	5	0	0	NA	M	<1mm	LT is 0.05m above tapeline
60+84.95	F	108	88	2.30	0.37	2.45	0.42	0	Air	Air	P	12	5	0	0	NA	M,V	<1mm	No comments
60+85.05	F	223	81	2.27	0.20	2.10	0.45	2	Yf	Rk	P	12	5	0	0	NA	M	<1mm	No comments
60+85.19	F	100	81	1.42	0.76	2.02	0.55	2	Tf	Tf	P	12	5	0	0	NA	M	<1mm	minor manganese
60+85.40	F	215	87	0.63	0.38	0.98	0.13	2	Rk	Rk	P	12	5	0	0	NA	M	<1mm	minor manganese

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
Compiled by: Sheldon K Johnson

Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+85.55	F	192	76	1.58	0.00	1.45	0.76	1	Air	Rk	P	12	5	0	0	NA	M	<1mm	LT is 0.04m above tapeline

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+85.80-60+90.55	FZ	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NA	NR	NR	abundant manganese, highly fractured zone, closely spaced columnar fracturing averaging 0.15m spacing, fractures striking at 195, dip average of 80 degrees, minor vapor phase parting, mostly short fractures (<1m), intermittent longer fractures, discontinuous fracturing

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+89.05	F	135	78	0.83	0.30	0.53	1.10	0	Air	Air	P	12	4	0	0	NA	M,V	<1mm	fracture curves slightly in lower 0.25m
60+89.42	F	175	74	0.40	1.01	1.38	1.30	2	Rk	Rk	P	12	4	0	0	NA	M,V	<1mm	No comments
60+89.47	F	077	86	0.40	1.58	1.75	1.20	1	Air	Yf	P	12	5	0	0	NA	M	<1mm	No comments
60+89.60	F	142	87	1.11	0.65	0.58	1.70	1	Air	Rk	U	12	5	0	0	NA	M,V	<1mm	amplitude 0.05m, wavelength 0.45
60+89.75	F	140	81	0.00	2.80	1.30	3.70	0	Air	St	P	12	5	0	0	NA	M,V	<1mm	UT is 0.10m below tapeline
60+90.08	F	205	75	0.94	0.13	1.03	0.70	1	Air	Yf	P	12	4	0	0	NA	M,V	<1mm	No comments
60+90.17	F	200	78	1.45	0.00	1.40	0.60	1	Air	Rk	P	12	5	0	0	NA	NA	NA	LT is 0.12m above tapeline
60+90.55	F	103	89	1.80	1.26	3.05	1.20	1	Air	Tf	P	12	5	0	0	NA	M,V	<1mm	No comments
60+91.05	F	062	86	1.76	0.55	2.23	0.30	2	Tf	Rk	P	13	4	0	0	NA	V	<1mm	2mm alteration margin
60+91.28	F	076	86	1.27	0.26	1.35	0.35	1	Air	Yf	P	13	5	0	0	NA	V	<1mm	No comments
60+91.62	F	045	86	1.64	0.27	1.75	0.36	1	Air	Rk	P	13	4	0	0	NA	V,M	<1mm	No comments

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+91.64	F	241	86	0.28	1.47	1.54	0.55	2	Yf	Tf	I	11	4	0	1	NA	NA	NA	No comments
60+91.77	F	208	85	1.54	1.33	2.31	1.18	2	Rk	Rk	I	11	3	0	1	NA	NA	NA	No comments
60+91.97	F	204	80	0.84	0.83	1.31	0.88	2	Yf	Tf	P	11	5	0	0	NA	NA	NA	No comments
60+92.20	F	190	88	1.55	1.23	2.20	1.23	2	Rk	Tf	C	13	2	0	2	NA	Br	3mm	radius 0.9m
60+92.22	F	212	83	1.16	0.00	1.13	0.54	1	Air	Yf	P	11	4	0	0	NA	NA	NA	LT is 0.02m above tapeline
60+92.30	F	193	73	3.52	0.24	3.57	1.46	2	Yf	Yf	I	13	3	0	8	NA	Br	10mm	No comments
60+92.51	F	231	80	0.05	1.68	1.39	0.84	2	Tf	Rk	I	11	4	0	0	NA	NA	NA	No comments
60+92.68	F	077	87	1.11	0.00	1.05	0.47	1	Air	Tf	I	11	3	0	2	NA	NA	NA	LT is 0.16m above tapeline
60+92.85	F	086	85	0.42	1.06	1.18	0.40	2	Rk	Rk	P	11	4	0	2	NA	NA	NA	No comments
60+93.11	F	157	82	0.00	1.15	1.09	0.13	2	Rk	Yf	I	13	4	0	0	NA	Br	3mm	No comments
60+93.16	F	149	82	1.28	0.58	1.61	0.48	2	Yf	Tf	I	11	3	0	0	NA	S	0.5mm	No comments
60+93.61	F	146	79	0.00	3.59	3.19	0.66	2	Yf	Tf	I	11	3	0	0	NA	S	0.5mm	UT is 0.17m below tapeline
60+93.75	F	074	87	0.46	1.07	1.31	0.43	1	Air	Tf	P	11	4	0	1	NA	NA	NA	No comments

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
Compiled by: Sheldon K Johnson

Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht(m)	Wd(m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+93.94	F	148	83	0.47	0.68	1.06	0.09	0	St	St	I	13	3	0	2	NA	Br	3mm	No comments
60+94.78	F	143	86	0.43	0.96	1.22	0.36	2	Tf	Tf	I	11	4	0	3	NA	S,M	0.5mm	No comments
60+94.94	F	081	88	1.06	0.03	0.99	0.15	1	St	Rk	I	11	4	0	1	NA	NA	NA	No comments
60+95.05	F	178	77	1.39	0.00	1.30	0.23	1	St	Tf	I	12	3	0	1	NA	M	1mm	LT is 0.12m above tapeline
60+95.25	F	187	76	0.56	0.59	1.04	0.41	2	Tf	Tf	P	11	4	0	0	NA	M	0.5mm	No comments
60+95.47	F	233	85	1.71	0.36	2.00	0.32	1	St	Tf	P	12	3	0	2	NA	S	1mm	3mm white weathered band
60+95.68	F	141	85	0.00	1.58	1.50	0.61	2	Tf	Tf	P	12	4	0	3	NA	M	1mm	UT is 0.28m below tapeline
60+96.52	F	201	80	1.48	0.44	1.58	0.53	1	St	Yf	P	11	3	0	0	NA	NA	NA	No comments
60+96.58	F	213	81	1.06	0.52	1.28	0.63	2	Rk	Yf	P	11	4	0	0	NA	NA	NA	No comments
60+97.29	F	250	75	0.65	0.41	1.02	0.18	1	Air	Rk	I	12	5	0	0	NA	M	<1mm	No comments
60+97.35	F	183	78	0.76	0.43	1.16	0.63	0	Air	St	P	12	5	0	0	NA	M	<1mm	2mm alteration margin, not a cooling joint
60+97.58	F	200	79	0.99	0.78	1.70	0.75	2	Rk	Yf	P	12	5	0	4	NA	M,V	<1mm	minor vapor phase coating

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+97.61	F	130	86	1.04	0.00	1.00	0.70	0	Air	Air	P	12	5	0	0	NA	M,V	<1mm	LT is 0.06m above tapeline
60+97.65	F	235	83	0.79	0.75	1.50	0.46	2	Rk	Rk	U	12	5	0	0	NA	M	<1mm	*strike varies from 210 to 255 because of rotation, wavelength 0.55m, amplitude 0.06m
60+98.27	F	115	85	1.16	0.95	2.05	1.57	1	Air	Tf	U	12	5	0	2	NA	M,V	<1mm	abundant vapor phase coating, 3mm alteration margin, amplitude 0.06m, wavelength 0.90m
60+98.61	F	132	82	1.10	0.04	0.98	0.82	1	St	Rk	C	12	5	0	0	NA	M,V	<1mm	abundant manganese, radius 1.5m
60+98.92	F	059	83	1.50	0.11	1.57	0.30	1	St	Rk	I	12	4	0	1	NA	M,V	<1mm	No comments

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
60+99.19	F	245	85	0.72	0.79	1.42	0.36	1	Air	Tf	P	12	5	0	1	NA	M,V	<1mm	No comments
60+99.40-61+00.00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	no DLS from 60+99.40 to 61+00.00 because of metal lagging
61+01.13	F	185	42	0.00	1.05	0.12	0.98	1	St	Rk	P	12	5	0	5	NA	M,V	<1mm	UT is 0.18m below tapeline
61+02.02	F	220	82	0.00	1.44	1.34	0.81	2	Rk	Yf	P	12	5	0	2	NA	M,V	<1mm	UT is 0.30m below tapeline
61+02.81	F	083	73	0.36	0.76	1.06	0.41	1	St	Tf	C	12	4	0	2	NA	M	<1mm	minor manganese, radius 0.8m
61+03.55	F	260	86	0.00	1.00	0.96	0.48	2	Tsh	Tsh	P	12	5	0	0	NA	M,V	<1mm	UT is at tapeline
61+03.70	F	105	85	0.08	1.95	1.88	1.43	2	Tf	Yf	P	12	5	0	1	NA	M,V	<1mm	No comments
61+04.10	F	222	77	0.15	1.10	1.17	0.52	2	Tf	Tf	P	12	5	0	1	NA	NA	NA	No comments
61+04.76	F	177	65	1.20	0.12	1.27	0.13	1	Air	Rk	C	12	5	0	8	NA	M,V	<1mm	radius 0.9m

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
61+04.78	F	183	79	0.00	1.06	1.05	0.73	1	Air	Tsh	P	12	5	0	1	NA	M,V	<1mm	UT is 0.24m below tapelin
61+04.78-61+06.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	no 1m fractures from 61+04.78
61+06.18-61+14.74	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	no DLS from 61+06.18 to 61+14.74 because of metal lagging
61+15.00	F	256	82	0.54	0.90	1.38	0.44	1	St	Rk	P	12	5	0	0	NA	M	<1mm	No comments
61+15.05	F	118	87	1.34	0.00	1.34	0.46	1	St	Rk	P	12	5	0	5	NA	M,V	<1mm	LT is at tapeline, minor vapor phase mineralization
61+16.41	F	226	85	0.28	0.84	1.05	0.25	1	St	Tf	P	12	5	0	0	NA	M,V	<1mm	No comments
61+16.91	F	218	87	0.65	0.91	1.55	0.44	1	St	Tsh	P	12	4	0	0	NA	V	<1mm	intermittent 1 to 2mm alteration margin

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
61+18.76	F	083	81	0.21	1.30	1.43	0.38	2	Yf	Tf	I	12	3	0	0	NA	V	<1mm	3mm alteration margin, not a cooling joint, has appearance of vertical vapor phase parting
61+18.82	F	224	83	2.06	0.25	2.15	0.16	1	St	Yf	P	12	5	0	0	NA	V,M	<1mm	No comments
61+18.97	F	182	82	2.00	1.50	2.85	1.80	1	St	Yf	I	13	3	0	0	NA	V	1mm	3mm alteration margin, not a cooling joint, has appearance of vertical vapor phase parting
61+19.76	F	232	85	2.80	0.00	2.64	0.20	1	St	Yf	P	12	5	0	0	NA	V,M	<1mm	LT is 0.11m above tapeline
61+20.03	F	230	87	1.80	0.28	1.97	0.40	2	Rk	Rk	I	13	3	0	5	NA	V	1mm	3mm alteration margin

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
Compiled by: Sheldon K Johnson

Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
61+20.45	F	082	85	0.67	0.95	1.62	0.46	1	Air	Yf	P	13	5	0	0	NA	M,V,C	<1mm, 1mm	minor effervescence with HCl, fracture rotates above tapeline to 232/86
61+20.60	F	223	83	1.14	0.21	1.27	0.20	1	St	Rk	P	12	5	0	0	NA	M,V	<1mm	minor vapor phase mineralization
61+20.99	F	165	86	0.86	0.98	1.79	1.45	1	Air	Yf	P	12	5	0	0	NA	M,V	<1mm	minor vapor phase mineralization
61+21.07	F	086	85	0.00	1.88	1.72	1.13	2	Rk	Tf	P	12	5	0	0	NA	M,V	<1mm	UT is 0.08m below tapeline
61+21.53	F	239	82	0.60	1.29	1.58	0.52	1	Air	Yf	P	11	5	0	0	NA	C,S,M	trace	No comments
61+21.68	F	189	78	0.96	2.10	2.10	2.15	1	St	Tf	P	11	5	0	0	NA	M,S	trace	No comments
61+21.83	F	197	75	0.00	1.43	1.29	0.91	2	Rk	Rk	P	11	5	0	0	NA	M,S	trace	UT is 0.08m below tapeline

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
Compiled by: Sheldon K Johnson

Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
61+22.18	F	243	86	1.07	0.61	1.60	0.45	1	St	Yf	P	13	3	0	0	NA	V	1mm	1 to 2mm alteration margin
61+22.55	F	132	88	1.15	0.08	0.28	1.05	2	Tf	Tf	P	12	4	0	0	NA	C,S	<1mm	No comments
61+22.79	F	325	82	1.24	0.00	0.47	1.15	2	Yf	Yf	P	12	4	0	0	NA	M,C	trace patchy	LT is 0.07m above tapeline
61+22.80	F	210	79	0.66	0.67	1.03	0.62	1	St	Yf	P	12	4	0	0	NA	M,C	trace	No comments
61+23.75	F	145	79	0.70	0.70	0.40	1.41	2	Yf	Tf	P	12	4	0	0	NA	C	patchy	No comments
61+24.17	F	245	85	2.05	0.00	2.00	0.20	1	St	Yf	P	11	5	0	0	NA	Io,C	trace	LT is 0.22m above tapeline
61+24.73	F	209	86	0.61	0.42	1.00	0.17	0	Air	St	P	13	3	0	0	NA	V	<1mm	No comments
61+25.03	F	210	73	0.95	0.54	1.39	0.40	1	Yf	St	P	11	4	0	0	NA	C	trace	No comments
61+25.60	F	147	77	0.00	1.08	0.14	1.08	2	Yf	Yf	P	11	5	0	0	NA	C,M	trace	UT is 0.15m below tapeline
61+26.55	F	105	86	0.90	1.01	1.72	0.56	0	St	St	P	13	3	0	0	NA	V	1mm	No comments
61+26.70	F	195	83	0.49	0.44	0.83	0.20	1	St	Rk	P	13	3	0	0	NA	V	2mm	No comments
61+30.36	F	223	81	0.00	1.35	1.27	0.78	0	O	O	P	13	4	0	0	NA	C,Br	trace, 0-2mm	UT is 0.13m below tapeline

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
Compiled by: Sheldon K Johnson

Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
61+31.03	F	096	85	0.00	1.34	1.27	0.84	1	St	Yf	P	12	5	0	0	NA	S	trace	UT is 0.20m below tapelin
61+31.76	F	216	73	0.00	1.25	1.04	0.82	0	Air	O	P	11	5	0	0	NA	M,S	trace	UT is 0.30m below tapeline
61+31.99	F	248	78	2.30	0.00	2.10	0.25	1	St	Tf	P	11	5	0	0	NA	M,S	trace	LT is 0.08m above tapeline, lower meter of fracture curves, possible cooling joint
61+32.27	F	159	86	1.19	0.11	0.77	0.76	0	Air	O	P	11	5	0	0	NA	M	trace	No comments
61+32.50	F	188	80	0.00	1.83	1.37	1.33	0	Air	O	P	11	5	0	0	NA	M	<1mm	UT is 0.2m below tapeline
61+32.65	F	042	87	1.20	0.14	1.30	0.14	0	St	O	P	11	5	0	1	NA	Io,M	trace	No comments
61+32.70	F	142	81	0.80	1.30	0.93	1.90	1	Air	Yf	P	11	5	0	0	NA	C	trace	No comments
61+32.80	F	236	84	1.42	0.21	1.49	0.22	1	St	Rk	P	13	3	0	0	NA	V	1mm	1 to 2mm alteration margin

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht(m)	Wd(m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
61+33.20	F	206	82	2.55	1.30	3.65	0.80	0	St	O	P	21	4	0	0	NA	Br	15-30mm	slightly undulating on lower end, possible shear, cannot determine offset
61+33.65	F	227	84	1.09	0.64	1.68	0.20	2	Yf	Tf	P	11	4	0	0	NA	NA	NA	upper end curves
61+34.13	F	200	84	0.48	1.11	1.41	0.84	1	St	Yf	P	13	3	0	0	NA	S	<1mm	apparent aperture mining induced
61+34.92	F	115	88	1.53	0.21	1.70	0.37	0	St	O	P	13	3	0	0	NA	C,M,Io	<1mm, trace, trace	lower 1/4 of fracture curves
61+36.12	F	110	86	0.22	1.03	0.91	0.83	1	Yf	St	P	13	3	0	0	NA	C,M	<1mm, trace	No comments
61+36.90	F	135	77	0.00	1.14	0.37	1.04	0	Air	St	P	13	4	0	0	NA	M	trace	UT is 0.21m below tapeline
61+37.56	F	237	88	0.07	1.01	1.06	0.53	1	O	Rk	P	13	3	0	0	NA	M,Io	trace	No comments

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
61+38.36	F	198	79	0.80	1.40	1.70	1.60	2	Yf	Tf	P	12	4	0	2	NA	C,M	<1mm	No comments
61+38.52	F	215	78	0.80	0.70	1.15	1.00	2	Yf	Tf	p	12	4	0	0	NA	M	<1mm	No comments
61+38.74	F	222	83	0.70	0.80	1.25	0.90	2	Yf	Tf	P	12	4	0	2	NA	M	<1mm	No comments
61+38.77	F	220	78	0.70	0.35	0.90	0.70	2	Yf	Yf	P	12	4	0	3	NA	M	<1mm	No comments
61+39.62	F	250	90	2.90	0.90	3.80	0.90	1	St	Tf	P	12	5	0	4	NA	NA	NA	No comments
61+42.20	F	300	88	1.90	0.00	1.80	0.90	0	St	St	P	12	5	0	0	NA	C,M	<1mm	LT is 0.13m above tapeline
61+42.35	F	141	86	0.00	1.05	0.25	0.95	0	Air	St	P	12	5	0	0	NA	M,C	<1mm	UT is at tapeline
61+43.35	F	205	86	0.63	0.64	0.85	0.65	2	Tf	Yf	I	14	3	0	0	NA	S	patchy	No comments
61+43.82	F	235	86	2.40	0.00	2.20	0.35	1	St	Yf	P	31	5	0	20	NA	NA	NA	LT is at tapeline, UT is behind lagging
61+43.84	F	145	73	1.10	0.00	0.70	0.27	2	Yf	Tf	P	11	4	0	0	NA	S	patchy	LT is 0.30m above tapeline, fracture face
61+44.81	F	195	78	0.90	0.56	1.15	0.66	2	Tf	Yf	P	11	3	0	0	NA	S	<1mm	No comments
61+45.62	F	247	81	0.52	0.93	1.03	0.50	1	Air	Tf	I	11	3	0	0	NA	S	patchy	No comments

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
61+45.72	F	253	88	0.72	1.03	1.40	0.66	2	Tf	Yf	P	11	4	0	0	NA	M	<1mm	No comments
61+46.80	F	145	89	0.00	1.15	0.44	1.46	1	Air	Yf	P	11	4	0	0	NA	M,S	trace, patchy	UT is at tapeline, fracture face
61+48.25	F	190	81	1.37	0.00	1.22	0.37	1	St	Yf	P	11	4	0	0	NA	M	<1mm	LT is at tapeline
61+48.26	F	184	72	0.16	1.80	1.60	1.10	2	Yf	Rk	P	11	4	0	0	NA	M,Io	<1mm, trace	No comments
61+48.60	F	187	77	0.93	0.31	1.16	0.46	2	Yf	Tf	I	11	3	0	0	NA	S	<1mm	No comments
61+49.30	F	178	73	0.60	0.41	0.70	0.70	2	Yf	Tf	P	11	4	0	0	NA	M,Io	<1mm, trace	fracture face
61+49.55	F	195	80	1.40	0.60	1.70	0.82	2	Yf	Rk	P	11	4	0	0	NA	M	<1mm	No comments
61+50.20	VPP	207	68	0.40	0.67	0.57	0.52	2	Rk	Yf	P	11	3	0	0	NA	S	1mm	No comments
61+50.57	F	245	78	1.85	0.00	1.67	0.45	1	Air	Yf	P	11	4	0	2	NA	Io,S	trace	LT is 0.21m above tapeline
61+50.88	F	210	86	0.38	0.71	0.97	0.35	1	Air	Tf	C	11	4	0	0	NA	M	trace	radius 1.5m
61+51.07	F	055	88	0.30	0.70	0.82	0.18	1	Air	Tf	P	11	4	0	0	NA	S,M	trace	No comments

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
61+51.55	SH	209	74	0.80	0.60	1.30	0.64	1	Air	Rk	P	11	4	100	220	0.01	Br	100mm	broken/crushed rock zone, possibly extends to invert, offset unknown, offset estimated
61+52.76	F	170	80	0.16	1.10	0.80	0.82	1	Air	Tf	P	11	4	0	2	NA	Io,M	trace	No comments
61+54.52	F	300	87	1.20	0.60	1.50	0.60	1	Air	Tf	P	12	5	0	0	NA	C,M	<1mm	No comments
61+56.80	F	202	74	2.60	1.00	2.90	1.50	1	St	Tf	P	12	4	0	3	NA	M,C	<1mm	No comments
61+56.95	F	228	90	2.70	0.30	2.60	0.35	1	St	Yf	P	12	5	0	2	NA	C,M	<1mm	No comments
61+57.00	F	165	75	2.90	1.10	1.80	2.70	2	Rk	Yf	P	12	5	0	20	NA	M	<1mm	UT is at 61+59.70, LT is at 61+57.00
61+57.10	F	285	87	2.50	0.00	2.40	0.10	1	Rk	St	P	12	5	0	0	NA	C,M	<1mm	LT is at tapeline
61+57.11	F	191	81	2.50	0.30	2.60	0.15	1	St	Yf	P	12	5	0	0	NA	C,M	<1mm	No comments
61+57.18	F	199	74	1.70	2.00	2.50	2.30	1	Yf	O	P	12	5	0	1	NA	C,M	<1mm	No comments

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
61+57.30	F	322	87	2.25	0.40	2.60	0.30	2	Rk	Rk	P	12	5	0	0	NA	C,M	<1mm	fracture face subparallel to tunnel, exposure about 0.6m wide
61+57.60	F	335	87	2.70	0.20	2.70	0.70	2	Tf	Rk	P	12	5	0	3	NA	M	<1mm	fracture face subparallel to tunnel, exposure up to 0.7m wide
61+58.00	F	235	82	1.30	0.25	1.50	0.45	1	Yf	O	P	12	5	0	0	NA	C,M	<1mm	No comments
61+58.00	F	212	74	1.80	0.30	2.00	0.30	0	Air	O	P	12	5	0	4	NA	C,M	<1mm	No comments
61+58.60	F	205	75	0.90	0.60	1.10	0.60	1	St	Tf	P	12	4	0	2	NA	M	<1mm	No comments
61+58.82	F	192	78	2.50	1.60	3.40	1.70	2	Rk	Yf	P	12	5	0	0	NA	NA	NA	No comments
61+60.30	F	198	80	0.36	1.20	1.10	0.95	2	Yf	Tf	P	11	4	0	0	NA	M	coating <1mm	No comments
61+60.31	F	115	82	0.00	2.03	1.30	1.70	2	Tf	Yf	P	11	4	0	0	NA	M	coating <1mm	UT is 0.13m below tapeline

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
61+60.41	F	175	82	1.05	0.00	1.00	0.20	2	Yf	Yf	P	11	5	0	0	NA	M	spotty <1mm	LT is 0.30m above tapeline
61+60.60	F	185	76	1.36	1.30	2.20	1.10	2	Yf	Yf	P	11	4	0	0	NA	M	coating <1mm	No comments
61+61.06	F	200	80	0.18	1.80	1.56	1.30	2	Yf	Yf	I	11	5	0	0	NA	M	coating <1mm	No comments
61+61.15	F	228	82	0.23	0.94	1.00	0.38	2	Yf	Tf	I	11	4	0	0	NA	M	spotty <1mm	No comments
61+61.18	F	208	80	1.55	0.00	1.50	0.30	2	Yf	Rk	P	11	4	0	0	NA	M	spotty <1mm	LT is 0.18m above tapeline
61+61.22	F	330	88	1.45	0.00	1.40	0.50	2	Rk	Rk	P	11	5	0	0	NA	M	spotty <1mm	LT is 0.22m above tapeline
61+61.50	F	250	86	1.86	0.00	1.80	0.46	2	Rk	Yf	I	11	4	0	0	NA	C	1mm	LT is at tapeline
61+62.30	F	135	80	0.00	5.50	1.10	4.50	2	Tf	Yf	I	11	4	0	0	NA	M	coating <1mm	UT is at tapeline
61+63.35	F	220	78	1.26	0.44	1.50	0.38	2	Rk	Tf	I	11	4	0	0	NA	M	spotty <1mm	No comments

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
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Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
61+63.46	F	212	82	2.60	0.50	2.55	0.42	2	Yf	Tf	P	11	4	0	0	NA	M	coating <1mm	No comments
61+63.47	F	175	82	1.50	0.00	1.41	0.50	2	Rk	Yf	P	11	4	0	0	NA	M	coating <1mm	LT is at tapeline
61+63.91	F	230	85	0.00	1.30	1.28	0.31	2	Yf	Tf	I	11	4	0	0	NA	M	spotty <1mm	UT is at tapeline
61+64.10	F	160	86	1.80	0.00	0.61	1.40	2	Rk	Yf	P	11	5	0	0	NA	M	spotty <1mm	LT is at tapeline
61+64.44	F	155	80	0.00	2.50	0.73	2.10	1	Air	Tf	P	11	5	0	0	NA	M	spotty <1mm	UT is at tapeline
61+64.46	F	220	82	1.10	0.50	1.38	0.21	2	Rk	Tf	I	11	4	0	0	NA	M	spotty <1mm	No comments
61+64.57	F	288	88	0.00	1.49	1.30	1.00	2	Yf	Yf	P	11	4	0	0	NA	M	spotty <1mm	UT is at tapeline
61+64.70	F	285	90	0.40	1.80	1.73	1.35	2	Yf	Yf	I	11	4	0	0	NA	M	spotty <1mm	No comments
61+67.09	F	240	84	0.22	1.00	1.18	0.40	2	Yf	Tf	P	11	4	0	0	NA	M	coating <1mm	No comments

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
Compiled by: Sheldon K Johnson

Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
61+68.00	F	195	80	0.77	1.14	1.50	1.00	2	Yf	Tf	I	11	4	0	0	NA	M	coating <1mm	No comments
61+68.25	F	210	78	0.63	1.47	1.86	0.52	2	Yf	Tf	I	11	3	0	0	NA	S,M	coating <1mm	No comments
61+68.73	F	230	74	0.20	1.79	1.78	0.86	2	Yf	Yf	P	11	4	0	0	NA	M	coating <1mm	No comments
61+69.14	F	200	80	1.00	1.30	1.60	0.70	2	Tf	Tf	P	11	4	0	0	NA	M	coating <1mm	No comments
61+69.62	F	230	78	2.10	0.00	2.00	0.30	2	Rk	Yf	I	11	3	0	0	NA	S	<1mm	LT is 0.10m above tapeline
61+69.63	F	228	76	0.87	0.80	1.60	0.32	2	Rk	Tf	I	11	3	0	0	NA	S	<1mm	No comments
61+69.97	F	270	85	1.42	0.50	1.40	0.46	2	Rk	Tf	I	11	3	0	0	NA	S	1mm	No comments
61+69.99	F	155	68	0.60	0.50	0.63	0.75	2	Yf	Tf	I	11	3	0	0	NA	M	spotty <1mm	No comments
61+70.78	F	246	80	1.80	0.00	1.60	0.22	2	Yf	Ysh	P	11	4	0	0	NA	M	coating <1mm	LT is at tapeline
61+70.79	SH	212	65	1.12	1.50	2.23	0.56	2	Rk	Tf	I	21	4	0	0	0.08	Br	10mm	normal offset

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
61+71.03	F	245	82	0.00	1.10	1.00	0.23	2	Yf	Yf	I	11	4	0	0	NA	M	coating <1mm	UT is 0.3m below tapeline
61+71.55	F	148	88	2.04	2.60	2.00	4.00	2	Rk	Yf	P	11	5	0	0	NA	M	coating <1mm	No comments
61+71.83	F	200	82	1.73	0.14	1.70	0.31	2	Rk	Yf	I	11	3	0	0	NA	S	<1mm	No comments
61+72.75	SH	175	84	0.70	1.36	1.42	1.40	2	Tf	Tf	I	11	3	0	0	0.09	V	2-4mm	reverse offset
61+72.88	F	085	88	0.13	1.27	1.32	0.32	2	Ysh	Tf	I	11	3	0	0	NA	V	1-2mm	No comments
61+73.29	F	260	86	0.58	0.49	0.98	0.12	2	Tf	Tf	I	11	3	0	0	NA	V	1-2mm	No comments
61+74.00	F	230	35	0.00	1.40	1.00	1.00	2	Ysh	Ysh	I	11	3	0	0	NA	NA	NA	UT is 0.14m below tapeline
61+74.15	SH	118	88	2.50	0.60	2.80	1.10	2	Ysh	Ysh	P	21	5	0	0	UNK	M,Br	coating <1mm, 15-20mm	offset unknown
61+74.26	SH	203	76	3.20	0.15	3.35	1.10	2	Ysh	Tf	P	21	5	0	0	UNK	M,Br,C	coating <1mm, 0-100mm, 3mm	No comments

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
61+74.60	SH	210	82	7.00	1.70	7.30	4.10	0	St	O	P	21	5	0	0	UNK	M,Br	coating <1mm, 0-50mm	No comments
61+75.19	SH	074	88	1.52	0.34	1.60	0.28	2	Ysh	Yf	P	11	5	0	0	0.03	M	coating <1mm	reverse offset
61+75.55	SH	085	80	5.00	1.98	5.00	3.00	0	St	In	P	31	5	0	0	UNK	Br,M	0-50mm, <1mm	offset unknown
61+76.05	F	222	78	0.95	0.30	1.05	0.18	1	Yf	St	I	11	3	0	0	NA	C	1-2mm	No comments
61+76.10	F	174	86	0.60	4.10	4.70	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	No comments
61+77.30	F	221	89	1.58	0.83	2.29	0.27	1	St	Tf	I	12	4	0	0	NA	M	1mm	No comments
61+77.52	F	031	75	1.36	0.25	1.56	0.53	2	Rk	Tf	P	12	2	0	0	NA	S	1mm	3mm wide light brown weathered zone
61+78.07	F	142	79	0.00	1.30	1.22	0.28	2	Tf	Tf	P	11	3	0	2	NA	S	1mm	UT is 0.25m below tapeline, silica occurs in patchy zones
61+78.26	F	174	78	0.85	0.51	1.12	1.02	2	Rk	Tf	P	12	3	0	2	NA	M	1mm	No comments

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Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
61+78.36	SH	166	78	0.27	2.06	2.14	1.66	2	Tf	Rk	P	12	3	0	0	0.015	S,M	1.5mm	normal offset
61+78.62	F	207	77	0.73	2.17	2.29	1.16	1	Air	Tf	P	13	2	0	1	NA	Br	2mm	No comments
61+78.73	F	192	36	0.85	0.15	0.92	0.35	2	Tf	Yf	P	11	1	0	1	NA	C	2mm	patchy occurrence of calcite
61+79.05	F	287	77	0.52	2.27	2.35	0.78	1	Tf	St	P	11	3	0	0	NA	S	2mm	No comments
61+79.83	F	174	86	0.56	3.15	2.03	3.20	2	Yf	Ysh	I	11	3	0	0	NA	M	spotty <1mm	spotty manganese
61+80.08	F	041	79	1.14	0.42	1.44	0.46	2	Rk	Tf	I	13	2	0	0	NA	Br	6mm	No comments
61+80.22	F	151	79	0.00	3.31	2.32	0.89	2	Rk	Rk	P	12	3	0	3	NA	M	1mm	UT is 0.28m below tapeline
61+80.78	F	147	79	0.00	1.01	0.95	0.16	1	St	Tf	P	12	3	0	0	NA	M	1mm	UT is 0.27m below tapeline
61+81.69	F	071	78	0.00	2.22	2.12	0.91	0	St	In	I	12	2	0	0	NA	M	1mm	UT is 0.11m below tapeline
61+82.30	F	146	76	0.00	1.85	1.76	0.43	1	St	Rk	I	12	4	0	1	NA	M	1mm	UT is 0.24m above tapeline
61+83.72	F	064	89	1.10	0.62	1.47	0.52	1	St	Rk	P	11	3	0	0	NA	NA	NA	No comments

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Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
61+84.75	F	232	78	2.37	0.00	2.02	0.73	0	St	St	P	11	2	0	0	NA	S	1mm	No comments
61+86.18	SH	209	76	0.99	1.55	2.29	0.57	1	Air	Rk	P	12	4	0	3	0.06	M	1mm	reverse offset
61+86.40	F	254	77	2.84	0.66	3.22	0.39	1	St	Yf	P	11	2	0	15	NA	S	1mm	No comments
61+86.79	F	187	81	0.64	0.56	1.07	0.29	1	St	Tf	I	11	2	0	2	NA	Br	3mm	No comments
61+87.10	F	175	90	3.20	1.80	3.70	2.20	0	St	O	P	12	4	0	20	NA	M	<1mm	No comments
61+87.72	F	255	78	2.30	1.40	3.20	0.60	1	St	Yf	P	12	4	0	7	NA	V,M	<1mm	No comments
61+87.97	F	172	70	1.05	0.75	1.20	1.20	2	Tf	Tf	P	12	2	0	5	NA	NA	NA	No comments
61+89.23	F	216	71	1.80	0.00	1.30	0.45	2	Rk	Yf	P	12	4	0	0	NA	NA	NA	LT is at tapeline
61+89.30	F	258	80	1.54	1.45	2.30	0.80	2	Rk	Tf	P	12	3	0	2	NA	V	0-1mm	No comments
61+89.90	F	194	71	0.30	1.40	0.60	1.00	2	Rk	Tf	P	12	4	0	0	NA	Br	0-50mm	No comments
61+90.00	F	305	88	1.80	0.00	1.60	1.30	2	Rk	Rk	C	12	4	0	0	NA	V	0-1mm	fracture face subparallel to tunnel, LT is at tapeline, radius 1.5m

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Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
61+90.40	F	190	67	0.00	1.80	1.35	1.30	2	Yf	Tf	P	12	3	0	10	NA	Br	0-10mm	UT is at tapeline, Br UT = broken or crushed rock and sand
61+90.46	F	195	82	0.50	1.40	1.60	1.20	1	Air	Yf	P	12	3	0	5	NA	V	0-3mm	Br in LT = broken or crushed rock and sand
61+90.63	F	072	84	4.20	0.00	3.00	0.10	2	Tf	Yf	P	12	4	0	4	NA	NA	NA	LT is at tapeline
61+90.75	F	245	88	2.70	0.80	3.30	0.50	2	Rk	Yf	P	12	4	0	15	NA	M	<1mm	No comments
61+90.85	F	207	80	2.70	0.30	3.00	0.60	2	Rk	Yf	P	12	3	0	10	NA	V	0-1mm	No comments
61+90.95	F	228	83	0.25	0.90	1.05	0.60	2	Yf	Yf	P	12	2	0	10	NA	V	<1mm	No comments
61+92.56	CJ	180	81	5.50	2.50	5.00	5.00	1	Tf	O	P	12	4	0	4	NA	V	0-1mm	height and width estimated
61+93.37	F	101	83	0.78	0.35	0.95	0.60	2	Tf	Tf	P	12	4	0	0	NA	NA	NA	No comments
61+93.53	F	235	85	1.50	0.90	2.10	0.50	2	Rk	Rk	P	12	4	0	0	NA	Br	0-15mm	Bx in UT = breccia

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Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
61+93.62	F	235	86	1.15	0.60	1.30	0.50	2	Tf	Rk	P	12	3	0	15	NA	Br,V,M	0-15mm, <1mm, <1mm	Bx in UT = breccia
61+93.90	F	242	74	0.30	1.20	1.40	0.75	2	Tf	Yf	P	12	4	0	10	NA	Br,M	0-15mm, <1mm	No comments
61+93.90	F	150	60	1.60	0.00	0.70	0.80	2	Rk	Tf	P	12	4	0	2	NA	M,V	<1mm	LT is 0.3m above tapeline
61+94.43	F	105	85	1.00	1.10	1.50	1.50	2	Yf	Rk	P	12	4	0	5	NA	M	<1mm	No comments
61+95.03	SH	050	44	0.95	0.05	0.60	0.15	2	Tf	Rk	P	12	3	0	0	0.01	V	0-1mm	resembles vapor phase parting, normal offset
61+95.51	VPP	220	80	3.70	1.00	3.60	0.80	2	Yf	Tf	P	12	3	0	0	NA	V	0-1mm	1 to 2mm gray alteration margin
61+95.67	F	240	88	1.20	1.10	2.00	0.30	2	Yf	Yf	P	12	4	0	0	NA	M	<1mm	No comments
61+95.76	F	250	88	4.00	2.30	6.00	2.00	0	St	O	P	12	4	0	10	NA	Br,V,M	0-60mm, 0-1mm, <1mm	No comments
61+95.84	F	238	80	0.70	0.60	1.10	0.10	1	Air	Yf	P	12	4	0	0	NA	M	<1mm	No comments

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Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
61+96.74	CJ	220	67	3.10	1.80	3.30	1.10.	2	Rk	Yf	P	12	3	0	2	NA	V,M	0-2mm, <1mm	No comments
61+97.30	F	205	60	1.15	1.30	1.90	0.70	2	Rk	Tf	P	12	3	0	0	NA	V	0-2mm	1 to 2mm gray alteration margin
61+98.63	F	159	68	0.00	2.14	1.89	1.71	1	St	Tf	I	12	2	0	0	NA	NA	NA	UT is 0.14m below tapeline, 1mm light grey weathered zone
61+99.17	F	178	76	2.16	0.00	1.95	1.03	1	St	Tf	P	11	2	0	3	NA	S	1mm	LT is 0.23m above tapeline
61+99.25	F	166	73	0.00	2.69	2.11	2.23	1	Air	Yf	P	11	3	0	0	NA	NA	NA	UT is 0.29m below tapeline
61+99.39	F	194	76	2.14	0.41	2.21	0.73	1	St	Tf	P	11	2	0	0	NA	NA	NA	No comments
61+99.46	F	102	86	0.00	1.01	0.85	0.43	2	St	Tf	I	12	2	0	2	NA	S	1mm	UT is 0.14m below tapeline, this fracture is the end of DLS #112
61+99.48	F	177	76	0.95	0.56	1.02	0.91	1	St	Yf	P	14	3	0	0	NA	Br	4mm	No comments

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Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
62+00.25	SH	172	80	1.95	0.67	2.38	0.85	0	St	St	P	23	2	0	2	UNK	Br	4mm	cannot measure offset
62+00.37	F	197	69	0.11	0.36	0.46	0.32	2	Tf	Tf	P	11	3	0	2	NA	NA	NA	No comments
62+00.59	F	201	78	1.42	1.20	2.14	1.14	1	St	Rk	P	11	3	0	2	NA	NA	NA	No comments
62+00.71	F	094	83	1.82	0.30	1.91	0.32	1	St	Rk	P	12	2	0	0	NA	M	1mm	this is the first fracture for DLS #113
62+00.80	F	177	58	1.81	0.00	1.67	0.92	0	St	St	P	11	3	0	0	NA	NA	NA	LT is 0.28m above tapeline
62+01.29	F	236	83	2.91	0.00	2.79	0.35	1	St	Rk	P	11	2	0	0	NA	S	2mm	LT is 0.16m above tapeline
62+01.61	F	093	88	0.00	0.77	0.73	0.33	2	Rk	Tf	I	12	2	0	2	NA	M	3mm	UT is 0.26m below tapeline
62+01.83	F	218	78	0.20	0.49	0.57	0.31	2	Tf	Tf	I	11	3	0	0	NA	NA	NA	No comments
62+01.92	F	317	64	0.46	0.00	0.45	0.05	2	Rk	Tf	P	11	3	0	0	NA	NA	NA	LT is 0.29m above tapeline
62+02.05	F	155	79	3.81	1.07	4.16	2.04	2	Rk	Tf	C	11	2	0	1	NA	S	2mm	radius 2.3m
62+02.55	SH	249	89	3.27	0.25	3.39	0.23	2	Tf	Yf	P	11	3	0	3	0.028	NA	NA	reverse offset

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Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
62+02.63	F	229	82	1.96	0.53	2.41	0.16	2	Rk	Tf	P	12	3	0	7	NA	M	1.5mm	No comments
62+03.87	F	046	83	1.04	0.00	0.97	0.12	2	Rk	Rk	I	14	2	0	4	NA	Br	4mm	LT is 0.07m above tapeline
62+04.16	F	142	67	3.41	0.00	2.54	1.01	1	St	Rk	I	12	3	0	2	NA	M	1mm	LT is 0.18m above tapeline
62+04.40	F	139	67	1.87	1.92	2.79	1.83	2	Yf	Tf	I	12	3	0	2	NA	M	1mm	No comments
62+06.99	VPP	220	74	0.60	0.00	0.50	0.10	2	Rk	Rk	P	12	3	0	0	NA	V	0-1mm	LT is 0.02m above tapeline, 8mm light brown alteration halo
62+07.54	F	054	74	0.75	0.07	0.55	0.10	2	Yvpp	Rk	P	12	3	0	0	NA	NA	NA	No comments
62+07.72	F	255	84	1.40	0.05	1.15	0.35	1	St	Yf	P	12	3	0	10	NA	NA	NA	No comments
62+07.80	F	268	76	0.60	0.95	1.30	0.50	2	Yf	Tf	P	12	4	0	0	NA	V,Br	0-1mm, 0-15mm	0 to 10mm light pinkish brown alteration margin
62+07.82	F	120	75	0.00	0.90	0.55	0.80	2	Tf	Yflt	P	12	3	0	0	NA	NA	NA	UT is 0.2m below tapeline
62+08.06	F	101	85	0.50	0.40	0.70	0.50	2	Yf	Yf	P	12	3	0	0	NA	NA	NA	No comments

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Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
62+08.07	F	260	83	3.10	0.80	3.40	0.30	1	St	Tflt	P	12	3	0	0	NA	Br	0-30mm	planar except curved below tapeline, radius 1.3m, attitude is representative of upper portion of fracture
62+09.37	FLT	160	78	3.70	6.50	4.10	10.30	0	St	O	P	12	4	0	0	0.2	Bx	0-10mm	right lateral offset
62+11.81	F	185	76	0.40	2.48	2.20	2.10	0	St	In	P	11	3	0	0	NA	M,V	<1mm, 1mm	2mm alteration margin on either side of fracture
62+12.00	F	310	82	0.00	1.04	0.30	1.00	1	Air	Rk	P	11	4	0	0	NA	M	<1mm	UT is at tapeline
62+12.50	F	248	76	0.05	2.04	2.00	1.10	1	Tf	St	P	11	4	0	0	NA	M	<1mm	No comments

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
Compiled by: Sheldon K Johnson

Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
62+13.00-62+35.00	FLT Z	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NA	NA	NA	from 62+13.00 to 62+35.00 is very fractured (Fault Zone?), few fractures over 1m in length
62+21.82	F	186	70	0.00	1.90	1.50	1.50	0	Air	St	I	11	3	0	0	NA	M	<1mm	UT is 0.2m below tapeline, spotty manganese
62+27.15	F	132	86	2.00	0.40	0.83	2.10	1	Rk	St	P	11	5	0	0	NA	V,M	<1mm	spotty vapor phase mineralization, spotty manganese
62+28.40	F	145	88	1.00	2.20	1.58	3.00	0	Air	Air	P	11	5	0	0	NA	M	<1mm	patchy manganese
62+31.37	F	144	76	0.75	1.05	0.70	1.40	0	Air	Air	P	11	5	0	0	NA	M	<1mm	spotty manganese

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
62+31.75	F	228	84	1.43	0.40	1.60	0.41	1	St	Tf	P	11	5	0	0	NA	M	<1mm	spotty manganese
62+31.94	F	148	38	0.00	1.40	0.50	1.40	2	Tf	Tf	P	11	4	0	0	NA	M	<1mm	UT is 0.20m below tapeline, spotty manganese
62+33.77	F	233	86	0.00	1.38	1.18	0.84	1	Air	Tf	P	31	5	0	0	NA	Br	4-35mm	UT is 0.10m below tapeline, possible shear, cannot measure offset
62+35.59	F	142	76	2.86	1.40	2.35	2.10	1	St	Yf	P	13	5	0	3	NA	M,V	trace	possible cooling joint due to vapor phase mineralization
62+36.15	F	148	80	0.99	1.64	1.32	1.96	1	St	Tf	P	13	5	0	2	NA	M,V	trace	possible cooling joint due to vapor phase mineralization

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
62+36.53	F	217	85	1.54	1.66	2.96	0.95	0	St	O	P	13	5	0	3	NA	M,V	trace, <1mm	possible cooling joint due to vapor phase mineralization
62+36.54	F	136	75	2.53	1.19	1.90	3.10	2	Rk	Yf	P	13	5	0	2	NA	M,V,Io	trace, <1mm, trace	aperture probably induced by TBM operation, possible cooling joint
62+37.85	F	194	74	0.87	0.13	0.87	0.39	2	Rk	Yf	P	13	4	0	2	NA	C	0-trace	LT ends in a possible shear or open fracture that is fillied with breccia
62+37.96	F	150	82	2.36	1.24	2.43	2.24	1	Tvpp	St	P	13	5	0	2	NA	M,V	trace	possible cooling joint

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
62+38.47	F	139	64	1.10	2.69	1.10	3.69	2	Yf	Tf	P	13	5	0	0	NA	M,Io,V	trace	fracture surface almost polished, possible cooling joint
62+38.60	SH	242	71	1.44	1.37	2.60	0.79	2	Rk	Tf	I	21	5	0	15	0.02	Br,Io, M	0-12mm, trace, trace	one vapor phase parting offset 0.02m, down on north, other vapor phase partings appear unbroken
62+38.80	F	147	83	0.94	2.53	1.83	3.02	2	Rk	Tf	P	13	5	0	0	NA	M,V	trace	possible cooling joint, surface almost polished in places
62+39.79	F	143	77	1.60	1.34	1.77	2.45	2	Tvpp	Rk	P	13	5	0	0	NA	M,V	trace	possible cooling joint due to vapor phase mineralization

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
62+40.67	F	146	81	1.50	2.11	1.48	3.20	2	Yf	Yf	P	13	5	0	0	NA	M,V	trace	possible cooling joint due to vapor phase mineralization
62+41.55	F	136	83	0.35	0.85	0.51	1.15	2	Yf	Rk	P	13	5	0	0	NA	M,V	trace	No comments
62+41.84	F	145	78	0.01	2.76	1.08	2.78	2	Tf	Rk	P	13	5	0	0	NA	M,V	trace	No comments
62+41.95	SH	223	84	2.14	1.58	3.51	0.74	1	Rk	O	I	21	4	0	7	UNK	Br,V	0-15mm, 0-trace	almost undulating, no offset apparent, but filled with broken rock
62+42.08	CJ	145	80	0.95	5.50	2.70	5.20	1	Rk	O	P	13	5	0	0	NA	V,M,Io	trace	probable cooling joint due to vapor phase mineralization

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
62+42.68	F	149	88	0.80	1.05	1.21	1.55	2	Tvpp	Yf	P	13	5	0	0	NA	M,V	trace	possible cooling joint surface almost polished in places
62+43.31	CJ	012	42	0.77	0.73	0.52	0.23	2	Rk	Tsh	P	13	5	0	0	NA	V	0-1mm	No comments
62+43.33	F	155	79	0.44	1.81	1.08	1.97	2	Tvpp	Yf	P	13	5	0	0	NA	M,V	trace	surface almost polished in places, slightly irregular
62+44.00	F	152	74	0.00	2.35	0.97	2.30	2	Tf	Tf	P	12	5	0	0	NA	M,Io	trace	UT is 0.20m below tapeline, surface locally almost polished
62+44.10	SH	226	73	0.31	2.04	2.26	1.06	1	Rk	O	P	31	4	0	18	0.02	C,M	0-4mm, trace	footwall has 99% of calcite, hanging wall has a trace of calcite

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
62+44.15	VPP	335	33	0.00	2.79	0.96	0.65	2	Tf	Tf	P	13	5	0	0	NA	V	0-2mm	2mm alteration margin, UT is 0.18m below tapeline
62+44.42	VPP	007	17	1.23	2.51	0.80	0.40	1	O	Tf	P	13	4	0	0	NA	C,V	trace, 2mm	2mm alteration margin
62+44.55	F	147	83	2.40	0.00	2.14	0.64	1	St	Tcj	I	13	4	0	2	NA	M,Io,V	<1mm, trace, trace	LT is at tapeline, possible cooling joint due to vapor phase mineralization
62+45.13	VPP	330	20	0.35	1.70	0.13	2.00	2	Rk	Rk	I	13	1	0	1	NA	C,V	0-3mm, 0-3mm	2 to 5mm alteration margin
62+45.60	F	136	79	1.55	0.08	0.68	1.47	2	Tf	Tvpp	P	13	5	0	0	NA	M,V	trace	No comments
62+46.36	VPP	338	19	0.00	0.82	0.09	0.81	2	Rk	Tsh	I	13	1	0	0	NA	C,V	trace, 2mm	UT is 0.06m below tapeline, 3mm alteration margin

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
62+46.49	F	144	81	0.00	1.30	0.76	1.08	2	Tvpp	Tf	P	13	5	0	0	NA	V,M	trace	UT is 0.17m below tapelin
62+47.08	SH	224	82	0.52	1.97	2.29	1.04	2	Rk	Rk	I	21	4	0	18	0.03	C,Io,V ,Br	0-10mm, stain, trace, 0-15mm	AZ is an average value, this feature is indistinct, several vapor phase partings cross this structure unbroken, one vapor phase parting appears to have 0.03m offset, north side down, this structure may have 0.02mm left lateral strike slip movement

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Detailed Line Survey-Data Collected from Station 60+00 to 65+00
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Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
62+47.13	VPP	333	18	0.00	1.57	0.15	1.55	2	Tsh	Rk	I	13	1	0	0	NA	C,V	trace, 2mm	UT is 0.08m below tapeline 3mm alteration margin
62+47.76	F	326	79	1.08	0.20	1.02	0.46	2	Tvpp	Tvpp	P	13	4	0	0	NA	M,V	trace	possible cooling joint due to vapor phase mineralization
62+51.03	VPP	339	22	0.83	1.30	0.20	0.17	2	L	Rk	I	13	2	0	0	NA	V	2mm	2 to 5mm alteration margin
62+53.30	F	158	77	0.68	0.93	1.10	1.10	2	Yf	Rk	P	12	3	0	2	NA	V,M	patchy, <1mm	No comments
62+53.80	VPP	198	15	0.00	1.20	0.27	0.10	2	Tf	Rk	I	13	2	0	20	NA	V	0-5mm	UT is 0.1m below tapeline 5mm alteration margin

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
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Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
62+54.71	SH	053	86	3.75	2.70	5.60	1.55	1	Yf	O	I	21	3	0	10	UNK	Br,M,I o	0-45mm, trace, trace	filled with broken rock, but no offset noted
62+58.86	F	140	74	0.00	4.50	2.10	3.50	2	L	Yvpp	I	11	4	0	0	NA	V,M	<1mm	UT is 0.22m below tapeline
62+59.60	F	325	82	0.00	1.00	0.50	0.70	2	Yvpp	Yvpp	I	11	3	0	0	NA	V	<1mm	UT is at tapeline
62+59.70	VPP	201	20	10.00	1.57	2.65	0.15	2	Rk	Rk	I	13	2	0	20	NA	V	0-5mm	5 to 7mm alteration margin
62+61.30	VPP	207	14	7.80	2.90	2.97	0.10	2	Yvpp	Rk	I	13	2	0	10	NA	V	0-5mm	5mm alteration margin
62+63.45	VPP	195	23	11.15	5.70	2.65	0.15	2	Rk	Yf	I	13	2	0	10	NA	V	0-5mm	LT ends in fracture, 5mm alteration margin
62+63.86	F	222	78	6.00	2.64	8.00	4.00	0	St	In	I	21	3	0	0	NA	Br	20mm	no vapor phase parting displacement apparent

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
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Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
62+66.30	VPP	183	31	27	3.30	7.00	0.15	2	Rk	Yf	I	13	2	0	15	NA	V	0-10mm	5 to 8mm alteration margin
62+68.00	VPP	186	20	15.00	2.00	6.00	0.15	2	Tf	Yf	I	13	2	0	15	NA	V	0-5mm	5mm alteration margin
62+69.45	VPP	308	20	5.30	0.50	0.14	5.30	2	Ycj	Ycj	I	11	2	0	0	NA	V	1-5mm	No comments
62+69.91	CJ	320	88	4.10	0.00	3.20	2.00	1	St	Rk	P	11	4	0	0	NA	V	<1mm	spotty vapor phase mineralization, LT is 0.22m above tapeline
62+69.93	CJ	318	88	3.10	0.50	3.40	1.10	1	Air	Tvpp	P	11	4	0	0	NA	V	<1mm	spotty vapor phase mineralization
62+70.00	VPP	310	22	5.50	0.00	0.20	5.00	2	Ycj	Ycj	I	11	2	0	0	NA	V	1-5mm	LT is 0.12m above tapeline
62+70.60	F	145	84	0.67	1.64	1.40	1.90	2	Ycj	Yf	I	11	3	0	0	NA	M	patchy to <1mm	No comments
62+70.75	F	210	74	2.30	0.00	2.20	0.20	2	Rk	Ysh	I	21	3	0	0	NA	Br	10-20mm	LT is 0.29m above tapeline

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
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Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
62+71.40	F	167	86	0.13	1.66	1.59	0.61	2	Rk	Rk	I	13	2	0	1	NA	Br	1-2mm	No comments
62+71.85	F	237	87	0.08	0.98	1.01	0.24	2	Rk	Rk	I	11	3	0	1	NA	NA	NA	offset by shea
62+72.32	F	139	75	5.68	0.06	4.41	1.41	2	Yf	Rk	C	11	2	0	3	NA	NA	NA	radius 1.4m
62+72.45	F	132	70	0.00	1.71	1.59	1.49	2	Tf	Tf	I	13	3	0	3	NA	Br	2mm	UT is 0.02m below tapeline
62+72.75	FLT	136	68	14.20	2.40	10.80	12.10	2	Tf	Rk	P	31	2	0	15	0.11	Br	5mm	reverse offset
62+74.28	VPP	318	22	2.70	0.00	0.11	2.60	2	Ycj	Tf	I	11	3	0	0	NA	V	1-4mm	LT is at tapeline
62+74.34	F	241	83	4.51	2.40	5.99	1.92	1	Tf	In	I	13	2	0	16	NA	Br	12mm	No comments
62+75.09	F	137	84	9.10	0.98	5.16	5.67	1	St	Rk	C	13	3	0	6	NA	Br	2mm	radius 3.10m
62+75.82	F	060	86	1.47	2.85	3.50	2.15	1	Tcj	O	I	11	3	0	0	NA	V	patchy <1mm	No comments
62+76.40	F	150	84	3.80	2.50	4.80	3.10	2	Tf	Rk	P	11	4	0	0	NA	M	patchy <1mm	No comments
62+77.20	F	142	76	2.70	1.30	2.10	2.80	2	Yf	Tf	P	11	4	0	0	NA	M	spotty <1mm	No comments
62+78.05	F	140	86	1.60	0.70	1.40	1.60	2	Tvpp	Yvpp	P	11	4	0	0	NA	M	patchy <1mm	No comments

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Station	Typ	Attitude		Trace Length		Ht(m)	Wd(m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
62+78.57	F	240	76	0.82	1.15	1.90	0.87	2	Tf	Rk	I	11	3	0	0	NA	M	spotty <1mm	No comments
62+78.74	F	140	82	10.00	4.60	7.00	9.00	0	St	O	P	11	4	0	0	NA	M	patchy <1mm	No comments
62+78.84	VPP	312	20	1.10	1.05	0.08	2.00	2	Yf	Yf	I	11	2	0	0	NA	V	1-5mm	No comments
62+79.17	F	130	80	2.70	0.60	1.20	1.70	1	St	Yf	P	11	4	0	0	NA	M	patchy <1mm	No comments
62+79.45	VPP	310	21	1.95	0.00	0.04	1.77	2	Tf	Tf	I	11	2	0	0	NA	V	1-5mm	LT is 0.15m above tapeline
62+85.20	F	140	76	0.20	1.10	0.84	0.82	1	St	Tf	I	11	4	0	0	NA	M	patchy <1mm	No comments
62+85.95	F	135	80	0.98	1.30	0.90	2.00	2	Yvpp	Tf	I	11	3	0	0	NA	V,M	<1mm, patchy	No comments
62+87.60	F	140	85	1.50	1.20	1.70	1.70	1	St	Yf	I	11	4	0	0	NA	V	<1mm	No comments
62+88.60	F	152	84	0.80	1.00	1.20	1.10	0	St	St	I	11	3	0	0	NA	V	<1mm	No comments
62+88.96	F	150	82	0.80	1.38	1.28	1.60	0	St	St	P	11	4	0	0	NA	V	<1mm	No comments
62+89.11	F	140	82	0.60	0.94	1.20	1.40	1	St	Rk	I	11	3	0	0	NA	M,V	patchy, <1mm	No comments

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
Compiled by: Sheldon K Johnson

Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
62+89.33	VPP	330	25	0.50	0.90	0.12	1.00	0	St	St	I	11	2	0	0	NA	V	1-5mm	No comments
62+89.70	F	153	84	1.06	0.00	1.00	0.32	1	St	Tvpp	P	11	4	0	0	NA	V	<1mm	LT is at tapeline
62+90.40	F	148	80	1.80	1.10	1.60	1.50	1	St	Rk	P	11	4	0	0	NA	V	patchy <1mm	No comments
62+90.85	F	152	82	2.40	2.10	3.60	2.80	0	St	St	P	11	4	0	0	NA	V,M	<1mm	No comments
62+91.30	F	145	80	1.50	0.60	1.54	1.20	1	St	Yf	P	11	4	0	0	NA	V	<1mm	No comments
62+91.55	F	150	76	2.06	4.44	2.97	5.00	0	St	In	P	11	4	0	0	NA	M,V	spotty <1mm, <1mm	possible coooling joint
62+91.56	VPP	000	26	0.00	1.95	0.10	1.80	1	St	Rk	I	11	2	0	0	NA	V	1-3mm	UT is 0.21m below tapeline, 1cm pink alteration around vapor phase minerals

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
Compiled by: Sheldon K Johnson

Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
62+91.95	VPP	350	26	2.40	0.00	0.10	2.30	1	St	Tf	I	11	2	0	0	NA	V	1-2mm	LT is 0.28m above tapeline 1cm pink alteration around vapor phase minerals
62+92.08	F	240	84	2.35	0.17	2.33	0.50	1	St	Tf	C	11	4	1	20	NA	M	patchy <1mm	radius 3.0m
62+93.02	F	135	82	0.00	3.10	1.33	2.55	2	Ysh	Rk	I	11	4	0	2	NA	M	<1mm	UT is 0.08m below tapeline
62+93.03	SH	222	89	2.65	2.20	4.22	1.25	1	Tf	In	I	21	4	1	50	UNK	M,V,C	<1mm, <1mm, patchy 0-3mm	offset unknown
62+93.59	F	250	85	2.55	0.17	2.52	0.57	2	Tf	Rk	P	11	3	0	4	NA	V	1mm	1 to 2mm alteration margin
62+93.60	F	133	83	2.94	1.60	2.95	1.93	1	St	Yf	P	11	4	0	4	NA	V,M	<1mm	possible cooling joint

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
Compiled by: Sheldon K Johnson

Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
62+93.90	F	142	82	1.46	0.20	1.20	0.80	2	Rk	Yf	P	11	4	0	0	NA	V,M	<1mm, patchy <1mm	possible cooling joint
62+94.46	F	150	84	3.20	4.40	5.00	5.30	0	St	In	P	11	4	0	3	NA	V,M	<1mm, patchy <1mm	possible cooling joint
62+94.72	F	138	82	3.20	0.70	3.00	2.30	1	St	Yf	P	11	4	0	4	NA	V,M	patchy <1mm, patchy <1mm	possible cooling joint
62+95.41	F	134	86	2.40	3.00	3.60	3.60	1	Rk	In	P	11	4	0	2	NA	V,M	patchy <1mm, patchy <1mm	possible cooling joint
62+95.79	F	139	83	1.85	3.98	3.60	3.95	0	St	In	P	11	4	0	5	NA	V,M	patchy <1mm, patchy <1mm	possible cooling joint

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
Compiled by: Sheldon K Johnson

Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht(m)	Wd(m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
62+96.65	F	240	72	0.42	1.50	1.82	0.90	1	Yf	O	P	11	3	0	4	NA	V,M	patchy <1mm, patchy <1mm	No comments
62+96.78	VPP	020	22	1.75	0.00	0.09	1.65	2	Tf	Tf	I	11	2	0	0	NA	V	1-3mm	LT is at tapeline, alteration margin 5mm thick
62+96.96	F	152	86	2.50	3.55	4.80	4.10	0	St	St	P	11	4	0	2	NA	V,M	patchy <1mm, patchy <1mm	possible cooling joint
62+98.05	F	140	80	0.80	0.50	0.90	0.90	1	Yvpp	St	P	11	3	0	0	NA	V	<1mm	No comments
62+98.59	F	045	86	0.88	0.40	1.12	0.17	2	Tvpp	Tvpp	I	11	3	0	0	NA	V	<1mm	3mm alteration margin
62+98.63	F	150	85	1.30	0.80	1.70	1.30	2	Tvpp	Yvpp	P	11	4	0	0	NA	M,V	<1mm	No comments

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
62+99.23	VPP	340	10	0.00	1.42	0.07	1.26	2	Tf	Tf	I	11	2	0	0	NA	V	1-3mm	UT is 0.14m below tapelin 2 to 4mm alteration margin
62+99.30	F	158	85	2.10	1.36	2.90	1.90	2	Yf	Yvpp	P	11	4	0	0	NA	M,V	<1mm	No comments
62+99.61	F	130	70	0.42	0.65	0.46	0.90	2	Yf	Yf	P	11	4	0	0	NA	M	patchy <1mm	No comments
62+99.73	F	145	84	1.43	2.10	3.10	1.40	2	Yf	Yf	P	11	4	0	0	NA	M,V	<1mm	No comments
63+00.00	F	138	82	2.40	1.45	3.60	2.10	2	Tvpp	Yvpp	P	11	4	0	0	NA	M,V	patchy, <1mm	No comments
63+00.20	F	142	82	2.40	3.10	5.30	4.30	1	Tvpp	O	P	11	4	0	0	NA	M,V	patchy, <1mm	No comments
63+00.74	F	250	90	0.13	1.87	1.64	1.10	1	Tvpp	O	I	11	4	0	5	NA	M,C	<1mm, 3mm	No comments
63+01.00	F	155	78	1.20	2.00	2.40	2.30	1	Tvpp	St	P	11	4	0	0	NA	M,V	<1mm	No comments
63+02.00	VPP	320	22	0.90	2.00	0.08	2.60	2	Tf	Tf	I	11	2	0	0	NA	V	1-5mm	3mm alteration margin

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
Compiled by: Sheldon K Johnson

Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
63+02.94	VPP	318	20	3.00	0.00	0.04	2.90	2	Yf	Rk	I	11	2	0	0	NA	V	1-5mm	LT is 0.24m above tapelin 5mm alteration margin
63+03.00	F	149	77	1.56	2.80	3.66	4.00	1	Tvpp	O	P	11	3	0	0	NA	M,V	<1mm, patchy	No comments
63+03.44	VPP	321	22	0.25	1.37	0.06	1.28	2	Tsh	Yf	I	11	2	0	0	NA	V	1-3mm	3mm alteration margin
63+03.55	F	055	84	0.70	1.10	1.52	0.62	2	Yf	Yf	I	11	3	0	0	NA	M,V	<1mm, patchy	No comments
63+03.75	F	151	81	2.10	1.77	3.00	2.50	1	Yf	O	P	11	4	0	0	NA	M,V	<1mm, patchy	No comments
63+04.75	F	153	83	1.70	0.50	1.87	1.00	2	Tvpp	Tvpp	I	11	3	0	0	NA	V,M	<1mm	No comments
63+04.90	FLT	160	82	1.96	2.37	2.93	2.30	1	Tvpp	O	I	21	3	0	0	0.14	V,M,Br	<1mm, <1mm, 5mm	reverse offset

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
63+04.95	VPP	310	18	0.00	3.10	0.12	3.00	2	Tflt	Tflt	I	11	2	0	0	NA	V	3mm	UT is 0.11m below tapelin(100mm alteration margin
63+05.85	VPP	315	20	0.00	2.50	0.09	2.30	2	L	Yflt	I	11	2	0	0	NA	V	3-5mm	UT is 0.05m below tapeline
63+06.16	F	145	86	1.20	2.50	2.60	2.20	1	Tvpp	O	P	11	4	0	0	NA	M	<1mm	No comments
63+06.70	F	245	74	2.80	2.10	4.10	0.90	1	L	O	P	11	4	0	0	NA	M	<1mm	No comments
63+07.20	F	131	82	1.10	0.00	0.77	0.50	2	Tvpp	Yvpp	I	11	2	0	0	NA	V	<1mm	LT is 0.11m above tapeline
63+07.60	VPP	318	20	2.20	0.60	0.11	2.28	2	Tflt	Tf	I	11	2	0	0	NA	V	2-5mm	No comments
63+08.38	F	172	84	1.46	0.60	1.90	0.12	2	Tvpp	Yflt	I	11	3	0	0	NA	V	1-2mm	No comments
63+08.95	FLT	156	84	2.72	0.50	2.70	0.70	2	L	Yflt	I	21	3	0	0	UNK	Br	5-20mm	offset unknown(maybe strike slip

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
63+09.15	FLT	133	83	3.40	3.90	7.00	5.00	0	St	In	I	21	3	0	110	UNK	Br,V,C	10-200mm, <1mm, 3mm	offset unknown, maybe strike slip
63+09.65	F	147	88	0.60	2.00	2.05	1.50	1	Yflt	O	I	11	3	0	0	NA	M,V,C	<1mm, <1mm, 0-3mm	No comments
63+10.25	F	071	81	0.00	1.37	1.30	0.29	2	L	Yvpp	I	11	3	0	0	NA	M,C	<1mm, 2mm	UT is 0.04m below tapeline
63+11.12	F	141	89	0.26	3.40	2.82	2.90	1	Tvpp	O	P	11	4	0	0	NA	M,V	<1mm	No comments
63+13.70	F	149	73	0.23	3.50	3.00	3.42	1	L	O	P	11	4	0	0	NA	M,V	<1mm	No comments
63+13.92	F	150	73	0.52	3.40	3.10	3.55	1	L	O	P	11	4	0	0	NA	M,V	<1mm	No comments
63+14.35	F	142	68	0.43	2.30	1.99	2.30	1	Yf	O	I	11	4	0	0	NA	M,V,S, Br,	<1mm, <1mm, 0-10mm, 0-5mm	No comments
63+14.55	F	241	86	0.00	1.60	1.46	1.10	2	Tf	Tf	I	11	3	0	0	NA	V,M,C	<1mm, <1mm, 2mm	UT is 0.23m below tapeline

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
63+14.64	F	139	81	0.11	2.30	1.60	1.80	1	Ysh	O	I	11	4	0	0	NA	V,M,C	<1mm, <1mm, 3mm	No comments
63+14.75	F	335	86	14.00	0.50	5.80	13.00	1	St	L	P	11	4	0	0	NA	V,M,Br	<1mm, <1mm, 10mm	No comments
63+15.63	F	144	83	0.17	2.68	2.40	1.80	1	Rk	O	P	11	4	0	4	NA	M,V	patchy <1mm, patchy <1mm	strike and dip by FPG mapper
63+16.50	F	147	87	0.00	3.20	1.90	2.50	1	Rk	In	P	12	3	0	2	NA	V	<1mm	UT is 0.06m below tapeline
63+17.15	F	161	77	0.00	1.30	1.10	0.80	2	Rk	Rk	P	11	4	0	0	NA	V	1mm	UT is 0.1m below tapeline, 2mm alteration margin
63+17.97	F	143	88	0.24	3.20	2.20	2.80	1	Rk	In	P	12	3	0	4	NA	V,M	patchy <1mm	No comments

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
63+18.50	VPP	025	10	6.40	0.00	6.20	0.15	2	Rk	Rk	I	11	2	0	0	NA	V	1mm	LT is at tapeline, vapor phase parting breaks into several veinlets, 5mm alteration margin
63+23.81	FLT	127	75	17.80	4.10	10.00	10.00	0	In	In	P	32	3	0	0	3.8	Br	3-8cm	offsets pvl/pmn contact, west side down
63+26.52	VPP	005	08	1.64	0.00	1.60	0.05	2	Rk	Tf	I	11	2	0	0	NA	V	1mm	LT is 0.08m above tapeline, UT is in breccia zone, 10mm alteration margin
63+27.28	F	135	90	0.47	0.80	1.00	0.85	2	Yvpp	Yvpp	P	12	5	0	2	NA	M	<1mm	No comments
63+27.30	VPP	351	07	0.40	2.34	2.70	0.15	2	Tf	Tf	I	11	2	0	0	NA	V	1mm	5mm alteration margin

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
63+29.45	VPP	342	10	0.73	0.47	1.10	0.10	2	Tflt	Rk	I	11	2	0	1	NA	V	1mm	5mm alteration margin
63+29.63	F	149	84	0.40	1.47	1.50	1.15	1	Yvpp	O	P	12	4	0	3	NA	V,M	patchy <1mm	No comments
63+30.10	FLT	146	89	1.50	2.80	3.00	2.80	1	Rk	O	P	12	5	0	3	0.28	V,M	patchy <1mm	normal offset
63+30.72	VPP	329	13	0.41	1.22	1.60	0.12	2	Tflt	Yf	I	11	2	0	1	NA	V	1mm	5mm alteration margin
63+32.18	F	147	82	0.00	1.53	1.30	0.58	2	Rk	Yvpp	P	12	4	0	0	NA	M	patchy <1mm	UT is 0.19m below tapeline
63+34.35	F	153	84	0.96	0.52	1.40	0.80	2	Rk	Rk	P	12	4	0	5	NA	M	<1mm	slight undulation to fracture plane
63+36.36	F	145	85	0.23	1.56	1.50	0.90	2	Rk	Rk	P	12	4	0	1	NA	M	<1mm	No comments
63+38.85	F	140	75	1.00	2.10	2.04	2.10	1	Yf	O	P	11	4	0	0	NA	V,M	<1mm	No comments
63+38.98	F	130	65	1.20	0.40	0.90	1.10	2	Rk	Yf	I	11	2	0	0	NA	M	<1mm	No comments
63+41.50	VPP	300	15	0.20	1.40	0.21	1.30	2	L	Tsh	I	11	2	0	0	NA	V	2-10mm	No comments

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
63+43.30	SH	150	76	15.00	1.70	7.00	17.00	0	In	O	I	32	2	0	0	UNK	M,Br, Ar	<1mm, 10mm, 0-20mm	offset unknown
63+45.30	F	140	70	0.20	2.40	2.00	2.10	2	L	Yvpp	I	11	2	0	0	NA	M	<1mm	No comments
63+45.50	F	150	88	1.37	2.00	2.50	1.50	2	L	L	I	11	3	0	0	NA	M,V	<1mm	No comments
63+48.70	SH	150	84	1.30	1.37	2.40	1.60	2	Rk	Rk	I	21	3	0	0	UNK	Br,V	10-20mm, <1mm	offset unknown
63+50.00	F	142	75	1.20	2.45	2.76	2.20	1	Rk	O	I	11	4	0	0	NA	V	<1mm	No comments
63+50.50	F	200	70	0.45	1.80	1.75	0.80	2	Rk	Rk	I	11	3	0	10	NA	V	<1mm	No comments
63+50.93	F	228	78	0.20	1.30	1.30	0.70	2	Rk	Rk	I	11	3	0	0	NA	V	<1mm	No comments
63+51.08	F	222	82	0.83	1.62	1.45	0.80	1	Ysh	O	I	11	3	0	0	NA	V	<1mm	No comments
63+52.25	SH	200	65	2.50	1.76	3.45	0.89	2	Yf	Rk	I	21	4	0	0	UNK	Br,V	0-200mm, <1mm	offset unknown
63+56.65	F	155	65	0.84	0.80	1.30	0.44	2	Rk	Rk	I	11	3	0	0	NA	V	<1mm	No comments
63+57.55	F	230	82	0.00	1.03	0.92	0.50	2	Rk	Rk	I	11	3	0	0	NA	V	<1mm	UT is 0.20m below tapeline
63+59.10	F	160	74	1.25	0.00	1.00	0.26	2	L	Rk	I	11	3	0	0	NA	V	<1mm	LT is 0.20m above tapeline

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
Compiled by: Sheldon K Johnson

Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
63+62.70	SH	150	80	2.44	1.87	3.40	2.00	1	Ysh	O	I	32	3	0	0	UNK	Br	10-30mm	offset unknown
63+63.04	F	150	76	2.60	2.07	3.80	2.00	2	Rk	Ysh	I	11	3	0	0	NA	Br,V	3-mm, <1mm	No comments
63+63.90	F	135	75	0.64	0.80	1.10	1.00	2	Rk	Rk	I	11	3	0	0	NA	V	<1mm	No comments
63+65.75	SH	128	75	1.35	3.30	4.10	3.75	1	Rk	O	I	11	3	0	0	UNK	Br,V	5mm, <1mm	offset unknown
63+67.80	SH	140	78	0.95	1.95	2.10	1.90	1	L	O	I	32	3	0	0	UNK	V,Br	<1mm, 10-20mm	offset unknown
63+68.10	F	145	84	1.44	0.80	1.90	1.30	2	L	Ysh	I	11	3	0	0	NA	V	<1mm	No comments
63+69.25	F	175	80	0.90	2.00	2.06	1.80	1	L	O	I	11	3	0	20	NA	V,Br	<1mm, 30mm	No comments
63+72.00	F	125	82	0.64	2.20	1.50	1.52	1	Rk	O	I	11	3	0	0	NA	V	<1mm	No comments
63+72.45	FLT	185	58	0.92	0.40	1.25	0.23	2	Ysh	Rk	I	31	2	0	0	0.4	V,Br	<1mm, 1.2mm	west edge of normal fault, intensely fractured, fault zone 1.0 to 1.2m
63+74.80	F	138	72	1.04	2.17	2.48	2.30	2	Rk	Yflt	I	11	2	0	0	NA	V	<1mm	No comments

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
Compiled by: Sheldon K Johnson

Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
63+75.30	F	145	62	1.40	1.00	1.90	1.50	2	Yf	Rk	I	11	2	0	0	NA	V	<1mm	No comments
63+75.80	F	155	74	0.90	0.90	1.54	1.30	2	Tvpp	Yf	I	11	2	0	0	NA	V	<1mm	No comments
63+77.30	F	155	86	0.50	1.20	1.53	1.20	2	Tvpp	Tf	I	11	2	0	0	NA	V	<1mm	No comments
63+78.61	FLT	150	78	2.50	1.80	3.10	1.90	1	Yflt	O	P	21	3	0	20	0.11	V	<1mm	normal offset
63+79.41	FLT	145	86	7.00	3.00	7.00	5.10	0	St	In	P	32	4	0	100	0.21	Br,Ar	130mm	reverse offset
63+79.45	VPP	198	17	0.00	1.80	0.01	1.70	2	Tflt	Tflt	I	11	2	0	0	NA	V	100mm	attitude uncertain, no plane to measure, UT is at tapeline
63+81.30	VPP	200	18	1.60	0.50	0.02	1.90	2	Tflt	Tflt	I	11	2	0	0	NA	V	100mm	attitude uncertain
63+81.94	F	205	80	1.10	0.00	1.00	0.12	2	L	Yflt	P	11	4	0	0	NA	V	<1mm	LT is 0.20m above tapeline
63+82.00	FLT	145	84	15.00	2.80	7.00	7.00	0	In	In	I	31	2	0	50	0.6	Br,Ar	100mm	normal offset
63+82.80	VPP	200	18	0.50	2.10	0.02	2.00	2	Tflt	Tf	I	11	2	0	0	NA	V	50mm	attitude uncertain

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
63+83.00	F	225	78	1.00	0.00	1.00	0.11	2	Rk	Tvpp	P	11	4	0	0	NA	V	<1mm	LT is at tapeline
63+84.52	SH	155	85	1.80	1.20	2.60	1.00	1	Rk	O	P	31	4	0	40	UNK	C,O,Br	0-40mm	offset unknown
63+85.10	SH	152	85	2.50	1.40	3.50	1.40	1	Rk	O	I	31	3	0	40	UNK	C,O,Br	0-40mm	offset unknown
63+85.20	F	175	80	1.50	0.00	1.50	0.13	2	L	Ysh	I	31	3	0	20	NA	V	0-5mm	LT is 0.20m above tapeline
63+86.15	F	148	84	0.24	1.10	1.20	0.43	2	L	Rk	I	11	3	0	0	NA	V	<1mm	No comments
63+86.34	F	150	80	0.80	1.60	1.90	1.20	1	L	O	I	11	3	0	0	NA	V	<1mm	No comments
63+86.55	F	140	78	0.22	0.85	0.80	0.70	2	L	Yf	I	11	3	0	0	NA	V	<1mm	No comments
63+86.56	F	152	88	0.00	1.26	1.20	0.62	1	Yf	O	P	11	3	0	0	NA	V	<1mm	UT is at tapeline
63+87.57	F	138	76	0.80	0.70	1.20	1.10	2	L	Rk	I	11	3	0	0	NA	C,O	0-2mm, <1mm	No comments
63+87.95	F	135	80	0.40	1.25	1.00	0.90	1	Yf	O	I	11	3	0	0	NA	C,V	0-2mm, <1mm	No comments
63+88.26	F	036	85	1.65	0.16	1.75	0.47	2	Tf	Rk	I	11	2	0	2	NA	S	1mm	No comments
63+88.90	F	154	79	0.11	3.01	2.47	1.68	1	Rk	In	I	13	2	0	3	NA	Br	3mm	No comments

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
63+88.90	F	028	74	1.22	0.00	1.17	0.25	2	Rk	Rk	I	11	2	0	0	NA	NA	NA	LT is 0.22m above tapeline
63+89.68	SH	174	72	2.72	0.00	2.46	0.63	2	Rk	Rk	I	21	2	0	5	0.03	S	2mm	normal offset, LT is 0.22m above tapeline
63+90.26	SH	139	81	4.54	3.07	7.00	9.70	0	In	In	P	23	2	0	100	0.09	Ar	20mm	reverse offset, marker beds on left wall are offset
63+92.76	F	213	82	15.20	1.25	7.90	9.50	0	In	In	I	14	2	0	12	NA	Ar	5mm	No comments
63+92.89	F	041	74	0.69	0.47	1.07	0.26	2	Rk	Rk	P	11	2	0	0	NA	S	1mm	No comments
63+93.59	F	166	80	6.80	2.97	6.24	3.59	0	St	In	P	13	3	0	2	NA	C	<1mm	No comments
63+94.80	F	171	76	4.41	2.61	6.20	1.73	1	Tf	In	P	13	4	0	0	NA	C	<1mm	No comments
63+95.94	F	118	77	8.28	3.24	6.95	3.71	0	St	In	P	13	3	0	0	NA	C	<1mm	No comments
63+97.03	F	179	82	1.74	2.41	4.11	1.32	1	Rk	In	P	13	4	0	0	NA	C	<1mm	No comments
63+97.66	F	209	82	0.52	1.47	1.83	0.74	1	Rk	In	P	13	4	0	0	NA	C	<1mm	No comments
63+98.74	F	159	68	0.00	1.65	1.39	0.67	1	Rk	In	P	13	3	0	0	NA	C	<1mm	UT is 0.20m below tapeline

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
63+99.54	F	141	72	4.60	1.94	5.07	2.38	0	St	In	P	13	4	0	0	NA	C	<1mm	No comments
64+00.00	F	225	85	0.00	1.36	1.10	0.80	2	L	Tf	P	13	4	0	0	NA	C,O	3-5mm	UT is at tapeline
64+01.04	F	165	78	2.06	2.40	4.88	1.70	1	Yf	O	I	13	4	0	0	NA	M,V	<1mm	No comments
64+01.95	F	180	86	1.60	0.50	1.80	0.30	2	L	L	I	13	4	0	0	NA	NA	NA	No comments
64+03.30	F	204	82	0.20	2.00	1.88	0.90	1	L	O	I	13	4	0	0	NA	V	<1mm	No comments
64+05.27	F	165	60	2.20	1.80	3.70	0.90	1	L	O	P	13	4	0	0	NA	NA	NA	No comments
64+05.60	F	190	62	0.15	2.24	2.08	1.20	1	Rk	O	I	13	3	0	0	NA	NA	NA	No comments
64+06.05	F	180	86	0.25	1.33	1.35	0.65	1	Rk	O	I	13	3	0	0	NA	NA	NA	No comments
64+09.75	SH	336	88	1.80	2.27	3.90	1.20	1	Rk	O	I	31	2	0	0	UNK	Ar,Br	5-80mm	offset unknown
64+10.68	F	205	80	0.94	0.40	1.20	0.18	2	Rk	L	I	13	3	0	0	NA	V	<1mm	No comments
64+11.60	SH	145	78	1.24	2.08	2.65	1.90	1	L	O	I	21	3	0	0	UNK	Br	0-30mm	offset unknown
64+21.38	F	145	78	0.90	1.50	1.88	0.93	1	Rk	O	I	13	3	0	0	NA	NA	NA	No comments
64+24.57	F	222	70	0.59	1.02	1.32	0.59	2	Rk	Rk	P	13	2	0	2	NA	Br	2mm	lithophysae intersects fracture face

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
64+26.17	F	216	81	1.05	2.21	2.58	1.21	1	Rk	In	I	31	1	0	0	NA	Br	200mm	No comments
64+26.55	F	154	87	0.55	0.86	1.15	0.40	2	Yf	Rk	I	13	1	0	3	NA	Br	5mm	No comments
64+27.59	SH	175	77	2.29	1.68	3.49	0.92	1	Rk	In	P	13	3	0	5	0.02	Br	2mm	normal offset
64+29.75	F	142	64	0.17	1.66	1.51	1.18	1	Rk	In	P	11	2	0	2	NA	Br	2mm	No comments
64+30.91	F	159	67	1.36	1.73	2.69	0.99	1	Rk	In	P	13	2	0	6	NA	Br	2mm	No comments
64+33.10	F	157	76	1.34	0.31	1.62	0.67	2	Yf	Rk	P	13	1	0	10	NA	Br	4mm	No comments
64+34.10	F	122	85	0.40	2.70	2.50	2.30	1	Rk	O	P	13	4	0	0	NA	NA	NA	No comments
64+35.25	SH	223	72	1.70	0.80	2.00	1.00	2	Rk	Rk	I	32	3	0	0	UNK	Ar,Br	80-90mm	No comments
64+37.35	F	028	86	0.00	1.36	1.20	0.75	2	Tf	Rk	I	13	3	0	0	NA	V	2-3mm	UT is at tapeline
64+37.87	F	184	54	0.63	0.42	0.86	0.31	2	Rk	Yf	I	13	4	0	0	NA	NA	NA	No comments
64+40.12	F	132	64	0.60	0.90	1.30	1.10	2	Rk	Tsh	I	13	3	0	0	NA	NA	NA	No comments
64+43.38	F	122	54	0.23	1.13	0.80	1.20	2	Rk	Rk	P	13	4	0	0	NA	M	<1mm	No comments
64+43.85	F	150	66	0.34	1.20	1.14	1.10	2	Rk	Rk	P	13	4	0	0	NA	V	coating <1mm	No comments
64+46.08	VPP	155	35	0.40	0.80	0.25	1.00	2	Tf	Tf	I	13	2	0	0	NA	V	2-3mm	No comments

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
64+46.20	F	158	84	1.00	0.04	0.96	0.15	2	Tvpp	Tvpp	I	13	4	0	0	NA	V	<1mm	No comments
64+47.47	F	165	78	0.30	0.90	1.10	0.70	2	Tvpp	Rk	I	13	3	0	0	NA	NA	NA	No comments
64+48.08	F	196	85	1.24	0.20	1.30	0.20	2	Rk	L	I	13	4	0	0	NA	NA	NA	No comments
64+53.10	F	054	28	1.05	0.00	0.64	0.85	2	Tf	Yf	P	13	3	0	0	NA	V	2mm	LT is 0.17m above tapeline
64+53.35	VPP	125	16	0.00	2.45	0.09	2.40	2	Yvpp	Tsh	I	13	3	0	0	NA	V	1-2mm	UT is 0.23m below tapeline, 3mm alteration margin
64+53.50	VPP	130	07	1.60	0.00	0.06	1.50	2	Tf	Tf	P	13	3	0	0	NA	V	1-2mm	LT is 0.05m above tapeline, 3mm alteration margin
64+54.30	F	210	65	0.16	1.20	1.00	0.16	2	Tvpp	Tvpp	P	13	3	0	0	NA	V	1-2mm	No comments
64+54.84	F	155	62	0.90	0.35	0.70	0.11	2	Rk	Yf	C	13	3	0	0	NA	V	1-2mm	radius 0.75m, to 4mm alteration margin

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
64+57.33	F	214	75	1.13	0.00	0.80	0.18	2	Yf	Tvpp	I	13	3	0	0	NA	V	1-2mm	LT is at tapeline
64+57.65	F	205	82	0.16	1.80	1.64	0.65	2	Yf	Yf	P	13	4	0	0	NA	V	1-2mm	No comments
64+58.95	F	165	72	0.00	1.80	1.66	1.20	1	Rk	O	P	13	3	0	0	NA	V	1-2mm	UT is 0.03m below tapeline, 3mm alteration margin
64+61.05	F	222	68	0.33	0.87	1.04	0.40	2	Tvpp	Tf	I	13	3	0	0	NA	V	1mm	No comments
64+61.39	F	215	75	0.90	0.20	0.91	0.07	2	VPP	Yf	I	13	3	0	0	NA	NA	NA	No comments
64+62.90	F	125	72	0.45	2.00	1.12	2.30	2	Rk	Yf	I	13	3	0	0	NA	NA	NA	No comments
64+64.20	F	195	81	0.83	0.20	1.00	0.14	2	Tvpp	L	P	13	3	0	3	NA	V	<1mm	No comments
64+65.25	F	150	85	0.70	1.90	2.23	1.30	1	L	O	P	13	3	0	0	NA	V	1-2mm	No comments
64+74.25	F	215	74	0.24	0.92	1.00	0.38	2	Rk	Rk	I	13	3	0	0	NA	O,C	1-2mm	No comments
64+74.68	SH	212	72	12.00	1.57	7.00	7.00	0	St	O	P	32	3	0	0	UNK	Br,Ar	20-30mm	offset unknown
64+79.00	SH	227	80	1.20	2.13	3.01	1.43	1	Rk	In	I	13	3	0	0	UNK	Ar	<1mm	No comments
64+79.21	SH	221	88	1.27	0.37	1.57	0.44	2	Rk	Rk	P	13	2	0	1	UNK	V,Br	<1mm	No comments
64+80.38	F	155	82	1.11	0.88	1.89	0.65	2	Rk	Rk	P	14	1	0	0	NA	Ar	<1mm	No comments

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
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Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
64+81.85	SH	172	71	1.01	1.00	1.85	0.86	2	Rk	Rk	P	15	4	0	81	UNK	Ar	4mm	rubble in shear where aperture widens to 81mm
64+82.31	F	141	62	0.57	1.42	1.69	0.90	1	Ysh	O	C	13	3	0	4	NA	Br	<1mm	radius 1.4m (radius of curved fracture plane)
64+85.90	F	169	81	1.94	0.35	2.10	0.62	2	L	Rk	P	13	2	0	6	NA	Br	1mm	fracture plane is slightly sinuous
64+86.17	F	231	66	0.00	2.30	1.74	0.92	1	L	In	P	15	2	0	110	NA	Ar,Br	<5mm	UT is 0.30m below tapeline
64+86.35	F	212	56	2.00	0.10	2.40	0.94	2	Rk	Tf	P	15	2	0	2	NA	Ar,Br	1mm	No comments
64+87.00	F	140	73	1.42	0.45	1.80	0.90	2	L	Rk	P	12	4	0	3	NA	NA	NA	fracture surface is clean
64+87.75	F	148	84	0.00	1.70	1.50	1.05	1	Yf	O	P	12	4	0	3	NA	NA	NA	fracture surface is clean, UT is 0.13m below tapeline

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
Compiled by: Sheldon K Johnson

Main Drift and South Ramp, Exploratory Studies Facility, Yucca Mountain Project
Detailed Line Survey-Data Collected from Station 60+00 to 65+00
Collected under GP-32, R0, SCP Study Number 8.3.1.4.2.2.4

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
64+88.69	F	142	85	0.00	2.00	1.60	1.50	1	Rk	O	P	12	4	0	0	NA	NA	NA	UT is 0.30m below tapeline, clean fracture surface
64+89.77	F	228	83	0.92	0.25	1.05	0.20	2	Rk	L	P	12	4	0	2	NA	NA	NA	clean fracture surface
64+90.38	F	229	86	0.60	0.50	1.05	0.25	2	VPP	L	P	13	5	0	10	NA	V,C	1mm	No comments
64+92.05	FLT	160	69	10.00	1.45	5.50	7.00	1	Rk	O	P	14	5	0	0	0.10	Br	10cm	probable normal offset
64+93.90	F	308	75	0.00	1.00	0.95	0.30	1	VPP	O	P	14	5	0	0	NA	NA	NA	UT is 0.28m below tapeline, fracture surface clean
64+94.39	F	158	88	0.17	1.27	1.20	0.50	1	L	O	P	12	5	0	4	NA	Br	6cm	No comments
64+95.43	F	133	88	0.00	1.33	1.18	0.63	1	Rk	In	P	14	3	0	0	NA	Ar,Br	7mm	UT is 0.30m below tapeline
64+95.64	F	142	51	1.70	0.00	1.18	0.37	2	Rk	Rk	C	13	2	0	0	NA	Br	15mm	LT is 0.20m above tapeline, radius 0.8m

Traceline Location: ESF Tunnel, Main Drift and South Ramp, Station 60+00 to 65+00
Dates Mapped: July 16, 1996 to August 26, 1996
Compiled by: Sheldon K Johnson

Station	Typ	Attitude		Trace Length		Ht (m)	Wd (m)	E	UT	LT	Pl	Ja	Rgh	Aptr mm		Off set	Infill type	Infill thick	Comments
		Str	Dip	A (m)	B (m)									Min	Max	m			
64+96.99	F	014	88	0.12	1.17	1.19	0.27	2	Rk	In	I	13	2	0	2	NA	Br	4mm	No comments
64+99.70	F	144	68	0.13	1.02	0.96	0.61	2	Yf	Rk	P	13	2	0	0	NA	Br	1mm	No comments

Line Survey Mappers: Gary Turlington, David Churchill, Jim Rogers, Donna Sinks, Rod Burt, Dawn Gonzales, Arthur Lee, Kent Dow, Tom Moyer, Debbie Barr, Alton Albin, Greg Mongano

Abbreviations for Detailed Line Surveys
to be used in Conjunction with Technical Procedure NWM-USGS-GP-32

Heading Abbreviations

Typ - Discontinuity Type
Str - Strike Azimuth
Trace Length
  A - Length above traceline
  B - Length below traceline
Ht - Length of fracture trace along dip
Wd - width of fracture trace along strike
E - ends in fracture in natural medium
UT - Upper Termination
LT - Lower Termination
Pl - Planarity
J_a - Joint Alteration Number
Rgh - Roughness Coefficient
Aptr - aperture of fracture
JRC - joint roughness coefficient
Offset - amount of offset along shear of fault
Infill type - infilling type
Infill thick - infilling thickness

Discontinuity Type

F - Fracture
CJ - Cooling Joint
VPP - Vapor Phase Parting
FLT - Fault
SH - Shear (<10cm disp.)
FZ - Fault Zone

Planarity

P - Planar
I - Irregular
U - Undulating (give wavelength (W) and amplitude (A),
C - Curved (give radius)

Joint Alteration Number - J_a

rock wall contact
  Ja.11 tightly healed, hard filling
  Ja.12 unaltered surface stain only
  Ja.13 slightly altered, non softening coating, sandy particles
  Ja.14 silty or sandy clay coatings, little clay
  Ja.15 softening or clay mineral coatings

rock wall contact before 10 cm shear
  Ja.21 sandy particles, clay free disintegrated rock
  Ja.22 over consolidated, non softening clay mineral fillings (<5mm)
  Ja.23 medium or low over consolidation, softening, clay mineral fillings (<5mm)
  Ja.24 swelling clay fillings

no rock wall contact
  Ja.31 zones of disintegrated or crushed rock
  Ja.32 zones of silty or sandy clay
  Ja.33 thick zones of clay

Aperture

Aperture is the open, unfilled distance between the sides of a fracture measured perpendicular to the sides (in mm, give max and min).

Terminations
(UT and LT)

Rk - ends blindly in rock mass
St - end not visible behind ground support
In - fracture extends under precast invert segments
T(discontinuity type) - (angle >45°) such as TF ends in a fracture
Y(discontinuity type)- (angle<45°) such as Yflt ends in a fault
VPP - ends in Vapor Phase Parting
L - ends in lithophysae
C - Crown
Air - Fracture (usually subparallel to tunnel) termination has been excavated
O - obscured

Roughness Coefficient - Rgh

R1 - Stepped, Near-normal steps and ridges occur on the fracture surface
R2 - Rough, Large, angular asperities can be seen
R3 - Moderately rough, asperities are clearly visible and fracture surface feels abrasive
R4 - Slightly rough, small asperities on the fracture surface are visible and can be felt
R5 - Smooth, no asperities, smooth to the touch
R6 - Polished, extremely smooth and shiny

Infilling Type

C - Calcite
F - Fluorite
O - Opal
Q - Quartz
S - Silica (amorphous)
V - Vapor-phase minerals
M - Manganese Oxides
Z - Zeolites
Io - Iron oxides
Fg -Fault Gouge
Fr - Fault Rubble
Br- Broken or crushed rock and sand
Ar - Clay
Bx - Breccia
U - Unknown mineral

Joint Roughness Coefficient

Values range from 1 (smooth) to 19 (rough); values determined by comparison of carpenters shape copier with standard profile; values appear on electronic file, but not on printout

Miscellaneous

NA - Not applicable
NR - Not recorded

P&S Account - 1.2.3.2.2.1.2 USGS

P&S Account Title - Structural Features within the Site Area

PWBS Element Number - 1.2.3.2.2.1.2

PWBS Element Title - Structural Features within the Site Area

Baseline Start - 01-oct-1996
Baseline Finish - 30-sep-1997

	Prior	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	Future	At Complete
					Fiscal Year Distribution								
Annual Budget	0	2397	0	0	0	0	0	0	0	0	0	0	2397

Statement of Work

All quality affecting work included within this scope shall be identified and controlled in accordance with approved implementing procedures identified on the current OCRWM-accepted Requirements Traceability Network Matrix.

OBJECTIVE:
Develop an adequate understanding of the three-dimensional geologic structure in the vicinity of Yucca Mountain to support development of a 3-D Integrated Site Model, process modeling, design, performance assessment, and preparation of a license application.

DESCRIPTION OF WORK:
o Carry out structural geologic mapping of Yucca Mountain and vicinity.
o Measure and analyze fracture characteristics (density, orientations, apertures, roughness, trace length, spatial distribution, degree of connectivity, fracture-filling minerals) for surface exposures, at depth in boreholes, and in the Exploratory Studies Facility (ESF).
o Perform geologic mapping of the ESF.
o Carry out prototype photogrammetric mapping in the ESF.
o Integrate structural geologic results with efforts to develop site and regional geologic and process models.

For FY 1997, prepare a site area geologic map, support development of the 3-D Integrated Site Model, update the fracture synthesis report and carry out an analysis of fractures as they relate to Cl-36 findings, and carry out geologic mapping of the ESF.

All deliverables will be accepted in accordance with DOE procedures for acceptance review, unless otherwise noted.

Summary Account	Title
0G32212FB2	Complete Site Area Geologic Map
0G32212FB3	Fracture Studies
0G32212FB4	Geologic Mapping of the Exploratory Studies Facil

OG32212 Structural Features within the Site Area (continued)

DELIVERABLES

Deliv ID	Description/Completion Criteria	Due Date
SPG22M3	Geol. Map of the Yucca Mountain Site Area Criteria - This deliverable shall include all information identified herein unless specifically exempted in writing by the COR at least 60 days before the scheduled due date (30 days in special cases agreed to by the COR). This milestone will be satisfied by completion of a geologic map of the Yucca Mountain Site Area. The map will be prepared at a 1:24,000-scale and will cover the area from Crater Flat east to Fortymile Wash and from the southern extent of the Claim Canyon Caldera south to the Busted Butte area. The map will include faults, contacts of geologic formations and zones (as appropriate), lithologic descriptions, cross sections, and a map unit correlation chart. The map will describe the nature of structural domains and provide information of the dominant dip domains within each structural block. This deliverable shall be prepared in accordance with OCRWM approved quality assurance procedures implementing requirements of the Quality Assurance Requirements Description. The product shall be developed on the basis of the best technical data, including both Q and non-Q data. The Q status of data used and cited in the report shall be appropriately noted. Stratigraphic nomenclature used shall be consistent with the Reference Information Base section 1.12 (a): Stratigraphy-Geologic Lithologic Stratigraphy. Within the report's Reference Section, references to data use in the report shall include record Accession Numbers or Data Tracking Numbers when available. Technical data contained within the deliverable and not already incorporated in the Geographic Nodal Information Study and Evaluation System (GENISES) shall be submitted for incorporation into the GENISES in accordance with YAP-SIII.3Q. Verification of technical data submittal complianc shall be demonstrated by including as part of the deliverable: 1) a copy of the Technical Data Information Form generated identifying the data in the Automated Technical Data Tracking system, and 2) a copy of the transmittal letter attached to the technical data transmittal to the GENISES Administrator. This deliverable shall be processed in accordance with YAP-5.1Q.	29-aug-1997
SPG32M3	Rpt: Lithostrat Q'd Frac Data, UZ Hydro Flow Mdl Criteria - This deliverable shall include all information identified herein unless specifically exempted in writing by the COR at least 60 days before the scheduled due date (30 days in special cases agreed to by the COR). This deliverable will be satisfied by completion of a report incorporating all available Q'd fracture data for each of the lithostratigraphic units developed for the site area UZ hydrologic flow model within the major structural blocks defined by the model. Report will include data from previous and new surface studies, ESF fracture studies, and available Q'd borehole data. The report will include an assessment (comparison) of Q'd and non-Q'd borehole (borehole TV logs and core data) data, as appropriate. This deliverable shall be prepared in accordance with OCRWM approved quality assurance procedures implementing requirements of the Quality Assurance Requirements Description. The product shall be developed on the basis of the best technical data, including both Q and non-Q data. The Q status of data used and cited in the report shall be appropriately noted. Stratigraphic nomenclature used shall be consistent with the Reference Information Base section 1.12 (a): Stratigraphy-Geologic Lithologic Stratigraphy. Within the report's Reference Section, references to data used in the report shall include record Accession Numbers or Data Tracking Number when available. Technical data contained within the deliverable and not already incorporated in the Geographic Nodal Informatio Study and Evaluation System (GENISES) shall be submitted for incorporation into the GENISES in accordance with YAP-SIII.3Q. Verification of technical data submittal compliance shall be demonstrated by including as part of the deliverable: 1) a copy o the Technical Data Information Form generated identifying the data in the	30-apr-1997

0G32212 Structural Features within the Site Area (continued)

DELIVERABLES

Deliv ID	Description/Completion Criteria	Due Date
	Automated Technical Data Tracking system, and 2) a cop of the transmittal letter attached to the technical data transmittal to the GENISES Administrator. This deliverable shall be processed in accordance with YAP-5.1Q.	
SPG42AM3	Rpt Geo North/South Main Drft Sta 28+00 to55+00 Criteria - This deliverable shall include all information identified herein unless specifically exempted in writing by the COR at least 60 days before the scheduled due date (30 days in special cases agreed to by the COR). This milestone report will consist of a compilation and summary of mapping data collected in the Exploratory Studies Facility (ESF) from Station 28+00 through 55+00. I will enhance the map and data deliverable for the same interval presented earlier as milestone 3GGF603M. The report will integrate all mapping and other data, including, as appropriate, data from the north ramp report, to present a complete description of the geology of the north/south main drift of the ESF. Maps included with the report will cover from station 28+0 to 55+00, and be presented at a scale of 1:125. These full-periphery geotechnical maps will show mapped geologic units and subunits, fractures, faults, and other important structural features (as appropriate), the location of all samples collected by the mapping group (or collected by PIs and/or the ESF Technical Coordination Office), and as-constructed installed ground suppor and type. The deliverable will supply fracture analysis for the north/south main drift in the form of tabulated data sets, stereo plots, and statistical treatment of fracture information (by stratigraphic unit, or some selected interval along the course of tunnel excavation). A cross section comparing the predicted geology of the north/south main drift and as-determined structural and stratigraphic interpretations will be presented. Predicted and actual stratigraphic, structural an other key features will be discussed in the report. Important sampling and testing activities will be identified and discussed, as appropriate. A general discussion of the stratigraphy and structure will be provided that will include characterization of predicted locations of known or suspected fault features such as the Sundance and Ghost Dance faults. The report will also include a description of rock characteristics associated with features that do not lend themselves well to graphical presentations contained in the report such as fault gouge and breccia. Results of the detailed line survey and appropriate graphical and tabular presentation of data will be included in the report. A summary of photographic work conducted in support of the mapping exercise will be provided as part of the report. The stereophotography will be identified within the report (photo numbers, current archive location) for future reference. The report will briefly describe any unusual features observed in the mapping, detailed line survey, photogrammetry, or sampling exercises. Results of the RQD and Q & RMR analyses will also be provided and integrated into map or other graphical presentations of related data. Simple statistical treatment or qualitative assessment of the results of the subject survey will be provided. Alcove maps (for constructed portions of Alcove 5, the thermal test facility, and Alcove 6, the north Ghost Dance Alcove), a summary of detailed line survey data, stereo photographic information, tabulations and assessment of structural data from alcove mapping investigations, and statistical treatment of alcove fracture data will be included in the report. Alcove borehole information will be incorporated for enhanced assessment of the geometry of stratigraphic units and structural features, as appropriate. This deliverable shall be prepared in accordance with OCRWM approved quality assurance procedures	28-feb-1997

0G32212 Structural Features within the Site Area (continued)

DELIVERABLES

Deliv ID	Description/Completion Criteria	Due Date
	implementing requirements of the Quality Assurance Requirements Description. The product shall be developed on the basis of the best technical data, including both Q and non-Q data. The Q status of data used and cited in the report shall be appropriately noted. Optional: Stratigraphy used shall be consistent with the Reference Information Base section 1.12 (a): Stratigraphy-Geologic Lithologic Stratigraphy. Within the report's Reference Section, references to data used in the report shall include record Accession Numbers or Data Tracking Number when available. Technical data contained within the deliverable and not already incorporated in the Geographic Nodal Informatio Study and Evaluation System (GENISES) shall be submitted for incorporation into the GENISES in accordance with YAP-SIII.3Q. Verification of technical data submittal compliance shall be demonstrated by including as part of the deliverable: 1) a copy o the Technical Data Information Form generated identifying the data in the Automated Technical Data Tracking system, and 2) a cop of the transmittal letter attached to the technical data transmittal to the GENISES Administrator. This deliverable shall be processed in accordance with YAP-5.1Q.	
SPG42BM3	Ltr Rpt: Geo S.R. Sta 55+00 to STA 63+47 Criteria - This deliverable shall include all information identified herein unless specifically exempted in writing by the COR at least 60 days before the scheduled due date (30 days in special cases agreed to by the COR). This milestone data submittal will consist of a compilation of maps, graphical data treatments, and data collected in the Exploratory Studies Facility (ESF) from Station 55+00 through Station 63+47. Maps included will be presented at a scale of 1:125. These full-periphery geotechnical maps will show mapped geologic units and subunits, fractures, faults, and other important structural features (as appropriate), the location of all samples collected by the mapping group (or collected by PIs and/or the ESF Technical Coordination Office), and as-constructed installed ground support and type. The deliverable will supply first-order graphical fracture analysis in the form of tabulated data sets, stereo plots, and statistical treatment of fracture information (by stratigraphic unit, or some selected interval along the course of tunnel excavation) as necessary for illustrative purposes. A cross section comparing the predicted geology of the south ramp through Station 63+47 and as-determined structural and stratigraphic interpretations will be presented. Results of the detailed line survey and appropriate graphical and tabular presentation of data will be included in the data submittal. Results of the RQD and Q&RMR analyses will also be provided and integrated into map or other graphical presentations of related data. Simple statistical treatment or qualitative assessment of the results of the subject survey will be provided. Alcove maps (for additional constructed portions of Alcove 5, the thermal test facility, and Alcove 6, the north Ghost Dance Alcove), line survey data, stereophotography, tabulations and assessment of structural data from alcove mapping investigations, and statistical treatment of alcove fracture data will be included in the report. Alcove borehole information will be incorporated for enhanced assessment of the geometry o stratigraphic units and structural features, as appropriate. This deliverable shall be prepared in accordance with OCRWM approved quality assurance procedures implementing requirements of the Quality Assurance Requirements Description. The product shall be developed on the basis of the best technical data, including both Q and non-Q data. The Q status of data used and cite in the report shall be appropriately noted. Stratigraphic nomenclature used shall be consistent with the Reference Information Base section 1.12 (a): Stratigraphy-Geologic Lithologic Stratigraphy. Within the report's Reference Section, references to dat used in the report shall include	28-feb-1997

0G32212 Structural Features within the Site Area (continued)

DELIVERABLES

Deliv ID	Description/Completion Criteria	Due Date
	record Accession Numbers or Data Tracking Numbers when available. Technical data contained within the deliverable and not already incorporated in the Geographic Nodal Information Study and Evaluation System (GENISES) shall be submitted for incorporation into the GENISES in accordance with YAP-SIII.3Q. Verification of technical data submittal compliance shall be demonstrated by including as part of the deliverable: 1) a copy of the Technical Data Information Form generated identifying the data in the Automated Technical Data Tracking system, and 2) a copy of the transmittal letter attached to the technical data transmittal to the GENISES Administrator. This deliverable shall be processed in accordance with YAP-5.1Q	
SPG42CM3	Ltr Rpt: Geo of S.Ramp, Sta 55+00 to S. Portal Criteria - This deliverable shall include all information identified herein unless specifically exempted in writing by the COR at least 60 days before the scheduled due date (30 days in special cases agreed to by the COR). This milestone report will consist of a compilation and summary of mapping data collected in the Exploratory Studies Facility (ESF) from Station 55+00 through the end o the south ramp. The report will integrate all mapping and other data, including, as appropriate, data from the north/south main drift report, to present a complete description of the geology of the south ramp of the ESF. Maps included with the report will cover from station 55+00 to the south portal, and be presented at a scale of 1:125. These full periphery maps will show mapped geologic units and subunits, fractures, faults, and other important structural features (as appropriate), the location of all samples collected by the mapping group (or collected by PIs and/or the ESF Technical Coordination Office), and as-constructe installed ground support and type. The deliverable will supply fracture analysis for the south ramp in the form of tabulated data sets, stereo plots, and statistical treatment of fracture information (by stratigraphic unit, or some selected interval along the course of tunnel excavation). A cross section comparing the predicted geology of the south ramp and as-determined structural and stratigraphic interpretations will be presented. Predicted and actual stratigraphic, structural and other key features will be discussed in the report. Important sampling and testing activities will be identified and discussed, as appropriate. Results of detailed line survey and appropriate graphical and tabular presentation of data will be included in the report. A summary of photographic work conducted in support of the mapping exercise will be provided as part of the report. The stereophotography will be identified within the report (photo numbers, current archive location) for future reference. The report will briefly describe any unusual features observed in the mapping, detailed line survey, photogrammetry, or sampling exercises. Results of the RQD and Q & RMR analyses will also be provided. Alcove maps (for additional constructed portions of Alcove 5, the thermal test facility, and Alcove 6, the north Ghost Dance Alcove), a summary of the detailed line survey data, stereo photographic information, tabulations and assessment of structural data from alcove mapping investigations, and statistical treatment of alcove fracture data will be included in the report. Alcove borehole information will be incorporated for enhanced assessment of the geometry of stratigraphic units and structural features, as appropriate. This deliverable shall be prepared in accordance with OCRWM approved quality assurance procedures implementing requirements of the Quality Assurance Requirements Description. The product shall be	30-aug-1997

OG32212 Structural Features within the Site Area (continued)

DELIVERABLES

Deliv ID	Description/Completion Criteria	Due Date
	developed on the basis of the best technical data, including both Q and non-Q data. The Q status of data used and cited in the report shall be appropriately noted. Stratigraphic nomenclature used shall be consistent with the Reference Information Base section 1.12 (a): Stratigraphy-Geologic Lithologic Stratigraphy. Within the report's Reference Section, references to data used in the report shall include record Accession Numbers or Data Tracking Numbers when available. Technical data contained within the deliverable and not already incorporated i the Geographic Nodal Information Study and Evaluation System (GENISES) shall be submitted for incorporation into the GENISES in accordance with YAP-SIII.3Q. Verification of technical data submittal compliance shall be demonstrated by including as part of the deliverable: 1) a copy of the Technical Data Information Form generated identifying the data in the Automated Technical Dat Tracking system, and 2) a copy of the transmittal letter attached to the technical data transmittal to the GENISES Administrator This deliverable shall be processed in accordance with YAP-5.1Q.	

Approvals

Preparer - print name	Date	Technical Reviewer - print name	Date	QA Reviewer - print name	Date
Robert W. Craig	9/25/96	Dennis R. Williams	9/26/96	Richard A. Kettler	9/26/96

Preparer - signature	Technical Reviewer - signature	QA Reviewer - signature
Robert W. Craig	[signature]	[signature]