CHAPTER 10

KNOWN MINERAL DEPOSITS AND OCCURRENCES IN NEVADA

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INTRODUCTION

Knowledge of the geographic distribution and geologic characteristics of mineral deposits is an important part of an analysis of resources. The presence of deposits confirms that specific ore-forming processes have occurred within the geologic environments that are believed to be permissive for the occurrence of certain deposit types, and adds confidence to the delineation of mineral resource tracts. Moreover, the evidence that a specific ore-forming process has taken place suggests the presence of other deposit types that are formed by similar or related processes. The presence or absence of known deposits affects the estimates of undiscovered deposits in a region.

This chapter, and its accompanying plates and tables, locates known mineral deposits, mines, prospects, and occurrences and classifies them based on the descriptive mineral deposit models in USGS Bulletin 1693 (Cox and Singer, 1986). Preparation of this chapter was greatly facilitated by use of the Mineral Resources Data System that contains over 6,800 entries for mineral sites throughout Nevada (Sherlock and Tingley, 1985). We reviewed records of metallic and selected nonmetallic mineral locations and, with the help of many literature references, discussions with industry geologists, and some site visits, classified more than 1,400 by mineral deposit type following Cox and Singer (1986). Some of these sites are deposits and some are occurrences as defined by Singer (chapter 1). The sites shown were selected on the basis of having sufficient information to be classified by mineral deposit model.

These deposits and occurrences are divided into two types: Type A related to plutons, such as porphyry, skarn and replacement, and including other deep seated deposit types such as low-sulfide gold quartz veins; and type B which includes epithermal, sediment-hosted gold, and syngenetic or early diagenetic deposits. These are listed correspondingly in tables 1 and 2 and are shown on plates 10-1 and 10-2. Documentation of individual mineral sites is available through the Mineral Resources Data System of the U.S. Geological Survey.

The objective of this classification is to provide a basis for a quantification of mineral resources in Nevada. Deposit models and their corresponding grade and tonnage models provide criteria that enable us to define unequivocally the term deposit, as opposed to less quantitative terms such as mineral occurrence, prospect, or locality. A deposit is a concentration of mineral of sufficient size and quality that it might, under the most favorable of circumstances be considered to have economic potential (Cox and others, 1986). For most deposits in this chapter, enough is known to classify them by type, and, for deposit types that have a grade and tonnage model, many deposits discussed can be expected to have a grade and tonnage consistent with the grade and tonnage model for that deposit type. Thus some prospects, when they are thoroughly explored can eventually be classified as deposits. For some deposit types, grade and tonnage data were available only on deposits grouped into districts, and, for these types, the grade and tonnage model refers to districts rather than individual deposits (see chapter 11 for discussion of grade and tonnage models). The maps and tables in this chapter show various combinations of deposits, occurrences, groups of closely spaced deposits, and districts. Throughout this report, mineral deposit grades, where given in percent, refer to percent by weight.

MINERAL DEPOSITS ASSOCIATED WITH PLUTONIC ROCKS

Plate 10-1 shows 791 deposits and occurrences, most of which are genetically associated with epizonal and mesozonal plutonic rocks. Some of these are formed in igneous intrusions and others in the surrounding rocks and structures. Included are 25 deposits that are believed to have formed at deep levels in the crust, but that are not clearly related to igneous activity. The deposits on plate 10-1 contain tungsten, beryllium, copper, iron, lead, zinc, silver and gold and form skarn, porphyry, replacement, vein, and disseminated deposits. Table 10-1 lists those mines, prospects, and occurrences in Nevada for which there was sufficient information to assign to them a deposit model type. These are shown on plate 10-1 by a deposit-model symbol.

There are more than 200 exposed granitoid intrusive bodies in Nevada and a few gabbroid intrusive bodies. Ore deposits associated with the granitoid bodies vary in type with the chemistry of the pluton, depth of emplacement of the body in the crust and with distance from the pluton contact. Tungsten skarn deposits form at the deepest levels and highest temperatures, adjacent to calc-alkaline plutons. Copper porphyries and copper (and gold) skarns form higher in the crust, even to subvolcanic levels. Polymetallic veins, polymetallic replacement bodies, and distal-disseminated silver-gold deposits, form at greater distances than skarns from the source pluton. Tungsten and beryllium vein deposits, and Climax-type molybdenum deposits are closely associated with chemically specialized plutons, respectively two-mica granite and high-silica granite porphyry.

Plate 10-1 shows some of the most productive deposits of their type in the United States: porphyry copper and copper skarn deposits at Ruth and Yerington, tungsten skarn deposits at Mill City, polymetallic replacement deposits at Eureka, Pioche, and Goodsprings, gold skarn deposits at Fortitude and McCoy, and distal disseminated silver-gold deposits at Cove and Candelaria.

(continued on page 10-19)

Table 10-1. Mineral deposits and occurrences in Nevada that are associated with plutons or formed at deep levels in the crust, listed by deposit type.

Tungsten skarn deposits **model number 14A**

Map no.	Mine name	District	Long. dd	Lat. dd	County
1	APEX	ALDER	-115.68	41.80	ELKO
2	GARNET	ALDER	-115.67	41.80	ELKO
3	KNOWLES BROS.	ALDER	-115.68	41.79	ELKO
4	MOHAWK-PITTSBURG	ALDER	-115.69	41.82	ELKO
5	UNKNOWN	ALDER	-115.53	41.88	ELKO
6	UNKNOWN	ALDER	-115.62	41.88	ELKO
7	CRESCENT CANYON DEPOSIT	ALPINE (CLAN ALPINE)	-117.81	39.68	CHURCHILL
8	TUNGSTEN MOUNTAIN MINE	ALPINE (CLAN ALPINE)	-117.75	39.67	CHURCHILL
9	BALD MOUNTAIN	BALD MOUNTAIN	-115.55	39.95	WHITE PINE
10	WARREN PROSPECT	BARCELONA	-116.96	38.65	NYE
11	COMSTOCK CLAIM	BASALT	-118.14	38.02	ESMERALDA
12	CEDAR CHEST PROSPECT	BELL	-117.81	38.53	MINERAL
13	CEDAR SUMMIT MINE	BELL	-117.80	38.52	MINERAL
14	T-BONE MINE	BIRCH CREEK	-117.05	39.37	LANDER
15	JETA CLAIMS	BLACK HORSE	-118.11	38.02	ESMERALDA
16	BIG CHIEF	BULLION	-116.75	40.26	LANDER
17	MINE CLAIMS	CARSON	-119.74	39.22	CARSON CITY
18	RUTH MINE	CHURCHILL	-119.28	39.33	LYON
19	UNNAMED TUNGSTEN	CHURCHILL	-119.27	39.34	LYON
20	UNNAMED TUNGSTEN	CHURCHILL	-119.29	39.35	LYON
21	TUNNEL PROSPECT	CONTACT	-114.72	41.68	ELKO
22	GARNET TUNGSTEN PROSPECT	Cottonwood	-119.54	40.40	WASHOE
23	SILVER SPRING STOCK	CURRANT	-115.48	38.85	NYE
24	ALEX ESKE TUNGSTEN	DELAWARE	-119.64	39.12	CARSON CITY
25	TACTITE THURSDAY	DELAWARE	-119.63	39.09	CARSON CITY
26	VALLEY VIEW	DELAWARE	-119.67	39.11	CARSON CITY
27	PIKE CLAIMS	DIAMOND	-115.84	39.79	EUREKA
28	SNOW WHITE CLAIMS	EAGLE	-114.10	39.67	WHITE PINE
29	TUNGSTATE CLAIM	EAGLE	-114.14	39.68	WHITE PINE
30	ROBINETTE PROSPECT	ELK MOUNTAIN	-115.08	41.91	ELKO
31	MIDDAY CLAIMS	FAIRVIEW	-118.20	39.11	CHURCHILL
32	MIDNIGHT MINE	FAIRVIEW	-118.19	39.11	CHURCHILL
33	SLATE MINE	FAIRVIEW	-118.20	39.11	CHURCHILL
34	DRY GULCH CLAIMS	FITTING	-118.37	38.59	MINERAL
35	FREIBERG TUNGSTEN PROSPECT	FREIBERG	-115.61	37.96	LINCOLN
36	UNNAMED PROSPECT	FREIBERG	-115.58	37.94	LINCOLN
37	ELLEN B	GALENA	-119.77	39.32	WASHOE
38	UNNAMED TUNGSTEN	GALENA	-119.77	39.31	WASHOE
39	LAST LAUGH/DIVIDE MINES	GARDNERVILLE	-119.60	38.89	DOUGLAS
40	TUNGSTEN HILLS	GARDNERVILLE	-119.58	38.88	DOUGLAS
41	WILLCOX TUNGSTEN PROSPECT	GOLD RUN	-117.45	40.80	HUMBOLDT
42	CAMPBELL (6)	HARRISON PASS	-115.49	40.29	ELKO
43	CLIMAX	HARRISON PASS	-115.47	40.31	ELKO
44	STAR MINE	HARRISON PASS	-115.48	40.31	ELKO
45	FLYING CLOUD MINE	HAWTHORNE	-118.63	38.41	MINERAL
46	LEMR PROSPECT	HAWTHORNE	-118.67	38.42	MINERAL
47	STORMY DAY	HOOKER	-119.29	40.45	PERSHING
48	THRASHER	HOOKER	-119.29	40.44	PERSHING
49	LITTLE JOE	ISLAND MOUNTAIN	-115.65	41.79	ELKO
50	BATHOLITH	JARBIDGE	-115.49	41.78	ELKO
51	COON CREEK PROSPECTS	JARBIDGE	-115.48	41.82	ELKO
52	STAR TUNGSTEN MINE	JUNIPER RANGE	-119.11	40.01	PERSHING
53	PHALEN MINE	KINSLEY	-114.33	40.13	ELKO
54	SADDLE PROSPECT	LEONARD CREEK	-118.64	41.60	HUMBOLDT
55	UNNAMED PROSPECT	LODI	-117.93	38.98	NYE
56	VICTORY TUNGSTEN MINE	LODI	-117.91	38.98	NYE
57	NEVADA-MASSACHUSETTS GROUP	MILL CITY	-118.13	40.78	PERSHING
58	RED HAWK MINE	MILL CITY	-118.17	40.82	PERSHING
59	HOWARD MINE	MOUNTAIN VIEW	-118.89	38.97	MINERAL
60	JOLLY RODGER CLAIMS	MOUNTAIN WELLS	-118.31	39.46	CHURCHILL
61	SHORT DAY (NBMG SAMPLE SITE 3946)	MOUNTAIN WELLS	-118.28	39.44	CHURCHILL
62	CROSBY MINE	NIGHTINGALE	-119.29	39.94	WASHOE
63	JAY BIRD MINE	NIGHTINGALE	-119.22	40.00	WASHOE
64	MARVELOUS	NIGHTINGALE	-119.21	40.00	PERSHING
65	MIDNIGHT TUNGSTEN	NIGHTINGALE	-119.31	39.93	WASHOE
66	M.G.L. MINES	NIGHTINGALE	-119.26	40.04	PERSHING
67	NIGHTINGALE MINE	NIGHTINGALE	-119.23	40.01	PERSHING
68	UNKNOWN TUNGSTEN	NIGHTINGALE	-119.25	39.90	WASHOE
69	OAK SPRING TUNGSTEN	OAK SPRING	-116.22	37.24	NYE
70	WADSWORTH	OLINGHOUSE	-119.37	39.60	WASHOE
71	SCHWARTZ TUNNEL	PATTERSON	-114.73	38.62	LINCOLN
72	PILOT MOUNTAINS GROUP	PILOT MOUNTAIN	-117.89	38.39	MINERAL
73	ALPINE MINE	POTOSI	-117.29	41.20	HUMBOLDT
74	CHASE MINE	POTOSI	-117.27	41.20	HUMBOLDT
75	GRANITE CREEK MINE	POTOSI	-117.28	41.14	HUMBOLDT
76	KIRBY MINE	POTOSI	-117.27	41.17	HUMBOLDT
77	KNIGHT PROSPECT	POTOSI	-117.29	41.21	HUMBOLDT
78	MARCUS MINE	POTOSI	-117.30	41.16	HUMBOLDT
79	MOUNTAIN KING MINE	POTOSI	-117.28	41.21	HUMBOLDT
80	OSGOOD CREEK PROSPECTS	POTOSI	-117.27	41.16	HUMBOLDT
81	PACIFIC MINE	POTOSI	-117.26	41.15	HUMBOLDT
82	RICHMOND MINE	POTOSI	-117.29	41.21	HUMBOLDT
83	RILEY EXTENSION MINE	POTOSI	-117.25	41.19	HUMBOLDT
84	RILEY MINE	POTOSI	-117.25	41.18	HUMBOLDT
85	TIP TOP MINE	POTOSI	-117.28	41.14	HUMBOLDT
86	TONOPAH MINE	POTOSI	-117.26	41.21	HUMBOLDT
87	TOP ROW MINE	POTOSI	-117.26	41.18	HUMBOLDT
88	TUNGSTEN PROSPECT	POTOSI	-117.30	41.14	HUMBOLDT
89	T.N.T. MINE	POTOSI	-117.27	41.22	HUMBOLDT
90	VALLEY VIEW MINE	POTOSI	-117.26	41.15	HUMBOLDT
91	COPPER KING MINE	PYRAMID	-119.67	39.73	WASHOE
92	COPPER KING CLAIMS	RAGGED TOP	-118.71	40.02	PERSHING
93	RAGGED TOP MINE	RAGGED TOP	-118.81	40.04	PERSHING
94	PEARL HARBOR TUNGSTEN MINE	RED MOUNTAIN	-119.47	39.33	LYON
95	RUTH CLAIMS	REESE RIVER	-116.77	39.70	LANDER
96	CRYSTAL CLAIMS	REGENT	-118.28	39.02	MINERAL
97	HOOPER MINE	REGENT	-118.33	39.00	MINERAL
98	NEVADA SCHEELITE MINE	REGENT	-118.32	39.00	MINERAL
99	RAWHIDE TUNGSTEN PROPERTY	REGENT	-118.32	39.03	MINERAL

100	SCHEELITE EXTENSION MINE	REGENT	-118.31	39.02	MINERAL
101	THORNE TUNGSTEN PROPERTY	REGENT	-118.32	39.01	MINERAL
102	YANKEE GIRL MINE	REGENT	-118.32	39.02	MINERAL
103	ROSE CREEK MINE	ROSE CREEK	-117.86	40.85	PERSHING
104	UNNAMED TUNGSTEN PROSPECT	ROSE CREEK	-117.89	40.85	PERSHING
105	JONES SCHEELITE MINE	SAND SPRINGS	-118.36	39.08	CHURCHILL
106	RED ANT MINE	SAND SPRINGS	-118.40	39.15	CHURCHILL
107	RED TOP MINE	SAND SPRINGS	-118.35	39.26	CHURCHILL
108	SCHEELITE QUEEN PROSPECT	SAND SPRINGS	-118.40	39.13	CHURCHILL
109	STANDARD TUNGSTEN CLAIMS	SAND SPRINGS	-118.33	39.26	CHURCHILL
110	STARDUST CLAIMS	SAND SPRINGS	-118.32	39.26	CHURCHILL
111	COPPER HEAD	SANTA FE	-118.08	38.55	MINERAL
112	YORK MINE	SANTA FE	-118.09	38.58	MINERAL
113	VERNON AND SNOWSTORM CLAIMS	SEVEN TROUGHS	-118.81	40.42	PERSHING
114	KING CLAIMS	SHON	-117.64	41.34	HUMBOLDT
115	LEDGE MINE	SHON	-117.63	41.36	HUMBOLDT
116	DEFENDER MINE	SILVER STAR	-118.42	38.22	MINERAL
117	PINE CROW PROSPECT	SILVER STAR	-118.43	38.21	MINERAL
118	LINKA MINE	SPENCER HOT SPRINGS	-116.84	39.33	LANDER
119	ATLANTIC CLAIM	SPRUCE MOUNTAIN	-114.83	40.56	ELKO
120	HILLTOP MINE	STAGGS	-118.98	40.54	PERSHING
121	SAGE HEN MINE	STAGGS	-118.98	40.54	PERSHING
122	UNNAMED TUNGSTEN PROSPECTS	STAGGS	-118.95	40.56	PERSHING
123	SORENSON FLUORITE	SYLVANIA	-117.63	37.37	ESMERALDA
124	SCHOFIELD MINE	TEM PIUTE	-115.62	37.63	LINCOLN
125	NEW TEMPIUTE MINE	TEM PIUTE	-115.63	37.63	LINCOLN
126	COPPER KING MINE	TOKOP	-117.28	37.24	ESMERALDA
127	NORTH STAR CLAIMS	TOKOP	-117.39	37.34	ESMERALDA
128	BONANZA KING GROUP	TOY	-118.69	40.00	CHURCHILL
129	PAYDAY AND LOBO CLAIMS	TOY	-118.72	39.99	CHURCHILL
130	ST ANTHONY MINE	TOY	-118.71	39.99	CHURCHILL
131	UNNAMED W MINE	TOY	-118.72	39.99	CHURCHILL
132	ARCTURUS MINE	TREGO MINING AREA	-119.23	40.71	PERSHING
133	ESTHER MINE	TRINITY	-118.55	40.39	PERSHING
134	NYE MINE	TROY	-115.55	38.40	NYE
135	TERRELL MINE	TROY	-115.54	38.41	NYE
136	CACTUS PROSPECT	TWIN RIVER	-117.23	38.99	NYE
137	HOMESTEAD MINE	UNNAMED	-119.03	38.45	MINERAL
138	KELLER - STUART	UNNAMED	-119.55	39.75	WASHOE
139	OWL CLAIM	VALLEY VIEW	-115.50	40.35	ELKO
140	GOLDEN SCHEELITE PROSPECT	VARYVILLE	-118.87	41.52	HUMBOLDT
141	KINGS CANYON MINE	VOLTAIRE	-119.83	39.15	CARSON CITY
142	DEFENSE MINE	WARM SPRINGS	-118.69	41.86	HUMBOLDT
143	LAST CHANCE PROPERTY	WARM SPRINGS	-118.70	41.85	HUMBOLDT
144	EPIDOTE CLAIM	WHITE HORSE	-114.28	40.28	ELKO
145	MONTE CRISTO DEPOSITS	WHITE PINE	-115.57	39.23	WHITE PINE
146	LONG	WILD HORSE	-118.39	40.08	PERSHING
147	LUCKY FOUR	WILD HORSE	-118.60	38.80	MINERAL
148	COWBOY MINE	WILSON	-119.17	38.63	LYON
149	COPPER STACK CLAIMS	WINDYPAH	-117.81	37.56	ESMERALDA

Tungsten vein deposits — model number 15A

Map no.	Mine name	District	Long. dd	Lat. dd	County
150	GEORGIA CLAIMS	AURUM	-114.61	39.89	WHITE PINE
151	FALCON PROSPECT	BELMONT	-116.95	38.58	NYE
152	OLD WINDLASS NO. 1 MINE	BELMONT	-116.88	38.57	NYE
153	ZABRISKIE TUNGSTEN PROPERTY	BELMONT	-116.87	38.55	NYE
154	LYNCH CREEK MINE	BIRCH CREEK	-117.05	39.36	LANDER
155	INDIAN SPRINGS TUNGSTEN	DELANO	-114.24	41.62	ELKO
156	TUNGSTONIA MINE	EAGLE	-114.17	39.67	WHITE PINE
157	UNNAMED PROSPECTS	EAGLE	-114.21	39.66	WHITE PINE
158	COMMODORE MINE	ELLSWORTH	-117.77	38.96	NYE
159	EAGLE GROUP	ELLSWORTH	-117.77	38.97	NYE
160	GRAND VIEW	ELLSWORTH	-117.74	38.97	NYE
161	BISONI FLUORSPAR DEPOSIT	FISH CREEK	-116.09	39.42	EUREKA
162	REESE AND BERRY	FISH CREEK	-116.07	39.43	EUREKA
163	DEER TRAIL	GEYSER RANCH AREA	-114.47	38.72	WHITE PINE
164	UNNAMED BERYL PROSPECTS	GILBERT CANYON AREA	-115.55	40.41	ELKO
165	LAKEVIEW MINE	IMLAY	-118.19	40.53	PERSHING
166	LEXINGTON MINE	LEXINGTON	-114.21	38.85	WHITE PINE
167	HIATT BERYL-FLUORITE	MANHATTAN	-117.09	38.50	NYE
168	SPANISH SPRINGS	MANHATTAN	-117.02	38.46	NYE
169	MOUNT WHEELER	MOUNT WASHINGTON	-114.34	38.90	WHITE PINE
170	POPCORN PROSPECT	MOUNTAIN WELLS	-118.31	39.45	CHURCHILL
171	PINE PROSPECT	OSCEOLA	-114.40	39.04	WHITE PINE
172	EAGLE ROCK MINE	PATTERSON	-114.75	38.61	LINCOLN
173	GEYSER RANCH & MILL SITE	PATTERSON	-114.70	38.67	LINCOLN
174	RARE METALS	PROCTOR	-114.30	40.91	ELKO
175	SILVER ZONE PASS	PROCTOR	-114.27	40.92	ELKO
176	REWARD PROSPECTS	RAVENSWOOD	-117.25	39.73	LANDER
177	TAYLOR MINE	ROBINSON	-115.02	39.27	WHITE PINE
178	LUCKY SEVEN MINE	ROUND MOUNTAIN	-117.00	38.71	NYE
179	N & H GROUP	ROUND MOUNTAIN	-117.01	38.70	NYE
180	STEVENSON'S AND SCHUPPY'S CLAIMS	ROUND MOUNTAIN	-117.03	38.70	NYE
181	VIOLET BLUE PROSPECT	ROUND MOUNTAIN	-117.05	38.70	NYE
182	OREANA	RYE PATCH	-118.25	40.39	PERSHING
183	SCHEELITE CHIEF MINE	SHOSHONE	-114.35	38.79	WHITE PINE
184	JOHNSON	SNAKE	-114.30	38.94	WHITE PINE
185	EAGLE CLAIM	TUNGSTEN	-114.34	38.97	WHITE PINE
186	HUB MINE	TUNGSTEN	-114.35	38.95	WHITE PINE
187	POLJACK PROPERTY	TUNGSTEN	-114.36	38.89	WHITE PINE
188	STAR CLAIM	TUNGSTEN	-114.35	38.97	WHITE PINE
189	TUNGSTEN CLAIM	TUNGSTEN	-114.35	38.96	WHITE PINE
190	DAWLEY CANYON MICA AREA	VALLEY VIEW	-115.46	40.40	ELKO
191	ERRINGTON AND THIE/GROUP	VALLEY VIEW	-115.44	40.40	ELKO
192	MICK (MICA?) MINE	VALLEY VIEW	-115.46	40.40	ELKO
193	WELLS. TUNGSTEN	WELLS	-115.01	41.04	ELKO

Climax molybdenum deposits — model number 16

Map no.	Mine name	District	Long. dd	Lat. dd	County
194	MAJUBA HILL EAST	ANTELOPE	-118.53	40.69	PERSHING
195	MOUNT HOPE	MOUNT HOPE	-116.17	39.80	LANDER

Porphyry molybdenum, low-fluorine deposits model number 21B

Map no.	Mine name	District	Long. dd	Lat. dd	County
196	BUCKINGHAM MINE	BATTLE MOUNTAIN	-117.07	40.62	LANDER
197	BUFFALO VALLEY MOLY	BATITLE MOUNTAIN	-117.27	40.54	LANDER
198	TRENTON COPPER PROSPECT	BATTLE MOUNTAIN	-117.19	40.63	LANDER
199	UV INDUSTRIES PROPERTY	FAIRPLAY	-117.86	38.79	NYE
200	GARDNERVILLE (ALPINE MILL)	GARDNERVILLE	-119.57	38.87	DOUGLAS
201	SNOW CREEK	LEONARD CREEK	-118.72	41.61	HUMBOLDT
202	HUBER HILLS/GRANITE RIDGE	MOUNTAIN CITY	-115.93	41.84	ELKO
203	JOLLY RODGER CLAIMS	MOUNTAIN WELLS	-118.31	39.46	CHURCHILL
204	P.D. DRILL SITE	MOUNTAIN WELLS	-118.27	39.44	CHURCHILL
205	OAK SPRING MOLY	OAK SPRING	-116.22	37.24	NYE
206	HALL PROPERTY	SAN ANTONE	-117.29	38.32	NYE
207	SISKON PROPERTY	SYLVANIA	-117.64	37.36	ESMERALDA

Porphyry copper deposits model number 17

Map no.	Mine name	District	Long. dd	Lat. dd	County
208	ELDER CREEK	BATTLE MOUNTAIN	-117.10	40.69	LANDER
209	SULLIVAN CUERVO	FAIRPLAY	-117.95	38.78	NYE
210	GREGG CANYON CU-MO PROSPECT	GOLD RUN	-117.51	40.74	HUMBOLDT
211	GUANOMI MINE	UNNAMED (PYRAMID)	-119.45	39.84	WASHOE
212	MACARTHUR	YERIINGTON	-119.24	39.05	DOUGLAS, LYON
213	ANN MASON	YERINGTON	-119.27	38.%	LYON
214	BEAR PROSPECT	YERINGTON	-119.18	39.03	LYON
215	LAGOMARSINO	YERINGTON	-119.16	39.(XI	LYON
216	YERINGTON OPEN PIT MINE	YERINGTON	-119.20	38.98	LYON

Porphyry copper, skarn related deposits model number 18A

Map no.	Mine name	District	Long. dd	Lat. dd	County
217	EAST ORE BODY COPPER CANYON	BATTLE MOUNTAIN	-117.12	40.54	LANDER
218	WEST ORE BODY COPPER CANYON	BATTLE MOUNTAIN	-117.13	40.54	LANDER
219	FISH CREEK PORPHYRY CU TARGET	FISH CREEK	-117.23	40.43	LANDER
220	LIBERTY PIT	ROBINSON	-115.00	39.26	WHITE PINE
221	MORRIS-BROOKS SHAFT	ROBINSON	-115.02	39.26	WHITE PINE
222	RUTH MINE	ROBINSON	-114.97	39.26	WHITE PINE
223	TRIPP PIT	ROBINSON	-115.02	39.26	WHITE PINE
224	VETERAN PIT	ROBINSON	-115.03	39.26	WHITE PINE

Copper skarn deposits model number 18B

Map no.	Mine name	District	Long. dd	Lat. dd	County
225	DEFIANCE MINE	AURUM	-114.57	39.61	WHITE PINE
226	KANSAS MINE	AURUM	-114.57	39.60	WHITE PINE
227	COPPER MOUNTAIN PROPERTY	BOVARD	-118.45	38.86	MINERAL
228	ALICE MINE	CONTACT	-114.80	41.78	ELKO
229	ALLEN NO. 2	CONTACT	-114.78	41.78	ELKO
230	ARIZONA MINE	CONTACT	-114.71	41.68	ELKO
231	BONANZA MINE	CONTACT	-114.85	41.78	ELKO
232	BOSTON MINE	CONTACT	-114.61	41.80	ELKO
233	BROOKLYN MINE	CONTACT	-114.79	41.78	ELKO
234	GREEN MONSTER CLAIM	CONTACT	-114.78	41.78	ELKO
235	JOHNSON MINE & GROUP	CONTACT	-114.63	41.69	ELKO
236	MAGNOLIA CLAIM	CONTACT	-114.81	41.78	ELKO
237	MAMMOTH "MINE"	CONTACT	-114.80	41.78	ELKO
238	NEVADA MINE	CONTACT	-114.83	41.73	ELKO
239	NEVADA-BELLEVIEW MINE	CONTACT	-114.78	41.78	ELKO
240	RATTLER MINE	CONTACT	-114.80	41.78	ELKO
241	SILVER CIRCLE	CONTACT	-114.80	41.78	ELKO
242	SILVER STAR	CONTACT	-114.63	41.64	ELKO
243	STANDARD GROUP	CONTACT	-114.84	41.79	ELKO
244	UNNAMED PROSPECT	CONTACT	-114.83	41.73	ELKO
245	VALLEY VIEW CLAIM	CONTACT	-114.78	41.78	ELKO
246	WAR EAGLE MINE	CONTACT	-114.69	41.68	ELKO
247	DELKER MINE	DELKER	-115.02	40.40	ELKO
248	UNKNOWN (SAMPLE LOCATION 037)	DELKER	-115.00	40.41	ELKO
249	BI-METALLIC	DOLLY VARDEN	-114.59	40.33	ELKO
250	VICTORIA MINE	DOLLY VARDEN	-114.55	40.33	ELKO
251	ESTES PROSPECT	ELK MOUNTAIN	-115.07	41.91	ELKO
252	RED ELEHPANT INCLINE	ELK MOUNTAIN	-115.08	41.91	ELKO
253	NBMG SAMPLE SITE 3834	FAIRVIEW	-118.19	39.25	CHURCHILL
254	SIDONG CLAIMS	FERBER	-114.13	40.26	ELKO
255	UNKNOWN	FERBER	-114.06	40.25	ELKO
256	UNKNOWN	FERBER	-114.10	40.24	ELKO
257	ADELAIDE MINE	GOLD RUN	-117.50	40.80	HUMBOLDT
258	UNNAMED EAST OF DIAMOND PK	HUNTINGTON CREEK	-115.83	40.02	EUREKA
259	MOTTINI MINE	IXL	-118.21	39.67	CHURCHILL
260	COPPER QUEEN	JESSUP	-118.83	39.99	CHURCHILL
261	HARD-TO-FIND MINE	JESSUP	-118.82	39.99	CHURCHILL
262	KINSLEY CONSOLIDATED	KINSLEY	-114.34	40.13	ELKO
263	AZTEC CLAIM	LITTLE MOUNTAIN	-114.33	37.64	LINCOLN
264	ENTERPRISE PROSPECT	LONE MOUNTAIN	-117.50	37.94	ESMERALDA
265	JERRY CLAIMS	PATTERSON	-114.74	38.61	LINCOLN
266	RED METALS MINE	PEAVINE	-119.95	39.61	WASHOE
267	CULVERWELL ADIT	PENNSYLVANIA	-114.47	37.41	LINCOLN
268	ALADDIN GROUP	RAILROAD	-116.01	40.52	ELKO
269	DELMAS MINE	RAILROAD	-116.02	40.51	ELKO
270	STORM KING CLAIM	RAILROAD	-116.01	40.52	ELKO
271	WEB FOOT	RAILROAD	-116.01	40.52	ELKO
272	CALAVADA MINE	SANTA FE	-118.09	38.59	MINERAL
273	COPPER CHIEF MINE	SANTA FE	-117.98	38.47	MINERAL
274	BANNER HILL GROUP	SPRUCE MOUNTAIN	-114.82	40.57	ELKO
275	ORIENTAL W ASH PROSPECTS	'TOKOP	-117.46	37.22	ESMERALDA
276	UNNAMED COPPER	UNNAMED (PYRAMID)	-119.69	39.70	WASHOE

277	COPPEREID	WHITE CLOUD	-118.19	39.85	CHURCHILL
278	BLUESTONE MINE	YERINGTON	-119.23	38.%	LYON
279	CASTING COPPER	YERINGTON	-119.28	38.95	LYON
280	DOUGLAS HILL	YERINGTON	-119.27	38.95	LYON
281	LUDWIG MINE	YERINGTON	-119.27	38.%	LYON
282	MASON VALLEY MINE	YERINGTON	-119.22	38.95	LYON
283	MCCONNELL MINE	YERINGTON	-119.23	38.94	LYON
284	NEVADA-DENVER MINE	YERINGTON	-119.27	38.98	LYON
285	WESTERN NEVADA	YERINGTON	-119.23	38.94	LYON

Zinc-lead skarn deposits — model number 18C

Map no.	Mine name	District	Long. dd	Lat. dd	County
286	JULIE SHAFT	BA'ITLE MOUNTAIN	-117.14	40.53	LANDER
287	HICKEY MINE	CONTACT	-114.78	41.78	ELKO
288	JUMBO PB PROSPECT	ELLENDALE	-116.74	38.06	NYE
289	NBMG SAMPLE SITE 3835	FAIRVIEW	-118.20	39.25	CHURCHILL
290	FREIBERG	FREIBERG	-115.60	37.94	LINCOLN
291	NBMG SAMPLE LOCATION 1763	FREIBERG	-115.59	37.93	LINCOLN
292	GOLD EAGLE MINE	LONE MOUNTAIN	-117.49	37.95	ESMERALDA
293	PAYMASTER MINE	LONE MOUNTAIN	-117.48	37.89	ESMERALDA
294	MOUNT HOPE MINE	MOUNT HOPE	-116.16	39.79	EUREKA
295	TRIPOLI MINE	RAILROAD	-116.01	40.52	ELKO
296	KEYSTONE MINE	ROBERTS	-116.55	39.92	EUREKA
297	BATTLE CREEK GROUP	RUBY VALLEY	-115.38	40.50	ELKO
298	HUMBUG GROUP (5)	SPRUCE MOUNTAIN	-114.78	40.58	ELKO
299	KILLIE MINE	SPRUCE MOUNTAIN	-114.82	40.57	ELKO
300	OLD SYLVANIA MINE	SYLVANIA	-117.72	37.40	ESMERALDA
301	WARD MINE	WARD	-114.88	39.08	WHITE PINE

Iron skarn deposits — model number 18D

Map no.	Mine name	District	Long. dd	Lat. dd	County
302	MINNESOTA IRON MINE	BUCKSKIN	-119.33	39.07	DOUGLAS
303	CALICO HILLS AREA	CALICO HILLS AREA	-116.30	36.87	NYE
304	ENGLE-STOUDER PROSPECT	ELLSWORTH	-117.81	38.96	NYE
305	BLACK HORSE PROSPECT	FITTING	-118.35	38.64	MINERAL
306	PHELPS STOKES MINE	GABBS	-117.83	38.89	NYE
307	DIG A LITTLE CLAIMS	LITTLE MOUNTAIN	-114.33	37.64	LINCOLN
308	MCCOY IRON MINE	MCCOY	-117.22	40.31	LANDER
309	HOGLE	MERRIMAC	-115.%	41.09	ELKO
310	A.J.A. IRON PROPERTY (SOUTH)	PALMETTO	-117.54	37.51	ESMERALDA
311	FOSTER PROSPECT	RAWHIDE - REGENT ?	-118.46	38.95	MINERAL
312	IRON BLOSSOM PROSPECT	RED MOUNTAIN	-119.49	39.35	LYON
313	DAYTON IRON DEPOSIT	RED MOUNTAIN	-119.43	39.36	LYON
314	IRON GATE MINE	SANTA FE	-118.09	38.51	MINERAL
315	MAVERIC SPRINGS PROSPECT	UNNAMED	-115.40	40.21	ELKO
316	CALICO HILLS PROSPECT	WEBER RESERVOIR AREA	-118.78	39.03	MINERAL
317	UNNAMED PROSPECTS	WESTGATE	-118.06	39.30	CHURCHILL
318	TULE PROSPECT SEC. 34	WILD HORSE	-118.37	40.07	PERSHING
319	LYON FE PROSPECTS	YERINGTON	-119.07	38.91	LYON
320	PUMPKIN HOLLOW FE PROSPECTS	YERINGTON	-119.08	38.92	LYON

Iron endoskarn deposits — model number ---

Map no.	Mine name	District	Long. dd	Lat. dd	County
321	BLACK JOE PROSPECT	COPPER KETTLE	-118.16	39.91	CHURCHILL
322	EMERY-FISK PROSPECT	COPPER KETTLE	-118.15	39.94	CHURCHILL
323	NORTH GROUP	COPPER KETTLE	-118.17	39.97	CHURCHILL
324	SOUTH GROUP	COPPER KETTLE	-118.17	39.93	CHURCHILL
325	BUENA VISTA MINE	MINERAL BASIN	-118.17	39.97	CHURCHILL
326	SEGERSTROM-HEIZER MINE	MINERAL BASIN	-118.15	40.04	PERSHING

Copper deposits in mafic rocks — model number ---

Map no.	Mine name	District	Long. dd	Lat. dd	County
327	BOYER COPPER DEPOSIT	TABLE MOUNTAIN	-117.94	39.98	CHURCHILL
328	COTTONWOOD CANYON NI DEPOSIT	TABLE MOUNTAIN	-117.91	40.00	CHURCHILL
329	CLIPPER CANYON PROSPECT	WHITE CLOUD	-118.21	39.82	CHURCHILL

Gold skarn deposits — model number ---

Map no.	Mine name	District	Long. dd	Lat. dd	County
330	BAILEY DAY MINE	BATTLE MOUNTAIN	-117.03	40.63	LANDER
331	BUFFALO VALLEY GOLD MINE	BATTLE MOUNTAIN	-117.25	40.641	LANDER
332	CARISSA MINE	BATTLE MOUNTAIN	-117.03	40.61	LANDER
333	FORTITUDE	BATTLE MOUNTAIN	-117.13	40.55	LANDER
334	LABRADOR	BATTLE MOUNTAIN	-117.05	40.63	LANDER
335	NORTHEAST EXT (SILVER KING MINE)	BATTLE MOUNTAIN	-117.13	40.55	LANDER
336	SURPRISE	BATTLE MOUNTAIN	-117.02	40.62	LANDER
337	TOMBOY-MINNIE MINE	BATTLE MOUNTAIN	-117.12	40.53	LANDER
338	HORSE CANYON PROSPECT	LEWIS	-116.92	40.41	LANDER
339	MC COY	MCCOY	-117.22	40.32	LANDER

Polymetallic replacement deposits — model number 19A

Map no.	Mine name	District	Long. dd	Lat. dd	County
340	PRINCE OF WALES MINE	ALPHA	-116.12	39.93	EUREKA
341					
342	GRAND DEPOSIT MINE	AURUM	-114.56	39.62	WHITE PINE

343	SIEGEL MINE	AURUM	-114.61	39.73	WHITE PINE
344	AVALANCHE PROSPECT	BATTLE MOUNTAIN	-117.13	40.56	LANDER
345	IRON CANYON MINE	BATTLE MOUNTAIN	-117.11	40.55	LANDER
346	SIMON MINE	BELL	-117.86	38.56	MINERAL
347	BLACK METAL MINE	BRISTOL-JACKRABBIT	-114.60	38.10	LINCOLN
348	BRISTOL MINE	BRISTOL-JACKRABBIT	-114.60	38.10	LINCOLN
349	BRISTOL SILVER MINE	BRISTOL-JACKRABBIT	-114.62	38.08	LINCOLN
350	DETROIT MINE	BRISTOL-JACKRABBIT	-114.62	38.09	LINCOLN
351	HILLSIDE MINE	BRISTOL-JACKRABBIT	-114.61	38.08	LINCOLN
352	IDA MAY MINE	BRISTOL-JACKRABBIT	-114.61	38.10	LINCOLN
353	NATIONAL MINE	BRISTOL-JACKRABBIT	-114.62	38.08	LINCOLN
354	VESUVIUS MINE	BRISTOL-JACKRABBIT	-114.61	38.08	LINCOLN
355	BERG CLAIMS	CHALK MOUNTAIN	-118.13	39.33	CHURCHILL
356	CHALK MOUNTAIN SILVER-LEAD MINE	CHALK MOUNTAIN	-118.12	39.32	CHURCHILL
357	WEST SIDE MINES CO MINE	CHALK MOUNTAIN	-118.13	39.33	CHURCHILL
358	GOLD CHIEF MINE	CHIEF	-114.51	37.70	LINCOLN
359	OLD DEMOCRAT MINE	CHIEF	-114.52	37.69	LINCOLN
360	NBMG SAMPLE LOCATION 1441	COMET	-114.60	37.89	LINCOLN
361	SCHODDE MINE	COMET	-114.60	37.88	LINCOLN
362	TB CLAIMS	COMET	-114.60	37.89	LINCOLN
363	UNNAMED PROSPECT	COMET	-114.61	37.90	LINCOLN
364	SILK WORM MINE	CONTACT	-114.66	41.61	ELKO
365	CALEDONIA	CORTEZ	-116.57	40.20	EUREKA
366	CORTEZ METALS MINE	CORTEZ	-116.59	40.15	EUREKA
367	CLEVELAND MINE	DELANO	-114.26	41.67	ELKO
368	DELANO MINE	DELANO	-114.27	41.67	ELKO
369	DOLLY VARDEN MINE	DOLLY VARDEN	-114.57	40.35	ELKO
370	KEYSTONE MINE	DOLLY VARDEN	-114.46	40.32	ELKO
371	RED HILLS MINE	EAGLE	-114.34	39.66	WHITE PINE
372	KING MIDAS	ELY SPRINGS	-114.68	37.93	LINCOLN
373	TARA CLAIMS	ELY SPRINGS	-114.64	37.93	LINCOLN
374	ALBION SHAFI	EUREKA	-116.00	39.51	EUREKA
375	AMERICAN SHAFT	EUREKA	-115.99	39.49	EUREKA
376	ATLAS SHAFT	EUREKA	-115.98	39.48	EUREKA
377	BELL SHAFT	EUREKA	-115.99	39.50	EUREKA
378	BERRYMAN TUNNEL	EUREKA	-115.99	39.47	EUREKA
379	BULLWACKER MINE	EUREKA	-116.00	39.52	EUREKA
380	CALIFORNIA TUNNEL	EUREKA	-115.98	39.47	EUREKA
381	CONNELLY MINE	EUREKA	-115.98	39.47	EUREKA
382	DIAMOND MINE	EUREKA	-115.99	39.47	EUREKA
383	DISTINCTION TUNNEL	EUREKA	-115.97	39.47	EUREKA
384	DUNDERBERG	EUREKA	-115.98	39.48	EUREKA
385	ELDERADO MINE	EUREKA	-115.99	39.48	EUREKA
386	EUREKA CONSOLIDATED	EUREKA	-115.98	39.50	EUREKA
387	EUREKA NEVADA TUNNEL	EUREKA	-116.00	39.47	EUREKA
388	FOURTH OF JULY TUNNEL	EUREKA	-115.99	39.46	EUREKA
389	HOLLY MINE	EUREKA	-115.99	39.52	EUREKA
390	INDUSTRY TUNNEL	EUREKA	-115.98	39.48	EUREKA
391	JACKSON MINE	EUREKA	-115.98	39.50	EUREKA
392	KK CONSOLIDATED	EUREKA	-115.99	39.50	EUREKA
393	PHOENIX MINE	EUREKA	-115.98	39.50	EUREKA
394	RICHMOND-EUREKA MINE	EUREKA	-116.00	39.50	EUREKA
395	TL SHAFT	EUREKA	-116.00	39.52	EUREKA
396	WILLIAMSBURG MINE	EUREKA	-116.00	39.53	EUREKA
397	DEAD CEDAR MINE	FERGUSON SPRING	-114.20	40.43	ELKO
398	FSW CLAIMS	FERGUSON SPRING	-114.23	40.44	ELKO
399	DOWNEYVILLE MINE	GABBS	-117.90	38.91	NYE
400	ALICE MINE	GOODSPRINGS	-115.49	35.84	CLARK
401	ANCHOR	GOODSPRINGS	-115.44	35.75	CLARK
402	ARGENTARIA MINE	GOODSPRINGS	-115.47	35.81	CLARK
403	AZURITE MINE	GOODSPRINGS	-115.57	35.82	CLARK
404	BILL NYE MINE	GOODSPRINGS	-115.51	35.81	CLARK
405	BLUE JAY MINE	GOODSPRINGS	-115.48	35.88	CLARK
406	BOSS MINE	GOODSPRINGS	-115.57	35.82	CLARK
407	BULLION MINE	GOODSPRINGS	-115.44	35.76	CLARK
408	CHRISTMAS GROUP	GOODSPRINGS	-115.46	35.72	CLARK
409	CONTACT MINE	GOODSPRINGS	-115.47	35.93	CLARK
410	FREDRICKSON MINE	GOODSPRINGS	-115.48	35.82	CLARK
411	GREEN MONSTER MINE	GOODSPRINGS	-115.65	35.89	CLARK
412	HIGHLINE AND RED STREAK CLAIMS	GOODSPRINGS	-115.55	35.83	CLARK
413	HOODOO MINE	GOODSPRINGS	-115.55	35.79	CLARK
414	HOOSIER MINE	GOODSPRINGS	-115.49	35.80	CLARK
415	INGOMAR AND MILFORD NO. 2 MINES	GOODSPRINGS	-115.49	35.71	CLARK
416	LOOKOUT, ANNEX AND MTN. TOP	GOODSPRINGS	-115.46	35.80	CLARK
417	MILFORD MINE	GOODSPRINGS	-115.49	35.71	CLARK
418	MOBILE MINE	GOODSPRINGS	-115.54	35.82	CLARK
419	PILGRIM MINE	GOODSPRINGS	-115.49	35.87	CLARK
420	POTOSI MINE	GOODSPRINGS	-115.54	35.96	CLARK
421	PRAIRIE FLOWER MINE	GOODSPRINGS	-115.49	35.86	CLARK
422	ROOT MINE	GOODSPRINGS	-115.54	35.78	CLARK
423	SINGER MINE	GOODSPRINGS	-115.53	35.78	CLARK
424	SULTAN MINE	GOODSPRINGS	-115.50	35.75	CLARK
425	TAM O'SHANTER MINE.	GOODSPRINGS	-115.48	35.71	CLARK
426	WHALE MINE	GOODSPRINGS	-115.53	35.81	CLARK
427	YELLOW PINE MINE	GOODSPRINGS	-115.50	35.85	CLARK
428	GROOM MINE	GROOM	-115.77	37.35	LINCOLN
429	LA PANTA MINE	HAWTHORNE	-118.45	38.49	MINERAL
430	BLUE BELL MINE	HIGHLAND	-114.58	37.96	LINCOLN
431	FORLORN HOPE MINE	HIGHLAND	-114.60	37.92	LINCOLN
432	MENDHA MINE	HIGHLAND	-114.55	37.94	LINCOLN
433	NBMG SAMPLE LOCATION 1396	HIGHLAND	-114.58	37.96	LINCOLN
434	HUNTER-VULCAN	HUNTER	-114.98	39.63	WHITE PINE
435	SAN RAFAEL MINE	LODI	-117.97	39.04	NYE
436	ALPINE EAGLE MINE	LONE MOUNTAIN	-117.54	38.03	ESMERALDA
437	ALPINE MINE	LONE MOUNTAIN	-117.56	38.03	ESMERALDA
438	GENERAL THOMAS MINE	LONE MOUNTAIN	-117.42	37.95	ESMERALDA
439	MOUNTAIN VIEW EXTENSION	LONE MOUNTAIN	-116.26	39.61	EUREKA
440	MOUNTAIN VIEW MINE	LONE MOUNTAIN	-116.26	39.61	EUREKA
441	SWANSON CLAIMS	LONE MOUNTAIN	-117.52	37.97	ESMERALDA
442	TECOMA CLAIM	LUCIN	-114.04	41.25	ELKO
443	MINERAL HILL MINES	MINERAL HILL	-116.09	40.15	EUREKA
444	MONTEZUMA CAMP	MONTEZUMA	-117.38	37.71	ESMERALDA
445	LEAD PIPE PROPERTY	MOREY	-116.31	38.69	NYE
446	J.S. CLAIMS	MUD SPRINGS	-115.15	40.30	ELKO
447	CAPPY'S DIGGINS	PATTERSON	-114.81	38.69	WHITE PINE
448	CASELTON SHAFT	PIOCHE	-114.46	37.92	LINCOLN
449	COMBINED METALS REDUCTION CO. 1	PIOCHE	-114.46	37.92	LINCOLN
450	ELY VALLEY MINES	PIOCHE	-114.49	37.95	LINCOLN
451	PIOCHE METALS MINE	PIOCHE	-114.51	37.95	LINCOLN
452	PRINCE MINE	PIOCHE	-114.47	37.90	LINCOLN

453	VIRGINIA-LOUISE MINE	PIOCHE	-114.47	37.90	LINCOLN
454	COPPER BELLE MINE	RAILROAD	-116.00	40.53	ELKO
455	LAST CHANCE	RAILROAD	-116.01	40.52	ELKO
456	GILA MINE	REVEILLE	-116.18	38.03	NYE
457	NEW REVEILLE MINE	REVEILLE	-116.19	38.00	NYE
458	BLACK FOREST MINE	SPRUCE MOUNTAIN	-114.81	40.57	ELKO
459	MONARCH MINE	SPRUCE MOUNTAIN	-114.83	40.56	ELKO
460	SPRUCE STANDARD	SPRUCE MOUNTAIN	-114.87	40.55	ELKO
461	JACKSON MINES	TECOMA	-114.07	41.44	ELKO
462	GILMORE MINE	TYBO	-116.41	38.37	NYE
463	TYBO MINE	TYBO	-116.40	38.37	NYE
464	GRANTSVILLE MINE	UNION	-117.58	38.85	NYE
465	VIOLA CLAIMS	VIOLA	-114.31	37.24	LINCOLN
466	POLAR STAR GROUP	WARM CREEK	-115.07	40.73	ELKO
467	MC ELLIN	WHITE PINE	-115.53	39.26	WHITE PINE
468	IRON CAP CLAIM	WILLOW CREEK	-115.56	38.10	NYE

Replacement manganese deposits model number 19B

Map no.	Mine name	District	Long. dd	Lat. dd	County
469	JACKRABBIT INCLINE	BRISTOL-JACKRABBIT	-114.60	38.09	LINCOLN
470	LUCKY STAR MINE	BRISTOL-JACKRABBIT	-114.62	38.11	LINCOLN
471	UNNAMED PROSPECT #2	BULLION	-117.03	40.03	LANDER
472	DARKEY MINE	DECOY	-114.34	40.68	ELKO
473	TEX CLAIMS	ELY SPRINGS	-114.68	37.93	LINCOLN
474	TOM MAJOR PROPERTY	GOLD RUN	-117.49	40.77	HUMBOLDT
475	FARNSWORTH-JONES	GOURD SPRINGS	-114.29	36.97	LINCOLN
476	BLACK PRINCE MINE	HIGHLAND	-114.53	37.93	LINCOLN
477	STEPTOE GROUP	NEVADA	-114.93	39.77	WHITE PINE
478	SOUTH PAW	PAHRANAGAT	-115.38	37.68	LINCOLN
479	INDEPENDENCE MINE	PIOCHE	-114.41	37.88	LINCOLN
480	SUSAN DUSTER MINE	PIOCHE	-114.45	37.92	LINCOLN
481	ZERO TUNNEL	P1OCHE	-114.46	37.92	LINCOLN
482	COLUMBIA MINE	ROBINSON	-114.97	39.27	WHITE PINE
483	CUBA MINE	ROBINSON	-114.96	39.27	WHITE PINE
484	KEYSTONE MINE	ROBINSON	-114.97	39.28	WHITE PINE
485	LARSH PROSPECT	TYBO	-116.39	38.37	NYE

Distal-disseminated silver-gold deposits model number 19C

Map no.	Mine name	District	Long. dd	Lat. dd	County
486	EAST HILL UNR TOP	BATTLE MOUNTAIN	-117.175	40.729	HUMBOLDT
487	EIGHT SOUTH	BATTLE MOUNTAIN	-117.16	40.742	HUMBOLDT
488	LONE TREE	BATTLE MOUNTAIN	-117.21	40.83	HUMBOLDT
489	REONA	BATTLE MOUNTAIN	-117.14	40.54	LANDER
490	STONEHOUSE	BATTLE MOUNTAIN	-117.21	40.83	HUMBOLDT
491	TRENTON VALMY	BATTLE MOUNTAIN	-117.178	40.645	HUMBOLDT
492	TENABO	BULLION	-116.64	40.31	LANDER
493	LUCKY HILL MINE	CANDELARIA	-118.09	38.15	MINERAL
494	ARCHIMEDES	EUREKA	-115.988	39.523	EUREKA
495	NEW WINDFALL SHAFI	EUREKA	-115.98	39.45	EUREKA
496	WINDFALL MINE	EUREKA	-115.98	39.45	EUREKA
497	HILLTOP MINE	HILLTOP	-116.81	40.42	LANDER
498	COVE	MCCOY	-117.21	40.34	LANDER
499	STAR POINTER	ROBINSON	-114.98	39.25	WHITE PINE
500	TAYLOR MINE	TAYLOR	-114.68	39.08	WHITE PINE
501	TREASURE HILL	WHITE PINE	-115.48	39.22	WHITE PINE

Polymetallic vein deposits model number 22C

Map no.	Mine name	District	Long. dd	Lat. dd	County
502	ANTELOPE MINE	ANTELOPE	-118.54	40.69	PERSHING
503	ELECTRIC MINE	ARABIA	-118.39	40.36	PERSHING
504	MONTEZUMA GROUP	ARABIA	-118.39	40.36	PERSHING
505	CALIFORNIA	AURA	-116.16	41.69	ELKO
506	COLUMBIA	AURA	-116.11	41.68	ELKO
507	HUMBOLDT MINE	AURA	-116.14	41.70	ELKO
508	AMARGOSA GROUP	AURUM	-114.57	39.61	WHITE PINE
509	CROWN POINT MINE	BALD MOUNTAIN	-115.56	39.90	WHITE PINE
510	BARCELONA MINE	BARCELONA	-116.88	38.62	NYE
511	PERKINS PROSPECT	BARCELONA	-116.96	38.65	NYE
512	WAR EAGLE MINE	BARCELONA	-116.94	38.66	NYE
513	BUZZARD MINE	BATTLE MOUNTAIN	-117.11	40.54	LANDER
514	DRISCOL PROPERTY	BATTLE MOUNTAIN	-117.13	40.57	LANDER
515	IRISH ROSE MINE	BATTLE MOUNTAIN	-117.08	40.61	LANDER
516	LITTLE GIANT MINE	BATTLE MOUNTAIN	-117.08	40.61	LANDER
517	LUCKY STRIKE MINE	BATTLE MOUNTAIN	-117.12	40.62	LANDER
518	NEVADA GROUP MINE	BATTLE MOUNTAIN	-117.13	40.55	LANDER
519	TRINITY-ARMOR MINE	BATTLE MOUNTAIN	-117.12	40.57	LANDER
520	WHITE AND SHILOH MINE	BATTLE MOUNTAIN	-117.13	40.57	LANDER
521	COMBINATION MINE	BELMONT	-116.86	38.58	NYE
522	EL DORADO SOUTH MINE	BELMONT	-116.86	38.58	NYE
523	SMOKY VALLEY MINE	BIRCH CREEK	-117.01	39.37	LANDER
524	BLACK HORSE GROUP MINE	BLACK HORSE	-114.32	39.15	WHITE PINE
525	TILFORD	BLACK HORSE	-114.25	39.20	WHITE PINE
526	QUEEN MINE	BUENA VISTA	-118.32	37.89	ESMERALDA
527	GREY EAGLE MINE	BULL1ON	-116.75	40.38	LANDER
528	PHOENIX	BULLION	-116.69	40.31	LANDER
529	POTOSI MINE	CANDELARIA	-118.11	38.15	MINERAL
530	KING MIDAS MINE	CENTRAL	-118.18	40.89	HUMBOLDT
531	GRAHAM	CHARLESTON	-115.50	41.70	ELKO
532	RESCUE MINE	CHARLESTON	-115.51	41.71	ELKO
533	MARY ANNE	CHERRY CREEK	-114.91	39.91	WHITE PINE
534	TEACUP (BISCUIT) MINE	CHERRY CREEK	-114.92	39.93	WHITE PINE
535	COMET MINE	COMET	-114.61	37.89	LINCOLN
536	ANTELOPE MINE	CONTACT	-114.77	41.78	ELKO
537	CAMP BIRD PROSPECT	CONTACT	-114.73	41.72	ELKO
538	EFFIE FAY GROUP	CONTACT	-114.79	41.77	ELKO
539	FLORENCE GROUP	CONTACT	-114.82	41.76	ELKO
540	PALO ALTO MINE	CONTACT	-114.78	41.78	ELKO

541	SUMMIT VIEW	CORRAL CREEK	-115.55	40.29	ELKO
542	UNKNOWN	CORRAL CREEK	-115.55	40.29	ELKO
543	BERLIN	CORTEZ	-116.57	40.19	EUREKA
544	BULLION HILL GROUP	CORTEZ	-116.57	40.18	EUREKA
545	EMMA E CLAIM	CORTEZ	-116.57	40.20	EUREKA
546	EMPIRE STATE	CORTEZ	-116.57	40.18	EUREKA
547	DOUBLE STANDARD MINE	CRESCENT	-115.19	35.56	CLARK
548	BIDWELL	DELAWARE	-119.63	39.14	LYON
549	BUNKER HILL MINE	DELAWARE	-119.67	39.12	CARSON CITY
550	JUNE ELLEN	DELAWARE	-119.61	39.11	LYON
551	BADGER CLAIMS	DESERT	-118.89	39.80	CHURCHILL
552	DESERT QUEEN MINE	DESERT	-118.89	39.80	CHURCHILL
553	FALLON EAGLE MINE	DESERT	-118.89	39.81	CHURCHILL
554	CHAMPION MINE	DIAMOND	-115.85	39.74	EUREKA
555	PHILLIPSBURG MINE	DIAMOND	-115.86	39.74	EUREKA
556	SILVER BELL CLAIMS	DIAMOND	-115.85	39.74	EUREKA
557	WILCOX AND FRAZER CLAIMS	DIAMOND	-115.87	39.74	EUREKA
558	DOLLY MINE	DOLLY VARDEN	-114.47	40.31	ELKO
559	DON DALE MINE	DON DALE	-115.77	37.55	LINCOLN
560	SILVER HILL MINE	DUTCH FLAT	-117.49	41.10	HUMBOLDT
561	UNNAMED PROSPECT	DYER	-118.02	37.76	ESMERALDA
562	ANTELOPE	EAGLE	-114.28	39.76	WHITE PINE
563	REES	EAGLE	-114.28	39.75	WHITE PINE
564	BULL RUN	EDGEMONT	-116.16	41.66	ELKO
565	LUCKY GIRL	EDGEMONT	-116.17	41.67	ELKO
566	ESTA BUENA MINE	ELLSWORTH	-117.76	38.97	NYE
567	MIDDAY PROSPECTS	FAIRVIEW	-118.19	39.11	CHURCHILL
568	UNNAMED PROSPECT	FIREBALL RIDGE AREA	-119.10	39.90	CHURCHILL
569	COMMONWEALTH	GALENA	-119.79	39.35	WASHOE
570	VETA GRANDE	GARDNERVILLE	-119.62	38.84	DOUGLAS
571	MABEL MINE	GARFIELD	-118.32	38.46	MINERAL
572	KRAMER-SILVER KING MINE	GOLCONDA	-117.32	40.94	HUMBOLDT
573	SILVER COIN GROUP	GOLCONDA	-117.32	40.93	HUMBOLDT
574	LAVINA MINE	GOODSPRINGS	-115.48	35.84	CLARK
575	LUCKY BOY MINE	HAWTHORNE	-118.68	38.46	MINERAL
576	MOUNTAIN LION MINE	HIGHLAND	-114.61	37.94	LINCOLN
577	SAMPLE SITE 1393	HIGHLAND	-114.59	37.97	LINCOLN
578	KATTENHORN MINE	HILLTOP	-116.83	40.42	LANDER
579	PITTSBURG MINE	HILLTOP	-116.84	40.42	LANDER
580	BIMETAL GROUP	HOLY CROSS	-118.58	39.14	CHURCHILL
581	ORLEANS MINE	HORNSILVER	-117.36	37.35	ESMERALDA
582	STAR MINE	IMLAY	-118.23	40.53	PERSHING
583	LAND ROVER PROSPECT	IRON HAT	-117.40	40.59	PERSHING
584	DIAMOND JIM	ISLAND MTN.	-115.65	41.75	ELKO
585	CREORE MINE	IXL	-118.21	39.63	CHURCHILL
586	JEFFERSON MINE	JEFFERSON CANYON	-117.02	38.73	NYE
587	PRUSSIAN MINE	JEFFERSON CANYON	-116.98	38.71	NYE
588	PRUSSIAN NORTH MINE	JEFFERSON CANYON	-116.98	38.72	NYE
589	PRUSSIAN SOUTH MINE	JEFFERSON CANYON	-116.98	38.71	NYE
590	GOLD ORE CLAIMS	JESSUP	-118.93	39.93	CHURCHILL
591	BROAD CREEK PROSPECT	JETT	-117.21	38.79	NYE
592	UNNAMED PROSP. OF JETT CANYON	JETT	-117.23	38.73	NYE
593	VALLEY GROUP	JETT	-117.24	38.73	NYE
594	GOLD NOTE GROUP	KENNEDY	-117.76	40.27	PERSHING
595	IMPERIAL GROUP	KENNEDY	-117.74	40.28	PERSHING
596	KLONDIKE MINE	KINGSTON	-117.13	39.23	LANDER
597	VICTORINE GOLD MINE	KINGSTON	-117.13	39.23	LANDER
598	DOTY	KINSLEY	-114.44	40.11	WHITE PINE
599	UNNAMED SILVER #2	LAFAYETTE	-114.78	40.95	ELKO
600	KNOB HILL MINE	LEE (RUBY RANGE)	-115.46	40.53	ELKO
601	BETTY O'NEAL MINE	LEWIS	-116.89	40.46	LANDER
602	EAGLE-MONITOR CLAIMS	LEWIS	-116.87	40.44	LANDER
603	ARCH CANYON PROSPECTS	LEXINGTON	-114.19	38.84	WHITE PINE
604	MONACO CLAIMS	LIDA	-117.47	37.45	ESMERALDA
605	ZEBRA SILVER CLAIMS	LONE MOUNTAIN	-117.43	37.97	ESMERALDA
606	JIM CLAIMS	LORAY	-114.30	41.10	ELKO
607	GOLDEN RAY CLAIMS	LOREY	-114.29	41.10	ELKO
608	RIP VAN WINKLE	MERRIMAC	-116.00	41.12	ELKO
609	KEYSTONE MINE	MILL CITY	-118.12	40.84	PERSHING
610	WIST WORKINGS	MOREY	-116.28	38.67	NYE
611	ST LAWRENCE MINE	MOUNT WASHINGTON	-114.31	38.90	WHITE PINE
612	PROTECTION GROUP MINE	MOUNTAIN CITY	-115.97	41.85	ELKO
613	LA PLATA SITE	MOUNTAIN WELLS	-118.31	39.45	CHURCHILL
614	SILVER REEF CLAIM	MUD SPRINGS	-115.16	40.30	ELKO
615	DEAD HORSE	MUD SPRINGS	-115.18	40.28	ELKO
616	MUTTLEBURY MINE	MUTTLEBURY	-118.36	40.15	PERSHING
617	BAY STATE MINE	NEWARK (STRAWBERRY)	-115.80	39.53	WHITE PINE
618	BLACK WARRIOR PEAK	NIGHTINGALE	-119.25	39.91	WASHOE
619	HILL TOP CLAIM	NORTHUMBERLAND	-116.99	38.93	NYE
620	ORA LOVELL	PAHRANAGAT	-115.38	37.67	LINCOLN
621	SILVER LODE	PATTERSON	-114.72	38.60	LINCOLN
622	UNNAMED AG	PATTERSON	-114.73	38.60	LINCOLN
623	WESTERN STAR	PILOT PEAK	-114.09	40.98	ELKO
624	ALPS MINE	PIOCHE	-114.43	37.92	LINCOLN
625	BLUE QUEEN CLAIMS	PIOCHE	-114.41	37.88	LINCOLN
626	BOSTON-PIOCHE MINE	PIOCHE	-114.45	37.92	LINCOLN
627	GELDER MINE	PIOCHE	-114.48	37.94	LINCOLN
628	HALF MOON MINE	PIOCHE	-114.48	37.93	LINCOLN
629	NBMG SAMPLE SITE 1417	PIOCHE	-114.44	37.92	LINCOLN
630	SALT LAKE-PIOCHE MINE	PIOCHE	-114.44	37.93	LINCOLN
631	TREASURE HILL MINES (NORTH END)	PIOCHE	-114.45	37.92	LINCOLN
632	VOLCANO MINE	PIOCHE	-114.43	37.92	LINCOLN
633	WIDE AWAKE MINE	PIOCHE	-114.43	37.92	LINCOLN
634	YUBA MINE	PIOCHE	-114.45	37.92	LINCOLN
635	KEYSTONE	PROCTOR	-114.30	40.89	ELKO
636	A.J.C. NO. 5 CLAIM	RAVENSWOOD	-117.27	39.77	LANDER
637	PINE CLAIM	RAVENSWOOD	-117.26	39.78	LANDER
638	QUEEN PROSPECT	RAVENSWOOD	-117.27	39.78	LANDER
639	RED BIRD PROSPECT	RAVENSWOOD	-117.28	39.76	LANDER
640	LIBERTY LOAN CLAIM	REBEL CREEK	-117.73	41.55	HUMBOLDT
641	WINTERS MINE	RED CANYON	-119.48	38.87	DOUGLAS
642	AMADOR MINE	REESE RIVER	-117.07	39.58	LANDER
643	AUSTIN DAKOTA MINE	REESE RIVER	-117.08	39.49	LANDER
644	AUSTIN HANDPAN MINE	REESE RIVER	-117.06	39.49	LANDER
645	AUSTIN MANHATTAN MINE	REESE RIVER	-117.06	39.49	LANDER
646	AUSTIN MINING MINE	REESE RIVER	-117.06	39.50	LANDER
647	AUSTIN NEVADA MINE	REESE RIVER	-117.07	39.49	LANDER
648	AUSTIN SILVER MINE	REESE RIVER	-117.07	39.50	LANDER
649	BAKER MINE	REESE RIVER	-117.08	39.48	LANDER
650	BUEL NORTH STAR MINE	REESE RIVER	-117.06	39.50	LANDER

651	CAMARGO MINE	REESE RIVER	-117.08	39.48	LANDER
652	CAMBRIAN AND NEW YORK MINE	REESE RIVER	-117.05	39.54	LANDER
653	CHASE MINE	REESE RIVER	-117.05	39.54	LANDER
654	COLUMBIA MINE	REESE RIVER	-117.06	39.55	LANDER
655	CONFIDENCE MINE	REESE RIVER	-117.05	39.54	LANDER
656	DIANA GOLD AND SILVER MINE	REESE RIVER	-117.06	39.50	LANDER
657	DOLLARHIDE HEDGE MINE	REESE RIVER	-117.06	39.49	LANDER
658	ECLIPSE MINE	REESE RIVER	-117.07	39.48	LANDER
659	FLORIDA MINE	REESE RIVER	-117.05	39.49	LANDER
660	FORTUNA MINE	REESE RIVER	-117.07	39.53	LANDER
661	GREAT EASTERN MINE	REESE RIVER	-117.06	39.49	LANDER
662	ISABELLA MINE	REESE RIVER	-117.06	39.49	LANDER
663	JACKPOT MINE	REESE RIVER	-117.08	39.49	LANDER
664	JACKSCREW MINE	REESE RIVER	-117.06	39.49	LANDER
665	JACOBS MINE	REESE RIVER	-117.06	39.49	LANDER
666	JO LANE LEDGE MINE	REESE RIVER	-117.06	39.49	LANDER
667	KLING AND KELLY MINE	REESE RIVER	-117.07	39.54	LANDER
668	LANDER CITY MINE	REESE RIVER	-117.06	39.49	LANDER
669	LAURENT DEPOSIT	REESE RIVER	-117.09	39.47	LANDER
670	MAGGIE MINE	REESE RIVER	-117.05	39.54	LANDER
671	MAGNOLIA MINE	REESE RIVER	-117.06	39.49	LANDER
672	MANHATITAN MINE	REESE RIVER	-117.07	39.48	LANDER
673	MARICOPA MINE	REESE RIVER	-117.04	39.54	LANDER
674	MIDAS MINE	REESE RIVER	-117.06	39.52	LANDER
675	MOHAWK MINE	REESE RIVER	-117.06	39.50	LANDER
676	MORGAN AND MUNSEY MINE	REESE RIVER	-117.08	39.49	LANDER
677	MORRIS AND CAPLE MINE	REESE RIVER	-117.05	39.54	LANDER
678	MORSE LEDGE MINE	REESE RIVER	-117.06	39.50	LANDER
679	MOSS MINE	REESE RIVER	-117.07	39.50	LANDER
680	NEVADA EQUITY MINE	REESE RIVER	-117.07	39.50	LANDER
681	NEW YORK AND AUSTIN MINE	REESE RIVER	-117.08	39.49	LANDER
682	PATRIOT MINE	REESE RIVER	-117.04	39.54	LANDER
683	PLYMOUTH MINE	REESE RIVER	-117.06	39.49	LANDER
684	PROVIDENTIAL MINE	REESE RIVER	-117.06	39.49	LANDER
685	SAMANTHE MINE	REESE RIVER	-117.06	39.50	LANDER
686	SARATOGA MINE	REESE RIVER	-117.06	39.50	LANDER
687	SAVAGE GOLD AND SILVER MINE	REESE RIVER	-117.06	39.49	LANDER
688	SEYMOUR MINE	REESE RIVER	-117.06	39.50	LANDER
689	SILVER CHAMBER MINE	REESE RIVER	-117.08	39.49	LANDER
690	SILVER WEDGE MINE	REESE RIVER	-117.06	39.49	LANDER
691	SOUTH AMERICAN MINE	REESE RIVER	-117.06	39.50	LANDER
692	SOUTHALL AND OKANE MINE	REESE RIVER	-117.05	39.53	LANDER
693	SOUTHERN LIGHT MINE	REESE RIVER	-117.06	39.49	LANDER
694	TIMOKE CLAIM	REESE RIVER	-117.05	39.50	LANDER
695	TOULUMNE MINE	REESE RIVER	-117.05	39.54	LANDER
6%	TROY GOLD AND SILVER MINE	REESE RIVER	-117.06	39.49	LANDER
697	TRUE BLUE MINE	REESE RIVER	-117.06	39.54	LANDER
698	WARD MINE	REESE RIVER	-117.06	39.49	LANDER
699	WARREN MINE	REESE RIVER	-117.06	39.49	LANDER
700	WASHINGTON MINE	REESE RIVER	-117.06	39.49	LANDER
701	WHITLACH MINE	REESE RIVER	-117.07	39.48	LANDER
702	WHITLACH YANKEE BLADE MINES	REESE RIVER	-117.04	39.53	LANDER
703	WILDER MINE	REESE RIVER	-117.07	39.49	LANDER
704	YANKEE BLADE CLAIMS	REESE RIVER	-117.05	39.55	LANDER
705	KING CLAIMS	REGENT	-118.15	39.02	MINERAL
706	ORIZABA MINE	REPUBLIC	-117.62	38.51	NYE
707	BUCK AND CHARLEY MINE	ROCHESTER	-118.20	40.28	PERSHING
708	RYE PATCH GROUP	RYE PATCH	-118.23	40.43	PERSHING
709	ZENOLI	SAFFORD	-116.26	40.57	EUREKA
710	GOOD HOPE PROSPECT	SAND SPRINGS	-118.37	39.28	CHURCHILL
711	SANTA FE AG-PB MINE	SANTA FE	-118.17	38.59	MINERAL
712	SILVER CHIEF MINES	SANTA FE	-118.22	38.63	MINERAL
713	NORTH STAR CLAIMS GROUP	SCOSSA	-118.59	40.73	PERSHING
714	BIG CASINO MINE	SEARCHLIGHT	-114.86	35.46	CLARK
715	DUPLEX MINE	SEARCHLIGHT	-114.92	35.46	CLARK
716	QUARTETTE MINE	SEARCHLIGHT	-114.92	35.45	CLARK
717 —	MARY CLOUGH MINE	SHON	-117.68	41.37	HUMBOLDT
718	AUBURN MINE	SIERRA	-117.87	40.77	PERSHING
719	AULD LANG SYNE MINE	SIERRA	-117.89	40.74	PERSHING
720	WHITE BEAR MINES	SIERRA	-117.89	40.75	PERSHING
721	SILVER KING	SILVER KING (SUNNYSI	-114.88	38.29	LINCOLN
722	ENDOWMENT MINE	SILVER STAR	-118.36	38.29	MINERAL
723	SILVER DYKE MINE	SILVER STAR	-118.20	38.32	MINERAL
724	G U B CLAIMS	SPRING CITY	-117.46	41.59	HUMBOLDT
725	BONANZA KING MINE	SPRING VALLEY	-118.10	40.33	PERSHING
726	DE SOTO SILVER MINE	STAR	-118.15	40.53	PERSHING
727	PFLUM MINE	STAR	-118.14	40.54	PERSHING
728	SHEBA MINE	STAR	-118.15	40.55	PERSHING
729	SILVER REEF MINE	STAR	-118.15	40.54	PERSHING
730	ANTELOPE	STATELINE PEAK	-120.00	39.73	WASHOE
731	JOHNSON CLAIMS	TEM PIUTE	-115.64	37.61	LINCOLN
732	TEM PIUTE SILVER MINE	TEM PIUTE	-115.64	37.61	LINCOLN
733	BARRETT SPRINGS MINE	TEN MILE	-117.88	41.02	HUMBOLDT
734	GOLD CROWN CLAIMS	TEN MILE	-117.94	41.02	HUMBOLDT
735	PANSY LEE MINE	TEN MILE	-117.87	41.02	HUMBOLDT
736	OHIO MINES CORP. TOKOP GROUP	TOKOP	-117.26	37.30	ESMERALDA
737	IRWIN MINE	TROY	-115.55	38.38	NYE
738	MAYOLLI CLAIM	TROY	-115.55	38.39	NYE
739	TROY AND GRAY EAGLE MINE	TROY	-115.52	38.32	NYE
740	VANDERHOEF CLAIMS	TROY	-115.53	38.37	NYE
741	BIG WEDGE CLAIMS	TULE CANYON	-117.55	37.32	ESMERALDA
742	BUCKEYE MINE	TWIN RIVER	-117.26	38.99	NYE
743	MURPHY MINE	TWIN RIVER	-117.28	38.94	NYE
744	TEICHART MINE	TWIN RIVER	-117.30	38.89	NYE
745	CUNNINGHAM PROSPECT	TYBO	-116.42	38.37	NYE
746	DIMICK MINE	TYBO	-116.41	38.37	NYE
747	BERLIN MINE	UNION	-117.61	38.88	NYE
748	RICHMOND MINE	UNION	-117.58	38.87	NYE
749	ARIZONA MINE	UNIONVILLE	-118.15	40.44	PERSHING
750	UNNAMED PROSPECT	UNNAMED	-119.25	39.25	LYON
751	COMSTOCK EUREKA	UNNAMED (PYRAMID)	-119.84	39.79	WASHOE
752	FREDS MOUNTAIN PROSPECT	UNNAMED (PYRAMID)	-119.85	39.8	WASHOE
753	UNNAMED COPPER	UNNAMED (PYRAMID)	-119.72	39.70	WASHOE
754	COLUMBIA MINE	VARYVILLE	-118.80	41.52	HUMBOLDT
755	CHEROKEE MINE	VIOLA	-114.38	37.27	LINCOLN
756	NBMG SAMPLE SITE 1738	VIOLA	-114.37	37.26	LINCOLN
757	ASHDOWN MINE	WARM SPRINGS	-118.69	41.83	HUMBOLDT
758	NBMG SAMPLE SITE 2955	WARM SPRINGS	-118.59	41.90	HUMBOLDT
759	VICKSBURG MINE	WARM SPRINGS	-118.70	41.83	HUMBOLDT
760	BI-METALLIC GROUP	WASHINGTON	-117.23	39.10	NYE

761	WEST WILLYS GROUP	WASHINGTON	-118.98	38.51	LYON
762	GREEN MINE	WILD HORSE	-118.36	40.04	PERSHING
763	RUSTLER CLAIM	WILLOW CREEK	-115.70	38.22	NYE
764	UNNAMED PROSPECT	WILLOW CREEK	-115.70	38.21	NYE
765	ROCKLAND MINE	WILSON	-119.09	38.65	LYON

Low-sulfide gold-quartz vein deposits — model number 36A

Map no.	Mine name	District	Long. dd	Lat. dd	County
766	ALABAMA MINE	AWAKENING	-117.96	41.29	HUMBOLDT
767	PAMLICO MINES	HAWTHORNE	-118.47	38.46	MINERAL
768	RED TOP MINE	HILLTOP	-116.81	40.42	LANDER
769	CASSIDY MINE	TREGO MINING AREA	-119.23	40.83	PERSHING
770	COWDEN MINE	WARM SPRINGS	-118.67	41.98	HUMBOLDT

Gold on flat faults deposits — model number 37B

Map no.	Mine name	District	Long. dd	Lat. dd	County
771	WALL STREET MINE	ELDORADO	-114.84	35.71	CLARK
772	JETCO CLAIMS	NEW BERRY	-114.74	35.29	CLARK
773	CAMP DUPONT GROUP	NEWBERRY	-114.75	35.56	CLARK
774	HOMESTAKE GROUP	NEWBERRY	-114.60	35.20	CLARK

Precambrian W and Be deposits — model number ---

Map no.	Mine name	District	Long. dd	Lat. dd	County
775	TAGLO	BUNKERVILLE	-114.06	36.65	CLARK
776	MACBRUSON CLAIMS	GOURD SPRINGS	-114.29	36.96	LINCOLN

Platinum deposits — model number ---

Map no.	Mine name	District	Long. dd	Lat. dd	County
777	KEY WEST	BUNKERVILLE	-114.15	36.62	CLARK

Quartzite-hosted gold deposits — model number ---

Map no.	Mine name	District	Long. dd	Lat. dd	County
778	JOHNNIE MINE	JOHNNIE	-116.05	36.46	NYE
779	GOLD EXCHANGE GROUP	OSCEOLA	-114.40	39.08	WHITE PINE

Gold veins related to two-mica granite deposits — model number ---

Map no.	Mine name	District	Long. dd	Lat. dd	County
780	WEEPAH MINE	LONE MOUNTAIN	-117.56	37.93	ESMERALDA
781	GOLDEN EAGLE MINE	SILVER PEAK	-117.71	37.78	ESMERALDA
782	MARY MINE	SILVER PEAK	-117.70	37.80	ESMERALDA
783	POCATELLO MINE	SILVER PEAK	-117.67	37.76	ESMERALDA

Lead-zinc deposits — model number ---

Map no.	Mine name	District	Long. dd	Lat. dd	County
784	ADA AND EDITH CLAIMS	CHARLESTON	-115.66	36.34	CLARK
785	CASTLE ROCK CU PROSPECT	GASS PEAK	-115.24	36.41	CLARK
786	JUNE BUG MINE	GASS PEAK	-115.17	36.37	CLARK
787	SAMPSON CLAIMS	GASS PEAK	-115.10	36.37	CLARK
788	JOE MAY PROSPECT	JOE MAY CANYON	-115.3	36.53	CLARK
789	LAKE MINE	L. PAHRANAGAT LAKE	-115.07	37.15	LINCOLN
790	QUARTZITE MTN. PROSPECT	QUARTZITE MTN.	-115.1	36.49	CLARK
791	WAMP SPRING SHAFT	WAMP SPRING	-115.07	36.65	CLARK

Table 10-2. Mineral deposits and occurrences in Nevada that are formed by epithermal processes, marine volcanic processes, or late diagenesis in sedimentary rocks. Included also are sediment-hosted gold deposits and volcanic-hosted magnetite deposits.

Comstock epithermal vein deposits — **model number 25C**

Map no.	Mine name	District	Long. dd	Lat. dd	County
792	WILLIAMS MINE	ALPINE (CLAN ALPINE)	-117.86	39.49	CHURCHILL
793	WINDLASS MINE	ALPINE (CLAN ALPINE)	-117.87	39.50	CHURCHILL
794	ARROWHEAD MINE	ARROWHEAD	-116.17	38.09	NYE
795	ARROWHEAD SYNDICATE MINES, INC.	ARROWHEAD	-116.18	38.08	NYE
796	WARRIOR MINE	ATHENS	-117.83	38.62	NYE
797	SOLO JOKER CLAIM	ATLANTA	-114.36	38.45	LINCOLN
798	AURORA MINE	AURORA	-118.89	38.29	MINERAL
799	JUMBO MINE	AWAKENING	-118.00	41.30	HUMBOLDT
800	OLYMPIC MINE	BELL	-117.89	38.61	MINERAL
801	AJAX MINE	BELLEHELEN	-116.48	38.07	NYE
802	GOLDEN PEN MINE	BOVARD	-118.38	38.78	MINERAL
803	RANDALL PROPERTY	BOVARD	-118.41	38.79	MINERAL
804	NEVADA RAND	BOVARD - RAND	-118.40	38.79	MINERAL
805	BROKEN HILLS MINE	BROKEN HILLS	-118.03	39.05	MINERAL
806	TIP TOP CLAIMS	BUENA VISTA	-118.31	37.93	ESMERALDA
807	MONTGOMERY-SHOSHONE MINE	BULLFROG	-116.81	36.91	NYE
808	NATIONAL BANK MINE	BULLFROG	-116.82	36.90	NYE
809	ORIGINAL BULLFROG MINE	BULLFROG	-116.88	36.90	NYE
810	MINT MINE	BURNER HILLS	-116.65	41.46	ELKO
811	CLIFFORD MINE	CLIFFORD	-116.48	38.14	NYE
812	GOLDEN KING MINE	CLOVERDALE	-117.55	38.64	NYE
813	COMO-EUREKA	COMO	-119.48	39.15	LYON
814	HERCULES	COMO	-119.46	39.23	LYON
815	HULLEY-LOGAN	COMO	-119.50	39.16	LYON
816	PONY MEADOWS CLAIMS	COMO	-119.45	39.19	LYON
817	RAPIDAN	COMO	-119.49	39.17	LYON
818	THE STONE CABIN CLAIMS	COMO	-119.47	39.18	LYON
819	ALPHA CLAIM	COMSTOCK LODE	-119.65	39.29	STOREY
820	ALTA SHAFT	COMSTOCK LODE	-119.65	39.28	STOREY
821	ANDES MINE	COMSTOCK LODE	-119.65	39.31	STOREY
822	BALTIMORE SHAFT	COMSTOCK LODE	-119.67	39.28	STOREY
823	BELCHER CLAIM	COMSTOCK LODE	-119.66	39.29	STOREY
824	BEST & BELCHER MINE	COMSTOCK LODE	-119.64	39.31	STOREY
825	BUCKEYE MINE	COMSTOCK LODE	-119.63	39.27	LYON
826	BULLION MINE	COMSTOCK LODE	-119.65	39.30	STOREY
827	C & C SHAFT	COMSTOCK LODE	-119.64	39.31	STOREY
828	CALEDONIA	COMSTOCK LODE	-119.66	39.28	STOREY
829	CALIFORNIA MINE	COMSTOCK LODE	-119.65	39.31	STOREY
830	CHALLENGE AND CONFIDENCE	COMSTOCK LODE	-119.66	39.29	STOREY
831	CHOLLAR MINE	COMSTOCK LODE	-119.65	39.30	STOREY
832	CONSOLIDATED VIRGINIA MINE	COMSTOCK LODE	-119.65	39.31	STOREY
833	CROWN POINT MINE	COMSTOCK LODE	-119.67	39.30	STOREY
834	DAYTON MINE	COMSTOCK LODE	-119.64	39.26	LYON
835	DONOUAN PROPERTY	COMSTOCK LODE	-119.65	39.27	STOREY
836	DRYSDALE MINE	COMSTOCK LODE	-119.65	39.27	STOREY
837	EXCHEQUER CLAIM	COMSTOCK LODE	-119.66	39.30	STOREY
838	FLOWERY MINE	COMSTOCK LODE	-119.59	39.32	STOREY
839	GLOBE CONSOLIDATED MINE	COMSTOCK LODE	-119.66	39.28	STOREY
840	HALE & NORCROSS MINE	COMSTOCK LODE	-119.65	39.30	STOREY
841	IMPERIAL MINE	COMSTOCK LODE	-119.65	39.29	STOREY
842	JUSTICE SHAFT	COMSTOCK LODE	-119.66	39.27	STOREY
843	KENTUCK MINE	COMSTOCK LODE	-119.66	39.29	STOREY
844	KEYES MINE	COMSTOCK LODE	-119.62	39.31	STOREY
845	KEYSTONE SHAFT	COMSTOCK LODE	-119.65	39.28	STOREY
846	KNICKERBOCKER MINE	COMSTOCK LODE	-119.66	39.28	STOREY
847	KOSSUTH MINE	COMSTOCK LODE	-119.64	39.25	LYON
848	LADY BRYAN MINE	COMSTOCK LODE	-119.59	39.32	STOREY
849	LADY WASHINGTON MINE.	COMSTOCK LODE	-119.65	39.28	STOREY
850	MONTE CRISTO MINE	COMSTOCK LODE	-119.62	39.31	STOREY
851	NEW YORK MINE	COMSTOCK LODE	-119.65	39.28	STOREY
852	NORTH BONANZA MINE	COMSTOCK LODE	-119.58	39.32	STOREY
853	OCCIDENTAL MINE	COMSTOCK LODE	-119.63	39.20	STOREY
854	OEST MINE	COMSTOCK LODE	-119.65	39.26	LYON
855	OPHIR CLAIM	COMSTOCK LODE	-119.65	39.31	STOREY
856	OVERLAND MINE	COMSTOCK LODE	-119.64	39.28	STOREY
857	OVERMAN 2 MINE	COMSTOCK LODE	-119.66	39.28	STOREY
858	OVERMAN CLAIM	COMSTOCK LODE	-119.65	39.29	STOREY
859	PET CLAIM	COMSTOCK LODE	-119.60	39.32	STOREY
860	POTOSI MINE	COMSTOCK LODE	-119.65	39.30	STOREY
861	SAVAGE MINE	COMSTOCK LODE	-119.65	39.31	STOREY
862	SCORPIAN SHAFT	COMSTOCK LODE	-119.63	39.32	STOREY
863	SIERRA NEVADA MINE	COMSTOCK LODE	-119.64	39.32	STOREY
864	SILVER HILL MINE	COMSTOCK LODE	-119.65	39.27	LYON
865	SOUTH COMSTOCK MINE	COMSTOCK LODE	-119.64	39.26	LYON
866	SUCCOR MINE	COMSTOCK LODE	-119.64	39.27	STOREY
867	UNION MINE	COMSTOCK LODE	-119.64	39.32	STOREY
868	UTAH SHAFT	COMSTOCK LODE	-119.64	39.33	STOREY
869	VOLCANO MINE	COMSTOCK LODE	-119.65	39.26	LYON
870	WOODVILLE SHAFT	COMSTOCK LODE	-119.65	39.27	STOREY
871	YELLOW JACKET MINE	COMSTOCK LODE	-119.66	39.29	STOREY
872	CORNUCOPIA	CORNUCOPIA	-116.29	41.53	ELKO
873	UNNAMED PROSPECT	COX CANYON	-118.26	39.64	CHURCHILL
874	UNNAMED PROSPECT	COX CANYON	-118.27	39.64	CHURCHILL
875	CULVERWELL MINE	DELAMAR	-114.75	37.48	LINCOLN
876	DELAMAR MINE	DELAMAR	-114.77	37.46	LINCOLN
877	NBMG SAMPLE LOCATION 1741	DELAMAR	-114.79	37.52	LINCOLN
878	GOLD ZONE DIVIDE MINING CO.	DIVIDE	-117.24	37.99	ESMERALDA
879	TONOPAH DIVIDE MINE	DIVIDE	-117.24	38.00	ESMERALDA
880	CHARLEY ROSS MINE	EAGLE VALLEY	-114.06	37.91	LINCOLN
881	CONFIDENCE MINE	EAGLE VALLEY	-114.05	38.12	LINCOLN
882	FORTUNA AND HELEN CLAIMS	EAGLE VALLEY	-114.09	37.94	LINCOLN
883	HOMESTAKE MINE	EAGLE VALLEY	-114.07	37.92	LINCOLN
884	HORSESHOE MINE	EAGLE VALLEY	-114.07	37.91	LINCOLN
885	IRIS	EAGLE VALLEY	-114.07	37.92	LINCOLN
886	KENO CLAIMS	EAGLE VALLEY	-114.08	37.92	LINCOLN
887	POPE MINE	EAGLE VALLEY	-114.06	37.91	LINCOLN
888	REDLITE CLAIMS	EAGLE VALLEY	-114.05	37.91	LINCOLN
889	SNOWFLAKE MINE	EAGLE VALLEY	-114.06	37.90	LINCOLN

890	UTAH SPUR MINE	EAGLE VALLEY	-114.05	38.01	LINCOLN
891	BUFFALO HUMP MINE	EASTGATE	-117.81	39.16	CHURCHILL
892	GOLD LEDGE MINE	EASTGATE	-117.88	39.26	CHURCHILL
893	GOLDEN CROWN GROUP	EDEN	-116.41	37.96	NYE
894	ELLENDALE MINE	ELLENDALE	-116.83	38.13	NYE
895	KEY FLOWER MINE	ELLSWORTH	-117.79	38.91	NYE
8%	OKEY DAVIS MINE	FAIRPLAY	-117.88	38.76	NYE
897	BELL MOUNTAIN MINE	FAIRVIEW	-118.13	39.18	CHURCHILL
898	BIG LEDGE MINE	FAIRVIEW	-118.18	39.20	CHURCHILL
899	BIG LEDGE MINE	FAIRVIEW	-118.18	39.20	CHURCHILL
900	BLUFF MINE	FAIRVIEW	-118.20	39.17	CHURCHILL
901	BUFF CLAIMS	FAIRVIEW	-118.20	39.17	CHURCHILL
902	CENTURION PROSPECT	FAIRVIEW	-118.17	39.28	CHURCHILL
903	CYCLONE GROUP	FAIRVIEW	-118.18	39.25	CHURCHILL
904	DROMEDARY HUMP MINE	FAIRVIEW	-118.17	39.25	CHURCHILL
905	FAIRVIEW EAGLE	FAIRVIEW	-118.17	39.24	CHURCHILL
906	FRED BRANCH PROPERTY	FAIRVIEW	-118.19	39.21	CHURCHILL
907	GOLD COIN #2 MINE	FAIRVIEW	-118.19	39.18	CHURCHILL
908	GRAND CENTRAL MINE	FAIRVIEW	-118.19	39.21	CHURCHILL
909	HAILSTONE GROUP	FAIRVIEW	-118.17	39.25	CHURCHILL
910	JELINEK MINE	FAIRVIEW	-118.18	39.20	CHURCHILL
911	MIZPAH MINE	FAIRVIEW	-118.18	39.20	CHURCHILL
912	NEVADA CROWN MINE	FAIRVIEW	-118.19	39.16	CHURCHILL
913	NEVADA CROWN SHAFTS	FAIRVIEW	-118.18	39.16	CHURCHILL
914	NEVADA FAIRVIEW MINE	FAIRVIEW	-118.20	39.18	CHURCHILL
915	NEVADA HILLS FLORENCE MINE	FAIRVIEW	-118.18	39.24	CHURCHILL
916	NEVADA HILLS MINE	FAIRVIEW	-118.17	39.24	CHURCHILL
917	OHIO GROUP	FAIRVIEW	-118.18	39.24	CHURCHILL
918	REX CLAIM #6	FAIRVIEW	-118.20	39.16	CHURCHILL
919	TJP TOP MINE	FISH LAKE VALLEY	-118.30	37.93	ESMERALDA
920	MAMMOTH PROSPECT	GILBERT	-117.70	38.19	ESMERALDA
921	RED CLOUD CLAIMS	GILBERT	-117.69	38.19	ESMERALDA
922	GOLD BASIN GOLD MINING CO.	GOLD BASIN	-117.72	39.26	LANDER
923	GOLD BASIN MINE	GOLD BASIN	-118.13	39.21	CHURCHILL
924	GOLD BUG MINE	GOLD BASIN	-118.12	39.20	CHURCHILL
925	BANNER	GOLD CIRCLE	-116.79	41.25	ELKO
926	EASTERN STAR MINE	GOLD CIRCLE	-116.72	41.26	ELKO
927	ELKO PRINCE	GOLD CIRCLE	-116.78	41.26	ELKO
928	REX MINE	GOLD CIRCLE	-116.78	41.24	ELKO
929	ST. PAUL	GOLD CIRCLE	-116.78	41.24	ELKO
930	WATER WITCH MINE	GOLD CIRCLE	-116.80	41.25	ELKO
931	JEEP GROUP	GOLDEN ARROW	-116.58	37.%	NYE
932	BUCKEYE AND OHIO	GOOD HOPE	-116.49	41.45	ELKO
933	GOOD HOPE	GOOD HOPE	-116.48	41.47	ELKO
934	SAM JACK GROUP	HANNAPAH	-116.97	38.20	NYE
935	BLACK BUTTE MINE	HOLY CROSS	-118.71	39.09	CHURCHILL
936	PYRAMID MINE	HOLY CROSS	-118.72	39.09	CHURCHILL
937	CRIPPLE QUEEN MINE	HOLY CROSS	-118.69	39.08	CHURCHILL
938	LAST HOPE MINE	HOLY CROSS	-118.71	39.07	CHURCHILL
939	SCOTIA MINE	HOLY CROSS	-118.70	39.09	CHURCHILL
940	TERRELL MINE	HOLY CROSS	-118.71	39.07	CHURCHILL
941	WATER SHAFT MINE	HOLY CROSS	-118.70	39.09	CHURCHILL
942	WINGFIELD MINE	HOLY CROSS	-118.71	39.07	CHURCHILL
943	PICK AND SHOVEL MINE	JARBIDGE	-115.41	41.84	ELKO
944	AJAX PROSPECT	JARBIDGE	-115.40	41.84	ELKO
945	ALPHA MINE	JARBIDGE	-115.41	41.86	ELKO
946	ALTITUDE MINE	JARBIDGE	-115.38	41.84	ELKO
947	BEN HUR PROSPECT	JARBIDGE	-115.40	41.85	ELKO
948	BLUSTER MINE	JARBIDGE	-115.41	41.84	ELKO
949	BOURNE MINE	JARBIDGE	-115.42	41.87	ELKO
950	BULLION PROSPECT	JARBIDGE	-115.38	41.86	ELKO
951	BUSTER G.M. CO.	JARBIDGE	-115.42	41.86	ELKO
952	COEUR D'ALENE-JARBIDGE G.M.CO.	JARBIDGE	-115.38	41.85	ELKO
953	FLAXIE MINE	JARBIDGE	-115.40	41.87	ELKO
954	LONG HIKE	JARBIDGE	-115.42	41.87	ELKO
955	NEW HOPE GROUP	JARBIDGE	-115.40	41.85	ELKO
956	NEW STAR GROUP	JARBIDGE	-115.40	41.86	ELKO
957	OZARK GROUP	JARBIDGE	-115.39	41.79	ELKO
958	PAN CLAIM	JARBIDGE	-115.42	41.85	ELKO
959	PAVLAK MINE JARBIDGE	JARBIDGE	-115.43	41.85	ELKO
960	RED DIKE PROSPECT	JARBIDGE	-115.37	41.88	ELKO
961	RIDDLE LEASE	JARBIDGE	-115.43	41.86	ELKO
962	STARLIGHT GROUP	JARBIDGE	-115.41	41.87	ELKO
963	UNNAMED PROSPECTS #5	JEFFERSON CANYON	-116.98	38.71	NYE
964	GOLD KING AND VALLEY KING CLAIMS	JESSUP	-118.88	39.95	CHURCHILL
%5	MAHONEY MINE	JUMBO (WEST COMSTOCK)	-119.71	39.29	WASHOE
966	PANDORA	JUMBO (WEST COMSTOCK)	-119.72	39.29	WASHOE
967	SILVER KING CLAIMS	KLONDYKE	-117.19	37.91	ESMERALDA
968	LEADVILLE MINE	LEADVILLE	-119.40	41.10	WASHOE
969	ASPEN GROUP	LODI	-117.78	39.10	LANDER
970	LONGSTREET MINE	LONG STREET	-116.71	38.38	NYE
971	AMALGAMATED MINE	MANHATTAN	-117.06	38.53	NYE
972	APRIL FOOL MINE	MANHATTAN	-117.07	38.54	NYE
973	BALD MOUNTAIN PROSPECT	MANHATTAN	-117.05	38.58	NYE
974	BIG FOUR MINE	MANHA'ITAN	-117.08	38.54	NYE
975	BIG PINE MINE	MANHATTAN	-117.08	38.54	NYE
976	KEYSTONE MINE	MANHATTAN	-117.06	38.51	NYE
977	MANHA'ITAN CONSOLIDATED MINE	MANHAITAN	-117.06	38.53	NYE
978	MANHATTAN MINE	MANHA'ITAN	-117.08	38.54	NYE
979	MUSTANG MINE	MANHATTAN	-117.08	38.54	NYE
980	UNION NO. 9 MINE	MANHATTAN	-117.08	38.53	NYE
981	WHITE CAPS MINE	MANHATTAN	-117.05	38.53	NYE
982	NBMG SAMPLE SITE 3935	MOUNTAIN WELLS	-118.28	39.47	CHURCHILL
983	NBMG SAMPLE SITE 3941	MOUNTAIN WELLS	-118.25	39.43	CHURCHILL
984	AUTO HILL PROSPECTS	NATIONAL	-117.59	41.84	HUMBOLDT
985	BLUM SHAFT	NATIONAL	-117.59	41.84	HUMBOLDT
986	CHEFOO TUNNEL	NATIONAL	-117.59	41.83	HUMBOLDT
987	NATIONAL MINE	NATIONAL	-117.57	41.84	HUMBOLDT
988	RADIATOR HILL	NATIONAL	-117.59	41.82	HUMBOLDT
989	BIG MOUTH	OLINGHOUSE	-119.43	39.78	WASHOE
990	BUSTER MINES	OLINGHOUSE	-119.39	39.67	WASHOE
991	GREEN HILL MINES	OLINGHOUSE	-119.42	39.66	WASHOE
992	KEYSTONE NEVADA MINE	OLINGHOUSE	-119.44	39.67	WASHOE
993	SECRET CANYON PROSPECT	OLINGHOUSE	-119.42	39.77	WASHOE
994	TIGER GROUP	OLINGHOUSE	-119.43	39.67	WASHOE
995	MAZY MINE	PEAVINE	-119.85	39.55	WASHOE
996	RENO MAY	PEAVINE	-119.84	39.56	WASHOE
997	PENNSYLVANIA MINE (SOUTH)	PENNSYLVANIA	-114.47	37.42	LINCOLN
998	GOOSEBERRY MINE	RAMSEY	-119.46	39.48	STOREY
999	RAMSEY	RAMSEY	-119.38	39.47	LYON

1000	RAMSEY COMSTOCK MINE	RAMSEY	-119.38	39.47	LYON
1001	S-PROSPECT	RAMSEY	-119.39	39.43	LYON
1002	OHIO MINE	REBEL CREEK	-117.71	41.64	HUMBOLDT
1003	RAWHIDE GROUP	REGENT	-118.42	39.03	MINERAL
1004	SUNNYSIDE CLAIMS	REGENT	-118.31	39.01	MINERAL
1005	COEUR ROCHESTER	ROCHESTER	-118.15	40.28	PERSHING
1006	NEVADA PACKARD MINES	ROCHESTER	-118.18	40.26	PERSHING
1007	APRIL FOOL GROUP	ROCK CREEK	-116.39	41.35	ELKO
1008	DREAMLAND MINE	ROSEBUD	-118.65	40.81	PERSHING
1009	FAIRVIEW MINE	ROUND MOUNTAIN	-117.06	38.71	NYE
1010	GOLD HILL MINE	ROUND MOUNTAIN	-117.05	38.77	NYE
1011	KINNEY PROSPECT	SAND SPRINGS	-118.33	39.27	CHURCHILL
1012	SUMMIT KING-DAN TUCKER MINE	SAND SPRINGS	-118.34	39.27	CHURCHILL
1013	FAIRVIEW GROUP	SEVEN TROUGHS	-118.79	40.45	PERSHING
1014	KINDERGARTEN AND WIHUJA MINES	SEVEN TROUGHS	-118.79	40.47	PERSHING
1015	MAZUMA HILLS MINE	SEVEN TROUGHS	-118.79	40.47	PERSHING
1016	PORTLAND MINE	SEVEN TROUGHS	-118.79	40.43	PERSHING
1017	16 T0 1 MINE	SILVER PEAK	-117.78	37.72	ESMERALDA
1018	MOHAWK MINE	SILVER PEAK	-117.81	37.73	ESMERALDA
1019	NIVLOC MINE	SILVER PEAK	-117.76	37.72	ESMERALDA
1020	SANGER MINE	SILVER PEAK	-117.82	37.74	ESMERALDA
1021	DOUGLAS GROUP	SILVER STAR	-118.20	38.34	MINERAL
1022	SILVER GLANCE GROUP	SILVERBOW	-116.49	37.88	NYE
1023	NBMG SAMPLE SITE 2605	SPRING CITY	-117.46	41.59	HUMBOLDT
1024	NBMG SAMPLE SITE 2609	SPRING CITY	-117.46	41.56	HUMBOLDT
1025	SILVER BUTTE CLAIMS	SPRING CITY	-117.46	41.59	HUMBOLDT
1026	WILD GOOSE VEIN	SPRING CITY	-117.46	41.59	HUMBOLDT
1027	JENNIE MINE	STATELINE/GOLD SPRING	-114.05	37.90	LINCOLN
1028	THOR MINE	STATELINE/GOLD SPRING	-114.05	37.90	LINCOLN
1029	TALAPOOSA MINES	TALAPOOSA	-119.27	39.45	LYON
1030	LAND MARK MINE	TOLICHA	-116.78	37.29	NYE
1031	JIM BUTLER TONOPAH MINING CO.	TONOPAH	-117.23	38.07	NYE
1032	KING TONOPAH MINE	TONOPAH	-117.22	38.09	NYE
1033	MAC NAMARA MINING CO.	TONOPAH	-117.23	38.07	NYE
1034	MIZPAH EXTENSION MINING CO.	TONOPAH	-117.22	38.08	NYE
1035	MONTANA - TONOPAH MINING CO.	TONOPAH	-117.23	38.07	NYE
1036	TONOPAH BELMONT DEVELOPMENT CO.	TONOPAH	-117.22	38.07	NYE
1037	TONOPAH MINING CO.	TONOPAH	-117.23	38.07	NYE
1038	TRINITY SILVER MINE	TRINITY	-118.59	40.41	PERSHING
1039	ARGENTA	TUSCARORA	-116.22	41.32	ELKO
1040	BELLE ISLE	TUSCARORA	-116.23	41.32	ELKO
1041	COMMON WEALTH	TUSCARORA	-116.23	41.32	ELKO
1042	DEFREES	TUSCARORA	-116.22	41.32	ELKO
1043	DEXTER	TUSCARORA	-116.22	41.31	ELKO
1044	EIRA	TUSCARORA	-116.23	41.31	ELKO
1045	GRAND PRIZE	TUSCARORA	-116.22	41.32	ELKO
1046	INDEPENDENCE	TUSCARORA	-116.23	41.32	ELKO
1047	MODOC	TUSCARORA	-116.25	41.30	ELKO
1048	NAVAJO	TUSCARORA	-116.23	41.31	ELKO
1049	NORTH BELLE ISLE	TUSCARORA	-116.23	41.32	ELKO
1050	NORTH COMMONWEALTH	TUSCARORA	-116.23	41.32	ELKO
1051	CRESTON PROSPECT	UNNAMED	-119.05	39.42	CHURCHILL
1052	HORN SILVER MINE	WAHMONIE	-116.17	36.83	NYE
1053	FRANZ HAMMEL MINE	WELLINGTON	-116.79	37.54	NYE
1054	WILLARD GROUP	WILLARD	-118.34	40.25	PERSHING
1055	ADAMSON MINE	WINNEMUCCA	-117.79	41.00	HUMBOLDT
1056	CIRAN PROSPECT	WONDER	-118.06	39.38	CHURCHILL
1057	GEIGER SHAFT	WONDER	-118.08	39.47	CHURCHILL
1058	GOLCONDA-GOLD WEDGE GROUP	WONDER	-118.10	39.48	CHURCHILL
1059	JACK POT MINE	WONDER	-118.06	39.47	CHURCHILL
1060	LANSING PROSPECT	WONDER	-118.06	39.38	CHURCHILL
1061	LAST CHANCE AND TONY PAN CLAIMS	WONDER	-118.10	39.48	CHURCHILL
1062	NBMG SAMPLE SITE 3925	WONDER	-118.08	39.48	CHURCHILL
1063	NBMG SAMPLE SJTES 3890,3926	WONDER	-118.08	39.48	CHURCHILL
1064	NBMG SAMPLE SITES 3927,3928	WONDER	-118.08	39.48	CHURCHILL
1065	NEVADA WONDER MINE	WONDER	-118.05	39.45	CHURCHILL
1066	RUBY-JUNE ROSE GROUP	WONDER	-118.09	39.46	CHURCHILL
1067	SILVER CENTER MINE	WONDER	-118.07	39.46	CHURCHILL
1068	SPIDER AND WASP PROSPECT	WONDER	-118.10	39.48	CHURCHILL
1069	TREASURE HILL CLAIM #1417	WONDER	-118.08	39.50	CHURCHILL
1070	VULTURE MINE	WONDER	-118.05	39.46	CHURCHILL
1071	WOLVERTON PROSPECT	WONDER	-118.06	39.37	CHURCHILL

Sado epithermal vein deposits model number 25D

Map no.	Mine name	District	Long. dd	Lat. dd	County
1072	BRUNER MINE	BRUNER	-117.80	39.08	NYE
1073	DULUTH MINE	BRUNER	-117.78	39.06	NYE

Epithermal quartz-alunite vein deposits model number 25E

Map no.	Mine name	District	Long. dd	Lat. dd	County
1074	QUO VADIS	ALUNITE	-115.00	35.95	CLARK
1075	ATLANTA MINES CO. CLAIMS	GOLDFIELD	-117.21	37.71	ESMERALDA
1076	BLUE BULL MINE	GOLDFIELD	-117.20	37.71	ESMERALDA
1077	COMBINATION MINE	GOLDFIELD	-117.22	37.71	ESMERALDA
1078	C.O.D. CONSOLIDATED MINING CO CLAIM	GOLDFIELD	-117.21	37.71	ESMERALDA
1079	FLORENCE MINE	GOLDFIELD	-117.22	37.71	ESMERALDA
1080	GOLDFIELD DEEP MINES CO.	GOLDFIELD	-117.21	37.71	ESMERALDA
1081	GOLDFIELD-BELMONT MINE	GOLDFIELD	-117.19	37.76	ESMERALDA
1082	GREAT BEND MINE	GOLDFIELD	-117.20	37.75	ESMERALDA
1083	JANUARY MINE	GOLDFIELD	-117.23	37.71	ESMERALDA
1084	JMP CLAIMS	GOLDFIELD	-117.18	37.75	ESMERALDA
1085	JUMBO EXTENSION MINING CO.	GOLDFIELD	-117.22	37.72	ESMERALDA
1086	JUMBO GROUP	GOLDFIELD	-117.22	37.72	ESMERALDA
1087	LAGUNA GROUP	GOLDFIELD	-117.22	37.72	ESMERALDA
1088	LONE STAR GROUP	GOLDFIELD	-117.20	37.72	ESMERALDA
1089	MOHAWK MINE	GOLDFIELD	-117.22	37.72	ESMERALDA
1090	MUSHETT LEASE	GOLDFIELD	-117.22	37.72	ESMERALDA
1091	QUARTZITE AND BLACK BUTITE MINES	GOLDFIELD	-117.18	37.75	ESMERALDA
1092	RED TOP MINE	GOLDFIELD	-117.22	37.72	ESMERALDA
1093	GOLDEN FLEECE	PEAVINE	-119.90	39.59	WASHOE

1094	PAYMASTER	PEAVINE	-119.91	39.59	WASHOE
1095	JONES-KINCAID	PYRAMID	-119.60	39.86	WASHOE
1096	ARKELL MINE	WEDEKIND	-119.75	39.57	WASHOE
1097	DESERT KING MINE	WEDEKIND	-119.75	39.56	WASHOE
1098	WEDEKIND MINE	WEDEKIND	-119.75	39.56	WASHOE

Hot spring gold deposits — model number 25A

Map no.	Mine name	District	Long. dd	Lat. dd	County
1099	ATLANTA MINE	ATLANTA	-114.32	38.47	LINCOLN
1100	MOTHER LODE	BARE MOUNTAIN	-116.65	36.91	NYE
1101	BUCKHORN MINE	BUCKHORN	-116.49	40.18	EUREKA
1102	TONOPAH HASBROUCK MINE	DIVIDE	-117.27	37.99	ESMERALDA
1103	DIXIE COMSTOCK	DIXIE VALLEY	-118.02	39.87	CHURCHILL
1104	PARADISE PEAK GOLD DEPOSIT	FAIRPLAY	-117.97	38.75	NYE
1105	GOLDBANKS MERGER MINES	GOLDBANKS	-117.61	40.46	PERSHING
1106	FLORIDA CANYON MINE	IMLAY	-118.24	40.58	PERSHING
1107	IVANHOWUSX MINE	IVANHOE	-116.56	41.11	ELKO
1108	HOG RANCH	LEADVILLE	-119.45	41.16	WASHOE
1109	BOREALIS MINE	LUCKY BOY	-118.76	38.38	MINERAL
1110	JAIMES RIDGE	LUCKY BOY	-118.80	38.41	MINERAL
1111	BUCKSKIN NATIONAL MINE	NATIONAL	-117.54	41.79	HUMBOLDT
1112	MULE CANYON	NORTH BULLION	-116.67	40.58	LANDER
1113	FIRE CREEK	NORTH BULLION	-116.65	40.47	LANDER
1114	ROUND MOUNTAIN MINING CO.	ROUND MOUNTAIN	-117.08	38.70	NYE
1115	WIND MOUNTAIN	SAN EMIDIO	-119.39	40.43	WASHOE
1116	SANTA FE GOLD MINE	SANTA FE	-118.17	38.55	MINERAL
1117	SLEEPER	SLUMBERING HILLS	-118.05	41.33	HUMBOLDT
1118	LEWIS	SULPHUR	-118.69	40.86	HUMBOLDT

Volcanogenic uranium deposits — model number 25F

Map no.	Mine name	District	Long. dd	Lat. dd	County
1119	HULSE MINE	ATLANTA	-114.33	38.46	LINCOLN
1120	ROUND MEADOW CANYON AREA	BARCELONA	-116.89	38.68	NYE
1121	NEVADA GROUP (NOS. 1 -43)	BOTTLE CREEK	-118.38	41.36	HUMBOLDT
1122	LUCKY DAY CLAIMS	BROKEN HILLS	-118.18	38.91	NYE
1123	BLACK BART EXTENSION CLAIM	BULLFROG	-116.79	36.95	NYE
1124	DEERHEAD PROSPECT	CARLIN	-116.07	40.64	ELKO
1125	COALDALE PROSPECT	COALDALE	-117.87	37.98	ESMERALDA
1126	THOR GROUP	CURRANT	-115.46	38.74	NYE
1127	PEAK CLAIMS	EAGLE VALLEY	-114.06	37.97	LINCOLN
1128	GOLCONDA HOT SPRING	GOLCONDA	-117.49	40.95	HUMBOLDT
1129	PILOT GROUP	HANNAPAH	-116.99	38.22	NYE
1130	DACIE CREEK	JERSEY	-117.35	40.24	LANDER
1131	OLD JAWBONE	JERSEY	-117.43	40.12	LANDER
1132	ASPHALTITE	MAGGIE CREEK	-116.33	40.75	EUREKA
1133	AIR ANOMALY NO. 4	MOORES CREEK	-116.90	38.86	NYE
1134	RACE TRACK MINE .	MOUNTAIN CITY	-115.95	41.83	ELKO
1135	SOUTH FORK CLAIMS (1&2)	MOUNTAIN CITY	-115.85	41.83	ELKO
1136	TAG, PAM, PAT, AND SAM CLAIMS	MOUNTAIN CITY	-115.91	41.82	ELKO
1137	GRANITE POINT CLAIMS	OPALITE	-118.16	41.81	HUMBOLDT
1138	MOONLIGHT MINE	OPALITE	-118.16	41.79	HUMBOLDT
1139	ARMSTRONG CLAIMS	PYRAMID	-119.65	39.91	WASHOE
1140	BING CLAIMS	PYRAMID	-119.63	39.83	WASHOE
1141	GARRETT PROSPECT	PYRAMID	-119.69	39.90	WASHOE
1142	LOST PARDNER MINE	PYRAMID	-119.58	39.84	WASHOE
1143	LOWARY	PYRAMID	-119.68	39.90	WASHOE
1144	RED BLUFF MINE	PYRAMID	-119.69	39.90	WASHOE
1145	UNKNOWN	ROBINSON MOUNTAIN	-116.06	40.43	ELKO
1146	PINE GROUP	ROUND MOUNTAIN	-117.04	38.73	NYE
1147	BUCKHORN MINE	STATELINE PEAK	-120.00	39.84	WASHOE
1148	JEANNE K CLAIM	STATELINE PEAK	-120.00	39.88	WASHOE
1149	LUCKY DAY AND VALLEY VIEW	STATELINE PEAK	-120.00	39.85	WASHOE
1150	YELLOW JACKET CLAIMS	STATELINE PEAK	-119.99	39.89	WASHOE
1151	HOPELESS URANIUM	UNNAMED	-119.74	39.96	WASHOE
1152	DIVIDE CLAIMS	UNNAMED (PYRAMID)	-119.83	39.92	WASHOE
1153	GOGETTER AND PUP CLAIMS	UNNAMED (PYRAMID)	-119.86	39.91	WASHOE
1154	GOLDEN EAGLE, RED EAGLE CLAIMS	UNNAMED (PYRAMID)	-119.83	39.93	WASHOE
1155	LAURA (?)	UNNAMED (PYRAMID)	-119.87	39.92	WASHOE
1156	PETRIFIED TREE GROUP	UNNAMED (PYRAMID)	-119.69	39.70	WASHOE
1157	SUNNYSIDE CLAIMS (NOS 1 & 2)	UNNAMED (PYRAMID)	-119.87	39.94	WASHOE
1158	TICK CANYON GROUP	UNNAMED (PYRAMID)	-119.87	39.90	WASHOE
1159	UNNAMED URANIUM	UNNAMED (PYRAMID)	-119.44	39.85	WASHOE
1160	VIRGIN VALLEY URANIUM CLAIMS	VIRGIN VALLEY	-119.10	41.81	HUMBOLDT

Epithermal manganese deposits — model number 25G

Map no.	Mine name	District	Long. dd	Lat. dd	County
1161	DEMOCRACY MANGANESE MINE	ATLANTA	-114.31	38.40	LINCOLN
1162	GAILLAC PROSPECT	CUPRITE	-117.24	37.63	ESMERALDA
1163	DIXON	DELAWARE	-119.61	39.17	CARSON CITY
1164	GOLCONDA TUNGSTEN MINE	GOLCONDA	-117.43	40.94	HUMBOLDT
1165	BULLION PROSPECT	HOLY CROSS (TERRELL)	-118.71	39.08	CHURCHILL
1166	SAILOR BOY MINE	JEFFERSON CANYON	-116.98	38.72	NYE
1167	TROY MINE	JEFFERSON CANYON	-116.97	38.72	NYE
1168	UNNAMED PROSPECTS #4	JEFFERSON CANYON	-116.97	38.71	NYE
1169	AMERICAN EAGLE AND CEDAR VEIN	MOREY	-116.25	38.67	NYE
1170	BLACK ROCK PROSPECT S	SILVER PEAK	-117.84	37.77	ESMERALDA
1171	BLACK JACK MINE	SILVER STAR	-118.11	38.34	MINERAL
1172	SKYLINE GROUP	UNNAMED	-119.24	41.90	HUMBOLDT
1173	NBMG SAMPLE SITE 788	VIGO AREA	-114.06	37.36	LINCOLN
1174	RAVEN MANGANESE GROUP	VIRGIN VALLEY	-119.12	41.73	HUMBOLDT

Rhyolite-hosted tin deposits — model number 25H

Map no.	Mine name	District	Long. dd	Lat. dd	County
1175	BLACK NUGGET	IZENHOOD	-116.88	40.97	LANDER
1176	GAMBLE LODE	IZENHOOD	-116.89	40.97	LANDER
1177	MAYFLOWER	IZENHOOD	-116.86	40.97	LANDER
1178	MODOC NO 6	IZENHOOD	-116.90	40.96	LANDER

Sediment-hosted mercury deposits — model number ---

Map no.	Mine name	District	Long. dd	Lat. dd	County
1179	JUNIPER MINE	ANTELOPE SPRINGS	-118.19	40.17	PERSHING
1180	LORI MINE	ANTELOPE SPRINGS	-118.17	40.13	PERSHING
1181	MONTGOMERY MINE	ANTELOPE SPRINGS	-118.15	40.12	PERSHING
1182	PERSHING MINE	ANTELOPE SPRINGS	-118.17	40.14	PERSHING
1183	RED BIRD MINE	ANTELOPE SPRINGS	-118.17	40.17	PERSHING
1184	DUTCH FLAT MINE	DUTCH FLAT	-117.50	41.18	HUMBOLDT
1185	BLACK JACK MINE	IMLAY	-118.22	40.53	PERSHING
1186	EUREKA MINE	MOUNT TOBIN	-117.62	40.27	PERSHING
1187	HOT GROUP	MOUNT TOBIN	-117.65	40.19	PERSHING
1188	BETTY MINE	PILOT MOUNTAIN	-117.94	38.36	MINERAL
1189	BLACK LIZARD PROSPECT	PILOT MOUNTAIN	-117.95	38.35	MINERAL
1190	DREW MINE	PILOT MOUNTAIN	-117.93	38.38	MINERAL
1191	LOST STEER MINE	PILOT MOUNTAIN	-117.95	38.37	MINERAL
1192	REWARD MINE	PILOT MOUNTAIN	-117.97	38.36	MINERAL
1193	CAHILL MINE	POVERTY PEAK	-117.46	41.35	HUMBOLDT
1194	HAPGOOD MINE	POVERTY PEAK	-117.45	41.33	HUMBOLDT
1195	TURILLAS MINE	POVERTY PEAK	-117.46	41.35	HUMBOLDT
1196	WHOLEY MINE	POVERTY PEAK	-117.46	41.36	HUMBOLDT
1197	APACHE MERCURY CLAIMS	SAND SPRINGS	-118.43	39.15	CHURCHILL
1198	FRECKLES MINE	TABLE MOUNTAIN	-117.93	40.09	PERSHING
1199	HORTON MINE	TOBIN AND SONOMA RANGE	-117.61	40.63	PERSHING

Hot-spring mercury deposits — model number 27A

Map no.	Mine name	District	Long. dd	Lat. dd	County
1200	LOU PROSPECT	BELL	-117.84	38.60	MINERAL
1201	RED DEVIL MINE	BEOWAWE	-116.47	40.57	EUREKA
1202	ANTHILL MINE	BOTTLE CREEK	-118.33	41.34	HUMBOLDT
1203	BALDWIN MINE	BOITLE CREEK	-118.31	41.36	HUMBOLDT
1204	BIRTHDAY MINE	BOTTLE CREEK	-118.33	41.35	HUMBOLDT
1205	BLUE CAN MINE	BOTTLE CREEK	-118.32	41.36	HUMBOLDT
1206	B. & B PROSPECT	BOTTLE CREEK	-118.32	41.36	HUMBOLDT
1207	FRANKLIN-KEENEY PROPERTY	BOTTLE CREEK	-118.42	41.40	HUMBOLDT
1208	HAGAN-HEGAN PROPERTY	BOTTLE CREEK	-118.34	41.37	HUMBOLDT
1209	MCADOO MINE	BOTTLE CREEK	-118.33	41.34	HUMBOLDT
1210	NIEBUHR MINE	BOTTLE CREEK	-118.34	41.38	HUMBOLDT
1211	RED ORE MINE	BOTTLE CREEK	-118.33	41.35	HUMBOLDT
1212	ROGERS-BURNISON PROPERTY	BOTTLE CREEK	-118.35	41.38	HUMBOLDT
1213	VERMILION PROSPECT	BOTTLE CREEK	-118.22	41.37	HUMBOLDT
1214	WHITE PEAKS MINE	BOTTLE CREEK	-118.31	41.36	HUMBOLDT
1215	POINSETTA MINE	BOVARD	-118.26	38.78	MINERAL
1216	NOGUEZ PROSPECT	BUENA VISTA	-118.47	38.09	MINERAL
1217	O. K. PROPERTY	BUENA VISTA	-118.31	37.94	MINERAL
1218	CASTLE PEAK MINE	CASTLE PEAK	-119.65	39.41	STOREY
1219	TAYLOR-BRAACH PROSPECT	CASTLE PEAK	-119.49	39.56	STOREY
1220	ANDIES MINE	DON DALE	-115.75	37.56	LINCOLN
1221	K & K MINE	DUTCH FLAT	-117.49	41.11	HUMBOLDT
1222	FINGER ROCK PROSPECT	FAIRPLAY	-117.95	38.79	NYE
1223	B. & B. MINE	FISH LAKE VALLEY	-118.25	37.89	ESMERALDA
1224	F & L MINE	FISH LAKE VALLEY	-118.24	37.90	ESMERALDA
1225	LUCKY PROPERTY	FISH LAKE VALLEY	-118.27	37.88	ESMERALDA
1226	WILD ROSE MINE	FISH LAKE VALLEY	-118.31	37.93	ESMERALDA
1227	HARVEY MINE	FLUORINE	-116.66	36.89	NYE
1228	MAMMOTH 1-5 CLAIMS	FLUORINE	-116.58	37.01	NYE
1229	ANTELOPE PROSPECT	GABBS	-117.81	38.89	NYE
1230	CASTLE ROCK MINE	GILBERT	-117.75	38.09	ESMERALDA
1231	GOLDBANKS QUICKSILVER MINE	GOLDBANKS	-117.68	40.48	PERSHING
1232	PRONTO PLATA MINE	GOLDBANKS	-117.74	40.51	PERSHING
1233	REDBOY	IVANHOE	-116.54	41.13	ELKO
1234	BUTTE NO. 2 MINE	IVANHOE	-116.56	41.12	ELKO
1235	BUTTE QUICKSILVER MINE	IVANHOE	-116.57	41.12	ELKO
1236	FOX MINE	IVANHOE	-116.61	41.14	ELKO
1237	GOVERNOR MINE	IVANHOE	-116.62	41.14	ELKO
1238	HATTER	IVANHOE	-116.53	41.12	ELKO
1239	JACKSON & SURPRISE CLAIMS	IVANHOE	-116.61	41.11	ELKO
1240	MIDAS	IVANHOE	-116.63	41.13	ELKO
1241	RIM ROCK AND HOMESTAKE	IVANHOE	-116.58	41.17	ELKO
1242	SHEEP CORRAL MINE	IVANHOE	-116.64	41.15	ELKO
1243	SILVER CLOUD MINE	IVANHOE	-116.63	41.05	ELKO
1244	VELVET MINE	IVANHOE	-116.56	41.12	ELKO
1245	WAR CLOUD PROPERTY	JACKSON	-117.55	39.06	NYE
1246	HORSE CANYON MINE	JETT	-117.29	38.61	NYE
1247	ANTELOPE PROPERTY	LONE PINE	-119.61	41.80	WASHOE
1248	MONTEZUMA PROSPECT (HG)	MONTEZUMA	-117.40	37.67	ESMERALDA
1249	MOUNT TOBIN MINE	MOUNT TOBIN	-117.54	40.33	PERSHING
1250	CANYON CREEK PROSPECT	NATIONAL	-117.65	41.78	HUMBOLDT
1251	MCCORMICK GROUP	NATIONAL	-117.55	41.79	HUMBOLDT
1252	STALL QUICKSILVER PROSPECT	NATIONAL	-117.65	41.74	HUMBOLDT
1253	CORDERO MINE	OPALITE	-117.82	41.91	HUMBOLDT
1254	DISASTER PEAK PROPERTY	OPALITE	-118.15	41.97	HUMBOLDT
1255	McDERMITT MINE	OPALITE	-117.81	41.92	HUMBOLDT
1256	RUJA MINE	OPALITE	-117.93	41.87	HUMBOLDT
1257	PRENTISS PROSPECT	POVERTY PEAK	-117.46	41.36	HUMBOLDT
1258	SNOWDRIFT PROPERTY	POVERTY PEAK	-117.43	41.37	HUMBOLDT
1259	BLACK HAWK MINE	QUEEN CITY	-115.96	37.77	NYE
1260	OSWELL PROPERTY	QUEEN CITY	-115.98	37.80	NYE
1261	DE LONGCHAMPS PROSPECT	RAMSEY	-119.28	39.47	LYON
1262	HORSE MOUNTAIN PROPERTY	ROCK CREEK	-116.39	41.34	ELKO

1263	SAN EMIDIO	SAN EMIDIO	-119.4	40.39	WASHOE
1264	HILLSIDE MINE	SPRING VALLEY	-118.09	40.33	PERSHING
1265	KING GEORGE MINE	SPRING VALLEY	-118.09	40.32	PERSHING
1266	SANTA ROSA PROSPECT	SULPHUR	-118.70	40.86	HUMBOLDT
1267	SHOEL PIT	SULPHUR	-118.66	40.86	HUMBOLDT
1268	BERRY CREEK GROUP	TUSCARORA	-116.29	41.29	ELKO
1269	RED BIRD GROUP	TUSCARORA	-116.21	41.34	ELKO
1270	A AND B MINE	TYBO	-116.47	38.25	NYE
1271	M AND M MINE	TYBO	-116.46	38.25	NYE
1272	B & B QUICKSILVER MINE	UN1ON	-117.55	38.91	NYE
1273	MERCURY MINING CO. MINE	UNION	-117.55	38.92	NYE
1274	NEVADA CINNABAR MINE	UNION	-117.55	38.91	NYE
1275	SAN PEDRO MINE	UN1ON	-117.52	38.86	NYE
1276	CRYSTAL PROSPECT	VIOLA	-114.32	37.24	LINCOLN
1277	PAINTED HILLS MINE	WARM SPRINGS	-118.86	41.81	HUMBOLDT
1278	WARM SPRINGS	WARM SPRINGS AREA	-117.10	40.52	LANDER

Simple antimony deposits — model number 27D

Map no.	Mine name	District	Long. dd	Lat. dd	County
1279	DE SOTO ANTIMONY MINE	ANTELOPE	-118.49	40.68	PERSHING
1280	CERVANTJTE MINE	ANTELOPE SPRINGS	-118.17	40.16	PERSHING
1281	HOLLYWOOD MINE	ANTELOPE SPRINGS	-118.12	40.15	PERSHING
1282	EATON MINE	ARROWHEAD	-116.20	38.05	NYE
1283	DEES MINE	BALD MOUNTAIN	-115.58	39.97	WHITE PINE
1284	FLOWER ANTIMONY MINE	BARCELONA	-116.91	38.67	NYE
1285	FLOWER QUICKSILVER MINE	BARCELONA	-116.91	38.66	NYE
1286	ANTIMONY KING MINE	BATTLE MOUNTAIN	-117.10	40.60	LANDER
1287	APEX ANTIMONY MINE	BATTLE MOUNTAIN	-117.10	40.57	LANDER
1288	NORTH PEAK ANTIMONY OCCURRENCE	BATTLE MOUNTAIN	-117.14	40.69	HUMBOLDT
1289	ANTIMONY KING MINE	BERNICE	-117.78	39.76	CHURCHILL
1290	ARRANCE PROSPECT	BERNICE	-117.79	39.76	CHURCHILL
1291	DRUMM MINE	BERNICE	-117.76	39.75	CHURCHILL
1292	HOYT MINE	BERNICE	-117.76	39.77	CHURCHILL
1293	LH.X. MINE	BERNICE	-117.79	39.76	CHURCHILL
1294	LOFTHOUSE MINE	BERNICE	-117.80	39.72	CHURCHILL
1295	MARGUERITE GROUP	BERNICE	-117.77	39.75	CHURCHILL
1296	ANTIMONY KING MINE	BIG CREEK	-117.10	39.39	LANDER
1297	BRAY-BEULAH MINE	BIG CREEK	-117.12	39.30	LANDER
1298	DRY CANYON MINE	BIG CREEK	-117.11	39.38	LANDER
1299	HARD LUCK-PRADIER MINE	BIG CREEK	-117.12	39.31	LANDER
1300	SUTHERLAND MINE	BLACK KNOB	-118.26	40.21	PERSHING
1301	EAGLE PROSPECT	BURNS BASIN	-115.93	41.29	ELKO
1302	PRUNTY ANTIMONY MINE	CHARLESTON	-115.49	41.70	ELKO
1303	MICKSPOT MINE	CROW SPRINGS	-117.71	38.38	ESMERALDA
1304	KING SOLOMON MINE	DANVILLE	-116.67	38.67	NYE
1305	TORO CLAIMS	DANVILLE	-116.56	38.73	NYE
1306	BLUE RIBBON	EDGEMONT	-116.08	41.74	ELKO
1307	YOUNG PROSPECT	EUREKA	-115.99	39.42	EUREKA
1308	NEVADA KING MINE	FLORENCE	-118.68	41.66	HUMBOLDT
1309	ANTIMONY IKE MINE	GOLDBANKS	-117.68	40.51	PERSHING
1310	BLUE DICK ANTIMONY MINE	HILLTOP	-116.84	40.41	LANDER
1311	ORE DRAG MINE	IRON HAT	-117.42	40.57	PERSHING
1312	FOSS	ISLAND MOUNTAIN	-115.73	41.74	ELKO
1313	ANTIMONY LODE PROSPECT	JEFFERSON CANYON	-116.99	38.72	NYE
1314	WALL CANYON MINE	JETT	-117.25	38.75	NYE
1315	GREEN PROSPECT	LAKE	-118.73	39.87	CHURCHILL
1316	HAZEL MINE	LAKE	-118.73	39.87	CHURCHILL
1317	BLUE NOSE MINE	LEWIS	-116.85	40.43	LANDER
1318	MORNING GLORY PROSPECT	LYNN	-116.30	40.91	EUREKA
1319	INDIAN VALLEY MINE	NATIONAL	-117.57	41.84	HUMBOLDT
1320	ANGELIA PROSPECT	NIGHTINGALE	-119.25	39.90	WASHOE
1321	SNOWDRIFT MINE	RED BUTTE	-118.56	41.10	HUMBOLDT
1322	ANTIMONIAL MINE	REVEILLE	-116.18	38.04	NYE
1323	BRADLEY MINE	RYE PATCH	-118.23	40.45	PERSHING
1324	PANTHER CANYON MINE	RYE PATCH	-118.23	40.45	PERSHING
1325	BLOODY CANYON MINE	STAR	-118.14	40.52	PERSHING
1326	FENCEMAKER MINE	TABLE MOUNTAIN	-117.86	40.08	PERSHING
1327	W. P. MINE	TEN MILE	-117.89	40.94	HUMBOLDT
1328	LUCKY TRAMP PROSPECT	TYBO	-116.47	38.28	NYE
1329	OUTLOOK PROSPECT	TYBO	-116.46	38.43	NYE
1330	PAGE MINE	TYBO	-116.45	38.55	NYE
1331	MILTON CANYON MINE	UNION	-117.58	38.82	NYE
1332	BLACK WARRIOR MINE	UNIONVILLE	-118.12	40.43	PERSHING
1333	CHOATES MINE	UNNAMED (PYRAMID)	-119.67	39.69	WASHOE
1334	DONATELLI MINE	UNNAMED (PYRAMID)	-119.55	39.75	WASHOE
1335	SLEEPY JOE	UNNAMED (PYRAMID)	-119.55	39.75	WASHOE
1336	SUNSET PROSPECT	UNNAMED (PYRAMID)	-119.66	39.69	WASHOE
1337	ADRIENE MINE	WILLARD	-118.30	40.26	PERSHING
1338	JOHNSON-HEIZER MINE	WILLARD	-118.32	40.28	PERSHING
1339	ROSAL MINE	WILLARD	-118.32	40.26	PERSHING

I Sediment-hosted gold deposits — model number 26A

Map no.	Mine name	District	Long. dd	Lat. dd	County
1340	AUSTIN GOLD VENTURE		-117.09	39.38	LANDER
1341	FONDAWAY CANYON		-118.20	39.80	CHURCHILL
1342	NIGHT HAWK RIDGE DEPOSIT		-115.77	39.19	WHITE PINE
1343	PAN		-115.68	39.41	WHITE PINE
1344	ROBERTSON		-116.69	40.31	LANDER
1345	SADDLE		-116.71	40.03	LANDER
1346	TRIPLET GULCH PROJECT		-116.69	40.30	LANDER
1347	WOODS GULCH		-115.97	41.68	ELKO
1348	ALLIGATOR RIDGE MINE.	ALLIGATOR RIDGE	-115.52	39.76	WHITE PINE
1349	GOLD PICK	ANTELOPE	-116.33	39.78	EUREKA
1350	GOLD RIDGE	ANTELOPE	-116.35	39.80	EUREKA
1351	GOLD STONE	ANTELOPE	-116.33	39.80	EUREKA
1352	BALD MOUNTAIN PROJECT	BALD MOUNTAIN	-115.59	39.96	WHITE PINE
1353	NORTH SELOX CLAIMS.	BALD MOUNTAIN	- I 15.49	39.92	WHITE PINE
1354	MARIGOLD MINE	BATTLE MOUNTAIN	-117.18	40.73	HUMBOLDT
1355	BIG SPRINGS	BIRCH CREEK	-115.98	41.55	ELKO
1356	BOOTSTRAP	BOOTSTRAP	-116.42	41.02	ELKO

1357	DEE GOLD MINE	BOOTSTRAP	-116.43	41.03	ELKO
1358	GOLD ACRES OPEN PIT MINE	BULLION	-116.74	40.26	LANDER
1359	LITTLE GOLD ACRES	BULLION	-116.74	40.25	LANDER
1360	BURNS BASIN GOLD DEPOSIT	BURNS BASIN	-116.01	41.34	ELKO
1361	JERRITT CANYON GOLD.	BURNS BASIN	-116.00	41.40	ELKO
1362	WINTERS CREEK	BURNS BASIN	-115.95	41.45	ELKO
1363	WRIGHT WINDOW	BURNS BASIN	-116.10	41.40	ELKO
1364	GOLDEN BUTTE	CHERRY CREEK	-115.05	39.83	WHITE PINE
1365	CORTEZ GOLD MINE	CORTEZ	-116.62	40.19	LANDER
1366	HORSE CANYON MINE	CORTEZ	-116.56	40.16	EUREKA
1367	PIPELINE	CORTEZ	-116.68	40.27	LANDER
1368	SOUTH PIPELINE	CORTEZ	-116.74	40.25	LANDER
1369	RATTO CANYON	EUREKA	-115.99	39.40	EUREKA
1370	ILLIPAH	ILLIPAH	-115.44	39.46	WHITE PINE
1371	STANDARD MINE	IMLAY	-118.23	40.51	PERSHING
1372	KINSLEY GOLD MINE	KINSLEY	-114.34	40.13	ELKO
1373	BULLION MONARCH MINE	LYNN	-116.34	40.92	EUREKA
1374	CARLIN GOLD MINE	LYNN	-116.28	40.93	EUREKA
1375	GENESIS	LYNN	-116.32	40.93	EUREKA
1376	GOLD STRIKE MINE	LYNN	-116.36	40.97	EUREKA
1377	LANTERN	LYNN	-116.36	40.92	EUREKA
1378	NORTH STAR	LYNN	-116.38	40.96	EUREKA
1379	PETE	LYNN	-116.28	40.92	EUREKA
1380	POST	LYNN	-116.35	40.98	EUREKA
1381	GOLD QUARRY MINE	MAGGIE CREEK	-116.21	40.79	EUREKA
1382	MAGGIE CREEK OPEN PIT GOLD MINE	MAGGIE CREEK	-116.33	40.79	EUREKA
1383	TUSC	MAGGIE CREEK	-116.23	40.80	EUREKA
1384	NORTHUMBERLAND MINE	NORTHUMBERLAND	-116.86	38.96	NYE
1385	CHIMNEY (TWIN CREEKS)	POTOSI	-117.17	41.28	HUMBOLDT
1386	GETCHELL GOLD MINE	POTOSI	-117.26	41.21	HUMBOLDT
1387	GETCHELL SECTION 4 GOLD PIT	POTOSI	-117.25	41.20	HUMBOLDT
1388	PINSON MINE	POTOSI	-117.27	41.13	HUMBOLDT
1389	PREBLE DEPOSIT	POTOSI	-117.39	41.00	HUMBOLDT
1390	RABBIT CREEK	POTOSI	-117.16	41.24	HUMBOLDT
1391	RAIN	RAILROAD	-116.01	40.61	ELKO
1392	GNOME	RAILROAD	-116.11	40.60	ELKO
1393	PINON RANGE-CORD RANCH		-115.84	40.46	ELKO
1394	GOLD BAR	ROBERTS	-116.36	39.76	EUREKA
1395	GOLD CANYON	ROBERTS	-116.36	39.81	EUREKA
1396	STEIGMEYER PROPERTY	ROUND MOUNTAIN	-117.08	38.68	NYE
1397	TONKIN SPRINGS	TONKIN SPRINGS	-116.43	39.90	EUREKA
1398	GREEN SPRINGS MINE	WHITE PINE	-115.55	39.14	WHITE PINE
1399	RELIEF CANYON GOLD DEPOSIT	ANTELOPE SPRINGS	-118.17	40.21	PERSHING

Cyprus massive sulfide deposits — model number 24A

Map no.	Mine name	District	Long. dd	Lat. dd	County
1400	BIG MIKE COPPER MINE	TOBIN AND SONOMA RANGE	-117.56	40.54	PERSHING
1401	GROUNDHOG NO. 1 & OTHER CLAIMS	TWIN RIVER	-117.32	38.95	NYE

Besshi massive sulfide deposits — model number 24B

Map no.	Mine name	District	Long. dd	Lat. dd	County
1402	RIO TINTO MINE	MOUNTAIN CITY	-115.98	41.81	ELKO

Volcanogenic manganese deposits — model number 24C

Map no.	Mine name	District	Long. dd	Lat. dd	County
1403	BLACK ROCK MINE	BATTLE MOUNTAIN	-117.23	40.60	LANDER
1404	BLACK DIABLO MINE	BLACK DIABLO	-117.55	40.68	PERSHING
1405	BLACK DIAMOND PROSPECTS	HARMONY	-117.55	40.69	HUMBOLDT
1406	BLACK EAGLE MINE	JERSEY VALLEY	-117.45	40.22	PERSHING
1407	MANGANESE PROSPECT	POTOSI	-117.23	41.26	HUMBOLDT
1408	KING GROUP	POVERTY PEAK	-117.39	41.40	HUMBOLDT

Kuroko massive sulfide deposits — model number 28A

Map no.	Mine name	District	Long. dd	Lat. dd	County
1409	YELLOW DOG AND HAPGOOD PROS.	DYKE CANYON AREA	-118.57	41.56	HUMBOLDT
1410	RED BOY	JACKSON	-118.52	41.21	HUMBOLDT
1411	GILBERT AND STROUD MINE	RED BUTTE	-118.53	41.05	HUMBOLDT
1412	COVE MEADOW DEPOSIT	VARYVILLE	-118.81	41.56	HUMBOLDT

Volcanic-hosted magnetite deposits — model number 251

Map no.	Mine name	District	Long. dd	Lat. dd	County
1413	BLACK JACK MINE	JACKSON CREEK	-118.44	41.29	HUMBOLDT
1414	IRON KING MINE	JACKSON CREEK	-118.42	41.31	HUMBOLDT
1415	JACKSON PROSPECT	JACKSON CREEK	-118.46	41.33	HUMBOLDT
1416	RED BIRD MINE	JACKSON CREEK	-118.42	41.30	HUMBOLDT
1417	BIG POLE CREEK	MODARELLI-FRENCHIE C	-116.31	40.34	EUREKA
1418	FRENCHIE CREEK PROSPECT	MODARELLI-FRENCHIE C	-116.29	40.36	EUREKA
1419	IMPERIAL PROSPECT	MODARELLI-FRENCHIE C	-116.29	40.36	EUREKA
1420	JACKSON PROSPECT	MODARELLI-FRENCHIE C	-116.32	40.37	EUREKA
1421	MODARELLI IRON MINE	MODARELLI-FRENCHIE C	-116.26	40.37	EUREKA
1422	SHEEP CREEK PROSPECT .	MODARELLI-FRENCHIE C	-116.31	40.30	EUREKA
1423	BARTH MINE	SAFFORD	-116.27	40.58	EUREKA
1424	WHITE ROCK PROSPECT	TABLE MOUNTAIN	-118.05	39.92	CHURCHILL

Artillery manganese deposits — model number ---

Map no.	Mine name	District	Long. dd	Lat. dd	County
1425	THREE KIDS DEPOSIT	LAS VEGAS	-114.91	36.09	CLARK
1426	VIRGIN RIVER DEPOSIT	VIRGIN RIVER	-114.47	36.19	CLARK

Kipushi copper-lead-zinc deposits — model number 32C

Map no.	Mine name County	District	Long. dd	Lat. dd	
1427	LINCOLN MINE	GOLD BUTTE	-114.18	36.33	CLARK

Tungsten Skarn Deposits

Tungsten skarns are scheelite-bearing, calc-silicate, contact metasomatic rocks formed at contacts along the margins and in roof pendants near the tops of granitoid intrusions. Tungsten skarns typically are found in argillaceous carbonate rocks in carbonate-clastic rock sequences. Most tungsten skarns form at a depth of 5 to 15 km at temperatures in excess of 500°C, and are best developed in the lowermost exposed carbonate beds of the intruded sedimentary sequence (Newberry and Einaudi, 1981). Scheelite is disseminated in contact metamorphic rocks, or occurs along fractures, and, locally, in quartz veins.

The overall geologic environment in western Nevada presents an ideal setting for the occurrence of tungsten skarns. They are present in most localities in Nevada where granitoid rocks are present, and are associated with granitoids of all ages. However, 84% of the 171 deposits and occurrences, including all of the major districts are near Cretaceous plutons. These plutons are deep-seated (Barton and others, 1988) and locally occupy as much as 50% of the area of pre-Cenozoic rocks. Deposits are most numerous in clastic sedimentary sequences with interbedded limestone that range in age from late Precambrian to Jurassic. It is interesting to note that the most productive tungsten skarns are found in limestones in Mesozoic rock sequences where the limestone beds are thin and widely scattered.

Two of the three largest tungsten skarn districts in Nevada, Mill City and Potosi, are located at the eastern margin of the Cretaceous Lovelock granitoid batholith belt, which may be a northern extension of the Sierra Nevada batholith (Smith and others, 1971). The largest deposit is the Springer Mine in the Nevada Massachusetts group, no. 57, plate 10-1 and table 10-1) in the Mill City district. There, small granodiorite stocks intruded and metamorphosed a thick, clastic sedimentary sequence of Triassic age that contains shale, quartzite, and thin limestone beds. The skarn minerals are diopside, grossular garnet, epidote, quartz, calcite, and actinolite. The ore mineral is scheelite, and small amounts of molybdenite, chalcopyrite, rare bismuthinite and several percent pyrite are also present. The Nevada Massachusetts group produced 1,800,000 tons of ore averaging 0.7% WO_3 (Johnson and Keith, 1991)

The Riley Mine (no. 84, plate 10-1, table 10-1) in the Potosi (or Getchell) district in the Osgood Mountains is the third largest tungsten-producer in Nevada. There, a single granodiorite stock (6 miles long and up to 2 miles wide) intrudes Cambrian shale, slate and limestone. Tungsten skarns cluster around the contact between the stock and adjacent limestone beds. Wollastonite is the most abundant skarn mineral. Both these districts have been subclassified as oxidized tungsten skarns which implies formation at lesser depths ranges in the tungsten skarn environment, based, in part, on composition of garnet and pyroxene (Einaudi and others, 1981). Einaudi and others (1981) classify the tungsten skarn at the Nightingale Mine (no. 67, plate 10-1 and table 10-1) farther south in the Lovelock belt as a reduced tungsten skarn which implies formation at greater depth. Skarn minerals in the Nightingale district, are similar to those in the Mill City and Potosi districts: quartz, epidote, garnet, calcite, pyroxene, and minor tremolite. In addition to scheelite; pyrrhotite, molybdenite, chalcopyrite, arsenopyrite, pyrite, titanite and apatite are also present.

Tungsten skarns also are found near small isolated Cretaceous granitoid stocks, which intrude lower Paleozoic carbonate sequence sedimentary rocks east of the main Cretaceous batholithic belt. Of these, the Tem Piute district in east-central Nevada, is the third largest producer of skarn tungsten in the state. These skarn ores produced by-product molybdenum, recovered from powellite and molybdenite, along with zinc and fluorspar. Exploration and development were active in the early 1980s at the New Tempiute (Emerson) Mine (no. 125, plate 10-1 and table 10-1). Small tungsten skarn deposits and occurrences are localized at contacts between Jurassic plutons and Upper Precambrian limestones along the eastern edge of the Sierra Nevada batholith in southern Esmeralda County. A few contain copper, lead, and zinc (e.g., Copper Stack, no. 149, plate 10-1 and table 10-1). This may suggest depths of formation somewhat higher than for the skarns associated with the Cretaceous batholith belt.

Only a few tungsten skarns are associated with Tertiary granitoid plutons in Nevada. The pluton in the Troy district and the pluton in the Bald Mountain district contain small tungsten skarns. The Bald Mountain tungsten skarn (no. 9, plate 10-1 and table 10-1) is near the Bald Mountain sediment-hosted gold deposit. These plutons are all in east central Nevada, aligned in the north-south direction. They are east of the "tungsten gap," a north-south zone near the 116° W meridian, first recognized by Kerr (1946) in which tungsten skarns are rare or absent.

Precambrian Tungsten and Beryllium Deposits:

Pegmatitic bodies containing tungsten and/or beryllium occur in an area of Precambrian metamorphic and intrusive rocks in the southern part of Nevada. We show two small occurrences, the Taglo (no. 775, plate 10-1 and table 10-1), a beryllium-bearing pegmatite and the MacBruson Claims (no. 776, plate 10-1 and table 10-1), a tungsten-bearing pegmatite with disseminated scheelite in skarn. They are included here to direct attention to the occurrence of tungsten and beryllium mineralization in the Precambrian rocks of Nevada.

Precambrian rocks of southern Nevada also host an apatite-monazite vein near Crescent Peak (not shown on plate 10-1). This vein may be related to the Mountain Pass rare-earth deposit 37 km to the west in California (Castor, 1991).

Tungsten and Beryllium Deposits Related to Peraluminous Granites

We recognize 43 mineral occurrences as tungsten- and/or beryllium-bearing veins and pegmatites associated with peraluminous granites mainly of Late Cretaceous age (Barton and Trim, 1991).

One occurrence, Tungstonia, is middle Tertiary in age and is associated with a biotite granite that intrudes a Cretaceous peraluminous granite (Trim and Barton, 1991). Tungsten veins in Nevada that contain wolframite and quartz are found in quartzite and granite; those that contain scheelite, quartz, and calcite are emplaced in carbonate rocks near granite contacts. Some veins locally contain both scheelite and wolframite. Other minerals present include molybdenite and powellite, fluorite, beryl, galena, sphalerite, as well as uranium-, antimony-, copper-, and gold- and silver-bearing minerals. There are numerous polymetallic veins that contain scheelite in Nevada and some veins (e.g., Bay State and Silver Dyke Mines, nos. 617 and 723, plate 10-1 and table 10-1), were mined for tungsten. However, polymetallic veins, described in a following section, differ from tungsten veins in that they contain a higher portion of base-metals and are commonly associated with base-metal skarn and porphyry deposits.

Huebernite, the manganese end member of the wolframite series was first described as a new mineral in 1865 from veins in the Ellsworth (Mammoth) district, Nye County (Stager and Tingley, 1988, p.13, 17). This district is represented by prospects in the Eagle group (no. 159, plate 10-1 and table 10-1). The prospect was first explored for its precious-metal content, as were many tungsten-bearing veins.

Tungsten veins form near the tops of two-mica granite plutons and are typically found in tensional fractures. At Round Mountain (represented by Stevenson's & Schuppy's claims, no. 180, plate 10-1 and table 10-1), quartz-huebnerite veins flanked by muscovite selvages and dated at 80 Ma, were deposited at the end stage of doming and metamorphism in a 95 Ma granite formed at initial depths of 3 to 3.5 km below the surface according to Shawe and others (1984).

Beryllium-bearing tungsten veins and beryllium-bearing pegmatites belong to the specialized class of deposits described by Barton and Trim (1991), characterized by the presence of lithophile elements (Be, F, W, Mo, Sn). They are found in a variety of deposit forms, including greisens, stockworks, F- and Al-rich skarns related to two-mica granites, and in late stage aplites and pegmatites. They are found in both carbonate and clastic host rocks. Barton suggests that deposits of this type may constitute major resources for beryllium and fluorspar. We recognize the scheelite-beryllium-bearing tungsten veins and pegmatites in the Humboldt Range (Oreana Mine no. 182, plate 10-1 and table 10-1), in the Toiyabe Range (Hiatt Beryl-Fluorite, no. 167, plate 10-1 and table 10-1), and near Mount Wheeler (Mount WheelerMine, no. 169, plate 10-1 and table 10-1) as being of this type. Following Barton and Trim (1991) we also include the Bisoni, and Reese and Berry prospects at McCullough Butte, Eureka County (no. 161-162, plate 10-1 and table 10-1), which contain fluorspar and beryllium, but are not noted for their tungsten content. Also formed in this general environment are pegmatites that contain beryllium, uranium, and tantalum minerals in the Ruby Range (Dawley Canyon, no. 190, plate 10-1 and table 10-1).

Climax Molybdenum Deposits

Two deposits in northern Nevada are classified as Climax molybdenum deposits, the Mount Hope and Majuba Hill deposits (nos. 195 and 194, plate 10-1 and table 10-1). Both deposits are associated with isolated small potassic high-silica porphyritic intrusive bodies of Tertiary age. The Climax molybdenum deposit type is characterized by stockworks of molybdenite and quartz associated with fluorite in granite porphyry (White and others, 1981; Ludington, 1986). Host intrusive complexes frequently show evidence for multistage intrusion of magma and exhibit zoned alteration in a shell-like pattern over the top of the complex (Mutschler and others, 1981). These deposits form at depths of 1 to 3 km and may be indicated at the surface by topaz-bearing rhyolites (Christiansen and others, 1986). At Mount Hope and at Majuba Hill, the igneous complexes contain dikes, breccias, and multistage, subvolcanic intrusive porphyritic rocks, and contain zoned alteration patterns (Mutschler and others, 1981; MacKenzie and Bookstrom, 1976).

The main molybdenum stockwork at Mount Hope is in an aplitic quartz porphyry. Lower grade mineralization is also found in a deeper, and slightly younger coarser-grained quartz porphyry. Reserves are estimated at 408,000,000 tonnes with a molybdenum content of 0.13 to 0.32% (Lowe and others, 1985). Lead, zinc, silver, tin, copper, fluorine, and molybdenum are anomalous in alteration zones around these plutons (Westra and Keith, 1981). The molybdenum-quartz stockwork mineralization at Majuba Hill is in the middle-stage of three rhyolite porphyry intrusive bodies. Copper, molybdenum, silver, tin, arsenic, lead, and zinc are anomalous in alteration zones associated with all three stages of intrusive bodies (MacKenzie and Bookstrom, 1976). Neither deposit has been developed as a molybdenum producer, but a small zinc-lead skarn orebody, hosted in Permian limestone has been mined peripheral to the Mount Hope porphyry. Small quantities of copper and tin were mined from the youngest rhyolite porphyry intrusive body at Majuba Hill.

Porphyry Molybdenum, Low-fluorine Deposits

The late 1970s and early 1980s, a period of intense exploration for molybdenum resulted in the discovery of a new type of molybdenum deposit in Nevada. Plate 10-1 shows the location of 12 of these low-fluorine porphyry-molybdenum targets which are in and near granodiorite stocks, mostly of Cretaceous and Tertiary age. Low-fluorine-type porphyry molybdenum deposits are characterized by molybdenite-quartz stockwork veinlets in calc-alkaline porphyritic intrusive rocks and in the adjacent country rock. Compared to Climax type deposits, they are deficient in fluorine, have lower molybdenum grades, and occur in rocks with lower silica content (Theodore, 1986). The deposits form during the late stages of intrusion with depths of formation of the ore zone at 1 to 2 km for stocks and 3 to 5 km for plutons (Westra and Keith, 1981, p. 850). The 12 targets shown on map A coincide with the distribution of Cretaceous plutons and although there is a broad spatial relationship between tungsten skarns and porphyry molybdenum, low-fluorine deposits, close proximity is the exception rather than the rule. Exceptions are the Gardnerville molybdenum deposit (no. 200, plate 10-1 and table 10-1) in the Pine Nut Range, which is situated below a productive tungsten skarn (Stager and Tingley, 1988, p. 46) and a prospect south of Luning reported by Harris (1991).

The Buckingham molybdenum system at Copper Basin (no. 196, plate 10-1 and table 10-1), in the Battle Mountain district is the largest and best studied of these targets (Blake and others, 1979; Theodore and others, 1992) with reserves of 907,000,000 tonnes containing 0.06% molybdenum (Sutolov, 1982). The Hall deposit (no. 206), with reserves of more than 200,000,000, tonnes and containing 0.091% Mo was described by Shaver (1991). U.V. Industries, and Gardnerville deposits (nos. 199, and 200) are known from brief reports. Other targets have been reported only from reconnaissance. There is a central molybdenum-rich zone at Buckingham and an annular molybdenum-rich zone at Hall (Westra and Keith, 1981, p. 854). Both deposits have distal copper-rich zones. The Copper Basin deposit is a supergene chalcocite enrichment blanket formed from disseminated copper that was deposited in the distal part of the Buckingham porphyry molybdenum system (Theodore and others, 1992). The copper ore, which was produced from sedimentary rocks of the Cambrian Harmony Formation, contained 0.8% copper and less than 100 ppm molybdenum.

Porphyry Copper Deposits

Porphyry copper systems are characterized by chalcopyrite in stockwork veinlets and disseminated grains in hydrothermally altered porphyry intrusions and in adjacent country rock. The systems tend to be best developed in high-level granitoid intrusive rocks which have a high degree of fracture-permeability. There is a continuum between copper porphyry and copper skarn deposits. Because of important grade and tonnage differences between members of this continuum, a somewhat arbitrary classification has been established (Cox, 1986a, b; and Cox and Theodore, 1986) based on the site of copper mineralization and the copper grade of the associated intrusion as shown in table 10-3.

Table 10-3. Critical differences in grade between porphyry copper; porphyry copper, skarn related; and copper skarn deposits

	Porphyry Cu	Porphyry Cu, skarn related	Cu skarn
Cu in porphyry	0.25 to 1%	0.25 to 1%	low
Cu in wall rocks	low	3 to 5%	3 to 5%

Five deposits classified as porphyry copper and shown on plate 10-1 are in the Yerington district and together contain about 1 billion tons of ore containing 0.4% copper. The Yerington deposit (no. 216, plate 10-1 and table 10-1), itself, produced 162 million tons of 0.55% copper ore between 1954 and 1978 when it was shut down (Einaudi, 1982, p. 146). The ore at Yerington contained no recoverable molybdenum or gold, and occurred in a multi-phase Jurassic (169.4 Ma to 168.5 Ma, dated by Dilles and Wright, 1988) granodiorite and quartz monzonite batholith associated with the porphyry dike swarms (Einaudi, 1982, p. 146).

An example of a Tertiary porphyry copper system is the Guanomi prospect (no. 211, plate 10-1 and table 10-1), near Pyramid Lake. This prospect contains low-grade copper-molybdenum mineralization around the contact zone of a stock with Tertiary rhyolite tuff (Bonham, 1969, p. 96-97). It was drilled in 1972 and no ore of economic grade was found (Prochnau, 1973). A single example of a Triassic porphyry copper system was described by Seedorff (1991) in the Royston district located 44 km northwest of Tonopah on the Esmeralda-Nye county line (not shown on plate 10-1). Exploration programs carried out between 1960 to 1980 did not reveal an economic deposit.

Porphyry Copper, Skarn-related Deposits

Porphyry copper, skarn-related deposits are characterized by chalcopyrite-bearing quartz-sulfide stockwork veinlets in porphyritic intrusive rock and adjacent skarn. Examples in Nevada are in the Robinson district, where several deposits form a linear belt extending 6 miles west from Ely, at Copper Canyon in the Battle Mountain district, and at the north end of the Fish Creek Mountains.

Deposits in the Robinson district (nos. 220-224, plate 10-1 and table 10-1) were the first in Nevada to produce copper from low-grade ores by open pit mining. Production began in 1908 on a reserve of 26 million tons of 2% ore (Joralemon, 1973). The district produced more than 3 million tons of copper from five open pits before closing in the late 1970s. A variety of byproduct metals were also produced, including gold, silver, lead, zinc, molybdenum, rhenium, platinum, and palladium (Hose and others, 1976). Satellite bodies to the main porphyry intrusion are now mined for gold. This deposit has been one of the richest laboratories of geologic research on mineral deposits in Nevada. Major research papers on the origin of the copper ores are by Fournier (1967a, b), James (1976), and Westra (1979, 1982). Drilling in the 1990s has identified reserves of 183 million tonnes containing 0.61% copper and 0.38 grams per tonne gold (Mining Magazine, Oct. 1992).

The Copper Canyon Mines (no. 217 -218, plate 10-1 and table 10-1) of the Battle Mountain district are small deposits by porphyry copper standards, containing 18 million tons of 0.8% copper ore. The orebodies produced byproduct metals, especially gold and silver, and satellite deposits to these are now being mined for gold. The Copper Canyon orebodies have also been the subject of detailed geologic research on the origin of the copper ores, see especially the research papers by Theodore and Blake (1975a, b) and Theodore and others (1982).

The skarn-related porphyry copper deposits are associated with intrusive rocks of different ages but similar composition. The Robinson district ores are related to an early Cretaceous (110 Ma) quartz monzonite porphyry and ore was produced from the intrusive porphyry and adjacent late Paleozoic metamorphosed limestone and shale. Hypogene, ore-grade copper mineralization is associated with biotite-orthoclase alteration in the quartz monzonite porphyry; ore-grade copper mineralization in the skarns is concentrated within about 60 m of the contacts with the porphyry (Einaudi, 1982). Copper Canyon ores are related to a Tertiary (38 Ma) porphyritic granodiorite which contains about 0.25% copper as chalcopyrite, but ore was produced only from the late Paleozoic sedimentary rocks of the Golconda allochthon and the Antler sequence which contained pyrrhotite, chalcopyrite, and calcsilicate minerals (Theodore and Blake, 1975a, b). The Fish Creek prospect (no. 219, plate 10-1 and table 10-1) is related to a late Cretaceous (85 Ma, dated by Miller and Silberman, 1977) mineralized leucocratic quartz monzonite and quartz monzonite porphyry that intrudes rocks of the Golconda allochthon. Ore grade is unknown.

Copper Skarn Deposits

Sixty-one copper skarn deposits and occurrences are present throughout Nevada. Copper skarns are characterized by chalcopyrite associated with magnetite and/or pyrrhotite; a variety of other ore minerals are locally significant.

Most copper skarns are spatially associated with Jurassic intrusive rocks. The Victoria Mine (no. 250, plate 10-1 and table 10-1), in the Dolly Varden district in eastern Nevada, is the largest copper producer of this type in the state. Pre-mining reserves were 3.5 million tons of 2.5% copper. The Victoria copper skarn is associated with a breccia pipe emplaced in Permian limestone and calcareous sandstone intruded by a Jurassic monzonitic stock and related porphyritic dikes. The deposit is unusual in the close association of skarn and mineralized breccia and the orebody occupies an area of collapse partly due to settling within the main mass of breccia (Atkinson and others, 1982, p. 913). Quartz-latite porphyry dikes related to the Jurassic stock are the source of mineralization (Atkinson and others, 1982, p. 902).

Two significant clusters of copper skarn deposits of Jurassic age are known: one group in the southern Yerington district (represented by Mason Valley, no. 282, plate 10-1 and table 10-1) and another surrounding the Contact pluton in northeastern Elko County (represented by Alice Mine, no. 228, plate 10-1 and table 10-1). Copper skarns in the Yerington district are located near the Yerington batholith but are some 3 to 4 km distant from the outermost edge of porphyry copper alteration and mineralization (Einaudi, 1982, p. 148). The Triassic volcanic-sedimentary sequence at Yerington contains a limestone interval a few hundred meters in thickness in which the copper skarns developed.

In the Contact district, small copper skarns ring the outer edge of the Contact pluton which intrudes a sequence of Late Paleozoic limestone, shale, argillites, quartzites and cherts 700 m thick (Coats, 1987, p. 43). Copper minerals are present within the pluton, but substantial exploration has failed to reveal larger orebodies of the porphyry copper, skarn-related type.

According to Einaudi and others (1981, p. 349) copper skarns appear to form in less dynamic magmatic-hydrothermal environments than the porphyry-related skarns, and perhaps at greater depths where fluid flow is more restricted. In that environment there is less likelihood of supersaturation and large crystals can grow slowly producing more massive ores. Copper skarns are typically associated with barren stocks, are relatively small deposits, share many characteristics of calcic iron skarns, and are similar in geology and geochemistry to zinc-lead skarns (Einaudi and others, 1981, p. 341).

Zinc-lead Skarn Deposits

Zinc-lead skarn deposits are found where carbonate rocks are intruded by granitoids and typically are formed more distally to the mineralizing intrusive rock than are copper and iron skarns. Their geologic environment of formation and geographic distribution is similar to the more numerous polymetallic replacement deposits. We recognize 16 deposits and occurrences of this type in Nevada. Zinc-lead skarns are characterized by sphalerite and galena in calc-silicate metamorphic rocks derived from carbonate and calcareous clastic sedimentary rocks. Calc-silicate mineralogy typically includes diopside, epidote, and tremolite. Manganese-rich silicate and carbonate minerals are characteristic of zinc lead skarns; manganoan hedenbergite is reported at the Paymaster deposit (no. 293, plate 10-1 and table 10-1), Esmeralda County (Gulbrandson and Gielow, 1960).

The largest zinc-lead skarns in Nevada are those in the Ward district (no. 301, plate 10-1 and table 10-1) with premining reserves of 1,300,000 tonnes containing 1.5% lead and 6.5% zinc (Hasler and others, 1991). Upper Paleozoic carbonate rocks at the Ward district are intruded by a 34 Ma monzogranite porphyry (James, 1972). According to James, ore minerals replace skarn above the intrusion and grade from sphalerite-chalcopyrite upward to galena-sphalerite-fluorite.

Iron Skarn Deposits

Plate 10-1 shows the location of 19 iron skarn deposits and occurrences. Iron skarn deposits contain magnetite or hematite with calc-silicate minerals in contact metasomatic rocks. The most important iron skarns develop where Mesozoic plutons intrude Triassic and Jurassic carbonate rocks in western Nevada. The Dayton Mine (no. 313, plate 10-1 and table 10-1), a good example of this type, has reserves of 44,000,000 tonnes containing 42% iron (Lowe and others, 1985). One small iron skarn associated with a Tertiary pluton (Hogle, no. 309, plate 10-1 and table 10-1) is in north central Nevada.

The largest iron skarn deposit in Nevada is in the northern Wassuk Range east of Yerington and is known as the Pumpkin Hollow or Lyon Prospect (no. 319, plate 10-1 and table 10-1). It was discovered in the 1950s by aeromagnetic surveys and does not outcrop. The published tonnage of Pumpkin Hollow is 250,000,000 tonnes containing 40% iron and 0.3% copper (Lowe and others, 1985), but the deposit may be as large as 400,000,000 tonnes (Marco Einaudi, oral commun., 1991). The reserve of 29,000,000 tonnes, containing 1.2% copper for the Lyon prospect (ARCO/Anaconda merger filing, Sept. 14, 1976) represents a small copper-rich portion the iron deposit. Although this deposit is similar to many other Nevada iron skarns in its geology (Upper Triassic limestone intruded by a Jurassic stock), it is unique with regard to its large tonnage and high copper content.

Iron endoskarns along the Pershing County-Churchill County boundary in the Mineral Basin district are associated with the gabbroic Humboldt Complex (John and Sherlock, 1991). They consist of massive magnetite replacement of mafic plutonic and volcanic rocks accompanied by scapolite and albite alteration and are analogous to the island-arc calcic magnetite skarn type of Einaudi and others (1981). The Buena Vista Mine (no. 325, plate 10-1 and table 10-1) is the largest of these with production of 230,000 tonnes and reserves in 1945 of 350,000 tonnes containing 54% iron, 0.04% sulfur and 0.49% phosphorous (Reeves and Kral, 1962). A more recent reserve estimate (Lowe and others, 1985) is 18,000,000 tonnes at 32.7% iron. The ore occurs mainly in replacement veins of magnetite and hematite in scapolitized gabbro. The Humboldt complex also contains small oxidized copper deposits of unknown type such as the Boyer copper deposit (no. 327, plate 10-1 table 10-1). Six iron endoskarns and three copper deposits in mafic rocks are shown with different symbols on plate 10-1 and listed separately in table 10-1.

Gold Skarn Deposits

Skarn deposits valued primarily for gold have only been recognized and mined in Nevada in recent years. Plate 10-1 shows the location of 10 gold skarn deposits. The descriptive model for gold skarns used in this report is the model constructed by Theodore and others (1991) for deposits with a gold grade of at least 1 gram per tonne and with distinctive skarn mineralogy. This model is in general agreement with Meinert (1988). According to the models, the gold-bearing skarns are generally calcic exoskarns associated with intense retrograde hydrosilicate alteration; the skarns may contain economic amounts of copper, lead, zinc, bismuth, and numerous other commodities as well as gold and silver. Native gold, pyrrhotite, base-metal sulfide minerals, bismuth minerals and magnetite are the most common ore minerals. Garnet, pyroxene, wollastonite, chlorite, epidote, quartz, actinolite-tremolite, and/or calcite are the most common gangue minerals. Most deposits are found in orogenic belts and island arc settings and are associated with felsic to intermediate intrusive rocks. Studies by Theodore and Hammarstrom (1991) on barren skarns versus gold skarns concludes: 1) limestone is a major host rock, nearby major faults or fault intersections are important, contacts between different lithologies are important. 2) gold mineralization is associated with extensive retrograde skarn formation dominated by actinolite, tremolite, quartz, calcite, chlorite, and sometimes clay (nontronite at Buffalo Valley). 3) high-temperature, high-saline conditions are sometimes present.

Most deposits assigned to this model type in Nevada are in the Copper Canyon (e.g., Fortitude and Tomboy-Minnie, no. 333 and 337, plate 10-1 and table 10-1) and Copper Basin (e.g., Surprise, no. 336, plate 10-1 and table 10-1) areas of the Battle Mountain district. The other large deposit of this type is in the McCoy district (McCoy Gold Mine, no. 339, plate 10-1 and table 10-1). Other occurrences of gold-bearing skarns are more appropriately assigned to the other skarn types.

Polymetallic Replacement Deposits

Polymetallic replacement deposits typically form tabular, podlike, and pipelike orebodies which are localized by faults or sedimentary strata. The deposits are in sedimentary rocks, chiefly carbonates, which are intruded by porphyritic calc-alkaline plutons. Massive carbonate beds which fracture during intrusion and deformation are the preferred host rock. Polymetallic replacement ores contain galena, sphalerite, tetrahedrite, and silver sulfosalts. Mineral zoning is common with inner zones rich in chalcopyrite or enargite and outer zones containing only sphalerite and rhodochrosite. Jasperoid is commonly found near orebodies.

Plate 10-1 shows 129 deposits and occurrences assigned to this model, most of them are in the eastern part of the state which is predominantly underlain by Paleozoic carbonate rocks, but a few deposits are found in Triassic carbonate rocks in western Nevada. Age of formation of polymetallic replacement deposits is difficult to determine because of the lack of ore or gangue minerals than can be dated isotopically. Of the three most significant clusters of polymetallic replacement deposits in Nevada, Pioche-Bristol-Highland, Eureka, and Goodsprings districts, the first is associated with Cretaceous or, more likely Tertiary plutons, the second with Cretaceous intrusions and the third with Triassic igneous rocks. Overall, Triassic plutons are not widespread in Nevada and more than 80% of known deposits and occurrences are near plutons of Cretaceous or Tertiary age.

The Pioche-Bristol-Highland districts constitute the richest cluster of polymetallic replacement deposits in Nevada producing more than 6,000,000 tonnes of lead-zinc-silver-gold ore between 1912 and 1964. One deposit, the Pan American (not listed in table 10-1) had reserves in 1982 of 2,420,000 tonnes containing 1.17% lead and 2.45% zinc (Lowe and others, 1985). Most of the stratabound ore in the district was found in limestone beds in the Cambrian Pioche Shale, but pipelike orebodies were found in higher units and rich veins were found in the underlying Precambrian quartzite (Westgate and Knopf, 1932; Gemmill, 1968).

The deposits in the Bristol district (no. 347-354, plate 10-1 and table 10-1) are possibly related to Tertiary granite plutons, but in the Pioche district to the south (no. 448-453, plate 10-1 and table 10-1), the question of age is complicated by the presence of the Yuba dike which parallels the mineralized veins and has been dated at 64 Ma (Johnston, 1972). The deposits in the Eureka district (no. 374-396, plate 10-1 and table 10-1) are mainly hosted in Cambrian carbonate rocks and are apparently associated with Cretaceous quartz diorite and quartz porphyry bodies which are poorly exposed in small outcrops and in mine workings (Nolan, 1962). The question of the age of the mineralization is complicated, however, by the presence of an Oligocene volcanic center in the southern part of the district (Blake and others, 1975).

The deposits in the Goodsprings or Yellow Pine district (no. 400-427, plate 10-1 and table 10-1) occur in Devonian and Mississippian strata and are related to poorly exposed granodiorite porphyry bodies which are noted for their very large feldspar crystals (Hewitt, 1931). Recent and detailed studies of the radiometric ages of these intrusions show that they are Triassic in age (Garside and others, 1993). The Goodsprings district is unique in Nevada in that a small proportion of the deposits in the district diverge markedly from typical polymetallic replacement deposits. The Boss Mine (no. 406, plate 10-1 and table 10-1) for example, is a high-grade, oxidized copper deposit with an interior zone rich in platinum group metals. Other examples such as Potosi (no. 420, plate 10-1 and table 10-1) resemble Mississippi Valley-type deposits in their ore textures and great distance from a plutonic source of mineralization (Hewitt, 1931; Paul Barton, oral commun., 1988).

Replacement Manganese Deposits

Plate 10-1 shows the location of 17 replacement manganese deposits and occurrences. Replacement manganese deposits are spatially and genetically related to polymetallic replacement deposits, but contain a higher amount of manganese or manganese oxide minerals and lesser amounts of Pb-, Zn-, and Ag-, minerals. Manganese carbonate replaces carbonate rocks and fills veins or cavities. The richest part of the ore is usually in the oxidized and weathered zone where carbonates are altered to black oxides and hydroxides. Copper carbonates are locally present in oxidized ores in the Pioche district. Spatial coincidence with polymetallic replacement deposits is strongest in the Pioche-Bristol-Highlands district which is the largest producer of this type in the state, yielding about 100,000 tonnes of ore (Crittenden, 1964). Elsewhere in the state, replacement manganese deposits are localized more distally to polymetallic replacement deposits in the White Pine district, and to porphyry copper deposits in the Robinson district.

Distal-disseminated Silver-gold Deposits

Distal-disseminated silver-gold deposits (Cox and Singer, 1992) contain silver and gold in stockworks of thin quartz-sulfide veins in sedimentary rock, and contain trace elements indicative of a plutonic-related suite, specifically Pb, Zn, Mn, Cu, As, Sb, and Bi. Most deposits contain a higher silver grade than sediment-hosted gold deposits. They are present in or near districts with major skarn, replacement, and vein base-metal ores, but are localized in the most distal parts of these districts. They are similar to sediment-hosted gold deposits discussed in a later section, but differ in ways described in table 10-4.

Table 10-4. Critical differences between sediment-hosted gold and distal disseminated silver-gold deposits

Type	Proximity to plutons	Ag:Au ratio	Geochemistry
Sediment-hosted Au	some deposits	less than one	As,Sb,Hg,Zn
Distal disseminated Ag-Au	all deposits	more than one	Mn,Zn,Pb,As,Sb

We have classified 16 deposits in Nevada belonging to this type. The largest is the Cove deposit (no. 498, plate 10-1 and table 10-1), with 81,000,000 tonnes of ore containing 1.8 grams per tonne Au and 92.5 grams per tonne Ag (Emmons and Coyle, 1988). Other deposits include Hilltop, Lucky Hill (Candelaria district), Star Pointer (Robinson district), and Taylor (nos. 497, 493, 499, and 500, plate 10-1 and table 10-1). Surface oxidation of distal disseminated deposits results in bonanza silver chloride-rich orebodies, such as found at Treasure Hill (no. 501, plate 10-1 and table 10-1) in the White Pine district.

Polymetallic Vein Deposits

Polymetallic veins are the most common intrusive-related mineral deposit type and Plate 10-1 shows the location of 265 deposits and occurrences. They are characterized by quartz veins containing diverse base- and precious-metal sulfide ore minerals in proximity to a granitoid intrusive rock. Vein structure can be complex and multiphase with a variety of forms and veins characteristically have envelopes of sericitic or argillic alteration. Tetrahedrite (or tennantite) is a characteristic ore mineral, and sphalerite, galena, chalco-pyrite jamesonite, native bismuth, stibnite and arsenopyrite are present in varying amounts. Most of these veins were mined for their silver content, but lead, zinc, and copper were also recovered from some. Native gold and electrum are present in some deposits, and many small veins were mined just for their gold content. Scheelite may also be present in polymetallic veins and, for some of these veins, was the principal commodity of interest in mining. The Teacup (Biscuit) mine, Cherry Creek district, White Pine County (no. 534, plate 10-1 and table 10-1) is an example of a tungsten-bearing polymetallic vein as is the Scheelite Chief, in the Shoshone district (no. 183, plate 10-1 and table 10-1). The Montezuma group of veins in the Arabia district, Pershing County (no. 504, plate 10-1 and table 10-1) are examples of polymetallic veins that produced antimony. Molybdenite, and fluorite are also reported in some polymetallic veins. At the Ashdown Mine (no. 757, plate 10-1, and table 10-1) in northern Nevada the vein was originally mined for free gold in quartz associated with pyrite, galena, and tetrahedrite, but at deeper levels, a body of massive molybdenite was encountered in a brecciated quartz vein (Stager and Tingley, 1988, p. 95).

Polymetallic veins are found throughout most of Nevada and are in association with plutons of all ages. Distribution patterns of polymetallic veins based on age of associated plutons suggests a correspondence with mineralized Tertiary plutons in the central part of Nevada. There is also a strong association with Jurassic and Cretaceous plutons, and it is interesting to note that many polymetallic vein deposits and occurrences are distributed toward the eastern edge of the Cretaceous Lovelock belt. In the Kennedy district (Gold Note, no. 594), polymetallic veins are associated with plutons of both Triassic and Tertiary ages (Wallace, 1977). Vikre and McKee (1985) have proposed that polymetallic veins in the Humboldt Range, Pershing County (e.g., Arizona, De Soto, no. 749, 726, plate 10-1 and table 10-1) are related to an unexposed pluton of Cretaceous age. Gold-bearing veins in the Searchlight district, Clark County (e.g., Quartette, no. 716, plate 10-1 and table 10-1) formed in proximity to a large Tertiary granitoid batholith.

The veins in the Reese River (Austin) district (represented by Whitlach, no. 701, plate 10-1 and table 10-1) were the most productive polymetallic veins in the state. Fifteen named veins and many smaller structures were found in a Jurassic pluton and in quartzite derived from lower Paleozoic sedimentary rocks. The veins measure up to 3 feet (1 m) in thickness, and as much as 3600 feet (1,100 m) in length and 1,700 feet (520 m) down dip (Ross,1953). They contain mainly quartz, with locally abundant calcite and rhodochrosite and sparsely distributed pyrite, base-metal sulfides, arsenopyrite, tetrahedrite, stibnite and proustite. The veins are believed to be genetically related to a Cretaceous pluton 8 km to the southeast, based on an age of 89 Ma obtained from vein sericite (E.H. McKee, oral commun., 1989).

Polymetallic veins are, in most places, spatially related to other deposit types associated with intrusive activity, such as polymetallic replacement, porphyry copper and porphyry molybdenum deposits. At Copper Basin and Copper Canyon, in the Battle Mountain district, an area where past and current mining activity includes deposits of both the porphyry copper, skarn-related type and gold and copper skarns, as well as a porphyry molybdenum, low-fluorine system, Theodore and Hammarstrom (1991) point out that all of these mineralizing centers are surrounded by a halo of polymetallic veins whose metal contents systematically vary laterally with distance from the porphyry centers. The Lucky Hill distal-disseminated deposit at Candelaria is associated with numerous polymetallic veins, such as the Potosi (no. 529, plate 10-1 and table 10-1).

Platinum in Mafic Rocks

This informal designation applies to a single group of deposits in the Bunkerville district in southern Nevada. At the Key West Mine (no. 777, plate 10-1 and table 10-1) platinum and palladium are associated with disseminated interstitial grains of pyrrhotite and copper-nickel sulfides in a hornblende pyroxenite dike that intrudes Precambrian metamorphic rocks.

Gold Veins Related to Two-mica Granite

Deposits on Mineral Ridge in the Silver Peak district and in the Lone Mountain district, (nos. 780-783, plate 10-1) are associated with Cretaceous alaskite and peraluminous granite that intrude schist and marble of the Precambrian Wyman Formation (Spurr, 1906, Bercaw and others, 1987, Keith and others, 1991, p. 405). The gold is found in quartz-carbonate veins with pyrite and minor arsenopyrite and galena. Similar veins associated with two-mica granite have been described by Theodore and others (1987) in the Gold Basin-Lost Basin districts in north eastern Arizona. The association of gold veins and peraluminous granite has been recognized by Keith (1984).

DEEP SEATED DEPOSITS UNRELATED TO IGNEOUS PLUTON

Twenty-two deposits and occurrences are considered to have a deep seated origin, but are not proven to be associated with epizonal and mesozonal plutonic rocks. Some deposits are located in the amagmatic zone of southern Nevada; others are related to metamorphic or tectonic processes.

Low-sulfide Gold-quartz Veins

Auriferous quartz veins with Ca-Mg-Fe carbonates, pyrite and sparse base-metal sulfides described as low-sulfide gold-quartz veins by Berger (1986b) are abundant in the western foothills of the Sierra Nevada in California. These veins commonly contain fluid inclusions rich in carbon dioxide, and, in rocks rich in Ca and Mg, such as basalt, graywacke or serpentine, they are enveloped by carbonate alteration zones. In other rock types, albite and sericite are common alteration products. These veins are found mainly along ductile shear zones in metavolcanic and volcaniclastic rocks of the greenschist facies of regional metamorphism and are recognized in northwestern Nevada in the Jackson Terrane. An example, visited by us, is the Cassidy Mine (no. 769, plate 10-1 and table 10-1). Metavolcanic rocks of the Koipato Terrane also contain gold-quartz veins that are suggestive of this type. In Koipato outcrops in the East Range, Theodore (oral commun., 1992) found gold occurrences in small quartz veins that contain carbon dioxide-rich fluid inclusions.

Gold on Flat Faults

Auriferous veins in shear zones and faults related to detachment zones were described as gold on flat faults by Bouley (1986) and detachment-fault-related polymetallic deposits by Long (1992a,b). These deposits typically have hematite and chalcopyrite as veins with chlorite-rich alteration halos. Examples in Nevada are localized along faults associated with the Precambrian to Tertiary core complexes along the Colorado River in the Eldorado and Newberry districts of southern Clark County (Wall Street Mine and Camp Dupont Group, nos. 771 and 773, plate 10-1 and table 10-1).

Quartzite-hosted Gold

Quartzite-hosted gold is a name informally applied to a group of poorly understood deposits in Nevada in which gold is found in milky quartz veins in upper Precambrian quartzite. Sulfides are rare or absent in these veins and alteration envelopes are not apparent. Examples are in the Johnnie district (Johnnie Mine no. 778, plate 10-1 and table 10-1). The Johnnie district is situated in the part of southern Nevada that is magnetically quiet and known as the amagmatic corridor (Anderson, 1981). Igneous rocks younger than the quartzite host rocks are unknown in this area and we believe these veins are formed by a process or processes unrelated to igneous intrusion. Deposits that are similar with respect to host-rock, texture, and mineralogy occur elsewhere in Nevada, but can be explained more conventionally by their spatial association with igneous rocks. Examples of these are in the Osceola (Gold Exchange Group, no. 779, plate 10-1 and table 10-1) and the Treasure Hill section of the Pioche district.

Lead-zinc Veins

Small veins of galena and sphalerite are known in the amagmatic region of southern Nevada emplaced in carbonate rocks of Paleozoic age (Ada and Edith claims and Sampson claims, no. 784 and 787, plate 10-1 and table 10-1). The veins are found in the same stratigraphic unit (Montecristo Formation) that is mineralized in the Goodsprings district 60 km to the south, and locally expand into small replacement deposits within that unit (J.V. Tingley, written commun., 1992). These occurrences resemble polymetallic vein and replacement deposits. They were not so classified because of the absence of evidence for an igneous source for the metals.

MINERAL DEPOSITS RELATED TO EPITHERMAL SYSTEMS

Plate 10-2 shows 636 gold-, silver-, uranium-, manganese-, tin-, mercury-, and antimony-bearing deposits and prospects, the majority of which are hosted in volcanic rocks and formed in the classic epithermal environment of shallow depth and relatively low temperatures analogous to fossil geothermal systems (White, 1981). These include the bonanza silver-gold vein districts of Tonopah and Comstock which established Nevada as the "Silver State."

Epithermal gold- and silver-bearing deposits related to volcanic systems are grouped into a quartz-adularia type, a quartz-alunite type, and a hot-spring type. Sediment-hosted gold deposits are discussed separately. The three types of epithermal gold-silver deposits consist of veins, stockworks, breccias, and disseminations; they follow faults and fractures in or near subaerial felsic to mafic lava flows, pyroclastic rocks, breccias, and subvolcanic intrusions. Some occur in sedimentary rocks near volcanic centers or subvolcanic intrusions (e.g., Willard, no. 1054).

Deposits principally containing commodities other than precious metals are grouped into six mineral deposit models. Volcanogenic uranium and epithermal manganese deposits develop in a variety of volcanic environments. Rhyolite-hosted tin deposits develop in highly-evolved rhyolites marked by the presence of topaz. Sediment-hosted mercury deposits are found primarily in pre-Tertiary carbonate rocks. Hot-spring mercury deposits are found in both volcanic and sedimentary rocks and many appear to be associated with basaltic rocks. Simple antimony deposits are found in both volcanic and sedimentary host rocks and over a wide range of geologic environments, and although the most productive deposits are in pre-Tertiary sedimentary rocks, the common association of antimony with epithermal vein systems suggests relationship to nearby volcanic activity.

Epithermal Quartz-adularia Gold-silver Deposits

Plate 10-2 shows the location of 281 epithermal gold- and/or silver-bearing mines and prospects in volcanic rock or in nearby sedimentary rock that are classified as quartz-adularia deposits or occurrences. This class of deposits is also termed alkali-chloride for the chemistry of the fluids or adularia-sericite referring to the characteristic alteration minerals (Heald and others, 1987). Productive deposits are characterized by complex ore mineralogy, with argentite and silver sulfosalts, galena and chalcopyrite, local tetrahedrite or sphalerite, extensive and gradational alteration, especially propylitic alteration, vuggy, comb, and crustiform vein structures with banded sulfide layers, quartz, calcite, and pyrite gangue mineralogy. Adularia is commonly present and sericite is also a common potassic mineral. Vein deposits in Tonopah, the Comstock, and Seven Troughs districts, among many others, are examples of this type.

Mosier and others (1986) have subdivided the quartz-adularia vein deposits into three subtypes using grade and tonnage differences which are correlated with differences in basement lithologies and corresponding availability of brines in the developing hydrothermal system. Comstock epithermal veins develop above a brine-poor basement composed of clastic sedimentary and metamorphic rocks, Sado epithermal veins develop above basement composed of thick volcanic or plutonic rocks, and Creede epithermal veins develop above basement composed of older miogeosynclinal sequences in which brines are abundant. The geologic environment permissive for Comstock epithermal vein deposits is very widespread in Nevada, and the majority of records describing gold-bearing epithermal vein deposits contain geologic data which supports assignment to the Comstock epithermal vein deposit type. We retain the classification of a few deposits in the Bruner district in Nye County, Nevada, as the Sado type as shown in Bulletin 1693. These have a simple ore assemblage of native gold and minor chalcopyrite in opaline or chalcedonic quartz in brecciated zones in or near intrusive rhyolite. The Bruner district (represented by the Duluth Mine, no. 1072, plate 10-2 and table 10-2) is situated in a region underlain by greater than 1,000 m thickness of rocks interpreted to be tuffs (chapter 2). We have not assigned any deposits in Nevada to the Creede type.

We use the descriptive model for Comstock epithermal vein deposits to represent the essential characteristics of the quartz-adularia epithermal deposits, and we use that grade and tonnage model in our analysis for undiscovered deposits. Comstock type deposits typically contain small amounts of fine-grained sulfides, sulfosalts and have low base-metal grades. Silver is characteristically much more abundant than gold.

The majority of the epithermal quartz-adularia vein deposits in Nevada are hosted in Tertiary volcanic rocks and are spatially related to synvolcanic deformational features, that is, faults and fractures in the host rock formed during or closely following the period of igneous activity. The type, kind, and timing of the structural preparation is described in chapter 4. Epithermal quartz-adularia districts are found in roughly equal numbers in volcanic rocks of the Bimodal basalt-rhyolite assemblage, Western andesite assemblage, and Interior andesite-rhyolite assemblage described in chapter 5 (table 10-5)

Table 10-5. Selected epithermal districts associated with three distinct volcanic assemblages in Nevada.

Bimodal basalt-rhyolite assemblage	Western andesite assemblage	Interior andesite-rhyolite assemblage
Silver Peak	Comstock	Fairview-Bell
Jarbidge	Aurora	Wonder
National	Rawhide	Tuscarora
Seven Troughs	Olinghouse	Bruner
Gold Circle (Midas)	Talapoosa	Sand Springs
Bullfrog-Pioneer?	Como	Eagle Valley
Rawhide (Regent)	Bovard	Bellehelen
Cornucopia	Ramsey	Eastgate
Rosebud	Gilbert	Golden Arrow
Klondike?	Hannapah?	Clifford?
Sleeper	Paradise Peak	Round Mountain-Gold Hill

(?) indicates districts in areas of overlapping assemblages, and for which the association is uncertain.

The silver-bearing veins in the Rochester district (Coeur Rochester at Nenzel Hill, no. 1005, plate 10-2 and table 10-2), hosted in Triassic rhyolites resemble epithermal quartz-adularia deposits in their vein mineralogy, form and structure, and alteration mineral assemblages. But, as pointed out by Vikre (1981), these veins have escaped deformation and recrystallization during the Cretaceous orogeny and have been dated by K-Ar methods at about 79 to 97 Ma (Vikre and McKee, 1985) although the enclosing Koipato rhyolites are approximately 235 Ma. We are unable to classify Coeur Rochester, although it is shown in plate 10-2 with a symbol representing the quartz-adularia type.

A few deposits hosted in pre-Tertiary sedimentary rocks are assigned to the epithermal quartz-adularia model. In these examples, the vuggy, open, quartz vein structure and the ore mineralogy clearly suggest epithermal origin; the Willard deposit (no. 1054, plate 10-2 and table 10-2) is a good example, and the gold-bearing veins in the Manhattan district (e.g., Manhattan Mine, no. 978, plate 10-2 and table 10-2) and Delamar district (e.g., Delamar Mine, no. 876, plate 10-2 and table 10-2) are other examples.

Epithermal Quartz-alunite Gold Deposits

Epithermal quartz-alunite gold vein deposits are recognized in only a few localities in Nevada. Goldfield, the only major past producing district of this type in Nevada, yielded 130 tonnes of Au (4.19 million oz), 45 tonnes of Ag (1.45 million oz), and 3420 tonnes of Cu (7.67 million lbs) (Ashley, 1990).

Epithermal quartz-alunite gold deposits typically have high gold-silver ratios; contain sulfur-rich copper minerals, especially enargite, famatinite, luzonite, and covellite; and are characterized by intense acid-sulfate hydrothermal alteration which results in depletion of potassium, sodium, calcium, and magnesium, and replacement by the aluminum-rich minerals, alunite, pyrophyllite, diaspore, and andalusite. Ore at Goldfield occurred in acid-sulfate zones with and without hypogene alunite (Ashley, 1990). The Mohawk Mine (no. 1089, plate 10-2 and table 10-2) in the Goldfield district is a good example of this type in Nevada. In the Peavine district, the Golden Fleece and Paymaster (no. 1093 and 1094, plate 10-2 and table 10-2) are included in the epithermal quartz-alunite model, however numerous enargite-pyrite veins associated with quartz-alunite alteration in the district display low gold values. The Wedekind district (e.g., Arkell, no. 1096, plate 10-2 and table 10-2) is included in this model because the alteration of the area includes pyrophyllite and diaspore although some small veins reportedly contain adularia. Quo Vadis, in the Alunite district in Clark County (no. 1074, plate 10-2 and table 10-2), consists of extensive quartz-alunite alteration associated with minor gold occurrences.

Most hypogene alunite occurrences with gold mineralization are associated with volcanic rocks of the Western andesite assemblage. The Alunite district is in andesitic rocks of the Mohave Province.

Alumina-rich alteration minerals formed early in the paragenesis, the presence of enargite-covellite-pyrite and the absence of adularia and calcite distinguish this class of gold-bearing deposit from the quartz-adularia type (Heald and others, 1987). Many deposits and altered areas in Nevada contain supergene alunite derived by oxidation of sulfur-rich fluids during the final cooling of the system or during weathering and oxidation by surface waters. Supergene alunite is paragenetically late and is commonly concentrated in the upper-most parts of hydrothermal systems. These deposits are not included in this model.

Hot-spring Gold-silver Deposits

Hot-spring gold-silver deposits are sparsely distributed throughout western Nevada and include several very productive mines (over 200,000 oz Au per year). Plate 10-2 shows the location of 20 hot-spring gold-silver deposits. Together they contributed 32% of Nevada gold production in 1988 (Bonham, 1989). Geologic studies of processes active at hot-springs that form the basis for the descriptive model are by White (1981 and 1985), Berger (1985), and Berger and Henley (1989).

Hot-spring deposits form where hydrothermal systems are active within a few hundred meters of the surface. Geologic characteristics include siliceous sinter, fumarolic mineral precipitates, and hydrothermal eruption breccias (Berger, 1985). Deposits typically have a high gold-silver ratio and contain precious-metals and sparse sulfides disseminated throughout a thick blanket-like section of permeable tuffs or in stockworks in brittle rocks. Deeper levels of hot-spring gold-silver deposits have geologic characteristics in common with epithermal veins, such as fault control, open-space-filling textures, and wallrock alteration. The transition from quartz-adularia to hot-spring deposit types is illustrated by three deposits in the National district in Humboldt County described by Vikre (1985, 1987). The National Mine (no. 987, plate 10-2 and table 10-2) in the northern part of the district is a quartz-adularia vein. The Buckskin National Mine (no. 1111, plate 10-2 and table 10-2) which contains late stage vug- and fracture-filling quartz, sulfides, and chalcedonic sinter, is classified as a hot-spring gold deposit, and the McCormick Mercury Mine (no. 1251, plate 10-2 and table 10-2) on the top of Buckskin Mountain, is a hot-spring mercury deposit in sinter. All represent different levels of the same Miocene hydrothermal system which extended from the surface to more than 700 m in depth (Vikre, 1987). Similar range of depth of ore deposition and differences in mineralization styles exists in the Round Mountain (no. 1114, plate 10-2 and table 10-2) and Sleeper (no. 1117, plate 10-2 and table 10-2) deposits. The large tonnage of bulk-mineable ore leads us to classify those two as hot-spring gold deposits rather than quartz-adularia vein deposits. Elsewhere, as at Rawhide (no. 1003, plate 10-2 and table 10-2) early mining activity centered on vein-type deposits, and the deposit is here classified as a quartz-adularia vein, but more recent exploration and development has revealed parts of the deposit that more closely resemble a hot-spring system (Black and others, 1991). Wind Mountain (no. 1115, plate 10-2 and table 10-2), is similar to Hog Ranch (no. 1108, plate 10-2 and table 10-2) (J.V. Tingley, written commun., 1989). Jaimies Ridge (no. 1110, plate 10-2 and table 10-2) is similar to Borealis (no. 1109, plate 10-2 and table 10-2). These deposits as well as Goldbanks (no. 1105, plate 10-2 and table 10-2), Round Mountain and Sleeper are examples of volcanic-hosted hot-spring deposits in which metals are deposited over a wide vertical range and which have many characteristics of quartz-adularia systems.

Because of the overlap of characteristics between gold-silver-bearing hot-spring and epithermal vein deposits, the classification of many deposits is open to debate. We have chosen to assign to this model the 16 deposits listed in the grade and tonnage model for hot-spring gold-silver deposits by Berger and Singer (1992) and six others that have similar geologic and deposit size characteristics.

Most hot-spring deposits in Nevada are found in volcanic rocks of the three assemblages mentioned above. Hog Ranch, Buckhorn, Fire Creek, and Sleeper are examples of deposits in rocks of the bimodal assemblage. Hog Ranch contains gold in mineralized sinter and disseminated in pyrite-rich bodies and the deposit as a whole physically resembles surface hot-spring areas at Mount Lassen and Yellowstone. Buckhorn (no. 1101, plate 10-2 and table 10-2) and Fire Creek (1113, plate 10-2 and table 10-2) are associated with the Northern Nevada rift zone, intruded by basaltic rocks of the bimodal assemblage. Both deposits contain gold localized within vertical fault zones cutting relatively impermeable, argillically altered basaltic andesite (Monroe and others, 1988). Sleeper is in peralkaline pyroclastic rocks intruded by a rhyolitic dome complex of the bimodal assemblage. Gold and silver are in bonanza veins, stockworks, and breccias which formed in a near-surface environment (Rytuba, 1989). Sleeper is most famous for electrum-chalcedony bonanza veins which also contain significant argentite and tetrahedrite, as well as silver telluride and selenide minerals and traces of adularia (Saunders and others, 1988). According to detailed studies at Sleeper (Nash and others, 1991), the bonanza vein segments of the deposits formed during periods of stable, quiet hydrothermal flow, and the stockworks and breccias, which have a higher silver:gold ratio, formed during intermittent periods of hydraulic fracturing and hydrothermal eruption.

In the volcanic rocks of the western andesite assemblage, Borealis and Paradise Peak are good examples. At Borealis gold is disseminated in zones of pervasive silicification in pyroclastic rocks interbedded in a flow sequence of intermediate composition (Tenneco Minerals, 1987). Mineralized hydrothermal breccias host main stage ore at Paradise Peak (John and others, 1991, no. 1104, plate 10-2 and table 10-2). Borealis and Paradise Peak are both characterized by extensive alunite alteration.

Round Mountain, the largest deposit in terms of tonnage, is associated with rocks of the interior andesite-rhyolite assemblage. Bulk-mineable disseminated gold was deposited primarily at depths of 400 to 500 m below the paleosurface in rhyolitic ash-flow tuffs (Sander, 1988), but high-grade veins are associated with hot-spring sinter. These veins, along with evidence for multiple brecciation episodes, were reported at the top portion of Round Mountain that was exposed prior to large-scale open pit mining (Tingley and Berger, 1985).

Lewis and Tonopah-Hasbrouck (no. 1118 and 1102, plate 10-2 and table 10-2) are examples of hot-springs deposits hosted in Tertiary sedimentary rocks. The gold deposit at Lewis formed from a hot-spring along a basin and range fault and is associated with only minor contemporaneous rhyolitic volcanic activity (Wallace, 1987). Precious-metal mineralization at Tonopah-Hasbrouck is in Miocene lake bed sediments and ash-fall tuffs below a chalcedonic sinter. The hot-spring was associated with dome-building volcanic activity (Graney, 1987). A few hot-spring deposits are found in mixed geologic environments of Tertiary volcanic and pre-Tertiary sedimentary rocks. The Atlanta deposit (no. 1099, plate 10-2 and table 10-2), for example, is located along the topographic margin of a caldera and both Tertiary tuffs and Silurian-Ordovician dolomites are altered and mineralized (Best and others, 1989). Florida Canyon (no. 1106, plate 10-2 and table 10-2) is another example of a hot-spring deposit developed upon and within pre-Tertiary sedimentary rocks. The Santa Fe deposit (no. 1116, plate 10-2 and table 10-2) is also included by us in the hot-spring gold-silver model. It appears to be similarly situated in pre-Tertiary sedimentary rocks that were mineralized by later volcanic hydrothermal episodes during the Miocene (19 Ma, Fiannaca, 1987).

Distinguishing characteristics of precious-metal vein and hot-spring deposits

Epithermal quartz-adularia vein deposits are distinguished from hot-spring deposits by the lack of evidence suggesting deposition at the paleosurface, by the presence of complex sulfosalts in the ore mineralogy, by a higher silver-gold ratio, and by vein form and structure suggesting deposition of metals primarily in fissures.

Epithermal quartz-adularia vein deposits are distinguished from epithermal quartz-alunite deposits, by the lack of high-sulfidation copper mineral and hypogene alunite or other alumina-rich alteration minerals, by the presence of calcite, adularia, or sericite and by a relatively low base-metal content, especially as contrasted with the high levels of copper found in some quartz-alunite deposits. Where alunite is present in quartz-adularia districts it is generally post-mineral and formed by supergene oxidation. However in the Virginia City Range, Vikre and others (1988) show evidence for an early unmineralized quartz-alunite stage which pre-dates the quartz-adularia veins of the Comstock Lode, as well as younger supergene alunite alteration.

Polymetallic vein deposits can usually be distinguished from epithermal vein deposits by their proximity to plutonic rocks, close association with porphyry, skarn, or replacement deposits, and their common occurrence in non-volcanic host rocks. Additionally, base metal sulfides are much more abundant than in the Comstock type of quartz-adularia veins common in Nevada. Tetrahedrite is abundant in the polymetallic veins whereas complex silver sulfosalts are abundant in the quartz-adularia veins. Both types exhibit vuggy, open-space filling textures, but compact, massive quartz veins are also important in polymetallic vein systems.

Volcanogenic Uranium Deposits

Volcanogenic uranium deposits develop in a variety of volcanic-related environments. They are disseminations and veins of uranium oxide minerals associated with shallow intrusive rhyolites and formed in a near surface environment. Plate 10-2 shows the location of 42 deposits, prospects, and occurrences of uranium assigned to the volcanogenic uranium mineral deposit model. One of the larger deposits, the Coaldale prospect (no. 1125, plate 10-2 and table 10-2) contains uranium in iron-manganese-bearing siliceous sinter, as well as siliceous veinlets, joint surface coatings, cavity fillings, and a breccia pipe. The Hulse prospect (no. 1119, plate 10-2 and table 10-2) is similarly in a siliceous breccia pipe which is probably associated with the hot-spring system in the Atlanta district. The Moonlight Mine (no. 1138, plate 10-2 and table 10-2) is in rhyolitic ring domes and shallow intrusive rocks associated with caldera margins in the McDermitt district. Other caldera-related deposits shown on Map. B are Dacie Creek (no. 1130, plate 10-2, and table 10-2), Lucky Day (no. 1122, plate 10-2 and table 10-2), Pilot Group (no. 1129, plate 10-2 and table 10-2) and those around the Mount Jefferson caldera complex (Pine Group, no. 1146, plate 10-2 and table 10-2). Some deposits occur in Miocene sedimentary rocks and resemble sandstone uranium deposits. They are included in the volcanogenic type because they occur close to volcanic centers and in the same districts as the volcanic-hosted deposits. The Petrified Tree deposit (no. 1156, plate 10-2 and table 10-2), an example of this type, contains uranium minerals in fossilized logs in sandstone overlying a bentonite clay layer. Scattered uranium occurrences are found in veinlets and breccias and disseminated in ash-flow tuffs at many localities in the state; perhaps many of these occurrences represent redistribution of uranium through the groundwater system at low temperatures.

Epithermal Manganese Deposits

Plate 10-2 shows the location of 14 epithermal manganese prospects. Typically, these are epithermal veins filling faults and fractures in subaerial volcanic rocks and 11 of those assigned to this model are in hot springs, fault zones, and tuffs related to Tertiary volcanic activity. Of these, six are spatially associated with calderas. The Black Rock (no. 1170, plate 10-2 and table 10-2), is in the Silver Peak caldera; others are associated with the Mt. Jefferson, Hot Creek, and Indian Peaks calderas. The Golconda, (no. 1164, plate 10-2 and table 10-2) is in Quaternary calcareous tufa related to active hot spring activity. Black Jack, (no. 1171, (plate 10-2 and table 10-2)), is in fissure zones in Triassic sedimentary rocks. Epithermal manganese deposits may contain a variety of metallic elements in addition to manganese. In Nevada, four deposits (Golconda, Black Jack, Democracy, no. 1161, and Dixon, no. 1163, plate 10-2 and table 10-2) contain tungsten oxides; four others (Black Rock, no. 1170, Troy, no. 1167, American Eagle, no. 1169, and Skyline, no. 1172, Map and table 10-2,) contain trace amounts of silver or gold.

Rhyolite-hosted Tin Deposits

Rhyolite-hosted tin deposits are characterized by cassiterite and wood tin in discontinuous veinlets in high-silica (>75% SiO_2) rhyolites. Distinctive accessory and vapor-phase minerals include topaz, fluorite, pseudobrookite, beryl, and bixbyite. They frequently form placer deposits.

All four rhyolite-hosted tin occurrences identified in Nevada are located in the Izenhood district, Sheep Creek Range, north-central Nevada at the southern edge of the Owyhee Plateau. The Mayflower (no. 1177, plate 10-2 and table 10-2) is representative of this type. They are present as cassiterite-bearing quartz incrustations in discontinuous and irregular fractures, and are interpreted to have formed during cooling of the lava flows and domes. Topaz, pseudobrookite, sanidine, silica minerals, fluorite, garnet, and cassiterite were deposited as vapor-phase minerals in miarolitic cavities. Host rock for these deposits are Miocene (ca 14 Ma) topaz-bearing rhyolite domes (Christiansen and others, 1986). The deposits were located by prospectors tracing the source of placer tin deposits. Similar rocks, without reported tin mineralization but reported to contain topaz, fluorite in silica-lined miarolytic cavities, are found farther southeast along the Cortez Rift in the vicinity of the Horse Canyon Mine (sediment-hosted gold) and Buckhorn Mine (hot-spring gold). A similar sequence of highly-evolved Miocene rhyolites is found at the northern end of the Sonoma Range, south of Winnemucca (Steve Ludington, unpublished data, 1991) but no tin prospects have been discovered in these rocks.

Sediment-hosted Mercury Deposits

Plate 10-2 shows the location of 21 sediment-hosted mercury deposits and occurrences. There is no published descriptive model for this type of deposit. These deposits differ from the hot-spring mercury deposits in that mineralization is disseminated in carbonate rocks, both limestone and dolomite, and in fractures in cherts and chert conglomerates; most deposits have been described as due to replacement and the ore is frequently reported to have been formed by fluids that migrated along thrust faults and ponded below an impervious bed. Grade of the ore is high. Cinnabar is associated with stibnite and locally with jamesonite and other lead-antimony sulfides as well as zinc and copper minerals at many of the localities (Johnson, 1977; Phoenix and Cathcart, 1952). Horton Mine, (no. 1199, plate 10-2 and table 10-2) is in greenstone interlayered in ocean-floor sedimentary rocks of the Havallah sequence.

Most sediment-hosted mercury deposits are concentrated in two areas, the Pilot Mountains (nos. 1188-1192, plate 10-2 and table 10-2) in Mineral County and the Antelope Springs district at the southern end of the Humboldt Range (nos. 1179-1183, plate 10-2 and table 10-2) in Pershing County. Sediment-hosted mercury deposits are spatially associated with simple antimony deposits, and with a few epithermal gold deposits which are in pre-Tertiary sedimentary rocks.

Hot-spring Mercury Deposits

Hot-spring mercury deposits typically form in siliceous sinter near the paleo-groundwater table in areas of fossil hot-spring systems (Rytuba and Heropoulos, 1992). Cinnabar, native mercury, minor marcasite, and pyrite are present as coatings and disseminations in fractured sinter. The majority of mercury deposits in Nevada are assigned to this model type and plate 10-2 shows the location of 79 hot-spring mercury mines, prospects and occurrences. Many are spatially associated with exposed basalts, and others are in areas coincident with prominent linear aeromagnetic features which are interpreted to be large-scale tensional features filled with mafic dikes.

McDermitt (no. 1255, plate 10-2 and table 10-2), the premier mercury district in Nevada, with premining reserves of 300,000 flasks of mercury, is associated with the

McDermitt caldera complex. The mercury and associated uranium deposits are reported to have formed as the result of reconcentration of metals dispersed in tuffs by large near-surface hydrothermal systems active at the end stage of caldera-forming volcanic eruptions. The source rocks were mercury- and uranium-bearing ash-flow tuffs, domes, intrusions of peralkaline high-silica rhyolite, and contemporaneous sedimentary rocks deposited during an earlier stage of caldera activity (Rytuba and Glanzman, 1979). Mercury sulfide and chloride minerals (cinnabar and corderoite) were redeposited in blanket-like beds in tuffaceous lacustrine sedimentary rocks above an opalite breccia interpreted to represent a tuff breccia silicified during hot-spring activity; the ore deposits are in a zone of potassium feldspar-clay alteration and locally below beds altered to alunite and kaolinite.

Smaller mercury deposits are in the Ivanhoe and Goldbanks districts (Butte, no. 1235, and Goldbanks Quicksilver, no. 1231, plate 10-2 and table 10-2) where blanket-like beds contain chalcedony, opal, and locally alunite. At the McCormick deposit (no. 1251, plate 10-2 and table 10-2) in the National district, cinnabar is in bands in siliceous sinter, disseminated in silica cement between fragments in sinter breccia, and in cavity fillings with opal and chalcedony. Hot-spring sinter is still preserved in the Fish Lake Valley district (e.g., B and B Mine, no. 1223, plate 10-2 and table 10-2). Some deposits, especially those in the Bottle Creek district (e.g., Red Ore Mine, no. 1211, plate 10-2 and table 10-2), are associated with basalt dikes with no specific indication of having formed near the paleosurface, yet are included in this model, because the process of ore formation is assumed to be the same. Other deposits contain cinnabar in faults or breccias associated with rhyolite or basalt, either in Tertiary volcanic or sedimentary rocks or in adjacent older pre-Tertiary sedimentary rocks. Native sulfur is associated with cinnabar, alunite and chalcedony at deposits in the Sulphur district (nos. 1266-1267, plate 10-2 and table 10-2). Pyrite, chalcedony or opal are common and, unlike the sediment-hosted mercury deposits, only traces of Au-, Ag-, Sb-bearing minerals are reported in deposits assigned to this model.

Rytuba and Heropoulus (1992) tabulated precious- and base-metal content of vapor-deposited versus fluid-deposited cinnabar and found that the latter contains the higher amounts of these metals. Based on this study we suggest that the major difference between deposits classified as hot-spring mercury or as sediment-hosted mercury is due to deposition of the former from vapor phase hot-spring exhalations and the latter from the fluids below the paleo-groundwater table. Hot-spring gold-silver deposits are found near many hot-spring mercury districts and isolated mercury occurrences, including Paradise Peak, Wind Mountain, Goldbanks, Ivanhoe and Sulphur deposits.

Simple Antimony Deposits

Vein and replacement deposits containing antimony-bearing minerals are numerous in Nevada. Plate 10-2 shows the location of 61 deposits and occurrences that we assign to the simple antimony deposit model. Stibnite is the main or only ore mineral in over half of these deposits. It forms massive replacement pods or lenses containing large stibnite blades or masses of fine needles, or fissure-filling deposits in which stibnite crystals line vugs and cavities. Locally, cinnabar or scheelite is present with stibnite. Other deposits assigned to the simple antimony model contain minor pyrite and sulfosalts such as tetrahedrite and jamesonite, and some contain chalcopyrite and sphalerite. Some complex antimony deposits (e.g., the Montezuma Mine, no. 504, plate 10-1 and table 10-1) are classified as polymetallic veins because of their high base metal content.

Simple antimony deposits are found in a wide variety of host rocks, both igneous and sedimentary, that range in age from Paleozoic to Tertiary. Simple antimony deposits in and near volcanic rocks are associated spatially with hot-spring gold or mercury deposits, quartz-adularia gold-silver vein deposits, and sediment-hosted gold or mercury deposits. Simple antimony deposits in and near plutons are associated spatially with tungsten skarn, polymetallic veins, and distal disseminated silver-gold deposits. Other deposits with plutonic associations are in the Battle Mountain, Hilltop, and Nightingale districts. Comparison of the mineralogy and preferred host-rock of deposits in these diverse ore-forming environments reveals no obvious correlations.

The relationship of antimony with volcanic-related epithermal processes is documented in the National district, Humboldt County. There, the Indian Valley (no. 1319, plate 10-2 and table 10-2) simple antimony deposit is in volcanic host rock adjacent to quartz-adularia gold veins. Studies by Vikre (1985, 1987) in the National district show that stibnite is clearly part of the same mineralizing system that formed the hot-spring mercury to deeper level quartz-adularia gold-silver vein deposits. Simple antimony deposits are found in proximity to 26 to 27 Ma calderas along the northeast border of the Walker Lane magnetic anomaly belt (see chapter 3). Simple antimony deposits in this line are in Tertiary volcanic rocks (King Solomon, no. 1304, plate 10-2 and table 10-2) or in Paleozoic sedimentary rocks nearby (Toro, no. 1305, plate 10-2 and table 10-2), and are in close proximity to hot-spring gold and mercury deposits, and quartz-adularia veins. Other districts in which a genetic association with volcanism is probable are Black Knob (Sutherland Mine, one of the most productive in Nevada, no. 1300, plate 10-2 and table 10-2), Willard (Adriene, no. 1337, plate 10-2 and table 10-2), and Bernice (Hoyt, no. 1292, plate 10-2 and table 10-2).

The spatial association of simple antimony with sediment-hosted gold deposits is recognized in many districts as might be expected because the geochemical signature of As, Sb, and Hg is a well-known characteristic associated with many of the sediment-hosted gold deposits. Jerritt Canyon was discovered during exploration for antimony (Birak and Hawkins, 1985). Other districts with spatial association of simple antimony and sediment-hosted gold deposits include the Lynn and Big Creek districts in Lander County, and at Bald Mountain and Golden Butte in White Pine County.

The two largest simple antimony deposits in Nevada, the Sutherland and Bloody Canyon (Lowe and others, 1985) are part of a cluster of deposits in the Humboldt Range, Pershing County. Deposits ring the Humboldt Range, cross district boundaries, and are spatially associated with different deposit types. Stibnite is in the ores of the sediment-hosted mercury deposits of the Antelope Springs district near the south end of the range and simple antimony deposits are also found (Hollywood Mine, no. 1281, plate 10-2 and table 10-2). An age determination from a quartz-clinochlore-stibnite vein from the Hollywood Mine suggests an age of mineralization near 100 Ma (Vikre and McKee, 1985). The Bloody Canyon Mine (no. 1325, plate 10-2 and table 10-2), near the north end of the range, is spatially associated with silver-rich polymetallic veins.

SEDIMENT-HOSTED GOLD DEPOSITS

Sediment-hosted gold deposits were first recognized as a deposit type in the early 1960s (Roberts, 1986). They are now well known for their large tonnage, and large gold production despite grades as low as 0.7 grams per tonne (.02 oz per ton) Au. Many of these bulk-mineable low-grade disseminated gold deposits individually produce more than 300 kg (10,000 oz) of gold in one year. To put this in perspective, it can be recalled that 10,000 oz was the total production figure traditionally used to identify important gold-producing districts in the United States (Koschmann and Bergendahl, 1962). Plate 10-2 shows the location of 43 sediment-hosted gold deposits. Together they contributed 64% of Nevada gold production in 1988 (Bonham, 1989). Classification of deposits in Nevada follows the descriptive model for carbonate-hosted gold-silver deposits (Berger, 1986a). Subsequent discoveries of deposits in clastic sedimentary rocks as well as carbonate host-rocks and removal of pluton-related distal disseminated silver-gold deposits from the model led to the change in title to sediment-hosted gold.

Sediment-hosted gold deposits characteristically contain micron-sized gold grains localized along thin fractures and disseminated throughout sedimentary host rocks. Ore typically contains pyrite, stibnite, realgar, orpiment and only rarely contains visible gold. Hydrothermal alteration associated with gold includes replacement by jasperoid, argillization, leaching of carbonates, and locally, introduction of carbonaceous material (Berger and Henley, 1989; Bakken, 1991; Hofstra and others, 1991). In Nevada, sediment-hosted gold deposits are found in areas underlain by crust that has been over-thickened by thrusting during the Antler, Golconda, and Sevier orogenies (Berger and Henley, 1989). The host-rocks range in age from Cambrian to Triassic, and most deposits are in rocks of Devonian age or older. Host-rock lithologies are variable, but the lithologic sequence at each deposit typically includes fine-grained calcareous sedimentary rock. The deposits are distributed in three groups which reflect differences in host rocks, structures, and possibly, age of formation.

The central group is represented by deposits in the Jerritt Canyon (Burns Basin) district (nos. 1360-1363, plate 10-2 and table 10-2); the Carlin trend which includes the Bootstrap (nos. 1356-1357), the Lynn and Maggie Creek (nos. 1373-1383), and the Railroad (1391-1392), plate 10-2 and table 10-2) districts; Marigold (nos. 1354, plate 10-2 and table 10-2); deposits in the Cortez trend (nos. 1358-1359, and 1365-1368, plate 10-2 and table 10-2); Tonkin Springs (nos. 1397 plate 10-2 and table 10-2); Gold Bar (nos. 1394, plate 10-2 and table 10-2); and Northumberland (nos. 1384, plate 10-2 and table 10-2). Many of these districts are situated on or close to the Roberts Mountains Thrust. Ages of some of these gold deposits have been indirectly estimated at between 36 and 39 Ma (Bonham, 1989; Berger and Bagby, 1991). Numerous volcanic and high-level plutonic heat sources of that age exist, generally within 10 km of sediment-hosted deposits. They presumably caused fluid circulation through the Roberts Mountain fault zone and its subsidiary fractures.

The western group of sediment-hosted gold deposits is represented by deposits in the Getchell trend (nos. 1385-1390, plate 10-2 and table 10-2), Standard (no. 1371, plate 10-2 and table 10-2), and Fondaway Canyon (no. 1341, plate 10-2 and table 10-2). The Getchell trend deposits are hosted by siliceous shale and phyllite of Cambrian age; the other two by shales of Triassic age. All of these deposits lie along the eastern margin of the Lovelock belt of 90 Ma old granitic plutons. Some workers (Berger and Bagby, 1991) assign a Cretaceous age to these deposits and suggest that plutons of any age, in the environment of the overthickened crust and resulting connate water reservoirs, can form sediment-hosted gold deposits.

The eastern group of deposits is represented by the Bald Mountain (no. 1352-1353, plate 10-2 and table 10-2), Golden Butte (no. 1364, plate 10-2 and table 10-2), Alligator Ridge (no. 1348, plate 10-2 and table 10-2), Illipah (no. 1370, plate 10-2 and table 10-2), Night Hawk (no. 1342, plate 10-2 and table 10-2), and Green Springs (no. 1398, plate 10-2 and table 10-2) deposits. These deposits are along shale-limestone contacts of Cambrian age and Devonian-Mississippian age at the other localities. Deposits at Bald Mountain are near a small pluton of Tertiary age. No igneous rocks have been recognized as obvious heat sources for the other deposits. Research by oil company geologists (see especially the work of Chamberlain and Scott, 1987 and Chamberlain, 1989) suggests that the role of hydrocarbon reservoir formation and tectonic fracturing may be related to the occurrence of gold in this eastern group of relatively small tonnage and low-grade deposits.

MINERAL DEPOSITS ASSOCIATED WITH MARINE VOLCANIC ROCKS

Twenty-eight mineral deposits and occurrences (nos. 1400-1427, plate 10-2, table 10-2) representing deposit types that form contemporaneously, or nearly so, with the enclosing sedimentary and volcanic host rocks are recognized in Nevada. These include three types of volcanogenic massive sulfides.

Cyprus Massive Sulfide

Cyprus massive sulfide deposits are characterized by massive pyrite, chalcopyrite, and sphalerite as stratiform lenses in rock sequences containing mafic or ultramafic rocks, especially pillow basalts and diabase dikes. The Havallah sequence of greenstones, argillites, and cherts, comprising the Golconda allochthon, is the principal host for known Cyprus-type massive sulfides in Nevada. The lower Paleozoic greenstone, argillite, chert sequences comprising the lower part of the Roberts Mountains allochthon also contain permissive rock sequences for this type of deposit, but so far Cyprus-type massive sulfides deposits have not been found in them.

The Big Mike massive sulfide copper deposit in north-central Nevada (no. 1400, plate 10-2 and table 10-2) is in greenstone units in the Havallah sequence of the Golconda terrane, and is considered to be a Cyprus-type deposit. It had production of 100,000 tons of ore averaging 10.5% copper, the high grade being a result of secondary enrichment. One other occurrence, the Ground Hog claim (no. 1401, plate 10-2 and table 10-2), is assigned to the Cyprus massive sulfide model type and is found in similar rocks in the Toiyabe Range in central Nevada.

The Big Mike deposit was recognized as a massive sulfide on the basis of its association with marine basalt and chert, and has been described in detail by Snyder (1977) and Rye and others (1984). It consists of one main lens-shaped orebody, approximately 250 feet long, 160 feet wide, and 49 feet thick; other small lenses all less than 25 feet in length were found during mining. Both high angle and low angle faults offset the rocks in the mine area. The ore contains three types of sulfide occurrences. Massive pyrite ore and framboidal pyrite ore are restricted to carbonaceous chert and argillite, and stringer mineralization occurs in both the underlying and overlying pillow basalts. The massive pyrite ore has been enriched by supergene mineralization and secondary copper sulfides, djurleite, digenite, and covellite occur throughout the ore lenses. Manganiferous cherts and jasper, locally cut by hematite-bearing quartz veins, occur in the rocks stratigraphically above the ore deposit.

The Ground Hog claim contains anomalous copper values detected in geochemical analysis in silicified greenstone. We believe this occurrence indicates that Cyprus-type massive-sulfide-forming processes were active because of the geologic setting, geochemistry (Kleinhampl and Ziony, 1985, p. 242; see table 10-1), and the presence of a silicified zone that could represent an exhalite or footwall stockwork in the original rocks before metamorphism and deformation.

The Golconda allochthon contains many localities where pillow basalts and cherts are known to occur. Massive pyrite bodies within the terrane are rare; one such is reported to be located at the mouth of Mill Canyon on the west side of Battle Mountain (Ralph Roberts, oral commun., 1988). Discoveries of massive sulfide deposits with significant copper or zinc grades are limited to the Big Mike so far as is now known. Bedded jaspers, jasperoid dikes, and sediment-hosted volcanogenic manganese accumulations (of the type described by Mosier and Page, 1987) may offer useful guides for massive sulfide exploration (Snyder, 1977).

Besshi Massive Sulfide

Besshi massive sulfide deposits are characterized by thin, sheetlike bodies of massive to well-laminated pyrite, pyrrhotite, and chalcopyrite within thinly laminated clastic sediments and mafic tuffs. Deposits typically are associated with submarine basalt flows. These lithologies are common in the lower Paleozoic rocks of the Roberts Mountains allochthon, and in the Havallah sequence of the Golconda allochthon. In Nevada, the Mountain City (Rio Tinto) copper deposit, Elko County, (no. 1402, plate 10-2 and table 10-2), interpreted to be a massive sulfide deposit of the Besshi type (Proffett, 1979), occurs in the Ordovician Valmy Formation in the northernmost exposures of the Roberts Mountains terrane.

The Mountain City deposit had a production of 1,110,000 tons of ore averaging 9.7% copper and consisting of massive pyrite with subordinate chalcopyrite and local sphalerite, strongly affected by supergene chalcocite enrichment (Coats and Stephens, 1968). The ore forms disc-shaped lenses as much as 300 by 30 m, in shales and quartzite beds in the Valmy Formation. Basaltic rock, though common in the Valmy Formation, is not known to underlie the deposit, but small lenses of greenstone occur within 1/2 mile of the mine (Coats, 1968). The deposit was discovered beneath a leached gossan (Crawford and Forbes, 1932a, b).

Other occurrences of pyrite in pods, stratabound disseminations, and stockwork zones, reportedly occur at various localities throughout the terrane. One such stringer zone is located at the mouth of Cottonwood Canyon on the east side of the central Toiyabe Range (Casaceli and others, 1986). A pyrite pod is located at Saval Ranch along Glance Creek on the east side of the Independence Range (Ralph Roberts, oral commun., 1988).

Franciscan-type Volcanogenic Manganese

Stratabound manganese oxide minerals associated with chert and other deep marine sedimentary and volcanic rocks, described as Franciscan type volcanogenic manganese deposits by Mosier and Page (1987), are common in the Golconda allochthon of north-central Nevada. The Black Diablo deposit (no. 1404, plate 10-2 and table 10-2), a good example of this type, consists of massive lenses of ore, enclosed in red jasperoid that grades into thin-bedded chert of the Havallah sequence (Johnson, 1977). The main manganese ore is a chert containing braunite intergrown with chalcedony. Black Diablo’s production of about 55,000 tonnes of ore places it in the upper 10% of Franciscan-type deposits.

Kuroko Massive Sulfide

Kuroko massive sulfide deposits are associated with volcanic rocks of intermediate to felsic composition, in contrast to the Cyprus or Besshi-type which are found with mafic volcanic rocks (Singer, 1986). They contain lenses of massive pyrite-chalcopyrite and sphalerite-galena-barite interbedded with marine volcanic and sedimentary rocks. These lenses commonly overlie pipelike stockworks of pyrite-chalcopyrite veinlets believed to represent feeder zones for the submarine exhalations that form the stratiform deposits. Gold and silver are locally found in the stockworks and in the zinc-lead-rich lenses.

The mines and occurrences in Nevada assigned to the kuroko massive sulfide deposit type occur in the western part of the state. Studies within the southern Jackson Mountains (Sorensen and others, 1987; Hamilton, 1987) describe silver-copper and iron-copper prospects which are targets for exploration for volcanogenic massive sulfide deposits. Included is the Red Boy prospect (no. 1410, plate 10-2 and table 10-2), visited by our team, which has abundant fragments of massive pyrite-chalcopyrite-sphalerite ore on the mine dump. There is an association with volcanic-hosted magnetite deposits throughout the area and all the deposits may be part of the same volcanogenic system. The copper-bearing prospects and small mines shown on map B and listed in table 10-2 are possibly veins and stockworks associated with kuroko-type massive sulfide systems. Barite veins, noted throughout the region, may also represent parts of kuroko systems.

MINERAL DEPOSITS ASSOCIATED WITH CONTINENTAL ARC VOLCANIC ROCKS

In Nevada, only one type of mineral deposit, volcanic-hosted magnetite, is found that formed in association with continental volcanic arcs.

Volcanic-hosted Magnetite Deposits

Volcanic-hosted magnetite deposits (Cox, 1986c) are massive lenses and irregular bodies of magnetite, hematite, and apatite that occur in andesitic to trachytic volcanic rocks. The volcanic rocks near the deposits are commonly altered to diopside or biotite; scapolite, and sericite alteration is present in some deposits. The model is not well constrained, and the genesis and permissive environment is not understood. Most deposits worldwide are in subaerial volcanic rocks, but some deposits in Nevada are found in the Jackson terrane where both marine and nonmarine volcanic rocks are present.

Volcanic-hosted magnetite deposits occur in Nevada in two volcanic sequences of Jurassic age: the Happy Creek metavolcanic rocks of the Jackson Mountains (e.g., Iron King Mine (no. 1414, plate 10-2 and table 10-2), and the Pony Trail volcanic sequence in eastern Lander County (e.g., Modarelli deposit, no. 1421, plate 10-2 and table 10-2). The Iron King Mine consistently produced ore through the 1950s from lenses of magnetite and hematite along faults near a diorite contact. The host andesite is chloritized near the orebody. Minor marcasite, pyrite and chalcopyrite are present in the ore. In the Modarelli deposit, lenses of martite, magnetite, and apatite are localized at intersections of faults in rhyolite and rhyodacite of the Pony Trail Group (Shawe and others, 1962). The Pony Trail is mainly subaerial as indicated by interbedded air-fall tuffs and crossbedded sandstone and is intruded by extensive epizonal diorite and granodiorite plutons (Muffler, 1964). The deposit had reserves in 1971 of 44,000,000 tonnes of ore containing 43.75% Fe and 1.05% P_2O_5 (Moore, 1971). Reconnaissance sampling of iron prospects in the Modarelli area (T.G. Theodore, oral commun., 1992) showed that the hematite-apatite-rich ores contain 400 to 2,380 ppm total rare earth elements. In these samples, rare-earth content is strongly correlated with phosphorous.

DEPOSITS FORMED DURING LATE DIAGENESIS IN SEDIMENTARY ROCKS

Two types of deposits are known in Nevada that are unrelated to igneous activity and are probably formed as a result of late diagenetic sedimentary processes.

Artillery Manganese

Stratiform manganese oxide deposits in lacustrine sandstone associated with volcanism, normal faulting, and extreme crustal extension are referred to as Artillery type manganese deposits after the type example in the Artillery Range in northwestern Arizona (Spencer and others, 1989; Koski and others, 1989). Similar deposits in Nevada include the Three Kids and Virgin River deposits (nos. 1425-1426, plate 10-2 and table 10-2) localized in the Miocene Horse Spring and Muddy Creek Formations and are believed to be formed by influx of manganese-rich fluids into basins adjacent to zones of rapid uplift and detachment faulting (Bouse, 1988). The Three Kids deposit contains manganese oxides as clasts in tuffaceous sedimentary rocks, and as cement between clastic grains locally forming massive beds containing up to 40% Mn and anomalous Fe, Pb, As, Cu, Mo, and other metals. It was the largest single manganese producer in Nevada yielding 590,000 tonnes of concentrate averaging about 45% manganese from 2,180,000 tonnes of ore (Crittenden, 1964). Reserves are estimated to be 7,000,000 tonnes containing 13.2% Mn (Kilgore and Thomas, 1971).

Kipushi Cu-Pb-Zn

High-grade deposits of copper, with variable amounts of lead, zinc, cobalt, arsenic, germanium, and gallium, that are associated with breccias in dolomitized limestone are called Kipushi deposits (Cox and Bernstein, 1986) after the type example in Zaire (DeMagnée and Francois, 1988). The Apex deposit (Bernstein, 1986) in southwestern Utah is an oxidized copper deposit rich in germanium and gallium that probably belongs to this deposit type. It is localized in the Pennsylvanian Callville Limestone, and, because these deposits are formed by processes closely related to sedimentary diagenesis, we suspect that similar deposits might exist in extensions of the Callville into southern Nevada. In a brief reconnaissance, we examined the Lincoln Mine (no. 1427, plate 10-2 and table 10-2) and other gossans and oxidized copper outcrops in the Callville on Tramp Ridge in 1988. These occurrences resemble the Kipushi type in the abundance of copper and the presence of germanium in amounts up to 30 ppm. They are localized on the flanks of irregular areas of brecciated dolomite, up to 500 m in diameter.

REFERENCES

Anderson, E.R., 1981, Structural ties between the Great Basin and Sonoran Desert sections of the Basin and Range Province: U.S. Geological Survey Open-File Report 81-503, p. 4-6.

Ashley, R.P., 1990, The Goldfield District, Esmeralda and Nye Counties, p. 1-7, *in* Shawe, D.R. and Ashley, R.P., eds., Epithermal gold deposits -- part 1, Geology and resources of gold in the United States: U.S. Geological Survey Bulletin 1857-H, 31 p.

Atkinson, W.W., Jr., Kaczmarowki, J.H., and Erickson, A.J., Jr., 1982, Geology of a skarn-breccia orebody at the Victoria Mine, Elko County, Nevada: Economic Geology, v. 77, p. 899-918.

Bakken, B.M., 1991, Gold mineralization, wall-rock alteration and the geochemical evolution of the hydrothermal system in the Main ore body, Carlin Mine, Nevada, *in* Raines, G.L., Lisle, R.E., Schafer, R.W., and Wilkinson, W.H., eds., Geology and ore deposits of the Great Basin, v. 1, Symposium Proceedings: Reno, Geological Society of Nevada, April 1990, p. 233-234.

Barton, M.D., and Trim, H.E., 1991, Late Cretaceous two-mica granites and lithophile-element mineralization in the Great Basin, *in* Raines, G.L., Lisle, R.E., Schafer, R.W., and Wilkinson, W.H., eds., Geology and ore deposits of the Great Basin, v. 1, Symposium Proceedings: Reno, Geological Society of Nevada, April 1990, p. 529-538.

Barton, M.D., Battles, D.A., Debout, G.E., Capo, R.C, Christensen, J.N., Davis, S.R., Hanson, R.B., Michelsen, C.J., and Trim, H.E., 1988, Mesozoic contact metamorphism in the western United States, p. 110-178, *in* Ernst, W.G., ed., Metamorphism and crustal evolution of the western United States, Rubey Volume VII: Englewood Cliffs, New Jersey, Prentice Hall, 1153 p.

Bercaw, L.B., Atkinson, W.W., and Nielson, R.L., 1987, Geology and gold deposits of central Mineral Ridge, Esmeralda County, Nevada" Geological Society of America Abstracts with Program, v. 19, no. 5, p. 260.

Berger, B.R., 1985, Geologic-geochemical features of hot-spring precious-metal deposits, p. 47-53, *in* Tooker, E.W., ed., Geologic characteristics of sediment- and volcanic-hosted disseminated gold deposits -- Search for an occurrence model: U.S. Geological Survey Bulletin 1646, 150 p.

Berger, B.R., 1986a, Descriptive model of carbonate-hosted Au-Ag, *in* Cox, D.P., and Singer, D.A., eds., Mineral deposit models: U.S. Geological Survey Bulletin 1693, p. 175.

Berger, B.R., 1986b, Descriptive model of low-sulfide Au-quartz veins, *in* Cox, D.P., and Singer, D.A., eds., Mineral deposit models: U.S. Geological Survey Bulletin 1693, p. 239.

Berger, B.R., and Bagby, W.C., 1991, The geology and origin of Carlin type deposits, *in* R.P. Foster, ed., Gold Exploration and Metallogeny: London, Blackie and Sons, p. 210-248.

Berger, B.R., and Henley, R.W., 1989, Advances in the understanding of epithermal gold-silver deposits, with special reference to the western United States, *in* Keays, R.R., Ramsay, W.R.H., and Groves D.I., eds., The Geology of Gold Deposits: the Perspective in 1988: Economic Geology Monograph 6, p. 405-423.

Berger, B.R., and Singer, D.A., 1992, Grade and tonnage model of hot-spring Au-Ag, *in* Bliss, J.D., ed., Developments in deposit modeling: U.S. Geological Survey Bulletin 2004, p.23-25.

Bernstein, L.R., 1986, Geology and mineralogy of the Apex germanium-gallium mine, Washington County, Utah: U.S. Geological Survey Bulletin 1577, 9 p.

Best, M.G., Christiansen, E.H., Deino, A.L., Grommé, C.S., McKee, E.H., and Noble, D.C., 1989, Excursion 3A: Eocene through Miocene volcanism in the Great Basin of the western United States, p. 91-133, *in* Chapin, C.E., and Zidek, Jiri, eds., Field excursions to volcanic terranes in the western United States, Volume II: Cascades and Intermountain West: New Mexico Bureau of Mines and Mineral Resources, Memoir 47, v. 2, 285 p.

Birak, D.J., and Hawkins, R.B., 1985, The geology of the Enfield Bell Mine and the Jerritt Canyon District, Elko County, Nevada, p. 95-105, *in* Tooker, E.W., Ed., Geologic characteristics of sediment- and volcanic-hosted disseminated gold deposits -- Search for an occurrence model: U.S. Geological Survey Bulletin 1646, 150 p.

Black, J.E., Mancuso, T.K., and Gant, J.L., 1991, Geology and mineralization at the Rawhide Au-Ag deposit, Mineral County, Nevada, p. 1123-1144, *in* Raines, G.L., Lisle, R.E., Schafer, R.W., and Wilkinson, W.H., eds., Geology and ore deposits of the Great Basin, v. 2, Symposium Proceedings: Reno, Geological Society of Nevada, April 1990, 1257 p.

Blake, D.W., Theodore, T.G., Batchelder, J.N., and Kretschmer, E.L., 1979, Structural relations of igneous rocks and mineralization in the Battle Mountain mining district, Lander County, Nevada, *in* Ridge, J.D., ed., Papers on mineral deposits of western North America: Nevada Bureau of Mines and Geology: Nevada Bureau of Mines and Geology, Report 33, p. 87-99.

Blake, M.C., McKee, E.H., Marvin, R.F., Silberman, M.L., and Nolan, T.B., 1975, The Oligocene volcanic center at Eureka, Nevada: U.S. Geological Survey Journal of Research, v. 3, p. 605.

Bonham, H.F., 1989, Bulk-mineable precious-metal deposits, *in* The Nevada mineral industry, 1988: Nevada Bureau of Mines and Geology Special Publication MI-1988, p. 19-26

Bonham, H.F., and Papke, K.G., 1969, Geology and mineral deposits of Washoe and Storey Counties, Nevada: Nevada Bureau of Mines and Geology Bulletin 70, 140 p.

Bouley, B.A., 1986, Descriptive model of gold on flat faults, *in* Cox, D.P., and Singer, D.A., eds., Mineral deposit models: U.S. Geological Survey Bulletin 1693, p. 251.

Bouse, R.M., 1988, Isotopic, chemical and petrographic characteristics of stratiform manganese oxide deposits in the Lake Mead region, southeastern Nevada: implications for the origin of the deposits [M.S. thesis]: University of Rhode Island, 101 p.

Cascaceli, R.J., Wendell, D.E., and Hoisington, W.D., 1986, Geology and mineralization of the McGinness Hills, Lander County, Nevada, *in* Precious metal mineralization in hot-springs systems, Nevada and California: Nevada Bureau of Mines and Geology Report 41, p. 93-102.

Castor, S.B., 1991, Rare earth deposits of the southern Great Basin, *in* Raines, G.L., Lisle, R.E., Schafer, R.W., and Wilkinson, W.H., eds., Geology and ore deposits of the Great Basin, v. 1, Symposium Proceedings: Reno, Geological Society of Nevada, April 1990, p. 523-528.

Chamberlin, A.K., 1989, Devonian/Mississippian stratigraphy of the Mokemoke Mountain, White Pine Range measured section: The Strat Column, v. 5, no. 5, p. 76-85.

Chamberlin, A.K., and Scott, Cheryl, 1987, Possible relationships between Mississippian Antler Mountain fluvial systems and Tertiary disseminated gold deposits in the eastern Great Basin, p. 479-485, *in* Kopp, R.S., and Cohenour, R.E., eds., Cenozoic geology of western Utah, sites for precious metal and hydrocarbon accumulations: Utah Geological Association, Publication 16, 683 p.

Christiansen, E.H., Sheridan, M.F., and Burt, D.M., 1986, The geology and geochemistry of Cenozoic topaz rhyolites from the western United States: Geological Society of America Special Paper 205, 82 p.

Coats, R.R., 1968, Preliminary geologic map of the southwestern quarter of the Mountain City Quadrangle, Elko County, Nevada: U.S. Geological Survey Open-file Report, scale 1:20,000. Coats, R.R., 1987, Geology of Elko County, Nevada: Nevada Bureau of Mines and Geology Bulletin 101, 112 p.

Coats, R.R., and Stephens, E.C., 1968, Mountain City Copper Mine, Elko County, Nevada, *in* Ridge, J.D., ed., Ore deposits of the United States, 1933-1967 (Graton Sales Volume), v. 2: New York, American Institute of Mining Metallurgical, and Petroleum Engineers, p. 1074-1101.

Cox, D.P., 1986a, Descriptive model of porphyry Cu, *in* Cox, D.P., and Singer, D.A., eds., Mineral deposit models: U.S. Geological Survey Bulletin 1693, p. 76.

Cox, D.P., 1986b, Descriptive model of porphyry Cu, skarn-related deposits, *in* Cox, D.P., and Singer, D.A., eds., Mineral deposit models: U.S. Geological Survey Bulletin 1693, p. 82.

Cox, D.P., 1986c, Descriptive model of volcanic-hosted magnetite, *in* Cox, D.P., and Singer, D.A., eds., Mineral deposit models: U.S. Geological Survey Bulletin 1693, p. 172.

Cox, D.P., and Bernstein, L.R., 1986, Descriptive model of Kipushi Cu-Pb-Zn, *in* Cox, D.P., and Singer, D.A., eds., Mineral deposit models: U.S. Geological Survey Bulletin 1693, p. 227.

Cox, D.P., and Singer, D.A., 1986, Mineral deposit models: U.S. Geological Survey Bulletin 1693, 379 p.

Cox, D.P., and Singer, D.A., 1992, Descriptive and grade and tonnage model of distal-disseminated Ag-Au, *in* Bliss, J.D., ed., Developments in deposit modeling: U.S. Geological Survey Bulletin 2004, p. 19-22.

Cox, D.P., and Theodore, T.G., 1986, Descriptive model of Cu Skarn deposits, *in* Cox, D.P., and Singer, D.A., eds., Mineral deposit models: U.S. Geological Survey Bulletin 1693, p. 76.

Cox, D.P., Barton, P.B. and Singer, D.A., 1986, Introduction, *in* Cox, D.P., and Singer, D.A., eds., Mineral deposit models: U.S. Geological Survey Bulletin 1693, p. 1-10.

Crawford, A.L., and Forbes, D.C., 1932a, The Rio Tinto copper discovery near Mountain City, Nevada: Proceedings of the Utah Academy of Sciences, Arts and Letters, v. 9, p. 51-52.

Crawford, A.L., and Forbes, D.C., 1932b, Microscopic characteristics of the Rio Tinto, Nevada, copper deposit: Colorado School of Mines Alumni Association, The Mines Magazine, v. 22, no. 8, p. 7-9.

Crittenden, M.D, Jr., 1964, Manganese, *in* Mineral and Water Resources of Nevada: Nevada Bureau of Mines and Geology Bulletin 65, p. 113 -119.

DeMagnée, I, and Francois, A., 1988, The origin of the Kipushi (Cu, Zn, Pb) deposit in direct relation with a Proterozoic salt diapir. Copperbelt of Central Africa, Shaba, Zaire, *in* Friedrich, G.H., and Herzig, P.M., eds., Base Metal Sulfide Deposits: Springer-Verlag, Berlin, Heidelberg, p. 74-93.

Dilles, J.H., and Wright, J.E., 1988, The chronology of early Mesozoic arc magmatism in the Yerington district of western Nevada and its regional implications: Geological Society of America Bulletin, v. 100, no. 5, p. 644-652.

Einaudi, M.T., 1982, Descriptions of skarns associated with porphyry copper plutons: Southwestern North America, p. 139-184, *in* S.R. Titley, ed., Advances in geology of the porphyry copper deposits, Southwestern North America: University of Arizona Press, Tucson, Arizona, 560 p.

Einaudi, M.T., Meinert, L.D., and Newberry, R.J., 1981, Skarn deposits, p. 317-391, *in* Skinner, B.J., ed., Seventy-fifth anniversary volume, 1905-1980, Economic Geology: New Haven, Connecticut, The Economic Geology Publishing Co., 964 p.

Emmons, D.L., and Coyle, R.D., 1988, Echo Bay details exploration activities at its Cove gold deposit in Nevada: Mining Engineering, v. 40, no. 8, p. 185-191

Fiannaca, Mike, 1987, Geology of the Santa Fe gold-silver deposit, Mineral County, Nevada, p. 233-239, *in* Johnson, J.L., and Abbott, Earl, eds., Bulk Mineable Precious Metal Deposits of the Western United States, Guidebook for field trips: Geological Society of Nevada, Symposium, April 6-8, 1987, 418 p.

Fournier, R.O., 1967a, The porphyry copper deposit exposed in the Liberty open pit mine near Ely, Nevada: Part I. syngenetic formation: Economic Geology, v. 62, p. 57-81.

Fournier, R.O., 1967b, The porphyry copper deposit exposed in the Liberty open pit mine near Ely, Nevada: Part II. The formation of hydrothermal alteration zones: Economic Geology, v. 62, p. 208-227.

Garside, L.J., Bonham, H.F., Jr., Tingley, J.V., and McKee, E.H., 1993, Potassium-argon ages of igneous rocks and alteration minerals associated with mineral deposits, western and southern Nevada: Isochron/West, no. 59, p.17-23.

Gemmil, Paul, 1968 Geology of the ore deposits of the Pioche district, Nevada, *in* Ridge, J.D., ed., Ore deposits of the United States, 1933-1967 (Graton Sales Volume), v. 2: New York, American Institute of Mining, Metallurgical, and Petroleum Engineers, p. 1128-1147.

Graney, J.R., 1987, Hasbrouck Mountain, Nevada, Precious metal mineralization in a fossil hot-spring environment p. 120-125, *in* Johnson, J.L., and Abbott, Earl, eds., Bulk Mineable Precious Metal Deposits of the Western United States, Guidebook for field trips: Geological Society of Nevada, Symposium, April 6-8, 1987, 418 p.

Gulbrandsen, R.A., and Gielow, D.G., 1960, Mineral assemblage of a pyrometasomatic deposit near Tonopah, Nevada: U.S. Geological Survey Professional Paper 400-B, p. 20.

Hamilton, M.M., 1987, Mineral resources of the South Jackson Mountains Wilderness Study Area, Humboldt County, Nevada: U.S. Bureau of Mines Mineral Land Assessment Open-File Report MLA-10-87, 93 p.

Harris, N.B., 1991, Geology and geochemistry of the New Boston-Blue Ribbon prospect, Mineral County, Nevada—a skarn associated with a calc-alkaline porphyry molybdenum system, *in* Raines, G.L., Lisle, R.E., Schafer, R.W., and Wilkinson, W.H., eds., Geology and ore deposits of the Great Basin, v. 1, Symposium Proceedings: Reno, Geological Society of Nevada, April 1990, p. 433-460.

Hasler, R.W., Wilson, W.R., and Darnton, B.T., 1991, Geology and ore deposits of the Ward mining district, White Pine County, Nevada, *in* Raines, G.L., Lisle, R.E., Schafer, R.W., and Wilkinson, W.H., eds., Geology and ore deposits of the

Great Basin, v. 1, Symposium Proceedings: Reno, Geological Society of Nevada, April 1990, p. 333-350.

Heald, Pamela, Foley, N.K., and Hayba, D.O., 1987, Comparative anatomy of volcanic-hosted epithermal deposits; acid-sulfate and adularia-sericite types: Economic Geology, v. 82, no. 1, p. 1-26.

Hewitt, D.F., 1931, Geology and ore deposits of the Goodsprings Quadrangle, Nevada: U.S. Geological Survey Professional Paper 162, 172 p.

Hofstra, A.H., Landis, G.P., Leventhal, J.S.., Northrop, H.R, Rye, R.O., Doe, T.C., and Dahl, A.R., 1991, Genesis of sediment-hosted disseminated gold deposits by fluid mixing and sulfidation of iron in the host rocks— chemical reaction path modeling of ore depositional processes at Jerritt Canyon, Nevada, *in* Raines, G.L., Lisle, R.E., Schafer, R.W., and Wilkinson, W.H., eds., Geology and ore deposits of the Great Basin, v. 1, Symposium Proceedings: Reno, Geological Society of Nevada, April 1990, p. 235-237.

Hose, R.K., Blake, M.C., Jr., and Smith, R.M., 1976, Geology and mineral deposits of White Pine County, Nevada: Nevada Bureau of Mines and Geology Bulletin 85, 105 p.

James, L.P., 1972, Zoned hydrothermal alteration and ore deposits in sedimentary rocks near mineralized intrusions, Ely area, Nevada [Ph.D. thesis]: Pennsylvania State University, 241 p.

James, L.P., 1976, Zoned alteration in limestone at porphyry copper deposits, Ely, Nevada: Economic Geology, v. 71, p. 488-512.

John, D.A., Nash, J.T., Clark, C.W., and Wulftange, W.H., 1991, Geology, hydrothermal alteration, and mineralization at the Paradise Peak gold-silver-mercury deposit, Nye County, Nevada, *in* Raines, G.L., Lisle, R.E., Schafer, R.W., and Wilkinson, W.H., eds., Geology and ore deposits of the Great Basin, v. 2, Symposium Proceedings: Reno, Geological Society of Nevada, April 1990, p. 1020-1050.

John, D.A., and Sherlock, M.G., 1991, Map showing mines and prospects in the Reno 1° by 2° Quadrangle, Nevada and California: U.S. Geological Survey Miscellaneous Field Studies Map MF-2154-B, scale 1:250,000, 14 p.

Johnson, M.G., 1977, Geology and mineral deposits of Pershing County, Nevada: Nevada Bureau of Mines and Geology Bulletin 89, 115 p.

Johnson, V.Y. and Keith, J.D., 1991, Petrology and geochemistry of the Springer scheelite skarn deposit, Mill City, Nevada, *in* Raines, G.L., Lisle, R.E., Schafer, R.W., and Wilkinson, W.H., eds., Geology and ore deposits of the Great Basin, v. 2, Symposium Proceedings: Reno, Geological Society of Nevada, April 1990, p. 553-578.

Johnston, W.P., 1972, K-Ar ages of Blind Mountain stock and Yuba dike, Lincoln County, Nevada: Isochron West, no. 3, p. 30.

Johnson, V.Y., and Keith, J.D., 1991, Petrology and Geochemistry of the Springer scheelite skarn deposit, Mill City, Nevada, *in* Raines, G.L., Lisle, R.E., Schafer, R.W., and Wilkinson, W.H., eds., Geology and ore deposits of the Great Basin, v. 2, Symposium Proceedings: Reno, Geological Society of Nevada, April 1990, p. 553-576.

Joralemon, I.B., 1973, Copper, the encompassing story of mankinds first metal: Howell-North Books, Berkeley, California, 407 p.

Kerr, P.F., 1946, Tungsten mineralization in the United States: Geological Society of America Memoir 15, 241 p.

Keith, S.B., 1984, Metallogeny, magma series, and geotectonic setting of igneous rocks: Magmachem Inc., chart.

Keith, S.B., Laux, D.P., Maughan, Jerald, Schwab, Karen, and Swan, M.M., 1991, Magma series and metallogeny, a case study from Nevada and environs, *in* Buffa, R.H., and Conyer, A.R., eds., Field trip guidebook compendium, geology and ore deposits of the Great Basin: Reno, Geological Society of Nevada, p. 404-493.

Kilgore, C.C., and Thomas, P.R., 1971, Manganese availability, domestic. A Minerals Availability System appraisal: U. S. Bureau of Mines Information Circular 8889, 14 p.

Kleinhampl, F.J., and Ziony, J.I., 1985, Mineral Resources of Northern Nye County, Nevada: Nevada Bureau of Mines and Geology Bulletin 99B, 243 p.

Koski, R.A., Bouse, R.M., Hein, J.R., and DeRosa, M.L., 1989, Composition and geologic setting of stratiform manganese deposits in the southern Basin and Range Province, Arizona and Nevada, p. 41-42, *in* Schindler, K.S., ed., USGS Research on Mineral Resources—1989, Program and abstracts Fifth Annual V. E. McKelvey Program on Mineral and Energy Resources: U.S. Geological Survey Circular 1035.

Koschmann, A.H. and Bergendahl, M.H., 1962, Gold in the United States: U.S. Geological Survey Mineral investigations Resource Map MR-24, scale 1:3,168,000. Long, K.R., 1992a, Preliminary descriptive deposit model for detachment-fault-related mineralization, *in* Bliss, J.D., ed., Developments in deposit modeling: U.S. Geological Survey Bulletin 2004, p. 57-56.

Long, K.R., 1992b, Descriptive model of detachment-fault-related polymetallic deposits, *in* Bliss, J.D., ed., Developments in deposit modeling: U.S. Geological Survey Bulletin 2004, p. 57-58.

Lowe, N.T., Raney, R.G., and Norberg, J.R., 1985, Principal deposits of strategic and critical minerals in Nevada: U.S. Bureau of Mines Information Circular IC 9035, 202 p.

Ludington, S.D., 1986, Descriptive model of Climax molybdenum deposits, *in* Cox, D.P., and Singer, D.A., eds., Mineral deposit models: U.S. Geological Survey Bulletin 1693, p. 73.

MacKenzie, W.B., and Bookstrom, A.A., 1976, Geology of the Majuba Hill area, Pershing County, Nevada: Nevada Bureau of Mines and Geology Bulletin 86, 23 p.

Meinert, L.D., 1988, Gold and silver in skarn deposits, p. 614-616, *in* Goode, A.D.T., Smyth, E.L., Birch, W.D., and Bosma, L.I., eds., Bicentennial Gold 88, Extended abstracts, poster programme, v. 2: Geological Society of Australia, abstracts series, no. 23, 662 p. Melbourne, Victoria, May 16-20, 1988.

Miller, B.W., and Silberman, M.L., 1977, Cretaceous K-Ar age of hydrothermal alteration at the North Fish Creek porphyry copper deposit, Fish Creek Mountains, Lander County, Nevada: Isochron West, no. 18, p. 7-8.

Monroe, S.C., Godlewski, D.W., and Plahuta, J.T., 1988, Geology and mineralization at the Buckhorn mine, Eureka County, Nevada, p. 273-291, *in* Schafer, R.W., Cooper, J.J., and Vikre, P.G., eds., Bulk mineable precious metal deposits of the Western United States: Symposium proceedings, Geological Society of Nevada, April 6-8, 1987, Reno, NV, 755 p.

Moore, L., 1971, Economic evaluation of California-Nevada iron resources and iron ore markets: U.S. Bureau of Mines Information Circular 8511, 207 p.

Mosier, D.L., Singer, D.A., Sato, T., and Page, N.J, 1986, Relationship of grade, tonnage, and basement lithology in volcanic-hosted epithermal precious- and base-metal quartz-adularia-type districts: Mining Geology, v. 36, no. 4, p. 245-264.

Mosier, D.L., and Page, N.J, 1987, Descriptive and grade-tonnage models of volcanogenic manganese deposits in oceanic environments — a modification: U.S. Geological Survey Bulletin 1811, 63 p.

Muffler, L.J.P., 1964, Geology of the Frenchie Creek Quadrangle, north-central Nevada: U.S. Geological Survey Bulletin 1179, 99 p.

Mutschler, F.E., Wright, E.G., Ludington, Steve, and Abbott, J.T., 1981, Granite molybdenite systems: Economic Geology, v. 76, p. 874-897.

Nash, J.T., Utterback, W.C., and Saunders, J.A., 1991, Geology and geochemistry of the Sleeper gold deposits, Humboldt County, Nevada — Interim Report, p. 1063-1084, *in* Raines, G.L., Lisle, R.E., Schafer, R.W., and Wilkinson, W.H., eds., Geology and ore deposits of the Great Basin, v. 2, Symposium Proceedings: Reno, Geological Society of Nevada, April 1990, 1257 p.

Nolan, T.B., 1962, The Eureka mining district, Nevada: U.S. Geological survey Professional Paper 406, 78 p.

Newberry, R.J., and Einaudi, M.T., 1981, Tectonic and geochemical setting of tungsten skarn mineralization in the Cordillera: Arizona Geological Society Digest, v. 14, p. 99-112.

Phoenix, D.A., and Cathcart, J.B., 1952, Quicksilver deposits in the Southern Pilot Mountains, Mineral County, Nevada: U.S. Geological Survey Bulletin 973-D, p. 143-171.

Prochnau, J.F., 1973, Summary report on the 1971-1972 exploration program, Pyramid Lake (Guanomi) property, Paiute Indian Reservation, Washoe County, Nevada: Nevada Bureau of Mines Open File Report, 12 p.

Proffett, J.M., Jr., 1979, Ore deposits of the western United States: a summary, *in* Ridge, J.D., ed., Papers on mineral deposits of western North America: Nevada Bureau of Mines and Geology, Report 33, p. 13-32.

Reeves, R.G., and Kral, V.E., 1962, Geology and iron deposits of the Buena Vista Hills, Chuchill and Pershing County, Nevada : Nevada Bureau of Mines Bulletin 53a, p. 1-32.

Roberts, R.J., 1986, The Carlin story in Tingley, J.V.,and Bonham, H.F., eds., Sediment-hosted precious-metal deposits of northern Nevada: Nevada Bureau of Mines an Geology, Report 40, p. 71-80.

Ross, C.P., 1953, The geology and ore deposits of the Reese River District, Lander County, Nevada: U.S. Geological Survey Bulletin 997, 132 p.

Rye, R.O., Roberts, R.J., Snyder, W.S., Lahusen, G.L., and Motica, J.E., 1984, Textural and stable 10-isotope studies of the Big Mike cupriferous volcanogenic massive sulfide deposit, Pershing County, Nevada: Economic Geology, v. 79, p. 124-140.

Rytuba, J.J., 1989, Geology of the volcanic-hosted Sleeper gold deposit, Humboldt County, Nevada: Geological Society of America Abstracts with Programs, 1989, May 8-11, 1989, Spokane, Washington, p. 138.

Rytuba, J.J., and Glanzman, R.K., 1979, Relation of mercury, uranium, and lithium deposits to the McDermitt caldera complex, Nevada-Oregon, *in* Ridge, J.D., ed., Papers on mineral deposits of western North America: Nevada Bureau of Mines and Geology: Nevada Bureau of Mines and Geology, Report 33, p. 109-117.

Rytuba, J.J., and Heropoulus, Chris, 1992 Mercury in Epithermal gold systems—an important by-product: U.S. Geological Survey Bulletin 1877, p. D1-D8.

Sander, M.V., 1988, Epithermal gold-silver mineralization, wall-rock alteration, and geochemical evolution of hydrothermal fluids in the ash-flow tuff at Round Mountain, Nevada [Ph.D dissert.]: Stanford University, 283 p.

Saunders, J.A., Utterback, W.C., Day, W.C., and Christian, R., 1988, Characteristics of bonanza epithermal gold mineralization at the Sleeper deposit, Nevada, USA, p. 386-388, *in* Goode, A.D.T., Smyth, E.L., Birch, W.D., and Bosma, L.I., eds., Bicentennial Gold 88, Extended abstracts, poster programme, v. 1: Geological Society of Australia, abstracts series, no. 23, 662 p. Melbourne, Victoria, May 16-20, 1988.

Seedorff, Eric, 1991, Royston district, western Nevada, a Mesozoic porphyry copper system that was tilted and dismembered by Tertiary normal faults, *in* Raines, G.L., Lisle, R.E., Schafer, R.W., and Wilkinson, W.H., eds., Geology and ore deposits of the Great Basin, v. 1, Symposium Proceedings: Reno, Geological Society of Nevada, April 1990, p. 359-392.

Shaver, S. A., 1991, Geology, alteration, mineralization, and trace element geochemistry of the Hall (Nevada Moly) deposit, Nye County, Nevada, *in* Raines, G.L., Lisle, R.E., Schafer, R.W., and Wilkinson, W.H., eds., Geology and ore deposits of the Great Basin, v. 1, Symposium Proceedings: Reno, Geological Society of Nevada, April 1990, p. 303-332

Shawe, D.R., Foord, E.E., and Conklin, N.M., 1984, Huebnerite veins near Round Mountain, Nye County, Nevada: U.S. Geological Survey Professional Paper 1287, 42 p.

Shawe, F.R., Reeves, R.G., and Kral, V.E., 1962, Iron ore deposits of northern Nevada, Part C, *in* Iron ore deposits of Nevada: Nevada Bureau of Mines, Bulletin 53, p. 79-128.

Sherlock, M.G., and Tingley, J.V., 1985, Nevada mineral-resource data: Information available through the U.S. Geological Survey Mineral Resources Data System: U.S. Geological Survey Circular 966, 35 p.

Singer, D.A., 1986, Descriptive model of kuroko massive sulfide, *in* Cox, D.P., and Singer, D.A., eds., 1986, Mineral deposit models: Bulletin 1693, p. 189.

Smith, J.G., McKee, E.H., Tatlock, D.B., and Marvin, R.F., 1971, Mesozoic granitic rocks in Northwestern Nevada: a link between the Sierra Nevada and Idaho Batholiths: Geological Society of America Bulletin, v. 82, no. 10, p. 2933-2944.

Snyder, W.S., 1977, Origin and exploration for ore deposits in upper Paleozoic chert-greenstone complexes of northern Nevada: Ph.D. dissertation, Stanford University, 159 p.

Sorensen, M.L., Plouff, Donald, Turner, R.L, and Hamilton, M.M., 1987, Mineral resources of the South Jackson Mountains Wilderness Study Area, Humboldt County, Nevada: U.S. Geological Survey Bulletin 1726-B, 14 p.

Spencer, J.E., Grubensky, M.J., Duncan, J.T., Shenk.J.D., Yarnold, J.C., and Lombard, J.P., 1989, Geology and mineral deposits of the central Artillery Mountains, *in* Spencer, J.E. and Reynolds, S.J., eds., Geology and mineral resources of the Buckskin and Rawhide Mountains, west-central Arizona: Arizona Geological Survey Bulletin 198, p. 168-183.

Spurr, J.E., 1906, Ore deposits of the Silver Peak Quadrangle Nevada: U.S. Geological Survey Professional Paper, 55, 174 p.

Stager, H.K., and Tingley, J.V., 1988, Tungsten deposits in Nevada: Nevada Bureau of Mines and Geology Bulletin 105, 256 p.

Sutolov, Alexander, 1982, Intermet molybdenum yearbook: Santiago, Chile, Intermet Publications, p. 28.Tenneco Minerals, 1987, The Borealis project, p. 243-244, *in* Johnson, J.L., and Abbott, Earl, eds., Bulk Mineable Precious Metal Deposits of the Western United States, Guidebook for field trips: Geological Society of Nevada, Symposium, April 6-8, 1987, 418 p.

Theodore, T.G., 1986, Descriptive model of porphyry molybdenum, low-fluorine deposits, *in* Cox, D.P., and Singer, D.A., eds., Mineral deposit models: U.S. Geological Survey Bulletin 1693, p. 120.

Theodore, T.G., and Blake, D.W., 1975a, Geology and geochemistry of the Copper Canyon porphyry copper deposit and surrounding area, Lander County, Nevada: U.S. Geological Survey Professional Paper 798-B, 86 p.

Theodore, T.G., and Blake, D.W., 1975b, Geology and geochemistry of the west orebody and assoicated skarns, Copper Canyon porphyry copper deposits, Lander County, Nevada, with a section on Electron microprobe analysis of andradite and diopside by N.G. Banks: U.S. Geological Survey Professional Paper, 798-C, 85 p.

Theodore, T.G., Blake, D.W., and Kretschmer, E.L., 1982, Geology of the Copper Canyon porphyry copper deposits, p. 543-550, *in* S.R. Titley, ed., Advances in geology of the porphyry copper deposits, Southwestern North America: University of Arizona Press, Tucson, Arizona, 560 p.

Theodore, T.G., Blake, D.W., Loucks, T.A., and Johnson, C.A., 1992, Geology of the Buckingham stockwork molydenum deposit and surrounding area, Lander County, Nevada: U.S. Geological Survey Professional Paper 798-D, 307 p.

Theodore, T.G., Blair, W.N., and Nash, J.T., 1987, Geology and gold mineralization of the Gold Basin-Lost Basin mining districts, Mojave County Arizona: U.S. Geological Survey Professional Paper 1361, 167 p.

Theodore, T.G., and Hammarstrom, J.M., 1991, Petrochemistry and fluid-inclusion study of skarns from the northern Battle Mountain mining district, Nevada, p. 497-554, *in* Skarns—Their genesis and metallogeny: Athens. Greece, Theophrastus Publications, p. 497-554.

Theodore, T.G., Orris, G.J., Hammarstrom, J.M., and Bliss, J.D., 1991, Gold-bearing skarns: U.S. Geological Survey Bulletin 1930, 61 p.

Tingley, J.V., and Berger, B.R., 1985, Lode gold deposits of Round Mountain, Nevada: Nevada Bureau of Mines and Geology, Bulletin 100, 62 p.

Trim, H.E., and Barton, M.D., 1991, Contrasting types of igneous-related mineralization in the Kern Mountains, White Pine County, Nevada, *in* Raines, G.L., Lisle, R.E., Schafer, R.W., and Wilkinson, W.H., eds., Geology and ore deposits of the Great Basin, v. 1, Symposium Proceedings: Reno, Geological Society of Nevada, April 1990, p. 579-581.

Vikre, P.G., 1981, Silver mineralization in the Rochester district, Pershing County, Nevada: Economic Geology, v. 76, p. 580-609

Vikre, P.G., 1985, Precious metal vein systems in the National district, Humboldt County, Nevada: Economic Geology, v. 80, p. 360-393.

Vikre, P.G., 1987, Paleohydrology of Buckskin Mountain, National district, Humboldt County, Nevada: Economic Geology, v. 82, p. 934-950.

Vikre, P.G., and McKee, E.H., 1985, Zoning and chronology of hydrothermal events in the Humboldt Range, Pershing County, Nevada: Isochron/West, no. 44, p. 17-24.

Vikre, P.G., McKee, E.H., and Silberman, M.L., 1988, Chronology of Miocene hydrothermal and igneous events in the Virginia Range, Washoe, Storey, and Lyon Counties, Nevada: Economic Geology, v. 83, p. 864-974.

Wallace, A.B., 1987, Geology of the Sulphur district, southwestern Humboldt County, Nevada, p. 165-171, *in* Johnson, J.L., and Abbott, Earl, eds., Bulk Mineable Precious Metal Deposits of the Western United States, Guidebook for field trips: Geological Society of Nevada, Symposium, April 6-8, 1987, 418 p.

Wallace, A.R., 1977, Geology and ore deposits, Kennedy mining district, Pershing County, Nevada [M.S. thesis]: University of Colorado, 87 p.

Westgate, L.G., and Knopf, Adolf, 1032, Geology and ore deposits of the Pioche district Nevada, U.S. Geological Survey Professional Paper 171, 79 p.

Westra, Gerhard, 1979, Porphyry copper genesis at Ely, Nevada, p. 127-140, *in* J.D. Ridge, ed., Papers on mineral deposits of western North America: Nevada Bureau of Mines and Geology, Report 33, 214 p.

Westra, Gerhard, 1982, Alteration and mineralization in the Ruth porphyry copper deposit near Ely, Nevada: Economic Geology, v. 77, p. 950-970.

Westra, Gerhard, and Keith S.B., 1981, Classification and genesis of stockwork molybdenum deposits: Economic Geology, v. 76, p. 844-973.

White, D.E., 1981, Active geothermal systems and hydrothermal ore deposits, p. 392-423, *in* Skinner, B.J., ed., Economic Geology, Seventy-fifth Anniversary Volume 1905-1980: El Paso, Texas, Economic Geology Publishing Co., 964 p.

White, D.E., 1985, Summary of the Steamboat Springs Geothermal Area, Nevada, with attached road-log commentary, p. 79-87, *in* Tooker, E.W., ed., Geologic characteristics of sediment- and volcanic-hosted disseminated gold deposits—Search for an occurrence model: U.S. Geological Survey Bulletin 1646, 150 p.

White, W.H., Bookstrom, A.A., Kamilli, R.J., Ganster, M.W., Smith, R.P., Ranta, D.E., and Steininger, R.C., 1981, Character and origin of Climax type molybdenum deposits, *in* Skinner, B.J., ed., Economic Geology, 75th Anniversary Volume: Economic Geology Publishing Co., p. 270-316.