DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

REPORT FOR BOREHOLE EXPLOSION DATA ACQUIRED IN THE 1999 LOS ANGELES REGION SEISMIC EXPERIMENT (LARSE II), SOUTHERN CALIFORNIA: Part II Data Tables and Plots

BY

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INTRODUCTION

The Los Angeles Region Seismic Experiment (LARSE), a joint project of the U.S. Geological Survey (USGS) and the Southern California Earthquake Center (SCEC), was conducted to produce seismic images of the subsurface in the Los Angeles region. Primary targets were major fault systems and sedimentary basins; the goal of the project was to address the earthquake hazard posed by these geologic features. The first phase of data collection (LARSE 1) was completed in 1994; the second phase (LARSE 2) was completed in 1999. A description of the 1999 survey and an overview of both phase I and II is given in Fuis and others (2001). In this report, we present the technical details for the explosion data collected in 1999.

EXPERIMENT DESIGN

The 1999 survey consisted of a 150-km-long low-fold reflection/refraction profile (line 2), 3 short refraction lines that cross line 2 in the San Fernando Valley (lines 3000, 4000, and 5000), and 2 auxiliary lines in the Santa Monica area (lines 6000 and 7000) (Fig 1; see Fig 2 in Fuis and others, 2001). In addition, a continuous recording array, 2.7-km in diameter, was located in Santa Monica (see Fig 3 in Fuis and others, 2001). The route for the line 2 profile was roughly north-south extending from Santa Monica Bay to the southern Sierra Nevada Mountains 150 kilometers north of the coast. Names given to both shotpoints and receivers have the distance from the coast encrypted into the location number. The 3000 line extended 12 kilometers along the Los Angeles river in southern San Fernando Valley. In the northern San Fernando Valley, the 4000 line extended (just north of Devonshire Blvd) east from Chatsworth park to Hanson Dam and the 5000 line ran between Hanson Dam and Mission Peak, crossing the Bouguer gravity low centered on the Van Norman Debris Basin. The 6000 and 7000 lines ran northwest-southeast through Santa Monica. They were designed to investigate the exaggerated shaking that

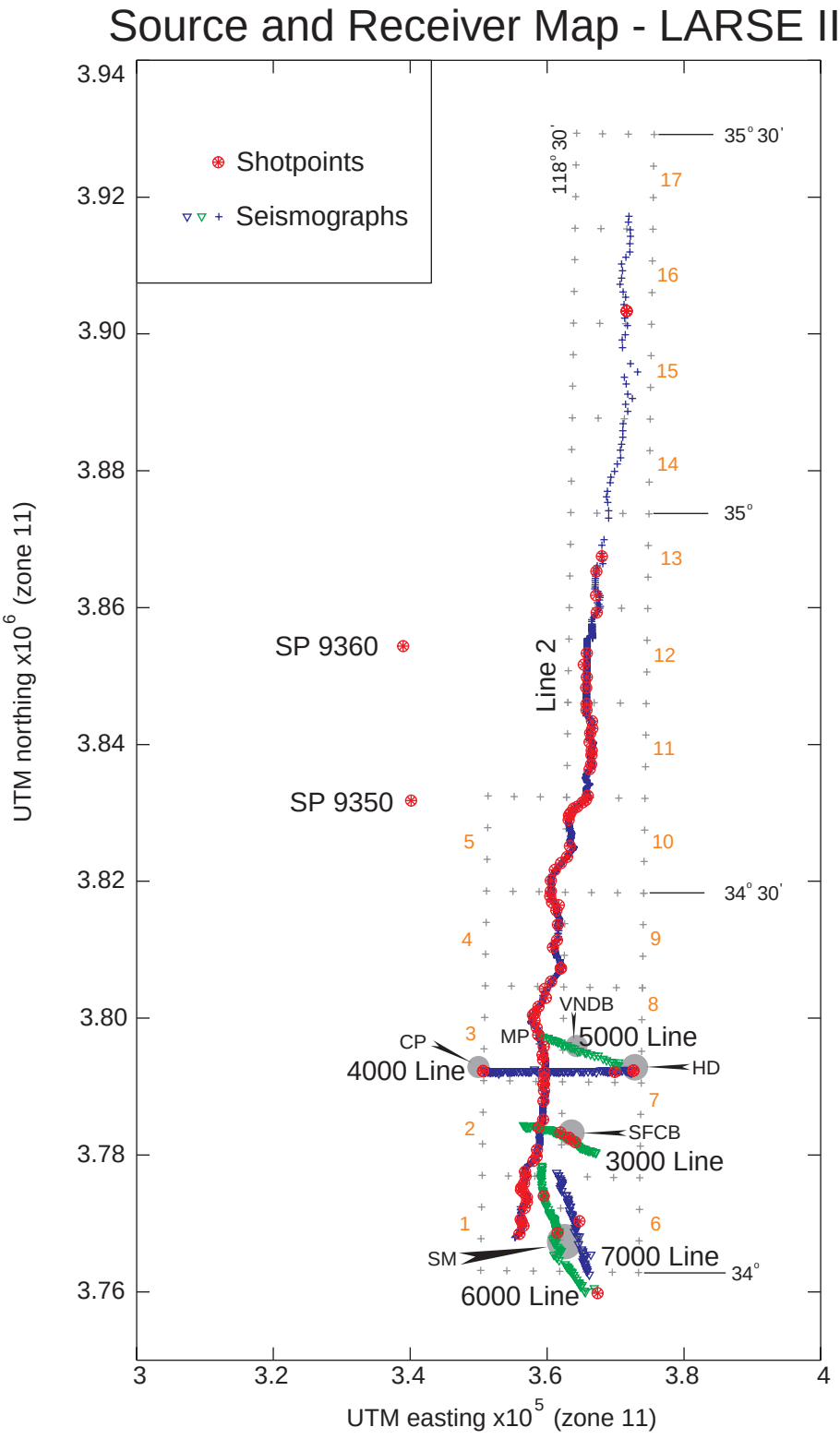

Figure 1. Map of Los Angeles region showing LARSE phase 2 lines. Gray tic marks are 2.5 degree tics along boundaries of USGS 7.5 minute serries (Topographic) maps. Orange numbers indicate map name as listed in Table 1. Abbreviations: CP, Chatsworth park; MP, Mission Peak; VNDB, Van Norman Debris Basin; HD, Hanson Dam; SFCB, Sepulveda Flood Control Basin; SM, Santa Monica.

occurred there during the 1994 M 6.7 Northridge earthquake; the 6000 line was deployed through the region of maximum damage and the 7000 line was deployed east of the damage zone. Two shotpoints (9350 and 9360) were located at distances that produced critical reflections from the Moho along an azimuth similar to the azimuth of damaging waves from the Northridge earthquake. The continuous recording array was centered on the 6000 line.

SHOTPOINTS

Four-digit numbers (8020-9370) were assigned to shotpoints. On line 2, shotpoint numbers began with 8020 near the coast and incremented northward ending with 9136 in the southern Sierra Nevada. Seventy-eight shotpoints are located along the line, spaced, on average, 1.2 km apart from 0-79 km north of the coast and 2.75 km apart from 79-101 km north of the coast. A single shotpoint completed the source array at 136 km north of the coast. Shotpoint numbers 8020-8990 indicate, in the second and third digits, the approximate distance to the coast and, shotpoint numbers 9110-9136 indicate the approximate distance to the coast in the second, third, and fourth digits. For example, two shotpoints, 8411 and 8412 are located ~41 kilometers from the coast and shotpoint 9136 is located 136 kilometers north of the coast.

Shotpoint numbers (9211-9370) are assigned arbitrarily to the other lines. Along the 3000 line, four shotpoints (9241, 9244, 9260, 9280) are located southeast of line 2 and one shotpoint, 8170, is collocated with line 2. The 4000 line has five shotpoints, 9211, 9212, 9213, 9221, and 9222, located along the line plus one shotpoint, 8260, collocated with line 2. The 5000 line has two shotpoints collocated with the 4000 line and one shotpoint, 8310, collocated with line 2. The 6000 and 7000 lines have a common shotpoint, 9310, at their southern ends. Two shotpoints, 9330, 9340, are located along

the 6000 line and one shotpoint, 9370, is located along the 7000 line. Two large off-line shotpoints, 9350, and 9360, were designed to provide critical or near critical reflections from the Moho in the Santa Monica region with emergence angles and azmuths similar to the damaging waves from the Northridge earthquake.

Latitude and Longitude in both NAD27 and WGS84 datums and UTM coordinates in both NAD27 and NAD83 datums are listed for all shotpoints in Table 2. For detailed maps of the shotpoints see Figures 3, 4, and 5 in Fuis and others (2001). All shotpoint permit requests were accompanied by an environmental assessment report (Appendix I). Shot and shotpoint information is listed in Table 2 of Fuis and others (2001) and drilling logs for some of the shotpoints are in Appendix II.

RECEIVER SITES, SEISMOGRAPHS, AND DATA

Receiver sites on line 2 are spaced on average 100 meter apart from 0-90 km north of the coast, 300-500 meters apart from 79-101 km, and 1000 meters apart from 101-150 km. Along the 3000 line, receiver sites are spaced 200 meters apart, along the 4000 line 270 meters apart, 400 meters apart along the 5000 line, 200 meters apart along the 6000 line, and 300 meters apart along the 7000 line. Receiver location numbers on line 2 are assigned in units hundreds of 100 meters north of the coast, beginning with 1000 at the coast. For example, receiver location number 1926 is 92.6 kilometers (92600 m) north of the coast. Receiver location numbers on the auxiliary lines are simply incremented from one end of the line. For example, receiver location number 3048 is the 48^{th} station west of the beginning of the 3000 line. Latitude and Longitude for receiver sites in both NAD27 and WGS84 datums and UTM coordinates in both NAD27 and NAD83 datums are listed in Table 3. See Fuis and others (2001) for a description of how the locations were determined.

Five different types of seismic acquisition systems were used to acquire data during LARSE II: PRS1's and PRS4's, SGR III's, RefTek's, Texan's, and PDAS's. A general description of each is given below. Instrument types are mixed along each line. Placement along the lines was designed to take advantage of each instrument's capabilities. RefTeks and PRS4's, 3-component seismographs, were distributed as evenly as possible among all lines. For further details of seismographic deployment, see "EXPERIMENT PLANNING AND DESIGN" in Fuis and others (2001) and Table 4 of this report. RefTeks that recorded both velocity and acceleration were deployed at ten shotpoints in San Fernando Valley. These data will be presented in a later report.

Data from each of the different seismographic systems was merged to produce SEG-Y data files for each shot. A description of the archiving process is given in Fuis and others (2001). Each component at each site was assigned a channel number. Channel numbers were organized by line and incremented by 1 for each seismographic component (trace) at a receiver site. Table 4 gives the relationship between location number, channel, and seismographic component. For each trace, all pertinent information about the receivers was written to the SEG-Y headers (see Table 5 for a description of the headers). Both Latitude and Longitude in the WGS84 datum and UTM coordinates in NAD83 datum are written to the SEG-Y headers. A preliminary version of merged data was produced and visually inspected. Data were corrected and quality control flags (Table 6) written to the SEG-Y headers (see Fuis and others, 2001, "DATA PROCESSING: Quality Assurance"). The final archival data was organized by seismic line (2, 3000, 4000, 5000, 6000, 7000, and 6500 (the scatter array in Santa Monica)). For each line, there are 93 SEG-Y shot files. The data are archived at IRIS/DMC and are available from the web site: www.iris.washington.edu ; Index of Services > Data Sources > Assembled data > PASSCAL. Plots of each shot recorded along line 2 are shown in Appendix III.

SEISMIC ACQUISITION SYSTEMS

Two models of PRS's were used in this survey, the single-channel PRS1 and the three-channel PRS4. Both instruments are designed similarly. Mark Products L4C, 2-Hz vertical-component geophones were used with the PRS1 and three L4C, 2-Hz geophones, one vertical-component and two horizontal-component geophones, were used with the PRS4. Automatic gain-ranging from 1 to 1024 in binary steps allows a total dynamic range for these instruments of 132 dB. Seismic data are sampled at 120 samples per second (or at 8.33 ms intervals) by a 12-bit A/D converter and stored in memory (DRAM) until the data are transferred ("uploaded") to a PC. Amplitude and phase response curves for the overall system are shown in Figures 2a and 3a, respectively. The amplitude response peaks between 5 and 6 Hz. For each unit, timing is provided by a temperature-compensated oscillator (TCXO), that is synchronized to satellite time during the programming ("downloading") process. After retrieval of the recorders, the clock drift is measured and a clock correction is made assuming a linear drift rate. Most clocks drift less than 20 milliseconds during a 24-hour period. The PRS instruments were designed by the Geological Survey of Canada and built by EDA Instruments Ltd. For more detailed information see Asudeh and others (1992).

The SGR III is a single-channel, digital seismic recorder with a theoretical dynamic range of 156 dB. Data are sampled at 500 samples per second (or at 2 ms intervals) by a 12 bit A/D converter with gain ranging from 0-90 dB in 6 dB steps. The SGR's have been modified by the USGS to turn on at preset times instead of using the standard radio turn on. Timing is provided by a TXCO with an accuracy of 0.1 ppm and is synchronized to a USGS master clock (accuracy 0.01 ppm) prior to deployment. Like the GSC PRS's, most SGR clocks drift less than 20 milliseconds during a 24-hour period. The USGS master clocks drift approximately one millisecond per week and are checked

periodically against satellite clocks. The digital data and the clock drift at the time of instrument retrieval are recorded on cartridge tape. The drift rate (assumed linear) is used to calculate a chronometer correction at shot time. For this experiment, the SGR III pre-amplifier was set to 50 mV, the low-cut filter was "out", and the 60-Hz notch filter was "in". Figure 3b shows the phase characteristics of the system associated with these filter settings. Each SGR III was connected to a single string of 6 modified Mark Products L-10B vertical-component geophones (8 Hz) connected in series. The total system amplitude response is shown in Figure 2b; it is relatively flat between 10 and 200 Hz. The SGR III recorders were designed by Amoco Production Company, built by Globe Universal Sciences, Inc., and modified by the USGS. For more detailed information see the SGR II seismic group recorder field system technical manual (technical specfications are the same for the SGR III), by Globe Universal Sciences, Inc., and L-10 geophone specifications, by Mark Products.

The RefTek 72A-06 and RefTek 72A-07 instruments are a digital seismic data acquisition system (DAS) with three-input-channels (except as below) and an internal data-storage disk with a capacity between 235 MB and 1 GB. The RefTek 72A-08 is designed similar to the RefTek 72A-07 instruments, except that it has 6 input channels. During this experiment, only three of the six channels were used to record data. Ten of the RefTek 72A-07 that were used have 6 input channels and all six channels were used to record three-component data in both velocity and acceleration. Timing, for all models of RefTeks, is provided by an internal voltage controlled oscillator (VCXO). Each instrument was synchronized with a GPS clock when it was deployed and when it was retrieved, and permanently attached GPS clocks allowed post-processing updates to the time between deployment and pickup. RefTeks are programmable for a range of different sample rates. During this experiment, data were recorded at 250 samples per second (or at 4 ms intervals). The RefTek 72A-06 has 16-bit A/D converter and produces data at a variable high-gain (programmable for 0, 18, 30, 42, 54, 66, or 78 dB), which

was set to 78 dB during this experiment. The RefTek 72A-07 has 24-bit A/D converter and outputs data at one of two gains, 1 or 32. During this experiment, the gain of the RefTek 72A-07's was set to 32. RefTeks filter data digitally with a series of digital finite impulse response (FIR) filters before the data are decimated. These filters are zero-phase and non-causal. All RefTeks are amplitude compatible, so that a given ground motion is recorded with the same amplitude on all systems. Ground motion (velocity) was sensed by Mark Products L-28 4.5-Hz three-component geophones and by Mark Products L-22D 2-Hz three-component geophones. Acceleration was recorded by force balanced accelerometers (FBA). The geophone type and component, for each trace, were written to the headers. RefTeks were designed and built by Refraction Technology Inc. For more detailed information see the IRIS/PASSCAL web site at: www.iris.edu/passcal/passcal.htm

The Texan (Reftek 125) is single channel seismograph which has solid state-memory and is the size of a can of tennis balls. Power is provided by 2 D-cell batteries that reside inside the unit. Programmable sampling rates available on the Texans are 1000, 500, 250, 200, 125, and 100 samples/second and the gain is fixed at 32 with 24-bit dynamic range. During this experiment, data were recorded at 250 samples per second (or at 4 ms intervals) and ground motion was sensed by high impedance 4.5 Hz geophones (Geospace GS11D). Each instrument contains a temperature-compensated crystal oscillator with a temperature stability of 0.1 ppm. On well adjusted oscillators, the drift rate is usually less then 40 ms/week. For each instrument, the oscillator is synchronized to a GPS clock before deployment and the drift is checked when it is retrieved. Timing corrections are made to millisecond accuracy and rounded to the nearest even sample interval. Data are filtered digitally with a series of digital finite impulse response (FIR) filters. These filters are zero-phase and non-causal. The recording media is flash memory, which is nonvolatile and is held until it is erased, even in the event of total power loss. The memory capacity for most of the existing Texans is

approximately 11.5 million 24-bit samples. This memory is offloaded to a computer and processed into SEGY format. Texans were designed and built by Refraction Technology Inc. For more detailed information see the University of Texas at El Paso (UTEP) web site at: www.geo.utep.edu/TATP/index_125.html

The PDAS-100 (Portable Data Acquisition System) is a six-input-channel digital seismic data acquisition system with an internal disk drive for data storage. Each recorder was equipped with a 500 m cable that has "takeouts" every 100 m. This allowed each PDAS to record data from 6 receiver locations. Ground motion was sensed by a string of six 4.5-Hz vertical-component geophones. Geophone strings were laid out inline, uniformly spaced, and centered at the receiver location. The PDAS is programmable for a range of different sample rates. Data were originally sampled at 1000 Hz, then digitally filtered with a series of finite impulse response (FIR) filters before the data were decimated to the programmed sample rate. As with the RefTeks, these filters are zero phase and non-causal. During this experiment, data were recorded at 200 samples per second (or at 5 ms intervals). Timing for the PDAS is provided by an internal digital controlled oscillator (DCXO) that was synchronized to a GPS clock every two hours. This gives timing accuracy to better than 5 ms. The PDAS has16-bit A/D converter with a fixed gain of 1. After acquisition, the data is archived and converted to SEGY. PDASs were designed and built by Teledyne Inc.

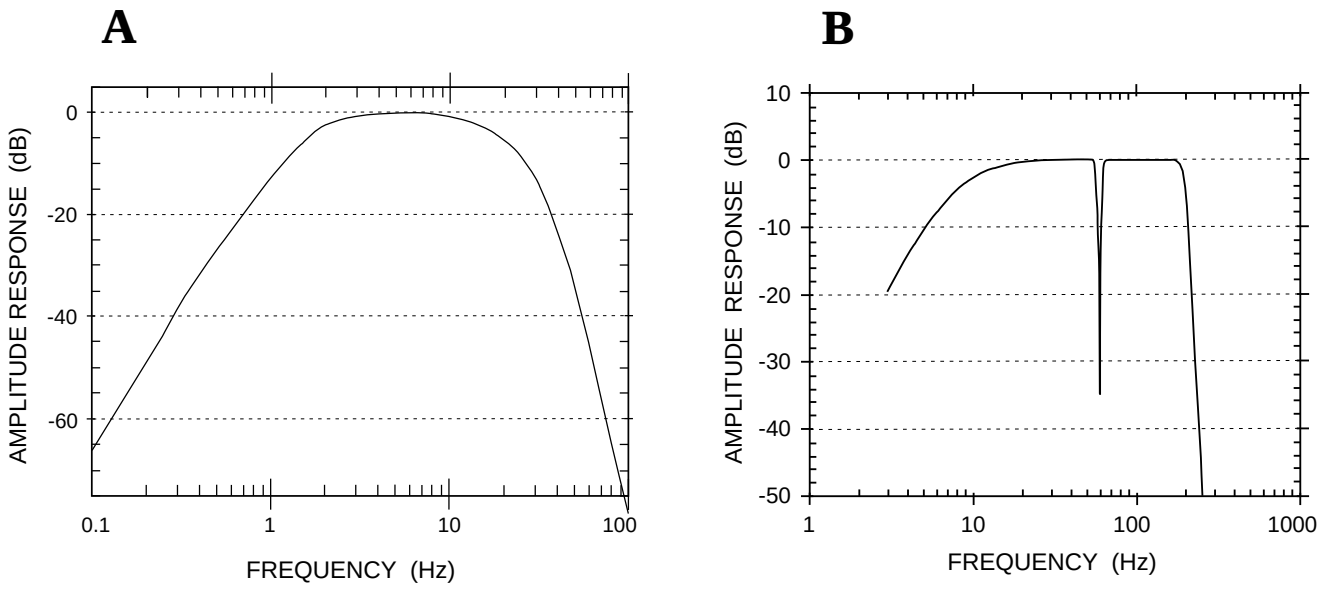

Figure 2. Amplitude response curves for A.) PRS1 with a Mark Products L4-C 2-Hz geophone, B.) SGR with Mark Products L10-B 8-Hz geophone.

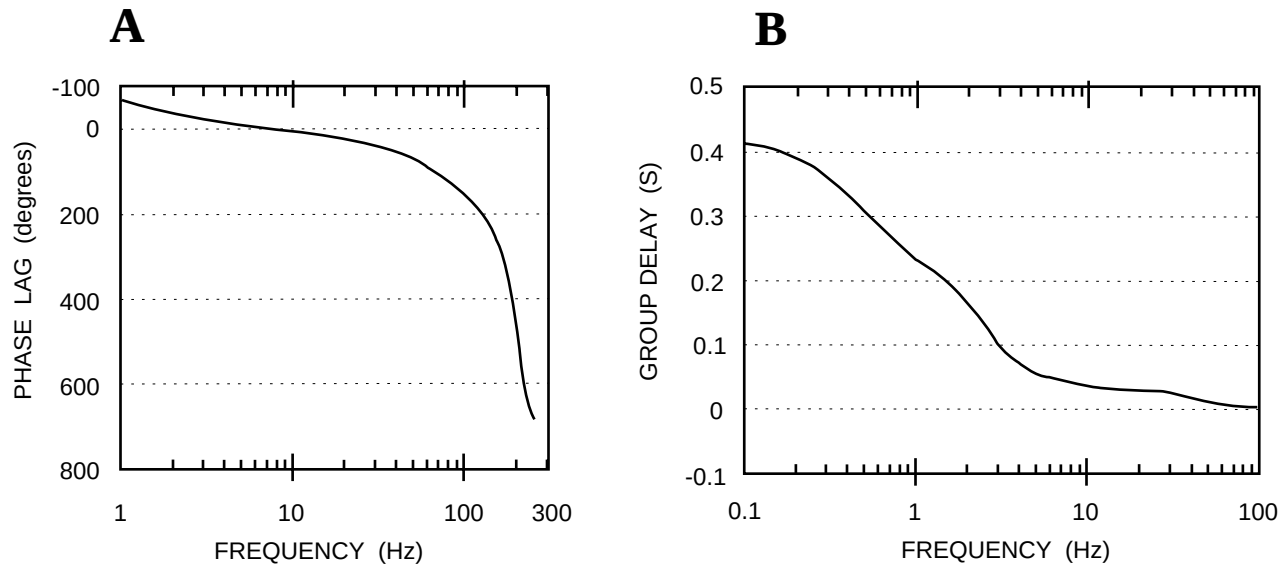

Figure 3. The phase characteristics of A.) PRS1 with the filters as described in the text B.) SGR.

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Table 1. USGS Topographic maps Traversed in LARSE II

Index No.	USGS QUAD Name
1	Topanga
2	Canoga Park
3	Oat Mtn
4	Newhall
5	Warm Springs
6	Beverly Hills
7	Van Nuys
8	San Fernando
9	Mint Canyon
10	Green Valley
11	Lake Hughes
12	Fairmont Butte
13	Tylerhorse Cyn
14	Tehachapi South
15	Tehachapi North
16	Loraine
17	Piute Peak

Table 2. Shotpoint Coordinates

	Geographic WGS84		UTM (NAD83 datum)		UTM	UTM (NAD27 datum)		Geographic NAD27 datum		ELEV	gps
LOCATION	LONG	LAT	easting (X)	northing (Y)	ZONE	easting (X)	northing (Y)	LONG	LAT	(FT)	flag
8020	-118.56047	34.04698	355967	3768463	11	356048	3768267	-118.55955	34.04697	226	2
8030	-118.55451	34.05772	356535	3769646	11	356616	3769449	-118.55359	34.05771	309	3
8043	-118.55886	34.06632	356148	3770606	11	356229	3770409	-118.55794	34.06631	444	2
8045	-118.55712	34.06279	356303	3770212	11	356384	3770015	-118.55620	34.06278	395	2
8050	-118.55300	34.08115	356714	3772242	11	356795	3772045	-118.55208	34.08114	1467	2
8060	-118.54980	34.08890	357022	3773097	11	357103	3772900	-118.54888	34.08889	1835	2
8070	-118.54954	34.09574	357058	3773855	11	357139	3773658	-118.54862	34.09573	1964	2
8084	-118.55544	34.10216	356524	3774575	11	356605	3774379	-118.55452	34.10215	2043	2
8085	-118.55903	34.10533	356198	3774932	11	356280	3774735	-118.55811	34.10532	2003	2
8093	-118.55455	34.11358	356625	3775841	11	356707	3775644	-118.55363	34.11357	1828	2
8095	-118.55900	34.10810	356206	3775239	11	356287	3775042	-118.55808	34.10809	2016	2
8100	-118.55243	34.12315	356837	3776899	11	356918	3776702	-118.55151	34.12314	1628	2
8110	-118.55312	34.12921	356784	3777572	11	356865	3777375	-118.55220	34.12920	1680	2
8120	-118.54007	34.14367	358011	3779157	11	358093	3778960	-118.53915	34.14366	964	2
8130	-118.53530	34.14913	358460	3779756	11	358542	3779559	-118.53438	34.14912	922	2
8140	-118.53481	34.15801	358520	3780740	11	358602	3780543	-118.53389	34.15800	849	2
8170	-118.53272	34.18802	358763	3784065	11	358844	3783868	-118.53180	34.18802	725	2
8190	-118.52556	34.19816	359440	3785180	11	359521	3784983	-118.52464	34.19816	733	2
8210	-118.52587	34.22236	359451	3787864	11	359533	3787667	-118.52495	34.22236	777	2
8230	-118.52501	34.23614	359553	3789391	11	359635	3789194	-118.52409	34.23614	849	2
8241	-118.52542	34.24451	359530	3790320	11	359611	3790123	-118.52450	34.24451	898	2
8242	-118.52559	34.24458	359514	3790328	11	359595	3790131	-118.52467	34.24458	899	2
8250	-118.52537	34.25293	359548	3791253	11	359630	3791057	-118.52445	34.25293	968	2
8260	-118.52545	34.26001	359553	3792039	11	359634	3791842	-118.52453	34.26001	1000	2
8270	-118.52716	34.27682	359423	3793905	11	359505	3793708	-118.52624	34.27682	1118	2
8280	-118.52828	34.28352	359331	3794650	11	359413	3794453	-118.52736	34.28352	1178	2
8290	-118.52663	34.29431	359501	3795844	11	359582	3795647	-118.52571	34.29431	1339	3
8310	-118.53577	34.30932	358685	3797521	11	358766	3797325	-118.53485	34.30932	2593	2
8320	-118.53841	34.31914	358458	3798614	11	358540	3798417	-118.53749	34.31914	2578	2
8331	-118.54200	34.32845	358144	3799651	11	358225	3799455	-118.54108	34.32845	2554	2
8333	-118.54446	34.33581	357930	3800471	11	358011	3800274	-118.54354	34.33581	2179	2
8340	-118.54144	34.33823	358212	3800735	11	358293	3800539	-118.54052	34.33823	1803	2
8350	-118.53598	34.34664	358728	3801660	11	358809	3801464	-118.53506	34.34664	1603	2
8360	-118.52438	34.35874	359815	3802986	11	359897	3802789	-118.52346	34.35874	1491	3
8380	-118.52656	34.37048	359634	3804291	11	359716	3804094	-118.52564	34.37048	1542	2
8390	-118.51635	34.38016	360589	3805351	11	360671	3805154	-118.51543	34.38016	1316	2
8411	-118.50124	34.39784	362008	3807291	11	362089	3807094	-118.50032	34.39784	1665	2
8412	-118.50143	34.39781	361990	3807287	11	362071	3807091	-118.50051	34.39781	1662	2

Table 2. Shotpoint Coordinates

8440	-118.51421	34.42535	360861	3810359	11	360942	3810163	-118.51329	34.42535	1409	2
8450	-118.50794	34.43455	361452	3811371	11	361534	3811174	-118.50702	34.43455	1604	2
8470	-118.50685	34.45523	361587	3813663	11	361668	3813466	-118.50593	34.45524	1395	2
8490	-118.50973	34.47410	361353	3815759	11	361434	3815563	-118.50881	34.47411	1450	2
8501	-118.50596	34.48101	361711	3816521	11	361792	3816324	-118.50504	34.48102	1519	2
8502	-118.51678	34.48458	360723	3816931	11	360804	3816735	-118.51586	34.48459	1570	2
8510	-118.51962	34.49244	360475	3817807	11	360557	3817610	-118.51870	34.49245	1962	2
8520	-118.51915	34.49961	360531	3818601	11	360612	3818405	-118.51823	34.49962	1876	2
8530	-118.51939	34.51317	360531	3820106	11	360612	3819909	-118.51847	34.51318	1976	2
8540	-118.51319	34.52749	361124	3821685	11	361205	3821489	-118.51227	34.52750	2005	2
8560	-118.50337	34.53634	362040	3822653	11	362121	3822457	-118.50245	34.53635	2112	2
8570	-118.49386	34.54494	362927	3823594	11	363008	3823398	-118.49294	34.54495	2150	2
8590	-118.48955	34.55900	363345	3825147	11	363426	3824951	-118.48863	34.55901	1658	2
8620	-118.49236	34.59331	363144	3828956	11	363225	3828760	-118.49144	34.59332	2846	2
8631	-118.49185	34.59964	363201	3829658	11	363282	3829461	-118.49093	34.59965	3134	2
8632	-118.48947	34.60275	363424	3829999	11	363505	3829803	-118.48855	34.60276	3296	2
8641	-118.48452	34.60843	363887	3830622	11	363968	3830426	-118.48360	34.60844	3462	2
8643	-118.47867	34.61118	364428	3830920	11	364509	3830723	-118.47775	34.61119	3627	2
8650	-118.47038	34.61698	365198	3831552	11	365279	3831355	-118.46946	34.61699	3833	3.1
8661	-118.46532	34.61998	365667	3831878	11	365748	3831681	-118.46440	34.61999	3755	2
8664	-118.46244	34.62581	365940	3832520	11	366021	3832324	-118.46152	34.62582	3808	2
8700	-118.45985	34.66074	366234	3836391	11	366315	3836195	-118.45893	34.66075	2852	3
8710	-118.45786	34.66724	366426	3837109	11	366507	3836913	-118.45694	34.66725	3324	2
8720	-118.45747	34.67920	366481	3838435	11	366562	3838239	-118.45655	34.67922	3029	3
8730	-118.45713	34.68530	366522	3839111	11	366603	3838915	-118.45621	34.68532	3223	2
8740	-118.46050	34.69654	366232	3840362	11	366313	3840166	-118.45958	34.69656	3595	2
8750	-118.45971	34.70829	366323	3841664	11	366404	3841468	-118.45879	34.70831	3457	2
8760	-118.45659	34.71417	366618	3842312	11	366699	3842116	-118.45567	34.71419	3003	2
8770	-118.45744	34.72401	366556	3843404	11	366637	3843208	-118.45652	34.72403	2778	2
8780	-118.46644	34.73835	365755	3845007	11	365836	3844811	-118.46552	34.73837	2698	2
8790	-118.46660	34.74652	365754	3845913	11	365835	3845717	-118.46568	34.74654	2666	2
8820	-118.46714	34.76808	365739	3848305	11	365820	3848109	-118.46622	34.76810	2600	3
8830	-118.46687	34.78204	365787	3849853	11	365867	3849657	-118.46595	34.78206	2554	2
8850	-118.47170	34.79846	365371	3851680	11	365452	3851484	-118.47078	34.79848	2503	3
8870	-118.46714	34.81357	365813	3853350	11	365894	3853154	-118.46622	34.81359	2477	3
8930	-118.45226	34.86724	367260	3859282	11	367341	3859087	-118.45134	34.86726	2673	2
8950	-118.45371	34.88991	367164	3861799	11	367245	3861603	-118.45279	34.88993	3170	3
8990	-118.45366	34.92157	367220	3865310	11	367300	3865114	-118.45274	34.92160	3400	2
9110	-118.44512	34.94142	368032	3867500	11	368112	3867304	-118.44420	34.94145	3760	3
9136	-118.41124	35.26513	371634	3903358	11	371715	3903163	-118.41032	35.26517	3440	
9211	-118.38348	34.26461	372632	3792362	11	372713	3792165	-118.38257	34.26461	990	3

Table 2. Shotpoint Coordinates

9212	-118.38365	34.26435	372616	3792333	11	372697	3792137	-118.38274	34.26435	990	3
9213	-118.41303	34.26225	369907	3792138	11	369989	3791941	-118.41211	34.26225	1015	3
9221	-118.62223	34.26090	350643	3792275	11	350724	3792078	-118.62131	34.26090	1061	3
9222	-118.62221	34.26075	350644	3792259	11	350726	3792062	-118.62129	34.26075	1068	3
9241	-118.48403	34.17406	363228	3782451	11	363309	3782254	-118.48311	34.17405	698	2
9244	-118.48437	34.17447	363197	3782497	11	363278	3782300	-118.48345	34.17446	695	2
9260	-118.49816	34.18138	361937	3783282	11	362018	3783085	-118.49724	34.18137	700	2
9280	-118.47471	34.16904	364078	3781882	11	364160	3781685	-118.47379	34.16903	680	2
9310	-118.43540	33.97048	367393	3759811	11	367474	3759614	-118.43449	33.97047	4	2
9330	-118.50003	34.04785	361547	3768476	11	361628	3768280	-118.49912	34.04784	280	2
9340	-118.52307	34.09754	359503	3774018	11	359584	3773821	-118.52215	34.09753	1443	2
9350	-118.74382	34.61580	340125	3831820	11	340206	3831624	-118.74290	34.61581	1905	3.1
9360	-118.76061	34.81881	338979	3854363	11	339060	3854167	-118.75968	34.81883	3345	3.2
9370	-118.46585	34.06485	364729	3770316	11	364811	3770119	-118.46494	34.06484	447	2

GPS equipment Flags:
. 0 unknown
. 1 USGS Rockwell
. 2 Potsdam Trimble
. 3 USC Trimble
. (3.1 Taylor)
. (3.2 Alan)
. 4 CSUN Trimble
. 5 UTEP Trimble
. 6 from Map
. 7 Interpolated
. 8 Marine unit

Table 3. Seismograph Coordinates

	Geographic WGS84		UTM (NAD83 datum)		Geographic NAD27 datum		UTM (NAD27 datum)		UTM	ELEV	gps	
LOCATION	LONG	LAT	easting (X)	northing (Y)	LONG	LAT	easting (X)	northing (Y)	ZONE	(FT)	flag	NOTES
9901	-118.56875	33.97868	355086	3760901	-118.56784	33.97867	355168	3760705	11	-184	8	OBS
9902	-118.56808	33.98120	355152	3761179	-118.56717	33.98119	355233	3760983	11	-180	8	OBS
9903	-118.56693	33.98552	355266	3761657	-118.56602	33.98551	355347	3761460	11	-171	8	OBS
9904	-118.56630	33.98887	355330	3762027	-118.56539	33.98886	355411	3761830	11	-163	8	OBS
1002	-118.56760	34.04213	355300	3767936	-118.56668	34.04212	355382	3767739	11	24	2	
1003	-118.56673	34.04259	355381	3767985	-118.56581	34.04258	355463	3767789	11	77	2	
1004	-118.56613	34.04387	355439	3768126	-118.56521	34.04386	355520	3767930	11	118	2	
1005	-118.56504	34.04494	355541	3768244	-118.56412	34.04493	355623	3768047	11	159	2	
1006	-118.56411	34.04521	355628	3768272	-118.56319	34.04520	355709	3768075	11	173	2	
1007	-118.56280	34.04599	355750	3768357	-118.56188	34.04598	355831	3768160	11	217	2	
1008	-118.56124	34.04559	355893	3768310	-118.56032	34.04558	355975	3768113	11	370	2	
1009	-118.56008	34.04754	356004	3768525	-118.55916	34.04753	356085	3768328	11	232	2	
1010	-118.56033	34.04836	355982	3768616	-118.55941	34.04835	356063	3768419	11	245	2	
1011	-118.55759	34.04854	356235	3768632	-118.55667	34.04853	356316	3768435	11	582	2	
1012	-118.55800	34.05039	356200	3768838	-118.55708	34.05038	356282	3768641	11	630	2	
1013	-118.55723	34.05101	356273	3768906	-118.55631	34.05100	356354	3768709	11	661	2	
1014	-118.55802	34.05158	356201	3768970	-118.55710	34.05157	356282	3768773	11	702	2	
1015	-118.55837	34.05273	356170	3769098	-118.55745	34.05272	356252	3768901	11	728	2	
1016	-118.55762	34.05369	356241	3769203	-118.55670	34.05368	356322	3769007	11	780	2	
1017	-118.55866	34.05562	356148	3769419	-118.55774	34.05561	356230	3769222	11	894	2	
1018	-118.55743	34.05579	356262	3769436	-118.55651	34.05578	356343	3769239	11	895	2	
1019	-118.55403	34.05655	356577	3769516	-118.55311	34.05654	356659	3769319	11	281	2	
1020	-118.55458	34.05727	356528	3769596	-118.55366	34.05726	356609	3769399	11	288	2	
1021	-118.55549	34.05823	356445	3769704	-118.55457	34.05822	356527	3769507	11	318	2	
1022	-118.55488	34.05770	356501	3769644	-118.55396	34.05769	356582	3769447	11	294	2	
1023	-118.55563	34.06020	356436	3769923	-118.55471	34.06019	356517	3769726	11	350	2	
1024	-118.55609	34.06121	356395	3770035	-118.55517	34.06120	356476	3769838	11	373	2	
1025	-118.55682	34.06187	356329	3770109	-118.55590	34.06186	356410	3769913	11	386	2	
1026	-118.55729	34.06300	356287	3770235	-118.55637	34.06299	356369	3770039	11	398	2	
1027	-118.55817	34.06421	356208	3770371	-118.55725	34.06420	356289	3770174	11	422	2	
1028	-118.55878	34.06521	356153	3770483	-118.55786	34.06520	356235	3770286	11	430	2	
1029	-118.55892	34.06609	356142	3770580	-118.55800	34.06608	356223	3770384	11	437	2	
1030	-118.55884	34.06695	356151	3770676	-118.55792	34.06694	356232	3770479	11	480	2	
1031	-118.55964	34.06779	356078	3770770	-118.55872	34.06778	356160	3770573	11	475	2	
1032	-118.56015	34.06910	356034	3770916	-118.55923	34.06909	356115	3770719	11	494	2	
1033	-118.55892	34.06912	356147	3770916	-118.55800	34.06911	356228	3770720	11	600	2	
1034	-118.55857	34.07020	356181	3771036	-118.55765	34.07019	356263	3770839	11	641	2	
1035	-118.55803	34.07102	356233	3771126	-118.55711	34.07101	356314	3770929	11	694	2	
1036	-118.55832	34.07220	356208	3771257	-118.55740	34.07219	356289	3771060	11	730	2	

Table 3. Seismograph Coordinates

	Geographic WGS84		UTM (NAD83 datum)		Geographic NAD27 datum		UTM (NAD27 datum)		UTM	ELEV	gps	
LOCATION	LONG	LAT	easting (X)	northing (Y)	LONG	LAT	easting (X)	northing (Y)	ZONE	(FT)	flag	NOTES
1038	-118.55843	34.07427	356201	3771487	-118.55751	34.07426	356282	3771290	11	876	2	
1039	-118.55796	34.07440	356245	3771501	-118.55704	34.07439	356326	3771304	11	943	2	
1040	-118.55844	34.07566	356203	3771641	-118.55752	34.07565	356284	3771444	11	984	2	
1041	-118.55791	34.07614	356252	3771693	-118.55699	34.07613	356334	3771497	11	1036	2	
1042	-118.55726	34.07689	356313	3771776	-118.55634	34.07688	356395	3771579	11	1080	2	
1043	-118.55692	34.07760	356346	3771854	-118.55600	34.07759	356427	3771657	11	1024	2	
1044	-118.55954	34.07896	356107	3772008	-118.55862	34.07895	356188	3771812	11	904	2	
1045	-118.55897	34.08035	356162	3772162	-118.55805	34.08034	356243	3771965	11	967	2	
1046	-118.55956	34.08289	356111	3772444	-118.55864	34.08288	356193	3772247	11	1105	2	
1047	-118.55289	34.08139	356724	3772269	-118.55197	34.08138	356806	3772072	11	1484	2	
1048	-118.55351	34.08246	356669	3772388	-118.55259	34.08245	356750	3772191	11	1518	2	
1049	-118.55346	34.08318	356675	3772468	-118.55254	34.08317	356756	3772271	11	1561	2	
1050	-118.55363	34.08400	356660	3772559	-118.55271	34.08399	356742	3772362	11	1565	2	
1051	-118.55358	34.08491	356667	3772660	-118.55266	34.08490	356748	3772463	11	1603	2	
1052	-118.55249	34.08551	356768	3772725	-118.55157	34.08550	356849	3772528	11	1620	2	
1053	-118.55222	34.08658	356795	3772843	-118.55130	34.08657	356876	3772646	11	1682	2	
1054	-118.55111	34.08730	356899	3772921	-118.55019	34.08729	356980	3772725	11	1735	2	
1055	-118.54865	34.08835	357127	3773034	-118.54773	34.08834	357209	3772838	11	1828	2	
1056	-118.55017	34.08888	356988	3773095	-118.54925	34.08887	357069	3772899	11	1830	2	
1057	-118.54926	34.09011	357074	3773230	-118.54834	34.09010	357155	3773034	11	1870	2	
1058	-118.54895	34.09084	357104	3773311	-118.54803	34.09083	357185	3773114	11	1867	2	
1059	-118.54981	34.09188	357026	3773428	-118.54889	34.09187	357107	3773231	11	1895	2	
1060	-118.54968	34.09286	357040	3773536	-118.54876	34.09285	357121	3773339	11	1941	2	
1061	-118.54978	34.09360	357032	3773618	-118.54886	34.09359	357113	3773421	11	1938	2	
1062	-118.54946	34.09459	357063	3773728	-118.54854	34.09458	357144	3773531	11	1946	2	
1063	-118.54951	34.09547	357060	3773825	-118.54859	34.09546	357141	3773628	11	1964	2	
1064	-118.54930	34.09670	357081	3773961	-118.54838	34.09669	357163	3773765	11	1991	2	
1065	-118.55005	34.09743	357013	3774043	-118.54913	34.09742	357095	3773847	11	2005	2	
1066	-118.54982	34.09826	357036	3774135	-118.54890	34.09825	357117	3773938	11	2026	2	
1067	-118.55099	34.09928	356930	3774250	-118.55007	34.09927	357011	3774053	11	2032	2	
1068	-118.55190	34.10007	356847	3774339	-118.55098	34.10006	356928	3774142	11	2048	2	
1069	-118.55278	34.10155	356768	3774504	-118.55186	34.10154	356850	3774307	11	2041	2	
1070	-118.55524	34.10220	356543	3774580	-118.55432	34.10219	356624	3774383	11	2034	2	
1071	-118.55428	34.10343	356633	3774715	-118.55336	34.10342	356715	3774518	11	2025	2	
1072	-118.55537	34.10414	356534	3774795	-118.55445	34.10413	356615	3774598	11	2014	2	
1073	-118.55615	34.10510	356464	3774902	-118.55523	34.10509	356545	3774706	11	1975	2	
1074	-118.55816	34.10678	356281	3775092	-118.55724	34.10677	356362	3774895	11	2018	2	
1075	-118.55835	34.10741	356265	3775162	-118.55743	34.10740	356346	3774965	11	2014	2	
1076	-118.55776	34.10805	356320	3775232	-118.55684	34.10804	356401	3775035	11	1979	2	
1077	-118.55752	34.10871	356343	3775305	-118.55660	34.10870	356425	3775108	11	1956	2	
1078	-118.55725	34.10963	356370	3775406	-118.55633	34.10962	356451	3775210	11	1927	2	

Table 3. Seismograph Coordinates

	Geographic WGS84		UTM (NAD83 datum)		Geographic NAD27 datum		UTM (NAD27 datum)		UTM	ELEV	gps	
LOCATION	LONG	LAT	easting (X)	northing (Y)	LONG	LAT	easting (X)	northing (Y)	ZONE	(FT)	flag	NOTES
1079	-118.55681	34.11054	356412	3775507	-118.55589	34.11053	356493	3775310	11	1884	2	
1080	-118.55556	34.11131	356528	3775590	-118.55464	34.11130	356610	3775393	11	1849	2	
1081	-118.55462	34.11224	356617	3775692	-118.55370	34.11223	356698	3775495	11	1873	2	
1082	-118.55472	34.11337	356609	3775818	-118.55380	34.11336	356691	3775621	11	1840	2	
1083	-118.55451	34.11437	356630	3775928	-118.55359	34.11436	356712	3775731	11	1811	2	
1084	-118.55418	34.11510	356662	3776009	-118.55326	34.11509	356743	3775812	11	1817	2	
1085	-118.55443	34.11593	356640	3776101	-118.55351	34.11592	356722	3775904	11	1813	2	
1086	-118.55419	34.11693	356664	3776212	-118.55327	34.11692	356746	3776015	11	1773	2	
1087	-118.55473	34.11766	356616	3776293	-118.55381	34.11765	356697	3776096	11	1771	2	
1088	-118.55394	34.11837	356690	3776371	-118.55302	34.11836	356771	3776174	11	1758	2	
1089	-118.55324	34.11926	356756	3776469	-118.55232	34.11925	356837	3776272	11	1749	2	
1090	-118.55263	34.12043	356814	3776598	-118.55171	34.12042	356895	3776401	11	1697	2	
1091	-118.55267	34.12141	356812	3776706	-118.55175	34.12140	356893	3776509	11	1667	2	
1092	-118.55124	34.12161	356944	3776726	-118.55032	34.12160	357026	3776530	11	1627	2	
1093	-118.55105	34.12276	356964	3776854	-118.55013	34.12275	357045	3776657	11	1605	2	
1094	-118.55077	34.12362	356991	3776949	-118.54985	34.12361	357072	3776752	11	1545	2	
1095	-118.55037	34.12469	357030	3777067	-118.54945	34.12468	357111	3776870	11	1533	2	
1096	-118.55370	34.12607	356725	3777225	-118.55278	34.12606	356806	3777028	11	1643	2	
1097	-118.55485	34.12710	356621	3777340	-118.55393	34.12709	356702	3777144	11	1674	2	
1098	-118.55416	34.12779	356685	3777416	-118.55324	34.12778	356767	3777219	11	1694	2	
1099	-118.55360	34.12843	356738	3777486	-118.55268	34.12842	356819	3777289	11	1716	2	
1100	-118.55303	34.12941	356792	3777594	-118.55211	34.12940	356874	3777397	11	1671	2	
1101	-118.55287	34.13033	356809	3777696	-118.55195	34.13032	356890	3777499	11	1637	3	
1102	-118.55310	34.13145	356789	3777820	-118.55218	34.13144	356871	3777623	11	1616	3	
1103	-118.55320	34.13253	356782	3777940	-118.55228	34.13252	356863	3777743	11	1612	3	
1104	-118.55279	34.13349	356821	3778046	-118.55187	34.13348	356903	3777849	11	1492	3	
1105	-118.55188	34.13409	356906	3778111	-118.55096	34.13408	356988	3777915	11	1382	3	
1106	-118.55075	34.13472	357012	3778180	-118.54983	34.13471	357093	3777983	11	1417	3	
1107	-118.54980	34.13530	357100	3778243	-118.54888	34.13529	357182	3778046	11	1439	3	
1108	-118.54942	34.13691	357138	3778421	-118.54850	34.13690	357219	3778224	11	1345	3	
1109	-118.54897	34.13795	357181	3778535	-118.54805	34.13794	357263	3778338	11	1341	3	
1110	-118.54789	34.13878	357282	3778626	-118.54697	34.13877	357363	3778429	11	1311	3	
1111	-118.54542	34.13994	357512	3778751	-118.54450	34.13993	357593	3778554	11	1232	3	
1112	-118.54380	34.14023	357662	3778781	-118.54288	34.14022	357743	3778584	11	1130	3	
1113	-118.54266	34.14067	357768	3778828	-118.54174	34.14066	357849	3778631	11	1096	3	
1114	-118.54191	34.14152	357838	3778921	-118.54099	34.14151	357919	3778724	11	1045	7	INTERP
1115	-118.54116	34.14236	357909	3779013	-118.54024	34.14235	357990	3778817	11	1024	3	
1116	-118.54050	34.14318	357971	3779103	-118.53958	34.14317	358052	3778907	11	969	3	
1117	-118.53989	34.14396	358028	3779189	-118.53897	34.14395	358110	3778992	11	952	3	
1118	-118.53926	34.14473	358088	3779274	-118.53834	34.14472	358169	3779077	11	945	3	
1119	-118.53868	34.14540	358142	3779347	-118.53776	34.14539	358224	3779150	11	945	3	

Table 3. Seismograph Coordinates

	Geographic WGS84		UTM (NAD83 datum)		Geographic NAD27 datum		UTM (NAD27 datum)		UTM	ELEV	gps	
LOCATION	LONG	LAT	easting (X)	northing (Y)	LONG	LAT	easting (X)	northing (Y)	ZONE	(FT)	flag	NOTES
1120	-118.53795	34.14648	358212	3779466	-118.53703	34.14647	358293	3779269	11	940	3	
1121	-118.53730	34.14710	358273	3779534	-118.53638	34.14709	358354	3779337	11	924	3	
1122	-118.53622	34.14784	358373	3779614	-118.53530	34.14783	358455	3779417	11	953	3	
1123	-118.53564	34.14915	358429	3779759	-118.53472	34.14914	358510	3779562	11	920	3	
1124	-118.53477	34.14984	358510	3779834	-118.53385	34.14983	358592	3779637	11	925	7	INTERP
1125	-118.53388	34.15054	358594	3779910	-118.53296	34.15053	358675	3779714	11	962	3	
1126	-118.53403	34.15106	358581	3779968	-118.53311	34.15105	358662	3779772	11	968	3	
1127	-118.53377	34.15172	358606	3780041	-118.53285	34.15171	358687	3779844	11	939	3	
1128	-118.53343	34.15258	358638	3780136	-118.53251	34.15257	358720	3779939	11	955	3	
1129	-118.53404	34.15331	358583	3780218	-118.53312	34.15330	358665	3780021	11	922	3	
1130	-118.53388	34.15481	358601	3780384	-118.53296	34.15480	358682	3780187	11	915	3	
1131	-118.53471	34.15566	358526	3780479	-118.53379	34.15565	358607	3780283	11	871	3	
1132	-118.53453	34.15660	358544	3780583	-118.53361	34.15659	358625	3780387	11	861	3	
1133	-118.53473	34.15754	358527	3780688	-118.53381	34.15753	358608	3780491	11	853	3	
1134	-118.53455	34.15835	358545	3780778	-118.53363	34.15834	358626	3780581	11	847	3	
1135	-118.53401	34.15956	358597	3780911	-118.53309	34.15955	358678	3780714	11	833	3	
1136	-118.53341	34.16040	358653	3781003	-118.53249	34.16039	358735	3780806	11	832	3	
1137	-118.53288	34.16111	358703	3781081	-118.53196	34.16110	358785	3780884	11	853	3	
1138	-118.53218	34.16181	358769	3781158	-118.53126	34.16180	358850	3780961	11	830	3	
1139	-118.53166	34.16250	358818	3781234	-118.53074	34.16249	358900	3781037	11	828	5	
1140	-118.53177	34.16347	358810	3781341	-118.53085	34.16346	358891	3781145	11	829	3	
1141	-118.53103	34.16432	358879	3781435	-118.53011	34.16431	358961	3781238	11	818	3	
1142	-118.53068	34.16525	358913	3781537	-118.52976	34.16524	358994	3781340	11	809	3	
1143	-118.53097	34.16608	358888	3781630	-118.53005	34.16607	358969	3781433	11	807	3	
1144	-118.53054	34.16710	358929	3781742	-118.52962	34.16709	359010	3781545	11	800	3	
1145	-118.53061	34.16804	358924	3781847	-118.52969	34.16803	359006	3781650	11	800	3	
1146	-118.53065	34.16897	358922	3781950	-118.52973	34.16896	359003	3781753	11	795	3	
1147	-118.53069	34.16985	358920	3782047	-118.52977	34.16984	359001	3781851	11	791	3	
1148	-118.53057	34.17081	358932	3782154	-118.52965	34.17080	359014	3781957	11	785	3	
1149	-118.53058	34.17194	358933	3782279	-118.52966	34.17193	359015	3782082	11	775	5	
1150	-118.53062	34.17285	358931	3782380	-118.52970	34.17284	359013	3782183	11	775	3	
1151	-118.53096	34.17379	358901	3782485	-118.53004	34.17378	358983	3782288	11	772	3	
1152	-118.53073	34.17442	358924	3782554	-118.52981	34.17441	359005	3782357	11	767	3	
1153	-118.53209	34.17497	358799	3782617	-118.53117	34.17496	358881	3782420	11	767	3	
1154	-118.53098	34.17626	358904	3782759	-118.53006	34.17625	358985	3782562	11	759	3	
1155	-118.53061	34.17730	358940	3782874	-118.52969	34.17729	359021	3782677	11	754	3	
1156	-118.53073	34.17822	358930	3782976	-118.52981	34.17821	359011	3782779	11	751	3	
1157	-118.53070	34.17922	358934	3783087	-118.52978	34.17921	359016	3782890	11	746	3	
1158	-118.53094	34.18031	358914	3783208	-118.53002	34.18030	358996	3783011	11	741	3	
1159	-118.53165	34.18092	358850	3783276	-118.53073	34.18091	358931	3783080	11	739	3	
1160	-118.53157	34.18176	358859	3783369	-118.53065	34.18175	358940	3783173	11	736	3	

Table 3. Seismograph Coordinates

	Geographic WGS84		UTM (NAD83 datum)		Geographic NAD27 datum		UTM (NAD27 datum)		UTM	ELEV	gps	
LOCATION	LONG	LAT	easting (X)	northing (Y)	LONG	LAT	easting (X)	northing (Y)	ZONE	(FT)	flag	NOTES
1161	-118.53177	34.18268	358842	3783472	-118.53085	34.18268	358923	3783275	11	733	3	
1162	-118.53153	34.18352	358865	3783565	-118.53061	34.18352	358947	3783368	11	731	3	
1163	-118.53157	34.18461	358863	3783685	-118.53065	34.18461	358945	3783489	11	729	3	
1164	-118.53156	34.18567	358866	3783803	-118.53064	34.18567	358947	3783606	11	726	3	
1165	-118.53178	34.18641	358847	3783885	-118.53086	34.18641	358928	3783689	11	727	3	
1166	-118.53170	34.18735	358856	3783990	-118.53078	34.18735	358937	3783793	11	726	3	
1167	-118.53176	34.18873	358853	3784143	-118.53084	34.18873	358934	3783946	11	725	3	
1168	-118.53155	34.18946	358873	3784223	-118.53063	34.18946	358955	3784026	11	726	3	
1169	-118.53141	34.19018	358887	3784303	-118.53049	34.19018	358969	3784106	11	726	5	
1170	-118.53062	34.19112	358962	3784406	-118.52970	34.19112	359043	3784209	11	727	3	
1171	-118.52991	34.19180	359028	3784481	-118.52899	34.19180	359110	3784284	11	728	3	
1172	-118.52825	34.19266	359183	3784574	-118.52733	34.19266	359264	3784377	11	728	3	
1173	-118.52820	34.19349	359189	3784666	-118.52728	34.19349	359270	3784469	11	729	3	
1174	-118.52569	34.19417	359421	3784738	-118.52477	34.19417	359502	3784541	11	729	5	
1175	-118.52632	34.19471	359364	3784798	-118.52540	34.19471	359445	3784601	11	730	3	
1176	-118.52605	34.19565	359390	3784902	-118.52513	34.19565	359472	3784705	11	730	3	
1177	-118.52640	34.19637	359359	3784982	-118.52548	34.19637	359441	3784786	11	731	3	
1178	-118.52645	34.19728	359356	3785083	-118.52553	34.19728	359438	3784887	11	732	3	
1179	-118.52646	34.19828	359357	3785194	-118.52554	34.19828	359438	3784998	11	733	3	
1180	-118.52616	34.19951	359387	3785330	-118.52524	34.19951	359468	3785134	11	735	3	
1181	-118.52608	34.20033	359395	3785421	-118.52516	34.20033	359477	3785224	11	736	3	
1182	-118.52611	34.20136	359394	3785535	-118.52519	34.20136	359476	3785339	11	738	3	
1183	-118.52616	34.20204	359391	3785611	-118.52524	34.20204	359472	3785414	11	739	3	
1184	-118.52589	34.20301	359417	3785718	-118.52497	34.20301	359499	3785521	11	740	3	
1185	-118.52617	34.20371	359393	3785796	-118.52525	34.20371	359474	3785599	11	741	3	
1186	-118.52631	34.20498	359382	3785937	-118.52539	34.20498	359463	3785740	11	742	3	
1187	-118.52647	34.20603	359369	3786054	-118.52555	34.20603	359450	3785857	11	742	3	
1188	-118.52634	34.20681	359382	3786140	-118.52542	34.20681	359464	3785943	11	743	3	
1189	-118.52633	34.20775	359385	3786244	-118.52541	34.20775	359466	3786048	11	744	3	
1190	-118.52611	34.20865	359406	3786344	-118.52519	34.20865	359488	3786147	11	745	3	
1191	-118.52646	34.20940	359375	3786428	-118.52554	34.20940	359457	3786231	11	746	3	
1192	-118.52647	34.21040	359376	3786538	-118.52555	34.21040	359458	3786342	11	747	3	
1193	-118.52650	34.21128	359375	3786636	-118.52558	34.21128	359456	3786439	11	748	3	
1194	-118.52644	34.21236	359382	3786756	-118.52552	34.21236	359464	3786559	11	749	3	
1195	-118.52614	34.21310	359411	3786837	-118.52522	34.21310	359492	3786641	11	750	3	
1196	-118.52645	34.21417	359384	3786957	-118.52553	34.21417	359466	3786760	11	752	3	
1197	-118.52650	34.21487	359381	3787034	-118.52558	34.21487	359462	3786837	11	753	3	
1198	-118.52620	34.21594	359410	3787152	-118.52528	34.21594	359492	3786956	11	756	3	
1199	-118.52650	34.21657	359384	3787223	-118.52558	34.21657	359465	3787026	11	757	3	
1200	-118.52655	34.21761	359381	3787338	-118.52563	34.21761	359462	3787141	11	759	3	
1201	-118.52657	34.21853	359380	3787440	-118.52565	34.21853	359462	3787243	11	762	3	

Table 3. Seismograph Coordinates

	Geographic WGS84		UTM (NAD83 datum)		Geographic NAD27 datum		UTM (NAD27 datum)		UTM	ELEV	gps	
LOCATION	LONG	LAT	easting (X)	northing (Y)	LONG	LAT	easting (X)	northing (Y)	ZONE	(FT)	flag	NOTES
1202	-118.52649	34.21970	359390	3787570	-118.52557	34.21970	359471	3787373	11	766	3	
1203	-118.52319	34.22014	359694	3787614	-118.52227	34.22014	359776	3787417	11	770	3	
1204	-118.52280	34.22138	359732	3787751	-118.52188	34.22138	359814	3787554	11	774	3	
1205	-118.52393	34.22193	359629	3787814	-118.52301	34.22193	359711	3787617	11	776	3	
1206	-118.52282	34.22271	359733	3787899	-118.52190	34.22271	359814	3787702	11	779	3	
1207	-118.52282	34.22407	359735	3788049	-118.52190	34.22407	359817	3787853	11	785	3	
1208	-118.52575	34.22520	359467	3788179	-118.52483	34.22520	359549	3787982	11	790	5	
1209	-118.52609	34.22627	359438	3788298	-118.52517	34.22627	359519	3788101	11	794	3	
1210	-118.52575	34.22667	359469	3788342	-118.52483	34.22667	359551	3788145	11	799	3	
1211	-118.52649	34.22749	359403	3788434	-118.52557	34.22749	359484	3788237	11	803	3	
1212	-118.52312	34.22787	359714	3788471	-118.52220	34.22787	359795	3788274	11	804	3	
1213	-118.52324	34.22933	359705	3788633	-118.52232	34.22933	359787	3788436	11	810	3	
1214	-118.52298	34.23025	359731	3788735	-118.52206	34.23025	359812	3788538	11	815	3	
1215	-118.52296	34.23107	359734	3788826	-118.52204	34.23107	359815	3788629	11	820	3	
1216	-118.52325	34.23209	359709	3788939	-118.52233	34.23209	359790	3788743	11	826	3	
1217	-118.52270	34.23295	359761	3789034	-118.52178	34.23295	359842	3788837	11	831	3	
1218	-118.52286	34.23383	359748	3789132	-118.52194	34.23383	359829	3788935	11	837	3	
1219	-118.52329	34.23473	359709	3789232	-118.52237	34.23473	359791	3789035	11	842	3	
1220	-118.52338	34.23550	359702	3789318	-118.52246	34.23550	359784	3789121	11	846	3	
1221	-118.52349	34.23636	359694	3789413	-118.52257	34.23636	359775	3789216	11	851	3	
1222	-118.52574	34.23723	359488	3789513	-118.52482	34.23723	359569	3789316	11	855	3	
1223	-118.52602	34.23813	359464	3789613	-118.52510	34.23813	359545	3789416	11	861	3	
1224	-118.52597	34.23904	359470	3789714	-118.52505	34.23904	359551	3789517	11	865	3	
1225	-118.52514	34.24005	359548	3789825	-118.52422	34.24005	359629	3789628	11	871	3	
1226	-118.52546	34.24100	359520	3789931	-118.52454	34.24100	359601	3789734	11	876	3	
1227	-118.52533	34.24191	359534	3790031	-118.52441	34.24191	359615	3789834	11	882	3	
1228	-118.52514	34.24280	359552	3790130	-118.52422	34.24280	359634	3789933	11	887	3	
1229	-118.52459	34.24350	359604	3790207	-118.52367	34.24350	359686	3790010	11	892	3	
1230	-118.52572	34.24441	359502	3790309	-118.52480	34.24441	359583	3790112	11	897	3	
1231	-118.52489	34.24538	359580	3790415	-118.52397	34.24538	359661	3790219	11	903	3	
1232	-118.52473	34.24635	359596	3790523	-118.52381	34.24635	359678	3790326	11	909	3	
1233	-118.52458	34.24731	359612	3790629	-118.52366	34.24731	359693	3790432	11	914	3	
1234	-118.52429	34.24824	359640	3790732	-118.52337	34.24824	359721	3790535	11	921	3	
1235	-118.52431	34.24922	359640	3790840	-118.52339	34.24922	359721	3790644	11	927	3	
1236	-118.52470	34.24990	359605	3790916	-118.52378	34.24990	359686	3790720	11	931	3	
1237	-118.52427	34.25113	359646	3791052	-118.52335	34.25113	359728	3790855	11	942	3	
1238	-118.52408	34.25180	359665	3791126	-118.52316	34.25180	359747	3790929	11	947	3	
1239	-118.52369	34.25273	359703	3791229	-118.52277	34.25273	359784	3791032	11	951	3	
1240	-118.52377	34.25355	359696	3791320	-118.52285	34.25355	359778	3791123	11	965	3	
1241	-118.52352	34.25441	359721	3791415	-118.52260	34.25441	359802	3791218	11	965	3	
1242	-118.52355	34.25539	359720	3791524	-118.52263	34.25539	359801	3791327	11	970	3	

Table 3. Seismograph Coordinates

	Geographic WGS84		UTM (NAD83 datum)		Geographic NAD27 datum		UTM (NAD27 datum)		UTM	ELEV	gps	
LOCATION	LONG	LAT	easting (X)	northing (Y)	LONG	LAT	easting (X)	northing (Y)	ZONE	(FT)	flag	NOTES
1243	-118.52354	34.25624	359722	3791618	-118.52262	34.25624	359804	3791421	11	969	3	
1244	-118.52321	34.25821	359756	3791836	-118.52229	34.25821	359837	3791639	11	974	3	
1245	-118.52349	34.25874	359731	3791895	-118.52257	34.25874	359812	3791698	11	989	3	
1246	-118.52351	34.25963	359731	3791994	-118.52259	34.25963	359812	3791797	11	992	3	
1247	-118.52398	34.26050	359689	3792091	-118.52306	34.26050	359770	3791894	11	998	3	
1248	-118.52397	34.26133	359691	3792183	-118.52305	34.26133	359773	3791986	11	1009	1	
1249	-118.52408	34.26235	359683	3792296	-118.52316	34.26235	359764	3792099	11	1012	3	
1250	-118.52353	34.26316	359735	3792385	-118.52261	34.26316	359816	3792189	11	1016	3	
1251	-118.52358	34.26408	359731	3792487	-118.52266	34.26408	359813	3792291	11	1021	3	
1252	-118.52357	34.26469	359733	3792555	-118.52265	34.26469	359815	3792358	11	1027	3	
1253	-118.52360	34.26584	359733	3792683	-118.52268	34.26584	359814	3792486	11	1031	3	
1254	-118.52360	34.26660	359734	3792767	-118.52268	34.26660	359815	3792570	11	1041	1	
1255	-118.52358	34.26743	359737	3792859	-118.52266	34.26743	359818	3792662	11	1047	3	
1256	-118.52358	34.26817	359738	3792941	-118.52266	34.26816	359819	3792744	11	1052	1	
1257	-118.52364	34.26914	359734	3793049	-118.52272	34.26914	359816	3792852	11	1057	3	
1258	-118.52386	34.27005	359716	3793150	-118.52294	34.27005	359797	3792953	11	1065	3	
1259	-118.52335	34.27110	359764	3793266	-118.52243	34.27110	359846	3793069	11	1076	3	
1260	-118.52335	34.27196	359766	3793361	-118.52243	34.27196	359847	3793164	11	1087	3	
1261	-118.52336	34.27308	359767	3793485	-118.52244	34.27308	359848	3793288	11	1104	3	
1262	-118.52351	34.27390	359754	3793576	-118.52259	34.27390	359836	3793380	11	1117	3	
1263	-118.52358	34.27483	359749	3793680	-118.52266	34.27483	359831	3793483	11	1132	3	
1264	-118.52350	34.27567	359758	3793773	-118.52258	34.27567	359840	3793576	11	1145	3	
1265	-118.52335	34.27656	359773	3793871	-118.52243	34.27656	359855	3793674	11	1153	3	
1266	-118.52361	34.27769	359751	3793997	-118.52269	34.27769	359833	3793800	11	1167	3	
1268	-118.52363	34.27918	359752	3794162	-118.52271	34.27918	359833	3793965	11	1192	3	
1269	-118.52425	34.28029	359697	3794286	-118.52333	34.28029	359778	3794089	11	1219	3	
1270	-118.52489	34.28093	359639	3794358	-118.52397	34.28093	359720	3794161	11	1214	3	
1271	-118.52535	34.28208	359598	3794486	-118.52443	34.28208	359680	3794289	11	1241	3	
1272	-118.52619	34.28343	359523	3794637	-118.52527	34.28343	359605	3794440	11	1300	3	
1273	-118.52626	34.28417	359518	3794719	-118.52534	34.28417	359600	3794522	11	1301	3	
1274	-118.52650	34.28509	359498	3794821	-118.52558	34.28509	359579	3794625	11	1318	3	
1275	-118.52630	34.28598	359517	3794920	-118.52538	34.28598	359599	3794723	11	1320	3	
1276	-118.52658	34.28687	359493	3795019	-118.52566	34.28687	359575	3794822	11	1325	3	
1277	-118.52739	34.28785	359420	3795129	-118.52647	34.28785	359502	3794932	11	1310	3	
1278	-118.52768	34.28880	359395	3795234	-118.52676	34.28880	359477	3795038	11	1345	3	
1279	-118.52775	34.28938	359390	3795299	-118.52683	34.28938	359471	3795102	11	1343	3	
1280	-118.52860	34.29036	359313	3795409	-118.52768	34.29036	359394	3795212	11	1370	3	
1281	-118.52841	34.29155	359333	3795540	-118.52749	34.29155	359414	3795344	11	1414	3	
1282	-118.52861	34.29205	359315	3795596	-118.52769	34.29205	359396	3795399	11	1436	3	
1283	-118.52948	34.29328	359237	3795734	-118.52856	34.29328	359318	3795537	11	1498	3	
1284	-118.52925	34.29426	359260	3795842	-118.52833	34.29426	359341	3795645	11	1505	3	

Table 3. Seismograph Coordinates

	Geographic WGS84		UTM (NAD83 datum)		Geographic NAD27 datum		UTM (NAD27 datum)		UTM	ELEV	gps	
LOCATION	LONG	LAT	easting (X)	northing (Y)	LONG	LAT	easting (X)	northing (Y)	ZONE	(FT)	flag	NOTES
1285	-118.52950	34.29508	359238	3795933	-118.52858	34.29508	359320	3795737	11	1490	3	
1286	-118.52930	34.29591	359258	3796025	-118.52838	34.29591	359339	3795828	11	1484	3	
1287	-118.52868	34.29664	359316	3796105	-118.52776	34.29664	359398	3795909	11	1507	3	
1288	-118.52856	34.29706	359328	3796152	-118.52764	34.29706	359409	3795955	11	1559	3	
1289	-118.53017	34.29878	359183	3796345	-118.52925	34.29878	359264	3796148	11	1575	1	
1290	-118.53043	34.29991	359161	3796470	-118.52951	34.29991	359242	3796274	11	1654	2	
1291	-118.53113	34.30063	359097	3796551	-118.53021	34.30063	359179	3796354	11	1729	2	
1292	-118.53233	34.30192	358989	3796696	-118.53141	34.30192	359070	3796499	11	1695	2	
1293	-118.53227	34.30240	358995	3796749	-118.53135	34.30240	359077	3796552	11	1787	2	
1294	-118.53297	34.30404	358934	3796932	-118.53205	34.30404	359015	3796735	11	1991	2	
1295	-118.53338	34.30473	358897	3797009	-118.53246	34.30473	358979	3796812	11	1989	2	
1296	-118.53400	34.30613	358842	3797165	-118.53308	34.30613	358924	3796968	11	2109	2	
1297	-118.53410	34.30726	358835	3797291	-118.53318	34.30726	358917	3797094	11	2297	2	
1298	-118.53388	34.30802	358857	3797375	-118.53296	34.30802	358938	3797178	11	2437	2	
1299	-118.53393	34.30844	358853	3797421	-118.53301	34.30844	358934	3797224	11	2460	2	
1300	-118.53399	34.30899	358848	3797482	-118.53307	34.30899	358930	3797285	11	2495	2	
1301	-118.53357	34.30984	358888	3797576	-118.53265	34.30984	358969	3797379	11	2621	7	INTERP
1302	-118.53316	34.31070	358927	3797671	-118.53224	34.31070	359009	3797474	11	2681	2	
1303	-118.53301	34.31161	358943	3797771	-118.53209	34.31161	359024	3797575	11	2671	2	
1304	-118.53386	34.31256	358866	3797878	-118.53294	34.31256	358947	3797681	11	2710	2	
1305	-118.53369	34.31340	358883	3797971	-118.53277	34.31340	358965	3797774	11	2713	2	
1306	-118.53339	34.31415	358912	3798054	-118.53247	34.31415	358993	3797857	11	2715	2	
1307	-118.53480	34.31531	358784	3798184	-118.53388	34.31531	358866	3797987	11	2706	2	
1308	-118.53599	34.31640	358677	3798307	-118.53507	34.31640	358758	3798110	11	2665	2	
1309	-118.53764	34.31741	358526	3798421	-118.53672	34.31741	358608	3798224	11	2652	2	
1310	-118.53867	34.31861	358434	3798556	-118.53775	34.31861	358515	3798359	11	2571	2	
1311	-118.53957	34.31949	358352	3798654	-118.53865	34.31949	358434	3798458	11	2587	2	
1312	-118.54010	34.32044	358305	3798761	-118.53918	34.32044	358386	3798564	11	2618	2	
1313	-118.54089	34.32103	358233	3798827	-118.53997	34.32103	358315	3798630	11	2636	2	
1314	-118.54160	34.32183	358169	3798917	-118.54068	34.32183	358251	3798720	11	2647	2	
1315	-118.54301	34.32291	358042	3799039	-118.54209	34.32291	358123	3798842	11	2649	2	
1316	-118.54630	34.32405	357741	3799170	-118.54538	34.32405	357822	3798973	11	2710	2	
1317	-118.54725	34.32529	357655	3799308	-118.54633	34.32529	357737	3799112	11	2770	2	
1318	-118.54760	34.32623	357625	3799413	-118.54668	34.32623	357706	3799216	11	2744	2	
1319	-118.54783	34.32689	357605	3799487	-118.54691	34.32689	357686	3799290	11	2738	2	
1320	-118.54723	34.32770	357661	3799576	-118.54631	34.32770	357743	3799379	11	2693	2	
1321	-118.54633	34.32829	357745	3799640	-118.54541	34.32829	357827	3799443	11	2675	2	
1322	-118.54542	34.32899	357830	3799716	-118.54450	34.32899	357911	3799519	11	2612	2	
1323	-118.54498	34.33021	357873	3799851	-118.54406	34.33021	357954	3799654	11	2582	2	
1324	-118.54543	34.33110	357833	3799950	-118.54451	34.33110	357914	3799753	11	2535	2	
1325	-118.54572	34.33219	357808	3800071	-118.54480	34.33219	357889	3799875	11	2490	2	

Table 3. Seismograph Coordinates

	Geographic WGS84		UTM (NAD83 datum)		Geographic NAD27 datum		UTM (NAD27 datum)		UTM	ELEV	gps	
LOCATION	LONG	LAT	easting (X)	northing (Y)	LONG	LAT	easting (X)	northing (Y)	ZONE	(FT)	flag	NOTES
1326	-118.54565	34.33325	357816	3800189	-118.54473	34.33325	357897	3799992	11	2459	2	
1327	-118.54596	34.33422	357789	3800297	-118.54504	34.33422	357871	3800100	11	2416	2	
1328	-118.54515	34.33465	357864	3800343	-118.54423	34.33465	357946	3800147	11	2348	2	
1329	-118.54450	34.33577	357926	3800467	-118.54358	34.33577	358007	3800270	11	2179	2	
1330	-118.54435	34.33671	357941	3800571	-118.54343	34.33671	358023	3800374	11	2137	2	
1331	-118.54261	34.33742	358103	3800647	-118.54169	34.33742	358184	3800450	11	1946	2	
1332	-118.54192	34.33815	358167	3800727	-118.54100	34.33815	358249	3800530	11	1818	2	
1333	-118.54083	34.33886	358269	3800804	-118.53991	34.33886	358350	3800608	11	1758	2	
1334	-118.54017	34.34010	358332	3800941	-118.53925	34.34010	358413	3800744	11	1642	2	
1335	-118.54071	34.34103	358284	3801045	-118.53979	34.34103	358365	3800848	11	1602	2	
1336	-118.54036	34.34182	358317	3801132	-118.53944	34.34182	358399	3800935	11	1689	7	INTERP
1337	-118.54002	34.34262	358350	3801220	-118.53910	34.34262	358431	3801023	11	1627	2	
1338	-118.54044	34.34396	358313	3801369	-118.53952	34.34396	358395	3801173	11	1609	2	
1339	-118.53790	34.34418	358547	3801390	-118.53698	34.34418	358629	3801193	11	1763	2	
1340	-118.53853	34.34509	358491	3801492	-118.53761	34.34509	358572	3801295	11	1774	2	
1341	-118.53652	34.34632	358678	3801626	-118.53560	34.34632	358759	3801429	11	1594	2	
1342	-118.53591	34.34680	358735	3801678	-118.53499	34.34680	358816	3801481	11	1591	2	
1344	-118.53434	34.34802	358881	3801811	-118.53342	34.34802	358963	3801614	11	1576	2	
1345	-118.53411	34.34956	358905	3801982	-118.53319	34.34956	358986	3801785	11	1724	2	
1346	-118.53248	34.35040	359056	3802072	-118.53156	34.35040	359138	3801876	11	1884	2	
1347	-118.53137	34.35103	359160	3802141	-118.53045	34.35103	359241	3801944	11	1880	2	
1348	-118.53104	34.35193	359191	3802240	-118.53012	34.35193	359273	3802043	11	1771	2	
1349	-118.52911	34.35239	359370	3802288	-118.52819	34.35239	359451	3802092	11	1658	2	
1350	-118.52959	34.35462	359329	3802536	-118.52867	34.35462	359411	3802340	11	1610	2	
1351	-118.52934	34.35469	359352	3802544	-118.52842	34.35469	359434	3802347	11	1590	2	
1352	-118.52905	34.35560	359381	3802644	-118.52813	34.35560	359462	3802448	11	1543	2	
1353	-118.52900	34.35657	359387	3802752	-118.52808	34.35657	359468	3802555	11	1518	2	
1354	-118.52846	34.35739	359438	3802842	-118.52754	34.35739	359519	3802645	11	1507	2	
1355	-118.52784	34.35836	359496	3802949	-118.52692	34.35836	359578	3802752	11	1492	2	
1356	-118.52825	34.35910	359460	3803031	-118.52733	34.35910	359541	3802835	11	1468	2	
1357	-118.52827	34.35998	359460	3803129	-118.52735	34.35998	359541	3802932	11	1460	2	
1358	-118.52831	34.36087	359457	3803228	-118.52739	34.36087	359539	3803031	11	1448	2	
1359	-118.52850	34.36179	359441	3803330	-118.52758	34.36179	359523	3803133	11	1438	2	
1361	-118.52649	34.36342	359629	3803508	-118.52557	34.36342	359710	3803311	11	1567	2	
1363	-118.52574	34.36501	359701	3803683	-118.52482	34.36501	359782	3803487	11	1529	2	
1364	-118.52719	34.36628	359569	3803826	-118.52627	34.36628	359651	3803630	11	1551	2	
1365	-118.52782	34.36701	359513	3803908	-118.52690	34.36701	359594	3803711	11	1581	2	
1368	-118.52378	34.36775	359885	3803985	-118.52286	34.36775	359967	3803788	11	1367	3.1	
1369	-118.52355	34.36927	359909	3804153	-118.52263	34.36927	359990	3803956	11	1363	3.1	
1372	-118.52244	34.37242	360016	3804501	-118.52152	34.37242	360098	3804304	11	1324	3.1	
1374	-118.51797	34.37416	360430	3804687	-118.51705	34.37416	360512	3804491	11	1322	3.1	

Table 3. Seismograph Coordinates

	Geographic WGS84		UTM (NAD83 datum)		Geographic NAD27 datum		UTM (NAD27 datum)		UTM	ELEV	gps	
LOCATION	LONG	LAT	easting (X)	northing (Y)	LONG	LAT	easting (X)	northing (Y)	ZONE	(FT)	flag	NOTES
1375	-118.51709	34.37543	360513	3804827	-118.51617	34.37543	360595	3804630	11	1329	2	
1376	-118.51662	34.37621	360558	3804913	-118.51570	34.37621	360639	3804716	11	1401	2	
1377	-118.51628	34.37718	360591	3805020	-118.51536	34.37718	360672	3804823	11	1446	2	
1378	-118.51541	34.37763	360672	3805069	-118.51449	34.37763	360753	3804872	11	1440	2	
1379	-118.51662	34.37905	360563	3805228	-118.51570	34.37905	360644	3805031	11	1447	2	
1380	-118.51630	34.38056	360595	3805395	-118.51538	34.38056	360676	3805198	11	1320	2	
1381	-118.51543	34.38195	360677	3805548	-118.51451	34.38195	360758	3805351	11	1309	2	
1382	-118.51415	34.38267	360796	3805626	-118.51323	34.38267	360877	3805429	11	1310	2	
1383	-118.51316	34.38367	360888	3805735	-118.51224	34.38367	360970	3805539	11	1310	2	
1384	-118.51246	34.38438	360954	3805813	-118.51154	34.38438	361035	3805617	11	1312	2	
1385	-118.51150	34.38498	361043	3805878	-118.51058	34.38498	361124	3805682	11	1318	2	
1386	-118.51093	34.38561	361097	3805947	-118.51001	34.38561	361178	3805751	11	1329	2	
1387	-118.51022	34.38636	361163	3806030	-118.50930	34.38636	361244	3805833	11	1423	2	
1388	-118.50893	34.38750	361284	3806154	-118.50801	34.38750	361365	3805958	11	1447	2	
1389	-118.50831	34.38820	361342	3806231	-118.50739	34.38820	361423	3806034	11	1353	2	
1390	-118.50711	34.38890	361453	3806307	-118.50619	34.38890	361535	3806110	11	1492	2	
1391	-118.50593	34.38993	361563	3806420	-118.50501	34.38993	361645	3806223	11	1336	2	
1392	-118.50567	34.39075	361589	3806510	-118.50475	34.39075	361670	3806314	11	1345	2	
1393	-118.50445	34.39255	361704	3806708	-118.50353	34.39255	361785	3806512	11	1607	2	
1394	-118.50368	34.39313	361776	3806772	-118.50276	34.39313	361857	3806575	11	1614	2	
1395	-118.50280	34.39369	361857	3806832	-118.50188	34.39369	361939	3806636	11	1640	2	
1396	-118.50208	34.39439	361925	3806909	-118.50116	34.39439	362006	3806712	11	1662	2	
1397	-118.50171	34.39543	361960	3807024	-118.50079	34.39543	362042	3806827	11	1636	2	
1398	-118.50180	34.39664	361954	3807158	-118.50088	34.39664	362035	3806962	11	1566	2	
1399	-118.50203	34.39724	361934	3807225	-118.50111	34.39724	362015	3807028	11	1632	2	
1400	-118.50169	34.39773	361966	3807279	-118.50077	34.39773	362047	3807082	11	1655	2	
1401	-118.50135	34.39871	361999	3807387	-118.50043	34.39871	362080	3807191	11	1588	2	
1402	-118.50132	34.40012	362004	3807544	-118.50040	34.40012	362085	3807347	11	1581	2	
1403	-118.50121	34.40044	362015	3807579	-118.50029	34.40044	362096	3807382	11	1545	2	
1404	-118.50166	34.40122	361975	3807666	-118.50074	34.40122	362056	3807469	11	1494	2	
1405	-118.50177	34.40211	361966	3807765	-118.50085	34.40212	362047	3807568	11	1467	7	INTERP
1406	-118.50188	34.40300	361957	3807864	-118.50096	34.40300	362039	3807667	11	1452	2	
1407	-118.50212	34.40386	361937	3807959	-118.50120	34.40386	362018	3807763	11	1450	2	
1408	-118.50221	34.40474	361930	3808057	-118.50129	34.40474	362011	3807860	11	1445	2	
1409	-118.50238	34.40563	361916	3808156	-118.50146	34.40563	361997	3807959	11	1419	2	
1410	-118.50267	34.40651	361890	3808254	-118.50175	34.40651	361972	3808057	11	1397	2	
1411	-118.50261	34.40749	361898	3808363	-118.50169	34.40749	361979	3808166	11	1391	2	
1412	-118.50249	34.40843	361910	3808467	-118.50157	34.40843	361991	3808270	11	1376	2	
1413	-118.50240	34.40939	361920	3808573	-118.50148	34.40939	362001	3808376	11	1369	7	INTERP
1414	-118.50713	34.41112	361488	3808771	-118.50621	34.41112	361569	3808575	11	1374	2	
1415	-118.50779	34.41147	361428	3808811	-118.50687	34.41147	361509	3808614	11	1403	2	

Table 3. Seismograph Coordinates

	Geographic WGS84		UTM (NAD83 datum)		Geographic NAD27 datum		UTM (NAD27 datum)		UTM	ELEV	gps	
LOCATION	LONG	LAT	easting (X)	northing (Y)	LONG	LAT	easting (X)	northing (Y)	ZONE	(FT)	flag	NOTES
1416	-118.50786	34.41239	361423	3808913	-118.50694	34.41239	361504	3808717	11	1377	2	
1417	-118.50824	34.41330	361390	3809015	-118.50732	34.41330	361471	3808818	11	1385	2	
1418	-118.50864	34.41445	361355	3809143	-118.50772	34.41445	361436	3808946	11	1291	2	
1419	-118.50932	34.41552	361294	3809262	-118.50840	34.41552	361375	3809066	11	1298	2	
1420	-118.50961	34.41640	361269	3809360	-118.50869	34.41640	361350	3809164	11	1246	2	
1421	-118.50978	34.41728	361255	3809458	-118.50886	34.41728	361336	3809262	11	1240	2	
1422	-118.51025	34.41854	361214	3809598	-118.50933	34.41854	361295	3809402	11	1238	2	
1423	-118.51047	34.41941	361195	3809695	-118.50955	34.41941	361276	3809499	11	1240	2	
1424	-118.51069	34.42038	361176	3809803	-118.50977	34.42038	361257	3809607	11	1241	2	
1425	-118.51085	34.42137	361163	3809913	-118.50993	34.42137	361244	3809717	11	1237	2	
1426	-118.51104	34.42238	361147	3810025	-118.51012	34.42238	361229	3809829	11	1241	2	
1427	-118.51117	34.42335	361137	3810133	-118.51025	34.42335	361218	3809937	11	1242	2	
1428	-118.51161	34.42422	361098	3810230	-118.51069	34.42422	361179	3810034	11	1241	2	
1429	-118.51179	34.42516	361083	3810335	-118.51087	34.42516	361164	3810138	11	1245	2	
1430	-118.51385	34.42602	360895	3810433	-118.51293	34.42602	360976	3810236	11	1425	2	
1431	-118.51348	34.42692	360931	3810532	-118.51256	34.42692	361012	3810336	11	1427	2	
1432	-118.51325	34.42779	360953	3810628	-118.51233	34.42779	361034	3810432	11	1440	2	
1433	-118.51301	34.42855	360976	3810712	-118.51209	34.42855	361058	3810516	11	1467	2	
1434	-118.51296	34.42948	360983	3810815	-118.51204	34.42948	361064	3810619	11	1498	2	
1435	-118.51308	34.43037	360973	3810914	-118.51216	34.43037	361054	3810718	11	1513	2	
1436	-118.51234	34.43116	361042	3811001	-118.51142	34.43116	361124	3810804	11	1601	2	
1437	-118.51124	34.43166	361144	3811055	-118.51032	34.43166	361226	3810858	11	1602	2	
1438	-118.51029	34.43257	361233	3811154	-118.50937	34.43257	361314	3810958	11	1608	2	
1439	-118.50958	34.43363	361300	3811271	-118.50866	34.43363	361381	3811074	11	1599	2	
1440	-118.50811	34.43412	361436	3811323	-118.50719	34.43412	361517	3811127	11	1602	2	
1441	-118.50776	34.43500	361470	3811420	-118.50684	34.43500	361551	3811224	11	1602	2	
1442	-118.50725	34.43567	361518	3811494	-118.50633	34.43567	361599	3811298	11	1613	2	
1443	-118.50541	34.43667	361688	3811602	-118.50449	34.43667	361769	3811406	11	1636	2	
1446	-118.50559	34.43945	361676	3811911	-118.50467	34.43945	361758	3811714	11	1626	3.1	
1449	-118.50673	34.44284	361577	3812289	-118.50581	34.44284	361658	3812092	11	1348	3.1	
1451	-118.50621	34.44404	361627	3812421	-118.50529	34.44404	361708	3812224	11	1327	3.1	
1454	-118.50551	34.44744	361697	3812797	-118.50459	34.44744	361778	3812600	11	1304	3.1	
1456	-118.50661	34.44913	361599	3812986	-118.50569	34.44914	361680	3812789	11	1306	3.1	
1458	-118.50634	34.45024	361625	3813109	-118.50542	34.45025	361706	3812912	11	1309	3.1	
1459	-118.50798	34.45101	361476	3813196	-118.50706	34.45102	361557	3813000	11	1317	3.1	
1460	-118.50708	34.45275	361561	3813388	-118.50616	34.45276	361643	3813191	11	1384	2	
1461	-118.50710	34.45337	361561	3813457	-118.50618	34.45338	361642	3813260	11	1376	2	
1462	-118.50708	34.45428	361564	3813558	-118.50616	34.45429	361645	3813361	11	1390	2	
1463	-118.50700	34.45519	361573	3813659	-118.50608	34.45520	361654	3813462	11	1405	2	
1464	-118.50660	34.45613	361611	3813762	-118.50568	34.45614	361692	3813566	11	1414	2	
1465	-118.50634	34.45702	361636	3813861	-118.50542	34.45703	361718	3813664	11	1444	2	

Table 3. Seismograph Coordinates

	Geographic WGS84		UTM (NAD83 datum)		Geographic NAD27 datum		UTM (NAD27 datum)		UTM	ELEV	gps	
LOCATION	LONG	LAT	easting (X)	northing (Y)	LONG	LAT	easting (X)	northing (Y)	ZONE	(FT)	flag	NOTES
1466	-118.50607	34.45788	361663	3813956	-118.50515	34.45789	361744	3813759	11	1499	2	
1467	-118.50606	34.45886	361665	3814064	-118.50514	34.45887	361746	3813868	11	1550	2	
1468	-118.50505	34.45959	361759	3814144	-118.50413	34.45960	361840	3813947	11	1575	2	
1469	-118.50493	34.46022	361771	3814214	-118.50401	34.46023	361852	3814017	11	1545	2	
1470	-118.50444	34.46101	361817	3814300	-118.50352	34.46102	361899	3814104	11	1501	2	
1471	-118.50407	34.46225	361854	3814437	-118.50315	34.46226	361935	3814241	11	1482	2	
1472	-118.50461	34.46342	361806	3814568	-118.50369	34.46343	361887	3814371	11	1556	2	
1473	-118.50571	34.46416	361706	3814652	-118.50479	34.46417	361787	3814455	11	1446	2	
1474	-118.50672	34.46550	361615	3814802	-118.50580	34.46551	361697	3814605	11	1470	2	
1475	-118.50718	34.46659	361575	3814923	-118.50626	34.46660	361656	3814726	11	1419	7	INTERP
1476	-118.50765	34.46768	361534	3815045	-118.50673	34.46769	361615	3814848	11	1396	2	
1477	-118.50758	34.46863	361542	3815150	-118.50666	34.46864	361623	3814953	11	1410	2	
1478	-118.50813	34.46956	361493	3815254	-118.50721	34.46957	361574	3815057	11	1405	2	
1480	-118.50841	34.47049	361468	3815357	-118.50749	34.47050	361550	3815161	11	1412	2	
1481	-118.50869	34.47134	361444	3815452	-118.50777	34.47135	361525	3815255	11	1413	2	
1482	-118.50902	34.47217	361415	3815544	-118.50810	34.47218	361496	3815348	11	1410	2	
1483	-118.50914	34.47331	361406	3815671	-118.50822	34.47332	361487	3815474	11	1426	2	
1484	-118.50915	34.47410	361406	3815759	-118.50823	34.47411	361488	3815562	11	1431	2	
1485	-118.50926	34.47544	361399	3815907	-118.50834	34.47545	361480	3815711	11	1440	2	
1486	-118.50959	34.47636	361370	3816010	-118.50867	34.47637	361451	3815813	11	1452	2	
1487	-118.50935	34.47731	361393	3816115	-118.50843	34.47732	361475	3815918	11	1443	2	
1488	-118.50934	34.47825	361396	3816219	-118.50842	34.47826	361477	3816023	11	1454	2	
1489	-118.50941	34.47911	361391	3816315	-118.50849	34.47912	361472	3816118	11	1458	2	
1490	-118.50951	34.48008	361383	3816422	-118.50859	34.48009	361464	3816226	11	1462	2	
1491	-118.50957	34.48110	361380	3816535	-118.50865	34.48111	361461	3816339	11	1466	2	
1492	-118.51086	34.48189	361262	3816625	-118.50994	34.48190	361343	3816428	11	1485	2	
1493	-118.51173	34.48262	361184	3816707	-118.51081	34.48263	361265	3816510	11	1494	2	
1494	-118.51222	34.48362	361140	3816819	-118.51130	34.48363	361221	3816622	11	1544	2	
1495	-118.51486	34.48452	360899	3816922	-118.51394	34.48453	360981	3816725	11	1622	2	
1496	-118.51718	34.48617	360689	3817108	-118.51626	34.48618	360770	3816912	11	1668	2	
1498	-118.51835	34.48806	360585	3817319	-118.51743	34.48807	360666	3817123	11	1860	2	
1499	-118.51849	34.48877	360573	3817398	-118.51757	34.48878	360654	3817202	11	1891	2	
1500	-118.51862	34.48987	360563	3817520	-118.51770	34.48988	360644	3817324	11	1913	2	
1501	-118.51891	34.49198	360540	3817755	-118.51799	34.49199	360621	3817558	11	1940	2	
1502	-118.51943	34.49239	360493	3817801	-118.51851	34.49240	360574	3817605	11	1950	2	
1503	-118.51997	34.49311	360444	3817882	-118.51905	34.49312	360526	3817685	11	1930	2	
1504	-118.51926	34.49391	360511	3817969	-118.51834	34.49392	360592	3817773	11	1938	2	
1505	-118.51896	34.49432	360539	3818014	-118.51804	34.49433	360620	3817818	11	1934	2	
1506	-118.51946	34.49519	360495	3818112	-118.51854	34.49520	360576	3817915	11	1909	2	
1507	-118.51963	34.49607	360481	3818209	-118.51871	34.49608	360562	3818013	11	1906	2	
1508	-118.51808	34.49729	360625	3818343	-118.51716	34.49730	360706	3818146	11	1850	2	

Table 3. Seismograph Coordinates

	Geographic WGS84		UTM (NAD83 datum)		Geographic NAD27 datum		UTM (NAD27 datum)		UTM	ELEV	gps	
LOCATION	LONG	LAT	easting (X)	northing (Y)	LONG	LAT	easting (X)	northing (Y)	ZONE	(FT)	flag	NOTES
1509	-118.51866	34.49835	360573	3818461	-118.51774	34.49836	360655	3818264	11	1853	2	
1510	-118.51812	34.49913	360624	3818547	-118.51720	34.49914	360705	3818350	11	1866	2	
1511	-118.51906	34.49996	360539	3818640	-118.51814	34.49997	360621	3818444	11	1880	2	
1512	-118.51813	34.50027	360625	3818673	-118.51721	34.50028	360706	3818477	11	1782	2	
1513	-118.51822	34.50136	360619	3818794	-118.51730	34.50137	360700	3818598	11	1771	2	
1514	-118.51813	34.50188	360628	3818852	-118.51721	34.50189	360709	3818655	11	1774	2	
1515	-118.51836	34.50302	360609	3818978	-118.51744	34.50303	360690	3818782	11	1785	2	
1516	-118.51859	34.50403	360589	3819091	-118.51767	34.50404	360670	3818894	11	1786	2	
1517	-118.51864	34.50472	360586	3819167	-118.51772	34.50473	360667	3818971	11	1789	2	
1518	-118.51852	34.50517	360598	3819217	-118.51760	34.50518	360679	3819021	11	1801	2	
1519	-118.51747	34.50692	360697	3819410	-118.51655	34.50693	360778	3819213	11	1826	2	
1520	-118.51742	34.50795	360703	3819524	-118.51650	34.50796	360784	3819327	11	1859	2	
1521	-118.51731	34.50855	360714	3819590	-118.51639	34.50856	360795	3819394	11	1865	2	
1522	-118.51887	34.50984	360573	3819736	-118.51795	34.50985	360654	3819539	11	1900	2	
1523	-118.51926	34.51074	360539	3819836	-118.51834	34.51075	360620	3819639	11	1900	2	
1524	-118.51935	34.51152	360532	3819923	-118.51843	34.51153	360613	3819726	11	1926	2	
1525	-118.51905	34.51271	360562	3820054	-118.51813	34.51272	360643	3819858	11	1960	2	
1526	-118.51937	34.51346	360533	3820138	-118.51845	34.51347	360615	3819941	11	1970	2	
1527	-118.51902	34.51398	360566	3820195	-118.51810	34.51399	360648	3819998	11	1951	2	
1528	-118.51913	34.51495	360558	3820303	-118.51821	34.51496	360639	3820106	11	1976	2	
1529	-118.51786	34.51599	360676	3820416	-118.51694	34.51600	360757	3820220	11	2002	2	
1530	-118.51765	34.51687	360697	3820513	-118.51673	34.51687	360778	3820317	11	2023	7	INTERP
1531	-118.51743	34.51775	360719	3820611	-118.51651	34.51776	360800	3820414	11	2028	2	
1532	-118.51770	34.51892	360696	3820741	-118.51678	34.51893	360777	3820544	11	1994	2	
1533	-118.51703	34.51947	360758	3820801	-118.51611	34.51948	360839	3820605	11	1979	2	
1534	-118.51719	34.52038	360745	3820902	-118.51627	34.52039	360826	3820706	11	1971	2	
1535	-118.51657	34.52141	360804	3821015	-118.51565	34.52142	360885	3820819	11	1974	2	
1536	-118.51458	34.52237	360988	3821119	-118.51366	34.52238	361069	3820923	11	1991	2	
1537	-118.51344	34.52281	361093	3821166	-118.51252	34.52282	361174	3820970	11	2007	2	
1538	-118.51237	34.52421	361194	3821320	-118.51145	34.52422	361275	3821124	11	1999	2	
1539	-118.51267	34.52511	361168	3821420	-118.51175	34.52512	361249	3821224	11	1977	2	
1540	-118.51178	34.52546	361250	3821458	-118.51086	34.52547	361331	3821262	11	1979	2	
1541	-118.51300	34.52660	361140	3821586	-118.51208	34.52661	361221	3821390	11	2005	2	
1542	-118.51223	34.52720	361212	3821652	-118.51131	34.52721	361293	3821455	11	1986	2	
1543	-118.51127	34.52821	361301	3821762	-118.51035	34.52822	361383	3821566	11	2002	2	
1544	-118.50970	34.52856	361446	3821799	-118.50878	34.52857	361527	3821603	11	2005	2	
1545	-118.50830	34.52994	361577	3821950	-118.50738	34.52995	361658	3821754	11	2015	2	
1546	-118.50737	34.53125	361664	3822094	-118.50645	34.53126	361746	3821898	11	2029	2	
1547	-118.50617	34.53200	361776	3822176	-118.50525	34.53201	361857	3821979	11	2040	2	
1548	-118.50513	34.53309	361873	3822295	-118.50421	34.53310	361954	3822099	11	2066	2	
1549	-118.50436	34.53385	361945	3822378	-118.50344	34.53386	362026	3822182	11	2080	2	

Table 3. Seismograph Coordinates

	Geographic WGS84		UTM (NAD83 datum)		Geographic NAD27 datum		UTM (NAD27 datum)		UTM	ELEV	gps	
LOCATION	LONG	LAT	easting (X)	northing (Y)	LONG	LAT	easting (X)	northing (Y)	ZONE	(FT)	flag	NOTES
1550	-118.50354	34.53425	362021	3822422	-118.50262	34.53426	362102	3822225	11	2074	2	
1551	-118.50281	34.53484	362089	3822486	-118.50189	34.53485	362170	3822290	11	2079	2	
1552	-118.50328	34.53558	362047	3822569	-118.50236	34.53559	362128	3822372	11	2102	2	
1553	-118.50155	34.53757	362209	3822787	-118.50063	34.53758	362290	3822591	11	2114	2	
1554	-118.50055	34.53822	362302	3822858	-118.49963	34.53823	362383	3822661	11	2124	2	
1555	-118.49993	34.53900	362360	3822943	-118.49901	34.53901	362441	3822747	11	2119	2	
1556	-118.49936	34.53946	362413	3822994	-118.49844	34.53947	362494	3822797	11	2118	2	
1557	-118.49872	34.54001	362473	3823054	-118.49780	34.54002	362554	3822857	11	2118	2	
1558	-118.49756	34.54069	362580	3823128	-118.49664	34.54070	362661	3822931	11	2138	2	
1559	-118.49616	34.54141	362710	3823206	-118.49524	34.54142	362791	3823009	11	2145	2	
1560	-118.49501	34.54253	362817	3823328	-118.49409	34.54254	362898	3823132	11	2178	2	
1561	-118.49538	34.54340	362785	3823425	-118.49446	34.54341	362866	3823229	11	2157	2	
1562	-118.49451	34.54399	362866	3823489	-118.49359	34.54400	362947	3823293	11	2138	2	
1563	-118.49336	34.54485	362973	3823583	-118.49244	34.54486	363054	3823387	11	2168	2	
1564	-118.49266	34.54545	363038	3823649	-118.49174	34.54546	363119	3823453	11	2173	2	
1565	-118.49172	34.54672	363126	3823788	-118.49080	34.54673	363207	3823592	11	2187	2	
1566	-118.49164	34.54767	363135	3823894	-118.49072	34.54768	363216	3823697	11	2201	2	
1567	-118.49142	34.54883	363157	3824022	-118.49050	34.54884	363238	3823826	11	2229	2	
1568	-118.49051	34.54934	363241	3824077	-118.48959	34.54935	363323	3823881	11	2213	2	
1569	-118.48993	34.55008	363296	3824159	-118.48901	34.55009	363377	3823962	11	2224	2	
1570	-118.48887	34.55110	363395	3824270	-118.48795	34.55111	363476	3824074	11	2236	2	
1571	-118.48814	34.55163	363463	3824328	-118.48722	34.55164	363544	3824132	11	2252	2	
1572	-118.48836	34.55269	363444	3824446	-118.48744	34.55270	363525	3824250	11	2264	2	
1573	-118.48591	34.55333	363670	3824514	-118.48499	34.55334	363751	3824317	11	2345	2	
1574	-118.48447	34.55406	363803	3824593	-118.48355	34.55407	363884	3824396	11	2304	2	
1575	-118.48462	34.55496	363791	3824693	-118.48370	34.55497	363872	3824496	11	2217	2	
1576	-118.48408	34.55580	363842	3824785	-118.48316	34.55581	363923	3824589	11	2172	2	
1577	-118.48348	34.55667	363898	3824881	-118.48256	34.55668	363980	3824684	11	2127	2	
1578	-118.48297	34.55747	363947	3824969	-118.48205	34.55748	364028	3824772	11	2074	2	
1579	-118.48337	34.55814	363911	3825044	-118.48245	34.55815	363992	3824847	11	1943	2	
9579	-118.48405	34.55907	363850	3825148	-118.48313	34.55908	363931	3824951	11	1833	2	
1580	-118.48672	34.55931	363606	3825178	-118.48580	34.55932	363687	3824982	11	1650	2	
9580	-118.48899	34.55900	363397	3825147	-118.48807	34.55901	363478	3824950	11	1649	2	
1581	-118.48929	34.56077	363372	3825343	-118.48837	34.56078	363453	3825147	11	1653	2	
1582	-118.48899	34.56183	363401	3825460	-118.48807	34.56184	363482	3825264	11	1652	2	
1583	-118.48896	34.56271	363406	3825558	-118.48804	34.56272	363487	3825362	11	1658	2	
1584	-118.48902	34.56368	363402	3825666	-118.48810	34.56369	363483	3825469	11	1666	2	
1585	-118.48902	34.56459	363403	3825767	-118.48810	34.56460	363484	3825570	11	1690	2	
1586	-118.48909	34.56540	363398	3825857	-118.48817	34.56541	363479	3825660	11	1709	2	
1587	-118.48965	34.56627	363348	3825954	-118.48873	34.56628	363429	3825757	11	1737	2	
1588	-118.48944	34.56702	363369	3826037	-118.48852	34.56703	363450	3825841	11	1773	7	INTERP

Table 3. Seismograph Coordinates

	Geographic WGS84		UTM (NAD83 datum)		Geographic NAD27 datum		UTM (NAD27 datum)		UTM	ELEV	gps	
LOCATION	LONG	LAT	easting (X)	northing (Y)	LONG	LAT	easting (X)	northing (Y)	ZONE	(FT)	flag	NOTES
1589	-118.48922	34.56777	363390	3826120	-118.48830	34.56778	363471	3825923	11	1806	2	
1590	-118.48871	34.56849	363438	3826199	-118.48779	34.56850	363519	3826002	11	1827	2	
1591	-118.48801	34.56927	363503	3826284	-118.48709	34.56928	363584	3826088	11	1853	2	
1592	-118.48796	34.57053	363510	3826424	-118.48704	34.57054	363591	3826228	11	1891	2	
1593	-118.48832	34.57176	363479	3826561	-118.48740	34.57177	363560	3826365	11	1971	2	
1594	-118.48800	34.57249	363510	3826641	-118.48708	34.57250	363591	3826445	11	1985	2	
1595	-118.48779	34.57339	363530	3826741	-118.48687	34.57340	363611	3826545	11	1998	2	
1596	-118.48733	34.57425	363574	3826836	-118.48641	34.57426	363655	3826640	11	2024	7	INTERP
1597	-118.48686	34.57512	363618	3826931	-118.48594	34.57513	363700	3826735	11	2058	2	
1598	-118.48696	34.57614	363611	3827045	-118.48604	34.57615	363692	3826848	11	2102	2	
1599	-118.48732	34.57720	363580	3827163	-118.48640	34.57721	363661	3826966	11	2108	2	
1600	-118.48772	34.57804	363544	3827256	-118.48680	34.57805	363625	3827060	11	2111	2	
1601	-118.48898	34.57922	363431	3827389	-118.48806	34.57923	363512	3827193	11	2167	2	
1602	-118.48989	34.57974	363348	3827448	-118.48897	34.57975	363429	3827252	11	2194	2	
1603	-118.49043	34.58058	363300	3827542	-118.48951	34.58059	363381	3827346	11	2227	2	
1604	-118.48980	34.58192	363360	3827690	-118.48888	34.58193	363441	3827493	11	2267	2	
1605	-118.49051	34.58289	363296	3827798	-118.48959	34.58290	363377	3827602	11	2336	2	
1606	-118.49075	34.58407	363276	3827929	-118.48984	34.58408	363357	3827733	11	2368	7	INTERP
1607	-118.49100	34.58525	363255	3828061	-118.49008	34.58526	363336	3827864	11	2461	2	
1608	-118.49122	34.58626	363237	3828173	-118.49030	34.58627	363318	3827977	11	2609	2	
1609	-118.49155	34.58705	363208	3828261	-118.49063	34.58706	363289	3828065	11	2675	2	
1610	-118.49185	34.58791	363182	3828357	-118.49093	34.58792	363263	3828160	11	2757	2	
1611	-118.49208	34.58874	363162	3828449	-118.49116	34.58875	363243	3828253	11	2836	2	
1612	-118.49206	34.58964	363165	3828549	-118.49114	34.58965	363246	3828353	11	2935	2	
1613	-118.49204	34.59042	363168	3828635	-118.49112	34.59043	363249	3828439	11	3053	2	
1614	-118.49217	34.59131	363158	3828734	-118.49125	34.59132	363239	3828538	11	3037	2	
1615	-118.49243	34.59212	363135	3828824	-118.49151	34.59213	363216	3828628	11	2957	2	
1617	-118.49231	34.59375	363149	3829005	-118.49139	34.59376	363230	3828809	11	2868	2	
1618	-118.49186	34.59464	363192	3829103	-118.49094	34.59465	363273	3828907	11	2936	2	
1619	-118.49138	34.59557	363237	3829206	-118.49046	34.59558	363318	3829009	11	3010	2	
1620	-118.49064	34.59646	363307	3829303	-118.48972	34.59647	363388	3829107	11	3063	2	
1621	-118.49050	34.59736	363321	3829403	-118.48958	34.59737	363402	3829207	11	3065	2	
1622	-118.49016	34.59826	363354	3829502	-118.48924	34.59827	363435	3829306	11	3132	2	
1623	-118.49128	34.59912	363252	3829599	-118.49036	34.59913	363333	3829403	11	3167	2	
1624	-118.49190	34.59981	363197	3829676	-118.49098	34.59982	363278	3829480	11	3129	3.1	
1625	-118.49154	34.60086	363231	3829792	-118.49063	34.60087	363312	3829596	11	3184	7	INTERP
1626	-118.49118	34.60190	363266	3829907	-118.49026	34.60191	363347	3829711	11	3290	2	
1627	-118.49003	34.60189	363372	3829905	-118.48911	34.60190	363453	3829708	11	3316	2	
1628	-118.48948	34.60273	363423	3829997	-118.48856	34.60274	363504	3829801	11	3296	2	
1629	-118.48878	34.60332	363489	3830062	-118.48786	34.60333	363569	3829865	11	3298	2	
1630	-118.48779	34.60375	363580	3830108	-118.48687	34.60376	363661	3829912	11	3296	2	

Table 3. Seismograph Coordinates

	Geographic WGS84		UTM (NAD83 datum)		Geographic NAD27 datum		UTM (NAD27 datum)		UTM	ELEV	gps	
LOCATION	LONG	LAT	easting (X)	northing (Y)	LONG	LAT	easting (X)	northing (Y)	ZONE	(FT)	flag	NOTES
1631	-118.48685	34.60434	363667	3830172	-118.48593	34.60435	363748	3829976	11	3334	2	
1632	-118.48543	34.60633	363801	3830391	-118.48451	34.60634	363882	3830195	11	3388	2	
1633	-118.48453	34.60726	363885	3830493	-118.48361	34.60727	363966	3830296	11	3435	2	
1634	-118.48435	34.60820	363903	3830597	-118.48343	34.60821	363984	3830400	11	3466	2	
1635	-118.48395	34.60902	363941	3830687	-118.48303	34.60903	364022	3830491	11	3473	2	
1636	-118.48309	34.60943	364020	3830731	-118.48217	34.60944	364101	3830535	11	3505	2	
1637	-118.48217	34.60992	364105	3830785	-118.48125	34.60993	364186	3830588	11	3508	2	
1638	-118.48155	34.61059	364163	3830858	-118.48063	34.61060	364244	3830662	11	3541	2	
1639	-118.47686	34.61265	364597	3831080	-118.47594	34.61266	364678	3830884	11	3667	2	
1640	-118.47564	34.61414	364711	3831244	-118.47472	34.61415	364792	3831048	11	3691	2	
1641	-118.47481	34.61468	364788	3831303	-118.47389	34.61469	364869	3831106	11	3727	2	
1642	-118.47410	34.61545	364854	3831387	-118.47318	34.61546	364935	3831191	11	3752	2	
1643	-118.47330	34.61565	364928	3831408	-118.47238	34.61566	365009	3831212	11	3770	2	
1644	-118.47263	34.61628	364990	3831477	-118.47171	34.61629	365071	3831281	11	3786	2	
1645	-118.47152	34.61638	365092	3831487	-118.47060	34.61639	365173	3831290	11	3808	2	
1646	-118.46606	34.61892	365597	3831761	-118.46514	34.61893	365678	3831565	11	3798	2	
1647	-118.46574	34.61983	365628	3831862	-118.46482	34.61984	365709	3831665	11	3761	2	
1648	-118.46555	34.62073	365647	3831961	-118.46463	34.62074	365728	3831765	11	3768	2	
1649	-118.46576	34.62162	365629	3832060	-118.46484	34.62163	365710	3831864	11	3775	2	
1650	-118.46556	34.62228	365648	3832133	-118.46464	34.62229	365729	3831937	11	3798	2	
1651	-118.46472	34.62289	365726	3832200	-118.46380	34.62290	365807	3832003	11	3841	2	
1652	-118.46412	34.62368	365783	3832286	-118.46320	34.62369	365864	3832090	11	3846	2	
1653	-118.46258	34.62523	365926	3832456	-118.46166	34.62524	366007	3832260	11	3827	2	
1654	-118.46265	34.62616	365921	3832559	-118.46173	34.62617	366002	3832363	11	3786	2	
1655	-118.46316	34.62709	365876	3832663	-118.46224	34.62710	365957	3832467	11	3692	2	
1656	-118.46356	34.62787	365841	3832750	-118.46264	34.62788	365922	3832554	11	3685	2	
1657	-118.46409	34.62867	365793	3832840	-118.46317	34.62868	365874	3832644	11	3588	2	
1658	-118.46390	34.62945	365812	3832926	-118.46298	34.62946	365893	3832730	11	3459	2	
1659	-118.46400	34.63010	365804	3832998	-118.46308	34.63011	365885	3832802	11	3341	2	
1660	-118.46505	34.63158	365710	3833164	-118.46413	34.63159	365791	3832968	11	3213	2	
1661	-118.46513	34.63247	365704	3833263	-118.46421	34.63248	365785	3833066	11	3246	2	
1662	-118.46511	34.63339	365708	3833365	-118.46419	34.63340	365788	3833168	11	3309	2	
1663	-118.46493	34.63420	365725	3833454	-118.46401	34.63421	365806	3833258	11	3382	2	
1664	-118.46460	34.63498	365757	3833540	-118.46368	34.63499	365838	3833344	11	3459	2	
1665	-118.46467	34.63585	365752	3833637	-118.46375	34.63586	365833	3833441	11	3526	2	
1666	-118.46389	34.63696	365825	3833759	-118.46297	34.63697	365906	3833563	11	3605	2	
1667	-118.46300	34.63788	365908	3833860	-118.46208	34.63789	365989	3833664	11	3681	2	
1668	-118.46181	34.63880	366019	3833960	-118.46089	34.63881	366100	3833764	11	3796	2	
1669	-118.46121	34.63969	366075	3834058	-118.46029	34.63970	366156	3833862	11	3861	2	
1670	-118.45933	34.64064	366249	3834161	-118.45841	34.64065	366330	3833965	11	3976	2	
1671	-118.45969	34.64150	366217	3834257	-118.45877	34.64151	366298	3834061	11	3955	2	

Table 3. Seismograph Coordinates

	Geographic WGS84		UTM (NAD83 datum)		Geographic NAD27 datum		UTM (NAD27 datum)		UTM	ELEV	gps	
LOCATION	LONG	LAT	easting (X)	northing (Y)	LONG	LAT	easting (X)	northing (Y)	ZONE	(FT)	flag	NOTES
1672	-118.46151	34.64239	366052	3834358	-118.46059	34.64240	366133	3834162	11	4103	2	
1673	-118.46392	34.64325	365832	3834456	-118.46300	34.64326	365913	3834260	11	4131	2	
1674	-118.46399	34.64419	365828	3834561	-118.46307	34.64420	365908	3834365	11	3952	2	
1675	-118.46424	34.64509	365806	3834661	-118.46332	34.64510	365887	3834465	11	3748	2	
1676	-118.46444	34.64607	365789	3834770	-118.46352	34.64608	365870	3834574	11	3522	2	
1677	-118.46478	34.64694	365760	3834867	-118.46386	34.64695	365841	3834671	11	3433	2	
1678	-118.46565	34.64777	365681	3834960	-118.46473	34.64778	365762	3834764	11	3268	2	
1679	-118.46675	34.64871	365582	3835066	-118.46583	34.64872	365663	3834870	11	3154	2	
1680	-118.46643	34.64959	365613	3835163	-118.46551	34.64960	365694	3834967	11	3087	2	
1681	-118.46571	34.65042	365680	3835254	-118.46479	34.65043	365761	3835058	11	2934	2	
1682	-118.46454	34.65131	365789	3835351	-118.46362	34.65132	365870	3835155	11	2814	2	
1683	-118.46532	34.65236	365719	3835469	-118.46440	34.65237	365800	3835273	11	2814	2	
1684	-118.46536	34.65317	365716	3835559	-118.46444	34.65318	365797	3835362	11	2782	2	
1685	-118.46526	34.65407	365727	3835658	-118.46434	34.65408	365808	3835462	11	2767	2	
1686	-118.46408	34.65500	365837	3835760	-118.46316	34.65501	365918	3835564	11	2766	2	
1687	-118.46321	34.65590	365918	3835858	-118.46229	34.65591	365999	3835662	11	2764	2	
1688	-118.46276	34.65682	365961	3835960	-118.46184	34.65683	366042	3835764	11	2789	2	
1689	-118.46284	34.65764	365955	3836051	-118.46192	34.65765	366036	3835855	11	2805	2	
1690	-118.46226	34.65843	366009	3836138	-118.46134	34.65844	366090	3835942	11	2801	2	
1691	-118.46136	34.65895	366092	3836194	-118.46044	34.65896	366173	3835998	11	2840	2	
1692	-118.46050	34.65954	366172	3836259	-118.45958	34.65955	366253	3836062	11	2835	2	
1693	-118.45910	34.66123	366303	3836444	-118.45818	34.66124	366384	3836248	11	2841	2	
1694	-118.45789	34.66215	366416	3836545	-118.45697	34.66216	366496	3836348	11	2862	2	
1695	-118.45738	34.66267	366463	3836602	-118.45646	34.66268	366544	3836405	11	2942	2	
1696	-118.45677	34.66348	366520	3836691	-118.45585	34.66349	366601	3836494	11	3015	2	
1697	-118.45646	34.66436	366550	3836788	-118.45554	34.66437	366631	3836592	11	3036	2	
1698	-118.45699	34.66509	366503	3836869	-118.45607	34.66510	366584	3836673	11	3088	2	
1699	-118.45749	34.66583	366458	3836952	-118.45657	34.66584	366539	3836756	11	3213	2	
1700	-118.45768	34.66665	366442	3837043	-118.45676	34.66666	366523	3836847	11	3296	2	
1701	-118.45766	34.66747	366445	3837134	-118.45674	34.66748	366526	3836938	11	3313	2	
1702	-118.45751	34.66841	366460	3837238	-118.45659	34.66842	366541	3837042	11	3316	2	
1703	-118.45762	34.66926	366452	3837333	-118.45670	34.66927	366533	3837137	11	3283	2	
1704	-118.45757	34.67005	366458	3837420	-118.45665	34.67006	366538	3837224	11	3271	2	
1705	-118.45768	34.67075	366449	3837498	-118.45676	34.67076	366529	3837302	11	3241	2	
1706	-118.45768	34.67303	366452	3837751	-118.45676	34.67304	366533	3837555	11	3168	2	
1707	-118.45781	34.67459	366443	3837924	-118.45689	34.67460	366524	3837728	11	3109	2	
1708	-118.45799	34.67548	366428	3838023	-118.45707	34.67549	366509	3837827	11	3091	2	
1709	-118.45866	34.67620	366368	3838104	-118.45774	34.67621	366448	3837908	11	3059	2	
1710	-118.45824	34.67700	366407	3838192	-118.45732	34.67701	366488	3837996	11	3031	2	
1711	-118.45800	34.67793	366431	3838295	-118.45708	34.67795	366512	3838099	11	3027	2	
1712	-118.45794	34.67828	366437	3838333	-118.45702	34.67830	366518	3838137	11	3027	2	

Table 3. Seismograph Coordinates

	Geographic WGS84		UTM (NAD83 datum)		Geographic NAD27 datum		UTM (NAD27 datum)		UTM	ELEV	gps	
LOCATION	LONG	LAT	easting (X)	northing (Y)	LONG	LAT	easting (X)	northing (Y)	ZONE	(FT)	flag	NOTES
1713	-118.45787	34.67934	366445	3838451	-118.45695	34.67936	366526	3838255	11	3032	2	
1714	-118.45779	34.68024	366454	3838551	-118.45687	34.68026	366535	3838355	11	3035	2	
1715	-118.45773	34.68114	366461	3838650	-118.45681	34.68116	366542	3838454	11	3039	2	
1716	-118.45764	34.68206	366470	3838752	-118.45672	34.68208	366551	3838556	11	3045	2	
1717	-118.45708	34.68295	366523	3838850	-118.45616	34.68297	366604	3838654	11	3062	2	
1718	-118.45704	34.68384	366528	3838949	-118.45612	34.68386	366609	3838753	11	3089	2	
1719	-118.45697	34.68477	366536	3839052	-118.45605	34.68479	366617	3838856	11	3181	2	
1720	-118.45724	34.68554	366513	3839138	-118.45632	34.68556	366593	3838942	11	3245	2	
1721	-118.45755	34.68614	366485	3839205	-118.45663	34.68616	366566	3839009	11	3329	2	
1722	-118.45747	34.68673	366493	3839270	-118.45655	34.68675	366574	3839074	11	3404	2	
1723	-118.45758	34.68725	366484	3839328	-118.45666	34.68727	366565	3839132	11	3341	2	
1724	-118.45730	34.68816	366511	3839428	-118.45638	34.68818	366592	3839232	11	3285	2	
1725	-118.45621	34.68868	366612	3839485	-118.45529	34.68870	366693	3839288	11	3295	2	
1726	-118.45601	34.68945	366632	3839570	-118.45509	34.68947	366712	3839374	11	3301	2	
1727	-118.45617	34.69034	366618	3839669	-118.45525	34.69036	366699	3839473	11	3295	2	
1728	-118.45616	34.69116	366621	3839760	-118.45524	34.69118	366701	3839563	11	3338	2	
1729	-118.45610	34.69202	366627	3839855	-118.45518	34.69204	366708	3839659	11	3372	2	
1730	-118.45572	34.69327	366664	3839993	-118.45480	34.69329	366745	3839797	11	3413	2	
1731	-118.45523	34.69409	366710	3840083	-118.45431	34.69411	366791	3839887	11	3434	2	
1732	-118.45468	34.69479	366762	3840160	-118.45376	34.69481	366843	3839964	11	3457	2	
1733	-118.45454	34.69566	366776	3840256	-118.45362	34.69568	366857	3840060	11	3484	2	
1734	-118.45504	34.69645	366732	3840345	-118.45412	34.69647	366812	3840149	11	3494	2	
1735	-118.45568	34.69718	366674	3840427	-118.45476	34.69720	366755	3840230	11	3496	2	
1736	-118.46089	34.69854	366199	3840584	-118.45997	34.69856	366280	3840388	11	3611	2	
1737	-118.46190	34.69960	366108	3840703	-118.46098	34.69962	366189	3840507	11	3594	2	
1738	-118.46130	34.70031	366164	3840781	-118.46038	34.70033	366245	3840585	11	3577	2	
1739	-118.46140	34.70122	366157	3840882	-118.46048	34.70124	366238	3840686	11	3579	2	
1740	-118.46130	34.70214	366167	3840984	-118.46038	34.70216	366248	3840788	11	3571	2	
1741	-118.46074	34.70290	366220	3841068	-118.45982	34.70292	366301	3840872	11	3540	2	
1742	-118.46008	34.70358	366281	3841142	-118.45916	34.70360	366362	3840946	11	3515	2	
1743	-118.45997	34.70500	366294	3841299	-118.45905	34.70502	366375	3841103	11	3488	2	
1744	-118.45982	34.70603	366309	3841414	-118.45890	34.70605	366390	3841217	11	3471	2	
1745	-118.45984	34.70693	366309	3841513	-118.45892	34.70695	366390	3841317	11	3482	2	
1746	-118.45963	34.70784	366330	3841614	-118.45871	34.70786	366410	3841418	11	3473	2	
1747	-118.45970	34.70873	366325	3841713	-118.45878	34.70875	366405	3841517	11	3420	2	
1748	-118.46003	34.70944	366295	3841792	-118.45911	34.70946	366376	3841596	11	3336	2	
1749	-118.46063	34.70989	366241	3841843	-118.45971	34.70991	366322	3841647	11	3238	2	
1750	-118.46062	34.71147	366245	3842018	-118.45970	34.71149	366326	3841822	11	3124	2	
1751	-118.45839	34.71244	366450	3842123	-118.45747	34.71246	366531	3841926	11	3047	2	
1752	-118.45788	34.71323	366498	3842209	-118.45696	34.71325	366579	3842013	11	3035	2	
1753	-118.45700	34.71376	366580	3842267	-118.45608	34.71378	366661	3842071	11	3018	2	

Table 3. Seismograph Coordinates

	Geographic WGS84		UTM (NAD83 datum)		Geographic NAD27 datum		UTM (NAD27 datum)		UTM	ELEV	gps	
LOCATION	LONG	LAT	easting (X)	northing (Y)	LONG	LAT	easting (X)	northing (Y)	ZONE	(FT)	flag	NOTES
1754	-118.45632	34.71441	366643	3842338	-118.45540	34.71443	366724	3842142	11	3000	2	
1755	-118.45651	34.71527	366627	3842434	-118.45559	34.71529	366708	3842238	11	2979	2	
1756	-118.45707	34.71602	366577	3842518	-118.45615	34.71604	366658	3842322	11	2960	2	
1757	-118.45801	34.71785	366494	3842722	-118.45709	34.71787	366575	3842526	11	2868	2	
1758	-118.45815	34.71876	366483	3842823	-118.45723	34.71878	366563	3842627	11	2861	2	
1759	-118.45759	34.71953	366535	3842908	-118.45667	34.71955	366616	3842712	11	2850	2	
1760	-118.45748	34.72041	366547	3843005	-118.45656	34.72043	366627	3842809	11	2829	2	
1761	-118.45747	34.72131	366549	3843105	-118.45655	34.72133	366630	3842909	11	2818	2	
1762	-118.45748	34.72221	366550	3843205	-118.45656	34.72223	366630	3843009	11	2805	2	
1763	-118.45748	34.72311	366551	3843305	-118.45656	34.72313	366632	3843109	11	2788	2	
1764	-118.45749	34.72418	366552	3843423	-118.45657	34.72420	366633	3843227	11	2777	2	
1765	-118.45837	34.72527	366473	3843545	-118.45745	34.72529	366554	3843349	11	2775	2	
1766	-118.45935	34.72617	366385	3843647	-118.45843	34.72619	366465	3843450	11	2777	2	
1767	-118.46007	34.72713	366320	3843754	-118.45915	34.72715	366401	3843558	11	2768	2	
1768	-118.46092	34.72819	366244	3843873	-118.46000	34.72821	366325	3843677	11	2757	2	
1769	-118.46209	34.72877	366138	3843939	-118.46117	34.72879	366219	3843742	11	2772	2	
1770	-118.46349	34.72928	366011	3843997	-118.46257	34.72930	366091	3843801	11	2771	2	
1771	-118.46660	34.73064	365728	3844152	-118.46568	34.73066	365809	3843956	11	2771	2	
1772	-118.46644	34.73213	365745	3844317	-118.46552	34.73215	365826	3844121	11	2748	2	
1773	-118.46645	34.73304	365746	3844418	-118.46553	34.73306	365826	3844222	11	2738	2	
1774	-118.46644	34.73394	365748	3844518	-118.46552	34.73396	365829	3844322	11	2730	2	
1775	-118.46643	34.73484	365750	3844617	-118.46551	34.73486	365831	3844421	11	2722	2	
1776	-118.46644	34.73574	365751	3844717	-118.46552	34.73576	365832	3844521	11	2713	2	
1777	-118.46641	34.73663	365755	3844816	-118.46549	34.73665	365836	3844620	11	2708	2	
1778	-118.46639	34.73754	365758	3844917	-118.46547	34.73756	365839	3844721	11	2703	2	
1779	-118.46636	34.73844	365763	3845017	-118.46544	34.73846	365843	3844821	11	2697	2	
1780	-118.46645	34.73934	365756	3845117	-118.46553	34.73936	365837	3844921	11	2691	2	
1781	-118.46637	34.74025	365765	3845217	-118.46545	34.74027	365845	3845021	11	2687	2	
1782	-118.46638	34.74115	365765	3845317	-118.46546	34.74117	365846	3845121	11	2682	2	
1783	-118.46640	34.74204	365765	3845416	-118.46548	34.74206	365846	3845220	11	2679	2	
1784	-118.46640	34.74295	365766	3845517	-118.46548	34.74297	365847	3845321	11	2676	2	
1785	-118.46642	34.74386	365766	3845618	-118.46550	34.74388	365847	3845422	11	2674	2	
1786	-118.46642	34.74476	365767	3845718	-118.46550	34.74478	365848	3845522	11	2671	2	
1787	-118.46674	34.74564	365740	3845816	-118.46582	34.74566	365820	3845620	11	2670	2	
1788	-118.46651	34.74658	365762	3845920	-118.46559	34.74660	365843	3845724	11	2666	2	
1789	-118.46651	34.74748	365764	3846019	-118.46559	34.74750	365844	3845823	11	2664	2	
1790	-118.46653	34.74838	365763	3846119	-118.46561	34.74840	365844	3845923	11	2661	2	
1791	-118.46651	34.74927	365766	3846218	-118.46559	34.74929	365847	3846022	11	2659	2	
1792	-118.46654	34.75011	365765	3846311	-118.46562	34.75013	365846	3846115	11	2655	2	
1793	-118.46657	34.75101	365764	3846411	-118.46565	34.75103	365845	3846215	11	2652	2	
1794	-118.46656	34.75188	365766	3846507	-118.46564	34.75190	365847	3846311	11	2650	2	

Table 3. Seismograph Coordinates

	Geographic WGS84		UTM (NAD83 datum)		Geographic NAD27 datum		UTM (NAD27 datum)		UTM	ELEV	gps	
LOCATION	LONG	LAT	easting (X)	northing (Y)	LONG	LAT	easting (X)	northing (Y)	ZONE	(FT)	flag	NOTES
1795	-118.46656	34.75277	365768	3846606	-118.46564	34.75279	365848	3846410	11	2648	2	
1796	-118.46661	34.75376	365765	3846716	-118.46569	34.75378	365845	3846520	11	2646	2	
1797	-118.46658	34.75458	365769	3846807	-118.46566	34.75460	365849	3846611	11	2643	2	
1798	-118.46660	34.75542	365768	3846900	-118.46568	34.75544	365849	3846704	11	2641	2	
1799	-118.46662	34.75640	365768	3847009	-118.46570	34.75642	365849	3846813	11	2638	2	
1800	-118.46662	34.75734	365769	3847113	-118.46570	34.75736	365850	3846917	11	2635	2	
1801	-118.46663	34.75824	365770	3847213	-118.46571	34.75826	365851	3847017	11	2632	2	
1802	-118.46667	34.75918	365768	3847317	-118.46575	34.75920	365849	3847121	11	2629	2	
1803	-118.46667	34.76005	365769	3847414	-118.46575	34.76007	365850	3847218	11	2625	2	
1804	-118.46664	34.76096	365773	3847515	-118.46572	34.76098	365854	3847319	11	2622	2	
1805	-118.46664	34.76190	365775	3847619	-118.46572	34.76192	365856	3847423	11	2619	2	
1806	-118.46665	34.76278	365775	3847716	-118.46573	34.76280	365856	3847520	11	2616	2	
1807	-118.46665	34.76366	365777	3847814	-118.46573	34.76368	365858	3847618	11	2613	2	
1808	-118.46666	34.76468	365778	3847927	-118.46574	34.76470	365858	3847731	11	2609	2	
1809	-118.46668	34.76553	365777	3848021	-118.46576	34.76555	365858	3847826	11	2606	2	
1810	-118.46669	34.76649	365778	3848128	-118.46577	34.76651	365859	3847932	11	2603	2	
1811	-118.46669	34.76740	365779	3848229	-118.46577	34.76742	365860	3848033	11	2601	2	
1812	-118.46669	34.76830	365781	3848329	-118.46577	34.76832	365862	3848133	11	2598	2	
1813	-118.46670	34.76921	365781	3848430	-118.46578	34.76923	365862	3848234	11	2595	2	
1814	-118.46671	34.77016	365782	3848535	-118.46579	34.77018	365863	3848339	11	2591	2	
1815	-118.46671	34.77105	365783	3848634	-118.46579	34.77107	365864	3848438	11	2589	2	
1816	-118.46673	34.77200	365783	3848739	-118.46581	34.77202	365864	3848543	11	2586	2	
1817	-118.46654	34.77292	365802	3848841	-118.46562	34.77294	365883	3848645	11	2583	2	
1818	-118.46652	34.77379	365805	3848937	-118.46560	34.77381	365886	3848741	11	2580	2	
1819	-118.46681	34.77512	365781	3849085	-118.46589	34.77514	365862	3848889	11	2577	2	
1820	-118.46682	34.77565	365781	3849144	-118.46590	34.77567	365862	3848948	11	2575	2	
1821	-118.46678	34.77654	365786	3849243	-118.46586	34.77656	365867	3849047	11	2572	2	
1822	-118.46678	34.77744	365787	3849342	-118.46586	34.77746	365868	3849147	11	2570	2	
1823	-118.46677	34.77834	365790	3849442	-118.46585	34.77836	365870	3849246	11	2566	2	
1824	-118.46675	34.77924	365793	3849542	-118.46583	34.77926	365874	3849346	11	2563	2	
1825	-118.46676	34.78015	365794	3849643	-118.46584	34.78017	365874	3849447	11	2560	2	
1826	-118.46647	34.78105	365822	3849742	-118.46555	34.78107	365902	3849547	11	2557	2	
1827	-118.46674	34.78193	365798	3849840	-118.46582	34.78195	365879	3849644	11	2554	2	
1828	-118.46674	34.78283	365800	3849940	-118.46582	34.78285	365881	3849744	11	2551	2	
1829	-118.46675	34.78376	365800	3850043	-118.46583	34.78378	365881	3849847	11	2548	2	
1830	-118.46675	34.78464	365802	3850141	-118.46583	34.78466	365883	3849945	11	2545	2	
1831	-118.46673	34.78556	365805	3850243	-118.46581	34.78558	365886	3850047	11	2541	2	
1832	-118.46674	34.78646	365806	3850343	-118.46582	34.78648	365886	3850147	11	2539	2	
1833	-118.46674	34.78735	365807	3850441	-118.46582	34.78737	365888	3850246	11	2536	2	
1834	-118.46675	34.78828	365808	3850545	-118.46583	34.78830	365888	3850349	11	2533	2	
1835	-118.46668	34.78920	365816	3850647	-118.46576	34.78922	365896	3850451	11	2529	2	

Table 3. Seismograph Coordinates

	Geographic WGS84		UTM (NAD83 datum)		Geographic NAD27 datum		UTM (NAD27 datum)		UTM	ELEV	gps	
LOCATION	LONG	LAT	easting (X)	northing (Y)	LONG	LAT	easting (X)	northing (Y)	ZONE	(FT)	flag	NOTES
1836	-118.46668	34.79005	365817	3850741	-118.46576	34.79007	365898	3850545	11	2527	2	
1837	-118.46670	34.79099	365817	3850845	-118.46578	34.79101	365897	3850649	11	2524	2	
1838	-118.46669	34.79191	365819	3850947	-118.46577	34.79193	365900	3850751	11	2521	2	
1839	-118.46669	34.79282	365820	3851048	-118.46577	34.79284	365901	3850852	11	2518	2	
1840	-118.46670	34.79373	365821	3851149	-118.46578	34.79375	365902	3850953	11	2516	2	
1841	-118.46671	34.79462	365822	3851248	-118.46579	34.79464	365902	3851052	11	2513	2	
1842	-118.46672	34.79553	365822	3851349	-118.46580	34.79555	365903	3851153	11	2510	2	
1843	-118.46677	34.79661	365819	3851469	-118.46585	34.79663	365900	3851273	11	2506	2	
1844	-118.46676	34.79745	365822	3851562	-118.46584	34.79747	365902	3851366	11	2503	2	
1845	-118.46676	34.79834	365823	3851660	-118.46584	34.79836	365904	3851464	11	2501	2	
1846	-118.46675	34.79925	365825	3851761	-118.46583	34.79927	365906	3851565	11	2497	2	
1847	-118.46676	34.80015	365826	3851861	-118.46584	34.80017	365907	3851665	11	2491	2	
1848	-118.46677	34.80107	365827	3851963	-118.46585	34.80109	365907	3851767	11	2484	2	
1849	-118.46679	34.80197	365826	3852063	-118.46587	34.80199	365907	3851867	11	2482	2	
1850	-118.46676	34.80286	365830	3852162	-118.46584	34.80288	365911	3851966	11	2480	2	
1851	-118.46676	34.80376	365832	3852261	-118.46584	34.80378	365913	3852066	11	2481	2	
1852	-118.46678	34.80458	365831	3852352	-118.46586	34.80460	365912	3852157	11	2479	2	
1853	-118.46679	34.80546	365832	3852450	-118.46587	34.80548	365913	3852254	11	2477	2	
1854	-118.46678	34.80645	365834	3852560	-118.46586	34.80647	365915	3852364	11	2477	2	
1855	-118.46681	34.80735	365833	3852660	-118.46589	34.80737	365914	3852464	11	2480	2	
1856	-118.46680	34.80828	365835	3852763	-118.46588	34.80830	365916	3852567	11	2481	2	
1857	-118.46682	34.80917	365835	3852862	-118.46590	34.80919	365916	3852666	11	2480	2	
1858	-118.46685	34.81010	365834	3852965	-118.46593	34.81012	365915	3852769	11	2479	2	
1859	-118.46685	34.81101	365835	3853066	-118.46593	34.81103	365916	3852870	11	2477	2	
1860	-118.46686	34.81189	365836	3853163	-118.46594	34.81191	365917	3852967	11	2476	2	
1861	-118.46686	34.81280	365837	3853264	-118.46594	34.81282	365918	3853068	11	2477	2	
1862	-118.46690	34.81374	365835	3853368	-118.46598	34.81376	365916	3853173	11	2476	2	
1863	-118.46689	34.81461	365838	3853465	-118.46597	34.81463	365918	3853269	11	2475	2	
1864	-118.46692	34.81552	365836	3853566	-118.46600	34.81554	365917	3853370	11	2474	2	
1865	-118.46690	34.81641	365840	3853665	-118.46598	34.81643	365920	3853469	11	2473	2	
1866	-118.46692	34.81740	365839	3853774	-118.46600	34.81742	365920	3853579	11	2472	2	
1867	-118.46690	34.81839	365843	3853884	-118.46598	34.81841	365924	3853688	11	2473	2	
1868	-118.46684	34.81945	365850	3854002	-118.46592	34.81947	365931	3853806	11	2473	2	
1869	-118.46682	34.82034	365853	3854100	-118.46590	34.82036	365934	3853905	11	2473	2	
1870	-118.46682	34.82131	365855	3854208	-118.46590	34.82133	365936	3854012	11	2471	2	
1871	-118.46684	34.82222	365854	3854309	-118.46592	34.82224	365935	3854113	11	2471	2	
1872	-118.46682	34.82313	365858	3854410	-118.46590	34.82315	365939	3854214	11	2475	2	
1873	-118.46679	34.82406	365862	3854513	-118.46587	34.82408	365943	3854317	11	2480	2	
1874	-118.46681	34.82499	365862	3854616	-118.46589	34.82501	365942	3854420	11	2481	2	
1875	-118.46689	34.82589	365856	3854716	-118.46597	34.82591	365937	3854520	11	2485	2	
1876	-118.46684	34.82690	365862	3854828	-118.46592	34.82692	365943	3854632	11	2490	2	

Table 3. Seismograph Coordinates

	Geographic WGS84		UTM (NAD83 datum)		Geographic NAD27 datum		UTM (NAD27 datum)		UTM	ELEV	gps	
LOCATION	LONG	LAT	easting (X)	northing (Y)	LONG	LAT	easting (X)	northing (Y)	ZONE	(FT)	flag	NOTES
1877	-118.46685	34.82779	365863	3854927	-118.46593	34.82781	365943	3854731	11	2495	2	
1878	-118.46685	34.82871	365864	3855029	-118.46593	34.82873	365945	3854833	11	2499	2	
1879	-118.46685	34.82963	365866	3855131	-118.46593	34.82965	365946	3854935	11	2502	2	
1880	-118.46686	34.83058	365866	3855236	-118.46594	34.83060	365947	3855040	11	2505	2	
1881	-118.46686	34.83151	365868	3855339	-118.46594	34.83153	365948	3855143	11	2510	2	
1882	-118.46686	34.83246	365869	3855445	-118.46594	34.83248	365950	3855249	11	2509	2	
1883	-118.46495	34.83320	366045	3855524	-118.46403	34.83322	366126	3855328	11	2498	2	
1884	-118.45823	34.83325	366660	3855521	-118.45731	34.83327	366740	3855325	11	2470	2	
1885	-118.45834	34.83420	366651	3855626	-118.45742	34.83422	366732	3855430	11	2472	2	
1886	-118.45842	34.83507	366645	3855723	-118.45750	34.83509	366726	3855527	11	2476	2	
1887	-118.45838	34.83595	366650	3855820	-118.45746	34.83597	366731	3855625	11	2480	2	
1888	-118.45836	34.83688	366654	3855923	-118.45744	34.83690	366734	3855728	11	2485	2	
1889	-118.45853	34.83780	366640	3856026	-118.45761	34.83782	366720	3855830	11	2490	2	
1890	-118.45861	34.83866	366634	3856121	-118.45769	34.83868	366714	3855925	11	2495	2	
1891	-118.45873	34.83962	366624	3856228	-118.45781	34.83964	366705	3856032	11	2502	2	
1892	-118.45882	34.84052	366617	3856328	-118.45790	34.84054	366698	3856132	11	2508	2	
1893	-118.45916	34.84135	366588	3856420	-118.45824	34.84137	366668	3856224	11	2514	2	
1894	-118.45928	34.84227	366578	3856522	-118.45836	34.84229	366659	3856327	11	2521	2	
1895	-118.45929	34.84315	366579	3856620	-118.45837	34.84317	366659	3856424	11	2527	2	
1896	-118.45935	34.84407	366575	3856722	-118.45843	34.84409	366655	3856526	11	2534	2	
1897	-118.45942	34.84499	366570	3856824	-118.45850	34.84501	366651	3856629	11	2541	2	
1898	-118.45937	34.84578	366576	3856912	-118.45845	34.84580	366656	3856716	11	2547	2	
1899	-118.45936	34.84668	366578	3857012	-118.45844	34.84670	366659	3856816	11	2554	2	
1900	-118.45937	34.84755	366579	3857108	-118.45845	34.84757	366659	3856912	11	2559	2	
1901	-118.45934	34.84847	366583	3857210	-118.45842	34.84849	366663	3857014	11	2565	2	
1902	-118.45936	34.84932	366582	3857304	-118.45844	34.84934	366663	3857109	11	2573	2	
1903	-118.45936	34.85020	366584	3857402	-118.45844	34.85022	366664	3857206	11	2583	2	
1904	-118.45940	34.85112	366582	3857504	-118.45848	34.85114	366662	3857308	11	2592	2	
1905	-118.45945	34.85207	366578	3857610	-118.45853	34.85209	366659	3857414	11	2601	2	
1908	-118.45986	34.85517	366546	3857954	-118.45894	34.85519	366627	3857758	11	2623	2	
1911	-118.45996	34.85784	366541	3858250	-118.45904	34.85786	366622	3858054	11	2658	2	
1914	-118.45771	34.86048	366751	3858540	-118.45679	34.86050	366832	3858344	11	2663	2	
1917	-118.45564	34.86299	366944	3858816	-118.45472	34.86301	367025	3858620	11	2662	2	
1920	-118.45383	34.86524	367113	3859063	-118.45291	34.86526	367194	3858867	11	2680	2	
1923	-118.45181	34.86769	367302	3859332	-118.45089	34.86771	367383	3859136	11	2676	2	
1926	-118.44945	34.87062	367523	3859654	-118.44853	34.87064	367603	3859458	11	2694	2	
1929	-118.44742	34.87312	367712	3859928	-118.44650	34.87314	367793	3859732	11	2708	2	
1932	-118.44676	34.87539	367776	3860179	-118.44584	34.87541	367857	3859983	11	3030	2	
1935	-118.44921	34.87808	367556	3860481	-118.44829	34.87810	367637	3860285	11	3000	2	
1938	-118.45173	34.88035	367330	3860736	-118.45081	34.88037	367410	3860540	11	3080	2	
1941	-118.44818	34.88399	367660	3861135	-118.44726	34.88401	367741	3860939	11	3100	2	

Table 3. Seismograph Coordinates

	Geographic WGS84		UTM (NAD83 datum)		Geographic NAD27 datum		UTM (NAD27 datum)		UTM	ELEV	gps	
LOCATION	LONG	LAT	easting (X)	northing (Y)	LONG	LAT	easting (X)	northing (Y)	ZONE	(FT)	flag	NOTES
1944	-118.44735	34.88695	367741	3861462	-118.44643	34.88697	367821	3861266	11	3110	2	
1947	-118.44762	34.88956	367720	3861752	-118.44670	34.88958	367801	3861556	11	3110	2	
1950	-118.44939	34.89231	367563	3862059	-118.44847	34.89233	367644	3861863	11	3110	2	
1953	-118.45118	34.89539	367404	3862403	-118.45026	34.89541	367485	3862207	11	3110	2	
1956	-118.45605	34.89848	366964	3862752	-118.45513	34.89850	367045	3862557	11	3110	2	
1959	-118.45561	34.90099	367008	3863030	-118.45469	34.90101	367089	3862834	11	3120	2	
1962	-118.45566	34.90372	367008	3863333	-118.45474	34.90374	367089	3863137	11	3170	2	
1965	-118.45504	34.90657	367069	3863648	-118.45412	34.90660	367150	3863452	11	3210	2	
1968	-118.45565	34.90939	367018	3863962	-118.45473	34.90942	367099	3863766	11	3230	2	
1971	-118.45509	34.91220	367074	3864273	-118.45417	34.91223	367155	3864077	11	3265	2	
1974	-118.45471	34.91499	367113	3864582	-118.45379	34.91502	367194	3864386	11	3305	2	
1977	-118.45434	34.91769	367151	3864880	-118.45342	34.91772	367232	3864685	11	3340	2	
1980	-118.45396	34.92040	367190	3865181	-118.45304	34.92043	367271	3864985	11	3390	2	
1983	-118.45384	34.92313	367206	3865483	-118.45292	34.92316	367287	3865287	11	3440	2	
1986	-118.45395	34.92608	367201	3865810	-118.45303	34.92611	367281	3865615	11	3485	2	
1990	-118.45233	34.92890	367353	3866121	-118.45141	34.92893	367434	3865925	11	3525	2	
1995	-118.44355	34.93186	368160	3866438	-118.44263	34.93189	368240	3866242	11	3555	2	
2000	-118.44482	34.93635	368051	3866937	-118.44390	34.93638	368132	3866742	11	3640	2	
2005	-118.44535	34.94100	368010	3867454	-118.44443	34.94103	368091	3867258	11	3760	2	
2010	-118.44533	34.94564	368019	3867968	-118.44441	34.94567	368100	3867773	11	3840	2	
2020	-118.44577	34.95606	367996	3869125	-118.44485	34.95609	368076	3868929	11	4080	3.2	
2030	-118.44237	34.96352	368318	3869948	-118.44145	34.96355	368399	3869752	11	4440	3.2	
2060	-118.43561	34.99184	368980	3873080	-118.43469	34.99187	369061	3872884	11	6130	3	
2070	-118.43575	35.00143	368983	3874143	-118.43483	35.00146	369064	3873948	11	6200	3	
2080	-118.43748	35.01261	368843	3875386	-118.43656	35.01264	368924	3875190	11	5260	3	
2090	-118.43921	35.01981	368697	3876186	-118.43829	35.01984	368777	3875991	11	5180	3	
2100	-118.43792	35.02716	368826	3877000	-118.43700	35.02719	368907	3876804	11	5390	3	
2110	-118.43361	35.03847	369237	3878249	-118.43269	35.03850	369318	3878053	11	6240	6	
2120	-118.43266	35.04572	369335	3879051	-118.43174	35.04575	369416	3878856	11	5530	6	
2130	-118.42723	35.05370	369843	3879929	-118.42631	35.05373	369924	3879734	11	5230	6	
2140	-118.42262	35.06346	370279	3881006	-118.42170	35.06349	370360	3880810	11	4920	6	
2150	-118.41777	35.07138	370734	3881878	-118.41685	35.07141	370815	3881683	11	4720	6	
2160	-118.41841	35.08170	370692	3883023	-118.41749	35.08173	370773	3882828	11	4640	6	
2170	-118.41617	35.08934	370908	3883868	-118.41525	35.08937	370989	3883672	11	4400	6	
2180	-118.41481	35.09871	371047	3884905	-118.41389	35.09874	371128	3884710	11	4230	6	
2190	-118.41475	35.10747	371066	3885877	-118.41383	35.10750	371147	3885681	11	4150	6	
2200	-118.41461	35.11667	371094	3886897	-118.41369	35.11670	371174	3886702	11	4090	6	
2220	-118.40707	35.13277	371806	3888673	-118.40615	35.13280	371887	3888478	11	4140	3	
2230	-118.41086	35.14215	371475	3889718	-118.40994	35.14218	371556	3889523	11	4350	3	
2240	-118.40033	35.15002	372447	3890577	-118.39941	35.15005	372528	3890382	11	4640	3	
2250	-118.40755	35.15579	371798	3891227	-118.40663	35.15583	371879	3891031	11	5190	3	

Table 3. Seismograph Coordinates

	Geographic WGS84		UTM (NAD83 datum)		Geographic NAD27 datum		UTM (NAD27 datum)		UTM	ELEV	gps	
LOCATION	LONG	LAT	easting (X)	northing (Y)	LONG	LAT	easting (X)	northing (Y)	ZONE	(FT)	flag	NOTES
2260	-118.41015	35.16908	371582	3892704	-118.40923	35.16912	371663	3892509	11	4490	3	
2270	-118.41334	35.17782	371306	3893677	-118.41242	35.17786	371386	3893482	11	4720	3	
2280	-118.39221	35.18505	373241	3894452	-118.39129	35.18509	373322	3894257	11	4590	3	
2290	-118.40410	35.19562	372175	3895640	-118.40318	35.19566	372255	3895445	11	4920	3	
2310	-118.41704	35.21664	371030	3897988	-118.41612	35.21668	371111	3897793	11	4920	1	
2320	-118.41755	35.22674	371000	3899109	-118.41663	35.22678	371080	3898914	11	4310	1	
2330	-118.41319	35.23400	371408	3899908	-118.41227	35.23404	371488	3899713	11	4140	1	
2340	-118.40977	35.24583	371738	3901216	-118.40885	35.24587	371818	3901021	11	3630	1	
2350	-118.41420	35.25586	371350	3902334	-118.41328	35.25590	371431	3902139	11	3400	1	
2360	-118.41148	35.26555	371613	3903405	-118.41056	35.26559	371694	3903210	11	3440	1	
2370	-118.41583	35.27351	371230	3904294	-118.41491	35.27355	371311	3904099	11	3180	1	
2380	-118.41318	35.28327	371487	3905373	-118.41226	35.28331	371567	3905178	11	2880	1	
2390	-118.41743	35.29004	371111	3906129	-118.41651	35.29008	371191	3905934	11	2830	1	
2400	-118.42255	35.30008	370661	3907250	-118.42163	35.30012	370742	3907054	11	2990	1	
2410	-118.42003	35.30815	370903	3908141	-118.41911	35.30819	370984	3907946	11	2780	1	
2420	-118.41890	35.31820	371022	3909255	-118.41798	35.31824	371102	3909059	11	2870	1	
2430	-118.42057	35.32696	370884	3910228	-118.41965	35.32700	370964	3910033	11	2990	1	
2440	-118.41362	35.33593	371530	3911214	-118.41270	35.33597	371610	3911019	11	3100	1	
2450	-118.40734	35.34287	372112	3911976	-118.40642	35.34291	372192	3911781	11	3240	1	
2460	-118.40777	35.35407	372090	3913219	-118.40685	35.35411	372171	3913023	11	3340	1	
2470	-118.40686	35.36379	372188	3914295	-118.40594	35.36383	372269	3914100	11	3520	1	
2480	-118.40737	35.37218	372155	3915227	-118.40645	35.37222	372235	3915032	11	3720	1	
2490	-118.41044	35.38237	371892	3916361	-118.40952	35.38241	371973	3916166	11	4258	1	
2500	-118.40968	35.38978	371973	3917182	-118.40876	35.38982	372053	3916987	11	4400	1	
3001	-118.44102	34.15515	367162	3780297	-118.44011	34.15514	367243	3780100	11	641	3	
3002	-118.44258	34.15568	367019	3780358	-118.44167	34.15567	367100	3780161	11	640	3	
3003	-118.44556	34.15611	366745	3780409	-118.44465	34.15610	366826	3780212	11	641	3	
3004	-118.44704	34.15708	366610	3780519	-118.44613	34.15707	366692	3780322	11	640	3	
3005	-118.45017	34.15794	366323	3780618	-118.44925	34.15793	366404	3780421	11	640	3	
3006	-118.45118	34.15796	366230	3780622	-118.45026	34.15795	366311	3780425	11	656	3	
3007	-118.45318	34.15813	366046	3780643	-118.45226	34.15812	366127	3780446	11	654	3	
3008	-118.45500	34.15817	365878	3780650	-118.45408	34.15816	365959	3780453	11	660	3	
3009	-118.45790	34.15926	365612	3780775	-118.45698	34.15925	365694	3780578	11	660	3	
3010	-118.45909	34.16052	365505	3780916	-118.45817	34.16051	365586	3780719	11	660	3	
3011	-118.46212	34.16050	365225	3780918	-118.46120	34.16049	365307	3780721	11	662	3	
3012	-118.46355	34.16118	365095	3780995	-118.46263	34.16117	365176	3780798	11	660	3	
3013	-118.46593	34.16150	364876	3781034	-118.46501	34.16149	364957	3780837	11	660	3	
3014	-118.46723	34.16215	364757	3781108	-118.46631	34.16214	364838	3780911	11	660	3	
3015	-118.46859	34.16377	364634	3781289	-118.46767	34.16376	364716	3781092	11	677	3	
3016	-118.47103	34.16495	364411	3781423	-118.47011	34.16494	364493	3781226	11	682	3	

Table 3. Seismograph Coordinates

	Geographic WGS84		UTM (NAD83 datum)		Geographic NAD27 datum		UTM (NAD27 datum)		UTM	ELEV	gps	
LOCATION	LONG	LAT	easting (X)	northing (Y)	LONG	LAT	easting (X)	northing (Y)	ZONE	(FT)	flag	NOTES
3017	-118.47390	34.16789	364151	3781753	-118.47298	34.16788	364233	3781556	11	682	3	
3018	-118.47479	34.16875	364071	3781850	-118.47387	34.16874	364152	3781653	11	680	3	
3019	-118.47593	34.17013	363968	3782004	-118.47501	34.17012	364049	3781807	11	689	3	
3020	-118.47837	34.17130	363745	3782137	-118.47745	34.17129	363826	3781940	11	683	3	
3021	-118.48023	34.17197	363574	3782214	-118.47931	34.17196	363656	3782017	11	680	3	
3022	-118.48207	34.17279	363406	3782307	-118.48115	34.17278	363487	3782110	11	681	3	
3023	-118.48388	34.17362	363241	3782402	-118.48296	34.17361	363322	3782205	11	700	3	
3024	-118.48626	34.17452	363023	3782505	-118.48534	34.17451	363104	3782308	11	700	3	
3025	-118.48812	34.17524	362852	3782587	-118.48720	34.17523	362934	3782390	11	700	3	
3026	-118.48998	34.17599	362682	3782673	-118.48906	34.17598	362764	3782476	11	700	3	
3027	-118.49168	34.17668	362527	3782752	-118.49076	34.17667	362608	3782555	11	700	3	
3028	-118.49359	34.17749	362352	3782844	-118.49267	34.17748	362433	3782647	11	700	3	
3029	-118.49544	34.17806	362182	3782910	-118.49452	34.17805	362264	3782713	11	700	3	
3030	-118.49745	34.17884	361998	3782999	-118.49653	34.17883	362080	3782802	11	700	3	
3031	-118.49923	34.17934	361835	3783057	-118.49831	34.17933	361917	3782860	11	700	3	
3032	-118.50079	34.18150	361695	3783298	-118.49987	34.18149	361776	3783102	11	704	3	
3033	-118.50288	34.18028	361500	3783166	-118.50196	34.18027	361582	3782969	11	700	4	
3034	-118.50479	34.18097	361325	3783245	-118.50387	34.18096	361407	3783048	11	700	3	
3035	-118.50680	34.18145	361141	3783301	-118.50588	34.18144	361222	3783104	11	704	3	
3036	-118.50879	34.18223	360959	3783390	-118.50787	34.18222	361040	3783193	11	703	3	
3037	-118.51111	34.18428	360748	3783621	-118.51019	34.18428	360830	3783424	11	704	2	
3038	-118.51315	34.18489	360561	3783691	-118.51223	34.18489	360643	3783494	11	715	3	
3039	-118.51527	34.18536	360367	3783746	-118.51435	34.18536	360448	3783549	11	716	2	
3040	-118.51732	34.18548	360178	3783762	-118.51640	34.18548	360259	3783566	11	705	2	
3041	-118.52021	34.18548	359912	3783766	-118.51929	34.18548	359993	3783569	11	706	2	
3042	-118.52258	34.18547	359693	3783768	-118.52166	34.18547	359775	3783572	11	719	2	
3043	-118.52462	34.18548	359505	3783772	-118.52370	34.18548	359587	3783576	11	720	2	
3044	-118.52659	34.18580	359324	3783811	-118.52567	34.18580	359406	3783614	11	721	2	
3046	-118.53156	34.18760	358869	3784017	-118.53064	34.18760	358951	3783820	11	725	2	
3047	-118.53273	34.18820	358762	3784085	-118.53181	34.18820	358844	3783888	11	725	2	
3048	-118.53536	34.18938	358522	3784220	-118.53444	34.18938	358603	3784023	11	726	2	
3049	-118.53620	34.18978	358445	3784265	-118.53528	34.18978	358527	3784068	11	726	2	
3050	-118.53879	34.18988	358207	3784280	-118.53787	34.18988	358288	3784083	11	729	3	
3051	-118.54113	34.18966	357991	3784259	-118.54021	34.18966	358072	3784062	11	729	2	
3053	-118.54608	34.18778	357531	3784057	-118.54516	34.18778	357613	3783860	11	726	2	
3054	-118.54781	34.18762	357372	3784042	-118.54689	34.18762	357453	3783845	11	725	2	
3055	-118.55074	34.18738	357101	3784019	-118.54982	34.18738	357183	3783823	11	726	2	
3056	-118.55293	34.18766	356900	3784054	-118.55201	34.18766	356981	3783857	11	725	2	
3057	-118.55473	34.18905	356736	3784210	-118.55381	34.18905	356818	3784013	11	729	2	
3058	-118.55676	34.19017	356551	3784337	-118.55584	34.19017	356633	3784140	11	740	2	

Table 3. Seismograph Coordinates

	Geographic WGS84		UTM (NAD83 datum)		Geographic NAD27 datum		UTM (NAD27 datum)		UTM	ELEV	gps	
LOCATION	LONG	LAT	easting (X)	northing (Y)	LONG	LAT	easting (X)	northing (Y)	ZONE	(FT)	flag	NOTES
4006	-118.38358	34.26485	372623	3792389	-118.38267	34.26485	372704	3792192	11	990	4	
4008	-118.38637	34.26158	372361	3792030	-118.38546	34.26158	372442	3791833	11	1013	4	
4009	-118.38829	34.26217	372185	3792097	-118.38738	34.26217	372266	3791901	11	1016	4	
4010	-118.39035	34.26286	371996	3792176	-118.38944	34.26286	372078	3791980	11	1008	4	
4011	-118.39255	34.26360	371795	3792261	-118.39164	34.26360	371876	3792065	11	1022	4	
4012	-118.39471	34.26427	371597	3792338	-118.39380	34.26427	371678	3792142	11	1031	4	
4013	-118.39647	34.26540	371437	3792466	-118.39556	34.26540	371518	3792269	11	1032	4	
4014	-118.40144	34.26455	370978	3792378	-118.40053	34.26455	371059	3792181	11	1013	4	
4016	-118.40504	34.26392	370645	3792313	-118.40412	34.26392	370727	3792116	11	1127	3	
4017	-118.40714	34.26390	370452	3792313	-118.40622	34.26390	370533	3792116	11	1225	4	
4018	-118.40971	34.26435	370216	3792366	-118.40879	34.26435	370297	3792170	11	1074	3	
4019	-118.41167	34.26341	370034	3792264	-118.41075	34.26341	370116	3792068	11	1079	2	
4020	-118.41372	34.26364	369846	3792293	-118.41280	34.26364	369927	3792096	11	1005	3	
4021	-118.41682	34.26397	369561	3792333	-118.41590	34.26397	369642	3792136	11	1001	3	
4022	-118.41816	34.26354	369437	3792287	-118.41724	34.26354	369518	3792091	11	1000	2	
4024	-118.42178	34.26283	369103	3792213	-118.42086	34.26283	369184	3792016	11	994	3	
4025	-118.42413	34.26241	368885	3792170	-118.42321	34.26241	368967	3791973	11	989	2	
4026	-118.42669	34.26368	368652	3792314	-118.42577	34.26368	368733	3792117	11	993	4	
4027	-118.42901	34.26350	368438	3792297	-118.42809	34.26350	368519	3792100	11	988	3	
4028	-118.43149	34.26355	368210	3792306	-118.43057	34.26355	368291	3792109	11	984	3	
4029	-118.43447	34.26144	367932	3792075	-118.43355	34.26143	368014	3791878	11	970	4	
4030	-118.43580	34.26388	367813	3792348	-118.43488	34.26388	367895	3792151	11	978	2	
4033	-118.44222	34.26156	367219	3792099	-118.44130	34.26156	367300	3791902	11	950	0	
4035	-118.44674	34.26306	366805	3792271	-118.44582	34.26306	366886	3792074	11	952	5	
4036	-118.44908	34.26270	366589	3792234	-118.44816	34.26270	366670	3792037	11	941	2	
4039	-118.45555	34.26261	365993	3792233	-118.45463	34.26261	366074	3792036	11	934	2	
4042	-118.46219	34.26224	365381	3792200	-118.46127	34.26224	365462	3792004	11	927	2	
4043	-118.46450	34.26293	365169	3792280	-118.46358	34.26293	365251	3792083	11	926	4	
4044	-118.46594	34.26267	365036	3792253	-118.46502	34.26267	365118	3792056	11	922	4	
4045	-118.46875	34.26255	364777	3792244	-118.46783	34.26255	364859	3792047	11	920	4	
4047	-118.47991	34.26234	363749	3792235	-118.47899	34.26234	363831	3792038	11	924	4	
4049	-118.47813	34.26259	363914	3792260	-118.47721	34.26259	363995	3792064	11	924	2	
4051	-118.48248	34.26236	363513	3792241	-118.48156	34.26236	363594	3792044	11	923	2	
4053	-118.48670	34.26187	363124	3792192	-118.48578	34.26187	363205	3791995	11	921	2	
4054	-118.48874	34.26232	362936	3792245	-118.48782	34.26232	363018	3792048	11	921	4	
4056	-118.49331	34.26189	362515	3792203	-118.49239	34.26189	362596	3792006	11	923	2	
4057	-118.49556	34.26213	362308	3792233	-118.49464	34.26213	362390	3792036	11	926	4	
4059	-118.49975	34.26188	361922	3792211	-118.49883	34.26188	362003	3792014	11	937	4	
4060	-118.50205	34.26130	361709	3792150	-118.50113	34.26130	361791	3791953	11	945	4	
4061	-118.50442	34.26207	361492	3792238	-118.50350	34.26207	361574	3792041	11	951	2	
4062	-118.50657	34.26191	361294	3792223	-118.50565	34.26191	361376	3792027	11	956	4	

Table 3. Seismograph Coordinates

	Geographic WGS84		UTM (NAD83 datum)		Geographic NAD27 datum		UTM (NAD27 datum)		UTM	ELEV	gps	
LOCATION	LONG	LAT	easting (X)	northing (Y)	LONG	LAT	easting (X)	northing (Y)	ZONE	(FT)	flag	NOTES
4063	-118.50907	34.26181	361064	3792216	-118.50815	34.26181	361145	3792019	11	964	2	
4064	-118.51081	34.26228	360904	3792270	-118.50989	34.26228	360986	3792073	11	975	2	
4066	-118.51516	34.26174	360503	3792216	-118.51424	34.26174	360584	3792020	11	987	4	
4067	-118.51740	34.26178	360297	3792224	-118.51648	34.26178	360378	3792027	11	995	2	
4068	-118.51925	34.26182	360126	3792231	-118.51833	34.26182	360208	3792034	11	1001	2	
4073	-118.53089	34.26162	359054	3792225	-118.52997	34.26162	359136	3792028	11	1007	2	
4074	-118.53269	34.26128	358888	3792190	-118.53177	34.26128	358969	3791993	11	998	4	
4075	-118.53523	34.26105	358654	3792168	-118.53431	34.26105	358735	3791971	11	991	2	
4076	-118.53732	34.26188	358463	3792262	-118.53640	34.26188	358544	3792066	11	996	2	
4079	-118.54044	34.26407	358179	3792510	-118.53952	34.26407	358261	3792313	11	1015	5	
4080	-118.54598	34.26154	357665	3792237	-118.54506	34.26154	357746	3792040	11	1024	4	
4081	-118.54844	34.26118	357438	3792200	-118.54752	34.26118	357519	3792004	11	1016	2	
4082	-118.55045	34.26128	357253	3792214	-118.54953	34.26128	357334	3792017	11	1104	2	
4083	-118.55283	34.26166	357034	3792260	-118.55191	34.26166	357116	3792063	11	1119	4	
4084	-118.55487	34.26115	356846	3792206	-118.55395	34.26115	356927	3792009	11	1016	3	
4086	-118.55917	34.26119	356450	3792217	-118.55825	34.26119	356531	3792020	11	1072	2	
4087	-118.56156	34.26159	356230	3792264	-118.56064	34.26159	356312	3792067	11	1122	4	
4088	-118.56574	34.26093	355844	3792197	-118.56482	34.26093	355926	3792000	11	998	4	
4091	-118.56924	34.26145	355523	3792260	-118.56832	34.26145	355604	3792063	11	1004	2	
4092	-118.57278	34.26104	355196	3792219	-118.57186	34.26104	355278	3792022	11	1011	2	
4093	-118.57532	34.26132	354963	3792254	-118.57440	34.26132	355044	3792057	11	1005	2	
4094	-118.57698	34.26079	354809	3792197	-118.57606	34.26079	354891	3792001	11	987	2	
4095	-118.57895	34.26056	354627	3792175	-118.57803	34.26056	354709	3791978	11	985	2	
4096	-118.58143	34.26075	354399	3792199	-118.58051	34.26075	354481	3792003	11	987	2	
4097	-118.58367	34.26053	354193	3792178	-118.58275	34.26053	354274	3791981	11	979	2	
4100	-118.59039	34.26080	353574	3792218	-118.58947	34.26080	353656	3792021	11	998	4	
4101	-118.59222	34.26097	353406	3792239	-118.59130	34.26097	353488	3792042	11	1019	2	
4102	-118.59464	34.26022	353182	3792160	-118.59372	34.26022	353264	3791963	11	993	2	
4103	-118.59712	34.25805	352950	3791923	-118.59620	34.25805	353031	3791726	11	980	4	
4104	-118.59876	34.26044	352803	3792190	-118.59784	34.26044	352885	3791993	11	989	2	
4105	-118.60092	34.26021	352604	3792168	-118.60000	34.26021	352685	3791971	11	982	2	
4106	-118.60279	34.25995	352431	3792141	-118.60187	34.25995	352513	3791945	11	977	2	
4107	-118.60545	34.26066	352187	3792224	-118.60453	34.26066	352269	3792027	11	973	2	
4108	-118.60770	34.26031	351980	3792189	-118.60678	34.26031	352061	3791992	11	967	2	
4109	-118.60966	34.25992	351798	3792148	-118.60874	34.25992	351880	3791951	11	963	2	
4110	-118.61175	34.26021	351607	3792183	-118.61083	34.26021	351688	3791986	11	962	2	
4111	-118.61414	34.26009	351386	3792174	-118.61322	34.26009	351468	3791977	11	962	2	
4112	-118.61858	34.26164	350980	3792352	-118.61766	34.26164	351062	3792155	11	995	2	
4113	-118.61781	34.25992	351048	3792160	-118.61689	34.25992	351130	3791963	11	991	2	
4114	-118.62002	34.25999	350845	3792171	-118.61910	34.25999	350926	3791974	11	991	2	

Table 3. Seismograph Coordinates

	Geographic WGS84		UTM (NAD83 datum)		Geographic NAD27 datum		UTM (NAD27 datum)		UTM	ELEV	gps	
LOCATION	LONG	LAT	easting (X)	northing (Y)	LONG	LAT	easting (X)	northing (Y)	ZONE	(FT)	flag	NOTES
5010	-118.40725	34.27098	370453	3793098	-118.40633	34.27098	370534	3792902	11	1051	4	
5013	-118.40693	34.27487	370488	3793529	-118.40601	34.27487	370570	3793333	11	1068	4	
5015	-118.41168	34.27220	370047	3793239	-118.41076	34.27220	370128	3793043	11	1052	4	
5017	-118.41575	34.27487	369676	3793541	-118.41483	34.27487	369758	3793344	11	1062	4	
5019	-118.42017	34.27568	369271	3793636	-118.41925	34.27568	369352	3793439	11	1059	4	
5022	-118.42645	34.27746	368695	3793842	-118.42553	34.27746	368777	3793645	11	1061	4	
5025	-118.43181	34.27965	368205	3794091	-118.43089	34.27965	368287	3793895	11	1060	4	
5027	-118.43969	34.28327	367486	3794503	-118.43877	34.28327	367567	3794306	11	1070	4	
5031	-118.44547	34.28311	366953	3794493	-118.44455	34.28311	367035	3794296	11	1058	4	
5034	-118.45189	34.28484	366365	3794693	-118.45097	34.28484	366446	3794496	11	1059	4	
5037	-118.45854	34.28672	365756	3794910	-118.45762	34.28672	365837	3794714	11	1148	4	
5039	-118.46116	34.28715	365515	3794961	-118.46024	34.28715	365597	3794765	11	1159	4	
5042	-118.46945	34.28897	364755	3795174	-118.46853	34.28897	364837	3794978	11	1150	4	
5044	-118.47260	34.28854	364465	3795131	-118.47168	34.28854	364546	3794934	11	1150	4	
5046	-118.47744	34.29214	364025	3795537	-118.47652	34.29214	364106	3795340	11	1150	4	
5048	-118.48145	34.29303	363657	3795641	-118.48053	34.29303	363739	3795444	11	1150	4	
5050	-118.48450	34.29372	363378	3795721	-118.48358	34.29372	363459	3795524	11	1176	4	
5052	-118.48892	34.29671	362976	3796059	-118.48800	34.29671	363057	3795862	11	1177	4	
5054	-118.49333	34.29613	362569	3796000	-118.49241	34.29613	362650	3795804	11	1272	2	
5056	-118.49793	34.29746	362148	3796154	-118.49701	34.29746	362229	3795957	11	1279	2	
5057	-118.49914	34.29965	362040	3796399	-118.49822	34.29965	362121	3796202	11	1301	2	
5059	-118.50355	34.30021	361635	3796467	-118.50263	34.30021	361716	3796270	11	1300	2	
5060	-118.50525	34.30136	361480	3796597	-118.50433	34.30136	361562	3796400	11	1328	2	
5062	-118.50758	34.30221	361267	3796694	-118.50666	34.30221	361349	3796497	11	1309	2	
5063	-118.51159	34.30301	360900	3796788	-118.51067	34.30301	360981	3796591	11	1378	2	
5064	-118.51406	34.30347	360673	3796843	-118.51314	34.30347	360754	3796646	11	1419	2	
5066	-118.51740	34.30366	360366	3796869	-118.51648	34.30366	360448	3796672	11	1510	4	
5068	-118.52240	34.30654	359911	3797195	-118.52148	34.30654	359992	3796998	11	1900	4	
5070	-118.52760	34.30757	359434	3797315	-118.52668	34.30756	359515	3797119	11	2275	4	
5072	-118.53144	34.30983	359084	3797572	-118.53052	34.30983	359166	3797375	11	2500	4	
5073	-118.53326	34.30936	358916	3797522	-118.53234	34.30936	358997	3797326	11	2530	4	
6005	-118.52718	34.13735	359189	3778439	-118.52626	34.13734	359271	3778242	11	1457	0	
6006	-118.52605	34.13567	359291	3778251	-118.52513	34.13566	359372	3778054	11	1484	0	
6007	-118.52628	34.13272	359265	3777924	-118.52536	34.13271	359346	3777727	11	1633	0	
6008	-118.52769	34.13100	359132	3777735	-118.52677	34.13099	359213	3777538	11	1681	0	
6009	-118.52638	34.12845	359248	3777450	-118.52546	34.12844	359330	3777254	11	1877	0	
6010	-118.52724	34.12594	359165	3777173	-118.52632	34.12593	359246	3776976	11	1868	0	
6011	-118.52802	34.12295	359088	3776843	-118.52710	34.12294	359169	3776646	11	1833	0	
6012	-118.52885	34.12103	359008	3776631	-118.52793	34.12102	359090	3776434	11	1757	0	
6013	-118.52736	34.12003	359144	3776518	-118.52644	34.12002	359225	3776321	11	1792	0	

Table 3. Seismograph Coordinates

	Geographic WGS84		UTM (NAD83 datum)		Geographic NAD27 datum		UTM (NAD27 datum)		UTM	ELEV	gps	
LOCATION	LONG	LAT	easting (X)	northing (Y)	LONG	LAT	easting (X)	northing (Y)	ZONE	(FT)	flag	NOTES
6015	-118.52654	34.11731	359215	3776215	-118.52562	34.11730	359297	3776018	11	1779	0	
6016	-118.52623	34.11234	359236	3775664	-118.52531	34.11233	359317	3775467	11	1791	0	
6017	-118.52592	34.10942	359259	3775339	-118.52500	34.10941	359341	3775143	11	1702	0	
6019	-118.52499	34.10474	359337	3774819	-118.52407	34.10473	359419	3774622	11	1546	0	
6020	-118.52416	34.10343	359412	3774673	-118.52324	34.10342	359493	3774476	11	1489	0	
6021	-118.52353	34.10129	359466	3774435	-118.52261	34.10128	359548	3774238	11	1453	0	
6022	-118.52284	34.09939	359527	3774223	-118.52192	34.09938	359608	3774026	11	1413	0	
6023	-118.52271	34.09658	359534	3773911	-118.52179	34.09657	359616	3773714	11	1426	0	
6024	-118.52235	34.09465	359564	3773697	-118.52143	34.09464	359646	3773500	11	1381	0	
6025	-118.52279	34.09271	359520	3773482	-118.52187	34.09270	359602	3773285	11	1334	0	
6026	-118.52157	34.09012	359629	3773193	-118.52065	34.09011	359710	3772996	11	1253	0	
6027	-118.52039	34.08735	359733	3772884	-118.51947	34.08734	359814	3772688	11	1218	0	
6028	-118.51923	34.08486	359836	3772607	-118.51831	34.08485	359917	3772410	11	1098	0	
6029	-118.51846	34.08330	359904	3772433	-118.51754	34.08329	359986	3772236	11	1019	0	
6031	-118.51517	34.07999	360203	3772061	-118.51425	34.07998	360284	3771864	11	954	0	
6032	-118.51290	34.07537	360404	3771546	-118.51198	34.07536	360486	3771349	11	872	0	
6033	-118.51366	34.07270	360330	3771251	-118.51274	34.07269	360411	3771054	11	773	0	
6034	-118.51335	34.07404	360361	3771399	-118.51243	34.07403	360442	3771202	11	839	0	
6035	-118.51337	34.07559	360361	3771571	-118.51245	34.07558	360443	3771374	11	840	0	
6036	-118.51170	34.07208	360510	3771179	-118.51078	34.07207	360591	3770982	11	846	0	
6037	-118.51008	34.06964	360655	3770906	-118.50916	34.06963	360737	3770710	11	827	0	
6038	-118.50904	34.06870	360750	3770801	-118.50813	34.06869	360831	3770604	11	823	0	
6039	-118.50744	34.06836	360897	3770761	-118.50653	34.06835	360978	3770564	11	876	0	
6040	-118.50655	34.06771	360978	3770688	-118.50564	34.06770	361059	3770491	11	787	0	
6041	-118.50542	34.06654	361080	3770556	-118.50451	34.06653	361161	3770359	11	728	0	
6042	-118.50532	34.06514	361087	3770401	-118.50441	34.06513	361168	3770204	11	709	0	
6043	-118.50558	34.06378	361061	3770250	-118.50467	34.06377	361142	3770054	11	576	0	
6044	-118.50513	34.06261	361101	3770120	-118.50422	34.06260	361182	3769923	11	630	0	
6045	-118.50467	34.06093	361140	3769933	-118.50376	34.06092	361222	3769736	11	544	3	
6046	-118.50484	34.05964	361122	3769790	-118.50393	34.05963	361204	3769594	11	513	3	
6047	-118.50314	34.05800	361277	3769606	-118.50223	34.05799	361358	3769409	11	535	3	
6048	-118.50321	34.05670	361268	3769462	-118.50230	34.05669	361349	3769265	11	505	3	
6049	-118.50337	34.05491	361250	3769264	-118.50246	34.05490	361332	3769067	11	465	3	
6050	-118.50195	34.05466	361381	3769234	-118.50104	34.05465	361462	3769037	11	422	3	
6051	-118.50226	34.05333	361350	3769087	-118.50135	34.05332	361432	3768890	11	428	3	
6052	-118.50167	34.05244	361403	3768988	-118.50076	34.05243	361485	3768791	11	403	3	
6053	-118.49765	34.05100	361772	3768822	-118.49674	34.05099	361853	3768626	11	313	3	
6054	-118.49774	34.04883	361760	3768582	-118.49683	34.04882	361841	3768385	11	295	3	
6055	-118.49881	34.04682	361658	3768361	-118.49790	34.04681	361739	3768164	11	274	3	
6056	-118.50020	34.04592	361528	3768263	-118.49929	34.04591	361610	3768066	11	263	3	
6057	-118.50331	34.04366	361238	3768016	-118.50240	34.04365	361319	3767819	11	232	3	

Table 3. Seismograph Coordinates

	Geographic WGS84		UTM (NAD83 datum)		Geographic NAD27 datum		UTM (NAD27 datum)		UTM	ELEV	gps	
LOCATION	LONG	LAT	easting (X)	northing (Y)	LONG	LAT	easting (X)	northing (Y)	ZONE	(FT)	flag	NOTES
6058	-118.50524	34.04211	361057	3767847	-118.50433	34.04210	361138	3767650	11	210	3	
6059	-118.50771	34.04021	360826	3767640	-118.50680	34.04020	360907	3767443	11	204	3	
6062	-118.50509	34.03669	361062	3767246	-118.50418	34.03668	361143	3767049	11	256	3	
6063	-118.50489	34.03483	361077	3767039	-118.50398	34.03482	361159	3766842	11	236	3	
6064	-118.50194	34.03703	361353	3767279	-118.50103	34.03702	361435	3767082	11	266	3	
6065	-118.50122	34.03490	361416	3767042	-118.50031	34.03489	361498	3766845	11	241	7	INTERP
6067	-118.49976	34.03064	361544	3766568	-118.49885	34.03063	361625	3766371	11	189	3	
6069	-118.49766	34.02825	361734	3766300	-118.49675	34.02824	361815	3766103	11	172	3	
6070	-118.49618	34.02691	361869	3766149	-118.49527	34.02690	361950	3765952	11	162	3	
6071	-118.49394	34.02510	362073	3765945	-118.49303	34.02509	362154	3765749	11	148	3	
6072	-118.49509	34.02387	361964	3765810	-118.49418	34.02386	362046	3765614	11	140	3	
6073	-118.49766	34.02126	361723	3765525	-118.49675	34.02125	361804	3765328	11	121	3	
6075	-118.50529	34.01981	361016	3765374	-118.50438	34.01980	361097	3765177	11	101	3	
6076	-118.50083	34.01652	361422	3765003	-118.49992	34.01651	361504	3764806	11	83	3	
6077	-118.50003	34.01701	361497	3765056	-118.49912	34.01700	361578	3764860	11	92	3	
6080	-118.49715	34.01290	361756	3764597	-118.49624	34.01289	361838	3764400	11	60	3	
6081	-118.49522	34.01191	361933	3764484	-118.49431	34.01190	362014	3764288	11	58	7	INTERP
6082	-118.49329	34.01093	362110	3764373	-118.49238	34.01092	362191	3764176	11	60	7	INTERP
6083	-118.49136	34.00995	362286	3764262	-118.49045	34.00994	362368	3764065	11	59	7	INTERP
6085	-118.48750	34.00798	362640	3764038	-118.48659	34.00797	362721	3763841	11	54	3	
6086	-118.48521	34.00519	362847	3763726	-118.48430	34.00518	362928	3763529	11	40	3	
6087	-118.48475	34.00497	362889	3763701	-118.48384	34.00496	362970	3763504	11	40	3	
6088	-118.48351	34.00428	363002	3763623	-118.48260	34.00427	363083	3763426	11	51	3	
6089	-118.48399	34.00369	362957	3763558	-118.48308	34.00368	363038	3763361	11	34	3	
6090	-118.48142	34.00283	363193	3763459	-118.48051	34.00282	363274	3763262	11	58	3	
6091	-118.48145	34.00110	363187	3763267	-118.48054	34.00109	363269	3763070	11	29	3	
6093	-118.47898	33.99927	363413	3763061	-118.47807	33.99926	363494	3762864	11	39	3	
6094	-118.47678	33.99793	363614	3762909	-118.47587	33.99792	363695	3762713	11	50	3	
6095	-118.47617	33.99690	363668	3762794	-118.47526	33.99689	363749	3762598	11	28	3	
6096	-118.47370	33.99374	363891	3762441	-118.47279	33.99373	363973	3762244	11	15	3	
6097	-118.47200	33.99054	364043	3762084	-118.47109	33.99053	364124	3761887	11	8	3	
6099	-118.46892	33.98784	364323	3761780	-118.46801	33.98783	364405	3761583	11	4	3	
6100	-118.46565	33.98389	364619	3761338	-118.46474	33.98388	364700	3761141	11	1	3	
6101	-118.46565	33.98384	364619	3761332	-118.46474	33.98383	364700	3761135	11	1	3	
6102	-118.46433	33.98227	364739	3761156	-118.46342	33.98226	364820	3760960	11	2	3	
6103	-118.46019	33.98076	365119	3760983	-118.45928	33.98075	365200	3760787	11	20	3	
6104	-118.46257	33.97847	364895	3760733	-118.46166	33.97846	364976	3760536	11	1	3	
6106	-118.45502	33.97138	365582	3759936	-118.45411	33.97137	365663	3759740	11	10	3	
6107	-118.45655	33.97326	365443	3760147	-118.45564	33.97325	365524	3759950	11	10	3	
6108	-118.44123	33.97683	366864	3760523	-118.44032	33.97682	366945	3760326	11	6	3	
6503	-118.50911	34.03504	360688	3767068	-118.50820	34.03503	360769	3766871	11	161	3	

Table 3. Seismograph Coordinates

	Geographic WGS84		UTM (NAD83 datum)		Geographic NAD27 datum		UTM (NAD27 datum)		UTM	ELEV	gps	
LOCATION	LONG	LAT	easting (X)	northing (Y)	LONG	LAT	easting (X)	northing (Y)	ZONE	(FT)	flag	NOTES
6504	-118.50194	34.03703	361353	3767279	-118.50103	34.03702	361435	3767082	11	266	3	
6505	-118.51043	34.02825	360555	3766317	-118.50952	34.02824	360636	3766120	11	180	3	
6506	-118.50631	34.03153	360941	3766675	-118.50540	34.03152	361022	3766478	11	201	3	
6507	-118.50470	34.03315	361092	3766853	-118.50379	34.03314	361173	3766656	11	218	3	
6508	-118.50508	34.03176	361055	3766699	-118.50417	34.03175	361136	3766502	11	203	3	
6509	-118.50407	34.03249	361149	3766779	-118.50316	34.03248	361231	3766582	11	211	3	
6510	-118.50108	34.03178	361424	3766696	-118.50017	34.03177	361505	3766499	11	201	3	
6511	-118.50647	34.02817	360921	3766303	-118.50556	34.02816	361002	3766106	11	172	3	
6512	-118.50520	34.02988	361041	3766491	-118.50429	34.02987	361122	3766294	11	184	3	
6513	-118.50385	34.02904	361164	3766396	-118.50294	34.02903	361245	3766199	11	177	3	
6514	-118.50369	34.02938	361179	3766433	-118.50278	34.02937	361261	3766236	11	182	3	
6515	-118.50280	34.03142	361265	3766658	-118.50189	34.03141	361346	3766461	11	199	3	
6516	-118.50281	34.03020	361262	3766523	-118.50190	34.03019	361343	3766326	11	188	3	
6517	-118.50547	34.03061	361017	3766572	-118.50456	34.03060	361098	3766375	11	193	3	
6518	-118.50012	34.03226	361514	3766748	-118.49921	34.03225	361595	3766551	11	205	3	
6519	-118.48017	34.01632	363330	3764953	-118.47926	34.01631	363411	3764756	11	128	3.1	
6520	-118.50723	34.02473	360845	3765922	-118.50632	34.02472	360926	3765725	11	145	3	
6521	-118.50582	34.02777	360980	3766257	-118.50491	34.02776	361061	3766061	11	169	3	
6522	-118.50315	34.02841	361228	3766325	-118.50224	34.02840	361309	3766128	11	173	3	
6523	-118.48752	34.04115	362691	3767717	-118.48661	34.04114	362772	3767520	11	286	3	
6524	-118.50074	34.03152	361455	3766666	-118.49983	34.03151	361536	3766470	11	197	3	
6525	-118.49867	34.03249	361648	3766771	-118.49776	34.03248	361729	3766574	11	209	3	
6526	-118.49595	34.03516	361903	3767064	-118.49504	34.03515	361985	3766867	11	244	3	
6527	-118.48712	34.04079	362728	3767676	-118.48621	34.04078	362809	3767479	11	281	3	
6528	-118.50413	34.02602	361133	3766061	-118.50322	34.02601	361214	3765864	11	155	3	
6530	-118.50152	34.03015	361381	3766516	-118.50061	34.03014	361462	3766319	11	186	3	
6531	-118.49997	34.02890	361522	3766375	-118.49906	34.02889	361603	3766178	11	176	3	
6532	-118.49947	34.03007	361570	3766504	-118.49856	34.03006	361651	3766307	11	185	3	
6534	-118.50555	34.03236	361012	3766766	-118.50464	34.03235	361094	3766569	11	209	3	
6535	-118.50320	34.02434	361216	3765874	-118.50229	34.02433	361298	3765677	11	141	3	
6537	-118.49957	34.02514	361553	3765957	-118.49866	34.02513	361634	3765761	11	151	3	
6538	-118.49821	34.02740	361682	3766206	-118.49730	34.02739	361763	3766009	11	167	3	
6539	-118.49845	34.02505	361656	3765946	-118.49754	34.02504	361737	3765749	11	150	3	
6541	-118.49858	34.02450	361643	3765885	-118.49767	34.02449	361724	3765688	11	146	3	
6542	-118.49354	34.02664	362112	3766116	-118.49263	34.02663	362193	3765919	11	160	3	
6543	-118.49293	34.02825	362171	3766293	-118.49202	34.02824	362252	3766096	11	167	3	
6545	-118.49037	34.01444	362385	3764758	-118.48946	34.01443	362466	3764562	11	75	3	
6546	-118.51415	34.02921	360213	3766429	-118.51324	34.02920	360295	3766232	11	104	3	
6547	-118.51637	34.03149	360012	3766684	-118.51546	34.03148	360093	3766488	11	43	3	
6548	-118.51035	34.03159	360568	3766687	-118.50944	34.03158	360649	3766490	11	193	3	
6549	-118.51369	34.03341	360263	3766894	-118.51278	34.03340	360344	3766697	11	157	3	

Table 3. Seismograph Coordinates

	Geographic WGS84		UTM (NAD83 datum)		Geographic NAD27 datum		UTM (NAD27 datum)		UTM	ELEV	gps	
LOCATION	LONG	LAT	easting (X)	northing (Y)	LONG	LAT	easting (X)	northing (Y)	ZONE	(FT)	flag	NOTES
6550	-118.51328	34.03627	360305	3767210	-118.51237	34.03626	360386	3767013	11	252	3	
6551	-118.49328	34.03086	362143	3766583	-118.49237	34.03085	362224	3766386	11	189	3	
6552	-118.48717	34.03384	362712	3766905	-118.48626	34.03383	362793	3766709	11	223	3	
6553	-118.48503	34.02858	362901	3766319	-118.48412	34.02857	362982	3766122	11	157	3	
6554	-118.48868	34.02399	362556	3765815	-118.48777	34.02398	362638	3765618	11	135	3	
6556	-118.47532	34.03588	363809	3767116	-118.47441	34.03587	363890	3766919	11	177	3.1	
6557	-118.46721	34.03670	364559	3767196	-118.46630	34.03669	364640	3766999	11	191	3.1	
7001	-118.51473	34.12945	360324	3777545	-118.51381	34.12944	360406	3777349	11	1789	0	
7002	-118.50293	34.12826	361411	3777397	-118.50201	34.12825	361492	3777200	11	1645	0	
7003	-118.49992	34.12483	361683	3777013	-118.49900	34.12482	361764	3776816	11	1610	0	
7004	-118.49993	34.12480	361682	3777010	-118.49901	34.12479	361763	3776813	11	1611	0	
7005	-118.49770	34.12101	361881	3776586	-118.49678	34.12100	361963	3776389	11	1680	0	
7006	-118.49664	34.11881	361975	3776341	-118.49572	34.11880	362057	3776144	11	1710	0	
7007	-118.49534	34.11710	362093	3776149	-118.49442	34.11709	362174	3775953	11	1707	7	INTERP
7008	-118.49402	34.11539	362211	3775958	-118.49310	34.11538	362293	3775761	11	1665	0	
7009	-118.49422	34.11287	362189	3775679	-118.49330	34.11286	362270	3775482	11	1626	0	
7010	-118.49533	34.11124	362084	3775500	-118.49441	34.11123	362165	3775303	11	1526	0	
7011	-118.49571	34.11028	362047	3775394	-118.49479	34.11027	362129	3775197	11	1469	3	
7012	-118.49661	34.10790	361960	3775131	-118.49569	34.10789	362042	3774934	11	1475	3	
7013	-118.49422	34.10452	362175	3774753	-118.49330	34.10451	362257	3774556	11	1595	0	
7015	-118.48727	34.09925	362808	3774159	-118.48635	34.09924	362889	3773962	11	1499	2	
7016	-118.48749	34.09853	362787	3774080	-118.48657	34.09852	362868	3773883	11	1502	2	
7017	-118.48057	34.09638	363421	3773832	-118.47966	34.09637	363503	3773635	11	1040	2	
7018	-118.48482	34.09432	363026	3773609	-118.48391	34.09431	363107	3773412	11	1367	2	
7019	-118.48382	34.09284	363116	3773444	-118.48291	34.09283	363197	3773247	11	1334	2	
7020	-118.48466	34.09070	363035	3773207	-118.48375	34.09069	363116	3773011	11	1248	2	
7021	-118.48439	34.08897	363057	3773015	-118.48348	34.08896	363138	3772818	11	1167	2	
7022	-118.48322	34.08765	363163	3772867	-118.48231	34.08764	363244	3772670	11	1165	2	
7023	-118.48149	34.08420	363317	3772482	-118.48058	34.08419	363398	3772286	11	1017	2	
7024	-118.48024	34.08363	363431	3772418	-118.47933	34.08362	363513	3772221	11	915	3	
7025	-118.48187	34.07892	363273	3771897	-118.48096	34.07891	363355	3771701	11	646	3	
7027	-118.48000	34.07450	363439	3771405	-118.47909	34.07449	363520	3771208	11	582	3	
7028	-118.47875	34.07325	363552	3771264	-118.47784	34.07324	363634	3771068	11	562	3	
7029	-118.47770	34.07315	363649	3771252	-118.47679	34.07314	363730	3771055	11	559	3	
7030	-118.47703	34.07140	363708	3771057	-118.47612	34.07139	363789	3770860	11	526	3	
7031	-118.47508	34.06693	363881	3770559	-118.47417	34.06692	363962	3770362	11	526	3	
7032	-118.47393	34.06444	363983	3770281	-118.47302	34.06443	364064	3770084	11	488	3	
7033	-118.47278	34.06259	364086	3770074	-118.47187	34.06258	364167	3769878	11	456	3	
7034	-118.47180	34.06046	364173	3769837	-118.47089	34.06045	364254	3769640	11	421	3.1	
7035	-118.47211	34.05627	364138	3769373	-118.47120	34.05626	364219	3769176	11	351	3	

Table 3. Seismograph Coordinates

	Geographic WGS84		UTM (NAD83 datum)		Geographic NAD27 datum		UTM (NAD27 datum)		UTM	ELEV	gps	
LOCATION	LONG	LAT	easting (X)	northing (Y)	LONG	LAT	easting (X)	northing (Y)	ZONE	(FT)	flag	NOTES
7036	-118.47146	34.05586	364197	3769326	-118.47055	34.05585	364279	3769130	11	344	3	
7037	-118.47082	34.05373	364253	3769089	-118.46991	34.05372	364334	3768892	11	322	3	
7038	-118.47356	34.05085	363995	3768774	-118.47265	34.05084	364077	3768577	11	302	3	
7041	-118.46907	34.04501	364401	3768120	-118.46816	34.04500	364482	3767923	11	253	3	
7042	-118.46551	34.04454	364728	3768063	-118.46460	34.04453	364810	3767866	11	247	3	
7045	-118.46676	34.03456	364597	3766958	-118.46585	34.03455	364678	3766761	11	177	3.1	
7049	-118.46176	34.02756	365048	3766175	-118.46085	34.02755	365129	3765978	11	154	3	
7050	-118.46005	34.02548	365202	3765942	-118.45914	34.02547	365284	3765745	11	168	3	
7051	-118.46006	34.02276	365197	3765641	-118.45915	34.02275	365278	3765444	11	170	3	
7052	-118.44712	34.02094	366389	3765422	-118.44621	34.02093	366470	3765225	11	173	3	
7053	-118.45829	34.01897	365355	3765218	-118.45738	34.01896	365436	3765021	11	155	3	
7054	-118.45845	34.01508	365334	3764787	-118.45754	34.01507	365415	3764590	11	143	3	
7055	-118.45789	34.01448	365384	3764720	-118.45698	34.01447	365466	3764523	11	141	3	
7056	-118.45976	34.01190	365208	3764436	-118.45885	34.01189	365289	3764239	11	121	3	
7057	-118.45649	34.00936	365506	3764150	-118.45558	34.00935	365587	3763953	11	39	3	
7058	-118.45604	34.00776	365545	3763972	-118.45513	34.00775	365626	3763775	11	28	3	
7059	-118.45522	34.00543	365617	3763713	-118.45431	34.00542	365698	3763516	11	20	3	
7060	-118.45447	34.00291	365682	3763432	-118.45356	34.00290	365763	3763235	11	20	3	
7061	-118.45319	34.00144	365798	3763267	-118.45228	34.00143	365879	3763071	11	25	3	
7062	-118.45271	33.99890	365838	3762985	-118.45180	33.99889	365919	3762788	11	26	3	
7063	-118.44931	33.99443	366145	3762485	-118.44840	33.99442	366226	3762288	11	23	3	

GPS equipment Flags:

. 0 unknown
. 1 USGS Rockwell
. 2 Potsdam Trimble
. 3 USC Trimble
. (3.1 Taylor)
. (3.2 Alan)
. 4 CSUN Trimble
. 5 UTEP Trimble
. 6 from Map
. 7 Interpolated
. 8 Marine unit

Table 4. Channels Assigned to Seismic Traces and Locations

Channel	Station	DAS Type	DAS Name	Compo-nent
1	1002	16	Texan	1
2	1003	16	Texan	1
3	1004	16	Texan	1
4	1005	13	RefTek	1
5	1005	13	RefTek	2
6	1005	13	RefTek	3
7	1006	16	Texan	1
8	1007	7	SGR	1
9	1008	16	Texan	1
10	1009	1	PRS1	1
11	1010	13	RefTek	1
12	1010	13	RefTek	2
13	1010	13	RefTek	3
14	1011	16	Texan	1
15	1012	7	SGR	1
16	1013	13	RefTek	1
17	1013	13	RefTek	2
18	1013	13	RefTek	3
19	1014	16	Texan	1
20	1015	16	Texan	1
21	1016	16	Texan	1
22	1017	16	Texan	1
23	1018	16	Texan	1
24	1019	13	RefTek	1
25	1019	13	RefTek	2
26	1019	13	RefTek	3
27	1020	1	PRS1	1
28	1021	7	SGR	1
29	1022	16	Texan	1
30	1023	7	SGR	1
31	1024	16	Texan	1
32	1025	13	RefTek	1
33	1025	13	RefTek	2
34	1025	13	RefTek	3
35	1026	16	Texan	1
36	1027	16	Texan	1
37	1029	1	PRS1	1
38	1030	13	RefTek	1
39	1030	13	RefTek	2
40	1030	13	RefTek	3
41	1031	16	Texan	1
42	1032	7	SGR	1
43	1033	16	Texan	1
44	1034	16	Texan	1
45	1035	13	RefTek	1
46	1035	13	RefTek	2
47	1035	13	RefTek	3
48	1036	16	Texan	1
49	1038	16	Texan	1
50	1039	1	PRS1	1
51	1040	13	RefTek	1
52	1040	13	RefTek	2
53	1040	13	RefTek	3
54	1041	16	Texan	1
55	1042	7	SGR	1
56	1043	16	Texan	1
57	1044	16	Texan	1
58	1045	16	Texan	1
59	1046	16	Texan	1
60	1047	13	RefTek	1
61	1047	13	RefTek	2
62	1047	13	RefTek	3
63	1048	7	SGR	1
64	1049	1	PRS1	1
65	1050	13	RefTek	1
66	1050	13	RefTek	2
67	1050	13	RefTek	3
68	1051	16	Texan	1
69	1052	7	SGR	1
70	1053	16	Texan	1
71	1054	16	Texan	1
72	1055	13	RefTek	1
73	1055	13	RefTek	2
74	1055	13	RefTek	3
75	1056	16	Texan	1
76	1057	7	SGR	1
77	1058	16	Texan	1
78	1059	1	PRS1	1
79	1060	13	RefTek	1
80	1060	13	RefTek	2
81	1060	13	RefTek	3
82	1061	16	Texan	1
83	1062	7	SGR	1
84	1063	16	Texan	1
85	1064	16	Texan	1
86	1065	13	RefTek	1
87	1065	13	RefTek	2
88	1065	13	RefTek	3
89	1066	16	Texan	1
90	1067	7	SGR	1
91	1068	16	Texan	1
92	1069	1	PRS1	1
93	1070	13	RefTek	1
94	1070	13	RefTek	2
95	1070	13	RefTek	3
96	1071	16	Texan	1
97	1072	7	SGR	1
98	1073	16	Texan	1
99	1074	16	Texan	1
100	1075	13	RefTek	1
101	1075	13	RefTek	2
102	1075	13	RefTek	3
103	1076	16	Texan	1
104	1077	7	SGR	1
105	1078	16	Texan	1
106	1079	1	PRS1	1
107	1080	13	RefTek	1
108	1080	13	RefTek	2
109	1080	13	RefTek	3
110	1081	16	Texan	1
111	1082	7	SGR	1

Table 4. Channels Assigned to Seismic Traces and Locations

Channel	Station	DAS Type	DAS Name	Compo-nent
112	1083	16	Texan	1
113	1084	16	Texan	1
114	1085	13	RefTek	1
115	1085	13	RefTek	2
116	1085	13	RefTek	3
117	1086	16	Texan	1
118	1087	7	SGR	1
119	1088	16	Texan	1
120	1089	1	PRS1	1
121	1090	13	RefTek	1
122	1090	13	RefTek	2
123	1090	13	RefTek	3
124	1091	16	Texan	1
125	1092	7	SGR	1
126	1093	16	Texan	1
127	1094	16	Texan	1
128	1095	16	Texan	1
129	1096	13	RefTek	1
130	1096	13	RefTek	2
131	1096	13	RefTek	3
132	1097	7	SGR	1
133	1098	16	Texan	1
134	1099	1	PRS1	1
135	1100	13	RefTek	1
136	1100	13	RefTek	2
137	1100	13	RefTek	3
138	1101	16	Texan	1
139	1102	7	SGR	1
140	1103	16	Texan	1
141	1104	16	Texan	1
142	1105	13	RefTek	1
143	1105	13	RefTek	2
144	1105	13	RefTek	3
145	1106	16	Texan	1
146	1107	7	SGR	1
147	1108	16	Texan	1
148	1109	1	PRS1	1
149	1110	13	RefTek	1
150	1110	13	RefTek	2
151	1110	13	RefTek	3
152	1111	16	Texan	1
153	1112	7	SGR	1
154	1113	16	Texan	1
155	1114	16	Texan	1
156	1115	13	RefTek	1
157	1115	13	RefTek	2
158	1115	13	RefTek	3
159	1116	16	Texan	1
160	1117	7	SGR	1
161	1118	16	Texan	1
162	1119	1	PRS1	1
163	1120	13	RefTek	1
164	1120	13	RefTek	2
165	1120	13	RefTek	3
166	1121	16	Texan	1
167	1122	7	SGR	1
168	1123	16	Texan	1
169	1124	16	Texan	1
170	1125	13	RefTek	1
171	1125	13	RefTek	2
172	1125	13	RefTek	3
173	1126	16	Texan	1
174	1127	7	SGR	1
175	1128	16	Texan	1
176	1129	1	PRS1	1
177	1130	16	Texan	1
178	1131	16	Texan	1
179	1132	7	SGR	1
180	1133	16	Texan	1
181	1134	16	Texan	1
182	1135	13	RefTek	1
183	1135	13	RefTek	2
184	1135	13	RefTek	3
185	1136	16	Texan	1
186	1137	7	SGR	1
187	1138	16	Texan	1
188	1139	1	PRS1	1
189	1140	13	RefTek	1
190	1140	13	RefTek	2
191	1140	13	RefTek	3
192	1141	16	Texan	1
193	1142	7	SGR	1
194	1143	13	RefTek	1
195	1143	13	RefTek	2
196	1143	13	RefTek	3
197	1144	16	Texan	1
198	1145	16	Texan	1
199	1146	16	Texan	1
200	1147	16	Texan	1
201	1148	16	Texan	1
202	1149	16	Texan	1
203	1150	13	RefTek	1
204	1150	13	RefTek	2
205	1150	13	RefTek	3
206	1151	1	PRS1	1
207	1152	7	SGR	1
208	1153	16	Texan	1
209	1154	7	SGR	1
210	1155	13	RefTek	1
211	1155	13	RefTek	2
212	1155	13	RefTek	3
213	1156	16	Texan	1
214	1157	7	SGR	1
215	1158	16	Texan	1
216	1159	1	PRS1	1
217	1160	13	RefTek	1
218	1160	13	RefTek	2
219	1160	13	RefTek	3
220	1161	16	Texan	1
221	1162	7	SGR	1
222	1163	16	Texan	1

Table 4. Channels Assigned to Seismic Traces and Locations

Channel	Station	DAS Type	DAS Name	Compo-nent
223	1164	16	Texan	1
224	1165	13	RefTek	1
225	1165	13	RefTek	2
226	1165	13	RefTek	3
227	1166	16	Texan	1
228	1167	7	SGR	1
229	1168	1	PRS1	1
230	1169	16	Texan	1
231	1170	13	RefTek	1
232	1170	13	RefTek	2
233	1170	13	RefTek	3
234	1171	16	Texan	1
235	1172	7	SGR	1
236	1173	16	Texan	1
237	1174	16	Texan	1
238	1175	13	RefTek	1
239	1175	13	RefTek	2
240	1175	13	RefTek	3
241	1176	16	Texan	1
242	1177	7	SGR	1
243	1178	16	Texan	1
244	1179	1	PRS1	1
245	1180	13	RefTek	1
246	1180	13	RefTek	2
247	1180	13	RefTek	3
248	1181	16	Texan	1
249	1182	7	SGR	1
250	1183	16	Texan	1
251	1184	16	Texan	1
252	1186	16	Texan	1
253	1187	7	SGR	1
254	1189	1	PRS1	1
255	1190	13	RefTek	1
256	1190	13	RefTek	2
257	1190	13	RefTek	3
258	1191	16	Texan	1
259	1192	7	SGR	1
260	1193	16	Texan	1
261	1194	16	Texan	1
262	1195	13	RefTek	1
263	1195	13	RefTek	2
264	1195	13	RefTek	3
265	1196	16	Texan	1
266	1197	7	SGR	1
267	1198	16	Texan	1
268	1199	1	PRS1	1
269	1200	13	RefTek	1
270	1200	13	RefTek	2
271	1200	13	RefTek	3
272	1201	16	Texan	1
273	1202	7	SGR	1
274	1203	16	Texan	1
275	1204	13	RefTek	1
276	1204	13	RefTek	2
277	1204	13	RefTek	3
278	1205	16	Texan	1
279	1206	13	RefTek	1
280	1206	13	RefTek	2
281	1206	13	RefTek	3
282	1207	7	SGR	1
283	1208	16	Texan	1
284	1209	1	PRS1	1
285	1210	13	RefTek	1
286	1210	13	RefTek	2
287	1210	13	RefTek	3
288	1211	16	Texan	1
289	1212	7	SGR	1
290	1213	16	Texan	1
291	1214	16	Texan	1
292	1215	13	RefTek	1
293	1215	13	RefTek	2
294	1215	13	RefTek	3
295	1216	16	Texan	1
296	1217	7	SGR	1
297	1218	16	Texan	1
298	1219	1	PRS1	1
299	1220	13	RefTek	1
300	1220	13	RefTek	2
301	1220	13	RefTek	3
302	1221	16	Texan	1
303	1222	7	SGR	1
304	1223	16	Texan	1
305	1224	16	Texan	1
306	1225	13	RefTek	1
307	1225	13	RefTek	2
308	1225	13	RefTek	3
309	1226	16	Texan	1
310	1227	7	SGR	1
311	1228	16	Texan	1
312	1229	1	PRS1	1
313	1230	13	RefTek	1
314	1230	13	RefTek	2
315	1230	13	RefTek	3
316	1231	16	Texan	1
317	1232	7	SGR	1
318	1233	16	Texan	1
319	1234	16	Texan	1
320	1235	13	RefTek	1
321	1235	13	RefTek	2
322	1235	13	RefTek	3
323	1236	16	Texan	1
324	1237	16	Texan	1
325	1238	16	Texan	1
326	1239	7	SGR	1
327	1240	13	RefTek	1
328	1240	13	RefTek	2
329	1240	13	RefTek	3
330	1241	16	Texan	1
331	1242	7	SGR	1
332	1243	16	Texan	1
333	1244	1	PRS1	1

Table 4. Channels Assigned to Seismic Traces and Locations

Channel	Station	DAS Type	DAS Name	Compo-nent
334	1245	13	RefTek	1
335	1245	13	RefTek	2
336	1245	13	RefTek	3
337	1246	16	Texan	1
338	1247	7	SGR	1
339	1248	16	Texan	1
340	1249	1	PRS1	1
341	1250	13	RefTek	1
342	1250	13	RefTek	2
343	1250	13	RefTek	3
344	1251	16	Texan	1
345	1252	7	SGR	1
346	1253	16	Texan	1
347	1254	1	PRS1	1
348	1255	13	RefTek	1
349	1255	13	RefTek	2
350	1255	13	RefTek	3
351	1256	16	Texan	1
352	1257	7	SGR	1
353	1258	16	Texan	1
354	1259	1	PRS1	1
355	1260	13	RefTek	1
356	1260	13	RefTek	2
357	1260	13	RefTek	3
358	1261	16	Texan	1
359	1262	7	SGR	1
360	1263	16	Texan	1
361	1264	1	PRS1	1
362	1265	13	RefTek	1
363	1265	13	RefTek	2
364	1265	13	RefTek	3
365	1266	16	Texan	1
366	1268	16	Texan	1
367	1269	1	PRS1	1
368	1270	13	RefTek	1
369	1270	13	RefTek	2
370	1270	13	RefTek	3
371	1271	16	Texan	1
372	1272	7	SGR	1
373	1273	16	Texan	1
374	1274	1	PRS1	1
375	1275	13	RefTek	1
376	1275	13	RefTek	2
377	1275	13	RefTek	3
378	1276	16	Texan	1
379	1277	7	SGR	1
380	1278	16	Texan	1
381	1279	1	PRS1	1
382	1280	13	RefTek	1
383	1280	13	RefTek	2
384	1280	13	RefTek	3
385	1281	16	Texan	1
386	1282	7	SGR	1
387	1283	16	Texan	1
388	1284	16	Texan	1
389	1285	13	RefTek	1
390	1285	13	RefTek	2
391	1285	13	RefTek	3
392	1286	7	SGR	1
393	1287	16	Texan	1
394	1288	16	Texan	1
395	1289	16	Texan	1
396	1290	16	Texan	1
397	1291	16	Texan	1
398	1292	16	Texan	1
399	1293	16	Texan	1
400	1294	16	Texan	1
401	1295	16	Texan	1
402	1296	16	Texan	1
403	1297	16	Texan	1
404	1298	16	Texan	1
405	1299	16	Texan	1
406	1300	13	RefTek	1
407	1300	13	RefTek	2
408	1300	13	RefTek	3
409	1301	16	Texan	1
410	1302	7	SGR	1
411	1303	16	Texan	1
412	1304	16	Texan	1
413	1305	13	RefTek	1
414	1305	13	RefTek	2
415	1305	13	RefTek	3
416	1306	16	Texan	1
417	1307	7	SGR	1
418	1308	16	Texan	1
419	1309	1	PRS1	1
420	1310	13	RefTek	1
421	1310	13	RefTek	2
422	1310	13	RefTek	3
423	1311	16	Texan	1
424	1312	7	SGR	1
425	1313	16	Texan	1
426	1314	1	PRS1	1
427	1315	13	RefTek	1
428	1315	13	RefTek	2
429	1315	13	RefTek	3
430	1316	16	Texan	1
431	1317	7	SGR	1
432	1318	16	Texan	1
433	1319	1	PRS1	1
434	1320	13	RefTek	1
435	1320	13	RefTek	2
436	1320	13	RefTek	3
437	1321	16	Texan	1
438	1322	7	SGR	1
439	1323	16	Texan	1
440	1324	1	PRS1	1
441	1325	13	RefTek	1
442	1325	13	RefTek	2
443	1325	13	RefTek	3
444	1326	16	Texan	1

Table 4. Channels Assigned to Seismic Traces and Locations

Channel	Station	DAS Type	DAS Name	Compo-nent
445	1327	7	SGR	1
446	1328	16	Texan	1
447	1329	1	PRS1	1
448	1330	13	RefTek	1
449	1330	13	RefTek	2
450	1330	13	RefTek	3
451	1331	16	Texan	1
452	1332	7	SGR	1
453	1333	16	Texan	1
454	1334	13	RefTek	1
455	1334	13	RefTek	2
456	1334	13	RefTek	3
457	1335	16	Texan	1
458	1336	16	Texan	1
459	1337	16	Texan	1
460	1338	16	Texan	1
461	1339	16	Texan	1
462	1340	16	Texan	1
463	1341	13	RefTek	1
464	1341	13	RefTek	2
465	1341	13	RefTek	3
466	1342	13	RefTek	1
467	1342	13	RefTek	2
468	1342	13	RefTek	3
469	1344	13	RefTek	1
470	1344	13	RefTek	2
471	1344	13	RefTek	3
472	1345	16	Texan	1
473	1346	16	Texan	1
474	1347	16	Texan	1
475	1348	16	Texan	1
476	1349	1	PRS1	1
477	1350	13	RefTek	1
478	1350	13	RefTek	2
479	1350	13	RefTek	3
480	1351	16	Texan	1
481	1352	16	Texan	1
482	1353	16	Texan	1
483	1354	1	PRS1	1
484	1355	13	RefTek	1
485	1355	13	RefTek	2
486	1355	13	RefTek	3
487	1356	16	Texan	1
488	1357	1	PRS1	1
489	1358	16	Texan	1
490	1359	13	RefTek	1
491	1359	13	RefTek	2
492	1359	13	RefTek	3
493	1361	16	Texan	1
494	1363	16	Texan	1
495	1364	1	PRS1	1
496	1365	13	RefTek	1
497	1365	13	RefTek	2
498	1365	13	RefTek	3
499	1368	16	Texan	1
500	1369	16	Texan	1
501	1372	13	RefTek	1
502	1372	13	RefTek	2
503	1372	13	RefTek	3
504	1374	16	Texan	1
505	1375	13	RefTek	1
506	1375	13	RefTek	2
507	1375	13	RefTek	3
508	1376	16	Texan	1
509	1377	7	SGR	1
510	1378	16	Texan	1
511	1379	16	Texan	1
512	1380	13	RefTek	1
513	1380	13	RefTek	2
514	1380	13	RefTek	3
515	1381	16	Texan	1
516	1382	7	SGR	1
517	1383	1	PRS1	1
518	1384	1	PRS1	1
519	1385	1	PRS1	1
520	1386	13	RefTek	1
521	1386	13	RefTek	2
522	1386	13	RefTek	3
523	1387	16	Texan	1
524	1388	16	Texan	1
525	1389	16	Texan	1
526	1390	16	Texan	1
527	1391	13	RefTek	1
528	1391	13	RefTek	2
529	1391	13	RefTek	3
530	1392	16	Texan	1
531	1393	16	Texan	1
532	1394	16	Texan	1
533	1395	16	Texan	1
534	1396	13	RefTek	1
535	1396	13	RefTek	2
536	1396	13	RefTek	3
537	1397	7	SGR	1
538	1398	16	Texan	1
539	1399	1	PRS1	1
540	1400	13	RefTek	1
541	1400	13	RefTek	2
542	1400	13	RefTek	3
543	1401	1	PRS1	1
544	1402	7	SGR	1
545	1403	7	SGR	1
546	1404	13	RefTek	1
547	1404	13	RefTek	2
548	1404	13	RefTek	3
549	1405	16	Texan	1
550	1406	16	Texan	1
551	1407	16	Texan	1
552	1408	16	Texan	1
553	1409	16	Texan	1
554	1410	16	Texan	1
555	1411	16	Texan	1

Table 4. Channels Assigned to Seismic Traces and Locations

Channel	Station	DAS Type	DAS Name	Compo-nent
583	1431	16	Texan	1
584	1432	1	PRS1	1
585	1433	16	Texan	1
586	1434	16	Texan	1
587	1435	13	RefTek	1
588	1435	13	RefTek	2
589	1435	13	RefTek	3
590	1436	16	Texan	1
591	1437	1	PRS1	1
592	1438	16	Texan	1
593	1439	1	PRS1	1
594	1440	13	RefTek	1
595	1440	13	RefTek	2
596	1440	13	RefTek	3
597	1441	16	Texan	1
598	1442	1	PRS1	1
599	1443	13	RefTek	1
600	1443	13	RefTek	2
601	1443	13	RefTek	3
602	1446	16	Texan	1
603	1449	16	Texan	1
604	1451	13	RefTek	1
605	1451	13	RefTek	2
606	1451	13	RefTek	3
607	1454	16	Texan	1
608	1456	13	RefTek	1
609	1456	13	RefTek	2
610	1456	13	RefTek	3
611	1458	16	Texan	1
612	1459	13	RefTek	1
613	1459	13	RefTek	2
614	1459	13	RefTek	3
615	1460	16	Texan	1
616	1461	16	Texan	1
617	1462	13	RefTek	1
618	1462	13	RefTek	2
619	1462	13	RefTek	3
620	1463	16	Texan	1
621	1464	16	Texan	1
622	1465	16	Texan	1
623	1466	16	Texan	1
624	1467	16	Texan	1
625	1468	16	Texan	1
626	1469	16	Texan	1
627	1470	13	RefTek	1
628	1470	13	RefTek	2
629	1470	13	RefTek	3
630	1471	16	Texan	1
631	1472	7	SGR	1
632	1473	16	Texan	1
633	1474	7	SGR	1
634	1475	7	SGR	1
635	1476	7	SGR	1
636	1477	7	SGR	1
637	1478	7	SGR	1
638	1480	13	RefTek	1
639	1480	13	RefTek	2
640	1480	13	RefTek	3
641	1481	16	Texan	1
642	1482	7	SGR	1
643	1483	16	Texan	1
644	1484	16	Texan	1
645	1485	13	RefTek	1
646	1485	13	RefTek	2
647	1485	13	RefTek	3
648	1486	16	Texan	1
649	1487	7	SGR	1
650	1488	16	Texan	1
651	1489	7	SGR	1
652	1490	13	RefTek	1
653	1490	13	RefTek	2
654	1490	13	RefTek	3
655	1491	16	Texan	1
656	1492	7	SGR	1
657	1493	16	Texan	1
658	1494	16	Texan	1
659	1495	13	RefTek	1
660	1495	13	RefTek	2
661	1495	13	RefTek	3
662	1496	16	Texan	1
663	1498	16	Texan	1
664	1499	7	SGR	1
665	1500	13	RefTek	1
666	1500	13	RefTek	2
667	1500	13	RefTek	3
668	1501	16	Texan	1
669	1502	7	SGR	1
670	1503	16	Texan	1
671	1504	16	Texan	1
672	1505	13	RefTek	1
673	1505	13	RefTek	2
674	1505	13	RefTek	3
675	1506	16	Texan	1
676	1507	7	SGR	1
677	1508	16	Texan	1
678	1509	7	SGR	1
679	1510	13	RefTek	1
680	1510	13	RefTek	2
681	1510	13	RefTek	3
682	1511	16	Texan	1
683	1512	16	Texan	1
684	1513	7	SGR	1
685	1514	16	Texan	1
686	1515	13	RefTek	1
687	1515	13	RefTek	2
688	1515	13	RefTek	3
689	1516	16	Texan	1
690	1517	7	SGR	1
691	1518	16	Texan	1
692	1519	7	SGR	1
693	1520	13	RefTek	1

Table 4. Channels Assigned to Seismic Traces and Locations

Channel	Station	DAS Type	DAS Name	Compo-nent
694	1520	13	RefTek	2
695	1520	13	RefTek	3
696	1521	16	Texan	1
697	1522	16	Texan	1
698	1523	16	Texan	1
699	1524	16	Texan	1
700	1525	13	RefTek	1
701	1525	13	RefTek	2
702	1525	13	RefTek	3
703	1526	16	Texan	1
704	1527	16	Texan	1
705	1528	16	Texan	1
706	1529	7	SGR	1
707	1530	13	RefTek	1
708	1530	13	RefTek	2
709	1530	13	RefTek	3
710	1531	16	Texan	1
711	1532	16	Texan	1
712	1533	16	Texan	1
713	1534	16	Texan	1
714	1535	13	RefTek	1
715	1535	13	RefTek	2
716	1535	13	RefTek	3
717	1536	16	Texan	1
718	1537	16	Texan	1
719	1538	7	SGR	1
720	1539	16	Texan	1
721	1540	13	RefTek	1
722	1540	13	RefTek	2
723	1540	13	RefTek	3
724	1541	16	Texan	1
725	1542	16	Texan	1
726	1543	16	Texan	1
727	1544	16	Texan	1
728	1545	13	RefTek	1
729	1545	13	RefTek	2
730	1545	13	RefTek	3
731	1546	16	Texan	1
732	1547	16	Texan	1
733	1548	16	Texan	1
734	1549	7	SGR	1
735	1550	13	RefTek	1
736	1550	13	RefTek	2
737	1550	13	RefTek	3
738	1551	16	Texan	1
739	1552	16	Texan	1
740	1553	16	Texan	1
741	1554	16	Texan	1
742	1555	13	RefTek	1
743	1555	13	RefTek	2
744	1555	13	RefTek	3
745	1556	16	Texan	1
746	1557	16	Texan	1
747	1558	16	Texan	1
748	1559	7	SGR	1
749	1560	13	RefTek	1
750	1560	13	RefTek	2
751	1560	13	RefTek	3
752	1561	16	Texan	1
753	1562	16	Texan	1
754	1563	16	Texan	1
755	1564	16	Texan	1
756	1565	13	RefTek	1
757	1565	13	RefTek	2
758	1565	13	RefTek	3
759	1566	16	Texan	1
760	1567	16	Texan	1
761	1568	16	Texan	1
762	1569	7	SGR	1
763	1570	13	RefTek	1
764	1570	13	RefTek	2
765	1570	13	RefTek	3
766	1571	16	Texan	1
767	1572	16	Texan	1
768	1573	16	Texan	1
769	1574	16	Texan	1
770	1575	16	Texan	1
771	1576	16	Texan	1
772	1577	16	Texan	1
773	1578	16	Texan	1
774	1579	16	Texan	1
775	9579	16	Texan	1
776	1580	13	RefTek	1
777	1580	13	RefTek	2
778	1580	13	RefTek	3
779	9580	13	RefTek	1
780	9580	13	RefTek	2
781	9580	13	RefTek	3
782	1581	16	Texan	1
783	1582	16	Texan	1
784	1583	16	Texan	1
785	1584	16	Texan	1
786	1585	16	Texan	1
787	1586	16	Texan	1
788	1587	16	Texan	1
789	1588	16	Texan	1
790	1589	16	Texan	1
791	1590	16	Texan	1
792	1591	16	Texan	1
793	1592	16	Texan	1
794	1593	16	Texan	1
795	1594	16	Texan	1
796	1595	16	Texan	1
797	1596	16	Texan	1
798	1597	16	Texan	1
799	1598	16	Texan	1
800	1599	16	Texan	1
801	1600	16	Texan	1
802	1601	16	Texan	1
803	1602	16	Texan	1
804	1603	16	Texan	1

Table 4. Channels Assigned to Seismic Traces and Locations

Channel	Station	DAS Type	DAS Name	Compo-nent
805	1604	16	Texan	1
806	1605	16	Texan	1
807	1606	16	Texan	1
808	1607	16	Texan	1
809	1608	16	Texan	1
810	1609	16	Texan	1
811	1610	16	Texan	1
812	1611	16	Texan	1
813	1612	16	Texan	1
814	1613	16	Texan	1
815	1614	16	Texan	1
816	1615	16	Texan	1
817	1617	13	RefTek	1
818	1617	13	RefTek	2
819	1617	13	RefTek	3
820	1618	16	Texan	1
821	1619	16	Texan	1
822	1620	16	Texan	1
823	1621	16	Texan	1
824	1622	16	Texan	1
825	1623	16	Texan	1
826	1624	13	RefTek	1
827	1624	13	RefTek	2
828	1624	13	RefTek	3
829	1625	16	Texan	1
830	1626	15	PDAS	1
831	1627	15	PDAS	1
832	1628	15	PDAS	1
833	1629	15	PDAS	1
834	1630	15	PDAS	1
835	1631	15	PDAS	1
836	1632	13	RefTek	1
837	1632	13	RefTek	2
838	1632	13	RefTek	3
839	1633	15	PDAS	1
840	1634	15	PDAS	1
841	1635	15	PDAS	1
842	1636	15	PDAS	1
843	1637	15	PDAS	1
844	1638	15	PDAS	1
845	1639	13	RefTek	1
846	1639	13	RefTek	2
847	1639	13	RefTek	3
848	1640	15	PDAS	1
849	1641	15	PDAS	1
850	1642	15	PDAS	1
851	1643	15	PDAS	1
852	1644	15	PDAS	1
853	1645	15	PDAS	1
854	1646	13	RefTek	1
855	1646	13	RefTek	2
856	1646	13	RefTek	3
857	1647	15	PDAS	1
858	1648	15	PDAS	1
859	1649	15	PDAS	1
860	1650	15	PDAS	1
861	1651	15	PDAS	1
862	1652	15	PDAS	1
863	1653	13	RefTek	1
864	1653	13	RefTek	2
865	1653	13	RefTek	3
866	1654	15	PDAS	1
867	1655	15	PDAS	1
868	1656	15	PDAS	1
869	1657	15	PDAS	1
870	1658	15	PDAS	1
871	1659	15	PDAS	1
872	1660	15	PDAS	1
873	1661	15	PDAS	1
874	1662	15	PDAS	1
875	1663	15	PDAS	1
876	1664	15	PDAS	1
877	1665	15	PDAS	1
878	1666	16	Texan	1
879	1667	16	Texan	1
880	1668	16	Texan	1
881	1669	16	Texan	1
882	1670	16	Texan	1
883	1671	16	Texan	1
884	1672	16	Texan	1
885	1673	16	Texan	1
886	1674	16	Texan	1
887	1675	16	Texan	1
888	1676	16	Texan	1
889	1677	16	Texan	1
890	1678	16	Texan	1
891	1679	16	Texan	1
892	1680	16	Texan	1
893	1681	16	Texan	1
894	1682	16	Texan	1
895	1683	16	Texan	1
896	1684	16	Texan	1
897	1685	16	Texan	1
898	1686	13	RefTek	1
899	1686	13	RefTek	2
900	1686	13	RefTek	3
901	1687	15	PDAS	1
902	1688	15	PDAS	1
903	1689	15	PDAS	1
904	1690	15	PDAS	1
905	1691	15	PDAS	1
906	1692	15	PDAS	1
907	1693	13	RefTek	1
908	1693	13	RefTek	2
909	1693	13	RefTek	3
910	1694	15	PDAS	1
911	1695	15	PDAS	1
912	1696	15	PDAS	1
913	1697	15	PDAS	1
914	1698	15	PDAS	1
915	1699	15	PDAS	1

Table 4. Channels Assigned to Seismic Traces and Locations

Channel	Station	DAS Type	DAS Name	Compo-nent
916	1700	15	PDAS	1
917	1701	15	PDAS	1
918	1702	15	PDAS	1
919	1703	15	PDAS	1
920	1704	15	PDAS	1
921	1705	15	PDAS	1
922	1706	13	RefTek	1
923	1706	13	RefTek	2
924	1706	13	RefTek	3
925	1707	15	PDAS	1
926	1708	15	PDAS	1
927	1709	15	PDAS	1
928	1710	15	PDAS	1
929	1711	15	PDAS	1
930	1712	15	PDAS	1
931	1713	13	RefTek	1
932	1713	13	RefTek	2
933	1713	13	RefTek	3
934	1714	13	RefTek	1
935	1714	13	RefTek	2
936	1714	13	RefTek	3
937	1715	13	RefTek	1
938	1715	13	RefTek	2
939	1715	13	RefTek	3
940	1716	13	RefTek	1
941	1716	13	RefTek	2
942	1716	13	RefTek	3
943	1717	15	PDAS	1
944	1718	15	PDAS	1
945	1719	15	PDAS	1
946	1720	15	PDAS	1
947	1721	15	PDAS	1
948	1722	15	PDAS	1
949	1723	13	RefTek	1
950	1723	13	RefTek	2
951	1723	13	RefTek	3
952	1724	15	PDAS	1
953	1725	15	PDAS	1
954	1726	15	PDAS	1
955	1727	15	PDAS	1
956	1728	15	PDAS	1
957	1729	15	PDAS	1
958	1730	15	PDAS	1
959	1731	15	PDAS	1
960	1732	15	PDAS	1
961	1733	15	PDAS	1
962	1734	15	PDAS	1
963	1735	15	PDAS	1
964	1736	13	RefTek	1
965	1736	13	RefTek	2
966	1736	13	RefTek	3
967	1737	15	PDAS	1
968	1738	15	PDAS	1
969	1739	15	PDAS	1
970	1740	15	PDAS	1
971	1741	15	PDAS	1
972	1742	15	PDAS	1
973	1743	13	RefTek	1
974	1743	13	RefTek	2
975	1743	13	RefTek	3
976	1744	15	PDAS	1
977	1745	15	PDAS	1
978	1746	15	PDAS	1
979	1747	15	PDAS	1
980	1748	15	PDAS	1
981	1749	15	PDAS	1
982	1750	13	RefTek	1
983	1750	13	RefTek	2
984	1750	13	RefTek	3
985	1751	15	PDAS	1
986	1752	15	PDAS	1
987	1753	15	PDAS	1
988	1754	15	PDAS	1
989	1755	15	PDAS	1
990	1756	15	PDAS	1
991	1757	13	RefTek	1
992	1757	13	RefTek	2
993	1757	13	RefTek	3
994	1758	15	PDAS	1
995	1759	15	PDAS	1
996	1760	15	PDAS	1
997	1761	15	PDAS	1
998	1762	15	PDAS	1
999	1763	15	PDAS	1
1000	1764	13	RefTek	1
1001	1764	13	RefTek	2
1002	1764	13	RefTek	3
1003	1765	16	Texan	1
1004	1766	16	Texan	1
1005	1767	16	Texan	1
1006	1768	16	Texan	1
1007	1769	16	Texan	1
1008	1770	16	Texan	1
1009	1771	16	Texan	1
1010	1772	15	PDAS	1
1011	1773	15	PDAS	1
1012	1774	15	PDAS	1
1013	1775	15	PDAS	1
1014	1776	15	PDAS	1
1015	1777	15	PDAS	1
1016	1778	16	Texan	1
1017	1779	13	RefTek	1
1018	1779	13	RefTek	2
1019	1779	13	RefTek	3
1020	1780	15	PDAS	1
1021	1781	15	PDAS	1
1022	1782	15	PDAS	1
1023	1783	15	PDAS	1
1024	1784	15	PDAS	1
1025	1785	15	PDAS	1
1026	1786	16	Texan	1

Table 4. Channels Assigned to Seismic Traces and Locations

Channel	Station	DAS Type	DAS Name	Compo-nent
1027	1788	15	PDAS	1
1028	1789	15	PDAS	1
1029	1790	15	PDAS	1
1030	1791	15	PDAS	1
1031	1792	15	PDAS	1
1032	1793	15	PDAS	1
1033	1794	13	RefTek	1
1034	1794	13	RefTek	2
1035	1794	13	RefTek	3
1036	1795	15	PDAS	1
1037	1796	15	PDAS	1
1038	1797	15	PDAS	1
1039	1798	15	PDAS	1
1040	1799	15	PDAS	1
1041	1800	15	PDAS	1
1042	1801	13	RefTek	1
1043	1801	13	RefTek	2
1044	1801	13	RefTek	3
1045	1802	13	RefTek	1
1046	1802	13	RefTek	2
1047	1802	13	RefTek	3
1048	1803	13	RefTek	1
1049	1803	13	RefTek	2
1050	1803	13	RefTek	3
1051	1804	15	PDAS	1
1052	1805	15	PDAS	1
1053	1806	15	PDAS	1
1054	1807	15	PDAS	1
1055	1808	15	PDAS	1
1056	1809	15	PDAS	1
1057	1810	13	RefTek	1
1058	1810	13	RefTek	2
1059	1810	13	RefTek	3
1060	1811	15	PDAS	1
1061	1812	15	PDAS	1
1062	1813	15	PDAS	1
1063	1814	15	PDAS	1
1064	1815	15	PDAS	1
1065	1816	15	PDAS	1
1066	1819	13	RefTek	1
1067	1819	13	RefTek	2
1068	1819	13	RefTek	3
1069	1821	15	PDAS	1
1070	1822	15	PDAS	1
1071	1823	15	PDAS	1
1072	1824	15	PDAS	1
1073	1825	15	PDAS	1
1074	1826	13	RefTek	1
1075	1826	13	RefTek	2
1076	1826	13	RefTek	3
1077	1827	15	PDAS	1
1078	1828	15	PDAS	1
1079	1829	15	PDAS	1
1080	1830	15	PDAS	1
1081	1831	15	PDAS	1
1082	1832	15	PDAS	1
1083	1833	13	RefTek	1
1084	1833	13	RefTek	2
1085	1833	13	RefTek	3
1086	1834	13	RefTek	1
1087	1834	13	RefTek	2
1088	1834	13	RefTek	3
1089	1835	13	RefTek	1
1090	1835	13	RefTek	2
1091	1835	13	RefTek	3
1092	1836	15	PDAS	1
1093	1837	15	PDAS	1
1094	1838	15	PDAS	1
1095	1839	15	PDAS	1
1096	1840	15	PDAS	1
1097	1841	15	PDAS	1
1098	1842	13	RefTek	1
1099	1842	13	RefTek	2
1100	1842	13	RefTek	3
1101	1843	13	RefTek	1
1102	1843	13	RefTek	2
1103	1843	13	RefTek	3
1104	1844	15	PDAS	1
1105	1845	15	PDAS	1
1106	1846	15	PDAS	1
1107	1847	15	PDAS	1
1108	1848	15	PDAS	1
1109	1849	15	PDAS	1
1110	1850	13	RefTek	1
1111	1850	13	RefTek	2
1112	1850	13	RefTek	3
1113	1851	13	RefTek	1
1114	1851	13	RefTek	2
1115	1851	13	RefTek	3
1116	1852	15	PDAS	1
1117	1853	15	PDAS	1
1118	1854	15	PDAS	1
1119	1855	15	PDAS	1
1120	1856	15	PDAS	1
1121	1857	15	PDAS	1
1122	1858	13	RefTek	1
1123	1858	13	RefTek	2
1124	1858	13	RefTek	3
1125	1859	13	RefTek	1
1126	1859	13	RefTek	2
1127	1859	13	RefTek	3
1128	1860	15	PDAS	1
1129	1861	15	PDAS	1
1130	1862	15	PDAS	1
1131	1863	15	PDAS	1
1132	1864	15	PDAS	1
1133	1865	15	PDAS	1
1134	1866	13	RefTek	1
1135	1866	13	RefTek	2
1136	1866	13	RefTek	3
1137	1867	13	RefTek	1

Table 4. Channels Assigned to Seismic Traces and Locations

Channel	Station	DAS Type	DAS Name	Compo-nent
1138	1867	13	RefTek	2
1139	1867	13	RefTek	3
1140	1868	15	PDAS	1
1141	1869	15	PDAS	1
1142	1870	15	PDAS	1
1143	1871	15	PDAS	1
1144	1872	15	PDAS	1
1145	1873	15	PDAS	1
1146	1874	13	RefTek	1
1147	1874	13	RefTek	2
1148	1874	13	RefTek	3
1149	1875	15	PDAS	1
1150	1876	15	PDAS	1
1151	1877	15	PDAS	1
1152	1878	15	PDAS	1
1153	1879	15	PDAS	1
1154	1880	15	PDAS	1
1155	1881	13	RefTek	1
1156	1881	13	RefTek	2
1157	1881	13	RefTek	3
1158	1882	13	RefTek	1
1159	1882	13	RefTek	2
1160	1882	13	RefTek	3
1161	1883	13	RefTek	1
1162	1883	13	RefTek	2
1163	1883	13	RefTek	3
1164	1884	15	PDAS	1
1165	1885	15	PDAS	1
1166	1886	15	PDAS	1
1167	1887	15	PDAS	1
1168	1888	15	PDAS	1
1169	1889	15	PDAS	1
1170	1890	13	RefTek	1
1171	1890	13	RefTek	2
1172	1890	13	RefTek	3
1173	1891	13	RefTek	1
1174	1891	13	RefTek	2
1175	1891	13	RefTek	3
1176	1892	15	PDAS	1
1177	1893	15	PDAS	1
1178	1894	15	PDAS	1
1179	1895	15	PDAS	1
1180	1896	15	PDAS	1
1181	1897	15	PDAS	1
1182	1898	13	RefTek	1
1183	1898	13	RefTek	2
1184	1898	13	RefTek	3
1185	1899	15	PDAS	1
1186	1900	15	PDAS	1
1187	1901	15	PDAS	1
1188	1902	15	PDAS	1
1189	1903	15	PDAS	1
1190	1904	15	PDAS	1
1191	1905	16	Texan	1
1192	1908	16	Texan	1
1193	1911	16	Texan	1
1194	1914	13	RefTek	1
1195	1914	13	RefTek	2
1196	1914	13	RefTek	3
1197	1917	13	RefTek	1
1198	1917	13	RefTek	2
1199	1917	13	RefTek	3
1200	1920	13	RefTek	1
1201	1920	13	RefTek	2
1202	1920	13	RefTek	3
1203	1923	13	RefTek	1
1204	1923	13	RefTek	2
1205	1923	13	RefTek	3
1206	1926	16	Texan	1
1207	1929	13	RefTek	1
1208	1929	13	RefTek	2
1209	1929	13	RefTek	3
1210	1932	16	Texan	1
1211	1935	13	RefTek	1
1212	1935	13	RefTek	2
1213	1935	13	RefTek	3
1214	1938	16	Texan	1
1215	1941	13	RefTek	1
1216	1941	13	RefTek	2
1217	1941	13	RefTek	3
1218	1944	16	Texan	1
1219	1947	13	RefTek	1
1220	1947	13	RefTek	2
1221	1947	13	RefTek	3
1222	1950	16	Texan	1
1223	1953	13	RefTek	1
1224	1953	13	RefTek	2
1225	1953	13	RefTek	3
1226	1956	16	Texan	1
1227	1959	13	RefTek	1
1228	1959	13	RefTek	2
1229	1959	13	RefTek	3
1230	1962	16	Texan	1
1231	1965	13	RefTek	1
1232	1965	13	RefTek	2
1233	1965	13	RefTek	3
1234	1968	16	Texan	1
1235	1971	13	RefTek	1
1236	1971	13	RefTek	2
1237	1971	13	RefTek	3
1238	1974	16	Texan	1
1239	1977	13	RefTek	1
1240	1977	13	RefTek	2
1241	1977	13	RefTek	3
1242	1980	16	Texan	1
1243	1983	13	RefTek	1
1244	1983	13	RefTek	2
1245	1983	13	RefTek	3
1246	1986	16	Texan	1
1247	1990	16	Texan	1
1248	1995	16	Texan	1

Table 4. Channels Assigned to Seismic Traces and Locations

Channel	Station	DAS Type	DAS Name	Compo-nent	Channel	Station	DAS Type	DAS Name	Compo-nent	Channel	Station	DAS Type	DAS Name	Compo-nent
1249	2000	16	Texan	1	1265	2170	1	PRS1	1	1281	2350	1	PRS1	1
1250	2005	16	Texan	1	1266	2180	1	PRS1	1	1282	2360	1	PRS1	1
1251	2010	16	Texan	1	1267	2190	1	PRS1	1	1283	2370	1	PRS1	1
1252	2020	16	Texan	1	1268	2200	1	PRS1	1	1284	2380	1	PRS1	1
1253	2030	16	Texan	1	1269	2220	1	PRS1	1	1285	2390	1	PRS1	1
1254	2060	1	PRS1	1	1270	2230	1	PRS1	1	1286	2400	1	PRS1	1
1255	2070	1	PRS1	1	1271	2240	1	PRS1	1	1287	2410	1	PRS1	1
1256	2080	1	PRS1	1	1272	2250	1	PRS1	1	1288	2420	1	PRS1	1
1257	2090	1	PRS1	1	1273	2260	1	PRS1	1	1289	2430	1	PRS1	1
1258	2100	1	PRS1	1	1274	2270	1	PRS1	1	1290	2440	1	PRS1	1
1259	2110	1	PRS1	1	1275	2280	1	PRS1	1	1291	2450	1	PRS1	1
1260	2120	1	PRS1	1	1276	2290	1	PRS1	1	1292	2460	1	PRS1	1
1261	2130	1	PRS1	1	1277	2310	1	PRS1	1	1293	2470	1	PRS1	1
1262	2140	1	PRS1	1	1278	2320	1	PRS1	1	1294	2480	1	PRS1	1
1263	2150	1	PRS1	1	1279	2330	1	PRS1	1	1295	2490	1	PRS1	1
1264	2160	1	PRS1	1	1280	2340	1	PRS1	1	1296	2500	1	PRS1	1

Table 4. Channels Assigned to Seismic Traces and Locations

Channel	Station	DAS Type	DAS Name	Component
1	3001	16	Texan	1
2	3002	16	Texan	1
3	3003	16	Texan	1
4	3004	9	PRS4	1
5	3004	9	PRS4	2
6	3004	9	PRS4	3
7	3005	16	Texan	1
8	3006	16	Texan	1
9	3007	9	PRS4	1
10	3007	9	PRS4	2
11	3007	9	PRS4	3
12	3008	1	PRS1	1
13	3009	7	SGR	1
14	3010	16	Texan	1
15	3011	9	PRS4	1
16	3011	9	PRS4	2
17	3011	9	PRS4	3
18	3012	1	PRS1	1
19	3013	7	SGR	1
20	3014	9	PRS4	1
21	3014	9	PRS4	2
22	3014	9	PRS4	3
23	3015	9	PRS4	1
24	3015	9	PRS4	2
25	3015	9	PRS4	3
26	3016	1	PRS1	1
27	3017	7	SGR	1
28	3018	16	Texan	1
29	3019	9	PRS4	1
30	3019	9	PRS4	2
31	3019	9	PRS4	3
32	3020	1	PRS1	1
33	3021	7	SGR	1
34	3022	1	PRS1	1
35	3023	9	PRS4	1
36	3023	9	PRS4	2
37	3023	9	PRS4	3
38	3024	1	PRS1	1
39	3025	7	SGR	1
40	3026	16	Texan	1
41	3027	9	PRS4	1
42	3027	9	PRS4	2
43	3027	9	PRS4	3
44	3028	1	PRS1	1
45	3029	7	SGR	1
46	3030	1	PRS1	1
47	3031	9	PRS4	1
48	3031	9	PRS4	2
49	3031	9	PRS4	3
50	3032	1	PRS1	1
51	3033	7	SGR	1
52	3034	16	Texan	1
53	3035	9	PRS4	1
54	3035	9	PRS4	2
55	3035	9	PRS4	3
56	3036	1	PRS1	1
57	3037	7	SGR	1
58	3038	7	SGR	1
59	3039	9	PRS4	1
60	3039	9	PRS4	2
61	3039	9	PRS4	3
62	3040	1	PRS1	1
63	3041	7	SGR	1
64	3042	16	Texan	1
65	3043	9	PRS4	1
66	3043	9	PRS4	2
67	3043	9	PRS4	3
68	3044	1	PRS1	1
69	3046	16	Texan	1
70	3047	16	Texan	1
71	3048	16	Texan	1
72	3049	9	PRS4	1
73	3049	9	PRS4	2
74	3049	9	PRS4	3
75	3050	7	SGR	1
76	3051	7	SGR	1
77	3053	16	Texan	1
78	3054	1	PRS1	1
79	3055	7	SGR	1
80	3056	1	PRS1	1
81	3057	16	Texan	1
82	3058	1	PRS1	1

Channel	Station	DAS Type	DAS Name	Component
1	4006	1	PRS1	1
2	4008	16	Texan	1
3	4009	16	Texan	1
4	4010	16	Texan	1
5	4011	16	Texan	1
6	4012	16	Texan	1

Table 4. Channels Assigned to Seismic Traces and Locations

Channel	Station	DAS Type	DAS Name	Component
7	4013	16	Texan	1
8	4014	16	Texan	1
9	4016	9	PRS4	1
10	4016	9	PRS4	2
11	4016	9	PRS4	3
12	4017	1	PRS1	1
13	4018	1	PRS1	1
14	4019	16	Texan	1
15	4020	1	PRS1	1
16	4021	9	PRS4	1
17	4021	9	PRS4	2
18	4021	9	PRS4	3
19	4022	16	Texan	1
20	4024	1	PRS1	1
21	4025	16	Texan	1
22	4026	1	PRS1	1
23	4027	9	PRS4	1
24	4027	9	PRS4	2
25	4027	9	PRS4	3
26	4028	1	PRS1	1
27	4029	7	SGR	1
28	4030	16	Texan	1
29	4033	9	PRS4	1
30	4033	9	PRS4	2
31	4033	9	PRS4	3
32	4035	7	SGR	1
33	4036	16	Texan	1
34	4039	9	PRS4	1
35	4039	9	PRS4	2
36	4039	9	PRS4	3
37	4042	16	Texan	1
38	4043	1	PRS1	1
39	4044	16	Texan	1
40	4045	1	PRS1	1
41	4047	7	SGR	1
42	4049	9	PRS4	1
43	4049	9	PRS4	2
44	4049	9	PRS4	3
45	4051	16	Texan	1
46	4053	16	Texan	1
47	4054	7	SGR	1
48	4056	13	RefTek	1
49	4056	13	RefTek	2
50	4056	13	RefTek	3
51	4057	1	PRS1	1
52	4059	7	SGR	1
53	4060	1	PRS1	1
54	4061	9	PRS4	1
55	4061	9	PRS4	2
56	4061	9	PRS4	3
57	4062	1	PRS1	1
58	4063	13	RefTek	1
59	4063	13	RefTek	2
60	4063	13	RefTek	3
61	4064	16	Texan	1
62	4066	7	SGR	1
63	4067	16	Texan	1
64	4068	13	RefTek	1
65	4068	13	RefTek	2
66	4068	13	RefTek	3
67	4073	16	Texan	1
68	4074	1	PRS1	1
69	4075	13	RefTek	1
70	4075	13	RefTek	2
71	4075	13	RefTek	3
72	4076	9	PRS4	1
73	4076	9	PRS4	2
74	4076	9	PRS4	3
75	4079	7	SGR	1
76	4080	1	PRS1	1
77	4081	13	RefTek	1
78	4081	13	RefTek	2
79	4081	13	RefTek	3
80	4082	16	Texan	1
81	4083	1	PRS1	1
82	4084	9	PRS4	1
83	4084	9	PRS4	2
84	4084	9	PRS4	3
85	4086	13	RefTek	1
86	4086	13	RefTek	2
87	4086	13	RefTek	3
88	4087	7	SGR	1
89	4088	1	PRS1	1
90	4091	13	RefTek	1
91	4091	13	RefTek	2
92	4091	13	RefTek	3
93	4091	1	PRS1	1
94	4092	16	Texan	1
95	4093	7	SGR	1
96	4094	1	PRS1	1
97	4095	16	Texan	1
98	4096	1	PRS1	1
99	4097	9	PRS4	1
100	4097	9	PRS4	2
101	4097	9	PRS4	3
102	4100	16	Texan	1
103	4101	16	Texan	1
104	4102	1	PRS1	1
105	4103	7	SGR	1
106	4104	16	Texan	1
107	4105	16	Texan	1
108	4107	16	Texan	1
109	4108	7	SGR	1
110	4109	1	PRS1	1
111	4110	16	Texan	1
112	4111	9	PRS4	1
113	4111	9	PRS4	2
114	4111	9	PRS4	3
115	4112	7	SGR	1
116	4113	16	Texan	1
117	4114	16	Texan	1

Table 4. Channels Assigned to Seismic Traces and Locations

Channel	Station	DAS Type	DAS Name	Component
1	5010	7	SGR	1
2	5013	1	PRS1	1
3	5015	7	SGR	1
4	5017	1	PRS1	1
5	5019	7	SGR	1
6	5022	1	PRS1	1
7	5025	0	0	1
8	5027	0	0	1
9	5031	1	PRS1	1
10	5034	7	SGR	1
11	5037	0	0	1
12	5039	7	SGR	1
13	5042	1	PRS1	1
14	5044	1	PRS1	1
15	5046	13	RefTek	1
16	5046	13	RefTek	2
17	5046	13	RefTek	3
18	5048	13	RefTek	1
19	5048	13	RefTek	2
20	5048	13	RefTek	3
21	5052	1	PRS1	1
22	5054	7	SGR	1
23	5056	1	PRS1	1
24	5057	1	PRS1	1
25	5059	1	PRS1	1
26	5060	1	PRS1	1
27	5062	1	PRS1	1
28	5063	1	PRS1	1
29	5064	7	SGR	1
30	5066	7	SGR	1
31	5068	16	Texan	1
32	5070	16	Texan	1
33	5072	16	Texan	1
34	5073	16	Texan	1

Channel	Station	DAS Type	DAS Name	Component
1	6005	13	RefTek	1
2	6005	13	RefTek	2
3	6005	13	RefTek	3
4	6006	16	Texan	1
5	6007	7	SGR	1
6	6008	16	Texan	1
7	6009	13	RefTek	1
8	6009	13	RefTek	2
9	6009	13	RefTek	3
10	6010	7	SGR	1
11	6011	7	SGR	1
12	6012	16	Texan	1
13	6013	13	RefTek	1
14	6013	13	RefTek	2
15	6013	13	RefTek	3
16	6015	7	SGR	1
17	6016	16	Texan	1
18	6017	13	RefTek	1
19	6017	13	RefTek	2
20	6017	13	RefTek	3
21	6019	7	SGR	1
22	6020	16	Texan	1
23	6021	13	RefTek	1
24	6021	13	RefTek	2
25	6021	13	RefTek	3
26	6022	16	Texan	1
27	6023	7	SGR	1
28	6024	16	Texan	1
29	6025	13	RefTek	1
30	6025	13	RefTek	2
31	6025	13	RefTek	3
32	6026	16	Texan	1
33	6027	7	SGR	1
34	6028	16	Texan	1
35	6029	13	RefTek	1
36	6029	13	RefTek	2
37	6029	13	RefTek	3
38	6031	7	SGR	1
39	6032	16	Texan	1
40	6033	7	SGR	1
41	6034	16	Texan	1
42	6035	13	RefTek	1
43	6035	13	RefTek	2
44	6035	13	RefTek	3
45	6036	16	Texan	1
46	6037	7	SGR	1
47	6038	16	Texan	1
48	6039	7	SGR	1
49	6040	16	Texan	1
50	6041	13	RefTek	1
51	6041	13	RefTek	2
52	6041	13	RefTek	3
53	6042	7	SGR	1
54	6043	16	Texan	1
55	6044	7	SGR	1
56	6045	16	Texan	1
57	6046	16	Texan	1

Table 4. Channels Assigned to Seismic Traces and Locations

Channel	Station	DAS Type	DAS Name	Component
58	6047	13	RefTek	1
59	6047	13	RefTek	2
60	6047	13	RefTek	3
61	6048	16	Texan	1
62	6049	16	Texan	1
63	6050	16	Texan	1
64	6051	16	Texan	1
65	6052	16	Texan	1
66	6053	13	RefTek	1
67	6053	13	RefTek	2
68	6053	13	RefTek	3
69	6054	16	Texan	1
70	6055	16	Texan	1
71	6056	16	Texan	1
72	6057	16	Texan	1
73	6058	16	Texan	1
74	6059	13	RefTek	1
75	6059	13	RefTek	2
76	6059	13	RefTek	3
77	6062	13	RefTek	1
78	6062	13	RefTek	2
79	6062	13	RefTek	3
80	6063	16	Texan	1
81	6064	16	Texan	1
82	6065	16	Texan	1
83	6067	16	Texan	1
84	6069	16	Texan	1
85	6070	16	Texan	1
86	6071	13	RefTek	1
87	6071	13	RefTek	2
88	6071	13	RefTek	3
89	6072	13	RefTek	1
90	6072	13	RefTek	2
91	6072	13	RefTek	3
92	6073	16	Texan	1
93	6075	16	Texan	1
94	6076	16	Texan	1
95	6077	13	RefTek	1
96	6077	13	RefTek	2
97	6077	13	RefTek	3
98	6080	16	Texan	1
99	6081	13	RefTek	1
100	6081	13	RefTek	2
101	6081	13	RefTek	3
102	6082	16	Texan	1
103	6083	16	Texan	1
104	6085	16	Texan	1
105	6086	13	RefTek	1
106	6086	13	RefTek	2
107	6086	13	RefTek	3
108	6087	16	Texan	1
109	6088	16	Texan	1
110	6089	16	Texan	1
111	6090	16	Texan	1
112	6091	16	Texan	1
113	6093	13	RefTek	1
114	6093	13	RefTek	2
115	6093	13	RefTek	3
116	6094	16	Texan	1
117	6095	16	Texan	1
118	6096	16	Texan	1
119	6097	13	RefTek	1
120	6097	13	RefTek	2
121	6097	13	RefTek	3
122	6099	16	Texan	1
123	6100	16	Texan	1
124	6101	13	RefTek	1
125	6101	13	RefTek	2
126	6101	13	RefTek	3
127	6102	16	Texan	1
128	6103	16	Texan	1
129	6104	16	Texan	1
130	6106	16	Texan	1
131	6107	16	Texan	1
132	6108	13	RefTek	1
133	6108	13	RefTek	2
134	6108	13	RefTek	3

Channel	Station	DAS Type	DAS Name	Component
1	6503	13	RefTek	1
2	6503	13	RefTek	2
3	6503	13	RefTek	3
4	6504	13	RefTek	1
5	6504	13	RefTek	2
6	6504	13	RefTek	3
7	6505	13	RefTek	1
8	6505	13	RefTek	2
9	6505	13	RefTek	3
10	6506	13	RefTek	1
11	6506	13	RefTek	2
12	6506	13	RefTek	3
13	6507	13	RefTek	1
14	6507	13	RefTek	2
15	6507	13	RefTek	3

Table 4. Channels Assigned to Seismic Traces and Locations

Channel	Station	DAS Type	DAS Name	Component
16	6508	13	RefTek	1
17	6508	13	RefTek	2
18	6508	13	RefTek	3
19	6509	13	RefTek	1
20	6509	13	RefTek	2
21	6509	13	RefTek	3
22	6510	13	RefTek	1
23	6510	13	RefTek	2
24	6510	13	RefTek	3
25	6511	13	RefTek	1
26	6511	13	RefTek	2
27	6511	13	RefTek	3
28	6512	13	RefTek	1
29	6512	13	RefTek	2
30	6512	13	RefTek	3
31	6513	13	RefTek	1
32	6513	13	RefTek	2
33	6513	13	RefTek	3
34	6514	13	RefTek	1
35	6514	13	RefTek	2
36	6514	13	RefTek	3
37	6515	13	RefTek	1
38	6515	13	RefTek	2
39	6515	13	RefTek	3
40	6516	13	RefTek	1
41	6516	13	RefTek	2
42	6516	13	RefTek	3
43	6517	13	RefTek	1
44	6517	13	RefTek	2
45	6517	13	RefTek	3
46	6518	13	RefTek	1
47	6518	13	RefTek	2
48	6518	13	RefTek	3
49	6519	13	RefTek	1
50	6519	13	RefTek	2
51	6519	13	RefTek	3
52	6520	13	RefTek	1
53	6520	13	RefTek	2
54	6520	13	RefTek	3
55	6521	13	RefTek	1
56	6521	13	RefTek	2
57	6521	13	RefTek	3
58	6522	13	RefTek	1
59	6522	13	RefTek	2
60	6522	13	RefTek	3
61	6523	13	RefTek	1
62	6523	13	RefTek	2
63	6523	13	RefTek	3
64	6524	13	RefTek	1
65	6524	13	RefTek	2
66	6524	13	RefTek	3
67	6525	13	RefTek	1
68	6525	13	RefTek	2
69	6525	13	RefTek	3
70	6526	13	RefTek	1
71	6526	13	RefTek	2
72	6526	13	RefTek	3
73	6527	13	RefTek	1
74	6527	13	RefTek	2
75	6527	13	RefTek	3
76	6528	13	RefTek	1
77	6528	13	RefTek	2
78	6528	13	RefTek	3
79	6530	13	RefTek	1
80	6530	13	RefTek	2
81	6530	13	RefTek	3
82	6531	13	RefTek	1
83	6531	13	RefTek	2
84	6531	13	RefTek	3
85	6532	13	RefTek	1
86	6532	13	RefTek	2
87	6532	13	RefTek	3
88	6534	13	RefTek	1
89	6534	13	RefTek	2
90	6534	13	RefTek	3
91	6535	13	RefTek	1
92	6535	13	RefTek	2
93	6535	13	RefTek	3
94	6537	13	RefTek	1
95	6537	13	RefTek	2
96	6537	13	RefTek	3
97	6538	13	RefTek	1
98	6538	13	RefTek	2
99	6538	13	RefTek	3
100	6539	13	RefTek	1
101	6539	13	RefTek	2
102	6539	13	RefTek	3
103	6541	13	RefTek	1
104	6541	13	RefTek	2
105	6541	13	RefTek	3
106	6542	13	RefTek	1
107	6542	13	RefTek	2
108	6542	13	RefTek	3
109	6543	13	RefTek	1
110	6543	13	RefTek	2
111	6543	13	RefTek	3
112	6545	13	RefTek	1
113	6545	13	RefTek	2
114	6545	13	RefTek	3
115	6546	13	RefTek	1
116	6546	13	RefTek	2
117	6546	13	RefTek	3
118	6547	13	RefTek	1
119	6547	13	RefTek	2
120	6547	13	RefTek	3
121	6548	13	RefTek	1
122	6548	13	RefTek	2
123	6548	13	RefTek	3
124	6549	13	RefTek	1
125	6549	13	RefTek	2
126	6549	13	RefTek	3

Table 4. Channels Assigned to Seismic Traces and Locations

Channel	Station	DAS Type	DAS Name	Component
127	6550	13	RefTek	1
128	6550	13	RefTek	2
129	6550	13	RefTek	3
130	6551	13	RefTek	1
131	6551	13	RefTek	2
132	6551	13	RefTek	3
133	6552	13	RefTek	1
134	6552	13	RefTek	2
135	6552	13	RefTek	3
136	6553	13	RefTek	1
137	6553	13	RefTek	2
138	6553	13	RefTek	3
139	6554	13	RefTek	1
140	6554	13	RefTek	2
141	6554	13	RefTek	3
142	6556	13	RefTek	1
143	6556	13	RefTek	2
144	6556	13	RefTek	3
145	6557	13	RefTek	1
146	6557	13	RefTek	2
147	6557	13	RefTek	3

Channel	Station	DAS Type	DAS Name	Component
1	7001	13	RefTek	1
2	7001	13	RefTek	2
3	7001	13	RefTek	3
4	7002	7	SGR	1
5	7003	16	Texan	1
6	7004	7	SGR	1
7	7005	16	Texan	1
8	7006	16	Texan	1
9	7007	7	SGR	1
10	7008	16	Texan	1
11	7009	16	Texan	1
12	7010	7	SGR	1
13	7011	16	Texan	1
14	7012	16	Texan	1
15	7013	7	SGR	1
16	7015	16	Texan	1
17	7016	7	SGR	1
18	7017	13	RefTek	1
19	7017	13	RefTek	2
20	7017	13	RefTek	3
21	7018	16	Texan	1
22	7019	7	SGR	1
23	7020	1	PRS1	1
24	7021	16	Texan	1
25	7022	7	SGR	1
26	7023	1	PRS1	1
27	7024	16	Texan	1
28	7025	1	PRS1	1
29	7027	1	PRS1	1
30	7028	16	Texan	1
31	7029	1	PRS1	1
32	7030	16	Texan	1
33	7031	1	PRS1	1
34	7032	16	Texan	1
35	7033	13	RefTek	1
36	7033	13	RefTek	2
37	7033	13	RefTek	3
38	7034	13	RefTek	1
39	7034	13	RefTek	2
40	7034	13	RefTek	3
41	7035	1	PRS1	1
42	7036	16	Texan	1
43	7037	1	PRS1	1
44	7038	16	Texan	1
45	7041	16	Texan	1
46	7042	1	PRS1	1
47	7045	16	Texan	1
48	7049	13	RefTek	1
49	7049	13	RefTek	2
50	7049	13	RefTek	3
51	7050	16	Texan	1
52	7051	1	PRS1	1
53	7052	16	Texan	1
54	7053	1	PRS1	1
55	7054	16	Texan	1
56	7055	1	PRS1	1
57	7056	16	Texan	1
58	7057	1	PRS1	1
59	7058	16	Texan	1
60	7059	1	PRS1	1
61	7060	16	Texan	1
62	7061	1	PRS1	1
63	7062	16	Texan	1
64	7063	16	Texan	1

Table 5. Archive Data Tape Format

Archive data tapes are written in standard SEG-Y 32-bit IBM floating point format (Barry et al., 1975). Data were written to disk image shot files; each file has the standard SEG-Y EBCDIC reel header. Minor modifications to the trace headers have been made to allow the archived data to be adequately described. A list of the header fields used for these data is shown below.

Trace Identification Header (total of 240 bytes)

---

size	bytes	Explanation
long	1- 4	*Sequence number within line*
long	5- 8	*Sequence number within reel*
long	9- 12	**Shot gather index number: [1-93; chronologic order]**
long	13- 16	**Channel Shot gather trace number:**
long	17- 20	SP name (e.g., 8170)
long	21- 24	CDP number (empty)
long	25- 28	CDP trace number (empty)
short	29- 30	Trace ID code (SET = 1)
short	31- 32	No. vertically summed traces (empty)
short	33- 34	No. horz summed traces (empty)
short	35- 36	1 = production, 2 = test (SET = 1)
long	37- 40	Source-receiver offset (signed)
long	41- 44	Receiver elevation (empty)
long	45- 48	Source elevation (empty)
long	49- 52	Source depth: (empty)
long	53- 56	Datum elevation at receiver (empty)
long	57- 60	Datum elevation at source (empty)
long	61- 64	Water depth at source (empty)
long	65- 68	Water depth at receiver (empty)
short	69- 70	Elev scalar - (SET = 1)
short	71- 72	Coordinate scalar (SET = -10)
long	73- 76	Source long deci-sec of arc (/36000.)
long	77- 80	Source lat deci-sec of arc (/36000.)
long	81- 84	Receiver long deci-sec of arc (/36000.)
long	85- 88	Receiver lat deci-sec of arc (/36000.)
short	89- 90	Coordinate units (SET = 2 = DEGREES)
short	91- 92	Weathering velocity (empty)
short	93- 94	Sub-weathering vel. (empty)
short	95- 96	Polarity flag: 0—trace has zero amplitude 1--data has NOT been modified; -1--data HAS been modified: changed polarity
short	97- 98	Orientation flag: (empty)
short	99-100	Source static (msec) (empty)
short	101-102	Receiver static (msec) (empty)

Table 5 continued. Archive Data Tape Format

size	bytes	Explanation
short	103-104	Total static applied (msec) (empty)
short	105-106	Manual time shift applied ("hand static")
short	107-108	Actual - nominal shot time (msec)
short	109-110	Relative time of first sample (msec): (T_O = -2000)
short	111-112	Polarity convention (empty)
short	113-114	Orientation convention (empty)
short	115-116	Number Samples if <2^15; else=32767 (see 229-232)
short	117-118	Sampling interval in microsec
short	119-120	Gain type (empty)
short	121-122	Instrument gain constant (empty)
short	123-124	Instrument inital gain in dB (empty)
long	125-128	UTM source X
long	129-132	UTM source Y
long	133-136	UTM receiver X
long	137-140	UTM receiver Y
short	141-142	Colocation site (0=N; 1=Y)
short	143-144	alias filter slope (empty)
short	145-146	notch filter frequency (empty)
short	147-148	notch filter slope (empty)
short	149-150	low-cutoff frequency (empty)
short	151-152	Deployment number (shot night: 1,2,3,4,5)
short	153-154	Line number (array)
short	155-156	Instrument channel number (empty)
short	157-158	Time of first sample year
short	159-160	Time of first sample day
short	161-162	Time of first sample hour
short	163-164	Time of first sample minute
short	165-166	Time of first sample sec
short	167-168	Time code [GMT=2]
short	169-170	Site index (1-954 ; S to N – line 2)
short	171-172	**Geographic shot gather index number: [1-93]**
short	173-174	PASSCAL: Field stake or location number
short	175-176	Trace header version number
short	177-178	Hand-edit QC flag
short	179-180	Component (Z=1, N-S=2, E-W=3)
Standard Unassigned header area		
long	181-184	Microsec trace start time
short	185-186	Charge size (kg)
short	187-188	Shot/trigger time - year
short	189-190	Shot/trigger time- Julian day
short	191-192	Shot/trigger time - hour
short	193-194	Shot/trigger time - minute
short	195-196	Shot/trigger time - second
long	197-200	Shot/trigger time - microsec
long	201-204	Override for sample interval (SET = 0)
short	205-206	Azimuth of sensor orient axis (empty)
short	207-208	Geophone inclination (empty)

Table 5 continued. Archive Data Tape Format

size	bytes	Explanation
long	209-212	LMO static (x/v) (ms) (empty)
short	213-214	LMO flag: (0=Y, 1=N) (SET = 1)
short	215-216	Instrument type: 1--PRS1 7--SGR 9--PRS4 13--Reftek (all types included) 15--PDAS 16--Texan
short	217-218	Correction to be applied: (SET=0)
short	219-220	Azimuth of source-receiver (min of arc)
short	221-222	Geophone type: 1--L28 (PASSCAL)(4.5 Hz) 2--L22 (2 Hz) 3--L10B (8 Hz) 4--L4 1 Hz 5--L4 2 Hz 6--FBA 7--TDC-10 (4.5 Hz) 8--L28 (GSC) 9--LRS1033 (4.5 HZ) 99--unknown
short	223-224	Geophone number (empty)
short	225-226	Inst. ID number
short	227-228	(MUST BE EMPTY)
long	229-232	Number of samples if > 2^15 (see 115-116)
long	233-236	(empty)
short	237-238	Receiver clock drift removed (Negative means the trace was shifted (i.e., moved) to earlier time)
short	239-240	(empty)

TABLE 6. EXPLANATION OF QC FLAGS

(LOCATED IN BYTES 177-178 OF HEADER)

A. Instrument performance status--FLAGS 0-3,12

0, BLANK = OK
1 = Signal seen but gain, DC, or internal(?) noise problems exist--or--STATUS not confirmed; located in time between confirmed dead intervals.
2 = No signal seen. Trace has gain, DC, or internal(?) noise problems
3 = DEAD--no significant amplitude seen
12 = Trace does not exist

B. Timing delay measured relative to adjacent traces--FLAGS 4-11--these timing delays have been removed from the data. The amount of the delay removed is given in header BYTES 105-106, "HAND STATIC":

4 = Delay is between 0-49 MS. This delay is certain (estimated error is 20-50 MS; Measured on at least 1 shot in a shooting window). Minus means early
5 = DELAY is between 50-99 MS.
6 = DELAY is between 100-999 MS.
7 = DELAY is 1000 MS or more.

8 = DELAY is between 0-49 MS. This delay is less certain (estimated ERROR is 50-100 MS; Delay may have been extrapolated from an adjacent shot window)
9 = DELAY is between 50-99 MS.
10 = DELAY is between 100-999 MS.
11 = DELAY is 1000 MS or more.

C. Other FLAGS --13,14

13 Polarity reversal has been fixed
14 Timing is not trustworthy (estimated ERROR in DELAY is more than 100 MS). These timing delays have been removed, nevertheless. The amount of DELAY removed is given in header BYTES 105-106, "HAND STATICS".

Appendix I — Environmental Assessment Report

PROJECT DESCRIPTION
and
ENVIRONMENTAL ASSESSMENT

by

U.S. GEOLOGICAL SURVEY
Earthquake Hazards Team

February 13, 1998

Title:

Los Angeles Regional Seismic Experiment, Part II (LARSE II)--A Seismic Imaging Survey

Located in:

San Fernando basin, Santa Monica, Santa Susana, and
San Gabriel Mountains, and Mojave Desert

Prepared by:

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SECTION I: PROPOSED ACTION

A. Purposes and Need

The Southern California Earthquake Center (consisting of the California Institute of Technology, the University of Southern California, the University of California Los Angeles, and other universities) and the U.S. Geologic Survey will conduct a seismic imaging survey of the Los Angeles region in October 1998 as part of the National Earthquake Hazards Reduction Program. Four goals of this Program that our survey will address are as follows:

1) To elucidate the geologic structure beneath the Los Angeles Region so that we can better understand the processes by which earthquakes are generated. This goal includes identifying active faults and defining their geometry. It also includes determining the type and distribution of various rock layers in the subsurface.

The 1987 M 5.9 Whittier, and the 1994 M 6.7 Northridge earthquakes have awakened all of us to the fact that there are many active "blind" thrust faults in the Los Angeles basin. These faults can only be detected (prior to large earthquakes on them) by seismic imaging of the type we will perform. In order to accurately assess seismic hazards, we must know where these faults are located.

2) To acquire data needed for the prediction of strong ground shaking during future large earthquakes. Two important factors that contribute to strong ground shaking are the thickness and seismic velocity of sedimentary rocks. Shaking is stronger for greater thickness and for lower seismic velocities in sedimentary rocks. ("Seismic velocity" is the speed at which seismic waves travel through a given material.) A third factor contributing to strong ground shaking, that became evident during the 1994 M 6.7 Northridge earthquake is focusing of seismic waves by deep rock reflectors in the earth's crust. In pursuing goal 1, we will identify regions that are underlain by significant thicknesses of low-velocity sedimentary rocks, and we will identify deep rock reflectors. Thus, we will be able to predict areas that will shake strongly during future large earthquakes. Information on ground shaking can be used in designing buildings to make them safer.

3) To better locate earthquakes. Our survey will calibrate the permanent Southern California seismographic network, permitting us to more accurately locate earthquakes.

4) To communicate earthquake hazards information to the public. We hope to take advantage of LARSE II, as we did in previous LARSE surveys, to communicate earthquake hazards information to the public.

B. General Description of Proposed Action

The first surveys of LARSE, carried out in 1993 and 1994, imaged structures chiefly along "Line 1", which extends northeastward from Seal Beach across the Los Angeles and San Gabriel Valley basins, the San Gabriel Mountains, and Mojave Desert (Figure 1). Line 1 was designed to investigate Earth structure near the 1987 M 5.9 Whittier Narrows and 1991 M 5.8 Sierra Madre earthquakes. The proposed surveys of LARSE II will image structures along "Line 2", which extends northward from the coast at Santa Monica through the Santa Monica Mountains, San Fernando Valley, Santa Susana Mountains, Transverse Ranges, and western Mojave Desert. Of considerable interest on Line 2 is structure near the 1994 M 6.7 Northridge earthquake.

During our 1994 survey, we recorded offshore airgun blasts along the onshore part of Line 2 (Figure 1). In order to complete seismic imaging along Line 2 and make this imaging comparable to that on Line 1, the remaining tasks include detonation of onshore buried explosions (called an "active" survey) and "passive" recording of earthquakes.

Active Survey. In order to image structures clearly at 10- to 15-km depth (6-10 miles), one needs powerful sources of vibrations at the surface. With such sources, one can construct both "CAT scan-" and "sonogram-" like images of the subsurface. Such images were constructed along Line 1 (see enclosed article). Buried explosions are required for these powerful sources for the following reasons:

a) Vibrating-truck sources, such as used by the oil industry for oil exploration, are inadequate for producing clear images at these depths.

b) Natural earthquake sources are inadequate by themselves. Earthquake sources are irregular in distribution and uncertain in location. The "image" one gets using earthquake sources alone is fuzzy and inaccurate.

Buried explosions are detonated in 8-inch, partly cased drill holes below a depth of 60 feet. The total depth of each drill hole varies with charge size (Table 1). The explosive is a commercial ammonium-nitrate-based product that is pumped into the drill holes. The explosive is covered, or "tamped", with approximately 60 feet of drill cuttings or gravel for containment. The explosive is inert until it is "primed" just prior to detonation on the night of the shot. Explosions are detonated at night, when wind and cultural noise are at their lowest levels at our seismograph sites.

Approximately 100 buried explosions, ranging in size from 50-4000 lbs., are planned along Line 2 for LARSE II (Table 1 and Appendix I). These explosions will be recorded by approximately 1000 seismographs spaced 100 meters (~300 feet) apart.

Drilling would take place during a 3-month period prior to the survey. Next, the drill holes would be loaded with explosive, capped, locked, and covered with dirt (for camouflage purposes) (Appendix I). After deployment of

the seismographs, the explosions would be detonated one after another over a 3- to 5-night period.

Passive survey. We propose to deploy a line of 100 seismographs along Line 2 at approximately 1-km (0.6-mile) spacing to record distant and local earthquakes. These seismographs would remain in place for approximately 6 months.

Environmental Questions and Answers

The chief environmental concerns that are usually expressed about an explosion survey are as follows:

1) Will the shots trigger earthquakes?
2) Will the shots damage water supplies?
3) Will the shots damage man-made structures?
4) How far can the blasts be felt?
5) What do the blasts sound like?
6) Will the shots damage the landscape, archaeological resources, or endangered species of plants or animals?
7) Will your activities generate dust?
8) Will roads be closed during your operations?

Answers to these questions are as follows and are elaborated in APPENDIX I

1) Our blasts will not trigger earthquakes. We have been performing this type of survey for more than 30 years, all over the world, in many different types of faulted areas, and with blasts larger than those proposed for LARSE II, and we have never triggered an earthquake. Our blasts are similar in size to freeway-construction or mine blasts and pose no greater hazard to triggering of earthquakes than do those blasts. Furthermore, we detonate our explosions near the surface, whereas the region where large earthquakes originate is generally 6 or more miles deep. Our signals are very weak by the time they reach that region. Finally, only our largest blast (located in a remote area of the Sierra Nevada Mountains) will have a size equivalent to a magnitude 2.5 earthquake. The Southern California region is shaken by an average of approximately 4 magnitude 2.5 earthquakes daily, and similar magnitudes are generated by mine blasts that occur nearly every workday of the year. Thus the hazard of our operation is not significant when put in proper perspective.

To our knowledge, the only events that DO trigger earthquakes are major earthquakes, like the M 7.3 Landers earthquake of June 1992, which triggered a M 5.2 earthquake in southern Nevada and numerous smaller earthquakes at several volcanic areas in the western U.S., including Mammoth Lakes, CA, the Geysers, CA, and Yellowstone National Park. The Landers earthquake represents 10's of millions times the energy in our shots.

2) We have performed tests before and after blasts that were detonated directly in water to determine if there were any residual nitrate, nitrite, ammonia, or pH changes. The results were negative (APPENDIX I). The explosive is completely consumed during detonation (APPENDIX I). In

locations where there is a possibility of providing a conduit from an upper aquifer to a lower, that might lead to future pollution of the lower aquifer, we will seal off the drillhole with concrete or bentonite after the blast.

In our 30 years of experience, we have never damaged a spring or well, although we have shot within a few hundred feet of springs and wells. Except for cases where an explosion is detonated directly in a spring or well, the only events that affect springs and wells are major earthquakes. (Major earthquakes apparently increase upper-crustal porosity, by shaking and opening of cracks, and cause water tables to be lowered.)

3) In siting our shotpoints, we use tables of ground velocity that we have established from years of blasting experience in order to ensure that we are beyond the lowest damage threshold for human structures (2 in/sec; APPENDIX I). That is not to say that our blasts may not be felt (see 4 below).

4) Most blasts can be felt only within a few hundred feet of the shotpoint. The larger blasts can be felt for a few 1000 feet. We have made an effort to keep the shotpoints well away from houses in order not to disturb people at night. Unfortunately, a few people may feel the shots. Prior to LARSE 94 we communicated the purposes and effects of our activities with the public by way of city council meetings, radio, newspaper, and TV.

5) The blasts usually sound like a dull "thud." Occasionally, when steam is vented, a hiss or dull roar (like a small jet engine) will occur for a period of seconds following the blast.

6) Areas chosen for shotpoints are always areas that have been affected by grading or dumping, such as road pull-outs, abandoned roads, and dumps. There are almost never archaeological resources near the shotpoints nor endangered species of plants and animals. The drilling and blasting operation at each site affects an area approximately 30 to 50 feet in diameter, and we leave each site in a condition similar to the condition in which we found it. At perhaps 10% of our shots, collapse craters ranging in diameter and depth from 5-15 feet are generated. These develop immediately after the blasts. We fill these in.

7) Our activities do not generate significant dust. Drilling is done with water, and dust is not generated. The shots are contained underground, and detonation does not generate dust. In the few cases when venting occurs during a shot, steam (not dust) is vented.

8) Shotpoints 70 A, B, and C are near Lake Hughes Road; they are the only shotpoints near a paved road. It will be determined later whether the road needs to be closed. If needed, the road will be closed between midnight and 6 AM for reasons of public safety. In a small percentage of our shots, flyrock is generated within about 100 ft or less of the shotpoint. Flyrock is cleaned off the highways before they are opened to traffic.

SECTION II: ALTERNATIVES

Alternatives to the "active" survey, as proposed, include the following:

1) Move the lines,
2) Eliminate the study (No Action Alternative),
3) Eliminate certain shotpoints, such as the ones in the Santa Monica or Santa Susana mountains, the San Fernando Valley, or the vicinity of the San Andreas fault,
4) Use vibrator trucks instead of explosions,
5) Use earthquakes instead of explosions.

The consequences of each of these alternatives are as follows:

1) LARSE was planned in the early 1990's, and the survey lines were chosen to investigate Earth structure along 2 key transects, or lines, across the Los Angeles region. Line 1 was chosen to investigate structure along a transect that passed through or near the epicenters of 1987 M 5.9 Whittier Narrows and 1991 M 5.8 Sierra Madre earthquakes. Line 1 also investigated the structure of the Los Angeles and San Gabriel Valley basins and the structure of the San Andreas fault. Line 2 was chosen to investigate the structure along a transect through the epicenter of the 1994 M 6.7 Northridge earthquake. In addition, Line 2 will address the structure of the San Fernando Valley basin, the mountain ranges on either side, and the structure of the San Andreas fault. The various surveys along Lines 1 and 2 were to include active explosion, passive earthquake recording, and offshore airgun surveys. All these surveys are complementary to one another and must be conducted along the same lines to be effective. We have conducted all three types of surveys along Line 1 and have conducted an offshore airgun survey along Line 2. To complete the imaging along Line 2, we still need the active explosion and passive earthquake surveys. We can not move Line 2 at this point and obtain a complete image of the subsurface along the line.

2) The active explosion survey and passive earthquake recording proposed herein are complementary to the offshore airgun survey that was conducted in 1994. Raypaths for seismic waves generated in the active explosion survey would "reverse" the raypaths for seismic waves generated in the airgun survey. Without raypath "reversal", models or images of subsurface structure can not be well "constrained". That is, the models and images can take multiple forms. For example, the depth of sediment-basement contact can be traded off against the seismic velocity of the sediments above the contact or the basement rocks below the contact. In short, with airgun data alone, we will not be able to construct accurate models or images along Line 2.

3) If certain shotpoints were eliminated, the following consequences would occur:

<u>Shotpoints in the Santa Monica or Santa Susana Mountains:</u>

These remote sites provide areas where we can safely detonate the larger explosions needed to image to seismogenic depths (10-15 km, or 6-9 miles). The causative fault for the Northridge earthquake is hypothesized to originate as a (south-dipping) "back-thrust" off of a "master" thrust fault that dips northward

from a point approximately 15-20 km (9-13 miles) deep beneath the Santa Monica Mountains to a point as far north as the San Andreas fault. Without large shotpoints in the Santa Monica and Santa Susana Mountains, we would not be able to shed any light on this hypothesis. We need to know how faults, like the Northridge fault and the hypothesized "master" thrust fault are interconnected beneath the Los Angeles region in order to have any hope of predicting the occurrence of future earthquakes.

Shotpoints within San Fernando Valley:
Shotpoints in the San Fernando Valley are critical to imaging the base of the sediments in this region. Without knowledge of the depth of sediments, or the seismic velocity of these sediments, we can not predict strong ground motions from future large earthquakes.

Shotpoints near the San Andreas Rift Zone:
From data acquired along Line 1 in 1994, we discovered a previously unknown "master" thrust fault that originates at great depth (23 km, or 14 miles deep) near the San Andreas fault and extends upward to the south to points beneath the San Gabriel Valley (where it is approximately 14 km, or 8 miles deep). This fault appears responsible for the 1987 M 5.9 Whittier Narrows earthquake and possibly other earthquakes. One of the objectives of LARSE II is to investigate whether the same or a similar "master" thrust fault also exists along Line 2. This fault was imaged best from shotpoints near the San Andreas fault. Without these shotpoints, we have no chance of confirming or denying the existence of such a "master" thrust fault beneath the northwestern part of the Los Angeles region.

In summary, in order for us to obtain a coherent image of the subsurface beneath the northwestern part of the Los Angeles region, we need a fairly continuous distribution of shotpoints. Elimination of any group of shotpoints degrades the image seriously. It is never possible to predict where an image can safely be degraded while still allowing us to make sense of what we see.

4) Experience has shown that seismic energy from vibrator trucks penetrates reliably only through the upper crust. To obtain a clear image of the crust below 6-10 miles depth requires explosions (usually of 500 lb. size or greater). In addition, it is more difficult to analyze seismic velocities from data where vibrator trucks are used as sources (because first-arriving energy is "emergent" and not sharp and "impulsive").

5) Imaging of the subsurface using earthquakes alone as sources of seismic energy has been carried about as far as is possible, and still, no image detailed enough to use in earthquake hazard reduction is available.

SECTION III: AFFECTED ENVIRONMENT

A. Topography

Not affected by proposed action.

B. Climate

Not affected by proposed action.

C. Air Quality

Not affected by proposed action.

D. Geology

Not affected by the proposed action. Also, no earthquakes will be triggered by the blasts (see Section I).

E. Soil Quality

In all cases, drilling would occur in areas already impacted by grading or dumping. Therefore, no significant impact of the proposed action is anticipated.

F. Water Quality

Water quality has been tested before and after explosions directly in water and no change except a temporary (two week) increase of suspended particles has been detected (Appendix I). Also, in our 30-year experience, we have never damaged a spring or a well (Section I).

G. Vegetation/Wildlife

In general, drillhole sites are placed so as to have minimal impact on vegetation. Access to the sites is by existing dirt roads. Off road driving is needed only to get the drill rig 10-50 ft. off traveled roads. Seismographs will be carried off road manually, and the digging of the sensor holes will be done by hand shovel.

Site SP59A, which is located in the SE corner of section 32 next to Forest Service Road 5N27, is near San Francisquito creek a habitat of the unarmored three spine spickleback fish a fully protected endangered species at the Federal level. In order to avoid impacting the environment of this fish, we will not drill at this site until the creek has dried (August or September). During drilling, which is described above and in Appendix I, we will not allow loose sediment to be dispersed in the creek bed. The drilling, loading, and shooting vehicles will be carefully driven and properly maintained such that no oil or petroleum products will spill into the creek. As described above and in Appendix I, all charges are buried; hole depth at this site is 160 ft. (Table 1). The explosion will be contained within the hole and will not have any effect on surface water.

H. Resource Use Patterns

Lake Hughes Road just south of Lake Hughes and possibly other short sections of paved and gravel roads may be closed to traffic between midnight and 5 AM during one or more of the nights during which the buried explosions are detonated.

I. Archaeological Resources

Sites will be investigated as needed.

SECTION IV: MITIGATION MEASURES

1) Drilling Stemming. During the drilling, water is combined with a foaming agent to flush cuttings from the hole. Cuttings and water will be contained behind a one-foot high berm built about ten feet from the drillhole on its downhill side to prevent runoff. The cuttings produced during drilling along with crushed stone are used to fill the drillhole once it has been loaded with the blasting agent (the blasting agent is loaded to within 50 feet of the surface and cuttings are used to fill the hole for the purpose of containing the explosion.)

2) Reclamation. Should there be slumping at the shothole after detonation, it will be filled with imported fill. Any casing protruding from the hole will be cut off two feet below the surface and removed from the site. The drilling area will be raked and recontoured.

SECTION V: EXPERIMENT CALENDAR

JULY thru SEPTEMBER	--drilling
AUGUST thru SEPTEMBER	--surveying of the seismographic sites
SEPTEMBER and/or OCTOBER	--loading
OCTOBER	--main experiment

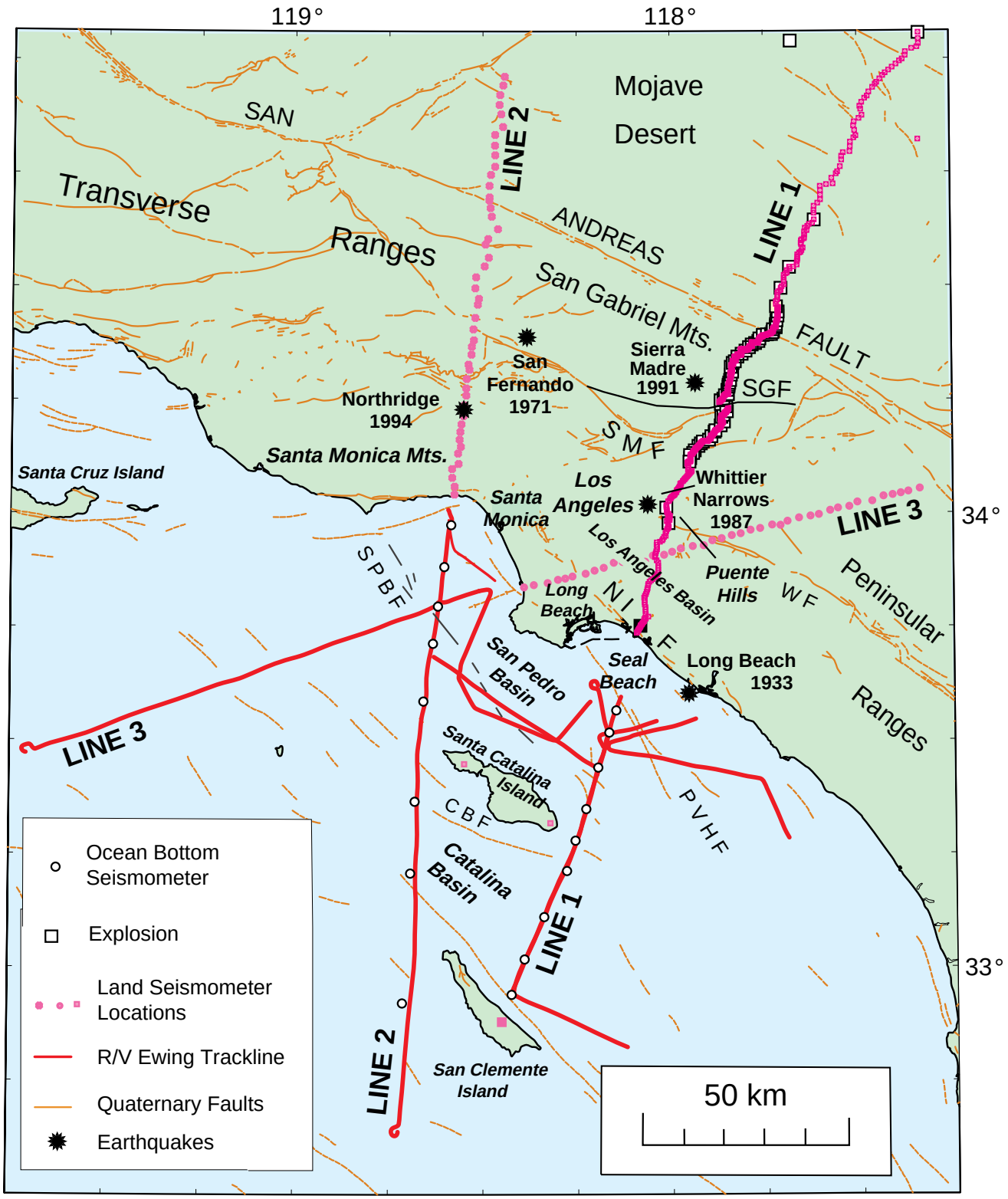

Figure 1. Fault map of the Los Angeles region showing the 1994 LARSE I survey. Airgun sources are along the R/V Ewing Trackline and explosive sources are shown with boxes.

TABLE 1.

Shotpoint (numbers reflect appx kilometers north of coast)	Range	Township	Quarter	section	Permit size	Drill hole Depth	Nearst Road	Miscellaneous
2A	R16W	T1S	SE	28	250	80		
2B	R16W	T1S	SW	28	250	80		
3	R16W	T1S	NE	29	2000	160		
4B	R16W	T1S	SE	20	3000	180		
4A	R16W	T1S	NW	20	250	80		
5B	R16W	T1S	SE	17	500	90		
6	R16W	T1S	SW	8	250	80		
7B	R16W	T1S	NW	8	500	90		
8A	R16W	T1S	SE	5	100	60		
9A	R16W	T1S	SW	4	1000	120		
9B	R16W	T1S	SW	4	1000	120		
9C	R16W	T1S	NE	4	500	90		
10A	R16W	T1N	SW	34	250	80		
11A	R16W	T1N	NW	34	500	90		
12	R16W	T1N	NE	27	250	80		
13B	R16W	T1N	SW	23	250	80		
14C	R16W	T1N	NW	23	250	80		
14D	R16W	T1N	NW	23	100	60		
17	R16W	T1N	NW	11	100	60		
21	R16W	T2N	SE	26	25	60		
23A	R16W	T2N	SE	23	100	60		
24	R16W	T2N	NE	23	250	80		
25	R16W	T2N	SE	14	250	80		
26A	R16W	T2N	SE	11	250	80		
27A	R16W	T2N	NE	11	100	60		
28	R16W	T2N	SE	2	100	60		
29A	R16W	T3N	SE	35	250	80		
30B	R16W	T3N	SW	35	500	90		
30A	R16W	T3N	SW	35	500	90		
31A	R16W	T3N	SW	26	1500	140		
32	R16W	T3N	NE	27	500	90		
33A	R16W	T3N	SE	22	1000	120		
33C	R16W	T3N	NE	22	1000	120		
34	R16W	T3N	NE	22	1000	120		
35B	R16W	T3N	NW	14	500	90		
36A	R16W	T3N	SE	11	100	60		
36B	R16W	T3N	SE	11	100	60		
37A	R16W	T3N	NW	11	100	60		
38A	R16W	T3N	SE	2	250	80		
39A	R16W	T3N	NW	1	25	60		
40B	R16W	T4N	SW	25	250	80		
41	R16W	T4N	SW	25	2000	160		
42	R16W	T4N	NW	25	500	90		
43A	R16W	T4N	NE	23	500	90		
44	R16W	T4N	NE	13	500	90		
45A	R16W	T4N	SW	12	100	60		
47B	R16W	T4N	SE	1	100	60		
47A	R16W	T4N	NE	1	250	80		
48A	R16W	T4N	NE	1	250	80		
49A	R16W	T5N	SE	36	100	60		
50A	R16W	T5N	SW	25	250	80	USFS road 6N21	

TABLE 1.

51B	R16W	T5N	NW	25	1000	120	USFS road 6N21	
52B	R16W	T5N	NW	24	1000	120	USFS road 6N21	
53B	R16W	T5N	SW	13	250	80	USFS road 6N21	
54A	R16W	T5N	NW	13	250	80	USFS road 6N21	
56A	R16W	T5N	NE	12	2000	160	USFS road 6N21	
57A	R15W	T5N	SE	6	2000	160	USFS road 6N21	
59A	R15W	T6N	SE	32	2000	160	USFS road 6N27	
62	R15W	T6N	SE	20	1000	120	USFS road 6N24	
63A	R15W	T6N	NE	20	250	80	USFS road 7N01	
63B	R15W	T6N	SE	17	250	80	USFS road 7N01	
64A	R15W	T6N	SE	17	250	80	USFS road 7N01	
64B	R15W	T6N	NW	16	250	80	USFS road 7N01	
64C	R15W	T6N	NW	16	250	80	USFS road 7N01	
65A	R15W	T6N	SE	9	250	80	USFS road 7N01	
66A	R15W	T6N	SE	9	1000	120	USFS road 7N01	
66B	R15W	T6N	SE	9	250	80	USFS road 7N01	
66C	R15W	T6N	SE	9	250	80	USFS road 7N01	
66D	R15W	T6N	NW	10	250	80	USFS road 7N01	
66E	R15W	T6N	NW	10	250	80	USFS road 7N01	
67A	R15W	T6N	SE	3	1000	120	USFS road 7N01	
70A	R15W	T7N	NE	33	250	80	USFS road 7N09 L.H. rd. (hwy)	
70B	R15W	T7N	NW	34	500	90	USFS road 7N09 L.H. rd. (hwy)	
70C	R15W	T7N	SW	27	250	80	USFS road 7N09 L.H. rd. (hwy)	
71A	R15W	T7N	NW	27	250	80	USFS road 7N08	
72A	R15W	T7N	SW	22	250	80		
73A	R15W	T7N	NE	22	50	60		
74A	R15W	T7N	NW	15	1000	120		
75A	R15W	T7N	SW	10	500	90		
76	R15W	T7N	NW	10	250	80		
77	R15W	T7N	NW	3	250	80		
78	R15W	T8N	SE	33	500	90		
79	R15W	T8N	SE	28	500	90		
81	R15W	T8N	SE	21	500	90		
83	R15W	T8N	SE	16	500	90		
85	R15W	T8N	NE	9	500	90		
87	R15W	T8N	NE	4	500	90		
89A	R15W	T9N	NE	33	500	90		
91	R15W	T9N	NW	27	1000	120		
93	R15W	T9N	SE	15	1500	140		
95	R15W	T9N	NE	10	1000	120		
97	R15W	T9N	NW	3	1000	120		
99	R15W	T10N	NE	34	4000	160		2 holes
101	R15W	T10N	SE	23	2000	160		
143					6000	180		2 holes or 3 holes @ 160 ea

APPENDIX I:
LAND SURVEY

NATIONAL
FOREST
SIERRA
PELONA
LEONA
RIDGE
ANDREAS
VALLEY
PALMDALE
QUARTZ HILL
LEONA VALLEY
CASTAIC
VALENCIA
SAUGUS
CANYON COUNTRY
NEWHALL
SANTA SUSANA MOUNTAINS
SAN FERNANDO
SYLMAR
PACOIMA
SAN GABRIEL
ANGELES
SUNLAND
TUJUNGA
LA CRESCENTA
LA CANADA FLINTRIDGE
CHATSWORTH
CANOGA PARK
RESEDA
VAN NUYS
NORTH HOLLYWOOD
BURBANK
GLENDALE
PASADENA
ALTADENA
WOODLAND HILLS
TARZANA
ENCINO
SHERMAN OAKS
HOLLYWOOD
WEST HOLLYWOOD
BEVERLY HILLS
MOUNTAINS
TOPANGA
PACIFIC PALISADES
SANTA MONICA
WEST LOS ANGELES
CULVER CITY
LOS ANGELES
ALHAMBRA
SAN MARINO
MONTEREY PARK
EAST LOS ANGELES
MONTEBELLO
HUNTINGTON PARK
COUNTY
COUNTY


A3
TEHACHAPI
MOJAVE
LOS ANGELES
ROSAMOND
LAKE HUGHES
PALMDALE
QUARTZ HILL
ANTELOPE ACRES
LEONA VALLEY
NATIONAL
FOREST
SIERRA
MOUNTAIN
RIDGE
VALLEY
EARTHQUAKE
SAN ANDREAS
Cummings Mtn.
Double Mtn.
Covington Mtn.
Twin Lakes
Standard Hill
Jupiter Mtn.
Red Mtn.
Sawtooth Mtn.
Three Points
Gaskins Dry Lake

A4
TEHACHAPI
MOJAVE
ROSAMOND
LOS
ANGELES
A N T E L O P E
Caliente
Stevenson Peak
Eagle Nest
Twin Lakes
Cummings Mtn.
Double Mtn.
Covington Mtn.
Moody's Pk.
Bear Mtn.
Black Mtn.
Cache Pk.
Stewart Pk.
Standard Hill
Soledad Mtn.
Willow Springs
Tropico Hill
Little Buttes
Holiday Valley
Stallion Springs
Monolith
Cameron
Keene
Woodford
Cross Mtn.
Emerald Mtn.
Kelso Valley
Harper Pk.
Julia Lake
Hungry Spr.
Corral Spr.
Tolly Spr.
Bowen
Hart Flat
Oak Flat
Cottonwood
Liebre Twins
Hayes Sprs.
Bush Spr.
TO LAKE HUGHES
TO LANCASTER

DRILLING OPERATIONS AND SEISMOGRAPH INSTALLATION

1a) Drilling. Each hole will be 8 inches in diameter and between 60 and 160 feet deep. A mobile water-well-drilling rig is used; it is mounted on a 3-axle diesel truck, weighing 25 to 30 tons. A second truck carrying water, drill stem, and other accessories accompanies the drill rig.

Drilling of the holes will be drilled under our supervision by a contract driller. Careful consideration is given to accessibility, material to be drilled in, and locations where damage, environmental and physical, will be minimal and restorable. An effort is made to select sites in areas already disturbed, e.g., gravel pits, dumps, abandoned roads, washes, or dry lake beds. Generally it is unnecessary to clear a pad for the drill sites. The drill rig will remain at each site for 1 to six days. The holes are lined with iron or PVC casing when necessary in order to keep them from collapsing before loading time. After drilling and before loading, each hole is capped by a piece of metal which is tack-welded onto the top of the pipe.

b) Loading. Four or five days before a shot is detonated, the lower portion of the holes are loaded with the blasting agent, which will arrive via a pump truck. The remaining 60 feet is filled (stemmed) with the drill cuttings. Once loaded, the holes will be padlocked shut and buried under dirt and brush until the night of the actual shooting. The shot holes are not primed, that is, a detonator is not attached, until a few minutes before detonation.

c) Shooting. Shots are fired one at a time, 1-2 minutes apart, over multiple nights. Shotpoint areas are checked for clearance before each shot. Noise from the shot is a muffled thud which may be heard up to one half mile away. Depending on the size of the charge and coupling of energy into the ground, ground roll may be felt from a few hundred feet to as much as 1 mile away. The shooting team will be positioned about 400 feet from the shotpoint when shooting.

d) Cleanup. We anticipate some subsidence in about 10% of the holes after a shot, especially in unconsolidated alluvium. When the experiment is completed, pipe at each shot hole is cut off and capped two feet below the surface and the area around the hole is filled and recontoured.

2) Seismographs. A seismograph consists of the following components: a recorder with a maximum size of 10x10x15 in.; a car battery with a maximum size of 10x12 in.; and one or more sensors of cylindrical shape with a maximum size of 6 in. in diameter and 8 in. in height. For security reasons, all components of the seismographs will have to be buried in a shallow hole inside a plastic garbage bag and covered with brush. The ground disturbance caused by such burial is smoothed upon pickup.

The actual ground motion produced by the seismic source is minute (millionths of an inch), and as such, the recording instrument must be very sensitive and background noise at its lowest. Because of this, shooting and recording are done at night (between 2 and 4:30 A.M.), when ground motion from moving cars, people, pumps, wind, etc., are at a minimum.

3) Safety Qualifications. Seismic experiments are routinely performed by scientists from SCEC and the USGS.

Drilling activity will be overseen by at least one project supervisor.

Loading and shooting crews will be composed of USGS staff, who have had explosive handling courses. Experience of individuals in handling and detonating explosives ranges from 10 to over 30 years.

TABLE 3

FRACTIONAL GROUND VELOCITY (FGV) AND MULTIPLYING FACTOR TO PRODUCE EQUIVALENCE WITH A SHOT IN WET ALLUVIUM (RA)

Shotpoint Type	FGV	RA
Wet alluvium	1.00	1.00
Dry alluvium	0.24	16.44
Hard rock	0.49	4.16
Lake	1.12	0.80
Ocean	3.49	0.08

REFERENCE

Kohler, W.M., and Fuis, G.S., 1989, Empirical relationship among shot size, shotpoint site condition, and recording distance for 1984-1987 U.S. Geological Survey seismic-refraction data: USGS Open-file Report 89-675, 107 p.

TABLE 5A
DISTANCE IN FEET BEYOND WHICH 90% OF SHOTS WILL PRODUCE SHAKING VELOCITY LESS THAN 2.0 IN/SEC

Shot Size (lb)	Distance (feet) Hard Rock	Wet Alluvium	Lake	Ocean	Dry Alluvium
10	384	504	537	892	357
50	502	663	708	1197	466
100	565	749	800	1362	523
500	747	998	1069	1855	690
1000	844	1133	1215	2126	779
1500	908	1222	1310	2306	837
2000	956	1289	1383	2443	882
2500	995	1344	1443	2556	918
3000	1029	1391	1493	2653	948
4000	1085	1469	1578	2814	999
5000	1130	1533	1647	2947	1041
6000	1169	1587	1706	3061	1076
8000	1233	1678	1804	3251	1134
10000	1285	1752	1884	3407	1182

TABLE 5B
DISTANCE IN FEET BEYOND WHICH 99.87% OF SHOTS WILL PRODUCE SHAKING VELOCITY LESS THAN 2.0 IN/SEC

Shot Size (lb)	Distance (feet) Hard Rock	Wet Alluvium	Lake	Ocean	Dry Alluvium
10	735	982	1051	1822	679
50	979	1321	1418	2509	903
100	1111	1506	1618	2892	1023
500	1502	2059	2218	4064	1379
1000	1716	2365	2551	4728	1573
1500	1856	2567	2771	5173	1701
2000	1964	2722	2941	5519	1799
2500	2052	2850	3080	5804	1879
3000	2128	2960	3200	6051	1947
4000	2254	3142	3399	6464	2061
5000	2357	3293	3564	6806	2154
6000	2445	3422	3705	7102	2234
8000	2592	3637	3941	7599	2367
10000	2713	3815	4135	8011	2476

DUPONT
E. I. DU PONT DE NEMOURS & COMPANY
INCORPORATED
WILMINGTON, DELAWARE 19898

FABRICATED PRODUCTS DEPARTMENT

CC: M. Irvin

A9

May 4, 1987

Ed Criley
U.S. Geological Survey
345 Middlefield Road
MS 977
Menlo Park, CA 94025

Dear Ed:

This is in response to your request for information on the post detonation products of Tovex® Extra Special marine watergel.

Ninety-seven percent of the post detonation products are gaseous, consisting of: water vapor (62.8%), nitrogen (20.46%), carbon dioxide (9.7%), hydrogen (2.4%), carbon monoxide (1.26%) and ammonia (0.38%). The remaining solids consist of sodium carbonate (2.8%), and sodium silicate (0.1%). Tovex® Extra Special marine watergels are formulated and oxygen balanced to detonate under confined borehole conditions without any additional source of oxygen necessary for complete detonation.

Tovex® Extra Special marine formulation watergel has been widely used for deep hole and submarine blasting approximately fifteen years.

Very truly yours,

T. I. Jerman /tjw

Theodore I. Jerman
Technical Specialist

TIJ/tjw
I:11

IRECO Incorporated

Eleventh Floor Crossroads Tower
Salt Lake City, Utah USA 84144
Telephone: (801) 364-4800
Telex: 388353

6 May 1987

Mr. Ed Criley
U.S. Geologic Survey
M.S. 977
345 Middlefield Road
Menlo Park, CA 90425

Dear Mr. Criley:

Emulsion blasting agents are inherently very water resistant. The continuous phase of the emulsion is oil, which surrounds each droplet of the aqueous phase (inorganic nitrate solution). Borehole water which comes in contact with the emulsion contacts only the continuous oil phase. The leaching of inorganic nitrates from the emulsion would therefore be minimal and would not present a significant pollution hazard.

We would expect that the detonation would consume 100% of the emulsion in the borehole and that the products of detonation (carbon dioxide, nitrogen and water) would not present a significant pollution hazard.

Bulk emulsion blasting agents are widely used throughout the world and I know of no instances where the groundwater has been contaminated by their use.

Very truly yours,

IRECO Incorporated

Herbert G. Knight, Jr.
Manager, Environmental Affairs

HGK/hbg

cc: S.R. Poulter
M.D. Lott
L.D. Lawrence

R5826

TABLE 1

REVISED COPY

NORTHERN TESTING LABORATORIES

600 UNIVERSITY PLAZA WEST, SUITE A — FAIRBANKS, ALASKA 99709
2505 FAIRBANKS STREET — ANCHORAGE, ALASKA 99503

Client: U.S Geological Survey
Address: 345 Middlefield Road, Menlo Park, California 94025
Attn: Gary Fuis

Sample numbering scheme: 70 A,B,C – 1, 2 (SP, water test, location, AFTER / BEFORE)

Date Arrived: 08-28-87
Time Arrived: 1300
Date Sampled: various
Time Sampled: various
Date Completed: 09-22-87

Source: Environmental Water

Sample ID #: 082087-18N through 34N

USGS Measurements using equipment borrowed from USFWS

Lake	NTL ID#	LOCATION SP	SAMPLE DATE	TSS mg/l	ALKALINITY mg/l	HARDNESS mg/l	CONDUCTIVITY umhos/cm	NITRATE-N mg/l	pH*: Time interval between blasting and sampling (if applicable)	pH*: Time interval between sampling and testing	pH value	Dissolved oxygen*: Time interval between blasting and testing (if applicable)	Dissolved oxygen (mg/l)		
Salcha River gravel pit lake	082087-18N	55 B - 1	08-14-87	4.8	28.7	27.8	720	0.72							
Salcha River gravel pit lake	082087-19N	55 B - 2	08-21-87	61	30.9	28.0	750	0.48							
Salcha River gravel pit lake	082087-20N	55 C - 1	08-14-87	4.8	29.8	27.8	730	0.62							
Salcha River gravel pit lake	082087-21N	55 CC - 1	08-14-87	8.0	30.9	27.0	710	1.2							
Salcha River gravel pit lake	082087-22N	55 C - 2	08-21-87	87	30.9	27.8	760	0.55							
Bonanza lake	082087-23N	70 A - 1	08-22-87	< 1	36.3	40.3	880	< 0.1	—	3½-4 hr	6.86	—	8.60	8.90	8.30
Bonanza lake	082087-24N	70 A - 2	08-25-87	115	36.5	33.4	880	0.20	6½ hr	5-6 hr	6.76	60-64 hr	8.00	8.30	—
Bonanza lake	082087-25N	70 B - 1	08-22-87	7.0	37.1	38.4	890	< 0.1	—	3½-4 hr	6.86	—	8.85	9.20	9.10
Bonanza lake	082087-26N	70 B - 2	08-25-87	14	38.7	41.3	900	0.1	6½ hr	5-6 hr	6.88	—	—	—	—
Bonanza lake	082087-27N	70 C - 1	08-22-87	1.6	37.8	40.3	880	< 0.1	—	3½-4 hr	7.00	—	—	—	—
Bonanza lake	082087-28N	70 C - 2	08-25-87	4.8	37.6	40.3	890	< 0.1	6½ hr	5-6 hr	7.00	60-64 hr	7.85**	—	—
Manley lake	082087-29N	74 A - 1	08-23-87	4.7	9.9	15.4	470	< 0.1	—	5½-6 hr	6.04	—	9.40	8.20	9.65
Manley lake	082087-30N	74 A - 2	08-26-87	221	15.2	16.3	550	0.25	9½-10½ hr	3½ hr	5.84	8-9 hr	—	—	6.15
Manley lake	082087-31N	74 B - 1	08-23-80	< 1	9.9	15.4	470	< 0.1	—	5½-6 hr	6.73	—	—	—	—
Manley lake	082087-32N	74 B - 2	08-26-87	234	14.4	17.3	560	0.79	9½-10½ hr	3½ hr	5.84	8-9 hr	—	4.60	6.80
Manley lake	082087-33N	74 C - 1	08-23-87	1.0	11.1	15.4	460	< 0.1	—	5½-6 hr	6.29	—	—	—	—
Manley lake	082087-34N	74 C - 2	08-26-87	265	14.4	18.2	550	0.84	9½-10½ hr	3½ hr	5.93	—	—	—	—

These readings were made in open water, not in sample containers. (readings taken at 3 sites 0-100 ft apart)

Note: Underlining indicates measurement made before shot (see sample numbering scheme)

* See note at end of table regarding measurement procedure

** See accompanying graph of D/O vs depth.

REPORTED BY: Diane L. Shaw, Chemistry Supervisor — DATE: 11-12-87

Table A1. -- Water quality measurements in lakes before and after shots.

TABLE A2

Water quality changes in Oly lake (lat. 68° 44'N., long. 148° 55'W.), North Slope, Alaska. A shot of charge size 960 lbs. was detonated at midnight 7/8/88.

Species	Change in concentration (measured within 12 hrs. of the shot) in milligrams/liter
1. Dissolved oxygen	range: 0.3-1.7 mg/1 average change: 0.9 mg/1
2. Nitrogen as nitrate and nitrite	0.015 mg/1
3. Nitrogen as ammonia	0.040 mg/1
4. Phosphorus as phosphate	0.0033 mg/1

(changes were measured by Prof. Michael C. Miller, University of Cincinnati).

Changes in total suspended solids were measured in a time sequence over a 1 week period - see Figure A1 on the following page.

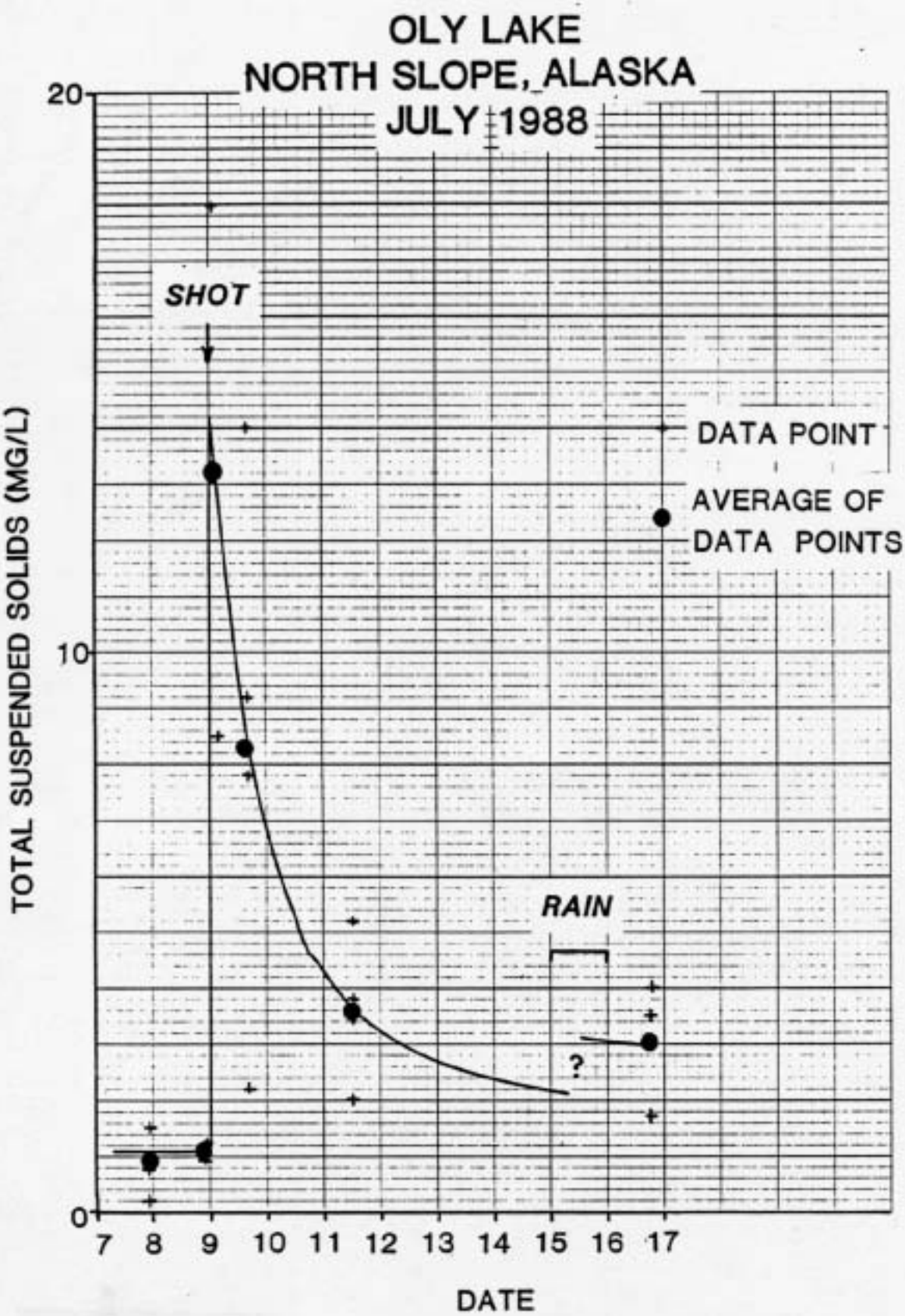

Figure A1. -- Oly lake - suspended solids as a function of time after shot.

APPENDIX II:
LIST OF PROSPECTIVE PERMITTORS

1. U.S. Department of Agriculture, Forest Service (USFS), Saugas District. Chief contact, Mike Wickman (805-296-9710).

2. U.S. Department of the Interior, Bureau of Land Management (BLM). Chief contact, Mike Hogan (760-384-5423).

3. Los Angeles County Department of Parks and Recreation. Chief contact, Jim Park (213-738-2965).

4. California Department of Parks and Recreation. Chief contact, Richard Rozzelle (213-738-2965).

5. Los Angeles City Department of Recreation and Parks. Chief contact, Alonzo Carmicheal (213-485-8168).

6. Los Angeles County Department of Public Works. Chief contacts Michael Anderson (818-458-6104) and T.A. Tidemanson (818-445-7630, 310-861-0316). Permit granted Aug. 2, 1994, for seismograph sites along Big Dalton Creek, Walnut Creek, La Canada Verde Creek, and Coyote Creek.

7. Los Angeles Unified School District.

8. Cal State Northridge. Chief contact, Prof. Gerry Simila (818) 677-3543.

9. We are also submitting requests to a number of private individuals and companies.

Appendix II — Drill Watcher Logs

Shotpoints were given temporary field names used by the permitor and drill watcher. These field names were converted into final shotpoint names during the processing phase of the experiment. On the “Drill Watcher Log” sheet, the term “Hole #” refers to the shotpoint name used by the drill watcher. The following table lists all the shot and shotpoint names.

Geographic Shotpoint Sequence Number	Chronologic SP Sequence Number == SEGY Bytes 9-12 "Shot Gather Index Number" or "FFID"	Drill Watcher Shotpoint Name	New Shotpoint Name == SEGY bytes 17-20 "SP"
1	82	2A	8020
2	72	3E	8030
3	79	4E	8045
4	70	4C	8043
5	1	5H	8050
6	12	6B	8060
7	19	7C	8070
8	58	8D	8084
9	2	8E	8085
10	13	9E	8095
11	3	9C	8093
12	14	10A	8100
13	20	11A	8110
14	64	12E	8120
15	73	13B	8130
16	83	14A	8140
17	74	17A	8170
18	84	19	8190
19	93	21	8210
20	68	23A	8230
21	77	24 (1)	8241
22	88	24 (2)	8242
23	76	25	8250
24	67	26A	8260
25	87	27A	8270
26	85	28	8280
27	65	29A	8290

Geographic Shotpoint Sequence Number	Chronologic SP Sequence Number == SEGY Bytes 9-12 "Shot Gather Index Number" or "FFID"	Drill Watcher Shotpoint Name	New Shotpoint Name == SEGY bytes 17-20 "SP"
28	4	31A	8310
29	15	32A	8320
30	21	33A	8331
31	29	33C	8333
32	48	34A	8340
33	57	35B	8350
34	35	36D	8360
35	44	38A	8380
36	53	39A	8390
37	18	41C(1-east)	8411
38	25	41C(2)	8412
39	11	44C	8440
40	54	45B	8450
41	45	47F	8470
42	36	49B	8490
43	49	50B1	8501
44	39	50B2	8502
45	30	51B	8510
46	50	52B	8520
47	40	53B	8530
48	22	54B	8540
49	16	56A	8560
50	6	57A	8570
51	31	59B	8590
52	56	62	8620
53	55	63A	8631
54	59	63B	8632

Geographic Shotpoint Sequence Number	Chronologic SP Sequence Number == SEGY Bytes 9-12 "Shot Gather Index Number" or "FFID"	Drill Watcher Shotpoint Name	New Shotpoint Name == SEGY bytes 17-20 "SP"
55	23	64A	8641
56	17	64C	8643
57	7	65A	8650
58	32	66A	8661
59	41	66D	8664
60	62	70C	8700
61	61	71A	8710
62	8	72A	8720
63	24	73A	8730
64	60	74A	8740
65	51	75A	8750
66	42	76A	8760
67	33	77A	8770
68	28	78	8780
69	38	79	8790
70	47	82	8820
71	27	83A	8830
72	37	85C	8850
73	46	87	8870
74	52	93	8930

Geographic Shotpoint Sequence Number	Chronologic SP Sequence Number == SEGY Bytes 9-12 "Shot Gather Index Number" or "FFID"	Drill Watcher Shotpoint Name	New Shotpoint Name == SEGY bytes 17-20 "SP"
75	43	95	8950
76	34	99	8990
77	26	101	9110
78	9	136	9136
79	81	301	9310
80	90	303	9330
81	63	304	9340
82	5	305	9350
83	92	307	9370
84	10	306	9360
85	69	208	9280
86	78	204C4	9244
87	89	204C1	9241
88	66	206	9260
89	80	201 (1-north)	9211
90	91	201 (2--south)	9212
91	71	201C	9213
92	75	202B1(north)	9221
93	86	202B2(south)	9222

charge size = 50

depth = 64ft casing = 42ft.

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: BRIAN Hoffman

Date: 9-14-1999 Hole # 2A Rig # 1 Driller: Sam Crum Supervisor: BH

TIME	LOG #	FOOTAGE	REMARKS
9:15	1		arrive at site
9:30	14		move rig into place.
9:39	16		water trip leave
9:30 to 10:40	14		maneuvering into site
10:05	2		Rig up
10:20	16		Rotation
10:27	8		Ingsoll Rit (5'?) Air Hammer
10:13	8		Ingsoll Pipe T + 8" drill bit
10:15	4	0-20ft	drilling pipe #1
10:19	5		pull pipe #1
[illegible]	[illegible]		[illegible]
10:21	5		install drilling casing
10:25	14		install 9 7/8 drill bit
10:26	3		reenter hole
10:28	14		re-position support casing
10:30	3		reenter hole
10:31	4		drilling with 9 7/8 bit
10:34	4		install pipe #2
10:35	4	20-40ft	drilling pipe #2
10:45	5		pull pipe #2
10:47	5		pull pipe #1
10:57	8		casing #1 up
11:05	8		casing #2 up
11:08	14		welding casing #1 + #2
11:23	5		pull drill casing
11:28	14		cut casing
11:34	14		Change drill bit to 8"s hammer
11:37	3		re-enter hole
11:37	8		install pipe #1
11:35			water table at 25 ft.
11:39	8		install pipe #2
11:40	4	20-40ft.	drilling pipe #2
11:45	4		install pipe #3
11:46	4	40-60ft	drilling pipe #3
11:54	8		install pipe #4
11:55	4	60-80ft	drilling pipe #4
11:55	14		hole at full depth 70ft.
12:00	5		pull pipe #4
12:02	5		pull pipe #3
12:02	5		pull pipe #2
12:03	5		pull pipe #1
12:09	10		Rig down
12:18	11		Move rig from hole
12:31	14		Weld cap
11:41	12:49		Crew + rig travel to shot point 3
			hole drilled to 73ft.
			casing length = 32 ft
			hole cleared to 73 ft.

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
9 inch drill bit _____ sacks
5ft drill hammer _____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer _____
Detergent _____
Other _____

CREW HOURS

Driller 1, Sam
Helper 1, Bernie
Helper 1, Scott

Footage: FROM _____ TO _____ TOTAL FOOTAGE _____

_____ changed at _____ Size _____
_____ changed at _____ Size _____
_____ changed at _____ Size _____

Approved _____

David Delis

Revised 9/8/99 11:27 AM

hardrock, hard shale, black shale at 32ft.

Charge = 100

depth = 68 ft. Casing = 44 ft.

CLIENT: U.S. Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP:

Date: 9-14-1999 Hole # 3E Rig # Driller: Sam Crum Supervisor:

	TIME	LOG #	FOOTAGE	REMARKS
(PM)	12:58	1		crew travel to site and arrives
	1:07	2		Rig up
	1:10	8		install drill bit - Air Hammer - 8"
	1:14	8		Install Casing
	1:17	4	0	Start Drilling
	1:17	14		Stop & Pull pipe & Remove drill bit
	1:20	8		Install New Drill Bit, 9⅞" diameter Tricone
	1:24	4		Resume drilling
	1:30	8		Pull pipe
	1:31	14		Remove bit
	1:35	8		Install 20 feet of casing
	1:39	8		Install 8" Air Hammer
	1:39	3		Reenter Hole, with 1st 20' segment of pipe
	1:45	8	20'	INSTALL Pipe II
	1:45	4		DRILL pipe II
0	1:55	8	40ft	INSTALL pipe III
	1:55	4		Drill pipe III
	2:04	8	60'	INSTALL pipe IV
	2:08	4		Drilling pipe IV
	2:11	14	75'	hole at full depth 75ft
	2:12	5		pull pipe IV
	2:13	5		pull pipe III
	2:14	5		pull pipe II
	2:16	5		pull pipe I
	2:20	10		Rig down
	2:24	11		move Rig
	2:27	14		weld cap
	2:38	11		Move Rig + crew to new site 4E
			*	*Note* WATER AT AROUND 14Ft
				Thought hole was dry, upon
				inspection water was found just below
				casing
				hole depth = 75 ft
				Casing length = 12 ft
				cleared to = 75 ft

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
8" Air Hammer
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer _____
Detergent _____
Other _____

CREW HOURS

Driller 1 / Sam
Helper 1 / Bernie
Helper 1 / Scot

Footage: FROM _____ ' TO _____ ' TOTAL FOOTAGE _____ '

_____ changed at _____ ' Size ____ "
_____ changed at _____ ' Size ____ "
_____ changed at _____ ' Size ____ "

Approved _____

David Deis

Revised 9/8/99 11:27 AM

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP:

Date: 9/15/99 Hole # 4C Rig # 1 Driller: Sam Crum Supervisor: LR/J.S

TIME	LOG #	FOOTAGE	REMARKS
1:36	2		Rig up / Level Trough
1:40	16		LEAVE H_2O
1:43	8		INSTALL DRIVE BIT - 5 7/8" to 10ft
1:43	8		INSTALL Pipe I
1:44	4		Drilling pipe I
1:47	14		* HIT ROCK ~ 8-10ft *
1:48	5		remove drill bit
1:51	16		RETURN H_2O
1:52	8		INSTALL 10ft casing for upper hole
1:54	8		INSTALL 5/8 R.d. hammer
1:59	4		Drilling pipe I
2:05	8		INSTALL Pipe II
2:06	4		DRILL pipe II
2:28	8		INSTALL pipe III
2:32	4		DRILL pipe III
2:33	8		INSTALL PIPE IV
2:34	4		DRILL pipe IV
2:40	14		HOLE AT MAX DEPTH
2:41	5		pull pipe IV
2:42	5		pull pipe III
2:43	5		pull pipe II
2:46	5		pull pipe I
2:48	14		Remove drill bit
2:56	14		measuring depth, weight & mirror # Cable Data
2:57	5		pull casing
2:59	8		INSTALL 10ft 12" diam drill bit
2:59	4		Drill 10" bit
3:05	14		[redacted] STOP (problem receiving hole)
3:06	14		Bring out mirror (cracked hole)
3:09	4		Drill open (10" bit)
3:12	14		mirror
3:13	4		Drill 10" bit
3:16	8		install pipe I
3:18	4		Drill pipe I
3:22	12		Level drill ground only reverse. Need a
[redacted]			VALVE REPLACEMENT
[redacted]	[redacted]		[redacted] / shutting
3:56			
3:59	14		EXIT HOLE
9:30	12		fixing rotation lever
10:03	2		start rig engine
10:37	10		rig down, continue maintenance
2:45	14		leave site for meeting with Gary

7-16-99

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe / casing
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer _____
Detergent _____
Other _____

CREW HOURS

Driller 1 / Sam
Helper 1 / BERARD
Helper 1 / SCOTT

Footage: FROM _____ ' TO _____ ' TOTAL FOOTAGE _____ '
_____ changed at _____ ' Size _____ "
_____ changed at _____ ' Size _____ "
_____ changed at _____ ' Size _____ "
Approved _____
David Dellis

Revised 9/8/99 11:27 AM

Hole Abandoned
moved 10' N to 4C

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: [redacted] LR & BH

AM - PM expected depth = 64'

Date: 9/24/99 Hole # 462 Rig # 1 Driller: Sam Crum Supervisor: LR & BH

TIME	LOG #	FOOTAGE	REMARKS
10:28	8 11		Rig Moved 40' to the North of 462
10:36	2		Rig Up & leveling Rig
10:44	8/14		Initial 12" Air Hammer Bit (app 12' long)
10:48	4	-0-	Drilling
10:46	8/14		Installing Tip casing
10:48	4		continue drilling
10:57	8	- 10 -	Install Pipe I
11:00	4		continue drilling
11:02	14		start foam.
11:22	16		Water trip
11:37	16		back from Water
11:38	4	10-30ft.	drilling pipe #1
12:10	12		Maintenance welding water outlet on clamp
12:32	8		install pipe #2
12:34	4	30-50ft.	drilling pipe #2
			Bit water at ~40'
13:20	5		pull all pipe
13:25	8		install CASING [redacted] #1
13:33	8		install CASING #2
13:35	12		Welding 1 & 2
13:48	8/14		change bit to the 8" Air Hammer
13:52	6		dumping Quick Gel (Bentonite) down around casing
13:58	8	50-70'	Install Pipe III
14:19	16		Water trip
14:35	16		Return water
14:40	5		Pull Pipe
14:50	10		Rig down
15:00	14		Put on Lid & Back Fill hole.

Completed Hole = 70"

Cased to 40'

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
Drill Mud
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer Hydro Foam
Detergent ✓
Other _____

CREW HOURS

Driller L. Sam
Helper L. Bernie
Helper L. Scott

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

Footage: FROM _____ TO _____ TOTAL FOOTAGE 62

Bit _____ ~~changed at~~ start Size 12" Air Hammer
Bit _____ changed at ~40-50' Size 9"
Bit _____ changed at _____ Size _____

Approved _____

Revised: 21, June 1999 David Delis

70

Charge-50
depth = 64 ft.
~~casing = ...~~ casing = 42 ft.

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP:

Date: 9-14-1999 Hole # 4E Rig # 1 Driller: Sam Crum Supervisor:

	TIME	LOG #	FOOTAGE	REMARKS
	2:45	1		crew travel to site + arrive
	2:50	2		rig up
	2:50	16		water trip
	2:54	8		install pipe #1
	3:00	4	0-20 ft.	drilling pipe #1
	3:07	16		back from water trip
	3:09	5		pull pipe #1
	3:12	8		install casing #1 20 ft.
	3:15	14		install 5 ft drilling hammer
	3:16	3		re enter hole
	3:16	8		install pipe #1
	3:17	4	0-20 ft	drilling
	3:19	8		stamping casing #1
	3:20	3		reenter hole
	3:22	8		install pipe #2
	3:23	4	20-40 ft	drilling #2
	3:36	8		install ~~casing~~ #3 pipe
	3:38	4	40-60 ft	drilling pipe #3
	3:43			water table ~~...~~ 50 ft.
	3:54	8		install pipe #4
	3:59	4		drilling pipe #4
	4:03			hole at full depth 75 ft.
	4:05	5		pull pipe #4
	4:07	5		pull pipe #3
	4:08	5		pull pipe #2
	4:11	5		pull pipe #1
	4:33	14		pull ~~...~~ original casing #1
	4:35	3		re-enter hole, cave in
	4:41	14		clearing hole of cave in
	4:53	5		pull pipe
	5:00	14	*	incomplete – need to get proper tools + casing to excavate cave in, drilling rig left on site over night, we'll resume 9-15-99
9-15-99 (AM)	10:15	1		crew arrives at site
	10:25	14		rig set-up
	10:44	14		install 12" 12 ft. drill hammer
	10:51	3		re-enter hole
	10:56	4		drilling cave in
	10:57	8		install pipe #1
	10:58	4		drilling cave in
	11:06	8		install pipe #2
	11:06	4		drilling ~~...~~ cave in
	11:33	5		pull pipe ⇒ cave in
(PM)	12:11	8		casing #1 up
	12:13	8		casing #2 up
	12:15	14		welding #1 + #2 casing together
	12:26	6		drill mud
	12:35	14		clearing / cleaning hole

(X) (continued on Arming Sheet) (X)

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud ________ sacks

LC ____ Type ______

________ sacks

________ sacks

________ sacks

Viscose used 5 ft drill hammer through

Cement bedrock

Diesel

Foamer ________

Detergent ________

Other ________

CREW HOURS

Driller 1, Sam

Helper 1, Bernie

Helper 1, Scott

Footage: FROM ______ ' TO ______ ' TOTAL FOOTAGE ________

________ changed at ______ ' Size ____ "

________ changed at ______ ' Size ____ "

________ changed at ______ ' Size ____ "

Approved ____________________

David Delis

Revised 9/8/99 11:27 AM

*hard rock at 40 ft.

4E (cont)

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: LR, BH, JS

Date: 9/15/99 Hole # 4E (cont) Rig # 1 Driller: Sam Crum Supervisor: LR, BH, JS

TIME	LOG #	FOOTAGE	REMARKS
12:47	5		Pull Pipe III
12:49	5		Pull Pipe II
12:55	5		Pull Pipe I
12:57	5		Pull Bit (8" Air Hammer)
13:03	6/14		Rig Down
13:09	10		Move Rig to 4C
13:15	11		
			(78) Hole drilled to 78'
			(78) Hole cased to 74'
			(78) Hole cleared to 78'

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer _____
Detergent _____
Other _____

CREW HOURS

Driller 1 / Sam
Helper 1 / Bernie
Helper 1 / Scott

Footage: FROM 0 ' TO _____ ' TOTAL FOOTAGE _____ '

_____ changed at _____ ' Size _____ "
_____ changed at _____ ' Size _____ "
_____ changed at _____ ' Size _____ "

Approved _____
David Delis

Revised 9/8/99 11:27 AM

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: ~~Ben Hom~~ Luke

(PM) expected depth = 70'

Date: 9/24/99 Hole # SH Rig # 1 Driller: Sam Crum Supervisor: Luke

TIME	LOG #	FOOTAGE	REMARKS
15:30	1/11		Crew & Rig Travel to New Site
15:58	2		Rig up & Tear Rig
16:02	8		Install Bit 9⅞ Tricone
16:04	9	-0-	Install Pipe I
16:08	4		Begin drilling
16:12	14		Remove Bit
16:14	8		Install 8" Air Hammer
16:15	8		Install temporary drilling casing
16:18	4		continue drilling
16:50	14		Remove Air Hammer
16:32	8		Install 9⅞" diameter Tricone
16:34	4		continue drilling
16:41	8	-20-	Install Pipe II
16:45	14		drilling w/ drive in or a floating Rock.
17:05	8		installing first 20 ft of casing.
17:13	8		reenter hole.
17:17	14		Start water (injecting into hole)
17:20	14		Start Foam
17:22	8	-40-	Install Pipe III
17:22	4		continue drilling
17:29	8	-60-	Install Pipe IV
17:30	4		continue drilling.
17:37	5	-75-	Pull Pipe
17:47	10		Rig Down.

(A) completed Hole = 75'

Cased to 20'

MATERIALS USED
Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer Hydro Foam
Detergent _____
Other _____

CREW HOURS
Driller 1 / Sam
Helper 1 / Bernie
Helper 1 / Scott

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

Footage: FROM 0 ' TO 75 ' TOTAL FOOTAGE 75 '

Short Bit diameter Tricone changed at 0 ' Size 9⅞"
Bit _____ changed at _____ ' Size _____ "
Bit _____ changed at _____ ' Size _____ "

Approved _____

Revised: 21, June 1999 David Delis

(75')

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: ~~Alex Yost~~ Luke

(PM) - (AM's) expected depth = 100'

Date: 9/24/98 Hole # 6B Rig # 1 Driller: Sam Crum Supervisor: Luke

TIME	LOG #	FOOTAGE	REMARKS
18:00	11		Rig Move to New Site
18:05	2		Rig up & leveling Rig.
18:10	8		install Bit #8 - 9 7/8" diameter Tricone
18:10	8	-0-	Install Pipe I
18:11	4		Begin drilling
18:16	14		Begin Water (injection)
18:20	14		Remove Tricone
18:22	8		Install 8" Air Hammer (at App 15')
18:23	4		continue drilling
[illegible]	[illegible]	[illegible]	[illegible]
18:30	5		Pull Pipe
18:31	8		Install casing II
18:40	14		casing cut off 15 ft. (Rock at 15')
18:55	4		continue drilling
19:00	8	-20-	Install Pipe II
19:[illegible]	[illegible]		continue drilling
19:12	8	-40-	Install Pipe III
19:13	4		continue drilling
19:26	5		Pull Pipe
19:30	14		Shut down For the Night
9/25/ (AM) 10:44	4		Begin drilling
10:47	8	-60-	Install Pipe III
10:49	4		continue drilling
11:00	8	-80-	Install Pipe IV
11:01	4		continue drilling
11:16	14	-100-	Hole complete
11:17	5		Pull Pipe
11:26	14		Remove Bit
11:30	10		Rig down
11:35	14		Attach Lid.
	1/11		Crew & Rig Move to New Site.

(1) Completed hole = 100'
(2) Cased to 15'
(3) Hit Rock at 15'

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer hydro foam
Detergent _____
Other _____

CREW HOURS

Driller 1, Sam
Helper 1, Bonnie
Helper 1, Scott

Footage: FROM 0 TO 100 TOTAL FOOTAGE 100

(Start) Bit 9 7/8 Tricone changed at 0 Size 9 7/8"
Bit Air Hammer changed at 15 Size 8"
Bit _____ changed at _____ Size _____"

Approved _____

Revised: 21, June 1999 David Dells

100'

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: ~~Alan Yong~~ Luke

AM-PM

Date: 9/25/99 Hole # 7C Rig # 1 Driller: Sam Crum Supervisor: Luke

TIME	LOG #	FOOTAGE	REMARKS
11:47	2		Rig Up & Leveled.
11:50	8		Install Bit - 9⅞" diameter Tricone.
11:51	8	— 0 —	Install Pipe I
11:57	4		Begin drilling
12:11	8		Install 8" diameter Tricone Air Hammer
12:15	8		Install casing I (20')
12:24	8	— 20 —	Install Pipe II
12:34	4		Continue Drilling
12:36	8	— 40 —	Install Pipe III
12:37	4		Continue Drilling
12:37	14		start water injection & Foamer
12:38	8	— 60 —	Install Pipe IV
12:39	4		Continue drilling
12:49	14	— 80 —	Hole completed at 80'
12:56	5		Pull Pipe
12:56	14		Remove Bit
12:59	10		Rig Down
(PM)			
13:01	14		Attach Lid
13:05	1/11		Rig & Crew Move to New Site.

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer Hydro Foam
Detergent _____
Other _____

(5) Hole completed @ 80'
(6) cased to 20'

CREW HOURS

Driller 1 / Sam
Helper 1 / Bernie
Helper 1 / Scott

Footage: FROM 0 TO 80 TOTAL FOOTAGE 80

(Stuck) Bit 9⅞ Tri-cone changed at ~~0~~ Size 9⅞"
Bit Air Hammer changed at 20 Size 8" "
Bit _____ changed at _____ Size _____"

Approved _____

Revised: 21, June 1999 David Deis

80'

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: ~~Alan Yeats~~ Luke

(PM) expected Depth = 100'

Date: 9/25 Hole # 8D Rig # 1 Driller: Sam Crum Supervisor: Luke

TIME	LOG #	FOOTAGE	REMARKS
13:18	2		Rig up & leveled.
13:20	9		Install Bit - 9 7/8" diameter Tricomb
13:24	8	— 0 —	Install Pipe I
13:25	4		Begin Drilling
13:25	14		Remove Bit
13:39	9		Install New Bit (8" Air Hammer)
13:41	8		Install Casing I
13:46	12		Begin Foamer (Top head Bushing)
14:01	8	— 20 —	Install Pipe II
14:02	4		Continue drilling
14:09	8	— 40 —	Install Casing III
14:10	4		Continue drilling
14:14	14		start water & Foamer Injection.
14:19	8	— 60 —	Install Pipe IV
14:20	4		continue drilling
14:26	8	— 80 —	Install Pipe V
14:27	4		Continue drilling.
14:55	14	— 100 —	Hole completed at 100'
14:39	5		Pull Pipe & Remove Bit.
14:49	10		Rig Down
14:55	14		Attach Lid.
14:59	11		Crew & Rig Move to new Site.
14:59	16		Leave on Water Trip.

(12) Hole completed = 100'

(12) Cased to 20'

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer Hydro Foam
Detergent _____
Other _____

CREW HOURS

Driller 1 / Sam
Helper 1 / Bonnie
Helper 1 / Scott

Footage: FROM _____ TO _____ TOTAL FOOTAGE _____

start Bit diameter 6 ~~changed at~~ 0' Size 9 7/8"
Bit Air Hammer changed at 20' Size 8"
Bit _____ changed at _____ Size _____

Approved _____

Revised: 21, June 1999 David Delis

100'

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: ~~Alan Yong~~ Luke

(PM) expected depth = 70'

Date: 9/25/99 Hole # 6E Rig # 1 Driller: Sam Crum Supervisor: Luke

TIME	LOG #	FOOTAGE	REMARKS
15:11	2		Rig up & leveled
15:12	8		Install Bit 9 7/8" diameter Tricone
15:12	8	— 0 —	Install Pipe I
15:14	4		Begin Drilling
15:22	14		Remove Bit.
15:25	8		Install casing I (20')
15:28	8		Install 8" Air Hammer
15:36	4	— 20 —	Install Pipe II
15:36	4		Continue drilling.
15:41	4	— 40 —	Install Pipe III
15:41	4		Continue drilling.
15:50	8	— 60 —	Install Pipe IV
15:50	4		Continue drilling.
15:56	14	— ~~(55)~~	Hole complete at 75'
15:57	5		Pull Pipe.
16:06	10		Rig down
16:18	14		Attach Lids
16:19	11		Crew & Rig Move to New Site.
			(8) Completed Hole = 75'
			# Cased to 20'
			Ø Drilled Dry & Hole dry

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer ~~Hydro Foam~~
Detergent _____
Other _____

CREW HOURS

Driller 1 / Sam
Helper 1 / Bernie
Helper 1 / Scott

Footage: FROM 0 ' TO 75 ' TOTAL FOOTAGE 75'

Start
Bit ~~Rock Tricone~~ changed at ~~0~~ 2 ' Size 9 7/8 "
Bit Air Hammer changed at 20 ' Size 8 "
Bit _____ changed at _____ ' Size _____ "

Approved _____

Revised: 21, June 1999 David Deis

75'

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: Luke Reusser

(AM) expected depth = 70'

Date: 9/26/99 Hole # 9C Rig # 1 Driller: Sam Crum Supervisor: Luke

TIME	LOG #	FOOTAGE	REMARKS
9:36	11		Crew & Rig Move to New site
9:40	2		Rig Up & Level.
9:40	16		Leave water TRA
9:44	9		Install Bit - 9⅞" diameter Tricone
9:44	8	0	Install Pipe I
9:47	4		Begin drilling
10:01	8		Install casing # (10')
10:03	14		cut casing
10:06	4		Install New Bit - 5" Air hammer
10:10	4		Continue Drilling
10:14	8	20	Install Pipe II
10:19	4		Drill
10:23	8	40	Install Pipe III
10:23	4		Drill
10:30	8	60	Install Pipe IV
10:31	4		Drill
10:36	14	(80)	Hole completed at 80'
10:37	5		Pull Pipe.
10:48	10		Rig down
10:50	14		Attach Lid
10:55	11		Rig & Crew Travel to New Site

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer _____
Detergent _____
Other _____

completed hole = 80'

cased to 10'

Drilled Dry & Hole dry

CREW HOURS

Driller 1 Sam
Helper 1 Bernie
Helper 1 Scott

Footage: FROM 0 TO 80 TOTAL FOOTAGE 80

start Drive 4 Air Hammer

~~changed at~~ 0 Size 9⅞"
changed at 10 Size 8"
changed at _____ Size _____

Approved _____

David Dalis

Revised 9/8/99 11:27 AM

80'

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: ~~Alan Yong~~ Luke

(PM) expected depth - 180'

Date: 9/25/99 Hole # 9E Rig # 1 Driller: Sam Crum Supervisor: Luke

TIME	LOG #	FOOTAGE	REMARKS
16:27	2		Rig up & leveled
16:27	18		Return water Trip.
16:32	8		Install Bit - 9⅞ Tricone
16:33	8	— 0 —	Install Pipe I
16:34	4		Begin Drilling
16:39	14		Hit Rock at ≈ 10'
16:41	8		change Bit to 8" Air Hammer
16:45	8		Install casing (10')
16:47	4		Continue Drilling
16:55	8	— 20 —	Install Pipe II
16:56	4		Drill
17:00	8	— 40 —	Install Pipe III
17:04	4		Drill
17:05	14		Water & Foam injection Begin
17:07	8	— 60 —	Install IV
17:08	4		Drill
17:15	8	— 80 —	Install Pipe V
17:16	4		Drill
17:24	8	— 100 —	Install Pipe VI
17:24	4		Drill
17:31	8	— 120 —	Install Pipe VII
17:34	4		Drill
17:42	8	— 140 —	Install Pipe VIII
17:43	4		Drill
17:49	8	— 160 —	Install Pipe IX
17:50	4		Drill
18:00	14	— (180) —	Hole completed at T180'
19:00	5		Pull Pipe
18:29	14		Auto tech Lid
	11		Crew & Rig Travel to New site.

MATERIALS USED
Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer Hydro Foam
Detergent _____
Other _____

CREW HOURS
Driller 1 / Sam
Helper 1 / Bernie
Helper 1 / Scott

LOG REFERENCE #
1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

(#) completed Hole = 180'
(#) Hole cased to 10'
(#) Hole dry

Footage: FROM 0 TO 180 TOTAL FOOTAGE 180
Bit Tricone changed at 0 Size 9⅞"
Bit Air Hammer changed at 10 Size 8"
Bit _____ changed at _____ Size _____
Approved _____
Revised: 21, June 1999 David Delis

180'

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: ~~Alan Mann~~ Luke Ransoff

(AM) expected depth = 80'

Date: 9/26/97 Hole # 10A Rig # 1 Driller: Sam Crum Supervisor: Luke

TIME	LOG #	FOOTAGE	REMARKS
11:15	3		Rig up.
11:26	5	— 0 —	Install Tricomb & Pipe I
11:31	4		Begin drilling
11:37	8	— 20 —	Install Pipe II
11:45	4		Drill
11:50	15		Pull Pipe & Bit
11:51	3		Install 8" Air Hammer
11:53	2		Install casing (24')
11:57	4		Drill
11:45	6	— 40 —	Install Pipe III
11:46	4		Drill
11:52	2	— 60 —	Install Pipe IV
11:58	4		Drill
11:58	14	— (80)	Hole completed at 82'
11:59	5		Pull Pipe & Bit
12:08	10		Rig Down
12:10	14		Attach Lid
12:12	11		Move Rig & Crew to New Site.
1130	16		water Trip Return
			(1) completed hole = 80'
			(2) cased to 24
			(3) Drilled dry 8" Hole Dry

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer _____
Detergent _____
Other _____

CREW HOURS

Driller 1, Sam
Helper 1, Scott
Helper 1, Bernie

Start

Footage: FROM 0 TO 80 TOTAL FOOTAGE 80'
Bit Tricomb ~~changed at~~ 0' Size 9 7/8"
Bit Air Hammer changed at 20' Size 8"
Bit _____ changed at _____' Size _____"

Approved _____

Revised: 21, June 1999

David Delis

(80)

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: Luke Reusser

(PM) expected depth = 70'

Date: 9/26/99 Hole # 11A Rig # 1 Driller: Sam Crum Supervisor: Luke

TIME	LOG #	FOOTAGE	REMARKS
12:33	2		Rig up & leveled
12:35	8		Install 1st - 9 7/8" Tricone.
12:35	2	- 0 -	Install Pipe I
12:37	4		Drill - using small Amount of water.
12:44	18		Install Casing (15-20)
12:53	8		Install 8" Air Hammer.
12:57	4		Drill
12:59	8	- 20 -	Install Pipe II
13:00	4		Drill
13:04	17		Maintenance (top head bushing replaced)
13:21	8		Install Pipe III
13:22	4		Drill
13:29	8	- 60 -	Install Pipe IV
13:30	4		Drill
13:37	14	- (80)	Hole completed at 80'
13:38	5		Pull Pipe
13:48	10		Rig Down.
13:58	14		Attach Lid
	11		Move rig to 208 (Fairbank & Woodley)
			(1) Completed hole = 80'
			(2) Cased to 20'
			(3) Hole dry.
			(4) Drilled almost dry

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer _____
Detergent _____
Other _____

CREW HOURS

Driller 1, Sam
Helper 1, Bernie
Helper 1, Scott

Footage: FROM 0 TO 80 TOTAL FOOTAGE 80

(left) Tricone
Air Hammer

changed at 0 Size 9 7/8"
changed at 20 Size 8"
changed at _____ Size _____

Approved _____
David Delis

Revised 9/8/99 11:27 AM

80'

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: ~~Alan Yong~~ Lake Reusser

Date: 10/21/99 Hole # 12E Rig # 1 Driller: Sam Crum Supervisor: Lake

TIME	LOG #	FOOTAGE	REMARKS
PM			
14:00	11		Move Rig to Next Site
14:26	2		Rig up
14:24	8		Install Bit & Air Hammer
14:32	8	— 0 —	Install Pipe I
14:38	4		Drill.
14:42	8	— 20 —	Install Pipe II
14:43	4		Drill
14:51	8	— 40 —	Install Pipe III
14:52	4		Drill
14:58	8,14	— 60 —	Stop drilling to Install casing
15:15	8		Install Casing I
	8		Install Casing II
	14		Weld Joints together
16:37	10		Rig down
			* Actual depth => 70'
			#Cased to 42'

Sam's Call Aaron at Rice

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer _____
Detergent _____
Other _____

CREW HOURS

Driller 1 / Sam
Helper 1 / Bernie
Helper 1 / Jeff

Footage: FROM 0 TO 70 TOTAL FOOTAGE 70

Bit _____ changed at _____ Size _____"
Bit _____ changed at _____ Size _____"
Bit _____ changed at _____ Size _____"

Approved _____

Revised: 21, June 1999 David Delis

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: Alan Yong

Date: 10. 21. 99. Hole # 12B Rig # 1 Driller: Sam Crum Supervisor: [illegible]

TIME	LOG #	FOOTAGE	REMARKS
5			
6			
7			H2O @ 70
8			ck
8 15	1		
9			
9 00	6	12 ft.	#1 pipe
9 45	4		
10	5		
15	8		#1 - 12 ft casing w/ perforations only casing needed.
10 09	10		
11			[illegible]
12			12 ft CASING
1			
2			
3			
4			
5			

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud______sacks
LC_____Type______
__________sacks
__________sacks
__________sacks
Viscose__________
Cement__________
Diesel
Foamer__________
Detergent__________
Other__________

CREW HOURS

Driller 1 / S. Crum
Helper 1 / [illegible]
Helper 1 / [illegible]

Footage: FROM 0 ' TO 60 ' TOTAL FOOTAGE 60 '
Bit__________ changed at ______' Size____"
Bit__________ changed at ______' Size____"
Bit__________ changed at ______' Size____" Approved__________

Revised: 21, June 1999 David Delis

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: Alan Yong

Date: 10.21.99 Hole # 14A Rig # 1 Driller: Sam Crum Supervisor: [illegible]

	TIME	LOG #	FOOTAGE	REMARKS
5				
6				
7				
8				
9				
10		1		
	[illegible]	2		
	[illegible]	4		
11	12:[illegible]		60'	Install Casing - 60'
				* WATER @ 60ft *
		4		
12	1:14		80'	Max Depth
	1:29	10		
1				
				Actual Depth 75'
				CASING Depth 60'
2				
3				
4				
5				

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud________sacks
LC_____Type_____
__________sacks
__________sacks
__________sacks
Viscose________
Cement________
Diesel
Foamer________
Detergent________
Other________

CREW HOURS

Driller___/______
Helper___/______
Helper___/______

Footage: FROM ______' TO ______' TOTAL FOOTAGE ________'
Bit________ changed at ______' Size____"
Bit________ changed at ______' Size____"
Bit________ changed at ______' Size____" Approved____________

Revised: 21, June 1999 David Delis

hole = 64 ft
casing = 42 ft.

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: Alan Yong

Date: 10-12-99 Hole # 17A Rig # Driller: Sam Crum Supervisor:

TIME	LOG #	FOOTAGE	REMARKS
12:25	1		arrive
12:29	2		rig up
12:40	8		install pipe #1
12:45	4	0-20 ft	drill pipe #1
1:00	8		install pipe #2
1:01	4	20-40 ft	drill pipe #2
1:06	8		install pipe #3
1:08	4	40-60 ft	drill pipe #3
1:11	5		pull pipe
1:16	8		install casing #1
1:17	8		install casing #2
1:27	8		install casing #3
1:42	14		clean hole
2:20	10		rig down
2:21	14		weld cap hole
2:34	3		re-enter hole add 20 ft.
2:55	11		move rig

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud_____sacks
LC_____Type_____
_____sacks
_____sacks
_____sacks
Viscose_____
Cement_____
Diesel
Foamer_____
Detergent_____
Other_____

CREW HOURS

Driller___/_____
Helper___/_____
Helper___/_____

Footage: FROM _____' TO _____' TOTAL FOOTAGE _____'
Bit_____ changed at _____' Size____"
Bit_____ changed at _____' Size____"
Bit_____ changed at _____' Size____"

Approved_____

Revised: 21, June 1999 David Delis

* actual hole = 64
v Actual casing - 60

CLIENT: U.S Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: Luke

expected depth = 61'

Date: 10/16/89 Hole # 19 Rig # 1 Driller: Sam Crum Supervisor:

TIME	LOG #	FOOTAGE	REMARKS
AM			
12:40	1		Move Rig to Redwood Ave
12:50	2		Rig up
12:54	8		Install Bit - 9⅞ diameter Tricone
12:57	6	— 0 —	Install Pipe I
12:58	4		Begin Drilling
12:58	8		Install 8" Air Hammer
12:59	4		Drill
PM			
13:10	8	— 20 —	Install Pipe II
13:10	4		Drill
13:09	8	— 40 —	Install Pipe III
13:12	5	(63)	Pull Pipe
13:39	9		Install casing I
13:43	8		Install CASING II
13:46	14		Welding I + II
13:50	8		Install casing III
14:10	14		Weld II + III
			Completed Hole = (63')
			60' casing.

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

LOG REFERENCE #

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer _____
Detergent _____
Other _____

CREW HOURS

Driller ___/_____
Helper ___/_____
Helper ___/_____

Footage: FROM _____ ' TO _____ ' TOTAL FOOTAGE _____ '

_____ changed at _____ ' Size ____ "
_____ changed at _____ ' Size ____ "
_____ changed at _____ ' Size ____ "

Approved _____

David Delis

Revised 9/8/99 11:27 AM

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP:

expected depth => 62'

Date: 10/16/99 Hole # 21 Rig # 1 Driller: Sam Crum Supervisor: Luke

AM

TIME	LOG #	FOOTAGE	REMARKS
10:10	11		Move to Northridge Middle School
10:35	2		Rig up
10:37	9		Install Bit
10:54	8	—0—	Install Pipe I
10:40	4		Drill
10:50	8	—20—	Install Pipe II
10:56	4		Drill
11:00	8	—40—	Install Pipe III
11:05	14	—63—	Hole completed at 63' (Pipe + Bit)
11:07	5		Pull Pipe
11:15	8		Install casing I
11:20	8		Install casing II
11:22	14		welding I & II together
11:30	8		Install casing III
11:40	14		Welding II & III together
11:45	3		reenter hole & clean hole.
			# 63' - completed hole
			# 60' Casing

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer _____
Detergent _____
Other _____

CREW HOURS

Driller 1 / Sam
Helper 1 / Bernie
Helper 1 / Aaron

Footage: FROM 0 ' TO 63 ' TOTAL FOOTAGE 63 '

_____ changed at _____ ' Size _____ "
_____ changed at _____ ' Size _____ "
_____ changed at _____ ' Size _____ "

Approved _____

David Delis

Revised 9/8/99 11:27 AM

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP:

Date: 10/13 Hole # 62 23A Rig # 1 Driller: Sam Crum Supervisor: JS

TIME	LOG #	FOOTAGE	REMARKS
9:50	1/16		ARRIVE / WATER TRIP LEAVE
10:00	2		
10:05	8	0	INSTALL PIPE 1 = BIT (TRICONE)
10:10	16		RETURN
10:18	4		START
10:20	3	40'	INSTALL PIPE #2
	4		
10:46	8	40'	INSTALL PIPE #3
12:30	4		
10:54	5	60'	PULL PIPE 1-3 + BIT
10:56	8		INSTALL CASING 1
10:41	8		INSTALL CASING #2
	14		WELDING
10:55	8		INSTALL CASING #3
	7		WELDING
11:10	3		
11:11	8		INSTALL PIPE 1, 2, 3
11:17	4	62'	MAX DEPTH
11:16	5		
11:16		62'	EXIT HOLE
11:21	16		
11:40	11		

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer _____
Detergent _____
Other _____

CREW HOURS

Driller 1 / SAM
Helper 1 / BERNIE
Helper 1 / SCOTT

Footage: FROM _____' TO _____' TOTAL FOOTAGE _____'
_____ changed at _____' Size _____"
_____ changed at _____' Size _____"
_____ changed at _____' Size _____"
Approved _____

David Delis

Revised 9/8/99 11:27 AM

10-12-99 Hole # 24

3:55	1		arrive at site
3:57	2		rig up
4:00	8		install pipe #1
4:01	4	0-20ft	drill pipe #1
4:05	8		install pipe #2
4:05	4	20-40ft	drill pipe #2
4:07	8		install pipe #3
4:08	4	40-60ft	drill pipe #3
4:10	5		pull pipe
4:22	8		install casing #1
4:23	8		install casing #2
4:34	8		install casing #3
4:50	14		Clean hole
4:58	5		remove pipe
5:05	14		Weld + cap hole
5:12	10		rig down
5:15	11		move rig

* actual depth: 80ft
* actual casing = 60 ft.

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP:

expected depth = 64'

M/AM

Date: 10/17/98 Hole # 24 wet Rig # | Driller: Sam Crum Supervisor: Luke

TIME	LOG #	FOOTAGE	REMARKS
8:00	11		Moved to 24 from 25
8:15	13		Maintenance
12:26	2		Rig up
12:31	4		Install 8" Air Hammer
12:45	12		Maintenance
14:20	14		Clean Hole
14:47	5		Pull Pipe
14:53	10		Rig Down
15:02	14		Casing cut Flush & Lid Attached,
			% completed Hole = 70'
			% cased to 60

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer _____
Detergent _____
Other _____

CREW HOURS

Driller 1 / Sam
Helper 1 / Bonnie
Helper 2 / Angie Sam

Footage: FROM 0 TO 70 TOTAL FOOTAGE 70'

_____ changed at _____ Size _____"
_____ changed at _____ Size _____"
_____ changed at _____ Size _____"

Approved _____

David Dells

Revised 9/8/99 11:27 AM

70'

hole = 80 ft
casing = 60 ft.

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: Alan Yong

Date: 10-12-99 Hole # 25 Rig # 1 Driller: Sam Crum Supervisor:

TIME	LOG #	FOOTAGE	REMARKS
9:30	1		arrive
9:35	2		rig up
9:45	3		install pipe #1
9:47	4	0-20 ft	drill pipe #1
9:52	5		install pipe #2
9:55	6	20-40 ft	drill pipe #2
10:12	7		install pipe #3
10:15	8	40-60 ft	drill pipe #3
10:24	9		install pipe #4
10:34	10	60-82 ft	drill pipe #4
10:32	11		pull all pipes
10:58	12		install casing #1
10:40	13		install casing #2
10:53	14		install casing #3
11:03	15		install casing #4
11:27	16		re-bentonite hole to clean
11:43	17		rig down
11:50	18		exit hole move rig

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud_____sacks
LC_____Type_____
_____sacks
_____sacks
_____sacks
Viscose_____
Cement_____
Diesel
Foamer_____
Detergent_____
Other_____

CREW HOURS

Driller___/_____
Helper___/_____
Helper___/_____

Footage: FROM _____' TO _____' TOTAL FOOTAGE _____'
Bit_____ changed at _____' Size_____"
Bit_____ changed at _____' Size_____"
Bit_____ changed at _____' Size_____"

Approved_____

Revised: 21, June 1999 David Delis

*actual depth = 82 ft.
* actual casing = 80 ft.

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: Luke Reuser

expected depth => 63'

AM

Date: 10/16/99 Hole # 26A Rig # 1 Driller: Sam Crum Supervisor: Luke

TIME	LOG #	FOOTAGE	REMARKS
6:30	11		Move to Granada Hills HS.
7:24	2		Rig up
7:25	8	- 0 -	Install Bit 6 3/4" Diameter Tricone
7:27	8		Install Pipe I
7:30	4		Begin Drilling
7:40	8	- 20 -	Install Pipe II
7:48	4		Drill
7:49	5	40	Pull Pipe
7:52	8		Install Air Hammer
7:54	5		Install casing I
8:00	8		Install casing II
8:02	14		[illegible] I + II
8:25	8		Install Pipe III
8:28	4		Drill
8:36	8	- 60 -	Install Pipe IV
8:37	4		Drill
8:52	5		Pull Pipe
[illegible]		- 65 -	completed hole
9:15	8		Install CASING III
9:05			[illegible] drill rig
9:52			[illegible] holes and lock in lid

(4) 65' completed Hole

(8) cased to 60'

(6) water + Detergent used

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud ______ sacks
LC ____ Type ____
______ sacks
______ sacks
______ sacks
Viscose ______
Cement ______
Diesel
Foamer ______
Detergent ______
Other ______

CREW HOURS

Driller 1, Sam
Helper 1, Brian
Helper 1, Aaron

Footage: FROM 0 ' TO 65 ' TOTAL FOOTAGE 65

changed at ______ ' Size ____ "
changed at ______ ' Size ____ "
changed at ______ ' Size ____ "

Approved ______

David Deis

Revised 9/8/98 11:27 AM

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP:

Date: 10/13 Hole # 62 27A Rig # 1 Driller: Sam Crum Supervisor: JS

TIME	LOG #	FOOTAGE	REMARKS
			NO LOG OF THIS HOLE DUE
			TO ERRANDS FOR SAM AND
			DISTANCE MARKINGS.
2:30	10		

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud_____sacks
LC_____Type_____
_____sacks
_____sacks
_____sacks
Viscose_____
Cement_____
Diesel
Foamer_____
Detergent_____
Other_____

CREW HOURS

Driller___/_____
Helper___/_____
Helper___/_____

Footage: FROM _____' TO _____' TOTAL FOOTAGE _____'
_____ changed at _____' Size____"
_____ changed at _____' Size____"
_____ changed at _____' Size____"

Approved_____
David Delis

Revised 9/8/99 11:27 AM

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP:

64'

Date: 10/13 Hole # 29A Rig # 1 Driller: Sam Crum Supervisor: JS

TIME	LOG #	FOOTAGE	REMARKS
2:08	2		
2:50	1		
3:04	8		3.5" 11 5" SL
3:07	8		INSTALL PVC I
3:06	4		LEAVE JD RETURN SUBURBAN
			AND BOBCAT TO WAREHOUSE
			NO SAMPLES
3:43	6	8-60'	INSTALL CASING I
3:50	6		INSTALL CASING II
4:05	8		INSTALL CASING III
4:32	8#3		REAMED BH DOWN TO 60"
4:39	8		INSTALL PVC EXT
4:42		~70	PROBE MAX DEPTH
4:43	5		
4:50			EXIT HOLE
4:56	10		
			70' 55' casing

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud_____sacks
LC_____Type_____
_____sacks
_____sacks
_____sacks
Viscose_____
Cement_____
Diesel
Foamer_____
Detergent_____
Other_____

CREW HOURS

Driller 1 / Sam
Helper 1 / Brian
Helper 1 / Alex

Footage: FROM _____' TO _____' TOTAL FOOTAGE _____'
_____ changed at _____' Size_____"
_____ changed at _____' Size_____"
_____ changed at _____' Size_____"

Approved_____

David Delis

Revised 9/8/99 11:27 AM

hole = 100ft

Casing = 65

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: Alan Yong

Date: 10-7-99 Hole # 31A Rig # Driller: Sam Crum Supervisor:

TIME	LOG #	FOOTAGE	REMARKS
4:45	1		arrive on site
4:45	2		rig up
4:53	3		install pipe #1 using tri-cone bit
4:56	4	0-20ft.	drilling pipe #1
5:07	3		install pipe #2
5:05	4	20-40 ft	drill pipe #2
5:06	3		install pipe #3
5:10	4	40-60 ft.	drill pipe #3
5:13	3		install pipe #4
5:14	4	60-80ft	drill pipe #4
5:21	3		install pipe #5
5:22	4	80-100ft	drill pipe #5
5:29	5		pull pipe #5
5:30	5		pull pipe #4
5:30	5		pull pipe #3
5:31	5		pull pipe #2
5:34	5		pull pipe #1
5:41	10		rig down
5:50	11		move rig

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud_____sacks
LC_____Type_____
_____sacks
_____sacks
_____sacks
Viscose_____
Cement_____
Diesel
Foamer_____
Detergent_____
Other_____

CREW HOURS

Driller___/_____
Helper___/_____
Helper___/_____

Footage: FROM _____' TO _____' TOTAL FOOTAGE _____'
Bit_____ changed at _____' Size_____"
Bit_____ changed at _____' Size_____"
Bit_____ changed at _____' Size_____"

Approved_____

Revised: 21, June 1999 David Deis

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP:

Date: 10/13 Hole # 32A Rig # 1 Driller: Sam Crum Supervisor: JS

TIME	LOG #	FOOTAGE	REMARKS
3:20	1		
3:30	2		
3:36	8	0	INSTALL BIT + REPAIR
3:35	4		
3:44	8	20'	INSTALL [illegible] U PIPES
	4		
3:53	8	40	INSTALL DOPE III
	4		
[illegible]	[illegible]	66	[illegible]
4:41	5		PULL PIPES 1-3 + BIT
4:06			INSTALL HAMMER
4:30	6		INSTALL CASING ~60'
4:53	3		
4:56	6		INSTALL PIPES I, II, III over next few
[illegible]	[illegible]		HOLE - CLEAN OUT HOLE
5:00	5		INSTALL PIPE IV
5:10	3		
5:13			EXIT HOLE
5:18	10		

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud_____sacks

LC_____Type_____

_____sacks

_____sacks

_____sacks

Viscose_____

Cement_____

Diesel

Foamer_____

Detergent_____

Other_____

CREW HOURS

Driller___/_____

Helper___/_____

Helper___/_____

Footage: FROM _____' TO _____' TOTAL FOOTAGE _____'

_____ changed at _____' Size_____"

_____ changed at _____' Size_____"

_____ changed at _____' Size_____"

Approved_____

David Delis

Revised 9/8/99 11:27 AM

CLIENT: U.S Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: Alan Yong

VU5

Date: 10/9/99 Hole # 34 Rig # 1 Driller: Sam Crum Supervisor: JS

TIME	LOG #	FOOTAGE	REMARKS
9:10	1		
9:16	2		
9:20	12		fixing pump
10:20	8		Install pipe I
10:25	9		
10:32	3		EXIT HOLE
10:35	8/		INSTALL CASING I
10:43	4/3		
10:45	8	20'	INSTALL pipe II
	7		
10:00	13		~~[redacted]~~ EXIT HOLE / CLOSE
11:25	8		INSTALL CASING II / + weld cap bit
11:41	3		
11:45	5	40'	INSTALL pipe III
	4		
12:00	8	60	INSTALL pipe III
	4		
12:10	8	80'	INSTALL pipe IV
	4		
12:25		100'	MAX DEPTH
12:38	5		Pull
12:47	10		
12:56	2		RIG UP MOVED DUE TO CALIBRE
			OF HOLE AROUND GOAT
	17		clean out hole
1:13	8		Install casing III
1:23	17		clean out hole
1:43	5		
1:50	14		EXIT HOLE
1:55	10		
2:02	11		
			NOTE- GAS IN HOLE DO NOT
			KNOW WHAT KIND BUT POSSIBLY
			COMBUSTABLE

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer _____
Detergent _____
Other _____

CREW HOURS

Driller ___ / _____
Helper ___ / _____
Helper ___ / _____

Footage: FROM _____ ' TO _____ ' TOTAL FOOTAGE _____ '
Bit _____ changed at _____ ' Size _____ "
Bit _____ changed at _____ ' Size _____ "
Bit _____ changed at _____ ' Size _____ "
Approved _____

Revised: 21, June 1999 David Delis

CLIENT: U.S Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: Alan Yong

70' - 80'

Date: 10/10 Hole # 36A Rig # 1 Driller: Sam Crum Supervisor: CB

TIME	LOG #	FOOTAGE	REMARKS
8:15	1		
	16		LEAVE
9:42	16		PADDOCK
10:35	2		
10:40	8		INSTALL 12¼ TRICON
10:41	6	0'	INSTALL PIPE I
10:45	4		
11:50	8		INSTALL CASING F 5'
10:35			TAKE OUT CASING
10:00	8		INSTALL HAMMER BIT
	4		
11:10	8		INSTALL TRICONE BIT
11:14	8		INSTALL UPPER CASING
	4		
11:27	8	20'	INSTALL PIPE II
	4		
12:37	8	40'	INSTALL PIPE III
	4		
11:48	8	60'	INSTALL PIPE IV
	4		
			LEAVE TO GET PARTS FOR SAM
1:45	8		CASING 4 INSTALLED
2:15	10		
			100' ft HOLE - DRY
			80 ft CASING

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer _____
Detergent _____
Other _____

CREW HOURS

Driller ___/_____
Helper ___/_____
Helper ___/_____

Footage: FROM _____' TO _____' TOTAL FOOTAGE _____'
Bit _____ changed at _____' Size _____"
Bit _____ changed at _____' Size _____"
Bit _____ changed at _____' Size _____"
Approved _____

Revised: 21, June 1999 David Delis

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: Alan Yong

140'

Date: 10/9 Hole # 36C Rig # 1 Driller: Sam Crum Supervisor: JS

TIME	LOG #	FOOTAGE	REMARKS
2:12	1		
2:18	2		
2:13	16		CLEAN'S
2:57	16		RETURN
3:05	3/4	0	INSTALL CASING I
3:12	5		+ take out bit
3:19	8		INSTALL CASING II
3:22	8	20'	INSTALL PIPE II
3:23	4		
3:31	8	40'	INSTALL PIPE III
3:39	4		
3:44	8	60	INSTALL PIPE IV
3:54	4		
3:57	8	80'	INSTALL PIPE V
	4		
4:05	8	100'	INSTALL PIPE VI
4:	4		
4:17	8	120'	INSTALL PIPE VII
↓	4		
4:32		MW	DEPTH MAX DEPTH
4:40	5		
4:55			CLEAN UP
9:05	10		
9:15	11		
			NOTE: HOLE CONTAINS GAS
			FLAMMABLE
			HOLE HAS LID BUT NO LOCK
			TAG WARNING HAZARDOUS

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer _____
Detergent _____
Other _____

CREW HOURS

Driller 1, SAM
Helper 1, [illegible]
Helper 1, SCOTT

Footage: FROM _____ ' TO _____ ' TOTAL FOOTAGE _____ '
Bit _____ changed at _____ ' Size _____ "
Bit _____ changed at _____ ' Size _____ "
Bit _____ changed at _____ ' Size _____ "
Approved _____

Revised: 21, June 1999 David Delis

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: Alan Yong

70'
HART PARK

Date: 10/6 Hole # 3RA Rig # 1 Driller: Sam Crum Supervisor:

TIME	LOG #	FOOTAGE	REMARKS
7:15	1		
7:15	2		
3:23	4/6		INSTALL 60' PIPE + DRILL
3:30	~~~		LOOKS TO GET SAM FILL
			2 SWELLERS BARS
3:55			RETURN - ON THE PIPE
	4		
4:05	5		
4:09	6		INSTALL 60' CASING
4:35			TALK TO SECURITY GUARD
4:36	14		TAKE OUT LARGE 8" LINER CASING
4:45	3		RE-ENTER + CLEAN OUT
4:47	8	60'	INSTALL PIPE IN
	4		
5:00		~ 50'	MAX DEPTH AROUND 80'
5:02	5		
5:10	10		

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud_____sacks
LC_____Type_____
_____sacks
_____sacks
_____sacks
Viscose_____
Cement_____
Diesel
Foamer_____
Detergent_____
Other_____

CREW HOURS

Driller___/_____
Helper___/_____
Helper___/_____

Footage: FROM _____' TO _____' TOTAL FOOTAGE _____'
Bit_____ changed at _____' Size_____"
Bit_____ changed at _____' Size_____"
Bit_____ changed at _____' Size_____"
Approved_____

Revised: 21, June 1999 David Delis

CLIENT: U.S Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: Alan Yong

(West)

Date: 10-11-99 Hole # 41C-1 Rig # 1 Driller: Sam Crum Supervisor:

TIME	LOG #	FOOTAGE	REMARKS
9:25	1		crew arrives
9:30	2		rig up
9:50	3		install pipe #1
9:56	4	0-20ft.	drilling pipe #2
10:05	8		install pipe #3
10:07	41	20-40ft	drilling pipe #3
10:36	8		install casing #1
10:43	3		re-enter hole to drill
10:49	8		re-install pipe #2 #2
10:46	41		drilling
10:57	8		install pipe #3
10:59	4	40-60ft	drilling pipe #3
11:04	8		install pipe #4
11:05	41	60-80ft	drill pipe #4
11:20	5		pull pipe #4
11:21	5		pull pipe #3
11:23	5		pull pipe #2
11:25	5		pull pipe #1
11:29	10		rig down
11:31	14		weld + cap hole
11:41	11		exit hole + move rig

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer _____
Detergent _____
Other _____

CREW HOURS

Driller 1, SAM
Helper 1, Bernie
Helper 1, Scott

Footage: FROM _____ ' TO _____ ' TOTAL FOOTAGE _____ '
Bit _____ changed at _____ ' Size _____ "
Bit _____ changed at _____ ' Size _____ "
Bit _____ changed at _____ ' Size _____ "
Approved _____

Revised: 21, June 1999 David Delis

* actual depth = 80 ft
* actual casing = 25 ft.

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: Alan Yong

(east)

Date: 10-11-99 Hole # 41C-2 Rig # Driller: Sam Crum Supervisor:

TIME	LOG #	FOOTAGE	REMARKS
11:45	1		Arrive at sta
11:53	2		Rig up
11:55	4		install pipe #1
12:00	4	0-30 ft	drill pipe #1
12:11	8		install casing #1
12:14	3		re-enter hole
12:19	8		install pipe #2
12:20	4	20-40 ft	drill pipe #2
12:27	8		install pipe #3
12:28	4	40-60 ft.	drill pipe #3
12:33	8		install pipe #4
12:34	4	60-80 ft	drill pipe #4
12:45	14		hole cleared to 40 ft.
12:45	5		pull pipe #4
12:46	5		pull pipe #3
12:47	5		Pull pipe #2
12:48	5		Pull pipe #1
12:59	14		Quit hole.
1:01	10		RIS down
1:07	14		Weld + cap hole
1:24	11		move rig

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer _____
Detergent _____
Other _____

CREW HOURS

Driller ___/_____
Helper ___/_____
Helper ___/_____

Footage: FROM _____ ' TO _____ ' TOTAL FOOTAGE _____ '

Bit _____ changed at _____ ' Size _____ "
Bit _____ changed at _____ ' Size _____ "
Bit _____ changed at _____ ' Size _____ "

Approved _____

Revised: 21, June 1999 David Delis

* actual depth = 80 ft.
* actual casing =

hole = 70 ft
casing = 46 ft.

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: Alan Yong

Date: 10-11-99 Hole # 47F Rig # 1 Driller: Sam Crum Supervisor:

TIME	LOG #	FOOTAGE	REMARKS
1	2:35		arrive
3	2:40		rig up
8	2:45		install pipe #1
4	2:50	0-20ft	drilling pipe #1
5	2:55		install pipe #2
4	2:57	20-40ft	drill pipe #2
8	3:02		install pipe #3
4	3:03	40-60ft	drill pipe #3
8	3:10		install pipe #4
4	3:11	60-80ft	drill pipe #4
8	3:19		install casing #2
8	3:23		install casing #3
9	3:35		install casing #3
14	3:47		clear hole to 80ft
3	4:07		pull pipe #4
5	4:08		pull pipe #3
5	4:09		pull pipe #2
5	4:10		pull pipe #1
10	4:14		rig down
14	4:17		exit hole
14	4:17		weld + cap hole
1	4:31		move rig

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud_____sacks
LC_____Type_____
_____sacks
_____sacks
_____sacks
Viscose_____
Cement_____
Diesel
Foamer_____
Detergent_____
Other_____

CREW HOURS

Driller___/_____
Helper___/_____
Helper___/_____

Footage: FROM _____' TO _____' TOTAL FOOTAGE _____'
Bit_____ changed at _____' Size_____"
Bit_____ changed at _____' Size_____"
Bit_____ changed at _____' Size_____"
Approved_____

Revised: 21, June 1999 David Duffy

* actual depth = 80ft.
* actual casing = 60ft.

hole depth = 70ft.
casing = 46ft.

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: David Delis

Date: 9-27-99 Hole # SDB Rig # : Driller: Sam Crum Supervisor:

TIME	LOG #	FOOTAGE	REMARKS
5:35	1		arrive to site
5:39	2		rig up
5:44	3		install pipe #1
5:49	4	0-20ft	drilling pipe #1
5:51	4		install pipe #2
5:51	4		change bit from 9 7/8 tri-cor
5:54	4		to 5 ft hammer
5:54	4	5:54 4	install casing #1
5:56	4		re-enter hole
5:59	4		install pipe #2
6:00	4	20-40ft	drilling pipe #2
6:05	4		install pipe #3
6:06	4	40-60ft	drilling pipe #3
6:12	4		install pipe #4
6:13	4	60-70ft	drill pipe #4
6:23	3		pull pipe #4
6:26	3		pull pipe #3
6:27	3		pull pipe #2
6:28	3		pull pipe #1
6:35	10		rig down
6:42	14		weld + cap hole
6:45	11		exit hole - move rig

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer _____
Detergent _____
Other _____

CREW HOURS

Driller 1, Sam
Helper 1, Bernie
Helper 1, Scott

Footage: FROM _____ ' TO _____ ' TOTAL FOOTAGE _____ '
Bit _____ changed at _____ ' Size _____ "
Bit _____ changed at _____ ' Size _____ "
Bit _____ changed at _____ ' Size _____ "

Approved _____

Revised: 21, June 1999 David Delis

* actual hole = 75 ft.
* actual casing = 70 ft

* hard rock at 12 ft.

hole depth = 70ft.
casing = 46 ft. Alternate hole

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: David Dellis

Date: 9-27-99 Hole # SOB Rig # 1 Driller: Sam Crum Supervisor: BH.

TIME	LOG #	FOOTAGE	REMARKS
4:00	1		Crew travel to site
4:05	3		rig up
4:09	4		drilling
4:10	9	0-20ft.	drill pipe #1
4:15	5		pull pipe #1
4:19	3		install casing
4:16	14		set hammer
4:20	4		drill pipe #4
4:25	2		install pipe #2
4:30	4	20-40ft.	drill pipe #2
4:35	8		install pipe #3
4:36	4	40-60ft.	drill pipe #3
4:53	8		install pipe #4
4:55	4	60-80ft	drill pipe #4
5:03	3		pull pipe #4
5:06	3		pull pipe #3
5:07	5		pull pipe #2
5:09	5		pull pipe #1
5:16	10		rig down
5:20	14		cap hole
5:25	11		exit hole / move rig

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer _____
Detergent _____
Other _____

CREW HOURS

Driller ___/_____
Helper ___/_____
Helper ___/_____

Footage: FROM _____ TO _____ TOTAL FOOTAGE _____
Bit _____ changed at _____ Size _____
Bit _____ changed at _____ Size _____
Bit _____ changed at _____ Size _____

Approved _____

Revised: 21, June 1999 David Dellis

* actual drill = 75 ft.
* actual casing = 20ft.

hole = 80ft
casing = 52ft

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: David Delis

Date: 9-28-1999 Hole # 54 Rig # : Driller: Sam Crum Supervisor: BH

TIME	LOG #	FOOTAGE	REMARKS
8:30	11		travel from SOB to 54
9:02	1		Arrive at 54
9:42	2		rig up
9:56	14		using 9 7/8 tri-cone bit
9:57	5		install pipe #1
9:59	4	0-20ft	drilling pipe #1
10:12	5		install casing #1
10:13	14		change bit to 5 ft hammer
10:15	3		tag bottom hole
10:28	5		install pipe #2
10:32	4	20-40ft	drilling pipe #2
10:37	5		install pipe #3
10:38	4	40-60ft	drilling pipe #3
10:47	5		install pipe #4
10:48	4	60-80ft	drilling pipe #4
11:00	3		pull pipe #4
11:01	5		pull pipe #3
11:02	3		pull pipe #2
11:03	5		pull pipe #1
11:10	10		rig down
11:15	14		weld + cap hole
11:32	14		exit hole
11:42	11		move rig to new site

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer _____
Detergent _____
Other _____

CREW HOURS

Driller 1, Sam
Helper 1, Bernie
Helper 1, Scott

Footage: FROM _____ ' TO _____ ' TOTAL FOOTAGE _____ '
Bit 9 7/8 changed at 20 ' Size _____ "
Bit 5 foot hammer changed at _____ ' Size _____ "
Bit _____ changed at _____ ' Size _____ " Approved _____

Revised: 21, June 1999 David Delis

* actual hole depth = 80ft.
* actual casing = 20ft.

hole = 100ft.
casing = 65ft.

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: David Delis

Date: 9-28-1999 Hole # 56 Rig # 1 Driller: Sam Crum Supervisor: DH

TIME	LOG #	FOOTAGE	REMARKS
11:33	1		arrive at site 56
11:34	2		rig up
11:38	3		install pipe #1
11:40	4	0-20 ft.	drilling #1
11:52	13		install casing #1
11:53	14		change drill bit to 5ft hammer
11:56	3		reenter hole
12:00	9		install pipe #2
12:01	4	20-40ft	drilling pipe #2
12:02	9		install pipe #3
12:03	4	40-60ft	drilling #3
12:15	9		install pipe #4
12:16	4	60-80ft.	drilling pipe #4
12:23	9		install pipe #5
12:24	4	80-100ft	drill #5
12:35	5		pull pipe #5
12:36	5		pull pipe #4
12:38	5		pull pipe #3
12:40	5		pull pipe #2
12:42	5		pull pipe #1
12:47	16		go for water
12:47	18		rig down
12:50	14		weld + cap hole
1:00	11		exit hole / move rig

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer _____
Detergent _____
Other _____

CREW HOURS

Driller ___/_____
Helper ___/_____
Helper ___/_____

Footage: FROM _____ ' TO _____ ' TOTAL FOOTAGE _____ '

Bit 9 7/8 changed at 20 ' Size ____ "
Bit 5ft hammer changed at _____ ' Size ____ "
Bit _____ changed at _____ ' Size ____ "

Approved _____ David Delis

Revised: 21, June 1999

* actual hole = 100ft.
* actual casing = 19ft.

hole = 80ft
casing = 52 ft.

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: David Delis

Date: 9-28-1999 Hole # 57 Rig # 1 Driller: Sam Crum Supervisor: BH

TIME	LOG #	FOOTAGE	REMARKS
1:15	1		crew arrive
1:16	2		rig up
2:58	10		redrill water trip
3:00	8		install casing #2
3:02	4	0-20ft.	drilling #1
3:12	8		install casing #1
3:14	14		change bit to 5ft hammer
3:15	3		re-enter hole
3:17	8		install pipe #2
3:18	4	20-40ft.	drilling pipe #2
3:22	8		install pipe #3
3:23	4	40-60ft	drilling pipe #3
3:27	8		install #4
3:28	4	60-80ft.	drilling #4
3:40	5		pull pipe #4
3:41	3		pull pipe #3
3:43	5		pull pipe #2
3:45	5		pull pipe #1
* 3:55	10		rig down * need more casing
4:06	11		move rig to next site

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud_____sacks
LC_____Type_____
_____sacks
_____sacks
_____sacks
Viscose_____
Cement_____
Diesel
Foamer_____
Detergent_____
Other_____

CREW HOURS

Driller___/_____
Helper___/_____
Helper___/_____

Footage: FROM _____' TO _____' TOTAL FOOTAGE _____'
Bit 9 7/8 changed at 20' Size_____"
Bit 5 ft. changed at _____' Size_____"
Bit_____ changed at _____' Size_____" Approved_____

Revised: 21, June 1999 David Delis

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: Alan Yong

Date: 10-6-99 Hole # Rig # Driller: Sam Crum Supervisor:

TIME	LOG #	FOOTAGE	REMARKS
		62	hole cleared = 100ft
			hole to weL = 40ft
9:46	1		arrive, toolbox meeting
9:50	2		rig up
10:05	8		install casing #2 to #1
10:10	14		weld #1 + #2 together
10:20	2		install casing #3
10:30	14		weld #2 + #3 together
10:56	8		install casing #4
11:02	14		weld casing 4 + 3 together
11:25	14		Clean hole
11:50	14		hole cleaned to 90 ft
11:55	5		pull all pipe from hole
12:00	10		rig down
12:07	14		Weld + cap hole
12:15	11		move rig

10-7-99
57A

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. ~~Mix Mud & Fill~~
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud_____sacks
LC_____Type_____
_____sacks
_____sacks
_____sacks
Viscose_____
Cement_____
Diesel
Foamer_____
Detergent_____
Other_____

CREW HOURS

Driller___/_____
Helper___/_____
Helper___/_____

Footage: FROM _____' TO _____' TOTAL FOOTAGE _____'
Bit_____ changed at _____' Size_____"
Bit_____ changed at _____' Size_____"
Bit_____ changed at _____' Size_____"
Approved_____

Revised: 21, June 1999 - David Delis

hole = 70 ft.
Casing = 46 ft.

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: David Delis

Date: 9-29-1999 Hole # 70C Rig # 1 Driller: Sam Crum Supervisor: BH

TIME	LOG #	FOOTAGE	REMARKS
1:40	1		arrive @ 70C
1:41	2		rig up
1:45	3	0-20ft	install pipe #2 + 5 ft hammer
1:46	4		drill #2
1:53	3		install support casing #1
1:54	3		re-enter hole
2:00	3		install pipe #2
2:01	4	20-40ft	drill pipe #3
2:09	3		install pipe #3
2:10	4	40-60ft	drill pipe #3
2:14	3		install pipe #4
2:15	4	60-80ft	drill pipe #4
2:26	5		pull pipe #4
2:26	5		pull pipe #3
2:29	5		pull pipe #2
2:30	5		pull pipe #1
2:37	10		rig down
2:40	9		weld + cap hole
2:46	11		exit hole / move rig

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer _____
Detergent _____
Other _____

CREW HOURS

Driller 1, Sam
Helper 1, Bernie
Helper 1, Scott

Footage: FROM _____ ' TO _____ ' TOTAL FOOTAGE _____ '
Bit _____ changed at _____ ' Size _____ "
Bit _____ changed at _____ ' Size _____ "
Bit _____ changed at _____ ' Size _____ "
Approved _____

Revised: 21, June 1999 David Delis

* actual depth = 80 ft
* actual casing = 0 ft.

Hole = 62 ft
casing = 40 ft.

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: David Delis

Date: Hole # 7A Rig # 1 Driller: Sam Crum Supervisor: BH

TIME	LOG #	FOOTAGE	REMARKS
11:30	1		arrive at site.
11:39	2		rig up
11:40	19		bits 9 7/8 tri-cone bit
11:42	8		install casing #1
11:43	2	0-20 ft	drilling #1
11:48	9		install support casing
11:52	8		install casing #2
11:52	4	20-40 ft	drilling #2
11:55	9		install casing #3
11:56	4	40-60 ft	drill #3
11:58	8		install #4
11:59	4	60-80 ft.	drill #4
12:02	5		pull #4
12:06	5		pull #3
12:10	5		pull #2
12:11	5		pull #1
12:12	8		install casing #1
12:16	8		casing #2 up
12:18	14		weld #1 + #2 together
12:25	8		casing #3 up
12:35	14		weld casing #2 + #3 together
12:49	14		stamping casing to depth
12:57	3		re-enter to clear hole
1:04	14		hole cleared to full depth
1:14	10		rig down
1:15	14		weld + cap hole
1:23	11		exit hole - move rig

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscosa _____
Cement _____
Diesel
Foamer _____
Detergent _____
Other _____

CREW HOURS

Driller ___/_____
Helper ___/_____
Helper ___/_____

Footage: FROM _____' TO _____' TOTAL FOOTAGE _____'
Bit _____ changed at _____' Size ____"
Bit _____ changed at _____' Size ____"
Bit _____ changed at _____' Size ____" Approved _____

Revised: 21, June 1999 David Delis

* actual depth = 64 ft.
* actual casing = 62 ft

hole = 80 ft
casing = 52 ft

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: David Delis

Date: 9-29-1999 Hole # 85C Rig # 1 Driller: Sam Crum Supervisor:

TIME	LOG #	FOOTAGE	REMARKS
4:29	1		arrive at site.
4:30	2		rig up.
4:35	3		install pipe #1 + 9 7/8 tri cone
4:36	4	0-20 ft.	drilling pipe #1
4:40	5		install support casing
4:42	3		re-enter hole
4:43	6		install pipe #2
4:44	4	20-40ft	drill pipe #2
4:55	3		install pipe #3
4:56	4	40-60ft	drill pipe #3
5:00	4		install pipe #4
5:01	4	60-80 ft	drill pipe #4
5:09	5		pull pipe #4
5:11	5		pull pipe #3
5:12	5		pull pipe #2
5:21			pull pipe #1
6			
6:25	10		rig down

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer _____
Detergent _____
Other _____

CREW HOURS

Driller ___/_____
Helper ___/_____
Helper ___/_____

Footage: FROM _____' TO _____' TOTAL FOOTAGE _____'
Bit _____ changed at _____' Size _____"
Bit _____ changed at _____' Size _____"
Bit _____ changed at _____' Size _____"
Approved _____
David Delis

Revised: 21, June 1999

* actual depth = 83 ft.
* actual casing = 80 ft

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP:

1461

Date: 7/30 Hole # 136A Rig # 1 Driller: Sam Crum Supervisor: JS

TIME	LOG #	FOOTAGE	REMARKS
5:35	1		
5:39	2		
5:46	4		
5:46	8		Pipe I
			~3 ft casing used
5:57	8	20'	Install pipe II
"	4		pipe II
6:18	8		Install pipe III
6:"	4	40'	pipe III
6:53	14		STOP Drilling for the day
10:05	1		
10:35	4		
10:35	8	60'	Install pipe IV
10:39	4		
11:11	8	80'	Install pipe V
11:13	4		
11:46	8	100'	Install pipe VI
11:48	4		
12:20	8	120'	Install pipe VII
12:22	4		
12:50	14	140'	Finish drilling - empty water truck / cleaning hole
1:00	16		LEAVE
1:03	5		
1:12			Exit hole
1:14	10		
1:16	11		Move to 136A2

MATERIALS USED

Mud _____ sacks

LC _____ Type _____

_____ sacks

_____ sacks

_____ sacks

Viscose _____

Cement _____

Diesel

Foamer _____

Detergent _____

Other _____

CREW HOURS

Driller 1 / Sam

Helper 1 / Bernie

Helper 1 / Scott

Footage: FROM _____ ' TO _____ ' TOTAL FOOTAGE _____ '

_____ changed at _____ ' Size ____ "

_____ changed at _____ ' Size ____ "

_____ changed at _____ ' Size ____ "

Approved _____

David Delis

Revised 9/8/99 11:27 AM

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP:

expected depth → 88'

Date: 10/17 Hole # 20| [redacted] Rig # 1 (tenth) Driller: Sam Crum Supervisor: Luke

PM

TIME	LOG #	FOOTAGE	REMARKS
16:15	2		Rig up
16:16	13		Cut/Prepared site by Gary Fuis
17:08	8		Install Bit
17:10	8		Install Pipe I
17:12	4	— 0 —	Begin Drilling
17:20	8	— 10 —	Install Air Hammer 12" (10' Long)
17:2[illegible]	4		Drill
17:39	8	— 30 —	Install Pipe II
17:40	4		Drill
17:55	8	— 50 —	Install Pipe III
17:56	4		Drill
18:50			
18:40	5		Pull Pipe
8:30	1		
9:00	8		INSTALL CASING + WELD
10:15	8		INSTALL PIPES I, II, III
	4		
10:25	5		INSTALL BIT [illegible]
11:36	5		
10:53	10		MAX DEPTH — 65-70'
			WATER @ 60'

Margin notes: .19, .17, .13; 10/18

(#) hole completed = 65'

(#) H_2O at 42'

Cased to

LOG REFERENCE #
1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud ______ sacks

LC ____ Type ______

______ sacks

______ sacks

______ sacks

Viscose ______

Cement ______

Diesel

Foamer ______

Detergent ______

Other ______

CREW HOURS

Driller 1, Sam

Helper 1, Bernie

Helper 1, Jeff

Footage: FROM ______ ' TO ______ ' TOTAL FOOTAGE ______ '

______ changed at ______ ' Size ____ "

______ changed at ______ ' Size ____ "

______ changed at ______ ' Size ____ "

Approved ______

David Dells

Revised 9/8/99 11:27 AM

(#) SP is ~~[illegible]~~ North of the Spillway in Hansen Dam. (MIOE)

CLIENT: U.S Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: Luke Reusser

expected depth => 95'-100'

Date: 10/22/99 Hole # 201 (South) Rig # 1 Driller: Sam Crum Supervisor: Luke

TIME	LOG #	FOOTAGE	REMARKS
(PM)			
16:01	2		Rig up
16:04	8	0	Install 8" Air Hammer
16:09	8		Install Pipe
16:12	4		Drill
		40'	100' = completed hole
		80'	100' Casing
		100'	Left at.

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer _____
Detergent _____
Other _____

CREW HOURS

Driller ___/_____
Helper ___/_____
Helper ___/_____

Footage: FROM _____' TO _____' TOTAL FOOTAGE _____'
_____ changed at _____' Size ____"
_____ changed at _____' Size ____"
_____ changed at _____' Size ____"
Approved _____

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP:

Date: [redacted] 10/18 Hole # 201C Rig # 1 Driller: Sam Crum Supervisor: [illegible]

TIME	LOG #	FOOTAGE	REMARKS
11:30	1		
11:04	2		
12:05	3	0'	INSTALL BIT + PIPE I
12:10	4		
12:20	5	20'	INSTALL PIPE II
	6		
12:30	7	40'	INSTALL PIPE III
	8		
12:44	9	60'	INSTALL PIPE IV
	10		
1100	11		

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud_____sacks
LC_____Type_____
_____sacks
_____sacks
_____sacks
Viscose_____
Cement_____
Diesel
Foamer_____
Detergent_____
Other_____

CREW HOURS

Driller____/____
Helper____/____
Helper____/____

Footage: FROM _____' TO _____' TOTAL FOOTAGE _____'
_____ changed at _____' Size____"
_____ changed at _____' Size____"
_____ changed at _____' Size____"

Approved_____
David Delis

Revised 9/8/99 11:27 AM

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: Luke Reusser

expected depth => 80'

Date: 10/22/99 Hole # 202B (South) Rig # 1 Driller: Sam Crum Supervisor: Luke

(AM)

TIME	LOG #	FOOTAGE	REMARKS
9:30	11		Move Rig to South Hole
9:40	2		Rig up
9:42	8		Install 8" Air Hammer
9:45	8	— 0 —	Install Pipe I
9:45	4		Drill
9:54	8	— 20 —	Install Pipe II
9:55	4		Drill
10:01	8	— 40 —	Install Pipe III
10:02	4		Drill
10:11	8	— 60 —	Install Pipe IV
10:12	4		Drill
10:18	8	— 80 —	~~Install Pipe~~ Hole completed at 80'
10:30	4		Maintenance on the Top Head drive
10:50	10		Rig Down
			(8) completed hole => 80'
			(4) Water Seeping in Bottom
			(4) Not cased

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer _____
Detergent _____
Other _____

CREW HOURS

Driller 1, Sam
Helper 1, Ernie
Helper 1, Jeff

Footage: FROM 0 ' TO 80 ' TOTAL FOOTAGE 80 '

_____ changed at _____ ' Size _____ "
_____ changed at _____ ' Size _____ "
_____ changed at _____ ' Size _____ "

- Steel Collar; I.D. to be removed on the Night of shooting

David Delis

Approved _____

Revised 9/8/99 11:27 AM

80

CLIENT: U.S Geological Survey/ S.C. E.C.
PROJECT: LARSE II
CLIENT REP: Luke + Jonathan

PM/AM

expected depth = 72'

Date: 10/21/98 Hole # 2028 (North) Rig # 1 Driller: Sam Crum Supervisor: Luke + Jonathan

TIME	LOG#	FOOTAGE	REMARKS
(PM) 18:10	16		Leave — water Trip
18:15	11		Move Rig to New Site
18:20	2		Rig up
18:22	4		Drill
18:40		80	Hole completed at 80'
18:42	5		Pull Pipe
			Leave — Until Tomorrow (10/22)
10/22 (AM) 9:31	10		Rig down.
		@	Wet at ≈ 60'
		@	completed hole 82'
		P	Steel collar; Not cased

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer _____
Detergent _____
Other _____

CREW HOURS

Driller 1, Sam
Helper 1, Bernie
Helper 1, Jeff

Footage: FROM 0 ' TO 82 ' TOTAL FOOTAGE 82 '
_____ changed at _____ ' Size _____ "
_____ changed at _____ ' Size _____ "
_____ changed at _____ ' Size _____ "

Approved _____ David Dells

Revised 9/8/99 11:27 AM

- hole is not cased, the steel collar can be taken out when the hole is loaded & about to be shot.

82

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: Alan Yong

64' [illegible]

Date: 9/9 Hole # 204 C2 Rig # 1 Driller: Sam Crum Supervisor: JS

TIME	LOG #	FOOTAGE	REMARKS
12:47	1		
12:50	2		
12:53	8		INSTALL DRILL BIT 2½' 9⅞ tricone
12:56	8	0	INSTALL PIPE I
1:06	4		START
1:18	8	20'	INSTALL PIPE II
1:19	4		DRILL
1:21	14		START FOAM
1:23	8	40'	INSTALL PIPE III
1:24	4		DRILL
1:26			HIT WATER TABLE ~55' (SB1H)
1:29	8	60'	INSTALL PIPE IV
1:29	4		DRILL
1:39	14	70'	Drilling levels at 70'
1:36	5		PULL PIPE
1:46			TAKE OUT DRILL BIT
1:47	8		INSTALL CASING PUSHER
1:48	8-3		CASING I UP (Left over casing for 204 C1)
1:51	14		WELDING
1:58	8		CASING II UP
2:00	14		WELDING I + II
2:08	8		CASING III UP
2:09	14		WELDING III + II
2:19	8		CASING IV UP
2:20	14		WELDING III + IV
2:35	14		CASING @ Full Depth
2:40	14		TAKE OUT CASING PUSHER
2:41	3/14		CLEAN HOLE
2:56	14		EXIT HOLE
3:00	10		
3:03	11		MOVE TO 204 C3
3:06	14		CAP HOLE
			Drilled to 70'
			Cased to 70'
			Hole cleared to 65'

Log #: 1. Crew Travel To Site; 2. Rig Up; 3. Reenter Hole; 4. Drilling; 5. Pull Pipe; 6. Mix Mud & Fill; 7. Coring; 8. Install Casing/Pipe; 9. Cementing; 10. Rig Down; 11. Move Rig To New Site; 12. Maintenance; 13. Standby (Explain); 14. Other (Explain); 15. Logging; 16. Water Trip

MATERIALS USED

Mud_____sacks
LC_____Type_____
_____sacks
_____sacks
_____sacks
Viscose_____
Cement_____
Diesel
Foamer_____
Detergent_____
Other_____

CREW HOURS

Driller___/_____
Helper___/_____
Helper___/_____

Footage: FROM 0 ' TO 70 ' TOTAL FOOTAGE 70' casing
Hole cleared to 65'

Bit_____ changed at _____' Size_____"
Bit_____ changed at _____' Size_____"
Bit_____ changed at _____' Size_____"

Approved_____

Revised: 21, June 1999 David Deis

SAMPLE - 10ft.
BURNT + SCOTT (Blue ...)

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: JS

62 ft

Date: 9/8 - 9/9 Hole # 204C1 Rig # 1 Driller: Sam Crum Supervisor JS

	TIME	LOG #	FOOTAGE	REMARKS
Cys 9/9	19:30	1		Set up site for morning of 9/9.
	6:38	16		leave H2O
AM	8:39	2		
	8:47	8		Installation drill bit 2½', 9 7/8 tricone
I	8:56	8	0'	Install pipe I
	9:34	16		Return H2O
	9:50	4		
	10:00			Start foam
	10:01	12		Stop drilling @ ~20ft./change part
II	10:20	8	20'	New pipe II
	10:28	4		Drilling starts again
III	10:27	8	40'	New pipe III
	10:29	4		Drill
IV	10:34	8	60'	New pipe IV — Hit water 60'
	10:39	4		Drill
~	10:41		70'	Drilling levels off
	10:42	5		Pull
	10:47	16		Return
	10:45	16		Leave
	10:50			Take out drill bit
	10:53	8		Install casing bit / pusher
	10:57			Cleaning
	11:02			Welding begins
	11:06	8/3		Casing I up
	11:10	8		Casing II up
				Welding
	11:23	8		Casing III up
				Welding
	11:39	8		Casing IV up
				Welding
	12:01	14		Casing full depth
	12:03	14		Cut casing
	12:14	14/3		Clean hole
				Hole to 63' Casing to 73'
	12:42	10		
	12:46	11		Move to 204C2
	12:48	14		Cap hole

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reamer Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud ______ sacks
LC ______ Type ______
______ sacks
______ sacks
______ sacks
Viscose ______
Cement ______
Diesel
Foamer ______
Detergent ✓
Other ______

CREW HOURS

Driller 11
Helper 11
Helper 11

Footage: FROM 0 ' TO 70 ' TOTAL FOOTAGE 70' CASING
HOLE TO 65'

changed at ______ ' Size ____ "
changed at ______ ' Size ____ "
changed at ______ ' Size ____ "

Approved ______

David Delis

Revised 9/8/99 11:27 AM

CLIENT: U.S Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: Luke Reusser + Brian Hoffmeister.

92'

Date: 9/10/99 Hole # 204C4 Rig # 1 Driller: Sam Crum Supervisor: LR+BH

TIME	LOG #	FOOTAGE	REMARKS
8:40 AM	1		Setting up Site
8:41	2		Rig up
8:44	8		Install Bit - 2¾" 9⅞" diameter Tricone
8:47	9	0	Install Pipe #1
8:49	4		Start drilling.
8:55	14		Start Coring
9:00	8	20'	Install Pipe II
9:01	4		Drill
9:03	8	40'	Install Pipe III
9:04	4		Drill
9:05			Hit water table ~ 60'
9:06	8	60'	Install Pipe IV
9:08	4		Drill
9:23	8	80'	Install Pipe V
9:24	4		Drill
9:33	14	100'	Drilling Stop - Lost at ~ 100'
9:34	5		Pull Pipe
9:40	14		Remove Drill Bit
9:46	8/14		Install Casing Pushes.
9:49	14		Welding Casing I
9:57	8		Casing I up & installed
9:59	8		Casing II up & Installed
10:01	14		welding I + II together
10:17	8		Casing III up
10:19	14		welding I + III together
10:40	5		Casing 4 up
10:45	14		welding III + IV together.
10:58			
11:01	14		Stamping 80' of pipe casing
11:08	8		Casing V up
11:11	14		Welding IV + V together
11:25	14		Stamping 100' of pipe casing
11:30	14		Tube in at 85', Cut casing, clean hole.
12:02	3		clean hole / Reenter hole
12:19	16		Water trip
12:33	14		continue to clean hole
12:50	5		pull 100' of drill pipe.
1:03	10		Rig down
1:11	14		Wash off drill rig
1:14	12		Weld and cap drill hole
1:30	14		exit hole 204C4
			* 88ft of well casing installed

LOG REFERENCE #
1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED
Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer _____
Detergent _____
Other _____

CREW HOURS
Driller 1 : Sam
Helper 1 : Bernie
Helper 1 : Seth

Footage: FROM 0 ' TO 100' ' TOTAL FOOTAGE 100' '
_____ changed at _____ ' Size ____ "
_____ changed at _____ ' Size ____ "
_____ changed at _____ ' Size ____ "
Approved _____

David Dalis

Revised 9/8/99 11:27 AM

go 8ft if dry

* hole=72ft casing=72ft

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: BRIAN Hoffman

Date: 9-13-1996 Hole # 206 Rig # 1 Driller: Sam Crum Supervisor: BH

TIME	LOG #	FOOTAGE	REMARKS
1:30	14		Arrive at #204 to pick up rig
2:00	16		water trip
2:45	1		crew travel to site, 206, arrive
2:47	2		rig up
2:56	4	0-20ft	drilling pipe #1
3:08	8		install support casing
3:11	6		install casing #2 pipe
3:12	4	20-40ft	drilling pipe #2
3:17	8		install casing pipe #3
3:18	4	40-60ft	drilling pipe #3
3:20	8		install pipe #4
3:20	4	60-80ft	drilling pipe #4 - hold
3:24	5		pull pipe, clogged hole at 60ft.
3:27	8		re-install pipe #4
3:28	4	60-80ft	drilling pipe #4, hole at full depth 80ft.
3:36	5		pull pipe #4
3:37	5		pull pipe #3
3:39	5		pull pipe #2
3:41	9		pull pipe #1 + remove drill bit
3:45	8		install casing pusher
*	*		hit water at 45'ft.
3:50	14		welding
3:53	8		casing #1 up
3:57	8		install casing #2
3:54	14		welding
3:59	8		casing #2 up
4:02	14		welding casing #1 + #2 together
4:13	8		casing #3 up
4:16	14		welding casing #2 + #3 together
4:33	8		casing #4 up
4:39	14		welding casing #3 + #4 together
4:48	14		Bentonite casing #4
4:55	12		Maintenance
5:14	3		re-enter hole / cleaning hole
5:30	5		pull cleaning pipe
5:40	10		Rig down
5:54	14		welding cap on hole
6:02	14		hole finished, exit hole
			# hole drilled to 80'
			# hole cased to (75')
			# hole reamed to (80')

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
9 7/8 drill bit
20ft drill pipe
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer Quik-Gel
Detergent hydro
Other _____

CREW HOURS

Driller 1, Sam
Helper 1, Bernie
Helper 1, Scott

Footage: FROM 0 TO 80 TOTAL FOOTAGE 80ft

_____ changed at _____ Size _____
_____ changed at _____ Size _____
_____ changed at _____ Size _____

Approved _____

David Delis

Revised 9/8/99 11:27 AM

CLIENT: U.S Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: David Delis

72ft

Date: 9-27-99 Hole # 208 Rig # : Driller: Sam Crum Supervisor:

Hour	TIME	LOG #	FOOTAGE	REMARKS
5				
				[illegible]
10	9:43	1		Same clay
	10:05	2/4		Silty/clay fill Brown color pumping H2O @ 10ft
	10:36	4	20ft	color change @ 40ft "yellowish grey" clay
	10:37	4	40ft	Same - clay
11	10:58	4	60ft	Same - clay
	11:07	4/14/15	75ft	Same - clay cleaning out well
	11:20	5/8		installing casing
	11:40	8	40ft	
12	11:50	8	60ft	
	12:05	8	75ft	[illegible] @ 9' well
	12:15	3/5		Cleaning out well ~ 8" bit
	12:37	12		
1	12:45	10		

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud ______ sacks
LC ______ Type ______
______ sacks
______ sacks
______ sacks
Viscose ______
Cement ______
Diesel ______
Foamer ✓
Detergent ______
Other ______

CREW HOURS

Driller ___/______
Helper ___/______
Helper ___/______

Footage: FROM ______' TO ______' TOTAL FOOTAGE 80'
Bit 10" changed at 75' Size 8"
Bit ______ changed at ______' Size ______"
Bit ______ changed at ______' Size ______"

casing 75ft

Approved ______________

Revised: 21, June 1999

David Delis

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: Luke

Date: 10/20/99 Hole # 301 Rig # 1 Driller: Sam Crum Supervisor: Luke

AM

TIME	LOG #	FOOTAGE	REMARKS
14:45	14	80	Hole completed at 80'
16:00	14	80	Cased to 80
16:01	3		Reenter + Clean Hole
16:31	5		Pull Pipe
			# Completed Hole = 80'
			# Cased to 80'

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer _____
Detergent _____
Other _____

CREW HOURS

Driller 1, Sam
Helper 1, Bonnie
Helper 1, Jeff

Footage: FROM 0 ' TO 80 ' TOTAL FOOTAGE 80 '
_____ changed at _____ ' Size _____ "
_____ changed at _____ ' Size _____ "
_____ changed at _____ ' Size _____ "

Approved _____
David Deis

Revised 9/8/99 11:27 AM

80

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: Alan Yong

Date: 10.20-99 Hole # 303 Rig # 1 Driller: Sam Crum Supervisor: Alan

TIME	LOG #	FOOTAGE	REMARKS
			No Samples
00	1		Arrived late due to traffic
			to 20 hrs work-day !!!
			Yahhhhh!!!
			H2O @ 60ft.
	10		
	11		
			Total casing 100'
			Depth 100'

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer _____
Detergent _____
Other _____

CREW HOURS

Driller ___/_____
Helper ___/_____
Helper ___/_____

Footage: FROM 0 TO 100 TOTAL FOOTAGE 100

Bit _____ changed at _____ Size ____"
Bit _____ changed at _____ Size ____"
Bit _____ changed at _____ Size ____"

Approved _____

Revised: 21, June 1999 David Delis

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: Alan Yong

hole #2 * new hole

Date: 10-6-99 Hole # 305 * Rig # 1 Driller: Sam Crum Supervisor: BH

TIME	LOG #	FOOTAGE	REMARKS
9:55	3		re-enter hole
10:15	3		install pipe #2
10:16	4	20-40 ft	drilling #2
10:39	3		install pipe #3
10:40	4	40-60 ft	drilling pipe #3
10:53	3		install pipe #4
10:54	4	60-80 ft	drilling #4
11:06	3		install pipe #5
11:07	4	80-100 ft	drill pipe #5
11:20	3		install pipe #6
11:21	4	100-120 ft	drill pipe #6
11:36	3		install pipe #7
11:37	4	120-140 ft	drill pipe #7
12:01	5		pull pipe #6
12:02	5		pull pipe #5
12:03	5		pull pipe #4
12:04	5		pull pipe #3
12:05	5		pull pipe #2
12:07	5		pull pipe #1
12:08	5		
12:20	10		rig down
12:45	14		weld + cap hole
1:01	11		move rig

805 341-0321

Martin

Woodward

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer _____
Detergent _____
Other _____

CREW HOURS

Driller ___/_____
Helper ___/_____
Helper ___/_____

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

Footage: FROM _____ ' TO _____ ' TOTAL FOOTAGE _____ '

Bit _____ changed at _____ ' Size _____ "
Bit _____ changed at _____ ' Size _____ "
Bit _____ changed at _____ ' Size _____ "

Approved _____

Revised: 21, June 1999 David Deis

* actual depth = 140
* actual casing = 30 ft

CLIENT: U.S.Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP:

140

Date: 10/5 Hole # 305, Rig # 1 Driller: Sam Crum Supervisor: JS

TIME	LOG #	FOOTAGE	REMARKS
10:35	1		
10:40	2		
10:40	10		LEAVE
10:49			Install bit
10:50	2		Install ~~casing~~ pipe I
11:06			LEAVE FOR SUPPLIES
1:45	14	30'-40'	~~Hole~~ 30' deep - problem hole losing integrity
			drive to keep cement at all
			change bit - 12" reamer 10' long
			~~started~~ tag @ ~~fitting~~ removed
			installed ~3'o- 8' casing at top
12:13	11		TAKE OUT 10' bit
12:17	2/5		Install new bit, take out pipe I
12:22	8		Install casing I
12:25	8		Install casing II / cut @ 30'
12:54	8		Install pipe II w/ new hole
12:58	8		Install pipe III
12:58	4		(pushing core in)
1:06	5		
1:09	8		~~Pull~~ TAKE OUT TOP 8' with casing
1:10	9		Add Quick Gel
1:15	3		
1:20	6		INSTALL PIPE I, II, III
1:24	4		Drilling pipe III
1:36	8	60'	Install pipe IV
	4		
1:54	6	80'	Install pipe V
	4		
2:09	8	100'	Install pipe VI
	4		
2:22	8	120'	Install pipe VII
	4		
2:43	5	140'	MAX Depth / pull pipe
approx 2:54	14		out hole
3:00	10		
3:04	11		MOVE TO 308

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer _____
Detergent _____
Other _____

CREW HOURS

Driller 1, JH
Helper 1, SCOT
Helper 1, GEORGE

Footage: FROM _____ ' TO _____ ' TOTAL FOOTAGE _____ '
_____ changed at _____ ' Size _____ "
_____ changed at _____ ' Size _____ "
_____ changed at _____ ' Size _____ "

Approved _____
David Deis

Revised 9/8/99 11:27 AM

10

CLIENT: U.S.Geological Survey, G.E.S.C.
PROJECT: LARSE II
CLIENT REP:

Date: 10/3 Hole # 305 Rig # 1 Driller: Sam Crum Supervisor: JS

TIME	LOG #	FOOTAGE	REMARKS
3:05	1		
3:07	2		
3:12	4		drill 10' bit
3:18	8		Install 8" large casing for upper hole
3:24	8	10	Install Pipe I
	14		
3:36	14		packer ~/ pipe rotator / holder
3:54	14		TAKE out 10" Bit
4:02	8		Install ~~casing~~ casing I 30"
4:33	9		use quick gel
4:36	3		
10-6 9:58	3		reenter hole

LOG REFERENCE #

1. Crew Travel To Site
2. Rig Up
3. Reenter Hole
4. Drilling
5. Pull Pipe
6. Mix Mud & Fill
7. Coring
8. Install Casing/Pipe
9. Cementing
10. Rig Down
11. Move Rig To New Site
12. Maintenance
13. Standby (Explain)
14. Other (Explain)
15. Logging
16. Water Trip

MATERIALS USED

Mud _____ sacks
LC _____ Type _____
_____ sacks
_____ sacks
_____ sacks
Viscose _____
Cement _____
Diesel
Foamer _____
Detergent _____
Other _____

CREW HOURS

Driller ___/_____
Helper ___/_____
Helper ___/_____

Footage: FROM _____ ' TO _____ ' TOTAL FOOTAGE _____ '

_____ changed at _____ ' Size ____ "
_____ changed at _____ ' Size ____ "
_____ changed at _____ ' Size ____ "

Approved _____
David Delis

Revised 9/8/99 11:27 AM

Appendix III — Plots of Shot Gathers

The plots shown here are shots recorded on line 2. Shot gathers are plotted reduced time (6 km/s reduction velocity) versus offset (distance in kilometers) from the shotpoint. Shotpoints 8020 through 9136 are located along line 2 and, therefore, are inline shots. Shotpoints 9211 through 9370 (geographic sequence numbers 79–93) were located along the auxilary lines and are therefore "fan" shots to line 2.

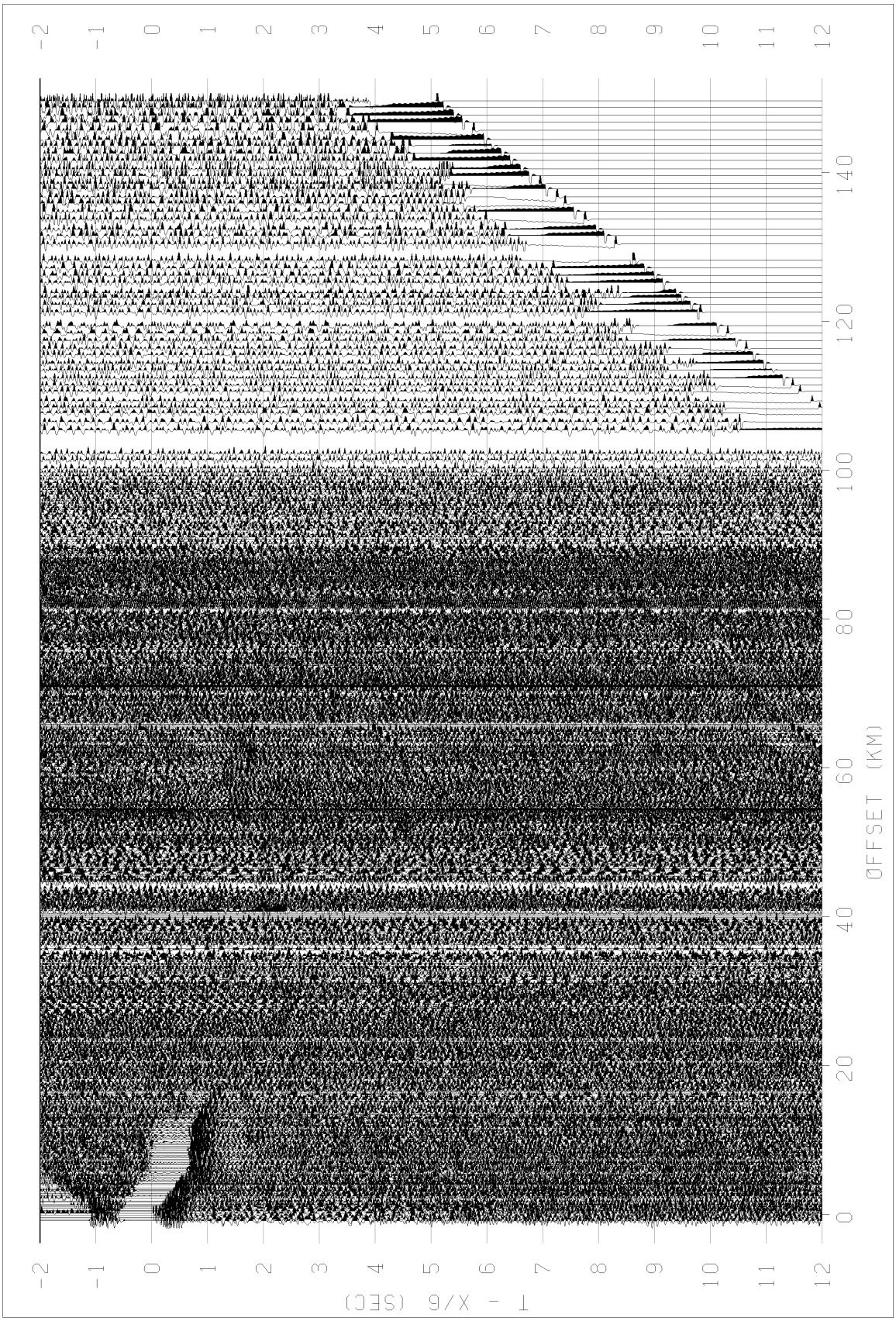

FIGURE . SHOTPOINT 8020, GEOGRAPHIC SEQUENCE NO. 1

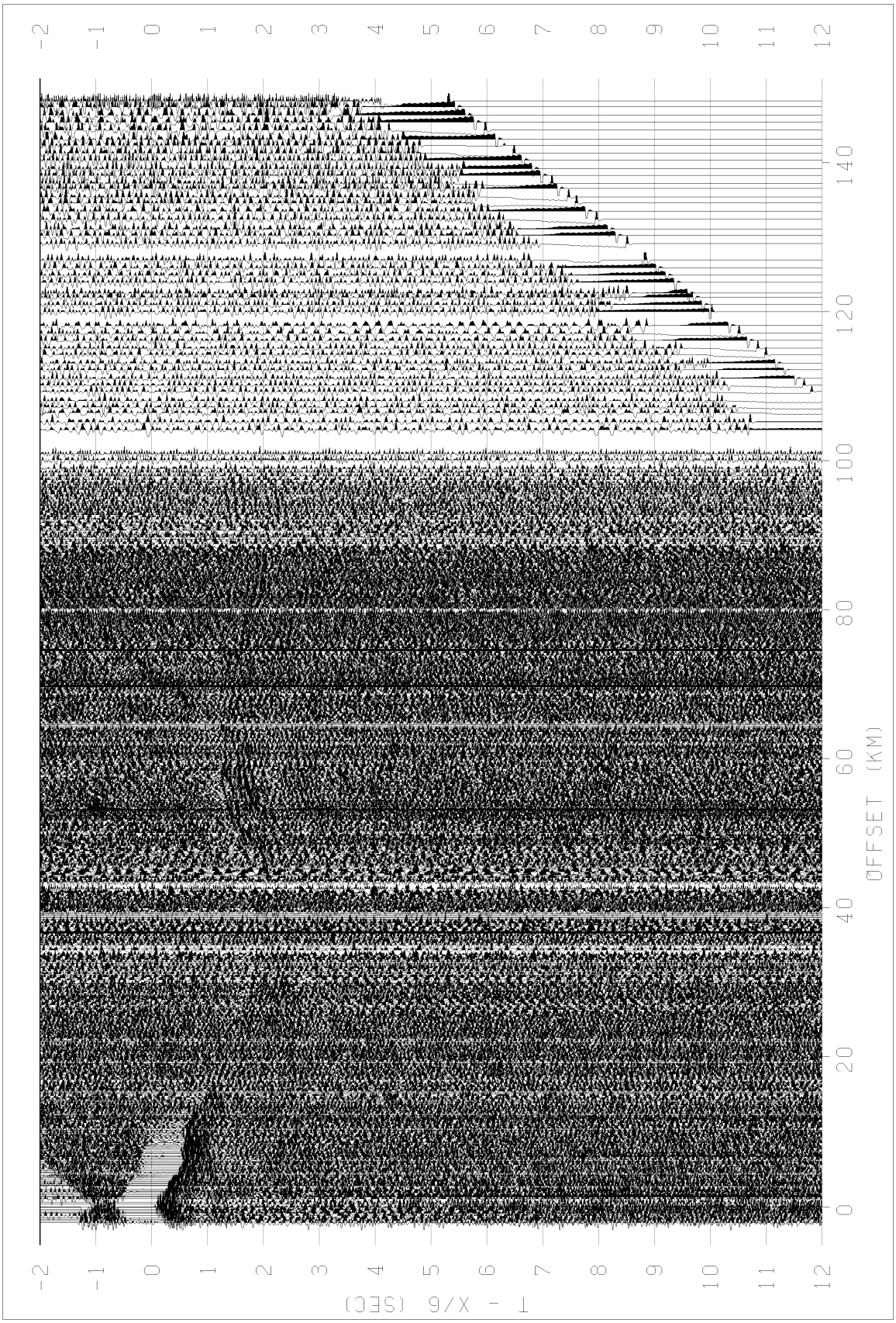

FIGURE . SHOTPOINT 8030, GEOGRAPHIC SEQUENCE NO. 2

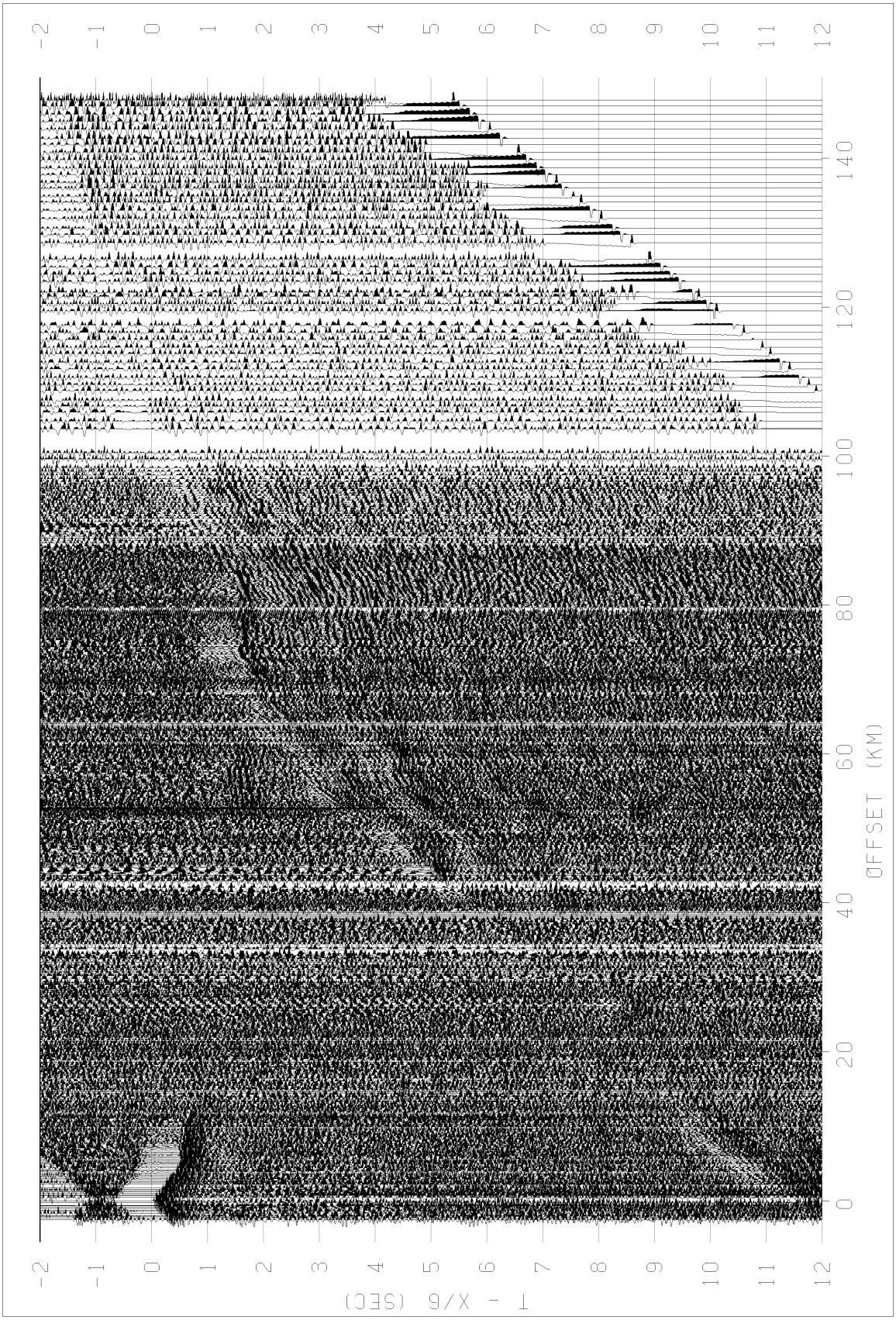

FIGURE . SHOTPOINT 8045, GEOGRAPHIC SEQUENCE NO. 3

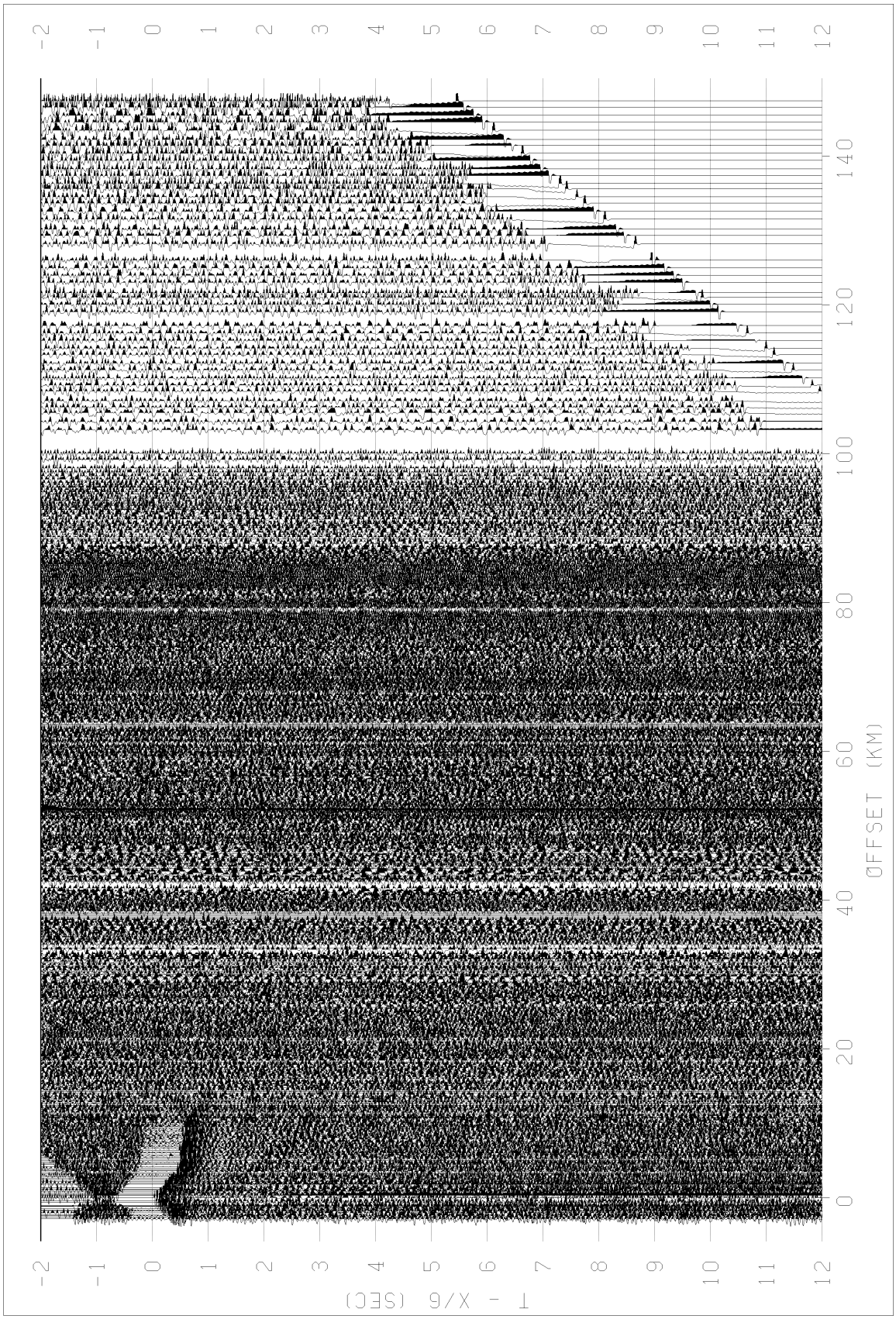

FIGURE . SHOTPOINT 8043, GEOGRAPHIC SEQUENCE NO. 4

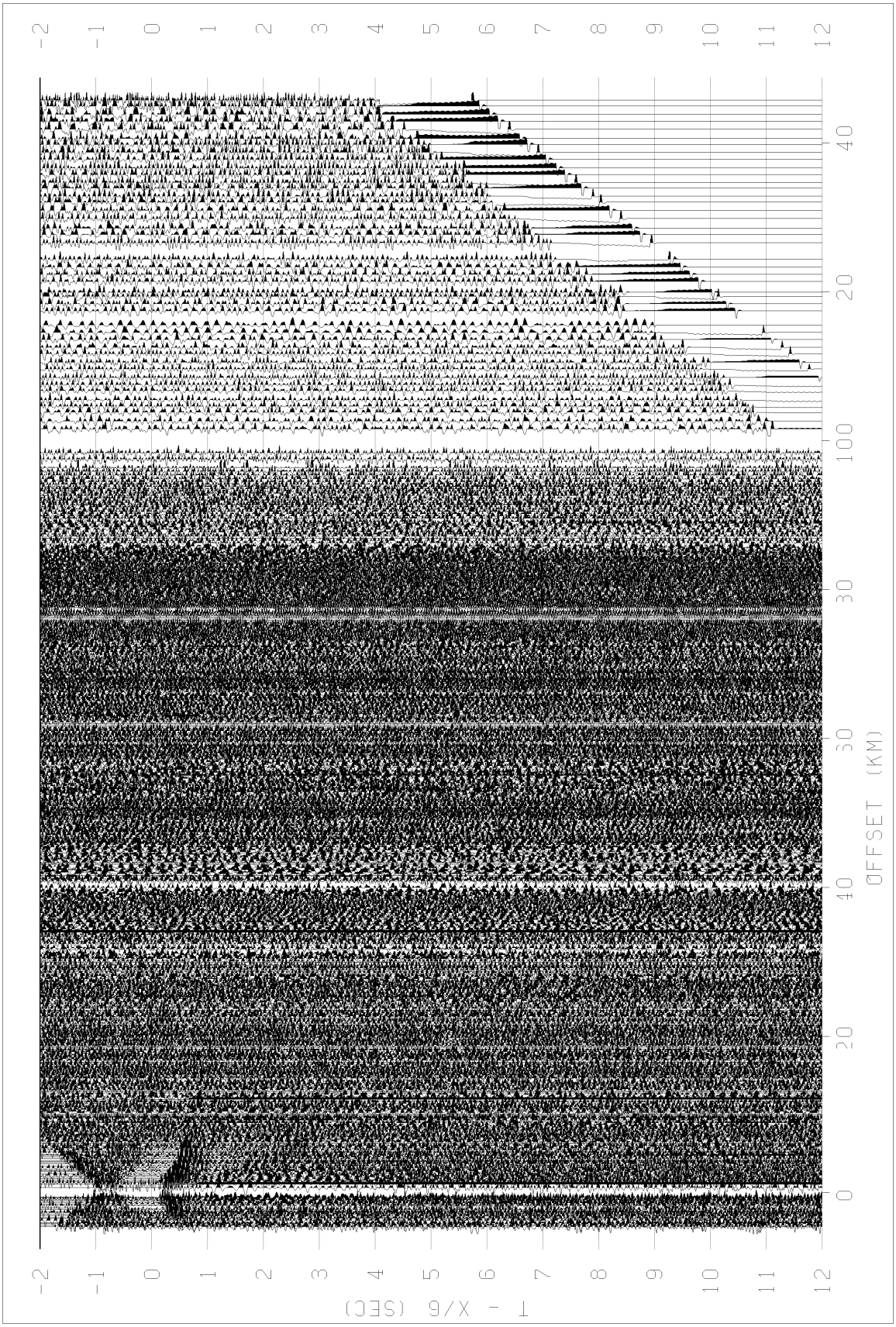

FIGURE . SHOTPOINT 8050, GEOGRAPHIC SEQUENCE NO. 5

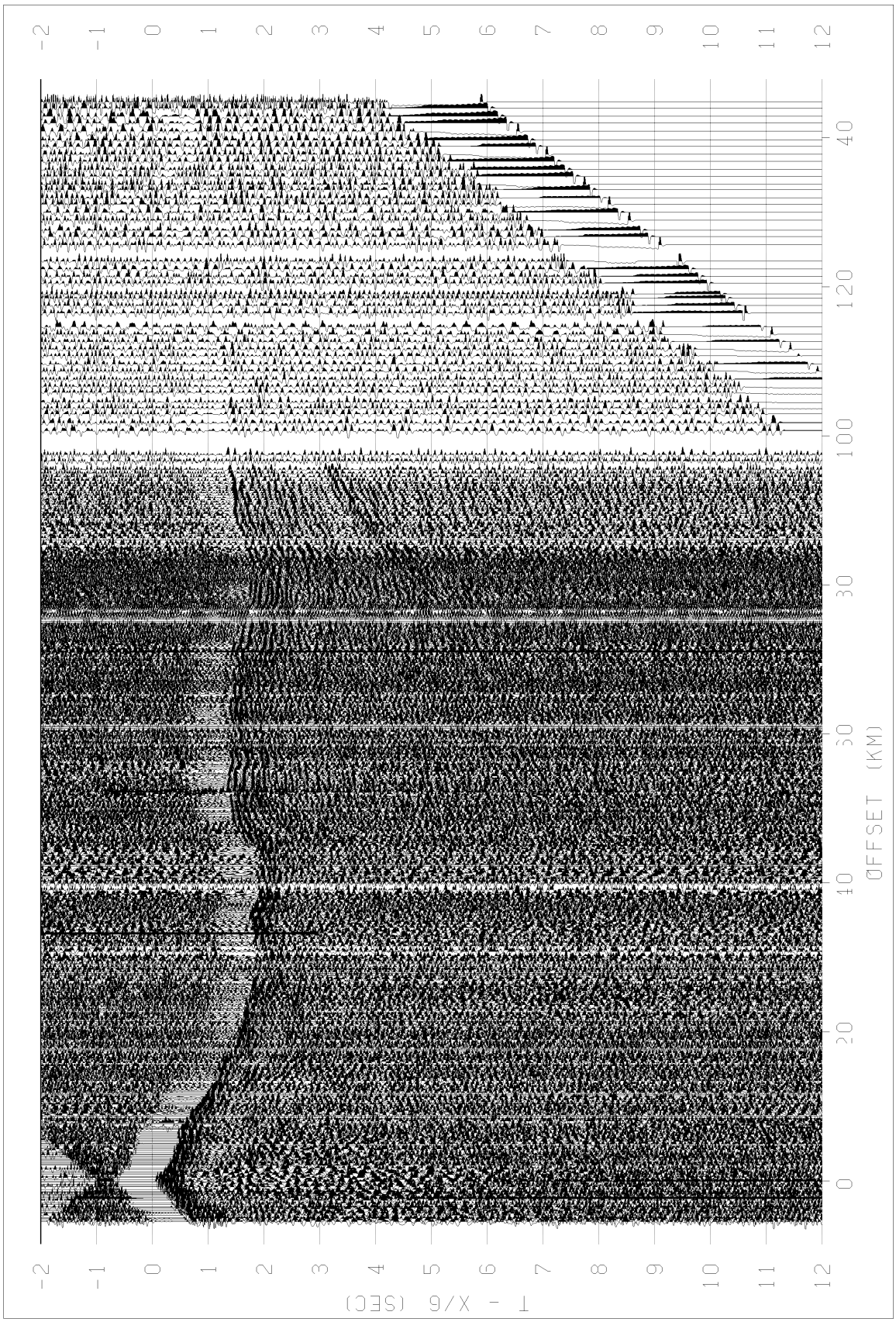

FIGURE . SHOTPOINT 8060, GEOGRAPHIC SEQUENCE NO. 6

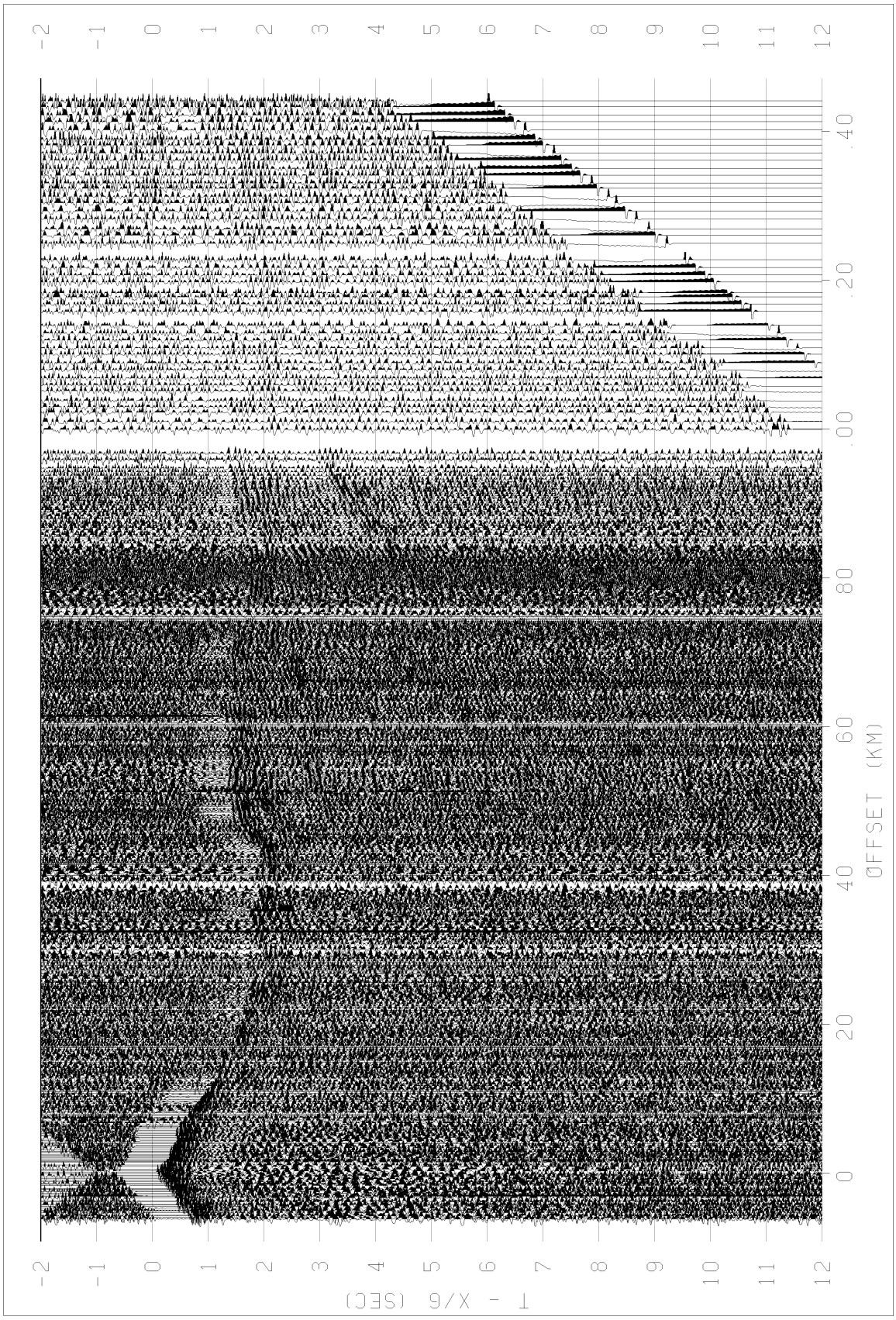

FIGURE . SHOTPOINT 8070, GEOGRAPHIC SEQUENCE NO. 7

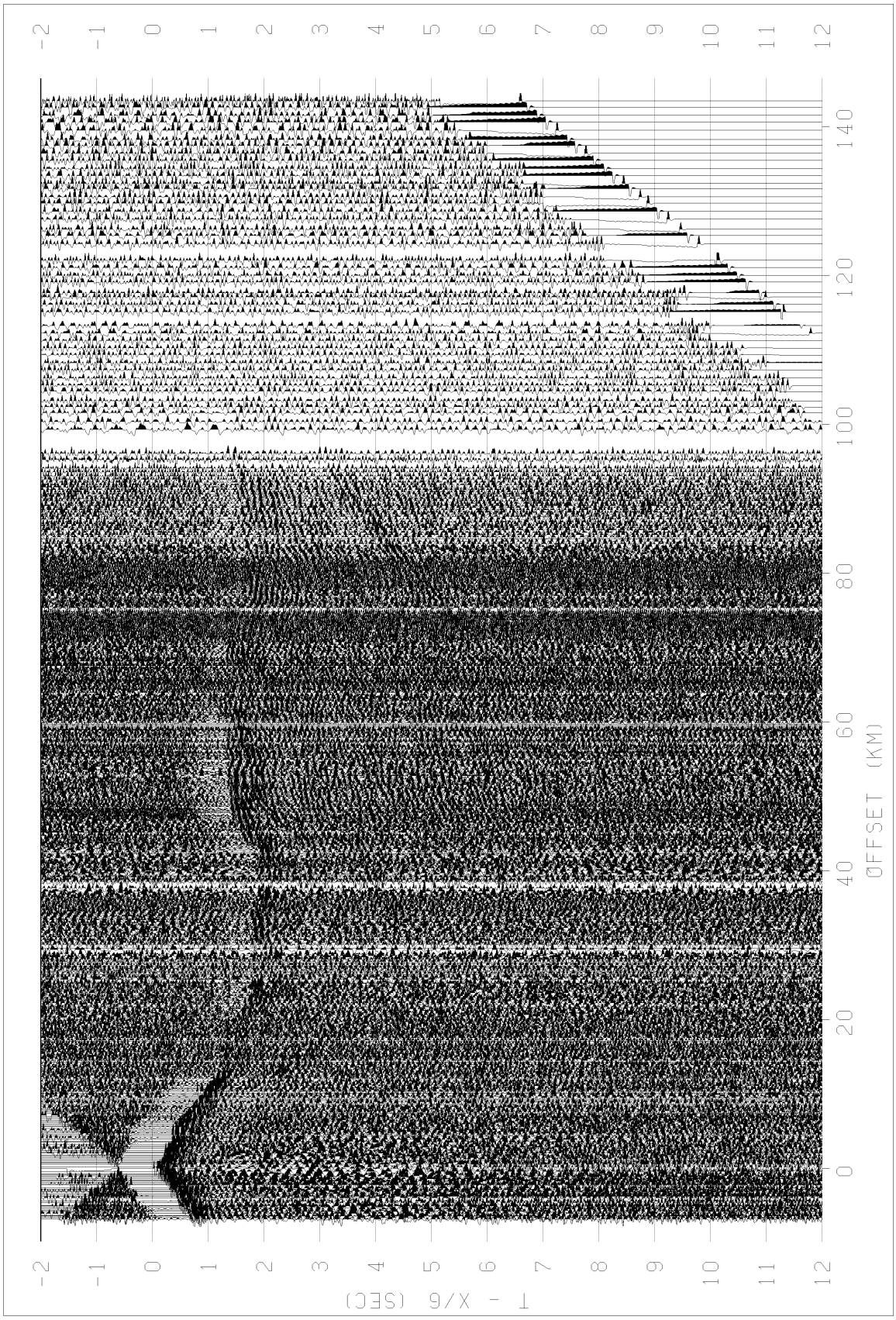

FIGURE . SHOTPOINT 8084, GEOGRAPHIC SEQUENCE NO. 8

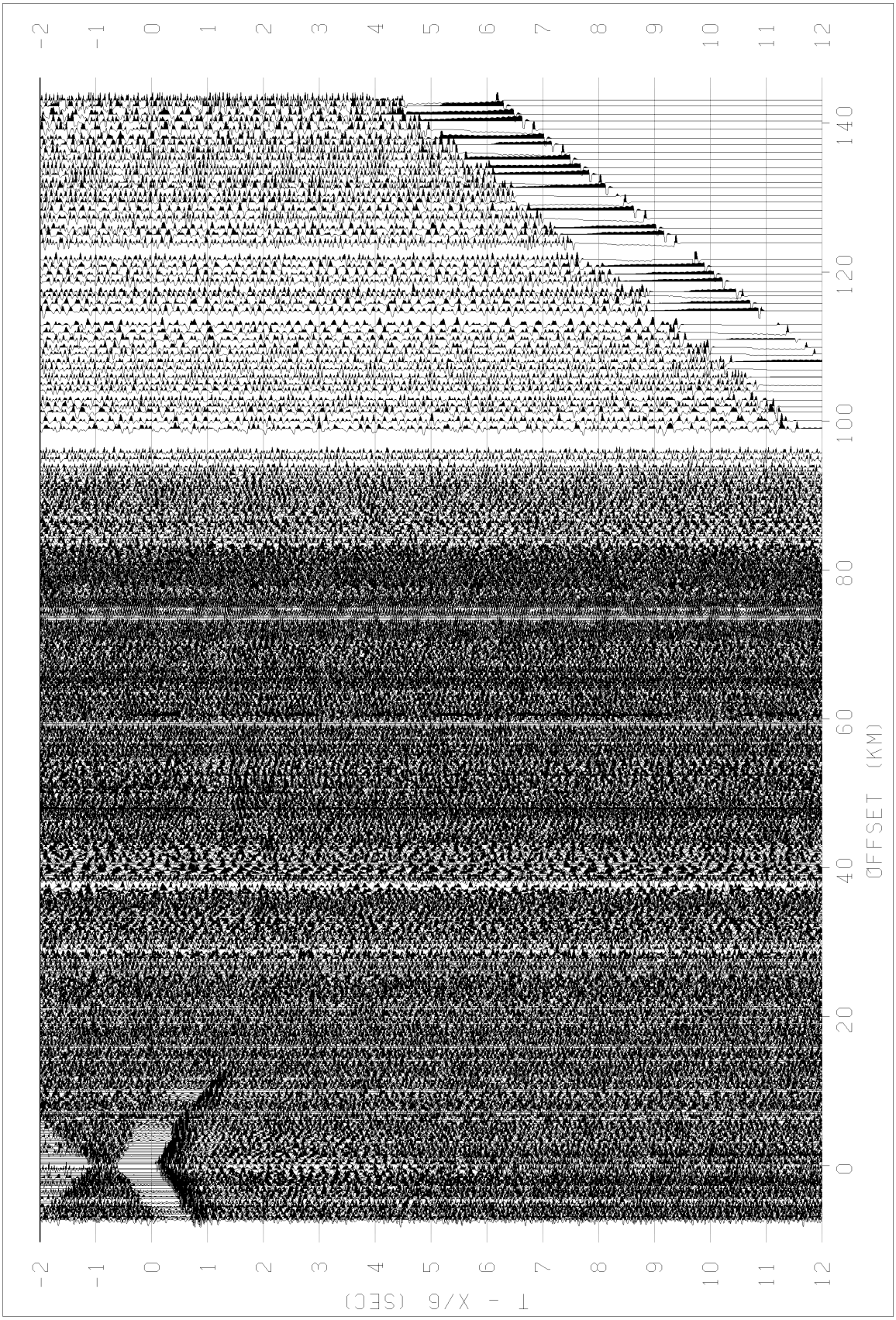

FIGURE . SHOTPOINT 8085, GEOGRAPHIC SEQUENCE NO. 9

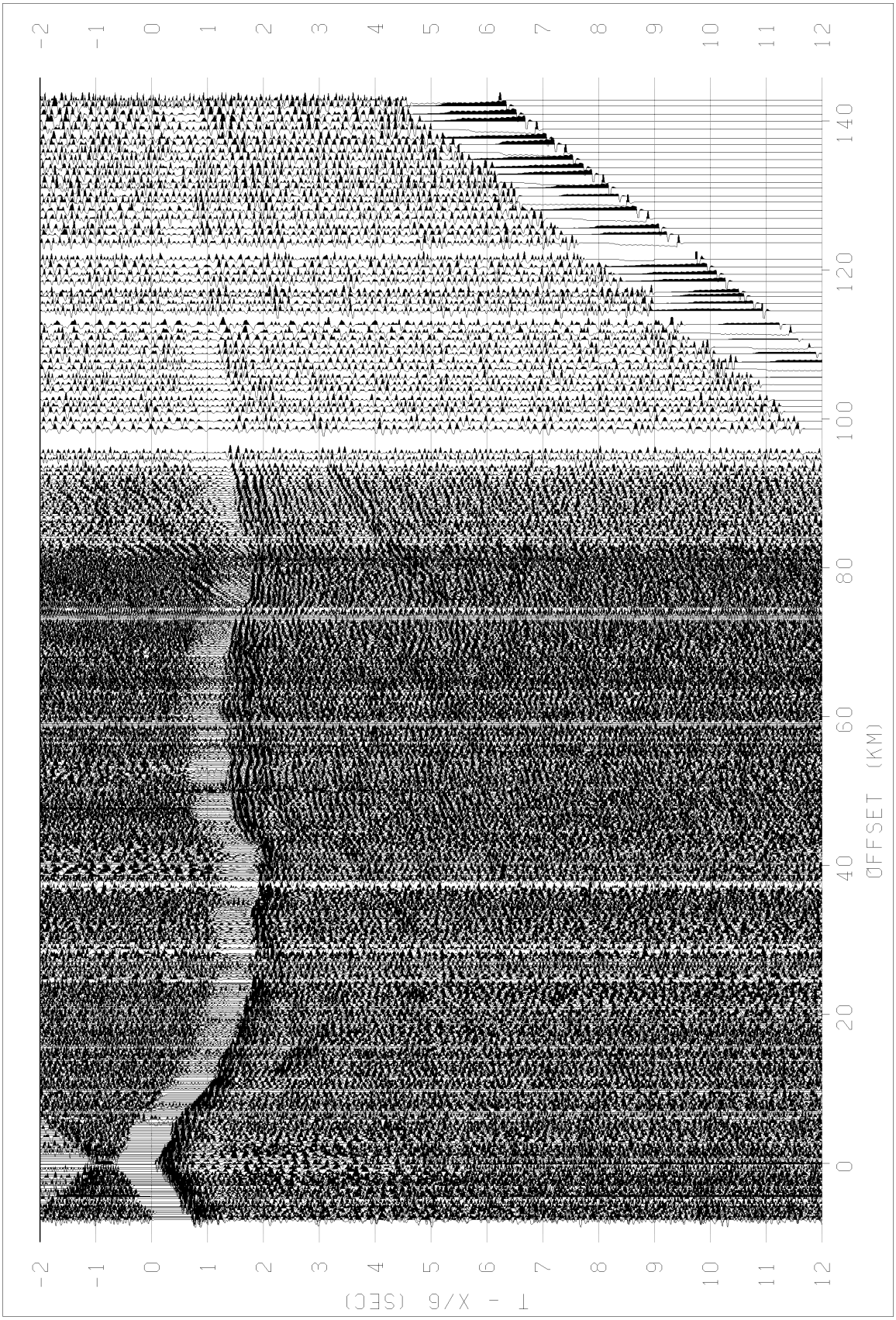

FIGURE . SHOTPOINT 8095, GEOGRAPHIC SEQUENCE NO. 10

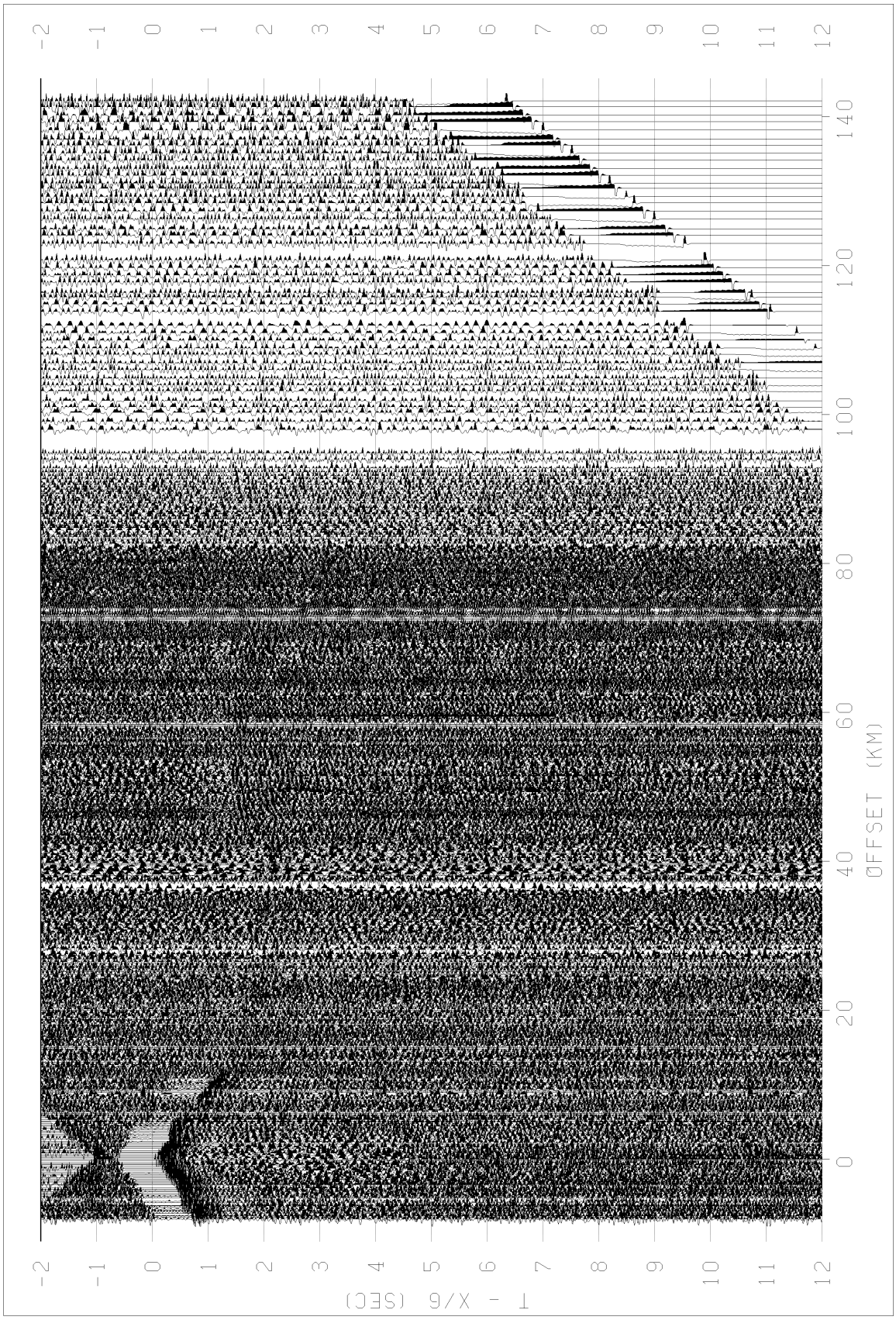

FIGURE . SHOTPOINT 8093, GEOGRAPHIC SEQUENCE NO. 11

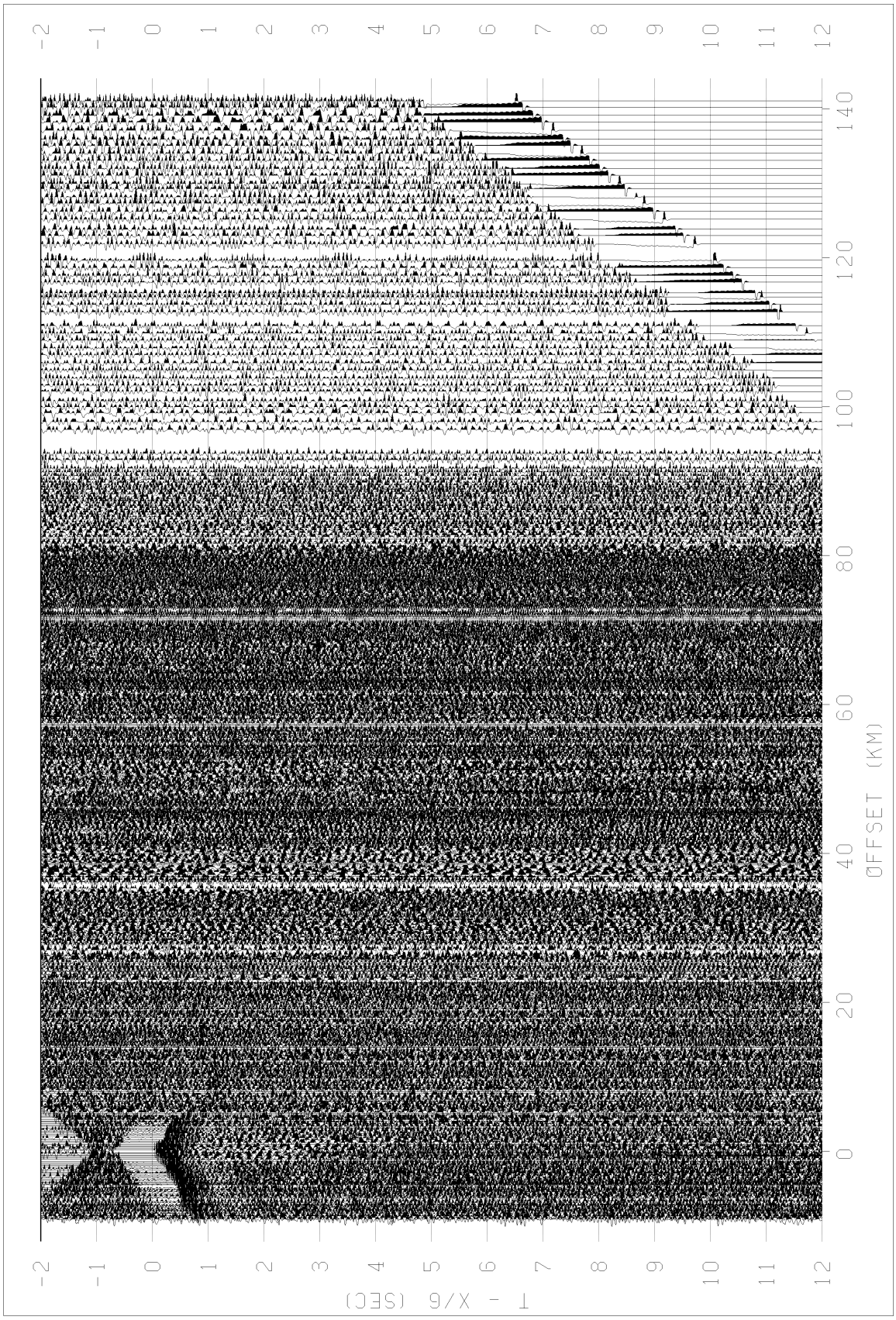

FIGURE . SHOTPOINT 8100, GEOGRAPHIC SEQUENCE NO. 12

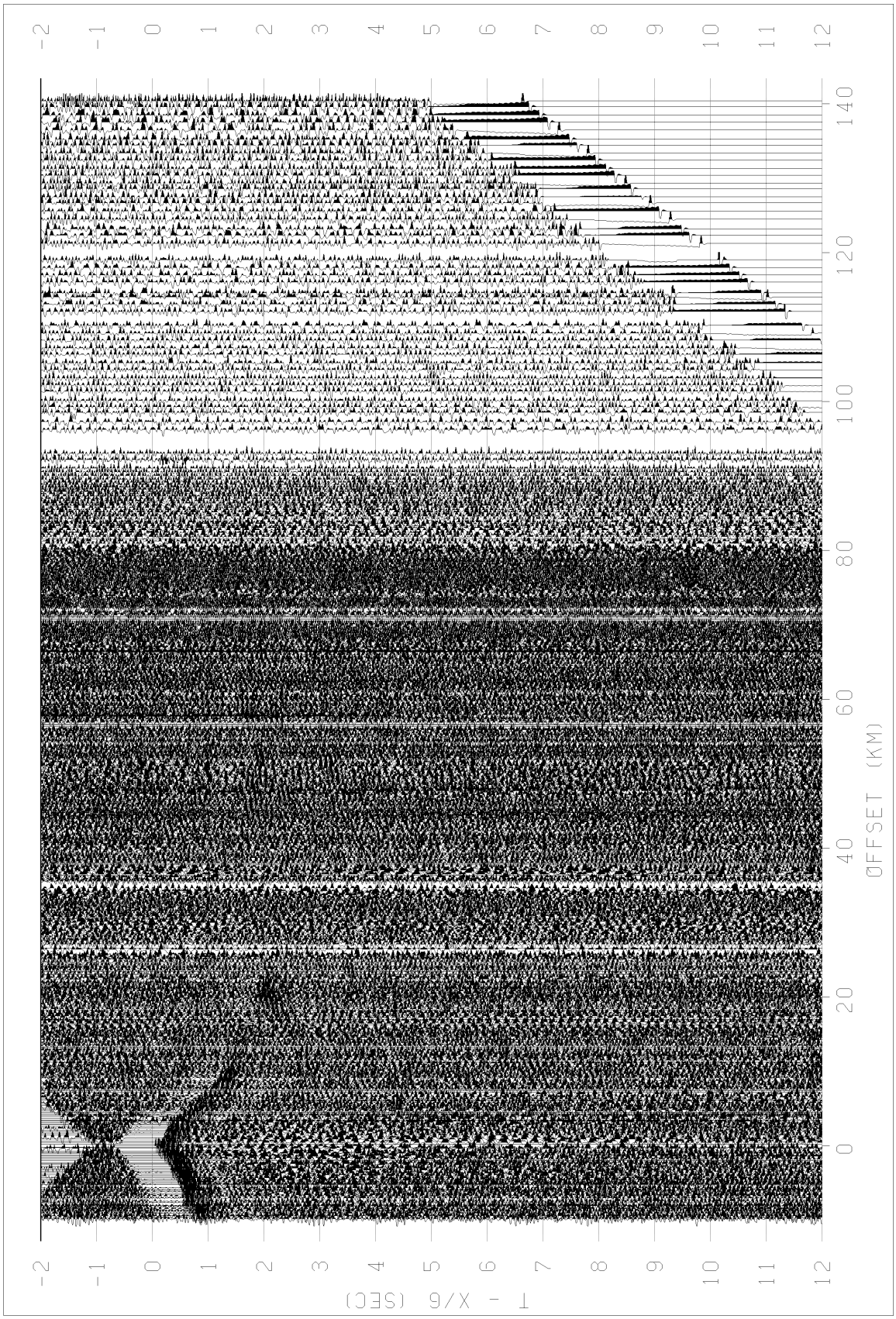

FIGURE . SHOTPOINT 8110, GEOGRAPHIC SEQUENCE NO. 13

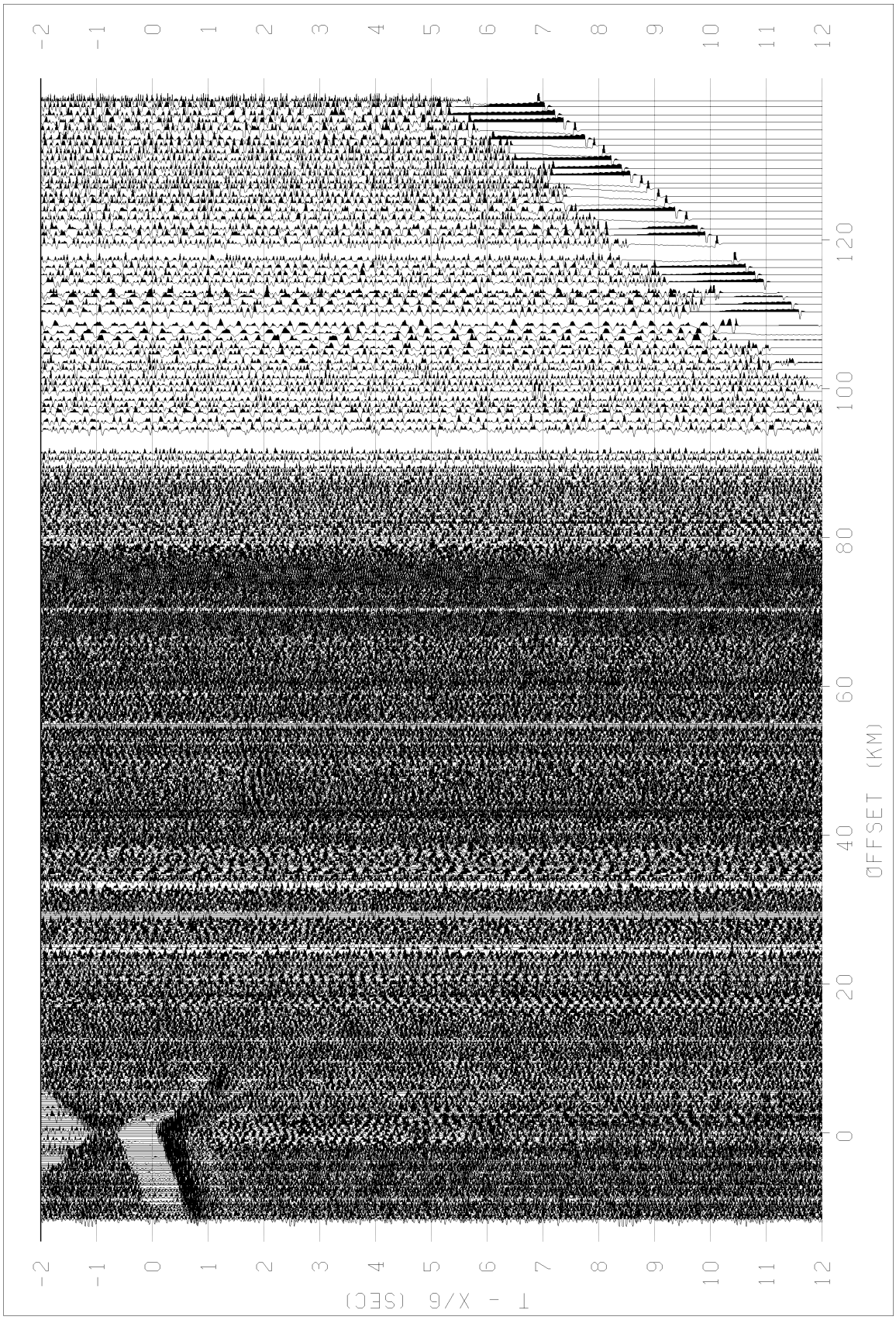

FIGURE . SHOTPOINT 8120, GEOGRAPHIC SEQUENCE NO. 14

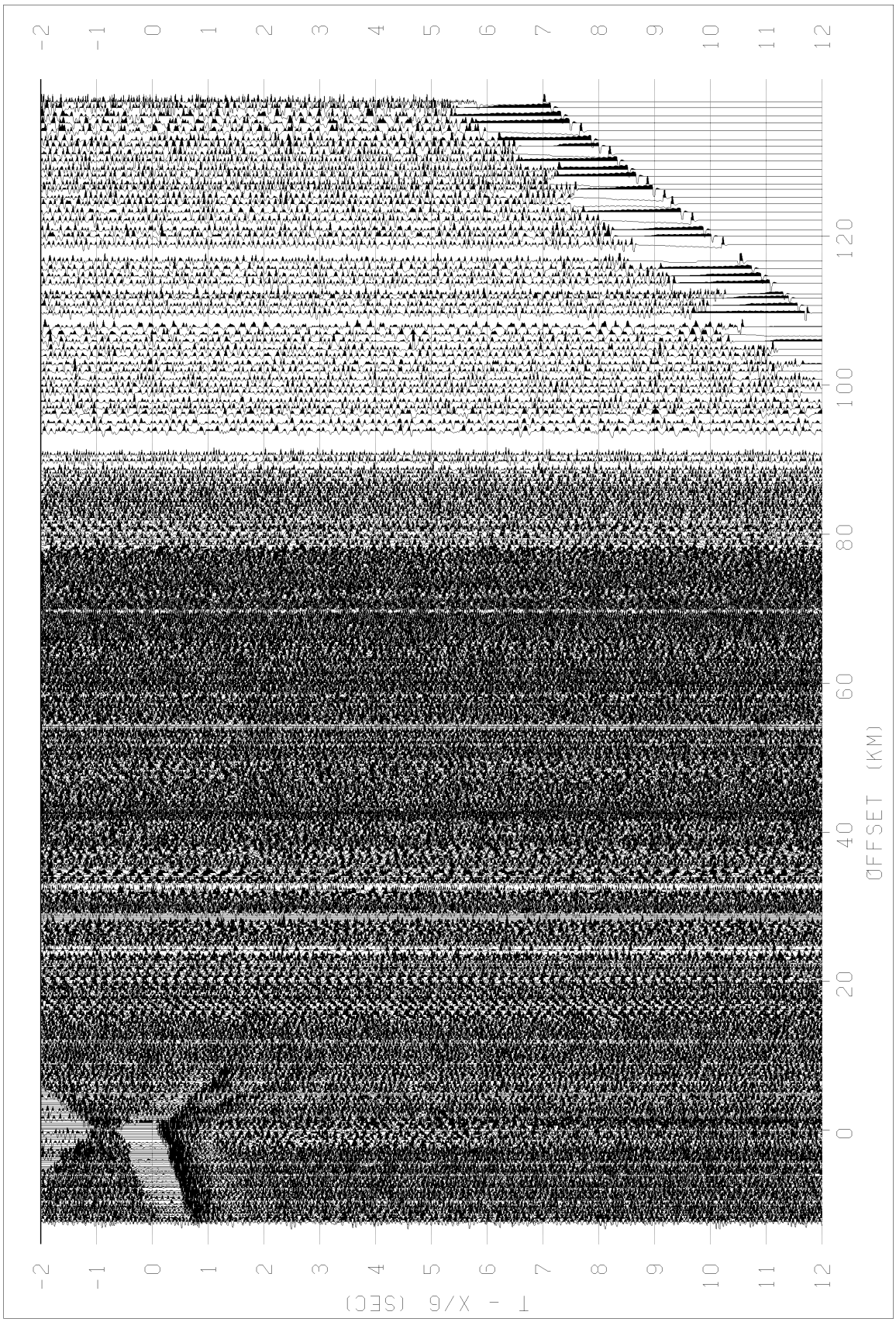

FIGURE . SHOTPOINT 8130, GEOGRAPHIC SEQUENCE NO. 15

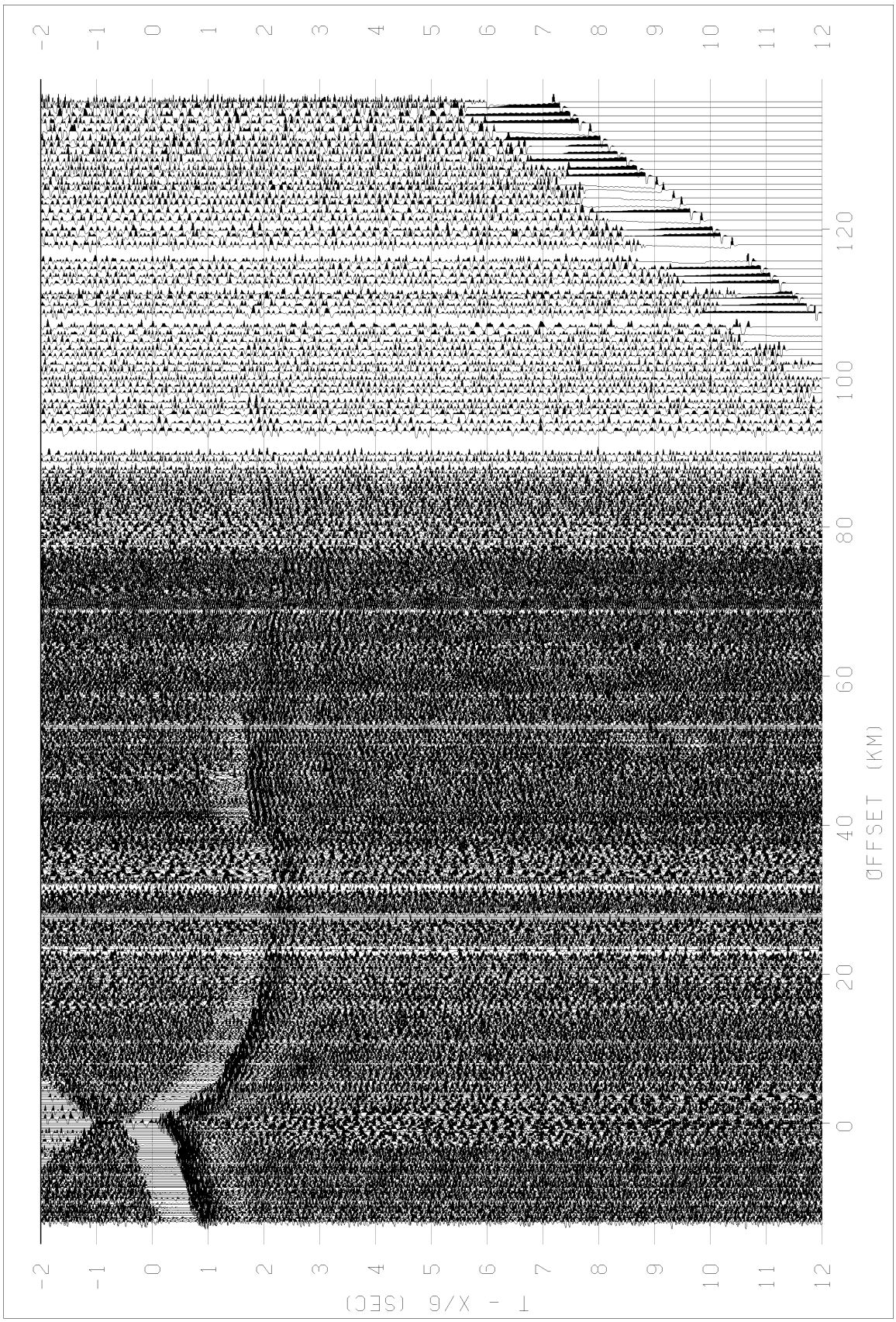

FIGURE . SHOTPOINT 8140, GEOGRAPHIC SEQUENCE NO. 16

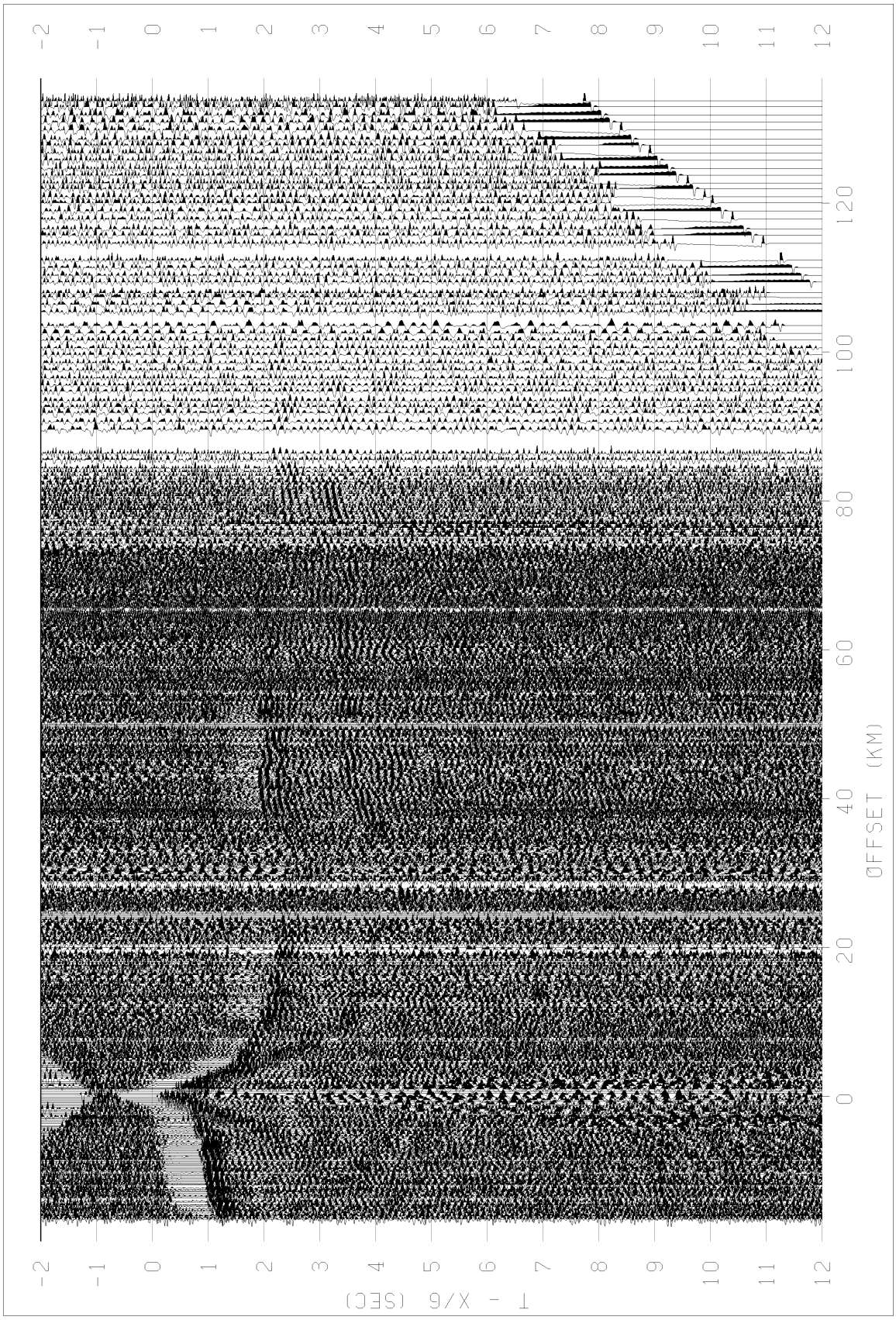

FIGURE . SHOTPOINT 8170, GEOGRAPHIC SEQUENCE NO. 17

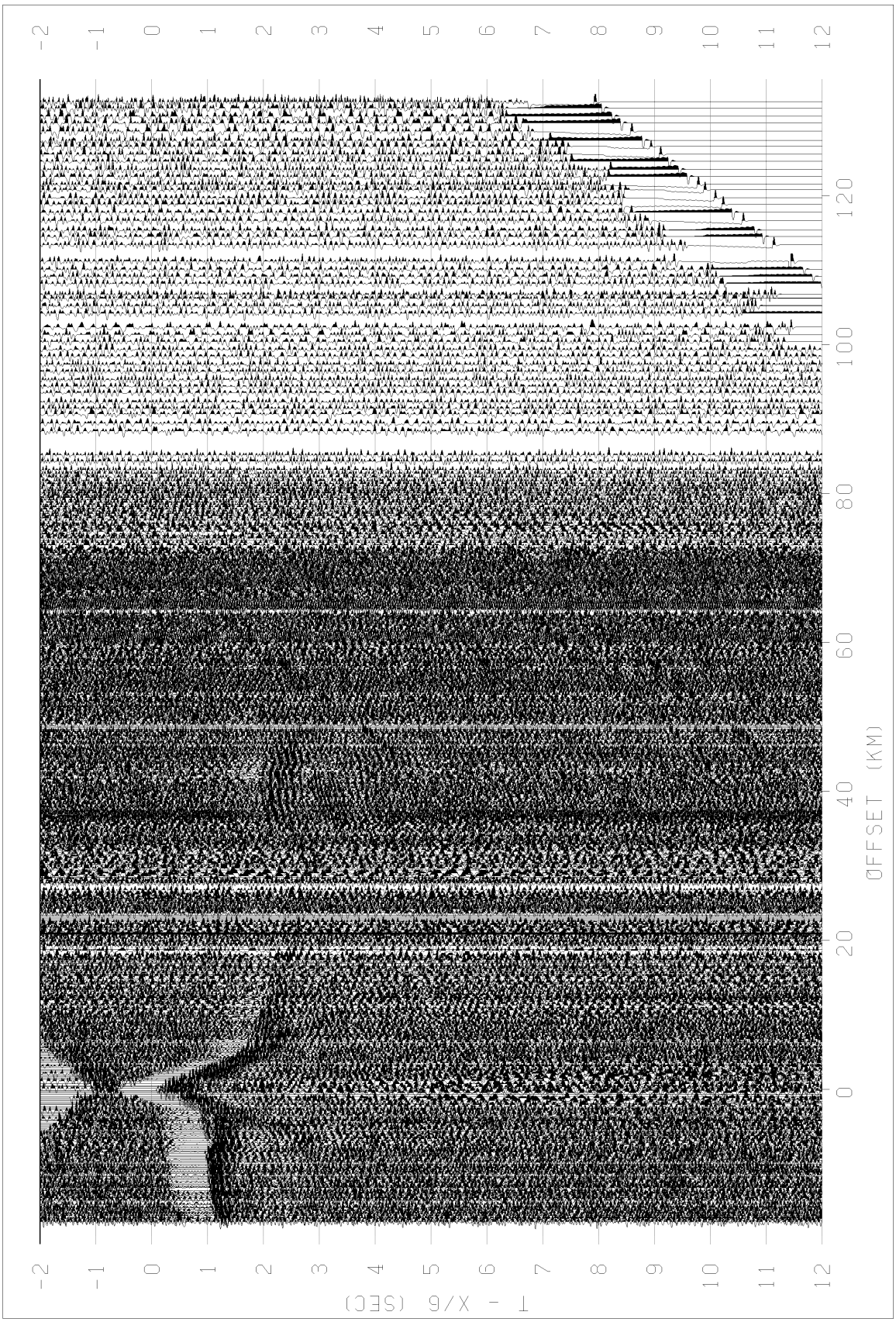

FIGURE . SHOTPOINT 8190, GEOGRAPHIC SEQUENCE NO. 18

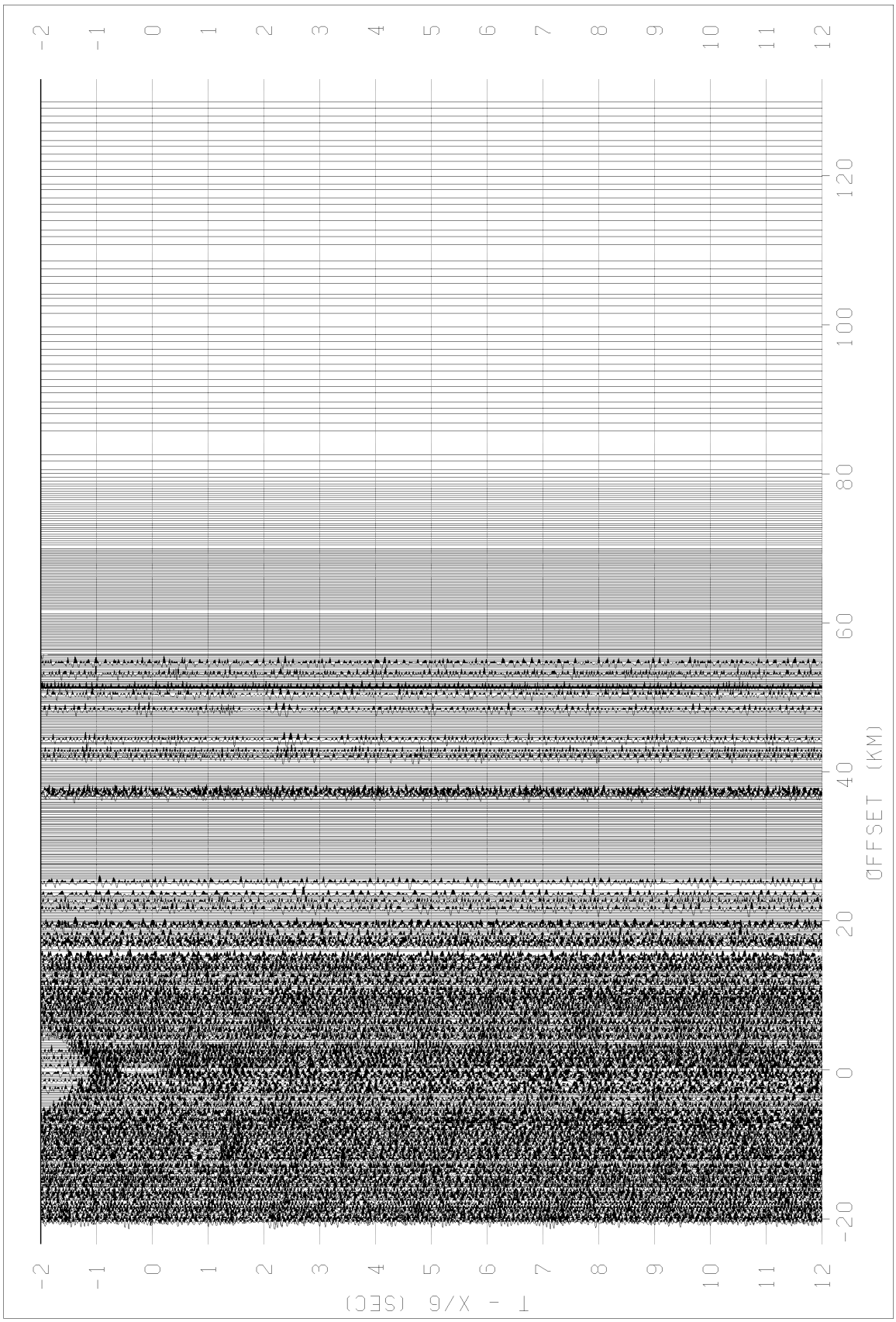

FIGURE . SHOTPOINT 8210, GEOGRAPHIC SEQUENCE NO. 19

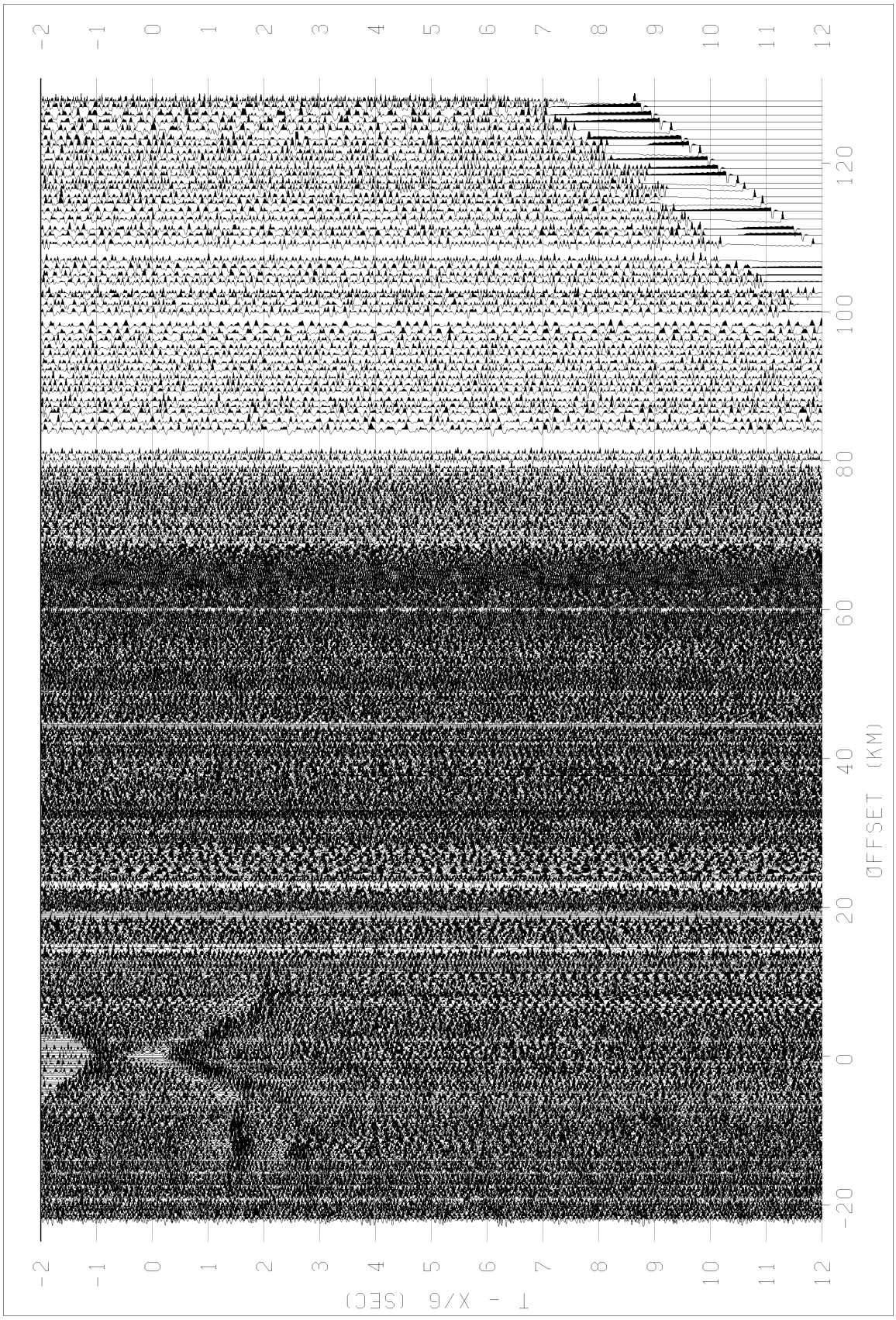

FIGURE . SHOTPOINT 8230, GEOGRAPHIC SEQUENCE NO. 20

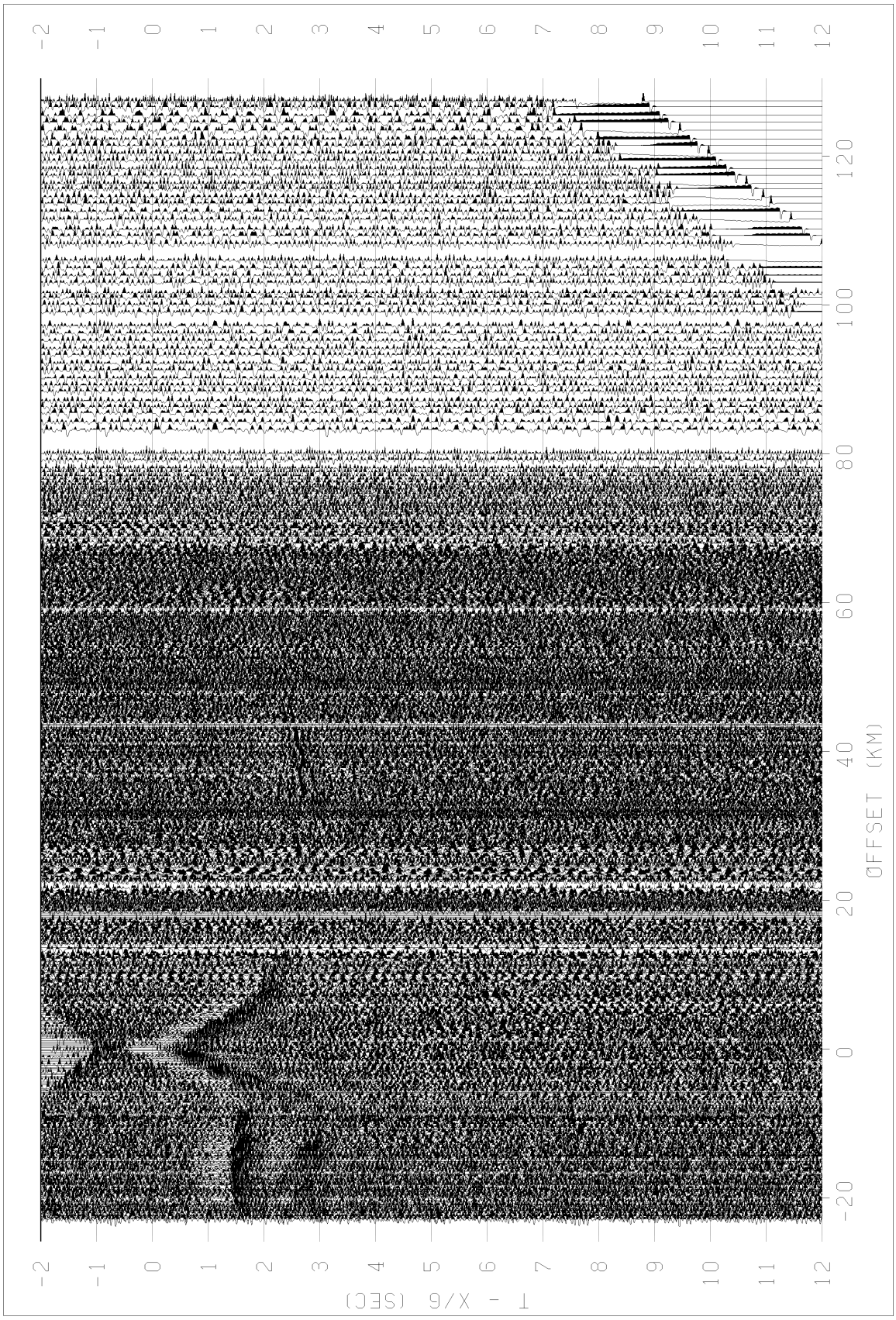

FIGURE . SHOTPOINT 8241, GEOGRAPHIC SEQUENCE NO. 21

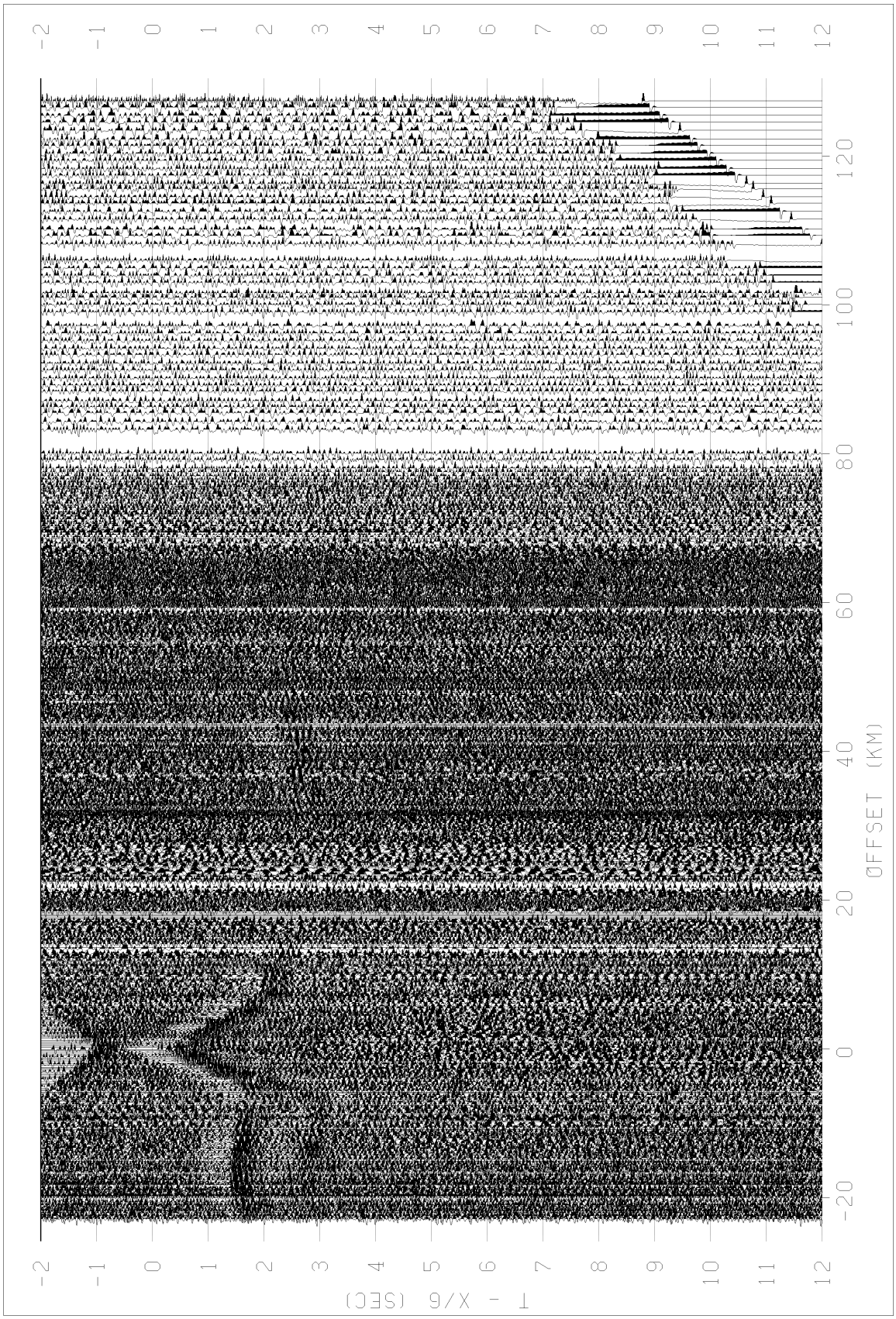

FIGURE . SHOTPOINT 8242, GEOGRAPHIC SEQUENCE NO. 22

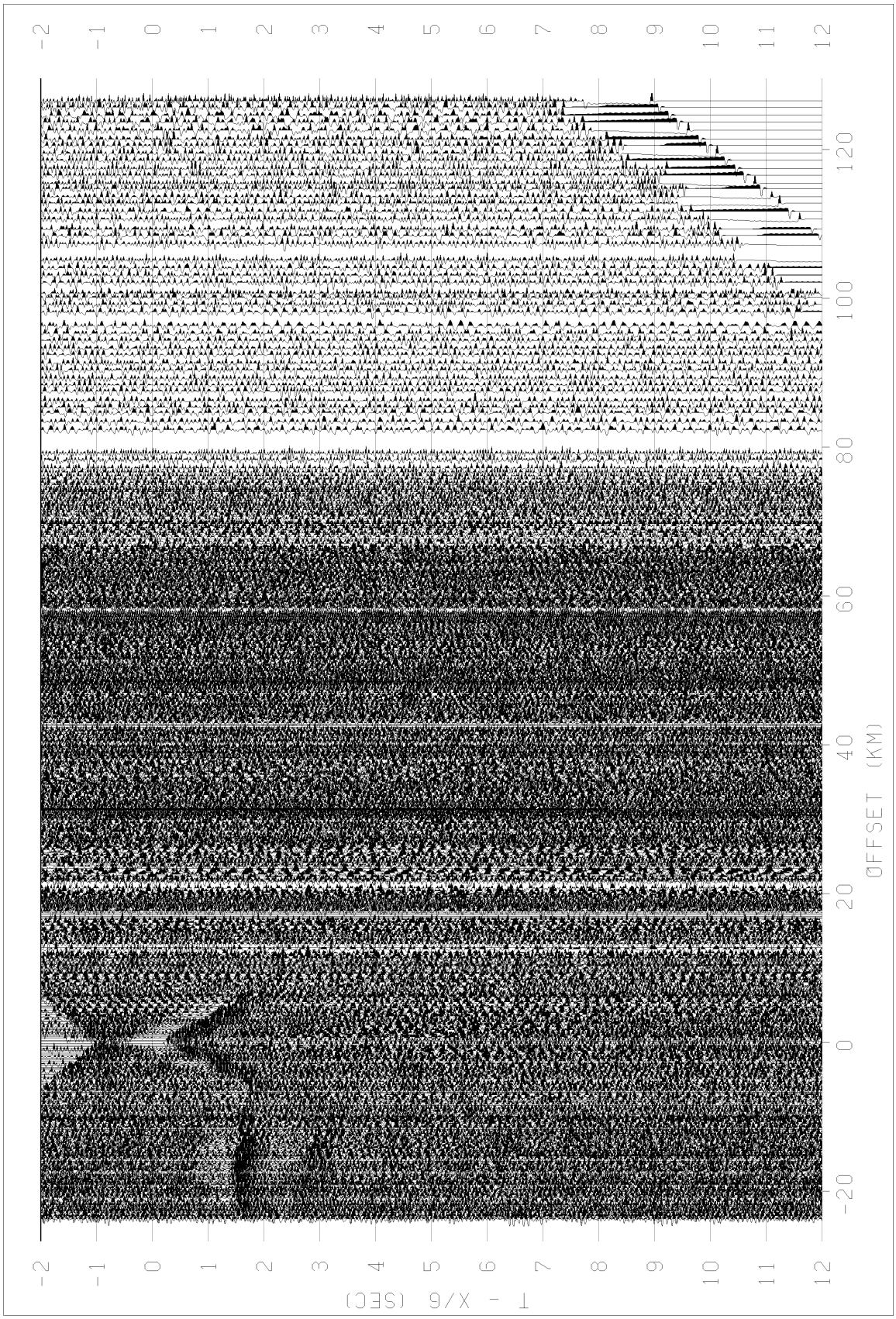

FIGURE . SHOTPOINT 8250, GEOGRAPHIC SEQUENCE NO. 23

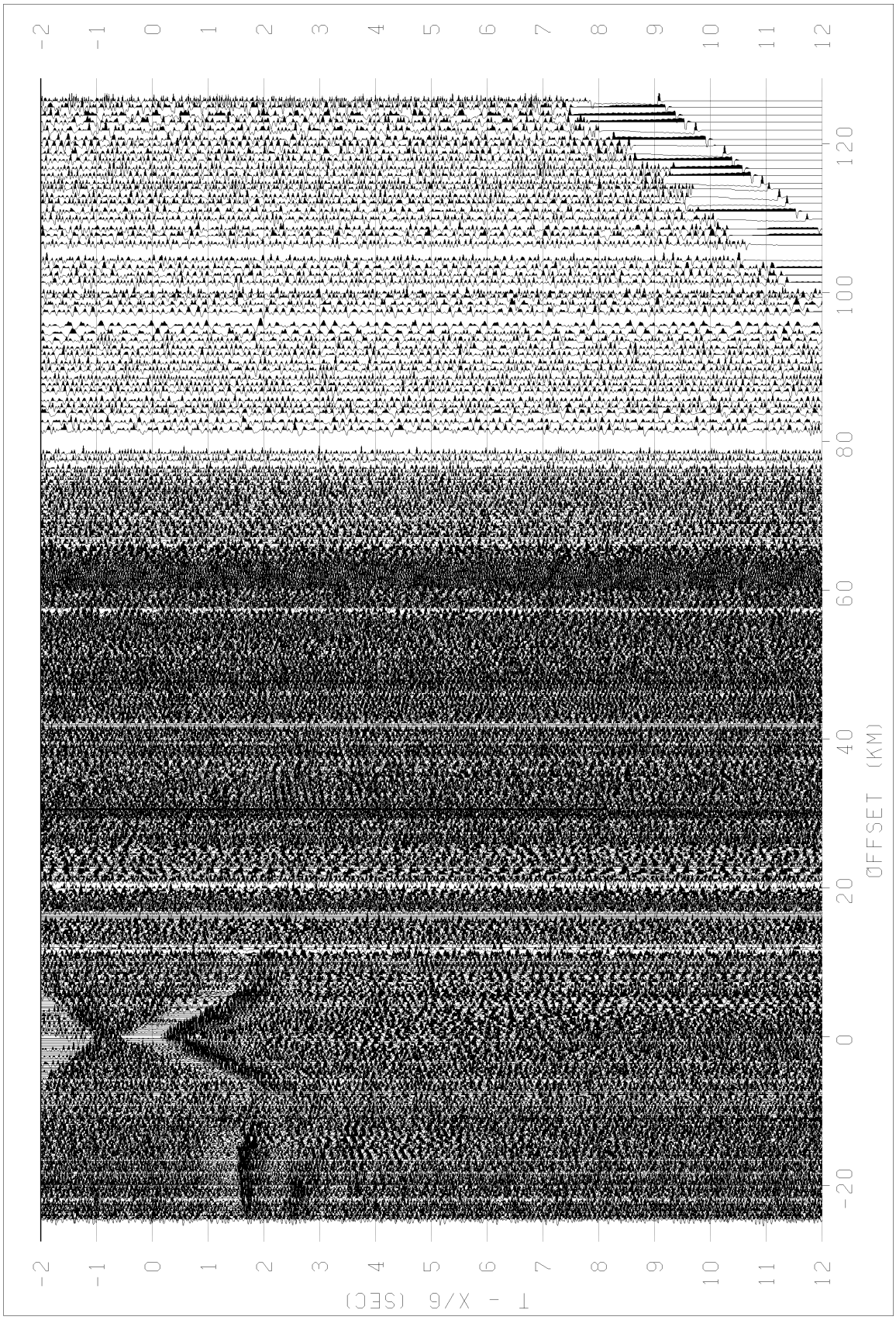

FIGURE . SHOTPOINT 8260, GEOGRAPHIC SEQUENCE NO. 24

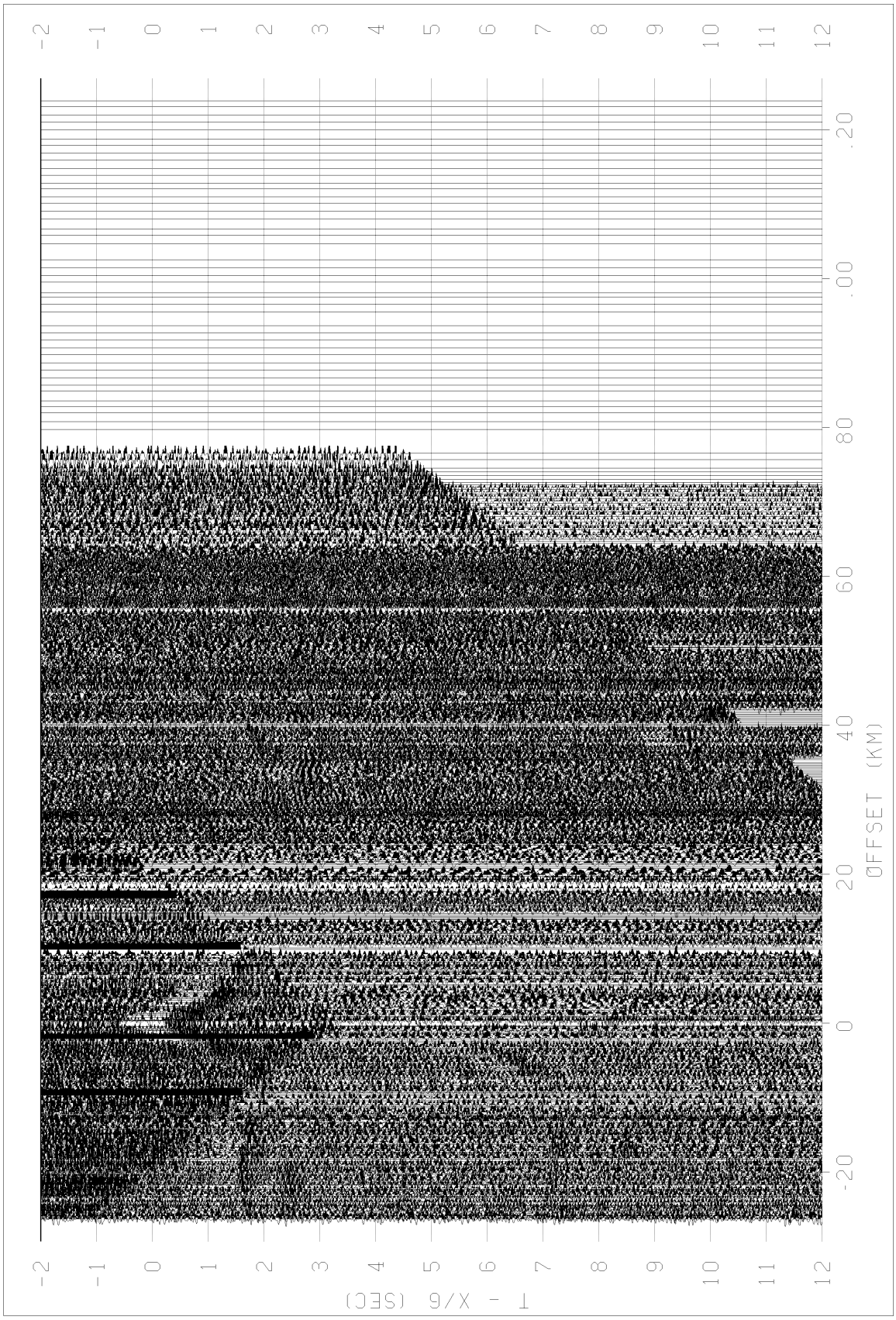

FIGURE . SHOTPOINT 8270, GEOGRAPHIC SEQUENCE NO. 25

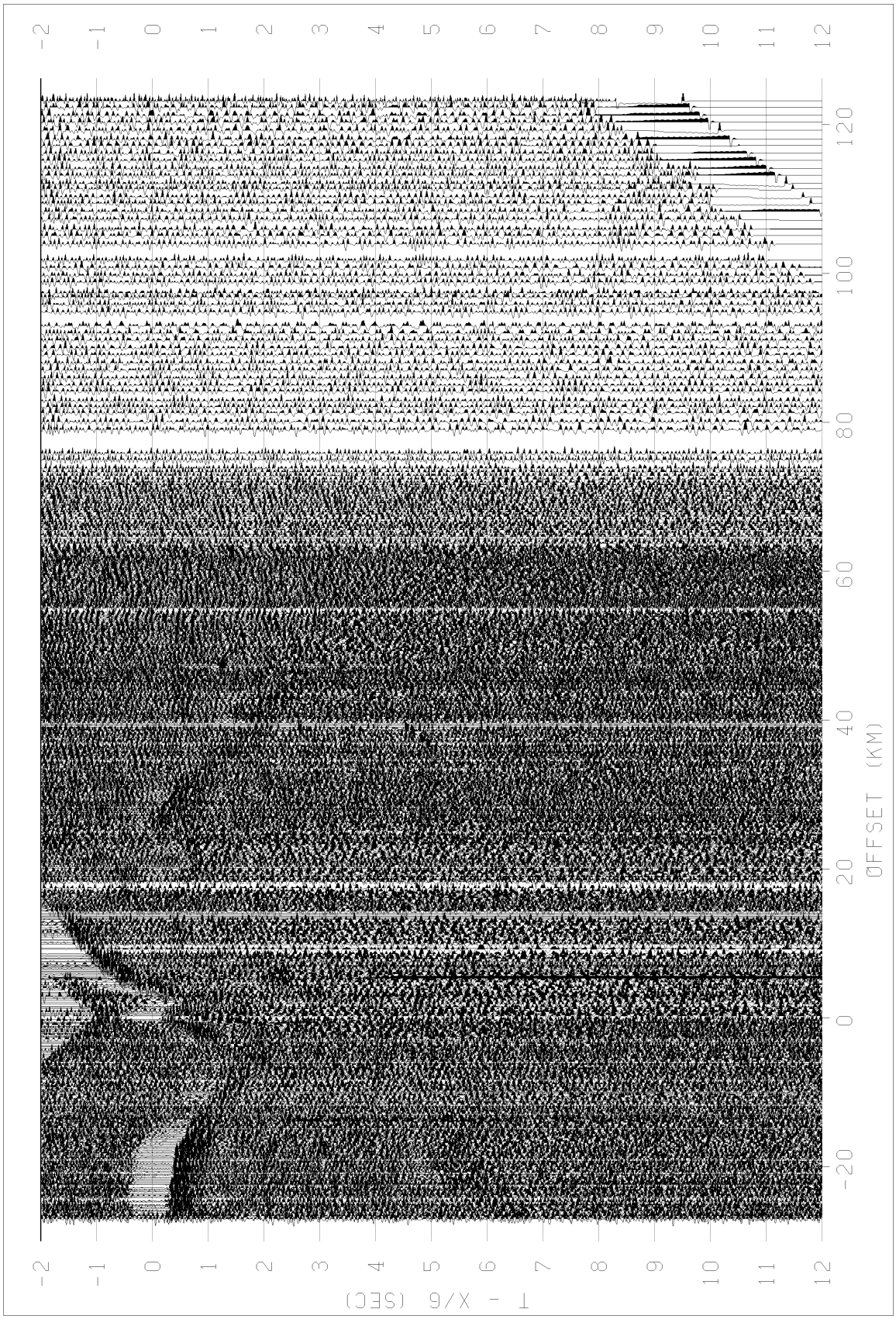

FIGURE . SHOTPOINT 8280, GEOGRAPHIC SEQUENCE NO. 26

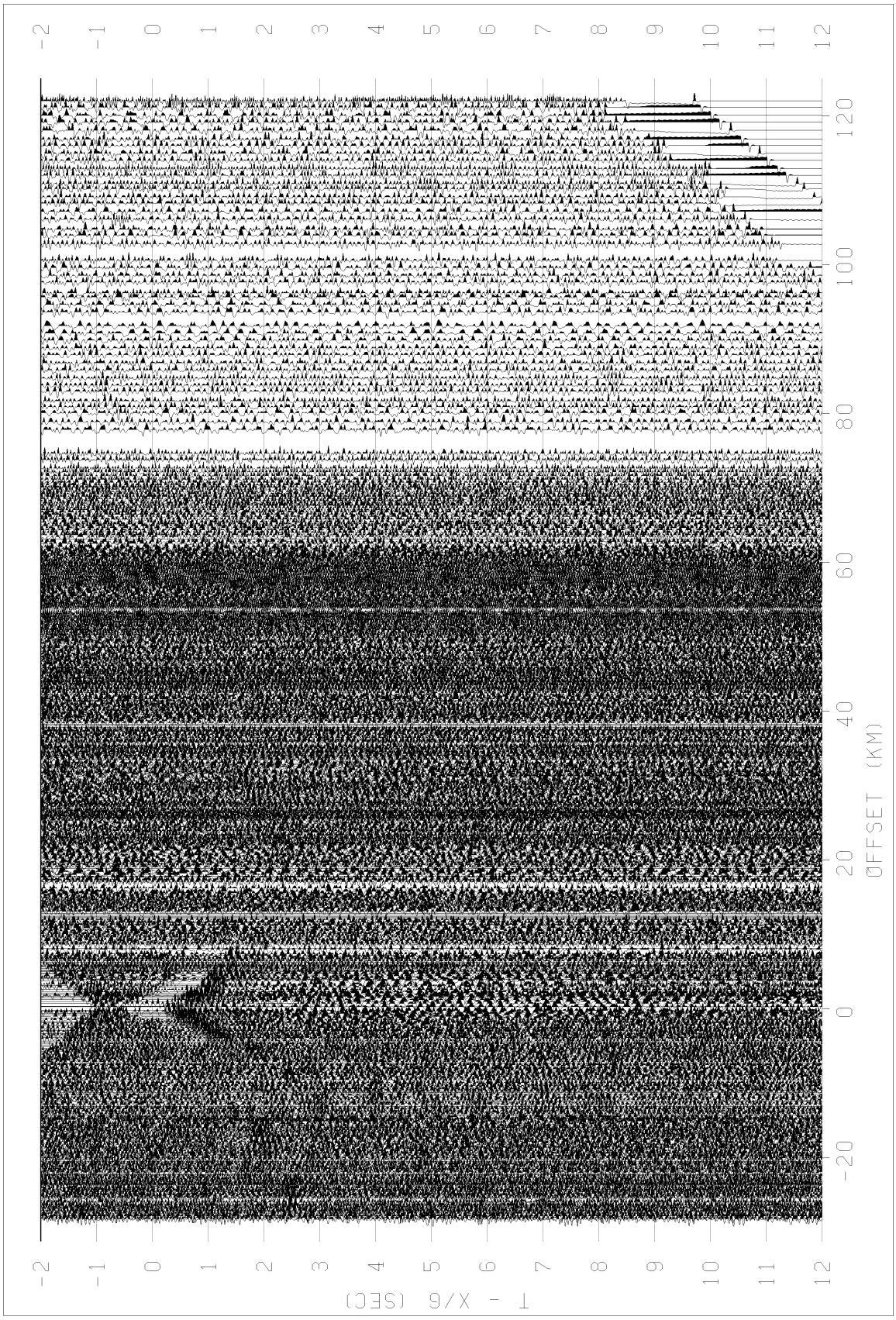

FIGURE . SHOTPOINT 8290, GEOGRAPHIC SEQUENCE NO. 27

FIGURE . SHOTPOINT 8310, GEOGRAPHIC SEQUENCE NO. 28

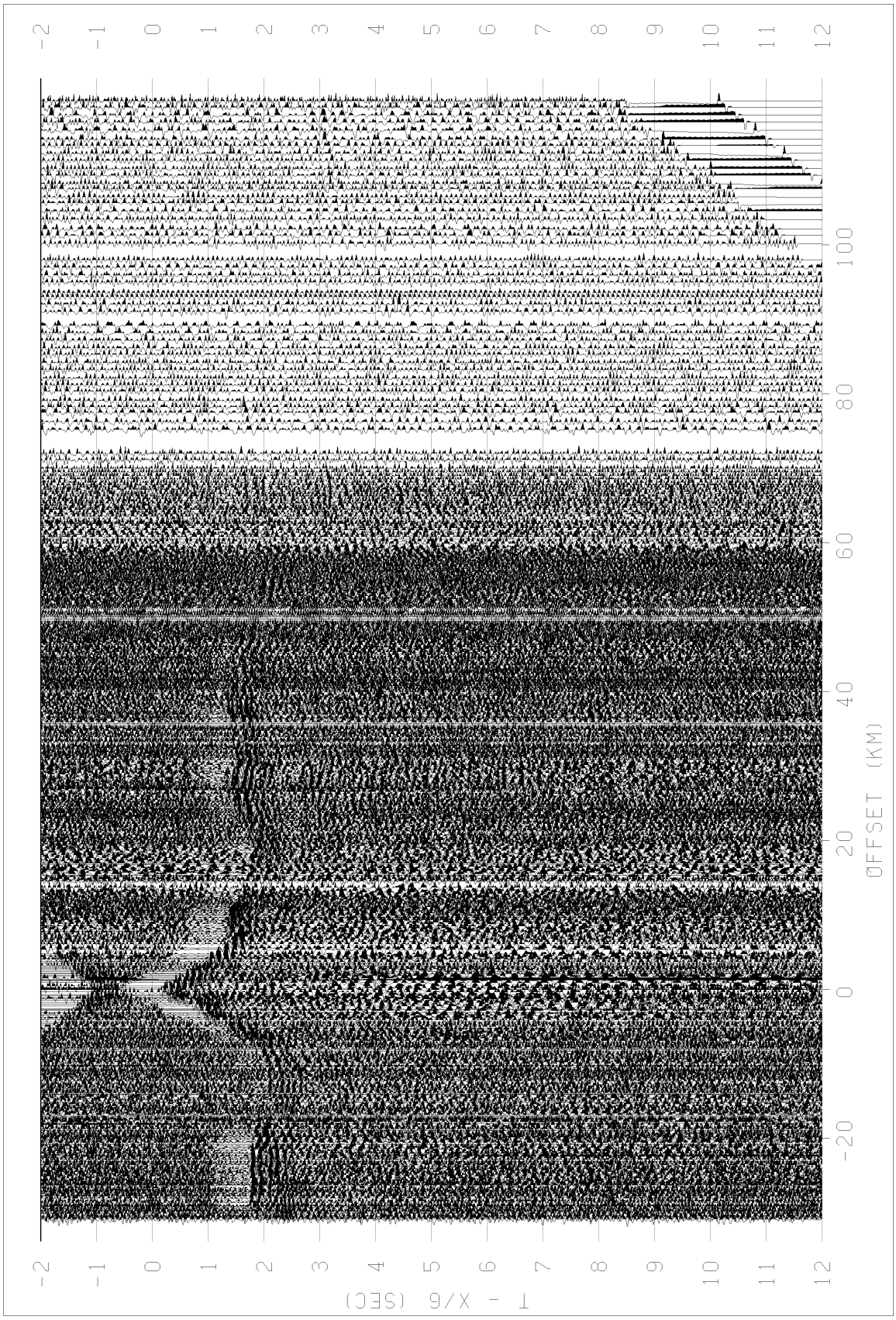

FIGURE . SHOTPOINT 8320, GEOGRAPHIC SEQUENCE NO. 29

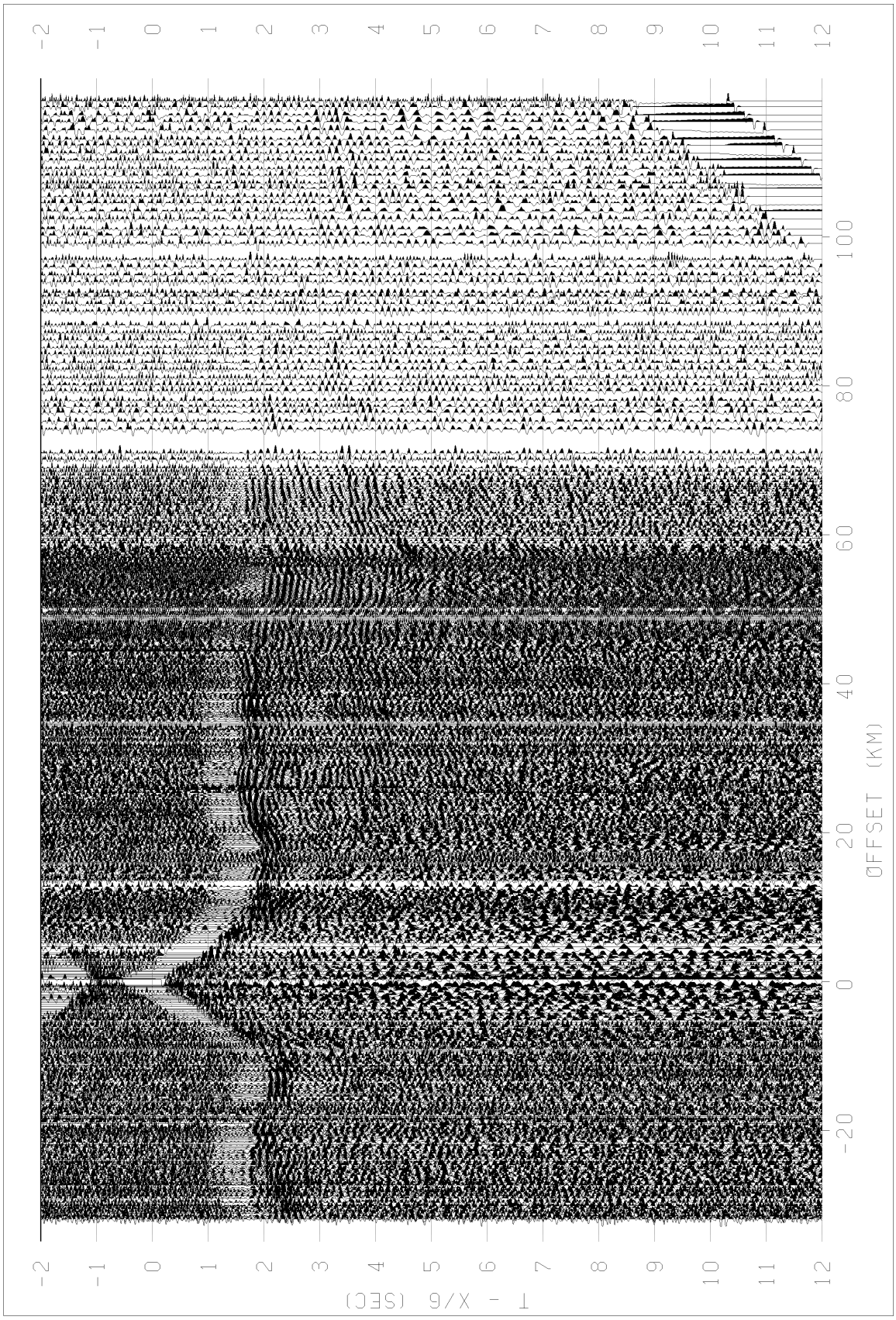

FIGURE . SHOTPOINT 8331, GEOGRAPHIC SEQUENCE NO. 30

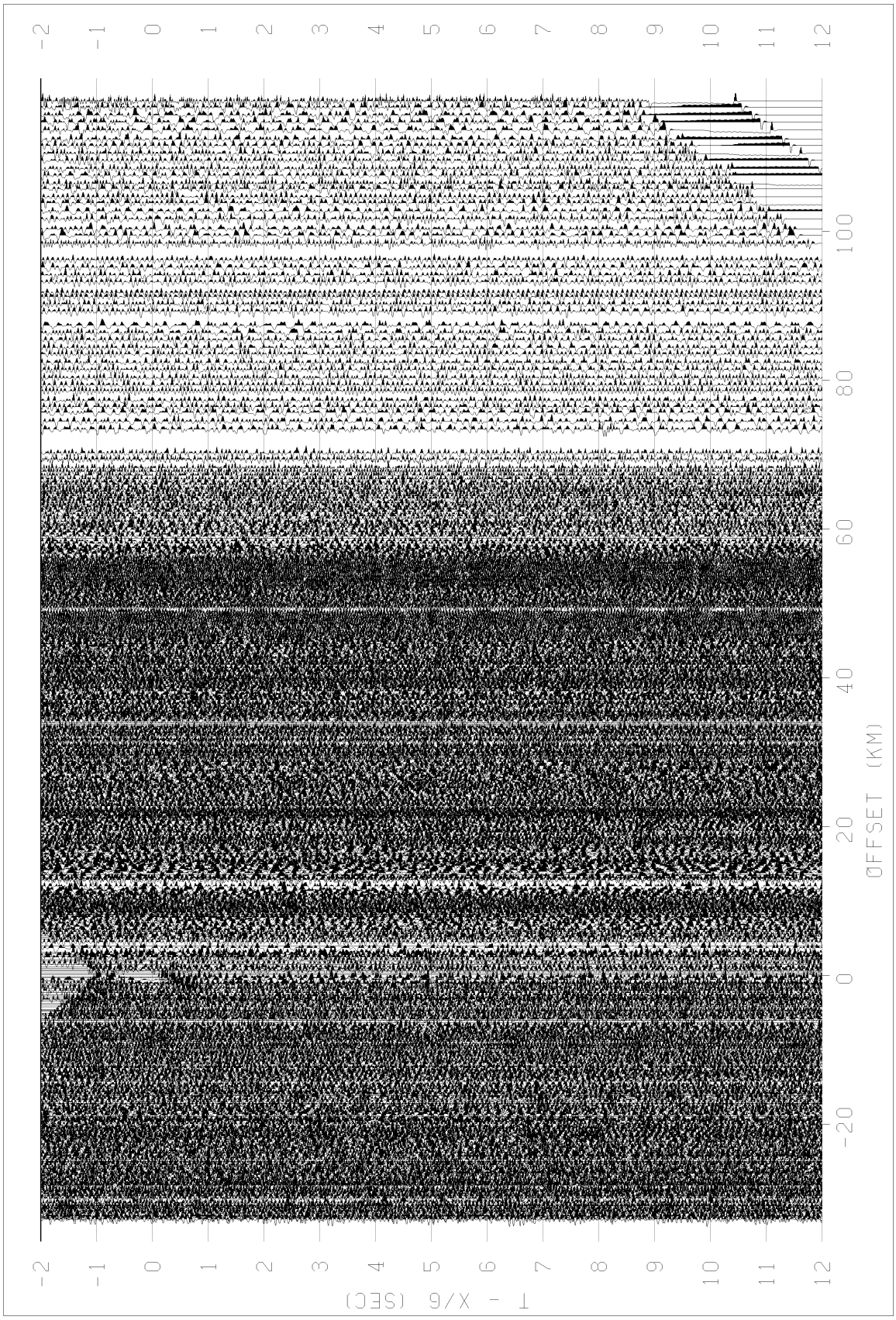

FIGURE . SHOTPOINT 8333, GEOGRAPHIC SEQUENCE NO. 31

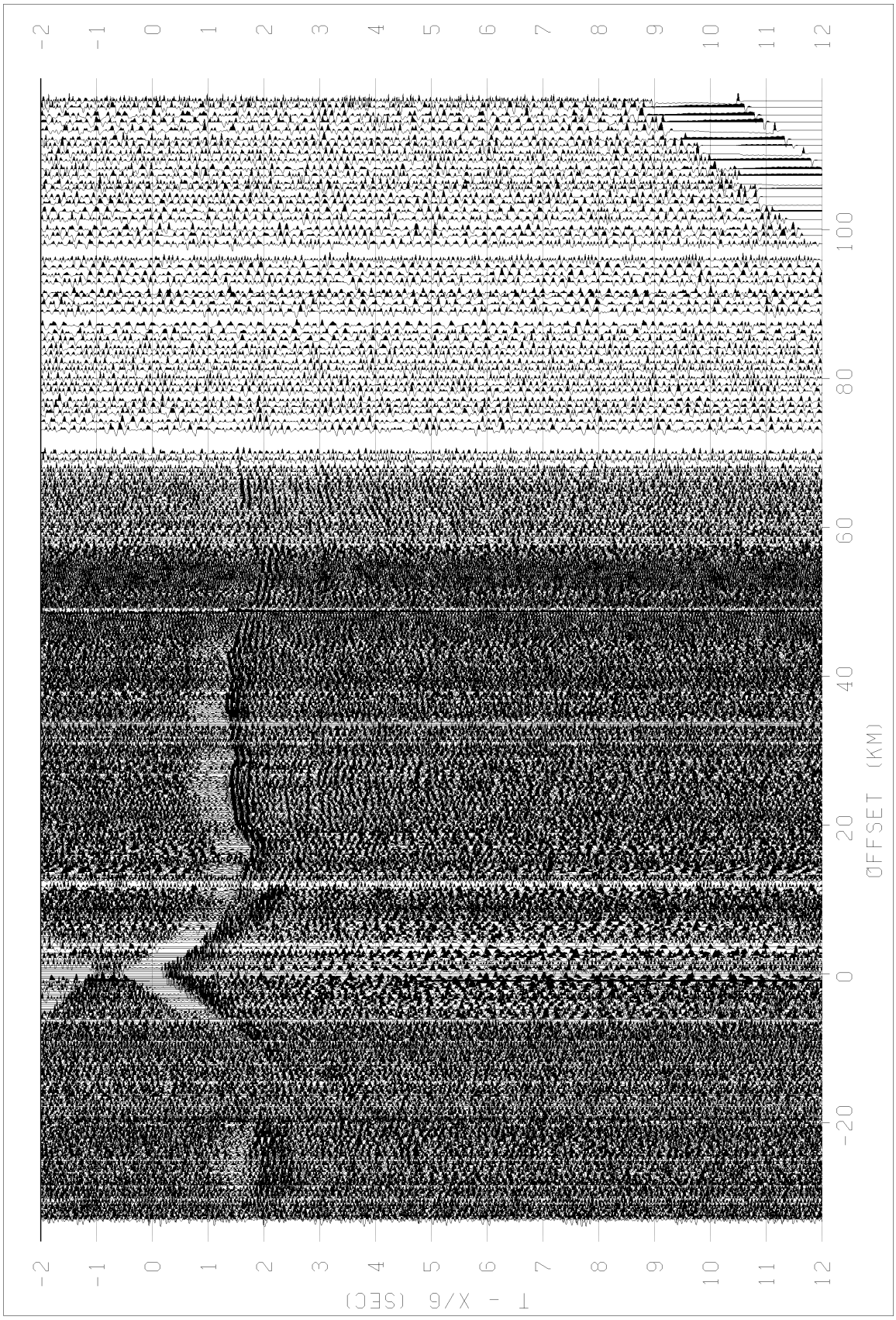

FIGURE . SHOTPOINT 8340, GEOGRAPHIC SEQUENCE NO. 32

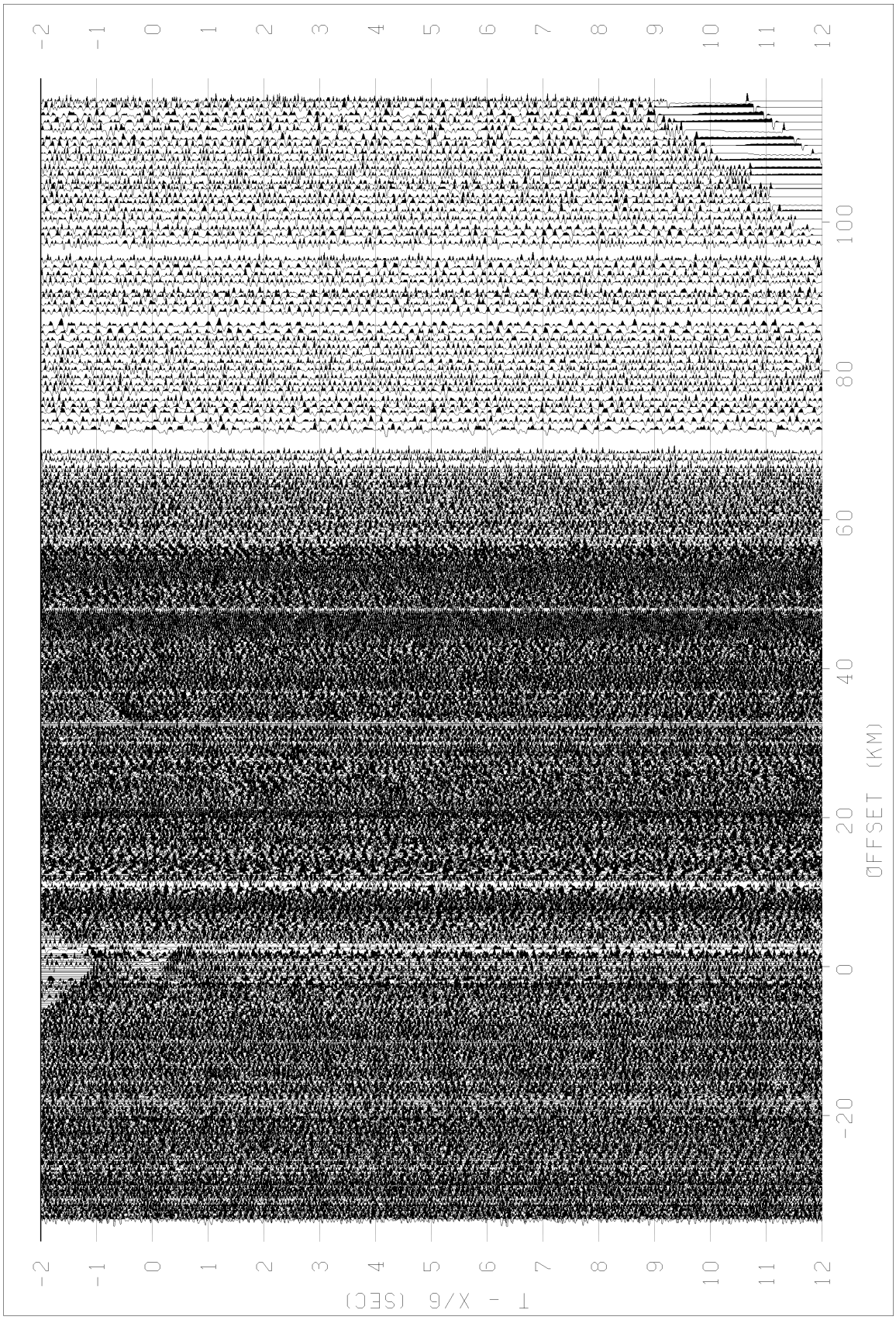

FIGURE . SHOTPOINT 8350, GEOGRAPHIC SEQUENCE NO. 33

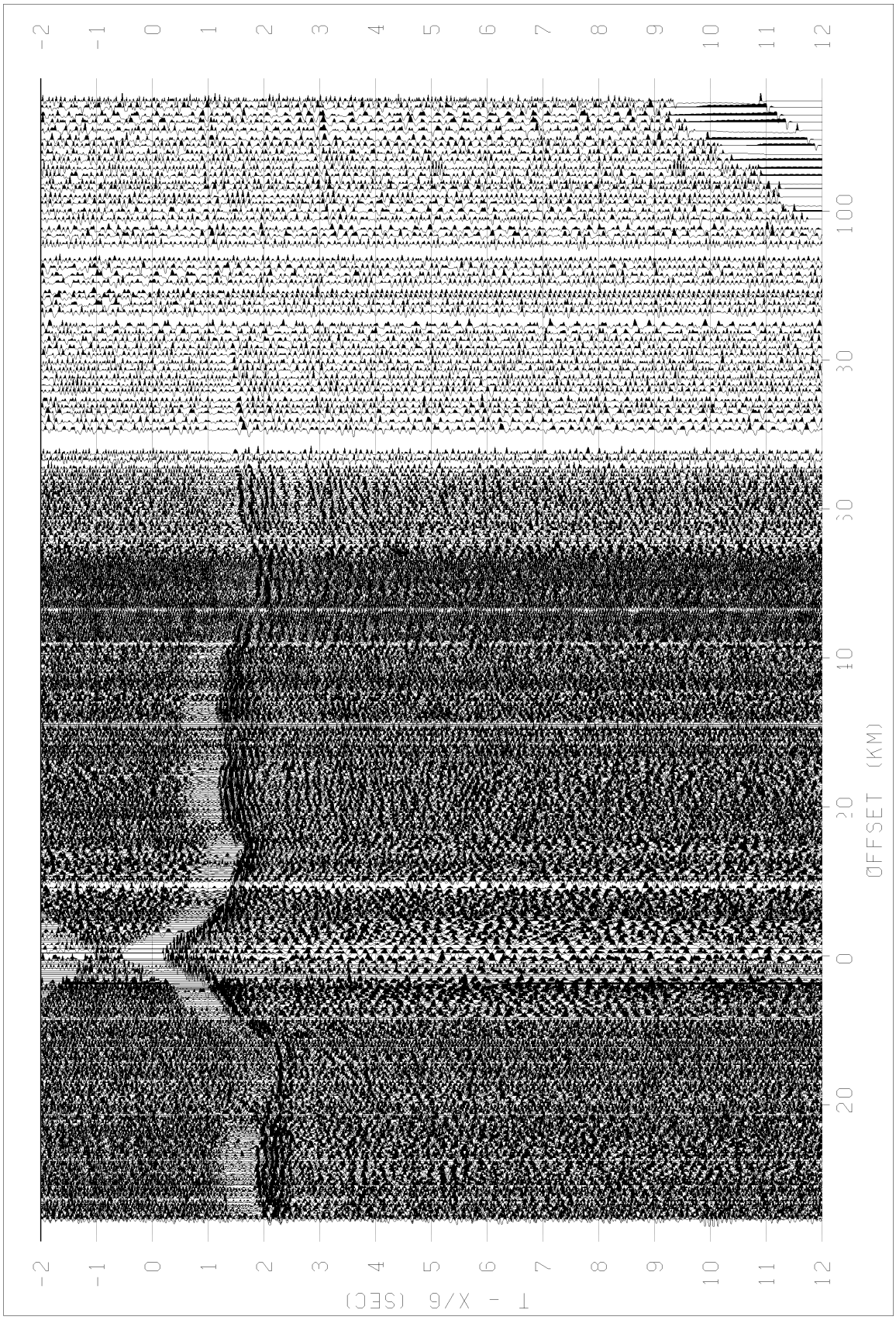

FIGURE . SHOTPOINT 8360, GEOGRAPHIC SEQUENCE NO. 34

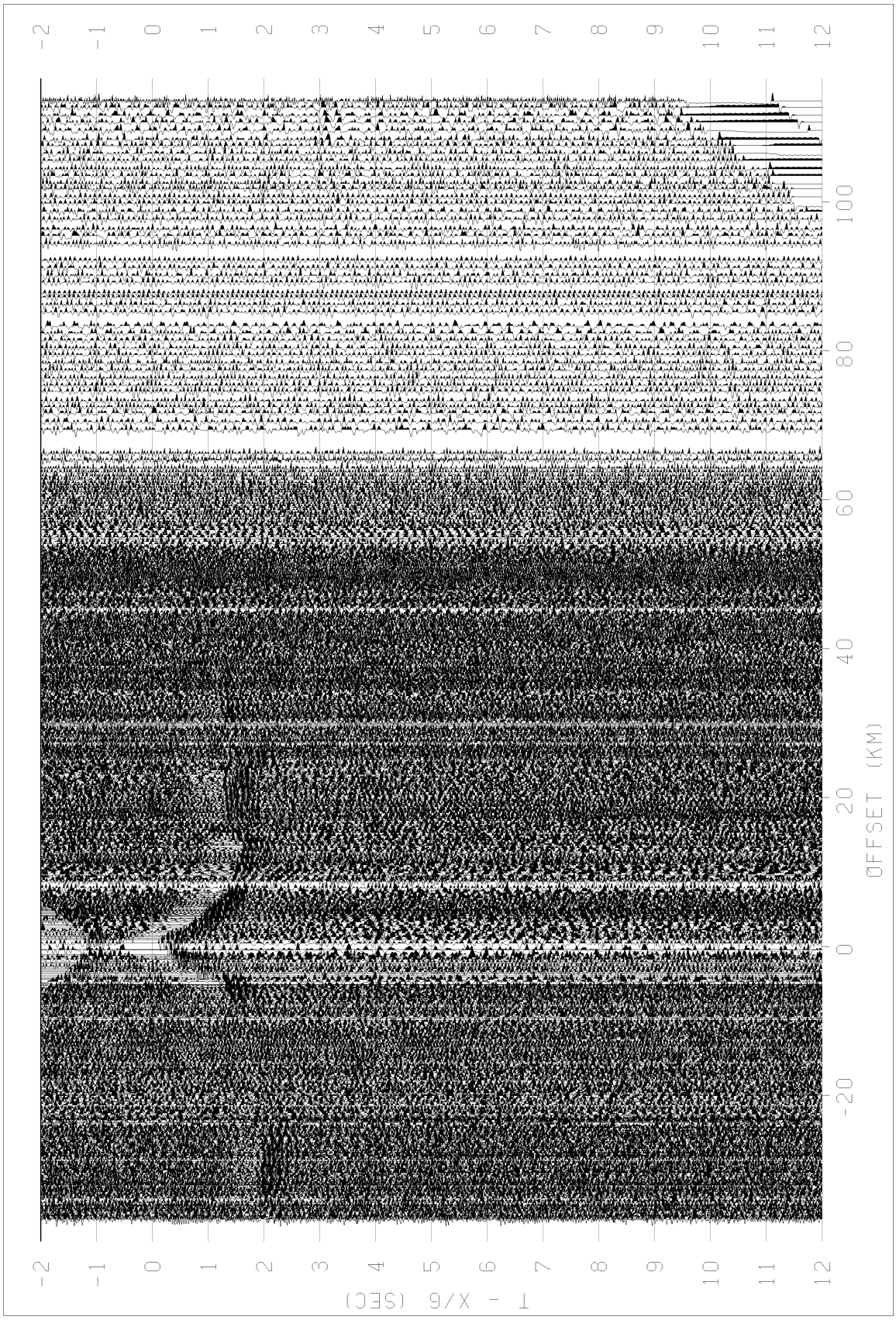

FIGURE . SHOTPOINT 8380, GEOGRAPHIC SEQUENCE NO. 35

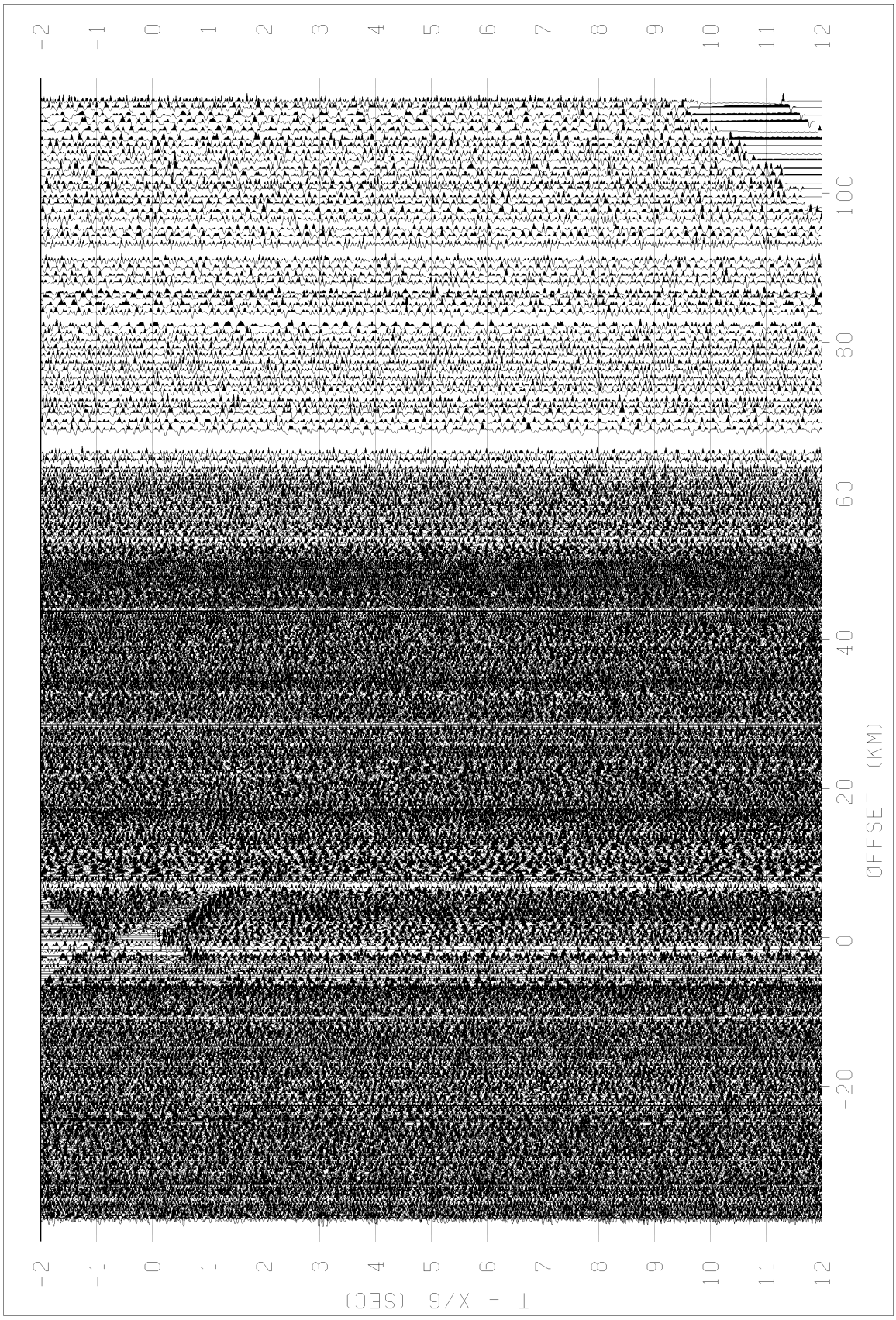

FIGURE . SHOTPOINT 8390, GEOGRAPHIC SEQUENCE NO. 36

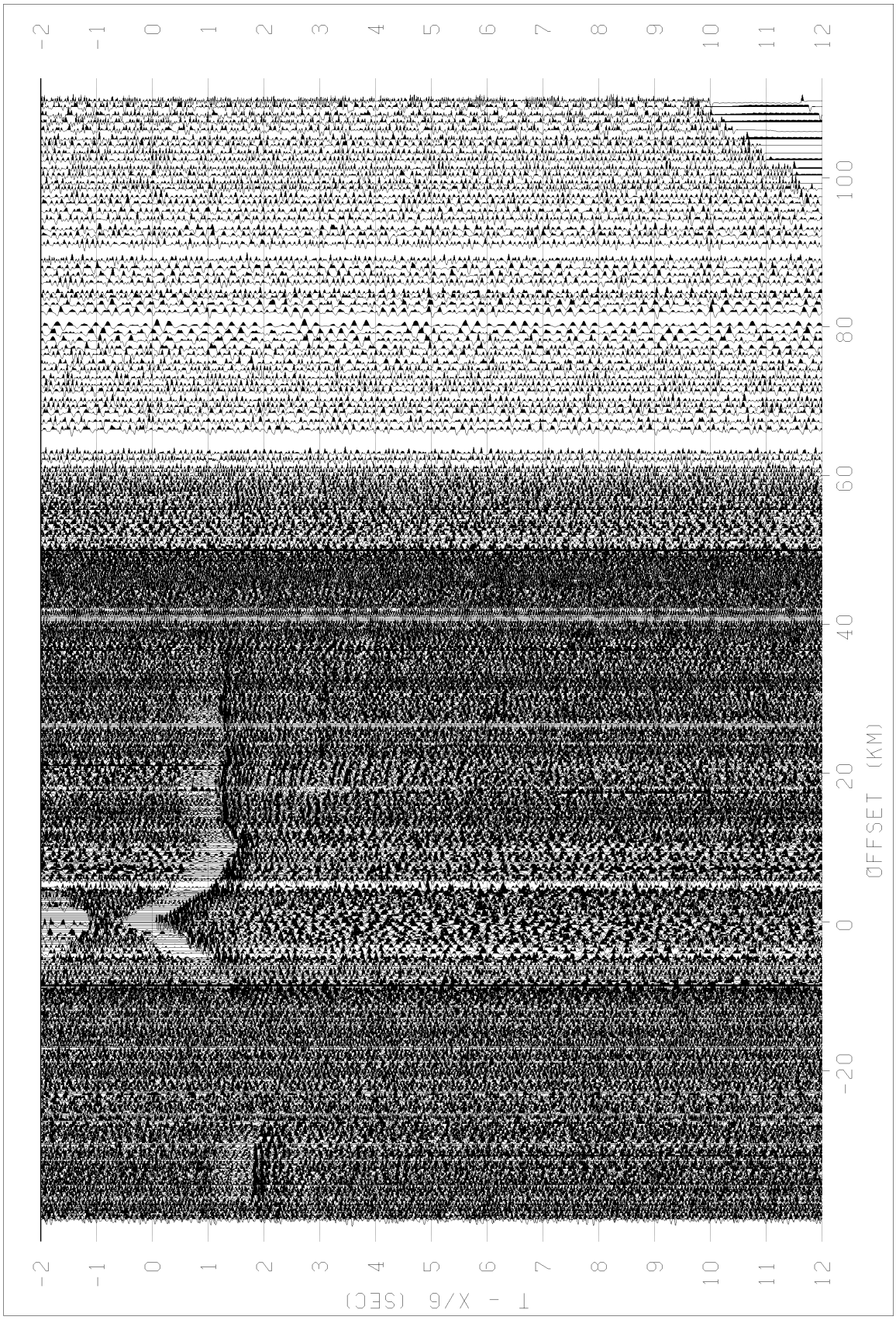

FIGURE . SHOTPOINT 8411, GEOGRAPHIC SEQUENCE NO. 37

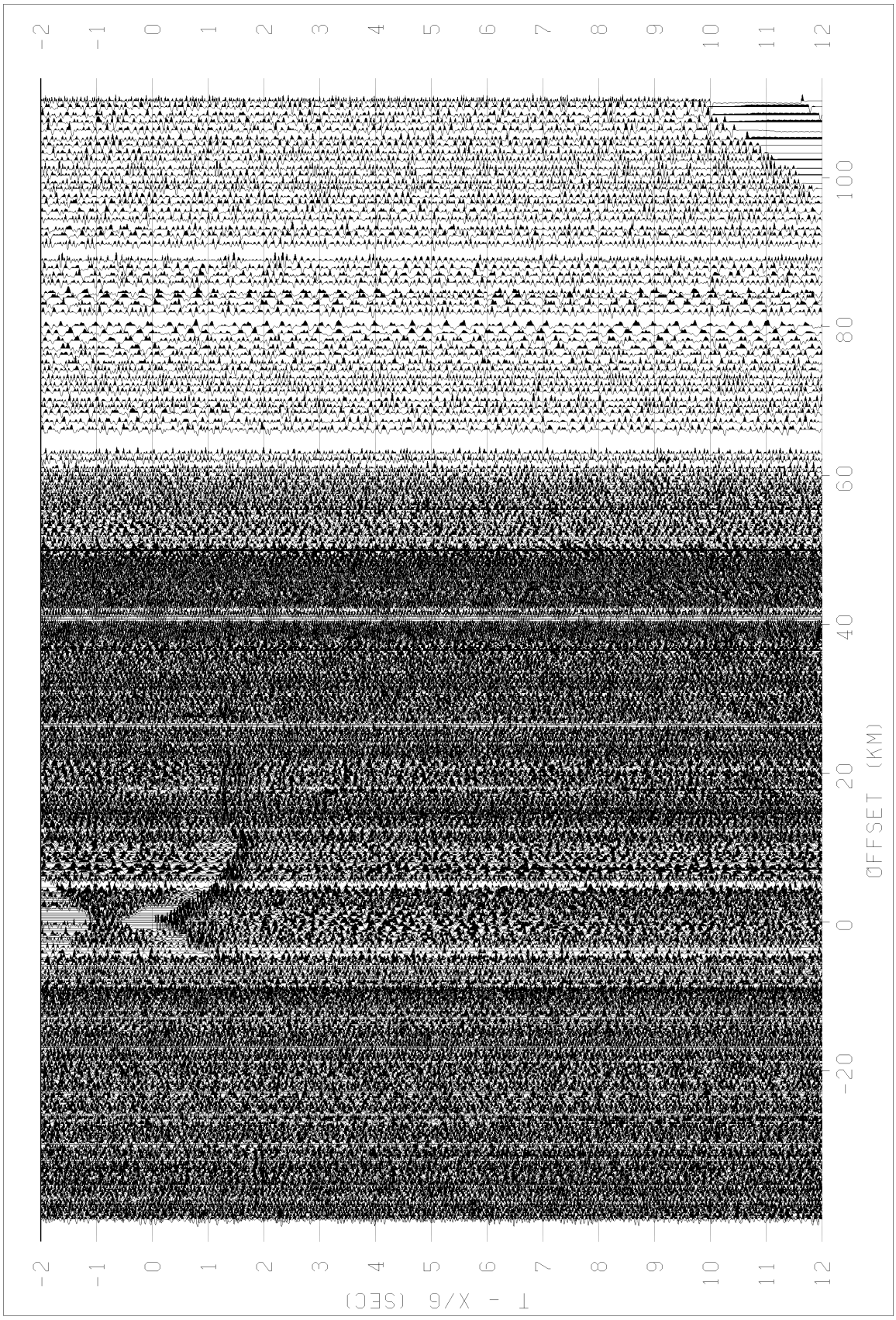

FIGURE . SHOTPOINT 8412, GEOGRAPHIC SEQUENCE NO. 38

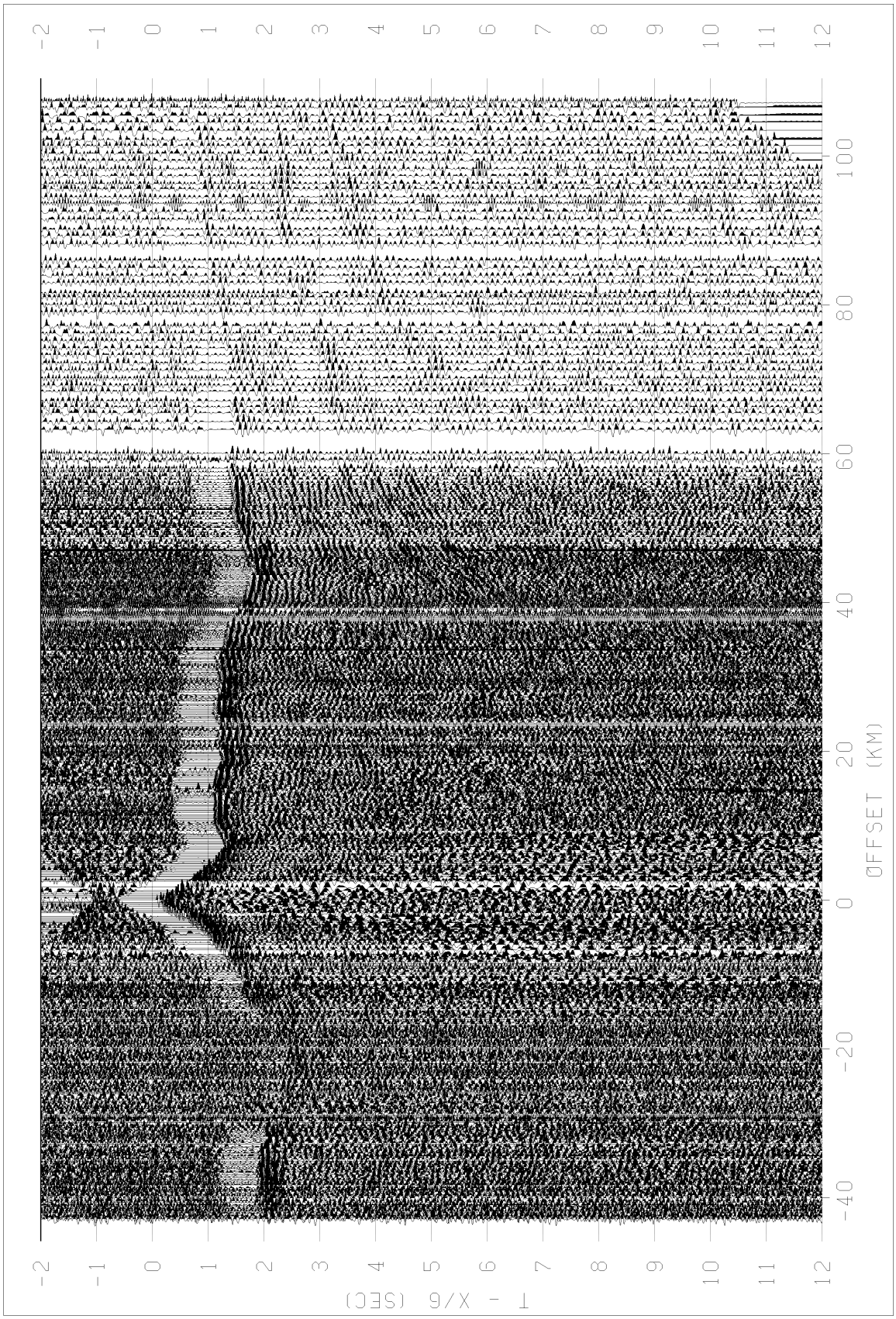

FIGURE . SHOTPOINT 8440, GEOGRAPHIC SEQUENCE NO. 39

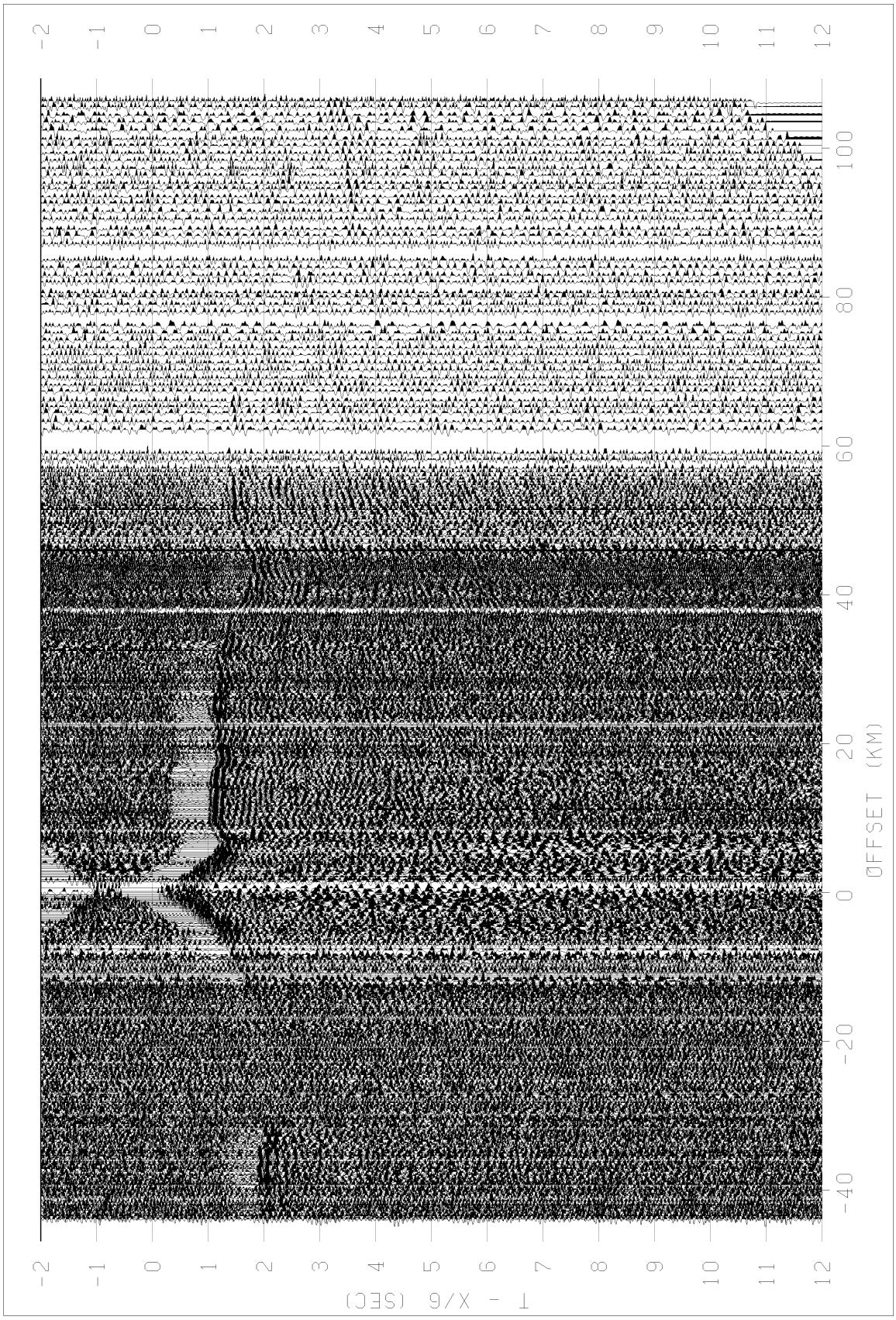

FIGURE . SHOTPOINT 8450, GEOGRAPHIC SEQUENCE NO. 40

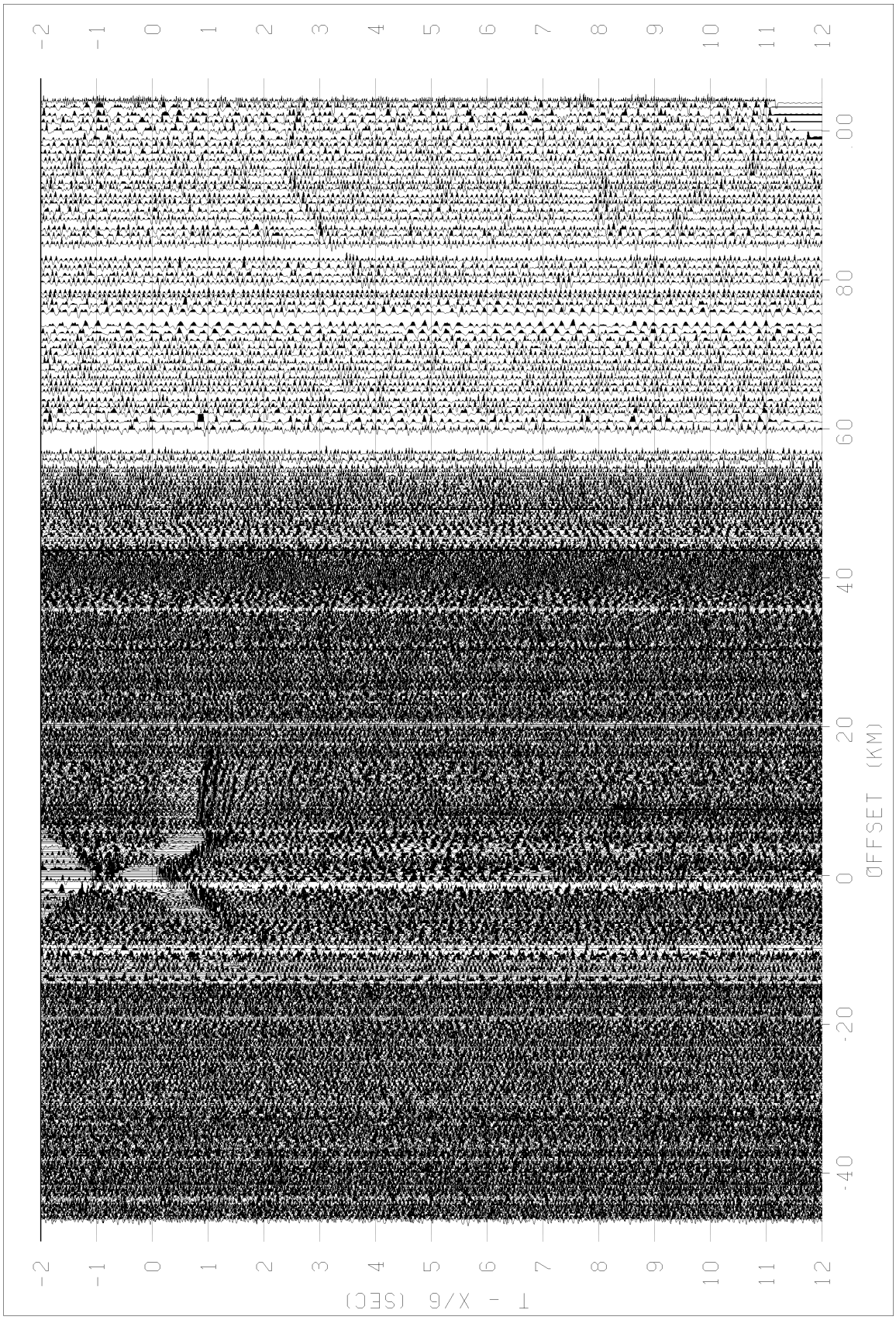

FIGURE . SHOTPOINT 8470, GEOGRAPHIC SEQUENCE NO. 41

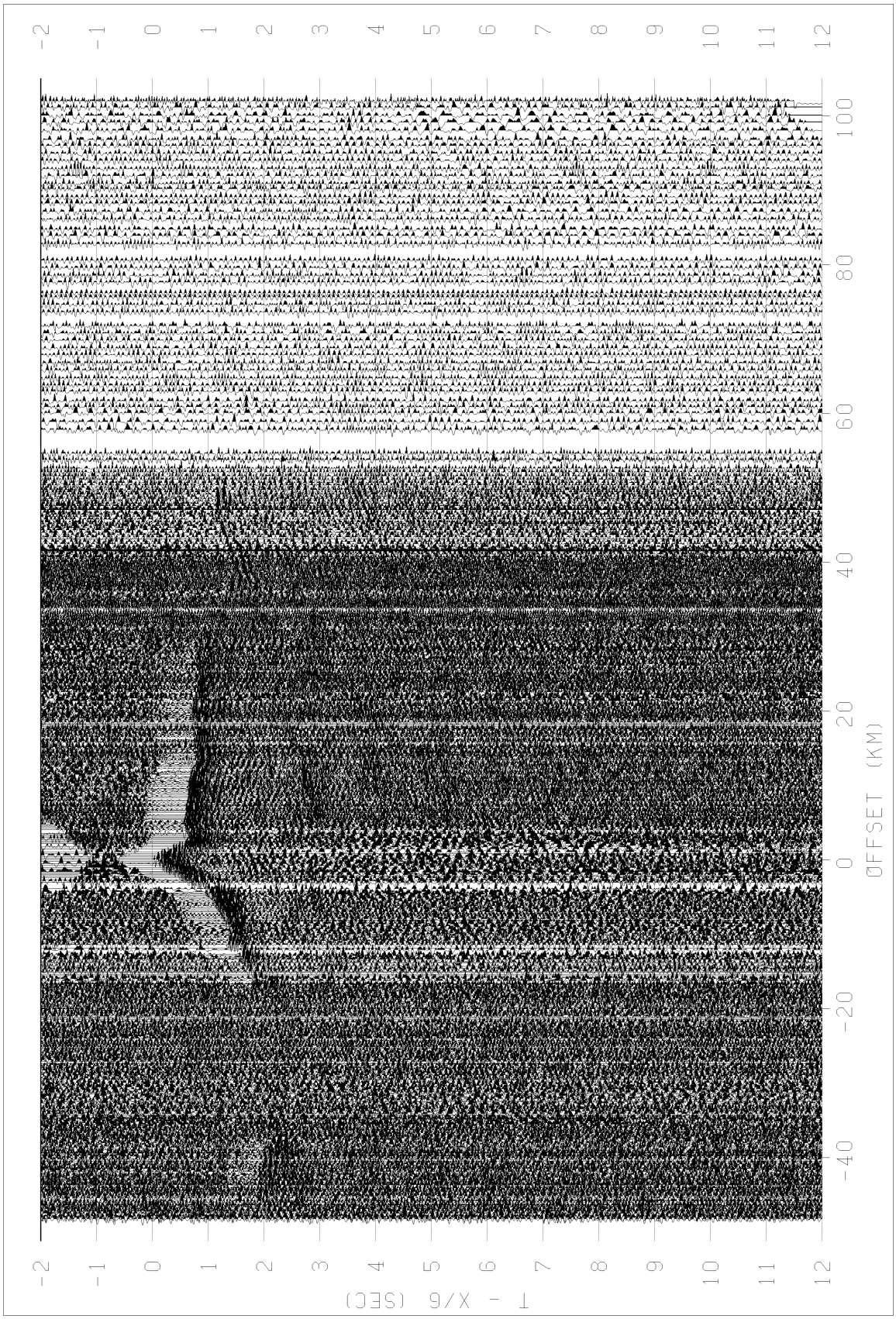

FIGURE . SHOTPOINT 8490, GEOGRAPHIC SEQUENCE NO. 42

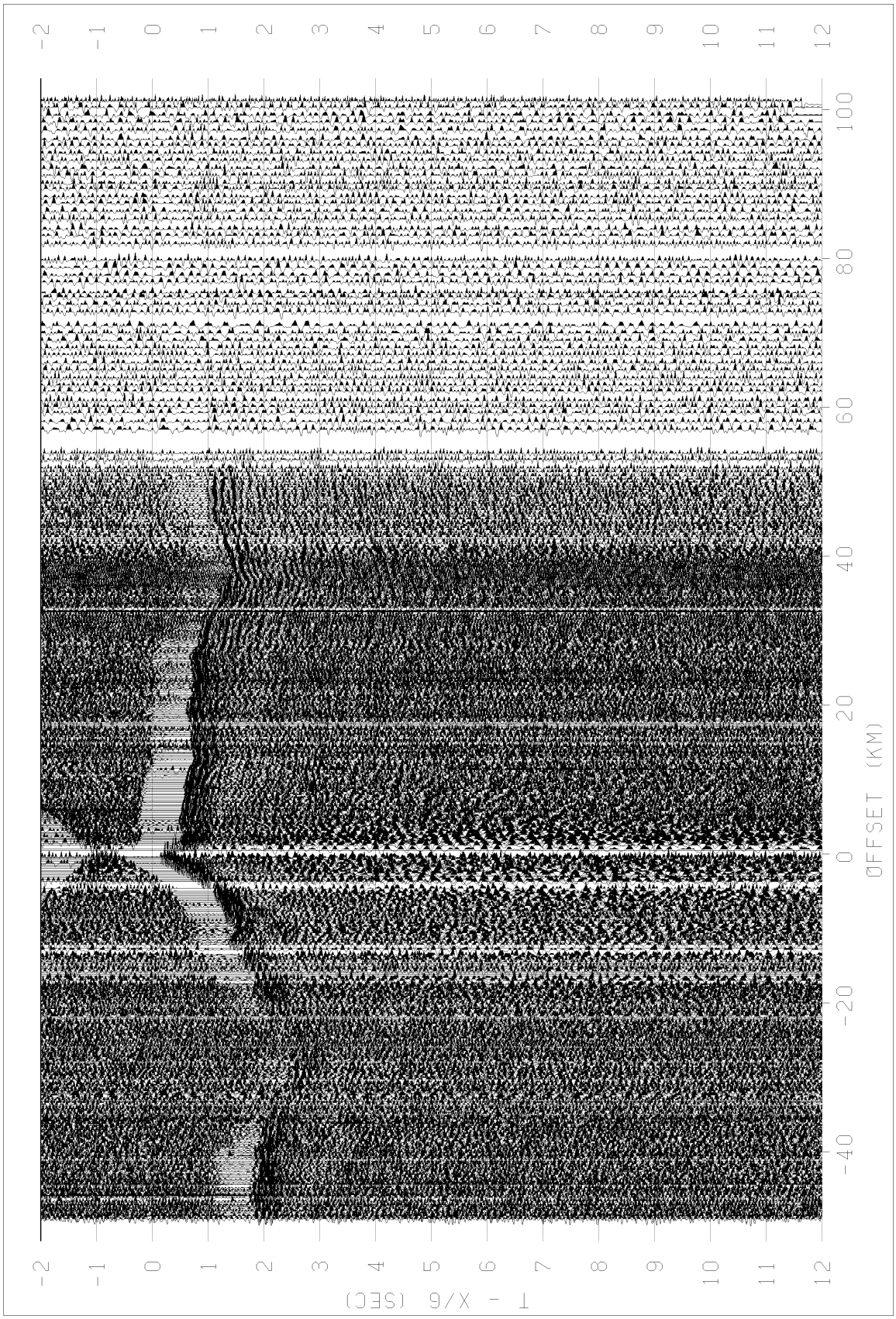

FIGURE . SHOTPOINT 8501, GEOGRAPHIC SEQUENCE NO. 43

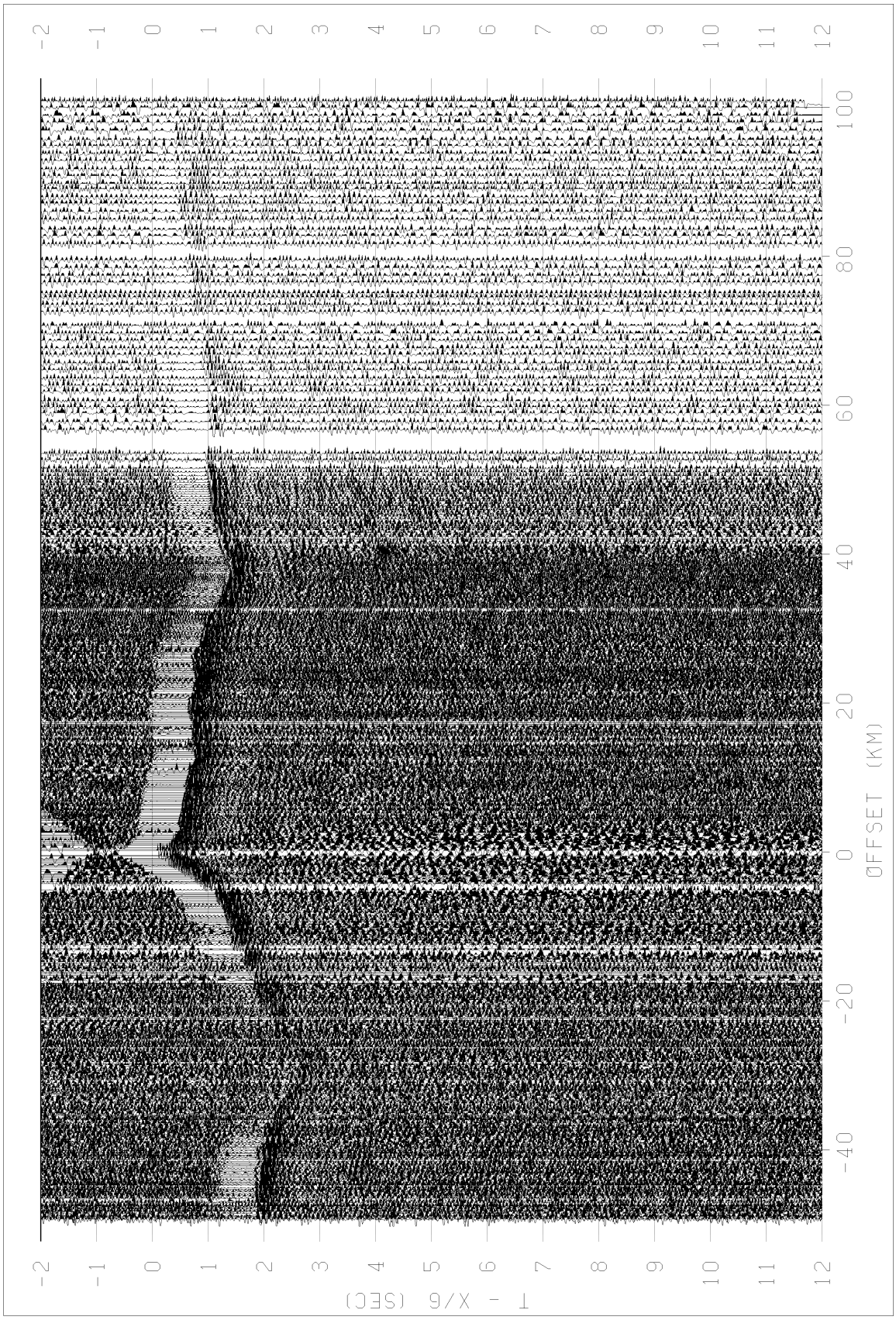

FIGURE . SHOTPOINT 8502, GEOGRAPHIC SEQUENCE NO. 44

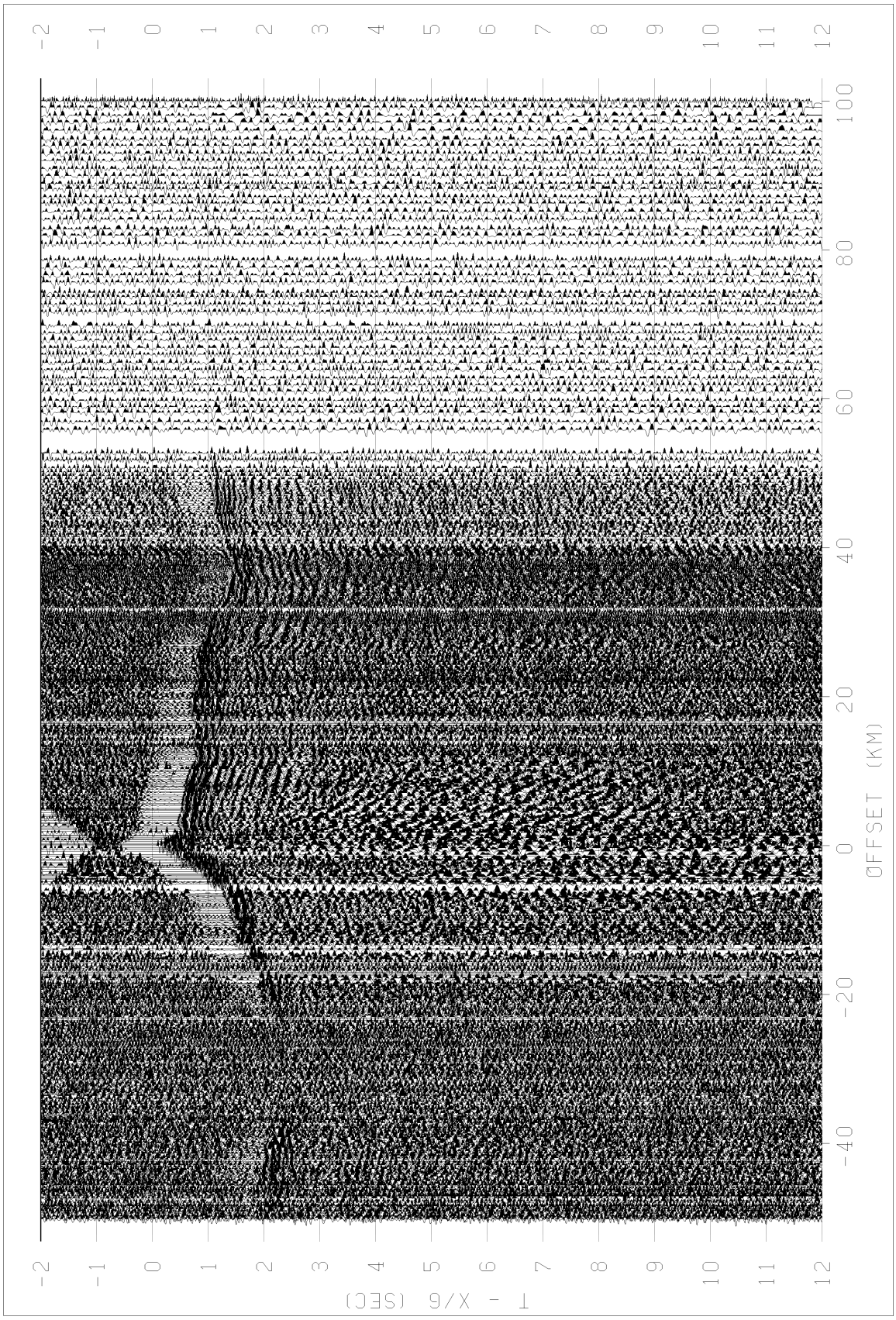

FIGURE . SHOTPOINT 8510, GEOGRAPHIC SEQUENCE NO. 45

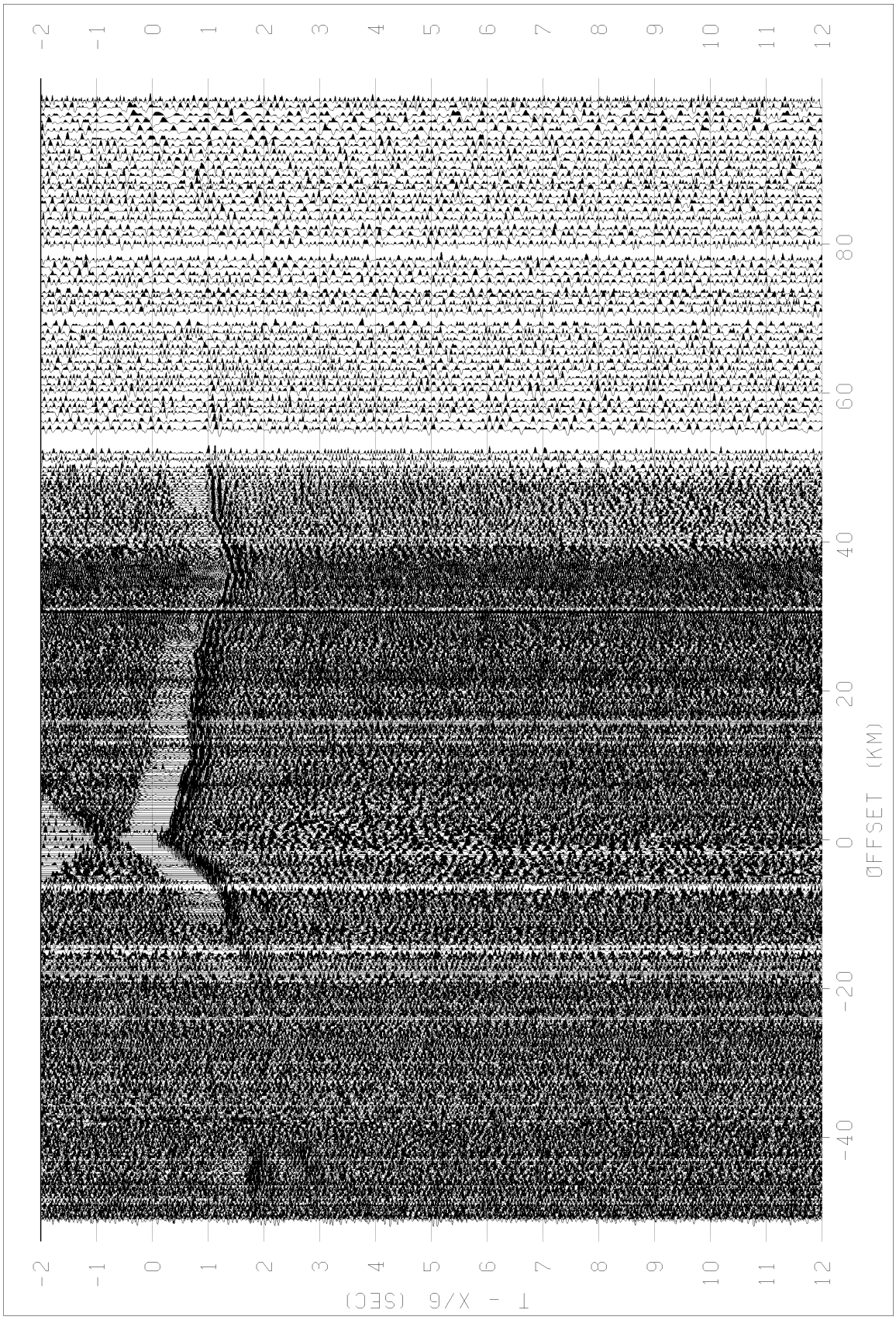

FIGURE . SHOTPOINT 8520, GEOGRAPHIC SEQUENCE NO. 46

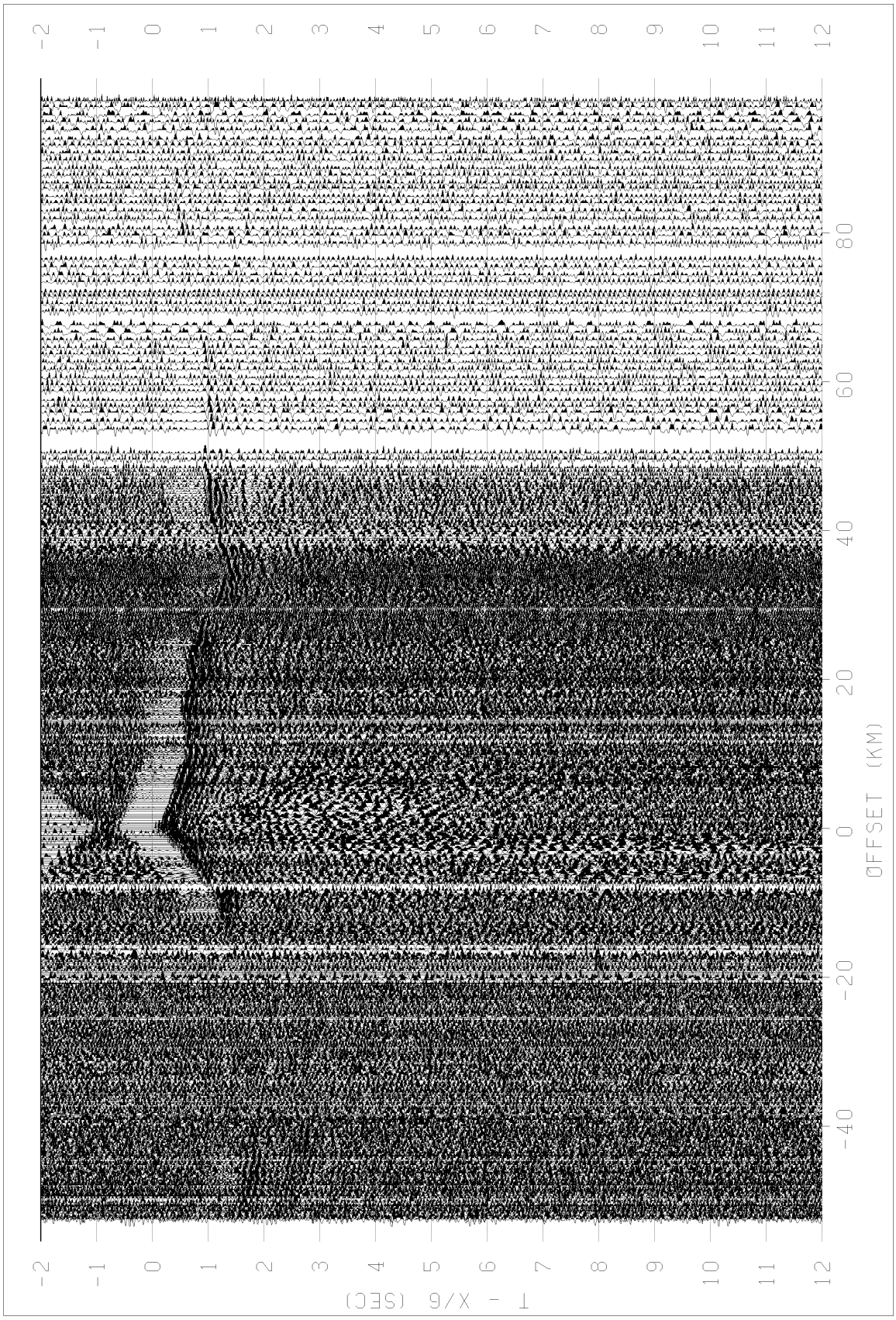

FIGURE . SHOTPOINT 8530, GEOGRAPHIC SEQUENCE NO. 47

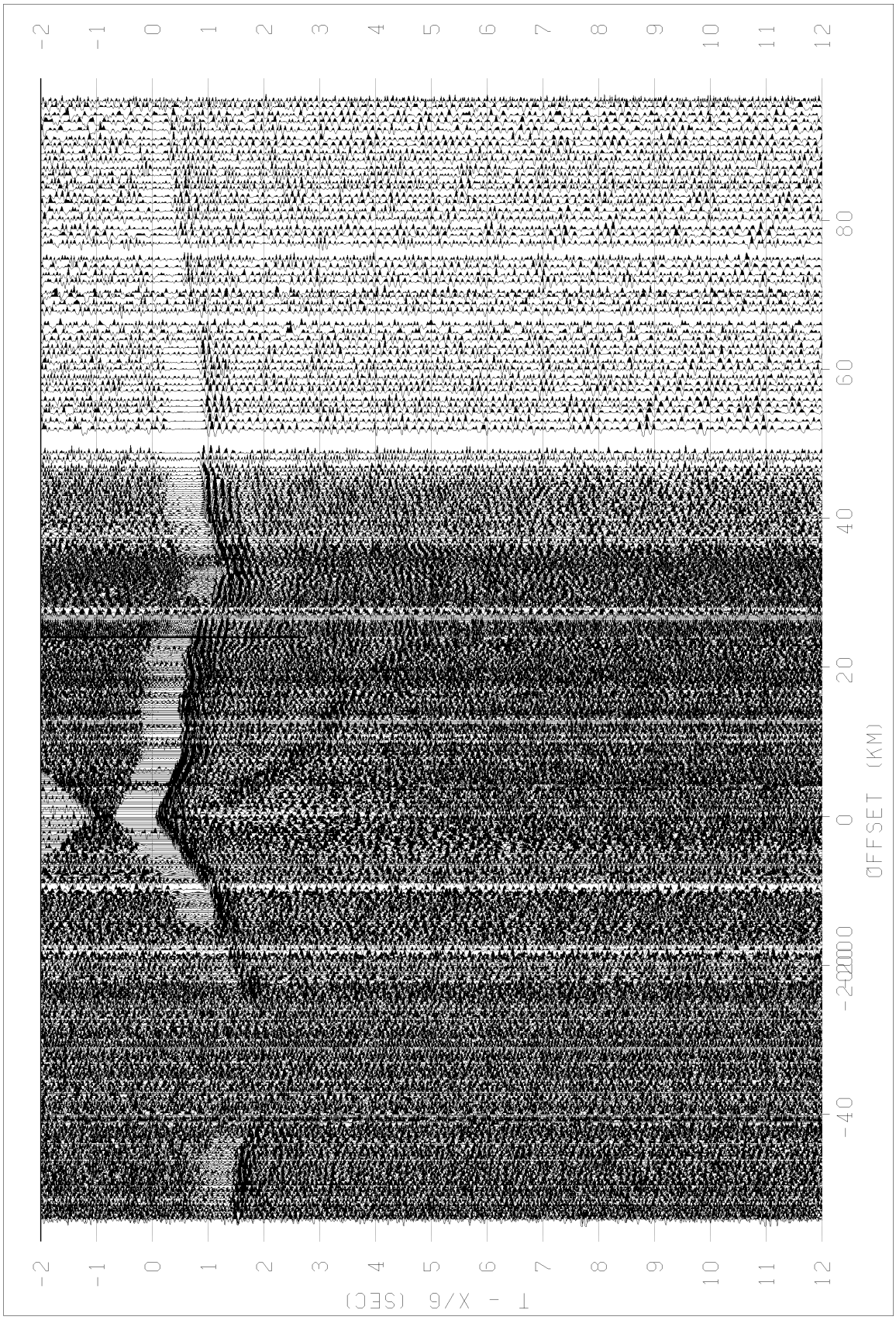

FIGURE . SHOTPOINT 8540, GEOGRAPHIC SEQUENCE NO. 48

FIGURE . SHOTPOINT 8560, GEOGRAPHIC SEQUENCE NO. 49

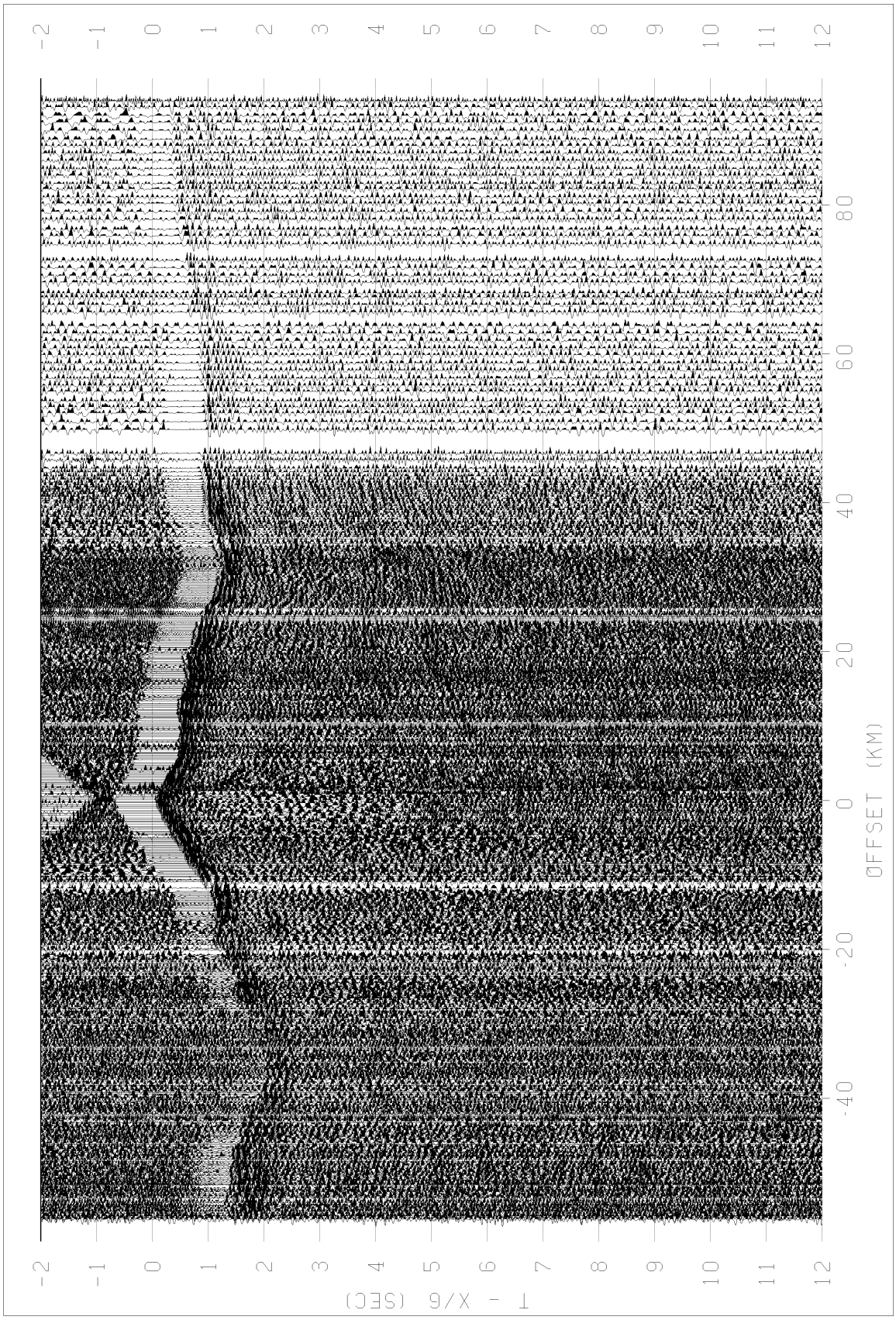

FIGURE . SHOTPOINT 8570, GEOGRAPHIC SEQUENCE NO. 50

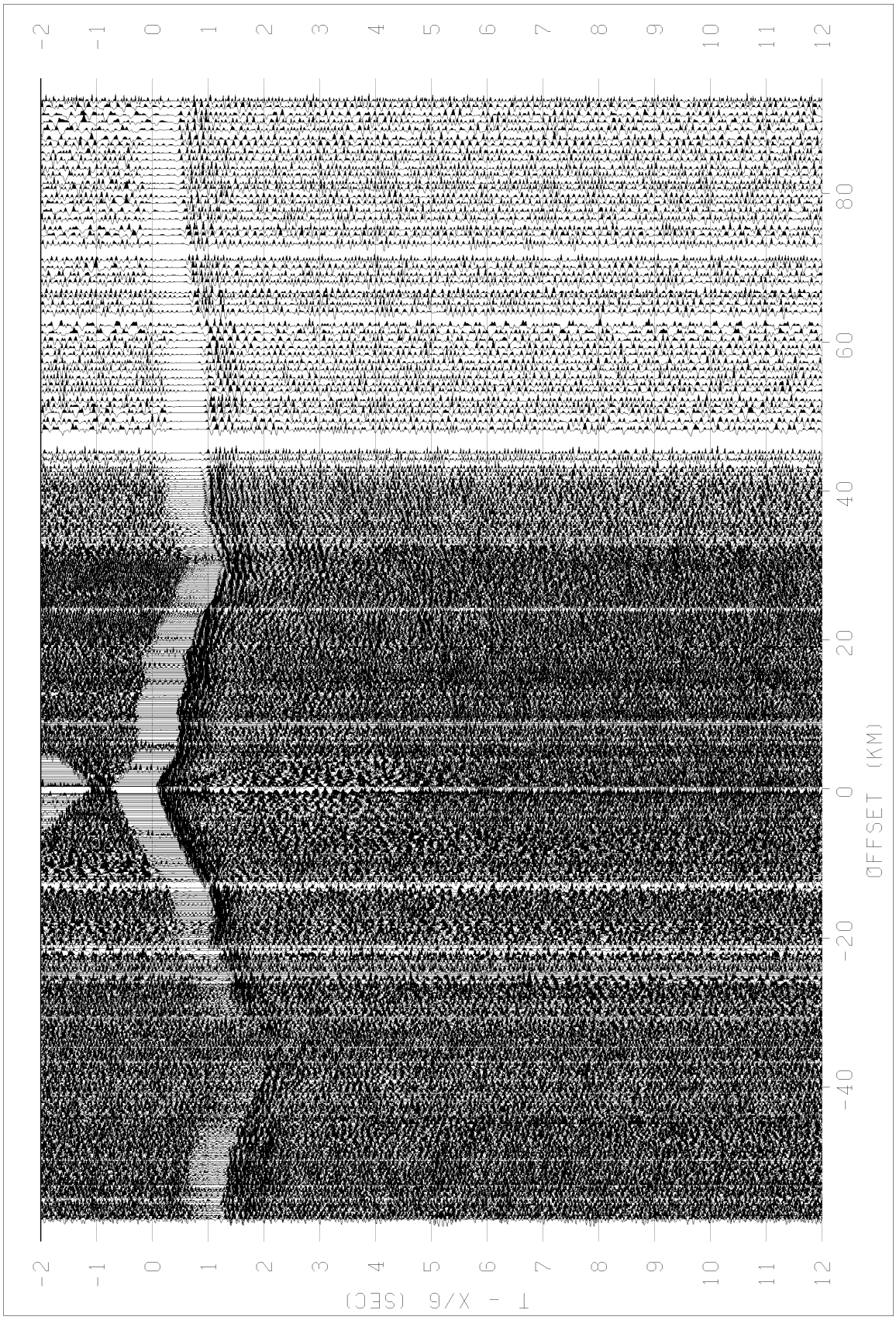

FIGURE . SHOTPOINT 8590, GEOGRAPHIC SEQUENCE NO. 51

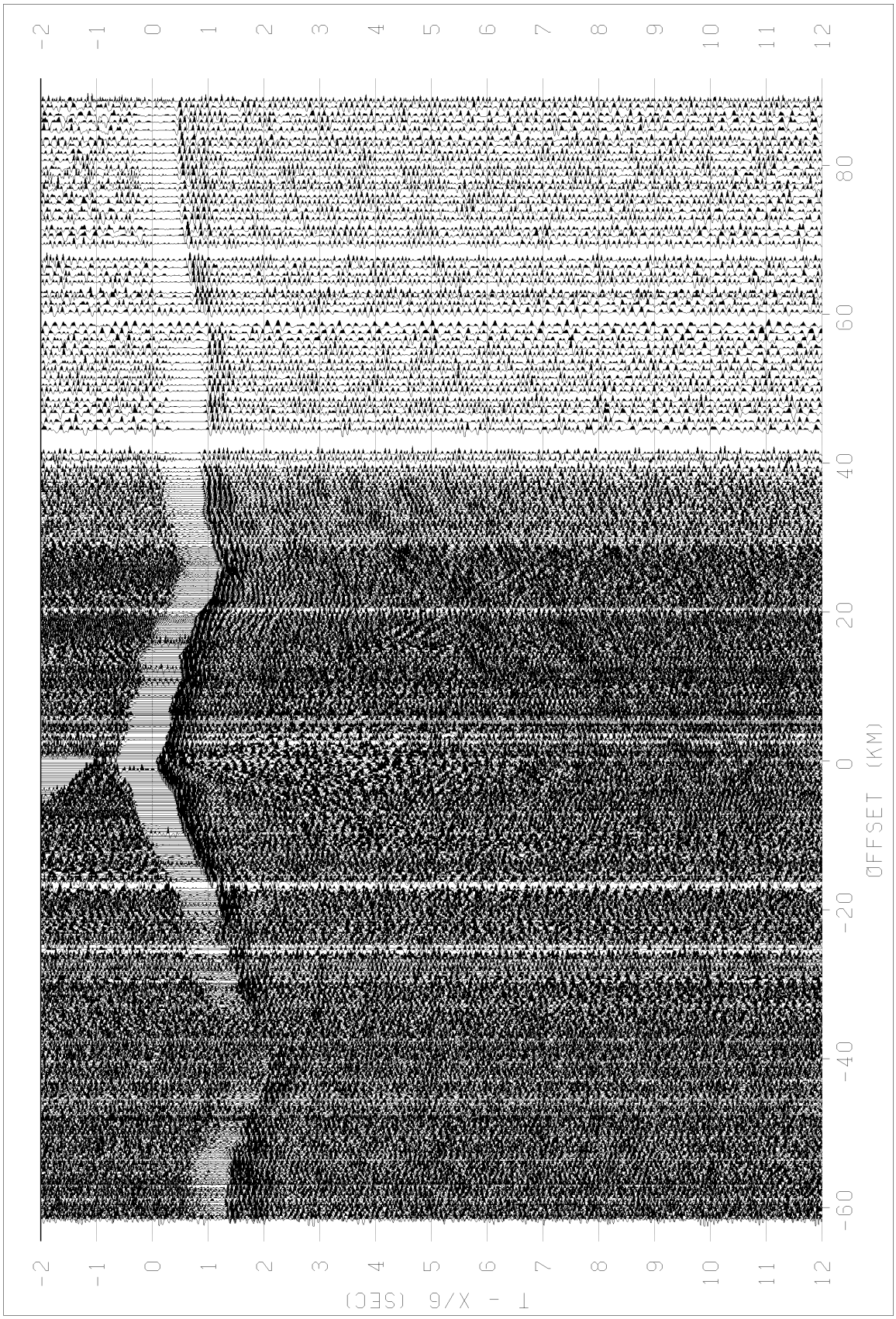

FIGURE . SHOTPOINT 8620, GEOGRAPHIC SEQUENCE NO. 52

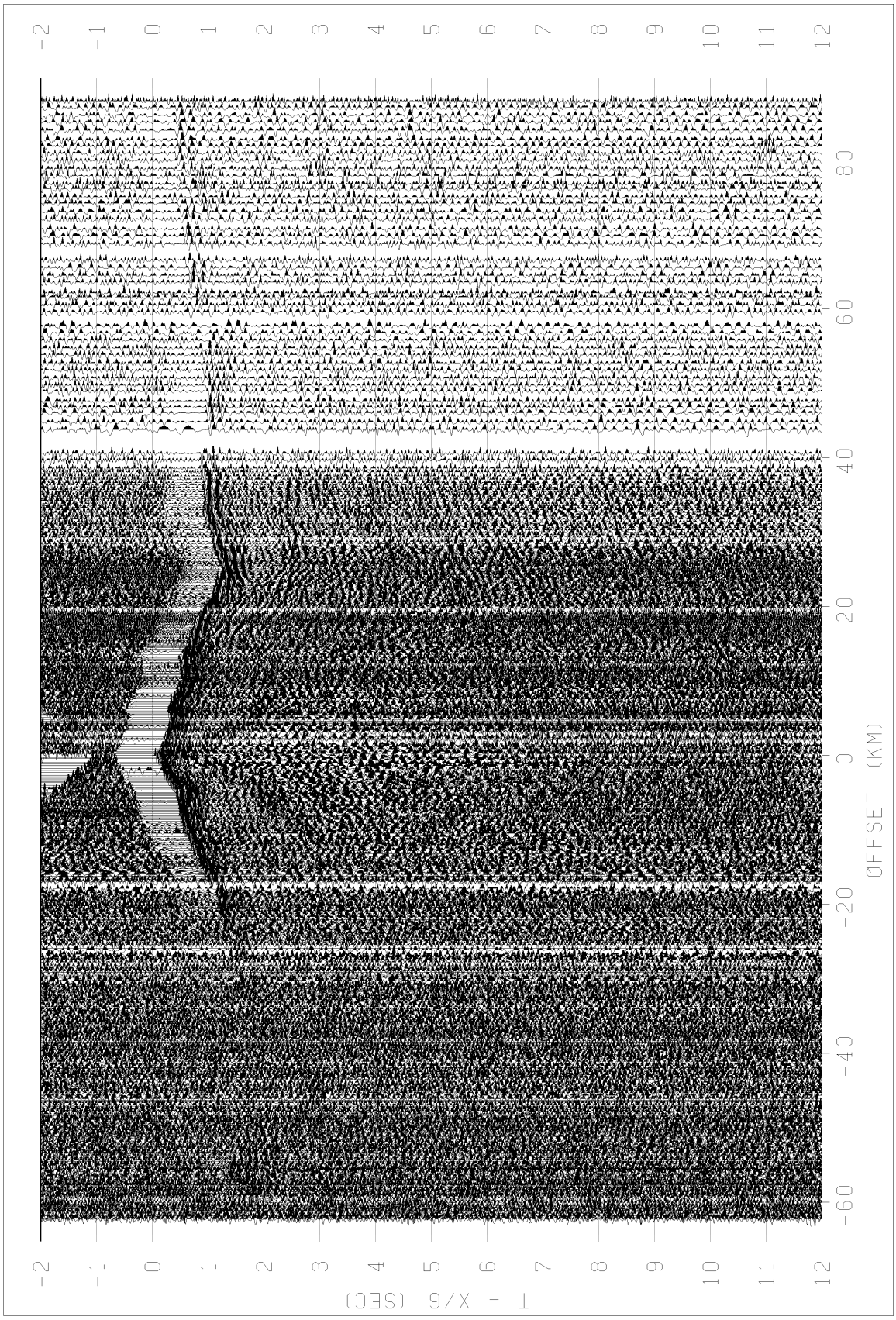

FIGURE . SHOTPOINT 8631, GEOGRAPHIC SEQUENCE NO. 53

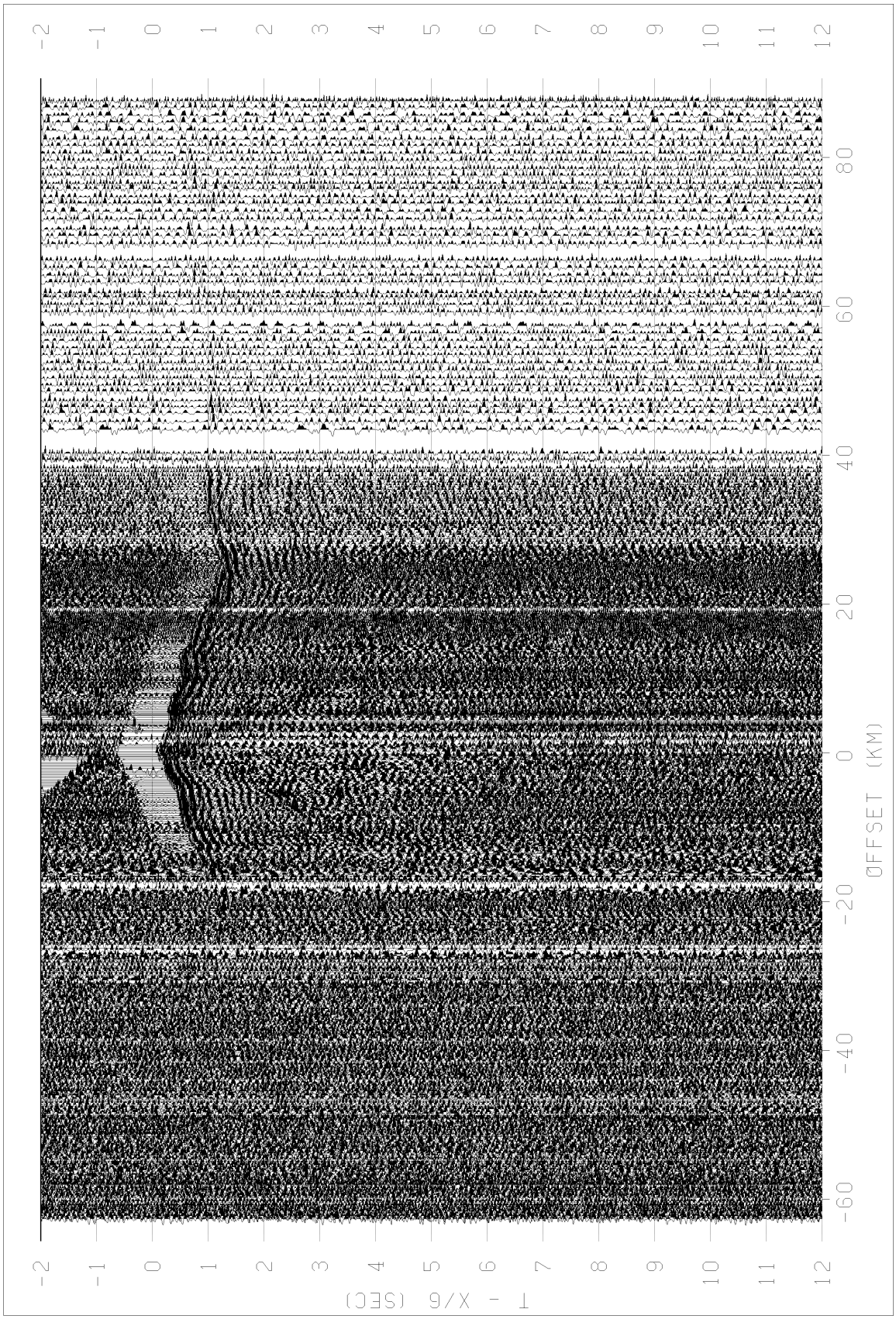

FIGURE . SHOTPOINT 8632, GEOGRAPHIC SEQUENCE NO. 54

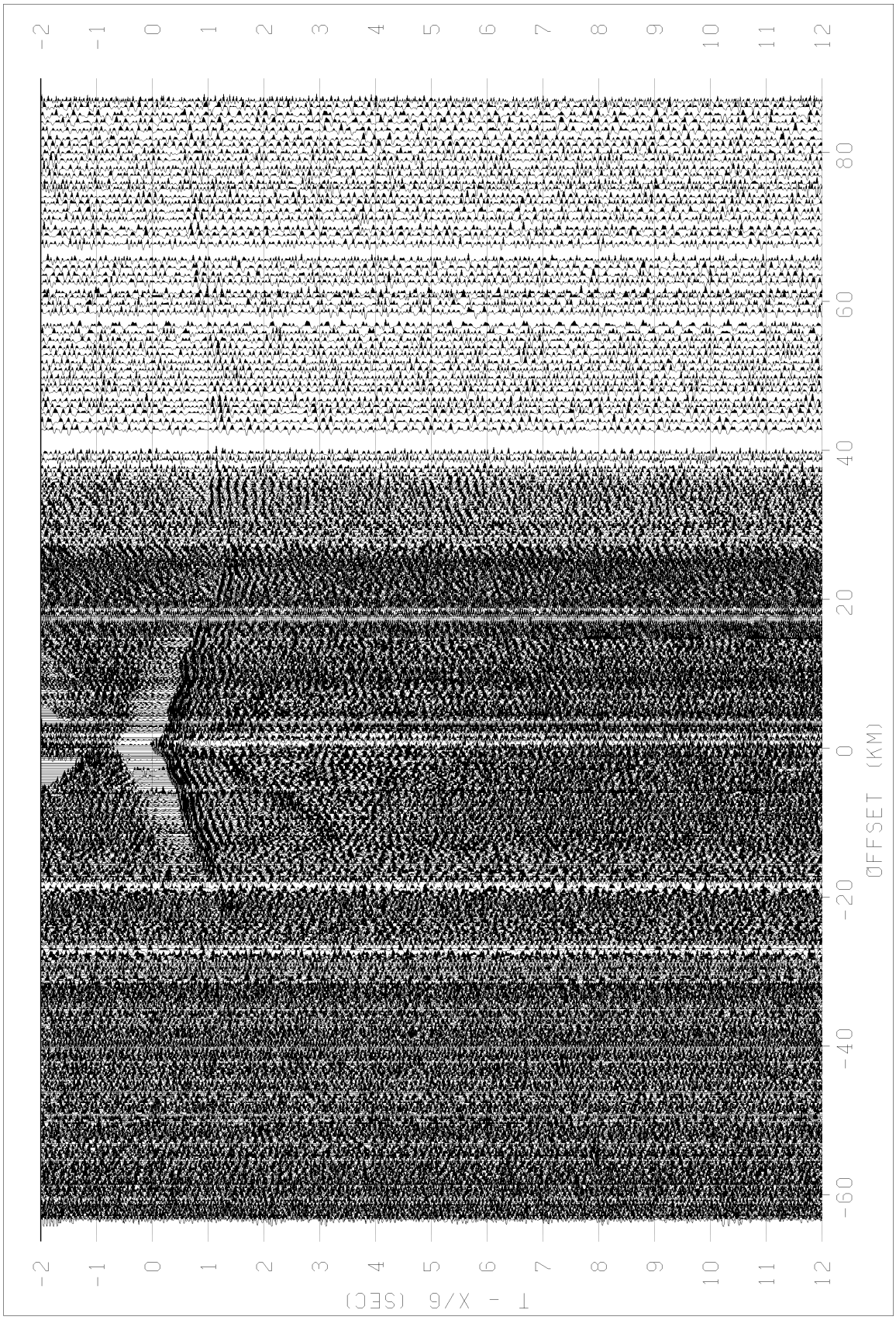

FIGURE . SHOTPOINT 8641, GEOGRAPHIC SEQUENCE NO. 55

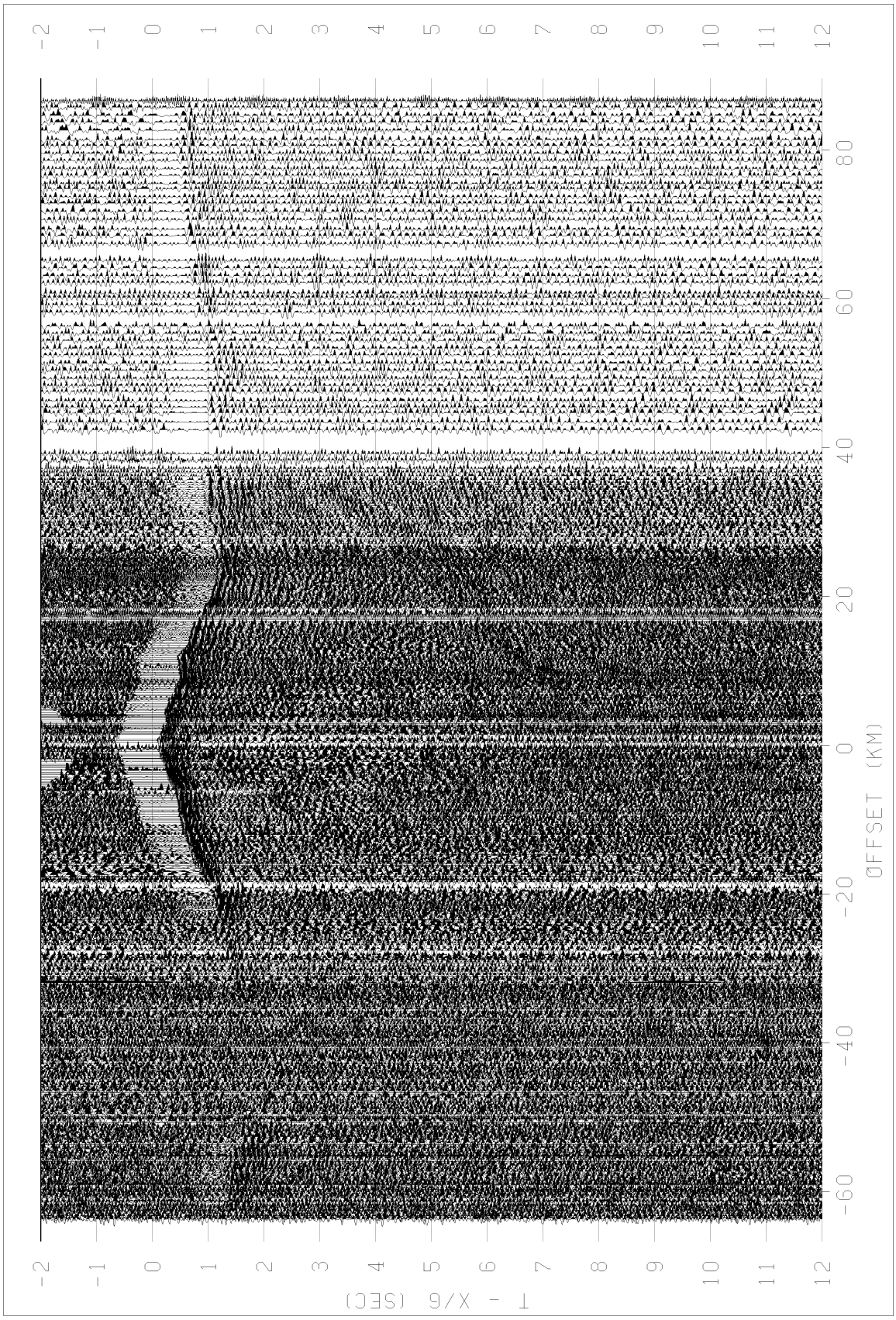

FIGURE . SHOTPOINT 8643, GEOGRAPHIC SEQUENCE NO. 56

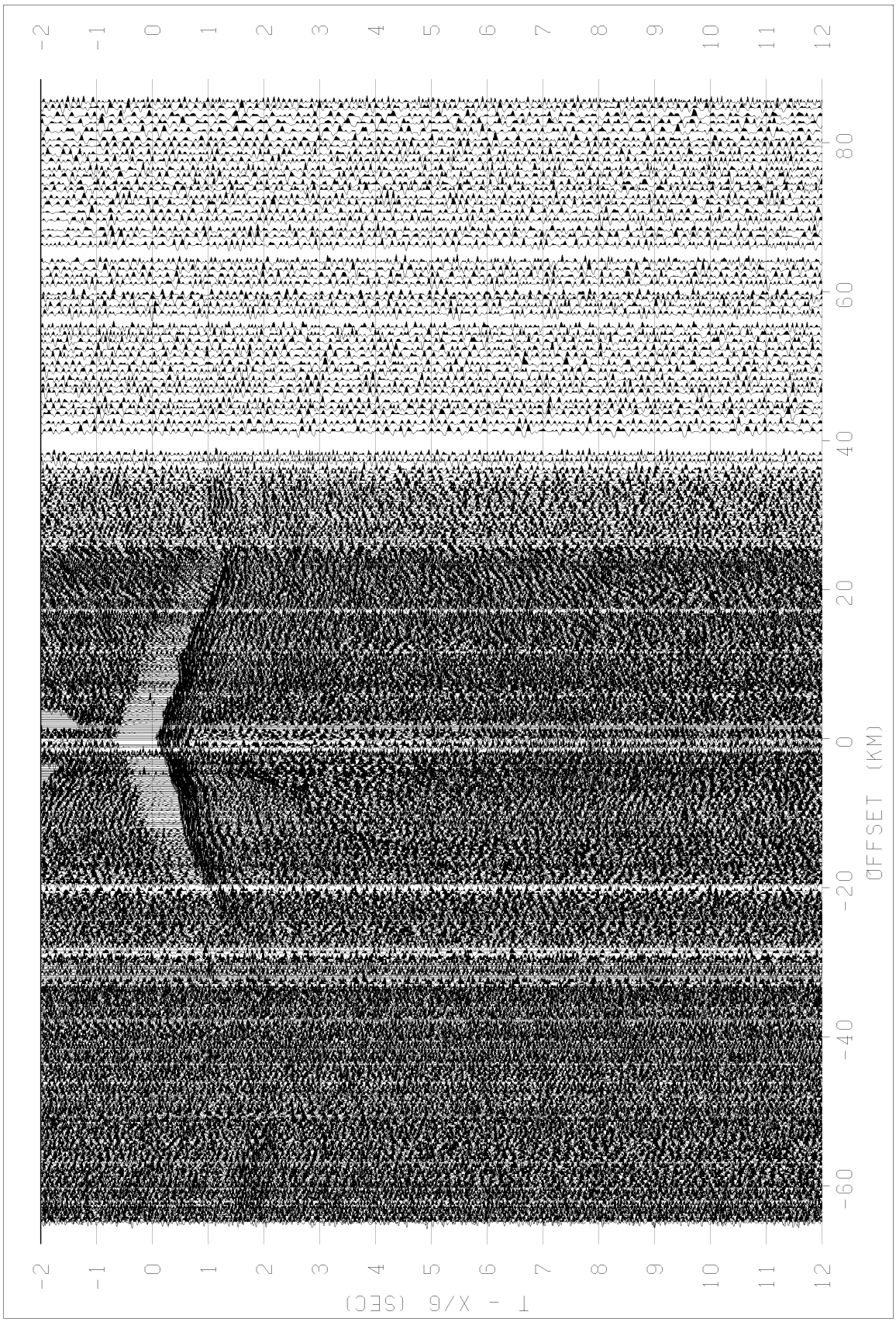

FIGURE . SHOTPOINT 8661, GEOGRAPHIC SEQUENCE NO. 58

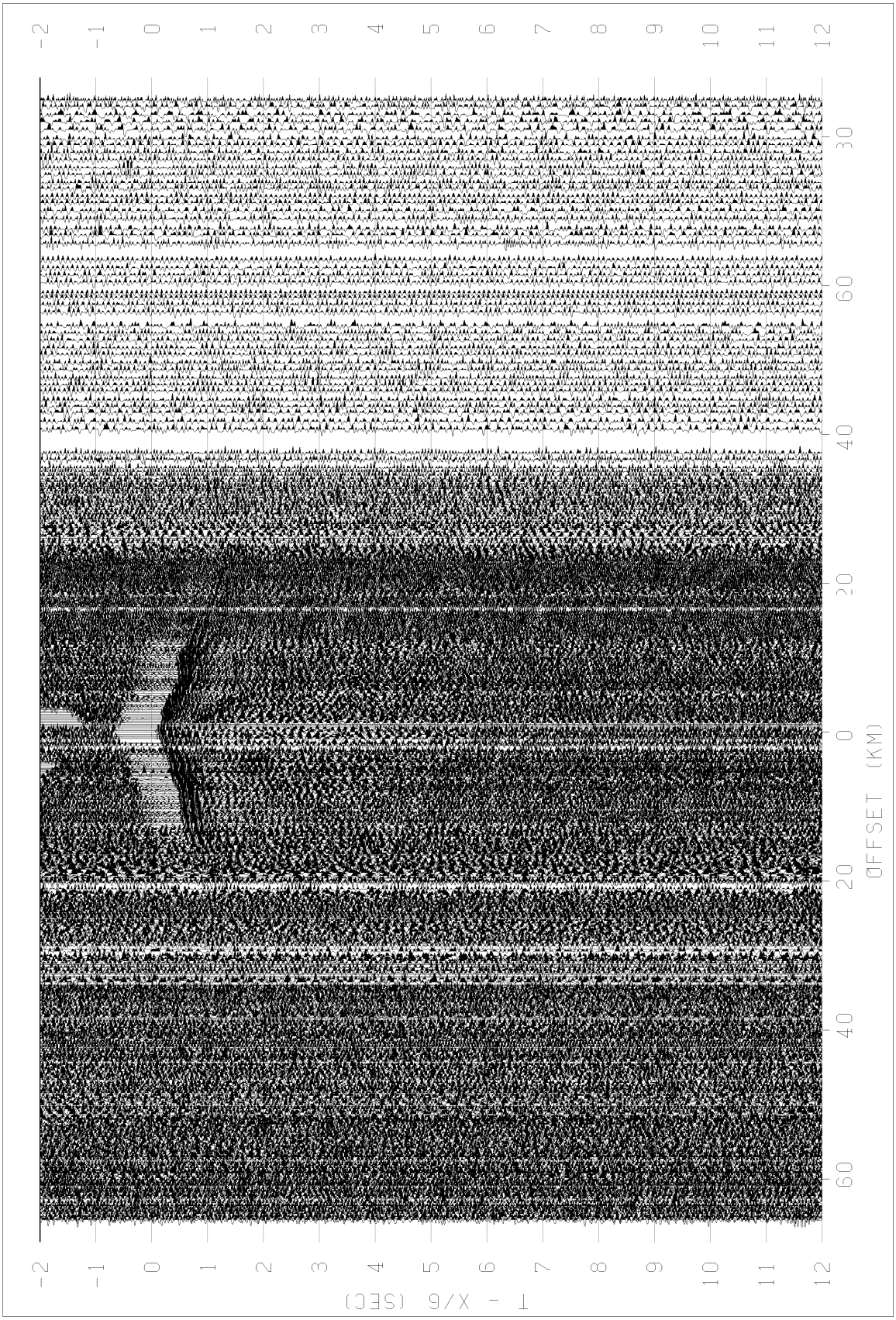

FIGURE . SHOTPOINT 8664, GEOGRAPHIC SEQUENCE NO. 59

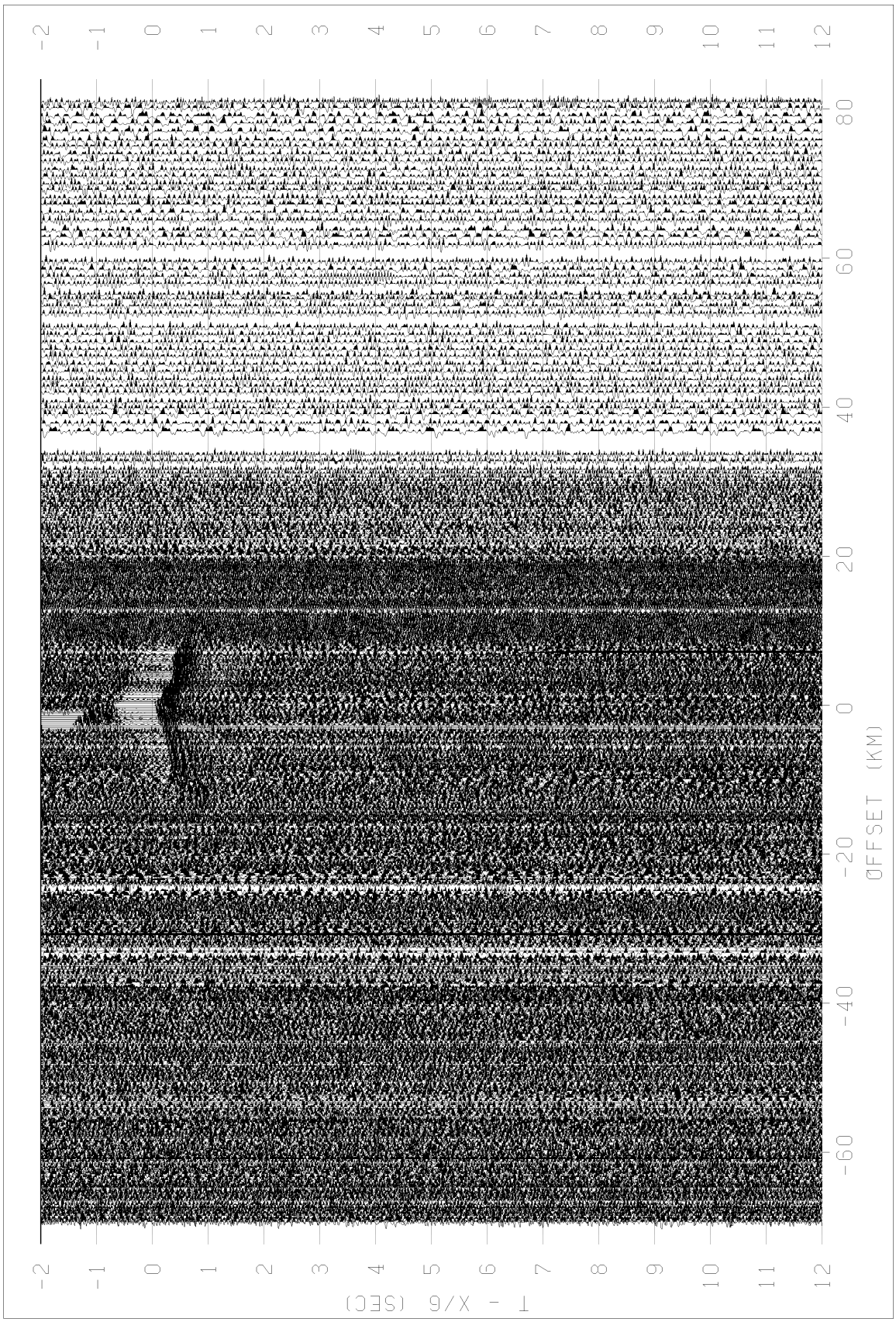

FIGURE . SHOTPOINT 8700, GEOGRAPHIC SEQUENCE NO. 60

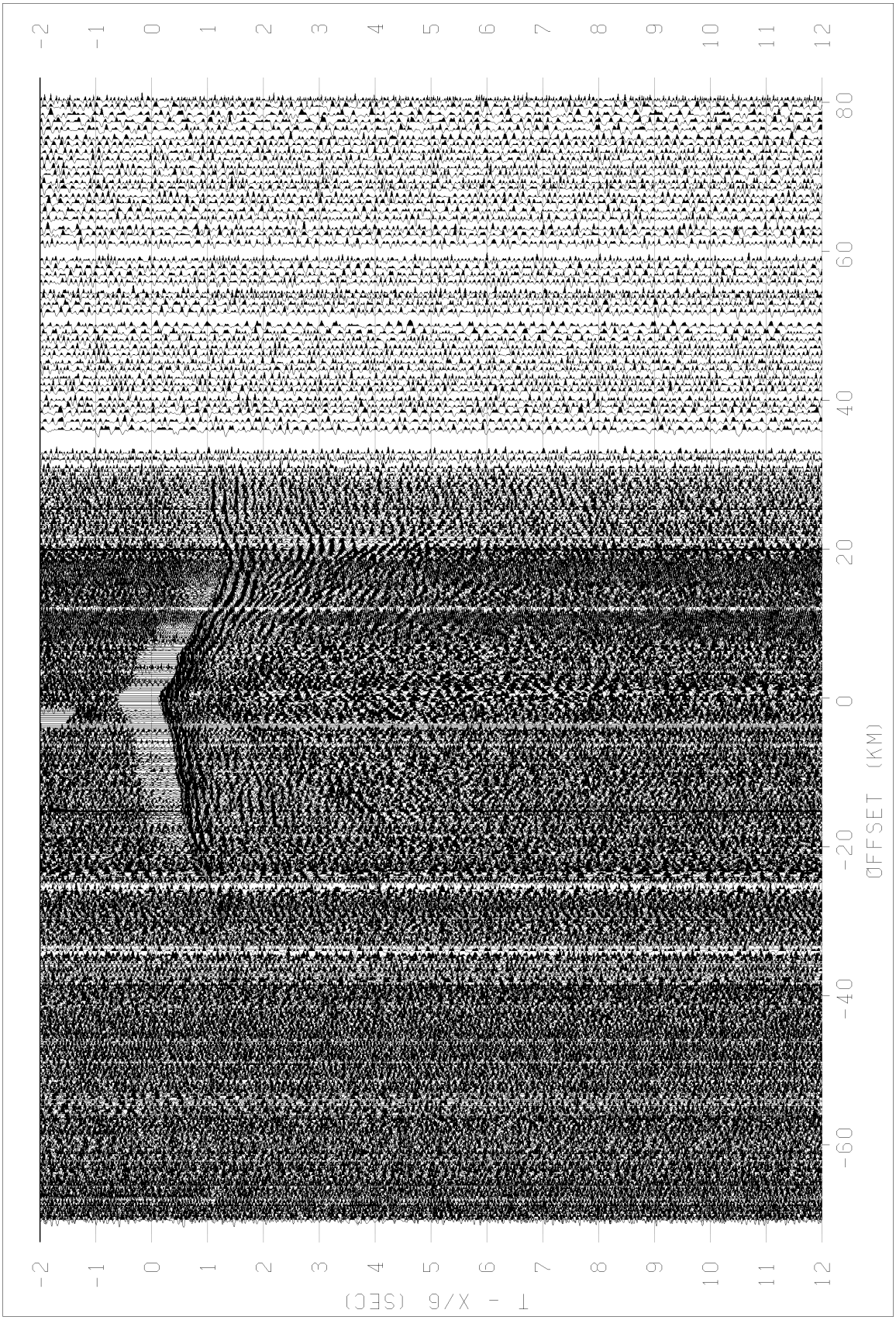

FIGURE . SHOTPOINT 8710, GEOGRAPHIC SEQUENCE NO. 61

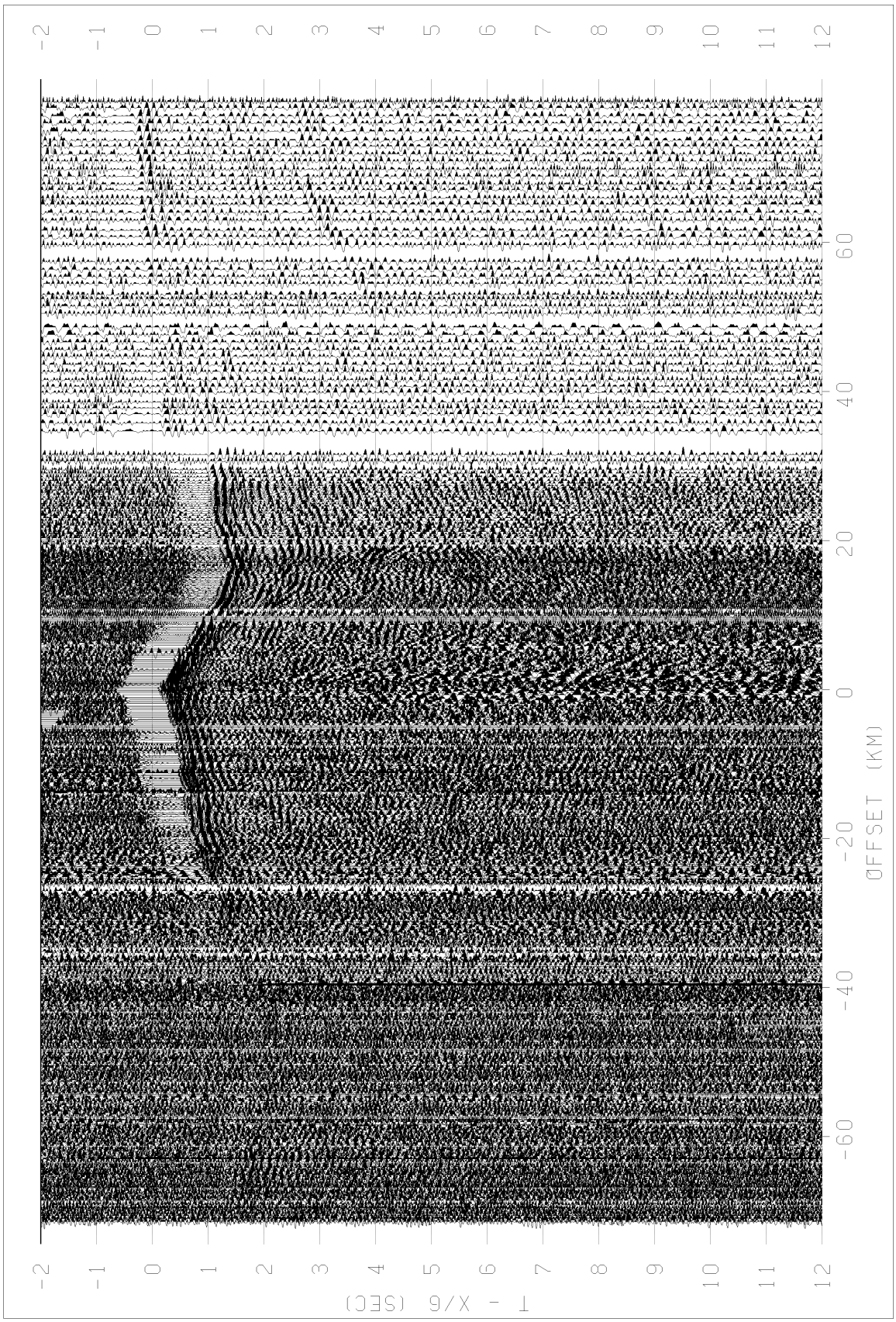

FIGURE . SHOTPOINT 8720, GEOGRAPHIC SEQUENCE NO. 62

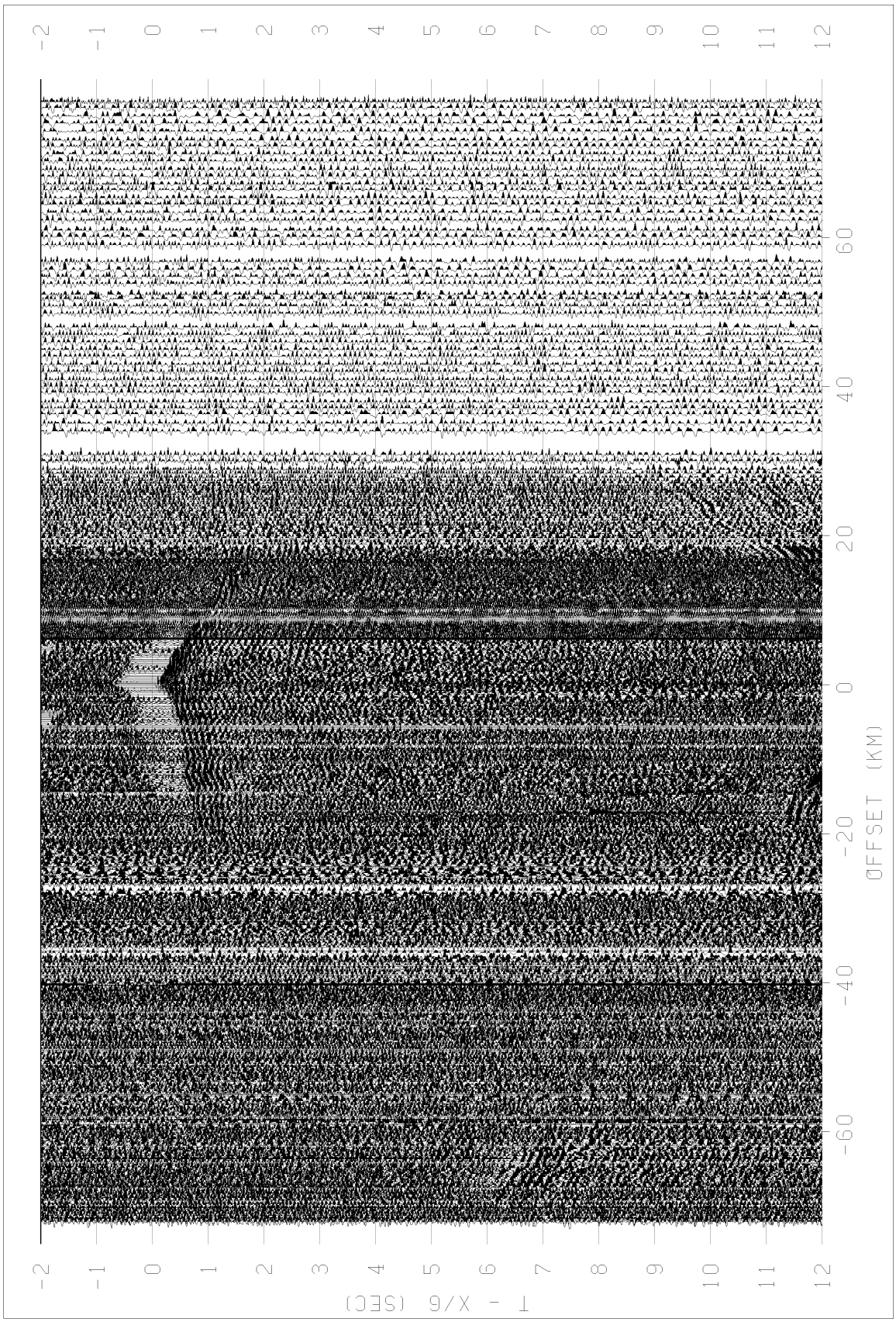

FIGURE . SHOTPOINT 8730, GEOGRAPHIC SEQUENCE NO. 63

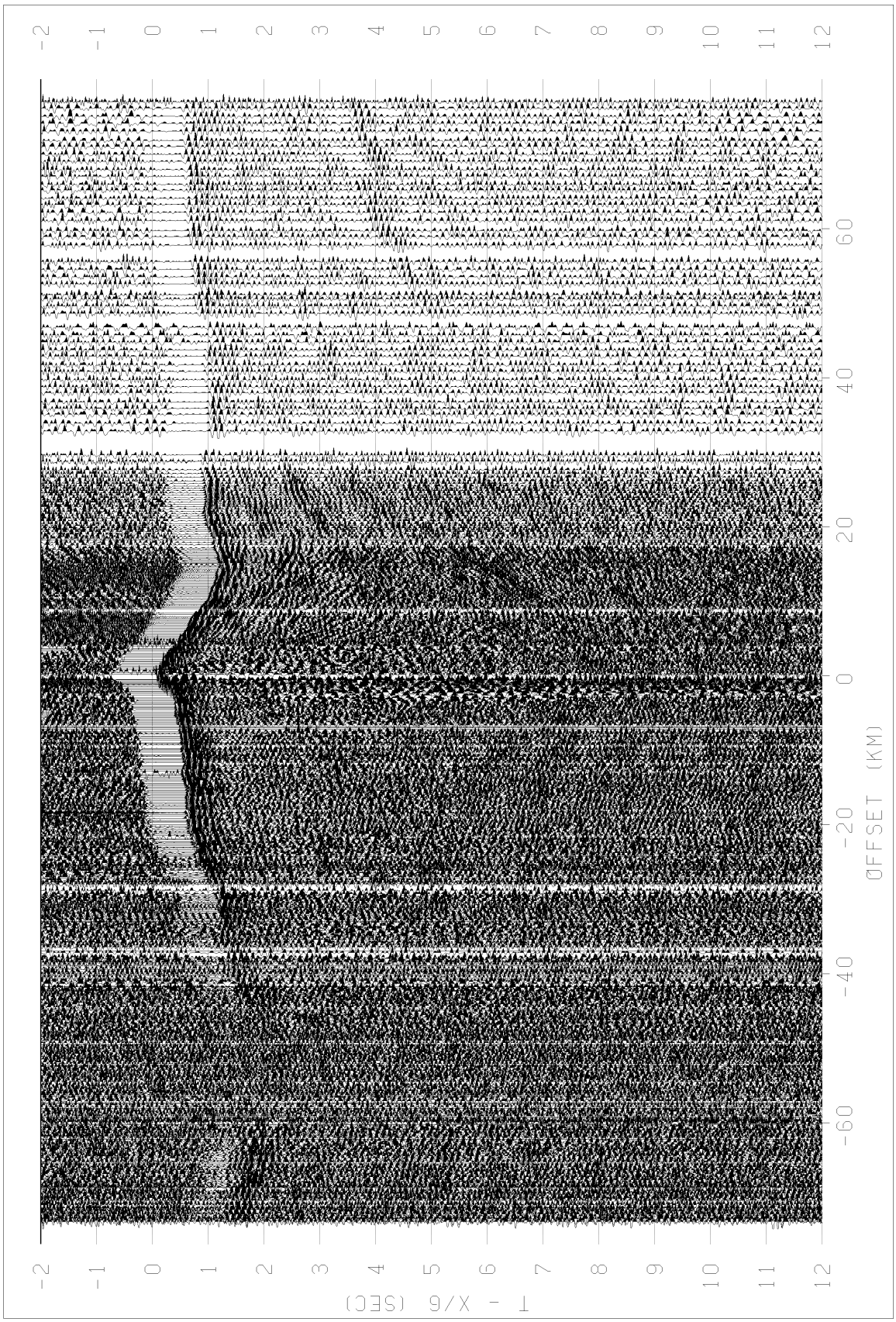

FIGURE . SHOTPOINT 8740, GEOGRAPHIC SEQUENCE NO. 64

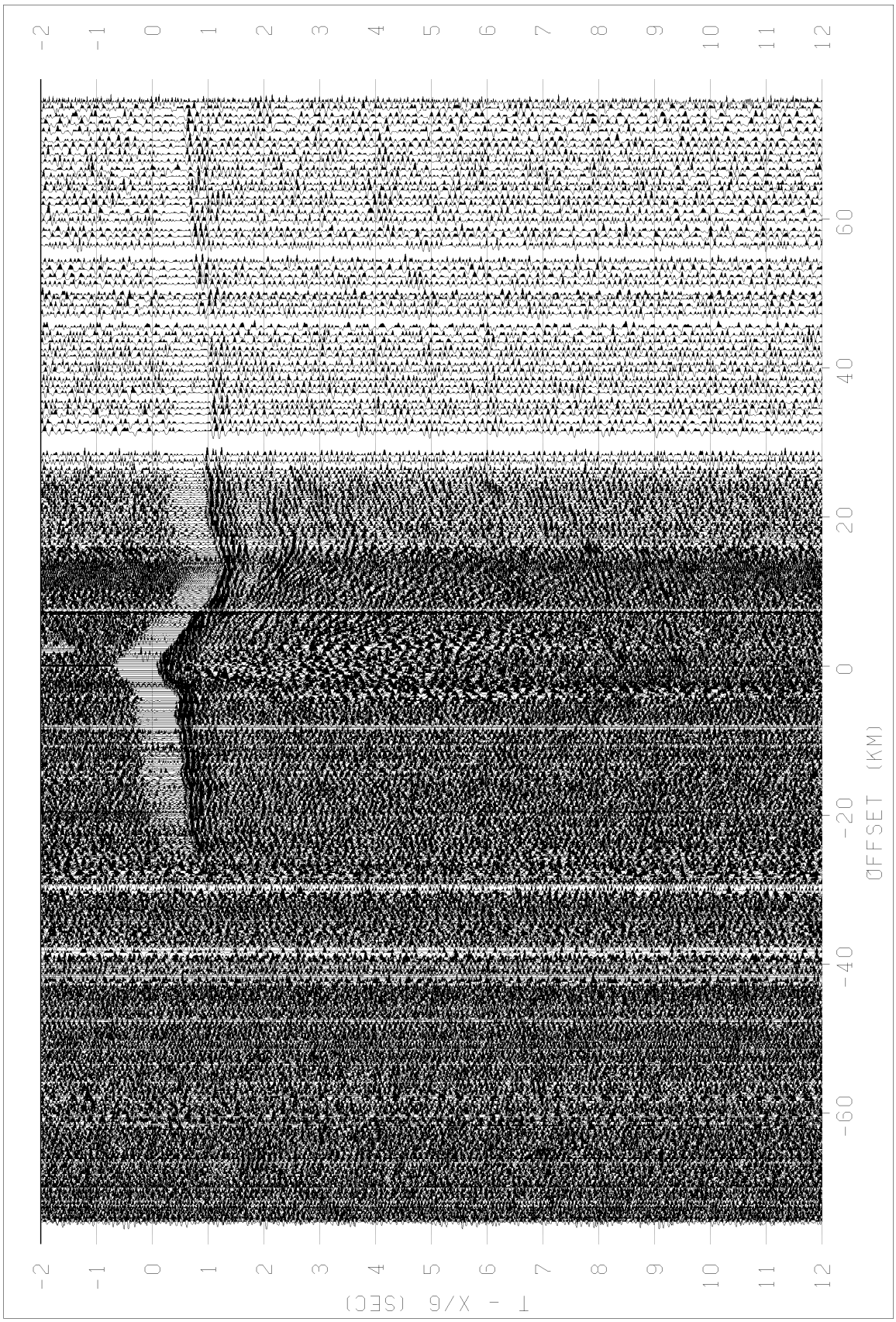

FIGURE . SHOTPOINT 8750, GEOGRAPHIC SEQUENCE NO. 65

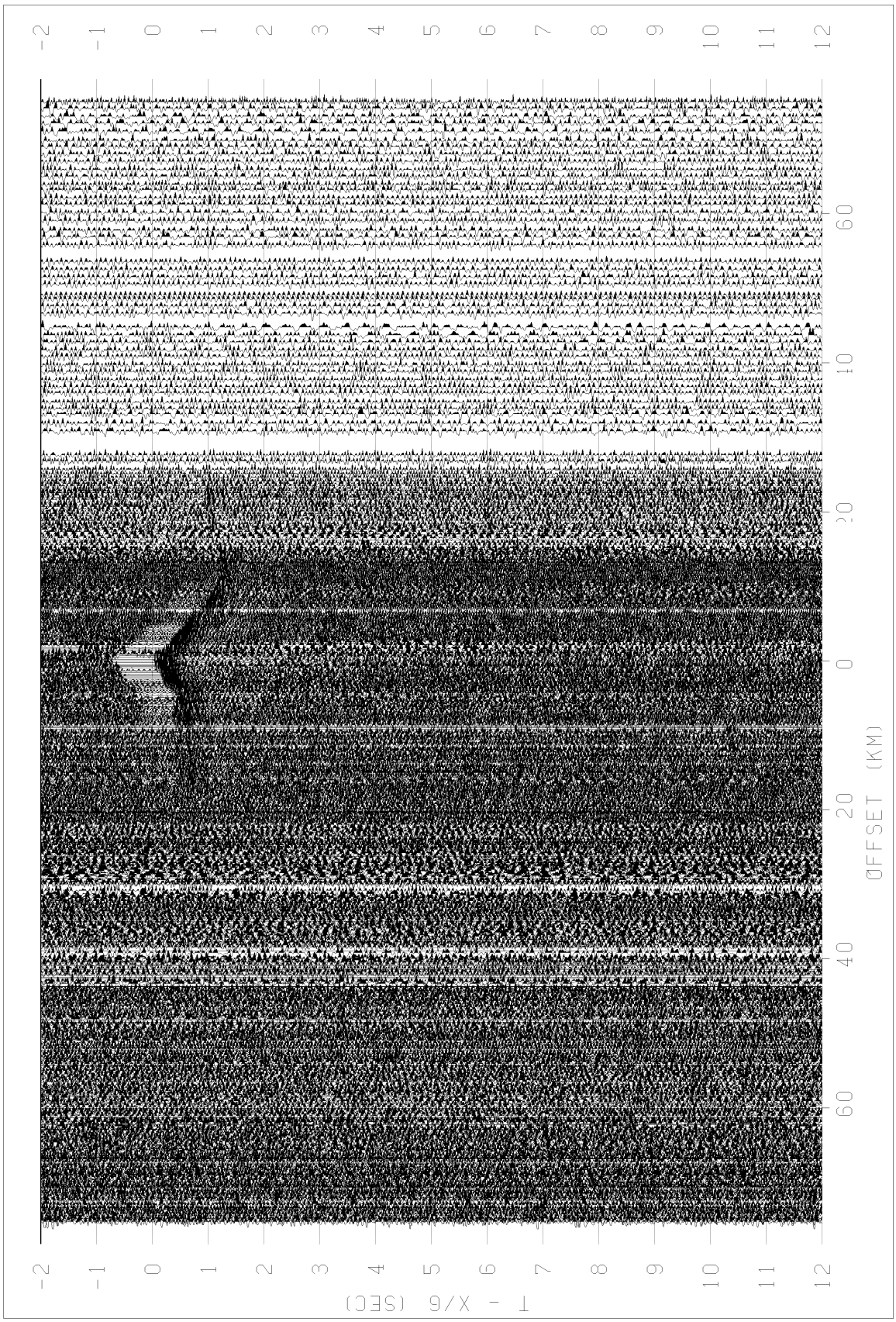

FIGURE . SHOTPOINT 8760, GEOGRAPHIC SEQUENCE NO. 66

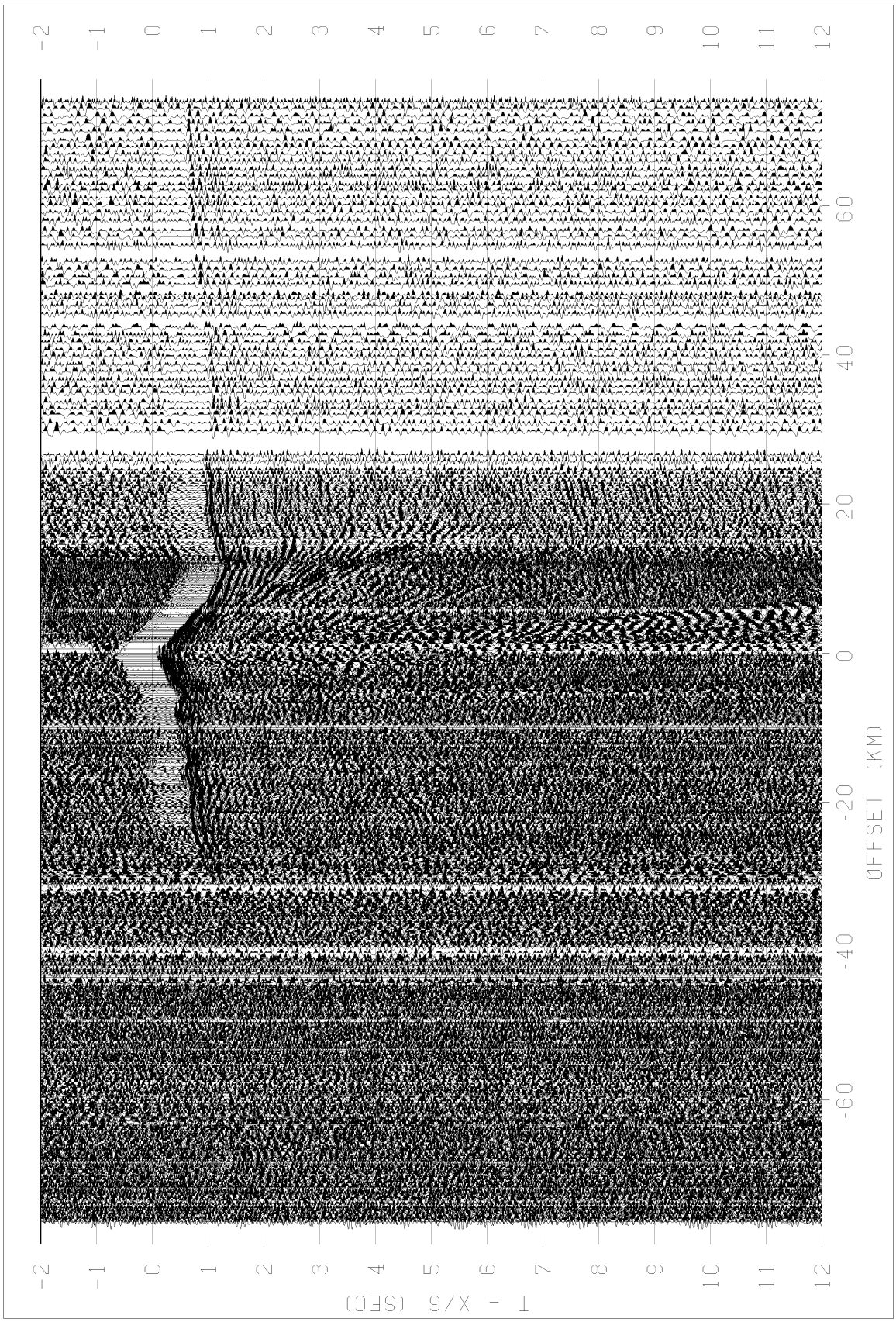

FIGURE . SHOTPOINT 8770, GEOGRAPHIC SEQUENCE NO. 67

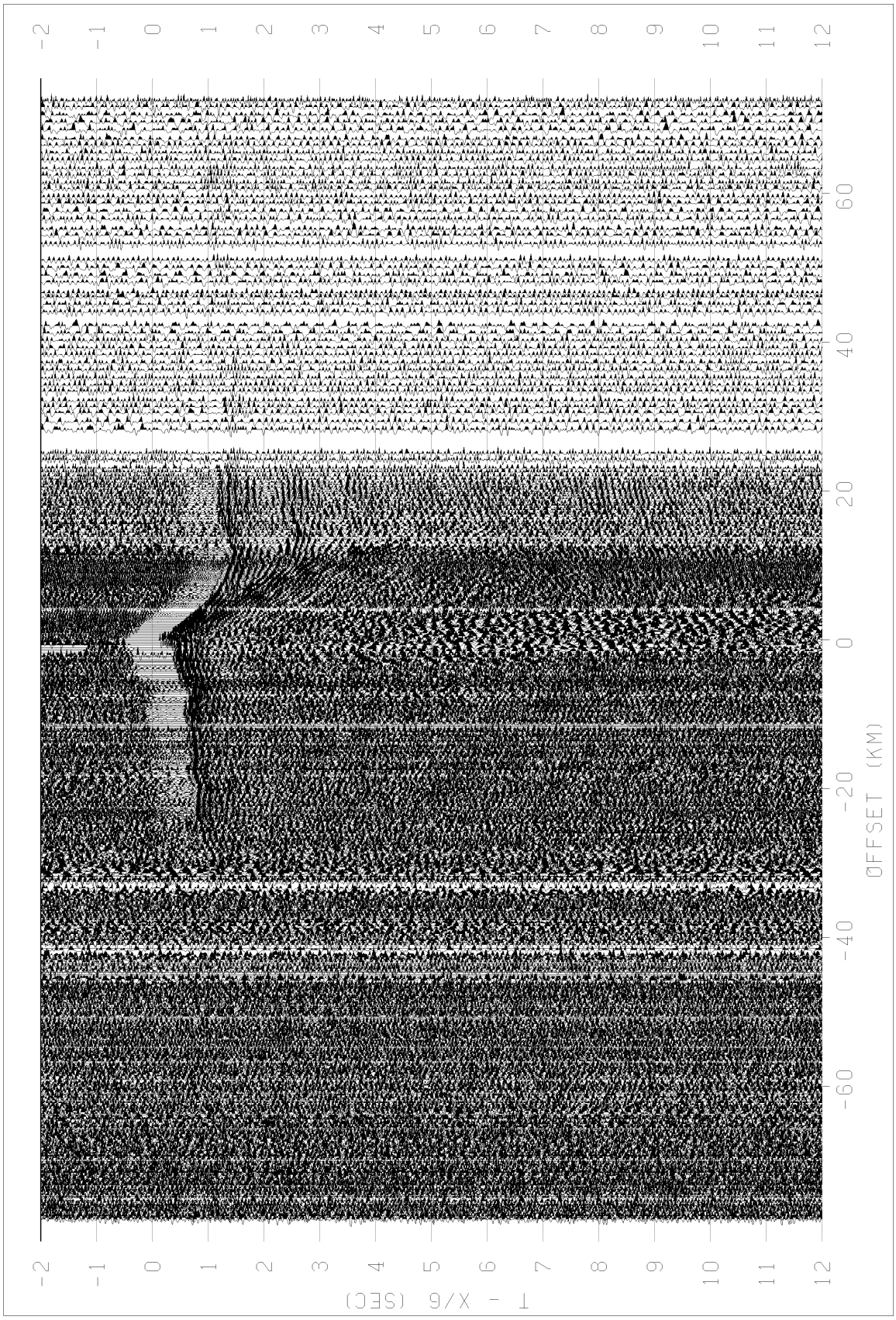

FIGURE . SHOTPOINT 8780, GEOGRAPHIC SEQUENCE NO. 68

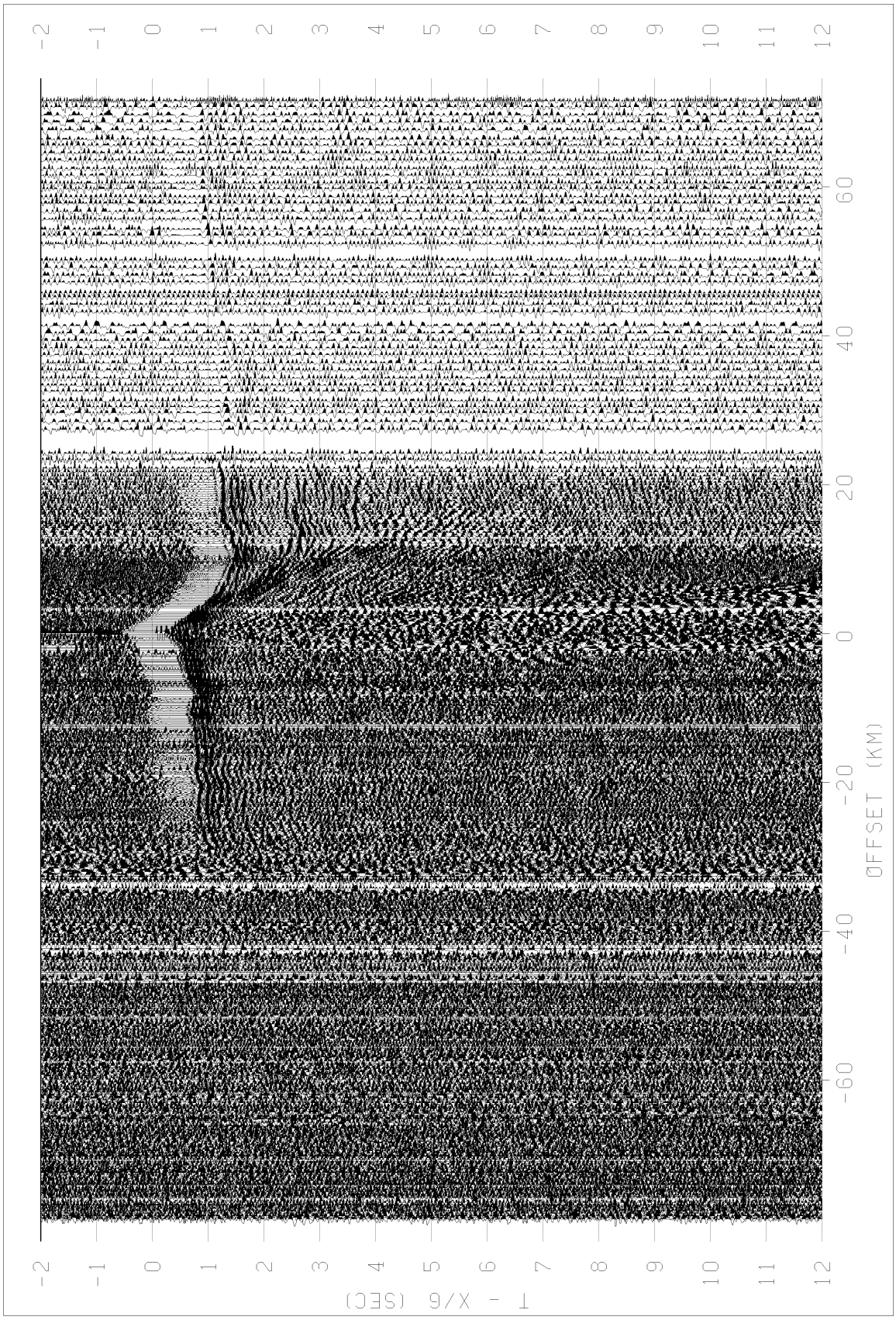

FIGURE . SHOTPOINT 8790, GEOGRAPHIC SEQUENCE NO. 69

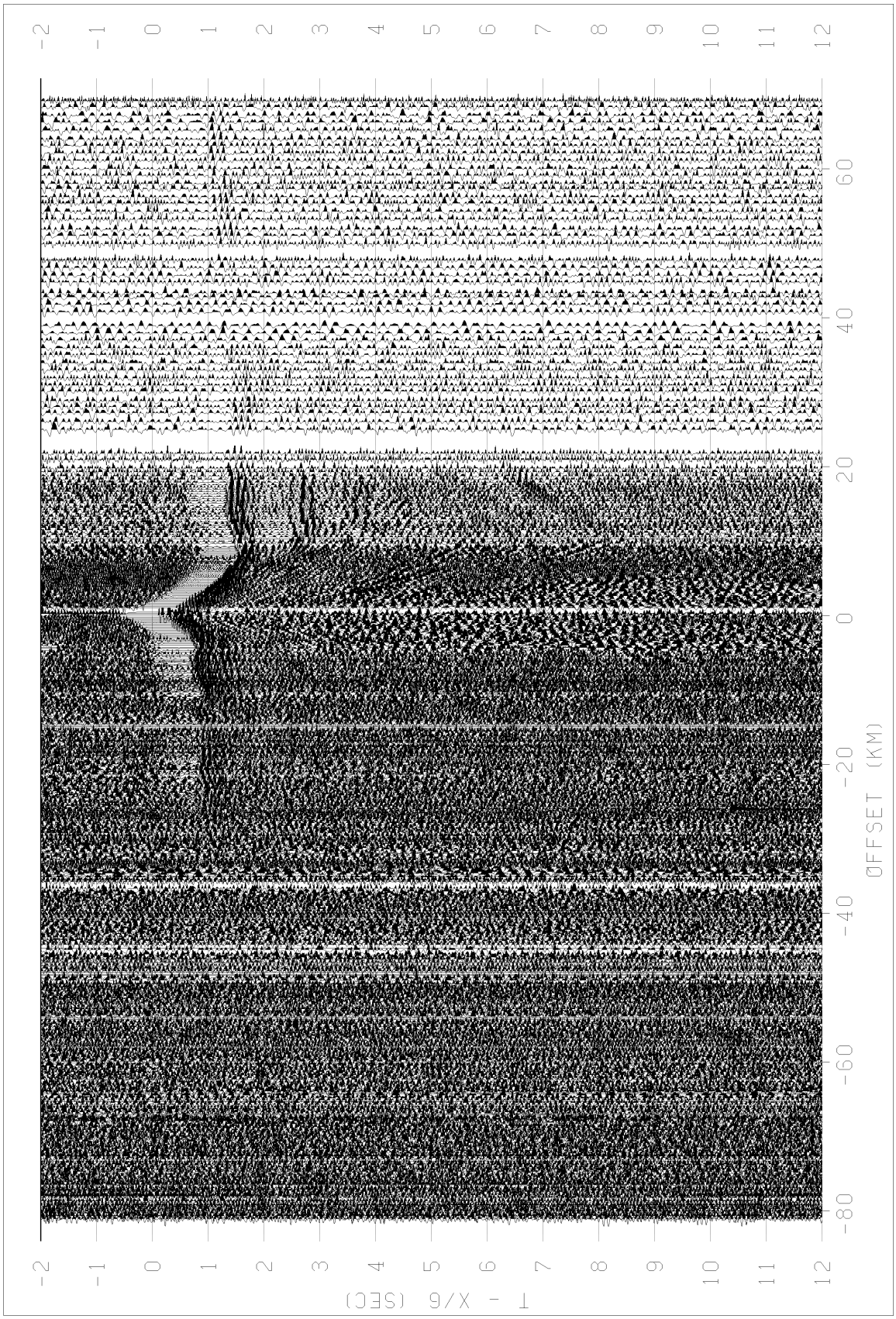

FIGURE . SHOTPOINT 8820, GEOGRAPHIC SEQUENCE NO. 70

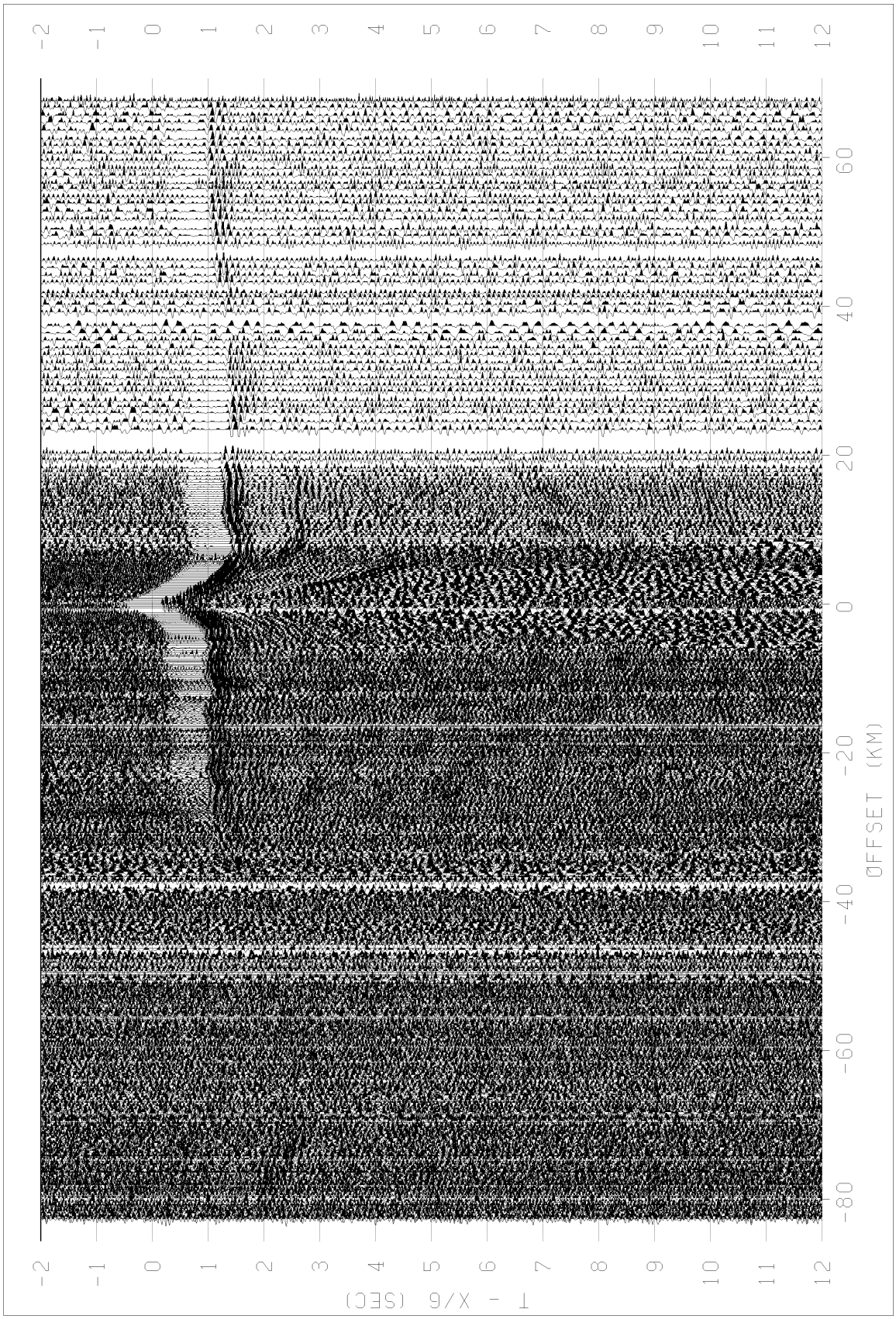

FIGURE . SHOTPOINT 8830, GEOGRAPHIC SEQUENCE NO. 71

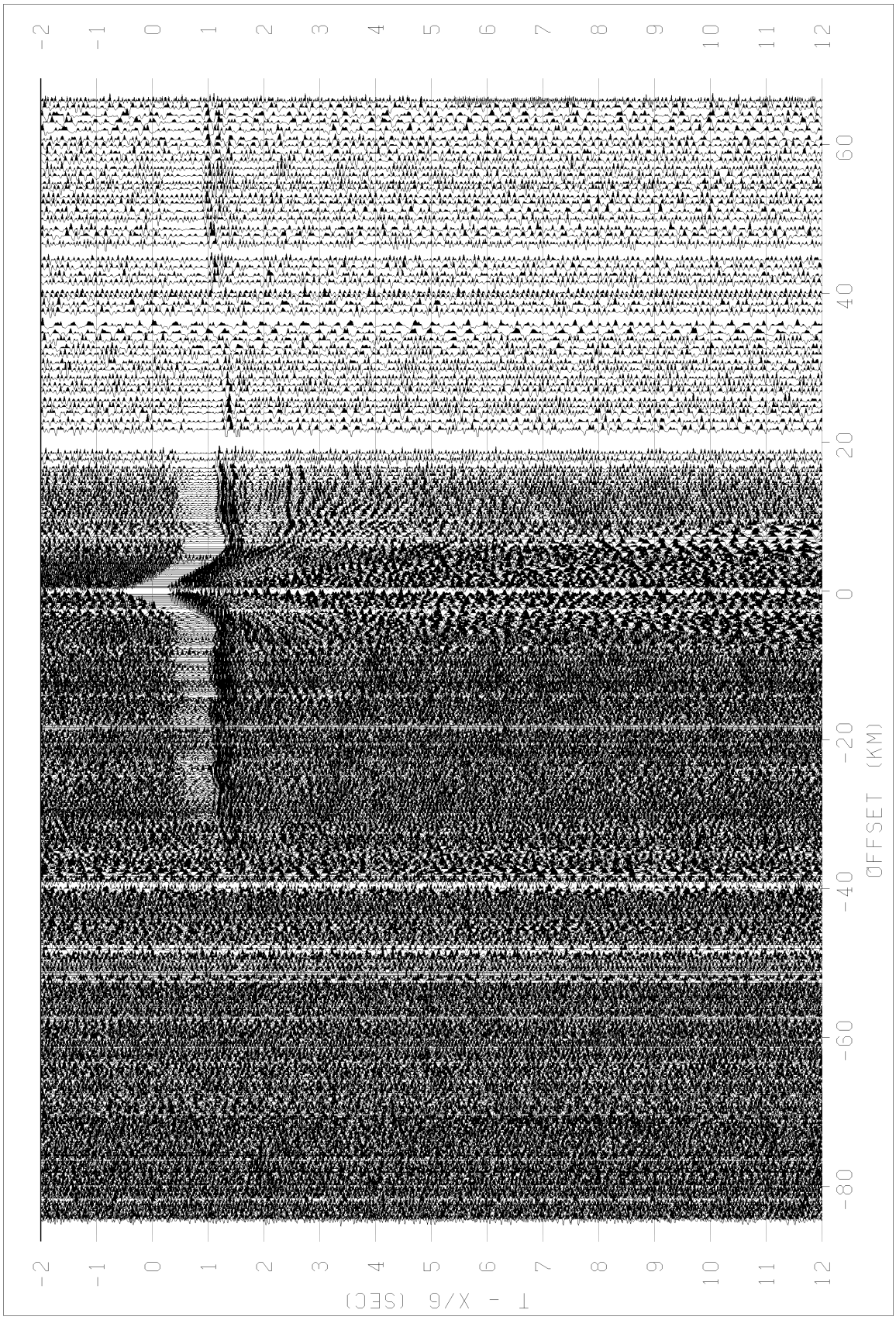

FIGURE . SHOTPOINT 8850, GEOGRAPHIC SEQUENCE NO. 72

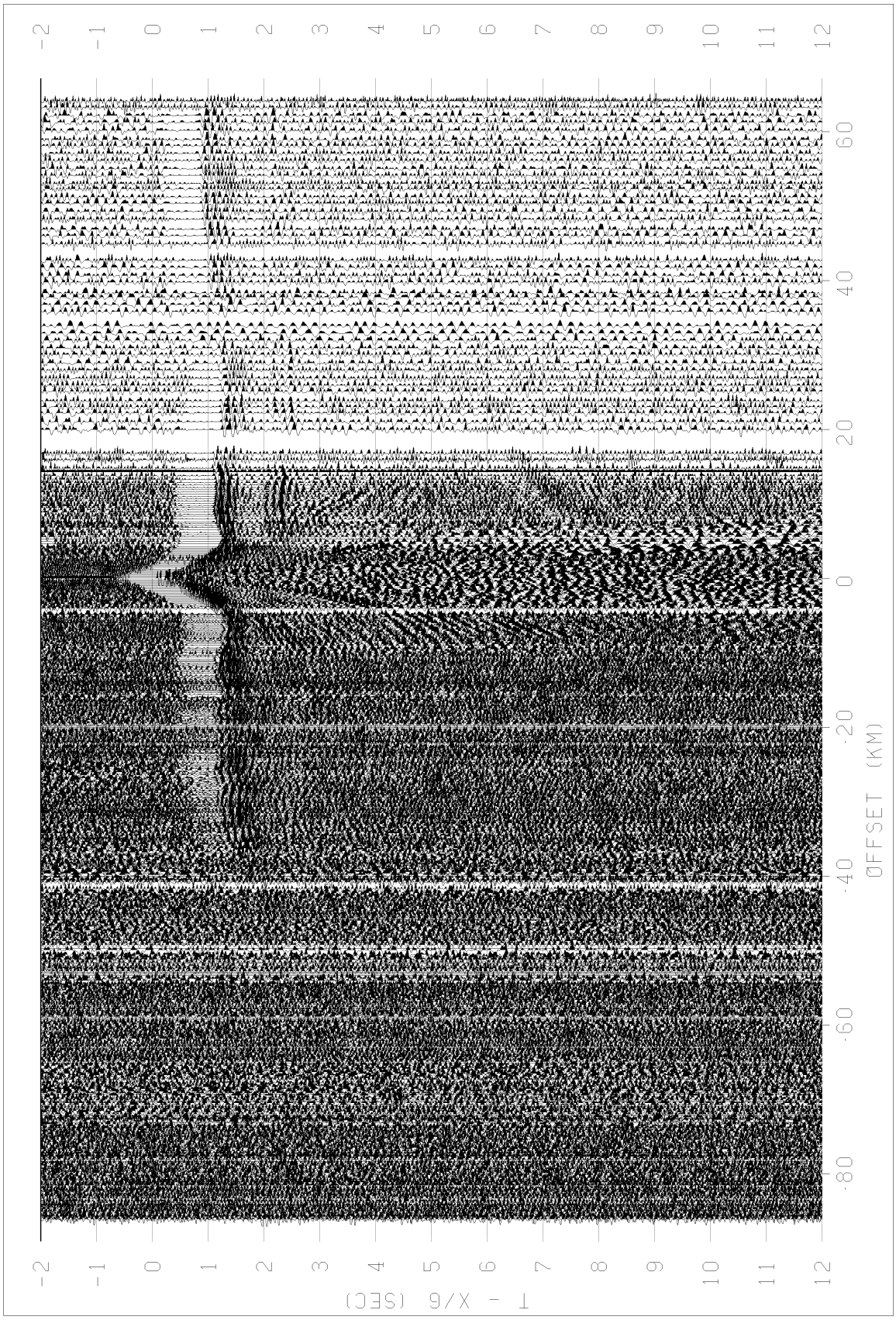

FIGURE . SHOTPOINT 8870, GEOGRAPHIC SEQUENCE NO. 73

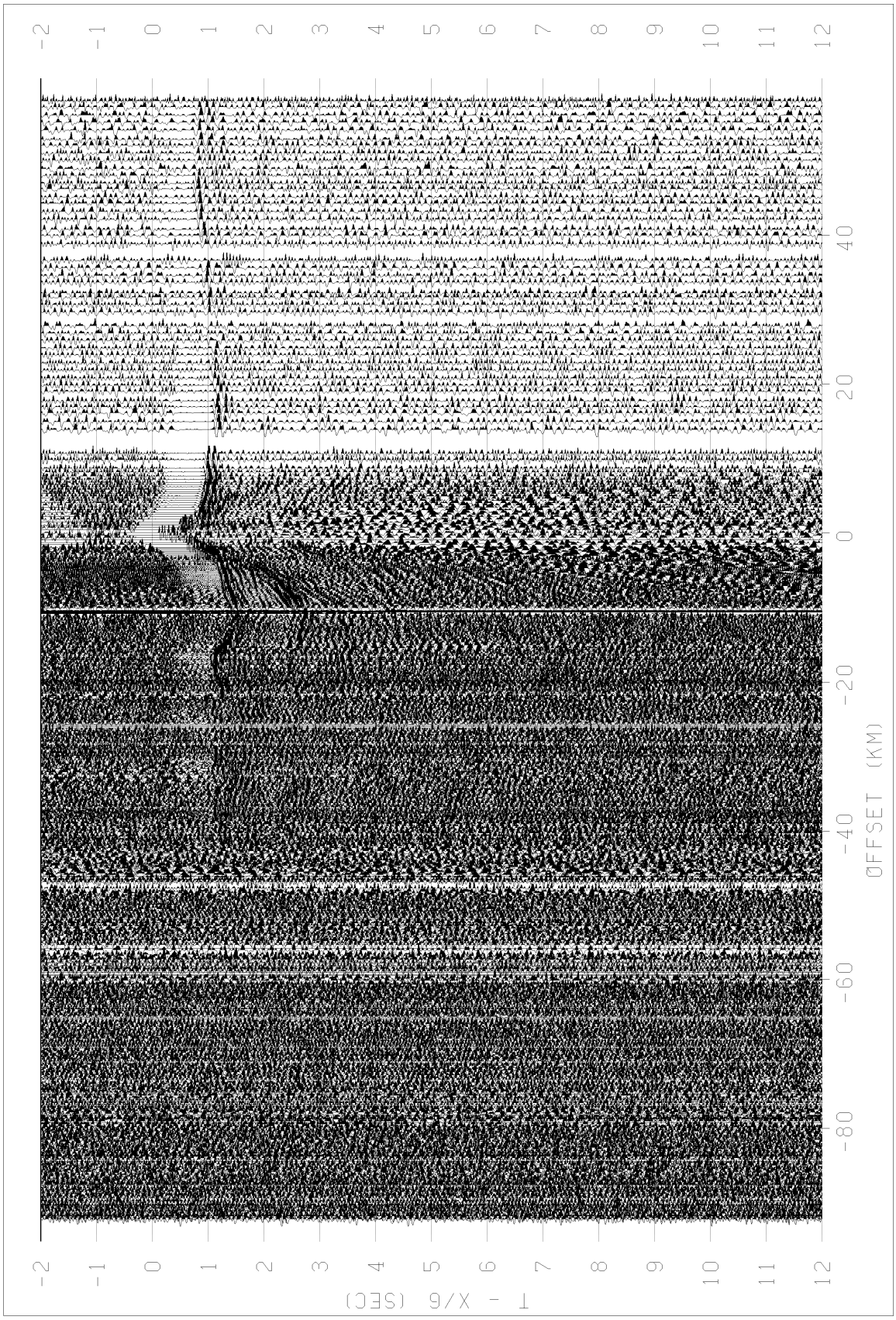

FIGURE . SHOTPOINT 8930, GEOGRAPHIC SEQUENCE NO. 74

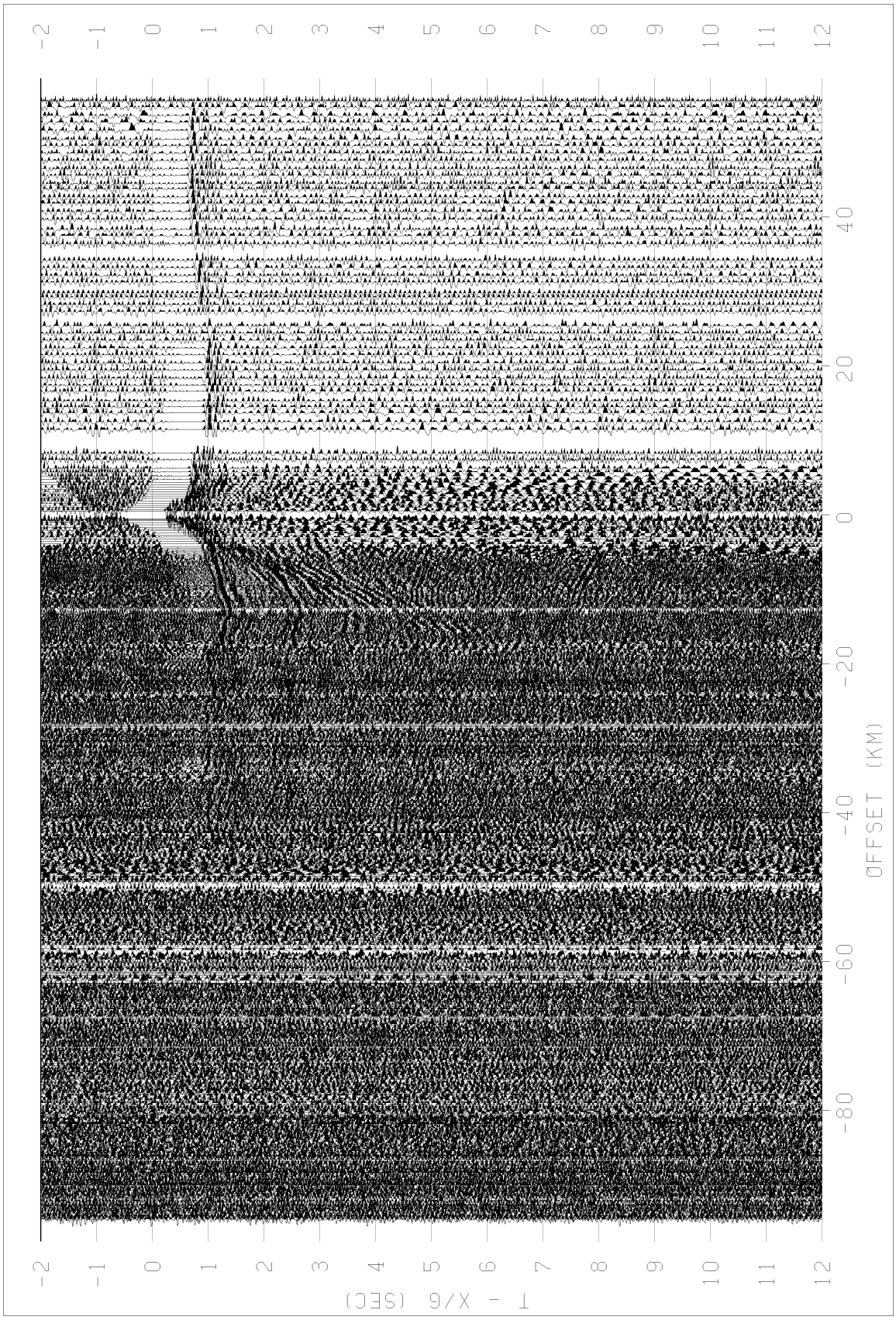

FIGURE . SHOTPOINT 8950, GEOGRAPHIC SEQUENCE NO. 75

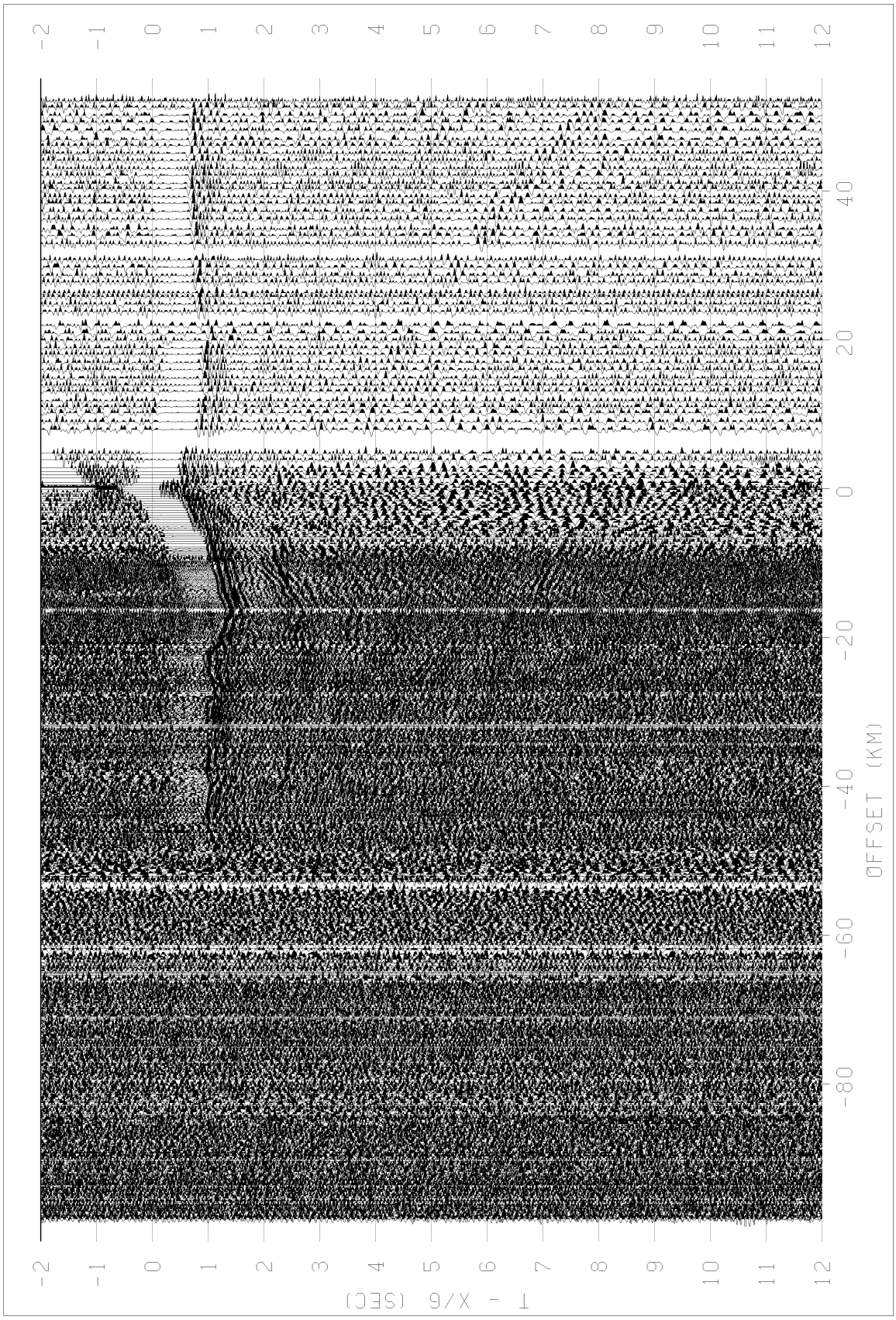

FIGURE . SHOTPOINT 8990, GEOGRAPHIC SEQUENCE NO. 76

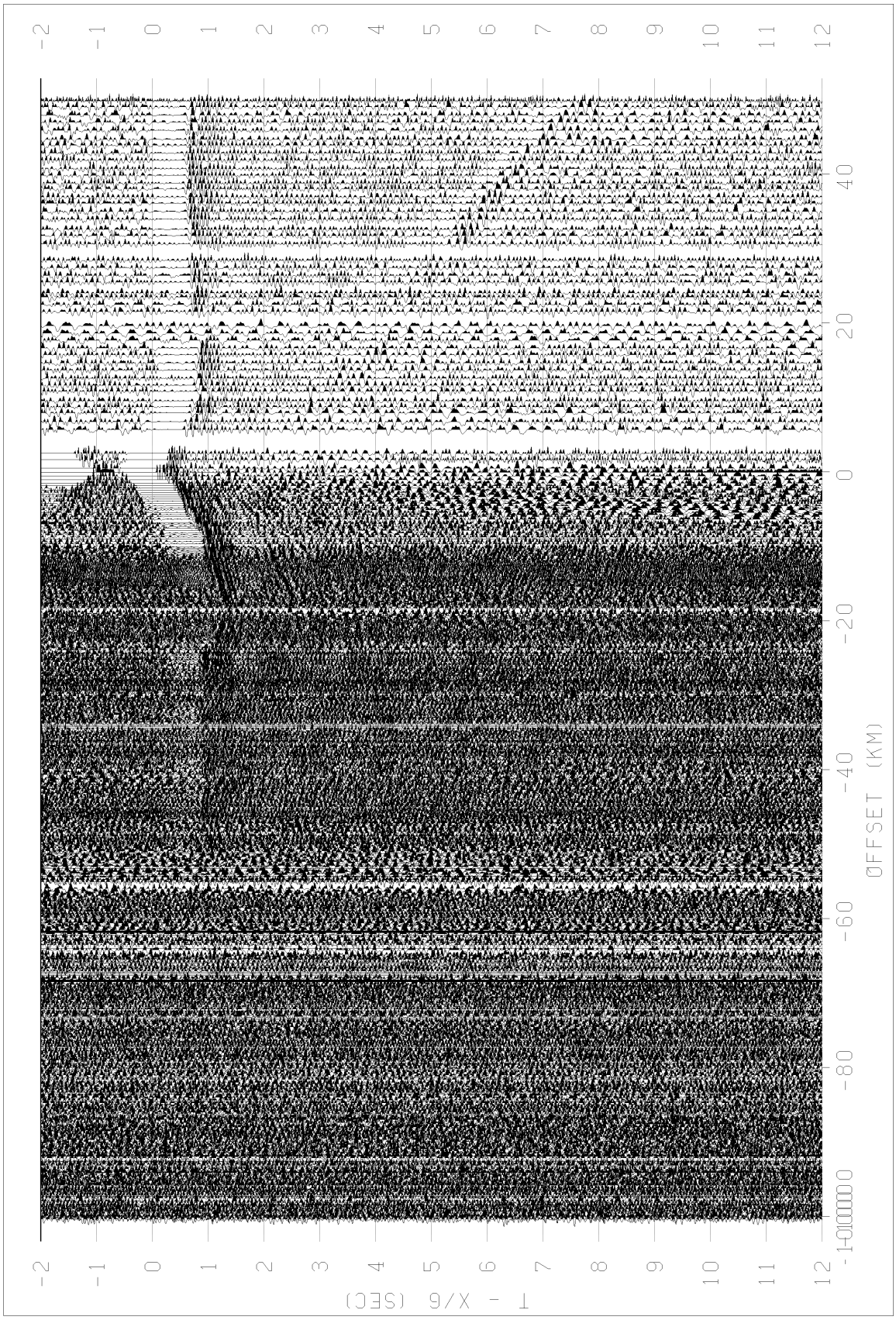

FIGURE . SHOTPOINT 9110, GEOGRAPHIC SEQUENCE NO. 77

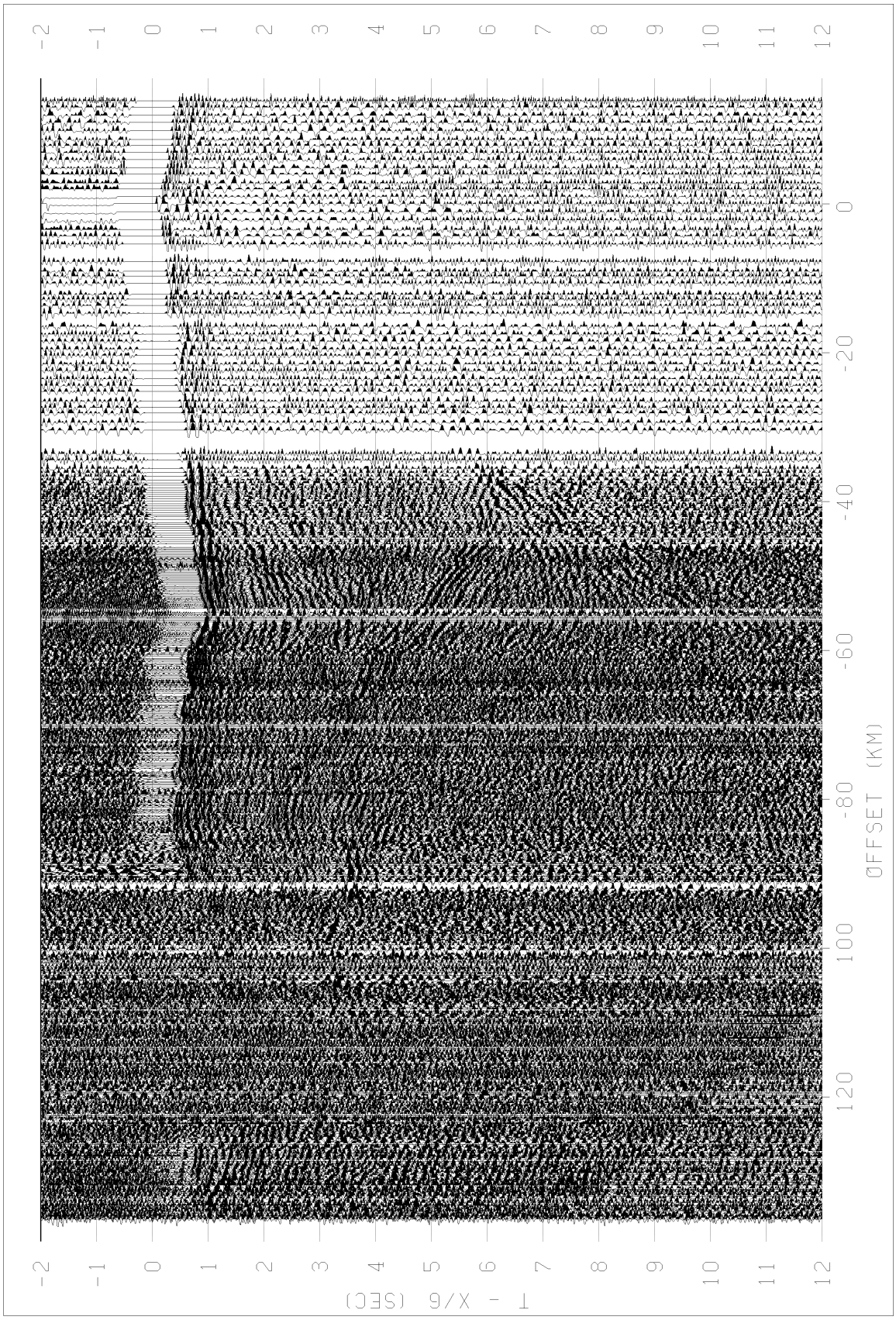

FIGURE . SHOTPOINT 9136, GEOGRAPHIC SEQUENCE NO. 78

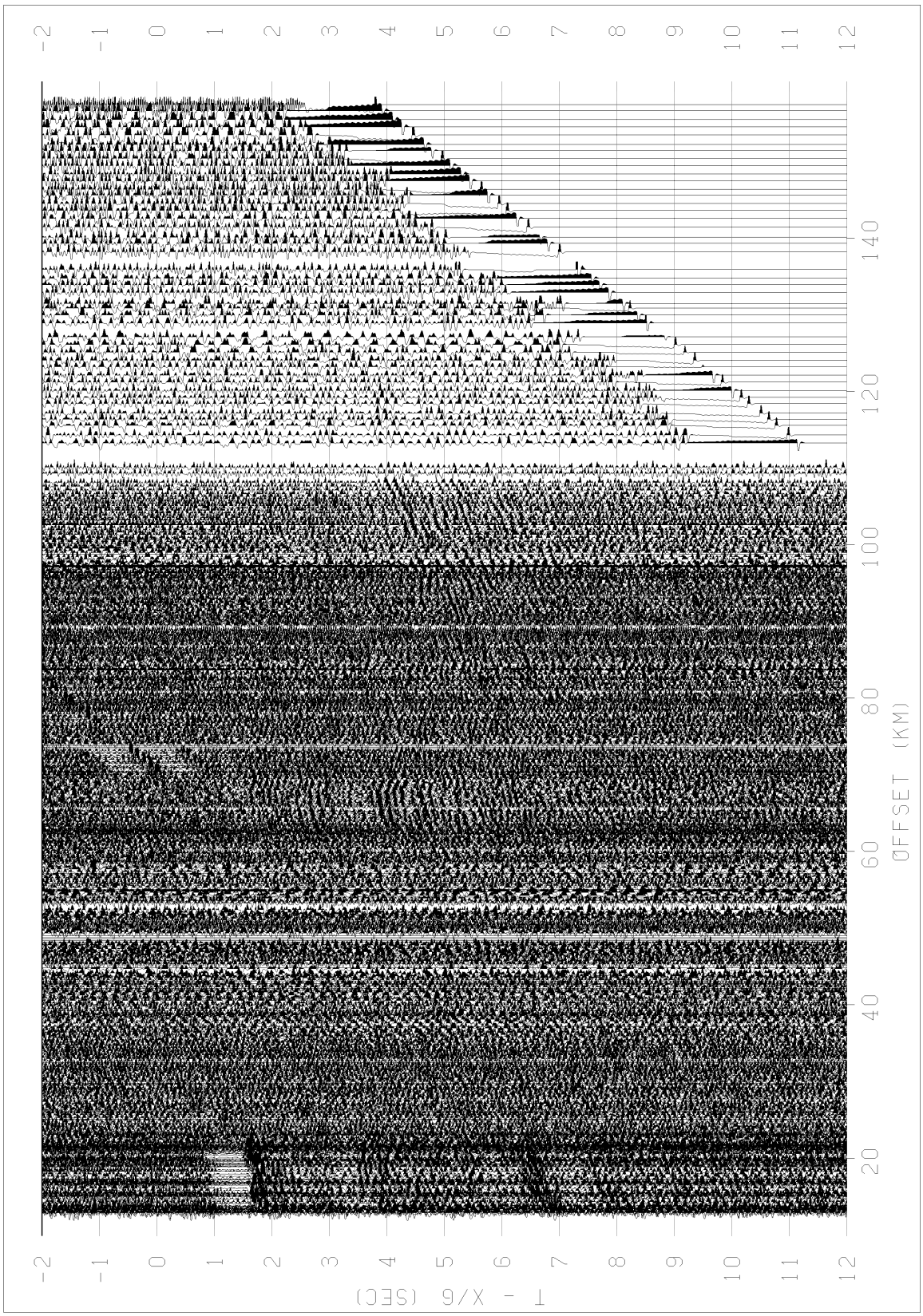

FIGURE . SHOTPOINT 9310, GEOGRAPHIC SEQUENCE NO. 79

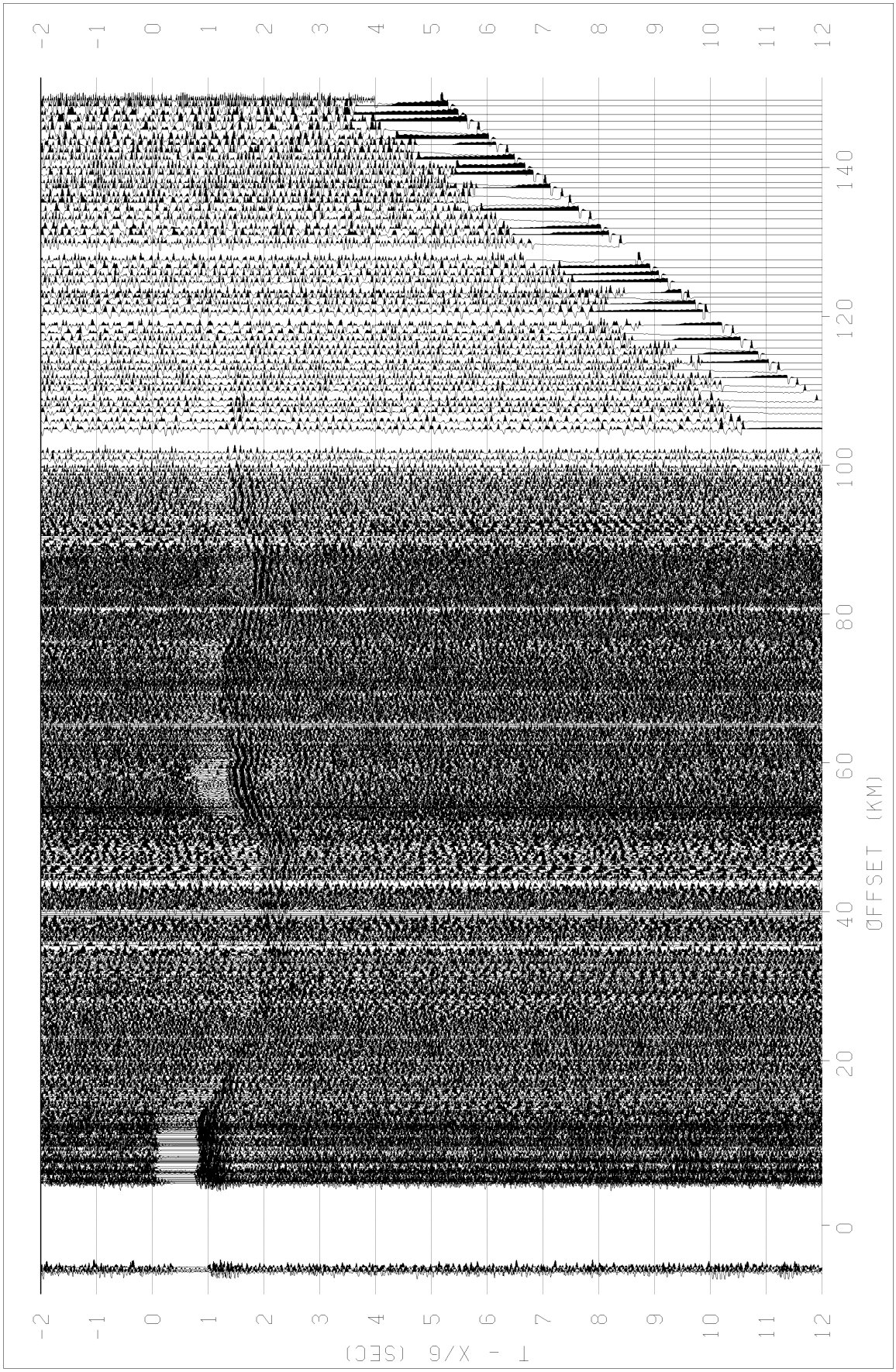

FIGURE . SHOTPOINT 9330, GEOGRAPHIC SEQUENCE NO. 80

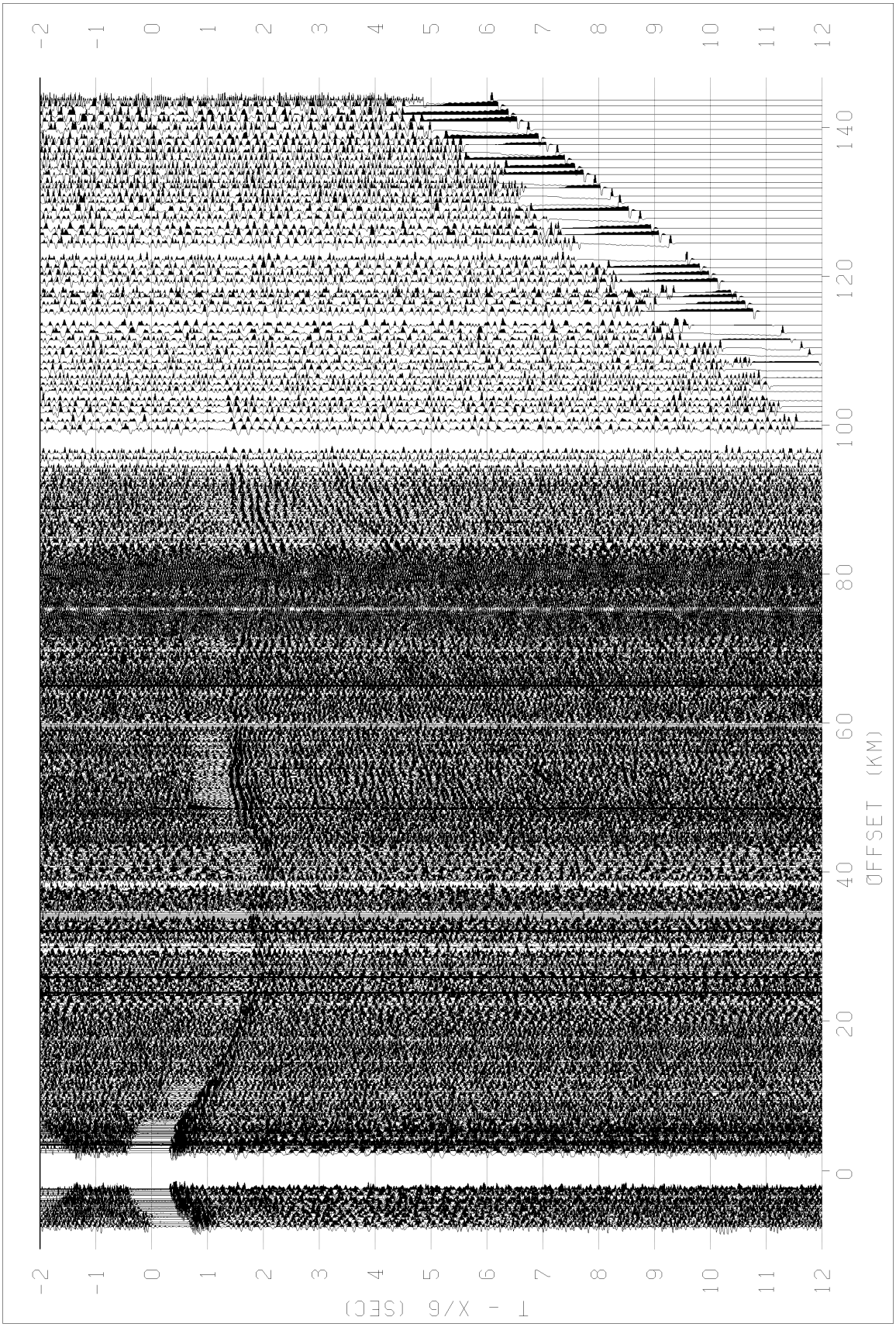

FIGURE . SHOTPOINT 9340, GEOGRAPHIC SEQUENCE NO. 81

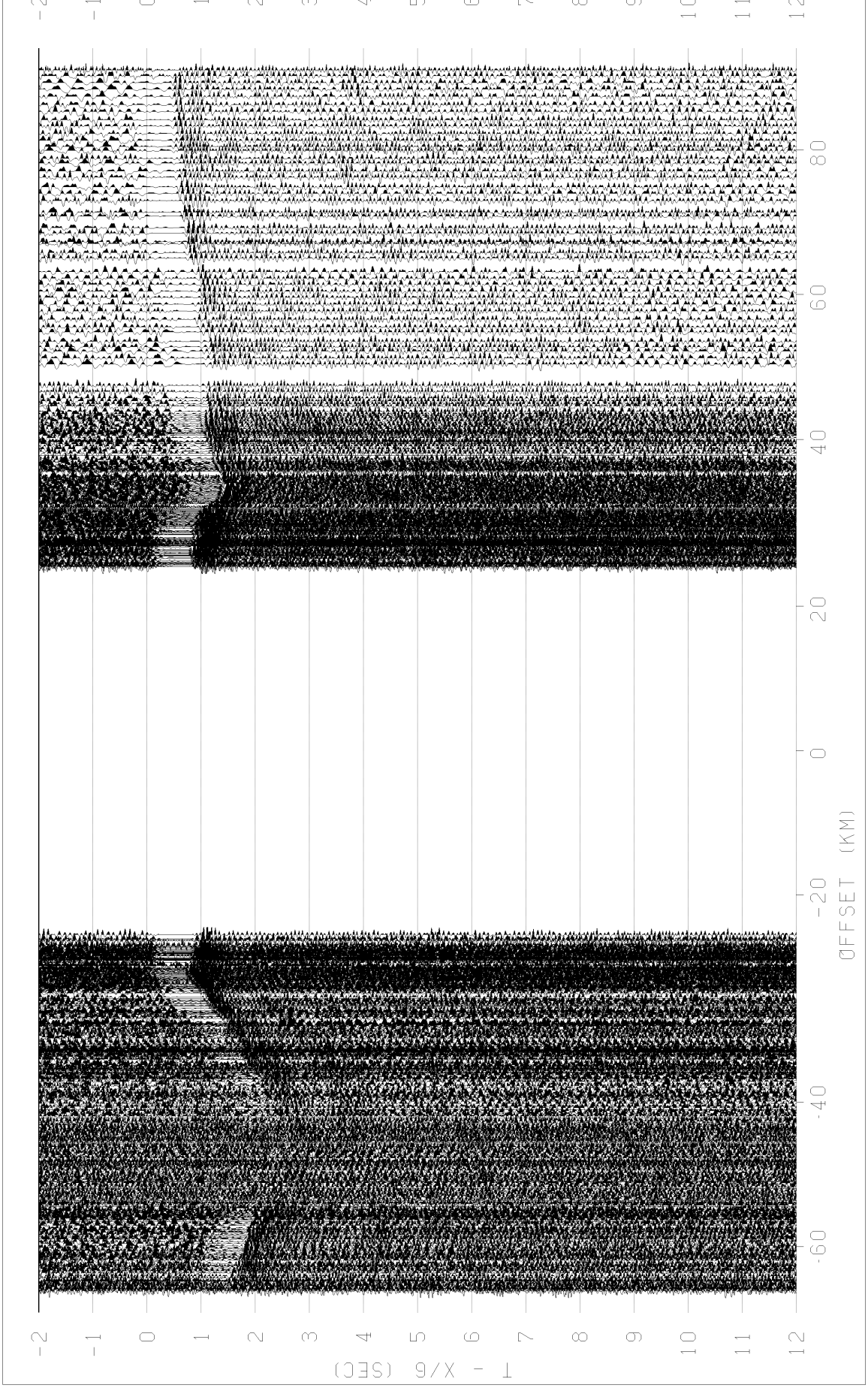

FIGURE . SHOTPOINT 9350, GEOGRAPHIC SEQUENCE NO. 82

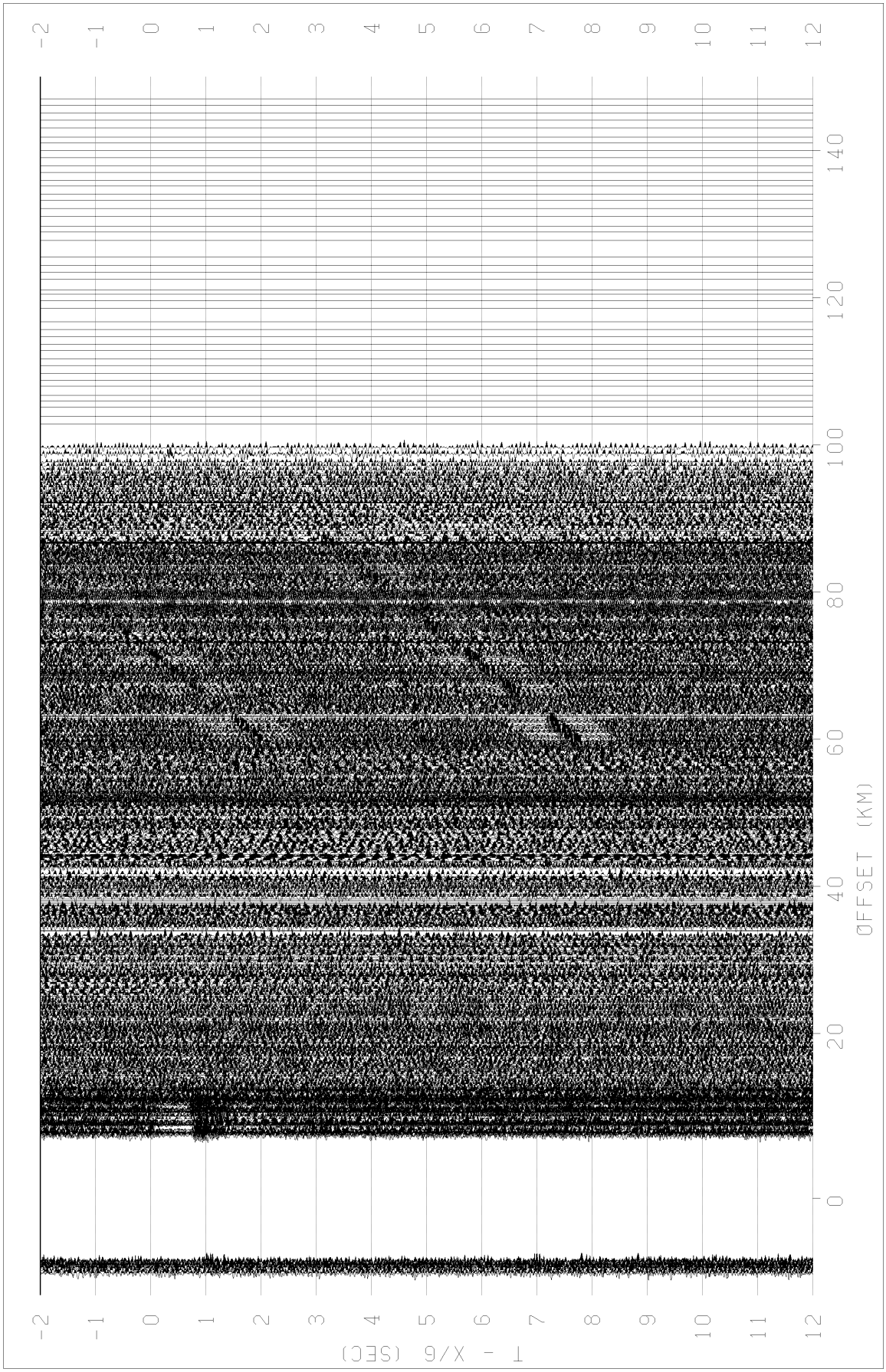

FIGURE . SHOTPOINT 9370, GEOGRAPHIC SEQUENCE NO. 83

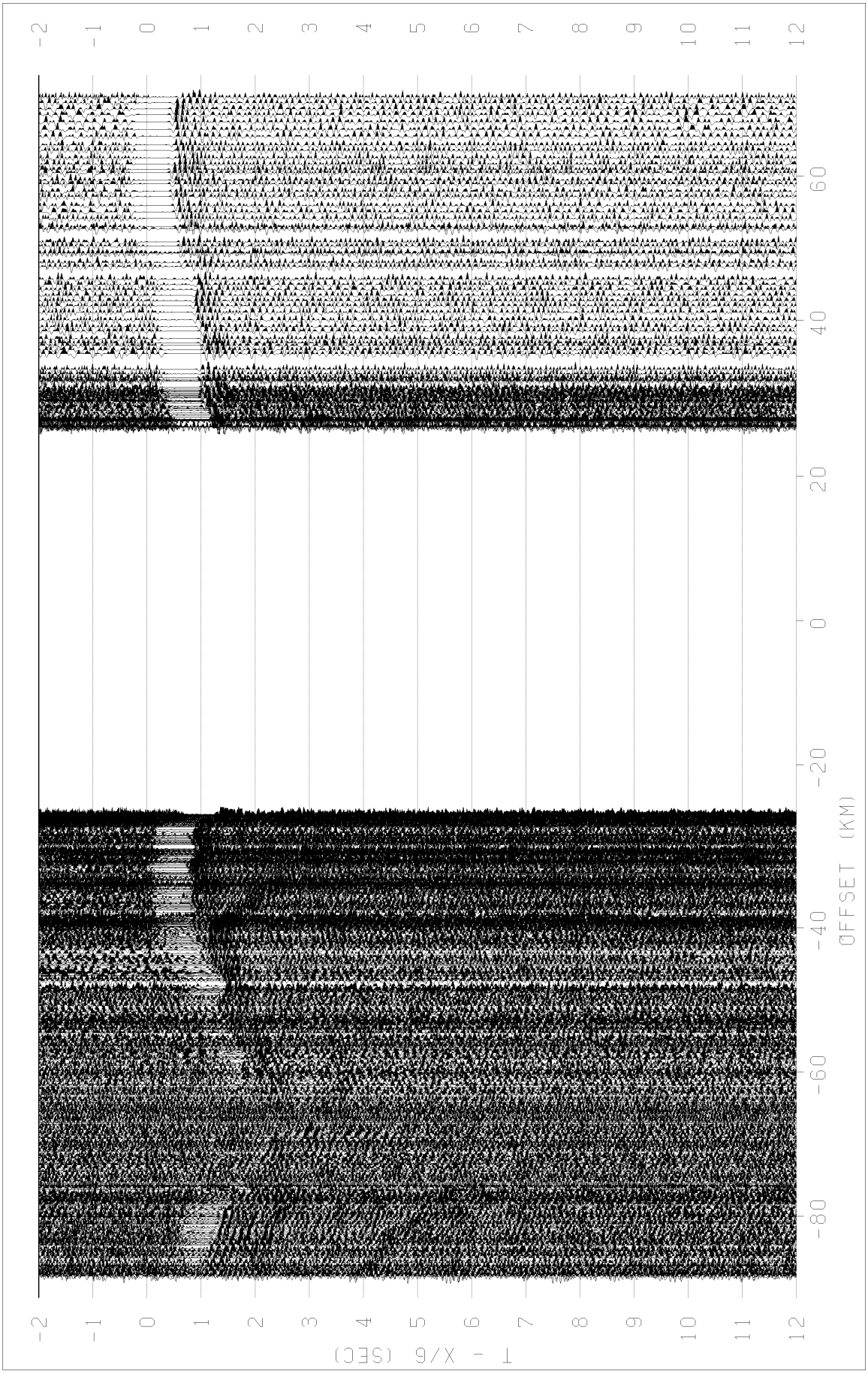

FIGURE . SHOTPOINT 9360, GEOGRAPHIC SEQUENCE NO. 84

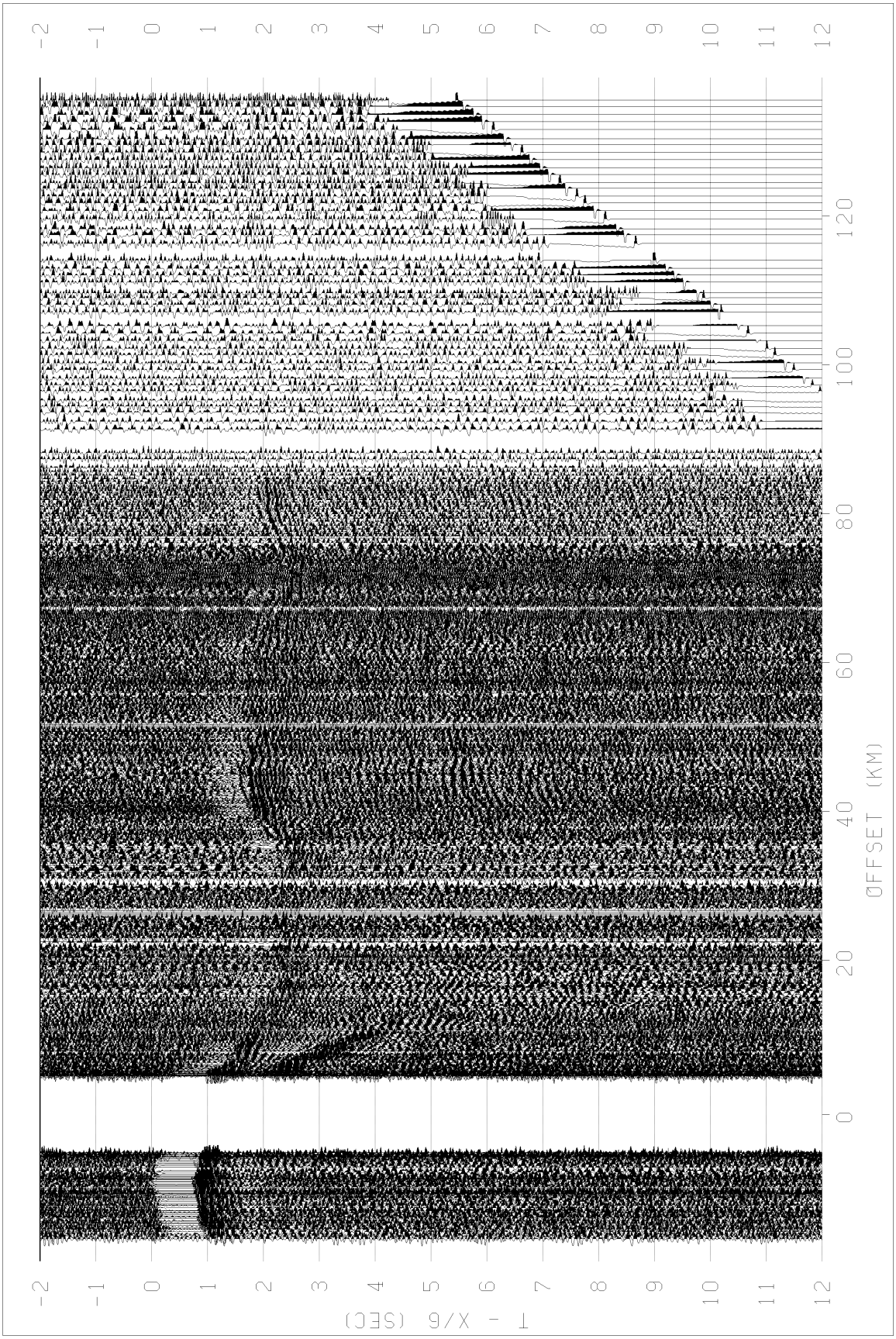

FIGURE . SHOTPOINT 9280, GEOGRAPHIC SEQUENCE NO. 85

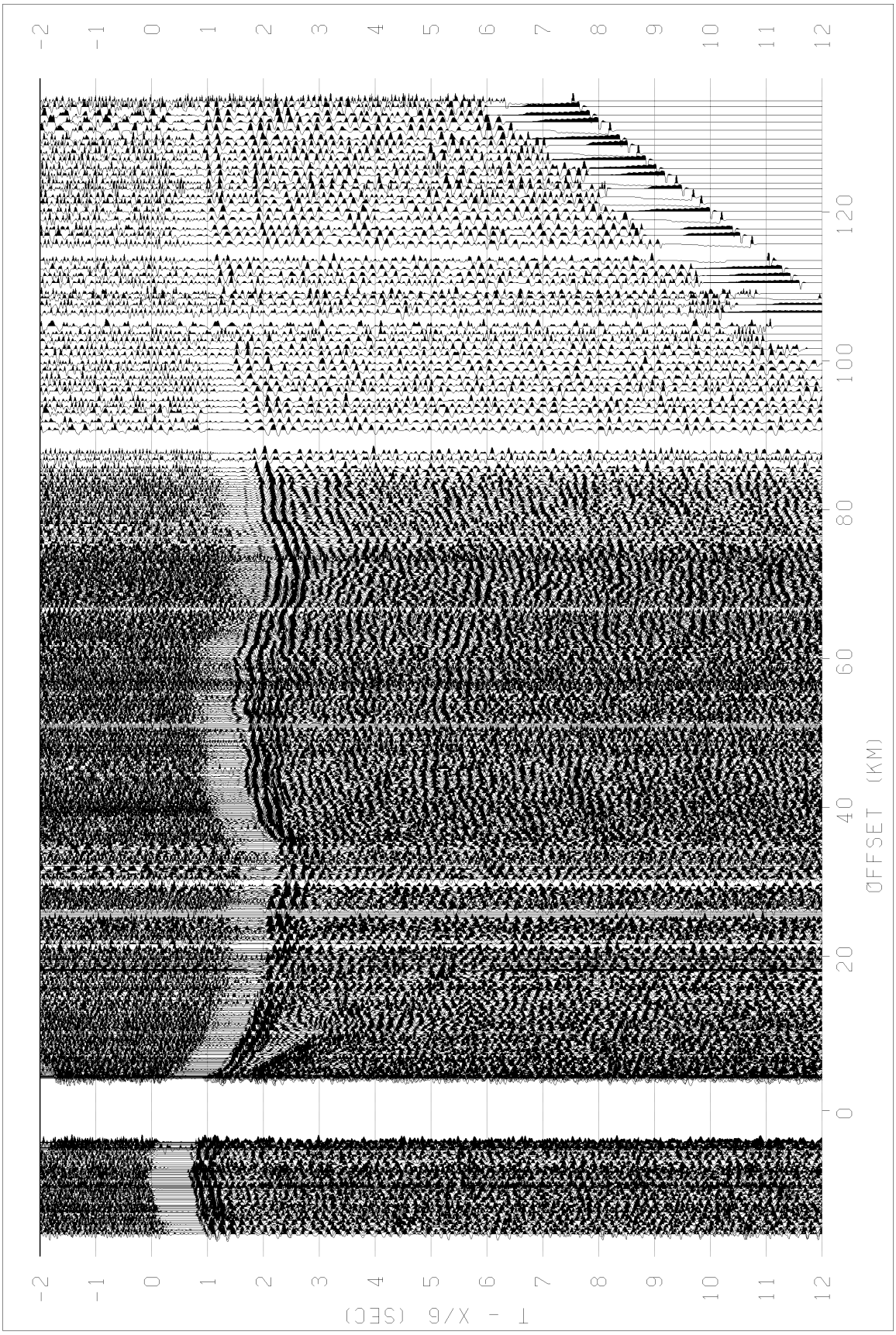

FIGURE . SHOTPOINT 9244, GEOGRAPHIC SEQUENCE NO. 86

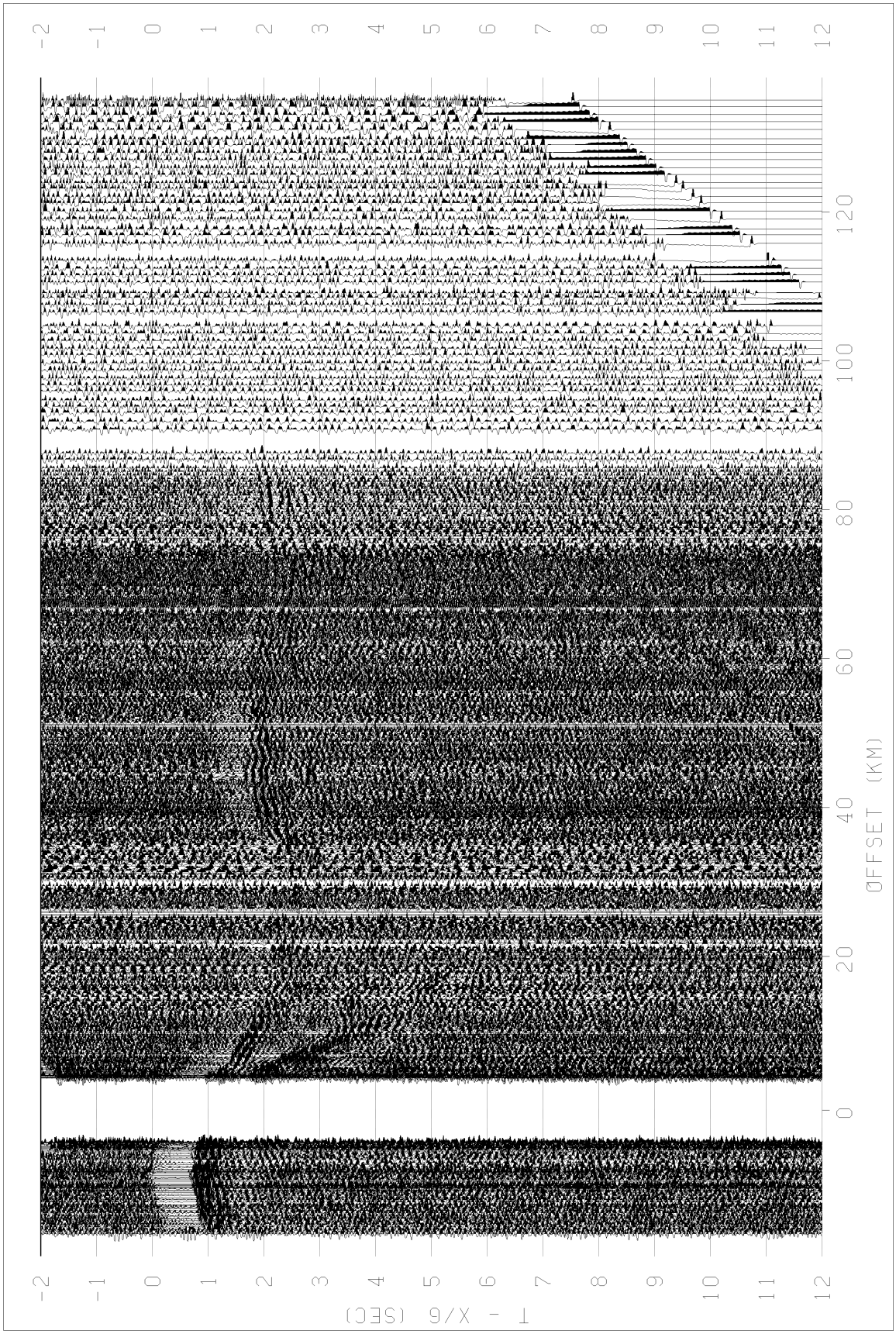

FIGURE . SHOTPOINT 9241, GEOGRAPHIC SEQUENCE NO. 87

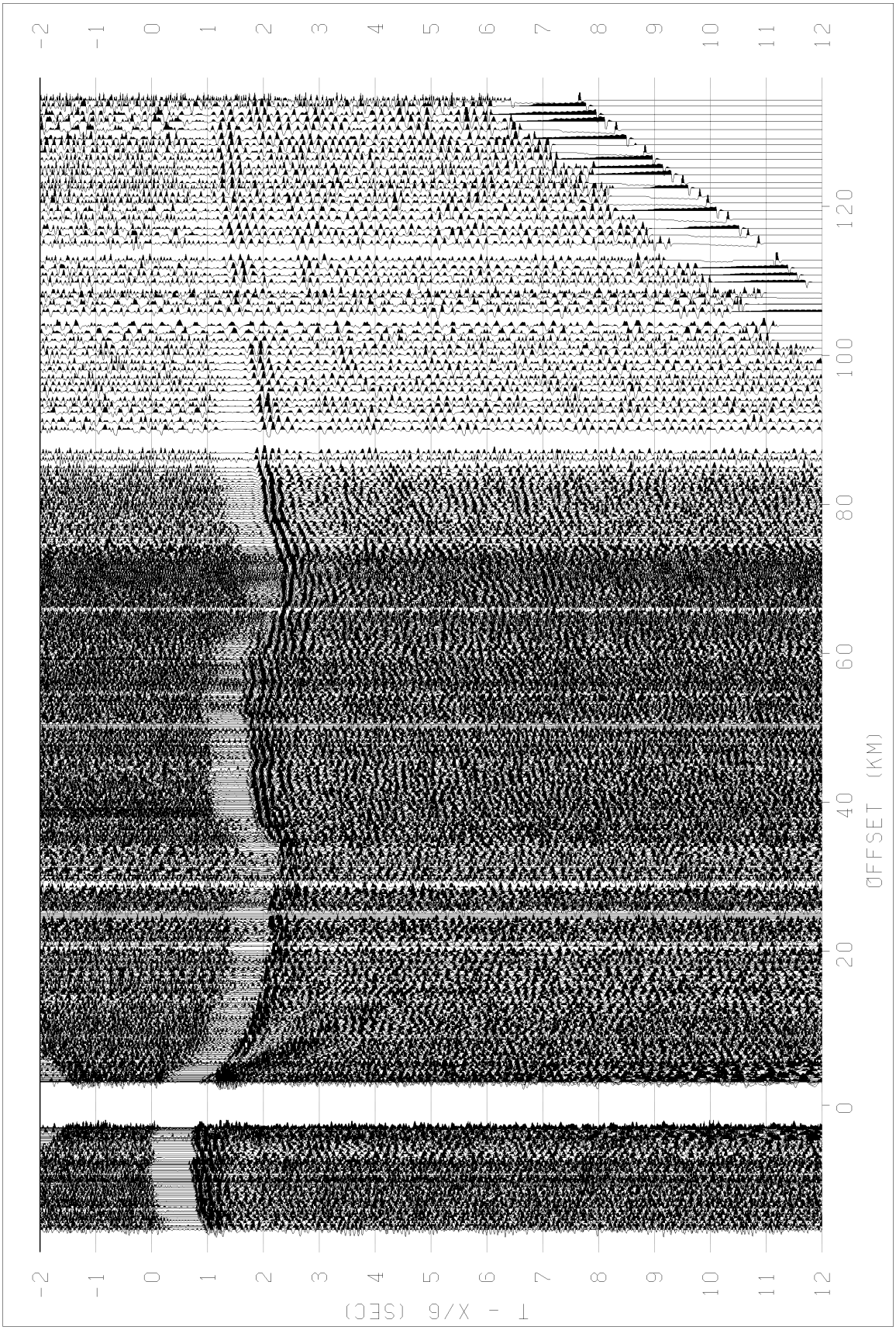

FIGURE . SHOTPOINT 9260, GEOGRAPHIC SEQUENCE NO. 88

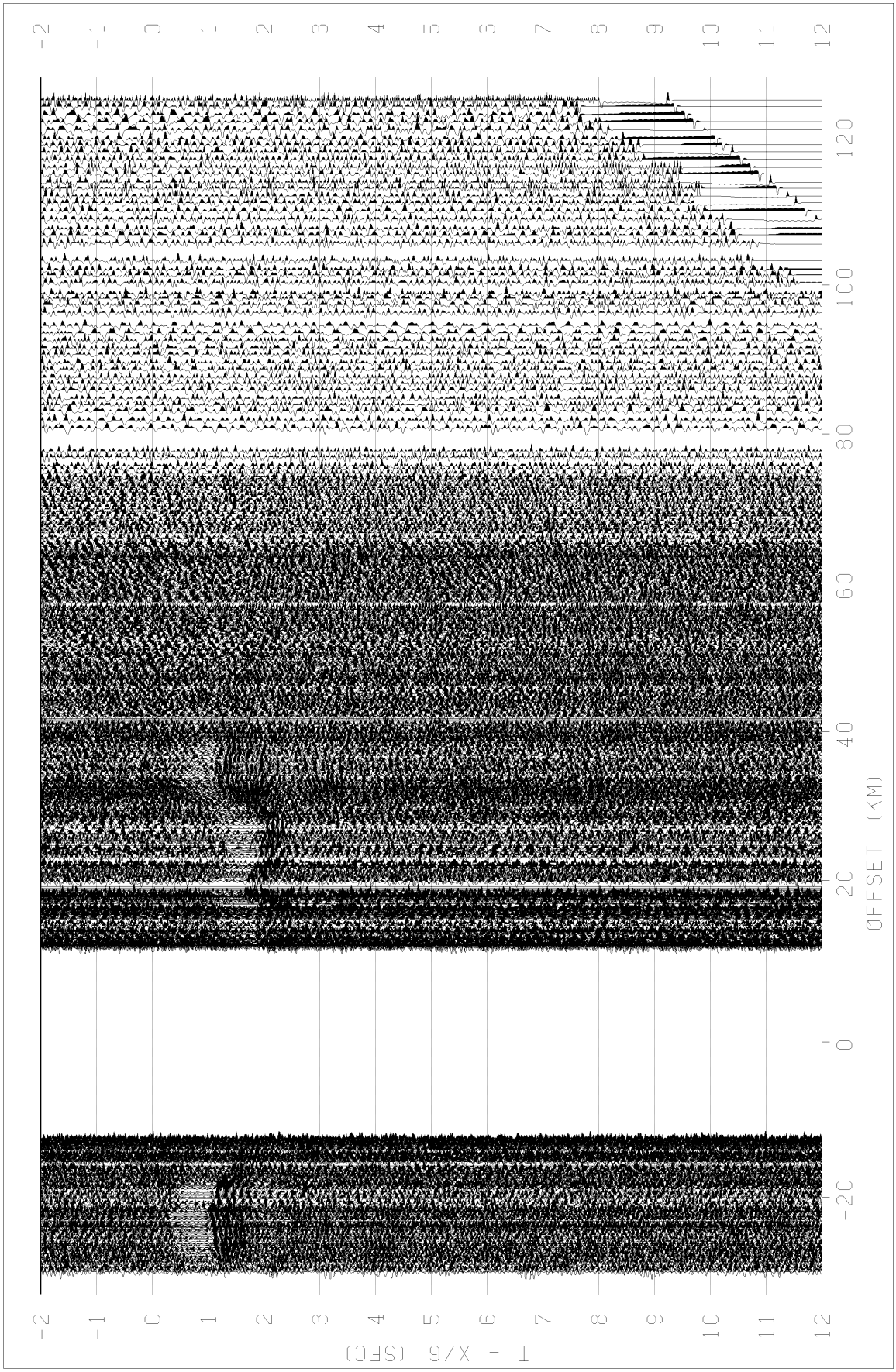

FIGURE . SHOTPOINT 9211, GEOGRAPHIC SEQUENCE NO. 89

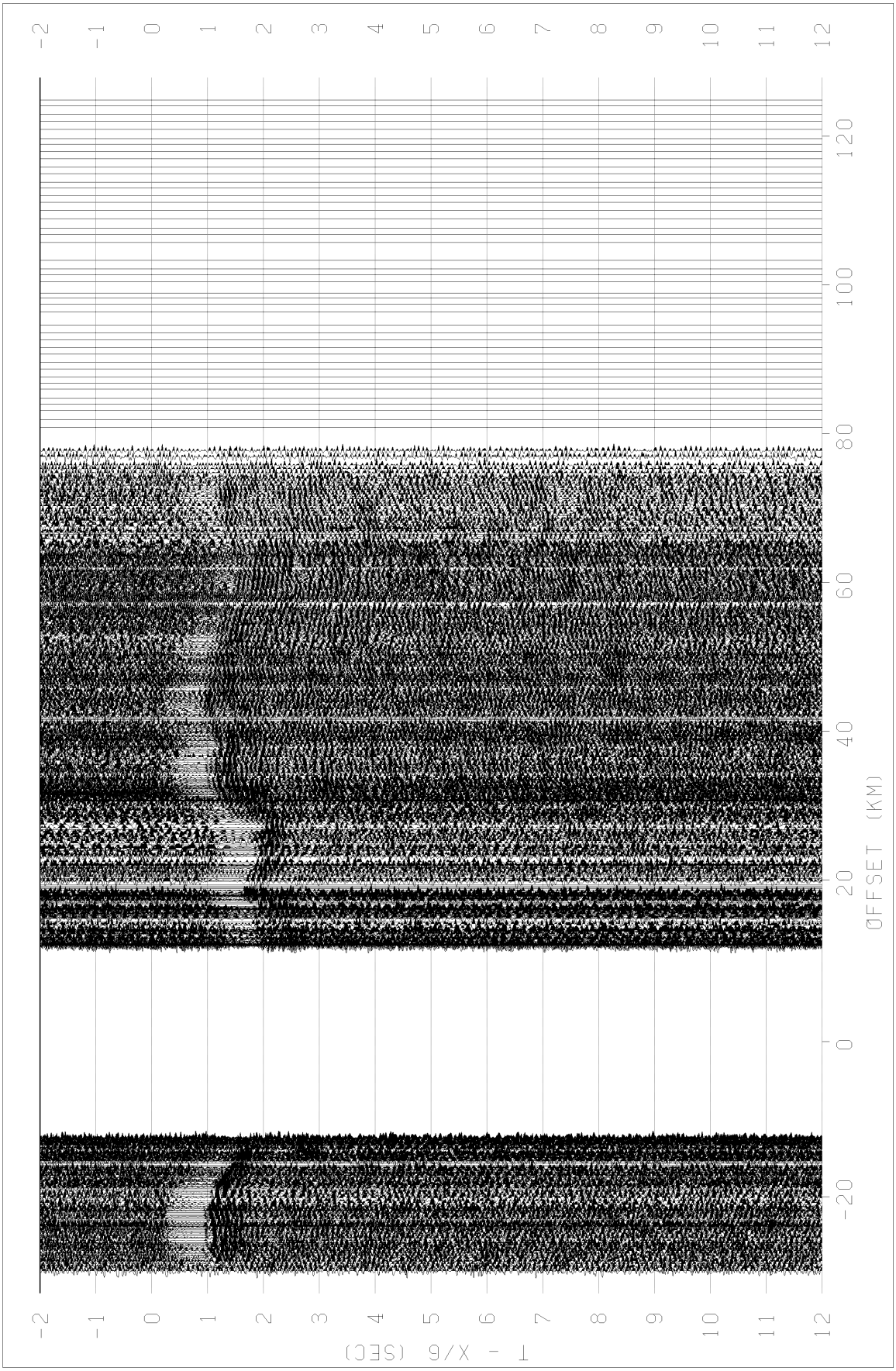

FIGURE . SHOTPOINT 9212, GEOGRAPHIC SEQUENCE NO. 90

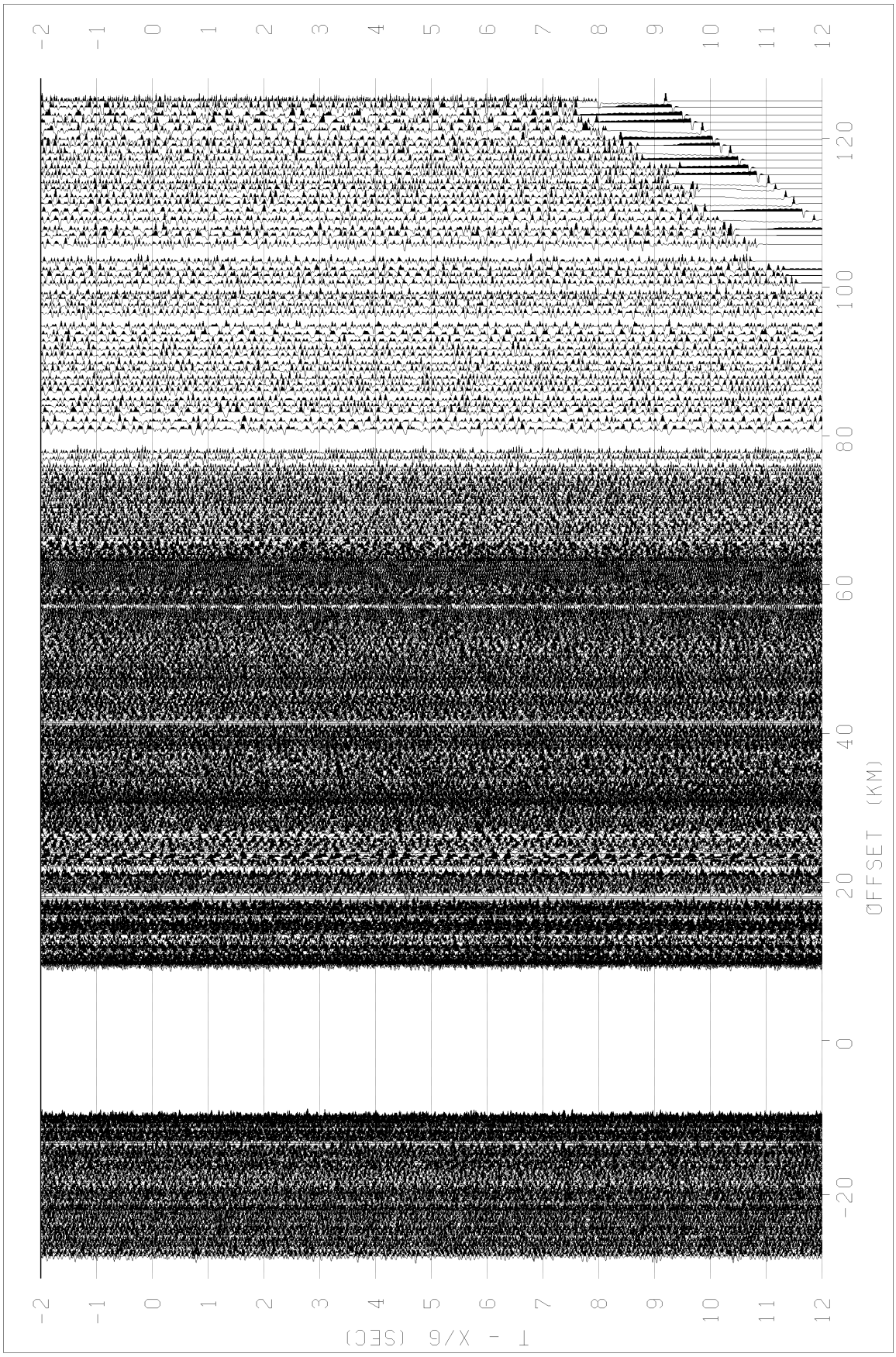

FIGURE . SHOTPOINT 9213, GEOGRAPHIC SEQUENCE NO. 91

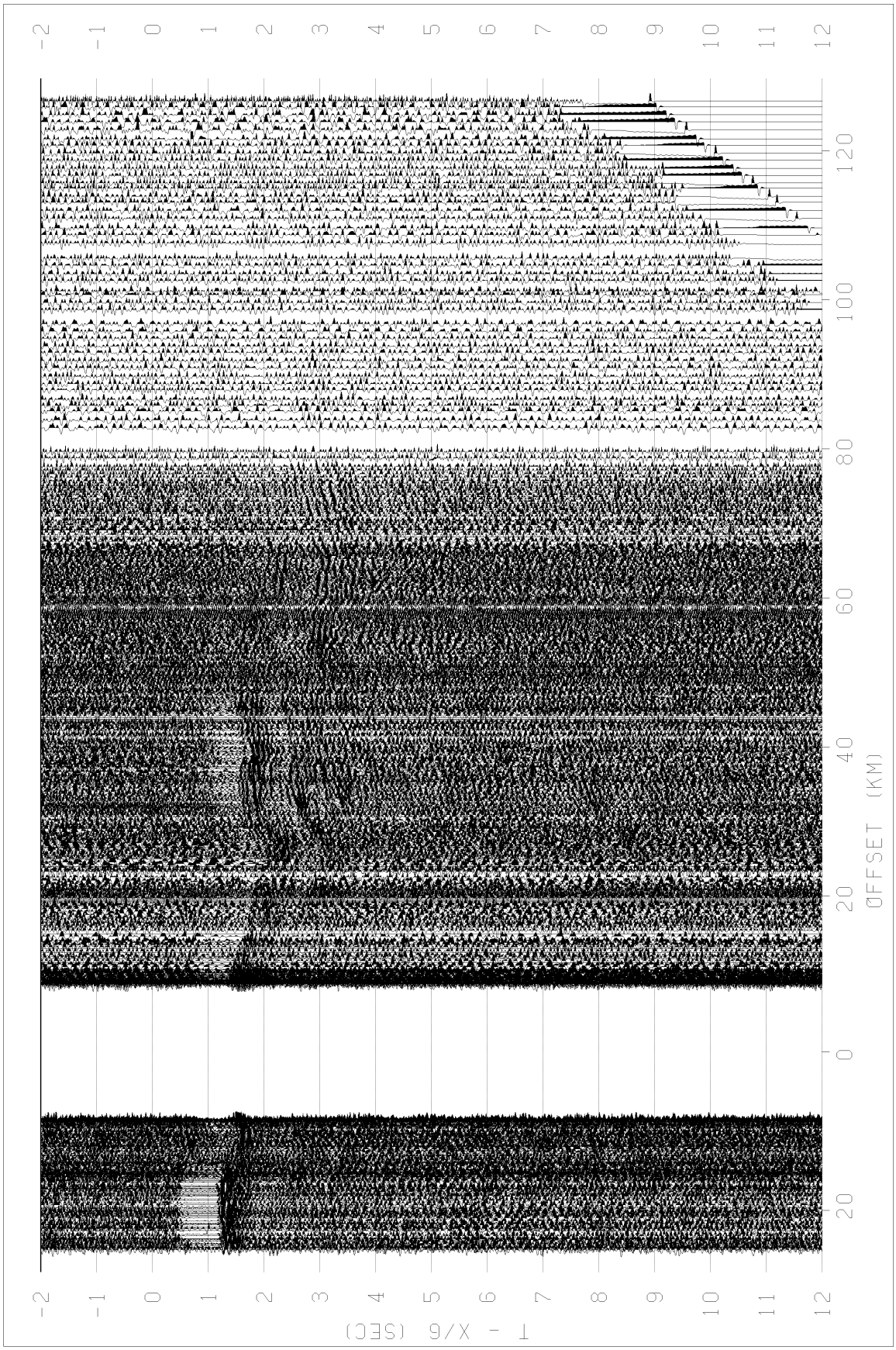

FIGURE . SHOTPOINT 9221, GEOGRAPHIC SEQUENCE NO. 92

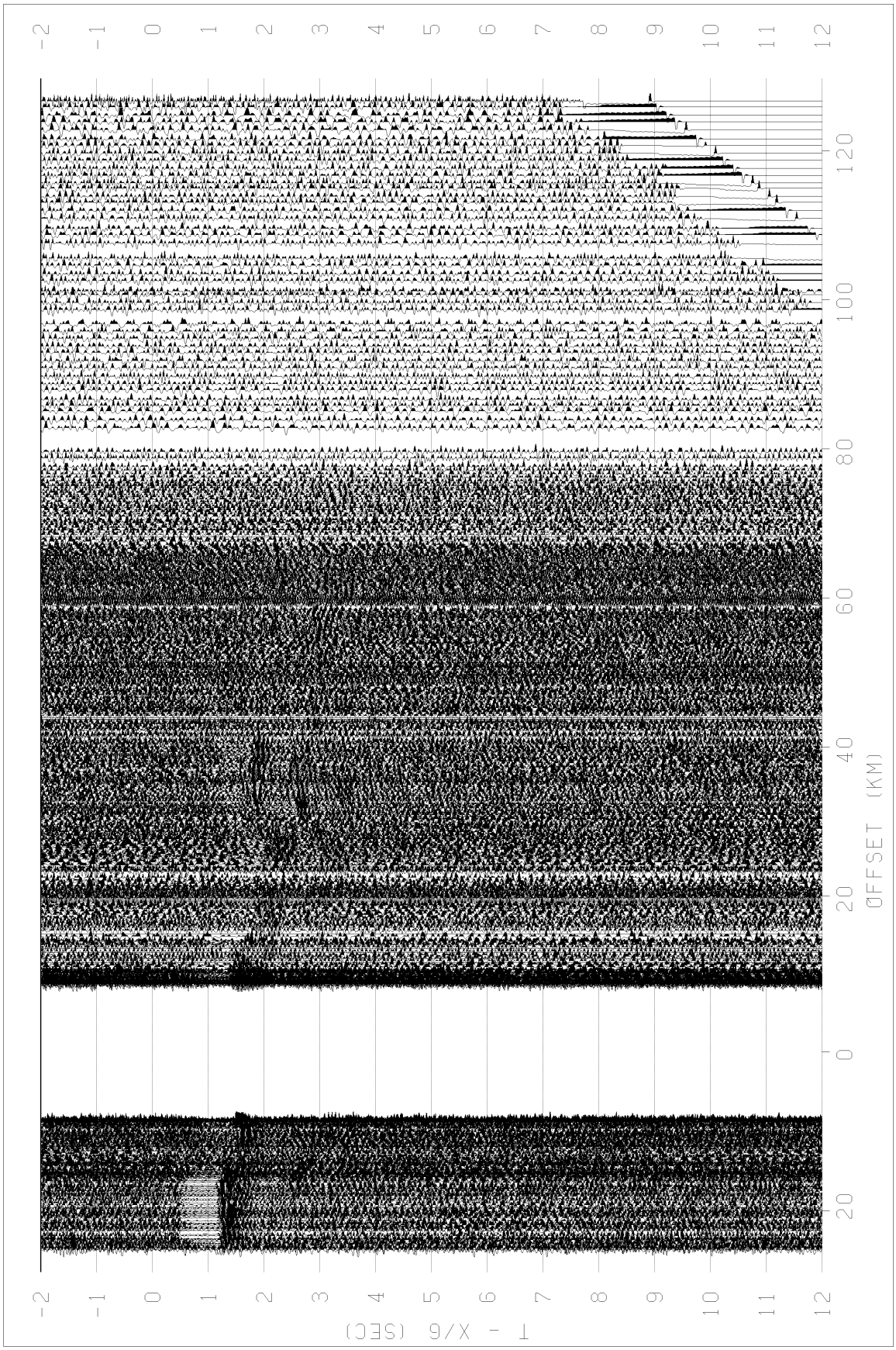

FIGURE . SHOTPOINT 9222, GEOGRAPHIC SEQUENCE NO. 93