

OPEN FILE REPORT NO. 357
RECONNAISSANCE GOLD GEOCHEMICAL SURVEY
OF FIVE SELECTED AREAS
IN SOUTHWESTERN NEW MEXICO:

VICTORIO MOUNTAINS,
TRES HERMANOS MOUNTAINS,
PYRAMID MOUNTAINS,
APACHE-SIERRA RICA HILLS,
AND SNAKE HILLS,
LUNA AND HIDALGO COUNTIES

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MAY 1989

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SUMMARY

A gold geochemical reconnaissance was conducted in five selected areas of southwestern New Mexico: Victorio Hills, the northern portion of the Tres Hermanos Mountains, Apache-Sierra Rica Hills, Pyramid Mountains, and Snake Hills. Pyramid Mountains have a history of significant copper-silver-gold, but the others have had only marginal production of any precious metals. However, all five areas have evidence of much silicification of carbonate sediments and Pyramid and Tres Hermanos Mountains show evidence of pyritized-quartz-rich Tertiary intrusion. Geochemical sampling was conducted for the most part at the alluvial-rock outcrop boundaries in small arroyos feeding in from the highlands. Two types of samples were collected: traditional "stream sediment" and "rock", defined as selected chips from boulders and cobbles taken from the drainage with attention given to silicification and/or pyritization. Some prospect pits also were sampled, but emphasis was on pits away from known production mines. Samples were analyzed only for gold, with a detection limit of two parts per billion.

GOLD ANALYSIS

A total of 328 field locations were sampled resulting in 210 dry stream sediment samples, 270 rock samples, and 28 samples from prospect pits. Gold analysis was done by Skyline Labs, Inc., in Tucson, Arizona. In addition, 76 samples were blindly resubmitted to Skyline for check assay. The results compared favorably, with a correlation of 98.2%. As a final quality control over assay results, 10 blind duplicate samples were sent to Bondar Clegg Inc., in Sparks, Nevada for check assay. Again, results were in good agreement with a correlation of 96.0%. While the detection limit for gold was 2 parts per billion (ppb), it must be remembered that no two duplicate samples will always agree due to a "nugget" effect. We believe that results less than 10 ppb may range over a factor of 2 to 3 for duplicate samples. However, duplicate samples above 10 ppb are normally very repeatable. On the high range of the scale, say over 500 ppb, duplicate samples may again vary by a factor of up to 2 because of "nugget" effects. From the aspect of geochemical prospecting these are quite acceptable errors. Samples below 10 ppb are not significant, while any sample over 30 ppb for dry stream sediments or 60 ppb for rocks are considered to be above typical background levels.

PRESENTATION OF RESULTS

Sample locations are presented as on 7 1/2 minute U.S. Geological Survey topographic maps. These may be used as overlays on existing geologic maps when available. The five selected areas covered by sampling can be summarized as follows:

SAMPLE AREA	QUADRANGLE NAME	GEOLOGIC MAP	DATE
Victorio Mountains	Gage	Yes @ 1:24000	1980
Tres Hermanos Mountains	North Peak	Yes @ 1:48000	1962
	West Lime Hills	Yes @ 1:48000	1962
Pyramid Mountains	Gary	Yes @ 1:24000	1978
	Lordsburg	Yes @ 1:24000	1978
Apache-Sierra Rica Hills	Doyle Peak	Ph.D Thesis @ 1:24000	
	Victorio Ranch	Ph.D Thesis @ 1:24000	
	Double Wells	Ph.D Thesis @ 1:24000	
Snake Hills	Red Mountain	Reconnaissance on'y	1986
	Bowlin Ranch	Reconnaissance on'y	1986

Each of the five areas will be described, giving key references, sample results, and a very brief narration concerning recommendations for additional exploration.

VICTORIO MOUNTAINS

KEY REFERENCES

Topographic Map: Gage

Geologic Map and Stratigraphy:

Thorman, C. H. and Drewes, H., 1980, Geologic map of the Victorio Mountains, Luna County, southwestern New Mexico: U.S. Geologic Survey, Miscellaneous Filed Studies, Map MF-1175.

Description of Mineral Deposits:

Griswold, G. B., 1961, Mineral deposits of Luna County: New Mexico Bureau of Mines and Mineral Resources, Bulletin 72, 157 pp.

Holser, W. T., 1953, Beryllium minerals in the Victorio Mountains, Luna County, New Mexico: American Mineralogist, 39:599-611.

RESULTS OF SAMPLING

Prospect pits:	15 samples, range 8 to 5500 ppb
Stream sediments:	36 samples, range 2 to 2800 ppb
Rock samples:	47 samples, range 2 to 770 ppb

The anomalous amounts of gold are significant in samples on the eastern and western ends of Mine Hill. The rock samples on the east end are of interest because most previous mining of high gold in lead ores was on the west end. Sampling the main range north and west of Mine Hill did not reveal anomalous amounts of gold. The high content of gold in oxidized lead-ore samples from prospect pits around Mine Hill and the presence of considerable jasperoid and intense silicification of carbonates are also encouraging for potential discovery of gold under alluvial cover along the eastern, southern, and southwestern margins of Mine Hill.

Gage:

Sample number	Analysis, ppb			Rock type
	Rock	Sediment	Prospect	
G-4	----	----	0440	Omc
G-5	----	----	1400	Oe
P-43	0017	0004	----	sftb,sft
P-44	----	----	0008	sflb
P-45	0110	0002	----	sfg,Omc

Sample number	Analysis, ppb			Rock type
	Rock	Sediment	Prospect	
P-46	----	----	0720	sfg
P-47	----	0002	0080	sfg
P-48	----	----	0230	Omc
P-49	0024	0004	----	Om,Omu
P-50	0013	----	----	Oma,Omc
P-51	0230	0002	----	sflb,sft
P-52	0440	----	----	sft
P-53	0770	----	----	sft,sfub
P-54	0017	----	----	sft
P-55	0026 -	----	----	kb
P-56	----	0004	----	kb
P-57	0013	0004	----	Tr,kb,sf
P-58	0017	0003	----	Tr,kb,sf
P-59	0003	0002	----	Tr,kb,sf,Trb,Om
P-60	0006	0002	----	Oe
P-61	0004	0002	----	Oe
R-21	0003	0002	----	Sflb
R-22	0006	0012	----	Sfg,Omc
R-23	----	----	0055	Omc
R-24	0002	0007	----	Oma,Omc,Omu
R-25	0008	0006	----	Omc,Oma,Omu
R-26	0002	0009	----	Sfg,Omc,Oma,Omu
R-27	0002	0015	----	Sflb,Sfg
R-28	0019	0018	----	Sft,Sflb
R-29	0015	0095	----	Sfub,Sft
R-30	----	----	0150	Sft
R-31	0006	----	----	Sft
R-32	0044	0003	----	Tks,kb
R-33	0085	0002	----	kb
R-34	0038	0006	----	Tr,Oe
R-35	0007	0002	----	Tr,Trb,kb,Sf,Om,Oe
R-36	0020	0002	----	Tks,Tr,Kb,Om
R-37	0007	0002	----	Oe
R-38	0003	0002	----	Sf,Om
R-39	0004	0002	----	Oe
X-26	0200	----	----	Sfg
X-27	0020	0003	----	Sfg
X-28	----	2800	1100	Sfg
X-29	0009	0003	----	Sfg,Omc
X-30	----	----	1200	Omc,Oma,Omu

Sample number	Analysis, ppb			Rock type
	Rock	Sediment	Prospect	
X-31	-----	-----	0570	Oe,Om
X-32	-----	-----	0480	Oma,Omu,Oe,Om
X-33	0055	-----	-----	Oma,Omu,Oe
X-34	0160	-----	-----	Omc,Oma,Omu
X-35	-----	-----	5500	Sft,Sflb
X-36	-----	-----	0750	Sfub,Sft
X-37	-----	-----	0300	Sft,Sflb
X-38	0036	0200	-----	Sft,Sflb
X-39	0003	0003	-----	Kb
X-40	0006	0002	-----	ls,Kb
X-41	0090	0007	-----	Tr,Kb,Sf,Om
X-42	0009	0002	-----	Sf,Om,Oe
X-43	0020	0002	-----	Kb

Tr- Rhyolite porphyry-may include quartz-latite porphyry and dacitic rocks

Trb - Rhyolite porphyry intrusive breccia

TKs - Conglomerate, sandstone, siltstone, shale, and some tuft breccia

Kb - Sandstone, arkose, siltstone, and some conglomerate and limestone

Kb-ls - Limestone lentils--some contain fragments of oyster fossils

Sf - Dark gray or dark brown dolomite, about 270 m thick

Sfub - Dark gray dolomite, 30 m thick

Sft - Pale yellowish brown dolomite, about 110 m thick

Sflb - Dark gray to dark brown dolomite about {xxxx} m thick

Sfg - Light to medium gray, fine-grained dolomite and sandy dolomite, 60 m thick

Om - Light to medium gray, medium-grained dolomite about 100 m thick

Omc - Light gray, thin-bedded dolomite and calcareous dolomite, about 35 m thick

Oma - Medium gray, abundantly cherty dolomite, about 45 m thick

Omu - Medium gray dolomite and a basal zone of brownish gray quartz sandstone,
20 m

Oe - Light gray limestone and dolomitic limestone, and some calcarenite
and edgewise pebble conglomerate

TRES HERMANOS MOUNTAINS

KEY REFERENCES

Topographic Maps: North Peak and West Lime Hills

Geologic Map and Stratigraphy:

Balk, R., 1962, Geologic map and sections of Tres Hermanos Mountains: New Mexico Bureau of Mines and Mineral Resources, Geologic Map 16.

Description of Mineral Deposits:

Griswold, G. B., 1961, Mineral deposits of Luna County: New Mexico Bureau of Mines and Mineral Resources, Bulletin 72, 157 pp.

Homme, F. C. and Rosenzweig, A., 1970, Contact metamorphism in the tres Hermanos Mountains: in Twenty-first Field Conference, New Mexico Geological Society, p. 141-145.

RESULTS OF SAMPLING

Prospect pits:	10 samples, range	5 to 1500 ppb
Stream sediments:	58 samples, range	2 to 7 ppb
Rock samples:	72 samples, range	2 to 70 ppb

Three types of geologic terrain were sampled: highly silicified Cretaceous sediments, pyritized quartz monzonite and contact metamorphosed Paleozoic carbonates. Only the results found in the pyritized quartz monzonite were in any way significant. The West Lime Hills contain significant amounts of highly silicified Cretaceous limestones and limestone pebble conglomerates which probably were originally quite permeable, but our sampling revealed no significant gold values. Some favorable indications of gold were observed in pyritized quartz monzonite. Oxidation appears to be quite shallow in most of the areas sampled; however, an area of possible interest would be blind drilling through alluvium north of pyritized outcroppings in secs. 26 and 27, T27S, R9W. The few samples taken from a skarn zone on the east flank of the Tres Hermanos have little indication of gold.

North Peak

Sample number	Analysis, ppb			Rock type
	Rock	Sediment	Prospect	
P-11	----	0002	----	Tm
P-12	----	0002	1500	Tm
P-13	0004	0002	----	Tm
P-14	----	0002	----	Tm
P-15	----	----	0130	Tm
P-16	0390	----	----	Tm
P-17	0005	----	----	Tm
P-18	----	0002	----	Tm
P-19	----	----	----	Tm
P-20	0013	----	----	Tm
P-21	0004	----	----	P,Me
P-22	0006	0002	----	P,Me
P-23	0003	0002	----	Ph
P-24	0002	0002	----	Ph
P-25	0002	0002	----	Ph
P-26	0003	0002	----	Sf,Me,Ph,P
P-27	0003	0002	----	Ph
P-28	0005	0004	----	Ph
P-29	0002	0005	----	Ph
P-32	0003	0002	----	Tm,Tx,Tai,Ph,Me,P
P-33	0002	0002	----	Tai,Ph
P-34	0002	0002	----	Tai,Ph
P-35	0002	0002	----	Tai,Ph
P-36	0003	0002	----	Tai,Ph
P-37	0006	0002	----	Tai,Ph
P-38	0003	0005	----	Tm,Tx,Tai,Ph
P-39	0002	0002	----	Tm,Tx
P-40	0003	0007	----	Tm,Tx
P-41	0002	0005	----	Tm,Tx
P-42	0002	0002	----	Tm,Tx
R-7	0026	0006	----	Tm
R-8	0019	0002	----	Tm
R-9	----	0002	----	Tm
R-10	0003	----	----	Tm
R-11	0002	0002	----	P,Me
R-12	0002	0002	----	P,Me
R-13	0002	0002	----	P,Me
R-14	0004	0002	----	P,Me
R-15	0002	0002	----	Tm,P,Me
R-16	0004	0002	----	Sf,Ph
R-17	0005	0002	----	Sf,Ph
X-7	----	----	0020	Tm
X-8	---	---	0026	Tm
X-9	0070	----	----	Tm

Sample number	Analysis, ppb			Rock type
	Rock	Sediment	Prospect	
X-10	0055	----	----	Tm
X-11	----	----	----	Tm
X-12	0006	----	----	Tm
X-13	----	----	----	Tm
X-14	----	----	0018	Tm
X-15	0002	----	----	Tm
X-16	0002	----	----	P
X-17	0002	----	----	Sf,Ph
X-18	0002	----	----	Sf,Ph
X-19	0002	----	----	Sf,Ph,P
X-20	0002	----	----	Sf,Ph
X-21	0014	----	----	Ph

Tx - Xenoliths; highly silicified and silicated xenoliths of Paleozoic and Cretaceous sedimentary rocks within quartz monzonite

Tm - Quartz monzonite; buff-colored, medium to fine-grained, equigranular tp slightly porphyritic

Tai - Andesite; intrusive andesite of essentially the same composition as extrusive andesite

Ph - Hueco Formation; thin bedded to massive limestones, in part oolitic

P - Pennsylvanian rock; almost completely fossiliferous recrystallized limestone except for partings and thin lenses of shale

Me - Escabrosa Limestone; light gray, massive, crinoidal, and cherty limestone

Sf - Fusselman Dolomite; marbleized dolomites and limestones

West Lime

Sample number	Analysis, ppb			Rock type
	Rock	Sediment	Prospect	
G-1	----	----	0004	Tm
G-2	0006	----	0006	Tm
G-3	0024	----	0024	Tm
P-1	0010	0002	----	Kul
P-2	0007	0002	----	Kc
P-3	0010	0005	----	Kul,Kc
P-4	0024	0002	----	Kul,Kc
P-5	0002	0002	----	Kul,Kc
P-6	0022	0002	----	Kul,Kc
P-7	0004	0002	----	Tl
P-8	0002	0002	----	Kul,Kc
P-9	0028	0002	----	Kc,Ta
P-10	0005	0002	----	Trl,Ta

Sample number	Analysis, ppb			Rock type
	Rock	Sediment	Prospect	
P-30	0070	0007	----	P
P-31	0004	0002	----	P
R-1	0005	0002	----	Kul,Kc,Kml
R-2	0016	0002	----	Kc,Kml,Tl
R-3	0004	0002	----	Kul,Kc
R-4	0003	0002	----	Kul,Kc
R-5	0020	0002	----	Kul,Kc,Ta
R-6	0012	0015	----	Kc,Ta
R-18	0019	0002	----	P
R-19	0003	0002	----	P
R-20	0002	0002	----	P
X-1	0011	----	----	Kul,Kc,Kml
X-2	0011	----	----	Kul,Kc,Kml
X-3	0007	----	----	Kc
X-4	----	----	----	Kul,Kc
X-5	0003	----	----	Kul,Kc,Ta
X-6	0006	----	----	Kc,Ta
X-22	0020	----	----	Tm,Me,P
X-23	0003	0002	----	P
X-24	0002	0002	----	Tm
X-25	0007	0002	----	Tx,Tm

Trl - Rhyolite and latite; flows, breccias, and tuffs of light gray to reddish brown rhyolite and latite

Tx - Xenoliths; highly silicified and silicated xenoliths of Paleozoic and Cretaceous sedimentary rock within quartz monzonite

Tm - Quartz monzonite; buff-colored, medium to fine-grained, equigranular to slightly porphyritic

Tl - Older latite; breccias, welded tuffs, and subordinate porphyritic flow of gray to yellowish tan latite

Kul - Upper limestone; sparsely fossiliferous, light to dark gray, thin- to thick-bedded

Kc - Limestone conglomerate; limestone and limestone-chert conglomerate

Kml - Massive limestone; gray, coarsely crystalline limestone within cherty and siliceous beds

P - Pennsylvanian rock; almost completely fossiliferous recrystallized limestone with thin lenses of shale; the sandstone

is gray, fine-grained to silty, crosslaminated, in part porous

Me - Escabrosa Limestone; light gray, massive, crinoidal, and cherty

SIERRA RICA AND APACHE HILLS

KEY REFERENCES

Topographic Maps: Doyle Peak, Victorio Ranch, and Double Wells.

Geologic Map and Stratigraphy:

Strongin, O., 1957, Geology and ore deposits of Apache Hills and Northern Sierra Rica: unpublished Ph.D. dissertation, 221 pp. (Columbia University)

Description of Mineral Deposits:

same as above.

RESULTS OF SAMPLING

Prospect pits: 3 samples, range 15 to 910 ppb
Stream sediments: 59 samples, range 2 to 18 ppb
Rock samples: 60 samples, range 2 to 350 ppb.

Our best results were obtained in southwest trending drainages from the Apache Hills. However, there are numerous prospect pits which could have contaminated samples. The area does warrant additional sampling. In the Sierra Rica, assay results were low, but additional sampling is worthwhile because four samples (X-131, 133, 134 and 175) are abnormal in gold and taken from arroyos free of prospects.

Doyle Peak

Sample number	Analysis, ppb			Rock type
	Rock	Sediment	Prospect	
X-138	0070	0002	----	Kcb
X-139	0011	0007	----	Tqd,Khrl
X-140	0015	0018	----	Tqd,Khrl
X-141	0022	0002	----	Tqd,Khrl
X-142	0005	0002	----	Tqd,Khrl
X-143	0007	0003	----	Tqd,Khrl
X-144	0046	0005	----	Tqm,Tpr,Tqd,Khrl
X-145	0036	0003	----	Tmp,Tqm,Tpr,Khrl
X-146	0011	0006	----	Tmp,Khrl
X-147	0005	0002	----	Tqm,Tpr,Tmp,Khrl
X-148	0350	0002	-----	Tqm,Tpr,Khrl
X-149	0004	0002	----	Tqm,Tpr,Khrd

Sample number	Analysis, ppb			Rock type
	Rock	Sediment	Prospect	
X-150	0006	0002	----	Tmp,Tqm,Tpr,Khrl
X-151	0002	0002	----	Tpr,Khrl,Tlc
X-152	0007	0002	----	Tqm,Tpr,Khrl,Tlc
X-153	0010	0016	----	Tpr,Khrl
X-154	0003	0002	----	Tpr,Khrl
X-155	0014	0002	----	Tqm,Tpr,Khrl
X-156	0026	0002	----	Khrl,Khrd
X-157	0010	0002	----	Khrl,Khrd
X-158	0017	0002	----	Tqm,Tpr,Trp,Khrd,Khrl
X-159	0007	0002	----	Khrd,Khrb
X-160	----	0002	----	Khrd,Khrb,Tlc
X-161	----	0002	----	Khrd,Khrb,Tlc
X-162	0002	0002	----	Khrd,Khrb,Tlc
X-163	0210	0002	----	Khrd,Khrb,Tlc
X-164	----	0004	----	Khrd,Khrb,Tlc
X-165	----	0002	----	Khrd,Khrb
X-166	----	0002	----	Khrd,Khrb
X-167	0065	0002	----	Khrd,Khrb
X-168	0240	0002	----	Khrd,Khrb

Tpr – Porphyritic rhyolite; light greenish tan with finely granular texture surface

Tqm – Quartz monzonite porphyry; grayish pink to greenish gray in color, crystalline texture

Tmp – Monzonite porphyry

Tqd – Quartz diorite porphyry; sills, plugs, and dikes, plug, breccia

Tlc – Last Chance volcanics; andesite and basalt flows; sill, dikes, plugs, breccia

Kcb – Corbett Formation; same as Sartan sandstone

Khrl – Limestone-sandstone member; limestone conglomerate, red to gray sandstone, green shale

Khrd – Rudistid limestone member; blue massive limestone, fine-grained or dense, fossiliferous

Khrb – Orbitolina limestone member; blue gray limestone, dense and fine-grained, rich in Orbitolina

Victorio Ranch

Sample number	Analysis, ppb			Rock type
	Rock	Sediment	Prospect	
R-50	0010	0002	----	Khrb
R-51	0003	0002	----	Khrd,Khrb
R-58	0002	0002	----	Khrd
R-59	0002	0002	----	Khrd

Sample number	Analysis, ppb			Rock type
	Rock	Sediment	Prospect	
X-119	0002	----	----	Khro
X-120	0006	----	----	Khro
X-121	0008	----	----	Khro,Khrb
X-122	0028	----	----	Khro
X-123	0024	----	----	Khro
X-124	0015	----	----	Khro
X-125	----	----	0910	Khro
X-126	----	----	0050	Khro
X-127	----	----	0015	Khro
X-128	0017	----	----	Khrb
X-129	0004	----	----	Khrb
X-135	----	0002	----	Khrd,Khrb
X-136	----	0003	----Khrd,Khro	
X-137	0002	0002	----	Khrd
X-169	----	0002	----	Khrd, Khrb
X-170	0006	0002	----	Khro
X-171	0032	0002	----	Khro,Khrb
X-172	0026	0002	----	Khrb
X-173	0008	0002	----	Khrb
X-174	0011	0004	----	Khro
X-175	0030	0060	----	Khro
X-176	----	0002	----	Khrd,Khrb
X-177	----	0002	----	Khrd,Khrb
X-178	----	0002	----	Khrd,Khrb,Khro
X-179	----	0002	----	Khrd,Khrb,Khro
X-180	0006	0002	----	Khrd,Khrb
X-181	0006	0007	----	Khrd,Khrb
X-182	0009	0002	----	Khrd,Khrb
X-183	0005	0002	----	Khrd,Khrb
X-184	0002	0002	----	Khrd,Khrb

Khrd - Rudistid limestone member, blue massive limestone, fine-grained or dense, fossiliferous

Khrb - Orbitolina limestone member, blue gray limestone, dense and fine-grained, rich in orbitoline

Khro - Oyster limestone member

Double Wells

Sample number	Analysis, ppb			Rock type
	Rock	Sediment	Prospect	
R-52	0002	0002	----	Khrd
R-53	----	----	----	Khrd
R-54	0002	0002	----	Khrd
R-55	0002	0002	----	Khrd
R-56	0003	0002	----	Khro,Khrb
R-57	0003	0002	----	Khrd
X-130	0010	----	----	Khro,Khrb
X-131	0100	----	----	Khro,Khrb
X-132	0005	----	----	Khro,Khrb
X-133	0055	----	----	Khro,Khrb
X-134	0038	----	----	Khrb

Khrd – Rudistid limestone member; blue massive limestone, fine-grained and dense, fossiliferous

Khrb – Orbitolina limestone member; blue gray limestone, dense and fine-grained, rich in orbitolina

Khro – Oyster limestone member

PYRAMID MOUNTAINS

KEY REFERENCES

Topographic Maps: Gary and Lordsburg.

Geologic Map and Stratigraphy:

Thorman, C. H. and Drewes, H., 1978, Geologic map of the Gary and Lordsburg quadrangles, Hidalgo county, New Mexico: U.S. Geological Survey, Miscellaneous Investigations Series, Map I - II 1151.

Flege, R. F., 1959, Geology of the Lordsburg quadrangle, Hidalgo County, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Bulletin 62, 36 pp.

Description of Mineral Deposits:

Lasky, S. G., 1938, Geology and ore deposits of the Lordsburg mining district: U.S. Geological Survey, Bulletin 885.

Huntington, M. G., 1947, Atwood copper group, Lordsburg district, Hidalgo County, New Mexico: U.S. Bureau of Mines, Report of Investigation 4029, 9 pp.

RESULTS OF SAMPLING

Prospect pits:	3 samples, range 9 to 650 ppb
Stream sediments:	48 samples, range 2 to 440 ppb
Rock samples:	67 samples, range 3 to 3100 ppb

The results on the east flank of the Pyramid Mountains confirm a metal-rich area. This is to be expected from the abundance of producing mines. On the west flank, there has been little past production. Of interest are samples X-50, 51, and 52, all on the west flank. Sample X-50 is the arroyo beneath Banner Mining company's tailings from the Bonney and Miser's Chest Mines. Samples X-51 and X-52 are from a dividing ridge and thus from the next arroyos north of Sample X-50. These latter samples give incentive for additional prospecting in sec. 15, T23S, R19W.

Gary

Sample number	Analysis, ppb			Rock type
	Rock	Sediment	Prospect	
X-38B	----	0024	----	Kas,Tgd
X-39B	----	0010	----	Kas,Tgd
X-40B	----	0003	----	Kas,Tgd
X-41B	----	0004	----	Kas,Tgd
X-42B	----	0004	----	Kas,Tgd,Tap
X-43	----	0002	----	Tgd
X-44	0070	0002	----	Tap,kas,Tgd
X-45	----	----	----	Tgd
X-46	0012	0002	----	Tap,Tgd
X-47	0009	0002	----	Tap,Tgd
X-48	0011	0010	----	Tap,Tgd
X-49	0060	0002	----	Tap,Tgd
X-50	0430	0060	----	Kas,Tib,Tir,Tap,Tgd
X-51	0530	----	----	Tgd
X-52	0610	0004	----	Tgd
X-53	0016	0010	----	Tap,Tgd
X-54	0340	0004	----	Tib,Tir,Kas,Tq,Tgd
X-55	0010	0002	----	Tib,Tir,Kas,Tgd
X-56	0006	0002	----	Tib,Tir,Kas,Tgd
X-57	0024	0003	----	Tib,Tq, Tgd,Kas
X-58	0014	0002	----	Tq,Kas,Tat
X-59	0006	0003	----	Kas, Tat
X-60	0036	----	----	Tq,Kas,Tat
X-61	0015	----	----	Tq,Kas
X-62	0070	----	----	Tq,Kas,Tal
X-63	1200	----	----	Kas,Tal
X-64	0560	----	----	Tgd,Tap,Tq,Kas,Taa
X-65	0080	----	----	Taa,Kas,Tal
X-66	0012	----	----	Tq,Taa,Kas,Tap
X-71	0810	----	----	Tga,Tq,Kas,Tap
X-72	0790	----	----	Tq,Tgd,Kas
X-73	3100	----	----	Tap,Tgd,Tq,Kas
X-74	0830	----	----	Tq,Tgd,Kas,Tap
X-75	0010	----	----	Tq,Tap,Tgd,Kas,Tib
X-76	0320	0015	----	Tq,Tap,Tgd,Kas,Tib
X-77	0390	0095	----	Tgd,Tir,Tib,Tgd
X-78	0016	----	----	Kas
X-79	0240	0440	----	Kas,Tap,Tgd
X-82	1800	0040	----	Tq,Tap,Kas
X-83	0180	0009	----	Tq,Kas,Tib,Tap
X-84	0180	0030	----	Tib,Tgd
X-85	0060	0004	----	Tq,Kas
X-86	----	0050	----	Tq,Tgd,Kas
X-87	0060	0013	----	Tq,Tgd

Sample number	Analysis, ppb			Rock type
	Rock	Sediment	Prospect	
X-88	0080	0017	----	Tq,Kas,Tgd
X-89	0180	0014	----	Tq,Tgd
X-90	0190	0009	----	Kas,Tgd,Tq
X-91	0024	0005	----	Tgd,Tir
X-98	0014	0002	----	Kas
X-99	0012	0006	----	Tap,Kas
X-100	0011	0003	----	Kas
X-101	-----	0002	0009	Tap,Ks,Tgd
X-102	0280	-----	----	Kas
X-103	-----	-----	0650	Kas,Tq,Tgd
X-104	0022	0011	----	Kas
X-112	0005	-----	----	Tib,Tir
X-113	0016	-----	----	Tib,Tir
X-114	0032	-----	----	Tib,Tir
X-115	0009	-----	----	Tgd
X-116	-----	0020	Tib,Tir	
X-117	0032	-----	----	Tib,Tir
X-118	0006	-----	----	Tir

Tal - Andesite of Lordsburg Draw; medium to dark gray, or brownish-gray nonporphyritic and porphyritic. Now rock and tuff breccia

Taa - Andesite flows of Animas Road; medium to dark gray, sparsely porphyritic olivine andesite

Tib - Intrusive rhyolite breccia; light gray to yellowish gray silicified breccia containing clasts of rhyolite, andesite, and granodiorite

Tir - Intrusive Rhyolite; plugs and dikes of very light gray to greenish gray dense porphyritic rock

Tq - Quartz veins; includes large silicified masses

Tap - Aplite; small intrusive bodies in and near Lordsburg stock. Typically pinkish orange gray and fine-grained.

Tgd - Granodiorite; light gray to light brownish gray fine to medium-grained

Kas - Andesite of Shakespeare; includes andesite flows, tuff breccias, flows breccia, epiclastic beds

Ks - Sandstone; light brown, light olive gray, and gray green, fine-grained to gritty, quartzose sandstone, siltstone, shale, and some quartzite lenses.

Lordsburg

Sample number	Analysis, ppb			Rock type
	Rock	Sediment	Prospect	
X-67	0310	-----	-----	Tq,Taa,Kas
X-68	-----	-----	-----	Taa,Kas
X-69	0022	-----	-----	Taa,Kas
X-70	-----	-----	-----	Taa,Kas
X-80	-----	0060	-----	Tq,Kas
X-81	0160	0005	-----	Tq,Tap,Tgd,Kas
X-92	-----	0002	-----	Kas,Trd,Tir
X-93	-----	0002	-----	Tq,Tap,Tl,Trd
X-94	-----	0002	-----	Trd,Tgd,Kas
X-95	1200	0014	-----	Tq,Trd,Tap,Kas
X-96	0085	0013	-----	Tq,Tap,Tgd,Kas
X-97	0250	0002	-----	Tl,Tq,Tgd,Tap,Kas
X-105	0140	0011	-----	Tq,Tgd,Tap,Kas
X-106	0017	0006	-----	Tir,Kas
X-107	0720	-----	-----	Tq,Tap,Tgd,Kas
X-108	-----	-----	-----	Tap,Kas
X-109	0042	0016	-----	Tq,Tgd,Tap,Tib,Kas,Taa
X-110	-----	0055	-----	Tq,Tib,Kas,Taa
X-111	-----	-----	-----	Kas,Taa

Trd - Rhyolitic tuff of Dogs Head; includes tuffaceous sandstone, tuff breccia, and some agglomerate. Mostly very pale yellow to very light gray and poorly indurated

Tl - Latitic-porphyry dikes; very light gray rock with sparse phenocrysts of feldspar and locally biotite in a very fine-grained groundmass of feldspar, matic, and opaque minerals

Taa - Andesite flows of Animas Road; medium to dark gray sparsely porphyritic olivine andesite

Tib - Intrusive rhyolite breccia; light gray to yellowish gray silicified breccia containing clasts of rhyolite, andesite, and granodiorite

Tir - Intrusive rhyolite; plugs and dikes of very light gray to greenish gray dense porphyritic rock

Tq - Quartz vein; includes large silicified masses

Tap - Aplite; small intrusive bodies in and near Lordsburg stock. Typically pinkish orange gray and fine grained

Tgd - Granodiorite; light gray to light brownish gray, fine to medium-grained

Kas - Andesite of Shakespeare; includes andesite flows, tuff breccias, flow breccias, epiclastic beds, and scattered small intrusive masses.

SNAKEHILLS

KEY REFERENCES

Topographic Maps: Red Mountain and Bowlin Ranch.

Geologic Maps and Stratigraphy:

No published map available. Reconnaissance mapping has been done by R. E. Clemons, New Mexico State University.

RESULTS OF SAMPLING

Prospect pits:	0 samples
Stream sediments	3 samples, all 2 ppb
Rock samples:	9 samples, range 2 to 42 ppb

There is no evidence of previous prospecting in the Snake Hills. Samples P-62 and 68 are on the threshold of being anomolisms.

Red Mountain

Sample number	Analysis, ppb			Rock type
	Rock	Sediment	Prospect	
P-62	0040	----	----	Om
P-63	0004	----	----	Om
P-64	0003	----	----	Om
p-65	0002	----	----	Om
P-66	0002	----	----	Om
P-67	0004	----	----	Om
P-68	0042	0002	----	Om/Oe
P-69	0003	0002	----	Om

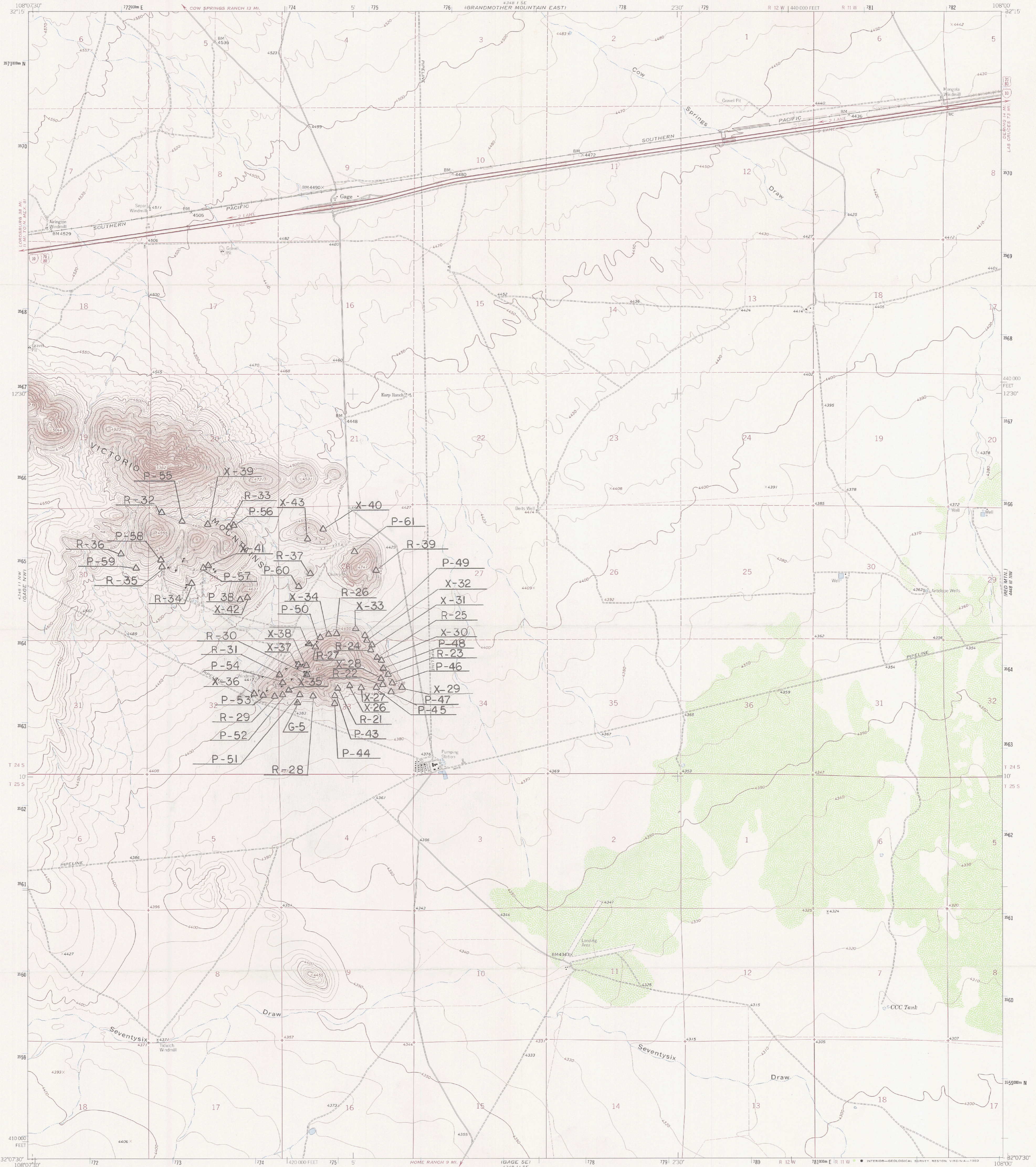
Om - Montoya Formation, light to medium gray, medium-grained dolomite

Oe - El Paso limestone; light gray limestone and dolomitic limestone, and some calcarenite and edgewise pebble conglomerate

Bowlin Ranch

Sample number	Analysis, ppb			Rock type
	Rock	Sediment	Prospect	
P-70	0002	----	----	Oe
P-71	0002	----	----	Oe

Oe - El Paso Limestone; light gray limestone and dolomitic limestone,
and some calcarenite and edgewise pebble conglomerate



Mapped, edited, and published by the Geological Survey

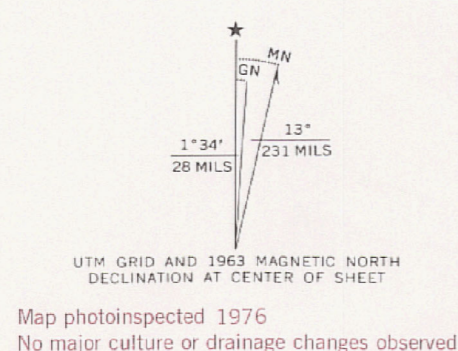
Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1962. Field checked 1963

Polyconic projection, 1927 North American datum
10,000-foot grid based on New Mexico coordinate system, west zone
1000-meter Universal Transverse Mercator grid ticks.

To place on the predicted North American Datum 1983 move the projection lines 8 meters south and 55 meters east as shown by the dashed corner ticks.

Fine red dashed lines indicate selected fence lines



SCALE 1:24 000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET



NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
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A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

ROAD CLASSIFICATION

Heavy-duty ————— Light-duty

Unimproved dirt =====

 Interstate Route  U.S.

GAGE, N. MEX.
N3207.5-W10800/7.5

1963
PHOTOINSPECTED 1976
DMA 4348 II NE-SERIES V88

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PLATE 2
NORTH PEAK QUADRANGLE
NEW MEXICO—LUNA CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)



Mapped, edited, and published by the Geological Survey
Control by USGS and USC&GS
Topography by photogrammetric methods from aerial
photographs taken 1964. Field checked 1965
Polyconic projection. 1927 North American Datum
10,000-foot grid based on New Mexico coordinate system,
west zone
1000-meter Universal Transverse Mercator grid ticks,
zone 13, shown in blue
Fine red dashed lines indicate selected fence lines
To place on the predicted North American Datum 1983
move the projection lines 8 meters south and
54 meters east as shown by dashed corner ticks
Map photoinspected 1976
No major culture or drainage changes observed

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
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A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST



ROAD CLASSIFICATION
Medium-duty ——— Light-duty ———
Unimproved dirt ———
State Route ———

NORTH PEAK, N. MEX.

31107-H6-TF-024

1965
PHOTOINSPECTED 1976
DMA 4447 1 NW-SERIES Y881

4447 IV NW
(HERMANAS NW)
31°52'30"
107°52'30"
490 000 FEET
129
230
50'

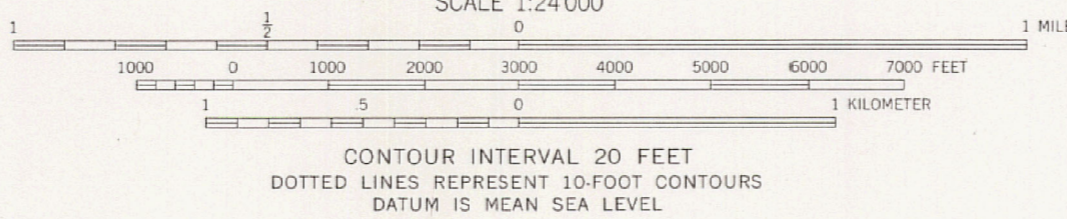
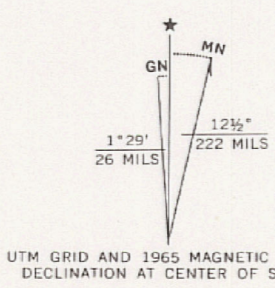
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PLATE 3
WEST LIME HILLS QUADRANGLE
NEW MEXICO—LUNA CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
NE/4 HERMANAS 15' QUADRANGLE

4448 III SE
(MIDWAY BUTTE)
R. 10 W.
335
R. 9 W.
336
47'30"
337
338
520 000 FEET
339
240
107°45'
32°00'



Mapped, edited, and published by the Geological Survey
Control by USGS and USC&GS
Topography by photogrammetric methods from aerial
photographs taken 1964. Field checked 1965
Polyconic projection. 1927 North American datum
10,000-foot grid based on New Mexico coordinate system,
west zone
1000-meter Universal Transverse Mercator grid ticks,
zone 13, shown in blue
Fine red dashed lines indicate selected fence lines



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A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST



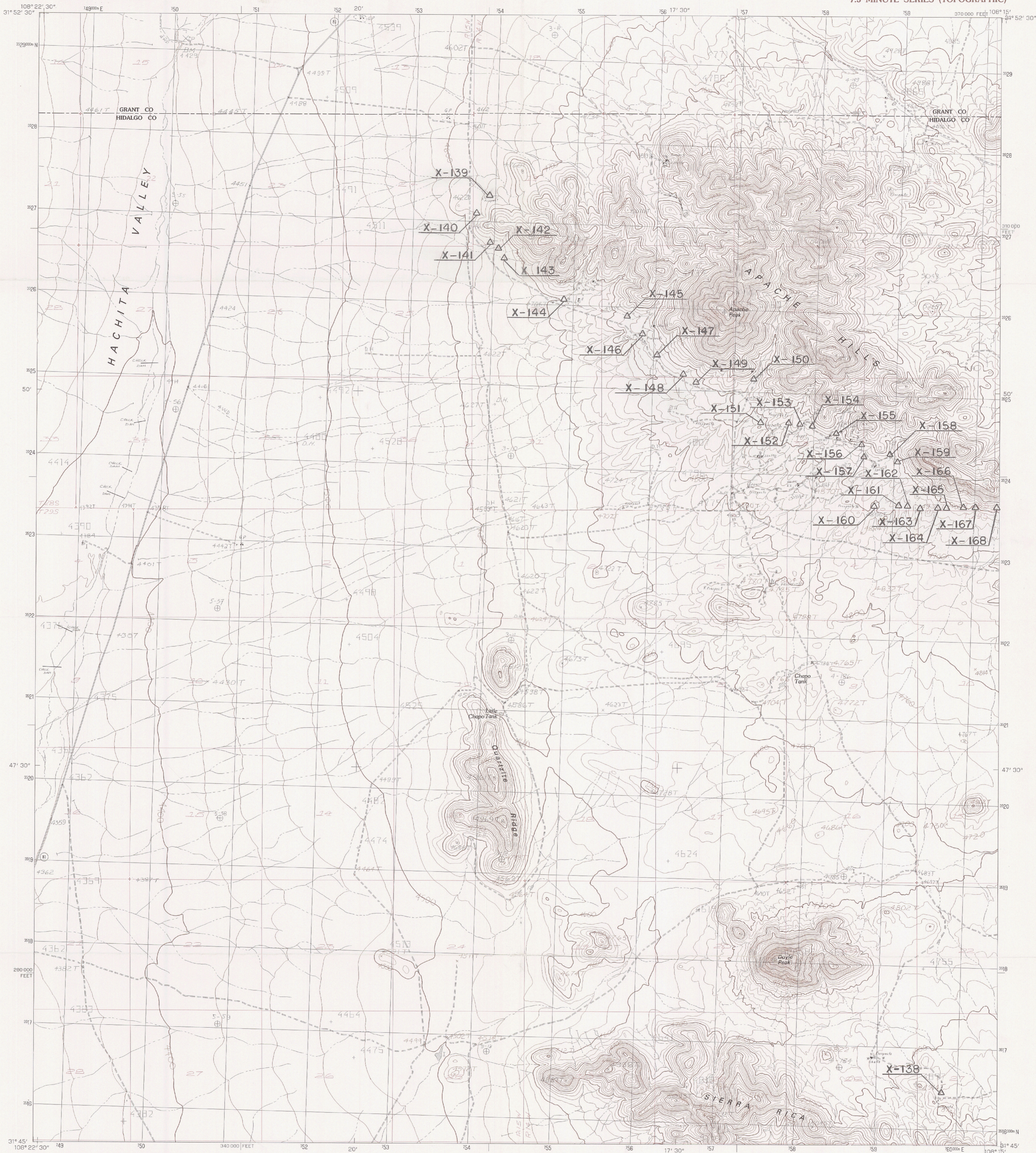
ROAD CLASSIFICATION
Light-duty ————— Unimproved dirt —————

WEST LIME HILLS, N. MEX.
NE/4 HERMANAS 15' QUADRANGLE
N3152.5—W10745/7.5

1965
AMS 4447 IV NE—SERIES V881

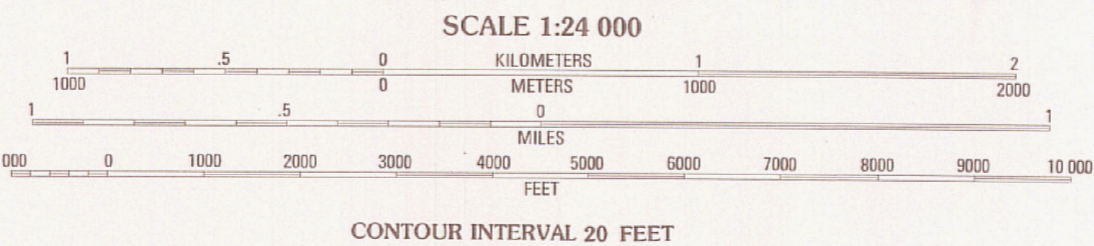
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PLATE 4
DOYLE PEAK QUADRANGLE
NEW MEXICO
7.5 MINUTE SERIES (TOPOGRAPHIC)



PRODUCED BY THE UNITED STATES GEOLOGICAL SURVEY
CONTROL BY USGS, NOSNOAA
COMPILED FROM AERIAL PHOTOGRAPHS TAKEN 1976
FIELD CHECKED 1977 MAP EDITED 1982
PROJECTION TRANSVERSE MERCATOR
GRID: 1000-METER UNIVERSAL TRANSVERSE MERCATOR ZONE 12
100000-FOOT STATE GRID TICKS NEW MEXICO, WEST ZONE
UTM GRID DECLINATION 12° EAST
1982 MAGNETIC NORTH DECLINATION 11° 30' EAST
VERTICAL DATUM NATIONAL GEODETIC VERTICAL DATUM OF 1929
HORIZONTAL DATUM 1927 NORTH AMERICAN DATUM
To place on the predicted North American Datum of 1983, move
the projection lines as shown by dashed corner ticks
(9 meters south and 56 meters east)
There may be private inholdings within the boundaries of any
Federal and State Reservations shown on this map

PROVISIONAL MAP
Produced from original
manuscript drawings. Infor-
mation shown as of date of
field check.



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FOR SALE BY U.S. GEOLOGICAL SURVEY, DENVER, COLORADO, 80225
OR RESTON, VIRGINIA 22092



1	2	3
4	5	6
7	8	

ADJOINING 7.5 QUADRANGLE NAMES

ROAD LEGEND
Improved Road
Unimproved Road
Trail
Interstate Route U.S. Route State Route

DOYLE PEAK, NEW MEXICO
PROVISIONAL EDITION 1982

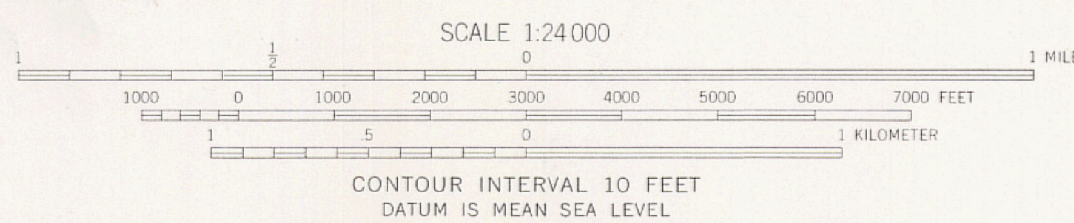
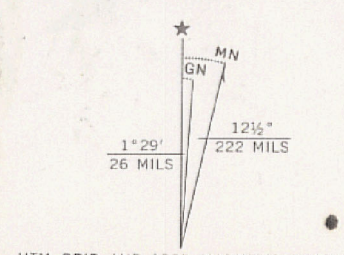
31108-G3-TF-024

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PLATE 5
VICTORIO RANCH QUADRANGLE
NEW MEXICO
7.5 MINUTE SERIES (TOPOGRAPHIC)
SW 1/4 VICTORIO 15' QUADRANGLE



Maped, edited, and published by the Geological Survey
Control by USGS, USC&GS, and International Boundary and
Water Commission
Topography by photogrammetric methods from aerial
photographs taken 1964. Field checked 1965.
Polyconic projection. 1927 North American datum
10,000-foot grid based on New Mexico coordinate system,
west zone.
1000-meter Universal Transverse Mercator grid ticks,
zone 12, shown in blue.
Fine red dashed lines indicate selected fence lines.



ROAD CLASSIFICATION
Light-duty ———— Unimproved dirt ————
○ State Route

VICTORIO RANCH, N. MEX.
SW 1/4 VICTORIO 15' QUADRANGLE
N3145—W10807.5/7.5

1965
AMS 4347 1 SW—SERIES V881

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FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR WASHINGTON, D. C. 20242
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

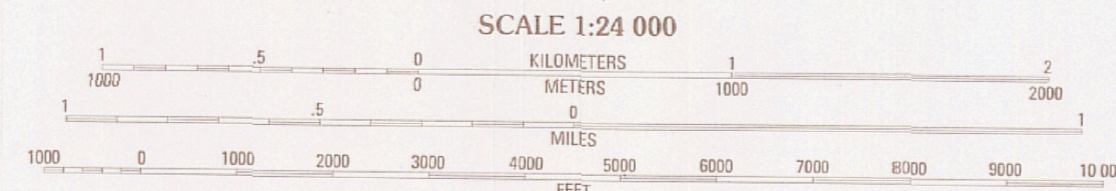
PLATE 6

DOUBLE WELLS QUADRANGLE
NEW MEXICO—CHIHUAHUA
7.5 MINUTE SERIES (TOPOGRAPHIC)



PRODUCED BY THE UNITED STATES GEOLOGICAL SURVEY
CONTROL BY USGS, NOS/NOAA, IBC, AND DGG
FIELD CHECKED 1977 MAP EDITED 1983
PROJECTION TRANSVERSE MERCATOR
GRID: 1000-METER UNIVERSAL TRANSVERSE MERCATOR ZONE 12
10,000-FOOT STATE GRID TICS
UTM GRID DECLINATION 1° 29' EAST
1983 MAGNETIC NORTH DECLINATION 1° 30' EAST
VERTICAL DATUM: NATIONAL GEODETIC VERTICAL DATUM OF 1929
HORIZONTAL DATUM: 1927 NORTH AMERICAN DATUM
To place on the predicted North American Datum of 1983, move
the projection lines as shown by dashed corner ticks
(9 meters south and 56 meters east)
There may be private inholdings within the boundaries of any
Federal and State Reservations shown on this map
Mexico portion copied from DGG 1:50,000-scale map,
Los Moscos H12B29, dated 1978

PROVISIONAL MAP
Produced from original
manuscript drawings. Infor-
mation shown as of date of
field check.



CONTOUR INTERVAL 20 FEET IN THE UNITED STATES
CONTOUR INTERVAL 20 METERS IN MEXICO

To convert meters to feet multiply by 3.2808
To convert feet to meters multiply by .3048

THE U.S. PORTION OF THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
AND BY CENTRO DE ASESORIA Y VENTA DE INFORMACIÓN ESTADÍSTICA Y CARTOGRÁFICA
BALDERAS #71, MEZZANINE, MEXICO 1, D.F.
A FOLDER DESCRIBING U.S. TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE FROM USGS



QUADRANGLE LOCATION

1	2	3
4	5	6
7	8	9

ADJOINING 7.5 QUADRANGLE NAMES

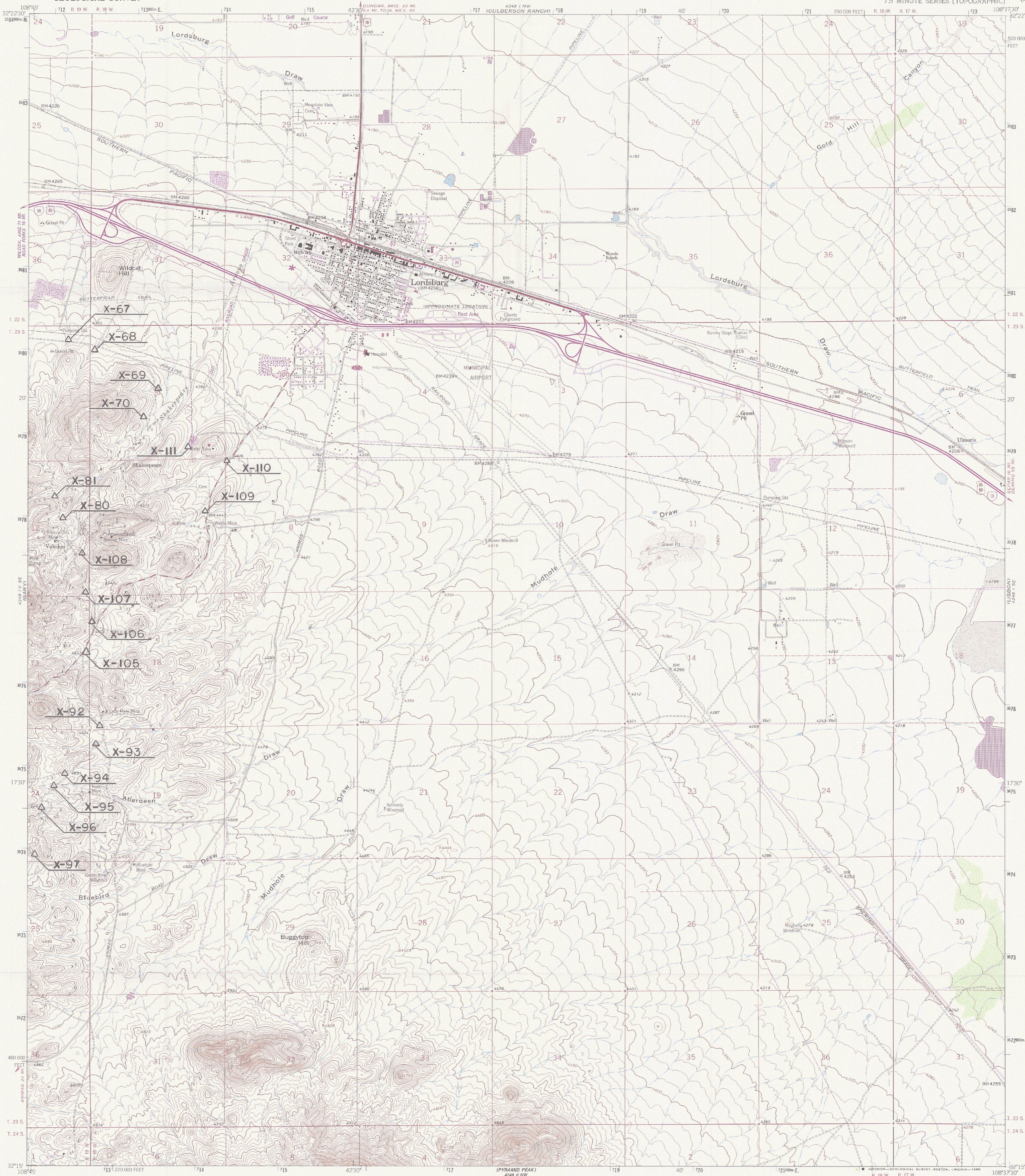
ROAD LEGEND
Improved Road
Unimproved Road
Trail
Interstate Route U.S. Route State Route

DOUBLE WELLS, N. MEX.—CHIH.
PROVISIONAL EDITION 1983

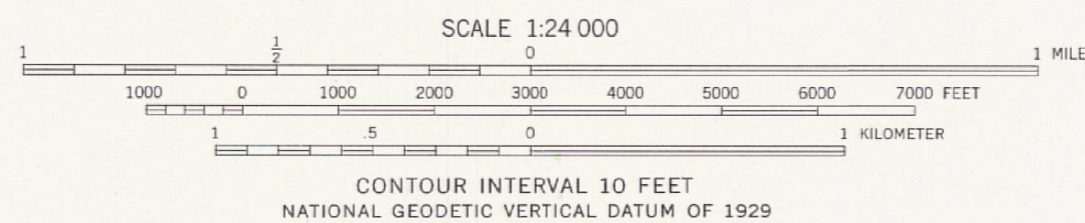
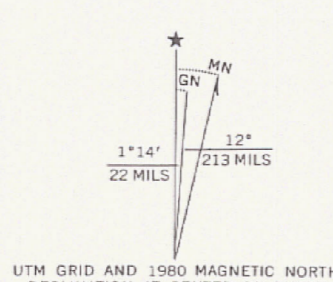
31108-F2-TF-024

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PLATE 7
LORDSBURG QUADRANGLE
NEW MEXICO-HIDALGO CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)



Mapped, edited, and published by the Geological Survey
Control by USGS and NOS/NOAA
Topography by photogrammetric methods from aerial
photographs taken 1962. Field checked 1963
Polyconic projection, 1927 North American datum
10,000-foot grid based on New Mexico coordinate system, west zone
1000-meter Universal Transverse Mercator grid ticks,
zone 12, shown in blue
Fine red dashed lines indicate selected fence lines
To place on the predicted North American Datum 1983
move the projection lines 7 meters south and
57 meters east as shown by dashed corner ticks
Revisions shown in purple compiled from aerial photographs
taken 1978 and other source data. This information not
field checked. Map edited 1980



ROAD CLASSIFICATION
Heavy-duty ——— Light-duty ———
Medium-duty ——— Unimproved dirt ———
Interstate Route U.S. Route State Route



LORDSBURG, N. MEX.
N3215-W10837.5/7.5

1963
PHOTOREVISED 1980
DMA 4248 1 SW-SERIES V881

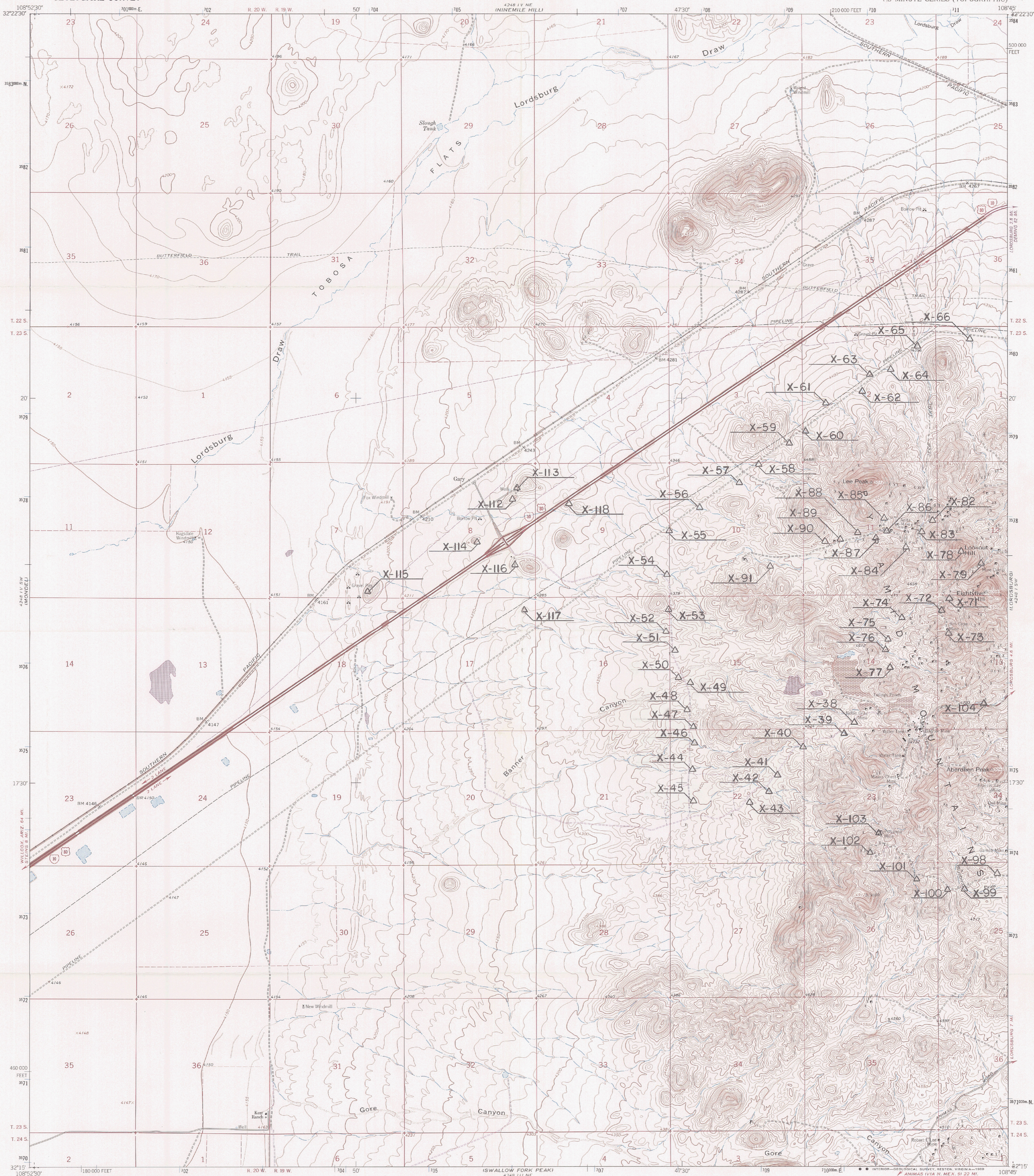
4248 IV SE
SERIES V881

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

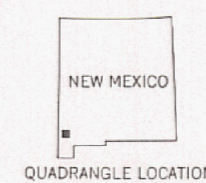
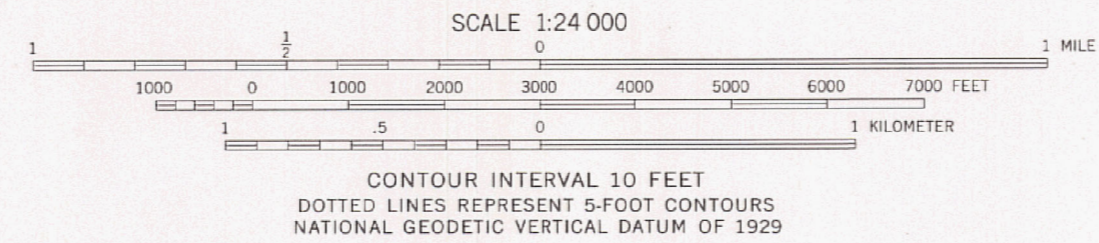
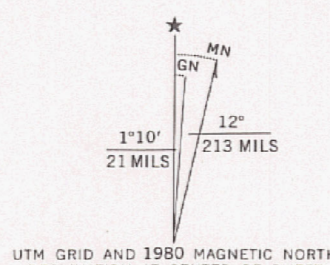
PLATE 8

GARY QUADRANGLE
NEW MEXICO-HIDALGO CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

4248 IV SE
SERIES V881



Mapped, edited, and published by the Geological Survey
Control by USGS and NOS/NOAA
Topography by photogrammetric methods from aerial
photographs taken 1963. Field checked 1964
Polyconic projection. 1927 North American datum
10,000-foot grid based on New Mexico coordinate system, west zone
1000-meter Universal Transverse Mercator grid ticks,
zone 12, shown in blue
Fine red dashed lines indicate selected fence lines
To place on the predicted North American Datum 1983
move the projection lines 7 meters south and
57 meters east as shown by dashed corner ticks
Revisions shown in purple compiled from aerial photographs
taken 1978 and other source data. This information not
field checked. Map edited 1980



ROAD CLASSIFICATION
Heavy-duty ——— Light-duty ———
Medium-duty ——— Unimproved dirt ———
Interstate Route U.S. Route

GARY, N. MEX.
N3215-W10845/7.5

1964
PHOTOREVISED 1980
DMA 4248 IV SE-SERIES V881

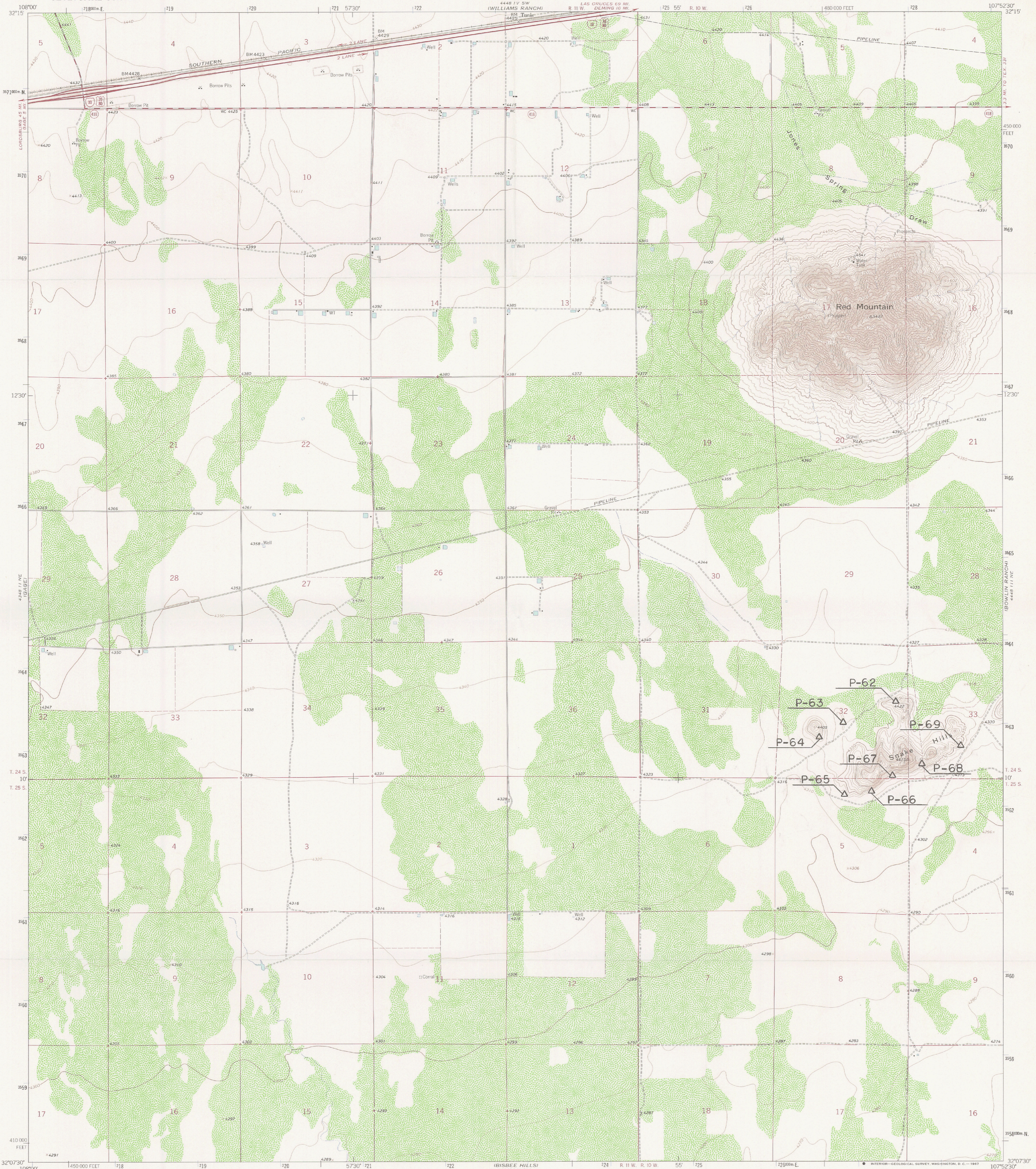
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A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

4448 11 SE
4448 11 SE
GRANDVIEW MTN.

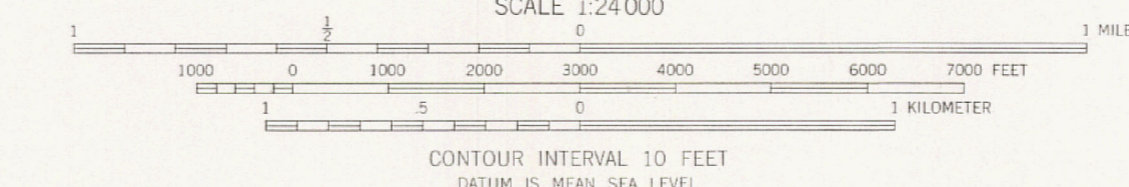
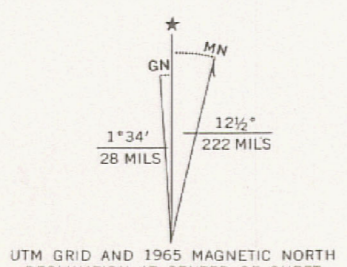
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PLATE 9
RED MOUNTAIN QUADRANGLE
NEW MEXICO-LUNA CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

4448 11 SE
4448 11 SE
DEMING WEST



Maped, edited, and published by the Geological Survey
Control by USGS and USC&GS
Topography by photogrammetric methods from aerial
photographs taken 1962 and planetable surveys 1965
Polyconic projection. 1927 North American datum
10,000-foot grid based on New Mexico coordinate system, west zone
1000-meter Universal Transverse Mercator grid ticks,
zone 13, shown in blue
Fine red dashed lines indicate selected fence lines



ROAD CLASSIFICATION
Heavy-duty ——— Light-duty ———
Medium-duty ——— Unimproved dirt ———
Interstate Route U.S. Route State Route

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR WASHINGTON, D. C. 20242
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

RED MOUNTAIN, N. MEX.
N3207.5 - W10752.5/7.5

1965

AMS 4448 111 NW-SERIES V881

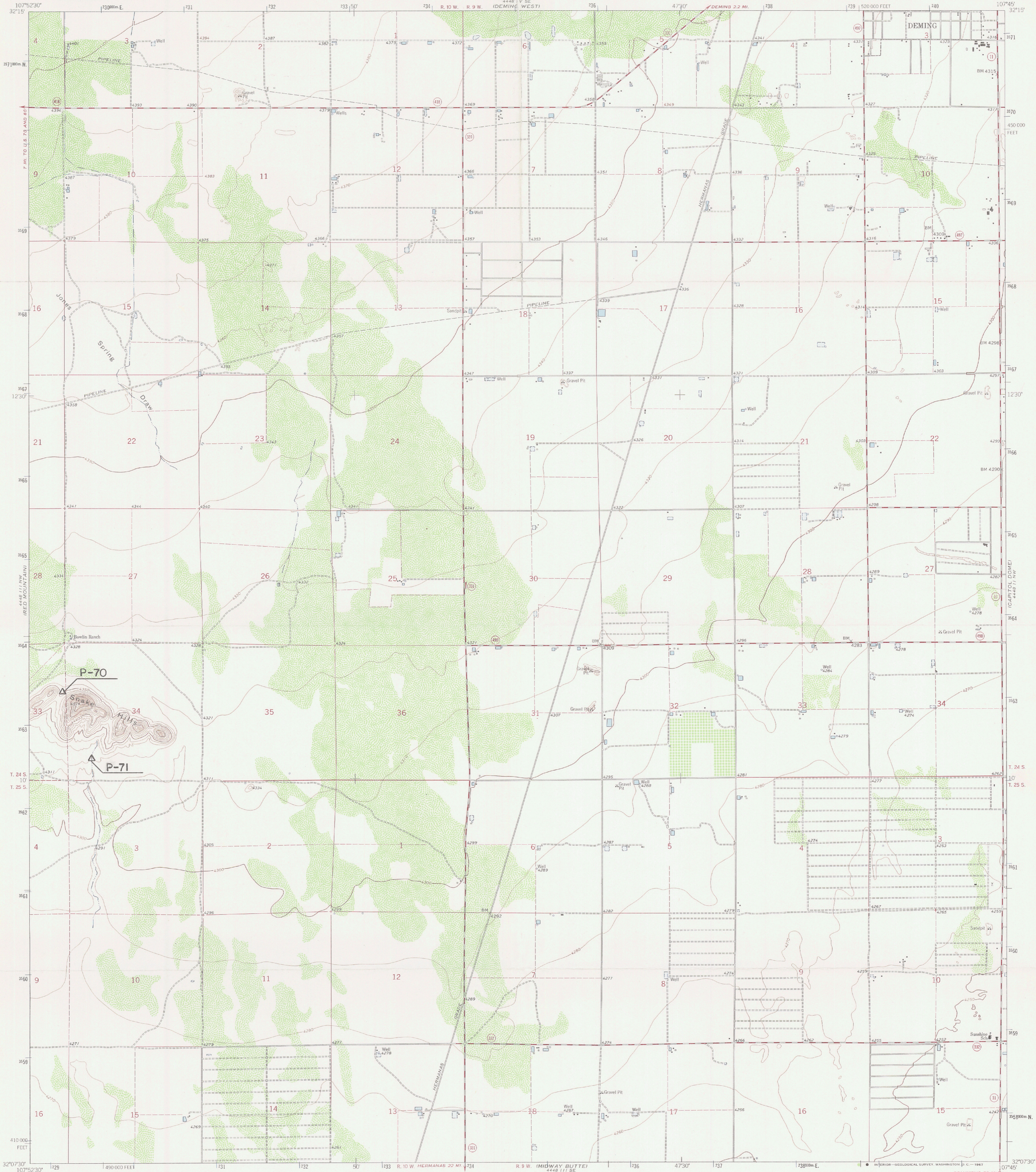
4448 11 SE
4448 11 SE
MIDWAY BUTTE

448 111 SW
WILLIAMS RANCH

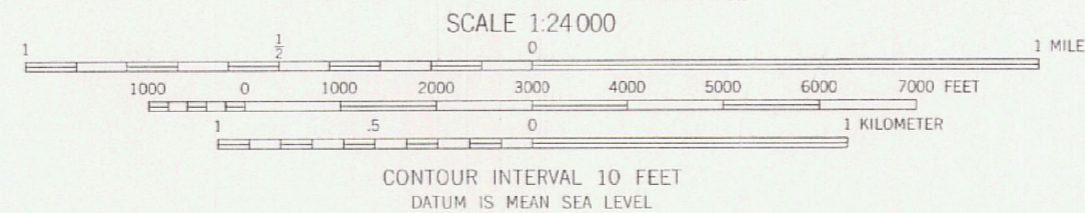
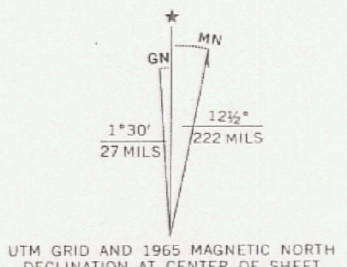
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PLATE 10
BOWLIN RANCH QUADRANGLE
NEW MEXICO—LUNA CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

448 111 SW
DEMING E 571



Mapped, edited, and published by the Geological Survey
Control by USGS and USC&GS
Topography by photogrammetric methods from aerial
photographs taken 1962 and planetable surveys 1965
Polyconic projection. 1927 North American datum
10,000-foot grid based on New Mexico coordinate system, west zone
1000 meter Universal Transverse Mercator grid ticks,
zone 13, shown in blue
Fine red dashed lines indicate selected fence lines



ROAD CLASSIFICATION
Medium-duty Light-duty
Unimproved dirt
State Route

BOWLIN RANCH, N. MEX.
N3207.5-W10745.7 5

1965
AMS 4448 111 NE-SERIES V881

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