ARCHIVE REPORT FOR MOST USGS SEISMIC REFRACTION INVESTIGATIONS CONDUCTED BETWEEN 1978 AND 1991

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Open-File Report 00-507

2000

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

[1]Menlo Park, California

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INTRODUCTION

In 1978, the U.S. Geological Survey (USGS) began acquiring seismic refraction data throughout the U.S. and Saudi Arabia. Numerous professional papers have been published in the literature and the technical details and goals for most of these surveys have been described in USGS Open-file reports (Table 1). This report describes the archiving of the data.

The data have been archived at:

The IRIS* Data Management Center
1408 NE 45th Street
Seattle, WA 98105
Telephone: (206) 547-0393
email: webmaster@iris.washington.edu
web site: www.iris.washington.edu/PASSCAL

In an earlier attempt to permanently archive data, some of the seismic data had been sent to:
National Geophysical Data Center
NOAA E/GCI
325 Broadway
Boulder, CO 80303

However, the National Geophysical Data Center was shut down in the mid-1990's.

The IRIS Data Management Center (DMC) has now become the chief archive center for seismic data of all types (earthquake, explosion, airgun, etc) collected by academia and the USGS. All recoverable data from the USGS refraction project conducted from 1978 to 1991 have been archived in SEG-Y format and sent to the DMC. The surveys are listed in Table 1, along with the USGS Open-file report number.

SEG-Y is a standardized tape format that consists of two tape header blocks followed by a block for each seismic trace (Barry and others, 1975). The first tape header block is 3200-bytes and is used for comments written in EBCIDIC. The second block is a 400-byte binary block with parameters that translator programs use to read the remaining seismic trace blocks. Trace blocks consist of a 240 btye header followed by the seismic data. I used the EBCIDIC comment block to describe the trace headers.

Because some of the data had been previously archived in SEG-Y format, the trace header formats differ for different surveys. The four different trace header formats are listed in Table 1 and the EBCIDIC headers describing the trace headers are shown in figures 1-4. For a few surveys, there were some inconsistencies between the archive data and the Open-File report information. Archive data for the Imperial Valley and Northeastern California investigations (Survey No. 8 and 1 in Table 1) have been changed to match the reports. Corrected shot lists for the TACT87 (Survey No. 35 in Table 1) and the Columbia Plateau I, 1984 (Survey No. 21 in Table 1) investigations are given in this report (Table 2 and 3).

* IRIS is and acronym for Incorporated Research Institutes in Seismology, which is supported by the National Science Foundation.

To conserve space, acronyms have been used for several surveys listed in table 1. The surveys are listed here with their full name.

TACT – Trans-Alaska crustal Transect

TACT PWS & TOK – Trans-Alaska crustal Transect
PWS – Prince William Sound line
TOK – Tok Junction line

TACT ORP – Trans-Alaska crustal Transect
ORP – Onelles Reflection Profile line

PACE – Pacific-to-Arizona Crustal Transect

NYNEX – New York – New England Experiment

REFERENCES

Barry, K.M., D.A. Cavers, and C.W. Kneale, 1975, Recommended standards for digital tape formats: Geophysics, v. 32, p1073-1084.

Table 1. Archived Projects

	SURVEY NAMES	USGS OPEN-FILE REPORT	FORMAT	SIZE	STUDY LOCATION
	Multi-year data	(1979-1985)		(MB)	
1	Northeastern California 1979-1985	OFR 87-625	1	76	CA Cascade Volcanoes & surrounding areas
2	NTS 1980-1983 (two OFRs - 1980-82; 1983)	OFR 83-588 OFR 84-661	1	20	Beatty, NV
3	Great Valley axial lines 1981-1982	OFR 89-494	1	12	central California
4	Livermore	OFR 99-146	2	11	Livermore, CA
	1978				
5	Saudi	OFR 02-37	2	22	Saudi Arabia
6	Oregon Cascade		2	8	Mt. Hood, Ore
7	Snake River Plain	Final Report	2	5	Southern Idaho
	1979				
8	Imperial Valley I and II	OFR 88-255	1	29	Imperial Valley, CA
	1980				
9	Gilroy		2	9	Gilroy, CA
10	Mojave Desert	OFR 88-580	1	17	Lancaster, CA
11	Mississippi Embayment		2	45	New Madrid, TN
	1981				
12	San Juan Bautista		2	9	San Juan Bautista, CA
	1982				
13	Morro Bay	OFR 84-642	2	12	Paso Robles, CA region
14	Long Valley	OFR 83-708	2	14	Mammoth Lakes, CA
	1983				
15	Coalinga refraction	OFR 84-643	2	13	Coalinga, CA
16	Coalinga Aftershocks	OFR 85-435	2	28	Coalinga, CA
17	Long Valley	OFR 85-708	2	22	Mammoth Lakes, CA
18	Central Oregon Profile	OFR 89-124	2	17	Bend, Ore
	1984				
19	TACT Chugach	OFR 85-531	1	17	south-central Alaska
20	TACT Richardson Hwy	OFR 86-274	1	28	south-central Alaska
21	Columbia Plateau I	OFR 88-226	2	14	Hanford, WA

Table 1. Archived Projects

	SURVEY NAMES	USGS OPEN-FILE REPORT	FORMAT	SIZE	STUDY LOCATION
	1984			(MB)	
22	Newberry Caldera 3-D	OFR 86-352	2	21	Bend, Ore
23	Maine-Quebec strike lines	OFR 87-133	1	53	Maine
24	Maine-Quebec cross-strike lines	OFR 86-47	1	35	Maine
	1985				
25	TACT PWS & TOK	OFR 87-440	1	45	south-central Alaska
26	Yucca Mtn (Nevada Test Site)	OFR 85-591	1	55	Beatty, NV
27	Medicine Lake 3-D	OFR 86-362	2	17	Mt. Shasta, CA
28	PACE 85	OFR 87-86	1	52	SE Calif. & western Arizona
	1986				
29	Nevada PASSCAL	OFR 87-415	2	45	northwestern Nevada
30	Chalfant Valley Aftershocks	OFR 88-71	1	10	Bishop, CA
31	Tehachapi		2	9	Bakersfield, CA
32	San Luis Obispo	OFR 88-35	1	17	San Luis Obispo, CA
	1987				
33	Whittier Narrows Shot	no report	1	2	Whittier, CA
34	PACE 87	OFR 88-694	1	48	western Arizona
*	TACT Alaska Range	OFR 89-321	2	92	central Alaska
35	TACT Fairbanks North ORP (short reflection line)	OFR 92-196			central Alaska Fairbanks-Yukon river, AK
	1988				
36	NYNEX	OFR 90-426	2	282	New York-New England
37	Columbia Plateau II	Stanford Report	CP88	531	Hanford, WA
	1990				
38	TACT-Brooks Range	OFR 93-265	BR90	2282	northern Alaska
	1991				
39	SF Bay Peninsula Profiles	OFR 92-570	2	84	San Francisco, CA
*	TACT 1987 are archived as one dataset. Two reports were written for the project.				
	Boxes in this table indicate the project and grouping of data.				

C 1 REEL IDENTIFICATION HEADER BYTES:
C 2 3217 - 3218 SAMPLING INTERVAL (MICROSECS).
C 3 3221 - 3222 NUMBER OF SAMPLES PER TRACE.
C 4 3225 - 3226 DATA SAMPLE FORMAT CODE.
C 5 3255 - 3256 MEASUREMENT SYSTEM (1 = METERS; 2 = FEET)
C 6
C 7
C 8 TRACE IDENTIFICATION HEADER BYTES :
C 9 1 - 4 TRACE SEQUENCE NUMBER WITHIN REEL.
C10 5 - 8 TRACE SEQUENCE NUMBER WITHIN REEL.
C11 9 - 12 STATION LOCATION NUMBER.
C12 29 - 30 TRACE ID CODE (1 = SEISMIC DATA).
C13 37 - 40 SHOTPOINT-RECEIVER DISTANCE (M).
C14 41 - 44 STATION ELEVATION (M).
C15 45 - 48 SHOTPOINT ELEVATION (M).
C16 49 - 52 SOURCE DEPTH (M).
C17 69 - 70 SCALAR TO BE APPLIED TO ALL ELEVATIONS.
C18 71 - 72 SCALAR TO BE APPLIED TO ALL COORDINATES.
C19 73 - 76 SHOTPOINT COORDINATE - X.
C20 77 - 80 SHOTPOINT COORDINATE - Y.
C21 81 - 84 RECEIVER COORDINATE - X.
C22 85 - 88 RECEIVER COORDINATE - Y.
C23 89 - 90 COORDINATE UNITS (1 = METERS; 2 = SECONDS OF ARC).
C24 115 - 116 NUMBER OF SAMPLES IN THIS TRACE.
C25 117 - 118 SAMPLE INTERVAL IN MICROSECONDS FOR THIS TRACE.
C26 121 - 122 INSTRUMENT ATTENUATION IN DB.
C27 157 - 158 SHOT TIME - YEAR.
C28 159 - 160 SHOT TIME - DAY OF YEAR.
C29 161 - 162 SHOT TIME - HOUR OF DAY (24 HOUR CLOCK).
C30 163 - 164 SHOT TIME - MINUTE OF HOUR.
C31 165 - 166 SHOT TIME - SECOND OF MINUTE.
C32 167 - 168 TIME BASIS CODE (2 = GMT).
C33 181 - 182 SHOT TIME - MILLISECONDS.
C34 183 - 184 SHOTPOINT LOCATION NUMBER.
C35 185 - 186 RECORDING INSTRUMENT UNIT NUMBER.
C36 191 - 192 DISTANCE WEIGHTING EXPONENT (HUNDREDTHS).
C37 193 - 194 SHOT SEQUENCE NUMBER (SHOT NUMBER).
C38 195 - 196 SHOT SIZE (KG).
C39 197 - 200 SHOTPOINT - STATION AZIMUTH (SEC OF ARC).
C40 201 - 204 TIME OF FIRST POINT MINUS SHOT TIME (MSEC)

Figure 1. SEG-Y trace header Format 2

C 1	Project:	USGS Open-File Report OFR XX-XXX		
C 2	For header format see Luetgert et al 1988 and Barry et al 1975			
C 3	REEL IDENTIFICATION HEADER BYTES:			
C 4	3217 -3218	SAMPLING INTERVAL (MICROSECS).		
C 5	3221 -3222	NUMBER OF SAMPLES PER TRACE.		
C 6	3225 -3226	DATA SAMPLE FORMAT CODE.		
C 7	3255 -3256	MEASUREMENT SYSTEM (1 = METERS; 2 = FEET)		
C 8	TRACE IDENTIFICATION HEADER BYTES :			
C 9	9 -12	SHOT	181-184	TRACE TIME; MICROSECONDS
C10	13-16	RECEIVER LOCATION NUMBER	185-186	MILLISECOND CORRECTION
C11	17-21	SHOTPOINT LOCATION NUMBER	187-188	CHARGE SIZE (kg)
C12	29-30	TRACE ID CODE	189-190	SHOT TIME; YEAR
C13		(1 = SEISMIC DATA)	191-192	SHOT TIME; DAY
C14	35-36	DATA USE (1=PRODUCTION)	193-194	SHOT TIME; HOUR
C15	37-40	OFFSET	195-196	SHOT TIME; MINUTE
C16	41-44	RECEIVER ELEVATION (M)	197-198	SHOT TIME; SECOND
C17	45-48	SHOTPOINT ELEVATION (M)	199-202	SHOT TIME; MICROSECOND
C18	49-52	SOURCE DEPTH (M)	203-204	AZIMUTH
C19	69-70	SCALAR FOR BYTES 41-68	209-212	REDUCTION VELOCITY
C20	71-72	SCALAR FOR BYTES 73-88		(KM/SEC)
C21	73-76	SHOTPOINT COORDINATE - X		
C22	77-80	SHOTPOINT COORDINATE - Y		
C23	81-84	RECEIVER COORDINATE - X		
C24	85-88	RECEIVER COORDINATE - Y		
C25	89-90	COORDINATE UNITS		
C26	109-110	SHOT TIME TO TRACE START DELAY (milliseconds)		
C27	115-116	NUMBER OF SAMPLES IN TRACE		
C28	117-118	SAMPLE RATE IN MICROSECONDS		
C29	119-120	GAIN TYPE (1=FIXED)		
C30	121-122	GAIN CONSTANT		
C31	123-124	INITAL INSTRUMENT GAIN IN DB		
C32	157-158	TRACE TIME; YEAR		
C33	159-160	TRACE TIME; DAY		
C34	161-162	TRACE TIME; HOUR		
C35	163-165	TRACE TIME; MINUTE		
C36	165-166	TRACE TIME; SECOND		
C37	167-168	TIME BASIS CODE (2 = GMT)		
C38	175-176	DIGITIZING ERROR CODE		
C39	177-178	DISTANCE-AZIMUTH ALGORITHM (1 = Sodano)		
C40	179-180	SPHEROID (5 = WGS 1972)		

Figure 2. SEG-Y trace header Format 2

```
C 1  CLIENT: STANFORD UNIV.        COMPANY: STANFORD UNIV.       CREW NO: 1
C 2  LINE: EAST-WEST   AREA: COLUMBIA PLATEAU, WA  MAP ID:
C 3  REEL NO: 4      DAY-START OF REEL:11/21 YEAR:1988 OBSERVER: CRAIG JARCHOW
C 4  INSTRUMENT: MFG: GUS       MODEL: SGR III   SERIAL NO: MANY DIFFERENT #s
C 5  DATA TRACES/RECORD: 76    AUXILIARY TRACES/RECORD: 0      CDP FOLD: 1
C 6  SAMPLE INTERVAL: 2 MS   SAMPLES/TRACE:16000 BITS/IN:6250 BYTES/SAMPLE: 4
C 7  RECORDING FORMAT:SGR    FORMAT THIS REEL:SEGY  MEASUREMENT SYSTEM:METRIC
C 8  SAMPLE CODE: FLOATING PT:YES FIXED PT:NO  FIXED PT-GAIN:NO  CORELATED:NO
C 9  GAIN  TYPE: FIXED:NO  BINARY:NO  FLOATING POINT:YES OTHER:NO
C10  FILTERS: ALIAS:200 HZ  NOTCH: 60 HZ  BAND:  0 - 200 HZ  SLOPE: 0 -250 DB/OC
C11  SOURCE: TYPE:EXPLOSION  NUMBER/POINT:1     POINT INTERVAL: 2 km
C12  PATTERN:NONE                    LENGTH        WIDTH
C13  SWEEP: START     HZ  END     HZ  LENGTH      MS  CHANNEL NO     TYPE
C14  TAPER: START LENGTH       MS  END LENGTH       MS  TYPE
C15  SPREAD: OFFSET        MAX DISTANCE:80 km  GROUP INTERVAL: 125 METERS
C16  GEOPHONES: PER GROUP:12  SPACING:5m  FREQUENCY:8Hz MFG: MARK    MODEL:L25F
C17  PATTERN: LINEAR, IN-LINE          LENGTH        WIDTH
C18  TRACES SORTED BY: RECORD:NO  CDP:NO  OTHER:SHOT (MAJOR KEY), STATION (MINOR
C19  AMPLITUDE RECOVERY: NONE:YES  SPHERICAL DIV:NO    AGC:NO OTHER:NO
C20  MAP PROJECTION:TRANSVERSE MERCATOR  ZONE ID      COORDINATE UNITS:METERS
C21  PROCESSING: CASSETTE TO 9-TRACK TRANSCRIPTION, SORTING, GEOMETRY
C22  PROCESSING: DEFINITION.
C23
C24  THIS TAPE CONTAINS THE RAW SHOT GATHERS FROM THE 1988 STANFORD/USGS SEISMIC
C25  PROGRAM. THE SPONSORS OF THIS PROGRAM WERE AMOCO, CONOCO, EXXON, GAS
C26  RESEARCH INSTITUTE, HUNT OIL, MERIDIAN OIL, MOBIL, OCCIDENTAL, SHELL, ORYX,
C27  AND UNOCAL.
C28
C29  THE SEISMIC SOURCES USED WERE 1000-LB EXPLOSIONS SPACED AT A NOMINAL
C30  INTERVAL OF TWO KILOMETERS. MOST OF THE RECORDING WAS DONE WITH SGR-III
C31  INSTRUMENTS, SPACED AT 125 METER INTERVALS (USGS RECORDERS WERE USED ALSO).
C32  THE INFO GIVEN ABOVE APPLIES TO THE SGR-III RECORDERS ONLY. REFER TO THE
C33  DATA RELEASE DOCUMENTATION FOR INFO ON THE USGS CASSETTE RECORDERS.
C34
C35  THE X-Y COORDINATES GIVEN IN BYTES 73-88 OF THE TRACE HEADERS WERE
C36  CALCULATED USING A TRANSVERSE MERCATOR PROJECTION WITH THE ORIGIN SET TO
C37  THE U.S. COAST AND GEODETIC SURVEY'S "MCMAHAN" TRIANGULATION STATION.
C38  THE LOCATION OF THIS TRI-STATION IS: 46,55,49.6692N 120,12,16.3656W (NAD
C39  1927). SHOT AND STATION #S ARE IN BYTES 189-90 AND 191-2 OF TRACE HEADERS.
C40  END EBCDIC
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Figure 3. SEG-Y trace header Format CP89

```
C1       BROOKS RANGE EXPERIMENT 1990 : SHOTS 1-11   DEPLOYMENT 1
C2
C3       GSC, SGR, PRS1 AND  SCR MERGED AND RESAMPLED DATA.
C4
C5       SAMPLE RATE = 4 MS / 60 SECS DATA / 32 BYTE IBM FLOAT FORMAT
C6       DATA IS REDUCED (VRED = +8.0KM/SEC)
C7       DATA IS DRIFT CORRECTED, AND CORRECTED FOR ALL OTHER TIMING ERROR
C8                AND TIMING SHIFTS.
C9       HEADERS ARE DESCRIBED AS NAME (XXX,N) WHERE XXX IS THE BYTE LOCATION
C10                                                    N  IS THE NUMBER OF BYTES
C11      SHOT          (  9,4) = SHOT SEQUENCE NUMBER
C12      CHAN          ( 13,4) = CHANNEL NUMBER
C13      ESPNUM        ( 17,4) = SHOTPOINT NUMBER, EQUIVALENT TO SP
C14      INGCONST     (121,2)  = TRUE AMPLITUDE FACTOR =1 INSTRUMENT GROUPS ARE TRUE
C15                             AMPLITUDE WRT THEMSELVES NOT WRT EACH OTHER
C16      MST          (181,4)  = 0 MICROSECONDS OF TRACE START TIME
C17      COR          (185,2)  = 0 MS TIMING CORRECTION (MST AND COR HEADERS USED TO
C18                             MAINTAIN COMPATABILITY WITH LUETGERT'S PROGRAMS)
C19      CHARGE       (187,2)  = CHARGE SIZE IN LBS
C20      SYEAR        (189,2)  = SHOT TIME:(YEAR,HOUR,DAY,MIN,SEC)EACH IN 2 BYTE HEADE
C21      SSMIC        (199,4)  = SHOT TIME: MICROSECONDS
C22      TSFIX        (203,2)  = MSEC TIME BEFORE SHOT = INITIAL DIGITIZING TIME
C23      DRIFT        (205,2)  = MSEC INSTRUMENT DRIFT
C24      TERROR       (207,2)  = MSEC CORRECTION TO SHOT TIME
C25      BOX          (209,2)  = SERIAL NO. OF THE BOX;  PRS1 VALUE SHOULD HAVE 'A' PR
C26      BOXTYPE      (211,2)  = 1 FOR SCR / 2 FOR SGR / 3 FOR PRS1 / 4 FOR REFTEK
C27      REC-STAT     (213,4)  =  RECEIVER STATION
C28      TSHIFT       (217,4)  = TSFIX + TERROR - DRIFT + XOFFSET/8.0 (TSHIFT CORRECTS
C29                             TO SHOT TIME; -XOFFSET/8.0 IS FAKE REDUCTION APPLIED IN
C30      REDUCED      (221,4)  =  -OFFSET/8.0 (OFFSET IS TRUE IR-SI OFFSET)
C31      TSTAT        (225,4)  = TSHIFT + REDUCED (WHAT WE APPLIED TO DATA)
C32      DDELAY       (229,4)  = TSHIFT + REDUCED - MST/1000.
C33                             (MST IS A MICROSECOND ERROR ASSOCIATED WITH TURNON TIME
C34                             OF SCR AND PRS1 INSTRUMENTS) IF DDELAY IS REMOVED THE
C35                             TRACE IS RETURNED TO THE STATE IN WHICH WE RECEIVED IT
C36      GAIN         (233,2)  = GAIN THAT APPLIED TO TRACES TO PROVIDE TRUE AMP
C37      COLSTA       (235,2)  = 1 - COLLOCATION STATION : ONE TYPE OF EACH INSTRUMENT
C38                             0 - OTHERWISE
C39      REFSHIFT     (237,2)  = EMPIRICAL STATIC SHIFT APPLIED TO REFTEKS(CLOCK DRIFT
C40      ADDITIONAL INFORMATION CONTACT A.R. LEVANDER (RICE) OR G.S. FUIS (USGS)
```

Figure 4. SEG-Y trace header Format BR89

SHOT	SP	YEAR	DAY	HOUR	MIN	SEC	SIZE(kg)	OFR	
1	19	1987	205	8	0	0.016	0	89-321	
2	44	1987	205	8	2	0.012	454	89-321	
3	49	1987	205	8	4	0.007	2724	89-321	
4	3	1987	205	8	6	0.01	1362	89-321	
5	8	1987	205	8	8	0.008	2724	89-321	
6	42	1987	205	8	10	0.005	227	89-321	
7	48	1987	205	10	0	0.007	0	89-321	
8	1	1987	205	10	2	0.005	908	89-321	
9	45	1987	205	10	4	0.012	908	89-321	
10	41	1987	205	10	6	0.01	454	89-321	
11	6	1987	205	12	0	0.76	1816	89-321	
12	2	1987	205	12	2	0.01	908	89-321	
13	46	1987	205	12	6	0.012	0	89-321	
14	43	1987	205	12	7	30.005	0	89-321	
15	54	1987	206	10	0	0.008	1362	89-321	
16	46	1987	206	10	2	0.01	0	89-321	
17	52	1987	229	8	2	0.014	1362	89-321	
18	51	1987	229	8	4	0.008	1816	89-321	
20	56	1987	229	8	6	0.012	908	89-321	
21	66	1987	229	8	8	0.008	0	89-321	
22	55	1987	229	8	10	0.014	227	89-321	
23	53	1987	229	10	0	0.012	908	89-321	
24	57	1987	229	10	2	0.012	1362	89-321	
25	73	1987	229	10	4	0.013	318	89-321	
26	59	1987	229	12	0	0.009	1816	89-321	
27	47	1987	229	12	2	0.01	908	89-321	
28	50	1987	232	8	0	0.016	2724	89-321	
29	69	1987	237	8	2	0.007	1814	92-196	
30	62	1987	237	8	4	0.006	907	92-196	
31	54	1987	237	8	6	0.007	2268	92-196	
32	57	1987	237	8	8	0.157	1814	92-196	
33	65	1987	237	8	10	0.007	1814	92-196	
34	67	1987	237	10	0	0.012	1361	92-196	
35	61	1987	237	10	2	0.006	454	92-196	
36	70	1987	237	10	4	0.005	1814	92-196	
37	64	1987	237	10	6	0.011	454	92-196	
38	66	1987	237	12	0	0.015	907	92-196	
39	60	1987	237	12	2	0.005	907	92-196	
40	59	1987	237	12	4	0.241	1361	92-196	
41	63	1987	237	12	6	0.011	907	92-196	
42	74	1987	238	8	0	0.005	1361	92-196	
43	63	1987	238	12	2	0.01	499	92-196	
SHOT	**SP**	**YEAR**	**DAY**	**HOUR**	**MIN**	**SEC**	**SIZE(kg)**	**OFR**	**GAIN**
44	61	1987	240	22	0	0.007	4.5	92-196	low
45	59	1987	240	22	2	0.009	4.5	92-196	low
46	60	1987	240	22	30	0.007	4.5	92-196	low
47	60	1987	241	1	30	0.007	4.5	92-196	low
48	59	1987	241	1	32	0.009	4.5	92-196	low
49	61	1987	241	2	0	0.007	4.5	92-196	low
50	61	1987	240	22	0	0.007	4.5	92-196	high
51	59	1987	240	22	2	0.009	4.5	92-196	high
52	60	1987	240	22	30	0.007	4.5	92-196	high
53	60	1987	241	1	30	0.007	4.5	92-196	high
54	59	1987	241	1	32	0.009	4.5	92-196	high
55	61	1987	241	2	0	0.007	4.5	92-196	high

Table 3. Columbia Plateau I 1984 Shot List

SHOT	SP	YEAR	DAY	HOUR	MIN	SEC
1	1001	1984	232	10	59	59.989
2	1003	1984	232	11	4	0.011
3	1004	1984	232	11	6	0.016
4	1002	1984	232	11	32	0.01
5	1001	1984	236	9	0	0.014
6	1002	1984	236	9	2	0.012
7	1003	1984	236	9	4	0.015
8	1004	1984	236	9	6	0.012