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Author

Moore, J.E.

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RECORDS OF WELLS, TEST HOLES, AND SPRINGS IN THE NEVADA TEST SITE AND SURROUNDING AREA

by

John E. Moore

PURPOSE AND SCOPE OF REPORT

Since November 1957 the U. S. Geological Survey, on behalf of the U. S. Atomic Energy Commission, has been collecting and compiling all available information on the source, occurrence, quality, quantity, temperature, and other aspects of the ground-water resources of the Nevada Test Site and the surrounding area. This report summarizes the basic information that has been collected on 49 wells and test holes from this area, together with information on 9 springs.

LOCATION AND EXTENT OF AREA

The area considered in this report includes the Nevada Test Site; Camp Desert Rock, lying to the south; Indian Spring Valley, lying to the southeast; and Emigrant and Kawich Valleys, lying to the north (fig

by personnel of the U. S. Geological Survey, published and unpublished reports of the U. S. Geological Survey, and the files of Holmes and Narver, Inc. See the attached bibliography for a complete listing of sources.

I. J. Winograd, U. S. Geological Survey, collected much of the data included in this report and assisted in the preparation of the tables. The field observations on which this study is based were made by the following personnel of the U. S. Geological Survey: Alfred Clebsch, Jr., O. J. Loeltz, C. E. Price, William Thordarson, G. E. Walker, and

overlying Tertiary rocks consist principally of vitric and zeolitic tuff, basalt, rhyolite, and rhyodacite of the Oak Spring Formation of Miocene (?) or younger age. The Tertiary and Quaternary alluvium consists principally of detritus deposited in the intermontane basins, much of it in the form of fans.

The principal aquifers at the Nevada Test Site are in the Oak Spring Formation and the alluvial deposits. Among the Paleozoic rocks, the marble of the Pogonip Group, of Ordovician age, is believed to be capable of yielding water, although to date no well produces from it.

Thicknesses of the alluvium and the Oak Spring Formation, as indicated by test holes and wells, are shown in table 1.

Table 1. Thicknesses of alluvium and Oak Spring Formation.

Well or test hole no.	Other no. or name	Alluvium (feet)	Oak Spring Formation (feet)
67-68	6th Army 1	610	----------
73-58	J-12	515	----------
73-61	J-11	1,025±	----------
73-69	Test hole 5	134	----------
81-67	Well 3	1,530	----------
84-68	Test hole 7	970	----------
84-67	USGS D	1,513	203
84-69	USGS E	450	1,910
88-63-b	U12e.03	-------	[a]719
88-63-c	U12e.M1	-------	[a]974
88-63-d	Hagestad	-------	1,896

[a]Thickness penetrated below floor of tunnel U12e, Rainier Mesa.

WELL AND TEST-HOLE RECORDS

Table 2 lists the records of wells and test holes for which hydro-

Table 2 - Chemical and radiochemical analyses of water from wells and test holes

Table 3. Chemical and radiochemical analyses of water from wells and test holes
A. Chemical analyses--Continued

Dissolved constituents given in parts per million (ppm)

Table 3. Chemical and radiochemical analyses of water from wells and test holes

B. Radiochemical analyses--Continued

Well or test hole no.	Analysis	Alpha activity (as µg/l Uranium equivalent)	Alpha activity Date	Beta activity (pc/l)	Beta activity Date	Radium (Ra) (pc/l)	Uranium (U) (µg/l)	Extractable Alpha (Net)	Strontium 90 (pc/l)
74-70-b	2165	< 4	10-17-57	<19	10- 4-57	.1	4.9	<3	< 5
Do---	2444	11 ± 5	7- 7-58	<16	4- 1-58	< .1	7.4	<1.7	< 5
Do---	2993	< 3.5	3-17-59	21 ± 2.6	4-22-59	.1±0.1	6.2±0.6	<2.0	< 3
81-67	1836	4.4	5- 7-57	<14	5- 6-57	< .2	3.1	--------	----------
Do---	2155	< 4	10-25-57	<15	10- 2-57	.5	3.6	2	< 5
Do---	2442	< 5	4- 7-58	<22	4- 1-58	< .1	7.1	<1.6	< 5
Do---	2086	6.1±2.7	12-15-58	14	12-12-58	< .1	2.3±0.2	6.8±2.3	< 4

SPRING RECORDS

Table 4 lists nine springs, of which seven have been known for years and were mentioned or described in previous reports of the U. S. Geological Survey. All are within the boundaries of the Nevada Test Site, except Indian Spring. Other springs are known to exist in the

All the springs issue from joints or zones of friable tuff in the lower part of the Oak Spring Formation. Joints appear to control the flow of Cane, Whitereek, and Oak Springs.

The springs range in altitude from 4,200 to 6,700 ft above sea level and are not believed to be restricted to any single lithologic unit (Clebsch, 1960, p. 9-10). Therefore it is thought that they are fed by several different perched zones of saturation. The area of any one perched aquifer may be only a few square miles.

Chemical and radiochemical analyses for all springs are shown in table 5. All analyses were made by the Quality of Water Branch, U. S. Geological Survey, Denver, Colo.

Table 5. Chemical and radiochemical analyses of water from springs

A. Chemical analyses

Dissolved constituents given in parts per million (ppm).

Spring no.	Analysis no.	Date of collection	Temperature (°F.)	pH	Specific conductance in micromhos at 25° C.	Silica (SiO_2)	Aluminium (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Strontium (Sr)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (sum)	Hardness (as $CaCo_3$) Total	Hardness (as $CaCo_3$) Noncarbonate	Percent sodium
74-66	2158	9-19-57	66	7.9	425	64	[a]0.0	[a]0.1	[a]0.00	32	9.2	0.0	37	7.8	163	0	28	20	0.5	19	0.25	298	118	0	39
Do---	2446	3-24-58	64	8.0	403	63	.0	.00	.0	30	9.2	< .1	36	7.6	152	0	30	19	.7	18	.00	288	113	0	39

Table 5. Chemical and radiochemical analyses of water from springs

B. Radiochemical analyses

Spring no.	Analysis no.	Alpha activity (as μg/l Uranium equivalent)	Date	Beta activity (pc/l)	Date	Radium (Ra) (pc/l)	Uranium (U) (μg/l)	Extractable Alpha (Net)	Strontium 90 (pc/l)
74-66	2158	< 4	10-17-57	< 15	10- 2-57	<0.1	0.5	<1	< 5
Do---	2446	< 4	7- 7-58	< 15	4- 1-58	< .1	3.7	<1.3	< 5
79-61	2159	< 3	10-17-57	142	10- 2-57	.1	.2	<1	< 6
Do---	2447	< 2	7- 8-58	24	4- 1-58	.1	< .1	< .1	< 5
83-63	2168	< 2	10-18-57	42	10- 4-57	< .1	1.1	<1	< 5
Do---	2448	< 2	7- 8-58	< 8	4- 1-58	.2	.7	< .2	< 5
88-63	2162	7.4	10-15-57	7900	10- 4-57	.3	.8	<1	63
88-64	3203	7.0±4.4	7-17-59	20±3	7- 6-59	2.5±0.5	1.0±0.1	.9±0.5	< 5
88-65	1835	2.4	6- 5-57	8	5- 6-57	<1.0	1.3	--------	----------
Do---	2152	4.4	10-15-57	55	10- 2-57	< .1	1.3	<1	< 5
Do---	2443	19 ±3	4- 7-58	77	4- 1-58	1.3	3.0	< .6	< 5
Do---	3255	5.0±3.1	6- 9-59	29±4	6-23-59	.5±0.1	1.0±0.1	.5±0.5	< .5
90-67	2518	< 2	7-10-58	< 12	5- 8-59	< .1	.4	< .2	< 5
90-68	3204	2.5±2.2	7-17-59	20±3	7- 6-59	.1±0.1	.7±0.1	.3±0.3	< .5
98-66	2523	4.6±3.5	7- 9-58	< 14	5-16-58	.1	5.9	<1.4	< 5

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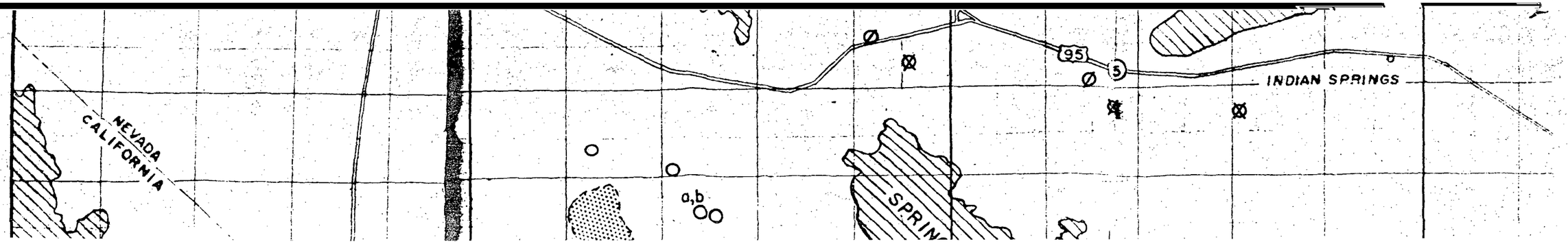
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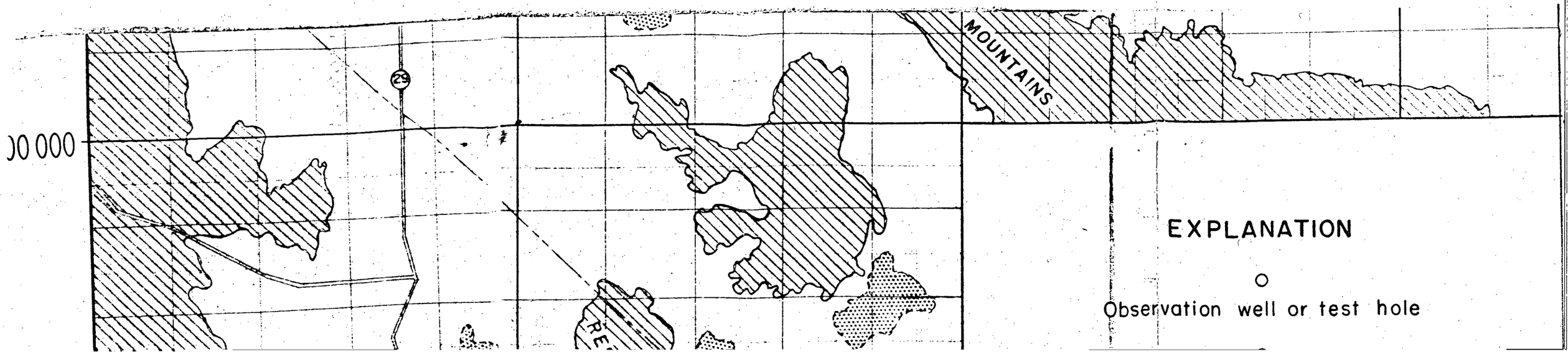
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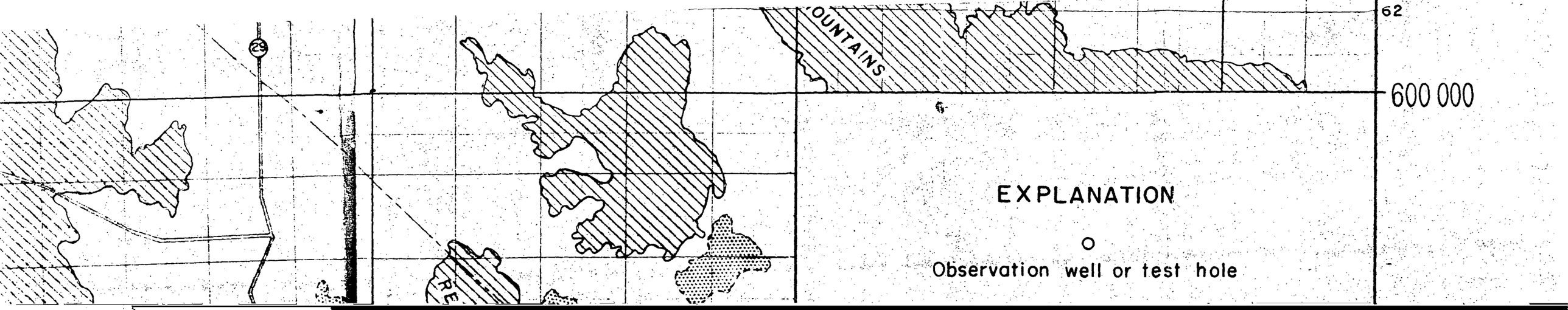
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