U.S. DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY

REPORT ON SEISMOLOGIC FIELD INVESTIGATIONS
OF THE 29 JUNE 1992
LITTLE SKULL MOUNTAIN EARTHQUAKE

by

M. Meremonte, E. Cranswick, J. Gornberg,
D. Worley, D. Carver, J. Brooks,¹

R. Banfill,²

D. Overturf, and T. Bice¹

Open-File Report 93-555

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature. Any use of trade, product, or firm names is for descriptive purposes only and does not imply endorsement by the USGS.

¹ Golden, CO

² Small Systems Support
2 Boston Harbor Place
Big Water, UT 84741-0205

Contents

	Page
Introduction	1
Geographical Setting	2
Description of the Instrumentation	3
Deployment	4
Clock Corrections	5
Field Operation and Processing	6
References	7
Appendix A: Station summaries	16
Appendix B: Clock summary of the master clock instruments	49
Appendix C: Copy of the tape labels (field logs) for DR200 instruments	53
Appendix D: Photographs of the station installations	70
Appendix E: Examples of digital waveforms from DR200 and REFTEK instruments	87
Appendix F: Examples of analog records from the MEQ800 instruments	90

Tables

Table 1. Summary of earthquakes in the southern Great Basin $\geq M_L=5.0$ within 150 km of the proposed repository at Yucca Mountain	1
Table 2. List of earthquakes $\geq M_L=2.5$ within 50 km of the proposed repository at Yucca Mountain ..	1
Table 3. List of the major geologic structures surrounding Little Skull Mountain	3
Table 4. Summary list of the names, recorder types (digital or analog), general geographic locations, coordinate locations and elevations of the USGS portable stations deployed	5

Illustrations

Figure 1. Map showing the southern Great Basin (SGBSN) and portable seismograph networks	8
Figure 2. Map showing the USGS portable seismograph network, Little Skull Mountain mainshock, and aftershocks	9
Figure 3. Geology map of Little Skull Mountain and the surrounding region showing the USGS portable seismographic network, main shock, and located aftershocks	10
Figure 4. Plots of the drift rate measurements of each recorder clock	11

Introduction

On 29 June 1992 at 10:14:22.4 a magnitude 5.6(M_L) earthquake occurred at Little Skull Mountain (LSM), Nevada. The hypocenter determined by the USGS from network data was 36.718° North, 116.292° West, at a depth of 9.5 km below sea level. This was one of the largest events to occur in the vicinity of the proposed site of a high radioactive waste repository at Yucca Mountain. The earthquake's epicenter was approximately 20 km to the southeast of the proposed repository site (PRS).

Historically, written records of reported earthquakes in the southern Great Basin (SGB) began emerging around 1860. Since that time, the number of intermediate to major earthquakes has been small in the vicinity of the PRS (Meremonte and Rogers, 1987; Harmsen and Bufe, 1991). Table 1 shows the frequency of earthquakes $\geq M_L=5.0$ within 150 km of Yucca Mountain.

Table 1. Summary of earthquakes $\geq M_L=5.0$ in the southern Great Basin within 150 km of PRS.

DATE & TIME (UTC)	LAT(N)	LON(W)	I(MM)	M_L	DIST (km)	COMMENTS
1872 326 2:30:-----	36.5	118.	XI	8.3	143.2	Owens Valley
1939 613 17:15:32.07	37.0	117.2	VI	5.0	70.9	
1940 310 18: 1:53.31	37.4	114.9	IV	5.0	147.8	
1945 614 3:31:15.66	37.0	117.4	VI	5.0	88.2	
1949 211 21: 5:23.30	37.0	117.8	VI	5.6	120.9	
1954 720 0:11:38.29	38.2	116.4	--	5.0	148.3	
1967 5 7 18: 1:36.10	37.0	115.0	IV	5.1	131.0	
1973 621 14:45: 0.61	37.1	116.0	VI	5.4	47.2	
1992 629 10:14:22.40	36.721	116.294	--	5.6	20.5	Little Skull Mt.

MM denotes Modified Mercalli scale

Within 50 km of the PRS one event was reported, within 100 km three events were reported, and within 150 km eight events were reported. Considering these earthquakes, the Owens Valley event was the most capable to have incurred a probable damaging effect upon the integrity of the proposed repository. Yet on June 29, 1992, the LSM earthquake of $M_L=5.6$ occurred within 21 kilometers of the proposed repository.

The LSM event underscored all previous years of earthquake monitoring by the southern Great Basin Seismic Network (SGBSN). Since August, 1978, the SGBSN has been continuously recording earthquakes (both digital and analog) with a dense sub-array at Yucca Mountain, Nevada (see Figure 1 and 2). Through this span of time (≈ 14 years), no other event of the LSM earthquake magnitude has occurred within 50 km of the PRS (see Table 2).

Table 2. List of earthquakes $\geq M_L=2.5$ within 50 km of the PRS.

DATE & TIME (UTC)	LAT(N)	LON(W)	DEPTH	M_L	DIST (km)	USGS TOPO REGION
1979 611 20:26:59.26	37.295	116.475	7.00	2.67	49.4	SILENT BUTTE
19790629 2:11:47.66	37.177	116.090	7.00	2.67	48.8	OAK SPRING
19800725 23:10:39.65	37.260	116.483	-0.92	2.86	45.6	SILENT BUTTE
19800731 19:26:15.71	37.073	116.004	7.00	2.68	47.4	YUCCA FLAT
19811013 14:47:53.58	37.060	116.950	7.00	2.56	49.6	SPRINGDALE
19811119 21:40:53.44	37.057	116.948	1.46	2.51	49.3	SPRINGDALE
19811216 21: 5: 0.33	37.110	116.117	7.47	2.90	41.8	YUCCA FLAT
19841110 16:40: 0.41	36.985	116.056	3.49	2.99	38.8	YUCCA LAKE

Table 2 (continued). List of earthquakes $\geq M_L=2.5$ within 50 km of the PRS.

DATE & TIME (UTC)	LAT(N)	LON(W)	DEPTH	M_L	DIST (km)	USGS TOPO REGION
19841209 19:40: 0.67	37.273	116.500	6.46	3.49	47.1	TRAIL RIDGE
19850507 20: 6:10.45	36.603	116.050	8.82	2.66	45.7	SPECTER RANGE SE
19850613 1:31:35.21	37.258	116.470	2.83	2.70	45.3	SILENT BUTTE
19850730 15: 4:24.31	37.146	116.879	5.31	2.96	49.8	SPRINGDALE
19860702 8:10:21.68	36.599	116.409	2.87	2.95	28.2	LATHROP WELLS SW
19860822 14:44:17.60	36.631	116.341	3.02	2.82	26.5	STRIPED HILLS
19861210 15: 3:52.59	36.633	116.330	2.90	2.61	26.7	STRIPED HILLS
19870630 16: 5: 0.14	36.995	116.054	-0.34	3.16	39.4	YUCCA LAKE
19890521 23:53:53.00	36.853	115.947	9.92	2.58	45.6	FRENCHMAN FLAT
19891010 19:39:52.26	36.827	116.262	0.14	2.51	17.7	JACKASS FLATS
19900207 15: 9:45.76	37.235	116.413	2.01	2.83	42.9	SCRUGHAM PEAK
19900215 13:35:12.26	37.193	116.379	7.12	2.76	38.7	SCRUGHAM PEAK
19900920 19: 4:35.61	36.902	116.651	0.06	2.55	18.1	BARE MTN
19901014 0:26:48.87	37.252	116.499	1.82	2.66	44.8	SILENT BUTTE
19901116 2: 0:51.65	37.158	116.867	10.85	2.59	49.9	SPRINGDALE
19910914 20: 4:43.14	37.227	116.422	2.93	3.10	42.0	SCRUGHAM PEAK
19911130 6:45:56.39	36.739	116.215	5.58	2.82	25.0	SPECTER RANGE NW
19920229 7 40:33.36	37.042	116.169	-0.29	2.77	33.4	TIPPIPAH SPRING

The LSM earthquake was significant because of its close proximity to Yucca Mountain and because of its occurrence only 22 hours after the $M_S=7.6$ Landers, California, earthquake of June 28, 1992 at 11:57:34.1. This fact coupled with the increased seismic activity across the southwest that began after the Landers earthquake has spawned some considerations on whether the LSM event was triggered. Although the earthquakes are separated by 280 km across the Furnace Creek - Death Valley fault and Garlock fault zones, the interrelationships of those two tectonic regimes are not well known (Brockman *et al*, 1992; Rogers *et al*, 1991). Because of these reasons and of the relevance to the proposed high radioactive waste repository at Yucca Mountain, Nevada, the U.S. Geological Survey (USGS) mounted an effort to digitally record the aftershock sequence of the LSM earthquake with support from the Yucca Mountain Project Office (YMPO).

Geologic Setting

The epicentral region is located on the southern edge of the Nevada Test Site (NTS area 25) in southeastern Nevada about 120 km northwest of Las Vegas, Nevada. Figure 3 is a geology map of the epicentral area enclosed by Calico Hills/Lookout Peak on the north, Skull Mountain/upper Rock Valley on the east, Specter Range/Striped Hills on the south and northern Amargosa Desert/Yucca Mountain on the west with LSM dominating the center on the southern edge of Jackass Flats. Structurally, the area is a system of northeast-striking faults, folds, and topographic trends (Frizzel and Shulters, 1990). Overall, the lithology to the southeast of Rock Valley consists of Paleozoic siltstones, limestones and dolomites from Middle Cambrian through Upper Devonian. To the northwest the lithology consists of a relatively thin layer of Tertiary ash-flow tuffs and basalts underlain by the Paleozoic sequence. Evidence of the underlying Paleozoic rocks can be observed in outcrop exposures of limestones and dolomites in the Calico Hills (Moldonado, 1985). Table 3 describes the geology of the major topographic structures surrounding LSM. Annotated at the end of

each geologic description are the portable stations that were located in that class of geology/topographic structure.

Table 3. Geology of the major topographic structures surrounding LSM; and the portable station located in that class of geology/topographic structure.

YUCCA MTN. - Compositionally zoned compound cooling unit of ash-flow tuff (upper quartz latite, middle rhyolite, and lower high-silica rhyolite); H50
CALICO HILLS / SHOSHONE MTN. - Rhyolite to quartz latite ash-flow tuffs (multiple flow compound cooling unit, large volume, densely welded, zoned rhyolite to quartz latite ash-flow tuff; And compound cooling unit, nonwelded to densely welded high-silica rhyolite with caprock of quartz latitic ash-flow tuff; CAL
LOOKOUT PEAK - Rhyodacitic (aphanitic granodiorite) and dacitic (quartz diorite) lava flows and flow breccia that contain primary hornblende.
VALLEYS (JACKASS FLATS, ROCK VALLEY, ETC.) - Unconsolidated to moderately cemented alluvial fan, slope wash, flood plain, and stream bed deposits (caliche locally); thickness up to 600m; SPE, COM, JAC, LAT, CLO, AR0, MVR, TCT, TWR, SLS, ARY, & HUDDLE TEST
SKULL MTN. (Northeast part) - Rhyodacitic (aphanitic granodiorite) and dacitic (quartz diorite) lava flows and flow breccia that contain primary hornblende.
SKULL MTN. (Southwest part) - Basalts (plagioclase-porphyritic olivine basalt, porphyritic clinopyroxene-olivine basalt, and quartz-olivine basaltic andesite).
LOCAL STRUCTURES IN VALLEY EAST OF SKULL MT. - sedimentary and tuffaceous sedimentary rocks; TPP
SPECTER RANGE - Banded, thinly laminated, locally oolitic or nodular, limestone and dolomite and minor siltstone; SPW
STRIPED HILLS - Limestone, silty limestone, dolomite and limestone conglomerates.
TOWER HILL WEST OF FIELD OFFICE CONTROL (FOC) - Black dense, vesicular, scoriaceous, stony basalt with quartz phenocrysts; TOW
LITTLE SKULL MTN. - Basalts (plagioclase-porphyritic olivine basalt, porphyritic clinopyroxene-olivine basalt, and quartz-olivine basaltic andesite); LSD

Frizzell and Shulters, 1990

Description of the Instrumentation

Instrumentation included Sprengnether DR200 and Refraction Technology, Inc., (REFTEK) 72A-02 digital and Sprengnether MEQ800 analog recording systems. The DR200 is a 12 bit system with a gain ranging analog to digital converter (ADC) that can record up to 200 samples/second on 4 channels. All DR200s have 7 pole (42db/octave) anti-aliasing filters with corner frequencies at 50 Hz. The 72A-02 is a 16 bit system that can record up to eight data streams. Each data stream is determined by the selected channels (1-6 or any combination thereof), sample rate (up to 1000 samples/second), and a trigger type (event, time, level, continuous, etc.). The ADC samples at a constant rate of 1000 samples/second per channel. The REFTEKs have 6 pole (36db/octave) anti-aliasing filters with corner frequencies at 250 Hz. The MEQ800 is a smoked paper drum recorder with selectable gains and low and high pass filters. Parameters for each instrument are outlined in the station summaries in appendix A.

Various seismometers were used in combination with the above recording instruments. We used Mark Products L22, L28 and L4C, Sprengnether S6000, and Teledyne Geotech S13 seismometers. The L22, and S6000s are three component packages while the L28s, L4Cs and the S13s are single component packages. The natural frequencies and polarities of each package are outlined in the station summaries in appendix A.

For timing on the DR200 MEQ800 systems we used the Geostationary Operational Environmental Satellite (GOES) as our absolute time reference. Master clocks (MC) synced to the GOES were used to measure the clock corrections (CC) on the recording instruments. The MCs consisted of three Sprengnether TS400s and a USGS, in house, timing system (MCIII).

Timing on the REFTEK instruments was maintained by an Omega radio clock synchronized to UTC. The Omega system has the ability to initialize or update the perpetual clock maintained by the central processor unit (CPU) of the recorder. CC updates are issued to the CPU clock whenever the recorder first locks or relocks to the Omega signal or when the internal comparator sees a phase error larger than the factory preset range. Clock updates are recorded with the seismic data during normal operation of the instruments.

Deployment

The Nevada Test Site (NTS) was an ideal location to operate a portable seismographic network. With the cooperation of the test site authorities we were able to install the temporary network with relative ease and quickness. Only minor difficulties were encountered such as the condition of the desert roads, the nearby habitation of a desert tortoise (which meant move to a new locality), or the finding of good rock sites within 1-2 focal depths (since most of the area is overlain by several hundred kilometers of sediments). The weather was warm with below normal temperatures (although they still climbed above 100°).

Within 38 hours after the main shock, eight DR200 and five MEQ800 instruments were installed surrounding the aftershock zone with the widest gap of 115° to the south. However, the gap was reduced to about 40° when including the permanent SGBSN seismographic stations (54 stations total, see figure 1) and the USNSN station, TPNV. The average separation between the USGS portable stations was ≈7.0 km which was near 1 focal depth of the depth range for the LSM aftershock series. Three REFTEK instruments were installed within two days to supplement the initial portable network. By the end of the recording period a total of seventeen digital and analog instruments were deployed and operating (see figure 2). Table 4 is a

summary of the names, recorder types (digital or analog), general geographic locations, coordinate locations and elevations of the portable stations.

Table 4. Summary characteristics of the portable stations.

STATION	TYPE	GEOGRAPHIC LOCATION	LAT (N)	LON (W)	ELEVATION (m)
AR0	digital	Jackass Flats, middle	36° 49.74'	116° 16.26'	1160
ARY	digital	Jackass Flats, middle	36° 49.74'	116° 16.26'	1160
CAL	digital	Calico Hills, S	36° 51.42'	116° 17.45'	1268
CL0	digital	Jackass Flats, N	36° 50.32'	116° 20.29'	1177
COM	digital	S. of Skull Mountain	36° 43.72'	116° 13.41'	1169
H50	digital	Yucca Mountain, top	36° 51.40'	116° 27.94'	1475
JAC	digital	Jackass Flats, SW	36° 45.84'	116° 22.43'	949
LAT	digital	Amargosa Desert, N	36° 40.65'	116° 22.84'	849
LSD	digital	Little Skull Mtn., top	36° 43.81'	116° 19.61'	1177
MVR	analog	Jackass Flats, NE	36° 51.65'	116° 13.60'	1326
SLS	analog	S. of Little Skull Mtn.	36° 42.00'	116° 16.02'	1045
SPE	digital	Mercury Valley, W	36° 39.22'	116° 7.09'	1076
SPW	digital	Specter Range, W	36° 41.30'	116° 10.69'	1073
TCT	analog	Wahmonie Flat, S	36° 48.34'	116° 8.95'	1352
TOW	digital	Tower Hill, middle	36° 47.27'	116° 19.70'	1111
TPP	analog	Upper Rock Valley	36° 43.37'	116° 7.74'	1158
TWR	analog	Jackass Flats, E	36° 46.43'	116° 14.29'	1109

See appendix A for a detailed description of the stations.

At the termination of the aftershock survey we performed a "huddle test" by installing all seventeen instruments (with their original recorder and seismometer) at the site of the REFTEK station AR0. The purpose of this experiment was to find out the agreement of the instrument responses and timing. Appendix A outlines the configuration of the huddle test and the instrument parameters.

Clock Corrections

Clock corrections (CC) are measured values of the differences between a time reference and a field instrument clock and when added to the time of the field instrument clock will yield the "true" time. Without precise CCs, uncertainties in timing would be impossible to determine. To measure the CCs on the individual recording instruments we used master clocks (MC) as intermediate time references between the absolute GOES time and the recorder clock. Usually, a CC between GOES and each MC was measured in the morning and in the evening for timing continuity. Then, the MCs were used in the field as our time references to measure the CCs on each instrument. Actual measurement of the CCs were performed by comparing the second pulse of the MC with the second pulse of each recorder clock using an oscilloscope; and the same was true for the CC between the GOES and each MC. Appendix A outlines the CCs measured between the recorder clocks and the MCs; and appendix B outlines the CCs measured between the MCs and the absolute time reference GOES.

CCs for the DR200 recorders and the MEQ800 recorders have been outlined in a USGS report to the Yucca Mountain Project Office (YMPO) (personal comm. Gomberg, 1993). Figure 4 displays the drift rate measurements and the estimate of the CC uncertainties. The drift rates include both the drift of the MCs and

the recorder clocks. The CCs range between 2-50 milliseconds with the largest corrections associated with the MEQ800 instruments. However, the uncertainties in the CCs are smaller or of the same order as those from visually scaled arrival times. For the REFTEK recorders, the CCs are resolved by an internal comparator which routinely checks the time difference between the internal CPU clock and the external radio clock (a clock phase error) and records the phase error with the seismic data.

Field Operation and Processing

As stated earlier the ease of maintaining the portable network was much facilitated by the convenience of the earthquake occurring on a U.S. Government facility. Although this facility had restrictions on our movements and sometimes on the hours we worked, the use of hand held radios to connect us to the Field Office Control (FOC) minimized the limits on our freedom to maintain the instruments properly and efficiently.

With respect to maintaining the mounting collection of data, we were able to setup a local area network (LAN) at Test Cell C in area 25. The LAN was established and maintained by Robert Banfill of Small Systems Support, Big Water, Utah. Connected to the LAN were two desk top PCs, two portable PCs, and a laser printer. A miniature computer center was at our disposal that enabled us to manage data from all three types of recording instruments (DR200s, REFTEKs, and MEQ800s). Furthermore, it enabled a "rough" database to be built composed of merged data from both DR200 and REFTEK formats in which the waveforms could be displayed together and earthquake parameters picked for preliminary processing. As a result we were able to produce a short report (with maps and figures) for the YMP/QA authorities several days after we began for a briefing and to monitor our quality assurance procedures.

Acknowledgements

The cooperation of the NTS YMP office located at the FOC building was paramount in the success of this survey. They were able to give us all the required training for working safely and environmentally on the Nevada Test Site. Thanks. I would like to especially thank Jim Brooks, Don Gibbons, and Jim McDonald for their outstanding help in deployment and maintenance of the portable network and the use of their offices at Test Cell C. Chris Early of Refraction Technology, Inc., was also especially helpful in solving some of the technical problems incurred with the REFTEKs. His expertise is greatly appreciated.

References

- Brockman, S., Brooks, J., Carver, D., Cranswick, E., Duggar, J., Gombert, J., Harmsen, S., Meremonte, M., Overturf, D., Shedlock, K., VanDreser, T., Worley, D., and Banfil, R., 1992, The June 29, 1992, Little Skull Mountain, Nevada, Earthquake: *EOS Transactions of the American Geophysical Union*, v. 73, no. 43, p. 354.
- Frizell, V. A. and Shuttters, J., 1990, Geologic Map of the Nevada Test Site, southern Nevada: *U.S. Geological Survey Miscellaneous Investigation Series Map I-2046*, scale 1:100,000.
- Harmsen, S. C. and Bufe, C. G., 1991, Seismicity and Focal Mechanisms for the southern Great Basin of Nevada and California; 1987 through 1989: *U.S. Geological Survey Open-File Report 91-572*, 208 p.
- Meremonte, M. E. and Rogers, A. M., 1987, Historical Catalog of southern Great Basin Earthquakes 1868 - 1978: *U.S. Geological Survey Open-File Report 87-80*, 203 p.
- Moldonado, Florian, 1985, Geologic Map of the Jackass Flats Area, Nye County, Nevada: *U.S. Geological Survey Miscellaneous Investigation Series Map I-1519*, scale 1:48,000.
- Rogers, A. M., Harmsen, S. C., Corbett, E. J., Priestly, K., and dePolo, D., 1991, The Seismicity of Nevada and some adjacent parts of the Great Basin, in Slemmons, D. B., Engdahl, E. R., Zoback, M. D., and Blackwell, D. D., eds., *Neotectonics of North America: Boulder, Colorado, Geological Society of America, Decade Map Volume 1.*, p153-184.

Figure 1. Map showing the southern Great Basin (SGBSN) and portable seismograph networks.

Data Sources: Seismic Stations

- SGBSN Permanent (FM)
- ▲ USGS Portable Digital (Reftek, DR200)
- △ USGS Portable Analog (MEQ)

Quaternary
Fault Trace

Fault Surface

Epicenters

Figure 2. Map showing the USGS portable seismograph network, Little Skull Mountain mainshock, and aftershocks.

Figure 4a. Drift rate measurements and clock correction uncertainties for each recorder clock (instruments: 253, 254, 255).

Figure 4b. Drift rate measurements and clock correction uncertainties for each recorder clock (instruments: 202, 262, 264).

Figure 4c. Drift rate measurements and clock correction uncertainties for each recorder clock (instruments: 177, 184, 199).

Figure 4d. Drift rate measurements and clock correction uncertainties for each recorder clock (instruments: 34, 618, 619).

Figure 4e. Drift rate measurements and clock correction uncertainties for each recorder clock (instruments: 269, 272).

Appendix A

Station Summaries

Summary of MEQ800 instruments	page 17
Summary of DR200 instruments	page 24
Summary of REFTEK instruments	page 36
Summary of HUDDLE Test instruments	page 44

Explanation of Station Summary Parameters

Explanations of clock correction (CC) descriptors:

All clock corrections are measured in milliseconds unless otherwise noted. Below is a list of annotations that modify CC's to make clear the intent of the action taken when the CC was measured (the pound sign (#), here, symbolizes an actual CC measurement):

For all cases below an instrument clock reset was performed interrupting the instrument's operation in conjunction with the noted action:

R# - A CC measurement was determined

R? - No CC measurement was determined

R#? - A CC measurement was determined but be aware of its integrity.

See "COMMENT" below entry for more detailed information.

For all cases below the instrument's operation was not interrupted (i.e., no instrument clock reset was performed) due to the noted action:

C# - A CC measurement was determined

C? - No CC measurement was determined

C#? - A CC measurement was determined but be aware of its integrity.

See "COMMENT" below entry for more detailed information.

? - no information is known about the instrument clock

Explanation of some instrument parameters:

The column header labels:

CC -- clock correction (milliseconds)

-- Tape label for DR200's or disk dump label for REFTEK's

MC -- Master Clock

SN -- Serial Number

GN -- Geographic North

The orientation of all seismometer components are in degrees.

All sample rates are measured in samples/second.

The annotation of a "Undf" in an entry field for data stream parameters indicates the associated parameter is undefined for either the CPU software implemented on the instrument or for that particular parameter setup shown.

Station Summaries of MEQ800 Instruments

ARY

Latitude: 36° 49.74'N Longitude: 116° 16.26'W Elevation: 1160m

Directions:

Take Test Cell C road to Jackass Flats Road;

Left ≈0.1km to a very good gravel road just before the Jackass Flats
Road curves to the right;

Left ≈0.1-0.2km along this road (look for a lone Joshua tree on your
left);

The station is to the left off of the road walking in the direction of
the water tower at Test Cell C (a 3 to 4 minute walk). The site
is about 50 meters to the South of the lone Joshua tree (see
accompanying pictures entitled AR0). This site is colocated with
REFTEK station AR0.

General geology:

Unconsolidated to moderately cemented flood plain deposits.

STATION SUMMARY:

<u>OPERATION (UTC)</u>	<u>RECORDER</u>	<u>SN</u>	<u>SEISMOMETER</u>	<u>SN</u>	<u>ORIENTATION</u>			
189+0111 - 194+0015	MEQ800	619	L4C 1Hz	3884	V,000/000			
COMMENT: MEQ setup to record 24 hour translation.								
<u>RECORD ON (UTC)</u>			<u>RECORD OFF (UTC)</u>			<u>FILTERS (Hz)</u>		
<u>TIME</u>	<u>CC</u>	<u>MC</u>	<u>TIME</u>	<u>CC</u>	<u>MC</u>	<u>GAIN</u>	<u>HI</u>	<u>LO</u>
189+0111	R+18	9227	189+2339	C+48	9227	84db	5	10
COMMENT ON: Rock drop @ 189+0125 at 60db.								
189+2339	C+48	"	190+1906	C+58	"	"	"	"
COMMENT ON: Rock drop @ 189+2350.								
190+1910	R+9	"	192+0007	C-31	"	"	"	"
COMMENT ON: Rock drop @ 190+1915.								
COMMENT OFF: Analog record full, drum rotation stopped @ 191+2054.								
192+0015	R+30	"	193+0052	C+28	"	"	"	"
COMMENT ON: Rock drop @ 192+0041.								
193+0052	C+28	"	194+0015	C-11	"	"	"	"
COMMENT ON: Rock drops @ 193+0104, 193+0105 and 193+0120.								
END RECORD ARY @ 194+0015 UTC								

MVR

Latitude: 36° 51.65'N Longitude: 116° 13.60'W Elevation: 1326m

Directions:

Take Test Cell C road to Jackass Flats Road;
Left 0.8km to Saddle Road;
Left 5.2km to station site;
The station is on the West side of the road below the embankment (see accompanying pictures).

General geology:

Unconsolidated to moderately cemented slope wash and stream bed deposits.

STATION SUMMARY:

<u>OPERATION (UTC)</u>			<u>RECORDER</u>	<u>SN</u>	<u>SEISMOMETER</u>	<u>SN</u>	<u>ORIENTATION</u>	
182+2348 - 193+2224			MEQ800	253	L4C 1Hz	2295	V,000/000	
COMMENT: MEQ setup to record 48 hour translation.								
<u>RECORD ON (UTC)</u>			<u>RECORD OFF (UTC)</u>			<u>FILTERS (Hz)</u>		
<u>TIME</u>	<u>CC</u>	<u>MC</u>	<u>TIME</u>	<u>CC</u>	<u>MC</u>	<u>GAIN</u>	<u>HI</u>	<u>LO</u>
182+2348	R+14	9523	184+2341	C-20	9227	90db	5	10
185+0014	R+4	9227	185+2228	C+92	9523	"	"	"
COMMENT ON: Reset clock to account for leap second @ 182+23:59:60.								
COMMENT ON: Modified MEQ to record 24 hour translation.								
185+2240	R+15	9523	186+2017	C+137	9227	96db	"	"
186+2028	R-30	9227	187+2208	C+110?	9523	90db	"	"
COMMENT OFF: CC's integrity questionable (see MVR log @ 187+2245).								
187+2245	?					"	"	"
COMMENT ON: We discovered that MC9523 has been running all day on low								
COMMENT ON: batteries after using it to measure CCs on SLS, TPP, TWR,								
COMMENT ON: and TCT. Here, at MVR, it died. Therefore , we will								
COMMENT ON: return to the last three MEQ stations (TWR, TCT, and MVR)								
COMMENT ON: to check CCs and/or reset time.								
188+0050	C+10840	9227						
188+0100	R+17	"						
COMMENT: Returned to check CC _{on} and, subsequently, reset time.								
			188+1919	C-26	9227	"	"	"
188+1926	C-26	"	189+2048	C-6	"	"	"	"
189+2048	C-6	"	190+1811	C+36	"	"	"	"
190+1815	R+3	"	191+2157	C+18	"	"	"	"
COMMENT OFF: Analog record full, drum rotation stopped @ 191+2020.								
191+2202	R+2	"	192+2308	C+46	"	"	"	"
192+2314	R+14	"	193+2224	C+28	"	"	"	"
COMMENT ON: Rock drops @ 192+2320 and 192+2321.								
END RECORD MVR @ 193+2224 UTC								

SLS

Latitude: 36° 42.00'N Longitude: 116° 16.02'W Elevation: 1045m

Directions:

Take Test Cell C road to Jackass Flats Road;
Right 13.9km to 4wd road that parallels the old powerlines (trending
WSW) just south of Little Skull Mountain;
Right 3.7km on 4wd trail winding under and over the fallen powerlines;
At this point you will be located on a small ridge between two dry
stream beds near a telephone pole;
The station is North of the road approximately 50-60 meters along the
small ridge (a 1 to 2 minute walk; (see accompanying pictures).

General geology:

Unconsolidated to moderately cemented slope wash and stream bed
deposits.

STATION SUMMARY:

<u>OPERATION (UTC)</u>			<u>RECORDER</u>	<u>SN</u>	<u>SEISMOMETER</u>	<u>SN</u>	<u>ORIENTATION</u>	
182+2232 - 194+1655			MEQ800	255	L4C 1Hz	3129	V,000/000	
COMMENT: MEQ setup to record 36 hour translation.								
<u>RECORD ON (UTC)</u>			<u>RECORD OFF (UTC)</u>			<u>FILTERS (Hz)</u>		
<u>TIME</u>	<u>CC</u>	<u>MC</u>	<u>TIME</u>	<u>CC</u>	<u>MC</u>	<u>GAIN</u>	<u>HI</u>	<u>LO</u>
182+2232	R+5	9227	184+0050	C-32	9227	96db	5	10
184+0112	R+10	"	184+1623	C+5	9523	90db	"	"
COMMENT ON: Reset clock to account for leap second @ 182+23:59:60.								
184+1631	C+5	9523	185+1835	C+69	"	"	"	"
185+1840	R+1	"	186+1701	C-8	9227	"	"	"
186+1718	R+10	9227	187+1649	C-65?	9523	"	"	"
COMMENT OFF: CC's integrity questionable (see MVR log @ 187+2245).								
187+1654	R+30?	9523	188+1700	C+80	9227	"	"	"
COMMENT ON: CC's integrity questionable (see MVR log @ 187+2245).								
188+1705	R+14	9227	189+1517	C-17	"	"	"	"
189+1522	R+17	"	190+1512	C+18	"	84db	"	"
COMMENT ON: Changed gain due to windy conditions.								
190+1512	C+18	"	191+1429	C-13	"	"	"	"
191+1433	R+3	"	192+1620	C-47?	"	"	"	"
COMMENT OFF: CC's integrity questionable (see TPP log @ 192+1530).								
192+1626	R+19?	"	193+1542	C+39	"	"	"	"
COMMENT ON: CC's integrity questionable (see TPP log @ 192+1530).								
COMMENT ON: Rock drops @ 192+1629 and 192+1630.								
193+1554	R+6	"	194+1655	C+5	"	"	"	"
END RECORD SLS @ 194+1655 UTC								

TCT

Latitude: 36° 48.34'N Longitude: 116° 8.95'W Elevation: 1352m

Directions:

Take Test Cell C road to Jackass Flats Road;

Right 4.0km to Cane Spring Road;

Left 9.9km to a good road leading to a group of buildings and a water tower on your right;

Right on that road through the opened gate of fence and past the group of buildings and the water tower;

Before the far building at the end of the road, go right on a dirt road past several small shacks on your left to the end where there is a circle;

The station is approximately one quarter of the way around the circle traveling clockwise and located 3 to 4 meters to the outside of the circle (see accompanying picture).

General geology:

Unconsolidated to moderately cemented slope wash and stream bed deposits.

STATION SUMMARY:

<u>OPERATION (UTC)</u>			<u>RECORDER</u>	<u>SN</u>	<u>SEISMOMETER</u>	<u>SN</u>	<u>ORIENTATION</u>	
182+2131 - 194+2130			MEQ800	618	L4C 1Hz	3700	V,180/000	
COMMENT: MEQ setup to record 48 hour translation.								
<u>RECORD ON (UTC)</u>			<u>RECORD OFF (UTC)</u>			<u>FILTERS (Hz)</u>		
<u>TIME</u>	<u>CC</u>	<u>MC</u>	<u>TIME</u>	<u>CC</u>	<u>MC</u>	<u>GAIN</u>	<u>HI</u>	<u>LO</u>
182+2131	R+14	9523				90db	5	10
183+2249	C?					84db	"	"
COMMENT: Changed gain due to windy conditions.								
			184+1849	C-18	9523	"	"	"
184+1918	R+8	"	185+2103	C+98	"	"	"	"
COMMENT ON: Reset clock to account for leap second @ 182+23:9:60.								
COMMENT ON: Modified MEQ to record 24 hour translation.								
185+2116	R+16	"	186+1922	C+43	9227	90db	"	"
186+1930	R+9	9227	187+2030	C-36?	9523	"	"	"
COMMENT OFF: CC's integrity questionable (see MVR log @ 187+2245).								
187+2045	R+60?	9523	188+0157	+74	9227	"	"	"
COMMENT ON: CC's integrity questionable (see MVR log @ 187+2245).								
COMMENT OFF: Returned to check the CC _{on} since the power on MC9523 was								
COMMENT OFF: low, but found the MEQ not translating.								
COMMENT OFF: Therefore, we removed the MEQ for repairs.								
188+2146	R+5	9227	189+1925	C-9	"	"	"	"
189+1958	R+8	"	190+1701	C+79	"	"	"	"
190+1711	R+12	"	191+2103	C-5	"	"	"	"
COMMENT OFF: Analog record full, drum rotation stopped @ 191+1901.								
191+2110	R+12	"	192+2205	C+30	"	"	"	"
192+2216	C+30	"	193+1801	C+18	"	"	"	"
COMMENT ON: Rock drops @ 192+2221 and 192+2229.								
193+1811	C+18	"	194+2130	C+34	"	"	"	"
COMMENT OFF: Analog record full, drum rotation stopped @ 194+2002.								
END RECORD TCT @ 194+2130 UTC								

TPP

Latitude: 36° 43.37'N Longitude: 116° 7.74'W Elevation: 1158m

Directions:

Take Test Cell C road to Jackass Flats Road;
 Right 21.1km to road for Area 27;
 Left 4.8km to an old grown-up 4wd drive trail on the left;
 Left on the 4wd trail and drive toward the closest grey/white mound to
 the NNW until the road ends at a dry stream bed;
 The station is on top of the whitish-grey mound NNW across the creek
 (about a 4 or 5 minute walk; (see accompanying pictures)).

General geology:

Unconsolidated to moderately cemented flood plain and stream bed
 deposits. Locally (at the station site) sedimentary and tuffaceous
 sedimentary rocks.

STATION SUMMARY:

<u>OPERATION (UTC)</u>			<u>RECORDER</u>	<u>SN</u>	<u>SEISMOMETER</u>	<u>SN</u>	<u>ORIENTATION</u>	
182+2100 - 194+1547			MEQ800	034	L4C 1Hz	1674	V,000/000	
COMMENT: MEQ setup to record 48 hour translation.								
<u>RECORD ON (UTC)</u>			<u>RECORD OFF (UTC)</u>			<u>FILTERS (Hz)</u>		
<u>TIME</u>	<u>CC</u>	<u>MC</u>	<u>TIME</u>	<u>CC</u>	<u>MC</u>	<u>GAIN</u>	<u>HI</u>	<u>LO</u>
182+2100	R+18	9227	183+1908	?		96db	5	30
COMMENT: No record for this period; the pen-motor was not engaged.								
183+1909	R+4	"	184+1504	?		"	"	10
COMMENT ON: Reset clock to account for leap second @ 182+23:59:60.								
COMMENT ON: Modified MEQ to record 24 hour translation.								
COMMENT OFF: Ground looping, could not get CC _{off} due to noise on scope;								
COMMENT OFF: therefore, no CC _{off} was recorded for this record.								
184+1520	R+18	9523	185+1722	C+102	9523	"	"	"
COMMENT OFF: No record for this period; the pen motor was not engaged.								
185+1738	R-2	"	186+1542	C+10	9227	"	"	"
186+1557	C+10	9227	187+1531	C-30?	9523	"	"	"
COMMENT OFF: CC's integrity questionable (see MVR log @ 187+2245).								
187+1538	R+18?	9523	188+1609	C+87	9227	"	"	"
COMMENT ON: CC's integrity questionable (see MVR log @ 187+2245).								
188+1616	R+4	9227	189+1417	C-6	"	"	"	"
189+1417	C-6	"	190+1353	C+13	"	"	"	"
190+1353	C+13	"	191+1340	C-3	"	"	"	"
191+1340	C-3	"	192+1524	C-35	"	"	"	"
192+1530	R+15?	"	193+1439	C+52	"	"	"	"
COMMENT ON: Accidentally retarded MC9227 instead of the MEQ clock.								
COMMENT ON: Attempted to recover from this error by advancing the MC								
COMMENT ON: to the original CC _{off} measured for the previous record								
COMMENT ON: removed @ 192+1524. However, succeeding measurements								
COMMENT ON: of CCs are questionable through 192+1814.								
COMMENT ON: Rock drops @ 192+1533 and 192+1534.								
193+1445	R+3	"	194+1547	C+20	"	"	"	"
END RECORD TPP @ 194+1547 UTC								

TWR

Latitude: 36° 46.43'N Longitude: 116° 14.29'W Elevation: 1109m

Directions:

Take Test Cell C road to Jackass Flats Road;
Right 7.5km to Horn Cutoff (a 4wd trail along NE-SW trending powerline);
Left ≈0.6km on Horn Cutoff to the substation;
At the substation, continue straight on 1.8km paralleling the powerline;
The station is left approximately 60 meters perpendicular from the road
and Bren Tower will be off your right shoulder (to the North) in
line with Test Cell C in the background (see accompanying
pictures).

General geology:

Unconsolidated to moderately cemented flood plain and stream bed
deposits.

STATION SUMMARY:

<u>OPERATION (UTC)</u>			<u>RECORDER</u>	<u>SN</u>	<u>SEISMOMETER</u>	<u>SN</u>	<u>ORIENTATION</u>	
182+1930 - 194+1832			MEQ800	254	L4C 1Hz	2296	V,000/000	
COMMENT: MEQ setup to record 48 hour translation.								
<u>RECORD ON (UTC)</u>			<u>RECORD OFF (UTC)</u>			<u>FILTERS (Hz)</u>		
<u>TIME</u>	<u>CC</u>	<u>MC</u>	<u>TIME</u>	<u>CC</u>	<u>MC</u>	<u>GAIN</u>	<u>HI</u>	<u>LO</u>
182+1930	R+8	9523	184+1732	C-116	9523	90db	5	10
184+1754	R+15	"	185+1954	C+31	"	"	"	"
COMMENT ON: Reset clock to account for leap second @ 182+23:59:60.								
COMMENT ON: Modified MEQ to record 24 hour translation.								
COMMENT OFF: Time on MEQ is fast by 10 minutes; reset MEQ clock.								
185+2010	R+13	"	186+1820	C-22	9227	"	"	"
186+1828	R+12	9227	187+1839	C-92?	9523	84db	"	"
COMMENT ON: Changed gain due to windy conditions.								
COMMENT OFF: CC's integrity questionable (see MVR log @ 187+2245).								
187+1917	R+22?	9523				"	"	"
COMMENT ON: CC's integrity questionable (see MVR log @ 187+2245).								
188+0230	C+21	9227						
COMMENT: Returned to check the CC _{on} since the power on MC9523 was low.								
			188+1757	C+62	9227	"	"	"
188+1808	R+33	"	189+1816	C-144	"	"	"	"
189+1831	R-14	"	190+1608	C-72	"	"	"	"
190+1614	R+11	"	191+1519	C-66	"	"	"	"
191+1525	R+16	"	192+1724	C-84?	"	"	"	"
COMMENT OFF: CC's integrity questionable (see TPP log @ 192+1530).								
192+1730	R+33?	"	193+1654	C+11	"	"	"	"
COMMENT ON: CC's integrity questionable (see TPP log @ 192+1530).								
COMMENT ON: Rock drops @ 192+1731 and 192+1733.								
193+1708	C+11	"	194+1832	C-38	"	"	"	"
END RECORD TWR @ 194+1832 UTC								

Station Summaries of DR200 Instruments

CAL

Latitude: 36° 51.42'N Longitude: 116° 17.45'W Elevation: 1268m

Directions:

Take Test Cell C road to 4wd road just South of Test Cell C on the right;

Right ≈0.4km to a good north-south gravel road cutting across the 4wd road;

Right ≈3.6 - 3.7km toward Calico Hills until you come to the first rhyolitic outcrop on the right (the outcrop is a bright rust color intermixed with white milky quartz);

The station is just below the outcrop in the stream bed (see accompanying pictures).

General geology:

Rhyolite to quartz latite ash-flow tuffs (compound cooling unit, nonwelded to densely welded high-silica rhyolite with caprock of quartz latitic ash-flow tuff; And multiple flow compound cooling unit, large volume, densely welded, zoned rhyolite to quartz latite ash-flow tuff).

STATION SUMMARY:

OPERATION (UTC)	RECORDER	SN	SEISMOMETER	SN	SENSITIVITY	DAMPING	CHANNEL	ORIENTATION (GN)
183+2236 - 193+2127	Sprengnether DR200	269	L22 2Hz	339	0.99V/cm/sec	0.666	1	V, 180/000
							2	N, 090/194
							3	E, 090/284

<----- INSTRUMENT PARAMETERS ----->													
#	START	CC	MC	STOP	CC	MC	ACQUISITION (UTC)	CHANLS	AMPF	ADC	FILTERS (Hz)	SAMPL	TRIGR
B	183+2236	R0	15					123	X10	Range	.2	50	200
	COMMENT START: Reset clock to account for leap second @ 182+23:59:60.												
-	183+2253	C?		184+1735	C?			"	X100	"	"	"	"
C	184+1740	C?		185+1720	C-6	9226		"	"	"	"	"	"
	COMMENT STOP: Channel 3 amplifier is dead.												
D	185+1725	R0	9226	186+2216	C-1			"	"	"	"	"	"
	COMMENT START: Stomp trigger @ 185+1735.												
E	186+2220	R0		187+2157	C-15			"	"	"	"	"	"
F	187+2202	R0						"	"	"	"	"	"
	COMMENT START: Replaced channel 3 amplifier.												
-	188+2235	C+2						"	"	"	"	"	"
-	188+2236	R0						"	"	"	"	"	"
-	189+1701	C-12						"	"	"	"	"	"
-	189+1702	R0		190+1828	C-14			"	X10	"	"	"	"
G	190+1830	R0						"	"	"	"	"	"
-	191+1550	C-2		192+1638	C-11			"	"	"	"	"	"
H	192+1640	R0		193+2127	C-16			"	"	"	"	"	"
END RECORD CAL @ 193+2127 UTC													

COM

Latitude: 36° 43.72'N Longitude: 116° 13.41'W Elevation: 1169m

Directions:

Take Test Cell C road to Jackass Flats Road;

Right 11.7km to a good gravel road on the left leading up to the top of Skull Mountain;

Left ≈0.6 - 0.7km to the site (the road will go up and down through three dips, at the bottom of the third and the largest dip, STOP);

The station is ≈30m off the South side of the road and up the hill to the left of the stream ≈3m (see accompanying pictures).

General geology:

Unconsolidated to moderately cemented alluvial fan, slope wash, and stream bed deposits.

STATION SUMMARY:

OPERATION (UTC)	RECORDER	SN	SEISMOMETER	SN	SENSITIVITY	DAMPING	CHANNEL	ORIENTATION (GN)
182+0355 - 193+1541	Sprengnether DR2000	272	S6000 2Hz	8769	1.2V/cm/sec	0.6	1	V, 000/000
							2	N, 090/196
							3	E, 090/106

<----- INSTRUMENT PARAMETERS ----->									
ACQUISITION (UTC)									
#	START	CC	MC	STOP	CC	MC	CHANLS	AMPF	ADC
A	182+0355	R0	15	182+0904	C+46	9226	123	X10	Range
B	182+0905	C+46	9226	183+1659	C+58	15	"	"	"
C	183+1700	R0	15	184+1624	?		"	"	"
COMMENT START: Reset clock to account for leap second @ 182+23:59:60.									
D	184+1625	?		185+1607	C+138	9226	"	"	"
E	185+1608	R0	9226	186+1646	C+42		"	"	"
F	186+1725	R0	"	187+2303	C+33		"	"	"
G	187+2315	R0	"				"	"	"
-	189+0130	C+44	"				"	"	"
-	189+0131	C+55	"	189+2226	C+78		"	"	"
COMMENT: Clock on the recorder will no longer advance @ 189+0130.									
H	189+2230	R-2	"				"	"	"
-	190+2315	C+27	"	191+2215	C+64		"	"	"
I	191+2220	R-26	"	192+2158	C+5		"	"	"
J	192+2200	C+5	"	193+1541	C+25		"	"	"
END RECORD COM @ 193+1541 UTC									

JAC

Latitude: 36° 45.84'N Longitude: 116° 22.43'W Elevation: 949m

Directions:

Take Test Cell C road to Jackass Flats Road;

Right 4.0km to the next road just south of Cane Spring Road (this is a "black top" road which passes to the south side of the Field Office Control buildings);

Right 7.5km to a good gravel road on the right (the gravel road is just before the "black top" road curves to the south to guard station 510;

Right ≈0.6km to another good gravel road that subparallels a telephone pole line;

Left ≈2.2km to a 4wd road on the left;

Left .4km to the site;

The station is about 6m off the east side of the road (to the West-Northwest is Busted Butte beyond the telephone line and to the East-Southeast is Little Skull Mountain; see accompanying pictures).

General geology:

Unconsolidated to moderately cemented flood plain deposits.

STATION SUMMARY:

<u>OPERATION (UTC)</u>	<u>RECORDER</u>	<u>SN</u>	<u>SEISMOMETER</u>	<u>SN</u>	<u>SENSITIVITY</u>	<u>DAMPING</u>	<u>CHANNEL</u>	<u>ORIENTATION (GN)</u>
182+2202 - 186+2043	Sprengnether DR200	202	S6000 2Hz	8771	1.2V/cm/sec	0.6	1	V, 000/000
							2	N, 090/195
							3	E, 090/105
187+1948 - 188+2316	Sprengnether DR200	276						(Same seismometer configuration as above entry.)
190+2016 - 193+1848	Sprengnether DR200	202						(Same seismometer configuration as above entry.)

LAT

Latitude: 36° 40.65'N Longitude: 116° 22.84'W Elevation: 849m

Directions:

Take Test Cell C road to Jackass Flats Road;

Right 4.0km to the next road just south of Cane Spring Road (this is a "black top" road which passes to the south side of the Field Office Control buildings);

Right 17.9km (driving towards Guard Station 510) to a 4wd road on the left (you will be getting close to the 4wd road turn off after you pass the old concrete missile silos laid on their sides for offices and, then, a fence row intersecting the "black top" road perpendicularly);

Left ≈1.5km to another 4wd road trending NE-SW (you will be travelling SW towards the Striped Hills subparallel to a telephone pole line)

Right at the intersection ≈0.2km to the site

The station is about 9m off the east side of the road to the NE of the surveyed benchmark nearby (to the SW is Striped Hills; see accompanying pictures).

General geology:

Unconsolidated to moderately cemented flood plain deposits.

STATION SUMMARY:

<u>OPERATION (UTC)</u>	<u>RECORDER</u>	<u>SN</u>	<u>SEISMOMETER</u>	<u>SN</u>	<u>SENSITIVITY</u>	<u>DAMPING</u>	<u>CHANNEL</u>	<u>ORIENTATION (CN)</u>
182+0248 - 189+1826	Sprengnether DR200	177	S6000 2Hz	9258	1.2V/cm/sec	0.6	1	V, 000/000
							2	N, 090/193
189+2347 - 193+1915	Sprengnether DR200	262					3	E, 090/103
								(Same seismometer configuration as above entry.)

<----- INSTRUMENT PARAMETERS ----->																			
----->																			
CHANLS AMPF ADC FILTERS (Hz) SAMPL TRIGR TRIGR STA LTA TRIGR LTA																			
#	START	CC	MC	STOP	CC	MC	INCLUD	MAGN	GAIN	HI	LO	RATE	TYPE	CHANLS	LOGIC	(sec)	(sec)	RATIO	HLD
COMMENT: Summary below for DR200 177.																			
A	182+0248	R0	15	182+2251	C+28	15	1	X100	Range	.2	50	200	EVT	23	And	.2	12.8	6db	OFF
							2	X100	None		50								
							3	X10	.2		50								
B	182+2252	C+28	"	183+2003	C+20	"	123	X10	"	.2	50	"	"	"	"	"	"	"	"
C	183+2005	R0	"	185+0229	?	"	"	"	"	"	"	"	"	"	"	"	"	"	"
COMMENT START: Reset clock to account for leap second @ 182+23:59:60.																			
D	185+0230	?	"	185+1951	C+73	9226	"	"	"	"	"	"	"	"	"	"	"	3db	"
E	185+2007	R0	9226	186+2105	C+22	"	"	"	"	"	"	"	"	"	"	"	"	"	"
F	186+2109	C+22	"	187+1909	C+27	"	"	"	"	"	"	"	"	"	"	"	"	"	"
G	187+1910	C+27	"	188+1925	C+51	"	"	"	"	"	"	"	"	"	"	"	"	"	"
H	188+1926	C+51	"	189+1826	C+60	"	"	"	"	"	"	"	"	1	Undf	"	"	6db	"
COMMENT STOP: Removed DR200 to install at LSD site.																			

COMMENT: Summary below for DR200 262.																			
I	189+2347	R0	9226				123	X10	Range	.2	50	200	EVT	23	And	.2	12.8	3db	OFF
-	190+2045	C-7	"				"	"	"	"	"	"	"	"	"	"	"	"	"
-	190+2046	R0	"	191+1838	C+5	9226	"	"	"	"	"	"	"	1	Undf	"	"	"	"
J	191+1840	R0	"	192+2030	C-2	"	"	"	"	"	"	"	"	"	"	"	"	"	"
K	192+2032	R0	"	193+1915	C-4	"	"	"	"	"	"	"	"	"	"	"	"	"	"
END RECORD LAT @ 193+1915 UTC																			

LSD

Latitude: 36° 43.81'N Longitude: 116° 19.61'W Elevation: 1177m

Directions:

Take Test Cell C road to Jackass Flats Road;

Right 4.0km to the next road just south of Cane Spring Road (this is a "black top" road which passes to the south side of the Field Office Control buildings);

Right 2.5km to a 4wd road on your left;

Left ≈6.7km to the top of Little Skull Mountain (LSM) all the way until you cannot drive anymore (this point will be just after the road steeply dips down to a flat area near the western edge of LSM);

The station is about 9m off the north side of the road (just to the NE, is a Yucca Mountain Digital site with its transceiver tower; see accompanying pictures).

General geology:

Basalts (plagioclase-porphyritic olivine basalt, porphyritic clinopyroxene-olivine basalt, and quartz-olivine basaltic andesite).

STATION SUMMARY:

<u>OPERATION (UTC)</u>	<u>RECORDER</u>	<u>SN</u>	<u>SEISMOMETER</u>	<u>SN</u>	<u>SENSITIVITY</u>	<u>DAMPING</u>	<u>CHANNEL</u>	<u>ORIENTATION (CN)</u>
183+0028 - 185+2152	Sprengnether DR200	184	S6000 2Hz	9255	1.2V/cm/sec	0.6	1	V, 000/000
							2	N, 090/196
							3	E, 090/106
185+2215 - 186+1823	Sprengnether DR200	276						(Same seismometer configuration as above entry.)
187+1800 - 189+0035	Sprengnether DR200	202						(Same seismometer configuration as above entry.)
189+1950 - 193+1758	Sprengnether DR200	177						(Same seismometer configuration as above entry.)

<----- INSTRUMENT PARAMETERS ----->																			
ACQUISITION (UTC)																			
#	START	CC	MC	STOP	CC	MC	CHANLS	AMPF	ADC	FILTERS (Hz)	SAMPL	TRIGR	TRIGR	TRIGR	STA	LTA	TRIGR	LTA	
							INCLUD	MAGN	GAIN	HI	LO	RATE	TYPE	CHANLS	LOGIC	(sec)	(sec)	RATIO	HLTD
COMMENT: Summary below for DR200 184.																			
A	183+0028	R+9?	15	183+2107	C-9?	15	123	X10	Range	.2	50	200	EVT	23	And	.2	12.8	6db	OFF
COMMENT START: From data analysis, the CC above of +9 ms should be -1000 + (+9) = -991 ms.																			
COMMENT OFF: From data analysis, tehe CC above of -9 ms should be -1000 + (-9) = -1009 ms.																			
B	183+2110	R0	"	185+0342	?	"	"	"	"	"	"	"	"	"	"	"	"	"	"
COMMENT START: Reset clock to account for leap second @ 182+23:59:60.																			
C	185+0400	?	"	185+2152	C+149	9226	"	"	"	"	"	"	"	"	"	"	"	3db	"
COMMENT STOP: Tapes from instrument are unreadable; removed instrument.																			
COMMENT: Summary below for DR200 276.																			
D	185+2215	R0	9226	186+1823	?	123	X10	Range	.2	50	200	EVT	23	And	.2	12.8	3db	OFF	
COMMENT STOP: Instrument locked up; rebooted, no tape operation; removed instrument.																			
COMMENT: Summary below for DR200 202.																			
E	187+1800	R0	9226	189+0035	C-75	9226	123	X10	Range	.2	50	200	EVT	23	And	.2	12.8	3db	OFF
COMMENT START: Stomp trigger @ 187+1800.																			
COMMENT STOP: No tape operation; removed instrument.																			
COMMENT: Summary below for DR200 177.																			
F	189+1950	R-25	9226	190+2146	C-18	9226	123	X10	Range	.2	50	200	EVT	23	And	.2	12.8	3db	OFF
G	190+2148	C-18	"	191+1722	C-4	"	"	"	"	"	"	"	"	1	Undf	"	"	"	"
H	191+1725	C-4	"	192+1914	C+8	"	"	"	"	"	"	"	"	"	"	"	"	"	"
I	192+1914	C+8	"	193+1758	C+16	"	"	"	"	"	"	"	"	"	"	"	"	"	"
END RECORD LSD @ 193+1758 UTC																			

SPE

Latitude: 36° 39.22'N Longitude: 116° 7.09'W Elevation: 1076m

Directions:

Take Test Cell C road to Jackass Flats Road (JFR);

Right 25.7km to a 4wd road on the right (the 4wd road intersects JFR in a Y, the left leg turns West on JFR and the right leg turns East on JFR);

Right ≈0.9km to the site;

The station is ≈15m off the West side of the road (Specter Mountain can be seen directly to the West in the background; see accompanying pictures).

General geology:

Unconsolidated to moderately cemented flood plain and stream bed deposits.

STATION SUMMARY:

<u>OPERATION (UTC)</u>	<u>RECORDER</u>	<u>SN</u>	<u>SEISMOMETER</u>	<u>SN</u>	<u>SENSITIVITY</u>	<u>DAMPING</u>	<u>CHANNEL</u>	<u>ORIENTATION (GN)</u>
182+1816 - 193+1420	Sprengnether DR200	199	S6000 2Hz	8772	1.2V/cm/sec	0.6	1	V, 000/000
							2	N, 090/192
							3	E, 090/102

<----- INSTRUMENT PARAMETERS ----->

ACQUISITION (UTC)										CHANLS AMPF ADC FILTERS (Hz) SAMPLE TRIGR TRIGR LOGIC (sec) STA LTA TRIGR LTA												
#	START	CC	MC	STOP	CC	MC	INCLUD	MAGN	GAIN	HI	LO	RATE	TYPE	CHANLS	TRIGR	LOGIC	(sec)	STA	LTA	RATIO	HLD	
A	182+1816	R0?	15	183+1512	C-20?	15	123	X100	Range	.2	50	200	EVT	23	And	.2	12.8	6db	OFF			
COMMENT START: From data analysis, the CC above of +0 ms should be -1000 + (+0) = -1000 ms.																						
COMMENT OFF: From data analysis, tehe CC above of -20 ms should be -1000 + (-20) = -1020 ms.																						
B	183+1513	R0	"	184+0211	?	"	"	X10	"	"	"	"	"	"	"	"	"	"	"	"		
COMMENT START: Reset clock to account for leap second @ 182+23:59:60.																						
C	184+0212	R0	"				"	"	"	"	"	"	"	1	Undf	"	"	9db	"	"		
-	184+1524	C?		185+1519	C+3	9226	"	"	"	"	"	"	"	23	And	"	"	3db	"	"		
D	185+1520	C?		186+1533	C+8	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"		
E	186+1540	R0	9226	188+0119	C-6	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"		
F	188+0120	R0	"	188+2045	C+3	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"		
G	188+2048	R+7	"				"	"	"	"	"	"	"	1	Undf	"	"	6db	"	"		
-	190+0155	C+5	"				"	"	"	"	"	"	"	"	"	"	"	"	"	"		
-	190+0156	R0	"				"	"	"	"	"	"	"	23	And	"	"	3db	"	"		
-	190+2340	C-8	"	191+2247	C-4	"	"	"	"	"	"	"	"	1	Undf	"	"	6db	"	"		
H	191+2259	R0	"				"	"	"	"	"	"	"	"	"	"	"	"	"	"		
-	192+2228	C-2	"	193+1420	C-3	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"		
END RECORD SPE @ 193+1420 UTC																						

SPW

Latitude: 36° 41.30'N Longitude: 116° 10.69'W Elevation: 1073m

Directions:

Take Test Cell C road to Jackass Flats Road;

Right 19.3km to a good gravel road on the right (the road follows the South side of a stream and is before the turn off for area 27);

Right ≈0.3 - 0.4km to a 4wd trail on your left;

Follow the trail to where it ends in a circlce at the base of a hill.

The station is directly up the hill from the back side of the circle just below one of the closest rock outcrops (to the North is Skull Mountain, see accompanying pictures).

General geology:

Banded, thinly laminated, locally oolitic or nodular, limestone and dolomite and minor siltstone.

STATION SUMMARY:

OPERATION (UTC)	RECORDER	SN	SEISMOMETER	SN	SENSITIVITY	DAMPING	CHANNEL	ORIENTATION (GN)
182+1712 - 189+2254	Sprengnether DR200	262	S6000 2Hz	8770	1.2V/cm/sec	0.6	1	V, 000/000
							2	N, 090/202
							3	E, 090/112

ACQUISITION (UTC)													INSTRUMENT PARAMETERS												
#	START	CC	MC	STOP	CC	MC	INCLUD	MAGN	GAIN	HI	LO	RATE	TYPE	TRIGR	TRIGR	TRIGR	STA	LTA	TRIGR	LTA	RATIO	HLD			
A	182+1712	R0?	15	183+1548	C-21?	15	123	X100	Range	.2	50	200	EVT	23	And	.2	12.8	6db	OFF						
COMMENT START: From data analysis, the CC above of +0 ms should be -1000 + (+0) = -1000 ms.																									
COMMENT OFF: From data analysis, tehe CC above of -21 ms should be -1000 + (-21) = -1021 ms.																									
B	183+1630	R0	"	184+1555	?	"	"	X10	"	"	"	"	"	"	"	"	"	"	"	"	"	"			
COMMENT START: Reset clock to account for leap second @ 182+23:59:60.																									
C	184+1556	R0	9226	185+1546	C+2	9226	"	"	"	"	"	"	"	"	"	"	"	"	3db	"	"	"			
D	185+1547	R0	"	186+1620	C+8	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"			
E	186+1622	R0	"	188+0037	C-6	"	"	"	"	"	"	"	"	"	"	"	"	"	6db	"	"	"			
F	188+0040	R0	"	188+2017	C+10	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"			
G	188+2018	R0	"	189+2254	C+4	"	"	"	"	"	"	"	"	1	Undf	"	"	"	"	"	"	"			
COMMENT STOP: Relocated recording instrument to station LAT.																									

END RECORD SPW @ 189+2254 UTC

TOW

Latitude: 36° 47.27'N Longitude: 116° 19.70'W Elevation: 1111m

Directions:

Take Test Cell C road to Jackass Flats Road; Right 4.0km to Cane Spring Road;

Right ≈2.8km pass well J-11 to intersection of a road trending SE-NW passing to north side of the hill marked "tower" on most maps (the hill is a prominent feature in the middle of Jackass Flats);

Right at the intersection ≈1.6km to a 4wd road on the left that leads southwest up to the top of the hill;

Left to the top of the hill and stop opposite the downed tower on the left;

The station is to the right about 15m where it can be clearly seen somebody has dug up the earth (directly to the north is Calico Hills; this is a Yucca Mountain digital site; see accompanying pictures).

General geology:

Black dense, vesicular, scoriaceous, stony basalt with quartz phenocrysts.

STATION SUMMARY:

OPERATION (UTC)	RECORDER	SN	SEISMOMETER	SN	SENSITIVITY	DAMPING	CHANNEL	ORIENTATION (GN)
182+0454 - 193+1959	Sprengnether DR200	264	S6000 2Hz	9257	1.2V/cm/sec	0.6	1	V, 000/000
							2	N, 090/193
							3	E, 090/103

<----- INSTRUMENT PARAMETERS ----->												
#	START	CC	MC	STOP	CC	MC	CHANLS	AMPF	ADC	FILTERS	HI	LO
A	182+0454	R+1	9226	182+2119	C+1	15	123	X10	Range	.2	50	200
B	182+2120	C+1	15	183+1840	C-4	"	"	"	"	"	"	"
C	183+1842	C-4	"	184+1853	?	"	"	"	"	"	"	"
COMMENT START: Reset clock to account for leap second @ 182+23:59:60.												
D	184+1855	?	"	185+1835	C+350	9226	"	"	"	"	"	"
E	185+1836	R0	9226	186+2305	C+23	"	"	"	"	"	"	"
F	186+2310	R0	"	187+2030	C+4	"	"	"	"	"	"	"
G	187+2032	R0	"	188+1842	C+12	"	"	"	"	"	"	"
H	188+1845	R+7	"	"	"	"	"	"	"	"	"	"
-	189+1743	C+11	"	"	"	"	"	"	"	"	"	"
-	189+1744	R0	"	"	"	"	"	"	"	"	"	"
-	190+1935	C+7	"	"	"	"	"	"	"	"	"	"
-	190+1936	R0	"	191+1635	C+16	"	"	"	"	"	"	"
I	191+1638	R0	"	"	"	"	"	"	"	"	"	"
-	192+1744	C+11	"	"	"	"	"	"	"	"	"	"
-	192+1745	R0	"	193+1959	C+6	"	"	"	"	"	"	"
END RECORD TOW @ 193+1959 UTC												

Station Summaries of REFTEK Instruments

CL0

Latitude: 36° 50.32'N Longitude: 116° 20.29'W Elevation: 1177m

Directions:

Take Test Cell C road to Jackass Flats Road;

Right 1.9km to paved road leading to Yucca Mountain (the road just before a group of buildings with a water tower and lighted helipads);

Right ≈6.3km to a good gravel road on the right (road is just past 1st road sign depicting a curve ahead);

Right a short distance to a 4wd drive trail on the right;

Right (almost straight ahead) on the 4wd drive trail toward the powerlines;

Where the road intersects the powerline road on the crest of a ridge, take the 4wd trail North following the crest;

Drive ≈1.1km to the SGBSN Yucca Mountain digital site #1 (an antenna tower will be seen on your left);

The station is located at this site (see accompanying pictures).

General geology:

Unconsolidated to moderately cemented slope wash and alluvial fan deposits.

STATION SUMMARY:

OPERATION (UTC)	RECORDER	SN	SEISMOMETER	SN	SENSITIVITY	DAMPING	CHANNEL	ORIENTATION (GN)
185+0000 - 186+0650	REFTEK 72A-02	520	S13 1Hz	3355	6.29V/cm/sec	0.028	1	V, 000/000
			S13 1Hz	3357	"	"	2	N, 090/000
			S13 1Hz	3356	"	"	3	E, 090/090
COMMENT: The damping shown is for the undamped system.								
COMMENT: REFTEK instrument running under V2.46.								
190+2324 - 194+2019	REFTEK 72A-02	518	(Same configuration for seismometers as previous entry.)					
194+2037 - 195+1904	REFTEK 72A-02	518	S13 1Hz	3355	3.96V/cm/sec	0.67	1	V, 000/000
			S13 1Hz	3357	"	"	2	N, 090/000
			S13 1Hz	3356	"	"	3	E, 090/090
COMMENT: The damping shown is for the damped system after installation of a 6.8k resistor for each component.								
COMMENT: REFTEK instrument running under V2.47.								

This site utilized the three S13 seismometers already installed for the Yucca Mountain Digital array.

<----- DATA STREAM PARAMETERS ----->													
ACQUISITION (UTC)		STRM	CHANLS		SAMPLE	TRIGR	TRIGR	MIN	TRIGR	STA	LTA	TRIGR	DTRIGR
#	START	STOP	NO.	NAME	MAGN	RATE	TYPE	CHANLS	WINDOW	(sec)	(sec)	RATIO	RATIO
COMMENT: Summary below for REFTEK 520.													
A	185+0000	186+0100	1	STREAM 1	123	X128	200	EVT	1	1	.2	20	5
	COMMENT STOP:			RAM dump to disk @ 186+0115 (RAM full).									1.5
	COMMENT STOP:			Error - general SCSI failure during RAM dump.									
B	186+0130	186+0650	"	"	"	X8	"	"	"	"	"	"	2.5
	COMMENT START:			Stomp trigger @ 186+0132.									100
	COMMENT STOP:			RAM dump to disk @ 187+0118 (RAM full).									
	COMMENT STOP:			Error - system device general failure during RAM dump; removed instrument for testing.									
COMMENT: Summary below for REFTEK 518.													
C	190+2324	190+2339	1	STREAM 1	123	X8	200	EVT	1	1	.2	20	5
-	190+2340	190+2352	"	"	"	"	"	"	"	"	"	"	2.5
-	190+2354	190+0607	"	"	"	"	"	"	"	"	.4	"	"
	COMMENT START:			Stomp trigger @ 190+2358.									
	COMMENT START:			Changed parameters several times before leaving @ 190+2359.									
	COMMENT STOP:			RAM dump to disk @ 191+2310 (RAM full).									
D	191+2320	191+2324	"	"	"	"	"	"	123	3	.2	"	4
-	191+2328	193+0214	"	"	"	"	"	"	"	"	"	"	.04
	COMMENT STOP:			Explosion to the NE beyond the ridge of Calico Hills @ 193+0213.									10
	COMMENT STOP:			RAM dump to disk @ 193+0214.									
	COMMENT STOP:			Explosion to the NE beyond the ridge of Calico Hills @ 193+0236.									
E	193+0242	194+0434	"	"	"	"	"	"	"	"	"	"	2
	COMMENT STOP:			RAM dump to disk @ 194+1622 (RAM full).									
F	194+1637	194+2019	"	"	"	"	"	"	"	"	"	"	"
	COMMENT START:			Stomp trigger @ 194+1642.									
	COMMENT STOP:			RAM dump to disk @ 194+2021.									
G	194+2037	195+1904	"	"	"	"	"	"	"	"	"	"	"
	COMMENT:			Installed 6.8k resistors for each S13.									
	COMMENT START:			Stomp trigger @ 194+2041.									
	COMMENT STOP:			RAM dump to disk @ 195+1905.									
END RECORD CL0 @ 195+1905 UTC													

H50

Latitude: 36° 51.40'N Longitude: 116° 27.94'W Elevation: 1475m

Directions:

Take Test Cell C road to Jackass Flats Road;

Right 1.9km to paved road leading to Yucca Mountain (a road just before a group of buildings with a water tower and lighted helipads);

Right ≈12.5km to a good, wide gravel road on your left (road is on the west side of Forty Mile Wash near a large sign);

Left on the gravel road and drive all the way to the top of Yucca Mountain (as soon as you turn onto the gravel road, there is a sharp curve to the left, 90° or more);

At the top, the road intersects a road following the ridge of Yucca Mountain;

Right at the T for ≈2.2km to Water Resources water well site H5 (an antenna, a small white trailer, and a solar cell panel marks this site);

The station is located ≈3.0m to the east side of the well (see accompanying pictures).

General geology:

Compositionally zoned compound cooling unit of ash-flow tuff (upper quartz latite, middle rhyolite, and lower high-silica rhyolite).

STATION SUMMARY:

OPERATION (UTC)	RECORDER	SN	SEISMOMETER	SN	SENSITIVITY	DAMPING	CHANNEL	ORIENTATION (GN)
191+1949 - 194+0016	REFTEK 72A-02	519	L22 2Hz	1507	0.88V/cm/sec	0.7	1	V,180/000
							2	N,090/002
							3	E,090/092

COMMENT: REFTEK instrument running under V2.46.

<===== DATA STREAM PARAMETERS =====>											
ACQUISITION (UTC)	STRM	CHANLS	SAMPLE	TRIGR	TRIGR	MIN	TRIGR	STA	LTA	TRIGR	DTRIGR
# START STOP	NO.	NAME	INCLUD	MAGN	RATE	TYPE	CHANLS	CHANLS	(sec)	RATIO	RATIO
A 191+1949 192+0232	1	WATER WELL	123	X32	200	EVT	123	3	20	3	1.5
COMMENT START:									.2		10
COMMENT STOP:											
COMMENT STOP:											
COMMENT STOP:											
B 192+2057 194+0016											
COMMENT START:											
COMMENT START:											
COMMENT STOP:											

END RECORD H50 @ 194+0016 UTC

AR0 (Phased Micro-Array station)

Location:

GPS (reference model WG584)

Latitude: 36° 49.74'N Longitude: 116° 16.26'W Elevation: 1160m

Raytheon Services Nevada (reference model Nevada plane coordinate system)

Latitude: 36° 49.72'N Longitude: 116° 16.22'W Elevation: 1159.68m

Directions:

Take Test Cell C road to Jackass Flats Road;

Left ≈0.1km to a very good gravel road just before the Jackass Flats Road curves to the right;

Left ≈0.1-0.2km along this road (look for a lone Joshua tree on your left);

The station is to the left off of the road walking in the direction of the water tower at Test Cell C (a 3 to 4 minute walk). The site is about 50 meters to the South of the lone Joshua tree (see accompanying pictures).

This site is collocated with MEQ800 station ARY.

General geology:

Unconsolidated to moderately cemented flood plain deposits.

STATION SUMMARY:

<u>OPERATION (UTC)</u>	<u>RECORDER</u>	<u>SN</u>	<u>SEISMOMETER</u>	<u>SN</u>	<u>SENSITIVITY</u>	<u>DAMPING</u>	<u>CHANNEL</u>	<u>ORIENTATION (GN)</u>
184+0318 - 186+0517	REFTEK 72A-02	519	L22 2Hz	460	0.88V/cm/sec	0.7	1	V,180/000
							2	N,090/014
			L28 4.5Hz	Z1	0.42V/cm/sec	0.652	3	E,090/104
			L28 4.5Hz	Z2	"	"	4	V,180/000
			L28 4.5Hz	Z3	"	"	5	V,180/000
							6	V,180/000
186+2357 - 188+1807	REFTEK 72A-02	519	L22 2Hz	461	0.88V/cm/sec	0.7	1	V,180/000
							2	N,090/014
			L28 4.5Hz	Z1	0.42V/cm/sec	0.652	3	E,090/104
			L28 4.5Hz	Z2	"	"	4	V,180/000
			L28 4.5Hz	Z3	"	"	5	V,180/000
							6	V,180/000
189+0118 - 194+0135	REFTEK 72A-02	517	(Same configuration for seismometers as previous entry.)					
COMMENT: Both REFTEK units running under V2.46.								

The micro-array consisted of a central three component 2Hz geophone surrounded by three vertical 4.5Hz geophones at radial distances of 50m separated by 120°.

```

<----- DATA STREAM PARAMETERS ----->
ACQUISITION (UTC) STRM          SAMPLE TRIGR TRIGR STA LTA TRIGR DTRIGR MEAN LT
# START STOP NO. NAME INCLUD MAGN RATE TYPE CHANLS CHANLS WINDOW (sec) (sec) RATIO RATIO REMOVL HL
COMMENT: Summary below for REFTEK 519.
A 184+0318 184+0846 1 VEC 123 X128 200 EVT 1 2 0 0 .1 20 8 4 0 0
COMMENT STOP: RAM dump to disk @ 185+0349 (RAM full).
B 185+0405 185+0455 1 VEC 123 X128 200 CRS 456 .2 " 2 1.5 1000 "
2 ZZZ 456 X128 200 EVT 456 " 4 2 100 "
COMMENT STOP: RAM dump to disk @ 186+0235 (RAM full).
C 186+0245 186+0251 1 VECZZZ 123 X32 200 EVT 1456 3 " " " 8 " 10
456 X128 " " " " " " 10
- 186+0253 186+0517 " " " " " " " " " " 10
COMMENT START: Rock drop trigger @ 186+0259.
COMMENT STOP: RAM dump to disk @ 186+2320 (RAM full).
D 186+2357 187+0732 " " 123 X32 " " " " " 8 " "
456 X128
COMMENT START: Vertical component on L22 seismometer 460 dead; replaced with 461.
COMMENT STOP: RAM dump to disk @ 188+0324 (RAM full)
E 188+0336 188+1807 " " 123 X32 " " " " " " " "
456 X128
COMMENT START: Rock drop trigger @ 188+0350.
COMMENT STOP: RAM dump to tape @ 189+0149 (RAM full) in the lab.
COMMENT STOP: REFTEK instrument 519 replaced.

```

ACQUISITION (UTC)				DATA STREAM PARAMETERS															
#	START	STOP	STRM	NAME	CHNLS	INCLUD	MAGN	RATE	SAMPLE	TRIGR	TRIGR	MIN	TRIGR	STA	LTA	TRIGR	DTRIGR	MEAN	LT
			NO.							TYPE	CHANLS	CHANLS	WINDOW	(sec)	(sec)	RATIO	RATIO	REMOVL	HL
F	189+0118	189+2334	1	VECZZZ	123	X32	200	200	EVT	1456	3		.2	.2	20	8	2	10	ON
COMMENT: Summary below for REFTEK 517.																			
COMMENT START: Rock drop trigger @ 189+0125.																			
COMMENT STOP: RAM dump to disk @ 189+2337.																			
G	189+2346	190+0134	1	VEC	123	X32	"	"	"	1	1		"	"	"	2	1.5	100	"
COMMENT START: Rock drop trigger @ 189+2350.																			
COMMENT STOP: RAM dump to disk @ 190+1824 (RAM full).																			
H	190+1910	191+0028	1	VECZZZ	123	X32	200	200	EVT	1456	3		"	"	"	8	2	10	"
COMMENT START: Rock drop trigger @ 190+1915.																			
COMMENT STOP: RAM dump to disk @ 191+0028.																			
I	191+0037	191+2009	1	VECZZZ	123	X32	200	200	EVT	"	"		"	"	"	"	"	"	"
COMMENT START: Rock drop trigger @ 191+2009.																			
J	191+2012	192+0020	1	VECZZZ	123	X32	200	200	EVT	"	"		"	"	"	"	"	"	"
COMMENT START: RAM dump to disk @ 192+0027.																			
K	192+0037	192+0119	2	ZZZ500	456	X128	500	500	CRS	"	"		"	"	"	"	"	"	"
COMMENT START: Rock drop trigger @ 192+0041.																			
-	192+0123	192+1823	1	VECZZZ	123	X32	200	200	EVT	"	"		"	"	"	"	"	"	"
COMMENT START: RAM dump to disk @ 192+1823																			
L	192+1831	193+0101	"	"	123	X32	"	"	"	"	"		"	"	"	"	"	"	"
COMMENT STOP: RAM dump to disk @ 193+0101																			

ACQUISITION (UTC)			DATA STREAM PARAMETERS																	
#	START	STOP	STRM	NO.	NAME	CHANLS	INCLUD	MAGN	RATE	SAMPLE	TRIGR	TRIGR	MIN	TRIGR	STA	LTA	TRIGR	DTRIGR	MEAN	LT
M	193+0117	194+0030		1	VECZZZ	123	456	X32	200		EVT									
				2	ZZZ500	456	456	X128	500		CRS									
	Rock drop trigger @ 193+0120.																			
-	194+0114	194+0135		1	CHAN-ID	123	456	X32	200		EVT		1				16	4		
								X128												
	RAM dump to disk @ 194+0135																			
	END RECORD AR0 @ 194+0135 UTC																			

NOTE: Records N and O are described in the HUDDLE TEST table in the next section.

Station Summaries of the HUDDLE Test

HUDDLE TEST:

Location:

GPS (reference model WG584)

Latitude: 36° 49.74'N Longitude: 116° 16.26'W Elevation: 1160m

Raytheon Services Nevada (reference model Nevada plane coordinate system)

Latitude: 36° 49.72'N Longitude: 116° 16.22'W Elevation: 1159.68m

Directions:

Take Test Cell C road to Jackass Flats Road;

Left ≈0.1km to a very good gravel road just before the Jackass Flats Road curves to the right;

Left ≈0.1-0.2km along this road (look for a lone Joshua tree on your left);

The station is to the left off of the road walking in the direction of the water tower at Test Cell C (a 3 to 4 minute walk). The site is about 50 meters to the South of the lone Joshua tree (see accompanying pictures entitled AR0).

General geology:

Unconsolidated to moderately cemented flood plain deposits.

STATION SUMMARY:

STATION	OPERATION (UTC)	RECORDER	SN (HISTORY)	SEISMOMETER	SN	SENSITIVITY	DAMPING	CHANNEL	ORIENT. (GN)
ARY	194+0015 - 195+1602	MEQ800	619 (ARY)	L4C 1Hz	3884	-----	-----	1	V, 000/000
COMMENT: Instrument setup to record 24 hour translation.									
ARX	194+0102 - 195+1611	MEQ800	253 (MVR)	L4C 1Hz	2295	-----	-----	1	V, 000/000
COMMENT: Instrument setup to record 24 hour translation.									
AR0	194+0252 - 195+1127	REF 72A-02	517 (AR0)	L22 2Hz	461	0.88V/cm/sec	0.7	1	V, 180/000
								2	N, 090/013
								3	E, 090/103
				L28 4.5hz	Z1	0.42V/cm/sec	0.652	4	V, 180/000
				L28 4.5Hz	Z2	"	"	5	V, 180/000
				L28 4.5Hz	Z3	"	"	6	V, 180/000
COMMENT: REFTEK instrument running under V2.46 recording 6 channels. The three L28 seismometers were removed from their original configuration for the micro-array and reinstalled next to the L22 for the huddle test.									
AS0	194+0252 - 195+1604	REF 72A-02	519 (H50)	L22 2Hz	1507	0.88V/cm/sec	0.7	1	V, 180/000
								2	N, 090/002
								3	E, 090/092
COMMENT: REFTEK instrument running under V2.46 recording 3 channels.									
RA0	194+1805 - 195+1710	REF 72A-02	430 (---)	L22 2Hz	496	0.88V/cm/sec	0.7	1	V, 000/000?
								2	N, 090/002?
								3	E, 090/092?
COMMENT: REFTEK instrument running under V2.44 recording 3 channels. This is UNR's instrument.									

STATION SUMMARY: (continued)

<u>STATION</u>	<u>OPERATION (UTC)</u>	<u>RECORDER</u>	<u>SN (HISTORY)</u>	<u>SEISMOMETER</u>	<u>SN</u>	<u>SENSITIVITY</u>	<u>DAMPING</u>	<u>CHANNEL</u>	<u>ORIENT. (CN)</u>
ARA	194+0005 - 195+1558	Spring. DR200	199 (SPE)	S6000 2Hz	8772	1.2V/cm/sec	0.6	1	V, 000/000
								2	N, 090/181
								3	E, 090/091
ARB	194+0010 - 195+1601	"	262 (LAT) 177 (LAT)	S6000 2Hz	9258	1.2V/cm/sec	0.6	1	V, 000/000
								2	N, 090/182
								3	E, 090/092
ARC	194+0010 - 195+1605	"	264 (TOW)	S6000 2Hz	9257	1.2V/cm/sec	0.6	1	V, 000/000
								2	N, 090/183
								3	E, 090/093
ARD	194+0015 - 195+1607	"	269 (CAL)	L22 2Hz	339	0.99V/cm/sec	0.666	1	V, 180/000
								2	N, 090/182
								3	E, 090/272
ARE	194+0045 - 195+1610	"	177 (LSD) 202 (LSD) 276 (LSD) 184 (LSD)	S6000 2Hz	9255	1.2V/cm/sec	0.6	1	V, 000/000
								2	N, 090/184
								3	E, 090/094
ARF	194+0055 - 195+1613	"	272 (COM)	S6000 2Hz	8769	1.2V/cm/sec	0.6	1	V, 000/000
								2	N, 090/181
								3	E, 090/091
ARG	194+0103 - 195+1615	"	184 (LSD) 262 (SPW)	S6000 2Hz	8770	1.2V/cm/sec	0.6	1	V, 000/000
								2	N, 090/181
								3	E, 090/091
ARH	194+0108 - 195+1618	"	202 (JAC) 276 (JAC)	S6000 2Hz	8771	1.2V/cm/sec	0.6	1	V, 000/000
								2	N, 090/182
								3	E, 090/092

? indicates the polarities of the components are unknown.

The "HISTORY" heading above indicates which recording instrument was connected to this seismometer and at which station this combination was installed during the survey.

RECORD ON (UTC)				RECORD OFF (UTC)				FILTERS (Hz)			
TIME	CC	MC	TIME	CC	MC	GAIN	HI	LO	HI	LO	
COMMENT: Summary below for ARY.											
194+0015	C-11	9227	195+0122	C-18	9227	84db	5	10			
COMMENT: Rock drops @ 194+0056, 194+0256, 194+1807 and 194+1818.											
195+0137	R+15	"	195+1601	C+31	"	"	"	"			
COMMENT: Rock drop @ 195+0217, 195+1556, and 195+1557.											
COMMENT: Summary below for ARX.											
194+0102	R-4	9227	195+0145	C+41	9227	84db	5	10			
COMMENT: Rock drop @ 194+0256 at a gain of 90db.											
COMMENT: Rock drops @ 194+1807 and 194+1818.											
COMMENT: Time on this record is 1 minute fast; subtract 1 minute for the correct time.											
195+0205	R+8	"	195+1611	C+39	"	"	"	"			
COMMENT: Rock drop @ 195+0217, 195+1556, and 195+1557.											

<----- DATA STREAM PARAMETERS ----->																
ACQUISITION (UTC)		STRM	CHANLS	SAMPLE	TRIGR	TRIGR	MIN	TRIGR	STA	LTA	TRIGR	DTRIGR	MEAN	LTA		
#	START	STOP	NO.	NAME	INCLUD	MAGN	RATE	TYPE	CHANLS	CHANLS	WINDOW	(sec)	RATIO	REMOVL	HLD	
COMMENT: Summary below for AR0.																
N	194+0252	194+1708	1	HUDDLE	123	+32	200	EVT	1456	1	.2	.2	20	16	4	10
					456	+128										ON
COMMENT: Rock drop triggers @ 194+0256 and 194+1644.																
COMMENT STOP: RAM dump to disk @ 194+1713.																
O	194+1741	195+1127	"	"	123	+32	"	"	"	"	"	"	"	"	"	"
					456	+128										
COMMENT: Rock drop triggers @ 194+1801, 194+1807, 194+1818, and 195+0216.																
COMMENT STOP: RAM dump to disk @ 195+1612.																
COMMENT: Summary below for AS0.																
A	194+0252	194+1649	1	HUDDLE	123	+32	200	EVT	1	0	0	.2	20	16	4	10
																ON
COMMENT: Rock drop trigger @ 194+0256 and 194+1644.																
B	194+1739	195+1604	"	"	"	"	"	"	"	"	"	"	"	"	"	"
COMMENT: Rock drop triggers @ 194+1801, 194+1807, 194+1818, 195+0216, 195+1556, and 195+1557.																
COMMENT STOP: RAM dump to disk @ 195+1604.																
COMMENT: Summary below for RA0.																
A	194+1805	195+1710	1	HUDDLE	123	+8	100	EVT	1	1	0	.2	20	8	U	10
																ON
COMMENT: Rock drop triggers @ 194+1807, 194+1818, 195+0216, 195+1556, and 195+1557.																
COMMENT STOP: RAM dump to disk @ 195+1710.																

ACQUISITION (UTC)										<----- INSTRUMENT PARAMETERS ----->									
#	START	CC	MC	STOP	CC	MC	CHANLS	AMPF	ADC	FILTERS (Hz)	SAMPL	TRIGR	TRIGR	STA	LTA	TRIGR	LTA	TRIGR	LTA
COMMENT:							INCLUD	MAGN	GAIN	HI	LO	RATE	TYPE	CHANLS	LOGIC	(sec)	(sec)	RATIO	HLD
Summary below for AR.																			
A	194+0005	R0	9226	194+1647	C-2	9226	123	+10	Range	.2	50	200	EVT	1	Undf	.2	12.8	3db	OFF
B	194+1652	C-2	"	195+0122	C-5	"	"	"	"	"	"	"	"	"	"	"	"	"	"
C	195+0124	C-5	"	195+1558	C-7	"	"	"	"	"	"	"	"	"	"	"	"	"	"
COMMENT:																			
Summary below for ARB.																			
A	194+0010	R0	9226	194+1658	C-3	9226	123	+10	Range	.2	50	200	EVT	1	Undf	.2	12.8	3db	OFF
B	194+1700	C-3	"	195+0126	C-5	"	"	"	"	"	"	"	"	"	"	"	"	"	"
C	195+0129	C-5	"	195+1601	C-8	"	"	"	"	"	"	"	"	"	"	"	"	"	"
COMMENT:																			
Summary below for ARC.																			
A	194+0010	R0	9226	194+1703	C+4	9226	123	+10	Range	.2	50	200	EVT	1	Undf	.2	12.8	3db	OFF
B	194+1705	C+4	"	195+0134	C+5	"	"	"	"	"	"	"	"	"	"	"	"	"	"
C	195+0136	C+5	"	195+1605	C+10	"	"	"	"	"	"	"	"	"	"	"	"	"	"
COMMENT:																			
Summary below for ARD.																			
A	194+0015	R0	9226	194+1708	C-9	9226	123	+10	Range	.2	50	200	EVT	1	Undf	.2	12.8	3db	OFF
B	194+1710	C-9	"	195+0139	C-14	"	"	"	"	"	"	"	"	"	"	"	"	"	"
C	195+0140	C-14	"	195+1607	C-22	"	"	"	"	"	"	"	"	"	"	"	"	"	"
COMMENT:																			
Summary below for ARE.																			
A	194+0045	R0	9226	194+1713	C+5	9226	123	+10	Range	.2	50	200	EVT	1	Undf	.2	12.8	3db	OFF
B	194+1715	C+5	"	195+0144	C+7	"	"	"	"	"	"	"	"	"	"	"	"	"	"
C	195+0146	C+7	"	195+1610	C+11	"	"	"	"	"	"	"	"	"	"	"	"	"	"
COMMENT:																			
Summary below for ARF.																			
A	194+0055	R0	9226	194+1720	C+21	9226	123	+10	Range	.2	50	200	EVT	1	Undf	.2	12.8	3db	OFF
B	194+1725	C+21	"	195+0149	C+30	"	"	"	"	"	"	"	"	"	"	"	"	"	"
C	195+0150	C+30	"	195+1613	C+48	"	"	"	"	"	"	"	"	"	"	"	"	"	"
COMMENT:																			
Summary below for ARG.																			
A	194+0103	R0	9226	194+1728	C-2	9226	123	+10	Range	.2	50	200	EVT	1	Undf	.2	12.8	3db	OFF
B	194+1730	C-2	"	195+0154	C-1	"	"	"	"	"	"	"	"	"	"	"	"	"	"
C	195+0155	C-1	"	195+1615	C-2	"	"	"	"	"	"	"	"	"	"	"	"	"	"
COMMENT:																			
Summary below for ARH.																			
A	194+0108	R0	9226	194+1734	C-49	9226	123	+10	Range	.2	50	200	EVT	1	Undf	.2	12.8	3db	OFF
B	194+1735	C-49	"	195+0158	C-75	"	"	"	"	"	"	"	"	"	"	"	"	"	"
C	195+0200	C-75	"	195+1618	C-118	"	"	"	"	"	"	"	"	"	"	"	"	"	"
END HUDDLE TEST RECORDS @ 195+1710 UTC																			

END HUDDLE TEST RECORDS @ 195+1710 UTC

Appendix B

Clock Summary of the Master Clock Instruments

Clock Corrections (CC) for Master Clocks (MC)

<u>MC</u>	<u>Type</u>	<u>SN</u>	<u>Time of CC (UTC)</u>	<u>CC (sec)</u>	<u>Reference MC</u>
#GOE	GOES	----	Satellite link to UTC	R+0.044	UTC
#MC0	MCIII	15	92*181+18:05:00.00	R+0.000	#GOE
"	"	"	92*182+05:30:00.00	?	
			COMMENT: MC fuse was loose.		
"	"	"	92*182+16:33:00.00	R+0.000	#MC1
"	"	"	92*183+02:04:00.00	?	
			COMMENT: No CC measurement taken.		
"	"	"	92*183+02:05:00.00	R+0.000	#GOE
			COMMENT: MC corrected for leap second.		
"	"	"	92*183+23:56:00.00	C+0.005	"
			COMMENT: CC determined by GOES comparator.		
#MC1	TS400	9226	92*181+18:05:00.00	R+0.000	#GOE
"	"	"	92*183+01:55:00.00	C-0.018	"
			COMMENT: GOES reference late.		
"	"	"	92*183+02:00:00.00	R+0.000	"
			COMMENT: MC corrected for leap second.		
"	"	"	92*183+23:54:00.00	C+0.005	"
			COMMENT: GOES reference early.		
"	"	"	92*186+14:30:00.00	C-0.005	"
"	"	"	92*187+14:30:00.00	C-0.015	"
"	"	"	92*187+14:31:00.00	R+0.000	"
"	"	"	92*188+14:58:00.00	C-0.007	"
"	"	"	92*189+16:19:00.00	C-0.020	"
"	"	"	92*189+16:20:00.00	R-0.003	"
"	"	"	92*190+16:48:00.00	C-0.014	"
"	"	"	92*190+16:49:00.00	R+0.002	"
"	"	"	92*191+15:32:00.00	C-0.004	"
"	"	"	92*192+16:05:00.00	C-0.020	"
"	"	"	92*192+16:06:00.00	R-0.003	"
"	"	"	92*193+13:00:00.00	C+0.000	"
"	"	"	92*194+14:52:00.00	C+0.007	"
"	"	"	92*195+15:11:00.00	C+0.012	"

Clock Corrections (CC) for Master Clocks (MC) -- continued

<u>MC</u>	<u>Type</u>	<u>SN</u>	<u>Time of CC (UTC)</u>	<u>CC (sec)</u>	<u>Reference MC</u>
#MC2	TS400	9227	92*182+16:33:00.00	R+0.013	#MC1
"	"	"	92*183+01:50:00.00	C-0.003	#GOE
<hr/>					
"	"	"	92*183+01:55:00.00	R+0.015	"
COMMENT: MC corrected for leap second.					
"	"	"	92*184+04:10:00.00	C+0.036	"
<hr/>					
"	"	"	92*184+04:11:00.00	R+0.002	"
"	"	"	92*185+16:05:00.00	C+0.026	"
<hr/>					
"	"	"	92*185+16:06:00.00	R+0.009	"
"	"	"	92*186+14:39:00.00	C+0.025	"
<hr/>					
"	"	"	92*186+14:41:00.00	R+0.009	"
"	"	"	92*187+23:45:00.00	C+0.019	"
"	"	"	92*188+14:33:00.00	C+0.031	"
<hr/>					
"	"	"	92*188+14:37:00.00	R-0.003	"
"	"	"	92*188+14:45:00.00	C-0.006	"
"	"	"	92*189+03:08:00.00	C+0.010	"
"	"	"	92*189+13:23:00.00	C+0.018	"
"	"	"	92*190+13:11:00.00	C+0.038	"
<hr/>					
"	"	"	92*190+13:14:00.00	R+0.004	"
"	"	"	92*191+12:57:00.00	C+0.022	"
"	"	"	92*192+13:34:00.00	C-0.005	"
<hr/>					
"	"	"	92*192+13:35:00.00	R+0.012	"
"	"	"	92*192+15:25:00.00	?	"
COMMENT: Time corrupted (see TPP @ 192+1530).					
"	"	"	92*192+18:14:00.00	C+0.062	"
<hr/>					
"	"	"	92*192+18:15:00.00	R+0.012	"
"	"	"	92*193+03:19:00.00	C+0.020	"
"	"	"	92*193+12:59:00.00	C+0.028	"
"	"	"	92*194+03:32:00.00	C+0.048	"
"	"	"	92*194+14:56:00.00	C+0.050	"
<hr/>					
"	"	"	92*194+14:57:00.00	R+0.017	"
"	"	"	92*195+15:12:00.00	C+0.036	"
<hr/>					
"	"	"	92*195+15:13:00.00	R+0.003	"
"	"	"	92*195+18:31:00.00	C+0.005	"

Clock Corrections (CC) for Master Clocks (MC) -- continued

<u>MC</u>	<u>Type</u>	<u>SN</u>	<u>Time of CC (UTC)</u>	<u>CC (sec)</u>	<u>Reference MC</u>
#MC3	TS400	9523	92*182+16:33:00.00	R+0.003	#MC1
"	"	"	92*183+01:47:00.00	C-0.010	#GOE
"	"	"	92*183+02:06:00.00	R+0.008	"
"	"	"	COMMENT: MC corrected for leap second.		
"	"	"	92*184+04:03:00.00	C+0.034	"
"	"	"	92*184+04:05:00.00	R+0.016	"
"	"	"	92*185+16:08:00.00	C+0.046	"
"	"	"	92*185+16:10:00.00	R+0.013	"
"	"	"	92*187+14:30:00.00	C+0.014?	"
"	"	"	COMMENT: Discovered low charge on MC's battery		
"	"	"	COMMENT: while servicing station MVR.		
"	"	"	COMMENT: (see MVR @ 187+2245).		
"	"	"	92*187+23:22:00.00	C+13.039	#MC2
"	"	"	COMMENT: CC after MC lost its charge.		
"	"	"	92*189+02:46:00.00	C+12.933	"
"	"	"	COMMENT: CC after MC charged for 24 hours.		
"	"	"	92*189+03:15:00.00	R+0.014	#GOE
"	"	"	92*190+01:09:00.00	C+0.032	"
"	"	"	92*190+01:10:00.00	R+0.015	"
"	"	"	92*191+01:13:00.00	C+0.035	"
"	"	"	92*191+01:14:00.00	R+0.002	"
"	"	"	92*192+01:00:00.00	C+0.022	"
"	"	"	92*192+01:01:00.00	R+0.006	"
"	"	"	92*193+03:16:00.00	C+0.029	"
"	"	"	92*194+03:27:00.00	C+0.051	"
"	"	"	92*194+03:31:00.00	R+0.002	"

Appendix C

Copy of the Tape Labels (field logs) for DR200 Instruments

Tape labels compiled during the survey	page 54
Tape labels compiled during the HUDDLE test	page 62

ON 92 183 22 36 0 ms *corrected for tape speed*
OFF 187 21 57+14.5 ms *TAPE - no records degaussed*
STACAL # B DR 269 JUG 0339-L22 *TR 2 EV 22*
X100

CERTIFIED MAGNETIC INFORMATION SYSTEMS WITHOUT BOT AND EOT MARKERS
ERROR FREE 431 DIGITAL CASSETTE ANSI/ECMA/ISO 300 feet

RC ON 92 186 22 20 0.0 ms *TR 4 EV 61*
OFF 187 21 57+14.5 ms *TRIG'D OUT*
STACAL # E DR 269 JUG 0339

Side
A

ON 92 187 22 02 0.0 ms *TR 2 EV 29*
OFF 190 18 28+14.4 ms
STACAL # F DR 269 JUG 0339-L22
2, 12, 8, X100

CERTIFIED MAGNETIC INFORMATION SYSTEMS WITHOUT BOT AND EOT MARKERS
ERROR FREE 431 DIGITAL CASSETTE ANSI/ECMA/ISO 300 feet

ON 92 187 22 02 0.0 ms
OFF 190 18 28+14.4 ms
STACAL # F DR 269 JUG 0339-L22

Side
A

Reset to
vert. pos. ON 92 185 17 25 0.0 ms *TR 3 EV 42*
Reset time OFF 186 22 16+0.7 ms
STACAL # D DR 269 JUG 0339-L22

RC ON 92 190 18 30 0.0 ms *TR 1 EV 10*
OFF 192 16 38+14.7 ms
STACAL # G DR 269 JUG 0339-L22

Side
A

RC ON 92 192 16 40 0.0 ms *TR 1 EV 7*
OFF 193 21 27+16.0 ms
STACAL # H DR 269 JUG 0339-L22

Side
A

T 300NH

Certified by
Verbatim Corporation

ON 92 182 03 33 ms *territory 5.420*
OFF 182 01 04 -45.6 ms *5 km 11 Mtn*
STACOM # A DR 272 JUG 8769 *26 EV no EN 126 EV TR2*

RC ON 92 186 17 25 0.0 ms *TR 2 EV 30*
OFF 187 23 03 -33.4 ms
STACOM # F DR 272 JUG 8769

Side
A

H3

T 300NH

Certified by
Verbatim Corporation

ON 92 182 01 05 -45.6 ms *5 km 11 Mtn*
OFF 183 16 59 -58 ms *not corrected for lamp second*
STACOM # B DR 272 JUG 8769 *171 17 EV*

RC ON 92 187 23 15 +0.2 ms *TR 3 EV 39*
OFF 189 22 26 -78.2 ms
STACOM # G DR 272 JUG 8769

Side
A

H3

Cert
Verbatim

ON 92 183 17 00 0 ms *corrected for lamp sec*
OFF 184 16 25 ms
STACOM # C DR 272 JUG 8769 *TR 1 EV 11*

RC ON 92 185 22 30 +1.9 ms *TR 3 EV 35*
OFF 191 22 15 -64.2 ms
STACOM # H DR 272 JUG 8769

Side
A

H3

Cert
Verbatim

ON 92 184 16 25 15 ms *TR 1 EV 11*
OFF 185 16 07 -13.7 ms *6 dB*
STACOM # D DR 272 JUG 8769 *2, 12.8, x10*

ON 92 191 22 20 +25.6 ms *TR 1 EV 13*
OFF 192 21 58 -5.0 ms
STACOM # I DR 272 JUG 8769

Side
A

H3

Cert
Verbatim

ON 92 185 16 08 00 ms *TR 2 EV 26*
OFF 186 16 46 -41.9 ms
STACOM # E DR 272 JUG 8769

ON 92 192 22 00 -5.0 ms *TR 1 EV 7*
OFF 193 15 41 -26.1 ms
STACOM # J DR 272 JUG 8769

H3

Cert
Verbatim

ON 92 182 22 02 -01 ms Jack 255 P/125
OFF 183 19 18 +86 ms not connected for loop sec
STA JAC # A DR 202 JUG 8771 TR 2 16 EV

H 2

Certified by
Verbatim Corporation

RC ON 92 185 19 15 ms TR 2 16 EV 19
OFF 186 20 43 +63.2 ms 247 JAC P/125
STA JAC # D DR 202 JUG 8771

Side
A

H

ON 92 183 19 20 0 ms connected for loop sec
OFF 184 20 00 ms
STA JAC # B DR 202 JUG 8771 TR 1 EV 2

Side
A

T 300NH

Certified by
Verbatim Corporation

RC ON 92 187 19 48 0.0 ms TR ? EV P
OFF 188 23 16 -34.6 ms
STA JAC # E DR 276 JUG 8771

Side
A

H 2

ON 92 184 20 17 15 ms TR 2 EV 17
OFF 185 19 09 ms
STA JAC # C DR 202 JUG 8771 Jack 255 P/125

Side
A

T 300NH

Certified by
Verbatim Corporation

RC ON 92 190 20 16 +0.1 ms TR 1 EV 14
OFF 191 18 06 +58.7 ms not for loop sec
STA JAC # F DR 202 JUG 8771

ON 92 191 18 10 +0.1 ms TR 1 EV 5
OFF 193 18 42 +64.9 ms
STA JAC # G DR 202 JUG 8771

ON 92 186 21 07-21.9 ms TR1 EV 13
OFF 187 17 09-27.2 ms
STALAT # F DR 177 JUG 9258

T 300NH

Certified by
Verbatim Corporation

ON 92 182 02 44 2 ms No of 2 through 44-43-36
OFF 182 22 51-28 ms 50 Repetitions
STALAT # A DR 177 JUG 9258 10059596100
Found Entry in base 1.116 Serial No. TR117EV

T 300NH

Certified by
Verbatim Corporation

ON 92 187 19 10-27.3 ms TR1 EV 9
OFF 188 11 25-44.0 ms
STALAT # E DR 177 JUG 9258

ON 92 183 20 03-20 ms 10059596100
OFF 183 20 03-20 ms 10059596100
STALAT # B DR 177 JUG 9258 10059596100

ON 92 188 19 25-44.0 ms TR1 EV 4
OFF 189 18 26-54.7 ms
STALAT # H DR 177 JUG 9258

ON 92 183 20 05 0 ms 10059596100
OFF 183 20 05 0 ms 10059596100
STALAT # C DR 177 JUG 9258 TR1 EV 7

T 300NH

Certified by
Verbatim Corporation

RC ON 92 189 22 42.0 ms TR 2 EV 27
OFF 190 12 35-51 ms
STALAT # I DR 262 JUG 9258

ON 92 185 19 51 12 ms TR 1 EV 17
OFF 185 19 51 12 ms -73.4 ms
STALAT # D DR 177 JUG 9258 2,12,8,10
DATE WRONG ON TAPE

T 300NH

Certified by
Verbatim Corporation

RC ON 92 191 18 40-0.2 ms TR 1 EV 11
OFF 192 20 30-1.7 ms
STALAT # J DR 262 JUG 9258

RC ON 92 185 20 07 0.0 ms TR 2 EV 17
OFF 185 21 05-21.3 ms
STALAT # E DR 177 JUG 9258

RC ON 92 192 20 32-0.3 ms TR 1 EV 12
OFF 193 19 15-41 ms
STALAT # K DR 262 JUG 9258

Tape D's label is difficult to read for the "ON" entry: ON 92 185 02 AS ms.

RC ON 92 187 18 00.0.0 TR 1 EV 48
OFF 189 00 35 +74.7 ms
STA LSD # F DR 202 JUG 9255

ON 92 183 21 07 +9 ms permanent site
OFF 183 21 07 +9 ms not corrected for loop around
STA LSD # A DR 164 JUG 7255
X100 161 EV TR 4

RC ON 92 189 19 50 +252 TR 2 EV 25
OFF 190 21 46 +18.2 ms
STA LSD # F DR 202 JUG 9255

ON 92 183 21 10 0 concatenated loop around
OFF 185 03 42 ms TR 2 EV 16
STA LSD # B DR 164 JUG 9255

T 300NH

Certified by
Verbatim Corporation

ON 92 190 21 48 +18.2 TR 3 EV 36
OFF 191 17 22 +40 ms
STA LSD # G DR 177 JUG 9255

ON 92 185 21 52 ms
OFF 185 21 52 ms
STA LSD # C DR 164 JUG 9255
2, 12.8, X10

T 300NH

Certified by
Verbatim Corporation

ON 92 191 17 25 +4.0 TR 2 EV 23
OFF 192 19 14 -7.5 ms
STA LSD # H DR 177 JUG 9255

RC ON 92 185 22 15 00 TR ? EV ?
OFF 186 18 23 ms
STA LSD # D DR 276 JUG 9255

T 300NH

Certified by
Verbatim Corporation

ON 92 192 19 14 -7.5 ms TR 2 EV 23
OFF 193 17 52 -15.2 ms
STA LSD # I DR 177 JUG 9255

Tapes A, B and C are annotated with the wrong jug (seismometer) serial number of 164. The serial number is 184. Tape F is annotated with the wrong jug serial number of 174. It is 202. See the station summary listing for LSD.

ON 92 182 19 16 0 ms *Specter Range Eng*
OFF 183 15 12 +30 ms *not connected for long sec*
STASPE # A DR 199 JUG 8772 TR4 | 37EV

H 300

Certified by
Verbatim Corporation

RC ON 92 186 15 40 -0.1 ms TR1 | EV11
OFF 188 01 19 +5.5 ms
STASPE # E DR 199 JUG 8772

T 300NH

Certified by
Verbatim Corporation

Side
A

ON 92 183 15 13 0 ms *connected for long sec*
OFF 184 02 11 7 ms *Dr least increased*
STASPE # B DR 199 JUG 8772

5EV | TR1

CERTIFIED MAGNETIC INFORMATION SYSTEMS WITHOUT BOT AND EOT MARKERS
431 DIGITAL CASSETTE ANSI/ECMA/ISO 300 feet

ON 92 188 01 20 -0.1 ms TR1 | EV 7
OFF 188 20 45 -2.5 ms
STASPE # F DR 199 JUG 8772

Side
A

ON 92 184 02 11 0 ms TR1 | EV15
OFF 185 15 19 -3.3 ms *328 C4243*
STASPE # C DR 199 JUG 8772 *92B CH1 x10*

Side
A

T 300NH

Certified by
Verbatim Corporation

RC ON 92 188 20 48 +0.1 ms TR1 | EV
OFF 191 22 47 +4.1 ms *var +1.7 603*
STASPE # G DR 199 JUG 8772

Side
A

T 300NH

Certified by
Verbatim Corporation

ON 92 185 15 20 0 ms TR1 | EV 14
OFF 186 15 33 -7.7 ms
STASPE # D DR 199 JUG 8772

Side
A

T 300NH

Certified by
Verbatim Corporation

RC ON 92 191 22 55 -0.2 ms TR1 | EV 10
OFF 193 14 20 +2.7 ms
STASPE # H DR 199 JUG 8772

ON 92 182 17 12 0 ms Nul of Spoken Code
OFF 183 15 48 +21 ms (only) near Turtle Circles
STAS PW # A DR 262 JUG 8770 X100
Internal But - 12.3 sec - 11.5V off
TR4 | 65EV

H

Verbatim

ON 92 185 15 47 0 ms TR 2 EV 27
OFF 186 16 10 -8.1 ms
STAS PW # D DR 262 JUG 8770

Side
A

T 300NH

Certified by
Verbatim Corporation

ON 92 183 16 30 0 ms External Bats only
OFF 184 15 55 ms Internal Bats (see by 800 L)
STAS PW # B DR 262 JUG 8770 X10
TR 1 | 65EV 13

H

Verbatim

ON 92 186 16 22 +0.2 ms TR 1 EV 14
OFF 188 00 37 +6.0 ms
STAS PW # E DR 262 JUG 8770

Side
A

T 300NH

Certified by
Verbatim Corporation

ON 92 184 15 55 0.5 ms TR 2 EV 20
OFF 185 15 46 -2.4 ms
STAS PW # C DR 262 JUG 8770 2 128 X10

Side
A

T 300NH

Certified by
Verbatim Corporation

RC ON 92 188 00 40 -0.1 ms TR 1 EV 9
OFF 188 20 17 -2.8 ms
STAS PW # F DR 262 JUG 8770

Side
A

Date did
not increment ON 92 188 20 18 -0.1 ms TR 1 EV 2
OFF 189 22 34 -3.7 ms vert. trig CDB
STAS PW # G DR 262 JUG 8770

ON 92 182 04 34-0.7 ms *Pen on top of bit with*
OFF 182 21 17-1.2 ms *tower*
STATOW # A DR 264 JUG 9257 TR2/16EV

Side
A

T 300NH

Certified by
Verbatim Corporation

ON 92 185 18 35-0.0 ms TR2/16EV
OFF 186 23 05-23.4 ms
STATOW # E DR 264 JUG 9257

Side
A

T 300NH

Certified by
Verbatim Corporation

ON 92 182 21 20-1.2 ms
OFF 183 18 40-1.4 ms *not connected for key sound*
STATOW # B DR 264 JUG 9257 TR-2/13EV

ON 92 186 23 10-0.0 ms TR1/11EV
OFF 187 20 30-37 ms
STATOW # E DR 264 JUG 9257

Side
A

H 300NH

Certified by
Verbatim Corporation

NH

ON 92 183 18 42-1.4 ms
OFF 187 18 53 ms
STATOW # C DR 264 JUG 9257 TR-1/11EV-9

Side
A

T 300NH

Certified by
Verbatim Corporation

RC ON 92 187 20 32-0.0 ms TR1/11EV10
OFF 188 18 42-11.6 ms
STATOW # G DR 264 JUG 9257

Side
A

H

ON 92 184 18 55-1.5 ms TR1/11EV11
OFF 185 18 35 ms *-349.7*
STATOW # D DR 264 JUG 9257, 2, 12, 8, 10

RC ON 92 188 18 45-0.0 ms TR2/11EV21
OFF 191 16 35-16.9 ms *Var. to 19.640*
STATOW # H DR 264 JUG 9257

H 300NH

Certified by
Verbatim Corporation

ON 92 191 16 38-0.1 ms TR2/11EV14
OFF 193 19 59-6.4 ms
STATOW # I DR 264 JUG 9257

RC ON 92 194 00 05 +0.1 TRI EV6
OFF 194 16 47 +2.9 MS HUDBLE TEST
STAARA # A DR 199 JUG 8772

ON 92 194 16 52 +2.4 MS TRI SEV
OFF 195 01 22 +4.6 MS HUDBLE TEST
STAARA # B DR 199 JUG 8772

Side
A

T 300NH

Certified by
Verbatim Corporation

ON 92 195 01 24 +4.6 MS TR 2 EV 5
OFF 195 15 58 +6.6 MS HUDBLE TEST
STAARA # C DR 199 JUG 8772

rc ON 92 194 00 10 0.0 ms TRI/EV8
OFF 194 16 58+3.0 ms HUDDLE TEST
STAARB # A DR 262 JUG 9258

Side

A

T 300NH

Certified by
Verbatim Corporation

NO
DATE
INCREASING

ON 92 194 17 00+3.0 ms TRI/EV9
OFF 195 01 26+5.1 ms HUDDLE TEST
STAARB # B DR 262 JUG 9258

DATE ON
HEADER
WRONG

ON 92 195 01 29+5.1 ms TRI/EV12
OFF 195 16 01+7.8 ms HUDDLE TEST
STAARB # C DR 262 JUG 9258

Side

A

T 300NH

Certified by
Verbatim Corporation

RC ON 92 194 00 10 +0.1 ms TR1/5V5
OFF 194 17 03 -4.5 ms BUDDLE TEST
STA ARC # A DR 264 JUG 9257

ON 92 194 17 05 -4.5 ms TR1/5V6
OFF 195 01 34 -5.4 ms BUDDLE TEST
STA ARC # B DR 264 JUG 9257

ON 92 195 01 36 -5.4 ms TR1/5V6
OFF 195 16 05 -9.6 ms BUDDLE TEST
STA ARC # C DR 264 JUG 9257

CERTIFIED
ERROR
FREE
431

MAGNETIC INFORMATION
SYSTEMS
DIGITAL CASSETTE ANSI/ECMA/ISO

WITHOUT
BOT AND EOT
MARKERS
300 feet

RC ON 92 194 00 15 0.0 TRI EV 4
 OFF 194 17 08 +8.9 HUDDLE TEST
 STARD # A DR 269 JUG 0328 L22

DATE DID NOT INCREASE ON 92 194 17 10 +8.9 TRI EV 8
 OFF 195 01 39 +13.8 HUDDLE TEST
 STARD # B DR 269 JUG 0338 L22

DATE ON HEAD-R IS WRONG ON 92 195 01 40 +13.8 TRI EV 4
 OFF 195 16 07 +21.9 HUDDLE TEST
 STARD # C DR 269 JUG 0338 L22

The jug (seismometer) serial number of 338 is wrong. The serial number is 339. See the HUDDLE test station summary listing for station ARD.

RC ON 92 194 00 45 0.0 ms TRI EV4
OFF 194 17 13 -4.6 ms HUDDLE TEST
STARE # A DR 177 JUG 9255

ON 92 194 17 15 -4.6 ms TRI EV5
OFF 195 01 44 -6.9 ms HUDDLE TEST
STARE # B DR 177 JUG 9255

ON 92 195 01 46 -6.5 ms TRI EV5
OFF 195 16 10 -10.7 ms HUDDLE TEST
STARE # C DR 177 JUG 9255

Side
A

T 300NH

Certified by
Verbatim Corporation

RC ON 92 194 00 55 0.0 ms TRI EV4
OFF 194 17 20 -21.0 ms HUDDLE TEST
STARRF # A DR 272 JUG 8769

Side
A

T 300NH

Certified by
Verbatim Corporation

ON 92 194 17 25 -21.0 ms TRI GVC
OFF 195 01 49 -29.8 ms HUDDLE TEST
STARRF # B DR 272 JUG 8769

ON 92 195 01 50 -29.8 ms TRI GVC
OFF 195 16 13 -48.4 ms
STARRF # C DR 272 JUG 8769

Side
A

T 300NH

Certified by
Verbatim Corporation

RC ON 92 194 01 03 +0.2 ms TRI EV1
OFF 194 17 28 +1.7 ms HUDDLE TEST
STA ARG # A DR 184 JUC 8770

ON 92 194 17 30 +1.7 ms TRI EV3
OFF 195 01 54 +0.6 ms HUDDLE TEST
STA ARG # B DR 184 JUC 8770

ON 92 195 01 55 +0.6 ms TRI EV2
OFF 195 16 15 +2.2 ms HUDDLE TEST
STA ARG # C DR 184 JUC 8770

ON 92 194 01 08+0.1 ms TR 1 EV 4
OFF 194 17 34+49.1 ms HUDDLE TEST
STARH # A DR 202 JUG 8771

H

Verba

ON 92 194 17 35+49.1 ms TR 1 EV 5
OFF 195 01 58+74.8 ms HUDDLE TEST
STARH # B DR 202 JUG 8771

H

Verba

ON 92 195 02 00+74.8 ms TR 1 EV 4
OFF 195 16 18+117.8 ms HUDDLE TEST
STARH # C DR 202 JUG 8771

H

Verba

Appendix D

Photographs of the Station Installations in alphabetical order

NOTE: The photograph of station AR0 is also the site of station ARY and the site of the HUDDLE test.

Station: **ARO**

Instrumentation at site. This is also the site of MEQ800 station ARY and of the HUDDLE test.

View to the east-northeast across northern Jackass Flats to Lookout Peak (background; center). Note the lone Joshua tree mentioned in the site directions and, behind it, the southward sloping ridge of Kiwi Mwesa.

View to the south across Jackass Flats to Little Skull Mountain.

Station: **CAL**

Instrumentation at site.

View to the north-northwest overlooking the rhyolite outcrop described in the site directions/geology.

View to the south-southeast overlooking the rhyolite outcrop. Skull Mtn. is in the far background on the right.

Station: **CL0**

Instrumentation at site. This site is being prepared for a permanent digital installation.

View to the north along crest of hill mentioned in the site directions towards Calico Hills.

View to the south overlooking Jackass Flats with Busted Butte on the right.

Station: **COM**

Instrumentation at site.

View to the north of the southern tip of Skull Mtn. The vehicles are parked at bottom of the third dip described in the site directions.

View to the south-southeast overlooking Rock Valley. Specter Range is in the background on the upper right.

Station: **H50**

Instrumentation at site. We colocated our instruments with Water Resources' H5 well on top of Yucca Mtn. The site is on the north side of Yucca Mtn. ridge.

View to the east-southeast across Jackass Flats to Skull Mtn. (background; right of the antenna).

View to the south along the ridge of Yucca Mtn. The water well is just right of the person and the seismometer is located in between.

Station: **JAC**
(not TAC)

Instrumentation at site.

View to the west-northwest with Busted Butte on the left beyond the telephone lines mentioned in the site directions. The low flat ridge in the background is the ridge of Yucca Mountain.

View to the east-southeast across Amargosa Desert to Little Skull Mtn. prominently sloping northward in the background.

Station: **LAT**

Instrumentation at site.

View to the north-northeast across northeastern Amargosa Desert with Little Skull Mtn. in the background behind the person. Note the USGS benchmark (foreground; left) mentioned in the site directions.

View to the east-southeast across eastern Amargosa Desert with Striped Hills in the background just left of the person.

Station: **LSD**

Instrumentation at site. The station is located on top of Little Skull Mountain. This site is being prepared for a permanent digital installation.

View to the north-northeast across Jackass Flats with Lookout Peak (background; center) beyond the tower.

View to the south across the flat area mentioned in the site directions.

Station: **MVR**

Instrumentation at site.

View to the southwest across Jackass Flats with the domed structures of Test Cell C faintly visible in the middle on the horizon.

View to the east-southeast of the embankment (just below vehicle) mentioned in the site directions and of the northwestern slopes of Kiwi Mesa.

Station: **SLS**

Instrumentation at site.

View to the north of the south flank of Little Skull Mountain.

View to the south-southwest along the western edge of the Specter Range. Rock Valley is on the east side of the hills in the photograph.

Station: **SPE**

Instrumentation at site.

View to the west overlooking western edge of Mercury Valley towards Specter Mountain (tallest peak) in the Specter Range.

View similar to the photograph above but a little more angled north.

Station: **SPW**

Instrumentation at site.

View to the north overlooking Rock Valley towards Skull Mt. The vehicles are parked at the backed side of the circle mentioned in site directions.

View to the south up to the top of the hill. The instrument is located where the person is crouching.

Station: **TCT**

Instrumentation at site.

View to the east-southeast of the northwestern flank of Skull Mtn. The seismometer is to the right of the person about 3 to 4 meters.

View to the west-southwest across Jackass Flats with the Training Center buildings on the right. The vehicle is at the edge of the circle mentioned in the site directions.

Station: **TOW**

Instrumentation at site. This site is being prepared for a permanent digital installation.

View to the north across western Jackass Flats to Calico Hills. The rectangular boxes are the future vaults for the permanent digital installation.

View to the south-southeast over the top of this hill. In the background to the right of the tower, is Little Skull Mtn. and, to the left, is Skull Mtn.

Station: **TPP**

Instrumentation at site.

View to the west of Skull Mountain (background; center and right) and Little Skull Mountain (background; left).

View to the south-southeast back towards the vehicles parked near the dry stream bed mentioned in the site directions.

Station: **TWR**

Instrumentation at site.

View to the north-northwest of Bren Tower, the domed structures of Test Cell C behind the tower, Calico Hills (background; far left), and Shoshone Mtn. beyond.

View to the east-southeast of the southwestern flank of Skull Mountain.

Appendix E

Examples of Digital Waveforms

From Two Events:

(190) 08-JUL-1992 04:34

(193) 11-JUL-1992 04:09

Seconds

92 * 193 + 04 : 09 : 07 . 486

Appendix F

Examples of Analog Records from the MEQ800 Instruments

From Two Events:

(190) 08-JUL-1992 04:34

(193) 11-JUL-1992 04:09

TPP 92 * 193 + 04:09 :10.6

TCT 92 * 193 + 04:09 :10.9

MVR 92 * 193 + 04:09 :11.1