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MEMORANDUM FOR: Newton K. Stablein, Senior Project Manager
Repository Licensing and Quality Assurance
Project Directorate
Division of High-Level Waste Management

FROM: Donald L. Chery, Jr., Section Leader
Hydrologic Transport Section
Geosciences & Systems Performance Branch
Division of High-Level Waste Management

SUBJECT: REQUEST FOR GEOSCIENCE DATA FROM THE YUCCA MOUNTAIN SITE AND VICINITY (411222)

In reviewing the Site Characterization Plan for Yucca Mountain, it is apparent that existing hydrogeologic data for the site is not readily available as a resource for staff evaluations. This information is needed by staff to independently review the present description of the natural system and processes functioning in the system. It is also needed to enable the staff to more effectively review and monitor the hydrologic, meteorologic, and climatologic studies at Yucca Mountain.

For developing general geosciences review capability, I ask that you obtain from DOE a magnetic tape of the SEPDB data base (with appropriate documentation) as offered in the DOE letter to J. Linehan from R. Stein, October 13, 1988, and as previously requested by memorandum to you (November 22, 1988).

Further, Neil Coleman has identified the following specific information that is needed to augment his technical review of the saturated groundwater flow system at Yucca Mountain.

1. Please obtain from the DOE digital water level data and plotted hydrographs for those wells listed in Table 3-24 of the SCP for which water level data have been collected. The digital data should be in the form of water level elevations and should not be provided as depths or pressures. Although we previously received a copy of Robison, et al. (1988) which contains hydrographs, we need additional information to independently review the water levels. The hydrographs provided in that reference generally include only the earlier manual measurements and do not include data collected recently using continuous downhole pressure measurements. Also, the hydrographs in Robison, et al. (1988) were split into separate sections in adherence to the report's 8½" x 11" format. The hydrographs we are requesting should be provided on large continuous sheets with no splitting, and should show the total period of record for each well, including potentiometric elevations from both manual measurements

and pressure monitoring devices. Where feasible, hydrographs for more than one well may be shown on each sheet.

The hydrographs should show water levels as elevations in both feet and meters and should include the complete period of record for each well. Time scales should be the same on all hydrographs. Periods of missing or questionable data should be explicitly identified on the hydrographs and in the digital record. Times of various events, including regional earthquakes, nuclear tests, nearby well construction or testing, etc., should also be shown on the hydrographs. We request that expanded sections of hydrographs for continuously monitored wells be provided to clearly show water level responses to underground nuclear tests at the Nevada Test Site.

Also, we request digital water level data and plotted hydrographs of wells on the Nevada Test Site for which water levels have been regularly monitored.

The digital data should be supplied as read-only computer access to the data base on which these data reside along with the appropriate format and processing information.

2. Please obtain from the DOE digital and plotted barometric pressure data covering the period from beginning of record of the earliest well at Yucca Mountain to the present. Data should be provided from meteorological stations that are closest to the wells. The time scales of the plots should be the same as on the hydrographs so that changes in water levels can easily be compared to barometric transients.

3. Please have DOE prepare and submit a borehole summary chart that summarizes important information about the wells listed in Table 3-24 of the SCP. A chart similar to this for the Hanford Site was previously prepared for NRC by the Basalt Waste Isolation Project (See attachment). The summary chart for wells at Yucca Mountain should include at least the following information:

well name(s) or number(s)
name of driller
year (and month) drilled
total well depth
depths and diameters of well casings
ground surface elevations
well screen data
types of borehole logs run
drilling method
latitude and longitude
Nevada State Plane Coordinates
approx. depth to water table
horizon to which well screen is open
information on uncased borehole lengths

General comments: for example, key references for additional data on each well, information on changes in well construction (deepening, etc.), anomalous losses of drilling fluid, significant drilling deviations, elevations of major producing zones, wellbore obstructions, current status of well, etc.

4. Please have DOE prepare and submit a compilation of well construction data. This package would consist of detailed construction diagrams for each of the 31 wells listed in Table 3-24 of the SCP. Elevation scales, in both feet and meters, should be included in the diagrams. Reproductions of the as-built geoengineering diagrams for these wells would be acceptable. Although extensive well construction data is included in Robison et al. (1988), construction diagrams were not provided.

5. Please have the DOE provide data, in both tabular and digital form, from hydrologic pumping tests conducted at the Yucca Mountain site for which published reports exist. For example, Lobmyer et al. (1983) and Whitfield et al. (1984) provide field plots of pumping test drawdowns and recoveries for wells UE-25b#1 and USW H-4, respectively. However, the references do not include appendices that list the actual time-drawdown data in tabular form. We request tabular and digital records (with appropriate format information) of time-drawdown data (as water level elevations) for all pumping tests (both drawdown and recovery phases, where applicable) conducted at the Yucca Mountain site.

Please contact me at extension 23461 if you have any questions regarding this data request.

/S/

Donald L. Chery, Jr., Section Leader
Hydrologic Transport Section
Geosciences and Systems Performance Branch
Division of High-Level Waste Management, NMSS

Attachment:
As stated

cc: R. Ballard
J. Linehan

SEE DISTRIBUTION NEXT PAGE.

OFC	HLGP	HLGP				
NAME	NColeman/cj	DLChery				
DATE	3/14/89	3/14/89				

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NAME	NColeman/cj	DLChery				
DATE	3/ /89	3/ /89				

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REFERENCES

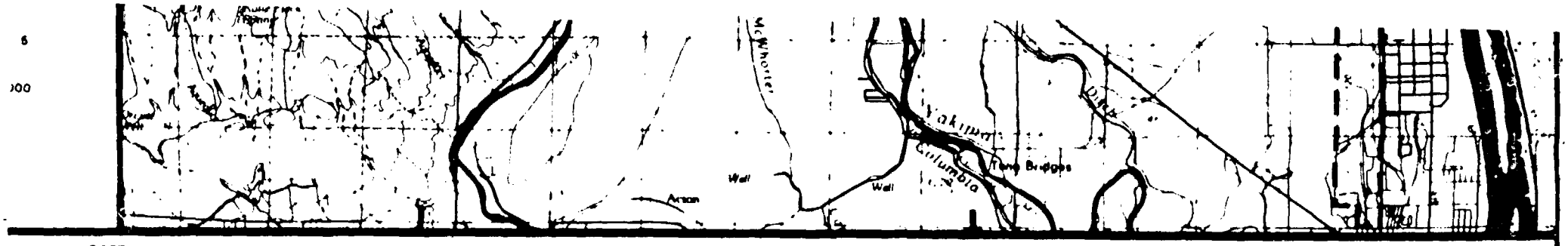
DOE, 1986. [Draft] Borehole Status Chart and Location Map: 2/28/86 version, U.S. Dept. of Energy, Richland Operations Office, Richland, Washington.

Lobmyer, D.H., M.S. Whitfield, Jr., R.R. Lahoud, and L. Bruckheimer, 1983. Geohydrologic Data for Test Well UE-25b#1, Nevada Test Site, Nye County, Nevada: U.S. Geological Survey, Open-File Report 83-855, Denver, Colorado.

Robison, J.H., D.M. Stephens, R.R. Luckey, and D.A. Baldwin, 1988. Water Levels in Periodically Measured Wells in the Yucca Mountain Area, Nevada, 1981-87: USGS Open-File Report 88-468, U.S. Geological Survey, Denver, Colorado.

Stein, R., 1988. Letter to J. Linehan (U.S. NRC) dated Oct. 13, 1988 re: Information on the DOE Technical Data Bases for Yucca Mountain: Office of Civilian Radioactive Waste Management, U.S. Dept. of Energy, Washington, D.C.

Whitfield, M.S., Jr., W. Thordarson, and E.P. Eshom, 1984. Geohydrologic and Drill-Hole Data for Test Well USW H-4, Yucca Mountain, Nye County, Nevada: U.S. Geological Survey, Open-File Report 84-449, Denver, Colorado.



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APPD FOR QUALITY ASSURANCE	
GROUP MNGR.	
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REVIEW	
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U. S. DEPARTMENT OF ENERGY
RICHLAND OPERATIONS OFFICE

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RICHLAND, WASHINGTON 99352

BOREHOLE STATUS CHART AND LOCATION MAP

SCALE	BLDG. No.	PAGE No.	PAGE

DESCRIPTIONS	REV DATE	REV. No.
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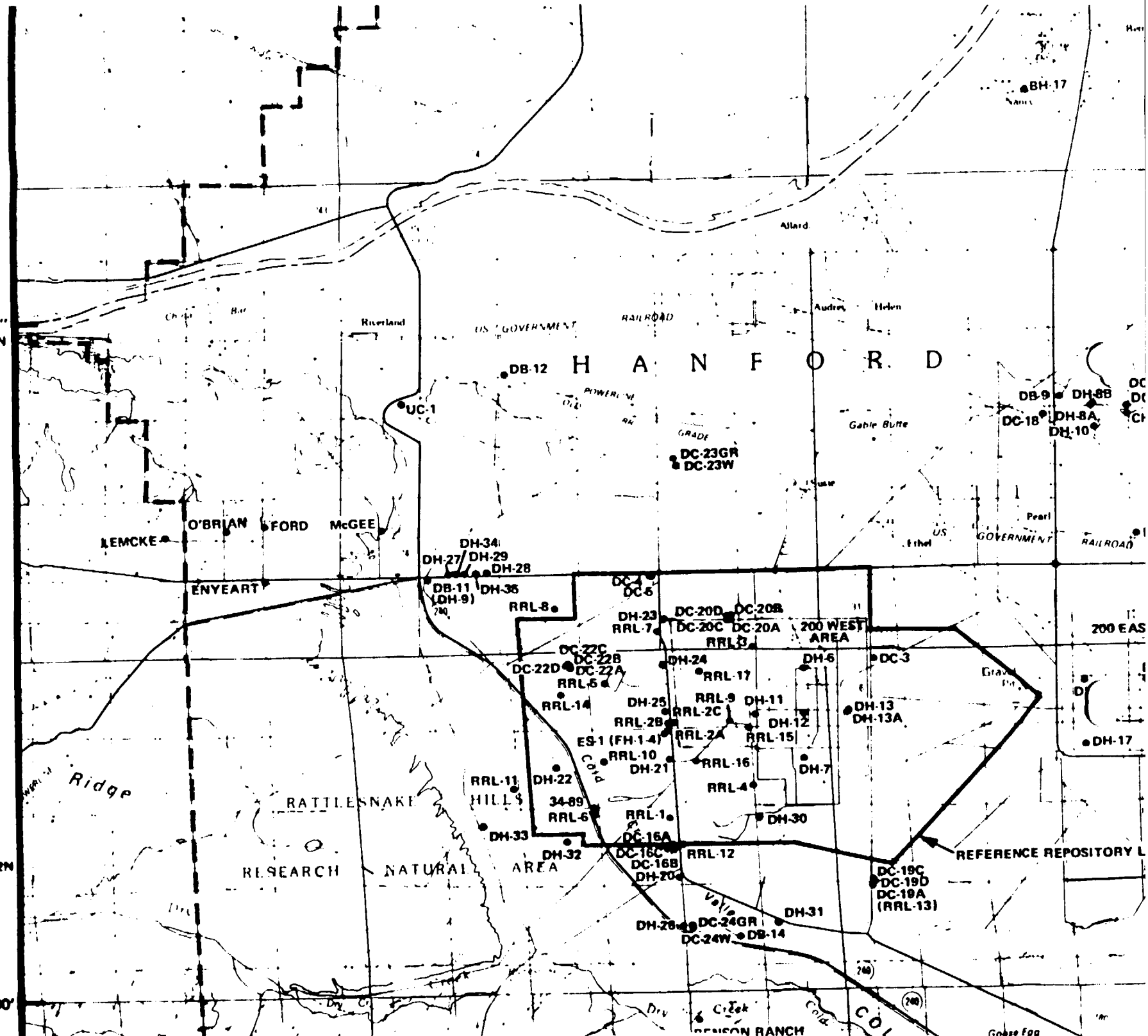

111-142/146

STALLATION
IME

CABLE TOOL 12/80 46°37'30"

ONTAMINATION

HOLE 299-W15-14

DRAFT

D FROM MAP LOCATION
TED DRILLING
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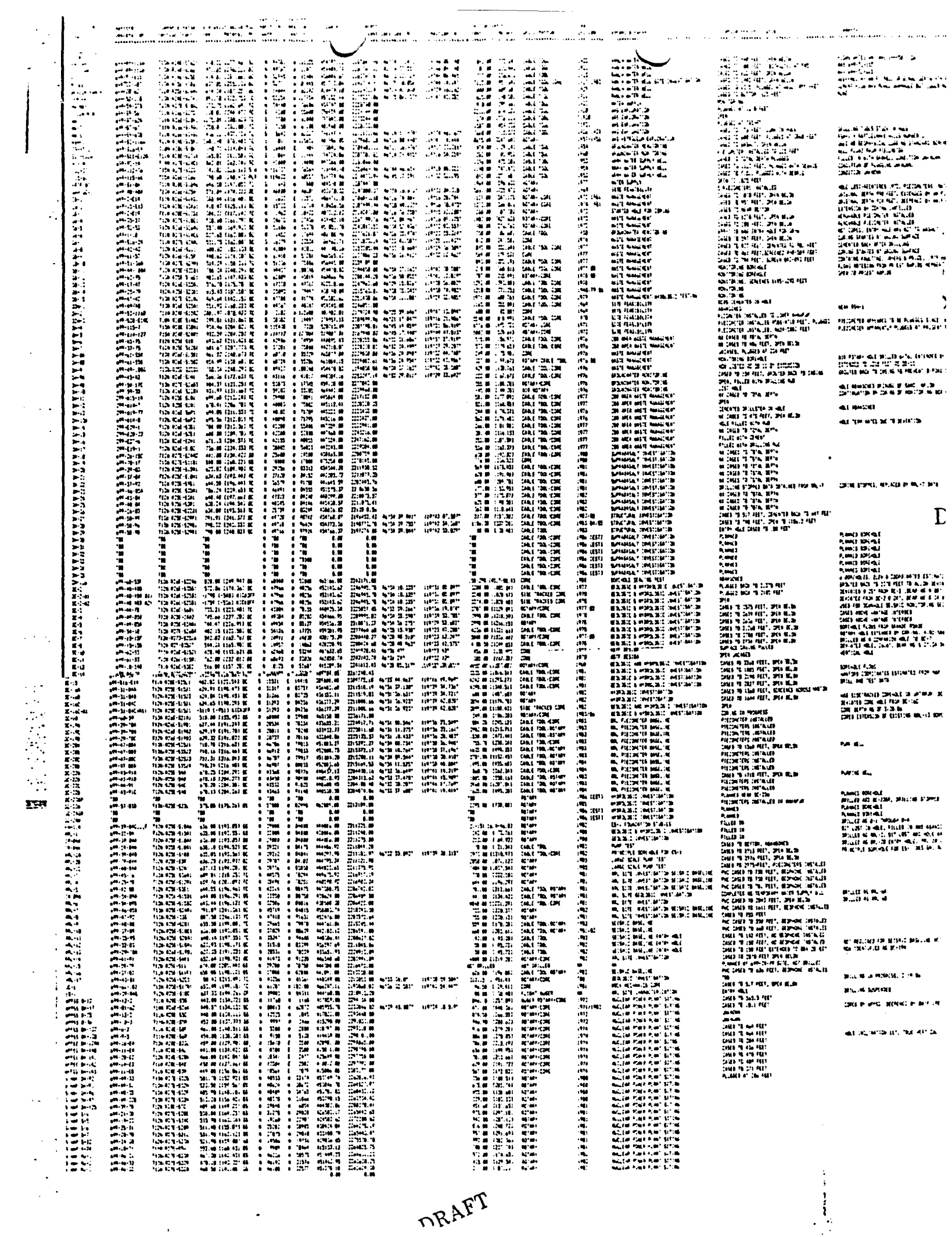
PHONE

Well Name	Hanford Designation	Township/Range-Section/Tract	Elevation above MSL Feet (Meters)	MP	Hanford North (N) South (S)	Hanford West (W) East (E)	Lambert North	Lambert East	Latitude (N)	Longitude (W)	Drilled Depth Feet (Meters)	Drill Method
[illegible]	699-49-111A	T13N/R24E-S36D1	910.32 (277.46)	BC	N 49381	W 111355	454397.11	2163843.98	46°34 37.472"	119°46 06.140"	1092.00 (332.84)	CABLE TOO
[illegible]	699-49-111B	T13N/R24E-S26G1	971.85 (296.22)	BC	N 49387	W 111437	454404.39	2163767.12	46°34 37.551"	119°46 09.240"	707.00 (215.49)	CABLE TOO
[illegible]	699-53-111	T13N/R24E-S25E1	924.81 (281.88)	BC	N 52995	W 111406	458008.67	2163787.63	46°35 13.129"	119°46 08.465"	777.00 (236.83)	CABLE TOO
[illegible]	699-53-103	T13N/R25E-S30G	837.05 (255.13)	BC	N 52737	W 103415	457773.04	2191774.91	46°35 10.856"	119°44 14.143"	3120.00 (951.09)	CABLE TOO
BENSON RANCH	699-28-82	T12N/R25E-S26M1	614.34 (187.25)	BC	N 14649	W 82342	424939.18	2212931.43	46°29 43.818"	119°39 16.282"	2000.00 (609.60)	CABLE TOO
[illegible]	699-52-118	T13N/R24E-S27K1	1091.70 (332.75)	TC	N 52254	W 117954	457252.94	2177237.06	46°35 06.257"	119°47 42.353"	625.00 (190.50)	CABLE TOO
MAINES	699-54-37B	T13N/R27E-S30A2	533.75 (162.69)	TC	N 54140	W 36806	459347.00	2258380.00			970.00 (295.66)	CABLE TOO
GOODWIN #1	699-59-56	T11N/R26E-S27D	1130.81 (344.43)	TC	S 9200	W 55600	396959.00	2239749.00			2212.00 (674.22)	CABLE TOO
MW-1	699-57-62A	T11N/R26E-S20R1	1275.81 (388.62)	TC	S 7300	W 62800	397843.00	2233344.00			1234.00 (376.12)	CABLE TOO
MW-3	699-53-67	T11N/R26E-S19A1	1250.81 (381.00)	TC	S 3150	W 67200	401988.00	2228133.00			1507.00 (459.33)	CABLE TOO
MW-6	699-59-63B	T11N/R26E-S29B1	1436.12 (437.73)	TC	S 8642	W 63227	396197.97	2232121.66	46°24 57.974"	119°34 46.787"	3660.00 (1115.57)	CABLE TOO
RSH-1	699-53-116M	T11N/R24E-S15R1	2881.90 (878.40)	TC	S 3017	W 115651	401988.05	2179682.28	46°26 00.490"	119°47 14.494"	10655.00 (3247.64)	ROTARY
399-5-2	699-S26-E9	T10N/R28E-S10K	390.71 (119.09)	TC	S 26484	E 9489	378842.46	2304802.11	46°21 56.976"	119°17 35.311"	424.00 (129.24)	CABLE TOO
S11-E12A	699-S11-E12A	T11N/R28E-S27J1	365.83 (111.50)	TC	S 11089	E 11949	394324.06	2307301.82	46°24 29.415"	119°16 54.259"	262.00 (85.95)	CABLE TOO
92-14	699-92-14	T14N/R27E-S24C1	862.01 (262.74)	TC	N 92000	W 14000	497266.00	2281000.00			1396.00 (425.50)	CABLE TOO
112-37	699-112-36	T15N/R27E-S32D	741.82 (226.11)	S/W	N 111737	W 36569	516944.90	2258469.48	46°44 46.659"	119°28 00.222"	1140.00 (347.47)	CABLE TOO
115-61	699-115-61	T15N/R26E-S28Q1	790.60 (240.97)	PLT	N 114633	W 60557	516779.46	2234473.99	46°45 17.591	119°33 52.295"	892.00 (271.86)	CABLE TOO
FFTF #3	699-51-8H	T11N/R28E-S18M8	646.50 (197.05)	TC	S 692	W 7888	404590.00	2287447.00			1964.00 (598.63)	ROTARY
ARH-DC-1	699-48-48A	T13N/R26E-S35H	571.89 (174.31)	BC	N 48000	W 48201	453178.32	2247000.37	46°34 18.671"	119°31 04.318"	5661.00 (1725.47)	ROTARY
DB-1	699-2-E14	T11N/R26E-S14D1	388.44 (118.40)	BC	N 1633	E 13572	406971.10	2308893.18	46°26 34.009"	119°16 28.749	1139.00 (347.17)	ROTARY/COR
DB-2	699-15-E13	T12N/R28E-S34J1	410.47 (125.11)	BC	N 15322	E 12714	420656.56	2307999.94	46°28 49.233"	119°16 38.473"	1273.00 (388.01)	ROTARY/COR
DB-3	699-2-E19	T11N/R28E-S13D1	384.31 (117.14)	TC	N 1963	E 18923	407313.13	2314243.00	46°26 36.558"	119°15 12.288"	288.00 (87.78)	ROTARY
DB-4	699-35-27	T12N/R27E-S10E1	530.00 (161.79)	BC	N 34672	W 27436	439983.14	2267799.76	46°32 04.967"	119°26 09.175"	1403.00 (427.63)	ROTARY/COR
DB-5	699-52-52	T13N/R26E-S26M1	557.48 (169.92)	BC	N 51886	W 52376	457053.78	2242813.53	46°34 57.436"	119°32 03.557"	900.00 (276.76)	ROTARY/COR
DB-6	699-1-18	T11N/R27E-S14C1	537.65 (163.88)	BC	N 1452	W 17699	406788.96	2277621.87	46°26 35.974"	119°23 55.319"	350.00 (106.68)	CABLE TOO
DB-7	699-S16-24	T11N/R27E-S34M1	531.75 (162.08)	BC	S 16279	W 23534	388962.71	2271833.19	46°23 41.587"	119°25 21.437"	812.00 (247.50)	CORE
DB-8	699-42-42	T12N/R26E-S1J1	600.82 (183.13)	BC	N 42884	W 42812	447198.26	2253205.44	46°33 18.869"	119°29 36.589"	1092.00 (332.84)	CABLE TOO
DB-9	699-61-57	T13N/R26E-S15P	440.63 (134.30)	BC	N 61410	W 57281	466565.13	2237886.22	46°36 31.913"	119°33 12.462"	589.00 (179.53)	CORE
DB-10	699-51-36A	T13N/R27E-S29M1	519.39 (158.31)	TC	N 51236	W 35886	456445.00	2259389.00			893.00 (272.19)	CABLE TOOL
DB-11	699-49-100A	T13N/R25E-S32D1	788.34 (240.29)	BC	N 49427	W 100348	454470.83	2194850.08	46°34 37.163"	119°43 30.580"	1210.00 (368.81)	CABLE TOOL
DB-12	699-63-95	T13N/R25E-S16E1	483.65 (147.42)	BC	N 63089	W 95019	468066.96	2208144.28	46°36 50.855"	119°42 12.829"	707.00 (215.49)	ROTARY/COR
DB-13	699-17-47	T12N/R26E-S35A1	576.70 (175.78)	BC	N 17330	W 47317	422510.66	2247963.60	46°29 15.826"	119°30 56.882"	1292.00 (393.80)	CABLE TOOL
DB-14	699-25-79	T12N/R25E-S23K1	615.43 (187.58)	BC	N 25092	W 79497	430190.09	2215763.81	46°30 35.343"	119°38 34.983"	1218.00 (371.25)	CABLE TOOL
DB-15	699-47-42	T13N/R27E-S31M1	469.64 (143.15)	BC	N 47308	W 41774	452502.62	2253430.06	46°34 11.288"	119°29 32.485"	1971.00 (600.76)	CABLE TOOL
DDH-1	699-49-48	T13N/R26E-S35A1	551.92 (168.22)	TC	N 49367	W 48347	454545.00	2246851.00			1165.00 (355.09)	CABLE TOOL
DH-2	699-53-116B	T11N/R24E-S15R2	2881.97 (878.42)	TC	S 3102	W 115608	401983.01	2179724.98	46°25 59.646"	119°47 13.894"	600.00 (182.88)	CORE
DDH-3	699-S30-E14C	T10N/R28E-S14G3	399.81 (121.86)	BC	S 30382	E 14497	374957.13	2309899.96	46°21 17.847"	119°16 21.486"	3540.00 (1078.99)	CABLE TOO
DH-4	699-115-7	T15N/R28E-S30N1	934.46 (284.82)	TC	N 115430	W 7328	520713.49	2287790.81	46°45 19.859"	119°21 06.419"	4776.00 (1455.72)	ROTARY/CO
DH-5	699-114-127	T15N/R24E-S28R1	932.59 (284.25)	TC	N 114112	W 127084	519887.81	2167948.82	46°45 17.448"	119°49 47.813"	5002.00 (1524.61)	ROTARY/COR
DH-6	699-43-75	T12N/R25E-S1B	693.62 (211.42)	BC	N 42986	W 74959	448095.43	2220255.86	46°33 31.686"	119°37 27.919"	515.00 (156.97)	CABLE TOOL
DH-7	699-37-75	T12N/R25E-S12G1	681.67 (207.77)	TC	N 37201	W 75000	442310.87	2220230.03	46°32 34.499"	119°37 29.287"	573.00 (174.65)	CABLE TOOL
DH-8A	699-61-55A	T13N/R26E-S15Q1	461.52 (140.67)	TC	N 60718	W 55339	465877.84	2239830.08	46°36 24.898"	119°32 44.740"	249.00 (75.90)	CORE
DH-8B	699-61-55B	T13N/R26E-S15Q2	454.99 (138.68)	BC	N 60724	W 55286	465884.15	2239882.61	46°36 24.954"	119°32 43.986"	327.00 (99.67)	ROTARY/CAB
DH-9	699-49-100A	T13N/R25E-S32D1	788.34 (240.29)	BC	N 49427	W 100348	454470.83	2194850.08	46°34 37.163"	119°43 30.589"	429.00 (130.76)	CABLE TOOL
DH-9A	699-43-42	T12N/R26E-S1H1	566.36 (172.63)	TC	N 43116	W 41817	448389.16	2253397.19	46°33 29.811"	119°29 33.642"	222.00 (67.67)	CABLE TOOL
DH-9B	699-54-17C	T13N/R27E-S26G3	484.37 (123.25)	TC	N 53873	W 17345	459130.00	2277842.00			355.00 (108.20)	ROTARY/COR
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	145.00 (44.20)	AIR ROTAR

DH-35	TBD	TBD	TBD	N	TBD	W	TBD	0.00	0.00					
CH-1,6	699-60-53F	T13N/R26E-S22A6	820.00 [249.94] GS	N	60000	W	53000	465166.00	2242171.00			150-290 [45.7-88.4]	CORE	
DC-2	699-48-48B	T13N/R26E-S35G1	572.06 [174.36] BC	N	47966	W	48256	453143.62	2246945.78	46°34'18.335"	119°31'05.097"	3300.00 [1005.84]	CABLE TOOL	
DC-2-A1	699-48-48B(A1)	T13N/R26E-S35G1	-1798 [-548] KICKOFF	N	47966	W	48256	453143.62	2246945.78	46°34'18.335"	119°31'05.097"	3348.00 [1020.47]	SIDE TRACK	
DC-2-A2	699-48-48B(A2)	T13N/R26E-S35G1	-1759 [-536] KICKOFF	N	47966	W	48256	453143.62	2246945.78	46°34'18.335"	119°31'05.097"	3374.00 [1028.40]	SIDE TRACK	
DC-3	699-44-78	T12N/R26E-S6B1	733.21 [223.48] TC	N	43804	W	78155	448925.34	2225057.45	46°33'39.266"	119°36'19.074"	3707.00 [1129.89]	ROTARY/CORE	
DC-4	699-49-85B	T13N/R25E-34A2	745.66 [227.28] BC	N	49384	W	85203	454466.91	2209995.02	46°34'35.598"	119°39'53.785"	3998.00 [1218.59]	CABLE TOOL	
DC-5	699-49-85A	T13N/R25E-S34A1	744.47 [226.91] BC	N	49454	W	85127	454536.38	2210071.37	46°34'36.275"	119°39'52.682"	3990.00 [1216.15]	ROTARY	
DC-6	699-54-18	T13N/R27E-S26G4	402.15 [122.58] BC	N	54126	W	17721	459381.95	2277464.68	46°35'15.930"	119°23'47.200"	4336.00 [1321.61]	CABLE TOOL	
DC-7	699-15-15F	T12N/R27S-S35J6	543.82 [165.76] BC	N	14911	W	14838	420175.39	2280448.27	46°28'48.510"	119°23'12.247"	5008.00 [1526.44]	ROTARY/CORE	
DC-8	699-15-156	T12N/R27-S35J7	544.31 [165.90] BC	N	14957	W	14862	420220.91	2280424.68	46°28'48.963"	119°23'12.575"	4100.50 [1249.83]	CABLE TOOL	
DC-10	699-62-53	T13N/R26E-S15J1	438.40 [133.62] GS	N	62468	W	53244	467632.65	2241920.41	46°36'42"	119°32'12"	456.00 [138.99]	CORE	
DC-11	699-61-53	T13N/R26E-S15R1	763.00 [232.61] GS	N	60693	W	53026	465858.74	2242143.74	46°36'24"	119°32'12"	385.00 [117.35]	CORE	
DC-12	699-10-54B	T11N/R26E-S36Z	516.00 [157.28] BC	N	10125	W	53687	415289.51	2241612.43	46°28'05.317"	119°32'28.021"	4455.00 [1357.88]	ROTARY/CORE	
DC-14	699-84-34	T14N/R27E-S29K1	393.90 [120.06] TC	N	84489	W	33860	489784.85	2261248.43			3335.00 [1016.51]	CABLE TOOL	
DC-15	699-S16-E14	T11N/R28E-S35L1	402.03 [122.54] BC	S	15531	E	14410	389808.48	2389775.18	46°23'44.463"	119°16'19.969"	4243.00 [1293.27]	CABLE TOOL	
DC-16A	699-31-84A	T12N/R25E-S15J1	624.91 [190.47] BC	N	31317	W	83727	436483.60	2211518.19	46°31'37.130"	119°39'34.736"	4398.00 [1340.51]	CABLE TOOL	
DC-16B	699-31-84B	T12N/R25E-S15J2	624.84 [190.45] BC	N	31266	W	83725	436553.11	2211519.83	46°31'36.631"	119°39'34.721"	1600.00 [487.68]	ROTARY	
DC-16C	699-31-84C	T12N/R25E-S15J1	624.65 [190.39] BC	N	31292	W	84236	436377.29	2211008.66	46°31'36.923"	119°39'42.028"	3854.00 [1174.70]	ROTARY	
DC-16C-A1	699-31-84C(A1)	T12N/R25E-S15J1	-3119 [-951] KICKOFF	N	31292	W	84236	436377.29	2211008.66	46°31'36.923"	119°39'42.028"	3899.00 [1188.42]	SIDE TRACK	
DC-18	699-60-59	T13N/R26E-S21A1	518.00 [155.45] GS	N	60000	W	59000	465150.00	2236171.00			349.00 [106.38]	ROTARY	
DC-19A	699-29-78A	T12N/R26E-S19B1	627.44 [191.24] BC	N	28534	W	78334	433655.21	2224917.71	46°31'08.546"	119°36'23.549"	804.20 [245.12]	CABLE TOOL	
DC-19C	699-29-78B	T12N/R26E-S19B2	629.19 [191.78] BC	N	28811	W	78240	433932.77	2225011.68	46°31'11.275"	119°36'22.161"	3982.00 [1213.71]	CABLE TOOL	
DC-19D	699-29-78C	T12N/R26E-S19B3	629.32 [191.82] BC	N	28727	W	78116	433848.86	2225135.57	46°31'10.433"	119°36'20.483"	1550.00 [472.44]	CABLE TOOL	
DC-20A	699-47-88A	T13N/R25E-S35J1	710.70 [216.62] BC	N	46786	W	79813	451883.27	2215392.27	46°34'08.734"	119°38'36.948"	755.70 [230.34]	CABLE TOOL	
DC-20B	699-47-88B	T13N/R25E-S35J2	710.16 [216.46] BC	N	46912	W	79833	452008.73	2215372.17	46°34'10.764"	119°38'37.196"	1635.00 [498.35]	CABLE TOOL	
DC-20C	699-47-88C	T13N/R25E-S35J3	711.31 [216.81] BC	N	46787	W	79917	451884.20	2215288.11	46°34'09.544"	119°38'38.418"	3781.00 [1152.45]	CABLE TOOL	
DC-20D	699-47-88D	T13N/R25E-S35J4	710.24 [216.48] BC	N	46987	W	80035	452083.65	2215169.53	46°34'11.525"	119°38'40.884"	1495.00 [455.68]	CABLE TOOL	
DC-22A	699-43-91A	T12N/R25E-S4A	670.25 [204.29] BC	N	43368	W	90776	448437.13	2204438.16	46°33'36.649"	119°41'14.219"	860.70 [262.34]	CABLE TOOL	
DC-22B	699-43-91B	T12N/R25E-S4B	670.18 [204.27] BC	N	43458	W	90900	448518.93	2204313.62	46°33'37.478"	119°41'15.989"	1805.00 [550.16]	CABLE TOOL	
DC-22C	699-44-91	T12N/R25E-S4C	670.28 [204.30] BC	N	43532	W	91025	448600.45	2204188.49	46°33'38.287"	119°41'17.769"	3960.00 [1207.01]	CABLE TOOL	
DC-22D	699-43-91C	T12N/R25E-S4D	670.13 [204.26] BC	N	43463	W	91140	448538.50	2204074.06	46°33'37.608"	119°41'19.414"	1625.00 [495.30]	CABLE TOOL	
DC-23GR	TBD	TBD	TBD	N	TBD	W	TBD	0.00	0.00			TBD	ROTARY	
DC-23W	699-57-83B	T13N/R25E-S23L	575.00 [175.26] GS	N	57000	W	82990	462089.00	2212189.00			2395.00 [730.00]	ROTARY	
DC-24GR	TBD	TBD	TBD	N	TBD	W	TBD	0.00	0.00			TBD	ROTARY	
DC-24W	TBD	TBD	TBD	N	TBD	W	TBD	0.00	0.00			TBD	ROTARY	
FH-1,4	699-39-84C,,,F	T12N/R25E-S18A6	636.00 [193.85] GS	N	39000	W	84000	444086.00	2211225.00			21-151 [6.4-46.0]	ROTARY	
RRL-1	699-33-84	T12N/R25E-S15A1	635.00 [193.55] GS	N	33000	W	84000	438086.00	2211240.00			242.00 [73.76]	ROTARY	
39-84A	699-39-84A	T12N/R25E-S18A1	636.00 [193.85] GS	N	39000	W	84000	444086.00	2211275.00			213.00 [64.92]	ROTARY	
39-84H	699-39-84H	T12N/R25E-S18A1	638.18 [194.52] BC	N	39321	W	84175	444486.92	2211049.20			70.00 [21.34]	CABLE TOOL	
RRL-2A	699-39-84B	T12N/R25E-S18B	635.05 [193.56] BC	N	39212	W	84041	444297.90	2211183.97	46°32'55.892"	119°39'38.315"	3973.00 [1210.97]	CABLE TOOL	
RRL-2B	699-39-84H	T12N/R25E-S3R	636.25 [193.93] BC	N	39707	W	84103	444795.34	2211121.98			2858.00 [871.12]	ROTARY	
RRL-2C	699-40-84A	T12N/R25E-S2N1	637.13 [194.20] BC	N	39736	W	83850	444823.65	2211375.95			3404.00 [1037.54]	ROTARY	
RRL-3	699-45-76	T13N/R25E-S36N1	689.81 [210.25] TC	N	44575	W	78294	449675.92	2216917.19			730.00 [222.50]	ROTARY	
RRL-4	699-35-78	T12N/R25E-S12M1	659.76 [201.09] TC	N	35498	W	78251	440598.92	2216983.34			644.00 [196.29]	ROTARY	
RRL-5	699-42-88	T12N/R25E-S3E1	644.55 [196.46] TC	N	42314	W	88475	447388.75	2206742.83			701.00 [213.66]	CABLE TOOL	
34-89A	699-34-89A	T13N/R25E-S15D1	644.00 [196.29] GS	N	33550	W	88750	438624.00	2206489.00			441.00 [134.42]	CABLE TOOL	
RRL-6	699-34-89B	T13N/R25E-S15D2	643.44 [196.12] TC	N	33506	W	88816	438580.38	2206423.00			4040.00 [1231.39]	CABLE TOOL	
RRL-7	699-46-85B	T13N/R25E-S34R1	791.87 [241.36] BC	N	45719	W	84815	450803.74	2210393.30			723.00 [220.37]	ROTARY	
RRL-8	699-47-92	T13N/R25E-33G	807.50 [246.13] TC	N	47410	W	91631	452476.80	2203572.64			755.00 [230.12]	ROTARY	
RRL-9	699-40-80	T12N/R25E-S2Q1	655.50 [199.80] TC	N	39665	W	79978	444761.81	2215245.44			559.00 [170.38]	CABLE TOOL	
RRL-10	699-37-89	T12N/R25E-S10E1	636.00 [193.85] BC	N	37029	W	88639	442103.12	2206591.00			668.00 [203.61]	CABLE TOOL	
RRL-11	699-35-95	T12N/R25E-S20A1	648.14 [197.55] TC	N	35247	W	94608	440306.41	2200627.02			142.00 [43.28]	CABLE TOOL	
RRL-12	699-32-83	T12N/R25E-S18M1	623.93 [190.17] BC	N	31510	W	83399	436597.69	2211845.06			150.00 [45.72]	CABLE TOOL	
			[ ]	N	29531	W	78339	433651.93	2224913.80			150.00 [45.72]	CABLE TOOL	



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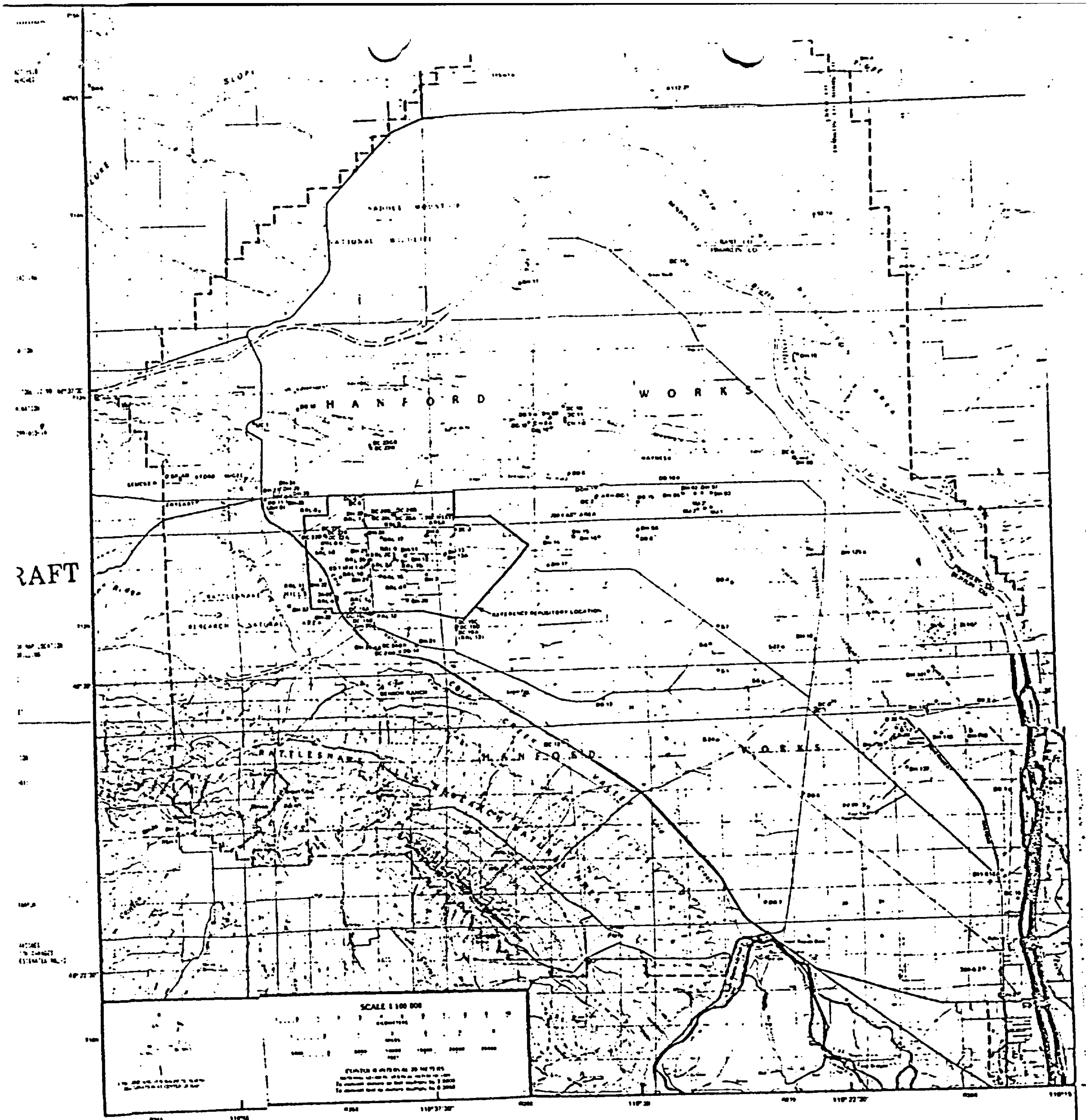

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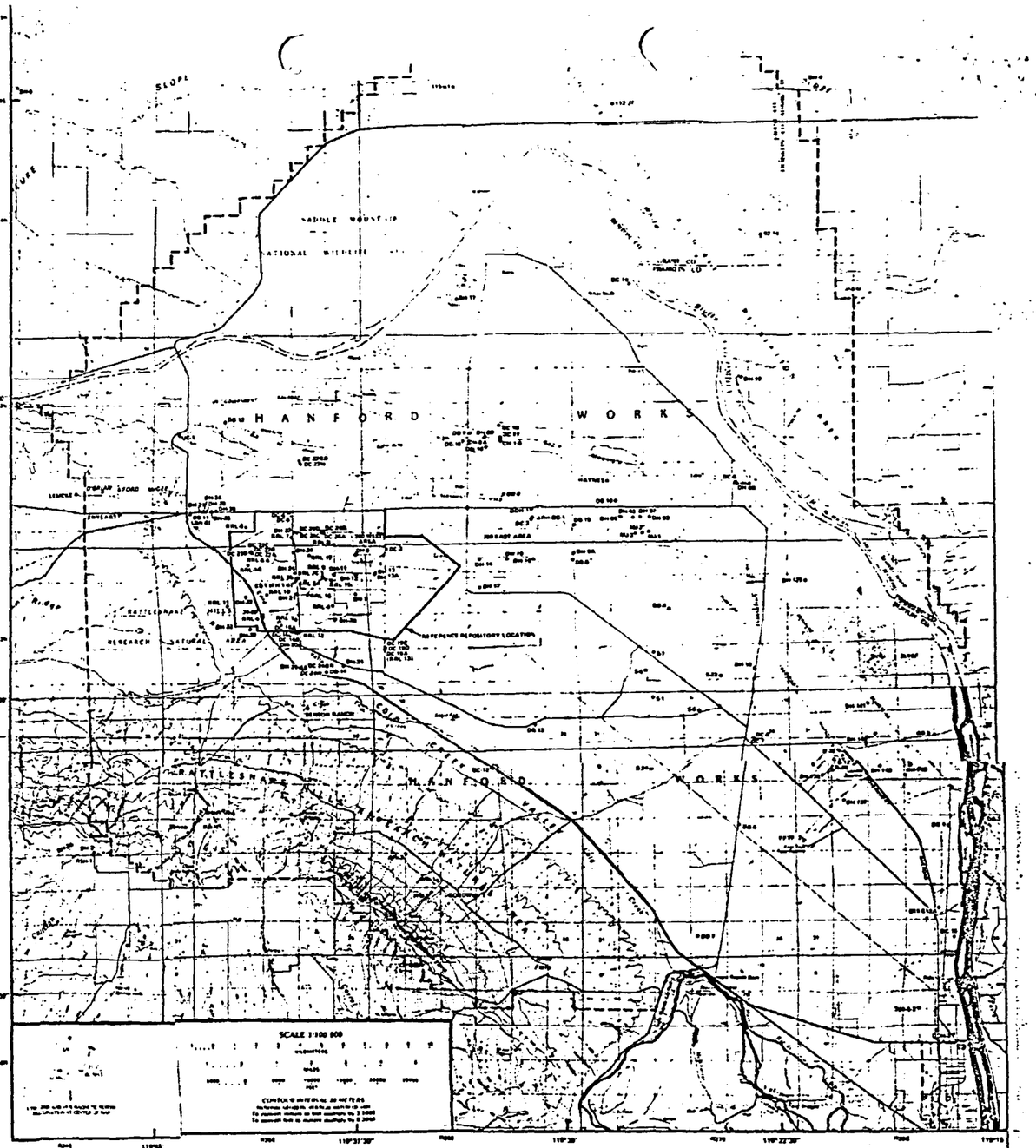

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