Task 20-5702-826

Investigate Issues in Hydrology/Geochemistry/Climatology

Technical Assessment

Due to CNWRA Reorganization, converted to Task 20-5708-871 - Radionuclide Transport effective 1/20/96

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Numbering changed 12/10/96 to correct misnumbering in scientific notebook log.

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Task 20-5702-826: Investigate Issues in Hydrology, Geochemistry, Climatology

The purpose of this project is to provide technical assessment methods for that will aid NRC/CNWRA staff in the review of the DOE LA for the HLW repository. The focus of this project is to be on issues in hydrology, geochemistry, and climatology that will have an impact on repository performance. The work presented here consists largely of projects that have been proposed by CNWRA either formally or informally to NRC/DWM/PAHB and have received verbal approval from the NRC section leader. A basic understanding of chemical and/or hydrological principles, as well as computer hardware and software are necessary requirements for most of the work outlined here. Specific knowledge requirements, data sources, computer hardware and software, as well as potential sources of error and uncertainty are described in more detail in the summaries provided here. 10/3/9

Starting in FY96, the Hydrology aspects of this technical assessment project were split off at CNWRA under the management of A. Gureghian.

1/20/96 DRL The objectives of this task are largely adopted for this new task 20-5708-871 KTI on Radionuclide transport resulting from NRC/CNWRA reorganization (see pg. 49 this volume). Focus is on using geochemical and hydrologic data to describe and place bounding limits on radionuclide transport processes such as mixing + dilution. Much of the purpose of this scientific notebook is to identify sources of hydrochemical data and provide a trace on the original sources to this extent possible. Related, little effort is directed to QA control of the original data sources, and the quality of these data, the reader is referred to the original report as identified here.

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Initial Entry DRJ 1/17/97

Saturated Zone Water Chemistry - Data Sources and GIS Entry

One of the goals of this task is to acquire existing hydrological and geochemical data for the Yucca Mountain region and use it to populate the Geographic Information System (GIS) database being developed at CNWRA as a part of other research projects.

The initial data source for saturated zone water chemistry identified for this technical assessment activity includes:

McKinley, P.W., M.P. Long, and L.V. Benson. 1991. *Chemical Analyses of Water for Selected Wells and Springs in the Yucca Mountain Area, Nevada and Southeastern California.* USGS Open-File Report 90-355. Denver, CO: U.S. Geological Survey.

This report is a USGS document prepared as a hydrochemical compilation of data collected over the past several decades at Yucca Mountain. These data were not generally collected under a DOE-approved QA program, but are freely used. The sources referenced in McKinley et al. (1991) should be consulted for determining the quality of the data.

Well and spring ID numbers (1-279) that are used by McKinley et al. (1991) are internal to the report. These sampling locations are shown in the maps included in this scientific notebook. Original data sources cited by McKinley et al. (1991) are also included.

Excel, 4.0 for Windows DRJ 1/17/96

The data included here are originally entered using a ~~Lotus 1-2-3~~ spreadsheet. This allows exporting an ASCII-comma delimited format for inclusion in GIS and 3D graphics systems like ArcInfo and EarthVision. In the tables, concentrations are given in units of mg/L. The notation -1111 means not reported, while -9999 indicates below detection limits.

Sampling locations - McKinley et al. (1991)

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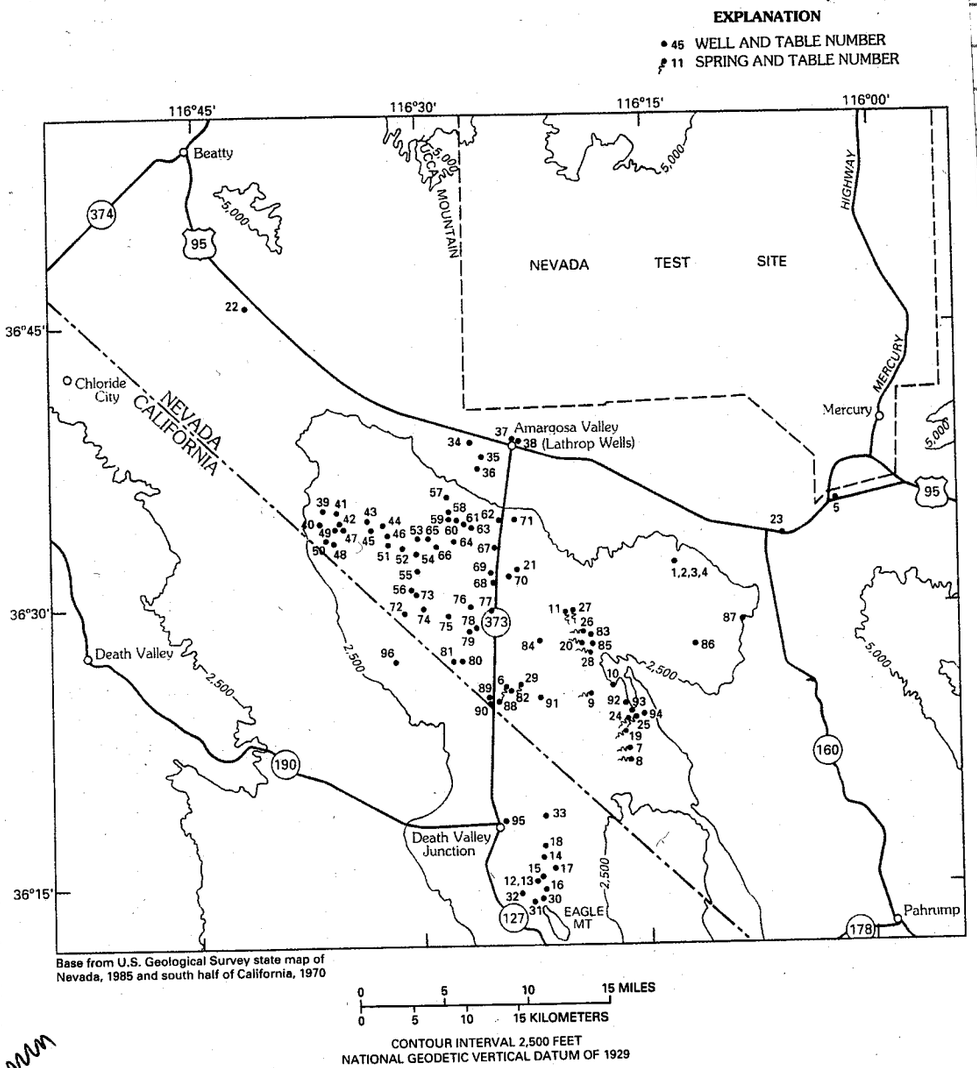

Figure 2.--Location of wells and springs in the Amargosa Desert area.

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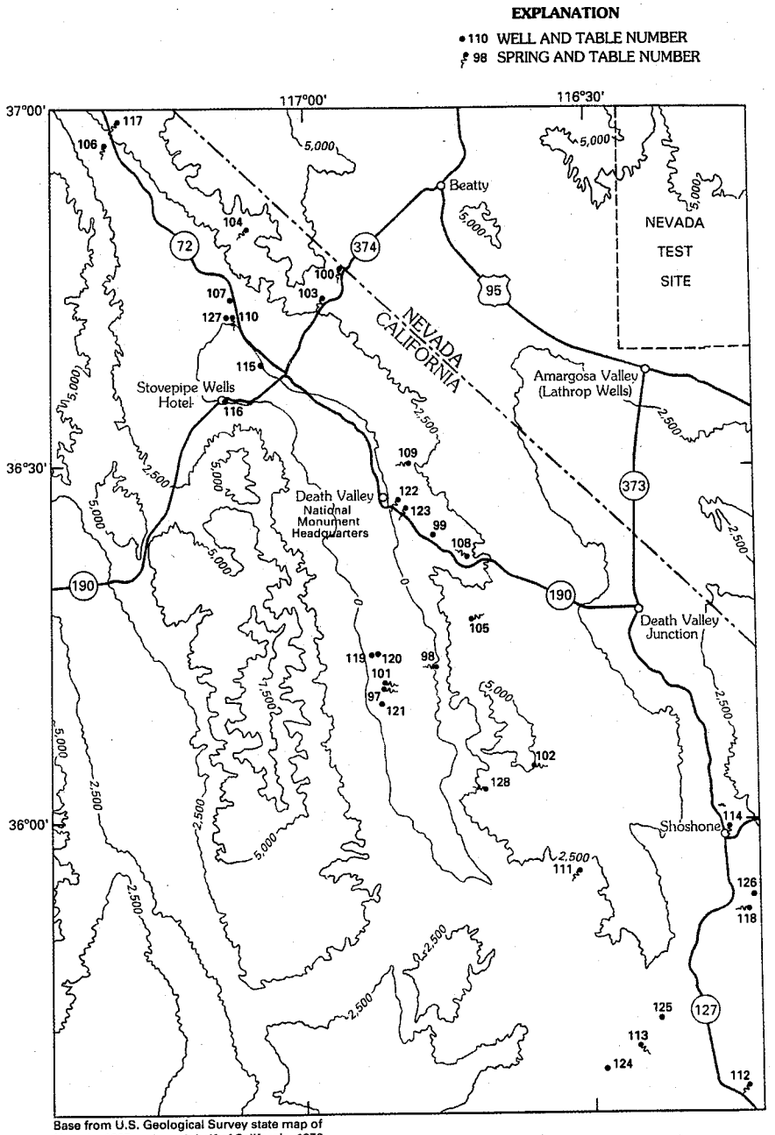

Base from U.S. Geological Survey state map of Nevada, 1985 and south half of California, 1970

Figure 3.--Location of wells and springs in the Death Valley area.

Sampling locations (McKinley et al., 1991)

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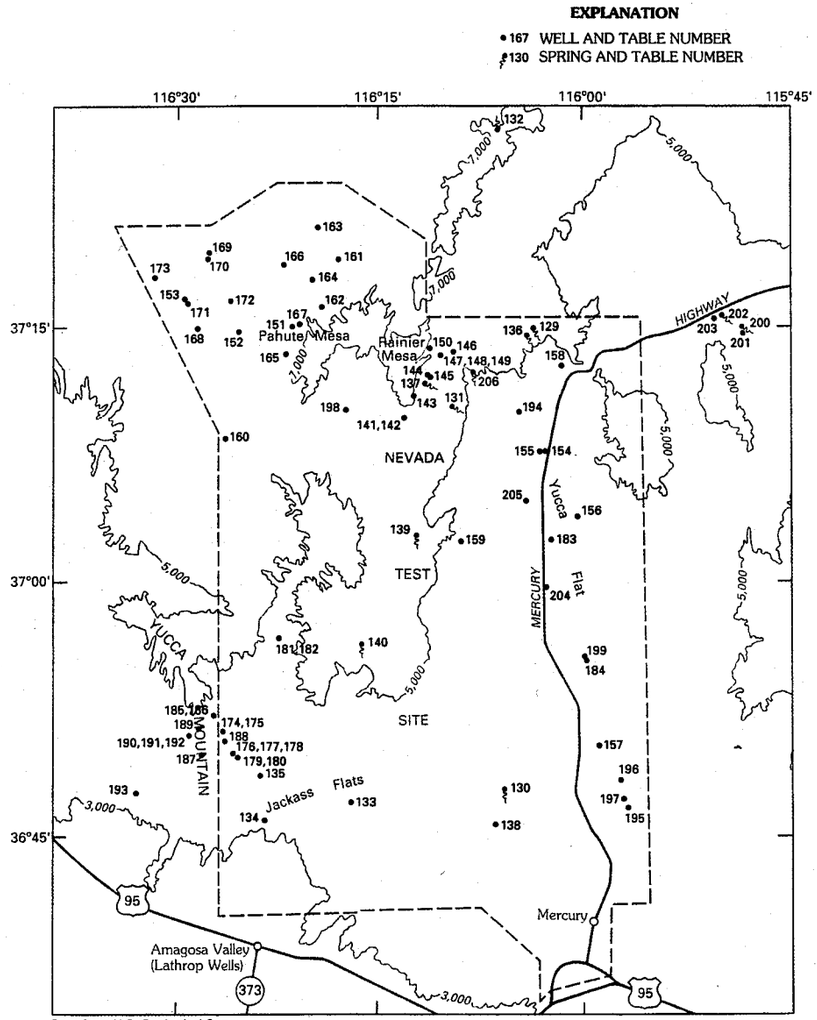

Base from U.S. Geological Survey state map of Nevada, 1985

Figure 4.--Location of wells and springs in the Nevada Test Site area.

Sampling locations (McKinley et al., 1991)

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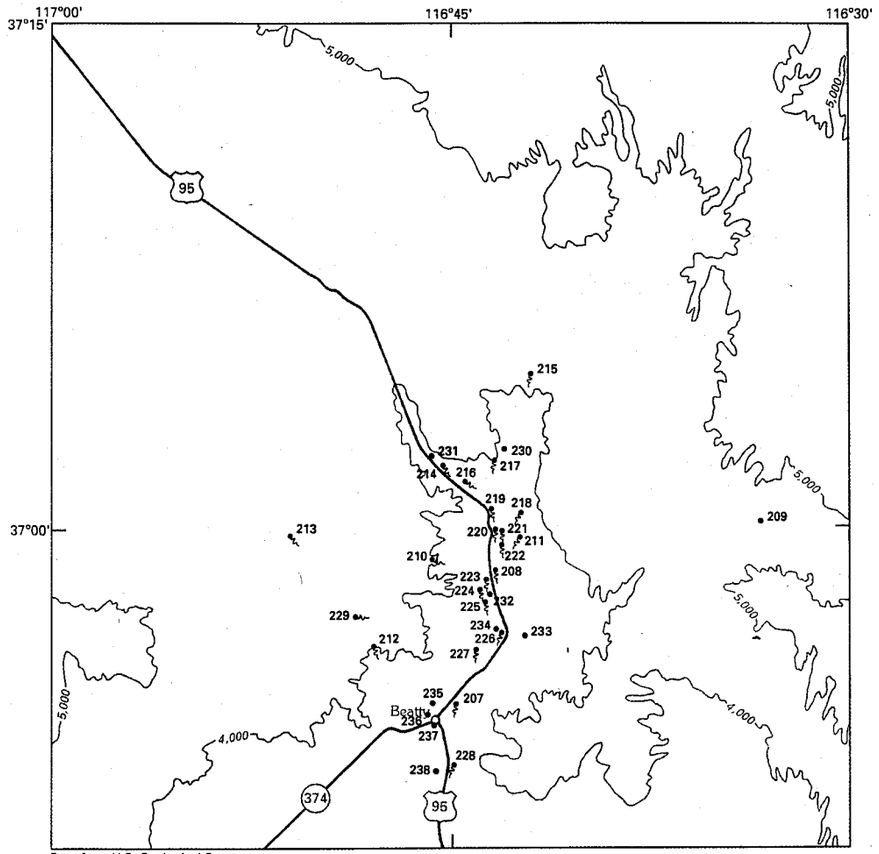

Figure 5.--Location of wells and springs in the Oasis Valley area.

Sampling locations- Melkinky et al. (1991)

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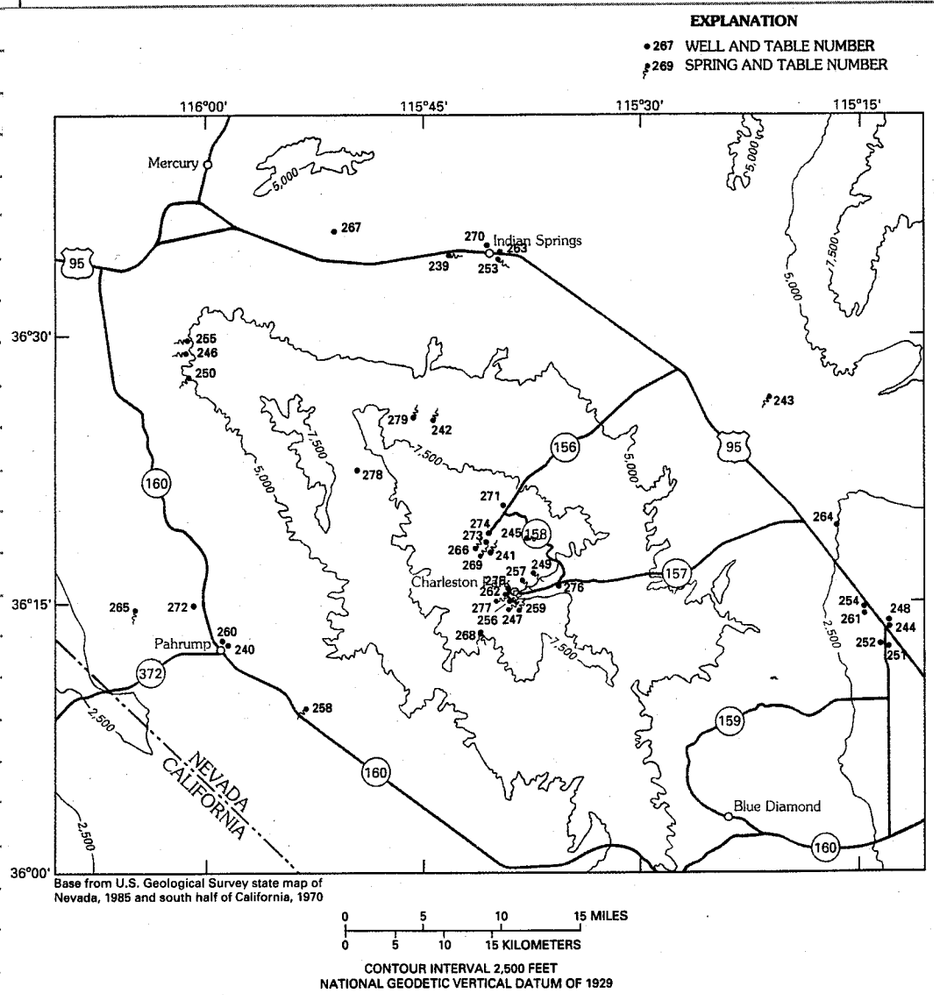

Figure 6.--Location of wells and springs in the Spring Mountains area.

Sampling locations- Melkinky et al. (1991)

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McKinley et al. (1991) REFERENCES CITED

Benson, L.V., Robison, J.H., Blankennagel, R.K., and Ogard, A.E., 1983, Chemical composition of ground water and the locations of permeable zones in the Yucca Mountain area, Nevada: U.S. Geological Survey Open-File Report 83-854, 19 p. (NNA.890511.0102)

Benson, L.V., and McKinley, P.W., 1985, Chemical composition of ground water in the Yucca Mountain area, Nevada--an update: U.S. Geological Survey Open-File Report 85-484, 10 p. (HQS.880517.1890)

Blankennagel, R.K., and Weir, J.E., Jr., 1973, Geohydrology of the eastern part of Pahute Mesa, Nevada Test Site: U.S. Geological Survey Professional Paper 712-B, p. B1-B35. (HQS.880517.1733)

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Craig, R.W., and Robison, J.H., 1984, Geohydrology of rocks penetrated by test well UE-25 #1, Yucca Mountain area, Nye County, Nevada: U.S. Geological Survey Water-Resources Investigations Report 84-4248, 57 p. (HQS.880517.1133)

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Miller, G.A., 1977, Appraisal of the water resources of Death Valley, California-Nevada: U.S. Geological Survey Open-File Report 77-728, 70 p. (HQS.880517.1934)

Moore, J.E., 1961, Records of wells, test holes, and springs in the Nevada Test Site and surrounding area: U.S. Geological Survey Trace Elements Investigations Report 781, 22 p. (NNA.901026.0052)

Nichols, W.D., and Davis, L.E., 1979, Data on ground-water resources of the Spring Mountain area, Toiyabe National Forest, Nevada: U.S. Geological Survey Open-File Report 79-1638, 16 p. (NNA.901026.0054)

Pantea, M.P., 1980, Lithology and lithium content of sediments drilled in a test hole on Alkali Flat (Franklin Lake), Inyo County, California: U.S. Geological Survey Open-File Report 80-1164, 20 p. (NNA.900124.0170)

Robinson, B.P., and Beetem, W.A., 1975, Quality of water in aquifers of the Amargosa Desert and vicinity, Nevada: U.S. Geological Survey report USGS-474-215, 64 p. (NNA.901026.0056)

Schoff, S.L., and Moore, J.E., 1964, Chemistry and movement of ground water, Nevada Test Site: U.S. Geological Survey Trace Elements Investigations Report 838, 75 p. (NNA.870518.0062)

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References Cited - McKinley et al. (1991)

Snyder, D.B. and Carr, W.J., 1982, Preliminary results of gravity investigations at Yucca Mountain and Vicinity, southern Nye County, Nevada: U.S. Geological Survey Open-File Report 82-701, 36 p. (HQS.880517.1418)

Technical Support Division, 1987, NTS Drilling and Mining Summary: Fenix & Scisson, Inc., Statistical Report. (NNA.901026.0057)

Thordarson, William, and Robinson, B.P. 1971, Wells and springs in California and Nevada within 100 miles of the point 37 15 N., 116 25 W., on the Nevada Test Site: U.S. Geological Survey report USGS-474-85, 174 p. (NNA.8700406.0223)

Waddell, R.K., 1984, Hydrologic and drill-hole data for test wells UE-29a #1 and UE-29a #2, Fortymile Canyon, Nevada Test Site: U.S. Geological Survey Open-File Report 84-142, 25 p. (NNA.870406.0055)

Walker, G.E., and Eakin, T.E., 1963, Geology and ground water of Amargosa Desert, Nevada-California: State of Nevada Ground Water Resources--Reconnaissance Series Report 14, 45 p. (HQS.880517.1862)

White, A.F., 1979, Geochemistry of ground water associated with tuffaceous rocks, Oasis Valley, Nevada: U.S. Geological Survey Professional Paper 712-E, p. E1-E25. (NNA.870517.0034)

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Whitfield, M.S., Eshom, E.P., Thordarson, William, and Schaefer, D.H., 1985, Geohydrology of test well USW H-4, Yucca Mountain, Nye County, Nevada: U.S. Geological Survey Water-Resources Investigations Report 85-4030, 33 p. (HQS.880517.1870)

Young, R.A., 1972, Water supply for Nuclear Rocket Development Station at the U.S. Atomic Energy Commission's Nevada Test Site: U.S. Geological Survey Water-Supply Paper 1938, 19 p. (NNA.870519.0007)

NOTE: Parenthesized numbers following each cited reference are for U.S. Department of Energy OCRWM Records Management purposes only and should not be used when ordering the publication.

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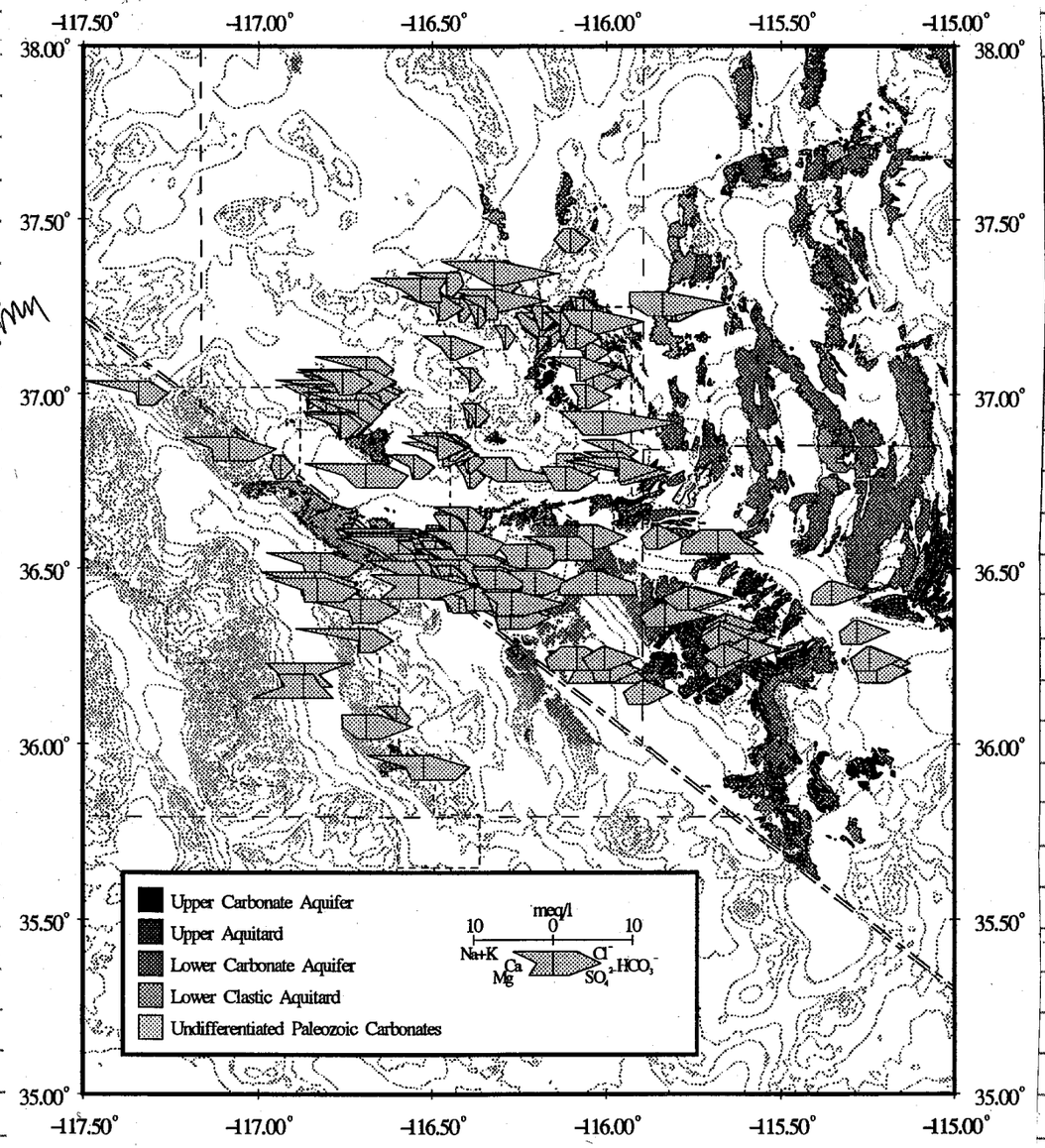
Stiff diagram map developed by Sandy Nguyen (SwRI, Division 15) using the hydrochemistry data of McKinley et al. (1991) and GIS/ArcInfo coverages (topography, political boundaries) developed in the Tectonics Research Project. S. Nguyen also developed a contouring routine on the CNWRA Silicon Graphics SPARC 10 workstation to investigate trends in chemical data over the Yucca Mountain region.

Coding done using ARC Macro Language (AML) of ArcInfo



ArcInfo, version 7.0

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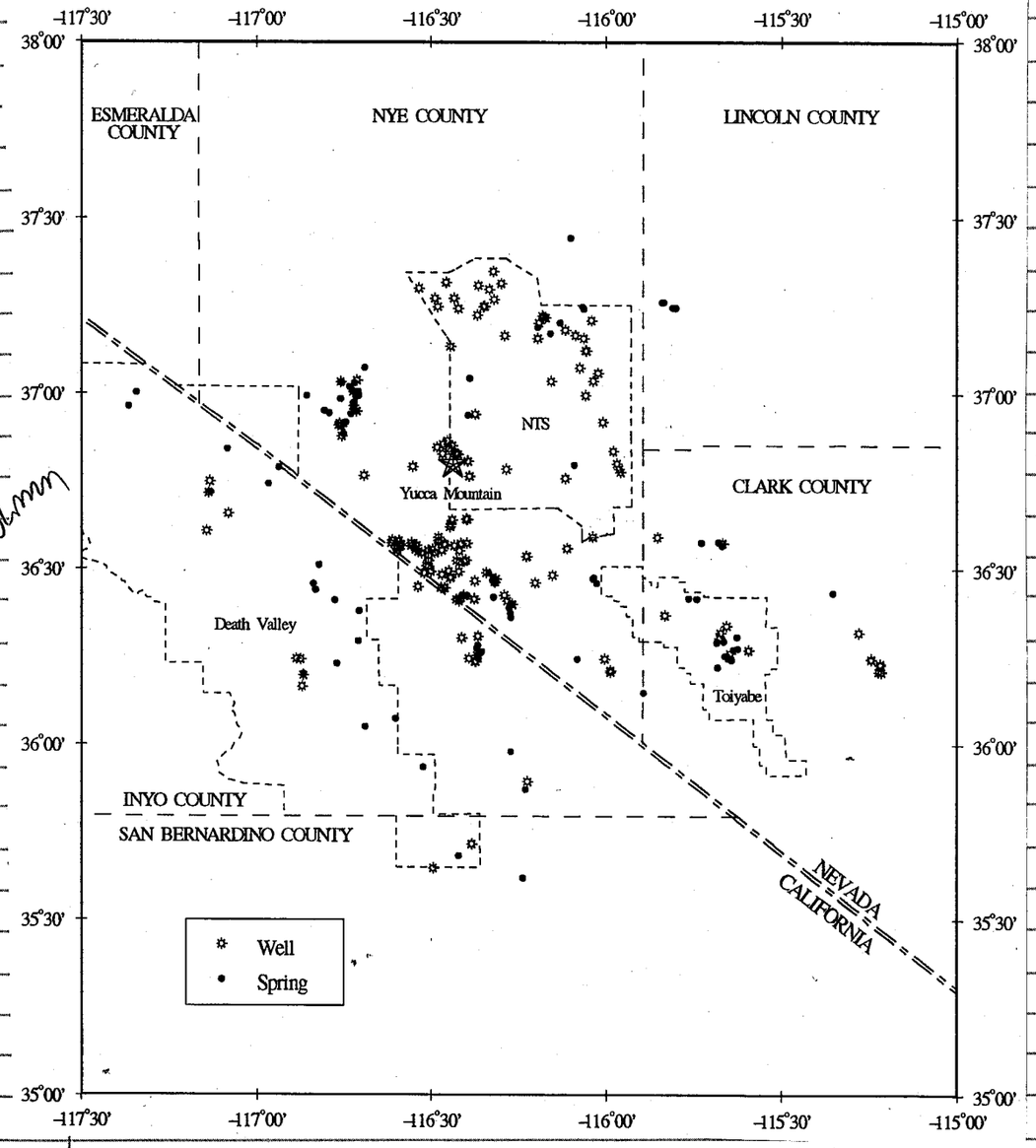
Available Water Chemistry Data

Mckinley et al. (1991)



ArcInfo, version 7.0

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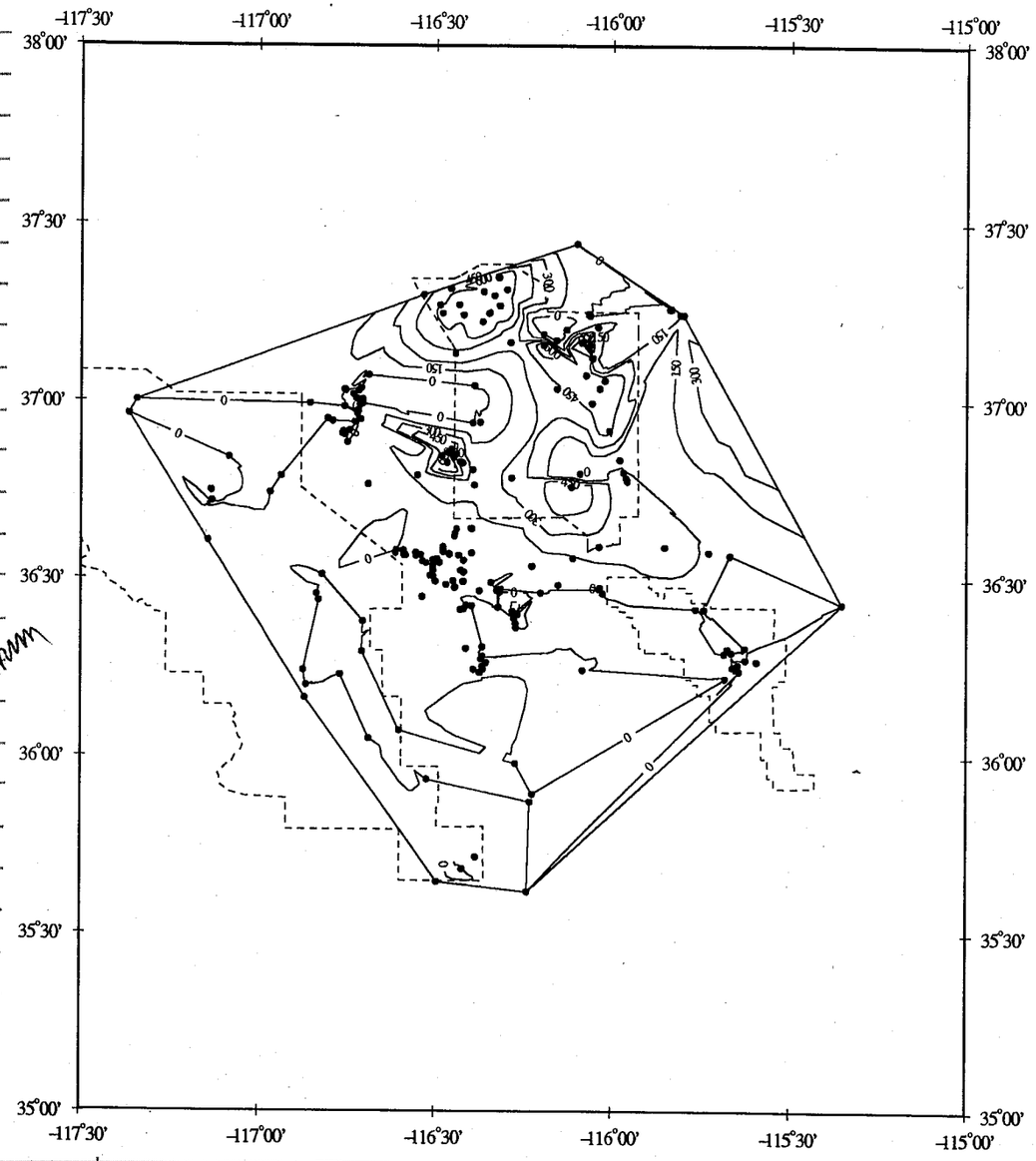
Water Depth

0 – 751 m, Contour Interval = 150 m



Drlmm

Arc Info, Version 7.0

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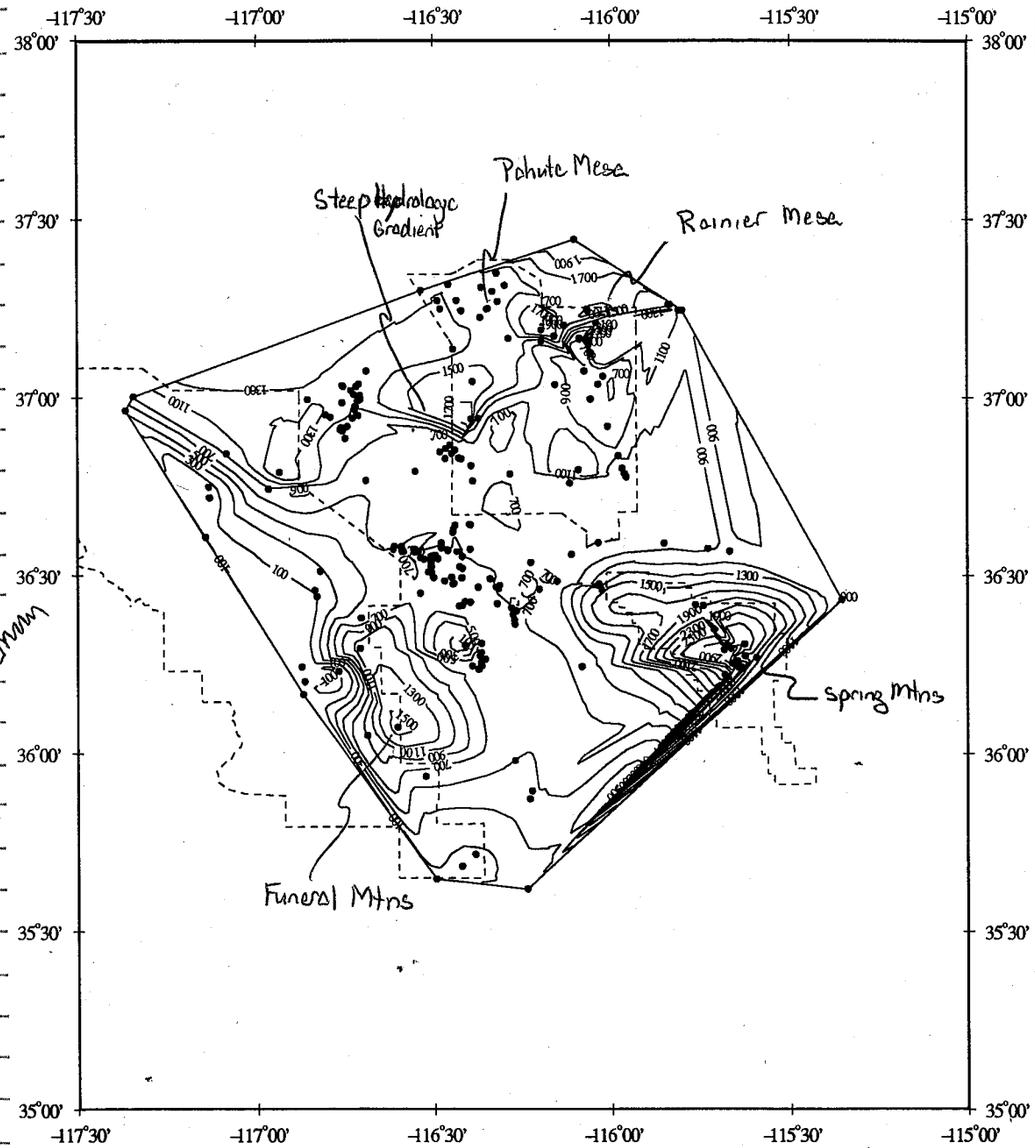
Water Table Elevation

-100 – 3048 m, Contour Interval = 200 m



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Arc Info, Version 7.0

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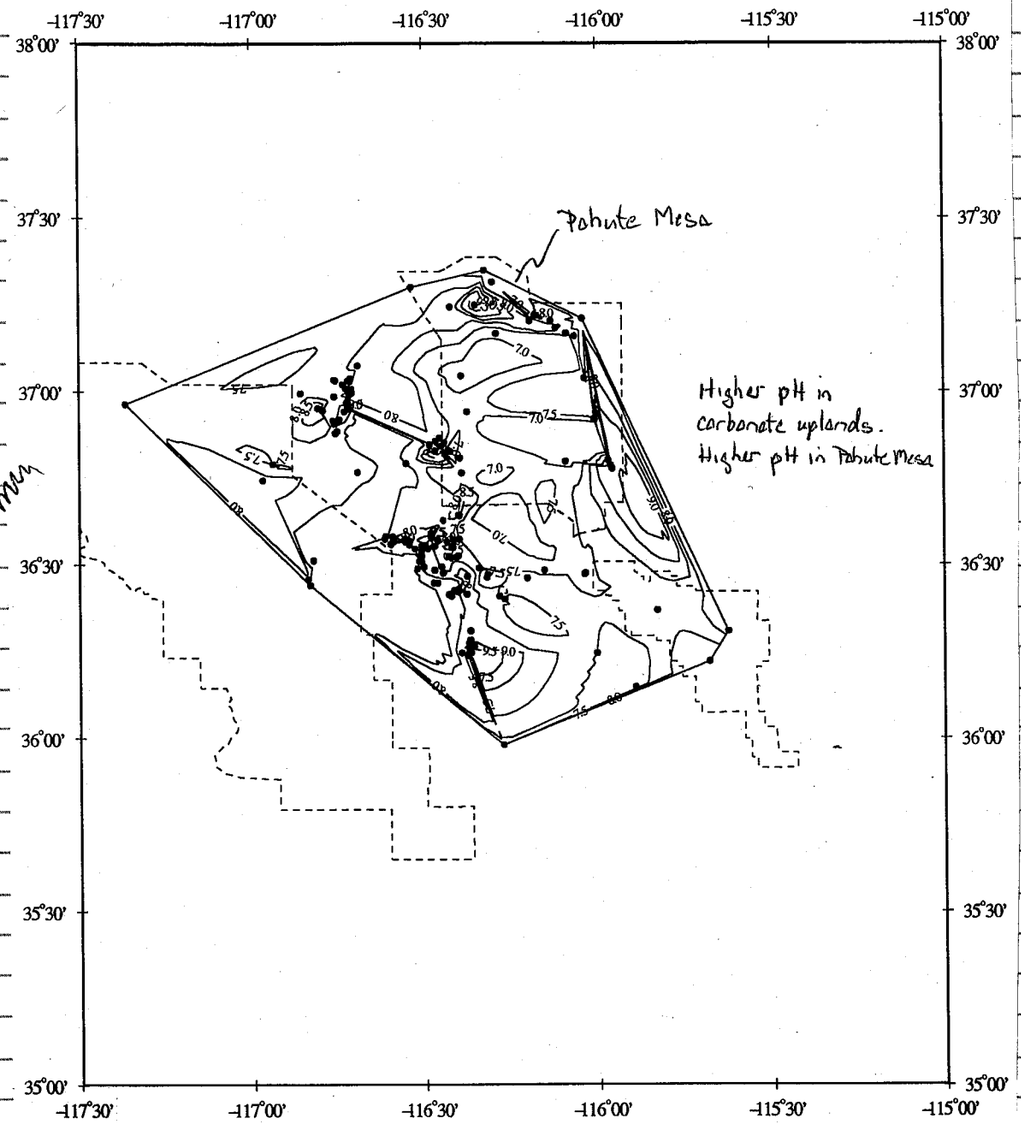
Field pH

6.5 – 10.0 units, Contour Interval = .5 units



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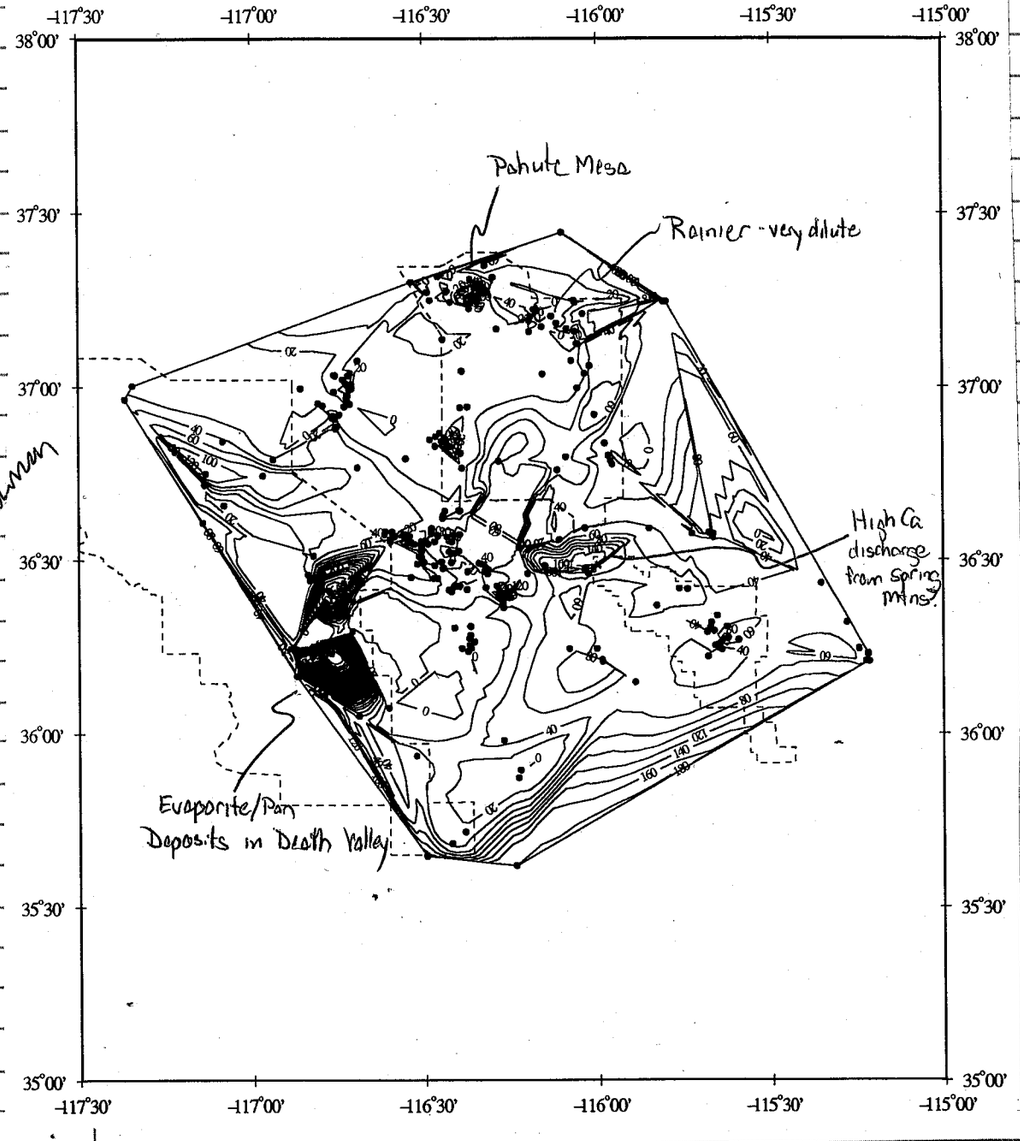
Calcium

0 – 830 mg/L, Contour Interval = 20 mg/L



Arc Info, Version 7.0

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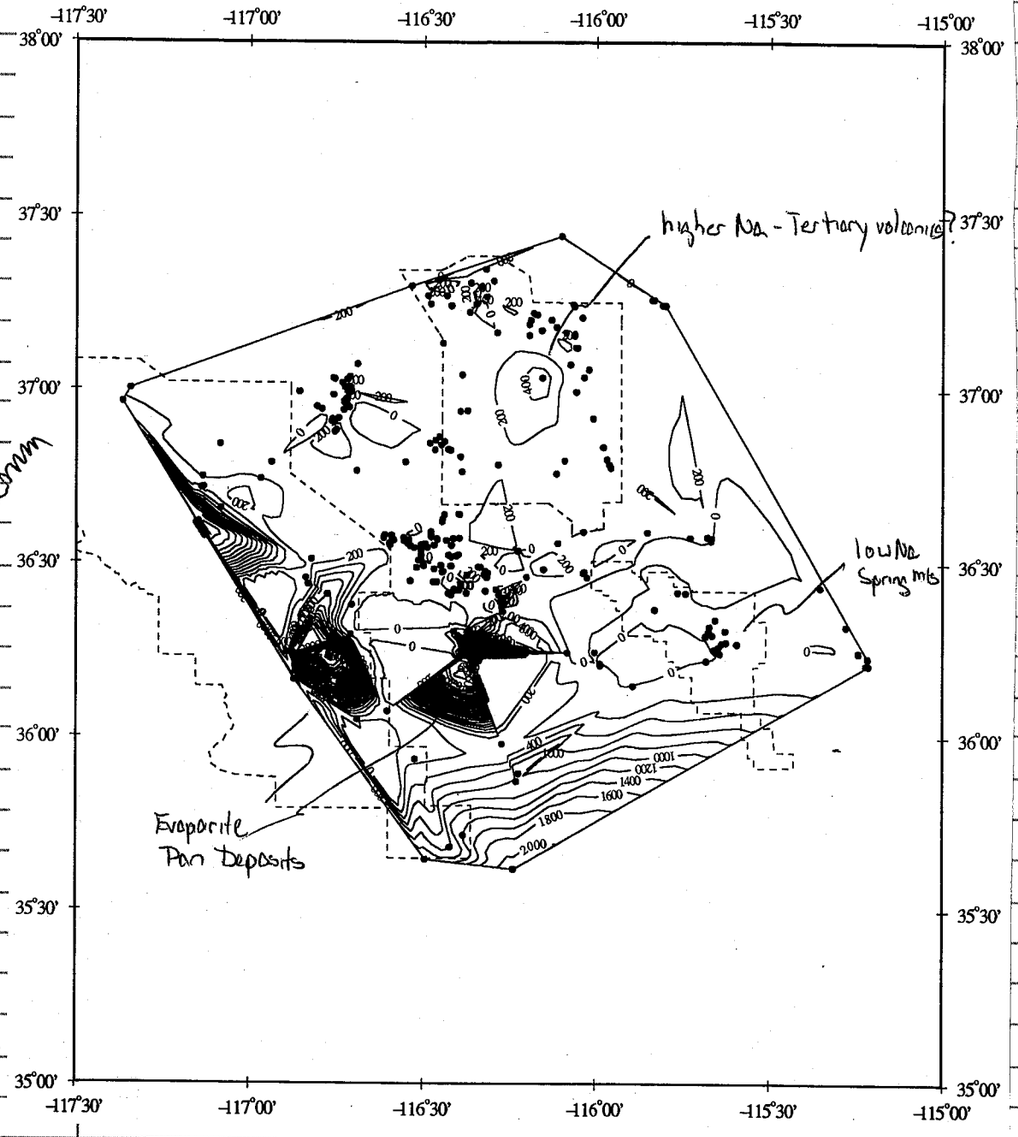
Sodium

0 – 28000 mg/L, Contour Interval = 200 mg/L



Arc Info, Version 7.0

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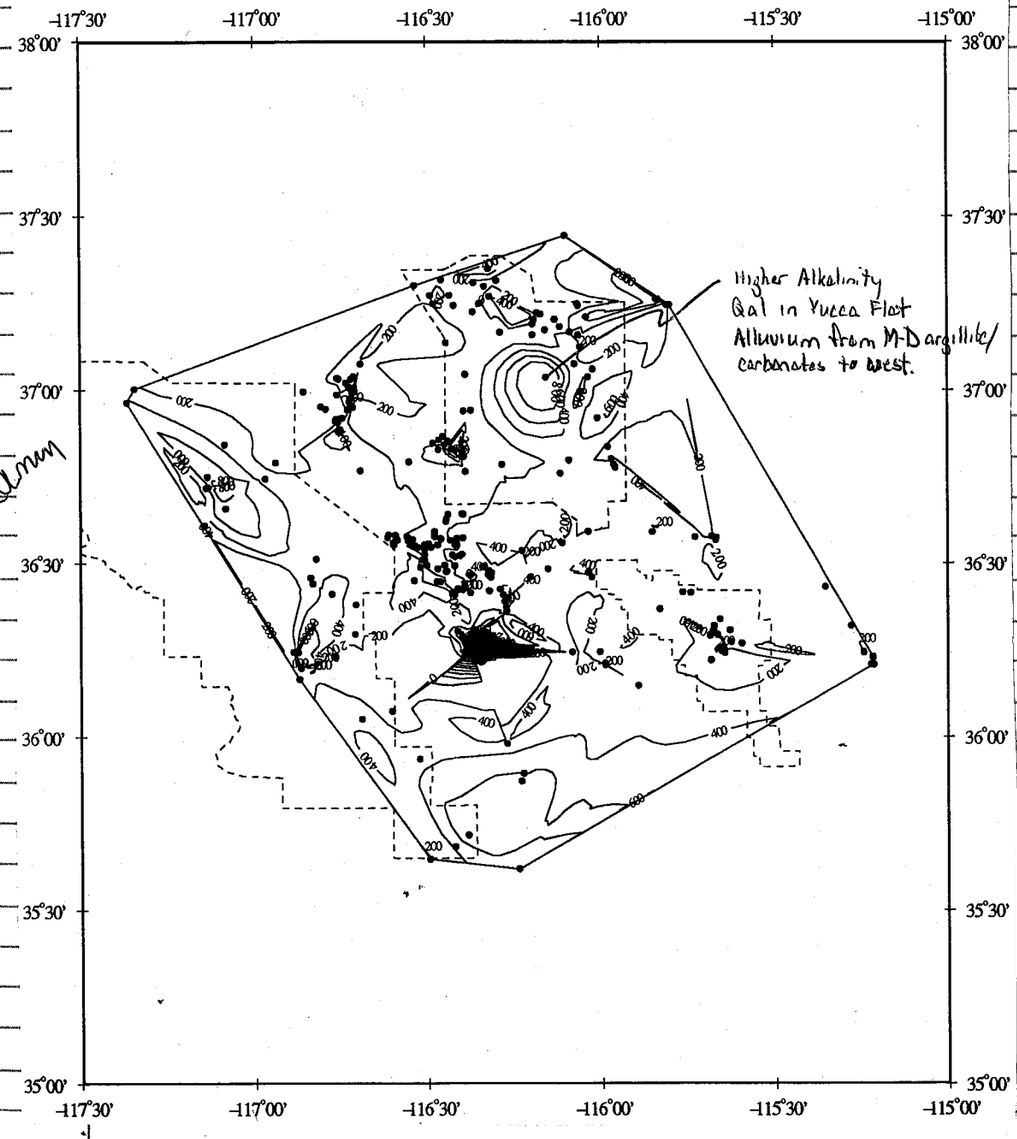
Alkalinity as HCO3

0 – 16000 mg/L, Contour Interval = 200 mg/L



Arc Info, Version 7.0

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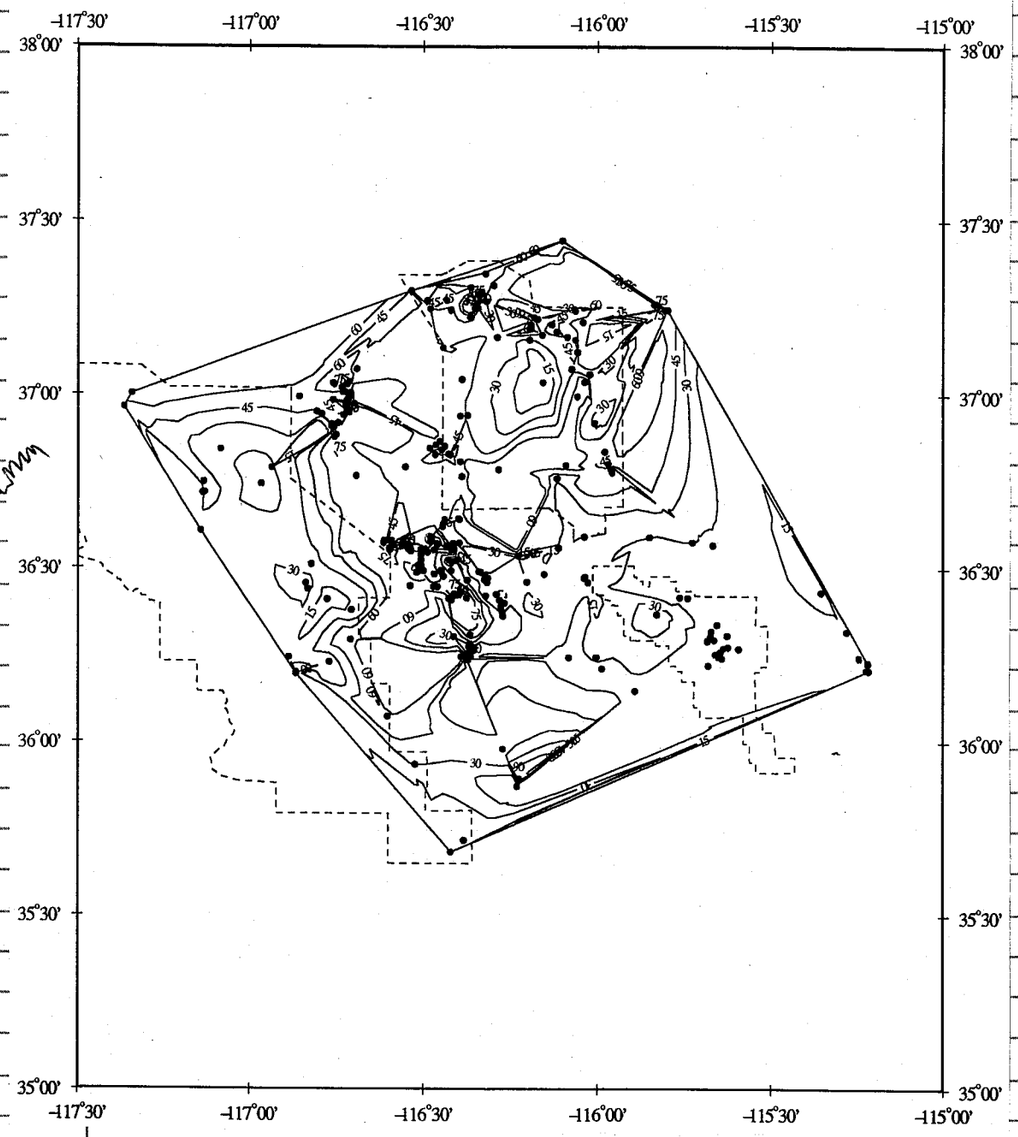
Silica

0 – 130 mg/L, Contour Interval = 15 mg/L



Arc Info, Version 7.0

1/17/96 DRJ

In a geologic system such as YM, much of the data generated during site characterization is most useful when tied to a geographic/geologic framework. GIS systems such as ARC/INFO are powerful tools for presenting and interpreting data in a geographic context. By superimposing different coverages such as geology, political boundaries, and geochemical/hydrologic data, it is possible to develop figures and maps that can transmit a wide range of information. In addition, the ARC Macro Language (AML) provides the capability to manipulate the data and display quantitative information in ways that may help in interpreting trends and tendencies.

In the initial stages of data compilation and entry into ARC/INFO format, the task on investigations of issues in hydrology, geochemistry, and climatology/meteorology have produced electronic forms of mineral chemistry data sources and entered them into the ARC/INFO database currently being constructed at CNWRA. For mineral composition, the data source is:

- Broxton, D.E., R.G. Warren, R.C. Hagan, and G. Luedemann. 1986. *Chemistry of Diagenetically Altered Tuffs at a Potential Nuclear Waste Repository, Yucca Mountain, Nye County, Nevada*. LA-10802-MS. Los Alamos, NM: Los Alamos National Laboratory.

The ARC/INFO database was initially developed for projects conducted by CNWRA for both NRC/NMSS tasks and NRC Research projects. As part of these projects, a great deal of information has been entered as coverages into ARC/INFO (Center for Nuclear Waste Regulatory Analyses, 1994). These coverages continue to evolve as part of ongoing efforts in these research projects. Where possible, the current effort will take advantage of existing coverages to provide a strong geological framework for the current effort in Investigations of Issues in Hydrology, Geochemistry, and Climatology/Meteorology, and to enhance display and interpretation of hydrologic, geochemical and climatological data.

Broxton et al. (1986) 1/17/96 DRJ

~~This report~~ is a Los Alamos report prepared as a compilation of mineral chemistry data collected from drill holes (and a few outcrop samples) at Yucca Mountain. These data were generally collected prior to the implementation of a DOE-approved QA program, but are freely used in this project. The sources referenced in Broxton et al. (1986) should be consulted for determining the quality of the data.

The data included here are originally entered using a Microsoft Excel, Version 4.0 for Windows (IBM PC) spreadsheet. This allows exporting an ASCII-comma delimited format for inclusion in GIS and 3D graphics systems like ArcInfo and EarthVision. In the tables, mineral compositions are expressed in terms of oxide weight percent.

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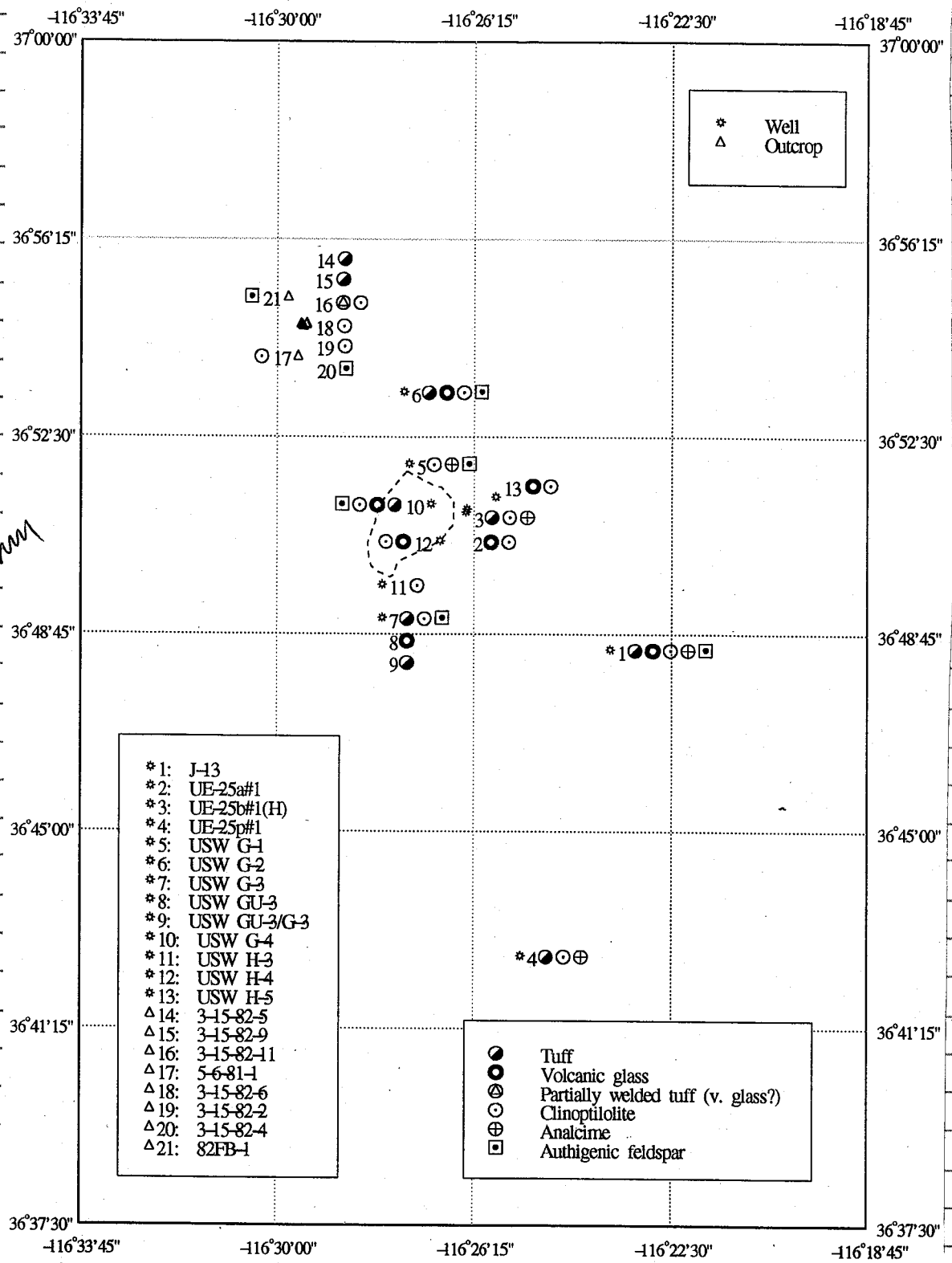
Available Mineral Compositional Data



Arc Info, Version 7.0

McKinley et al (1991) 1/17/96

Tabulated data, Excel 4.0 DRJ

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Site No. ()	SITE NAME ()	NEVADA NORTH (COORDINATE)	NEVADA EAST (COORDINATE)	Latitude ()	Longitude ()	Data Source ()	Analyzing Lab ()	Aquifer ()	Lithology ()	Use ()	Elevation (m)	Well-Depth (m)	Water Depth (m)	Pumping Time (h)
1	Amargosa Alluvium OBS Hole	650572	629255	36 32 12	116 13 36	USGS	USGS	QTal	-1111	OBS	733	189	13	-1111
2	Amargosa Tracer Hole No. 1	650785	629206	36 32 13	116 13 37	USGS	USGS	Pzc	-1111	OBS	733	202	13	-1111
3	Amargosa Tracer Hole No. 2	650523	629037	36 32 11	116 13 39	USGS	USGS	Pzc	DOLO	OBS	732	252	12	-1111
4	Amargosa Tracer Hole No. 3	650730	629130	36 32 13	116 13 30	USGS	USGS	Pzc	-1111	OBS	732	246	12	-1111
5	Army 1 (Army 6B)	670902	664772	36 35 30	116 02 14	USGS	USGS	Pzc	-1111	OBS	961	583	239	3
6	Ash Tree Spring 17S/49E-35ddd	310200	575000	36 25 35	116 24 42	1,USGS	USGS	Qal	-1111	-1111	664	-9999	0	-1111
7	Big Spring 18S/51E-19a	591600	615600	36 22 29	116 16 26	USGS	USGS	Qal/Pzc	-1111	IRR	683	-9999	0	-1111
8	Bole Spring 18S/51E-30a	587500	617000	36 21 47	116 16 21	4	USGS	-1111	-1111	-1111	683	-9999	0	-1111
9	Crystal Spring 18/50E-03a	608300	601400	36 25 15	116 19 16	USGS	USGS	Qal	-1111	IRR	671	-9999	0	-1111
10	Devils Hole 17S/50E-36ccd	610100	610600	36 25 32	116 17 27	2,USGS	USGS	Pzc	LS	PS	720	-1111	-1111	-1111
11	Fairbanks Spring 17S/50E-09adc	633669	595533	36 28 26	116 20 30	USGS	USGS	QTal	-1111	IRR	695	-9999	0	-1111
12	Franklin L. FL-1-1 25N/6E-31dc	547584	587796	36 15 15	116 22 08	7	USGS	Q1	UNCONSOLID	TEST	611	41	-1111	0.1
13	Franklin L. FL-1-2 25N/6E-31dc	547584	587796	36 15 15	116 22 08	7	USGS	Q1	UNCONSOLID	TEST	611	102	-1111	0.1
14	GS-12 Franklin Lake DVJ	554874	587448	36 16 27	116 22 12	USGS	USGS	Q1	UNCONSOLID	TEST	613	9	1	-1111
15	GS-15 Franklin Lake DVJ	547697	588369	36 15 16	116 22 01	USGS	USGS	Q1	UNCONSOLID	TEST	611	7	2	-1111
16	GS-18 Franklin Lake DVJ	544482	589707	36 14 44	116 21 57	USGS	USGS	Q1	UNCONSOLID	TEST	610	9	4	-1111
17	GS-4 Franklin Lake DVJ	551449	591633	36 15 53	116 21 21	USGS	USGS	Q1	UNCONSOLID	TEST	611	7	1	-1111
18	GS-8 Franklin Lake DVJ	559213	588255	36 17 00	116 22 02	USGS	USGS	Q1	UNCONSOLID	TEST	611	10	0	-1111
19	Jack Rabbit Spring 18S	597100	614400	36 23 24	116 16 41	USGS	USGS	Qal/Pzc	-1111	IRR	692	-9999	0	0.5
20	Longstreet Spring 17S/50E-22aba	625400	600400	36 28 04	116 19 30	USGS	USGS	Qal/Pzc	-1111	IRR	701	-9999	0	-1111
21	Mathew's Well	646358	578351	36 31 32	116 24 00	WATSTORE	USGS	-1111	-1111	-1111	707	-1111	-1111	-1111
22	NECO Well #1 13S/47E-35b	734000	493000	36 46 00	116 41 30	USGS	USGS	QTal	-1111	IND	850	175	86	-1111
23	Point of Rocks Highway Well	659000	663000	36 33 33	116 08 42	3,USGS	USGS	Qal	-1111	Destroyed	858	244	139	-1111
24	Point of Rocks Springs (King)	601000	615700	36 24 02	116 16 25	USGS	USGS	Pzc	-1111	IRR	701	-9999	0	-1111
25	Point of Rocks Springs Rock	601300	616500	36 24 05	116 16 25	USGS	USGS	Qal	-1111	IRR	707	-9999	0	-1111
26	Rogers Spring 17S/50E-15a1	629039	601265	36 28 40	116 19 20	USGS	USGS	Qal	-1111	IRR	695	-9999	-1111	-1111
27	Soda Spring 17S/50E-10c--1	633300	597200	36 29 22	116 20 10	USGS	USGS	Qal	-1111	IRR	695	-9999	-1111	-1111
28	Spring 17S/50E-23bbc	624500	602500	36 27 38	116 19 04	USGS	USGS	Qal	-1111	Unused	715	-9999	-1111	-1111
29	Spring 18S/49E-01aba Clay Camp	610000	579500	36 25 30	116 23 50	1,USGS	USGS	QTal	TRAVERTINE	Unused	664	-9999	0	-1111
30	Well 05 Franklin Lake DVJ	541524	586750	36 14 15	116 22 21	USGS	USGS	Q1	UNCONSOLID	TEST	610	10	2	-1111
31	Well 10 Franklin Lake DVJ	541219	586014	36 14 12	116 22 30	USGS	USGS	Q1	UNCONSOLID	TEST	609	11	2	-1111
32	Well 13 Franklin Lake DVJ	544339	581008	36 14 43	116 23 31	USGS	USGS	Q1	UNCONSOLID	TEST	611	5	3	-1111
33	Well 15 Franklin Lake DVJ	567617	588389	36 18 33	116 22 00	USGS	USGS	Q1	UNCONSOLID	TEST	622	-9999	0	-1111
34	Well 15S/49E-22a1 Lathrop Well	689283	566551	36 38 27	116 26 23	6,USGS	USGS	Qal	-1111	DOM/IRR	796	174	90	-1111
35	Well 15S/49E-22dc Lathrop	683537	565369	36 37 40	116 26 40	1,USGS	USGS	QTal	-1111	IND	784	148	78	-1111
36	Well 15S/49E-27acc Amargosa	680890	564768	36 37 14	116 26 45	USGS	USGS	-1111	-1111	OBS	777	467	73	-1111
37	Well 15S/50E-18ccc Lathrop	689200	578500	36 38 36	116 23 57	1,USGS	USGS	Qal	-1111	PS	812	120	105	-1111
38	Well 15S/50E-18cdc Lathrop	688831	579211	36 38 32	116 23 48	1	USGS	Qal	-1111	Unused	812	120	105	-1111
39	Well 16S/48E-07bba	667000	516500	36 34 55	116 38 40	1	USGS	Qal	-1111	DOM	725	38	0	-1111
40	Well 16S/48E-07cbc	663500	515500	36 34 25	116 38 50	1,USGS	USGS	Qal	-1111	DOM	722	46	23	-1111
41	Well 16S/48E-08bacbc	666279	522020	36 34 50	116 35 30	1,5	USGS	Qal	-1111	IRR	727	80	34	-1111
42	Well 16S/48E-08cda Sullivan	662500	523000	36 34 15	116 35 20	1,USGS	USGS	Qal	-1111	DOM	722	-1111	40	-1111
43	Well 16S/48E-10cba Kirker	664000	532500	36 34 25	116 33 20	1,USGS	USGS	-1111	ALLUVIUM	DOM	725	46	32	-1111
44	Well 16S/48E-15aaa Bob Nichols	661500	536000	36 34 03	116 32 31	1,USGS	USGS	QTal	-1111	DOM/IRR	725	56	29	-1111
45	Well 15S/48E-15aa Amargosa	661032	532782	36 33 58	116 33 16	1	USGS	-1111	-1111	-1111	724	50	30	-1111
46	Well 16S/48E-15dda Amargosa	657699	536304	36 33 25	116 32 35	1	USGS	Qal	-1111	-1111	719	-1111	-1111	-1111
47	Well 15S/48E-17abb Amargosa	662000	524000	36 34 00	116 35 10	1	USGS	Qal	GRAVEL	IRR	722	85	31	-1111
48	Well 16S/48E-17ccc Amargosa	656085	520641	36 33 09	116 35 47	1	USGS	Qal	-1111	-1111	718	-1111	-1111	-1111
49	Well 15S/48E-18bcc Amargosa	661224	522840	36 34 00	116 35 20	1,5	USGS	Qal	-1111	IRR	720	110	27	-1111
50	Well 16S/48E-18dad Amargosa	656381	520477	36 33 32	116 35 48	1	USGS	-1111	-1111	-1111	722	-1111	-1111	-1111
51	Well 16S/48E-23bdb Lathrop	655173	538347	36 33 00	116 32 10	1	USGS	Qal	-1111	IRR	716	100	29	-1111
52	Well 16S/48E-23da Amargosa	654187	541612	36 32 44	116 31 35	1	USGS	Qal	-1111	IRR	713	140	24	-1111
53	Well 16S/48E-24aaa Amargosa	656500	546900	36 33 13	116 30 25	1	USGS	QTal	-1111	IRR/DOM	722	146	29	-1111
54	Well 16S/48E-25aa Jacob's #1	651000	547000	36 32 18	116 30 24	1,USGS	USGS	-1111	S/G	IRR	714	50	28	-1111
55	Well 16S/48E-36aaa Smith's	645900	547000	36 31 29	116 30 24	1,USGS	USGS	Qal	-1111	IRR	709	91	21	-1111
56	Well 16S/48E-36dcc John Mills	640500	545000	36 30 35	116 30 50	1,USGS	USGS	Qal	-1111	DOM/IRR	701	124	13	0.1
57	Well 16S/49E-05acc A. Sasse	670200	555300	36 35 28	116 28 42	1,USGS	USGS	-1111	-1111	-1111	746	87	21	-1111
58	Well 16S/49E-08abb K. Finical	666900	555400	36 34 56	116 28 41	1,USGS	USGS	QTal	-1111	DOM	739	60	45	0.2
59	Well 16S/49E-08acc	665000	555500	36 34 35	116 28 40	1,USGS	USGS	QTal	-1111	DOM	738	62	45	1
60	Well16S/49E-08cda K. Garey	663100	560200	36 34 18	116 27 42	1,USGS	USGS	Qal	-1111	IRR	741	94	46	-1111
61	Well 16S/49E-09dcc School	662300	560750	36 34 10	116 27 35	1,USGS	USGS	Qal	-1111	PS	739	55	49	-1111
62	Well 16S/49E-12ddd Amargosa	663335	574225	36 34 20	116 24 50	1	USGS	-1111	-1111	-1111	750	-1111	-1111	-1111
63	Well 16S/49E-15aaa Schoolhouse	661500	569500	36 34 00	116 26 00	1,USGS	USGS	Qal	-1111	DOM	744	120	51	-1111
64	Well 16S/49E-16ccc Amargosa	656320	558008	36 33 11	116 28 09	1	USGS	-1111	TUFF	-1111	726	-1111	-1111	-1111
65	Well 16S/49E-19dc Amargosa	657500	550250	36 33 23	116 29 44	1,USGS	USGS	QTal	S/G	Unused	723	105	33	-1111
66	Well 16S/49E-19daa Jacob's	654100	552300	36 32 49	116 29 19	1,USGS	USGS	-1111	S/G	-1111	720	84	30	-1111
67	Well 16S/49E-23add Amargosa	656252	572812	36 33 10	116 25 10	1,5	USGS	QTal	ALLUVIUM	IRR	732	116	32	-1111
68	Well 16S/49E-35aaa Amargosa	644119	572643	36 31 10	116 25 10	1,5	USGS	Qal	-1111	IRR	708	52	30	-1111
69	Well 16S/49E-35baa Amargosa	646000	571000	36 31 27	116 25 37	1	USGS	Qal	S/G	DOM/IRR	714	100	28	-1111
70	Well 16S/49E-36aba Amargosa	645140	576722	36 31 20	116 24 20	1,5	USGS	Qal	-1111	IRR	712	-1111	-1111	-1111
71	Well 16S/50E-07bcd Cook	664000	579000	36 34 25	116 23 50	1,USGS	USGS	Qal	-1111	DOM/IRR	756	60	42	0.2
72	Well 17S/48E-12bc Lyle Recs. #2	632800	543400	36 28 20	116 31 10	USGS	USGS	Tv	-1111	-1111	687	-1111	-1111	-1111
73	Well 17S/48E-lab	639650	546850	36 30 28	116 30 25	1,USGS	USGS	-1111	S/G	UNUSED	702	41	16	3
74	Well 17S/48E-07bb Lyle Recs. #1	634800	548900	36 29 38	116 30 01	1,USGS	USGS	-1111	-1111	IRR	698	152	12	-1111
75	Well 17S/48E-36aba Amargosa	631350	558100	36 29 04	116 28 06	1,USGS	USGS	-1111	S/G	UNUSED	693	99	15	3
76	Well 17S/49E-08aaa Copelanmd	634850	563850	36 29 40	116 26 58	1,USGS	USGS	Qal	-1111	UNUSED	695	6	5	-1111
77	Well 17S/49E-11ba Mecca Club	634800	571500	36 29 36	116 25 15	1,USGS	USGS	Qal	-1111	DOM	694	66	20	-1111
78	Well 17S/49E-15bbd Amargosa	628800	565550	36 28 39	116 26 37	1	USGS	-1111	S/G	UNUSED	690	110	17	2.2
79	Well 17S/49E-15bc Amargosa	625828	563899	36 28 32	116 26 43	1,5	USBR	Qal	-1111	IRR	690	167	18	-1111
80	Well 17S/49E-28bcd Amargosa	617800	560820	36 26 50	116 27 40	1	USGS	-1111	-1111	-1111	689	-1111	-1111	-1111
81	Well 17S/49E-29acc Amargosa	617792	557433	36 26 50	116 28 17	1	USGS	-1111	-1111	-1111	683	-1111	-1111	-1111
82	Well 17S/49E-36ccd	610000	576500	36 25 30	116 24 25	USGS	USGS	Qal	-1111	IND	671	213	-1111	4
83	Well 17S/50E-14cac Flowing	627000	603500	36 28 20	116 18 55	USGS	USGS	QTal	-1111	IRR	713	29	0	-1111
84	Well 17S/50E-18aab Amargosa	624942	585760	36 28 00	116 22 30	1,5	DR1	Qal	-1111	IRR	699	30	5	-1111
85	Well 17S/50E-23bb2 Flowing	624000	602500	36 27 50	116 18 06	USGS	USGS	QTal/Pzc	-1111	IRR	713	46	0	-1111
86	Well 17S/51E-23b Flowing	624000	635000	36 27 40	116 12 10	USGS	USGS	QTal	-1111	DOM	710	7	0	-1111
87	Well 17S/52E-08c1	631282	651070	36 29 00	116 09 10	USGS	USGS	Qal	LIMESTONE	DOM/IRR	729	122	10	-1111
88	Well 18S/49E-02caa Tenneco #2	606600	572700	36 24 59	116 25 10	USGS	USGS	Qal	S/G	IND/PS	664	114	20	0.6
89	Well 18S/49E-02cbc Tenneco #3	605800	570200	36 24 51	116 25 41	1,USGS	USGS	QTal	-1111	IND	658	224	22	2.2
90	Well 18S/49E-11bbb Amargosa	604100	572300	36 24 35	116 25 15	1	USGS	-1111	-1111	-1111	658	-1111	-1111	-1111
91	Well 18S/50E-06dac	606133	585248	36 24 54	116 22 37	1	DR1	-1111	-1111	-1111	659	-1111	-1111	-1111
92	Well 18S/51E-07bbb	604100	614000	36 24 33	116 16 57	USGS	USGS	Qal	PC	IND	707	152	7	4.7
93	Well 18S/51E-07dac Spr Meadows	600787	617307	36 24 00	116 16 05	USGS	USGS	QTal	-1111	IRR	704	91	5	-1111
94	Well 18S/51E-07db Ash Meadows	601089	617061	36 24 03	116 16 08	EPA	EPA	Qal	-1111	IRR	707	86	0	-1111
95	Well 25N/5E-14cl DVJ	566000	575000	36 18 15	116 24 46	4	USGS	-1111	-1111	-1111	62	45	1	-1111
96	Well 27N/4E-27bbb	621000	538000	36 27 00	116 32 16	1	USGS	Qal	S/G	IRR	685	91	14	-1111
97	Artesian Well Eagle Borax Spr	526791	441400	36 11 50	116 51 55	1	USGS	-1111	-1111	TEST	-78	15	-1111	-1111
98	Badwater Spring Death Valley	538880	469688	36 13 50	116 46 10	1	USGS	-1111	-1111	-1111	-79	-9999	0	-1111
99	Borate Mine in Furnace Creek	604607	468123	36 24 40	116 48 30	1	USGS	Ql	Sediment	IND	335	15	-1111	-1111
100	Daylight Spring 13S/46E-35aba	742728	421104	36 47 25	116 56 10	USGS	USGS	Ty	-1111	-1111	1356	-9999	0	-1111
101	Eagle Borax Spring 24N/1E-15DS1	528306	441407	36 12 05	116 51 55	1	USGS	-1111	-1111	-1111	-78	-9999	0	-1111
102	Hidden Spring in Black Mtn	481743	518880	36 04 25	116 36 10	1	USGS	-1111	Volcanic	-1111	1524	-9999	0	-1111
103	Hole-in-The-Rock Spring Ca.	725800	412100	36 44 37	116 58 00	USGS	USGS	Qal	-1111	UNUSED	878	-9999	0	-1111
104	Klare Spring 13S/45E-04LS1	782008	375234	36 50 34	117 05 00	1	USGS	-1111	Limestone	-1111	814	-9999	0	-1111
105	Lemonade Spring in Black Mtn	562328	487722	36 17 42	116 42 30	1	USGS	-1111	Volcanic	-1111	1158	-9999	0	-1111
106	Mesquite Spring 11S/42E-26	806585	296306	36 57 50	117 21 50	2	USGS	PS	-1111	-1111	540	-9999	0	-1111
107	Midway Well 14S/45E-18D2	729064	363445	36 44 59	117 07 58	1	USGS	QTa/Tc	-1111	TEST	30	30	5	-1111
108	Navel Spring 26N/2E-13FS1	593469	488553	36 22 50	116 42 20	1	USGS	QTf	-1111	-1111	610	-9999	0	-1111
109	Nevares Spring	641432	454777	36 30 44	116 49 14	WATSTORE	USGS	-1111	-1111	-1111	280	-9999	0	-1111
110	Palm Tree Spring 14S/45E-30BS1	716924	364800	36 43 09	117 07 50	1	USGS	QTa/Tc	-1111	-1111	8	-9999	0	-1111
111	Rhodes Spring 21N/4E-11MS1	431519	542349	35 58 08	116 31 25	1	USGS	-1111	Crystalline	-1111	610	-9999	0	-1111

Site No.	Yield (L/s)	Sampling Method ()	Filtration (micrometers)	Date (mm/dd/yy)	Sp. Cond. (microS/cm)	Field pH (units)	Lab pH (units)	Temp (deg.C)	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	Alk(HCO3) (mg/L)	SO4 (mg/L)	Cl (mg/L)	F (mg/L)	Silica (mg/L)	NO3 (mg/L)	PO4 (mg/L)	Li (mg/L)	Sr (mg/L)	TDS (mg/L)	Balance(+/-) (percent)
1	-1111	-1111	-1111	9/9/69	400	-1111	8.4	29	5.9	7.8	64	8.7	118	39	22	1.2	1.9	-1111	-1111	0.11	0.89	238	7.1
2	-1111	-1111	-1111	9/29/66	540	-1111	8.5	-1111	22	19	60	7.9	188	76	25	1.4	21	0.4	-1111	0.1	0.74	319	0.3
3	-1111	Pump	0.45	9/3/69	638	-1111	7.6	31	43	18	64	8.4	285	70	20	1.4	22	0.3	-1111	0.08	0.85	410	12.7
4	-1111	-1111	-1111	9/28/66	812	-1111	8.2	-1111	52	26	80	11	279	130	52	1.7	22	4.3	0.74	0.1	1.6	508	0.5
5	28	-1111	0.45	4/13/72	545	-1111	7.8	31	41	21	38	7.7	257	82	19	1.2	21	0.24	-1111	0.04	0.8	334	1.2
6	1	Pump	0.45	3/6/74	365	8	7.9	19	14	4.4	48	8	165	40	6.5	2.3	82	1.5	0.21	0.06	0.21	286	5.9
7	66	-1111	-1111	11/21/66	769	-1111	7.6	-1111	44	18	87	8.7	318	105	25	1.4	28	0.2	0	0.12	1.2	480	0.1
8	1	-1111	-1111	7/27/62	778	-1111	7.1	22.2	38	18	106	9.2	306	113	27	1	33	1	0	0.17	0.8	500	1.1
9	178	-1111	-1111	11/20/66	658	-1111	8.2	-1111	40	20	72	9.6	278	81	22	1.7	25	0	0	0.09	0.97	432	0.3
10	-1111	-1111	-1111	12/9/66	677	-1111	8.1	33.5	50	24	65	7.6	310	78	20	1.8	22	0.2	-1111	0.09	0.88	423	1.2
11	-1111	-1111	0.45	9/2/72	660	7.6	7.2	-1111	47	20	69	7.9	301	85	22	2.5	22	0	0	0.1	0.88	434	1.9
12	-1111	-1111	-1111	6/11/78	12600	8.2	9	27	4.3	2.8	2200	160	2220	1300	1400	20	13	-1111	-1111	0.11	0.24	6380	1.9
13	-1111	Pump	-1111	6/11/78	8578	8.4	-1111	23	2.4	2.2	2200	91	2540	1300	920	25	15	-1111	-1111	0.15	0.2	6040	1.2
14	-1111	Pump	0.45	11/14/83	33000	9.6	9.2	20.9	4.1	16	10000	590	7195	8600	7000	11	13	11	-1111	0.04	-1111	30300	10.6
15	-1111	Pump	0.45	11/14/83	58000	9.5	9.1	22.9	5	3.2	24000	880	8130	15000	25000	22	32	10	-1111	0.02	-1111	69900	7.8
16	-1111	Pump	0.45	11/18/83	65000	9.9	9.3	17	4	6.6	28000	830	16000	19000	23000	30	28	200	-1111	0.01	-1111	79700	8.8
17	-1111	Pump	0.45	11/16/83	16000	8.3	9	22	2.5	1.6	4400	76	3350	3000	32300	18	25	0.71	-1111	0.85	-1111	12600	8.4
18	-1111	Pump	0.45	11/19/83	3570	8.5	8.4	18.8	3.9	5.2	760	71	716	280	690	6.1	35	0.1	-1111	0.09	-1111	2200	3.1
19	37	Pump	0.45	4/6/71	2590	-1111	8	26.2	120	78	330	18	148	820	240	1.7	23	14	0	0.18	3.2	2060	1.9
20	66	-1111	-1111	11/18/66	689	-1111	8.2	-1111	48	19	69	7.8	300	75	17	1.9	22	0.4	0	0.09	0.92	418	0.7
21	-1111	-1111	-1111	9/11/81	929	7.6	7.8	24.5	50	20	110	1.2	317	170	28	4.4	33	-1111	-1111	0.16	1	587	4.4
22	-1111	Pump	0.45	8/2/72	1120	7.6	7.3	27.5	55	14	170	10	328	190	79	5.2	70	0.04	0	0.27	0.37	782	1.2
23	5	-1111	-1111	8/30/84	862	-1111	7.3	-1111	32	20	120	11	200	160	57	1.6	20	8.2	0.18	-1111	-1111	545	2.8
24	68	-1111	-1111	11/21/66	680	-1111	7.6	-1111	48	21	67	7.1	304	78	21	2	22	0.2	0	0.08	0.82	408	0.3
25	1	-1111	-1111	11/21/66	674	-1111	7.7	-1111	46	21	68	7.5	304	78	21	1.5	22	0.2	0	0.09	1.1	412	0.7
26	46	-1111	-1111	11/20/66	677	-1111	7.6	-1111	47	21	69	7.8	302	78	21	1.5	23	0	0	0.09	0.9	412	0.2
27	5	-1111	-1111	11/19/66	772	-1111	7.7	-1111	39	17	110	10	330	83	27	2	35	-1111	-1111	0.1	0.76	488	0.1
28	12	-1111	-1111	11/20/66	691	-1111	7.6	-1111	48	22	69	7.7	310	80	21	2.5	22	0.2	0	0.08	0.84	417	0.7
29	-1111	Pump	0.45	4/6/71	680	8.6	8	17.5	24	12	95	18	263	100	18	2.9	73	-1111	-1111	0.15	0.65	484	1.5
30	-1111	Pump	0.45	11/21/83	17000	9.3	9	20.2	2.6	2	4500	87	2350	2600	3800	15	8.7	0.17	-1111	2	-1111	12400	4.5
31	-1111	Pump	0.45	11/21/83	22000	9.3	8.8	19.5	4	4.4	6200	230	2450	3400	6700	12	20	35	-1111	0.24	-1111	17900	5.8
32	-1111	Pump	0.45	11/17/83	3320	8.4	8.3	20.8	9.3	5.2	750	21	600	550	480	3.4	67	0.09	-1111	0.41	-1111	2180	1.9
33	-1111	Pump	0.45	11/21/83	1740	8.4	8.3	20.2	6.4	3.9	370	18	528	270	110	3.6	67	-1111	-1111	0.35	-1111	1110	1.9
34	50	-1111	-1111	4/24/68	338	-1111	8	27.8	25	2.4	41	5.2	145	33	8	1.4	52	3.5	-1111	-1111	-1111	233	0
35	1	Pump	0.45	11/20/72	330	7.8	8.7	-1111	27	2	43	4.6	149	33	8.5	0.9	49	1.4	0.03	0.04	0.06	270	1.2
36	-1111	-1111	-1111	3/30/73	339	-1111	7.8	42.2	22	1.6	48	2.9	151	36	7.3	0.8	19	0.04	0.28	0.04	0.07	217	1.2
37	-1111	-1111	0.45	11/17/72	487	8.4	7.5	-1111	17	0.9	93	4.1	157	100	13	2.1	34	0.86	0.03	0.09	0.06	368	0.8
38	-1111	-1111	-1111	12/15/68	-1111	8	-1111	25.1	12	0.7	93	3.9	153	79	17	2.5	38	-1111	-1111	-1111	-1111	-1111	0.6
39	-1111	Pump	0.45	3/30/71	980	7.4	7.8	24.7	53	9.4	140	10	251	180	63	1.9	68	1.9	-1111	0.16	0.44	643	0.1
40	-1111	Pump	0.45	3/31/71	960	7.7	7.9	24.2	47	16	130	9.2	239	180	62	2	64	2.5	-1111	0.16	0.46	617	0.2
41	86	-1111	-1111	6/24/71	-1111	7.8	-1111	25	59	6.3	180	13	296	200	80	-1111	38	-1111	-1111	-1111	-1111	-1111	1.5
42	-1111	Pump	0.45	3/31/71	860	7.6	7.9	23.3	48	8.8	180	10	264	180	67	1.9	69	2.9	-1111	0.21	0.31	678	0.5
43	8	-1111	-1111	3/31/71	370	8.3	7.8	24.5	9.1	4	81	5.4	166	33	8	1.9	64	4.5	0	0.06	0.09	269	2.2
44	32	Pump	0.45	3/31/71	665	8.1	7.9	25.5	9.8	3.2	56	5.8	153	29	7.3	2	68	6	0	0.06	0.06	246	0.4
45	-1111	-1111	-1111	6/24/71	-1111	8	-1111	25	60	7.8	150	9.8	284	200	66	-1111	37	-1111	-1111	-1111	-1111	-1111	0.3
46	-1111	-1111	-1111	6/26/79	-1111	8	-1111	-1111	20	5.8	71	7.4	178	38	17	-1111	72	-1111	-1111	-1111	-1111	-1111	6.8
47	76	-1111	-1111	6/18/82	1074	-1111	7.4	24	60	7.8	160	12	302	180	69	1.2	75	1.2	-1111	0.2	0.8	800	0.9
48	-1111	-1111	-1111	6/25/79	-1111	-1111	7.7	-1111	66	11	170	12	239	240	83	-1111	76	-1111	-1111	-1111	-1111	-1111	2.8
49	47	-1111	-1111	6/24/79	-1111	8	-1111	-1111	55	11	150	12	271	190	61	-1111	80	-1111	-1111	-1111	-1111	-1111	1.9
50	-1111	-1111	-1111	6/25/79	-1111	7.7	-1111	-1111	53	8.5	150	11	236	190	63	-1111	77	-1111	-1111	-1111	-1111	-1111	2.8
51	-1111	-1111	-1111	8/19/82	346	-1111	7.3	24	9.4	1	66	8.8	156	27	6.6	2	74	3.1	-1111	0.06	1.8	284	1.7
52	-1111	-1111	-1111	2/17/66	-1111	8.2	-1111	24	22	2.2	69	8.7	134	67	27	-1111	-1111	-1111	-1111	-1111	-1111	-1111	1.1
53	101	Pump	0.45	11/17/72	321	8.1	7	27	18	0.7	64	6.8	147	30	7.8	1.5	79	1.8	0.06	0.08	0.08	320	2.2
54	-1111	Pump	0.45	3/5/74	325	8.1	7.9	26.5	19	0.8	43	7.3	133	28	8.3	1.3	72	1.7	0.21	0.05	0.08	262	6.1
55	-1111	Pump	0.45	3/4/74	335	8.4	7.9	-1111	17	2	40	6.1	133	25	8.9	1.6	78	1.8	0.25	0.04	0.06	251	7.1
56	145	Pump	0.45	4/5/71	830	7.2	7.9	26	55	9.8	100	13	300	110	33	2.8	70	8.1	-1111	0.14	0.46	557	0.3
57	-1111	Pump	0.45	3/4/74	300	8.2	7.8	-1111	28	2.2	35	5.2	135	26	6	1	62	1.7	0.18	0.05	0.05	233	1.3
58	6	Pump	0.45	11/17/72	306	7.5	7	23	30	2.8	37	5.6	152	30	7.7	0.7	54	1.6	0.03	0.04	0.08	258	1.4
59	17	Pump	0.45	4/1/71	318	7.6	7.5	25.8	23	2.4	37	6.5	138	28	6.2	0.7	58	6.6	-1111	0.04	0.09	235	0.7
60	30	Pump	0.45	11/18/72	430	7.6	7.4	24	33	3.3	56	9.4	144	78	14	0.9	76	1.7	0.03	0.04	0.2	370	2.4
61	-1111	Pump	0.45	3/1/74	370	8.2	7.8	23.3	23	2.6	56	8	141	67	10	0.9	72	1.7	0.21	0.04	0.11	337	4.9
62	0	-1111	-1111	6/26/79	-1111	7.6	-1111	-1111	46	17	120	4.3	289	160	24	-1111	20	-1111	-1111	-1111	-1111	-1111	1.6
63	0	Pump	0.45	3/31/71	650	7.7	7.9	23.8	41	7.6	80	9.7	195	130	23	0.8	46	0.5	-1111	0.06	0.35	424	1.5
64	0	-1111	-1111	6/26/79	-1111	7.8	-1111	-1111	30	1.9	40	4.3	132	51	8.2	-1111	77	-1111	-1111	-1111	-1111	-1111	0.7
65	-1111	Pump	0.45	3/1/74	300	8.1	8	-1111	20	2.7	42	8.8	150	28	7.4	1.2	69	1.5	0.16	0.04	0.07	269	7.5
66	-1111	Pump	0.45	3/5/74	309	8.2	7.8	26.4	24	1.1	36	8.2	134	33	6.6	1	76	1.8	0.21	0.04	0.06	265	7.8
67	-1111	-1111	-1111	6/26/79	-1111	8.2	-1111	-1111	16	1.7	58	6.5	127	35	8.9	-1111	76	-1111	-1111	-1111	-1111	-1111	7.3
68	47	-1111	-1111	6/24/79	-1111	7.7	-1111	-1111	44	16	120	18	271	150	29	-1111	37	-1111	-1111	-1111	-1111	-1111	4.3
69	-1111	Pump	0.45	6/24/79	-1111	7.4	-1111	-1111	53	19	110	13	303	170	31	-1111	38	-1111	-1111	-1111	-1111	-1111	0.7
70	-1111	-1111	-1111	6/24/79	-1111	7.7	-1111	-1111	45	20	110	17	293	160	24	-1111	43	-1111	-1111	-1111	-1111	-1111	1.7
71	-1111	Pump	0.45	4/1/71	870	7.5	8	30.6	44	17	120	13	285	180	28	4.5	28	-1111	-1111	0.2	0.89	537	0.3
72	-1111	Pump	0.45	3/3/74	1290	7.5	7.7	-1111	74	24	160	16	404	180	78	6.9	48	6.8	0.15	0.18	0.67	816	3.8
73	1	Pump	0.45	3/5/74	308	8.2	8	24.4	19	1.5	40	7.1	135	25	6.3	1.7	79	1.5	0.25	0.05	0.08	253	6.3
74	-1111	Pump	0.45	3/1/74	350	8.3	8	-1111	24	1.8	48	7.3	153	31	8.5	1.7	80	1.8	0.25	0.06	0.1	286	5.6
75	1	Pump	0.45	3/6/74	284	8.4	8	24	21	2.7	36	7.5	123	27	8.4	1.4	81	1.5	0.25	0.05	0.09	251	4.4
76	-1111	Pump	0.45	3/1/74	375	8	7.9	-1111	25	3.6	48	9.7	131	69	10	1.2	70	1.6	0.21	0.05	0.13	321	6.7
77	20	-1111	-1111	3/7/74	788	-1111	8.1	22	40	14	87	14	210	160	28	2.8	53	0.1	0.12	0.14	0.78	632	0.1
78	1	Pump	0.45	3/6/74	280	8.1	8.1	22.5	21	4	32	8.2	120	35	10	1.4	73	1.6	0.21	0.04	0.1	-1111	1.2
79	-1111	-1111	-1111	2/17/68	-1111	8.2	-1111	24	22	9.7	39	6.6	122	28	11	-1111	-1111	-1111	-1111	-1111	-1111	-1111	13
80	0	-1111	-1111	6/23/79	-1111	7.6	-1111	-1111	43	10	100	12	284	89	24	-1111	70	-1111	-1111	-1111	-1111	-1111	1.8
81	0	-1111	-1111	6/23/79	-1111	7.6	-1111	21	54	15	160	20	276	180	70	-1111	72	-1111	-1111	-1111	-1111	-1111	4.3
82	0	Pump	0.45	4/1/71	3990	8.8	8.4	23.6	1.3	1	840	10	1220	700	250	15	11	19	0.47	0.09	0.24	2690	1.3
83	4	Pump	0.45	4/2/71	670	7.3	8	34.5	44	21	60	8.8	286	80	22	1.6	22	0.1	-1111	0.09	0.82	393	2.2
84	-1111	-1111	-1111	12/27/71	-1111	8.8	-1111	16	7.6	6.5	250	27	416	180	70	-1111	43	-1111	-1111	-1111	-1111	-1111	0.4
85	35	Pump	0.45	4/2/71	670	7.1	7.9	34.8	42	21	63	8.8	285	82	22	1.7	22	-1111	-1111	0.08	0.91	392	2.2
86	-1111	-1111	-1111	8/2/72	610	7.8	7.4	20.8	31	20	72	12	282	69	20	1.4	27	0.06	0.06	0.12	0.94	398	0.5
87	0	Pump	0.45	5/23/71	2750	7.2	7.8	28.8	150	78	380	14	290	860	290	1.5	20	-1111	24	0.12	0.28	2040	0.6
88	8	Pump	0.45	11/18/72	534	8.3	6.9	23.8	17	6.4	110	8.4	267	52	12	4.5	62	0.92	0.06	0.07	0.53	422	2.1
89	9	Pump	0.45	11/18/72	700	7.6	7.4	23.8	29	12	120	8.7	352	74	20	3.7	59	0.35	0.03	0.13	0.59	498	1
90	-1111	-1111	-1111	6/23/79	-1111	7.4	-1111	25	34	8.5	69	12	224	90	31	-1111	78	-1111	-1111	-1111	-1111	-1111	4.4
91	-1111	-1111	-1111	2/12/72	-1111	8.2	-1111	-1111	24	12	100	14	230	100	21	-1111	81	-1111	-1111	-1111	-1111	-1111	3.4
92	85	Pump	0.45	4/2/71	880	7.7	8	31.2	46	21	60	9	285	77	21	1.7	23	-1111	-1111	0.08	0.81	402	1.9
93	65	Pump	0.45	4/5/71	3400	7.5	8	26.7	140	98	490	24	211	1200	280	1.7	18	20	-1111	0.21	4.3	2830	0.4
94	2	-1111	-1111	1/13/76	720	-1111	7.1	31	38	25	83	9.7	415	80	28	1.3	-1111	0.1	-1111	0.03	0.71	390	9
95	13	-1111	-1111	6/29/52	1380	-1111	8.6	23.6	1.9	1.9	325	12	556	149	49	7.9	31	0.2	-1111	-1111	-1111	874	2.4
96	80	Pump	-1111	6/18/82	943	-1111	7.3	22	68	68	130	19	438	110	32	3.6	72	0.2	-1111	0.14	0.6	640	0.2
97	-1111	-1111	-1111	5/17/74	1190	-1111	7.9	29.5	63	35	110	7.6	110	170	200	0.4	28	0.2	-1111	-1111	-1111	873	0
98	-1111	-1111	-1111	1/30/58	35000	-1111	7.5	11.6	830	85	9050	330	110	2800	11400	8.8	26	-1111	-1111	-1111	-1111	23600	3.2
99	18	-1111	-1111	1/7/72	5930	-1111	8	14	350	87	960	7.8	480	2900	220	1.1	12	0.6	-1111	-1111	-1111	5380	4.4
100	-1111	-1111	0.45	11/18/72	250	7.5	6.8	-1111	25	6.1	17	1.5	107	18	11	0.2	14	2.1	-1111	0.01	0.18	164	2.4
101	-1111	-1111	-1111	11/00/54	7730	-1111	7.1	-1111	610	270	760	28	320	1400	1800	1.2	42	0.7	-1111	-1111	-1111	5130	0.7
102	-1111	-1111	-1111	4/7/87	265	-1111	7.8	13	5.7	1.2	50	5	110	21	15	0.8	58	0.6	-1111	-1111	-1111	212	0.2
103	-1111	-1111	0.45	11/19/72	2030	8.1	7.5	-1111	91	120	200	11	353	710	130	0.5	12	0.17	0.03	0.12	1.3	1580	1.8
104	0.1	-1111	-1111	11/17/68	890	-1111	7.8	22.6	44	24	130	4.9	360	140	31	5	20	0.8	-1111	-1111	-1111	572	0
105	-1111	-1111	-1111	11/18/68	800	-1111	7.1	12	2.2	2.1	180	7.4	260	79	64	0.8	57	19	-1111	-1111	-1111	533	3.4
106	-1111	-1111	-1111	3/1/65	1240	7.7	7.8	22	30	13	230	13	435	160	80	3.8	58	0	0.01	0.18	0.33	804	0.1
107	-1111	-1111	-1111	5/10/72	1890	-1111	6.8	30	120	49	190	20	740	240	73	1.3	33	0.8	-1111	-1111	-1111	1090	1.2
108	-1111	-1111	-1111	5/16/74	1030	-1111	8.2	23	30	11	160	8.4	300	100	78	2	18	31	-1111	-1111	-1111	590	1.7
109	-1111	-1111	-1111	4/22/82	1010	7.3	7.8	38.6	44	21	150	11	340	170	38	3.6	27	-1111	-1111	0.02	1.1	634	1.7
110	-1111	-1111	-1111	5/15/74	2210	-1111	8.1	18.5	58	65	340	23	870	360	210	1.5	37	2.2	-1111	-1111	-1111	1430	1.9
111	-1111	-1111	-1111	3/23/70	1010	-1111	7.8	17	45	18	160	5.5	360	200	30	2.6	30	0.4	-1111	-1111	-1111	877	1

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Site No. ()	SITE NAME ()	NEVADA NORTH (COORDINATE)	NEVADA EAST (COORDINATE)	Latitude ()	Longitude ()	Data Source ()	Analyzing Lab ()	Aquifer ()	Lithology ()	Use ()	Elevation (m)	Well-Depth (m)	Water Depth (m)
112	Salt Spring Silurian Valley	316704	627138	35 37 10	116 14 20	1	CADWR	-1111	PC SED	-1111	183	-9999	0
113	Saratoga Spring 18N/05E-8S2	339772	572592	35 41 00	116 25 20	1	USGS	-1111	PC SED	-1111	61	-9999	0
114	Shoshone Spring 22N/7E-30bcd	448000	616500	35 58 48	116 16 23	USGS	USGS	Qal	-1111	DOM/IND	600	-9999	0
115	Stovepipe Wells 15S/45E-15D1	684846	378601	36 39 30	117 04 50	1	CADWR	Qr	-1111	DOM	-15	-1111	-1111
116	Stovepipe Wells 15S/44E-36K1	678727	360586	36 36 30	117 08 30	1,3	USGS	Qr	-1111	-1111	0	20	12
117	Surprise Spring 11S/43E-18E82	820678	302900	37 00 12	117 20 30	1	USGS	-1111	Volcanic	-1111	814	-9999	0
118	Tecopa Hot Springs	408700	628000	35 52 20	116 13 52	1	USGS	-1111	PC SED	-1111	427	-9999	0
119	Test Well at Tule Spring	543984	435281	36 14 40	116 53 10	1	USGS	-1111	-1111	TEST	-76	16	-1111
120	Test Well east of Tule SPring	543480	435976	36 14 35	116 52 25	1	CADWR	-1111	-1111	TEST	-79	16	0
121	Test Well near Bennett's Well	515166	440146	36 09 55	116 52 10	1	CADWR	-1111	-1111	TEST	-79	10	5
122	Texas Spring	621621	450060	36 27 28	116 50 11	WATSTORE	USGS	-1111	-1111	-1111	122	-9999	0
123	Travertine Spring	615449	451876	36 26 27	116 49 49	WATSTORE	USGS	-1111	-1111	-1111	88	-9999	0
124	Well 18N/5E-14J1	326583	551167	35 38 50	116 29 40	1	CADWR	Qr	-1111	-1111	61	20	10
125	Well 19N/6E-18N1 Black Mtn	381834	593694	35 43 00	116 23 05	1	USGS	-1111	PC SED	-1111	152	82	78
126	Well 21N/7E-28P1 Flowing	416817	630616	35 53 40	116 13 30	1	USGS	-1111	PC SED	-1111	457	61	0
127	Well B6 South of Triangle Spr	717025	359000	36 43 02	117 08 10	1	USGS	QTa/Tc	-1111	TEST	8	18	-1111
128	Willow Spring near Gold Valley	473345	483431	36 03 02	116 41 20	1	CADWR	-1111	Crystalline	-1111	814	-9999	0
129	Butte Spring (Tubb Spring)	907700	678000	37 14 50	116 04 00	7,USGS	USGS	Tos	-1111	UNUSED	1707	-9999	0
130	Cane Spring	746000	668000	36 47 50	116 06 30	USGS	USGS	Tv	-1111	UNUSED	1280	-9999	0
131	Captain Jack Spring	881500	647500	37 10 20	116 09 32	2	USGS	Tos	TUFF	UNUSED	1670	-9999	0
132	Indian Spring (Belted Range)	860750	664000	37 26 35	116 06 06	3	USGS	Tos	-1111	UNUSED	2036	-9999	0
133	J-11 Jackass Flats	740969	611764	36 47 06	116 17 06	3	USGS	Tos	-1111	PS/IND	1050	405	316
134	J-12 Jackass Flats	733509	581011	36 45 54	116 23 24	USGS	USGS	Tv	TUFF	IND	953	347	226
135	J-13 Jackass Flats	749209	579651	36 48 28	116 23 40	7,13,USGS	USGS	Tpt	TUFF	IND	1011	1060	293
136	Oak Spring North Yucca Flat	907800	675400	37 14 30	116 03 50	7	USGS	Tos	-1111	UNUSED	1768	-9999	0
137	Rainier Spring	889300	637300	37 11 22	116 11 43	2	USGS	Tos	-1111	UNUSED	1902	-9999	0
138	Test Well F	731853	661153	36 45 34	116 06 59	WATSTORE	USGS	Pzc	-1111	OBS	1263	1036	529
139	Tippipah Spring Yucca Flat	835482	634000	37 02 40	116 23 23	WATSTORE	USGS	Tv	-1111	UNUSED	1597	-9999	0
140	Topopah Spring Calico Hills	787100	615750	36 58 21	116 23 40	3	USGS	Tos	-1111	UNUSED	1769	-9999	0
141	TW-1 (0-171 M)	876855	629310	37 09 29	116 03 50	7,USGS	USGS	Tos	TUFF	-1111	1876	170	125
142	TW-1 (0-1282 M)	876855	629310	37 09 28	116 11 43	USGS	USGS	Tos/Pzc	TUFF&LS	OBS	1876	1282	634
143	U-12e.06 ST 14+25 Rainier Mesa	895550	633000	37 10 55	116 06 59	USGS	USGS	Tv	TUFF	-1111	2306	-1111	-1111
144	U-12n MN DFT 3+00 Rainier Mesa	892860	638210	37 12 07	116 11 32	USGS	USGS	Tv	TUFF	-1111	1836	-1111	-1111
145	U-12n.03 Tunnel Rainier Mesa	892739	638485	37 12 06	116 11 28	USGS	USGS	Tv	-1111	-1111	-9999	-1111	-1111
146	U-12t Main Drift Station 18+05	895510	643980	37 13 03	116 10 20	USGS	USGS	Tv	TUFF	-1111	1707	-1111	-1111
147	U-12t.03 UG #1 Rainier Mesa	900020	641789	37 13 07	116 10 41	6,USGS	USGS	Tv	-1111	-1111	-9999	-1111	-1111
148	U-12t.03 UG #2 Rainier Mesa	900020	641789	37 13 07	116 10 41	6,USGS	USGS	Tv	TUFF	-1111	-9999	-1111	-1111
149	U-12t.03 UG #3 Rainier Mesa	900020	641789	37 13 07	116 10 41	USGS	USGS	-1111	-1111	-1111	-9999	-1111	-1111
150	U-12t.04 UG #1 Rainier Mesa	900030	641040	37 13 18	116 10 56	USGS	USGS	-1111	-1111	-1111	2072	-1111	-1111
151	U-19v PS #1D Pahute Mesa	909366	592425	37 14 53	116 20 57	USGS	USGS	Qal	-1111	OBS	2085	1254	688
152	U-20a#2 Pahute Mesa	907395	571439	37 14 34	116 25 16	1,USGS	USGS	Tv	RHY	IND	1873	1372	630
153	U-20f Pahute Mesa	917818	581857	37 16 17	116 29 18	4,USGS	USGS	Tv	RHY	OBS	1864	1281	596
154	U-2bs PS #1db Yucca Flat	864278	678022	37 07 22	116 03 21	USGS	USGS	Qal	-1111	OBS	1289	383	209
155	U-2be Yucca Flat	864330	677301	37 07 23	116 03 31	USGS	USGS	Tmr	TUFF	EMPLACE	1268	585	525
156	U-3cn#5 Yucca Flat	841255	697997	37 03 34	116 01 21	USGS	USGS	Pzc	-1111	TEST	1223	822	496
157	UE-05c Frenchman Flat	760133	700997	36 50 11	115 58 47	USGS	USGS	Tw	LAVA FLOWS	OBS	980	817	75
158	UE-15d Yucca Flat	895709	682064	37 12 33	116 02 29	USGS	USGS	Pz/E/pE	DOLO	IND/OBS	1398	1673	203
159	UE-16f Yucca Flat	832353	648843	37 02 09	116 09 25	WATSTORE	USGS	Qal	-1111	TEST	1416	394	430
160	UE-18r Pahute Mesa	868100	564700	37 08 06	116 26 40	4,5	USGS	Tv	TUFF RHY	OBS	1688	1525	418
161	UE-19b#1 Pahute Mesa	933700	606935	37 18 52	116 17 57	4,5	USGS	Tv	RHY&WTUFF	IND	2073	1372	645
162	UE-19c Pahute Mesa	917000	601027	37 16 08	116 19 10	4,5	USGS	Tv	RHY	OBS	2144	1378	715
163	UE-19d Pahute Mesa	945891	600202	37 20 54	116 19 19	4,5,USGS	USGS	Tv	RHY	OBS	2084	2344	684
164	UE-19e Pahute Mesa	927300	598999	37 17 50	116 20 02	4,5	USGS	Tv	TUFF	IND	2109	1830	663
165	UE-19fs Pahute Mesa	900400	587084	37 13 28	116 22 03	4,5	USGS	Tv	RHY	PLUGGED	2053	1457	703
166	UE-19gs Pahute Mesa	931339	587843	37 18 30	116 21 53	4,5	USGS	Tv	TUFF	IND	2048	1374	623
167	UE-19i Pahute Mesa	910105	593072	37 14 58	116 20 48	4,5	USGS	Tv	RHY	UNUSED	2065	2438	688
168	UE-20d Pahute Mesa	909200	554280	37 14 52	116 28 49	4,5	USGS	Tv	RHY	UNUSED	1906	1369	632
169	UE-20e Pahute Mesa	934564	560957	37 19 02	116 27 25	USGS	USGS	Tv	RHY/TUFF	UNUSED	1919	660	-1111
170	UE-20e#1 Pahute Mesa	934466	560958	37 19 01	116 27 26	4,5	USGS	Tv	RHY	UNUSED	1919	1949	554
171	UE-20f Pahute Mesa	917825	552007	37 16 17	116 29 17	4,5	USGS	Tv	RHY	UNUSED	1864	4171	596
172	UE-20h Pahute Mesa	918015	567746	37 16 18	116 26 02	4,5	USGS	Tv	RHY/TUFF	UNUSED	1999	2197	645
173	UE-20j Pahute Mesa	928015	538538	37 18 01	116 32 03	4,5	USGS	Tv	WTUFF	UNUSED	1799	1734	397
174	UE-25b#1 (0-1220 M) Yucca Mtn	765243	566416	36 51 08	116 26 23	9,13	USGS	Th/Ttc	TUFF	DOM	1201	1220	470
175	UE-25b#1 (853-914 M) Yucca Mtn	765243	566416	36 51 08	116 26 23	9,13	USGS	Tcb	TUFF	TEST	1201	1220	470
176	UE-25c#1 Yucca Mtn	757096	569680	36 49 47	116 25 43	13	USGS	Tc/Tctt	TUFF	TEST	1131	914	401
177	UE-25c#2 Yucca Mtn	756849	569634	36 49 47	116 25 43	13	USGS	Tcb	TUFF	TEST	1132	914	401
178	UE-25c#3 Yucca Mtn	756810	569555	36 48 47	116 25 43	13	USGS	Tcb/Tctt	TUFF	TEST	1132	914	402
179	UE-25p#1 (1300-1800 M) Yucca Mtn	756171	571485	36 49 38	116 25 21	10,USGS	USGS	-1111	TUFF	TEST	1114	1805	382
180	UE-25p#1 (0-1220 M)	756171	571485	36 49 38	116 25 21	10,13,USGS	USGS	Sm/DSlm	DOLO	TEST	1114	1805	361
181	UE-29a#2 (87-213 M)	767745	565547	36 56 29	116 22 28	11,13,5	USGS	Th	RHY	TEST	1216	422	29
182	UE-29a#2 (250-355 M)	767745	565547	36 56 29	116 22 28	11,13,5	USGS	Th	RHY	TEST	1216	422	28
183	USGS Water Well A Yucca Flat	833000	684000	37 02 13	116 02 11	1,USGS	USGS	QTal	S/G	IND	1221	570	482
184	USGS WATER WELL C YUCCA FLAT	790083	692061	36 55 08	116 00 34	1	USGS	Ec	LS	IND	1195	518	470
185	USW H-1 (572-687 M) YUCCA MTN	770254	562388	36 51 57	116 27 12	8,13	USGS	Tcp/Ttc	WTUFF	TEST	1303	1828	572
186	USW H-1 (687-1829 M) YUCCA MTN	770254	562388	36 51 57	116 27 12	8,13	USGS	Tcb/Ttc	NWTUFF	TEST	1303	1829	572
187	USW H-3 Yucca Mtn	756542	558452	36 49 42	116 28 00	13	USGS	Tct/Ttr	TUFF	TEST	1483	1219	751
188	USW H-4 YUCCA MTN	761644	563811	36 50 32	116 26 54	12,13	USGS	Tcb/Tctt	TUFF	TEST	1249	1219	519
189	USW H-5 YUCCA MTN	766634	558908	36 51 22	116 27 55	8,13	USGS	Tcb/Tctt	TUFF	TEST	1477	1219	704
190	USW H-6 (526-1220 M)	763288	554074	36 50 49	116 28 55	13	USGS	Tcb/Tctt	TUFF	TEST	1302	1220	526
191	USW H-6 (600-650 M)	763288	554074	36 50 49	116 28 55	13	USGS	Tct	TUFF	TEST	1302	1220	526
192	USW H-6 (753-835 M)	763288	554074	36 50 49	116 28 55	13	USGS	Tcb	TUFF	TEST	1302	1220	526
193	USW VH-1 CRATER FLAT	743356	533626	36 47 32	116 33 07	13	USGS	Tcb	TUFF	TEST	954	762	184
194	WATER WELL 2 YUCCA FLAT	879999	668720	37 09 56	116 06 15	1,USGS	USGS	Qal	SILT&DOLO	DOM	1382	1043	626
195	WATER WELL 5A FRENCHMAN FLAT	738361	707514	36 46 35	115 57 29	1,USGS	USGS	Tv	TUFF	IRR	843	277	212
196	WATER WELL 5B FRENCHMAN FLAT	747359	704263	36 48 04	115 58 08	1,USGS	USGS	QTal	S/G	IND	842	274	209
197	WATER WELL 5C FRENCHMAN FLAT	741644	708305	36 47 08	115 57 44	1,USGS	USGS	QTal	S/G	IND	939	366	211
198	WATER WELL 8 PAHUTE MESA	879468	609999	37 09 56	116 17 21	1,USGS	USGS	Tv	RHY/TUFF	IND	1736	1673	328
199	WATER WELL C-1 YUCCA FLAT	790011	692132	36 55 07	116 00 34	1,USGS	USGS	Ec	LS	IND	1195	503	470
200	WATERTOWN 1 SW CRYSTAL SPRING	909046	748549	37 14 40	115 48 33	USGS	USGS	Tv	RHY/TUFF	DOM	1354	204	149
201	WATERTOWN 2 GROOM LAKE	909062	752226	37 14 39	115 48 01	USGS	USGS	Tv	-1111	DOM	1352	333	273
202	WATERTOWN 3 SW CRYSTAL SPRING	914990	742272	37 15 39	115 50 03	USGS	USGS	QTal	-1111	IND/PS	1355	113	33
203	WATERTOWN 4 GROOM LAKE	914840	741224	37 15 37	115 50 20	USGS	USGS	QTal	-1111	IND/IRR	1355	165	35
204	WELL 3 YUCCA FLAT	817795	677762	36 59 43	116 03 29	1,USGS	USGS	Tv	TUFF,SS	IRR	1210	549	486
205	WELL D YUCCA FLAT	846600	672800	37 04 28	116 04 30	USGS	USGS	Pzc	DOLO	OBS	1265	584	528
206	WHITEROCK SPRING	893100	656000	37 12 09	116 07 52	USGS	USGS	Tv	-1111	Unused	1550	-9999	0
207	Beatty Spring 12S/47E-06cda	789300	477500	36 55 07	116 44 37	1,USGS	USGS	Tv	-1111	DOM	1027	-9999	0
208	Burro Hot Spring 11S/47E-16dcd	806500	484000	36 58 28	116 43 17	1,USGS	USGS	Tv	-1111	UNUSED	1087	-9999	0
209	Coffer's Well 11S/48E-1dd	820480	482640	37 00 15	116 43 18	EPA	EPA	-1111	-1111	-1111	1122	-1111	-1111
210	Crystal Spring 11S/47E-18acb	813500	473200	36 59 06	116 45 30	USGS	USGS	Tv	-1111	UNUSED	1207	-9999	0
211	Goss Spring 11S/47E-10db	816846	489238	36 59 40	116 42 25	EPA	EPA	-1111	-1111	IRR	1158	-9999	0
212	Indian Springs 11S/46E-26dcc	798800	462700	36 56 40	116 47 30	1,USGS	USGS	Tv	-1111	DOM	1219	-9999	0
213	Mud Spring 11S/46E-06bdc	817500	444900	36 59 40	116 51 20	USGS	USGS	Qal	-1111	STOCK	1294	-9999	0
214	Peacock R. Spr. 10S/47E-31aab	830200	474300	37 01 51	116 45 17	1,USGS	USGS	Qal	-1111	DOM/IND	1170	-9999	0
215	Spring 10S/47E-14bab	846000	493200	37 04 27	116 41 24	1,USGS	USGS	Qal	-1111	IRR	1214	-9999	0
216	Spring 10S/47E-32dda	826200	480500	37 01 11	116 44 00	1,USGS	USGS	Qal	-1111	DOM	1134	-9999	0
217	Spring 10S/47E-33aab	830000	484800	37 01 49	116 43 07	1,USGS	USGS	Tv	-1111	DOM/IRR	1183	-9999	0
218	Spring 11S/47E-03cdb	821000	487800	37 00 20	116 42 30	1,USGS	USGS	Tv	-1111	DOM/IND	1170	-9999	0
219	Spring 11S/47E-04cad	821200	493100	37 00 30	116 43 30	1,USGS	USGS	Qal	-1111	DOM	1122	-9999	0
220	Spring 11S/47E-10bcc	817500	486100	36 59 45	116 42 51	1,USGS	USGS	Tv	-1111	DOM	1122	-9999	0
221	Spring 11S/47E-10caa	817200	488200	36 59 45	116 42 25	1,USGS	USGS	Tv	-1111	IRR	1158	-9999	0
222	Spring 11S/47E-10ccb	815400	486000	36 59 24	116 42 53	1,USGS	USGS	Qal	-1111	DOM	1113	-9999	0
223	Spring 11S/47E-21aba	808000	484800	36 58 21	116 43 10	1,USGS	USGS	Qal	-1111	DOM	1087	-9999	0

Site No. ()	Pumping Time (h)	Yield (L/s)	Sampling Method ()	Filtration (micrometers)	Date (mm/dd/yy)	Sp. Cond. (microS/cm)	Field pH (units)	Lab pH (units)	Temp (deg.C)	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	Alk(HCO3) (mg/L)	SO4 (mg/L)	Cl (mg/L)	F (mg/L)	Silica (mg/L)	NO3 (mg/L)	PO4 (mg/L)	Li (mg/L)	Br (mg/L)	TDS (mg/L)	Balance(+/-) (percent)
112	-1111	1	-1111	-1111	4/25/67	10000	-1111	7.7	18	180	170	2030	56	834	910	2800	8.1	-1111	-1111	-1111	-1111	-1111	6700	0.7
113	-1111	5	-1111	-1111	4/8/67	4720	-1111	8	29	34	21	1000	40	435	1000	650	2.4	39	3.4	-1111	-1111	-1111	3050	1.6
114	-1111	28	-1111	0.45	3/28/71	4700	7.4	8	34	42	24	230	23	381	240	140	2	41	0.3	0	0.36	1.2	938	2.1
115	-1111	-1111	-1111	-1111	4/9/52	3640	-1111	8.1	-1111	16	38	600	-1111	780	460	290	1.1	-1111	-1111	-1111	-1111	-1111	2250	0.4
116	-1111	-1111	-1111	0.45	6/18/60	14200	-1111	7.6	30.5	82	230	2700	200	288	1200	4200	0.6	22	0.06	-1111	-1111	-1111	8170	0.8
117	-1111	0.3	-1111	-1111	1/21/67	710	-1111	7.9	20	7.3	1.3	150	7.6	230	93	46	1.8	64	1.7	-1111	-1111	-1111	484	0.4
118	-1111	11	-1111	-1111	11/16/64	3480	-1111	8.6	43	6	0	820	17	640	540	460	3.8	8.8	-1111	-1111	-1111	-1111	2300	1.2
119	-1111	-1111	-1111	-1111	3/22/70	1840	-1111	7.4	21	75	40	260	7	130	280	400	0.3	21	-1111	-1111	-1111	-1111	1100	1.5
120	-1111	-1111	-1111	-1111	3/12/70	12100	-1111	8.1	27.5	14	13	2400	470	780	470	3600	5.4	-1111	-1111	-1111	-1111	-1111	-1111	2.6
121	-1111	-1111	-1111	-1111	4/27/68	682	-1111	7.5	28.5	48	78	74	4	190	180	43	0.8	-1111	-1111	-1111	-1111	-1111	495	25.8
122	-1111	-1111	-1111	-1111	4/22/62	864	7.8	8.1	31	38	20	150	11	330	170	37	4.3	33	-1111	-1111	0.17	1.2	628	0.6
123	-1111	-1111	-1111	-1111	4/22/62	970	7.4	7.9	35	36	18	140	10	330	180	40	4.4	32	-1111	-1111	0.17	1.1	606	2
124	-1111	-1111	-1111	-1111	6/2/68	7360	-1111	7.6	26	130	110	1400	52	190	780	2000	4.8	-1111	3.5	-1111	-1111	-1111	4780	1.4
125	-1111	-1111	-1111	-1111	3/17/67	5880	-1111	8.5	30.5	27	10	1400	7.8	684	1300	780	6	42	5.9	-1111	-1111	-1111	3900	1.7
126	-1111	-1111	-1111	-1111	4/8/67	3900	-1111	8.8	48	2	0	900	17	595	590	540	3	85	-1111	-1111	-1111	-1111	2500	1.8
127	-1111	-1111	-1111	-1111	4/28/68	2180	-1111	8.3	26.5	37	59	360	21	420	360	280	1.5	24	-1111	-1111	-1111	-1111	1380	1.2
128	-1111	1	-1111	-1111	1/12/66	728	-1111	7.8	20	60	14	67	5	360	88	57	0.6	-1111	1	-1111	-1111	-1111	365	13.2
129	-1111	-1111	-1111	-1111	11/10/60	272	-1111	7.8	15	21	2.4	24	6.8	139	12	12	0.4	30	0.8	12	-1111	-1111	185	0.2
130	-1111	0.1	Dipped	0.45	3/25/71	483	6.9	7.8	10.6	44	12	46	8.8	247	34	23	0.6	65	8.2	-1111	0.02	0.13	347	0.8
131	-1111	-1111	-1111	-1111	5/1/59	189	-1111	6.8	13.3	3.2	0	47	2.2	85	25	4	0.4	43	-1111	1.2	-1111	-1111	178	1.1
132	-1111	-1111	-1111	-1111	5/1/58	358	-1111	7.2	10	42	7.8	17	4.8	148	38	12	0.4	61	-1111	-1111	-1111	-1111	254	0.9
133	-1111	7	-1111	-1111	12/16/58	1180	-1111	7.6	35.6	82	13	143	15	102	449	18	1.1	88	8	-1111	-1111	-1111	847	0.1
134	-1111	87	Pump	0.45	5/1/74	271	7.2	7.6	27	15	2.2	38	4.6	116	23	7.7	1.6	56	1.8	0.18	0.04	0.02	215	0.3
135	0.4	42	Pump	0.45	3/26/71	285	7.2	7.4	31	12	2.1	42	5	124	17	7.1	2.4	57	7.2	0	0.04	0.02	202	0.2
136	-1111	0.1	-1111	-3333	4/28/58	241	-1111	7.5	12.8	18	4.8	22	6.4	116	14	8	0.3	57	-1111	0.1	-1111	-1111	180	0.8
137	-1111	-1111	-1111	-1111	9/19/57	346	-1111	8.3	18.1	7.2	1	68	4	158	18	14	0.6	65	0.8	2.2	-1111	0.2	250	0.1
138	-1111	-1111	-1111	0.45	3/12/80	625	-1111	7.4	64	44	16	64	9.7	244	75	20	3	38	0.06	-1111	0.11	0.62	372	2
139	-1111	-1111	-1111	0.45	8/6/80	215	6.9	-1111	13	5.1	0.4	40	3.1	92	19	8	0.3	48	-1111	-1111	-1111	0.01	191	0.7
140	-1111	-1111	-1111	-1111	3/25/58	114	-1111	6.9	11.7	7.2	1	14	6.4	48	15	3	0.3	50	2	0.8	-1111	-1111	123	0.6
141	-1111	1	Bailer	-1111	10/1/60	177	7.6	7.6	-1111	2	0	36	1	82	11	7	0.6	38	1.8	11	-1111	-1111	240	7.4
142	-1111	8.5	Pump	0.45	6/22/65	189	-1111	8.7	27.8	1.2	0.1	49	0	87	8	2.5	1.8	28	1.6	-1111	0.04	-1111	139	6.4
143	-1111	-1111	-1111	0.45	8/2/72	205	8.1	8.4	19.2	3.3	0.4	34	6.4	56	11	8.1	0.2	46	-1111	0.15	0.02	0.03	184	1.8
144	-1111	-1111	-1111	0.45	8/2/72	570	8.2	7.3	12.5	46	6.8	62	7.4	221	64	32	0.6	41	0.6	0.51	0.03	0.05	408	1.3
145	-1111	-1111	-1111	-1111	9/30/68	230	-1111	8	6.8	1.1	0.2	51	2.8	110	12	9.6	0.3	51	1.3	0	0.09	0.02	180	0.6
146	-1111	-1111	-1111	-1111	11/15/72	282	7.6	7.1	-1111	2.4	0.1	67	3.5	149	16	12	0.1	41	0.46	0.12	0.02	-1111	248	0.2
147	-1111	-1111	-1111	-1111	11/16/72	227	7.2	6.8	-1111	8.1	1.5	38	6.6	113	18	10	0.1	50	0.55	0.03	0.01	0.01	220	1.5
148	-1111	-1111	-1111	-1111	2/15/73	267	-1111	7.4	-1111	20	5	33	5.3	136	14	6	-1111	61	0.36	1	0.02	0.01	214	3.6
149	-1111	-1111	-1111	-1111	7/12/74	271	-1111	7.4	-1111	27	5	24	5.1	133	15	11	0.2	67	0.48	0.09	-1111	-1111	197	2.1
150	-1111	-1111	-1111	-1111	8/22/73	280	-1111	7.2	-1111	20	4.1	30	6.6	133	16	11	0.3	60	0.8	0.28	0.01	0.02	218	0.6
151	-1111	-1111	-1111	-1111	6/12/73	2580	8.6	8.5	-1111	250	0.1	330	17	34	1100	100	0.5	130	0.03	0.28	0.33	3.2	2220	1.8
152	0.7	11	Pump	0.45	10/6/71	270	8.3	7.9	38	5.8	0.2	55	2.2	110	28	10	2.8	44	0.7	0.01	0.05	0.01	184	1
153	-1111	6	-1111	-1111	5/27/66	297	-1111	8.1	41.6	0.4	0	69	0.6	88	23	7	3.7	38	0.7	0.12	-1111	-1111	184	5.8
154	-1111	-1111	-1111	-1111	8/19/74	170	-1111	7.4	73.8	11	1	21	4.9	85	8.4	3.4	0.2	26	0.09	0.21	0.06	0.08	124	0.1
155	-1111	14	-1111	-1111	8/23/72	389	-1111	6.8	26	2.5	0.3	79	5.6	188	28	8.6	1.3	52	0.8	0.12	0.03	0.05	278	3.2
156	-1111	-1111	-1111	-1111	11/15/74	586	-1111	-1111	-1111	41	17	64	9.7	271	41	32	0.8	38	0.02	0.21	0.06	0.21	352	1.6
157	6	21	-1111	-1111	3/23/71	1380	-1111	7.8	28.2	8.6	2.2	86	6.3	186	44	11	1.8	59	7.4	0	0.01	0.06	303	1.6
158	0.5	22	Pump	0.45	3/21/71	760	7.3	7.8	34.8	56	16	80	15	398	44	15	1.4	19	0	0	0.16	0.45	413	0.2
159	-1111	-1111	-1111	-1111	8/25/77	1363	-1111	8.2	23	5.2	2	430	3	1000	110	18	4.3	7.2	-1111	-1111	-1111	-1111	1080	0.5
160	47	15	Swabbed	-1111	1/29/68	449	-1111	8	32.2	26	1	81	3.1	252	24	7.8	2.8	45	0.6	-1111	0.1	0.18	313	0.2
161	12	6	-1111	-1111	10/13/64	314	7.1	7.4	30	24	2.4	42	3	150	21	6.8	3.2	41	0.4	-1111	0.04	-1111	228	1.4
162	-1111	-1111	-1111	-1111	3/9/66	644	-1111	7.8	31.1	13	0.1	140	0.2	400	0	7.7	4.3	30	0.2	0	0.28	0.09	390	1.8
163	-1111	-1111	-1111	-1111	3/9/66	950	7.2	7.9	34.4	57	2.8	150	4.3	489	57	20	4.9	55	0.6	-1111	0.38	0.19	578	1.6
164	24	4	Pump	-1111	8/1/66	204	-1111	8.2	35	3.7	-1111	43	0.8	80	16	3.7	5.3	56	1.7	-1111	0.06	0.02	169	1.2
165	24	8	Pump	0.45	8/18/65	202	-1111	8.1	37.7	11	1.6	29	3	86	9	6.3	3.6	58	2.2	-1111	0.02	0.02	186	1.4
166	24	12	Pump	-1111	3/27/65	345	-1111	8.2	41.6	12	-1111	68	0.9	148	38	9	2	48	1.3	-1111	-1111	-1111	248	1
167	-1111	8	Pump	-1111	8/2/65	228	-1111	7.7	47.2	5	0	75	0.5	88	70	7	5.5	39	0.2	-1111	0.05	0.04	230	0.4
168	-1111	4	Pump	-1111	8/12/66	487	-1111	8.5	40	8.5	0.1	107	2.6	182	40	24	3	45	-1111	-1111	0.09	-1111	327	3.4
169	-2222	-1111	-1111	-1111	6/5/64	515	-1111	7.7	47.2	0.4	0	110	3.8	130	43	57	4.8	44	1	0	-1111	-1111	336	0.3
170	28	6	-1111	-1111	3/8/66	352	-1111	8.8	32.8	0.2	-1111	83	2	119	42	20	4.5	38	0.5	0	0.07	0.03	245	0.2
171	47	6	Pump	-1111	8/11/64	519	-1111	7.2	48.9	4.8	-1111	113	2	184	48	40	5	47	0.1	0.02	-1111	-1111	369	1.2
172	-2222	27	-1111	-1111	8/26/65	301	-1111	8.1	32.2	0.6	-1111	64	1.8	107	30	15	2.7	49	1.3	0.01	0.09	0.02	231	1.4
173	-2222	4	Pump	-1111	10/21/64	904	7.5	7	38.8	46	1.2	140	6.4	150	135	120	2.2	44	0.9	0	-1111	-1111	583	0.1
174	72	35	Pump	0.45	9/1/81	300	7.5	7.6	38	17	0.6	48	3.5	139	22	8.5	1.8	52	4	-1111	0.22	0.04	225	-1.2
175	672	-1111	Pump	0.45	7/20/82	291	7.1	7.7	37.2	18	0.7	46	2.8	133	21	7.5	1.6	51	-1111	-1111	0.12	0.05	221	1.8
176	92	16	Pump	0.45	9/30/83	290	7.6	7.7	41.5	11	0.3	56	2	151	23	7.4	2.1	58	4.9	-1111	0.12	0.03	229	3.4
177	138	15	Pump	0.45	3/13/84	285	7.7	7.8	40.6	12	0.4	54	2.1	139	22	7.1	2	64	5.3	0.03	0.09	0.04	233	0.1
178	112	26	Pump	0.45	5/9/84	289	7.7	7.8	40.8	11	0.4	55	1.9	137	22	7.2	2	53	5.8	-1111	0.11	0.04	229	0.2
179	53	22	Pump	0.45	2/11/83	1116	6.7	7.9	57	94	31	150	12	753	78	28	4.9	44	-1111	-1111	0.31	0.49	812	1.8
180	101	31	Pump	0.45	5/12/83	1549	6.6	7.2	56	100	39	150	12	694	180	28	4.7	41	-1111	-1111	0.59	0.45	854	2.8
181	91	32	Pump	0.45	1/8/82	240	7.2	7.6	25.1	10	0.2	44	1.1	107	22	11	1	44	9.3	-1111	0.1	0.04	184	2.3
182	82	35	Pump	0.45	1/15/82	258	7	7.4	22.7	10	0.3	44	1.3	107	21	8.8	0.9	44	8.7	-1111	0.11	0.03	192	0.3
183	6.2	8	Pump	0.45	3/23/71	390	7.7	7.8	26.6	21	7.4	48	8.8	215	17	4.7	0.9	89	6.9	-1111	0.02	0.21	266	0.4
184	1.3	28	Pump	0.45	3/29/71	1020	7.6	7.5	36.7	72	30	120	14	589	66	33	1.1	28	0.1	0	0.3	0.77	626	1.6
185	48	4	Pump	0.45	10/20/80	255	7.7	7.8	33	4.5	-1111	61	2.4	115	19	5.7	1.2	47	-1111	-1111	0.04	0.01	178	0.4
186	58	2	Pump	0.45	12/8/80	247	7.5	8	34.7	8.2	-1111	51	1.9	122	18	5.8	1	40	-1111	-1111	0.04	0.02	189	0.8
187	500	0.1	Pump	0.45	3/14/84	523	9.2	9	28.5	0.8	0	120	1.1	274	31	8.5	5.5	43	0.1	-1111	0.22	-1111	347	3.7
188	210	18	Pump	0.45	5/17/82	340	7.4	7.9	34.8	17	0.3	73	2.6	173	26	6.8	4.6	46	-1111	-1111	0.13	0.03	248	3.8
189	85	10	Pump	0.45	7/3/82	275	7.8	7.8	36.5	1.9	0	60	2.1	126	16	6.1	1.4	48	-1111	-1111	0.06	0.01	220	2.1
190	39	26	Pump	0.45	10/16/82	379	8.1	8.3	37.8	4.1	0.1	86	1.3	182	28	7.6	4.7	48	-1111	-1111	0.06	0.01	263	0.8
191	169	14	Pump	0.45	7/6/84	402	8.3	8.3	37.2	4.7	0.1	88	1.4	234	32	7.4	4.7	49	-1111	0.06	0.06	0.01	-1111	8.4
192	216	13	Pump	0.45	6/20/84	360	8.3	8.4	41.6	1.4	0	88	1.3	217	25	7.2	3.8	47	-1111	0.18	0.07	-1111	269	6.6
193	24	15	Pump	0.45	2/11/81	388	7.5	8	35.5	9.9	1.5	78	1.8	162	44	10	2.7	48	-1111	-1111	0.09	0.06	277	0.8
194	0.3	10	Pump	0.45	3/21/71	376	7.5	7.6	34.5	31	14	27	8.7	197	21	6	0.4	44	5.1	-1111	0.01	0.08	229	2.4
195	-1111	6	-1111	-1111	6/4/64	687	8.9	8.2	23	2.7	0.4	160	8.4	384	27	11	2.3	50	7.5	0.01	-1111	-1111	456	0
196	4	16	Pump	0.45	3/25/71	490	8.2	7.6	25	7	2.2	90	11	181	52	21	0.7	41	11	0	0.04	0.04	336	0.5
197	4	20	Pump	0.45	3/22/71	560	8.7	8.1	24.5	1	0.4	130	6.8	316	23	8.3	0.8	47	5.5	-1111	-1111	0.02	362	0.2
198	3.3	37	Pump	0.45	3/24/71	205	7.2	7.4	26.5	8.3	1.1	31	3.6	80	14	7.4	0.8	41	4.3	0	0.02	0.02	135	2.4
199	4	18	Pump	0.45	3/29/71	1030	7	7.6	38	72	30	120	14	589	66	33	1	29	0	0	0.3	0.78	621	1.6
200	-1111	1	-1111	-1111	4/21/66	338	-1111	7.8	24.4	6.5	1.8	73	9	165	38	5.6	2.1	71	1.8	0.01	0.11	0.03	272	0.5
201	-1111	1	-1111	-1111	9/4/69	380	-1111	7.5	20.6	3	1	83	10	207	15	6.7	2.2	58	1.7	0	0.08	0.06	298	1.1
202	-1111	16	Pump	0.45	9/4/69	340	-1111	7.5	24.6	15	3.5	55	7.4	176	20	7.2	1.1	75	8	-1111	0.09	0.16	288	0.8
203	-1111	16	Pump	0.45	9/4/69	905	-1111	6.9	35.7	63	22	82	23	508	89	11	1.6	21	0	0	0.33	1	565	0.2
204	4	2	Pump	0.45	4/16/69	369	-1111	7.7	21.5	19	13	40	8.5	197	19	4	0.9	64	12	-1111	0.04	0.31	265	2.5
205	-1111	1	Bailer	-1111	10/7/65	449	-1111	8.1	-1111	11	4.9	80	8.4	276	17	9.5	1.4	43	-1111	-1111	0.04	0.1	324	1.3
206	-1111	0.1	Flowing	0.45	7/31/72	241	7.7	6.2	18	3.8	0	44	5.2	78	25	10	0.5	47	1.5	-1111	0.03	0.03	206	1.1
207	-1111	-1111	-1111	-1111	7/3/67	534	8.2	7.9	24	13	2.8	106	6.8	196	70	26	3.8	60	0.5	0	0.11	0.08	409	1.8
208	-1111	-1111	-1111	-1111	2/5/74	288	-1111	7.8	36.5	18	0.5	173	7.8	288	127	47	6.1	60	0	0	-1111	0.12	672	1.2
209	-1111	-1111	-1111	-1111	7/15/76	340	-1111	6.8	24	12	0.2	69	0.8	160	30	10	3.6	-1111	0.37	-1111	0.11	0.16	340	1.1
210	-1111	-1111	-1111	-1111	7/5/87	355	7.7	7.6	24	22	3.5	50	3.6	143	22	21	0.6	45	13	0	0.06	0.09	281	3.2
211	-1111	3	-1111	-1111	1/21/78	700	-1111	7.1	18	4.9	5.3	170	13	290	80	65	3.1	-1111	1.2	-1111	0.07	-1111	150	0.1
212	-1111	1	-1111	-1111	7/3/87	316	7.9	7.4	21	8.3	1	57	1.6	127	17	15	0.4	48	4.5	0	0.04	0.06	236	0.6
213	-1111	-1111	-1111	-1111	7/6/87	416	7.8	7.4	18.5	5	2.1	75	3.2	128	10	34	0.9	83	2.1	0	0.09	0.06	287	7.2
214	-1111	1	-1111	-1111	7/5/87	587	7.6	7.7	18.5	23	4.3	100	7.9	232	53	42	2.5	75	1.2	0	0.08	0.23	443	1.4
215	-1111	22	-1111	-1111	7/5/87	701	8.1	7.8	20	7.6	0.3	143	8.1	212	83	51	4.2	57	0.1	0	0.17	0.04	459	1.2
216	-1111	14	-1111	-1111	7/5/87	593	7.6	7.7	22	30	6.4	137	0.1	314	96	37	2.2	62	0	0	0.11	0.42	530	1.7
217	-1111	16	-1111	-1111	7/5/87	888	7.8	7.6	22	26	4.5	169	8	304	103	68	4.3	54	0.2	0	0.11	0.19	601	0.5
218	-1111	3	-1111	-1111	7/5/87	582	8.2	7.7	23	16	1.1	122	4.8	188	90	45	2.8	47	0.7	0	0.15	0.1	430	1.2
219	-1111	1	-1111	-1111	7/6/87	1100	7.7	7.8	21	20	4.5	223	8.7	388	129	80	5.1	62	0.4	0	0.15	0.35	722	0.8
220	-1111	-1111	-1111	-1111	7/6/87	742	7.6	7.7	19.5	14	0.4	156	7.1	284	91	42	4.6	51	0.4	0	0.18	0.07	522	1.7
221	-1111	3	-1111	-1111	7/6/87	916	8.1	8.1	24	14	0.7	186	2.3	306	109	64	6.1	39	0.2	0	0.22	0.21	588	2
222	-1111	-1111	-1111	-1111	7/6/87	616	8.3	8.1	21	12	0.9	124	4.6	195	82	45	2.7	50	1.4	0	0.16	0.13	422	1.2
223	-1111	1	-1111	-1111	7/4/87	735	7.8	7.6	41	13	0.5	150	7.7	228	118	35	4.1	70	0.1	0	0.25	0.1	516	0.9

H2O Chemistry, Mckinley et al. (1491)

1/17/96 DBJ

D. Belcher

MCK91H2O.XLS 1/17/96 1:23 PM

Site No.	SITE NAME	NEVADA NORTH	NEVADA EAST	Latitude	Longitude	Data Source	Analyzing Lab	Aquifer	Lithology	Use	Elevation	Well-Depth	Water Depth	Pumping Time	Yield	Sampling Method	Filtration	Date	Sp. Cond.	Field pH	Lab pH	Temp	Ca	Mg	Na	K	Alk(HCO3)	SO4	Cl	F	Silica	NO2	PO4	Li	Br	TDS	Balance(+/-)
()	()	(COORDINATE)	(COORDINATE)	()	()	()	()	()	()	()	(m)	(m)	(m)	(h)	(L/s)	()	(micrometers)	(mm/dd/yy)	(micro-S/cm)	(units)	(units)	(deg.C)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(percent)
224	Spring 118/47E-21acc (Well)	807100	483700	36 58 03	116 43 21	1,USGS	USGS	Qal	-1111	IRR	1065	-8888	3	-1111	2	-1111	-1111	7/4/67	1110	7.7	8	31.5	23	2.9	282	8.5	372	159	69	6	60	0	0	0.27	0.23	750	0.4
225	Spring 118/47E-21dbb2	806400	483800	36 57 56	116 43 20	USGS	USGS	Qal	-1111	DOM	1062	-8888	0	-1111	2	-1111	-1111	7/4/67	1180	7.9	8.2	28	26	3.1	248	8.2	366	167	72	6	54	0	0	0.28	0.26	800	0.6
226	Spring 118/47E-28dac	800400	485100	36 57 00	116 43 00	1,2,USGS	USGS	Qal	-1111	IRR	1061	-8888	0	-1111	2	-1111	-1111	7/4/67	1110	8.1	8.8	21	10	3.3	248	8.8	360	168	69	6.4	48	0	0	0.26	0.1	721	0.7
227	Spring 118/47E-33bac	787800	481800	36 56 31	116 43 43	1,USGS	USGS	Tv	-1111	DOM	1081	-8888	0	-1111	2	-1111	-1111	7/4/67	938	8.2	7.9	34	8.7	0.1	112	2.4	178	70	27	3.8	46	0.1	0	0.14	0.03	339	0.4
228	Spring 128/47E-20bbb	777100	478900	36 53 06	116 45 00	1,USGS	USGS	Qal	-1111	DOM/IND	978	-8888	0	-1111	25	-1111	-1111	7/23/67	1210	7.7	8	18.5	37	3.8	264	10	382	184	77	5.8	66	0	0	0.1	0.19	902	0.8
230	Well 108/47E-27cba	832700	486900	37 02 18	116 42 42	1,USGS	USGS	Qal	-1111	DOM	1187	2	0	-1111	1	-1111	-1111	7/6/67	291	8.7	7.8	26.5	0	0.4	59	1.7	118	14	14	0.4	44	1.2	0	0.04	0.03	222	0.7
231	Well 108/47E-27cba	831100	473200	37 02 00	116 48 50	1,USGS	USGS	Qal	-1111	DOM	1183	97	9	-1111	3	-1111	-1111	7/5/67	582	7.8	7.6	22.5	24	4.6	100	8	234	89	40	1.8	72	0.7	0	0.08	0.23	448	1.3
232	Well 108/47E-27cba	808400	483500	36 57 56	116 43 20	1,USGS	USGS	Qal	-1111	STOCK	1079	-8888	1	-1111	2	-1111	-1111	7/4/67	1150	7.7	8.1	29	25	3.2	242	8.3	372	167	72	6	56	0	0	0.28	0.26	783	1.8
233	Well 108/47E-27cba	800600	486500	36 56 59	116 42 46	1,USGS	USGS	Qal	-1111	DOM	1061	17	8	-1111	1	-1111	-1111	7/3/67	561	8.2	7.9	21.5	10	0.4	119	6.1	186	72	36	3.2	62	0	0	0.14	0.03	381	1.7
234	Well 108/47E-27cba	802600	484600	36 57 18	116 43 10	1,USGS	USGS	Qal	-1111	DOM	1073	9	-1111	-1111	0.1	-1111	-1111	7/4/67	1610	8	8.3	18	38	5.2	315	11	524	218	93	7	58	0	0	0.36	0.39	962	0.8
235	Well 108/47E-27cba	798200	472400	36 54 59	116 45 40	1,USGS	USGS	Qal	-1111	DOM	1030	55	24	-1111	5	-1111	-1111	7/3/67	661	7.9	7.9	21.5	32	4.4	105	7.3	218	83	39	0.3	54	2	0	0.08	0.13	456	2.7
236	Well 108/47E-27cba	796800	471900	36 54 35	116 46 50	USGS	USGS	Qal	-1111	DOM	1024	76	30	0.8	0.3	-1111	-1111	5/20/68	501	-1111	8.2	20.5	7.6	1	102	1.2	160	48	33	0.6	24	10	0	0.06	-1111	323	3
237	Well 108/47E-27cba	794500	473600	36 54 20	116 45 26	1,USGS	USGS	Qal	-1111	DOM	1000	91	7	-1111	18	-1111	-1111	7/3/67	1190	7.9	8	20	28	3.3	256	10	388	178	73	6	56	0	0	0.21	0.18	801	3.3
238	Well 108/47E-27cba	778000	474200	36 52 45	116 45 18	1,USGS	USGS	Qal	-1111	IRR/DOM	969	55	-1111	-1111	18	Pump	0.45	11/18/72	1430	7.8	7.9	-1111	38	5.6	280	10	438	250	100	6.3	67	0.48	0.08	0.22	0.2	1040	1.1
239	Cactus Spring 185/55E-11a	668898	775521	39 24 33	119 43 42	USGS	USGS	Qal	-1111	DOM	987	122	110	-1111	0.31	-1111	-1111	12/10/66	364	-1111	8	20.6	40	22	5	1.3	234	14	3.7	0.3	19	2	-1111	0.01	0.28	208	2.3
240	Calvada Well 3 Pahrump	530972	700288	36 12 25	115 59 15	EPA	EPA	-1111	-1111	-1111	817	-1111	-1111	-1111	-1111	-1111	-1111	7/18/78	750	-1111	8.5	18	61	65	27	1.8	200	240	76	-1111	-1111	2.6	-1111	-1111	0.83	440	3.2
241	Cpvs Spring 185/56E-14c	542647	788100	36 17 40	115 39 55	WATSTORZ	USGS	-1111	-1111	-1111	3048	-8888	0	-1111	-1111	-1111	-1111	7/24/80	285	-1111	-1111	5	48	10	1.2	0.4	186	0.8	0.3	0.2	9.8	-1111	-1111	-1111	-1111	166	0.2
242	Cold CR Spring 185/55E-04dcc	607410	772187	36 24 55	115 44 30	USGS	USGS	LS	DOM		1896	-8888	0	-1111	44	-1111	-1111	12/12/68	438	-1111	7.9	10	71	18	1.8	0.4	288	18	1.1	0.2	8.4	-1111	-1111	-1111	0.22	295	0.4
243	Corn Crk Spring 17S/51E-21abb	615000	886000	36 26 57	115 21 19	USGS	USGS	QTal	-1111	IND	890	-8888	0	-1111	3	-1111	0.45	12/8/68	484	-1111	7.9	21	46	31	6.2	1.8	290	17	8.2	0.2	18	2.8	-1111	-1111	0.26	270	1.8
244	Crump Well 20S/50E-12bab	542050	828754	36 13 39	115 13 05	USGS	USGS	Qal	-1111	DOM	693	91	-1111	-1111	-1111	-1111	-1111	1/17/79	402	-1111	-1111	20	43	23	6.7	0.8	222	30	2.8	0.2	15	0.21	-1111	-1111	-1111	231	0.4
245	Deer Creek Spring 18S/57E-07a	668900	805800	36 18 28	115 37 40	1,2	USGS	Qal	-1111	DOM	2648	-8888	0	-1111	3	-1111	-1111	10/28/64	440	7.4	7.4	7.9	61	21	1	0.3	266	8.8	1.1	0	8.8	-1111	-1111	-1111	232	0.5
246	Diebert Spring 17S/53E-17adc	628800	695700	36 28 33	116 02 09	USGS	USGS	Qal	-1111	DOM	1225	-8888	0	-1111	-1111	0.046	11/16/72	1720	7.4	7.9	16	150	150	74	2.8	394	770	26	0.3	27	0	0.03	0.2	3.8	1680	0.3
247	East Spring #2	648883	789218	36 14 49	115 39 07	2,WATSTORE	USGS	-1111	-1111	-1111	2780	-8888	0	-1111	2	-1111	-1111	8/24/78	102	-1111	-1111	4	40	8	0.8	0.2	148	4.6	0.8	0.1	3.8	-1111	-1111	-1111	-1111	130	3.5
248	Ella's Well 20S/50E-12bab	542054	827001	36 13 50	115 13 08	USGS	USGS	QTal	-1111	DOM	684	91	-1111	-1111	-1111	-1111	-1111	1/17/79	472	-1111	-1111	14.4	47	27	7.7	1.2	243	47	6.3	0.2	8.4	-1111	2.6	-1111	-1111	288	2.1
249	Fletcher Spring	656287	806808	36 16 28	115 37 22	3,WATSTORE	USGS	-1111	-1111	-1111	2310	-8888	0	-1111	2	-1111	-1111	8/23/78	378	-1111	-1111	11.5	94	24	2.6	0.7	341	19	2.8	0.1	7.7	-1111	-1111	-1111	-1111	209	1.9
250	Grapevine Spring (Jubilee Mine)	623000	688000	36 37 36	116 01 28	USGS	USGS	Qal	-1111	IND	1463	-8888	0	-1111	1	-1111	-1111	12/13/68	818	-1111	8	18.8	89	59	28	1.9	284	248	16	0.2	20	0	0	0.02	0.78	535	0.2
251	Hillcrest Manor 1 20S/50E-13bd	533978	828182	36 12 27	115 12 55	USGS	USGS	Qal	-1111	DOM	681	209	-1111	-1111	-1111	-1111	-1111	1/17/79	435	-1111	-1111	23	48	23	6.8	0.8	244	34	3.2	0.2	12	-1111	1.2	-1111	-1111	250	2
252	Hillcrest Manor 2 20S/50E-13bc	534045	825808	36 12 31	115 13 24	USGS	USGS	QTal	-1111	DOM	697	117	-1111	-1111	-1111	-1111	-1111	1/17/79	438	-1111	-1111	21	53	29	10	2	246	69	13	0.2	13	-1111	5.2	-1111	-1111	318	3.6
253	Indian Springs 18S/56E-16b-1	662028	782400	36 33 83	115 40 07	USGS	USGS	Pzc	-1111	DOM	869	-8888	0	-1111	28	-1111	-1111	12/8/66	385	-1111	7.8	28	42	22	9.8	1.2	222	15	4.5	0.1	12	1.3	-1111	-1111	0.28	200	1.2
254	Kawanaki's Well 20S/50E-07ad	547200	819398	36 14 42	115 14 40	USGS	USGS	Qal	-1111	DOM	708	91	-1111	-1111	-1111	-1111	-1111	1/17/79	424	-1111	-1111	18.8	45	23	5.7	1	233	34	3.3	0.2	14	-1111	1.7	-1111	-1111	243	2.4
255	Kwichye Spring 17S/53E-17dcd	627800	694800	36 28 21	116 02 16	USGS	USGS	-1111	UNCONSOLID	Stock	1204	-8888	0	-1111	-1111	0.48	11/16/72	1600	7.4	8.8	12.5	130	120	64	2.8	408	680	21	0.3	29	0.02	0.03	0.21	5.7	1430	1.2
256	Little Falls Spring 19S/56E-35	548810	797875	36 15 13	115 38 23	WATSTORE	USGS	-1111	-1111	-1111	2621	-8888	0	-1111	-1111	-1111	-1111	7/23/80	-1111	-1111	-1111	5	48	7.8	0.8	0.4	183	1	0.4	0.2	2.7	-1111	-1111	-1111	-1111	150	1.3
257	Lower Stanley S Spring	655034	803133	36 18 14	115 38 18	3,WATSTORE	USGS	-1111	-1111	-1111	2491	-8888	0	-1111	-1111	-1111	-1111	8/18/78	430	-1111	-1111	10	61	41	1.4	0.4	-1111	14	2.5	-1111	7.1	-1111	-1111	-1111	-1111	81
258	Manse Spring near Pahrump	509500	729000	36 08 50	115 53 35	USGS	USGS	Qal	-1111	DOM/IRR	988	-8888	0	-1111	88	-1111	-1111	10/28/64	414	7.4	7.3	23.8	50	22	4.7	0.9	228	27	3.1	0	13	0.9	0	-1111	-1111	232	1.8
259	Maple Spring 20S/56E-01adc	544503	801770	36 14 39	115 38 26	3,WATSTORE	USGS	-1111	Sediment	Unused	2783	-8888	0	-1111	1	-1111	-1111	8/25/78	120	-1111	-1111	3	37	7.8	0.7	0.2	148	3.7	0.7	0.1	3.2	-1111	-1111	-1111	-1111	126	0.6
260	Pahrump Church 20S/53E-14cb	531197	688720	36 12 42	115 58 18	USGS	USGS	Qal	-1111	DOM	806	61	-1111	-1111	-1111	-1111	-1111	1/8/79	430	-1111	-1111	27	47	23	5.7	1.2	235	35	4.8	0.2	13	-1111	1.6	-1111	-1111	247	2.2
261	Pitzer's Well 20S/50E-03ad	546287	818444	36 14 33	115 14 40	USGS	USGS	QTal	-1111	DOM	706	104	-1111	-1111	-1111	-1111	-1111	1/17/79	432	-1111	-1111	19.2	49	23	5.1	1.1	249	38	3.6	0.2	13	-1111	1.1	-1111	-1111	261	2.7
262	Rainbow Spring 18S/56E-35cc	548811	797873	36 15 14	115 38 23	3,WATSTORE	USGS	-1111	-1111	-1111	2612	-8888	0	-1111	2	-1111	-1111	8/24/78	160	-1111	-1111	5	63	7.4	0.7	0.3	183	5.1	0.7	0.1	4.1	-1111	-1111	-1111	-1111	161	2.5
263	Sewer Company Well 1	660000	785000	36 24 27	115 40 04	EPA	EPA	-1111	-1111	-1111	948	-1111	-1111	-1111	-1111	-1111	-1111	1/12/78	540	-1111	7.1	23	57	35	7	2.4	270	36	17	0.4	-1111	0.78	-1111	0.01	0.05	280	3.5
264	Shultz's Well 19S/60E-08aab	574248	808348	36 18 11	115 18 50	USGS	USGS	Qal	-1111	DOM	780	-1111	-1111	-1111	-1111	-1111	-1111	1/17/78	938	-1111	-1111	17.8	46	24	9.4	1	250	26	9.1	0.2	13	-1111	1.1	-1111	-1111	242	2.8
265	Six Mile Spring 20S/53E-01bdb	544200	672800	36 14 38	116 05 00	1	USGS	Qal/Pzc	-1111	-1111	779	-9999	0.6	-1111	3	-1111	-1111	11/1/64	668	-1111	7.2	-1111	78	41	40	10	247	209	32	1.1	18	0.2	0.07	-1111	-1111	602	0.8
266	T-Bar Spring 18S/56E-15c	560391	790781	36 17 28	115 41 00	WATSTORE	USGS	-1111	-1111	-1111	2820	-8888	-1111	-1111	-1111	-1111	-1111	7/24/80	242	-1111	-1111	6	41	9.3	0.8	0.4	171	3.4	0.3	0.2	9.1	-1111	-1111	-1111	-1111	142	2.1
267	Test Well 10 near Mercury	571081	738075	36 35 27	116 01 06	1	USGS	Pzc (311-397)	DOLO	IND/OBS	1068	397	256	-1111	28	-1111	-1111	6/28/84	331	-1111	7.2	27.2	41	17	7.8	1	200	14	9.3	0.2	18	1.8	0	-1111	-1111	200	0.8
268	Trout Spring 20S/56E-10ca	539750	780625	36 13 16	115 40 58	USGS	USGS	-1111	-1111	DOM	2249	-8888	0	-1111	14	-1111	-1111	3/6/77	264	8.5	8.4	8.2	33	11	0.9	0.4	180	8.5	0.8	0.2	3	-1111	-1111	-1111	-1111	142	3.5
269	Two Springs 18S/56E-15c	562378	789282	36 17 28	115 41 05	3,WATSTORE	USGS	-1111	-1111	-1111	3048	-8888	0	-1111	-1111	-1111	-1111	8/18/78	142	-1111	-1111	4	47	0.1	0.7	0.3	1	24	0.1	0.1	3.6	-1111	-1111	-1111	-1111	78	64
270	USAF #2 Indian Springs AFB	666749	782651	36 34 40	115 40 45	EPA	EPA	-1111	-1111	-1111	956	-8888	-1111	-1111	-1111	-1111	-1111	1/12/78	620	-1111	7.3	22	80	57	47	8	200	270	68	0.4	-1111	2.8	-1111	0.01	0.8	680	5.7
271	Well 18S/56E-35dcc	578852	787394	36 20 20	115 39 25	3	USGS	-1111	Sediment	DOM	2441	-1111	-1111	-1111	-1111	-1111	-1111	8/22/78	407	-1111	-1111	-1111	54	23	1.4	0.8	256	14	1.8	0.1	8.2	-1111	-1111	-1111	-1111	227	1.4
272	Well 19S/53E-34ca Wilcox Well	545000	696000	36 14 40	116 00 15	1	USGS	-1111	-1111	IRR	906	197	-1111	-1111	-1111	-1111	-1111	10/28/64	457	7.8	7.2	29.6	56	22	5.5	1.6	258	18	4.2	0.1	16	1.6	-1111	-1111	-1111	237	1.6
273	Well 18S/56E-13dca Lee's Court	572150	782600	36 19 08	115 40 24	3	USGS	-1111	Sediment	DOM	2536	-1111	-1111	-1111	-1111	-1111	-1111	8/22/78	442	-1111	-1111	10	49	31	1.9	0.7	288	28	1.8	0.1	7.8	-1111	-1111	-1111	-1111	244	0.2
274	Well 18S/56E-19aba Ski Lodge	567155	781693	36 18 15	115 40 23	3	USGS	-1111	Sediment	DOM	2646	-1111	79	-1111	-1111	-1111	-1111	8/23/78	398	-1111	-1111	8	47	14	0.9	0.4	207	9.9	1.4	0.1	4.8	-1111	-1111	-1111	-1111	187	1.4
275	Well 18S/56E-29bdb	561286	800634	36 15 37	115 38 49	3	USGS	-1111	Sediment	PS	2316	47	14	-1111	-1111	-1111	-1111	8/21/78	282	-1111	-1111	-1111	48	8.8	0.8	0.3	171	5.7	0.8	0.1	4.5	-1111	-1111	-1111	-1111	153	3.2
276	Well 18S/57E-28baa	564870	816198	36 16 08	115 35 39	3	USGS	-1111	Sediment	DOM	2071	91	20	-1111	-1111	-1111	-1111	8/21/78	397	-1111	-1111	-1111	62	14	1.4	0.6	244	12	1.7	0.2	5.7	-1111	-1111	-1111	-1111	218	0.1
277	West Spring 19S/56E-29d	548592	796320	36 15 11	115 39 42	3	USGS	-1111	-1111	-1111	2804	-8888	0	-1111	2	-1111	-1111	8/24/78	322	-1111	-1111	8.5	58	8.9	0.7	0.3	207	9.8	3.7	0.2	4.6	-1111	-1111	-1111	-1111	192	0.8
278	Wheeler Well 18S/55E-20abc	560000	746000	36 22 08	115 48 52	1	USGS	Qal	-1111	Stock	1318	-1111	-1111	-1111	-1111	-1111	-1111	10/28/64	678	7.7	7	10	63	28	10	9.8	362	8.8	12	0.2	30	21	0.44	-1111	-1111	391	2
279	Willow Springs 18S/55E-02a	606000	765500	36 25 01	115 45 51	USGS	USGS	Qal	-1111	DOM	1828	-8888	0	-1111	31	-1111	-1111	12/14/66	442	-1111	7.8	10.6	67	17	4.8	0.5	302	13	1.8	0.2	7.8	3	0	-1111	0.36	253	3.2

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Rock/Mineral Chemistry, Broxton et al. (1986)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
1	SAMPLE	DRILL HOLE NO.	DEPTH (FT)	DEPTH (M)	SOURCE	Rock/Mineral Type	Analytical Method	SIO2	TIO2	AL2O3	FE2O3	FEO	MNO	MGO	CAO	BAO	NA2O	K2O	P2O5	H2O	Total Oxides	NOTES
2	USWG-2*1*675FT	USW G-2	675	205.74	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	64.3	0.33	16.8	1.83	not meas.	0.17	1.77	2.6	0	1.38	2.72	0.05	8	100.0	Pah Canyon Paintbrush Tuff. Clinoptilolite-, Smectite- bearing Tuff; Diagenetic Zone I
3	USWG-2*2*2430FT	USW G-2	2430	740.664	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	76.5	0.14	11.9	1.24	not meas.	0.13	0.41	1.98	0	1.68	3.96	0.01	3.49	101.4	Tuff in Calico Hills. Clinoptilolite-, Mordenite-bearing nonwelded tuff; Diagenetic Zone II
4	USWG-2*3*2667FT	USW G-2	2667	812.9016	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	75.6	0.11	12.7	1.38	not meas.	0.08	0.14	1.59	0	2.51	3.04	0.02	2.44	99.6	Tuff in Calico Hills. Clinoptilolite-, Mordenite-bearing nonwelded tuff; Diagenetic Zone II.
5	USWG-2*4*3067FT	USW G-2	3067	934.8216	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	73.3	0.16	13.1	1.44	not meas.	0.04	0.29	2.25	0	3.37	3.34	0.06	3.61	101.0	Prow Pass Member, Crater Flat Tuff, Mordenite Bearing Tuff; Diagenetic Zone II.
6	USWG-2*5*3192FT	USW G-2	3192	972.9216	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	76	0.12	11.9	1.34	not meas.	0.08	0.14	1.11	0	2.63	3.89	0.02	2.89	100.1	Prow Pass Member, Crater Flat Tuff. Clinoptilolite-, Mordenite-bearing nonwelded Tuff, Diagenetic Zone II.
7	USWG-2*6*3454FT	USW G-2	3454	1052.7792	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	76	0.14	14.3	1.6	not meas.	0.04	0.57	1.49	0	2.96	2.12	0.02	2.73	101.0	Bullfrog Member, Crater Flat Tuff. Mordenite Bearing Tuff; Diagenetic Zone III.
8	USWG-2*7*3541FT	USW G-2	3541	1079.2968	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	73.8	0.2	14	1.96	not meas.	0.08	0.45	0.74	0	4.17	3.37	0.03	2.14	100.9	Bullfrog Member, Crater Flat Tuff. Analcime-bearing Tuff; Diagenetic Zone III.
9	USWG-2*8*3795FT	USW G-2	3795	1156.716	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	71.8	0.55	14.4	4.35	not meas.	0.03	0.69	0.55	0	1.17	3.49	0.22	2.72	100.0	Tram Member, Crater Flat Tuff. Analcime-,Kaolinite-bearing Nonwelded Tuff; Diagenetic Zone III.
10	USWG-2*9*3933FT	USW G-2	3933	1198.7784	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	76.1	0.12	12.4	1.17	not meas.	0.07	0.26	0.95	0	2.77	4.31	0.02	2.27	99.4	Tram Member, Crater Flat Tuff. Analcime-bearing Tuff; Diagenetic Zone III.
11	USWG-2*10*4090FT	USW G-2	4090	1246.632	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	63	0.68	14.1	5.3	not meas.	0.17	1.72	5.26	0	2.19	2.7	0.35	3.82	99.3	Rhyodacite Lava. Analcime-, Calcite-bearing lava; Diagenetic Zone III.
12	USWG-2*11*4805FT	USW G-2	4805	1464.564	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	74.2	0.26	14.1	1.77	not meas.	0.02	0.66	0.24	0	2.51	4.77	0.05	1.57	100.1	Tuff of Lithic Ridge. Authigenic Albite-, Analcime-bearing nonwelded tuff; Diagenetic Zone IV.
13	USWG-2*12*5895FT	USW G-2	5895	1796.796	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	66.2	0.37	12	3.05	not meas.	0.14	0.93	5.29	0	2.26	2.76	0.08	6.16	99.2	Bedded Tuff. Calcite-, Chlorite-bearing bedded tuff; Diagenetic Zone IV.
14	USWG-2*13*5992FT	USW G-2	5992	1826.3616	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	72	0.27	13.6	1.96	not meas.	0.1	0.47	1.31	0	3.68	4	0.07	2.26	99.7	Older Tuff Sequence. Calcite-, Chlorite-bearing nonwelded Tuff; Diagenetic Zone IV.
15	USWG-3*14*1498FT	USW GU-3/G-3	1498	456.5904	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	74.5	0.1	11.7	1.1	not meas.	0.08	0.12	0.77	0	3.2	4.34	0.01	3.56	99.5	Tuff of Calico Hills. Vitric nonwelded tuff; Diagenetic Zone I.
16	USWG-3*15*1598FT	USW GU-3/G-3	1598	487.0704	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	73.1	0.11	12.2	1.41	not meas.	0.1	0.2	0.83	0	3.29	4.37	0.02	3.41	99.0	Prow Pass Member, Crater Flat Tuff. Vitric nonwelded tuff; Diagenetic Zone I.
17	USWG-3*16*1986FT	USW GU-3/G-3	1986	605.3328	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	68.3	0.12	11.3	1.35	not meas.	0.07	0.23	0.82	0	3.44	3.61	0.02	10.32	99.6	Prow Pass Member, Crater Flat Tuff. Clinoptilolite-bearing nonwelded tuff; Diagenetic Zone II.
18	USWG-3*17*2577FT	USW GU-3/G-3	2577	785.4696	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	66.3	0.12	12.9	1.32	not meas.	0.1	0.27	2.34	0	2.43	3.61	0.02	9.63	99.2	Bullfrog Member, Crater Flat Tuff. Clinoptilolite-bearing nonwelded tuff; Diagenetic Zone II.
19	USWG-3*18*3207FT	USW GU-3/G-3	3207	977.4936	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	74.9	0.24	12.6	2.03	not meas.	0.57	0.44	1.41	0	3.12	4.12	0.07	1.19	100.7	Tram Member, Crater Flat Tuff. Clinoptilolite-bearing partially welded tuff; Diagenetic Zone II.
20	USWG-3*19*3589FT	USW GU-3/G-3	3589	1093.9272	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	66.5	0.48	13.8	2.85	not meas.	0.06	0.61	1.83	0	2.88	3.42	0.16	6.86	99.6	Tram Member, Crater Flat Tuff. Clinoptilolite-bearing nonwelded tuff; Diagenetic Zone II.
21	USWG-3*20*3854FT	USW GU-3/G-3	3854	1174.6992	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	69.4	0.16	12.4	1.33	not meas.	0.03	0.66	1.15	0	3.32	2.98	0.02	8.06	99.5	Tuff of Lithic Ridge. Clinoptilolite-bearing nonwelded tuff; Diagenetic Zone II.
22	USWG-3*21*4008FT	USW G-3	4008	1221.6384	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	69.8	0.34	14.4	2.29	not meas.	0.07	0.6	1.31	0	3.44	4.85	0.09	1.83	99.0	Tuff of Lithic Ridge. Analcime-bearing nonwelded tuff; Diagenetic Zone III.
23	USWG-3*22*4263FT	USW G-3	4263	1299.3624	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	73.2	0.26	12.7	1.75	not meas.	0.07	0.48	1.27	0	4	3.55	0.05	2.61	99.9	Tuff of Lithic Ridge. Analcime-bearing nonwelded tuff; Diagenetic Zone III.
24	USWG-3*23*4568FT	USW G-3	4568	1392.3264	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	67.8	0.43	13.7	2.96	not meas.	0.08	1.08	1.8	0	3.56	2.4	0.11	5.26	99.2	Tuff of Lithic Ridge. Analcime-bearing nonwelded tuff; Diagenetic zone III.
25	USWG-3*24*4786FT	USW G-3	4786	1458.7728	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	72.2	0.26	13.6	1.77	not meas.	0.11	0.61	1.26	0	3.39	4.23	0.05	2.41	99.9	Older Tuff Sequence. Analcime-bearing nonwelded tuff; Diagenetic Zone III.
26	USWG-3*25*4869FT	USW G-3	4869	1484.0712	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	71	0.23	12.9	1.58	not meas.	0.05	0.5	0.96	0	4.7	2.57	0.04	4.11	98.6	Older Tuff Sequence. Analcime-bearing nonwelded tuff; Diagenetic Zone III.
27	USWG-4*26*1314FT	USW G-4	1314	400.5072	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	70.2	0.14	16.7	1.44	not meas.	0.09	0.9	3.51	0	1.9	0.72	0.02	5.91	101.5	Topopah Spring Member, Paintbrush Tuff. Smectite-,Clinop.-bearing tuff at top of Topopah Spring vitrophyre; Diagenetic Zone I.
28	USWG-4*27*1470FT	USW G-4	1470	448.056	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	69.6	0.07	10.9	0.9	not meas.	0.05	0.06	0.69	0	2.53	4.31	0.02	10.1	99.3	Tuff of Calico Hills. Clinoptilolite-bearing nonwelded tuff; Diagenetic Zone II.
29	USWG-4*28*1544FT	USW G-4	1544	470.6112	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	69.3	0.07	11.3	0.96	not meas.	0.04	0.06	0.84	0	2.85	4	0.02	9.9	99.3	Tuff of Calico Hills. Clinoptilolite-, Mordenite-bearing nonwelded tuff; Diagenetic Zone II.
30	USWG-4*29*2131FT	USW G-4	2131	649.5288	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	65.1	0.11	13	1.33	not meas.	0.02	0.17	2.62	0	2.46	3.39	0.01	10.56	98.8	Prow Pass Member, Crater Flat Tuff. Clinoptilolite-, Mordenite-bearing nonwelded tuff; Diagenetic Zone II.
31	USWG-4*30*2226FT	USW G-4	2226	678.4848	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	66.4	0.14	13.1	1.45	not meas.	0.05	0.26	2.43	0	2.15	3.78	0.01	8.4	98.2	Prow Pass Member, Crater Flat Tuff. Clinoptilolite-, Mordenite-bearing nonwelded tuff; Diagenetic Zone II.
32	USWG-4*31*2716FT	USW G-4	2716	827.8368	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	67.7	0.13	12.2	1.24	not meas.	0.04	0.2	2.57	0	2.81	2.4	0.01	10.11	99.4	Bullfrog Member, Crater Flat Tuff. Mordenite-bearing nonwelded tuff; Diagenetic Zone II.
33	USWG-4*32*2792FT	USW G-4	2792	851.0016	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	68.3	0.16	11.6	1.32	not meas.	0.03	0.24	2.94	0	2.68	1.63	0.02	10.98	99.9	Tram Member, Crater Flat Tuff. Mordenite-bearing nonwelded tuff; Diagenetic Zone II.
34	USWG-4*33*1279FT	USW G-4	1279	389.8392	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	74	0.1	12.4	1.07	not meas.	0.08	0.31	0.66	0	3.4	4	0.01	3.79	99.8	Topopah Spring Member, Paintbrush Tuff. Vitric basal Vitrophyre.
35	USWG-4*34*1323FT	USW G-4	1323	403.2504	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	69.1	0.11	13.4	1.13	not meas.	0.06	0.94	3.22	0	1.23	2.64	0.01	8.9	100.7	Topopah Spring Member, Paintbrush Tuff. Clinoptilolite-bearing nonwelded tuff; Diagenetic Zone II.
36	USWG-4*35*1381FT	USW G-4	1381	420.9288	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	72.9	0.09	11.3	1.04	not meas.	0.05	0.49	3.09	0	1.64	1.88	0.02	8.79	101.3	Tuff of Calico Hills. Clinoptilolite-bearing nonwelded tuff; Diagenetic Zone II.
37	USWG-4*36*1505FT	USW G-4	1505	458.724	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	73.2	0.09	12.1	1.02	not meas.	0.03	0.2	2.46	0	1.29	3.32	0	6.7	100.4	Tuff of Calico Hills. Clinoptilolite-bearing nonwelded tuff; Diagenetic Zone II.
38	USWG-4*37*1667FT	USW G-4	1667	508.1016	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	72.1	0.08	11.3	1	not meas.	0.05	0.12	2.67	0	1.47	3.47	0.02	7.68	100.0	Tuff of Calico Hills. Clinoptilolite-bearing nonwelded tuff; Diagenetic Zone II.
39	USWG-4*38*2087FT	USW G-4	2087	636.1176	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	71.3	0.16	12.6	1.67	not meas.	0.08	0.54	1.93	0	1.92	4.35	0.03	5.16	99.7	Prow Pass Member, Crater Flat Tuff. Clinoptilolite-bearing nonwelded tuff; Diagenetic Zone II.
40	USWG-4*39*2304FT	USW G-4	2304	702.2592	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	70.9	0.13	12.3	1.55	not meas.	0.05	0.41	2.62	0	1.69	3.46	0.03	6.58	99.7	Bullfrog Member, Crater Flat Tuff. Clinoptilolite-, Mordenite(?)-bearing nonwelded tuff; Diagenetic Zone II.
41	UE-25b#1(H)*40*2832FT	UE-25b#1(H)	2832	863.1936	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	73	0.12	12.9	1.32	not meas.	0.13	0.69	2.46	0	2.07	2.96	0.03	4.53	100.2	Bullfrog Member, Crater Flat Tuff. Mordenite-, Clinoptilolite-bearing nonwelded tuff; Diagenetic Zone II.
42	UE-25b#1(H)*41*2879FT	UE-25b#1(H)	2879	877.5192	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	67.3	0.26	13.2	1.82	not meas.	0.04	1.3	3.13	0	1.18	3.75	0.09	7.24	99.3	Bullfrog member, Crater Flat Tuff. Mordenite-, Clinoptilolite-bearing nonwelded tuff; Diagenetic Zone II.
43	UE-25b#1(H)*42*3393FT	UE-25b#1(H)	3393	1034.1864	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	67.1	0.37	13.4	2.65	not meas.	0.12	0.76	3.04	0	2.88	3.5	0.11	4.43	98.4	Tram Member, Crater Flat Tuff. Analcime-, Calcite-bearing nonwelded tuff; Diagenetic Zone III.
44	UE-25b#1(H)*43*3602FT	UE-25b#1(H)	3602	1097.8896	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	66.3	0.53	14.3	3.66	not meas.	0.12	0.83	2.78	0	2.8	3.6	0.18	4.1	99.2	Tram Member, Crater Flat Tuff. Analcime-, Calcite-bearing nonwelded tuff; Diagenetic Zone III.
45	UE-25b#1(H)*44*3767FT	UE-25b#1(H)	3767	1148.1816	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	68.6	0.48	12.8	3.25	not meas.	0.12	0.77	2.51	0	2.28	3.51	0.16	3.63	98.1	Tram Member, Crater Flat Tuff. Analcime-, Calcite-, Kaolinite-bearing nonwelded tuff; Diagenetic Zone III.
46	UE-25b#1(H)*45*3835FT	UE-25b#1(H)	3835	1168.908	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	69.3	0.47	13.8	3.21	not meas.	0.08	1.01	2.02	0	2.67	3.34	0.17	3.34	99.4	Tram Member, Crater Flat Tuff. Analcime-, Calcite-bearing nonwelded tuff; Diagenetic Zone III.
47	UE-25b#1(H)*46*3963FT	UE-25b#1(H)	3963	1207.9224	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	69.6	0.34	13.8	2.16	not meas.	0.03	1.06	1.73	0	2.49	3.18	0.07	4.96	99.4	Tuff of Lithic Ridge. Analcime-, Calcite-bearing nonwelded tuff; Diagenetic Zone III.
48	UE-25p#1*47*1700-10FT	UE-25p#1	1700-1710	518.2-521.2	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	73.2	0.11	12.3	1.36	not meas.	0.05	0.36	2.37	0	2.38	2.7	0.02	6.83	101.7	Prow Pass Member, Crater Flat Tuff. Clinoptilolite-bearing nonwelded tuff; Diagenetic Zone II.
49	UE-25p#1*48*1730-40FT	UE-25p#1	1730-1740	527.3-530.4	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	73.3	0.12	12.7	1.43	not meas.	0.09	0.3	2.1	0	2.4	2.91	0.02	6.15	101.5	Prow Pass Member, Crater Flat Tuff. Clinoptilolite-bearing nonwelded tuff; Diagenetic Zone II.
50	UE-25p#1*49*1790-1800FT	UE-25p#1	1790-1800	545.6-548.6	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	72.6	0.14	12.4	1.57	not meas.	0.06	0.44	2.17	0	2.25	2.28	0.03	5.34	99.3	Prow Pass Member, Crater Flat Tuff. Clinoptilolite-bearing nonwelded tuff; Diagenetic Zone II.
51	UE-25p#1*50*2280-90FT	UE-25p#1	2280-2290	694.9-698.0	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	72.7	0.17	12.2	1.44	not meas.	0.1	0.4	2.07	0	2.25	4.25	0.03	4.11	99.7	Bullfrog Member, Crater Flat Tuff. Analcime-bearing nonwelded tuff; Diagenetic Zone III.
52	UE-25p#1*51*2650-60FT	UE-25p#1	2650-2660	807.7-810.8	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	71.5	0.32	12.9	2.28	not meas.	0.11	1.1	1.73	0	2.72	4.43	0.1	2.74	99.9	Bullfrog Member, Crater Flat Tuff. Analcime-bearing nonwelded tuff; Diagenetic Zone III.
53	UE-25p#1*52*2760-70FT	UE-25p#1	2760-2770	841.2-844.3	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	72.7	0.28	12.8	2.29	not meas.	0.11	0.92	1.83	0	2	3.34	0.03	3.23	99.6	Bullfrog Member, Crater Flat Tuff. Analcime bearing nonweld tuff; Diagenetic Zone III.
54	UE-25p#1*53*3430-40FT	UE-25p#1	3430-3440	1045.5-1048.5	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	74.3	0.17	12.6	1.23	not meas.	0.05	0.29	0.81	0	3	5.22	0.03	1.99	99.7	Older Tuff Sequence. Authigenic albite-bearing nonweld tuff; Diagenic Zone IV.
55	UE-25p#1*54*3560-70FT	UE-25p#1	3560-3570	1085.1-1088.1	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	75.1	0.1	11.9	1.34	not meas.	0.05	0.5	1.48	0	1.77	5.07	0.03	1.78	99.1	Older Tuff Sequence. Authigenic albite-bearing nonweld tuff; Diagenetic Zone IV.
56	J-13*55*1457FT	J-13	1457	444.0936	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	69.6	0.08	10.6	0.94	not meas.	0.05	0.5	1.96	0	0.88	3.55	0.02	10.14	98.3	Tuff of Calico Hills. Clioptilolite-bearing nonwelded tuff; Diagenetic Zone II.
57	J-13*56*1519FT	J-13	1519	462.9912	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	69.5	0.08	12.1	1.01	not meas.	0.04	0.39	1.87	0	1.22	3.94	0.02	8.65	98.8	Tuff of Calico Hills. Clinoptilolite-bearing nonwelded tuff; Diagenetic Zone II.
58	J-13*57*1883FT	J-13	1883	573.9384	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	75.2	0.11	12.6	1.44	not meas.	0.1	0.11	0.68	0	3.91	4.39	0.02	0.77	99.3	Prow Pass Member, Crater Flat Tuff. Devitrified partially welded tuff.
59	J-13*58*2001FT	J-13	2001	609.9048	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	70.1	0.19	13.9	1.67	not meas.	0.02	0.14	0.41	0	5.55	2.94	0.02	3.74	98.7	Prow Pass Member, Crater Flat Tuff. Analcime-bearing nonwelded tuff; Diagenetic Zone III.
60	J-13*59*2133FT	J-13	2133	650.1384	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	75.3	0.11	12.6	1.44	not meas.	0.09	0.23	0.75	0	4.02	4.38	0.03	0.3	99.3	Bullfrog Member, Crater Flat Tuff. Devitrified partially welded tuff.
61	J-13*60*2982FT	J-13	2982	908.9136	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	74.8	0.16	12.2	1.41	not meas.	0.05	0.21	0.89	0	3.7	4.46	0.02	0.94	98.8	Tram Member, Crater Flat Tuff. Authigenic albite-bearing nonwelded tuff; Diagenetic Zone IV.
62	J-13*61*2999FT	J-13	2999	914.0952	Broxton et al. (1986)	Tuff	XRF; Na by AA or plasma spect.; H20 by LOI	70	0.3	12.4	2.18	not meas.	0.1	0.51	2.52	0	2.55	4.18	0.1	3.81	98.7	Tram Member, Crater Flat Tuff. Analcime-, Authigenic albite-bearing nonwelded tuff; Diagenetic Zone IV.
63	3-15-82-5	outcrop	0	0	Broxton et al. (1986)	Tuff	AA; H20 by LOI	69.5	0.06	12.3	0.75	0.07	0.04	0.1	1.06	0	0.68	6.67	0.01	8.42	99.6	Tuff of Calico Hills. Clinop.,Mord.-bearing nonwelded tuff; DZ II. Nev. State Coordinates 786500N, 551000E; FIELD # 3-15-82-5
64	3-15-82-9	outcrop	0	0	Broxton et al. (1986)	Tuff	AA; H20 by LOI	66.6	0.1	12.4	1.06	0.04	0.04	0.15	0.61	0	0.59	7.81	0.01	10.04	99.4	Tuff on Calico Hills. Clinop.,Mord.-bearing nonwelded tuff; DZ II; Nev. State Coordinates 786700N, 551400E; FIELD # 3-15-82-9
65	USWG-2(GLASS)1*331FT	USW G-2	331	100.8888	Broxton et al. (1986)	Volcanic glass	Electron microprobe	73.7	0.14	12.1	0.91	not meas.	not meas.	0	0.28	0	4.26	4.64	not meas.	not meas.	96.0	
66	USWG-2(GLASS)2*331FT	USW G-2	331	100.8888	Broxton et al. (1986)	Volcanic glass	Electron microprobe	72.5	0.16	12.3	0.88	not meas.	not meas.	0	0.26	0	4.56	4.43	not meas.	not meas.	95.1	
67	USWG-2(GLASS)3*331FT	USW G-2	331	100.8888	Broxton et al. (1986)	Volcanic glass	Electron microprobe	72.9	0.15	11.8	0.89	not meas.	not meas.	0	0.25	0	4.45	4.53	not meas.	not meas.	95.0	
68	USWG-2(GLASS)4*331FT	USW G-2	331	100.8888	Broxton et al. (1986)	Volcanic glass	Electron microprobe	72.4	0.16	12.2	0.88	not meas.	not meas.	0	0.26	0	4.62	4.34	not meas.	not meas.	94.9	
69	USWG-2(GLASS)5*331FT	USW G-2	331	100.8888	Broxton et al. (1986)	Volcanic glass	Electron microprobe	72.2	0.13	12.1	0.69	not meas.	not meas.	0	0.26	0	4.68	4.35	not meas.	not meas.	94.4	
70	USWG-2(GLASS)6*331FT	USW G-2	331	100.8888	Broxton et al. (1986)	Volcanic glass	Electron microprobe	73.3	0.1	12.1	0.81	not meas.	not meas.	0	0.27	0	4.55	4.37	not meas.	not meas.	95.5	
71	USWG-2(GLASS)7*331FT	USW G-2	331	100.8888	Broxton et al. (1986)	Volcanic glass	Electron microprobe	73	0.13	11.9	0.94	not meas.	not meas.	0	0.24	0	4.59	4	not meas.	not meas.	94.7	
72	USWG-2(GLASS)8*331FT	USW G-2	331	100.8888	Broxton et al. (1986)	Volcanic glass	Electron microprobe	73.1	0.1	11.3	0.65	not meas.	not meas.	0	0.23	0	4.52	3.92	not meas.	not meas.	93.8	
73	USWG-2(GLASS)9*331FT	USW G-2	331	100.8888	Broxton et al. (1986)	Volcanic glass	Electron microprobe	72	0.16	12.2	0.91	not meas.	not meas.	0	0.25	0	4.43	4.23	not meas.	not meas.	94.2	
74	USWG-2(GLASS)10*358FT	USW G-2	358	109.1184	Broxton et al. (1986)	Volcanic glass	Electron microprobe	72	0.16	11.7	0.83	not meas.	not meas.	0	0.19	0	3.99	4.22	not meas.	not meas.	93.1	
75	USWG-2(GLASS)11*358FT	USW G-2	358	109.1184	Broxton et al. (1986)	Volcanic glass	Electron microprobe	72.5	0.13	11.6	0.77	not meas.	not meas.	0	0.18	0	4.33	4.22	not meas.	not meas.	93.7	
76	USWG-2(GLASS)12*358FT	USW G-2	358	109.1184	Broxton et al. (1986)	Volcanic glass	Electron microprobe	74.1	0.1	11.8	0.62	not meas.	not meas.	0	0.21	0	4.4	3.99	not meas.	not meas.	95.2	
77	USWG-2(GLASS)13*358FT	USW G-2	358	109.1184	Broxton et al. (1986)	Volcanic glass	Electron microprobe	73.2	0.13	11.9	0.66	not meas.	not meas.	0	0.24	0	4.54	3.95	not meas.	not meas.	94.6	
78	USWG-2(GLASS)14*358FT	USW G-2	358	109.1184	Broxton et al. (1986)	Volcanic glass	Electron microprobe	73.4	0.11	11.9	0.81	not meas.	not meas.	0	0.22	0	4.38	4.06	not meas.	not meas.	94.9	
79	USWG-2(GLASS)15*547FT	USW G-2	547	166.7256	Broxton et al. (1986)	Volcanic glass	Electron microprobe	71.1	0.13	11.8	0.85	not meas.	not meas.	0	0.56	0	3.24	4.71	not meas.	not meas.	92.4	
80	USWG-2(GLASS)16*547FT	USW G-2	547	166.7256	Broxton et al. (1986)	Volcanic glass	Electron microprobe	73	0.09	11.9	0.73	not meas.	not meas.	0	0.54	0	3.36	4.84	not meas.	not meas.	94.5	
81	USWG-2(GLASS)17*547FT	USW G-2	547	166.7256	Broxton et al. (1986)	Volcanic glass	Electron microprobe	72.2	0.09	12.2	0.78	not meas.	not meas.	0	0.51	0	3.67	5.07	not meas.	not meas.	94.5	
82	USWGU-3(GLASS)18*356FT	USW GU-3	356	108.5088	Broxton et al. (1986)	Volcanic glass	Electron microprobe	74.1	0.13	12.2	0.73	not meas.	not meas.	0	0.05	0.11	4	5.05	not meas.	not meas.	96.4	
83	USWGU-3(GLASS)19*356FT	USW GU-3	356	108.5088	Broxton et al. (1986)	Volcanic glass	Electron microprobe	74.4	0.05	11.9	0.4	not meas.	not meas.	0	0.05	0.02	3.78	5.3	not meas.	not meas.	95.9	
84	USWGU-3(GLASS)20*356FT	USW GU-3	356	108.5088	Broxton et al. (1986)	Volcanic glass	Electron microprobe	73.7	0.03	11.2	1.23	not meas.	not meas.	0.11	0.89	0	4.43	2.77	not meas.	not meas.	94.4	
85	USWGU-3(GLASS)21*1195FT	USW GU-3	1195	364.236	Broxton et al. (1986)	Volcanic glass	Electron microprobe	74.9	0.1	11.9	0.74	not meas.	not meas.	0	0.21	0.19	3.4	5.78	not meas.	not meas.	97.2	
86	USWGU-3(GLASS)22*1227FT	USW GU-3	1227	373.9896	Broxton et al. (1986)	Volcanic glass	Electron microprobe	74.2	0.09	11.7	0.14	not meas.	not meas.	0	0.34	0	3.36	5.31	not meas.	not meas.	95.1	
87	USWGU-3(GLASS)23*1227FT	USW GU-3	1227	373.9896	Broxton et al. (1986)	Volcanic glass	Electron microprobe	73.7	0.04	12	0.6	not meas.	not meas.	0	0.4	0	3.39	5.61	not meas.	not meas.	95.7	
88	USWGU-3(GLASS)24*1227FT	USW GU-3	1227	373.9896	Broxton et al. (1986)	Volcanic glass	Electron microprobe	73.4	0.05	11.7	0.91	not meas.	not meas.	0.05	0.59	0.16	3.4	5.45	not meas.	not meas.	95.7	
89	USWGU-3(GLASS)25*1227FT	USW GU-3	1227	373.9896	Broxton et al. (1986)	Volcanic glass	Electron microprobe	73.5	0.08	11.7	0.83	not meas.	not meas.	0	0.27	0.13	3.31	5.63	not meas.	not meas.	95.5	
90	USWGU-3(GLASS)26*1227FT	USW GU-3	1227	373.9896	Broxton et al. (1986)	Volcanic glass	Electron microprobe	74.1	0.11	11.8	0.73	not meas.	not meas.	0	0.24	0.07	3.41	5.55	not meas.	not meas.	96.0	
91	USWGU-3(GLASS)27*1227FT	USW GU-3	1227	373.9896	Broxton et al. (1986)	Volcanic glass	Electron microprobe	74.4	0.09	11.5	0.81	not meas.	not meas.	0	0.22	0.04	3.27	5.68	not meas.	not meas.	95.9	
92	USWGU-3(GLASS)28*1227FT	USW GU-3	1227	373.9896	Broxton et al. (1986)	Volcanic glass	Electron microprobe	74	0.08	11.8	0.95	not meas.	not meas.	0	0.37	0	3.24	5.6	not meas.	not meas.	95.9	
93	USWGU-3(GLASS)29*1227FT	USW GU-3	1227	373.9896	Broxton et al. (1986)	Volcanic glass	Electron microprobe	73.8	0.07	11.7	0.46	not meas.	not meas.	0.01	0.52	0.13	3.13	5.72	not meas.	not meas.	95.5	
94	USWGU-3(GLASS)30*1227FT	USW GU-3	1227	373.9896	Broxton et al. (1986)	Volcanic glass	Electron microprobe	74.2	0.04	11.7	0.2	not meas.	not meas.	0	0.31		3.47	5.58	not meas.	not meas.	95.5	
95	USWGU-3(GLASS)31*1303FT	USW GU-3	1303	397.1544	Broxton et al. (1986)	Volcanic glass	Electron microprobe	74.6	0.09	11.9	0.77	not meas.	not meas.	0.02	0.29	0	3.42	5.59	not meas.	not meas.	96.7	
96	USWGU-3(GLASS)32*1303FT	USW GU-3	1303	397.1544	Broxton et al. (1986)	Volcanic glass	Electron microprobe	75.4	0.01	11.6	0.38	not meas.	not meas.	0	0.38	0	3.32	5.5	not meas.	not meas.	96.6	
97	USWGU-3(GLASS)33*1303FT	USW GU-3	1303	397.1544	Broxton et al. (1986)	Volcanic glass	Electron microprobe	73.4	0.04	12	0.69	not meas.	not meas.	0.04	0.32	0.12	3.39	5.49	not meas.	not meas.	95.5	
98	USWGU-3(GLASS)34*1303FT	USW GU-3	1303	397.1544	Broxton et al. (1986)	Volcanic glass	Electron microprobe	74.1	0.04	12.1	0.66	not meas.	not meas.	0	0.34	0	3.58	5.66	not meas.	not meas.	96.5	
99	USWGU-3(GLASS)35*1303FT	USW GU-3	1303	397.1544	Broxton et al. (1986)	Volcanic glass	Electron microprobe	74.4	0.07	11.9	0.56	not meas.	not meas.	0	0.29	0.12	3.44	5.66	not meas.	not meas.	96.4	
100	USWGU-3(GLASS)36*1303FT	USW GU-3	1303	397.1544	Broxton et al. (1986)	Volcanic glass	Electron microprobe	74.1	0.03	11.7	0.54	not meas.	not meas.	0	0.36	0	3.2	5.68	not meas.	not meas.	95.6	
101	USWGU-3(GLASS)37*1394FT	USW GU-3	1394	424.8912	Broxton et al. (1986)	Volcanic glass	Electron microprobe	73.9	0	11.8	0.85	not meas.	not meas.	0.02	0.43	0	3.49	4.93	not meas.	not meas.	95.4	
102	USWGU-3(GLASS)38*1394FT	USW GU-3	1394	424.8912	Broxton et al. (1986)	Volcanic glass	Electron microprobe	72.4	0.05	11.7	0.8	not meas.	not meas.	0.02	0.43	0	3.41	4.96	not meas.	not meas.	93.7	
103	USWGU-3(GLASS)39*1394FT	USW GU-3	1394	424.8912	Broxton et al. (1986)	Volcanic glass	Electron microprobe	73.8	0.05	12	0.78	not meas.	not meas.	0	0.43	0.06	3.69	4.8	not meas.	not meas.	95.4	
104	USWGU-3(GLASS)40*1537FT	USW GU-3	1537	468.4776	Broxton et al. (1986)	Volcanic glass	Electron microprobe	74.5	0.01	12.1	0.63	not meas.	not meas.	0	0.6	0.76	3.21	4.92	not meas.	not meas.	96.7	
105	USWGU-3(GLASS)41*1537FT	USW GU-3	1537	468.4776	Broxton et al. (1986)	Volcanic glass	Electron microprobe	73.9	0.07	11.8	0.71	not meas.	not meas.	0	0.57	0	3.06	5.13	not meas.	not meas.	95.2	
106	USWGU-3(GLASS)42*1537FT	USW GU-3	1537	468.4776	Broxton et al. (1986)	Volcanic glass	Electron microprobe	73.9	0.07	11.8	0.56	not meas.	not meas.	0	0.6		3.13	5	not meas.	not meas.	95.1	
107	USWGU-3(GLASS)43*1537FT	USW GU-3	1537	468.4776	Broxton et al. (1986)	Volcanic glass	Electron microprobe	73.1	0.04	12.1	0.58	not meas.	not meas.	0	0.62	0	3.38	5.05	not meas.	not meas.	94.8	
108	USWGU-3(GLASS)44*1537FT	USW GU-3	1537	468.4776	Broxton et al. (1986)	Volcanic glass	Electron microprobe	73.9	0.07	11.8	0.71	not meas.	not meas.	0	0.67	0	3.06	5.13	not meas.	not meas.	95.2	
109	USWGU-3(GLASS)45*1571FT	USW GU-3	1571	478.8408	Broxton et al. (1986)	Volcanic glass	Electron microprobe	74.6	0.05	11.9	0.76	not meas.	not meas.	0	0.4	1.57	3.35	4.96	not meas.	not meas.	97.5	
110	USWG-4(GLASS)46*1432FT	USW G-4	1432	436.4736	Broxton et al. (1986)	Volcanic glass	Electron microprobe	73.7	0.11	11.9	0.69	not meas.	not meas.	0.02	0.49	0	3.38	4.96	not meas.	not meas.	95.3	
111	USWG-4(GLASS)47*1432FT	USW G-4	1432	436.4736	Broxton et al. (1986)	Volcanic glass	Electron microprobe	74.3	0.06	11.9	0.74	not meas.	not meas.	0.07	0.53	0.18	3.35	5.01	not meas.	not meas.	96.1	
112	USWG-4(GLASS)48*1432FT	USW G-4	1432	436.4736	Broxton et al. (1986)	Volcanic glass	Electron microprobe	73.8	0.07	11.7	0.79	not meas.	not meas.	0.05	0.44	0	3.33	4.99	not meas.	not meas.	95.2	
113	USWH-4(GLASS)49*1312FT	USW H-4	1312	399.8976	Broxton et al. (1986)	Volcanic glass	Electron microprobe	73.9	0.04	12	0.67	not meas.	not meas.	0	0.43	0	3.27	4.91	not meas.	not meas.	95.2	
114	USWH-4(GLASS)50*1312FT	USW H-4	1312	399.8976	Broxton et al. (1986)	Volcanic glass	Electron microprobe	74.3	0.04	12.1	0.83	not meas.	not meas.	0	0.41	0	3.29	5.09	not meas.	not meas.	96.1	
115	USWH-4(GLASS)51*1312FT	USW H-4	1312	399.8976	Broxton et al. (1986)	Volcanic glass	Electron microprobe	73.4	0.02	12	0.86	not meas.	not meas.	0	0.43	0	3.03	5.39	not meas.	not meas.	95.1	
116	USWH-4(GLASS)52*1312FT	USW H-4	1312	399.8976	Broxton et al. (1986)	Volcanic glass	Electron microprobe	74	0.05	12.3	0.77	not meas.	not meas.	0	0.45	0	3.38	4.96	not meas.	not meas.	95.9	
117	USWH-4(GLASS)53*1312FT	USW H-4	1312	399.8976	Broxton et al. (1986)	Volcanic glass	Electron microprobe	74	0.05	12	0.83	not meas.	not meas.	0	0.49	0	3.28	5.37	not meas.	not meas.	96.0	
118	USWH-4(GLASS)54*1312FT	USW H-4	1312	399.8976	Broxton et al. (1986)	Volcanic glass	Electron microprobe	74	0.01	12	0.73	not meas.	not meas.	0	0.43	0	3.16	5.25	not meas.	not meas.	95.6	
119	USWH-5(GLASS)55*450FT	USW H-5	450	137.16	Broxton et al. (1986)	Volcanic glass	Electron microprobe	74.6	0.09	11.9	0.71	not meas.	not meas.	0	0.14	0.04	4.21	4.9	not meas.	not meas.	96.6	
120	USWH-5(GLASS)56*450FT	USW H-5	450	137.16	Broxton et al. (1986)	Volcanic glass	Electron microprobe	73.6	0.1	11.9	0.77	not meas.	not meas.	0	0.18	0.11	4.28	4.66	not meas.	not meas.	95.8	
121	USWH-5(GLASS)57*450FT	USW H-5	450	137.16	Broxton et al. (1986)	Volcanic glass	Electron microprobe	72.3	0.09	11.8	0.52	not meas.	not meas.	0	0.2	0.2	4.24	4.65	not meas.	not meas.	94.1	

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Rock/Mineral Chemistry, Broxton et al. (1986)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
1	SAMPLE	DRILL HOLE NO.	DEPTH (FT)	DEPTH (M)	SOURCE	Rock/Mineral Type	Analytical Method	SIO2	TIO2	AL2O3	FE2O3	FEO	MNO	MGO	CAO	BAO	NA2O	K2O	P2O5	H2O	Total Oxides	NOTES
122	USWH-5(GLASS)58*450FT	USW H-5	450	137.16	Broxton et al. (1986)	Volcanic glass	Electron microprobe	73.7	0.05	11.5	0.83	not meas.	not meas.	0.01	0.2	0.2	4.34	4.64	not meas.	not meas.	95.6	
123	USWH-5(GLASS)59*1610FT	USW H-5	1610	490.728	Broxton et al. (1986)	Volcanic glass	Electron microprobe	74.3	0.03	12	0.73	not meas.	not meas.	0.02	0.45	0.06	3.42	5.06	not meas.	not meas.	96.1	
124	USWH-5(GLASS)60*1762FT	USW H-5	1762	537.0576	Broxton et al. (1986)	Volcanic glass	Electron microprobe	73.7	0.05	11.8	0.76	not meas.	not meas.	0	0.49	0	3.32	4.96	not meas.	not meas.	95.1	
125	USWH-5(GLASS)61*1762FT	USW H-5	1762	537.0576	Broxton et al. (1986)	Volcanic glass	Electron microprobe	73.7	0.05	11.7	0.64	not meas.	not meas.	0	0.48	0.14	3.52	4.96	not meas.	not meas.	95.2	
126	USWH-5(GLASS)62*1762FT	USW H-5	1762	537.0576	Broxton et al. (1986)	Volcanic glass	Electron microprobe	72.8	0.07	12	0.66	not meas.	not meas.	0	0.48	0	3.47	4.75	not meas.	not meas.	94.2	
127	USWH-5(GLASS)63*1762FT	USW H-5	1762	537.0576	Broxton et al. (1986)	Volcanic glass	Electron microprobe	73	0.02	12	0.71	not meas.	not meas.	0	0.45	0	3.41	4.9	not meas.	not meas.	94.5	
128	USWH-5(GLASS)64*1800FT	USW H-5	1800	548.64	Broxton et al. (1986)	Volcanic glass	Electron microprobe	74.4	0.02	11.8	0.69	not meas.	not meas.	0	0.53	0.23	3.3	5.13	not meas.	not meas.	96.1	
129	USWH-5(GLASS)65*1800FT	USW H-5	1800	548.64	Broxton et al. (1986)	Volcanic glass	Electron microprobe	74.6	0	11.7	0.47	not meas.	not meas.	0	0.52	0	3.48	5.18	not meas.	not meas.	96.0	
130	USWH-5(GLASS)66*1966FT	USW H-5	1966	599.2368	Broxton et al. (1986)	Volcanic glass	Electron microprobe	72.7	0.03	11.7	0.79	not meas.	not meas.	0	0.46	0	3.04	5.02	not meas.	not meas.	93.7	
131	USWH-5(GLASS)67*1966FT	USW H-5	1966	599.2368	Broxton et al. (1986)	Volcanic glass	Electron microprobe	72.5	0.04	11.7	0.8	not meas.	not meas.	0	0.39	0	2.92	5.15	not meas.	not meas.	93.5	
132	USWH-5(GLASS)68*1966FT	USW H-5	1966	599.2368	Broxton et al. (1986)	Volcanic glass	Electron microprobe	72.3	0.06	11.8	0.84	not meas.	not meas.	0	0.38	0	2.99	5	not meas.	not meas.	93.4	
133	UE-25a#1(GLASS)69*226FT	UE-25a#1	226	68.8848	Broxton et al. (1986)	Volcanic glass	Electron microprobe	73.7	0.16	12.6	0.77	not meas.	not meas.	0.06	0.42	0	4.05	5.24	not meas.	not meas.	97.0	
134	UE-25a#1(GLASS)70*226FT	UE-25a#1	226	68.8848	Broxton et al. (1986)	Volcanic glass	Electron microprobe	73.9	0.21	12.6	0.75	not meas.	not meas.	0.02	0.47	0	4.04	5.43	not meas.	not meas.	97.4	
135	UE-25a#1(GLASS)71*251FT	UE-25a#1	251	76.5048	Broxton et al. (1986)	Volcanic glass	Electron microprobe	72.5	0.14	11.3	0.71	not meas.	not meas.	0	0.47	0	2.79	5.58	not meas.	not meas.	93.5	
136	UE-25a#1(GLASS)72*251FT	UE-25a#1	251	76.5048	Broxton et al. (1986)	Volcanic glass	Electron microprobe	72.5	0.07	11.5	0.81	not meas.	not meas.	0	0.43	0	3.24	5.06	not meas.	not meas.	93.6	
137	UE-25a#1(GLASS)73*251FT	UE-25a#1	251	76.5048	Broxton et al. (1986)	Volcanic glass	Electron microprobe	73.1	0.1	11.4	0.67	not meas.	not meas.	0.02	0.39	0	3.19	5.42	not meas.	not meas.	94.3	
138	UE-25a#1(GLASS)74*251FT	UE-25a#1	251	76.5048	Broxton et al. (1986)	Volcanic glass	Electron microprobe	68.4	0	14.3	1.76	not meas.	not meas.	0.18	0.75	0.06	3.89	5.72	not meas.	not meas.	95.1	
139	UE-25a#1(GLASS)75*251FT	UE-25a#1	251	76.5048	Broxton et al. (1986)	Volcanic glass	Electron microprobe	73	0.08	11.3	0.69	not meas.	not meas.	0	0.38	0	3.33	5.05	not meas.	not meas.	93.8	
140	UE-25a#1(GLASS)76*277FT	UE-25a#1	277	84.4296	Broxton et al. (1986)	Volcanic glass	Electron microprobe	70.5	0	13.4	0.92	not meas.	not meas.	0.05	0.43	0.07	3.48	5.92	not meas.	not meas.	94.8	
141	UE-25a#1(GLASS)77*277FT	UE-25a#1	277	84.4296	Broxton et al. (1986)	Volcanic glass	Electron microprobe	67.1	0	15.1	0.89	not meas.	not meas.	0.14	0.78	0.01	3.95	5.9	not meas.	not meas.	93.9	
142	UE-25a#1(GLASS)78*277FT	UE-25a#1	277	84.4296	Broxton et al. (1986)	Volcanic glass	Electron microprobe	67.3	0	15	0.86	not meas.	not meas.	0.14	0.75	0.06	3.67	6.64	not meas.	not meas.	94.4	
143	UE-25a#1(GLASS)79*277FT	UE-25a#1	277	84.4296	Broxton et al. (1986)	Volcanic glass	Electron microprobe	73.4	0	11.6	0.37	not meas.	not meas.	0	0.13	0	2.82	6.42	not meas.	not meas.	94.7	
144	UE-25a#1(GLASS)80*277FT	UE-25a#1	277	84.4296	Broxton et al. (1986)	Volcanic glass	Electron microprobe	72.7	0.01	11.6	0.46	not meas.	not meas.	0	0.15	0	2.64	6.59	not meas.	not meas.	94.2	
145	UE-25a#1(GLASS)81*277FT	UE-25a#1	277	84.4296	Broxton et al. (1986)	Volcanic glass	Electron microprobe	72.8	0.07	11.5	0.47	not meas.	not meas.	0	0.15	0	3.5	5.81	not meas.	not meas.	94.3	
146	UE-25a#1(GLASS)82*277FT	UE-25a#1	277	84.4296	Broxton et al. (1986)	Volcanic glass	Electron microprobe	72.6	0.07	11.5	0.36	not meas.	not meas.	0	0.14	0	3.02	6.39	not meas.	not meas.	94.1	
147	UE-25a#1(GLASS)83*277FT	UE-25a#1	277	84.4296	Broxton et al. (1986)	Volcanic glass	Electron microprobe	71.7	0.08	11.6	0.75	not meas.	not meas.	0	0.15	0	2.64	6.17	not meas.	not meas.	93.3	
148	UE-25a#1(GLASS)84*277FT	UE-25a#1	277	84.4296	Broxton et al. (1986)	Volcanic glass	Electron microprobe	68.7	0.19	13.5	0.73	not meas.	not meas.	0	0.39	0	3.88	5.98	not meas.	not meas.	93.4	
149	UE-25a#1(GLASS)85*277FT	UE-25a#1	277	84.4296	Broxton et al. (1986)	Volcanic glass	Electron microprobe	68.7	0.2	13.4	0.73	not meas.	not meas.	0	0.37	0	3.48	6.6	not meas.	not meas.	93.5	
150	UE-25a#1(GLASS)86*277FT	UE-25a#1	277	84.4296	Broxton et al. (1986)	Volcanic glass	Electron microprobe	68.2	0.21	13.5	0.56	not meas.	not meas.	0	0.35	0	4.15	6.24	not meas.	not meas.	93.2	
151	UE-25a#1(GLASS)87*1279FT	UE-25a#1	1279	389.8392	Broxton et al. (1986)	Volcanic glass	Electron microprobe	74.4	0	11.4	0.47	not meas.	not meas.	0	0.38	0	3.69	4.67	not meas.	not meas.	94.9	
152	UE-25a#1(GLASS)88*2113FT	UE-25a#1	2113	644.0424	Broxton et al. (1986)	Volcanic glass	Electron microprobe	75.1	0	11.4	0.29	not meas.	not meas.	0	0.87	0	3.11	4.59	not meas.	not meas.	95.4	
153	J-13(GLASS)89*1421FT	J-13	1421	433.1208	Broxton et al. (1986)	Volcanic glass	Electron microprobe	75.9	0.06	12.4	0.31	not meas.	not meas.	0	0.28	0	3.36	5.78	not meas.	not meas.	98.1	
154	J-13(GLASS)90*1421FT	J-13	1421	433.1208	Broxton et al. (1986)	Volcanic glass	Electron microprobe	77.5	0.11	12.2	0.81	not meas.	not meas.	0.04	0.29	0.17	3.27	6	not meas.	not meas.	100.4	
155	J-13(GLASS)91*1421FT	J-13	1421	433.1208	Broxton et al. (1986)	Volcanic glass	Electron microprobe	76.8	0.09	12.1	0.76	not meas.	not meas.	0.03	0.27	0.07	3.28	5.97	not meas.	not meas.	99.3	
156	J-13(GLASS)92*1421FT	J-13	1421	433.1208	Broxton et al. (1986)	Volcanic glass	Electron microprobe	76.6	0.11	12.5	0.82	not meas.	not meas.	0.06	0.31	0.07	3.48	5.76	not meas.	not meas.	99.7	
157	J-13(GLASS)93*1427FT	J-13	1427	434.9496	Broxton et al. (1986)	Volcanic glass	Electron microprobe	74.2	0	11.8	0.75	not meas.	not meas.	0	0.23	0.07	3.88	4.87	not meas.	not meas.	95.8	
158	J-13(GLASS)94*1427FT	J-13	1427	434.9496	Broxton et al. (1986)	Volcanic glass	Electron microprobe	75.3	0	11.9	0.81	not meas.	not meas.	0	0.24	0	3.98	4.91	not meas.	not meas.	97.1	
159	J-13(GLASS)95*1427FT	J-13	1427	434.9496	Broxton et al. (1986)	Volcanic glass	Electron microprobe	75.3	0	12.1	0.21	not meas.	not meas.	0	0.15	0.12	3.94	4.97	not meas.	not meas.	96.8	
160	J-13(GLASS)96*1427FT	J-13	1427	434.9496	Broxton et al. (1986)	Volcanic glass	Electron microprobe	73.8	0	12.1	0.43	not meas.	not meas.	0	0.15	0.21	3.95	4.92	not meas.	not meas.	95.6	
161	J-13(GLASS)97*1507FT	J-13	1507	459.3336	Broxton et al. (1986)	Volcanic glass	Electron microprobe	74.2	0	12	0.73	not meas.	not meas.	0	0.4	0	3.33	5.78	not meas.	not meas.	96.4	
162	J-13(GLASS)98*1507FT	J-13	1507	459.3336	Broxton et al. (1986)	Volcanic glass	Electron microprobe	74.4	0	12.1	0.73	not meas.	not meas.	0	0.42	0.02	3.37	5.73	not meas.	not meas.	96.8	
163	J-13(GLASS)99*1507FT	J-13	1507	459.3336	Broxton et al. (1986)	Volcanic glass	Electron microprobe	74.9	0	12	0.83	not meas.	not meas.	0	0.35	0	3.36	5.86	not meas.	not meas.	97.3	
164	J-13(GLASS)100*1575FT	J-13	1575	480.06	Broxton et al. (1986)	Volcanic glass	Electron microprobe	74.3	0.06	11.9	0.58	not meas.	not meas.	0.04	0.46	0.09	3.21	4.98	not meas.	not meas.	95.6	
165	J-13(GLASS)101*1575FT	J-13	1575	480.06	Broxton et al. (1986)	Volcanic glass	Electron microprobe	72.3	0.06	11.6	0.74	not meas.	not meas.	0.05	0.45	0	3.25	5.01	not meas.	not meas.	93.5	
166	3-15-82-11(GLASS)102	outcrop	0	0	Broxton et al. (1986)	Partially welded tuff (v. glass?)	Electron microprobe	72.4	0.02	11.6	0.54	not meas.	not meas.	0	0.4	0	3.52	4.73	not meas.	not meas.	93.2	Outcrop at Prow Pass, N. Yucca Mt.; Nev. State Coordin. 786550N, 551400E. Partially welded tuff near base of Topopah Spring, Paintbrush tuff
167	3-15-82-11(GLASS)103	outcrop	0	0	Broxton et al. (1986)	Partially welded tuff (v. glass?)	Electron microprobe	72.7	0.05	11.6	0.46	not meas.	not meas.	0	0.41	0	3.53	4.77	not meas.	not meas.	93.5	Outcrop at Prow Pass, N. Yucca Mt.; Nev. State Coordin. 786550N, 551400E. Partially welded tuff near base of Topopah Spring, Paintbrush tuff
168	3-15-82-11(GLASS)104	outcrop	0	0	Broxton et al. (1986)	Partially welded tuff (v. glass?)	Electron microprobe	74.6	0.06	11.5	0.35	not meas.	not meas.	0	0.43	0	3.46	4.44	not meas.	not meas.	94.8	Outcrop at Prow Pass, N. Yucca Mt.; Nev. State Coordin. 786550N, 551400E. Partially welded tuff near base of Topopah Spring, Paintbrush tuff
169	3-15-82-11(GLASS)105	outcrop	0	0	Broxton et al. (1986)	Partially welded tuff (v. glass?)	Electron microprobe	73.8	0.03	11.8	0.44	not meas.	not meas.	0	0.45	0	3.58	4.58	not meas.	not meas.	94.7	Outcrop at Prow Pass, N. Yucca Mt.; Nev. State Coordin. 786550N, 551400E. Partially welded tuff near base of Topopah Spring, Paintbrush tuff
170	3-15-82-11(GLASS)106	outcrop	0	0	Broxton et al. (1986)	Partially welded tuff (v. glass?)	Electron microprobe	72.6	0.03	11.5	0.47	not meas.	not meas.	0	0.4	0	3.33	4.7	not meas.	not meas.	93.0	Outcrop at Prow Pass, N. Yucca Mt.; Nev. State Coordin. 786550N, 551400E. Partially welded tuff near base of Topopah Spring, Paintbrush tuff
171	3-15-82-11(GLASS)107	outcrop	0	0	Broxton et al. (1986)	Partially welded tuff (v. glass?)	Electron microprobe	72.7	0	11.8	0.66	not meas.	not meas.	0	0.45	0	3.54	4.79	not meas.	not meas.	93.7	Outcrop at Prow Pass, N. Yucca Mt.; Nev. State Coordin. 786550N, 551400E. Partially welded tuff near base of Topopah Spring, Paintbrush tuff
172	3-15-82-11(GLASS)108	outcrop	0	0	Broxton et al. (1986)	Partially welded tuff (v. glass?)	Electron microprobe	72.7	0	11.7	0.52	not meas.	not meas.	0.01	0.42	0	3.69	4.75	not meas.	not meas.	93.8	Outcrop at Prow Pass, N. Yucca Mt.; Nev. State Coordin. 786550N, 551400E. Partially welded tuff near base of Topopah Spring, Paintbrush tuff
173	3-15-82-11(GLASS)109	outcrop	0	0	Broxton et al. (1986)	Partially welded tuff (v. glass?)	Electron microprobe	72.3	0.03	11.7	0.61	not meas.	not meas.	0	0.41	0	3.52	4.82	not meas.	not meas.	93.4	Outcrop at Prow Pass, N. Yucca Mt.; Nev. State Coordin. 786550N, 551400E. Partially welded tuff near base of Topopah Spring, Paintbrush tuff
174	3-15-82-11(GLASS)110	outcrop	0	0	Broxton et al. (1986)	Partially welded tuff (v. glass?)	Electron microprobe	70.9	0.04	11.8	0.69	not meas.	not meas.	0	0.43	0	3.38	4.74	not meas.	not meas.	92.0	Outcrop at Prow Pass, N. Yucca Mt.; Nev. State Coordin. 786550N, 551400E. Partially welded tuff near base of Topopah Spring, Paintbrush tuff
175	3-15-82-11(GLASS)111	outcrop	0	0	Broxton et al. (1986)	Partially welded tuff (v. glass?)	Electron microprobe	72.3	0.04	11.9	0.35	not meas.	not meas.	0	0.39	0	3.48	4.72	not meas.	not meas.	93.2	Outcrop at Prow Pass, N. Yucca Mt.; Nev. State Coordin. 786550N, 551400E. Partially welded tuff near base of Topopah Spring, Paintbrush tuff
176	3-15-82-11(GLASS)112	outcrop	0	0	Broxton et al. (1986)	Partially welded tuff (v. glass?)	Electron microprobe	71.6	0	11.6	0.63	not meas.	not meas.	0	0.48	0	3.31	4.72	not meas.	not meas.	92.3	Outcrop at Prow Pass, N. Yucca Mt.; Nev. State Coordin. 786550N, 551400E. Partially welded tuff near base of Topopah Spring, Paintbrush tuff
177	USWG-1(CLINOP)1*1286FT	USW G-1	1286	391.9728	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	63.5	0	12.6	0	not meas.	not meas.	0.28	5.09	0	0.87	0.57	not meas.	not meas.	82.9	
178	USWG-1(CLINOP)2*1436FT	USW G-1	1436	437.6928	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	69.9	0	12.4	0	not meas.	not meas.	0	0.88	0	2.29	5.89	not meas.	not meas.	90.4	
179	USWG-1(CLINOP)3*1561FT	USW G-1	1561	475.7928	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.7	0	11.6	0.02	not meas.	not meas.	0	0.62	0	2.6	4.87	not meas.	not meas.	85.4	
180	USWG-1(CLINOP)4*1561FT	USW G-1	1561	475.7928	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	69.5	0	11.9	0.18	not meas.	not meas.	0	0.56	0	2.3	5.64	not meas.	not meas.	90.0	
181	USWG-1(CLINOP)5*1561FT	USW G-1	1561	475.7928	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	63.4	0	10.9	0	not meas.	not meas.	0	0.57	0	2.29	4.99	not meas.	not meas.	82.2	
182	USWG-1(CLINOP)6*1639FT	USW G-1	1639	499.5672	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.5	0	11.5	0	not meas.	not meas.	0.02	0.73	0.09	2.59	4.56	not meas.	not meas.	86.0	
183	USWG-1(CLINOP)7*1774FT	USW G-1	1774	540.7152	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68.1	0	12.2	0	not meas.	not meas.	0.09	1.11	0.03	2.84	4.2	not meas.	not meas.	88.6	
184	USWG-1(CLINOP)8*1774FT	USW G-1	1774	540.7152	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	63.8	0	11.9	0	not meas.	not meas.	0.12	1.43	0.12	3.18	2.25	not meas.	not meas.	82.8	
185	USWG-2(CLINOP)9*561FT	USW G-2	561	170.9928	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68.5	0	12.4	0	not meas.	not meas.	1.05	3.97	0	0.22	1.31	not meas.	not meas.	87.6	
186	USWG-2(CLINOP)10*561FT	USW G-2	561	170.9928	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.5	0	13	0	not meas.	not meas.	1.17	4.29	0	0.21	0.96	not meas.	not meas.	87.2	
187	USWG-2(CLINOP)11*561FT	USW G-2	561	170.9928	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.7	0	12.8	0	not meas.	not meas.	0.98	4.18	0	0.28	1.37	not meas.	not meas.	87.3	
188	USWG-2(CLINOP)12*561FT	USW G-2	561	170.9928	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.6	0	12.9	0	not meas.	not meas.	0.93	4.41	0	0.26	1.06	not meas.	not meas.	85.2	
189	USWG-2(CLINOP)13*561FT	USW G-2	561	170.9928	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.6	0	12.4	0	not meas.	not meas.	1.03	3.86	0	0.23	1.18	not meas.	not meas.	86.3	
190	USWG-2(CLINOP)14*561FT	USW G-2	561	170.9928	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.8	0	12.6	0	not meas.	not meas.	0.99	4.23	0	0.19	1.27	not meas.	not meas.	86.1	
191	USWG-2(CLINOP)15*584FT	USW G-2	584	178.0032	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	62.6	0.03	13.3	0	not meas.	not meas.	1.41	4.41	0.12	0.02	0.63	not meas.	not meas.	82.5	
192	USWG-2(CLINOP)16*584FT	USW G-2	584	178.0032	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.6	0	13.8	0	not meas.	not meas.	1.47	4.23	0.02	0.18	1.09	not meas.	not meas.	86.4	
193	USWG-2(CLINOP)17*584FT	USW G-2	584	178.0032	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67	0	13.6	0	not meas.	not meas.	1.35	4.16	0	0.03	0.75	not meas.	not meas.	86.9	
194	USWG-2(CLINOP)18*584FT	USW G-2	584	178.0032	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	62.1	0	13.6	0	not meas.	not meas.	1.53	4.03	0	0.13	0.97	not meas.	not meas.	82.4	
195	USWG-2(CLINOP)19*584FT	USW G-2	584	178.0032	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	61.1	0	13.5	0	not meas.	not meas.	1.55	3.98	0.07	0.14	0.96	not meas.	not meas.	81.3	
196	USWG-2(CLINOP)20*584FT	USW G-2	584	178.0032	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	61.6	0	14	0	not meas.	not meas.	1.75	4.09	0	0.12	0.59	not meas.	not meas.	82.2	
197	USWG-2(CLINOP)21*584FT	USW G-2	584	178.0032	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	62.9	0	14	0	not meas.	not meas.	1.86	4.06	0.09	0.1	0.54	not meas.	not meas.	83.6	
198	USWG-2(CLINOP)22*657FT	USW G-2	657	200.2536	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.5	0	13.3	0.03	not meas.	not meas.	0.96	4.11	0.51	0.11	1.28	not meas.	not meas.	87.8	
199	USWG-2(CLINOP)23*657FT	USW G-2	657	200.2536	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.2	0	13.4	0.33	not meas.	not meas.	0.95	4.07	0.42	0.25	1.62	not meas.	not meas.	88.2	
200	USWG-2(CLINOP)24*657FT	USW G-2	657	200.2536	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.4	0.06	13.3	0.26	not meas.	not meas.	0.97	3.95	0.22	0.14	1.68	not meas.	not meas.	86.0	
201	USWG-2(CLINOP)25*657FT	USW G-2	657	200.2536	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.2	0	13.1	0.03	not meas.	not meas.	0.9	3.9	0.4	0.36	1.86	not meas.	not meas.	87.8	
202	USWG-2(CLINOP)26*762FT	USW G-2	762	232.2576	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68.4	0.06	11.7	0.24	not meas.	not meas.	0.75	2.94	0	0.23	2.39	not meas.	not meas.	86.7	
203	USWG-2(CLINOP)27*1691FT	USW G-2	1691	515.4168	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.9	0	12.4	0.02	not meas.	not meas.	0.04	2.97	0	0.96	3.79	not meas.	not meas.	88.1	
204	USWG-2(CLINOP)28*1691FT	USW G-2	1691	515.4168	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.3	0	12.3	0.01	not meas.	not meas.	0	3.14	0.07	0.84	3.55	not meas.	not meas.	86.2	
205	USWG-2(CLINOP)29*1745FT	USW G-2	1745	531.876	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.6	0	12.6	0.04	not meas.	not meas.	0	3.57	0.16	1.02	2.78	not meas.	not meas.	84.8	
206	USWG-2(CLINOP)30*1745FT	USW G-2	1745	531.876	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.9	0	12.6	0.01	not meas.	not meas.	0	3.41	0.16	1.32	3.26	not meas.	not meas.	85.7	
207	USWG-2(CLINOP)31*1745FT	USW G-2	1745	531.876	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.7	0	12	0	not meas.	not meas.	0	3.52	0.14	0.96	3.77	not meas.	not meas.	87.1	
208	USWG-2(CLINOP)32*1745FT	USW G-2	1745	531.876	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65	0.04	12.6	0.1	not meas.	not meas.	0	3.2	0.03	1.32	3.46	not meas.	not meas.	85.7	
209	USWG-2(CLINOP)33*1745FT	USW G-2	1745	531.876	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.5	0	12.4	0	not meas.	not meas.	0	3.48	0	1.23	3.01	not meas.	not meas.	85.6	
210	USWG-2(CLINOP)34*1745FT	USW G-2	1745	531.876	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.6	0	12.5	0.01	not meas.	not meas.	0	3.49	0	1.13	3.2	not meas.	not meas.	84.9	
211	USWG-2(CLINOP)35*2078FT	USW G-2	2078	633.3744	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	70	0	11.4	0	not meas.	not meas.	0.45	2.88	0	0.66	2.62	not meas.	not meas.	88.0	
212	USWG-2(CLINOP)36*2078FT	USW G-2	2078	633.3744	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.1	0	11.8	0	not meas.	not meas.	0.46	2.81	0	0.65	2.72	not meas.	not meas.	84.5	
213	USWG-2(CLINOP)37*2158FT	USW G-2	2158	657.7584	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.6	0.01	12.7	0	not meas.	not meas.	0.56	3.13	0	0.97	2.91	not meas.	not meas.	86.9	
214	USWG-2(CLINOP)38*2158FT	USW G-2	2158	657.7584	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.6	0	12.2	0	not meas.	not meas.	0.48	3.43	0	0.79	2.61	not meas.	not meas.	87.0	
215	USWG-2(CLINOP)39*2158FT	USW G-2	2158	657.7584	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68.3	0	12.7	0	not meas.	not meas.	0.52	3.36	0	0.94	2.84	not meas.	not meas.	88.7	
216	USWG-2(CLINOP)40*2158FT	USW G-2	2158	657.7584	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68	0	12.9	0	not meas.	not meas.	0.54	3.5	0	0.58	2.45	not meas.	not meas.	88.0	
217	USWG-2(CLINOP)41*2158FT	USW G-2	2158	657.7584	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68.6	0	11.4	0	not meas.	not meas.	0.41	3.23	0	0.42	2.23	not meas.	not meas.	86.3	
218	USWG-2(CLINOP)42*2158FT	USW G-2	2158	657.7584	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.6	0	11.6	0	not meas.	not meas.	0.61	3.23	0	0.77	2.64	not meas.	not meas.	85.4	
219	USWG-2(CLINOP)43*2325FT	USW G-2	2325	708.66	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	69.4	0	12	0.03	not meas.	not meas.	0.3	3.45	0	1.07	2.36	not meas.	not meas.	88.6	
220	USWG-2(CLINOP)44*2325FT	USW G-2	2325	708.66	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	70.1	0	12.7	0.03	not meas.	not meas.	0.28	3.53	0	0.95	2.45	not meas.	not meas.	90.0	
221	USWG-2(CLINOP)45*2430FT	USW G-2	2430	740.664	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	70.2	0	11.6	0.01	not meas.	not meas.	0.36	2.77	0.15	0.64	2.81	not meas.	not meas.	88.5	
222	USWG-2(CLINOP)46*2430FT	USW G-2	2430	740.664	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	71.3	0	12	0	not meas.	not meas.	0.31	3.06	0	0.72	2.71	not meas.	not meas.	90.1	
223	USWG-2(CLINOP)47*3067FT	USW G-2	3067	934.8216	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	74.1	0.1	11.4	0.52	not meas.	not meas.	0	0.34	0.11	4.6	3.04	not meas.	not meas.	94.2	
224	USWG-2(CLINOP)48*3067FT	USW G-2	3067	934.8216	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	74.7	0.1	11.7	0.73	not meas.	not meas.	0.03	0.32	0.16	4.66	3.06	not meas.	not meas.	95.5	
225	USWG-2(CLINOP)49*3067FT	USW G-2	3067	934.8216	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	74.5	0.07	11.6	0.8	not meas.	not meas.	0	0.29	0.08	4.49	2.86	not meas.	not meas.	94.7	
226	USWG-2(CLINOP)50*3067FT	USW G-2	3067	934.8216	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	73.4	0.1	11.6	0.18	not meas.	not meas.	0	0.29	0.11	4.74	3.17	not meas.	not meas.	93.6	
227	USWG-2(CLINOP)51*3067FT	USW G-2	3067	934.8216	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	74.3	0.09	11.7	0.71	not meas.	not meas.	0	0.34	0.18	4.77	2.87	not meas.	not meas.	95.0	
228	USWG-2(CLINOP)52*3067FT	USW G-2	3067	934.8216	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	69.7	0	10.5	0	not meas.	not meas.	0	2.7	0.18	2.48	0.51	not meas.	not meas.	86.1	
229	USWG-2(CLINOP)53*3192FT	USW G-2	3192	972.9216	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	63.2	0	12.2	0.06	not meas.	not meas.	0	2.05	0	3.2	1.85	not meas.	not meas.	82.6	
230	USWG-2(CLINOP)54*3192FT	USW G-2	3192	972.9216	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.2	0.03	12.5	0.18	not meas.	not meas.	0.02	2.25	0	3.26	2.15	not meas.	not meas.	84.6	
231	USWG-2(CLINOP)55*3192FT	USW G-2	3192	972.9216	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	63.7	0.03	12.2	0.11	not meas.	not meas.	0	2.05	0	3.61	1.61	not meas.	not meas.	83.3	
232	USWG-2(CLINOP)56*3192FT	USW G-2	3192	972.9216	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65	0	12.5	0.11	not meas.	not meas.	0.02	1.91	0	3.61	1.77	not meas.	not meas.	84.9	
233	USWG-2(CLINOP)57*3192FT	USW G-2	3192	972.9216	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	63	0.05	12.8	0.54	not meas.	not meas.	0.05	2.16	0.17	3.33	1.73	not meas.	not meas.	83.8	
234	USWG-2(CLINOP)58*3192FT	USW G-2	3192	972.9216	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66	0.04	12.6	0.17	not meas.	not meas.	0	2.09	0	3.26	2	not meas.	not meas.	86.2	
235	USWG-2(CLINOP)59*3192FT	USW G-2	3192	972.9216	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.2	0	12.8	0.17	not meas.	not meas.	0.05	2.43	0.05	3.06	1.89	not meas.	not meas.	86.8	
236	USWG-2(CLINOP)60*3192FT	USW G-2	3192	972.9216	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.4	0	12.2	0.29	not meas.	not meas.	0	1.72	0	3.32	2.32	not meas.	not meas.	85.3	
237	USWG-2(CLINOP)61*3250FT	USW G-2	3250	990.6	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.9	0	11.6	0.08	not meas.	not meas.	0	2.33	0.02	3.73	0.04	not meas.	not meas.	84.7	
238	USWG-2(CLINOP)62*3250FT	USW G-2	3250	990.6	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68.2	0	12	0.13	not meas.	not meas.	0.02	2.37	0.04	4.2	0.13	not meas.	not meas.	87.1	
239	USWG-3(CLINOP)63*1195FT	USW G-3	1195	364.236	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.7	0.03	13.2	0.3	not meas.	not meas.	0.91	4.28	0.04	0.7	0.36	not meas.	not meas.	84.8	
240	USWG-3(CLINOP)64*1195FT	USW G-3	1195	364.236	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67	0.04	12.3	0.25	not meas.	not meas.	0.72	4	0.13	0.77	0.78	not meas.	not meas.	86.0	
241	USWG-3(CLINOP)65*1195FT	USW G-3	1195	364.236	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	62.6	0.02	12.4	0	not meas.	not meas.	0.65	4.03	0	0.54	0.48	not meas.	not meas.	80.9	

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	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
1	SAMPLE	DRILL HOLE NO.	DEPTH (FT)	DEPTH (M)	SOURCE	Rock/Mineral Type	Analytical Method	SIO2	TIO2	AL2O3	FE2O3	FEO	MNO	MGO	CAO	BAO	NA2O	K2O	P2O5	H2O	Total Oxides	NOTES
242	USWG-3(CLINOP)66*1195FT	USW G-3	1195	364.236	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.9	0	12.1	0	not meas.	not meas.	0.79	3.96	0.01	0.59	0.64	not meas.	not meas.	83.0	
243	USWG-3(CLINOP)67*1195FT	USW G-3	1195	364.236	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	63.1	0.05	11.9	0.83	not meas.	not meas.	0.93	3.86	0.19	0.48	0.94	not meas.	not meas.	82.2	
244	USWG-3(CLINOP)68*1195FT	USW G-3	1195	364.236	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	70	0	12.4	0	not meas.	not meas.	0.56	3.94	0	0.7	1.19	not meas.	not meas.	88.8	
245	USWG-3(CLINOP)69*1874FT	USW G-3	1874	571.1952	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	69.5	0	12.1	0.04	not meas.	not meas.	0	1.62	0	1.45	4.91	not meas.	not meas.	89.6	
246	USWG-3(CLINOP)70*1874FT	USW G-3	1874	571.1952	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.5	0	11.2	0.02	not meas.	not meas.	0	1.69	0	1.76	3.95	not meas.	not meas.	85.1	
247	USWG-3(CLINOP)71*1874FT	USW G-3	1874	571.1952	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.7	0	12	0.05	not meas.	not meas.	0	1.66	0	1.58	4.61	not meas.	not meas.	87.6	
248	USWG-3(CLINOP)72*1874FT	USW G-3	1874	571.1952	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.3	0.01	12	0.05	not meas.	not meas.	0	1.57	0	1.84	5.04	not meas.	not meas.	87.8	
249	USWG-3(CLINOP)73*1874FT	USW G-3	1874	571.1952	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.6	0.04	12	0.09	not meas.	not meas.	0	1.64	0	1.64	5.44	not meas.	not meas.	88.7	
250	USWG-3(CLINOP)74*1874FT	USW G-3	1874	571.1952	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.9	0	11.5	0	not meas.	not meas.	0	1.59	0	1.53	4.61	not meas.	not meas.	85.1	
251	USWG-3(CLINOP)75*1874FT	USW G-3	1874	571.1952	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	69.2	0	11.9	0	not meas.	not meas.	0	1.66	0	1.68	4.3	not meas.	not meas.	87.7	
252	USWG-3(CLINOP)76*1874FT	USW G-3	1874	571.1952	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68.2	0	11.9	0	not meas.	not meas.	0	1.96	0	1.69	5.2	not meas.	not meas.	88.9	
253	USWG-3(CLINOP)77*1874FT	USW G-3	1874	571.1952	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	69	0.03	11.8	0.03	not meas.	not meas.	0	1.59	0	1.62	5.05	not meas.	not meas.	89.0	
254	USWG-3(CLINOP)78*1986FT	USW G-3	1986	605.3328	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.2	0	11.4	0	not meas.	not meas.	0	0.59	0	1.65	6.51	not meas.	not meas.	84.4	
255	USWG-3(CLINOP)79*1986FT	USW G-3	1986	605.3328	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.6	0	11.6	0.01	not meas.	not meas.	0	0.64	0	2.1	6.12	not meas.	not meas.	87.1	
256	USWG-3(CLINOP)80*1986FT	USW G-3	1986	605.3328	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.9	0	11.9	0.08	not meas.	not meas.	0	0.6	0	1.95	6.49	not meas.	not meas.	87.9	
257	USWG-3(CLINOP)81*1986FT	USW G-3	1986	605.3328	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.7	0.01	11.9	0	not meas.	not meas.	0	0.68	0	2.18	5.68	not meas.	not meas.	87.2	
258	USWG-3(CLINOP)82*1986FT	USW G-3	1986	605.3328	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68	0	11.7	0	not meas.	not meas.	0	0.59	0	2.13	5.74	not meas.	not meas.	88.2	
259	USWG-3(CLINOP)83*1986FT	USW G-3	1986	605.3328	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.5	0.01	11.8	0.06	not meas.	not meas.	0	0.63	0	2.54	5.45	not meas.	not meas.	88.1	
260	USWG-3(CLINOP)84*1986FT	USW G-3	1986	605.3328	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	69.1	0	12.3	0	not meas.	not meas.	0	0.61	0	2.6	5.51	not meas.	not meas.	90.1	
261	USWG-3(CLINOP)85*1986FT	USW G-3	1986	605.3328	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.1	0	12	0.14	not meas.	not meas.	0	0.59	0	2.41	6.06	not meas.	not meas.	86.3	
262	USWG-3(CLINOP)86*1986FT	USW G-3	1986	605.3328	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.6	0	11.7	0.06	not meas.	not meas.	0	0.66	0	2.11	5.91	not meas.	not meas.	86.0	
263	USWG-3(CLINOP)87*1986FT	USW G-3	1986	605.3328	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.8	0	11.2	0.2	not meas.	not meas.	0	0.66	0	2.05	5.56	not meas.	not meas.	85.5	
264	USWG-3(CLINOP)88*1993FT	USW G-3	1993	607.4664	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.9	0	12.1	0	not meas.	not meas.	0	0.64	0	2.4	5.86	not meas.	not meas.	88.8	
265	USWG-3(CLINOP)89*2577FT	USW G-3	2577	785.4696	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.3	0	12.1	0	not meas.	not meas.	0.18	3.02	0.11	1.83	1.74	not meas.	not meas.	86.3	
266	USWG-3(CLINOP)90*2577FT	USW G-3	2577	785.4696	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67	0.02	12.7	0	not meas.	not meas.	0.27	3.09	0	1.66	1.87	not meas.	not meas.	86.6	
267	USWG-3(CLINOP)91*2577FT	USW G-3	2577	785.4696	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68.1	0.03	12.6	0	not meas.	not meas.	0.27	3.28	0	1.71	1.74	not meas.	not meas.	87.7	
268	USWG-3(CLINOP)92*2577FT	USW G-3	2577	785.4696	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	70.8	0.01	12.7	0	not meas.	not meas.	0.22	3.29	0.11	1.56	1.84	not meas.	not meas.	90.6	
269	USWG-3(CLINOP)93*2577FT	USW G-3	2577	785.4696	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	69.8	0.02	12.8	0.02	not meas.	not meas.	0.25	3.05	0.59	1.55	1.97	not meas.	not meas.	90.1	
270	USWG-3(CLINOP)94*2577FT	USW G-3	2577	785.4696	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.3	0.03	12.9	0.03	not meas.	not meas.	0.2	3.51	0.05	1.69	1.84	not meas.	not meas.	86.6	
271	USWG-3(CLINOP)95*2577FT	USW G-3	2577	785.4696	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68.3	0	12.9	0	not meas.	not meas.	0.24	3.27	0	1.7	2.1	not meas.	not meas.	88.5	
272	USWG-3(CLINOP)96*2577FT	USW G-3	2577	785.4696	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68.8	0.02	12.7	0	not meas.	not meas.	0.22	3.19	0.08	1.53	2.18	not meas.	not meas.	88.7	
273	USWG-3(CLINOP)97*2615FT	USW G-3	2615	797.052	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	63.9	0	11.7	0	not meas.	not meas.	0	1.57	0	2.88	2.71	not meas.	not meas.	82.8	
274	USWG-3(CLINOP)98*2615FT	USW G-3	2615	797.052	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	62.9	0	11.3	0	not meas.	not meas.	0	1.53	0	2.91	2.97	not meas.	not meas.	81.5	
275	USWG-3(CLINOP)99*2656FT	USW G-3	2656	809.5488	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.7	0.02	11.9	0.01	not meas.	not meas.	0	1.82	0	2.07	3.45	not meas.	not meas.	87.0	
276	USWG-3(CLINOP)100*2656FT	USW G-3	2656	809.5488	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.7	0.02	12.6	0.12	not meas.	not meas.	0	1.86	0	2.48	3.46	not meas.	not meas.	88.2	
277	USWG-3(CLINOP)101*2695FT	USW G-3	2695	821.436	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.8	0.01	12	0.36	not meas.	not meas.	0	1.98	0	2.54	3.19	not meas.	not meas.	85.9	
278	USWG-3(CLINOP)102*3226FT	USW G-3	3226	983.2848	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.7	0	12.1	0.29	not meas.	not meas.	0.04	1.96	0	2.43	2.88	not meas.	not meas.	86.4	
279	USWG-3(CLINOP)103*3226FT	USW G-3	3226	983.2848	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.9	0	12.1	0.68	not meas.	not meas.	0.03	1.91	0	2.78	2.93	not meas.	not meas.	86.2	
280	USWG-3(CLINOP)104*3475FT	USW G-3	3475	1059.18	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.9	0.07	12.3	0.07	not meas.	not meas.	0.3	1.19	0.07	2.89	3.57	not meas.	not meas.	87.4	
281	USWG-3(CLINOP)105*3589FT	USW G-3	3589	1093.9272	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.1	0	11.4	0.51	not meas.	not meas.	0.12	0.79	0.19	2.23	5.56	not meas.	not meas.	85.9	
282	USWG-3(CLINOP)106*3589FT	USW G-3	3589	1093.9272	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67	0	11.4	0.26	not meas.	not meas.	0	0.88	0.13	2.2	4.47	not meas.	not meas.	86.3	
283	USWG-3(CLINOP)107*3589FT	USW G-3	3589	1093.9272	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.7	0	12.2	0	not meas.	not meas.	0	1.19	0.1	2.42	4.38	not meas.	not meas.	85.0	
284	USWG-3(CLINOP)108*3672FT	USW G-3	3672	1119.2256	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.8	0	12.3	0	not meas.	not meas.	0	1.12	0.13	2.8	3.85	not meas.	not meas.	85.0	
285	USWG-3(CLINOP)109*3672FT	USW G-3	3672	1119.2256	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.4	0	11.8	0.22	not meas.	not meas.	0.04	1.07	0	2.98	3.93	not meas.	not meas.	84.4	
286	USWG-3(CLINOP)110*3672FT	USW G-3	3672	1119.2256	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.7	0	12.7	0	not meas.	not meas.	0.02	1.09	0.32	2.81	4.46	not meas.	not meas.	86.1	
287	USWG-3(CLINOP)111*3672FT	USW G-3	3672	1119.2256	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.7	0	12.5	0.04	not meas.	not meas.	0.07	0.96	0.23	2.63	5.61	not meas.	not meas.	87.7	
288	USWG-3(CLINOP)112*3672FT	USW G-3	3672	1119.2256	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.9	0	11.8	0.07	not meas.	not meas.	0	1.12	0.01	2.42	4.36	not meas.	not meas.	86.7	
289	USWG-3(CLINOP)113*3672FT	USW G-3	3672	1119.2256	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.2	0	12.5	0	not meas.	not meas.	0	1.04	0.91	2.27	5.02	not meas.	not meas.	88.9	
290	USWG-3(CLINOP)114*3759FT	USW G-3	3759	1145.7432	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.3	0	12.5	0	not meas.	not meas.	0	1.18	0.39	3.22	3.33	not meas.	not meas.	87.9	
291	USWG-3(CLINOP)115*3759FT	USW G-3	3759	1145.7432	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.3	0	12.2	0.02	not meas.	not meas.	0	1.06	0	2.96	3.99	not meas.	not meas.	85.5	
292	USWG-3(CLINOP)116*3759FT	USW G-3	3759	1145.7432	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.8	0	12.2	0.08	not meas.	not meas.	0	1.09	0	3.69	3.2	not meas.	not meas.	87.1	
293	USWG-3(CLINOP)117*4423FT	USW G-3	4423	1348.1304	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.3	0	12.9	0	not meas.	not meas.	0.4	2.43	0.3	3.19	0.59	not meas.	not meas.	85.1	
294	USWG-3(CLINOP)118*4423FT	USW G-3	4423	1348.1304	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.3	0	12.6	0.12	not meas.	not meas.	0.22	2.35	0.27	3.21	1.15	not meas.	not meas.	85.2	
295	USWG-4(CLINOP)119*1432FT	USW G-4	1432	436.4736	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.1	0	12.2	0	not meas.	not meas.	0.02	1.53	0.18	2.34	5.42	not meas.	not meas.	88.8	
296	USWG-4(CLINOP)120*1432FT	USW G-4	1432	436.4736	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.4	0	12.4	0	not meas.	not meas.	0	1.39	1.03	2.42	4.93	not meas.	not meas.	89.6	
297	USWG-4(CLINOP)121*1470FT	USW G-4	1470	448.056	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68.4	0	11.8	0	not meas.	not meas.	0	0.84	0	2.5	5.43	not meas.	not meas.	89.0	
298	USWG-4(CLINOP)122*1470FT	USW G-4	1470	448.056	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66	0	12.3	0	not meas.	not meas.	0	0.98	0	2.15	5.41	not meas.	not meas.	86.8	
299	USWG-4(CLINOP)123*1470FT	USW G-4	1470	448.056	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.1	0	12.4	0	not meas.	not meas.	0	1.06	0	2.55	5.54	not meas.	not meas.	88.7	
300	USWG-4(CLINOP)124*1470FT	USW G-4	1470	448.056	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.8	0	12	0	not meas.	not meas.	0	0.89	0	2.35	5.68	not meas.	not meas.	88.7	
301	USWG-4(CLINOP)125*1470FT	USW G-4	1470	448.056	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.4	0	11.8	0	not meas.	not meas.	0	0.87	0.08	2.13	5.03	not meas.	not meas.	87.3	
302	USWG-4(CLINOP)126*1470FT	USW G-4	1470	448.056	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.1	0	12.4	0	not meas.	not meas.	0	1.08	0	2.24	4.97	not meas.	not meas.	87.8	
303	USWG-4(CLINOP)127*1544FT	USW G-4	1544	470.6112	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.1	0	12.7	0.05	not meas.	not meas.	0	0.94	0.09	2.88	5.36	not meas.	not meas.	86.1	
304	USWG-4(CLINOP)128*1544FT	USW G-4	1544	470.6112	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66	0	12.8	0.11	not meas.	not meas.	0	1.09	0.08	3.01	5.26	not meas.	not meas.	88.3	
305	USWG-4(CLINOP)129*1544FT	USW G-4	1544	470.6112	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.6	0.01	12.5	0.13	not meas.	not meas.	0.02	0.96	0.11	3.06	5.45	not meas.	not meas.	87.8	
306	USWG-4(CLINOP)130*1544FT	USW G-4	1544	470.6112	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.6	0.02	12	0.09	not meas.	not meas.	0	0.79	0.05	3.1	5.66	not meas.	not meas.	86.2	
307	USWG-4(CLINOP)131*1544FT	USW G-4	1544	470.6112	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68.9	0.02	13	0.12	not meas.	not meas.	0.02	0.81	0.1	3.25	5.62	not meas.	not meas.	91.8	
308	USWG-4(CLINOP)132*1707FT	USW G-4	1707	520.2936	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.3	0	12.8	0	not meas.	not meas.	0.01	0.84	0.02	2.67	5.46	not meas.	not meas.	89.2	
309	USWG-4(CLINOP)133*1707FT	USW G-4	1707	520.2936	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.9	0	13.1	0.03	not meas.	not meas.	0.05	1.09	0.1	2.67	5.72	not meas.	not meas.	88.7	
310	USWG-4(CLINOP)134*1707FT	USW G-4	1707	520.2936	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.2	0	12.3	0	not meas.	not meas.	0.02	0.93	0.05	2.61	6.28	not meas.	not meas.	89.4	
311	USWG-4(CLINOP)135*1707FT	USW G-4	1707	520.2936	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.4	0	12.7	0	not meas.	not meas.	0.05	0.84	0.05	1.91	6.59	not meas.	not meas.	86.5	
312	USWG-4(CLINOP)136*1707FT	USW G-4	1707	520.2936	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68.1	0	12.6	0	not meas.	not meas.	0.06	1.05	0.04	2.42	5.78	not meas.	not meas.	90.1	
313	USWG-4(CLINOP)137*1762FT	USW G-4	1762	537.0576	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	69.3	0	12.9	0	not meas.	not meas.	0.07	1.74	0	3.48	3.86	not meas.	not meas.	91.3	
314	USWG-4(CLINOP)138*1762FT	USW G-4	1762	537.0576	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	69	0	13	0	not meas.	not meas.	0.09	1.6	0	2.71	3.67	not meas.	not meas.	89.1	
315	USWG-4(CLINOP)139*1762FT	USW G-4	1762	537.0576	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68.8	0	13.4	0	not meas.	not meas.	0.06	1.66	0.21	3.17	3.87	not meas.	not meas.	91.2	
316	USWG-4(CLINOP)140*1762FT	USW G-4	1762	537.0576	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	69.5	0	13.3	0.04	not meas.	not meas.	0.09	1.73	0.1	3.33	3.74	not meas.	not meas.	91.8	
317	USWG-4(CLINOP)141*1762FT	USW G-4	1762	537.0576	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67	0.01	13.4	0.05	not meas.	not meas.	0.12	1.79	0.16	3.45	3.77	not meas.	not meas.	89.8	
318	USWG-4(CLINOP)142*1762FT	USW G-4	1762	537.0576	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.3	0.02	13	0	not meas.	not meas.	0.15	1.65	0.18	3.19	3.9	not meas.	not meas.	89.4	
319	USWG-4(CLINOP)143*1762FT	USW G-4	1762	537.0576	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66	0.02	13.2	0.04	not meas.	not meas.	0.09	1.7	0.24	3.08	4.29	not meas.	not meas.	88.7	
320	USWG-4(CLINOP)144*2132FT	USW G-4	2132	649.8336	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.5	0	11.8	0	not meas.	not meas.	0.05	3.45	0.11	1.02	2.14	not meas.	not meas.	83.1	
321	USWG-4(CLINOP)145*2132FT	USW G-4	2132	649.8336	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.5	0	11.7	0	not meas.	not meas.	0.04	3.44	0	0.93	2.36	not meas.	not meas.	84.0	
322	USWG-4(CLINOP)146*2132FT	USW G-4	2132	649.8336	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65	0	11.1	0.07	not meas.	not meas.	0.05	3.6	0	1.35	2.21	not meas.	not meas.	83.3	
323	USWG-4(CLINOP)147*2132FT	USW G-4	2132	649.8336	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.6	0	12.1	0.04	not meas.	not meas.	0.05	3.42	0.16	1.07	2.31	not meas.	not meas.	84.8	
324	USWG-4(CLINOP)148*2132FT	USW G-4	2132	649.8336	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.1	0	11.8	0	not meas.	not meas.	0.05	3.58	0.03	0.92	2.3	not meas.	not meas.	83.8	
325	USWG-4(CLINOP)149*2132FT	USW G-4	2132	649.8336	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.1	0	12.3	0.01	not meas.	not meas.	0.03	3.59	0	1.18	1.69	not meas.	not meas.	83.9	
326	USWG-4(CLINOP)150*2132FT	USW G-4	2132	649.8336	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.3	0	11.6	0	not meas.	not meas.	0.03	3.63	0	1.11	1.98	not meas.	not meas.	84.7	
327	USWG-4(CLINOP)151*2132FT	USW G-4	2132	649.8336	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.1	0	11.1	0.04	not meas.	not meas.	0.04	3.59	0	0.97	1.93	not meas.	not meas.	82.8	
328	USWG-4(CLINOP)152*2132FT	USW G-4	2132	649.8336	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.4	0	12	0.01	not meas.	not meas.	0.02	3.48	0	1.18	2.05	not meas.	not meas.	84.1	
329	USWG-4(CLINOP)153*2132FT	USW G-4	2132	649.8336	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.3	0	12.1	0.06	not meas.	not meas.	0.03	3.78	0	1.33	1.78	not meas.	not meas.	83.4	
330	USWG-4(CLINOP)154*2227FT	USW G-4	2227	678.7896	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64	0	12.1	0.02	not meas.	not meas.	0.11	3.69	0	1.22	1.42	not meas.	not meas.	82.6	
331	USWG-4(CLINOP)155*2227FT	USW G-4	2227	678.7896	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.8	0	12.4	0	not meas.	not meas.	0.14	3.92	0	0.84	1.62	not meas.	not meas.	84.7	
332	USWG-4(CLINOP)156*2227FT	USW G-4	2227	678.7896	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.1	0	12.1	0.04	not meas.	not meas.	0.11	3.88	0.02	1.21	1.14	not meas.	not meas.	82.6	
333	USWG-4(CLINOP)157*2227FT	USW G-4	2227	678.7896	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.7	0	12.2	0.02	not meas.	not meas.	0.19	4.02	0	1.15	1.67	not meas.	not meas.	84.0	
334	USWG-4(CLINOP)158*2227FT	USW G-4	2227	678.7896	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.6	0	12.3	0.03	not meas.	not meas.	0.1	3.51	0	1.38	1.85	not meas.	not meas.	85.0	
335	USWG-4(CLINOP)159*2227FT	USW G-4	2227	678.7896	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.5	0	11.7	0.1	not meas.	not meas.	0.19	3.72	0.16	0.9	1.33	not meas.	not meas.	83.6	
336	USWG-4(CLINOP)160*2227FT	USW G-4	2227	678.7896	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.1	0	11.6	0.01	not meas.	not meas.	0.13	3.38	0.03	1.02	1.94	not meas.	not meas.	85.1	
337	USWG-4(CLINOP)161*2239FT	USW G-4	2239	682.4472	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.3	0	12	0.01	not meas.	not meas.	0.37	4.02	0.29	0.96	1.43	not meas.	not meas.	85.4	
338	USWG-4(CLINOP)162*2239FT	USW G-4	2239	682.4472	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.6	0	12.1	0.06	not meas.	not meas.	0.31	4.09	0.03	0.52	1.11	not meas.	not meas.	82.8	
339	USWG-4(CLINOP)163*2239FT	USW G-4	2239	682.4472	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.7	0.01	12.2	0.06	not meas.	not meas.	0.37	4.01	0.1	0.83	1.68	not meas.	not meas.	85.0	
340	USWG-4(CLINOP)164*2239FT	USW G-4	2239	682.4472	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.9	0.02	12.1	0.12	not meas.	not meas.	0.45	3.89	0.06	0.39	1.49	not meas.	not meas.	85.4	
341	USWG-4(CLINOP)165*2239FT	USW G-4	2239	682.4472	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.4	0	10.9	0.08	not meas.	not meas.	0.45	3.65	0	0.9	1.91	not meas.	not meas.	83.2	
342	USWG-4(CLINOP)166*2239FT	USW G-4	2239	682.4472	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.2	0	12	0.09	not meas.	not meas.	0.37	3.97	0.04	0.5	1.29	not meas.	not meas.	83.5	
343	USWG-4(CLINOP)167*2239FT	USW G-4	2239	682.4472	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.6	0	11.9	0.07	not meas.	not meas.	0.37	3.59	0	0.63	1.71	not meas.	not meas.	84.9	
344	USWG-4(CLINOP)168*2738FT	USW G-4	2738	834.5424	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.9	0	11.8	0	not meas.	not meas.	0.29	4.32	0.04	0.8	0.91	not meas.	not meas.	84.1	
345	USWG-4(CLINOP)169*2738FT	USW G-4	2738	834.5424	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.9	0	12.6	0	not meas.	not meas.	0.3	4.34	0.2	0.56	1.1	not meas.	not meas.	84.0	
346	USWG-4(CLINOP)170*2738FT	USW G-4	2738	834.5424	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.5	0	12.8	0	not meas.	not meas.	0.37	4.49	0.03	0.87	1.06	not meas.	not meas.	86.1	
347	USWG-4(CLINOP)171*2738FT	USW G-4	2738	834.5424	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.8	0	12.4	0.02	not meas.	not meas.	0.24	4.26	0	0.83	1.02	not meas.	not meas.	84.6	
348	USWG-4(CLINOP)172*2738FT	USW G-4	2738	834.5424	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.9	0	11.6	0	not meas.	not meas.	0.26	4.14	0.14	1.1	1.8	not meas.	not meas.	83.9	
349	USWG-4(CLINOP)173*2738FT	USW G-4	2738	834.5424	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.9	0	12.4	0.05	not meas.	not meas.	0.27	4.31	0.17	0.57	1.17	not meas.	not meas.	85.6	
350	USWG-4(CLINOP)174*2738FT	USW G-4	2738	834.5424	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.9	0	10.6	0	not meas.	not meas.	0.29	4.15	0.1	0.58	0.63	not meas.	not meas.	81.3	
351	USWG-4(CLINOP)175*2738FT	USW G-4	2738	834.5424	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.9	0.02	12.2	0.09	not meas.	not meas.	0.33	4.48	0.23	0.49	1.06	not meas.	not meas.	84.8	
352	USWG-4(CLINOP)176*2738FT	USW G-4	2738	834.5424	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.7	0	12.7	0.05	not meas.	not meas.	0.38	4.4	0.13	0.82	1.23	not meas.	not meas.	86.4	
353	USWG-4(CLINOP)177*2738FT	USW G-4	2738	834.5424	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.2	0	12	0.04	not meas.	not meas.	0.33	4.18	0.15	0.59	1.12	not meas.	not meas.	82.6	
354	USWH-3(CLINOP)178*1800FT	USW H-3	1800	548.64	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68.9	0	11.9	0.05	not meas.	not meas.	0.04	3.61	0	0.84	2.97	not meas.	not meas.	88.2	
355	USWH-3(CLINOP)179*1800FT	USW H-3	1800	548.64	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	70.7	0	11.7	0.03	not meas.	not meas.	0.02	3.62	0.07	0.84	2.75	not meas.	not meas.	89.8	
356	USWH-3(CLINOP)180*1800FT	USW H-3	1800	548.64	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.6	0	11.5	0.04	not meas.	not meas.	0.02	3.19	0	0.85	3.13	not meas.	not meas.	83.2	
357	USWH-3(CLINOP)181*1800FT	USW H-3	1800	548.64	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	58.5	0	9.6	0.11	not meas.	not meas.	0.01	2.85	0	0.66	2.45	not meas.	not meas.	74.2	
358	USWH-3(CLINOP)182*1800FT	USW H-3	1800	548.64	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.8	0	12.1	0.04	not meas.	not meas.	0.02	3.79	0.08	0.96	2.89	not meas.	not meas.	87.7	
359	USWH-4(CLINOP)183*1420FT	USW H-4	1420	432.816	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	63	0	9.2	0.03	not meas.	not meas.	0.08	2.71	0	0.58	2.75	not meas.	not meas.	78.4	
360	USWH-4(CLINOP)184*1420FT	USW H-4	1420	432.816	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.6	0	12.3	0.01	not meas.	not meas.	0.26	3.37	0	0.55	2.92	not meas.	not meas.	86.0	
361	USWH-4(CLINOP)185*1420FT	USW H-4	1420	432.816	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.4	0	12.2	0	not meas.	not meas.	0.25	3.2	0	0.66	3.1	not meas.	not meas.	86.8	

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	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
1	SAMPLE	DRILL HOLE NO.	DEPTH (FT)	DEPTH (M)	SOURCE	Rock/Mineral Type	Analytical Method	SIO2	TIO2	AL2O3	FE2O3	FEO	MNO	MGO	CAO	BAO	NA2O	K2O	P2O5	H2O	Total Oxides	NOTES
362	USWH-4(CLINOP)186*1420FT	USW H-4	1420	432.816	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68.5	0	12.2	0.05	not meas.	not meas.	0.22	3.21	0.12	0.63	3.38	not meas.	not meas.	88.3	
363	USWH-4(CLINOP)187*1420FT	USW H-4	1420	432.816	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68	0	12.2	0	not meas.	not meas.	0.23	3.22	0	0.72	2.93	not meas.	not meas.	87.3	
364	USWH-4(CLINOP)188*1420FT	USW H-4	1420	432.816	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.9	0	12.2	0	not meas.	not meas.	0.18	3.24	0	0.68	3.1	not meas.	not meas.	87.3	
365	USWH-4(CLINOP)189*1455FT	USW H-4	1455	443.484	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	62.6	0	11.2	0.08	not meas.	not meas.	0.61	3.28	0	0.63	1.82	not meas.	not meas.	80.1	
366	USWH-4(CLINOP)190*1455FT	USW H-4	1455	443.484	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.4	0	11.5	0	not meas.	not meas.	0.76	3.59	0.02	0.43	1.88	not meas.	not meas.	85.6	
367	USWH-4(CLINOP)191*1455FT	USW H-4	1455	443.484	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.5	0	11.9	0	not meas.	not meas.	0.76	3.53	0	0.42	1.89	not meas.	not meas.	83.0	
368	USWH-4(CLINOP)192*1455FT	USW H-4	1455	443.484	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.4	0	12.2	0	not meas.	not meas.	0.77	3.73	0.03	0.38	1.4	not meas.	not meas.	84.9	
369	USWH-4(CLINOP)193*1550FT	USW H-4	1550	472.44	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.5	0	12.2	0	not meas.	not meas.	0	2.2	0	1.54	5.08	not meas.	not meas.	87.5	
370	USWH-4(CLINOP)194*1550FT	USW H-4	1550	472.44	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	63.9	0	11.9	0.04	not meas.	not meas.	0	2.15	0.09	1.46	4.61	not meas.	not meas.	84.2	
371	USWH-4(CLINOP)195*1550FT	USW H-4	1550	472.44	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	57.9	0	12.2	0.03	not meas.	not meas.	0	2.26	0	1.79	3.31	not meas.	not meas.	77.5	
372	USWH-4(CLINOP)196*1550FT	USW H-4	1550	472.44	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.9	0	11.7	0.16	not meas.	not meas.	0	2.18	0	1.45	4.52	not meas.	not meas.	84.9	
373	USWH-4(CLINOP)197*1550FT	USW H-4	1550	472.44	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.2	0	12.9	0.02	not meas.	not meas.	0	2.44	0.15	1.3	4.42	not meas.	not meas.	88.4	
374	USWH-4(CLINOP)198*1550FT	USW H-4	1550	472.44	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68.8	0	12.9	0	not meas.	not meas.	0	2.25	0.15	1.32	4.54	not meas.	not meas.	90.0	
375	USWH-4(CLINOP)199*1960FT	USW H-4	1960	603.504	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.4	0	11.8	0.05	not meas.	not meas.	0	0.27	0	3.39	4.32	not meas.	not meas.	86.2	
376	USWH-4(CLINOP)200*1960FT	USW H-4	1960	603.504	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68.5	0	12.3	0	not meas.	not meas.	0	0.3	0.07	3.49	4.72	not meas.	not meas.	89.4	
377	USWH-4(CLINOP)201*1960FT	USW H-4	1960	603.504	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.5	0	12.1	0	not meas.	not meas.	0	0.29	0	4.18	4.19	not meas.	not meas.	88.3	
378	USWH-4(CLINOP)202*1960FT	USW H-4	1960	603.504	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	73.4	0.02	11.6	0.48	not meas.	not meas.	0	0.26	0	3.32	4.73	not meas.	not meas.	93.8	
379	USWH-4(CLINOP)203*1960FT	USW H-4	1960	603.504	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.4	0	11.9	0.08	not meas.	not meas.	0	0.32	0.16	3.66	4.04	not meas.	not meas.	87.6	
380	USWH-4(CLINOP)204*1960FT	USW H-4	1960	603.504	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.6	0	11.9	0	not meas.	not meas.	0	0.32	0	3.06	5.34	not meas.	not meas.	88.2	
381	USWH-4(CLINOP)205*1960FT	USW H-4	1960	603.504	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.5	0.02	11.5	0	not meas.	not meas.	0	0.31	0	3.09	5.14	not meas.	not meas.	87.6	
382	USWH-5(CLINOP)206*1666FT	USW H-5	1666	507.7968	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.4	0	13	0.01	not meas.	not meas.	0.78	4.39	0	0.43	0.56	not meas.	not meas.	85.6	
383	USWH-5(CLINOP)207*1666FT	USW H-5	1666	507.7968	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.5	0.02	13.3	0	not meas.	not meas.	0.86	5.19	0	0.17	0.21	not meas.	not meas.	85.3	
384	USWH-5(CLINOP)208*1917FT	USW H-5	1917	584.3016	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	70.1	0.01	12.4	0	not meas.	not meas.	0	1.76	0	1.87	4.59	not meas.	not meas.	90.7	
385	USWH-5(CLINOP)209*1917FT	USW H-5	1917	584.3016	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	69.6	0	12.8	0	not meas.	not meas.	0	1.57	0.04	2.03	4.95	not meas.	not meas.	91.0	
386	USWH-5(CLINOP)210*1917FT	USW H-5	1917	584.3016	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	70.9	0	12.9	0	not meas.	not meas.	0	1.66	0.04	1.86	4.96	not meas.	not meas.	92.3	
387	USWH-5(CLINOP)211*1917FT	USW H-5	1917	584.3016	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.5	0	12.8	0	not meas.	not meas.	0	1.73	0	2.07	5.45	not meas.	not meas.	88.6	
388	USWH-5(CLINOP)212*1917FT	USW H-5	1917	584.3016	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.1	0.01	12.7	0	not meas.	not meas.	0	1.49	0.22	1.98	5.56	not meas.	not meas.	89.1	
389	USWH-5(CLINOP)213*1917FT	USW H-5	1917	584.3016	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	61.3	0	10.8	0	not meas.	not meas.	0	1.59	0.03	1.7	3.84	not meas.	not meas.	79.3	
390	USWH-5(CLINOP)214*1917FT	USW H-5	1917	584.3016	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	61.1	0	10.1	0	not meas.	not meas.	0	1.56	0	1.51	3.8	not meas.	not meas.	78.1	
391	USWH-5(CLINOP)215*1917FT	USW H-5	1917	584.3016	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	62.1	0	10.5	0	not meas.	not meas.	0	1.6	0	1.84	3.95	not meas.	not meas.	79.9	
392	USWH-5(CLINOP)216*1917FT	USW H-5	1917	584.3016	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	62.7	0	10.8	0	not meas.	not meas.	0	1.64	0.03	1.66	4.14	not meas.	not meas.	81.0	
393	USWH-5(CLINOP)217*1917FT	USW H-5	1917	584.3016	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	63.7	0	10.7	0	not meas.	not meas.	0	1.61	0.18	1.61	4.25	not meas.	not meas.	82.1	
394	USWH-5(CLINOP)218*1930FT	USW H-5	1930	588.264	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64	0	10.6	0.45	not meas.	not meas.	0	1.87	0.07	1.66	4.06	not meas.	not meas.	82.7	
395	USWH-5(CLINOP)219*1930FT	USW H-5	1930	588.264	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.4	0	12.1	0	not meas.	not meas.	0	2.05	0	1.71	4.14	not meas.	not meas.	87.4	
396	USWH-5(CLINOP)220*1930FT	USW H-5	1930	588.264	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.3	0	12.1	0	not meas.	not meas.	0	2.18	0	1.44	4.24	not meas.	not meas.	87.3	
397	USWH-5(CLINOP)221*1930FT	USW H-5	1930	588.264	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	72	0	11.4	0.04	not meas.	not meas.	0	1.93	0.79	2.31	3.67	not meas.	not meas.	92.1	
398	USWH-5(CLINOP)222*2220FT	USW H-5	2220	676.656	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	71.3	0	11	0	not meas.	not meas.	0.04	1.31	0.01	2.49	3.24	not meas.	not meas.	89.4	
399	USWH-5(CLINOP)223*2220FT	USW H-5	2220	676.656	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	62.2	0	12.4	0.01	not meas.	not meas.	0	1.34	0	2.8	3.89	not meas.	not meas.	82.6	
400	USWH-5(CLINOP)224*2220FT	USW H-5	2220	676.656	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68.8	0	11	0	not meas.	not meas.	0	1.55	0	2.22	3.63	not meas.	not meas.	87.2	
401	USWH-5(CLINOP)225*2220FT	USW H-5	2220	676.656	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	71.4	0	12.4	0	not meas.	not meas.	0	1.62	0.23	2.2	4.53	not meas.	not meas.	92.4	
402	UE-25a#1(CLINOP)226*1279FT	UE-25a#1	1279	389.8392	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	55.7	0	14.1	0.82	not meas.	not meas.	3.3	2.1	0	0.62	0.85	not meas.	not meas.	77.5	
403	UE-25a#1(CLINOP)227*1323FT	UE-25a#1	1323	403.2504	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.8	0	11.4	0	not meas.	not meas.	0.74	3.87	0	0.5	1.75	not meas.	not meas.	84.1	
404	UE-25a#1(CLINOP)228*1323FT	UE-25a#1	1323	403.2504	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68.9	0	12	0.02	not meas.	not meas.	0.62	3.8	0.13	0.55	2.02	not meas.	not meas.	88.0	
405	UE-25a#1(CLINOP)229*1323FT	UE-25a#1	1323	403.2504	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	69	0	12.3	0.08	not meas.	not meas.	0.6	3.85	0	0.52	1.81	not meas.	not meas.	88.2	
406	UE-25a#1(CLINOP)230*1323FT	UE-25a#1	1323	403.2504	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68.7	0	12	0.02	not meas.	not meas.	0.57	3.92	0	0.56	1.76	not meas.	not meas.	87.5	
407	UE-25a#1(CLINOP)231*1323FT	UE-25a#1	1323	403.2504	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68.7	0.02	12.3	0.04	not meas.	not meas.	0.63	4.2	0.06	0.56	1.43	not meas.	not meas.	87.8	
408	UE-25a#1(CLINOP)232*1323FT	UE-25a#1	1323	403.2504	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.1	0.03	11.6	0.02	not meas.	not meas.	0.38	4.01	0.15	0.67	1.78	not meas.	not meas.	84.7	
409	UE-25a#1(CLINOP)233*1323FT	UE-25a#1	1323	403.2504	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.4	0.03	12	0.02	not meas.	not meas.	0.67	3.92	0.2	0.6	1.8	not meas.	not meas.	85.6	
410	UE-25a#1(CLINOP)234*1358FT	UE-25a#1	1358	413.9184	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.7	0	11.2	0.03	not meas.	not meas.	0.31	3.71	0.07	0.67	1.79	not meas.	not meas.	85.4	
411	UE-25a#1(CLINOP)235*1358FT	UE-25a#1	1358	413.9184	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	63.8	0	10.3	0.23	not meas.	not meas.	0.22	3.07	0.03	0.56	2.05	not meas.	not meas.	80.3	
412	UE-25a#1(CLINOP)236*1358FT	UE-25a#1	1358	413.9184	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.7	0	11.2	0	not meas.	not meas.	0.3	3.8	0.1	0.35	1.78	not meas.	not meas.	84.2	
413	UE-25a#1(CLINOP)237*1381FT	UE-25a#1	1381	420.9288	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67	0.03	11.9	0	not meas.	not meas.	0.69	3.74	0.09	0.48	1.83	not meas.	not meas.	85.8	
414	UE-25a#1(CLINOP)238*1384FT	UE-25a#1	1384	421.8432	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.9	0.02	11.8	0	not meas.	not meas.	0.68	3.5	0.12	0.6	2.23	not meas.	not meas.	84.9	
415	UE-25a#1(CLINOP)239*1384FT	UE-25a#1	1384	421.8432	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.5	0.02	11.6	0	not meas.	not meas.	0.75	3.73	0	0.51	1.86	not meas.	not meas.	85.0	
416	UE-25a#1(CLINOP)240*1384FT	UE-25a#1	1384	421.8432	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.4	0	11.7	0	not meas.	not meas.	0.68	4.09	0.08	0.49	1.58	not meas.	not meas.	84.0	
417	UE-25a#1(CLINOP)241*1384FT	UE-25a#1	1384	421.8432	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.6	0.04	10.9	0	not meas.	not meas.	0.62	3.96	0	0.5	1.65	not meas.	not meas.	85.3	
418	UE-25a#1(CLINOP)242*1384FT	UE-25a#1	1384	421.8432	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68	0.02	11.5	0	not meas.	not meas.	0.66	4.02	0.14	0.48	1.61	not meas.	not meas.	86.4	
419	UE-25a#1(CLINOP)243*1465FT	UE-25a#1	1465	446.532	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.4	0	11.1	0.37	not meas.	not meas.	0	2.76	0.04	0.5	4.05	not meas.	not meas.	84.2	
420	UE-25a#1(CLINOP)244*1465FT	UE-25a#1	1465	446.532	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.5	0	11.3	0.01	not meas.	not meas.	0	3.66	0.01	0.67	2.14	not meas.	not meas.	84.3	
421	UE-25a#1(CLINOP)245*1505FT	UE-25a#1	1505	458.724	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.6	0	11.4	0.04	not meas.	not meas.	0	3.46	0.14	0.78	3.07	not meas.	not meas.	84.6	
422	UE-25a#1(CLINOP)246*1584FT	UE-25a#1	1584	482.8032	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.7	0	11.9	0.04	not meas.	not meas.	0	3.92	0.01	0.92	2.25	not meas.	not meas.	85.7	
423	UE-25a#1(CLINOP)247*1584FT	UE-25a#1	1584	482.8032	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.2	0	12.2	0.01	not meas.	not meas.	0	3.82	0	0.83	2.78	not meas.	not meas.	85.8	
424	UE-25a#1(CLINOP)248*1584FT	UE-25a#1	1584	482.8032	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.5	0	12.1	0	not meas.	not meas.	0	4.13	0.07	0.42	2.3	not meas.	not meas.	85.5	
425	UE-25a#1(CLINOP)249*1667FT	UE-25a#1	1667	508.1016	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.7	0.03	12.8	0.03	not meas.	not meas.	0	3.71	0	0.91	3.01	not meas.	not meas.	87.2	
426	UE-25a#1(CLINOP)250*1667FT	UE-25a#1	1667	508.1016	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.7	0.06	12.1	0.02	not meas.	not meas.	0.01	3.61	0	0.79	2.79	not meas.	not meas.	86.1	
427	UE-25a#1(CLINOP)251*1667FT	UE-25a#1	1667	508.1016	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.5	0	12.7	0.04	not meas.	not meas.	0.03	3.71	0	1.01	3.3	not meas.	not meas.	87.3	
428	UE-25a#1(CLINOP)252*1667FT	UE-25a#1	1667	508.1016	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	63.5	0.01	12.6	0.03	not meas.	not meas.	0.02	3.66	0	1.06	3.6	not meas.	not meas.	84.5	
429	UE-25a#1(CLINOP)253*1667FT	UE-25a#1	1667	508.1016	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.1	0.04	13.1	0.01	not meas.	not meas.	0.03	3.98	0.07	0.94	3.29	not meas.	not meas.	86.6	
430	UE-25a#1(CLINOP)254*1667FT	UE-25a#1	1667	508.1016	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.8	0.05	12.6	0.06	not meas.	not meas.	0.03	3.97	0	0.8	3.01	not meas.	not meas.	86.3	
431	UE-25a#1(CLINOP)255*1667FT	UE-25a#1	1667	508.1016	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.5	0.02	12.6	0.05	not meas.	not meas.	0.01	3.63	0.05	0.69	3.4	not meas.	not meas.	86.2	
432	UE-25a#1(CLINOP)256*1667FT	UE-25a#1	1667	508.1016	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	63.6	0	12.1	0.03	not meas.	not meas.	0.04	3.54	0.06	0.82	2.96	not meas.	not meas.	83.2	
433	UE-25a#1(CLINOP)257*1667FT	UE-25a#1	1667	508.1016	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.4	0.02	12.4	0.05	not meas.	not meas.	0.01	3.86	0	1.05	3.3	not meas.	not meas.	86.1	
434	UE-25a#1(CLINOP)258*1667FT	UE-25a#1	1667	508.1016	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.6	0.05	12.6	0.06	not meas.	not meas.	0.03	3.97	0	0.8	3.01	not meas.	not meas.	87.1	
435	UE-25a#1(CLINOP)259*1667FT	UE-25a#1	1667	508.1016	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	69.2	0	13.3	0.08	not meas.	not meas.	0.04	4.03	0.04	0.89	2.82	not meas.	not meas.	90.4	
436	UE-25a#1(CLINOP)260*1667FT	UE-25a#1	1667	508.1016	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.1	0	12.6	0.09	not meas.	not meas.	0.02	3.84	0.32	1.02	2.92	not meas.	not meas.	87.9	
437	UE-25a#1(CLINOP)261*1824FT	UE-25a#1	1824	555.9552	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	62.5	0	12.6	0.06	not meas.	not meas.	0.06	4.78	0	0.62	1	not meas.	not meas.	81.6	
438	UE-25a#1(CLINOP)262*1824FT	UE-25a#1	1824	555.9552	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.1	0	13.9	0.03	not meas.	not meas.	0.15	5.43	0.21	1.13	1.33	not meas.	not meas.	88.3	
439	UE-25a#1(CLINOP)263*1824FT	UE-25a#1	1824	555.9552	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68.8	0	13.4	0.02	not meas.	not meas.	0.14	5.12	0.19	0.99	1.44	not meas.	not meas.	90.1	
440	UE-25a#1(CLINOP)264*1824FT	UE-25a#1	1824	555.9552	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.8	0.02	13.6	0	not meas.	not meas.	0.15	4.96	0.02	1.22	1.29	not meas.	not meas.	88.1	
441	UE-25a#1(CLINOP)265*2087FT	UE-25a#1	2087	636.1176	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.3	0	11.6	0	not meas.	not meas.	0.52	3.93	0	0.26	1.4	not meas.	not meas.	83.0	
442	UE-25a#1(CLINOP)266*2087FT	UE-25a#1	2087	636.1176	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.1	0	12	0	not meas.	not meas.	0.71	3.76	0.06	0.47	1.54	not meas.	not meas.	82.7	
443	UE-25a#1(CLINOP)267*2087FT	UE-25a#1	2087	636.1176	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	60.8	0	12	0.06	not meas.	not meas.	0.71	3.92	0.18	0.59	1.49	not meas.	not meas.	79.7	
444	UE-25a#1(CLINOP)268*2087FT	UE-25a#1	2087	636.1176	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.3	0	12	0.05	not meas.	not meas.	0.68	3.94	0.06	0.36	1.28	not meas.	not meas.	84.7	
445	UE-25a#1(CLINOP)269*2087FT	UE-25a#1	2087	636.1176	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	63.5	0.02	12.4	0.02	not meas.	not meas.	0.6	4.09	0.19	0.7	2.14	not meas.	not meas.	83.7	
446	UE-25a#1(CLINOP)270*2113FT	UE-25a#1	2113	644.0424	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	75.1	0	11.4	0.29	not meas.	not meas.	0	0.87	0	3.11	4.59	not meas.	not meas.	95.4	
447	UE-25a#1(CLINOP)271*2220FT	UE-25a#1	2220	676.656	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.8	0	11.6	0	not meas.	not meas.	0.6	3.7	0	0.41	1.48	not meas.	not meas.	82.5	
448	UE-25a#1(CLINOP)272*2220FT	UE-25a#1	2220	676.656	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.4	0	11.7	0	not meas.	not meas.	0.61	3.76	0	0.33	1.33	not meas.	not meas.	83.1	
449	UE-25a#1(CLINOP)273*2220FT	UE-25a#1	2220	676.656	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65	0	11.6	0	not meas.	not meas.	0.54	3.67	0	0.38	1.25	not meas.	not meas.	82.6	
450	UE-25a#1(CLINOP)274*2220FT	UE-25a#1	2220	676.656	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66	0	11.8	0	not meas.	not meas.	0.56	3.79	0	0.34	1.33	not meas.	not meas.	83.8	
451	UE-25a#1(CLINOP)275*2220FT	UE-25a#1	2220	676.656	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.2	0	12.1	0.02	not meas.	not meas.	0.64	3.97	0	0.31	1.48	not meas.	not meas.	82.6	
452	UE-25a#1(CLINOP)276*2220FT	UE-25a#1	2220	676.656	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	63.3	0	11.5	0.03	not meas.	not meas.	0.55	3.78	0	0.36	1.4	not meas.	not meas.	80.9	
453	UE-25a#1(CLINOP)277*2220FT	UE-25a#1	2220	676.656	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	62.2	0	11.4	0.06	not meas.	not meas.	0.55	3.72	0.02	0.35	1.39	not meas.	not meas.	79.7	
454	UE-25a#1(CLINOP)278*2220FT	UE-25a#1	2220	676.656	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	63.4	0	11.4	0	not meas.	not meas.	0.56	3.8	0.07	0.52	1.42	not meas.	not meas.	81.2	
455	UE-25a#1(CLINOP)279*2304FT	UE-25a#1	2304	702.2592	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.7	0	11.9	0	not meas.	not meas.	0.13	4.19	0.2	0.94	1.49	not meas.	not meas.	86.6	
456	UE-25a#1(CLINOP)280*2304FT	UE-25a#1	2304	702.2592	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.4	0	12.2	0	not meas.	not meas.	0.15	4.15	0.14	0.89	1.45	not meas.	not meas.	86.4	
457	UE-25a#1(CLINOP)281*2304FT	UE-25a#1	2304	702.2592	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.3	0.02	11.3	0.05	not meas.	not meas.	0.22	4.2	0	0.99	1.68	not meas.	not meas.	85.8	
458	UE-25a#1(CLINOP)282*2304FT	UE-25a#1	2304	702.2592	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.4	0	11.7	0.03	not meas.	not meas.	0.16	4.46	0.02	0.99	1.37	not meas.	not meas.	86.1	
459	UE-25a#1\(CLINOP)283*2304FT	UE-25a#1	2304	702.2592	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.2	0.02	11.9	0	not meas.	not meas.	0.19	4.24	0.07	0.78	1.6	not meas.	not meas.	83.0	
460	UE-25a#1(CLINOP)284*2304FT	UE-25a#1	2304	702.2592	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.9	0	12.1	0.01	not meas.	not meas.	0.19	4.31	0	0.77	1.62	not meas.	not meas.	86.9	
461	UE-25a#1(CLINOP)285*2304FT	UE-25a#1	2304	702.2592	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.9	0.01	12.1	0.03	not meas.	not meas.	0.21	4.26	0	0.89	1.69	not meas.	not meas.	84.1	
462	UE-25a#1(CLINOP)286*2304FT	UE-25a#1	2304	702.2592	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.1	0.01	12.1	0	not meas.	not meas.	0.15	4.07	0	0.78	1.65	not meas.	not meas.	82.8	
463	UE-25a#1(CLINOP)287*2304FT	UE-25a#1	2304	702.2592	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.4	0.02	12.5	0.02	not meas.	not meas.	0.17	4.25	0.03	0.73	1.64	not meas.	not meas.	85.8	
464	UE-25a#1(CLINOP)288*2304FT	UE-25a#1	2304	702.2592	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68.8	0.01	11.9	0.07	not meas.	not meas.	0.15	4.19	0	1.08	1.6	not meas.	not meas.	87.8	
465	UE-25a#1(CLINOP)289*2304FT	UE-25a#1	2304	702.2592	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68.1	0.03	12.1	0.04	not meas.	not meas.	0.17	4.31	0	0.89	1.6	not meas.	not meas.	87.2	
466	UE-25b#1(H)(CLINOP)290*2832FT	UE-25b#1(H)	2832	863.1936	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	58.1	0	16.5	0	not meas.	not meas.	0.69	5.79	0	0.59	1.01	not meas.	not meas.	82.7	
467	UE-25b#1(H)(CLINOP)291*2832FT	UE-25b#1(H)	2832	863.1936	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	58.3	0	16.2	0	not meas.	not meas.	0.82	5.93	0	0.7	1.33	not meas.	not meas.	83.3	
468	UE-25b#1(H)(CLINOP)292*2832FT	UE-25b#1(H)	2832	863.1936	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	58.2	0	15.8	0	not meas.	not meas.	0.86	5.79	0.03	0.76	1.29	not meas.	not meas.	82.7	
469	UE-25b#1(H)(CLINOP)293*2832FT	UE-25b#1(H)	2832	863.1936	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	58.2	0	15.8	0	not meas.	not meas.	0.84	5.86	0	0.67	1.26	not meas.	not meas.	82.6	
470	UE-25b#1(H)(CLINOP)294*2832FT	UE-25b#1(H)	2832	863.1936	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	59.9	0	16.5	0	not meas.	not meas.	0.91	6.06	0	0.23	1.41	not meas.	not meas.	85.0	
471	UE-25b#1(H)(CLINOP)295*2832FT	UE-25b#1(H)	2832	863.1936	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	58.3	0	16.2	0	not meas.	not meas.	0.91	5.91	0	0.36	1.38	not meas.	not meas.	83.1	
472	UE-25b#1(H)(CLINOP)296*2832FT	UE-25b#1(H)	2832	863.1936	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	59	0	16	0	not meas.	not meas.	0.86	5.7	0.11	0.74	1.36	not meas.	not meas.	83.8	
473	UE-25b#1(H)(CLINOP)297*2832FT	UE-25b#1(H)	2832	863.1936	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	58.2	0	16.2	0.05	not meas.	not meas.	0.86	5.75	0.08	0.72	1.08	not meas.	not meas.	82.9	
474	UE-25b#1(H)(CLINOP)298*2832FT	UE-25b#1(H)	2832	863.1936	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	55.5	0	16.2	0	not meas.	not meas.	0.82	5.95	0.15	0.86	1.28	not meas.	not meas.	80.8	
475	UE-25b#1(H)(CLINOP)299*2832FT	UE-25b#1(H)	2832	863.1936	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	57	0.03	16.3	0.04	not meas.	not meas.	0.67	5.88	0.21	0.59	1.32	not meas.	not meas.	82.0	
476	UE-25b#1(H)(CLINOP)300*2832FT	UE-25b#1(H)	2832	863.1936	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	57.8	0.04	15.1	0.02	not meas.	not meas.	0.96	5.92	0.07	0.35	1.3	not meas.	not meas.	81.5	
477	UE-25b#1(H)(CLINOP)301*2832FT	UE-25b#1(H)	2832	863.1936	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	55.8	0	15.1	0.05	not meas.	not meas.	0.81	5.74	0.17	0.49	1.29	not meas.	not meas.	79.5	
478	UE-25b#1(H)(CLINOP)302*2832FT	UE-25b#1(H)	2832	863.1936	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	56.7	0	15	0.02	not meas.	not meas.	0.79	5.73	0.19	0.5	1.37	not meas.	not meas.	80.3	
479	UE-25b#1(H)(CLINOP)303*2879FT	UE-25b#1(H)	2879	877.5192	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	55.1	0	16.3	0	not meas.	not meas.	0.67	6.07	0	0.24	1.54	not meas.	not meas.	79.9	
480	UE-25b#1(H)(CLINOP)304*2879FT	UE-25b#1(H)	2879	877.5192	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	56.5	0	16.5	0	not meas.	not meas.	0.45	6.3	0	0.51	1.49	not meas.	not meas.	81.8	
481	UE-25b#1(H)(CLINOP)305*2879FT	UE-25b#1(H)	2879	877.5192	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	54.8	0	17	0	not meas.	not meas.	0.34	6.31	0.06	0.66	1.55	not meas.	not meas.	80.7	

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	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
1	SAMPLE	DRILL HOLE NO.	DEPTH (FT)	DEPTH (M)	SOURCE	Rock/Mineral Type	Analytical Method	SIO2	TIO2	AL2O3	FE2O3	FEO	MNO	MGO	CAO	BAO	NA2O	K2O	P2O5	H2O	Total Oxides	NOTES
482	UE-25b#1(H)(CLINOP)306*2879FT	UE-25b#1(H)	2879	877.5192	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	55.9	0	16.4	0	not meas.	not meas.	0.41	6.5	0	0.96	1.47	not meas.	not meas.	81.6	
483	UE-25b#1(H)(CLINOP)307*2879FT	UE-25b#1(H)	2879	877.5192	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	56.1	0	16.4	0	not meas.	not meas.	0.43	6.37	0.02	0.46	1.5	not meas.	not meas.	81.3	
484	UE-25b#1(H)(CLINOP)308*2879FT	UE-25b#1(H)	2879	877.5192	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	56.5	0	16.9	0	not meas.	not meas.	0.33	6.66	0.1	0.57	1.49	not meas.	not meas.	82.6	
485	UE-25b#1(H)(CLINOP)309*2879FT	UE-25b#1(H)	2879	877.5192	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	56.1	0	16.9	0.06	not meas.	not meas.	0.22	6.77	0.21	0.89	1.43	not meas.	not meas.	82.6	
486	UE-25b#1(H)(CLINOP)310*2879FT	UE-25b#1(H)	2879	877.5192	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	56	0	16.9	0.07	not meas.	not meas.	0.27	6.59	0.14	0.86	1.53	not meas.	not meas.	84.4	
487	UE-25b#1(H)(CLINOP)311*2879FT	UE-25b#1(H)	2879	877.5192	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	56.1	0	17.6	0.03	not meas.	not meas.	0.22	6.96	0.26	0.63	1.6	not meas.	not meas.	83.4	
488	UE-25p#1(CLINOP)312*1250FT	UE-25p#1	1250	381	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.8	0.02	12.8	0	not meas.	not meas.	0.07	3.73	0.11	1.08	2.54	not meas.	not meas.	88.2	
489	UE-25p#1(CLINOP)313*1250FT	UE-25p#1	1250	381	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.9	0	12.4	0.01	not meas.	not meas.	0.07	3.58	0.07	1.01	2.5	not meas.	not meas.	85.6	
490	UE-25p#1(CLINOP)314*1250FT	UE-25p#1	1250	381	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.8	0	12.4	0.06	not meas.	not meas.	0.07	3.76	0.02	0.96	2.48	not meas.	not meas.	87.6	
491	UE-25p#1(CLINOP)315*1250FT	UE-25p#1	1250	381	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	69.2	0	12.4	0.06	not meas.	not meas.	0.06	3.66	0.06	1	2.62	not meas.	not meas.	89.0	
492	UE-25p#1(CLINOP)316*1250FT	UE-25p#1	1250	381	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	69.5	0	13	0.04	not meas.	not meas.	0.07	3.61	0.07	1.39	3.09	not meas.	not meas.	90.8	
493	UE-25p#1(CLINOP)317*1250FT	UE-25p#1	1250	381	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68.6	0	12.4	0	not meas.	not meas.	0.07	3.59	0	1.13	3.01	not meas.	not meas.	88.8	
494	UE-25p#1(CLINOP)318*1250FT	UE-25p#1	1250	381	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	69.8	0	12.6	0.02	not meas.	not meas.	0.06	3.64	0.02	1.4	3.03	not meas.	not meas.	90.6	
495	UE-25p#1(CLINOP)319*1250FT	UE-25p#1	1250	381	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	69.2	0	12.4	0.03	not meas.	not meas.	0.06	3.57	0	1.06	2.67	not meas.	not meas.	89.0	
496	UE-25p#1(CLINOP)320*1250FT	UE-25p#1	1250	381	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68.9	0	12.4	0	not meas.	not meas.	0.01	3.47	0.04	1.1	2.62	not meas.	not meas.	88.5	
497	UE-25p#1(CLINOP)321*1350FT	UE-25p#1	1350	411.48	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	69.2	0	12.2	0	not meas.	not meas.	0.08	3.76	0	1.11	2.38	not meas.	not meas.	88.7	
498	UE-25p#1(CLINOP)322*1350FT	UE-25p#1	1350	411.48	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68.7	0	12.5	0.02	not meas.	not meas.	0.06	3.87	0.09	0.87	2.27	not meas.	not meas.	88.4	
499	UE-25p#1(CLINOP)323*1350FT	UE-25p#1	1350	411.48	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68.3	0.03	11.9	0	not meas.	not meas.	0.11	3.58	0.13	0.69	2.42	not meas.	not meas.	87.2	
500	UE-25p#1(CLINOP)324*1400FT	UE-25p#1	1400	426.72	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66	0	13.5	0	not meas.	not meas.	0.07	4.39	0.18	1.23	1.39	not meas.	not meas.	86.8	
501	UE-25p#1(CLINOP)325*1400FT	UE-25p#1	1400	426.72	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.5	0	12.9	0	not meas.	not meas.	0.08	4.08	0.14	1.43	1.52	not meas.	not meas.	86.7	
502	UE-25p#1(CLINOP)326*1400FT	UE-25p#1	1400	426.72	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.4	0	12.2	0	not meas.	not meas.	0.06	3.8	0.12	1.16	1.94	not meas.	not meas.	86.7	
503	UE-25p#1(CLINOP)327*1700FT	UE-25p#1	1700	518.16	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.9	0	12.6	0.02	not meas.	not meas.	0.24	3.91	0.06	1.33	1.42	not meas.	not meas.	84.5	
504	UE-25p#1(CLINOP)328*1700FT	UE-25p#1	1700	518.16	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68	0	13	0	not meas.	not meas.	0.22	4.19	0.11	1.32	1.18	not meas.	not meas.	88.0	
505	UE-25p#1(CLINOP)329*1700FT	UE-25p#1	1700	518.16	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	71.5	0	13	0	not meas.	not meas.	0.27	4.06	0.07	1.53	1.3	not meas.	not meas.	91.7	
506	UE-25p#1(CLINOP)330*1700FT	UE-25p#1	1700	518.16	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	69.5	0.02	12.7	0	not meas.	not meas.	0.21	3.83	0.13	1.62	1.31	not meas.	not meas.	89.3	
507	UE-25p#1(CLINOP)331*1700FT	UE-25p#1	1700	518.16	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.1	0	12.9	0	not meas.	not meas.	0.32	4.37	0.06	1.55	1.23	not meas.	not meas.	87.5	
508	UE-25p#1(CLINOP)332*1700FT	UE-25p#1	1700	518.16	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.6	0.03	13	0	not meas.	not meas.	0.28	3.94	0.21	1.66	1.26	not meas.	not meas.	87.9	
509	UE-25p#1(CLINOP)333*1700FT	UE-25p#1	1700	518.16	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	63.7	0.02	12.3	0	not meas.	not meas.	0.27	4	0.07	1.67	1.22	not meas.	not meas.	83.2	
510	UE-25p#1(CLINOP)334*1700FT	UE-25p#1	1700	518.16	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68.9	0.02	12.9	0	not meas.	not meas.	0.26	4.2	0.04	1.58	1.34	not meas.	not meas.	89.3	
511	UE-25p#1(CLINOP)335*1700FT	UE-25p#1	1700	518.16	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68.2	0.02	12.6	0	not meas.	not meas.	0.33	4.11	0.14	1.44	1.39	not meas.	not meas.	88.4	
512	UE-25p#1(CLINOP)336*1700FT	UE-25p#1	1700	518.16	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	70	0	13.2	0	not meas.	not meas.	0.29	4.09	0.62	1.54	1.34	not meas.	not meas.	91.1	
513	UE-25p#1(CLINOP)337*1700FT	UE-25p#1	1700	518.16	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.2	0	12.7	0	not meas.	not meas.	0.28	3.95	0.04	1.71	1.56	not meas.	not meas.	87.4	
514	UE-25p#1(CLINOP)338*1800FT	UE-25p#1	1800	548.64	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.7	0	11.8	0	not meas.	not meas.	0.2	3.5	0	1.6	1.22	not meas.	not meas.	84.0	
515	UE-25p#1(CLINOP)339*1800FT	UE-25p#1	1800	548.64	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.2	0	11.1	0	not meas.	not meas.	0.2	3.18	0	1.19	1.3	not meas.	not meas.	84.2	
516	UE-25p#1(CLINOP)340*1800FT	UE-25p#1	1800	548.64	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.5	0	11.9	0.05	not meas.	not meas.	0.19	3.68	0.16	1.13	1.02	not meas.	not meas.	83.5	
517	UE-25p#1(CLINOP)341*1800FT	UE-25p#1	1800	548.64	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	63.1	0	11.8	0	not meas.	not meas.	0.26	3.84	0.08	1.13	1.02	not meas.	not meas.	81.2	
518	UE-25p#1(CLINOP)342*1800FT	UE-25p#1	1800	548.64	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	61.2	0	11.8	0	not meas.	not meas.	0.23	3.48	0.16	1.33	1.34	not meas.	not meas.	79.5	
519	UE-25p#1(CLINOP)343*1800FT	UE-25p#1	1800	548.64	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	70.4	0	12.5	0.04	not meas.	not meas.	0.24	3.7	0.09	1.39	1.36	not meas.	not meas.	89.7	
520	UE-25p#1(CLINOP)344*1800FT	UE-25p#1	1800	548.64	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.7	0	11.8	0.03	not meas.	not meas.	0.23	3.4	0.11	1.38	1.58	not meas.	not meas.	87.2	
521	UE-25p#1(CLINOP)345*2760FT	UE-25p#1	2760	841.248	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	69.4	0	13.4	0.06	not meas.	not meas.	0.04	5.3	0.08	0.9	0.51	not meas.	not meas.	89.7	
522	UE-25p#1(CLINOP)346*2760FT	UE-25p#1	2760	841.248	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	69.1	0	13.7	0	not meas.	not meas.	0.03	5.32	0.15	0.91	0.48	not meas.	not meas.	89.7	
523	UE-25p#1(CLINOP)347*2760FT	UE-25p#1	2760	841.248	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68.5	0	13.6	0	not meas.	not meas.	0	5.21	0.23	1.13	0.47	not meas.	not meas.	89.1	
524	UE-25p#1(CLINOP)348*3330FT	UE-25p#1	3330	1014.984	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	60.3	0.02	15	0	not meas.	not meas.	0.12	7.12	0.32	0.76	0.28	not meas.	not meas.	83.9	
525	UE-25p#1(CLINOP)349*3330FT	UE-25p#1	3330	1014.984	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	60.6	0	16	0	not meas.	not meas.	0.08	7.22	0.19	0.85	0.41	not meas.	not meas.	85.4	
526	UE-25p#1(CLINOP)350*3330FT	UE-25p#1	3330	1014.984	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	63.5	0	15.6	0	not meas.	not meas.	0.06	6.76	0.22	1.02	0.43	not meas.	not meas.	87.5	
527	UE-25p#1(CLINOP)351*3330FT	UE-25p#1	3330	1014.984	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	60.4	0.01	15.1	0	not meas.	not meas.	0.06	6.57	0.07	1.34	0.38	not meas.	not meas.	84.0	
528	UE-25p#1(CLINOP)352*3330FT	UE-25p#1	3330	1014.984	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	63.3	0	15.3	0	not meas.	not meas.	0.06	6.58	0.08	1.03	0.48	not meas.	not meas.	86.9	
529	UE-25p#1(CLINOP)353*3330FT	UE-25p#1	3330	1014.984	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	63.3	0	15	0	not meas.	not meas.	0.05	6.84	0.16	0.85	0.42	not meas.	not meas.	86.6	
530	UE-25p#1(CLINOP)354*3330FT	UE-25p#1	3330	1014.984	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	63.2	0	14.9	0	not meas.	not meas.	0.08	6.47	0.27	0.98	0.48	not meas.	not meas.	86.4	
531	UE-25p#1(CLINOP)355*3330FT	UE-25p#1	3330	1014.984	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	63	0	14.9	0.02	not meas.	not meas.	0.06	6.59	0.14	1.03	0.47	not meas.	not meas.	86.2	
532	UE-25p#1(CLINOP)356*3330FT	UE-25p#1	3330	1014.984	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	63.4	0	15.5	0.04	not meas.	not meas.	0.15	6.66	0.05	0.92	0.51	not meas.	not meas.	87.2	
533	UE-25p#1(CLINOP)357*3330FT	UE-25p#1	3330	1014.984	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.7	0	15.3	0.06	not meas.	not meas.	0.12	6.83	0	0.67	0.47	not meas.	not meas.	88.1	
534	UE-25p#1(CLINOP)358*3330FT	UE-25p#1	3330	1014.984	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	62.8	0.04	15.2	0	not meas.	not meas.	0.19	6.82	0.16	0.73	0.47	not meas.	not meas.	86.4	
535	UE-25p#1(CLINOP)359*3330FT	UE-25p#1	3330	1014.984	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.1	0	15.5	0.02	not meas.	not meas.	0.1	6.6	0	1.31	0.61	not meas.	not meas.	88.1	
536	J-13(CLINOP)360*1335FT	J-13	1335	406.908	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66	0.02	13.1	0.47	not meas.	not meas.	0.51	4.49	0.04	1.07	1.06	not meas.	not meas.	86.8	
537	J-13(CLINOP)361*1335FT	J-13	1335	406.908	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	60.4	0.04	13.3	0.47	not meas.	not meas.	0.39	4.64	0.04	0.95	1.06	not meas.	not meas.	81.3	
538	J-13(CLINOP)362*1335FT	J-13	1335	406.908	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.1	0.03	13	0.47	not meas.	not meas.	0.56	4.42	0	0.75	1	not meas.	not meas.	84.3	
539	J-13(CLINOP)363*1335FT	J-13	1335	406.908	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	59.9	0.02	13.2	0.67	not meas.	not meas.	0.66	4.39	0	1.43	0.99	not meas.	not meas.	81.2	
540	J-13(CLINOP)364*1421FT	J-13	1421	433.1208	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.3	0.02	10.9	0	not meas.	not meas.	0	2.47	0.06	1.09	4.3	not meas.	not meas.	85.1	
541	J-13(CLINOP)365*1421FT	J-13	1421	433.1208	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68	0.03	11.8	0	not meas.	not meas.	0	2.66	0	1.21	4.02	not meas.	not meas.	87.7	
542	J-13(CLINOP)366*1421FT	J-13	1421	433.1208	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	70.9	0	12.3	0	not meas.	not meas.	0	2.63	0	1.39	4.89	not meas.	not meas.	92.1	
543	J-13(CLINOP)367*1421FT	J-13	1421	433.1208	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	70.3	0	12.1	0	not meas.	not meas.	0	2.63	0	1.23	4.11	not meas.	not meas.	90.4	
544	J-13(CLINOP)368*1421FT	J-13	1421	433.1208	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	71.6	0.03	12.6	0	not meas.	not meas.	0	2.77	0	1.16	4.25	not meas.	not meas.	92.6	
545	J-13(CLINOP)369*1421FT	J-13	1421	433.1208	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	70.1	0.05	12	0.37	not meas.	not meas.	0.03	2.84	0.1	1.22	4.09	not meas.	not meas.	90.8	
546	J-13(CLINOP)370*1421FT	J-13	1421	433.1208	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.8	0.04	11.4	0	not meas.	not meas.	0	2.45	0.03	1.22	3.93	not meas.	not meas.	86.9	
547	J-13(CLINOP)371*1421FT	J-13	1421	433.1208	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	69.2	0.03	11.6	0	not meas.	not meas.	0	2.56	0	1.19	4.53	not meas.	not meas.	89.0	
548	J-13(CLINOP)372*1421FT	J-13	1421	433.1208	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	69.4	0.03	11.8	0	not meas.	not meas.	0.01	2.3	0.12	1.3	4.86	not meas.	not meas.	89.8	
549	J-13(CLINOP)373*1457FT	J-13	1457	444.0936	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	63.6	0.03	12.1	0	not meas.	not meas.	0.99	3.48	0.1	0.38	2.02	not meas.	not meas.	82.7	
550	J-13(CLINOP)374*1457FT	J-13	1457	444.0936	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	62.7	0.02	11.3	0.04	not meas.	not meas.	0.92	2.85	0.06	0.34	2.52	not meas.	not meas.	80.8	
551	J-13(CLINOP)375*1457FT	J-13	1457	444.0936	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.9	0.03	11.9	0	not meas.	not meas.	0.94	3.05	0.03	0.41	2.41	not meas.	not meas.	83.7	
552	J-13(CLINOP)376*1457FT	J-13	1457	444.0936	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.4	0.03	11.9	0	not meas.	not meas.	0.89	3.07	0	0.49	2.62	not meas.	not meas.	84.4	
553	J-13(CLINOP)377*1457FT	J-13	1457	444.0936	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.1	0	11.7	0.06	not meas.	not meas.	0.92	2.95	0.06	0.46	2.52	not meas.	not meas.	82.8	
554	J-13(CLINOP)378*1457FT	J-13	1457	444.0936	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.3	0	11.5	0.08	not meas.	not meas.	0.93	2.76	0.1	0.39	2.57	not meas.	not meas.	83.6	
555	J-13(CLINOP)379*1457FT	J-13	1457	444.0936	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.4	0	11.9	0.18	not meas.	not meas.	0.88	3.1	0.16	0.5	2.58	not meas.	not meas.	84.7	
556	J-13(CLINOP)380*1457FT	J-13	1457	444.0936	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.5	0	11.8	0.04	not meas.	not meas.	0.94	3.01	0.09	0.59	2.89	not meas.	not meas.	84.9	
557	J-13(CLINOP)381*1457FT	J-13	1457	444.0936	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	63.9	0.03	11.7	0.16	not meas.	not meas.	0.94	2.83	0.19	0.31	2.42	not meas.	not meas.	82.5	
558	J-13(CLINOP)382*1519FT	J-13	1519	462.9912	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.1	0.02	11.9	0	not meas.	not meas.	0.4	3.5	0	0.53	2.85	not meas.	not meas.	85.3	
559	J-13(CLINOP)383*1519FT	J-13	1519	462.9912	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.5	0.02	12.2	0.03	not meas.	not meas.	0.51	3.22	0	0.66	3.1	not meas.	not meas.	85.2	
560	J-13(CLINOP)384*1519FT	J-13	1519	462.9912	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.9	0	12.6	0	not meas.	not meas.	0.53	3.79	0.06	0.52	2.71	not meas.	not meas.	86.1	
561	J-13(CLINOP)385*1519FT	J-13	1519	462.9912	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64	0.03	12.2	0.02	not meas.	not meas.	0.38	3.82	0.1	0.63	2.4	not meas.	not meas.	83.6	
562	J-13(CLINOP)386*1519FT	J-13	1519	462.9912	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64	0.03	12.3	0.09	not meas.	not meas.	0.47	3.74	0	0.77	3.19	not meas.	not meas.	84.6	
563	J-13(CLINOP)387*1519FT	J-13	1519	462.9912	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66	0.02	12.1	0.07	not meas.	not meas.	0.5	3.59	0.07	0.56	2.91	not meas.	not meas.	85.8	
564	J-13(CLINOP)388*1519FT	J-13	1519	462.9912	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.8	0	12.5	0.01	not meas.	not meas.	0.45	3.49	0	0.72	3.35	not meas.	not meas.	87.3	
565	J-13(CLINOP)389*1519FT	J-13	1519	462.9912	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.4	0.02	12.7	0.02	not meas.	not meas.	0.47	3.63	0	0.75	3.22	not meas.	not meas.	87.2	
566	J-13(CLINOP)390*1519FT	J-13	1519	462.9912	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.8	0.03	12.7	0.04	not meas.	not meas.	0.52	3.66	0	0.71	3.6	not meas.	not meas.	88.1	
567	J-13(CLINOP)391*1519FT	J-13	1519	462.9912	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.6	0	11.8	0	not meas.	not meas.	0.42	3.42	0	0.63	3.27	not meas.	not meas.	87.1	
568	J-13(CLINOP)392*1546FT	J-13	1546	471.2208	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.6	0	9.7	0	not meas.	not meas.	0	3.91	0.1	0.19	1.82	not meas.	not meas.	80.3	
569	J-13(CLINOP)393*1546FT	J-13	1546	471.2208	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.5	0	12.3	0	not meas.	not meas.	0	4.44	0.06	0.5	2.93	not meas.	not meas.	85.7	
570	J-13(CLINOP)394*1612FT	J-13	1612	491.3376	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68.1	0	12.2	0.13	not meas.	not meas.	0	4.39	0.06	0.3	2.55	not meas.	not meas.	87.7	
571	J-13(CLINOP)395*1612FT	J-13	1612	491.3376	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.6	0	12.4	0.06	not meas.	not meas.	0	4.56	0	0.3	2.42	not meas.	not meas.	87.4	
572	3-15-82-11(CLINOP)396	outcrop	0	0	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	63.5	0	11.2	0	not meas.	not meas.	0.68	2.13	0	0.89	3.16	not meas.	not meas.	81.6	Outcrop at Prow Pass, N. Yucca Mt.; Nev. State Coordin. 786550N, 551400E.
573	3-15-82-11(CLINOP)397	outcrop	0	0	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	63.6	0	11.1	0	not meas.	not meas.	0.63	2.18	0	0.84	3.13	not meas.	not meas.	81.5	Outcrop at Prow Pass, N. Yucca Mt.; Nev. State Coordin. 786550N, 551400E.
574	3-15-82-11(CLINOP)398	outcrop	0	0	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	63.8	0	11.3	0	not meas.	not meas.	0.68	2.09	0	0.86	3.41	not meas.	not meas.	82.1	Outcrop at Prow Pass, N. Yucca Mt.; Nev. State Coordin. 786550N, 551400E.
575	3-15-82-11(CLINOP)399	outcrop	0	0	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.5	0	11.9	0.56	not meas.	not meas.	0.6	2.41	0	0.89	3.33	not meas.	not meas.	86.5	Outcrop at Prow Pass, N. Yucca Mt.; Nev. State Coordin. 786550N, 551400E.
576	3-15-82-11(CLINOP)400	outcrop	0	0	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.4	0	11.9	0	not meas.	not meas.	0.55	2.47	0	0.95	3.27	not meas.	not meas.	85.5	Outcrop at Prow Pass, N. Yucca Mt.; Nev. State Coordin. 786550N, 551400E.
577	3-15-82-11(CLINOP)401	outcrop	0	0	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.6	0	12.3	0	not meas.	not meas.	0.61	2.47	0	0.89	3.39	not meas.	not meas.	87.3	Outcrop at Prow Pass, N. Yucca Mt.; Nev. State Coordin. 786550N, 551400E.
578	3-15-82-11(CLINOP)402	outcrop	0	0	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68.9	0	12.1	0	not meas.	not meas.	0.68	2.11	0	0.76	3.43	not meas.	not meas.	88.0	Outcrop at Prow Pass, N. Yucca Mt.; Nev. State Coordin. 786550N, 551400E.
579	3-15-82-11(CLINOP)403	outcrop	0	0	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	63.8	0	12.7	0	not meas.	not meas.	0.61	2.67	0	0.99	3.16	not meas.	not meas.	83.9	Outcrop at Prow Pass, N. Yucca Mt.; Nev. State Coordin. 786550N, 551400E.
580	5-6-81-1(CLINOP)404	outcrop	0	0	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	63.3	0	12.6	0	not meas.	not meas.	0.74	2.77	0	0.34	3.6	not meas.	not meas.	83.6	Outcrop at Prow Pass, N. Yucca Mt.; Nev. State Coordin. 782850N, 550625E; Nonwelded zeol. tuff in upper and central part of Calico Hills tuff.
581	5-6-81-1(CLINOP)405	outcrop	0	0	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	63.4	0	12.4	0	not meas.	not meas.	0.81	2.69	0.2	0.29	3.69	not meas.	not meas.	83.5	Outcrop at Prow Pass, N. Yucca Mt.; Nev. State Coordin. 782850N, 550625E; Nonwelded zeol. tuff in upper and central part of Calico Hills tuff.
582	5-6-81-1(CLINOP)406	outcrop	0	0	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.3	0	11.9	0	not meas.	not meas.	0.38	2.37	0	0.52	5.27	not meas.	not meas.	87.7	Outcrop at Prow Pass, N. Yucca Mt.; Nev. State Coordin. 782850N, 550625E; Nonwelded zeol. tuff in upper and central part of Calico Hills tuff.
583	5-6-81-1(CLINOP)407	outcrop	0	0	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.6	0	12.8	0	not meas.	not meas.	0.81	2.55	0	0.43	4.14	not meas.	not meas.	86.2	Outcrop at Prow Pass, N. Yucca Mt.; Nev. State Coordin. 782850N, 550625E; Nonwelded zeol. tuff in upper and central part of Calico Hills tuff.
584	5-6-81-1(CLINOP)408	outcrop	0	0	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.7	0	12.7	0	not meas.	not meas.	1.13	2.37	0	0.35	3.77	not meas.	not meas.	85.0	Outcrop at Prow Pass, N. Yucca Mt.; Nev. State Coordin. 782850N, 550625E; Nonwelded zeol. tuff in upper and central part of Calico Hills tuff.
585	5-6-81-1(CLINOP)409	outcrop	0	0	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.4	0	12.6	0	not meas.	not meas.	0.76	2.82	0	0.43	3.99	not meas.	not meas.	85.0	Outcrop at Prow Pass, N. Yucca Mt.; Nev. State Coordin. 782850N, 550625E; Nonwelded zeol. tuff in upper and central part of Calico Hills tuff.
586	5-6-81-1(CLINOP)410	outcrop	0	0	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	65.3	0	12.9	0	not meas.	not meas.	0.7	2.76	0	0.38	3.94	not meas.	not meas.	86.0	Outcrop at Prow Pass, N. Yucca Mt.; Nev. State Coordin. 782850N, 550625E; Nonwelded zeol. tuff in upper and central part of Calico Hills tuff.
587	3-15-82-6(CLINOP)411	outcrop	0	0	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64	0	12.3	0	not meas.	not meas.	0.5	2.33	0	0.36	5.68	not meas.	not meas.	85.2	Outcrop at Prow Pass, N. Yucca Mt.; Nev. State Coordin. 786400N, 551100E; Nonwelded zeol. tuff in upper and central part of Calico Hills tuff.
588	3-15-82-2(CLINOP)412	outcrop	0	0	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68.4	0	12.2	0	not meas.	not meas.	0.01	0.91	0	1.1	7.24	not meas.	not meas.	89.9	Outcrop at Prow Pass, N. Yucca Mt.; Nev. State Coordin. 786600N, 550900E; Nonwelded zeol. tuff near base of Calico Hills tuff.
589	3-15-82-2(CLINOP)413	outcrop	0	0	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	70	0	12.1	0	not meas.	not meas.	0.04	0.98	0	1.1	6.68	not meas.	not meas.	90.9	
590	3-15-82-2(CLINOP)414	outcrop	0	0	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	69.6	0	12.4	0	not meas.	not meas.	0.04	0.9	0	1.16	7.96	not meas.	not meas.	92.1	
591	3-15-82-2(CLINOP)415	outcrop	0	0	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	68.6	0	13	0	not meas.	not meas.	0.04	1.05	0	1.2	8.14	not meas.	not meas.	92.0	
592	3-15-82-2(CLINOP)416	outcrop	0	0	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	64.1	0	11.7	0	not meas.	not meas.	0.03	0.92	0	1.21	7.7	not meas.	not meas.	85.7	
593	3-15-82-2(CLINOP)417	outcrop	0	0	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	66.6	0	12.7	0	not meas.	not meas.	0.1	0.8	0	0.99	9.03	not meas.	not meas.	89.8	
594	3-15-82-2(CLINOP)418	outcrop	0	0	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	69.9	0	12.2	0	not meas.	not meas.	0.04	0.61	0	0.9	8.38	not meas.	not meas.	92.0	
595	3-15-82-2(CLINOP)419	outcrop	0	0	Broxton et al. (1986)	Clinoptilolite	Electron microprobe	67.3	0	12.2	0	not meas.	not meas.	0.02	1.13	0	1.22	8.29	not meas.	not meas.	88.2	
596	USWG-1(ANALC)1*3371FT	USW G-1	3371	1027.4808	Broxton et al. (1986)	Analcime	Electron microprobe	59.1	0	19.6	0	not meas.	not meas.	0	0.01	0	12	0	not meas.	not meas.	90.7	
597	USWG-1(ANALC)2*3371FT	USW G-1	3371	1027.4808	Broxton et al. (1986)	Analcime	Electron microprobe	58.7	0	19.6	0	not meas.	not meas.	0	0	0	11.9	0	not meas.	not meas.	90.2	
598	USWG-1(ANALC)3*3371FT	USW G-1	3371	1027.4808	Broxton et al. (1986)	Analcime	Electron microprobe	59.6	0	19.5	0	not meas.	not meas.	0	0	0	12	0	not meas.	not meas.	91.1	
599	USWG-1(ANALC)4*3371FT	USW G-1	3371	1027.4808	Broxton et al. (1986)	Analcime	Electron microprobe	59	0	19.6	0	not meas.	not meas.	0	0.01	0	12.1	0	not meas.	not meas.	90.7	
600	USWG-1(ANALC)5*3371FT	USW G-1	3371	1027.4808	Broxton et al. (1986)	Analcime	Electron microprobe	59.1	0	19.7	0	not meas.	not meas.	0	0.04	0	12.1	0	not meas.	not meas.	90.9	
601	USWG-1(ANALC)6*3371FT	USW G-1	3371	1027.4808	Broxton et al. (1986)	Analcime	Electron microprobe	58.9	0	19.7	0	not meas.	not meas.	0	0.01	0	11.8	0	not meas.	not meas.	90.4	

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	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
1	SAMPLE	DRILL HOLE NO.	DEPTH (FT)	DEPTH (M)	SOURCE	Rock/Mineral Type	Analytical Method	SIO2	TIO2	AL2O3	FE2O3	FEO	MNO	MGO	CAO	BAO	NA2O	K2O	P2O5	H2O	Total Oxides	NOTES
602	USWG-1(ANALC)7*3371FT	USW G-1	3371	1027.4808	Broxton et al. (1986)	Analcime	Electron microprobe	58.9	0	19.4	0	not meas.	not meas.	0	0	0	12.1	0	not meas.	not meas.	90.4	
603	USWG-1(ANALC)8*3371FT	USW G-1	3371	1027.4808	Broxton et al. (1986)	Analcime	Electron microprobe	57.9	0	19.5	0	not meas.	not meas.	0	0.01	0	11.9	0	not meas.	not meas.	89.3	
604	USWG-1(ANALC)9*3371FT	USW G-1	3371	1027.4808	Broxton et al. (1986)	Analcime	Electron microprobe	59	0	19.6	0	not meas.	not meas.	0	0	0	12.1	0	not meas.	not meas.	90.7	
605	USWG-1(ANALC)10*3371FT	USW G-1	3371	1027.4808	Broxton et al. (1986)	Analcime	Electron microprobe	59	0	19.6	0	not meas.	not meas.	0	0.02	0	12.2	0	not meas.	not meas.	90.8	
606	USWG-1(ANALC)11*3371FT	USW G-1	3371	1027.4808	Broxton et al. (1986)	Analcime	Electron microprobe	58.1	0	19.1	0	not meas.	not meas.	0	0	0	11.6	0	not meas.	not meas.	88.8	
607	USWG-1(ANALC)12*4095FT	USW G-1	4095	1248.156	Broxton et al. (1986)	Analcime	Electron microprobe	60.2	0	18.2	0.04	not meas.	not meas.	0	0	0	11.4	0	not meas.	not meas.	89.8	
608	USWG-1(ANALC)13*4208FT	USW G-1	4208	1282.5984	Broxton et al. (1986)	Analcime	Electron microprobe	58.2	0	19.5	0	not meas.	not meas.	0	0	0	12.1	0	not meas.	not meas.	89.8	
609	USWG-1(ANALC)14*4208FT	USW G-1	4208	1282.5984	Broxton et al. (1986)	Analcime	Electron microprobe	57	0	20	0	not meas.	not meas.	0	0	0	12.5	0	not meas.	not meas.	89.5	
610	USWG-1(ANALC)15*4208FT	USW G-1	4208	1282.5984	Broxton et al. (1986)	Analcime	Electron microprobe	57.2	0	19.3	0	not meas.	not meas.	0	0	0	12.1	0	not meas.	not meas.	88.6	
611	USWG-1(ANALC)16*4295FT	USW G-1	4295	1309.116	Broxton et al. (1986)	Analcime	Electron microprobe	60.2	0	18.9	0.07	not meas.	not meas.	0	0.03	0.03	11.3	0	not meas.	not meas.	90.5	
612	USWG-1(ANALC)17*4295FT	USW G-1	4295	1309.116	Broxton et al. (1986)	Analcime	Electron microprobe	60.5	0	18.8	0.04	not meas.	not meas.	0	0.04	0.03	11.2	0	not meas.	not meas.	90.6	
613	USWG-1(ANALC)18*4295FT	USW G-1	4295	1309.116	Broxton et al. (1986)	Analcime	Electron microprobe	59.4	0	19.5	0.04	not meas.	not meas.	0	0.02	0	11.5	0	not meas.	not meas.	90.5	
614	USWG-1(ANALC)19*4295FT	USW G-1	4295	1309.116	Broxton et al. (1986)	Analcime	Electron microprobe	59.4	0	19.3	0.07	not meas.	not meas.	0	0	0	11.5	0	not meas.	not meas.	90.3	
615	USWG-1(ANALC)20*4341FT	USW G-1	4341	1323.1368	Broxton et al. (1986)	Analcime	Electron microprobe	59.6	0.03	19.4	0	not meas.	not meas.	0.01	0.01	0.07	11.8	0	not meas.	not meas.	90.9	
616	USWG-1(ANALC)21*4341FT	USW G-1	4341	1323.1368	Broxton et al. (1986)	Analcime	Electron microprobe	59.1	0	18.4	0	not meas.	not meas.	0.03	0.01	0.05	11.4	0	not meas.	not meas.	89.0	
617	USWG-1(ANALC)22*4400FT	USW G-1	4400	1341.12	Broxton et al. (1986)	Analcime	Electron microprobe	61.6	0	19.1	0	not meas.	not meas.	0	0	0.26	11.6	0	not meas.	not meas.	92.6	
618	USWG-1(ANALC)23*4503FT	USW G-1	4503	1372.5144	Broxton et al. (1986)	Analcime	Electron microprobe	59.9	0	18.6	0	not meas.	not meas.	0	0.02	0	11.6	0.01	not meas.	not meas.	90.0	
619	USWG-1(ANALC)24*4503FT	USW G-1	4503	1372.5144	Broxton et al. (1986)	Analcime	Electron microprobe	57.5	0	19.8	0	not meas.	not meas.	0	0.02	0	12.2	0.04	not meas.	not meas.	89.6	
620	USWG-1(ANALC)25*4700FT	USW G-1	4700	1432.56	Broxton et al. (1986)	Analcime	Electron microprobe	57.8	0	19.7	0.04	not meas.	not meas.	0	0	0.05	11.9	0	not meas.	not meas.	89.5	
621	USWG-1(ANALC)26*4700FT	USW G-1	4700	1432.56	Broxton et al. (1986)	Analcime	Electron microprobe	58.4	0	19.7	0.01	not meas.	not meas.	0	0	0.18	11.8	0	not meas.	not meas.	90.1	
622	USWG-1(ANALC)27*4700FT	USW G-1	4700	1432.56	Broxton et al. (1986)	Analcime	Electron microprobe	58.2	0	20	0.04	not meas.	not meas.	0	0	0	11.8	0	not meas.	not meas.	90.0	
623	USWG-1(ANALC)28*4876FT	USW G-1	4876	1486.2048	Broxton et al. (1986)	Analcime	Electron microprobe	59.1	0.05	18.9	0	not meas.	not meas.	0.02	0	0	11.8	0	not meas.	not meas.	89.9	
624	USWG-1(ANALC)29*4876FT	USW G-1	4876	1486.2048	Broxton et al. (1986)	Analcime	Electron microprobe	58.7	0	20.4	0	not meas.	not meas.	0	0	0	12.8	0.02	not meas.	not meas.	89.9	
625	USWG-1(ANALC)30*4876FT	USW G-1	4876	1486.2048	Broxton et al. (1986)	Analcime	Electron microprobe	59.9	0	18.8	0.01	not meas.	not meas.	0.03	0.02	0	11.7	0.03	not meas.	not meas.	90.5	
626	USWG-1(ANALC)31*4876FT	USW G-1	4876	1486.2048	Broxton et al. (1986)	Analcime	Electron microprobe	57.3	0.02	19	0	not meas.	not meas.	0	0	0	11.9	0.03	not meas.	not meas.	88.3	
627	USWG-1(ANALC)32*4912FT	USW G-1	4912	1497.1776	Broxton et al. (1986)	Analcime	Electron microprobe	57.1	0	19.9	0.01	not meas.	not meas.	0	0	0	11.9	0	not meas.	not meas.	88.9	
628	USWG-1(ANALC)33*4912FT	USW G-1	4912	1497.1776	Broxton et al. (1986)	Analcime	Electron microprobe	58.4	0	20	0.04	not meas.	not meas.	0	0	0	11.9	0.01	not meas.	not meas.	90.4	
629	USWG-1(ANALC)34*4912FT	USW G-1	4912	1497.1776	Broxton et al. (1986)	Analcime	Electron microprobe	57	0	20.8	0	not meas.	not meas.	0	0	0	12.5	0	not meas.	not meas.	90.3	
630	USWG-1(ANALC)35*5093FT	USW G-1	5093	1552.3464	Broxton et al. (1986)	Analcime	Electron microprobe	59.4	0	20	0	not meas.	not meas.	0	0	0	11.8	0	not meas.	not meas.	91.2	
631	USWG-1(ANALC)36*5126FT	USW G-1	5126	1562.4048	Broxton et al. (1986)	Analcime	Electron microprobe	58.6	0	19.5	0.01	not meas.	not meas.	0.01	0.03	0	12.2	0.01	not meas.	not meas.	90.4	
632	USWG-1(ANALC)37*5126FT	USW G-1	5126	1562.4048	Broxton et al. (1986)	Analcime	Electron microprobe	59.3	0	19.9	0.03	not meas.	not meas.	0	0	0.03	12.5	0.02	not meas.	not meas.	91.8	
633	USWG-1(ANALC)38*5167FT	USW G-1	5167	1574.9016	Broxton et al. (1986)	Analcime	Electron microprobe	57.5	0	19.8	0.01	not meas.	not meas.	0	0	0.05	12	0	not meas.	not meas.	89.5	
634	USWG-1(ANALC)39*5167FT	USW G-1	5167	1574.9016	Broxton et al. (1986)	Analcime	Electron microprobe	57.4	0	19.7	0	not meas.	not meas.	0	0.01	0.11	11.6	0	not meas.	not meas.	88.8	
635	USWG-1(ANALC)40*5167FT	USW G-1	5167	1574.9016	Broxton et al. (1986)	Analcime	Electron microprobe	58.4	0	18	0.01	not meas.	not meas.	0	0	0	11.2	0	not meas.	not meas.	87.6	
636	USWG-1(ANALC)41*5167FT	USW G-1	5167	1574.9016	Broxton et al. (1986)	Analcime	Electron microprobe	57.9	0	20.1	0	not meas.	not meas.	0	0.04	0	12.8	0	not meas.	not meas.	90.5	
637	USWG-1(ANALC)42*5212FT	USW G-1	5212	1588.6176	Broxton et al. (1986)	Analcime	Electron microprobe	60.4	0	18.6	0.06	not meas.	not meas.	0	0.01	0.08	11.3	0.03	not meas.	not meas.	90.5	
638	USWG-1(ANALC)43*5212FT	USW G-1	5212	1588.6176	Broxton et al. (1986)	Analcime	Electron microprobe	59.4	0	18.5	0	not meas.	not meas.	0.01	0.02	0.13	11.3	0.03	not meas.	not meas.	89.4	
639	USWG-1(ANALC)44*5212FT	USW G-1	5212	1588.6176	Broxton et al. (1986)	Analcime	Electron microprobe	58.7	0	19.4	0.1	not meas.	not meas.	0.02	0.02	0.05	11.7	0	not meas.	not meas.	90.0	
640	USWG-1(ANALC)45*5212FT	USW G-1	5212	1588.6176	Broxton et al. (1986)	Analcime	Electron microprobe	59.8	0	18.9	0.04	not meas.	not meas.	0	0.02	0.05	11.7	0.02	not meas.	not meas.	90.5	
641	USWG-1(ANALC)46*5296FT	USW G-1	5296	1614.2208	Broxton et al. (1986)	Analcime	Electron microprobe	56.5	0	19.5	0.02	not meas.	not meas.	0	0	0.12	11.8	0	not meas.	not meas.	87.9	
642	USWG-1(ANALC)47*5296FT	USW G-1	5296	1614.2208	Broxton et al. (1986)	Analcime	Electron microprobe	59.1	0	20	0.04	not meas.	not meas.	0	0	0.09	11.9	0	not meas.	not meas.	91.1	
643	USWG-1(ANALC)48*5296FT	USW G-1	5296	1614.2208	Broxton et al. (1986)	Analcime	Electron microprobe	59	0	19.8	0.04	not meas.	not meas.	0	0	0	12	0	not meas.	not meas.	90.8	
644	USWG-1(ANALC)49*5296FT	USW G-1	5296	1614.2208	Broxton et al. (1986)	Analcime	Electron microprobe	59.2	0	19.5	0.05	not meas.	not meas.	0	0	0.7	11.7	0.01	not meas.	not meas.	91.2	
645	USWG-1(ANALC)50*5311FT	USW G-1	5311	1618.7928	Broxton et al. (1986)	Analcime	Electron microprobe	58.9	0	19.8	0.03	not meas.	not meas.	0	0.02	0.17	12.2	0.01	not meas.	not meas.	91.1	
646	USWG-1(ANALC)51*5311FT	USW G-1	5311	1618.7928	Broxton et al. (1986)	Analcime	Electron microprobe	59.6	0	19.5	0	not meas.	not meas.	0	0.05	0	12.2	0.01	not meas.	not meas.	91.4	
647	USWG-1(ANALC)52*5412FT	USW G-1	5412	1649.5776	Broxton et al. (1986)	Analcime	Electron microprobe	56.4	0.02	19.9	0	not meas.	not meas.	0	0	0	12.4	0	not meas.	not meas.	88.7	
648	USWG-1(ANALC)53*5412FT	USW G-1	5412	1649.5776	Broxton et al. (1986)	Analcime	Electron microprobe	58	0	19.3	0.01	not meas.	not meas.	0	0	0	12	0	not meas.	not meas.	89.3	
649	USWG-1(ANALC)54*5498FT	USW G-1	5498	1675.7904	Broxton et al. (1986)	Analcime	Electron microprobe	57.5	0	20	0	not meas.	not meas.	0	0	0	12	0	not meas.	not meas.	89.5	
650	USWG-1(ANALC)55*5498FT	USW G-1	5498	1675.7904	Broxton et al. (1986)	Analcime	Electron microprobe	58.1	0	19.9	0	not meas.	not meas.	0	0	0	11.6	0.06	not meas.	not meas.	89.9	
651	USWG-1(ANALC)56*5679FT	USW G-1	5679	1730.9592	Broxton et al. (1986)	Analcime	Electron microprobe	59.3	0	19.6	0	not meas.	not meas.	0	0.04	0.13	12.2	0.02	not meas.	not meas.	91.3	
652	USWG-1(ANALC)57*5746FT	USW G-1	5746	1751.3808	Broxton et al. (1986)	Analcime	Electron microprobe	57.7	0	20	0	not meas.	not meas.	0	0.04	0	11.9	0	not meas.	not meas.	89.6	
653	USWG-1(ANALC)58*5746FT	USW G-1	5746	1751.3808	Broxton et al. (1986)	Analcime	Electron microprobe	58.6	0	19.2	0	not meas.	not meas.	0	0.04	0	11.6	0	not meas.	not meas.	89.4	
654	UE-25b#1(H)(ANALC)59*3393FT	UE-25b#1(H)	3393	1034.1864	Broxton et al. (1986)	Analcime	Electron microprobe	61.9	0	18.2	0	not meas.	not meas.	0	0	0.04	11.3	0	not meas.	not meas.	91.4	
655	UE-25b#1(H)(ANALC)60*3393FT	UE-25b#1(H)	3393	1034.1864	Broxton et al. (1986)	Analcime	Electron microprobe	61.3	0	18.5	0	not meas.	not meas.	0	0	0	11.1	0	not meas.	not meas.	90.9	
656	UE-25b#1(H)(ANALC)61*3393FT	UE-25b#1(H)	3393	1034.1864	Broxton et al. (1986)	Analcime	Electron microprobe	61.5	0	18.7	0	not meas.	not meas.	0	0.02	0	11.3	0	not meas.	not meas.	91.5	
657	UE-25b#1(H)(ANALC)62*3393FT	UE-25b#1(H)	3393	1034.1864	Broxton et al. (1986)	Analcime	Electron microprobe	60.7	0	18.6	0	not meas.	not meas.	0	0	0.01	11.4	0	not meas.	not meas.	90.7	
658	UE-25b#1(H)(ANALC)63*3506FT	UE-25b#1(H)	3506	1068.6288	Broxton et al. (1986)	Analcime	Electron microprobe	61.8	0	18.5	0	not meas.	not meas.	0	0	0	11.2	0.02	not meas.	not meas.	91.5	
659	UE-25b#1(H)(ANALC)64*3506FT	UE-25b#1(H)	3506	1068.6288	Broxton et al. (1986)	Analcime	Electron microprobe	61.6	0	19	0	not meas.	not meas.	0	0.04	0.06	11.6	0	not meas.	not meas.	92.3	
660	UE-25b#1(H)(ANALC)65*3506FT	UE-25b#1(H)	3506	1068.6288	Broxton et al. (1986)	Analcime	Electron microprobe	58.6	0	20.6	0	not meas.	not meas.	0	0.03	0	12.7	0	not meas.	not meas.	91.8	
661	UE-25b#1(H)(ANALC)66*3506FT	UE-25b#1(H)	3506	1068.6288	Broxton et al. (1986)	Analcime	Electron microprobe	57.6	0	20.8	0	not meas.	not meas.	0	0	0.01	12.5	0.01	not meas.	not meas.	90.9	
662	UE-25p#1(ANALC)67*2220FT	UE-25p#1	2220	676.656	Broxton et al. (1986)	Analcime	Electron microprobe	59.9	0	19.2	0	not meas.	not meas.	0	0	0.03	12	0	not meas.	not meas.	91.1	
663	UE-25p#1(ANALC)68*2220FT	UE-25p#1	2220	676.656	Broxton et al. (1986)	Analcime	Electron microprobe	59.3	0	18.8	0	not meas.	not meas.	0	0	0	11.9	0	not meas.	not meas.	90.0	
664	UE-25p#1(ANALC)69*2220FT	UE-25p#1	2220	676.656	Broxton et al. (1986)	Analcime	Electron microprobe	59.2	0	19.5	0	not meas.	not meas.	0	0	0	11.9	0	not meas.	not meas.	90.6	
665	UE-25p#1(ANALC)70*2220FT	UE-25p#1	2220	676.656	Broxton et al. (1986)	Analcime	Electron microprobe	59.6	0	19.5	0.02	not meas.	not meas.	0	0.02	0.09	11.9	0.03	not meas.	not meas.	91.2	
666	UE-25p#1(ANALC)71*2290FT	UE-25p#1	2290	697.992	Broxton et al. (1986)	Analcime	Electron microprobe	58.1	0	19.6	0.02	not meas.	not meas.	0	0	0.13	12.1	0	not meas.	not meas.	90.0	
667	UE-25p#1(ANALC)72*3453FT	UE-25p#1	3453	1052.4744	Broxton et al. (1986)	Analcime	Electron microprobe	62.5	0	18.8	0	not meas.	not meas.	0	0	0	11.3	0	not meas.	not meas.	92.6	
668	J-13(ANALC)73*608FT	J-13	608	185.3184	Broxton et al. (1986)	Analcime	Electron microprobe	58.6	0	19.3	0.02	not meas.	not meas.	0	0	0.16	11.7	0.03	not meas.	not meas.	89.8	
669	J-13(ANALC)74*608FT	J-13	608	185.3184	Broxton et al. (1986)	Analcime	Electron microprobe	57.8	0	19.9	0.04	not meas.	not meas.	0	0	0.14	12	0.04	not meas.	not meas.	89.9	
670	J-13(ANALC)75*608FT	J-13	608	185.3184	Broxton et al. (1986)	Analcime	Electron microprobe	57.5	0	19.3	0	not meas.	not meas.	0	0	0	11.4	0	not meas.	not meas.	88.2	
671	J-13(ANALC)76*608FT	J-13	608	185.3184	Broxton et al. (1986)	Analcime	Electron microprobe	58.1	0	18.9	0.07	not meas.	not meas.	0.02	0	0	11.7	0.01	not meas.	not meas.	88.8	
672	J-13(ANALC)77*1995FT	J-13	1995	608.076	Broxton et al. (1986)	Analcime	Electron microprobe	60.1	0.02	19.3	0.04	not meas.	not meas.	0.01	0.03	0.13	11.6	0.03	not meas.	not meas.	91.3	
673	J-13(ANALC)78*1995FT	J-13	1995	608.076	Broxton et al. (1986)	Analcime	Electron microprobe	61.5	0	18.7	0.05	not meas.	not meas.	0	0	0.12	11.2	0.03	not meas.	not meas.	91.6	
674	J-13(ANALC)79*1995FT	J-13	1995	608.076	Broxton et al. (1986)	Analcime	Electron microprobe	59.2	0.02	20.2	0.05	not meas.	not meas.	0	0.04	0.05	12.2	0.05	not meas.	not meas.	91.8	
675	J-13(ANALC)80*1995FT	J-13	1995	608.076	Broxton et al. (1986)	Analcime	Electron microprobe	58.4	0	20.2	0	not meas.	not meas.	0	0	0	12.1	0.01	not meas.	not meas.	90.7	
676	J-13(ANALC)81*1995FT	J-13	1995	608.076	Broxton et al. (1986)	Analcime	Electron microprobe	61.4	0	19.1	0.02	not meas.	not meas.	0	0.02	0.05	11.2	0	not meas.	not meas.	91.8	
677	J-13(ANALC)82*1995FT	J-13	1995	608.076	Broxton et al. (1986)	Analcime	Electron microprobe	60.3	0	18.9	0	not meas.	not meas.	0	0	0.09	11.6	0.01	not meas.	not meas.	90.8	
678	USWG-1(FSPAR)1*4208FT	USW G-1	4208	1282.5984	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	66.9	0	16.3	0	not meas.	not meas.	0	0	0	0.04	15	not meas.	not meas.	98.2	
679	USWG-1(FSPAR)2*4341FT	USW G-1	4341	1323.1368	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	67.8	0.02	19.6	0	not meas.	not meas.	0.01	0.16	0	11.8	0.01	not meas.	not meas.	99.4	
680	USWG-1(FSPAR)3*4400FT	USW G-1	4400	1341.12	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	69.3	0	19	0	not meas.	not meas.	0	0	0	11.1	0.58	not meas.	not meas.	100.0	
681	USWG-1(FSPAR)4*4400FT	USW G-1	4400	1341.12	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	69.4	0	19.8	0.02	not meas.	not meas.	0	0.14	0.13	11.6	0.05	not meas.	not meas.	101.1	
682	USWG-1(FSPAR)5*4503FT	USW G-1	4503	1372.5144	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	67.3	0.02	16.4	0.01	not meas.	not meas.	0.02	0.04	0.05	0.07	15.2	not meas.	not meas.	99.1	
683	USWG-1(FSPAR)6*4912FT	USW G-1	4912	1497.1776	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	67	0	16.6	0.04	not meas.	not meas.	0	0	0.16	0.04	14.9	not meas.	not meas.	98.7	
684	USWG-1(FSPAR)7*5026FT	USW G-1	5026	1531.9248	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	68.1	0	19	0	not meas.	not meas.	0	0.16	0	11.2	0.09	not meas.	not meas.	98.6	
685	USWG-1(FSPAR)8*5026FT	USW G-1	5026	1531.9248	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	66.2	0.01	16.4	0.02	not meas.	not meas.	0	0.01	0	0.07	15.1	not meas.	not meas.	97.8	
686	USWG-1(FSPAR)9*5093FT	USW G-1	5093	1552.3464	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	69.1	0	19.7	0.08	not meas.	not meas.	0	0.26	0	11.4	0.07	not meas.	not meas.	100.6	
687	USWG-1(FSPAR)10*5093FT	USW G-1	5093	1552.3464	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	69.5	0	19.9	0.07	not meas.	not meas.	0	0.42	0	11.4	0.03	not meas.	not meas.	101.3	
688	USWG-1(FSPAR)11*5093FT	USW G-1	5093	1552.3464	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	69.4	0	19.9	0.02	not meas.	not meas.	0	0.36	0	11.7	0.04	not meas.	not meas.	101.4	
689	USWG-1(FSPAR)12*5093FT	USW G-1	5093	1552.3464	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	70.1	0	19.5	0.01	not meas.	not meas.	0	0.31	0	11.5	0.05	not meas.	not meas.	101.5	
690	USWG-1(FSPAR)13*5093FT	USW G-1	5093	1552.3464	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	70	0	20	0.02	not meas.	not meas.	0	0.36	0	11.4	0.07	not meas.	not meas.	101.9	
691	USWG-1(FSPAR)14*5093FT	USW G-1	5093	1552.3464	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	69.1	0	20.4	0.02	not meas.	not meas.	0	0.74	0.08	11.3	0.03	not meas.	not meas.	101.7	
692	USWG-1(FSPAR)15*5093FT	USW G-1	5093	1552.3464	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	68.3	0	19.4	0.09	not meas.	not meas.	0	0.21	0	11.5	0.05	not meas.	not meas.	99.6	
693	USWG-1(FSPAR)16*5093FT	USW G-1	5093	1552.3464	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	70.5	0	19.7	0	not meas.	not meas.	0	0.25	0	11.7	0.04	not meas.	not meas.	102.2	
694	USWG-1(FSPAR)17*5126FT	USW G-1	5126	1562.4048	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	59	0.04	19.3	0.01	not meas.	not meas.	0	0	0.05	11.8	0.02	not meas.	not meas.	90.2	
695	USWG-1(FSPAR)18*5126FT	USW G-1	5126	1562.4048	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	67.8	0.02	17.3	0.13	not meas.	not meas.	0.03	0.01	0.06	0.1	16.2	not meas.	not meas.	101.6	
696	USWG-1(FSPAR)19*5296FT	USW G-1	5296	1614.2208	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	68.4	0	19.7	0.04	not meas.	not meas.	0	0.28	0	11.6	0.04	not meas.	not meas.	100.1	
697	USWG-1(FSPAR)20*5311FT	USW G-1	5311	1618.7928	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	69.5	0.03	19.1	0.04	not meas.	not meas.	0	0.34	0.13	11.5	0.09	not meas.	not meas.	100.7	
698	USWG-1(FSPAR)21*5311FT	USW G-1	5311	1618.7928	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	68.6	0.01	19.6	0.07	not meas.	not meas.	0.01	0.55	0	11.5	0.06	not meas.	not meas.	100.4	
699	USWG-1(FSPAR)22*5412FT	USW G-1	5412	1649.5776	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	66.4	0.07	16.8	0.04	not meas.	not meas.	0	0.02	0	0.32	15	not meas.	not meas.	98.7	
700	USWG-1(FSPAR)23*5412FT	USW G-1	5412	1649.5776	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	67.4	0.02	16.5	0.01	not meas.	not meas.	0.02	0.02	0.1	0.05	15.5	not meas.	not meas.	99.6	
701	USWG-1(FSPAR)24*5412FT	USW G-1	5412	1649.5776	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	68.3	0	19.4	0.01	not meas.	not meas.	0	0.02	0	11.9	0.09	not meas.	not meas.	99.7	
702	USWG-1(FSPAR)25*5412FT	USW G-1	5412	1649.5776	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	66.6	0	19.1	0	not meas.	not meas.	0	0.06	0	11.6	0.12	not meas.	not meas.	97.5	
703	USWG-1(FSPAR)26*5498FT	USW G-1	5498	1675.7904	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	67.2	0	17	0	not meas.	not meas.	0	0.03	0	0.03	15.3	not meas.	not meas.	99.6	
704	USWG-1(FSPAR)27*5498FT	USW G-1	5498	1675.7904	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	66.9	0	17	0	not meas.	not meas.	0	0	0	0.06	15.3	not meas.	not meas.	99.3	
705	USWG-1(FSPAR)28*5498FT	USW G-1	5498	1675.7904	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	69.7	0	18.9	0	not meas.	not meas.	0	0.02	0	11.7	0.09	not meas.	not meas.	100.4	
706	USWG-1(FSPAR)29*5498FT	USW G-1	5498	1675.7904	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	69.2	0	19.3	0	not meas.	not meas.	0	0.04	0.06	11.9	0.09	not meas.	not meas.	100.6	
707	USWG-1(FSPAR)30*5637FT	USW G-1	5637	1718.1576	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	68.4	0	19.9	0.01	not meas.	not meas.	0	0.42	0.03	11.6	0.04	not meas.	not meas.	100.3	
708	USWG-1(FSPAR)31*5746FT	USW G-1	5746	1751.3808	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	67.1	0	20.3	0.11	not meas.	not meas.	0	1.06	0	10.6	0.63	not meas.	not meas.	99.8	
709	USWG-1(FSPAR)32*5746FT	USW G-1	5746	1751.3808	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	69.6	0	19.8	0	not meas.	not meas.	0	0.22	0	11.9	0.04	not meas.	not meas.	101.6	
710	USWG-1(FSPAR)33*5746FT	USW G-1	5746	1751.3808	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	66.4	0	20.1	0	not meas.	not meas.	0	1.13	0	10.8	0.02	not meas.	not meas.	98.5	
711	USWG-1(FSPAR)34*5746FT	USW G-1	5746	1751.3808	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	69.1	0	19.8	0.04	not meas.	not meas.	0	0.36	0	11.5	0.04	not meas.	not meas.	100.9	
712	USWG-1(FSPAR)35*5746FT	USW G-1	5746	1751.3808	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	68.4	0	19.6	0.03	not meas.	not meas.	0	0.17	0	11.3	0.07	not meas.	not meas.	99.6	
713	USWG-1(FSPAR)36*5847FT	USW G-1	5847	1782.1656	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	69.8	0.04	18.8	0.04	not meas.	not meas.	0	0.13	0.06	11.3	0.13	not meas.	not meas.	100.3	
714	USWG-1(FSPAR)37*5847FT	USW G-1	5847	1782.1656	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	68.4	0.03	19.6	0.05	not meas.	not meas.	0.02	0.62	0.15	11.6	0.08	not meas.	not meas.	100.6	
715	USWG-1(FSPAR)38*5847FT	USW G-1	5847	1782.1656	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	67.2	0.03	19.5	0.08	not meas.	not meas.	0	1.24	0.2	10.8	0.1	not meas.	not meas.	99.2	
716	USWG-1(FSPAR)39*5847FT	USW G-1	5847	1782.1656	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	68.6	0.01	19.5	0	not meas.	not meas.	0.01	0.95	0	11.1	0.07	not meas.	not meas.	100.2	
717	USWG-1(FSPAR)40*5947FT	USW G-1	5947	1812.6456	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	67.3	0	20	0.01	not meas.	not meas.	0	0.9	0	11.1	0.01	not meas.	not meas.	99.2	
718	USWG-2(FSPAR)41*2325FT	USW G-2	2325	708.66	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	67.9	0	16.5	0.03	not meas.	not meas.	0	0.02	0	0.03	15.5	not meas.	not meas.	100.0	
719	USWG-2(FSPAR)42*2325FT	USW G-2	2325	708.66	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	68.1	0.04	16.4	0	not meas.	not meas.	0	0	0	0.04	15.3	not meas.	not meas.	99.9	
720	USWG-2(FSPAR)43*2325FT	USW G-2	2325	708.66	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	68.7	0	16.6	0	not meas.	not meas.	0	0.02	0	0.18	15.1	not meas.	not meas.	100.6	
721	USWG-2(FSPAR)44*2325FT	USW G-2	2325	708.66	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	68.8	0	16.4	0	not meas.	not meas.	0	0	0	0.06	15.2	not meas.	not meas.	100.5	

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Rock/Mineral Chemistry, Broxton et al. (1986)

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	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
1	SAMPLE	DRILL HOLE NO.	DEPTH (FT)	DEPTH (M)	SOURCE	Rock/Mineral Type	Analytical Method	SiO2	TiO2	AL2O3	FE2O3	FEO	MNO	MGO	CAO	BAO	NA2O	K2O	P2O5	H2O	Total Oxides	NOTES
2	USWG-2/FSPAR/45*2430FT	USW G-2	2430	740.664	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	67.8	0.01	18.8	0	not meas.	not meas.	0	0	0	0.03	15.5	not meas.	not meas.	100.1	
3	USWG-2/FSPAR/46*4805FT	USW G-2	4805	1464.564	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	65.5	0	20.7	0.1	not meas.	not meas.	0	1.55	0.06	10.7	0.39	not meas.	not meas.	99.0	
4	USWG-2/FSPAR/47*4805FT	USW G-2	4805	1464.564	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	65.6	0	19.7	0.01	not meas.	not meas.	0	0	0.18	0.32	15.2	not meas.	not meas.	99.0	
5	USWG-2/FSPAR/48*4805FT	USW G-2	4805	1464.564	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	66.9	0	18.5	0	not meas.	not meas.	0	0	0.1	0.17	15.1	not meas.	not meas.	98.8	
6	USWG-2/FSPAR/49*4838FT	USW G-2	4838	1474.6224	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	68.7	0	19.5	0.03	not meas.	not meas.	0	0.35	0	11.7	0.09	not meas.	not meas.	100.4	
7	USWG-2/FSPAR/50*4838FT	USW G-2	4838	1474.6224	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	68.7	0	19.7	0.04	not meas.	not meas.	0	0.69	0	11.6	0.09	not meas.	not meas.	100.7	
8	USWG-2/FSPAR/51*4838FT	USW G-2	4838	1474.6224	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	68.6	0.02	19.1	0	not meas.	not meas.	0	0.27	0	11.6	0.02	not meas.	not meas.	99.6	
9	USWG-2/FSPAR/52*5696FT	USW G-2	5696	1736.1408	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	67	0	20.1	0.04	not meas.	not meas.	0	0.94	0.2	11.5	0.02	not meas.	not meas.	99.8	
10	USWG-2/FSPAR/53*5820FT	USW G-2	5820	1773.936	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	66.9	0	19.9	0.07	not meas.	not meas.	0	0.38	0	11.5	0.07	not meas.	not meas.	101.7	
11	USWG-2/FSPAR/54*5895FT	USW G-2	5895	1796.796	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	66.2	0	19.8	0	not meas.	not meas.	0	0.46	0.15	11.4	0.04	not meas.	not meas.	98.1	
12	USWG-2/FSPAR/55*5895FT	USW G-2	5895	1796.796	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	66.7	0	19.6	0	not meas.	not meas.	0	0.8	0.03	11.4	0.04	not meas.	not meas.	98.2	
13	USWG-2/FSPAR/56*5992FT	USW G-2	5992	1826.3616	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	66.3	0	19	0	not meas.	not meas.	0	0	0.05	11.9	0.04	not meas.	not meas.	98.2	
14	USWG-2/FSPAR/57*5992FT	USW G-2	5992	1826.3616	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	63.5	0.02	18	0.06	not meas.	not meas.	0	0.09	1.05	0.42	16.8	not meas.	not meas.	99.6	
15	USWG-3/FSPAR/58*4709FT	USW G-3	4709	1434.9864	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	66.8	0.06	17.1	0	not meas.	not meas.	0	0.03	0.07	0.03	15.2	not meas.	not meas.	99.3	
16	USWG-4/FSPAR/59*2738FT	USW G-4	2738	834.5424	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	66.4	0	17.7	0	not meas.	not meas.	0	0.03	0.05	0.06	16.1	not meas.	not meas.	100.3	
17	J-13/FSPAR/60*2980FT	J-13	2980	908.304	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	67.3	0	20.1	0	not meas.	not meas.	0	0.58	0	11.8	0.06	not meas.	not meas.	99.8	
18	J-13/FSPAR/61*2980FT	J-13	2980	908.304	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	67.2	0	19.6	0	not meas.	not meas.	0	0.15	0	12	0.04	not meas.	not meas.	99.0	
19	J-13/FSPAR/62*2980FT	J-13	2980	908.304	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	66.3	0	19.6	0	not meas.	not meas.	0	0.33	0	12	0.03	not meas.	not meas.	100.3	
20	3-15-82-4/FSPAR/63	outcrop	0	0	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	67.9	0	17.2	0	not meas.	not meas.	0	0	0	0.23	15.2	not meas.	not meas.	100.5	Outcrop at Prow Pass, N. Yucca Mt., Nonwelded tuff near base of Calico Hills tuff, Nevada State Coords, 786500N, 551000E
21	82FB-1/FSPAR/64	outcrop	0	0	Broxton et al. (1986)	Authigenic feldspar	Electron microprobe	67.5	0	17.5	0	not meas.	not meas.	0	0	0	0.17	15.4	not meas.	not meas.	100.6	Outcrop at Prow Pass, N. Yucca Mt., Nonwelded tuff near base of Calico Hills tuff, Nevada State Coords, 786700N, 549700E

An additional, more comprehensive source of water chemistry data is found in the USGS report of Perfect et al. (1995).

Perfect, D.L., C.C. Faunt, W.C. Steinkampf, and A.K. Turner. 1995. *Hydrochemical Data Base for the Death Valley Region, California and Nevada*. USGS Open-File Report 94-305. Denver, CO: U.S. Geological Survey.

This report includes compressed Lotus 1-2-3 (*.WK1) files with major and minor element analyses compiled over several decades for the region surrounding Yucca Mountain. One contains the raw data for over 4700 wells and springs from USGS and DOE reports and the USGS National Water Information Sevice (NWIS) database. A second file has been edited to remove duplicates, make chemical data consistent, and calculate charge balance. The "editing" philosophy used by Perfect et al. (1995) is described in the report. These data were not generally collected under a DOE-approved QA program, but are freely used here. The sources referenced in Perfect et al. (1995) should be consulted for determining the quality of the data. see pgs. 33+34 1/18/96 DRJ

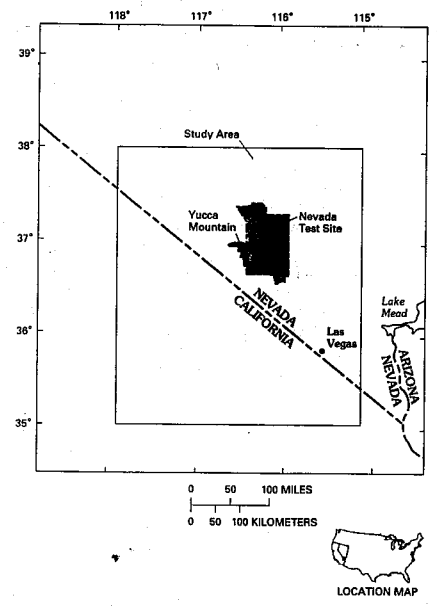

Figure 1. Area of interest.

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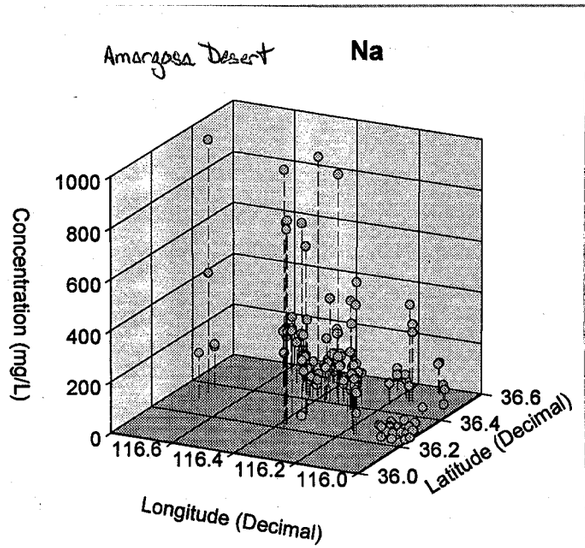
Example of major element trends from Perdet et al. (1995)
Amargosa Desert (graphics from SigmaPlot, Version 2.0)



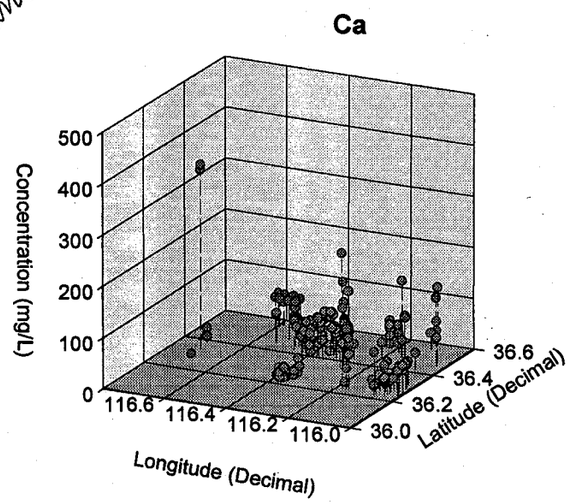


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Table 3. Data sources and codes

Data source code	Data Sources
1	Benson and McKinley, 1985
2	Benson and others, 1983
3	Blankennagel and Weir, 1973
4	Calzia, 1979a
5	Calzia, 1979b
6	Claassen, 1973
7	Claassen, 1983
8	Claassen, H.C., U.S. Geological Survey, unpublished data
9	Cooperative Extension U.S. Department of Agriculture
10	Craig and Robison, 1984
11	Crowley, 1979a
12	Crowley, 1979b
13	Czarnecki, J., U.S. Geological Survey, unpublished data
14	Dockter and Server, 1979
15	Dockter, 1979
16	Dudley and Larson, 1976
17	Environmental Protection Agency (EPA), unpublished data
18	Glancy, 1968
19	Hardman and Miller, 1934
20	Hunt and others, 1966
21	Lahoud and others, 1984
22	Malmberg and Eakin, 1962
23	Malmberg, 1967
24	Miller, 1977
25	Moore, 1961
26	U.S. Geological Survey, National Water Data Storage and Retrieval System (WATSTORE)
27	Nichols and Davis, 1979
28	Robinson and Beetem, 1975
29	Rush, 1968
30	Schaefer and others, 1992
31	Schoff and Moore, 1964
32	Thomas and others, 1991
33	Thomas, J. (written communication, 1989)
34	U.S. Energy Research and Development Administration
35	U.S. Geological Survey, National Water Information System (NWIS-I)
36	U.S. Geological Survey, unpublished data
37	Waddell, 1984
38	Walker and Eakin, 1963
39	White, 1979
40	Winograd and Thordarson, 1975
41	Winograd, U.S. Geological Survey, unpublished data
42	Whitfield and others, 1985
43	Whitfield, U.S. Geological Survey, unpublished data
44	Young, 1972

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Perfect et al. (1995)
Original Data Sources

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Calzia, J.P., 1979b, Geophysical, lithologic, and water quality data from Soda Dry Lake, San Bernardino County, California: U.S. Geological Survey Open-File Report. (NNA.940510.0003)

Claassen, H.C., 1973, Water quality and physical characteristics of Nevada Test Site water-supply wells: U.S. Geological Survey USGS–474–158, 145 p. (HQS.880517.1740)

Claassen, H.C., 1983, Sources and mechanisms of recharge for ground water in the west-central Amargosa Desert, Nevada—A geochemical interpretation: U.S. Geological Survey Open-File Report 83–542, 61 p. (NNA.870406.0176)

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Radionuclide Thermodynamic Data

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I. Introduction

For the geochemical aspects of HLW disposal, thermodynamic and kinetic data are necessary to model processes such as dissolution of waste forms, precipitation of secondary phases, and retardation of radionuclide transport. There are currently 9 CDMs related to geochemistry, and as identified in Turner and Pickett (1994), most of these CDMs will require some type of thermodynamic data and kinetic rate data to assist in review of the License Application (LA). These include:

- 3.2.3.1 - (FAC) Nature and Rates of Geochemical Processes
- 3.2.3.2 - (FAC) Geochemical Conditions
- 3.2.3.3 - (FAC) Mineral Assemblages
- 3.2.3.4 - (PAC) Groundwater Conditions and the Engineered Barrier System
- 3.2.3.5 - (PAC) Geochemical Processes
- 3.2.3.7 - (PAC) Gaseous Radionuclide Movement

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For those CDMs that require confirmatory or independent calculations (Types 4 and 5), accurate state-of-the-art data are needed to produce reliable results. For those CDMs that require checking DOE calculations (Type 3), it is important to confirm that accurate thermodynamic data have been used in the models.

II. Statement of the Problem

Basic thermodynamic and kinetic rate data for gases, solids, and aqueous species are applicable to any system, in addition to Yucca Mountain. These data are typically kept in electronic databases e.g., GEMBOCHS (USDOE, 1993), and are formatted for use with a particular geochemical speciation codes such as EQ3/6, PHREEQE, or MINTEQA2. Many of the thermodynamic databases that are available have been developed to address a wide range of geochemical problems. For this reason, they are commonly quite large (e.g., EQ3/6 has over 1500 aqueous species, gases, and solids) and contain a large number of species that are not directly relevant to waste disposal at Yucca Mountain. In addition, the size of these databases makes them cumbersome to use and slows down geochemical calculations.

The results of geochemical modeling are strongly dependent on the thermodynamic database used. Several different geochemical codes are currently used at CNWRA and NRC (e.g., EQ3/6, PHREEQE, MINTEQA2, GEM). If the databases contain different values, then the results will not be strictly comparable. While there is typically good agreement between different databases on thermodynamic data for common species such as CO_3^{2-} and quartz, there is much uncertainty for many of the elements of concern in HLW disposal (Pu, Np, Am, U, Tc); for example, equilibrium constants from different sources may vary by many orders of magnitude. Given these uncertainties, in an effort to develop a complete database, there is the possibility that inappropriate values have been incorporated.

At CNWRA, the EQ3/6 database under development at Lawrence Livermore National Laboratory is the starting point for other radiochemical databases. For example, data for 13 different radioelements have been taken from the EQ3/6 database and added to the MINTEQA2 database currently used in the Sorption Modeling for HLW Performance Assessment Research Project, and the EQ3/6 database is used by the reactive transport codes GEM and MULTIFLOW under development at CNWRA. However, recent scoping calculations (Table 1) performed at CNWRA indicate that for some uranium-silicates, the equilibrium constant (Log K) currently in the EQ3/6 database differ from values calculated using recommended free energies of formation by up to 9 orders of magnitude. This has significant implications for solubility and transport calculations, and also leads to uncertainty about other values in the database.

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Table 1. Thermodynamic data for uranyl silicate minerals and comparison with the EQ3/6 database (Data0.com.r16 release). The difference values are defined as (EQ3/6 value) - (Calculated Values).

Mineral	EQ3/6 Data0.com.r16		New Estimate[a,b]		Difference	
	ΔG_0 (kJ/mol)	Log K	ΔG_0 (kJ/mol)	Log K	ΔG_0 (kJ/mol)	Log K
Uranophane	-4975	17.289	-6213	8.123	1238	9.166
Soddyite	-3685	0.395	-3706	-3.285	21	3.680
Weeksite	-9043	15.380	-9039	16.081	-4	-0.701

a. Recent data taken form McKenzie (unpublished) based on Nguyen et al. (1991).
b. Free energies (ΔG_0 in kJ/mol) for aqueous species are: UO_2^{2+} = -952.556; K^+ = -282.462; Ca^{2+} = -552.790; SiO_2 (aq) = -833.411; H_2O = -237.182. Data for aqueous species are taken from EQ3/6 database (Data0.com.r16 release).

II. Proposed Work

Although it is beyond the intended scope of this activity to undertake the extensive review and critical evaluation of the current literature that is necessary to develop a large thermodynamic database, it should be possible to select a limited set of critical elements such as the actinides, and identify critical species such as the uranium-silicates for closer inspection. Since the EQ3/6 database is already the basis for much of the radionuclide geochemical modeling work done by the DOE and by the CNWRA and NRC, we propose a basic effort to spot check selected thermodynamic data in this database by comparison to other databases, and by checking the original data source where possible. If CNWRA staff can develop acceptable values for selected critical species, then the different geochemical codes used in Research and Technical Assessment will be working from the same baseline and model results will be comparable.

Work would include:

A. Identification of critical radioelements such as Np, Am, Pu, U, and Tc for which the CNWRA staff believe thermodynamic data are uncertain.

B. Identification of key aqueous species and minerals. Uranium-silicates are of particular interest as solubility-limiting phases in evaluating uranium natural analogs such as Peña Blanca.

C. For those identified elements/components of interest, compilation and documentation of free energies of formation, as well as critical data review in a spreadsheet format. This type of approach would provide convenient tabulation of the data, and would accommodate geochemical modeling using either free energies or equilibrium constants that could be calculated from the tabulated data. It may also be possible to compile heat capacity and enthalpy data for extrapolating to elevated temperatures. A similar approach has been used in earlier NRC-sponsored work at Sandia National Laboratories (Phillips et al., 1988).

IV. Anticipated Products

This work was originally envisioned as an ongoing study designed to take advantage of advances in the available thermodynamic data. At the completion of this initial limited study, it is anticipated that there

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would be a spreadsheet containing critically reviewed free energies of formation for a limited number of important elements/components, together with documentation of data sources. These free energies could then be combined according to reaction stoichiometry to develop free energies and equilibrium constants for species and solids important to Research and Technical Assessment needs. This approach would be used to augment the existing EQ3/6 database and provide a standard baseline for geochemical modeling at CNWRA and NRC. The spreadsheet tabulation could be expanded to include other species and solids of interest, and would allow for quick incorporation of new data as they become available.

The final product of this work has been the development of a user-friendly, limited-scale thermodynamic database for Np, Pu, Am, Th, and Tc, with additional work on uranyl silicates (soddyite, weeksite, boltwoodite, and uranophane). The software used for this effort has benn Claris Filemaker Pro for Windows, Version 2.1. The database was prepared by Dr. Yiming Pan, working as SwRI temporary staff for CNWRA. Dr. Pan has previously worked for CNWRA as part of the Geochemical Natural Analogues Research Project. Filemaker Pro, Version 2.1 is a commercially available software package used for data compilation and display. No modifications were made to the code as a part of this project, and only the executable is available to CNWRA.

Complete electronic files are included on disks in the envelope at the back of this scientific notebook. A general outline of the data formulation and data sources is included below.

V. References

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EQ3/6 database (Data0.com.r16, june92 release) is the version used in subsequent calculations

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Filemaker Pro has been used to set up to types of data display

1) General tabulation of all aqueous species/solids for a given radioelement

2) Detailed tabulation of data with critical comments for a given species/solid for a radioelement

Display Type 1 - General Tabulation - Np solids

Table D Thermodynamic Properties of Neptunium Solid Phases

Species	$G_f°$(kJ/mol)	$H_f°$(kJ/mol)	S°(J/mol-K)	Log K°	Reference
Np - 1	0.000	0.000	50.460	-171.2094	[EQ3/6]
Np - 2	0.000	0.000	50.30		[88PHI/HAL]
Np_2O_5 - 1	-2012.956	2092.000	2092.000	-9.5000	[EQ3/6]
Np_2O_5 - 2	-2013.000	-2147.250	163.00		[88PHI/HAL]
NpO_2 - 1	-1021.800	-1074.065	80.300	7.8026	[EQ3/6]
NpO_2 - 2	-1021.800	-1074.000	80.30		[88PHI/HAL]
$NpO_2(OH)$ - 1	-1128.000	-1224.156	101.000	-4.2364	[EQ3/6]
$NpO_2(OH)$ - 2	-1128.000	-1224.100	101.00		[88PHI/HAL]
$NpO_2(OH)_2$ - 1	-1236.000	-1377.149	118.000	-5.9851	[EQ3/6]
$NpO_2(OH)_2$ - 2	-1236.000	-1377.010	118.00		[88PHI/HAL]
$Np(OH)_4$ - 1	-1447.000	-1620.851	139.000	-0.8103	[EQ3/6]
$Np(OH)_4$ - 2	-1447.000	-1621.365	139.00		[88PHI/HAL]
NpO_3H_2O - 1	-1247.000	-1379.000	146.000		[88PHI/HAL]

Type 1 Display
General Tabulation - Np aqueous species

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Table D Thermodynamic Properties of Neptunium Aqueous Species

Species	$G_f°$(kJ/mol)	$H_f°$(kJ/mol)	S°(J/mol-K)	Log K°	Reference
Np^{+++} - 1	-517.100	-527.099	-179.100	-18.2885	[EQ3/6]
Np^{+++} - 2	-517.100	-527.200	-179.10		[88PHI/HAL]
Np^{++++} - 1	-502.900	-555.999	-389.000		[EQ3/6]
Np^{++++} - 2	-502.900	-556.100	-389.10		[88PHI/HAL]
NpO_2^+ - 1	-915.000	-977.986	-21.000	9.8683	[EQ3/6]
NpO_2^+ - 2	-915.000	-978.200	-21.00		[88PHI/HAL]
NpO_2^{++} - 1	-795.800	-860.473	-92.000	9.7615	[EQ3/6]
NpO_2^{++} - 2	-795.800	-860.600	-94.00		[88PHI/HAL]
$NpO_2(OH)$ (aq) - 1	-1101.379	2092.000	2092.000	-8.9000	[EQ3/6]
$NpO_2(OH)$ (aq) - 2	-1101.000	-1220.104	25.00		[88PHI/HAL]
NpO_2OH^+ - 1	-1003.298	2092.000	2092.000	-5.2000	[EQ3/6]
NpO_2OH^+ - 2	-1004.000	-1102.990	24.00		[88PHI/HAL]
$(NpO_2)_2(OH)_2^{++}$ - 1	-2029.432	-2092.000	-2092.000	-6.4000	[EQ3/6]
$(NpO_2)_2(OH)_2^{++}$ - 2	-2029.380	-2246.210	-14.00		[88PHI/HAL]
$(NpO_2)_3(OH)_5^+$ - 1	-3473.419	-2092.000	-2092.000	-17.5000	[EQ3/6]
$(NpO_2)_3(OH)_5^+$ - 2	-3474.000	-3897.550	116.00		[88PHI/HAL]
$Np(OH)_4$ (aq) - 1	-1396.828	2092.000	2092.000	-9.6000	[EQ3/6]
$Np(OH)_4$ (aq) - 2	-1397.000	-1699.900	75.00		[88PHI/HAL]

Revised Date: January 2, 1996

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Display Type I
General Tabulation
Np-aqueous species

Table D Thermodynamic Properties of Neptunium Aqueous Species

Species	$G_f°$(kJ/mol)	$H_f°$(kJ/mol)	S°(J/mol-K)	Log K°	Reference
$NpOH^{+++}$ - 1	-734.371	2092.000	2092.000	-1.0000	[EQ3/6]
$NpOH^{+++}$ - 2	-734.000	-790.540	-167.00		[88PHI/HAL]
$Np(OH)_2^{++}$ - 1	-961.282	2092.000	2092.000	-2.8000	[EQ3/6]
$Np(OH)_2^{++}$ - 2	-961.000	-1050.400	-44.00		[88PHI/HAL]
$Np(OH)_3^{+}$ - 1	-1181.336	2092.000	2092.000	-5.8000	[EQ3/6]
$Np(OH)_3^{+}$ - 2	-1181.000	-1313.705	44.00		[88PHI/HAL]
$Np(OH)_5^{-}$ - 1	-1607.183	2092.000	2092.000	-14.3000	[EQ3/6]
$Np(OH)_5^{-}$ - 2	-1607.000	-1863.350	96.00		[88PHI/HAL]
$NpOH^{++}$ - 1	-714.326	2092.000	2092.000	-7.0000	[EQ3/6]
$NpOH^{++}$ - 2	-714.300	-726.900	-75.00		[88PHI/HAL]
$NpO_2(CO_3)_2^{--}$ - 1	-1931.677	-2183.069	170.000	-6.6576	[EQ3/6]
$NpO_2(CO_3)_2^{--}$ - 2	-1953.800	-2221.700	116.10		[88PHI/HAL]
NpO_2CO_3 (aq)	-1360.000	-1540.000	-36.00		[88PHI/HAL]
$NpO_2(CO_3)_2^{---}$ - 1	-2010.922	-2299.685	110.002	-13.6576	[EQ3/6]
$NpO_2(CO_3)_2^{---}$ - 2	-2009.600	-2298.800	110.00		[88PHI/HAL]
$NpO_2(CO_3)_3^{-----}$ - 1	-2547.466	-2977.594	79.998	-22.4864	[EQ3/6]
$NpO_2(CO_3)_3^{-----}$ - 2	-2547.000	-2977.700	80.00		[88PHI/HAL]
$NpO_2(CO_3)_3^{----}$ - 1	-2496.191	-2927.110	12.000	-10.5864	[EQ3/6]

Table D Thermodynamic Properties of Neptunium Aqueous Species

Species	$G_f°$(kJ/mol)	$H_f°$(kJ/mol)	S°(J/mol-K)	Log K°	Reference
$NpO_2(CO_3)_3^{----}$ - 2	-2505.200	-2927.900	38.10		[88PHI/HAL]
$NpO_2CO_3^{-}$ - 1	-1469.241	-1598.752	200.000	-5.7288	[EQ3/6]
$NpO_2CO_3^{-}$ - 2	-1470.020	-1599.900	200.00		[88PHI/HAL]
$Np(CO_3)_5^{------}$ - 1	-3361.434	-3912.931	160.000	-13.3440	[EQ3/6]
$Np(CO_3)_5^{------}$ - 2	-3361.000	-3912.310	160.00		[88PHI/HAL]
$NpO_2(OH)_2^{-}$ - 1	-1262		40	-22.4	[89LEM/GAR]

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Display Type II - Detailed Tabulation Np-solid

Table D (Cont'd)

Species NpO_2 - 1

del $G_f°$(kJ/mol) -1021.800

del $H_f°$(kJ/mol) -1074.065

S°(J/mol-K) 80.300

Log K° 7.8026

Reaction $Np^{++++} + 2H_2O = NpO_2 + 4H^+$

Reference [EQ3/6]

Data Assessment

1. The data are from review evaluations. The data source is from [84LEM].
2. The log K° value in [EQ3/6] is for dissolution of NpO_2.
3. Using del $G_f°$ [Np^{++++}] = -502.900 kJ/mol and del $G_f°$ [H_2O] = -237.18 kJ/mol both from EQ3/6, we then have del $G_r°$ = -44.538 kJ/mol and del $G_f°$ = -1021.798 kJ/mol.

Back-calculating ΔG_r° in the data assessment comments provides assurance that the log K used in EQ3/6 (data0.com.r16) is consistent with free energy given in original data source

Title/Date 1/19/96 Display Type 2 - Detailed tabulation Np-aqueous species

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Table D (Cont'd)

Species	Np^{+++} - 1
G_f°(kJ/mol)	-517.100
H_f°(kJ/mol)	-527.099
S°(J/mol-K)	-179.100
Log K°	-18.2885
Reaction	$Np^{++++} + 0.5H_2O = Np^{+++} + 0.25O_2 + H^+$
Reference	[EQ3/6]

Data Assessment

1. The data are from review evaluations. The data source is from [84LEM].
2. The log K° value in [EQ3/6] is for dissolution of Np^{+++}.
3. Using del G_f° [Np^{++++}] = -502.9 kJ/mol and del G_f° [H_2O] = -237.18 kJ/mol both from EQ3/6, we then have del G_r° = 104.391 kJ/mol and del G_f° = -517.098 kJ/mol.

Original Data Sources

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1/19/96 DRJ

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Reorganization of CNWRA. Research transferred to 20-5708-871-KT1 Radionuclide Transport effective 1/20/96 DRJ

4/12/96 DRJ 4/12/96 DRJ

Some modifications have been made to the comprehensive water chemistry database of Perfect et al. (1995).

Perfect, D.L., C.C. Faunt, W.C. Steinkampf, and A.K. Turner. 1995. *Hydrochemical Data Base for the Death Valley Region, California and Nevada.* USGS Open-File Report 94-305. Denver, CO: U.S. Geological Survey.

4/12/96 DRJ

The Lotus 1-2-3 file DATAEDIT.WK1 file of Perfect et al. (1995) has been converted to an Excel 4.0 for Windows file (*.XLS). As mentioned earlier, the ~~second~~ DATAEDIT.WK1 file has been edited by Perfect et al. (1995) to remove duplicates, make chemical data consistent, and calculate charge balance. The "editing" philosophy used by Perfect et al. (1995) is described in the report.

The edited file consists of some 3733 water chemistry analyses. Most of the analyses are replicated samples collected at different times from springs and wells in the Yucca Mountain region. Complete major and minor element concentrations are commonly reported, but in some instances only trace contaminants such as Cd, Cu, and Zn were reported for a given analyses. All concentrations are reported in mg/L, and -99998 indicates no reported value.

Once entered in Excel, the data files have been modified using spreadsheet formulas in several ways:

1) A column was added and Arc ID# were assigned to each analysis. The analyses were first ordered by increasing latitude from south to north, and numbered sequentially from 1-3733. These ID#'s should be maintained in subsequent analyses.

2) Sampling locations are reported in terms of latitude and longitude (degrees, minutes, seconds). For incorporation into existing ArcInfo coverages, additional columns have been developed that convert locations first to decimal degrees (degrees + (minutes/60) + (seconds/3600)), and then projected to UTM coordinates. The UTM projection conversion is based on UTM Zone 11, with a central meridian of -117°, and using the Clarke 1866 ellipsoid. The formulas used in the conversion were taken from: Assuming a false easting of 500,000 m

Snyder, J. 1987. *Map Projections, A Working Manual*. USGS Professional Paper 1395. Washington, DC: U.S. Geological Survey.

and checked against examples given in Snyder (1987) (see below).

3) Analyses for each element are checked for positive concentrations (to account for the -99998, not reported), converted to molality (m_i), and total groundwater ionic strength was calculated such that:

$$I = 0.5(\Sigma m_i z_i^2)$$

This requires adding two rows. The first added row identifies the assumed aqueous species. In most cases, this was assumed to be the unspeciated cation or anion (e.g., Ca^{++}, Cl^-), but in some cases, particularly for anions, other species were assumed such as SO_4^{-2}, PO_4^{-3}, and $VO_2(OH)_3^{-2}$. The second added row contains the gram formula weight for each of the assumed species.

Confirmatory calculations to follow

Added rows

Part of DATAEDIT.WK1 (Perfect et al., 1995) converted to Excel, 4.0 for windows file DATAEDIT.XLS

DRJ

SITE NAME	SITE ID	ARC ID#	LATITUDE	LAT (DEC)	UTM(north)	LONGITUDE	LONG (DEC)	UTM(east)	DATE	TIME	TEMP	ALK	HARDNESS	COND	pH	Ca	Mg	Na	K	Cl	SO4	HCO3
Assumed Predominant Species																Ca++	Mg++	Na+	K+	Cl-	SO4-2	HCO3-
Gram Molecular Weight																40.08	24.31	22.99	39.1	35.45	96.06	61.02
Testing UTM Conversion			481500	48.250000	5344238.4	1160730	-116.125000	564956.9														
CO-1 NESENE SEC10 T11N,R2E CO-1-1	-9998	1	350347	35.063056	3878865.2	1164521	-116.755833	522264.0	780621	-9998	24.30	320.00	54.00	7165.00	8.40	15.00	3.80	1600.00	4.70	1900.00	530.00	390.00
CO-1 NESENE SEC10 T11N,R2E CO-1-2	-9998	2	350347	35.063056	3878865.2	1164521	-116.755833	522264.0	780621	-9998	25.60	150.00	330.00	7207.00	7.90	100.00	19.00	1500.00	7.40	1800.00	790.00	183.00
SD-1 NENE SEC 31 T13N, R8E SD-1-1	-9998	3	351036	35.176667	3892842.9	1160330	-116.058333	585746.8	780708	-9998	25.50	892.00	770.00	12000.00	7.60	150.00	92.00	2300.00	29.00	4000.00	31.00	109.00
SD-1 NENE SEC 31 T13N, R8E SD-1-2	-9998	4	351036	35.176667	3892842.9	1160330	-116.058333	585746.8	780708	-9998	26.50	110.00	56.00	1027.00	8.40	16.00	3.70	220.00	3.90	180.00	140.00	134.00
Cut Spring	-9998	5	351642	35.278333	3904669.8	1153315	-115.554167	631484.1	170000	-9998	-9998.00	-9998.00	-9998.00	-9998.00	-9998.00	67.00	18.00	44.00	-9998.00	57.00	61.00	236.00
Kessler Spring	-9998	6	351754	35.298333	3906813.6	1153206	-115.535000	633204.6	160000	-9998	-9998.00	-9998.00	-9998.00	-9998.00	-9998.00	67.00	17.00	35.00	-9998.00	71.00	58.00	178.00
CU-2 SWNWSW SEC 22 T30S,R42E	-9998	7	351823	35.306389	3908823.1	1172804	-117.467778	457473.1	780617	-9998	21.20	170.00	220.00	16000.00	8.00	65.00	13.00	4000.00	100.00	6000.00	340.00	207.00
CU-1 SWSESW SEC 10 T30S,R42E CU1-2	-9998	8	351957	35.332500	3909817.7	1172754	-117.465000	457739.2	780816	-9998	25.30	97.00	340.00	5717.00	7.80	110.00	15.00	1100.00	49.00	1800.00	120.00	118.00
CU-1 SWSESW SEC 10 T30S,R42E CU1-	-9998	9	351957	35.332500	3909817.7	1172754	-117.465000	457739.2	780816	-9998	22.40	120.00	250.00	1805.00	7.80	77.00	13.00	300.00	20.00	460.00	120.00	146.00
U.P.R.R. Well	-9998	10	352300	35.383333	3916805.0	1151324	-115.223333	661379.4	160000	-9998	-9998.00	-9998.00	-9998.00	-9998.00	-9998.00	26.00	4.10	49.00	-9998.00	35.00	73.00	73.00
IV-1 SENE SEC 35 T15.5N, R15E	-9998	11	352546	35.429444	3921748.1	1151854	-115.331667	651449.1	780616	-9998	24.80	72.00	55.00	362.00	8.40	17.00	3.00	50.00	3.00	33.00	45.00	86.00
Murphy Well	-9998	12	352709	35.452500	3924282.4	1152048	-115.346667	650044.5	170000	-9998	-9998.00	-9998.00	-9998.00	-9998.00	-9998.00	28.00	20.00	55.00	-9998.00	30.00	51.00	211.00
IVANPAH VALLEY WELL 15.5/15-23N1	-9998	13	352712	35.453333	3924377.4	1152042	-115.345000	650194.3	540914	-9998	20.00	-9998.00	161.00	464.00	7.30	28.00	22.00	43.00	5.50	28.00	39.00	189.00
IVANPAH VALLEY WELL 15.5/15-20J1	-9998	14	352724	35.456667	3924684.6	1152312	-115.386667	646406.6	540508	-9998	23.90	-9998.00	89.00	845.00	8.10	24.00	9.00	129.00	8.00	175.00	38.00	109.00
IVANPAH VALLEY WELL 16/16-33L1	-9998	15	352800	35.466667	3925878.3	1151600	-115.266667	657277.9	540508	-9998	25.60	-9998.00	25.00	528.00	8.20	8.00	1.10	105.00	2.50	65.00	41.00	131.00
Ruben Bucher Well	-9998	16	352806	35.468333	3926003.4	1152212	-115.370000	647867.8	160000	-9998	-9998.00	-9998.00	-9998.00	-9998.00	-9998.00	15.00	5.00	101.00	-9998.00	61.00	31.00	171.00
CRESENT SPRING	-9998	17	352843	35.478611	3927445.2	1151047	-115.179722	665143.4	850822	-9998	20.50	-9998.00	-9998.00	990.00	7.60	108.00	25.00	37.00	5.00	66.00	235.00	168.00
IVANPAH VALLEY WELL 16/14-23Q1	-9998	18	352853	35.481389	3927397.2	1152424	-115.406667	644547.2	540508	-9998	-9998.00	-9998.00	237.00	794.00	7.60	45.00	31.00	71.00	4.00	121.00	76.00	136.00
016N014E19FS1S	353000115305101	19	353000	35.500000	3929309.3	1153051	-115.514167	634763.0	691106	-9998	5.20	385.00	470.00	1140.00	-9998.00	30.00	96.00	73.00	2.00	82.00	106.00	470.00
016N015E12Q02S	353108115185001	20	353108	35.518889	3931698.5	1151850	-115.313889	652893.7	230413	-9998	-9998.00	-9998.00	88.00	-9998.00	-9998.00	29.00	3.90	42.00	-9998.00	40.00	61.00	-9998.00
016N016E12Q02S	353106116185001	21	353108	35.518889	3931696.5	1151850	-115.313889	652893.7	240128	-9998	-9998.00	-9998.00	120.00	-9998.00	-9998.00	43.00	4.10	94.00	-9998.00	102.00	109.00	-9998.00
U.P.R.R. Well	-9998	22	353112	35.520000	3931815.4	1151900	-115.316667	652639.6	150000	-9998	-9998.00	-9998.00	-9998.00	-9998.00	-9998.00	26.00	19.00	107.00	-9998.00	139.00	49.00	154.00
IVANPAH VALLEY WELL 16/14-12Q1	-9998	23	353117	35.521389	3931814.4	1152512	-115.420000	643266.4	540508	-9998	-9998.00	-9998.00	143.00	643.00	7.80	25.00	19.00	83.00	4.70	96.00	38.00	156.00
016N015E12Q01S	353118115185201	24	353118	35.521667	3932003.7	1151852	-115.314444	652838.0	151028	-9998	-9998.00	126.00	140.00	-9998.00	-9998.00	26.00	19.00	107.00	-9998.00	139.00	93.00	154.00
016N015E12Q03S	353121115185201	25	353121	35.522500	3932096.1	1151852	-115.314444	652836.4	430608	0	-9998.00	-9998.00	115.00	-9998.00	-9998.00	20.00	18.00	93.00	-9998.00	110.00	43.00	-9998.00

DRJ 4/12/94

Increasin Lat

Added Columns

Added Columns

Added column
Arc ID# 1-3733
Sorted by increasing latitude

Testing Lat/Long to UTM Conversion
48°15'00" N } Zone 11
116°07'30" W } Central Meridian = -117°

Decimal Lat = 48 + 15/60 + 00/3600 = 48.25 N
Decimal Long = (-1) * (116 + 07/60 + 30/3600) = -116.125° W

UTM Conversion:
Clarke 1866 spheroid (ellipsoid)
Zone 11, -117° CM; 500,000 m false easting
Test is -117 - (-116.125) = 0.875° = 52'30" East of CM.

HEROID METERS

LATITUDE 48°15'00"			
Δλ	West of C.M. E	East of C.M. E	N
0°00'00"	500,000.0	500,000.0	5,343,868.4
07 30	490,720.4	509,279.6	5,343,875.9
15 00	481,440.8	518,559.2	5,343,898.6
22 30	472,161.2	527,838.8	5,343,936.3
30 00	462,881.7	537,118.3	5,343,989.2
37 30	453,602.1	546,397.9	5,344,057.2
45 00	444,322.6	555,677.4	5,344,140.2
52 30	435,043.1	564,956.9	5,344,238.4
1 00 00	425,763.7	574,236.3	5,344,351.7
07 30	416,484.3	583,515.7	5,344,480.1
15 00	407,204.9	592,795.1	5,344,623.6
22 30	397,925.6	602,074.4	5,344,782.2
30 00	388,646.3	611,353.7	5,344,955.9
37 30	379,367.1	620,632.9	5,345,144.8
45 00	370,088.0	629,912.0	5,345,348.7
52 30	360,808.9	639,191.1	5,345,567.8
2 00 00	351,529.9	648,470.1	5,345,802.0
07 30	342,251.0	657,749.0	5,346,051.3
15 00	332,972.2	667,027.8	5,346,315.7
22 30	323,693.4	676,306.6	5,346,595.3
30 00	314,414.8	685,585.2	5,346,889.9
37 30	305,136.2	694,863.8	5,347,199.7
45 00	295,857.8	704,142.2	5,347,524.7
52 30	286,579.4	713,420.6	5,347,864.7

From Table 9, Snyder (1987)

Comparison exact to .1 meters

DRJ

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mulas below are only slightly modified from those presented in standard references to provide mm accuracy at full scale (Army, 1973, p. 5–7; Thomas, 1952, p. 2–3). (See p. 269 for numerical examples.)

$$x = k_0N[A + (1 - T + C)A^3/6 + (5 - 18T + T^2 + 72C - 58e'^2)A^5/120] \quad (8\text{–}9)$$

$$y = k_0\{M - M_0 + N \tan\phi\,[A^2/2 + (5 - T + 9C + 4C^2)A^4/24 + (61 - 58T + T^2 + 600C - 330e'^2)A^6/720]\} \quad (8\text{–}10)$$

$$k = k_0[1 + (1 + C)A^2/2 + (5 - 4T + 42C + 13C^2 - 28e'^2)A^4/24 + (61 - 148T + 16T^2)A^6/720] \quad (8\text{–}11)$$

where k_0 = scale on central meridian (e.g., 0.9996 for the UTM projection)

$$e'^2 = e^2/(1 - e^2) \quad (8\text{–}12)$$

$$N = a/(1 - e^2 \sin^2\phi)^{1/2} \quad (4\text{–}20)$$

$$T = \tan^2\phi \quad (8\text{–}13)$$

$$C = e'^2\cos^2\phi \quad (8\text{–}14)$$

$$A = (\lambda - \lambda_0)\cos\phi, \text{ with } \lambda \text{ and } \lambda_0 \text{ in radians} \quad (8\text{–}15)$$

$$M = a[(1 - e^2/4 - 3e^4/64 - 5e^6/256 - \ldots)\phi - (3e^2/8 + 3e^4/32 + 45e^6/1024 + \ldots)\sin 2\phi + (15e^4/256 + 45e^6/1024 + \ldots)\sin 4\phi - (35e^6/3072 + \ldots)\sin 6\phi + \ldots] \quad (3\text{–}21)$$

DRJ

with ϕ in radians. M is the true distance along the central meridian from the Equator to ϕ. See equation (3–22) for a simplification for the Clarke 1866 ellipsoid.
$M_0 = M$ calculated for ϕ_0, the latitude crossing the central meridian λ_0 at the origin of the x, y coordinates.

Note: If $\phi = \pm\pi/2$, all equations should be omitted except (3–21), from which M and M_0 are calculated. Then $x = 0$, $y = k_0(M - M_0)$, $k = k_0$.

UTM conversion formulas from Snyder (1987)

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The rest of top part of Perfect et al. (1995) data.

CO3	PO4	NO3	F	SiO2	As	Ba	Be	B	Cd	Cr	Co	Cu
CO3-2	PO4-3	NO3-	F-	SiO2(aq)	HAsO4-2	Ba++	Be++	H3BO4(aq)	Cd++	Cr++++	Co++	Cu++
60.01	94.97	62	19	60.08	139.92713	137.327	9.012182	61.83302	112.411	51.9961	58.9332	63.546
-99998.00	0.08198554	-99998.00	14.00	43.00	-99998.00	-99998.00	-99998.00	10.00	-99998.00	-99998.00	-99998.00	-99998.00
-99998.00	0	-99998.00	7.10	29.00	-99998.00	-99998.00	-99998.00	11.00	-99998.00	-99998.00	-99998.00	-99998.00
-99998.00	0	-99998.00	4.70	26.00	-99998.00	-99998.00	-99998.00	1.60	-99998.00	-99998.00	-99998.00	-99998.00
-99998.00	0	-99998.00	7.60	15.00	-99998.00	-99998.00	-99998.00	0.56	-99998.00	-99998.00	-99998.00	-99998.00
0.00	-99998.00	-99998.00	-99998.00	45.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00
0.00	-99998.00	-99998.00	-99998.00	36.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00
-99998.00	0.03066185	-99998.00	1.20	56.00	-99998.00	-99998.00	-99998.00	15.00	-99998.00	-99998.00	-99998.00	-99998.00
-99998.00	0	-99998.00	1.10	75.00	-99998.00	-99998.00	-99998.00	3.10	-99998.00	-99998.00	-99998.00	-99998.00
-99998.00	0	-99998.00	1.00	59.00	-99998.00	-99998.00	-99998.00	1.40	-99998.00	-99998.00	-99998.00	-99998.00
0.00	-99998.00	-99998.00	-99998.00	17.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00
-99998.00	0.03066185	-99998.00	0.90	15.00	-99998.00	-99998.00	-99998.00	0.09	-99998.00	-99998.00	-99998.00	-99998.00
0.00	-99998.00	-99998.00	-99998.00	59.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00
0.00	-99998.00	10.00	1.00	-99998.00	-99998.00	-99998.00	-99998.00	0.20	-99998.00	-99998.00	-99998.00	-99998.00
0.00	-99998.00	6.00	2.00	-99998.00	-99998.00	-99998.00	-99998.00	0.25	-99998.00	-99998.00	-99998.00	-99998.00
0.00	-99998.00	19.00	2.10	-99998.00	-99998.00	-99998.00	-99998.00	0.20	-99998.00	-99998.00	-99998.00	-99998.00
12.00	-99998.00	-99998.00	-99998.00	41.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00
-99998.00	-99998.00	-99998.00	0.60	55.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00
0.00	-99998.00	17.00	0.90	-99998.00	-99998.00	-99998.00	-99998.00	0.25	-99998.00	-99998.00	-99998.00	-99998.00
0.00	-99998.00	-99998.00	1.00	-99998.00	-99998.00	-99998.00	-99998.00	0.21	-99998.00	-99998.00	-99998.00	-99998.00
-99998.00	-99998.00	-99998.00	-99998.00	24.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00
-99998.00	-99998.00	-99998.00	-99998.00	22.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00
0.00	-99998.00	-99998.00	-99998.00	17.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00
0.00	-99998.00	19.00	1.40	-99998.00	-99998.00	-99998.00	-99998.00	0.20	-99998.00	-99998.00	-99998.00	-99998.00
0.00	-99998.00	-99998.00	-99998.00	17.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00
-99998.00	-99998.00	-99998.00	-99998.00	18.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00

Fe	TOTAL Fe	Pb	Mn	Mo	Ni	Ag	Sr	V	Zn	Li	Se	I
Fe++		Pb++	Mn++	MoO4-2	Ni++	Ag+	Sr++	VO2(OH)3-2	Zn++	Li+	SeO4-2	I-
55.847		207.2	54.93805	159.9376	58.69	107.8682	87.62	133.96232	65.39	6.941	142.9576	126.90447
0.07	-99998.00	-99998.00	0.03	-99998.00	-99998.00	-99998.00	0.60	-99998.00	-99998.00	0.03	-99998.00	0.38
0.02	-99998.00	-99998.00	0.60	-99998.00	-99998.00	-99998.00	2.30	-99998.00	-99998.00	0.10	-99998.00	0.31
0.06	-99998.00	-99998.00	0.49	-99998.00	-99998.00	-99998.00	11.00	-99998.00	-99998.00	0.35	-99998.00	0.36
0.05	-99998.00	-99998.00	0.01	-99998.00	-99998.00	-99998.00	0.83	-99998.00	-99998.00	0.08	-99998.00	0.07
-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00
-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00
0.03	-99998.00	-99998.00	0.07	-99998.00	-99998.00	-99998.00	1.80	-99998.00	-99998.00	4.70	-99998.00	0.11
0.02	-99998.00	-99998.00	0.14	-99998.00	-99998.00	-99998.00	2.10	-99998.00	-99998.00	0.64	-99998.00	0.16
0.02	-99998.00	-99998.00	0.07	-99998.00	-99998.00	-99998.00	1.50	-99998.00	-99998.00	0.37	-99998.00	0.05
-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00
0.13	-99998.00	-99998.00	0.00	-99998.00	-99998.00	-99998.00	0.51	-99998.00	-99998.00	0.02	-99998.00	0.03
-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00
-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00
-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00
-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00
-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00
-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00
-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00
-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00
-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00
-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00
-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00
-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00
-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00

Added columns.

I.S. major = Ionic strength major + minor elements: Ca^{++} to $SiO_{2(aq)}$
I.S. trace = Ionic strength trace elements: As to Hg
I.S. total = Ionic strength (major) + I.S. (trace)

Broken into three columns due to Excel 4.0 limits on formula length

Br	TOTAL N	Hg	DO	DOC	TDS	I.S. (major)	I.S. (trace)	I.S. (total)	BALANCE	DS#	LAB	AQUIFER	LITHOLOGY	MPLE SOUR	COMMENTS	ALTITUDE	WELL DEPTH	VATER DEPT	WL ALT			
Br-		Hg++																				
79.904		200.59																				
-99998.00	0.05	-99998.00	-99998.00	-99998.00	4140.00	7.7324E-02	2.0953E-05	7.7345E-02	B	14	USGS	X	SAND	WELL	DOCKTER, F	-99998.00	235.00	-99998.00	-99998.00		UTM Zone	11
-99998.00	0.07	-99998.00	-99998.00	-99998.00	4480.00	8.2800E-02	8.3483E-05	8.2883E-02	B	14	USGS	X	SAND	WELL	DOCKTER, F	-99998.00	455.00	-99998.00	-99998.00		lat(0)	0
-99998.00	0.14	-99998.00	-99998.00	-99998.00	7520.00	1.2352E-01	2.9770E-04	1.2382E-01	B	5	USGS	X	CLAY, SAND	WELL	CALZIA, SOD	-99998.00	75.00	-99998.00	-99998.00		long(0)	-117.00
-99998.00	2.80	-99998.00	-99998.00	-99998.00	670.00	1.2690E-02	2.7139E-05	1.2718E-02	B	5	USGS	X	SAND	WELL	CALZIA, SOD	-99998.00	400.00	-99998.00	-99998.00		a	6378206.40
-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	433.00	9.7900E-03	0.0000E+00	9.7900E-03	B	19	X	X	X	SPRING	X	-99998.00	-99998.00	-99998.00	-99998.00		e2	0.00676866
-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	406.00	9.1717E-03	0.0000E+00	9.1717E-03	B	19	X	X	X	SPRING	X	-99998.00	-99998.00	-99998.00	-99998.00		e'2	0.00681478
-99998.00	0.12	-99998.00	-99998.00	-99998.00	9770.00	1.8602E-01	3.8371E-04	1.8640E-01	B	15	USGS	X	SAND	WELL	DOCKTER, F	-99998.00	75.00	-99998.00	-99998.00			
-99998.00	2.30	-99998.00	-99998.00	-99998.00	3410.00	6.0155E-02	1.0048E-04	6.0256E-02	B	15	USGS	X	GRAVEL	WELL	DOCKTER, F	-99998.00	400.00	-99998.00	-99998.00			
-99998.00	4.30	-99998.00	-99998.00	-99998.00	1180.00	2.2185E-02	6.4354E-05	2.2249E-02	B	15	USGS	X	SAND	WELL	DOCKTER, F	-99998.00	-99998.00	-99998.00	-99998.00			
-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	240.00	5.3130E-03	0.0000E+00	5.3130E-03	B	19	X	X	X	WELL	X	-99998.00	530.00	370.00	-99998.00			
-99998.00	1.80	-99998.00	-99998.00	-99998.00	215.00	4.3700E-03	1.7858E-05	4.3879E-03	B	4	USGS	X	CLAY, SAND	WELL	CALZIA, J.P.	-99998.00	335.00	-99998.00	-99998.00			
-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	335.00	7.4537E-03	0.0000E+00	7.4537E-03	B	19	X	X	X	WELL	X	-99998.00	116.00	92.00	-99998.00			
-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	7.0761E-03	0.0000E+00	7.0761E-03	B	18	CA DWR	X	X	WELL	TABLE 14	-99998.00	-99998.00	-99998.00	-99998.00			
-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	9.1000E-03	0.0000E+00	9.1000E-03	B	18	CA DWR	X	X	WELL	TABLE 14	-99998.00	-99998.00	-99998.00	-99998.00			
-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	5.8580E-03	0.0000E+00	5.8580E-03	B	18	CA DWR	X	X	WELL	TABLE 14	-99998.00	-99998.00	-99998.00	-99998.00			
-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	372.00	6.6638E-03	0.0000E+00	6.6638E-03	B	19	X	X	X	WELL	X	-99998.00	412.00	88.00	-99998.00			
-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	1.5534E-02	0.0000E+00	1.5534E-02	B	33	X	X	X	X	X	-99998.00	-99998.00	-99998.00	-99998.00			
-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	1.0957E-02	0.0000E+00	1.0957E-02	B	18	CA DWR	X	X	WELL	TABLE 14	-99998.00	-99998.00	-99998.00	-99998.00			
-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	684.00	1.8252E-02	0.0000E+00	1.8252E-02	B	35	X	X	X	X	X	-99998.00	-99998.00	-99998.00	-99998.00			
-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	4.5163E-03	0.0000E+00	4.5163E-03	NI	35	X	X	X	X	X	-99998.00	-99998.00	-99998.00	-99998.00			
-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	8.2366E-03	0.0000E+00	8.2366E-03	NI	35	X	X	X	X	X	-99998.00	-99998.00	-99998.00	-99998.00			
-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	433.00	9.4310E-03	0.0000E+00	9.4310E-03	B	19	X	X	X	WELL	X	-99998.00	506.00	275.00	-99998.00			
-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	8.2901E-03	0.0000E+00	8.2901E-03	B	18	CA DWR	X	X	WELL	TABLE 14	-99998.00	-99998.00	-99998.00	-99998.00			
-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	1.0348E-02	0.0000E+00	1.0348E-02	B	35	X	X	X	X	X	-99998.00	-99998.00	-99998.00	-99998.00			
-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	-99998.00	6.7844E-03	0.0000E+00	6.7844E-03	NI	35	X	X	X	X	X	-99998.00	-99998.00	-99998.00	-99998.00			

UTM transform parameters

Confirmatory I.S. calculations for Arc ID # 1

DRJ 4/12/96

~~$I = 0.5 * [((15/40.08) * 10^{-3} * 2^2) + (\frac{3.8}{24.31} * 10^{-3} * 2^2) + (\frac{1600}{22.99} * 10^{-3} *$~~

$$I = 0.5 * 10^{-3} [(\frac{15}{40.08} * 2^2) + (\frac{3.8}{24.31} * 2^2) + (\frac{1600}{22.99} * 1^2) + (\frac{4.70}{39.1} * 1^2) + (\frac{1900}{35.45} * -1^2) + (\frac{530}{96.06} * -2^2) + (\frac{390}{61.02} * -1^2) + (\frac{.082}{94.97} * -3^2) + (14/19 * -1^2) + (\frac{43}{60.08} * 0^2)$$

$$+ (\frac{10}{61.83} * 0^2) + (\frac{.07}{55.847} * 2^2) + (\frac{.03}{54.94} * 2^2) + (\frac{0.60}{87.62} * 2^2) + (\frac{.03}{6.941} * 1^2) + (\frac{0.38}{126.904} * -1^2)]$$

(Terms labelled: Ca, Mg, Na, K, Cl, SO_4, HCO_3, PO_4 (replacing CO_3, DRJ 4/12/96), F, $SiO_{2(aq)}$, $H_3BO_{4(aq)}$, Fe, Mn, Sr, Li, I)

$= 0.077345$

$= 7.7345 \times 10^{-2}$ vs. spreadsheet 7.7345×10^{-2} m agreement w/in rounding error.

Two FORTRAN 77 programs were developed to help in the interpretation of the water chemistry compilation of Perfect et al. (1995). Source codes are included below.

The first program is entitled MINTMK and is designed to go line by line through the Perfect et al. (1995) database and read the reported values column by column and assign them to the appropriate value. These must be read in the order in which they are entered in Perfect et al. (1995). The major elements pH, Ca, Mg, Na, K, HCO_3-, CO_3^{2-}, SO_4^{2-}, Cl, F, and SiO_2(aq) are then written to create an input file appropriately formatted for MINTEQA2, Version 3.11. In the MINTEQA2 file, the intermediate output option is specified, the pH and temperature are fixed at the measured values, Eh is unspecified, and all mineral precipitation is suppressed.

The second program, called MNTFIL is designed to read a MINTEQA2 output file (Intermediate level) line-by-line searching for key phrases. The first phrase "Part 1 of Output File" indicates the start of each file, and then the words 'co2 (g)', 'calcite', and 'cristobalite' are searched for. Once these key words are found, the value for log P(CO_2), and the saturation indices for calcite and cristobalite are written to a comma-delimited ASCII file. If key words are not found, the letters n.d. (not determined) are entered in the ASCII file. The ArcID# as discussed above is used to tie these values to the original dataset for plotting in GIS format.

It should be noted that these programs can be relatively easily modified to write other variables to the MINTEQA2 input files or search for additional phrases in the MINTEQA2 output file.

For testing these programs, the dataset of Perfect et al. (1995) was edited according to the following criteria:

1) Ca++ is reported (positive values only)
2) Either CO_3^{2-} and/or HCO_3- are reported (positive values only)
2) pH is reported (values between 1 and 14)
3) The water analysis is charged balanced as described and reported by Perfect et al. (1995)

This resulted in a dataset of about 1448 entries from the original 3733. The ArcID# assigned above maintains the relationship to the original Perfect et al. (1995) database.

PROGRAM MINTMK Pg.1

```
c
C  4567890123456789012345678901234567890123456789012345678901234567890123456789012
c  The following program is a feeble attempt to read hydrochemical
c  input files and prepare files suitable for input into MINTEQA2,
c  Version 3.11. This program was prepared by D.R. Turner for the
c  Center For Nuclear Waste Regulatory Analyses in San Antonio, TX
c  for the Radionuclide Transport KTI 20-5708-871. Many of the
c  necessary parameters/flags are hard-wired and cannot currently be
c  modified by the user during the run session. (05/31/96)
c
c
      CHARACTER  Name*40,Siteid*15,Arcid*4,Balanc*2,DatSrc*10,Lab*8,
     + Aqufer*20,Lithol*20,SmpSrc*10,Commnt*60,Filin*12,Filout*12
      INTEGER  Lat,Long,Date,Time
      REAL  Latdec,Londec,UTMNor,UTMEst,Temp,Alk,Hard,Cond,pH,Ca,Mg,
     + Na,K,Cl,SO4,HCO3,CO3,PO4,NO3,F,SiO2,As,Ba,Be,Boron,Cd,Cr,Co,Cu,
     + Fe,TotFe,Pb,Mn,Mo,Ni,Ag,Sr,V,Zn,Li,Se,Iodine,Br,TotN,Hg,DisOrg,
     + DOC,TDS,ISMaj,ISTrac,ISTot,Alt,Weldep,Watdep,Watlev,HGue,CaGue,
     + MgGue,NaGue,KGue,ClGue,SO4Gue,CO3Gue,PO4Gue,NO3Gue,FGue,SiGue,
     + Totcrb
c
c
c  Prompt the user for the names of the input file containing the
c  hydrochemical data, and the MINTEQA2 filename to be created.
c
      PRINT*, 'Enter the name of the Comma-Delimited ASCII file
     + containing the water chemistry data?'
      READ(*,11) Filin
11    FORMAT(A12)
      PRINT*, 'Enter the name of MINTEQA2 file to be created (8.3)?'
      READ(*,12) Filout
12    FORMAT(A12)
c
c  Open the water chemistry file and the MINTEQA2 input file
c
       OPEN(Unit=8, File=Filin, Status='Old', Access='Sequential',
     +Form='Formatted', Action='Read')
       OPEN(Unit=9, File=Filout, Status='Unknown', Access='Append',
     +Form='Formatted', Position='Append')
c
C  4567890123456789012345678901234567890123456789012345678901234567890123456789012
c  Reading the data out of the original water chemistry file. The order
c  in which column input will be read is reasonably standard, and is
c  based on the analysis tables of Perfect et al. (1995). Site Name,
c  SiteID,ArcID(CNWRA added),Lat,LatDec,UTMNor(CNWRA added),Long,LonDec,
c  UTMEst(CNWRA added),Date,Time,Temp,Alk,Hard,Cond,pH,Ca,Mg,Na,K,Cl,
c  SO4,HCO3,CO3,PO4,NO3,F,SiO2,As,Ba,Be,Boron,Cd,Cr,Co,Cu,Fe,TotFe,Pb,
c  Mn,Mo,Ni,Ag,Sr,V,Zn,Li,Se,Iodine,Br,TotN,Hg,DisOrg,DOC,TDS,ISMaj,
c  ISTrac,ISTot,Balanc,DatSrc,Lab,Aqufer,Lithol,SmpSrc,Commnt,Alt,
c  Weldep,Watdep,Watlev.
c
c
c
c
30    READ(8,*,end=31)Name,SiteID,ArcID,Lat,LatDec,UTMNor,Long,LonDec,
     +  UTMEst,Date,Time,Temp,Alk,Hard,Cond,pH,Ca,Mg,Na,K,Cl,SO4,HCO3,
     +  CO3,PO4,NO3,F,SiO2,As,Ba,Be,Boron,Cd,Cr,Co,Cu,Fe,TotFe,Pb,Mn,
     +  Mo,Ni,Ag,Sr,V,Zn,Li,Se,Iodine,Br,TotN,Hg,DisOrg,DOC,TDS,ISMaj,
     +  ISTrac,ISTot,Balanc,DatSrc,Lab,Aqufer,Lithol,SmpSrc,Commnt,
     +  Alt,Weldep,Watdep,Watlev
c
c  Write the selected data to the MINTEQA2 Output File
c
c  Write two Title Lines for MINTEQA2
         WRITE(9,40)Name,SiteID,ArcID
40       FORMAT(A35,';','SiteID=',A15,';','ArcID=',A4)
       WRITE(9,42)UTMNor,UTMEst,Date,Time
42     FORMAT('UTM='F9.1,'North',';',1x,F8.1,'East',';',1x,
     +   'Date=',I6,';',1x,'Time=',I4)
c
c  Write Temperature-Concentration Units. If Temp>0, use Logged temp. If
c  no temperature is reported, a value of -99998 is typically entered in
c  database (Perfect et al., 1995), and a temp of 25.00 degrees C is
c  assumed for the geochemical speciation and entered in the MINTEQA2
c  input file. Concentration units are assumed to be in the reported
c  units of mg/L. Regardless of input concentration units, MINTEQA2
```

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Program Mintmk Pg. 2

```
c  output, is in molal.
c
        IF(Temp.gt.0)THEN
          WRITE(9,43)Temp
43        FORMAT(F5.2,1X,'MG/L   0.000  0.00000E-01')
        ELSE
          WRITE(9,44)
44        FORMAT('25.00 MG/L   0.000  0.00000E-01')
        ENDIF
c
c  Lines 4 & 9 of MINTEQA2 output contain flags that are hardwired.
c  Because there are no sweep options, writing to a Lotus-file, or
c  Sorption Models, lines 5,6,7,8, & 10 of the MINTEQA2 files contain
c  no line entry.
c
        WRITE(9,45)
45      FORMAT('0 0 1 0 3 0 0 0 1 1 0 0 0')
        WRITE(9,46)
46      FORMAT('0   0   0')
c
c  For each major element, write the 3-digit MINTEQA2 ID number, the
c  reported concentration (in mg/L), an initial activity guess
c  (log molal), a "y" flag for improved activity guess, and the text
c  identifier from the MINTEQA2 databases.
c
       IF(pH.gt.0)THEN
         HGue=-1*pH
         WRITE(9,47)HGue
47       FORMAT('    330  0.000E-01  ',F6.2,' y',20X,'/H+1')
       ENDIF
       IF(Ca.gt.0)THEN
         CaGue=DLOG10((Ca/40.078)*1e-3)
         WRITE(9,48)Ca,CaGue
48       FORMAT('    150  ',E9.3,2X,F6.2,' y',20X,'/Ca+2')
       ENDIF
       IF(Mg.gt.0)THEN
         MgGue=DLOG10((Mg/24.305)*1e-3)
         WRITE(9,49)Mg,MgGue
49       FORMAT('    460  ',E9.3,2X,F6.2,' y',20X,'/Mg+2')
       ENDIF
       IF(Na.gt.0)THEN
         NaGue=DLOG10((Na/22.98977)*1e-3)
         WRITE(9,50)Na,NaGue
50       FORMAT('    500  ',E9.3,2X,F6.2,' y',20X,'/Na+1')
       ENDIF
       IF(K.gt.0)THEN
         KGue=DLOG10((K/39.0983)*1e-3)
         WRITE(9,51)K,KGue
51       FORMAT('    410  ',E9.3,2X,F6.2,' y',20X,'/K+1')
       ENDIF
       IF(Cl.gt.0)THEN
         ClGue=DLOG10((Cl/35.4527)*1e-3)
         WRITE(9,52)Cl,ClGue
52       FORMAT('    180  ',E9.3,2X,F6.2,' y',20X,'/Cl-1')
       ENDIF
       IF(SO4.gt.0)THEN
         SO4Gue=DLOG10((SO4/96.0636)*1e-3)
         WRITE(9,53)SO4,SO4Gue
53       FORMAT('    732  ',E9.3,2X,F6.2,' y',20X,'/SO4-2')
       ENDIF
       IF(HCO3.gt.0.and.CO3.le.0)THEN
         CO3Gue=DLOG10((HCO3/61.01714)*1e-3)
         TotCrb=HCO3*(61.01714/60.0092)
         WRITE(9,54)TotCrb,CO3Gue
       ENDIF
       IF(HCO3.gt.0.and.CO3.gt.0)THEN
         CO3Gue=DLOG10(((HCO3/61.01714)+(CO3/60.0092))*1e-3)
         TotCrb=CO3+(HCO3*(61.01714/60.0092))
         WRITE(9,54)TotCrb,CO3Gue
       ENDIF
       IF(HCO3.le.0.and.CO3.gt.0)THEN
         CO3Gue=DLOG10((CO3/60.0092)*1e-3)
         WRITE(9,54)CO3,CO3Gue
54       FORMAT('    140  ',E9.3,2X,F6.2,' y',20X,'/CO3-2')
       ENDIF
       IF(PO4.gt.0)THEN
         PO4Gue=DLOG10((PO4/94.971362)*1e-3)
```

Convert HCO_3^- to CO_3^{2-} which is the base component used in MINTEQA2

6/21/96 DR

Program Mintmk Pg. 3

```
         WRITE(9,55)PO4,PO4Gue
55       FORMAT('    580  ',E9.3,2X,F6.2,' y',20X,'/PO4-2')
       ENDIF
       IF(NO3.gt.0)THEN
         NO3Gue=DLOG10((NO3/62.00494)*1e-3)
         WRITE(9,56)NO3,NO3Gue
56       FORMAT('    492  ',E9.3,2X,F6.2,' y',20X,'/NO3-1')
       ENDIF
       IF(F.gt.0)THEN
         FGue=DLOG10((F/18.998403)*1e-3)
         WRITE(9,57)F,FGue
57       FORMAT('    270  ',E9.3,2X,F6.2,' y',20X,'/F-1')
       ENDIF
       IF(SiO2.gt.0)THEN
         SiO2=SiO2*(60.0843/96.11486)
         SiGue=DLOG10((SiO2/60.0843)*1e-3)
         WRITE(9,58)SiO2,SiGue
58       FORMAT('    770  ',E9.3,2X,F6.2,' y',20X,'/H4SiO4')
       ENDIF
c
c  Insert Blank Line
c
         WRITE(9,59)
59       FORMAT(' ')
c
c  Fixed pH
c
         WRITE(9,60)
60       FORMAT(' 3   1')
         WRITE(9,61)pH
61       FORMAT('    330    ',F7.4,'     0.0000',19X,'/H+1')
c
c  Insert Blank Lines
c
         WRITE(9,62)
62       FORMAT(' ',' ')
         WRITE(9,63)
63       FORMAT(' ',' ')
       GOTO 30
31     CONTINUE
C  45678901234567890123456789012345678901234567890123456789012345678901234567890123456789012
       STOP
       END
```

Program MINTMK designed to read water chemistry files of Parkhurst et al. (1995)

6/21/96 DBLumm

```
"C O - 1 N E S E N E S E C 1 0 T 1 1 N R 2 E
CO-1-1",-99998,1,350347,35.06306,3879865,1164521,-116.756,522264,780621,-99998,24.3,320,54,7165,8.4,15,3.8,1600,4.7,1900,530,390,-99998,0.09,-99998,14,43,-99998,-99998,-99998,10,-99998,-99998
,-99998,-99998,0.07,-99998,-99998,0.03,-99998,-99998,-99998,0.6,-99998,-99998,0.03,-99998,0.38,-99998,0.05,-99998,-99998,-99998,4140,7.73E-02,2.10E-05,7.73E-02,B,14,USGS,X,SAND,WELL,"DOCKTER, R.D
COYOTE DRY LAKE, CA",-99998,235,-99998,-99998
"C O - 1 N E S E N E S E C 1 0 T 1 1 N R 2 E
CO-1-2",-99998,2,350347,35.06306,3879865,1164521,-116.756,522264,780621,-99998,25.6,150,330,7207,7.9,100,19,1500,7.4,1800,790,183,-99998,0,-99998,7.1,29,-99998,-99998,-99998,11,-99998,-99998,
99998,-99998,0.02,-99998,-99998,0.6,-99998,-99998,-99998,2.3,-99998,-99998,0.1,-99998,0.31,-99998,0.07,-99998,-99998,-99998,4480,8.28E-02,8.35E-05,8.29E-02,B,14,USGS,X,SAND,WELL,"DOCKT
COYOTE DRY LAKE, CA",-99998,455,-99998,-99998
"S D - 1 N E N E S E C 3 1 T 1 3 N R 9 E
SD-1-1",-99998,3,351036,35.17667,3892843,1160330,-116.058,585746.8,780708,-99998,25.5,892,770,12000,7.6,150,92,2300,29,4000,31,109,-99998,0,-99998,4.7,26,-99998,-99998,-99998,1.6,-99998,-9999
,-99998,-99998,0.06,-99998,-99998,0.49,-99998,-99998,-99998,11,-99998,-99998,0.35,-99998,0.36,-99998,0.14,-99998,-99998,-99998,7520,1.24E-01,2.98E-04,1.24E-01,B,5,USGS,X,"CLAY, SANDY",WELL,"CALZIA
SODA DRY LAKE, CA",-99998,75,-99998,-99998
```

Perfect et al (1995) water chemistry as comma-delimited ASCII files

DBLumm

```
CO-1 NESENE SEC10 T11N,R2E CO-1-1  ;SiteID=-99998        ;ArcID=1
UTM=3879865.0North: 522264.0East; Date=780621; Time=****
24.30 MG/L   0.000  0.00000E-01
0 0 1 0 3 0 0 0 1 1 0 0 0
0   0   0
    330  0.000E-01   -8.40 y                  /H+1
    150  0.150E+02   -3.43 y                  /Ca+2
    460  0.380E+01   -3.81 y                  /Mg+2
    500  0.160E+04   -1.16 y                  /Na+1
    410  0.470E+01   -3.92 y                  /K+1
    180  0.190E+04   -1.27 y                  /Cl-1
    732  0.530E+03   -2.26 y                  /SO4-2
    140  0.397E+03   -2.19 y                  /CO3-2
    580  0.900E-01   -6.02 y                  /PO4-2
    270  0.140E+02   -3.13 y                  /F-1
    770  0.269E+02   -3.35 y                  /H4SiO4

  3   1
    330     8.4000      0.0000                /H+1
```

Program Mintmk results reading Datacdit.* files of Perfect et al. (1995)

Minteqa2 input files at logged Temp (C), mg/L input, constant pH at reported value.

measured Temp

```
CO-1 NESENE SEC10 T11N,R2E CO-1-2  ;SiteID=-99998        ;ArcID=2
UTM=3879865.0North: 522264.0East; Date=780621; Time=****
25.60 MG/L   0.000  0.00000E-01
0 0 1 0 3 0 0 0 1 1 0 0 0
0   0   0
    330  0.000E-01   -7.90 y                  /H+1
    150  0.100E+03   -2.60 y                  /Ca+2
    460  0.190E+02   -3.11 y                  /Mg+2
    500  0.150E+04   -1.19 y                  /Na+1
    410  0.740E+01   -3.72 y                  /K+1
    180  0.180E+04   -1.29 y                  /Cl-1
    732  0.790E+03   -2.08 y                  /SO4-2
    140  0.186E+03   -2.52 y                  /CO3-2
    270  0.710E+01   -3.43 y                  /F-1
    770  0.181E+02   -3.52 y                  /H4SiO4
```

concentrations in mg/L (measured)

```
  3   1
    330     7.9000      0.0000                /H+1
```

measured pH

```
SD-1 NENE SEC 31 T13N, R9E SD-1-1  ;SiteID=-99998        ;ArcID=3
UTM=3892843.0North: 585746.8East; Date=780708; Time=****
25.50 MG/L   0.000  0.00000E-01
0 0 1 0 3 0 0 0 1 1 0 0 0
0   0   0
    330  0.000E-01   -7.60 y                  /H+1
    150  0.150E+03   -2.43 y                  /Ca+2
    460  0.920E+02   -2.42 y                  /Mg+2
    500  0.230E+04   -1.00 y                  /Na+1
    410  0.290E+02   -3.13 y                  /K+1
    180  0.400E+04   -0.95 y                  /Cl-1
    732  0.310E+02   -3.49 y                  /SO4-2
    140  0.111E+03   -2.75 y                  /CO3-2
    270  0.470E+01   -3.61 y                  /F-1
    770  0.163E+02   -3.57 y                  /H4SiO4

  3   1
    330     7.6000      0.0000                /H+1
```

units in mg/L
reported T=25.5°C

constant pH=7.6

6/21/96 DBLumm

DADATA2.XLS

TOTAL N	Hg	DO	DOC	TDS	TS. (mg/l)	T.S. (mg/cm)	I.S. (mmol)	BALANCE	DS#	LAB	AQUIFER		LITHOLOGY	SAMPLE SOURCE	COMMENTS	ALTITUDE	WELL	WATER DEPTH	WL ALT
	Hg++																		
	200.59																		
0.06	-99998	-99998	4140	-99998	-99998	-99998	7.73E-02	2.10E-05	14	USGS	X		SAND	WELL	DOCKTER, R.D. COYOTE DRY LAKE, CA	-99998	-99998	235	-99998
0.07	-99998	-99998	4480	-99998	-99998	-99998	8.28E-02	8.35E-05	14	USGS	X		SAND	WELL	DOCKTER, R.D. COYOTE DRY LAKE, CA	-99998	-99998	455	-99998
0.14	-99998	-99998	7520	-99998	-99998	-99998	1.24E-01	2.98E-04	5	USGS	X		CLAY, SANDY	WELL	DOCKTER, R.D. COYOTE DRY LAKE, CA	-99998	-99998	75	-99998
2.8	-99998	-99998	670	-99998	-99998	-99998	1.27E-02	2.71E-05	5	USGS	X		SAND	WELL	CALZIA SODA DRY LAKE, CA	-99998	-99998	400	-99998
0.12	-99998	-99998	9720	-99998	-99998	-99998	1.86E-01	3.84E-04	15	USGS	X		SAND	WELL	DOCKTER, R.D. CUDDEBACK DRY LAKE, CA	-99998	-99998	75	-99998
2.3	-99998	-99998	3410	-99998	-99998	-99998	6.02E-02	1.00E-04	15	USGS	X		GRAVEL	WELL	DOCKTER, R.D. CUDDEBACK DRY LAKE, CA	-99998	-99998	400	-99998
4.3	-99998	-99998	1180	-99998	-99998	-99998	2.22E-02	3.84E-04	15	USGS	X		SAND	WELL	DOCKTER, R.D. CUDDEBACK DRY LAKE, CA	-99998	-99998	75	-99998
1.8	-99998	-99998	215	-99998	-99998	-99998	4.37E-02	1.79E-05	4	USGS	X		CLAY, SANDY, SILTY	WELL	CALZIA, J.P. IVANHAH VALLEY, CA	-99998	-99998	335	-99998
0.09	-99998	-99998	4140	-99998	-99998	-99998	7.73E-02	2.10E-05	14	USGS	X		SAND	WELL	DOCKTER, R.D. COYOTE DRY LAKE, CA	-99998	-99998	235	-99998

DADATA2.XLS

HCO3-	CO3-2	PO4-3	NO3-	F-	SiO2	As	Ba	Be	B	HBO4(aq)	Cd	Ca	Cl	Cr+++	Cr++	Co++	Cu++	Fe++	TOTAL Fe	Pb	Mn++	Mo	MoO4-2	Ni++	Ag+	Sr	VO2(OH)-2	Zn++	Li+	Sr++	I-	Br-
61.0174	60.0092	64.9738	62.0048	18.9984	60.0843	138.9271	9.012182	61.83302	112.411	51.9961	58.9332	63.546	55.847		207.2	54.93805	158.9376	58.69	107.8682	87.62	133.3623	65.39	8.9411	142.3576	126.9045	78.904
-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998
183	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998
134	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998
118	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998
146	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998
88	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998
131	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998
100	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998
168	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998
126	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998
156	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998	-99998

DADATA2.XLS

SITE NAME																																
Elemental Thermodynamic Species																																
Gram Molecular Weight																																
CO-1NESENE SEC10 T11N,R2E CO-1-1	-99998	350347	35.06306	3879865	1164521	-116.756	522264	780621	-99998	24.3	320	54	7165	8.4	15	3.8	1600	4.7	1900	530	390	-99998	0.09	-99998	14	43	-99998	-99998	-99998	10	-99998	-99998
CO-1NESENE SEC10 T11N,R2E CO-1-2	-99998	350347	35.06306	3879865	1164521	-116.756	522264	780621	-99998	25.6	150	330	7207	7.9	100	19	1500	7.4	1800	790	183	-99998	0	-99998	7.1	29	-99998	-99998	-99998	11	-99998	-99998
SD-1 NENE SEC 31 T13N, R9E SD-1-1	-99998	351036	35.17667	3892843	1160330	-116.058	585746.8	780708	-99998	25.5	892	770	12000	7.6	150	92	2300	29	4000	31	109	-99998	0	-99998	4.7	26	-99998	-99998	-99998	1.6	-99998	-9999
CO-2 SWNWSW SEC 22 T30S,R42E	-99998	351823	35.30639	3806823	1172804	-117.488	457421.1	780617	-99998	2.13	170	340	8727	7.8	110	15	1100	49	1800	120	33	-99998	2.3	-99998	8.1	17	1200	480	120	20	300	100
CU-1 SWSESW SEC 10 T30S,R42E CU1-1	-99998	351857	35.3325	3809818	1172754	-117.465	457738.2	780618	-99998	2.54	87	340	5717	7.8	110	13	4000	100	6000	340	45	-99998	2.4	-99998	8.4	17	1200	480	120	20	300	100
CU-1 SWSESW SEC 10 T30S,R42E CU1-2	-99998	351857	35.3325	3809818	1172754	-117.465	457738.2	780618	-99998	2.12	170	220	16000	8	65	13	4000	100	6000	340	45	-99998	2.4	-99998	8.4	17	1200	480	120	20	300	100
CU-2 SWNWSW SEC 22 T30S,R42E	-99998	351823	35.30639	3806823	1172804	-117.488	457421.1	780617	-99998	2.53	87	340	5717	7.8	110	15	1100	49	1800	120	33	-99998	2.3	-99998	8.1	17	1200	480	120	20	300	100
SD-1 NENE SEC 31 T13N, R9E SD-1-2	-99998	351036	35.17667	3892843	1160330	-116.058	585746.8	780708	-99998	28.5	892	770	12000	7.6	150	92	2300	29	4000	31	109	-99998	0	-99998	4.7	26	-99998	-99998	-99998	1.6	-99998	-9999
IVANHAH VALLEY WELL 15/5-16AD1.	-99998	352724	35.45667	3824377	1152312	-115.387	468606.6	540508	-99998	23.9	69	445	15387	7.3	161	28	4400	43	5.5	28	38	-99998	1.2	-99998	8.2	28	1200	480	120	20	300	100
IVANHAH VALLEY WELL 15/5-23H1.	-99998	352712	35.45333	3824277	1152042	-115.345	465018.3	540814	-99998	20	69	445	15387	7.3	161	28	4400	43	5.5	28	38	-99998	1.2	-99998	8.2	28	1200	480	120	20	300	100
IVANHAH VALLEY WELL 16/16-33A1.	-99998	352800	35.46667	3826078	1151600	-115.267	465277.9	540508	-99998	25.6	25	345	15387	7.3	161	28	4400	43	5.5	28	38	-99998	1.2	-99998	8.2	28	1200	480	120	20	300	100
CRESENT SPRING.	-99998	352643	35.47661	3827445	1151047	-115.18	465134.4	850622	-99998	20.5	-99998	890	7.8	106	25	3.7	220	3.9	180	140	40	-99998	1.1	-99998	8.1	17	1200	480	120	20	300	100
IVANHAH VALLEY WELL 16/14-12D1.	-99998	352853	35.48138	3827397	1154124	-115.407	464547.2	540508	-99998	227	294	7.6	46	31	71	4	121	76														
IVANHAH VALLEY WELL 16/14-12D1.	-99998	353117	35.52139	3831814	1152512	-115.42	464266.4	540508	-99998	143	643	7.8	25	19	83	4.7	96	38														

DADATA2.XLS

6/21/96 Perfect et al headers Excel 4.0 files

```
Temperature (Celsius): 24.30
Units of concentration: MG/L
Ionic strength to be computed.
If specified, carbonate concentration represents total inorganic carbon.
Do not automatically terminate if charge imbalance exceeds 30%
Precipitation is allowed only for those solids specified as ALLOWED
  in the input file (if any).
The maximum number of iterations is: 200
The method used to compute activity coefficients is: Davies equation
Intermediate output file
```

(1)

Matches input files prepared using Program Mintmak

```
330  0.000E-01  -8.40 y
150  1.500E+01  -3.43 y
460  3.800E+00  -3.81 y
500  1.600E+03  -1.16 y
410  4.700E+00  -3.92 y
180  1.900E+03  -1.27 y
732  5.300E+02  -2.26 y
140  3.970E+02  -2.19 y
580  9.000E-02  -6.02 y
270  1.400E+01  -3.13 y
770  2.690E+01  -3.35 y
```

H2O has been inserted as a COMPONENT

```
3  1
330    8.4000   0.0000
```

pH

INPUT DATA BEFORE TYPE MODIFICATIONS

ID	NAME	ACTIVITY GUESS	LOG GUESS	ANAL TOTAL
330	H+1	3.981E-09	-8.400	0.000E-01
150	Ca+2	3.715E-04	-3.430	1.500E+01
460	Mg+2	1.549E-04	-3.810	3.800E+00
500	Na+1	6.918E-02	-1.160	1.600E+03
410	K+1	1.202E-04	-3.920	4.700E+00
180	Cl-1	5.370E-02	-1.270	1.900E+03
732	SO4-2	5.495E-03	-2.260	5.300E+02
140	CO3-2	6.457E-03	-2.190	3.970E+02
580	PO4-3	9.550E-07	-6.020	9.000E-02
270	F-1	7.413E-04	-3.130	1.400E+01
770	H4SiO4	4.467E-04	-3.350	2.690E+01
2	H2O	1.000E+00	0.000	0.000E-01

Charge Balance: UNSPECIATED

Sum of CATIONS= 7.110E-02 Sum of ANIONS = 7.895E-02

PERCENT DIFFERENCE = 5.235E+00 (ANIONS - CATIONS)/(ANIONS + CATIONS)

```
IMPROVED ACTIVITY GUESSES PRIOR TO FIRST ITERATION:
   SO4-2      Log activity guess:   -2.26
   CO3-2      Log activity guess:   -4.12
   PO4-3      Log activity guess:  -10.00
   H4SiO4     Log activity guess:   -3.56
```

PART 3 of OUTPUT FILE

PC MINTEQA2 v3.10 DATE OF CALCULATIONS: 7-JUN-96 TIME: 8:27:12

PARAMETERS OF THE COMPONENT MOST OUT OF BALANCE:

ITER	NAME	TOTAL MOL	DIFF FXN	LOG ACTVTY	RESIDUAL
0	F-1	7.402E-04	1.921E-05	-3.13000	1.914E-05
1	F-1	7.402E-04	8.199E-08	-3.13871	7.964E-09
2	F-1	7.402E-04	1.895E-04	-3.13842	1.894E-04
3	F-1	7.402E-04	2.809E-06	-3.23526	2.735E-06
4	F-1	7.402E-04	-3.504E-07	-3.23676	2.764E-07

ID	NAME	ANAL MOL	CALC MOL	LOG ACTVTY	GAMMA	DIFF FXN
770	H4SiO4	2.811E-04	2.712E-04	-3.55913	1.017692	2.367E-10
150	Ca+2	3.759E-04	3.113E-04	-3.91096	0.394339	-5.692E-09
460	Mg+2	1.570E-04	1.310E-04	-4.28691	0.394339	-2.412E-09
500	Na+1	6.991E-02	6.903E-02	-1.26198	0.792442	-3.237E-07
410	K+1	1.207E-04	1.192E-04	-4.02488	0.792442	-5.602E-10
180	Cl-1	5.383E-02	5.383E-02	-1.36998	0.792442	-2.503E-07
732	SO4-2	5.542E-03	4.822E-03	-2.72090	0.394339	-9.209E-08
140	CO3-2	6.645E-03	1.448E-04	-4.24332	0.394339	-3.171E-08
580	PO4-3	9.519E-07	2.943E-10	-10.44054	0.123227	-1.563E-11
270	F-1	7.402E-04	7.319E-04	-3.23656	0.792442	-3.410E-09
2	H2O	0.000E-01	-3.047E-06	-0.00102	1.000000	0.000E-01
330	H+1	0.000E-01	5.024E-09	-8.40000	0.792442	0.000E-01

Type I - COMPONENTS AS SPECIES IN SOLUTION

ID	NAME	CALC MOL	ACTIVITY	LOG ACTVTY	GAMMA	NEW LOGK
330	H+1	5.024E-09	3.981E-09	-8.40000	0.79244	0.101
150	Ca+2	3.113E-04	1.228E-04	-3.91096	0.39434	0.404
460	Mg+2	1.310E-04	5.165E-05	-4.28691	0.39434	0.404
500	Na+1	6.903E-02	5.470E-02	-1.26198	0.79244	0.101
410	K+1	1.192E-04	9.443E-05	-4.02488	0.79244	0.101
180	Cl-1	5.383E-02	4.266E-02	-1.36998	0.79244	0.101
732	SO4-2	4.822E-03	1.902E-03	-2.72090	0.39434	0.404
140	CO3-2	1.448E-04	5.711E-05	-4.24332	0.39434	0.404
580	PO4-3	2.943E-10	3.626E-11	-10.44054	0.12323	0.909
270	F-1	7.319E-04	5.800E-04	-3.23656	0.79244	0.101
770	H4SiO4	2.712E-04	2.760E-04	-3.55913	1.01769	-0.008

Type II - OTHER SPECIES IN SOLUTION OR ADSORBED

ID	NAME	CALC MOL	ACTIVITY	LOG ACTVTY	GAMMA	NEW LOGK
5007320	naso4 -	6.550E-04	5.190E-04	-3.28481	0.79244	0.799
7702700	sif6 -2	1.091E-26	4.302E-27	-26.36635	0.39434	30.612
3300020	oh-	3.013E-06	2.388E-06	-5.62204	0.79244	-13.920
1501400	cahco3 +	7.741E-06	6.134E-06	-5.21225	0.79244	11.443

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7/1/96 DRJ

[illegible]	[illegible]	9.635E-06	9.806E-06	-5.00852	1.01769	[illegible]
[illegible]	[illegible]	7.708E-07	6.108E-07	-6.21407	0.79244	[illegible]
[illegible]	[illegible]	9.247E-09	7.327E-09	-8.13505	0.79244	[illegible]
[illegible]	[illegible]	2.120E-08	2.157E-08	-7.66610	1.01769	[illegible]
1505801	capo4 -	1.597E-08	1.265E-08	-7.89785	0.79244	[illegible]
1505802	cah2po4 +	8.156E-11	6.463E-11	-10.18957	0.79244	21.063
1507320	caso4 aq	4.645E-05	4.727E-05	-4.32540	1.01769	2.299
3301400	hco3 -	6.216E-03	4.926E-03	-2.30750	0.79244	10.437
3301401	h2co3 aq	4.305E-05	4.381E-05	-4.35844	1.01769	16.677
3302700	hf aq	3.303E-09	3.361E-09	-8.47352	1.01769	3.155
3302701	hf2 -	9.313E-12	7.380E-12	-11.13196	0.79244	3.842
3302702	h2f2 aq	3.071E-17	3.125E-17	-16.50511	1.01769	6.760
3305800	hpo4 -2	8.235E-07	3.248E-07	-6.48845	0.39434	12.756
3305801	h2po4 -	2.638E-08	2.091E-08	-7.67974	0.79244	19.662
3305802	h3po4	1.127E-14	1.147E-14	-13.94054	1.01769	21.692
3307320	hso4 -	9.094E-10	7.206E-10	-9.14228	0.79244	2.080
3307700	h3sio4 -	9.947E-06	7.882E-06	-5.10335	0.79244	-9.843
3307701	h2sio4 -2	9.485E-09	3.740E-09	-8.42711	0.39434	-21.264
4105800	khpo4 -	7.510E-11	5.951E-11	-10.22541	0.79244	12.741
4107320	kso4 -	1.573E-06	1.247E-06	-5.90428	0.79244	0.943
4601400	mgco3 aq	2.737E-06	2.785E-06	-5.55517	1.01769	2.967
4601401	mghco3 +	3.718E-06	2.946E-06	-5.53070	0.79244	11.501
4602700	mgf +	2.452E-06	1.943E-06	-5.71153	0.79244	1.913
4603300	mgoh +	2.526E-08	2.001E-08	-7.69866	0.79244	-11.710
4605800	mgpo4 -	9.062E-09	7.181E-09	-8.14380	0.79244	6.685
4605801	mgh2po4 +	4.380E-11	3.471E-11	-10.45952	0.79244	21.169
4605802	mghpo4 aq	1.217E-08	1.239E-08	-7.90705	1.01769	15.213
4607320	mgso4 aq	1.707E-05	1.737E-05	-4.76023	1.01769	2.240
5001400	naco3 -	7.053E-05	5.589E-05	-4.25267	0.79244	1.354
5001401	nahco3 aq	1.469E-04	1.495E-04	-3.82530	1.01769	10.072
5002700	naf aq	5.056E-06	5.146E-06	-5.28854	1.01769	-0.798
5005800	nahpo4 -	4.310E-08	3.416E-08	-7.46652	0.79244	12.737

(2)

Type III - SPECIES WITH FIXED ACTIVITY

ID	NAME	CALC MOL	LOG MOL	NEW LOGK	DH
2	H2O	-3.047E-06	-5.516	0.001	0.000
330	H+1	-6.449E-03	-2.191	8.400	0.000

Type VI - EXCLUDED SPECIES (not included in mole balance)

ID	NAME	CALC MOL.	LOG MOL	NEW LOGK	DH
3301403	co2 (g)	1.314E-03	-2.881	18.161	-0.530

Log P_{CO_2} read by MINTFIL

PART 4 of OUTPUT FILE

PC MINTEQA2 v3.10 DATE OF CALCULATIONS: 7-JUN-96 TIME: 8:27:12

PERCENTAGE DISTRIBUTION OF COMPONENTS AMONG
TYPE I and TYPE II (dissolved and adsorbed) species

```
H4SiO4     96.5   PERCENT BOUND IN SPECIES #     770   H4SiO4
            3.5   PERCENT BOUND IN SPECIES #3307700   h3sio4 -

Ca+2       82.8   PERCENT BOUND IN SPECIES #     150   Ca+2
            2.1   PERCENT BOUND IN SPECIES #1501400   cahco3 +
            2.6   PERCENT BOUND IN SPECIES #1501401   caco3 aq
           12.4   PERCENT BOUND IN SPECIES #1507320   caso4 aq

Mg+2       83.4   PERCENT BOUND IN SPECIES #     460   Mg+2
            1.7   PERCENT BOUND IN SPECIES #4601400   mgco3 aq
            2.4   PERCENT BOUND IN SPECIES #4601401   mghco3 +
            1.6   PERCENT BOUND IN SPECIES #4602700   mgf +
           10.9   PERCENT BOUND IN SPECIES #4607320   mgso4 aq

Na+1       98.7   PERCENT BOUND IN SPECIES #     500   Na+1

K+1        98.7   PERCENT BOUND IN SPECIES #     410   K+1
            1.3   PERCENT BOUND IN SPECIES #4107320   kso4 -

Cl-1      100.0   PERCENT BOUND IN SPECIES #     180   Cl-1

SO4-2      87.0   PERCENT BOUND IN SPECIES #     732   SO4-2
           11.8   PERCENT BOUND IN SPECIES #5007320   naso4 -

CO3-2       2.2   PERCENT BOUND IN SPECIES #     140   CO3-2
           93.5   PERCENT BOUND IN SPECIES #3301400   hco3 -
            1.1   PERCENT BOUND IN SPECIES #5001400   naco3 -
            2.2   PERCENT BOUND IN SPECIES #5001401   nahco3 aq

PO4-3       2.2   PERCENT BOUND IN SPECIES #1505800   cahpo4 aq
            1.7   PERCENT BOUND IN SPECIES #1505801   capo4 -
           86.5   PERCENT BOUND IN SPECIES #3305800   hpo4 -2
            2.8   PERCENT BOUND IN SPECIES #3305801   h2po4 -
            1.3   PERCENT BOUND IN SPECIES #4605802   mghpo4 aq
            [illegible]   PERCENT BOUND IN SPECIES #5005800   nahpo4 -

F-1        98.9   PERCENT BOUND IN SPECIES #     270   F-1

H2O        98.9   PERCENT BOUND IN SPECIES #3300020   oh-

H+1        96.4   PERCENT BOUND IN SPECIES #3301400   hco3 -
            1.3   PERCENT BOUND IN SPECIES #3301401   h2co3 aq
            2.3   PERCENT BOUND IN SPECIES #5001401   nahco3 aq
```

(3)

PART 5 of OUTPUT FILE

PC MINTEQA2 v3.10 DATE OF CALCULATIONS: 7-JUN-96 TIME: 8:27:12

----------- EQUILIBRATED MASS DISTRIBUTION -----------

IDX	NAME	DISSOLVED MOL/KG	DISSOLVED PERCENT	SORBED MOL/KG	SORBED PERCENT	PRECIPITATED MOL/KG	PRECIPITATED PERCENT
770	H4SiO4	2.811E-04	100.0	0.000E-01	0.0	0.000E-01	0.0
150	Ca+2	3.759E-04	100.0	0.000E-01	0.0	0.000E-01	0.0
460	Mg+2	1.570E-04	100.0	0.000E-01	0.0	0.000E-01	0.0
500	Na+1	6.991E-02	100.0	0.000E-01	0.0	0.000E-01	0.0
410	K+1	1.207E-04	100.0	0.000E-01	0.0	0.000E-01	0.0
180	Cl-1	5.383E-02	100.0	0.000E-01	0.0	0.000E-01	0.0
732	SO4-2	5.542E-03	100.0	0.000E-01	0.0	0.000E-01	0.0
140	CO3-2	6.645E-03	100.0	0.000E-01	0.0	0.000E-01	0.0
580	PO4-3	9.519E-07	100.0	0.000E-01	0.0	0.000E-01	0.0
270	F-1	7.402E-04	100.0	0.000E-01	0.0	0.000E-01	0.0
2	H2O	3.047E-06	100.0	0.000E-01	0.0	0.000E-01	0.0
330	H+1	6.449E-03	100.0	0.000E-01	0.0	0.000E-01	0.0

Charge Balance: SPECIATED

Sum of CATIONS = 7.005E-02 Sum of ANIONS 7.146E-02

PERCENT DIFFERENCE = 9.941E-01 (ANIONS - CATIONS)/(ANIONS + CATIONS)

EQUILIBRIUM IONIC STRENGTH (m) = 7.616E-02

EQUILIBRIUM pH = 8.400

DATE ID NUMBER: 960607
TIME ID NUMBER: 8271284

PART 6 of OUTPUT FILE

PC MINTEQA2 v3.10 DATE OF CALCULATIONS: 7-JUN-96 TIME: 8:27:12

Saturation indices and stoichiometry of all minerals

```
  ID #    NAME          Sat. Index       Stoichiometry in [brackets]
8015005 akerminite       -16.430   [ -1.000]   2 [ -6.000] 330 [  2.000] 770
                                   [  2.000] 150 [  1.000] 460
6015000 anhydrite         -2.001   [  1.000] 150 [  1.000] 732
5015000 aragonite          0.175   [  1.000] 150 [  1.000] 140
5046000 artinite          -5.672   [ -2.000] 330 [  2.000] 460 [  1.000] 140
                                   [  5.000]   2
2046000 brucite           -4.326   [  1.000] 460 [  2.000]   2 [ -2.000] 330
8015007 ca3sio5          -38.943   [ -6.000] 330 [  1.000] 770 [  3.000] 150
                                   [  1.000]   2
5015001 calcite            0.316   [  1.000] 150 [  1.000] 140
2077000 chalcedony        -0.026   [ -2.000]   2 [  1.000] 770
8646000 chrysotile        -1.859   [ -6.000] 330 [  3.000] 460 [  2.000] 770
                                   [  1.000]   2
8246000 clinoenstite      -2.418   [ -1.000]   2 [  1.000] 460 [  1.000] 770
                                   [ -2.000] 330
2077001 cristobalite       0.039   [ -2.000]   2 [  1.000] 770
8215000 diopside          -1.656   [ -2.000]   2 [  1.000] 150 [  1.000] 460
                                   [  2.000] 770 [ -4.000] 330
5015002 dolomite           0.301   [  1.000] 150 [  1.000] 460 [  2.000] 140
6046000 epsomite          -4.870   [  1.000] 460 [  1.000] 732 [  7.000]   2
7015002 fco3apatite       13.025   [  9.496] 150 [  0.360] 500 [  0.144] 460
                                   [  4.800] 580 [  1.200] 140 [  2.480] 270
4215000 fluorite           0.573   [  1.000] 150 [  2.000] 270
8046000 forsterite        -6.915   [ -4.000] 330 [  2.000] 460 [  1.000] 770
6015001 gypsum            -1.785   [  1.000] 150 [  1.000] 732 [  2.000]   2
4150000 halite            -4.212   [  1.000] 500 [  1.000] 180
5015003 huntite           -3.821   [  3.000] 460 [  1.000] 150 [  4.000] 140
7015003 hydrapatite        1.722   [  5.000] 150 [  3.000] 580 [  1.000]   2
                                   [ -1.000] 330
5046001 hydrmagnesit     -12.938   [  5.000] 460 [  4.000] 140 [ -2.000] 330
                                   [  6.000]   2
8015002 larnite          -17.021   [ -4.000] 330 [  1.000] 770 [  2.000] 150
2015000 lime             -19.989   [ -2.000] 330 [  1.000] 150 [  1.000]   2
8450000 magadiite         -3.467   [ -1.000] 330 [ -9.000]   2 [  1.000] 500
                                   [  7.000] 770
5046002 magnesite         -0.512   [  1.000] 460 [  1.000] 140
8015004 merwinite        -24.666   [ -8.000] 330 [  2.000] 770 [  1.000] 460
                                   [  3.000] 150
6050001 mirabilite        -4.108   [  2.000] 500 [  1.000] 732 [ 10.000]   2
8015003 monticellite      -8.514   [ -4.000] 330 [  1.000] 770 [  1.000] 150
                                   [  1.000] 460
3050000 natron            -5.439   [  2.000] 500 [  1.000] 140 [ 10.000]   2
5046003 nesquehonite      -2.922   [  1.000] 460 [  1.000] 140 [  3.000]   2

  ID #    NAME          Sat. Index       Stoichiometry in [brackets]
8015001 ca-olivine       -15.524   [ -4.000] 330 [  1.000] 770 [  2.000] 150
2046001 periclase         -9.060   [ -2.000] 330 [  1.000] 460 [  1.000]   2
2015001 portlandite       -9.841   [ -2.000] 330 [  1.000] 150 [  2.000]   2
2077002 quartz             0.460   [ -2.000]   2 [  1.000] 770
8646004 sepiolite(a)      -4.431   [ -0.500]   2 [  2.000] 460 [  3.000] 770
                                   [ -4.000] 330
8646003 sepiolite(c)      -1.611   [ -0.500]   2 [  2.000] 460 [  3.000] 770
                                   [ -4.000] 330
2077003 sio2(a,gl)        -0.531   [ -2.000]   2 [  1.000] 770
2077004 sio2(a,pt)        -0.840   [ -2.000]   2 [  1.000] 770
```

} read by MINTFIL

7/1/96 DRT

PC-MINTEQA2 V3.10 DATE OF CALCULATIONS: 7-JUN-96 TIME: 8:27:22

PART 5 of OUTPUT FILE

PC-MINTEQA2 V3.10 DATE OF CALCULATIONS: 7-JUN-96 TIME: 8:27:22

PART 4 of OUTPUT FILE

PERCENTAGE DISTRIBUTION OF COMPONENTS AMONG TYPE I and TYPE II (dissolved and adsorbed) species

ID	NAME				
499	H4SiO4	99.4	PERCENT BOUND IN SPECIES # 770	H4SiO4	
1720	H4SiO4	3.720E-04	100.0	0.000E-01	0.0
1770	H4SiO4	3.720E-04	100.0	0.000E-01	0.0
498	Mg+2	3.810E-01	100.0	0.000E-01	0.0
500	Na+1	1.007E-01	100.0	0.000E-01	0.0
		99.9	PERCENT BOUND IN SPECIES # 500	Na+1	
	K+1	99.9	PERCENT BOUND IN SPECIES # 410	K+1	
	Cl-1	100.0	PERCENT BOUND IN SPECIES # 180	Cl-1	
	SO4-2	75.1	PERCENT BOUND IN SPECIES # 732	SO4-2	
	CO3-2	12.8	PERCENT BOUND IN SPECIES #5107320	nasO4 -	
		6.3	PERCENT BOUND IN SPECIES #1507320	caSO4 aq	
		5.6	PERCENT BOUND IN SPECIES #4607320	mgSO4 aq	
		1.2	PERCENT BOUND IN SPECIES #1501400	caHCO3 +	
		89.8	PERCENT BOUND IN SPECIES #3301400	hco3 -	
		3.8	PERCENT BOUND IN SPECIES #3301401	h2co3 aq	
		1.3	PERCENT BOUND IN SPECIES #4601401	mgHCO3 +	
		2.9	PERCENT BOUND IN SPECIES #5001401	naHCO3 aq	
	F-1	90.5	PERCENT BOUND IN SPECIES # 270	F-1	
		1.0	PERCENT BOUND IN SPECIES #1507700	caF +	
		7.7	PERCENT BOUND IN SPECIES #4607700	mgF +	
	H2O	80.7	PERCENT BOUND IN SPECIES #3300020	oh-	
		2.6	PERCENT BOUND IN SPECIES #1503300	caoh +	
		16.8	PERCENT BOUND IN SPECIES #4603300	mgoh +	
	H+1	1.2	PERCENT BOUND IN SPECIES #1501400	caHCO3 +	
		87.5	PERCENT BOUND IN SPECIES #3301400	hco3 -	
		7.3	PERCENT BOUND IN SPECIES #3301401	h2co3 aq	
		1.3	PERCENT BOUND IN SPECIES #4601401	mgHCO3 +	
		2.0	PERCENT BOUND IN SPECIES #5001401	naHCO3 aq	

Type III - SPECIES WITH FIXED ACTIVITY

ID	NAME	CALC MOL	LOG MOL	MGM LOGK	GM
2	H2O	-6.172E-07	-6.172	0.000	0.000
300	H+1	-1.912E-03	-2.719	7.000	0.000

Type VI - EXCLUDED SPECIES (not included in mole balance)

ID	NAME	CALC MOL	LOG MOL	MGM LOGK	GM
3301400	co2 (g)	2.194E-03	(-2.659)	16.159	0.530

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PART 3 of OUTPUT FILE

Saturation indices and stoichiometry of all minerals

ID #	NAME	Sat. Index	Stoichiometry in [brackets]						
8015005	akermanite	-13.393	[-7.000]	[2.000]	[8.000]	[3.000]	[0.000]	[0.000]	[0.000]
6015000	amphibole	-2.344	[-1.000]	[2.000]	[5.000]	[8.000]	[1.000]	[0.000]	[0.000]
5015000	aragonite	-5.180	[-1.000]	[1.000]	[0.000]	[3.000]	[0.000]	[0.000]	[0.000]
5046000	artinite	-5.789	[-2.000]	[3.000]	[2.000]	[5.000]	[0.000]	[0.000]	[0.000]
2046000	brucite	-4.498	[-1.000]	[1.000]	[2.000]	[2.000]	[0.000]	[0.000]	[0.000]
8015007	cabs1o5	-0.630	[-1.000]	[1.000]	[0.000]	[3.000]	[0.000]	[0.000]	[0.000]
5015001	calcite	(-0.049)	[-1.000]	[1.000]	[0.000]	[3.000]	[0.000]	[0.000]	[0.000]
8246000	chromocite	-2.769	[-2.000]	[2.000]	[0.000]	[3.000]	[0.000]	[0.000]	[0.000]
8246000	chrysotile	-2.726	[-3.000]	[2.000]	[5.000]	[4.000]	[0.000]	[0.000]	[0.000]
2015000	clinoenstatite	-2.769	[-1.000]	[1.000]	[0.000]	[3.000]	[0.000]	[0.000]	[0.000]
2015000	cristobalite	(-2.128)	[-2.000]	[1.000]	[0.000]	[2.000]	[0.000]	[0.000]	[0.000]
5015000	dolomite	-0.007	[-2.000]	[2.000]	[2.000]	[6.000]	[0.000]	[0.000]	[0.000]
6046000	epsomite	-4.857	[-1.000]	[1.000]	[1.000]	[7.000]	[0.000]	[0.000]	[0.000]
4015000	fluorite	-0.512	[-1.000]	[1.000]	[2.000]	[2.000]	[0.000]	[0.000]	[0.000]
6015001	gypsum	-2.141	[-1.000]	[1.000]	[1.000]	[4.000]	[0.000]	[0.000]	[0.000]
5015001	halite	-4.781	[-1.000]	[1.000]	[0.000]	[0.000]	[1.000]	[1.000]	[0.000]
5046001	hydromagnesit	-12.960	[-4.000]	[5.000]	[2.000]	[8.000]	[0.000]	[0.000]	[0.000]
8015002	larnite	-18.231	[-2.000]	[1.000]	[0.000]	[4.000]	[0.000]	[0.000]	[0.000]
8015000	lime	-20.443	[-1.000]	[1.000]	[0.000]	[2.000]	[0.000]	[0.000]	[0.000]
8650000	magadite	-3.507	[-7.000]	[7.000]	[0.000]	[14.000]	[1.000]	[1.000]	[0.000]
5046002	nahcolite	-0.680	[-1.000]	[1.000]	[0.000]	[1.000]	[1.000]	[0.000]	[0.000]
8015004	nepheline	-8.730	[-3.000]	[2.000]	[2.000]	[8.000]	[0.000]	[0.000]	[0.000]
8650001	natrolite	-5.249	[-4.000]	[3.000]	[3.000]	[10.000]	[0.000]	[0.000]	[0.000]
8650000	natrosilite	-6.578	[-2.000]	[1.000]	[1.000]	[5.000]	[0.000]	[0.000]	[0.000]
5046003	nesquehonite	-2.895	[-1.000]	[1.000]	[1.000]	[3.000]	[0.000]	[0.000]	[0.000]
8015001	ca-olivine	-16.743	[-2.000]	[1.000]	[0.000]	[4.000]	[0.000]	[0.000]	[0.000]
2015001	portlandite	-10.342	[-1.000]	[1.000]	[0.000]	[2.000]	[0.000]	[0.000]	[0.000]
2077002	quartz	0.244	[-2.000]	[2.000]	[0.000]	[2.000]	[0.000]	[0.000]	[0.000]
2077003	sio2(a,gl)	-0.742	[-2.000]	[2.000]	[0.000]	[2.000]	[0.000]	[0.000]	[0.000]
2077004	sio2(a,pt)	-1.150	[-2.000]	[2.000]	[0.000]	[2.000]	[0.000]	[0.000]	[0.000]
8246002	talc	-6.152	[-6.000]	[4.000]	[4.000]	[12.000]	[0.000]	[0.000]	[0.000]
6650000	thermonatr	-7.575	[-2.000]	[1.000]	[1.000]	[4.000]	[0.000]	[0.000]	[0.000]
5650001	thermonatr	-7.575	[-2.000]	[1.000]	[1.000]	[4.000]	[0.000]	[0.000]	[0.000]
8215001	tremolite	-0.372	[-8.000]	[7.000]	[2.000]	[22.000]	[0.000]	[0.000]	[0.000]
8215002	wollastonite	-4.430	[-1.000]	[1.000]	[1.000]	[3.000]	[0.000]	[0.000]	[0.000]
8215000	p-wollastnt	-5.278	[-1.000]	[1.000]	[0.000]	[3.000]	[0.000]	[0.000]	[0.000]

Charge Balance: SPECIATED

Sum of CATIONS =	1.194E-01	Sum of ANIONS	1.185E-01		
PERCENT DIFFERENCE =	1.383E-01	(ANIONS - CATIONS)/(ANIONS + CATIONS)			
EQUILIBRIUM IONIC STRENGTH (m) =	1.239E-01				
EQUILIBRIUM pH =	7.600				

ID	NAME	MOL/KG	PERCENT	SORBED MOL/KG	PERCENT	PRECIPITATED MOL/KG	PERCENT
499	H4SiO4	1.720E-04	100.0	0.000E-01	0.0	0.000E-01	0.0
1720	H4SiO4	3.720E-04	100.0	0.000E-01	0.0	0.000E-01	0.0
1770	H4SiO4	3.720E-04	100.0	0.000E-01	0.0	0.000E-01	0.0
498	Mg+2	3.810E-01	100.0	0.000E-01	0.0	0.000E-01	0.0
500	Na+1	1.007E-01	100.0	0.000E-01	0.0	0.000E-01	0.0

DATE ID NUMBERS: 950607
TIME ID NUMBER: &272288

Example MINTEQA2 output files for 1st three records in QAdata.XLS file shown on pg. 58, this volume. Data taken from Perfect et al. (1995) (see ~~pocket~~ disk in back pocket)

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Pg. 1 of 2

```
      PROGRAM MNTFIL
C
C     4567890123456789012345678901234567890123456789012345678901234567890123456789012
C     The following program is a feeble attempt to read MINTEQA2 output
C     files and extract information regarding mineral saturations (S.I.).
C     This program was prepared by D.R. Turner for the CNWRA in San Antonio,
C     TX for the Radionuclide Transport KTI (20-5708-871). Many of the
C     necessary parameters/flags are hard-wired and cannot currently be
C     modified by the user during the run session.
C
C
      IMPLICIT NONE
      CHARACTER  Line*80,Name*35,ArcID*10,Filin*12,Filout*12,CO2*6,
     + CcSI*7,CrsbSI*7
      INTEGER  I,Flag
C
C     Prompt the user for the names of the MINTEQA2 output file
C     and the Filename to be created.
C
      PRINT*, 'Enter the name of MINTEQA2 output file to be searched'
      READ(*,11) Filin
11    FORMAT(A12)
      PRINT*, 'Enter the name of output file to be created (8.3)'
      READ(*,12) Filout
12    FORMAT(A12)
C
C     Open the MINTEQA2 output file being read and the output file
C     being created.
C
      OPEN(Unit=8, File=Filin, Status='Old', Access='Sequential',
     + Form='Formatted', Action='Read')
      OPEN(Unit=9, File=Filout, Status='Unknown', Access='Sequential',
     + Form='Formatted', Position='Append')
C
C     4567890123456789012345678901234567890123456789012345678901234567890123456789012
C     This program will read the MINTEQA2 output file line-by-line,
C     checking for the phrase "Part One of Output File indicating the start
C     of a different chemical analysis. The site ID from Perfect et al.
C     1995)is read, and then a line-by-line search is initiated for the
C     word "calcite". Once "calcite" is located, the saturation index is
C     read into the output file. The process is then repeated for the next
C     water sample.
C
C     Write headers
C
      WRITE(9,20)
20    FORMAT('"',12x,'Site Name',13x,'"',',',2x,'ArcID',6x,'P(CO2)',
     + 3x,'SI(Cc)',1x,'SI(Crsb)')
C
C     Set Flag and Start Reading MINTEQA2 output file
C
      Flag=0
30    READ(8,40,end=31)Line
40    FORMAT (A80)
C
C     Look for start of speciation file
C
      IF(Line(32:52).eq.'PART 1 of OUTPUT FILE')THEN
C
C     After first pass through the read loop, write Name,CO2,CcSI,CrsbSI
C     to output file
C
         IF(Line(32:52).eq.'PART 1 of OUTPUT FILE'.and.Flag.gt.0)THEN
            WRITE(9,60)Name,ArcID,CO2,CcSI,CrsbSI
60          FORMAT('"',A35,'"',',',A10,',',A7,',',A7,',',A7)
         ENDIF
C
C     Set Initial Values for CO2,CcSI,CrsbSI
C
      CO2='n.d.'
      CcSI='n.d.'
      CrsbSI='n.d.'
C
C     Skip Lines to find Title
C
         do 50 I=1,3
           read(8,45,end=31)Line
```

Set initially at n.d., will be overwritten if saturation index is reported

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Program Mntfil

Pg. 2 of 2

```
45          FORMAT (A80)
50        continue
c
c  Read Title and assign variables 'Name'& 'ArcID'
c
          READ(8,55,end=31)Line
55        FORMAT (A80)
          Name=Line(1:35)
          ArcID=Line(60:69)
          Flag=1
c
c  Read PCO2 and assign to variable 'CO2'
c
      ELSEIF(Line(10:16).eq.'co2 (g)')THEN
          CO2=Line(40:45)
c
c  Read Calcite Saturation Index and assign to variable 'CcSI'
c
      ELSEIF(Line(11:17).eq.'calcite')THEN
          CcSI=Line(25:31)
c
c  Read Cristobalite Saturation Index and assign to variable 'CrsbSI'
c
      ELSEIF(Line(11:22).eq.'cristobalite')THEN
         CrsbSI=Line(25:31)
      ENDIF
     GOTO 30
31   CONTINUE
c
c  Write Final Record
c
      WRITE(9,65)Name,ArcID,CO2,CcSI,CrsbSI
65    FORMAT('"',A35,'",',',',A10,',',A7,',',A7,',',A7)
C  45678901234567890123456789012345678901234567890123456789012345678901234567890123456789012
      STOP
      END
```

DRL

Program Mntfil Output

Extracted S.I. from MINTEQA2 output files, speciation of water chemistry from Perfect et al. (1995)

n.d. means not determined. No $SiO_{2(aq)}$ analysis reported in Perfect et al. (1995)

Site Name	ArcID	Log P(CO2)	Calcite SI(Cc)	Cristobalite SI(Crsb)
"CO-1 NESENE SEC10 T11N,R2E CO-1-1	"ArcID=1	-2.881	0.316	-0.039
"CO-1 NESENE SEC10 T11N,R2E CO-1-2	"ArcID=2	-2.703	0.316	-0.140
"SD-1 NENE SEC 31 T13N, R9E SD-1-1	"ArcID=3	-2.659	0.043	-0.175
"SD-1 NENE SEC 31 T13N, R9E SD-1-2	"ArcID=4	-3.256	0.229	-0.465
"CU-2 SWNWSW SEC 22 T30S,R42E	"ArcID=7	-2.816	0.136	0.223
"CU-1 SWSESW SEC 10 T30S,R42E CU1-2	"ArcID=8	-2.787	0.176	0.276
"CU-1 SWSESW SEC 10 T30S,R42E CU1-1	"ArcID=9	-2.683	0.212	0.207
"TV-1 SENE SEC 35 T15.5S, R15E	"ArcID=11	-3.443	0.142	-0.434
"IVANPAH VALLEY WELL 15.5/15-23N1.	"ArcID=13	-2.089	-0.538	n.d.
"IVANPAH VALLEY WELL 15.5/15-20J1.	"ArcID=14	-3.069	0.020	n.d.
"IVANPAH VALLEY WELL 16/16-33L1.	"ArcID=15	-3.067	-0.221	n.d.
"CRESENT SPRING.	"ArcID=17	-2.627	0.413	0.202
"IVANPAH VALLEY WELL 16/14-23Q1.	"ArcID=18	-2.484	-0.135	n.d.
"IVANPAH VALLEY WELL 16/14-12Q1.	"ArcID=23	-2.707	0.013	n.d.
"IVANPAH VALLEY WELL 16/14-1H1.	"ArcID=62	-2.538	0.184	n.d.
"IVANPAH VALLEY WELL 17/14-36M1.	"ArcID=71	-3.170	0.360	n.d.
"PINE SPRING.	"ArcID=73	-2.118	0.542	-0.410
"IVANPAH VALLEY WELL 27/59-8a1.	"ArcID=88	-4.758	1.094	n.d.
"SALT SPRING 18N/7E-30FS1.	"ArcID=90	-2.115	0.562	n.d.
"ORA HANA SPRING.	"ArcID=91	-1.713	-0.093	0.366
"OWL HOLE SPRING 18N/3E-22CS1	"ArcID=108	-3.485	0.342	n.d.
"SOUTH DEATH VALLEY 18N/5E-14?1.	"ArcID=112	-2.405	0.136	n.d.
018N006E12H S.	"ArcID=118	-2.792	0.868	-0.114
"018N006E02ES1S SARATOGA SPRING.	"ArcID=123	-2.530	0.388	0.044
"018N005E02ES1S SARATOGA SPRING.	"ArcID=127	-2.592	0.574	-0.070
"018N005E02ES1S SARATOGA SPRING.	"ArcID=130	-2.225	0.097	0.017
"018N005E02ES1S SARATOGA SPRING.	"ArcID=131	-2.510	0.427	0.002
"018N005E02ES1S SARATOGA SPRING.	"ArcID=135	-2.315	0.237	-0.025
"018N005E02ES1S SARATOGA SPRING.	"ArcID=136	-2.388	0.369	-0.061
"018N006E02ES1S SARATOGA SPRING.	"ArcID=138	-2.306	0.329	-0.083
"018N005E02ES1S SARATOGA SPRING.	"ArcID=140	-2.328	0.194	-0.053
018N006E02ES1S SARATOGA SPRING.	"ArcID=141	-2.418	0.288	-0.034
"MESQUITE VALLEY WELL 18/13-8D1.	"ArcID=148	-2.225	0.464	n.d.
"MCCLANAHAN SPRING.	"ArcID=149	-2.778	0.491	-0.142
"019N006E19N01S.	"ArcID=152	-2.679	0.922	-0.065
"MESQUITE VALLEY WELL 19/12-26H1.	"ArcID=157	-2.667	0.596	n.d.
"MESQUITE VALLEY WELL 19/12-26H2.	"ArcID=158	-2.615	0.593	n.d.
"MESQUITE VALLEY WELL 19/13-19N1.	"ArcID=159	-2.641	0.073	n.d.
"MESQUITE VALLEY WELL 19/12-15R1.	"ArcID=161	-2.185	0.192	n.d.
"MESQUITE VALLEY WELL 19/12-14N1.	"ArcID=162	-3.225	0.811	n.d.
"MESQUITE VALLEY WELL 19/12-14E1.	"ArcID=165	-2.368	-0.225	n.d.
"MESQUITE VALLEY WELL 19/12-14D1.	"ArcID=166	-2.660	0.475	n.d.
"MESQUITE VALLEY WELL 19/12-11Q1.	"ArcID=167	-2.519	0.418	n.d.
"JEAN LAKE WELL 25/60-10d1.	"ArcID=169	-2.585	-0.236	n.d.
"MESQUITE VALLEY WELL 25/57-9a1.	"ArcID=170	-2.663	0.816	n.d.
"MESQUITE VALLEY WELL 19/12-11D1.	"ArcID=171	-2.696	0.492	n.d.
"ROSECHRIST WELL.	"ArcID=175	-1.989	-0.207	-0.133
"MESQUITE VALLEY WELL 25/57-5a1.	"ArcID=176	-2.424	0.508	n.d.
"MESQUITE VALLEY WELL 19/12-2A1.	"ArcID=177	-2.709	0.738	n.d.
"MESQUITE VALLEY WELL 19/12-3B1.	"ArcID=178	-2.041	-0.008	n.d.
"MESQUITE VALLEY WELL 19/12-2D1.	"ArcID=179	-2.323	0.121	n.d.
"MESQUITE VALLEY WELL 19/12-4B1.	"ArcID=180	-2.444	0.318	n.d.
"MESQUITE VALLEY WELL 20/12 33Q1.	"ArcID=181	-2.471	0.275	n.d.
"CASTILLO WELL.	"ArcID=183	-1.863	0.120	-0.328
"MESQUITE VALLEY WELL 20/12-19F1.	"ArcID=185	-2.716	0.513	n.d.
"TECOPA HOT SPRING.	"ArcID=186	-2.383	0.342	0.160
"TECOPA HOT SPRING.	"ArcID=187	-2.729	0.599	-0.928
"TECOPA HOT SPRING.	"ArcID=188	-2.286	0.099	0.127
"BIRD SPRING.	"ArcID=189	-2.362	-0.092	-0.478
"WELL 21N/7E-28P1.	"ArcID=190	-2.962	0.292	-0.068
"SQUAW SPRING 23S/46E-33DS1.	"ArcID=191	-1.993	-1.397	0.299
"GREATER VIEW SPRING 23S/45E-23DS1.	"ArcID=192	-2.785	0.424	-0.058
"WILSON'S TANK.	"ArcID=194	-1.847	0.276	-0.191
"RHODES SPRING 21N/4E-11MS1.	"ArcID=195	-2.323	0.313	-0.011
"SKY HARBOR AIRPORT.	"ArcID=201	-2.627	0.223	-0.118
"SHOSHONE SPRING SESWNW 30-21.5N-7E.	"ArcID=202	-2.382	0.700	-0.112
022N007E30ES1S.	"ArcID=203	-2.200	0.470	-0.081
"GALENA CANYON 22S/47E-19QS1.	"ArcID=206	-2.847	0.234	-0.284
"212 S22 E60 27ABB 1.	"ArcID=219	-2.224	0.276	-0.369
"212 S22 E60 27ABB 1.	"ArcID=220	-2.617	0.613	-0.345
"HIDDEN HILLS RANCH WELL.	"ArcID=221	-1.833	-0.174	-0.207
"S22/54-24DCC.	"ArcID=222	-2.557	0.786	-0.303
"MT. SPRINGS FIRE STATION.	"ArcID=225	-1.816	0.065	-0.442
"SNOWBOAT COUNTRY CLUB #2.	"ArcID=237	-2.725	0.367	-0.034
"GEMSTAR GYPSUM PLANT WELL.	"ArcID=240	-1.690	-0.288	-0.595
"RAINBOW SPRING.	"ArcID=245	-1.982	0.026	-0.336

Compare results from 1st 3 records of MINTEQA2 output files record on pp. 60-62 this volume. All values match.

Additional coverages and data sources that are currently being used in ArcView include:

- YMP Boundaries: (e.g.,NTS boundaries, ESF outline, Controlled Access Boundary) - USDOE

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- State/County: Nevada Bureau of Mines

- Geologic coverage: Frizzell, V.A., Jr., and J. Shulters. 1990. *Geologic Map of the Nevada Test Site, Southern Nevada.* Map I-2046. Miscellaneous Investigations, U.S. Geol. Survey.

Geologic (DRJ 7/22/96)

Additional coverages that are to be converted from Arc/Info to ArcView format include 1ox2o (1:250,000) sheets from the Geologic Atlas of California as described in:

D'Agnese, F.A., C.C. Faunt, and A.K. Turner. 1995. *Preliminary Digital Geologic Maps of the Mariposa, Kingman, Trona, and Death Valley Sheets, California.* Open File Report 94-318, U.S. Geological Survey. Denver, DO.

- Landsat Imagery: TM bands, purchased from EOSAT by CNWRA.

- Hypsography: Topography from USGS Digital Elevation Models.

DRL

These coverages were initially prepared for use in Arc/Info, Version 6.1, and have been converted to ArcView, Version 2.0b coverages at CNWRA using the SHAPE command in Arc/Info

CNWRA (DRJ 7/22/96)

Additional Background information on available Arc/Info coverages includes:

Much of the available geospatial data is focused on the nine 7.5 minute quadrangle area about Yucca Mountain Nevada. Both raster and vector datasets are included. Geospatial data is organized in a hierarchical file system, with abbreviated names (for a discussion of file nomenclature and file naming constraints, see file "aafile.std" on this CDROM).

A complete, recursive listing of the file tree on this CDROM is beyond the scope of this document. An abbreviated file list is included here to illustrate the major divisions and types of data included in this distribution. This file tree list has been extensively pruned to aid illustration and discussion. Root level categories are: DEMS, FAULTS, HYDRO, HYPSO, ROADS, and SLAR.

DEMS subdirectory/workspace contains Digital Terrain Elevation Data and shaded reliefs for two resolutions of raster data: (a) Goldfield and Death Valley 1x2 degree (1:250,000 scale) domains of California and Nevada, at 3 arc seconds resolution (subdirectory/workspace "dvgf3sec"), and (b) nine 7.5 minute quadrangles (1:24,000 scale) about Yucca Mountain Nevada, at 30 meter resolution (subdirectory/workspace "ymlocal").

FAULTS subdirectory/workspace contains CNWRA digital tracings of faults published on the maps of Dohrenwend and many others (1991 thorough 1993), Frizzel et al. (1990), Jennings (1992), Nakata et al. (1982), and O'Neill et al. (1992). These fault maps were digitized from paper map copies using ARC/Info. The resolution of these fault traces vary, depending upon the scale of the original maps. Thus, not all maps are applicable at all scales. The original maps should be consulted to obtain an indication of the degree of resolution that can be demanded from each of these maps. Simple (x,y) raw line data is available in the RAWLIN subdirectory/workspace for use by applications software other than

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ARC/Info (basically output from the ARC/Info UNGENERATE command output).

HYDRO subdirectory/workspace contains hydrographic vectors (streams) for nine 7.5 minute quadrangles (1:24,000 scale) about Yucca Mountain Nevada. These data were purchased from the USGS in DLG (digital line graph) format, and converted into formats suitable for use in ARC/Info. Simple (x,y) raw line data is available in the RAWLIN subdirectory/workspace for use by applications software other than ARC/Info (UNGENERATE output).

HYPSO subdirectory/workspace contains hypsographic vectors (topographic contours) for nine 7.5 minute quadrangles (1:24,000 scale) about Yucca Mountain Nevada. These data were purchased from the USGS in DLG format, and converted into formats suitable for use in ARC/Info. Simple (x,y) raw line data is available in the RAWLIN subdirectory/workspace for use by applications software other than ARC/Info (UNGENERATE output).

ROADS subdirectory/workspace contains Road and Trail vectors for nine 7.5 minute quadrangles (1:24,000 scale) about Yucca Mountain Nevada. These data were purchased from the USGS in DLG format, and converted into formats suitable for use in ARC/Info. Simple (x,y) raw line data is available in the RAWLIN subdirectory/workspace for use by applications software other than ARC/Info (UNGENERATE output).

SLAR subdirectory/workspace contains Synthetic Aperture Radar/Side Looking Airborne Radar (SAR/SLAR) imagery for the middle third of both Goldfield and Death Valley 1x2 degree quadrangles (1:250,000 scale). These data were purchased from the USGS, formatted as 8-bit unsigned binary files. The file format was similar to Planetary Data Systems (PDS) format used by Jet Propulsion Laboratory. See appendix 2.0 for more detail. The ground pixel resolution of this data is 12 meters. Each pixel is an indication of X-Band (8.0 to 12.0 gigahertz) radar backscatter, and was received renormalized into the 0-255 integer range. Original files have been modified slightly so that ARC/Info users can display this SLAR data in a first order map registered space using the MAPWARP and IMAGE commands of ARCPLOT. Non-ARC/Info users must be able to read unsigned, 8-bit integer binary files (referred to as Band Interleaved by Line (BIL) files in some remote sensing image processing software). Map registration of SLAR imagery varies from very good near the Yucca Mountain site (few tens of meters) to poor at the north-south extremes of the SLAR scans (few hundreds of meters). SLAR imagery was acquired by the USGS contractor in some unknown scanner space, and reprojection into a true map space is probably impossible (scanner distortions are unknown). On this CDROM, SLAR imagery has been registered to UTM map space using a first order linear transformation, most accurate around Yucca Mountain Nevada.

last updated, 02-feb-95. R.Martin.

1/9/97
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Notebook closed due to closing of Radionuclide Transport KTI (20-5708-871). Final deliverables transmitted to NRC.

I have reviewed this notebook and find it to be in compliance with QAP-501. There is sufficient information for another qualified person to conduct the activities.

E.C. [illegible]

1/13/97

ADDITIONAL INFORMATION FOR SCIENTIFIC NOTEBOOK #: 157A

Document Date:	01/20/1996
Availability:	Southwest Research Institute® Center for Nuclear Waste Regulatory Analyses 6220 Culebra Road San Antonio, Texas 78228
Contact:	Southwest Research Institute® Center for Nuclear Waste Regulatory Analyses 6220 Culebra Road San Antonio, TX 78228-5166 Attn.: Director of Administration 210.522.5054
Data Sensitivity:	☐"Non-Sensitive" ☐ Sensitive ☐"Non-Sensitive - Copyright" ☐ Sensitive - Copyright
Date Generated:	1996 through 1997
Operating System: (including version number)	Windows
Application Used: (including version number)	
Media Type: (CDs, 3 1/2, 5 1/4 disks, etc.)	5 - 3 ½ disks
File Types: (.exe, .bat, .zip, etc.)	exe, xls
Remarks: (computer runs, etc.)	Media contains: H_2O chemistry raw data; limited thermodynamic data evaluation; ionic strength calculations.