STUDY OF THE LITHOLOGY, PETROLOGY, AND ROCK CHEMISTRY FOR THE PYRAMID MOUNTAINS, NEW MEXICO

by

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Part 1: Sample Locations
Part 2: Hand Specimen Descriptions
Part 3: X-Ray Chemical Analyses

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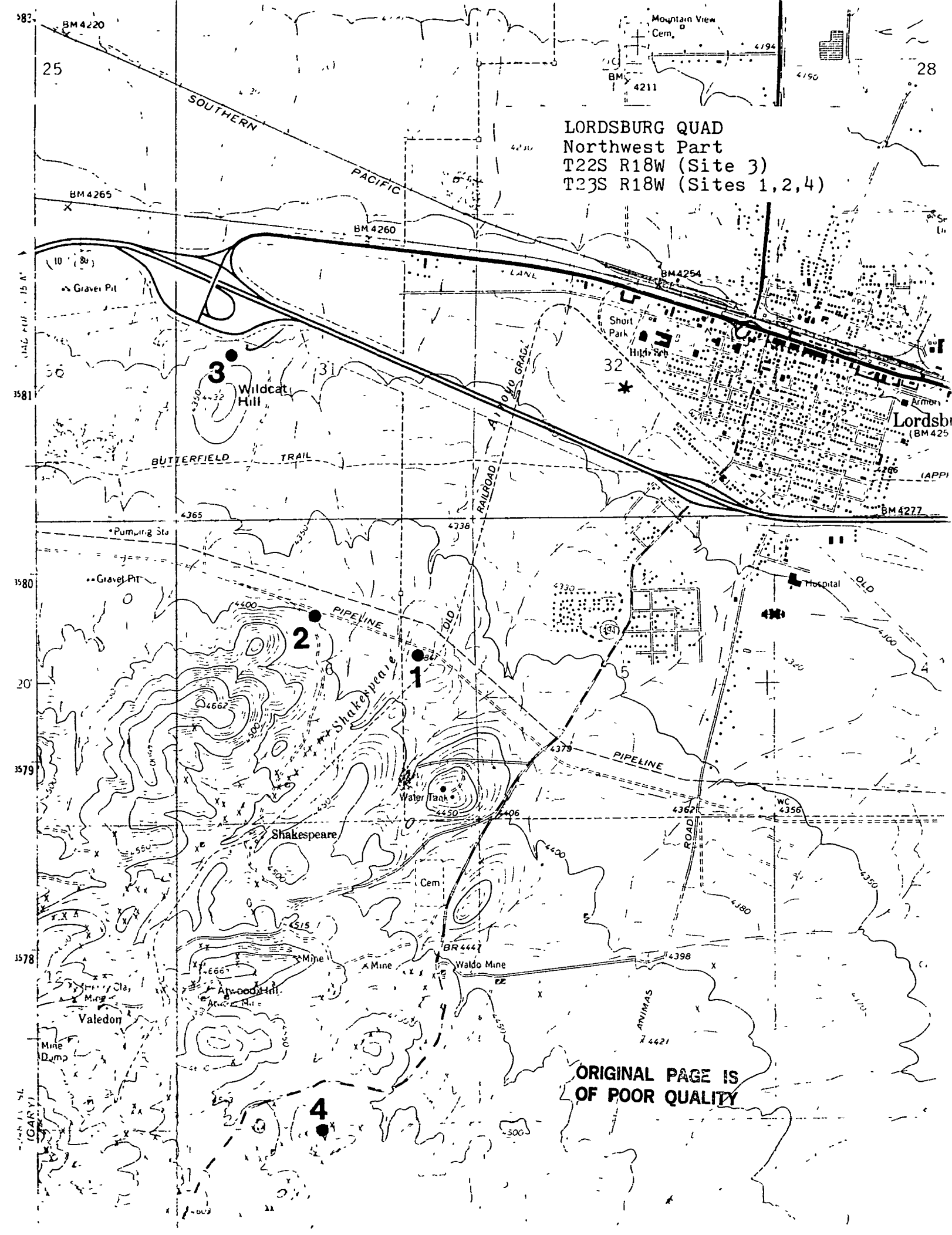
Part I Location of Sample Sites

Rock and soil samples were collected at 24 sites within the Pyramid Mountains of southwestern New Mexico in late September, 1984. The site locations are specified as 10-acre plots within the Section, Township, and Range land survey system. They are shown on copies of portions of 7½-minute quadrangle topographic maps (Lordsburg, Gary, Pyramid Peak, Table Top Mountain, and South Pyramid Peak).

Sample	Site Location
1	SW¼ SE¼ NE¼ Sec. 6, T23S, R18W; ridgetop 1 mi NE of Shakespeare townsite
2	NE¼ SE¼ NW¼ Sec. 6, T23S, R18W; pipeline road .75 mi N of Shakespeare townsite
3	SE¼ SW¼ NW¼ Sec. 31, T22S, R18W; Wildcat Hill, 2 mi W of Lordsburg
4	NE¼ NE¼ NW¼ Sec. 18, T23S, R18W; hilltop south of paved road, .5 mi SW of Atwood Mine
5	SE¼ SE¼ SW¼ Sec. 14, T23S, R19W; 300 ft S of Nellie Gray Mine
6	SE¼ SE¼ NW¼ Sec. 14, T23S, R19W; .5 mi N of Nellie Gray Mine. Sample 6' is from the tailings pond immediately south of site 6.
7	SE¼ NW¼ NE¼ Sec. 19, T23S, R18W; hilltop .5 mi SE of Lady Mary Mine
8	NE¼ SE¼ SE¼ Sec. 7, T24S, R18W; .75 mi SW of Pyramid Peak. Sample 8' was collected 200 ft north of site 8.
9	SW¼ NE¼ NW¼ Sec. 17, T24S, R18W; Rockhouse Seep, 1 mi S of Pyramid Peak
10	SW¼ NW¼ SW¼ Sec. 9, T24S, R18W; Rockhouse Canyon, 1 mi SE of Pyramid Peak
12	NE¼ SE¼ NE¼ Sec. 16, T24S, R18W; McWirter Canyon, .5 mi NE of Cedar Mountain Well
13	SE¼ NW¼ SE¼ Sec. 16, T24S, R18W; 1000 ft E of Cedar Mountain Well
14	NE¼ SW¼ SE¼ Sec. 16, T24S, R18W; 400 ft S of site 13
15	SE¼ SW¼ SE¼ Sec. 16, T24S, R18W; .25 mi SE of Cedar Mountain Well
16	NE¼ SW¼ SE¼ Sec. 26, T25S, R19W; 1.5 mi S of Woodhaul Canyon and 2 mi W of Animas Road
17	NE¼ NE¼ NE¼ Sec. 35, T25S, R19W; Holtkamp Canyon, 1 mi W of Hightower Well. Sample 17' was collected 100 ft S of site 17, and 17" 500 ft S of site 17.
18	NW¼ NE¼ SE¼ Sec. 30, T25S, R18W; Holtkamp Canyon, .25 mi E of Rainbow Well
19	SE¼ NW¼ NW¼ Sec. 24, T25S, R19W; Woodhaul Canyon, 2.5 mi E of Animas Road. Samples 19' and 19" were collected 800 ft west of site 19.

Sample	Site Location
20	NE¼ SE¼ NW¼ Sec. 25, T23S, R18W; NE of Hughes Windmill. Sample 20A was collected across road NE of site 20.
21	NW¼ NE¼ NE¼ Sec. 26, T23S, R19W; SE of Polyanna Mine
22	SE¼ SW¼ SE¼ Sec. 26, T23S, R19W; S of Polyanna Mine
23	unknown
24	SE¼ SE¼ NW¼ Sec. 28, T24S, R18W; S of North Linn Tank
26	NE¼ SW¼ NE¼ Sec. 22, T25S, R18W; S of South Uhl Draw


LORDSBURG QUAD
Northwest Part
T22S R18W (Site 3)
T23S R18W (Sites 1,2,4)
SOUTHERN PACIFIC
BM 4220
BM 4265
BM 4260
BM 4254
BM 4277
Mountain View Cem.
4194
4211
Gravel Pit
Short Park
Hilda Sch
Armory
Lordsburg
(BM 4254)
Wildcat Hill
BUTTERFIELD TRAIL
RAILROAD
OLD GRADE
LANE
Pumping Sta
Gravel Pit
PIPELINE
OLD
Shakespeare
Water Tank
Hospital
ROAD
Cem
Mine
Waldo Mine
Arwood Hill
Valedon
Mine Dump
ANIMAS
BR 4447
4398
4421
1
2
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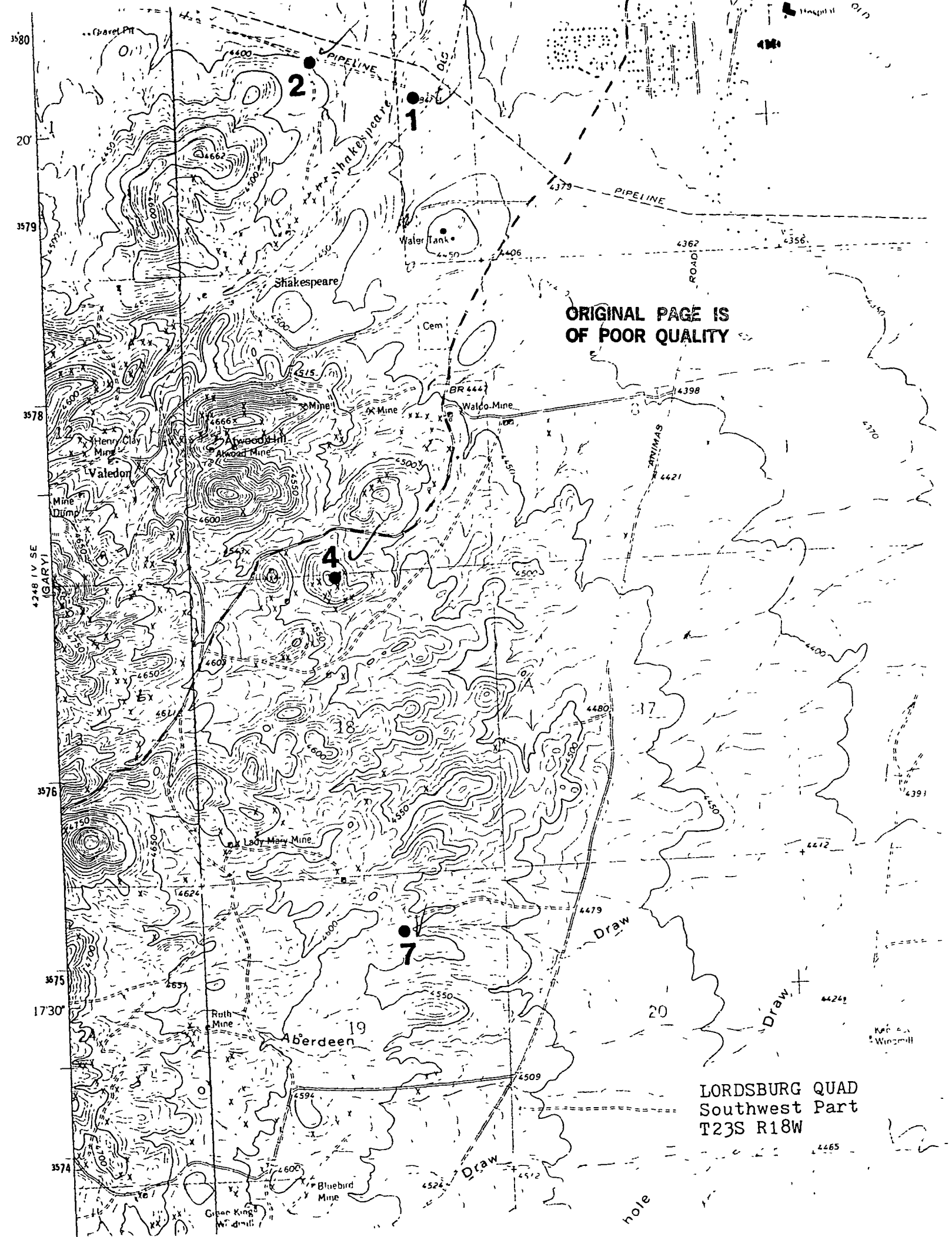
ORIGINAL PAGE IS
OF POOR QUALITY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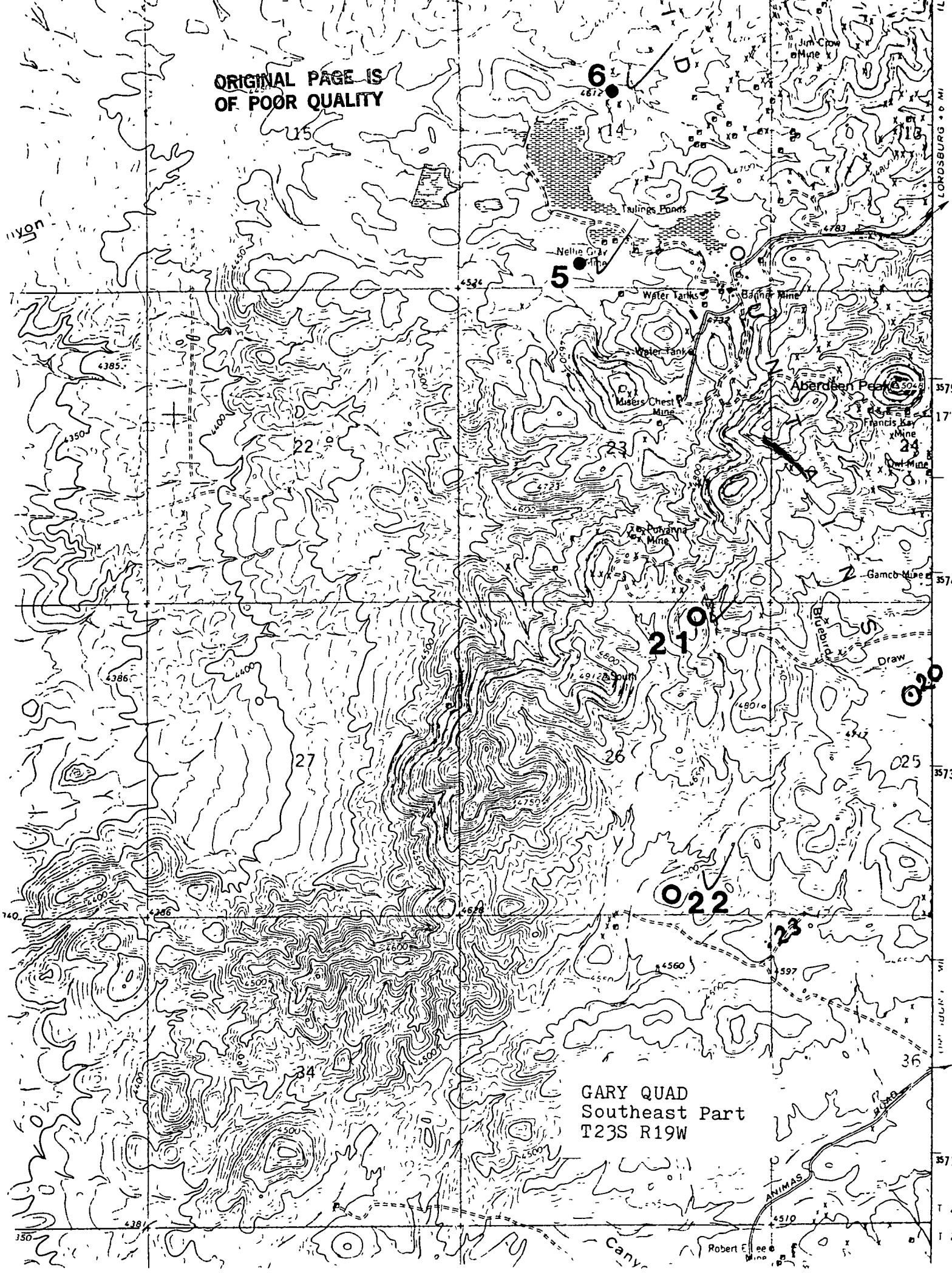
LORDSBURG QUAD
Southwest Part
T23S R18W
Shakespeare
Valedon
Aberdeen
Atwood Hill
Atwood Mine
Henry Clay Mine
Mine Dump
Walco Mine
Lady Mary Mine
Ruth Mine
Bluebird Mine
Green King Windmill
Water Tank
Cem
PIPELINE
ROAD
Draw
1
2
4
7
A
A'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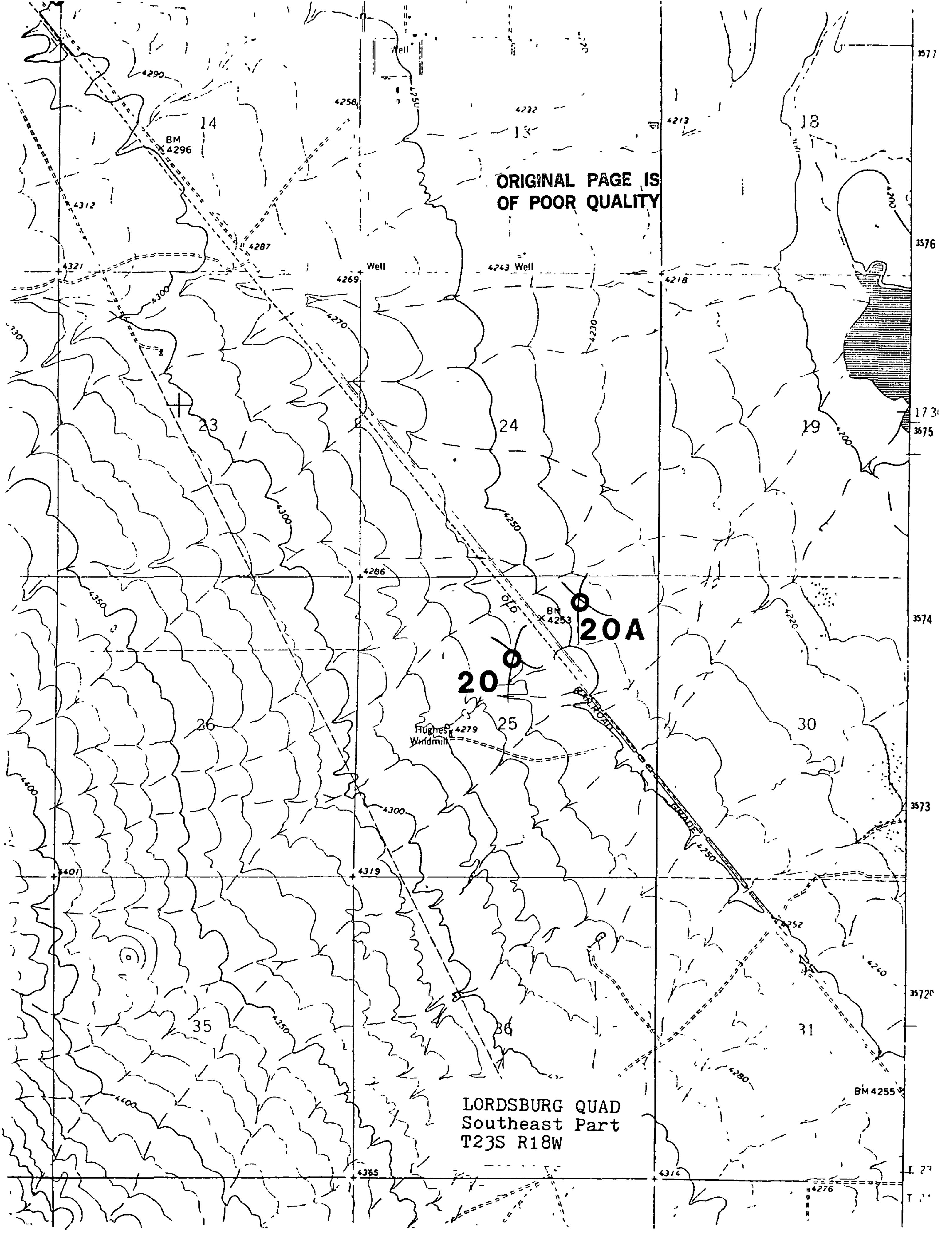
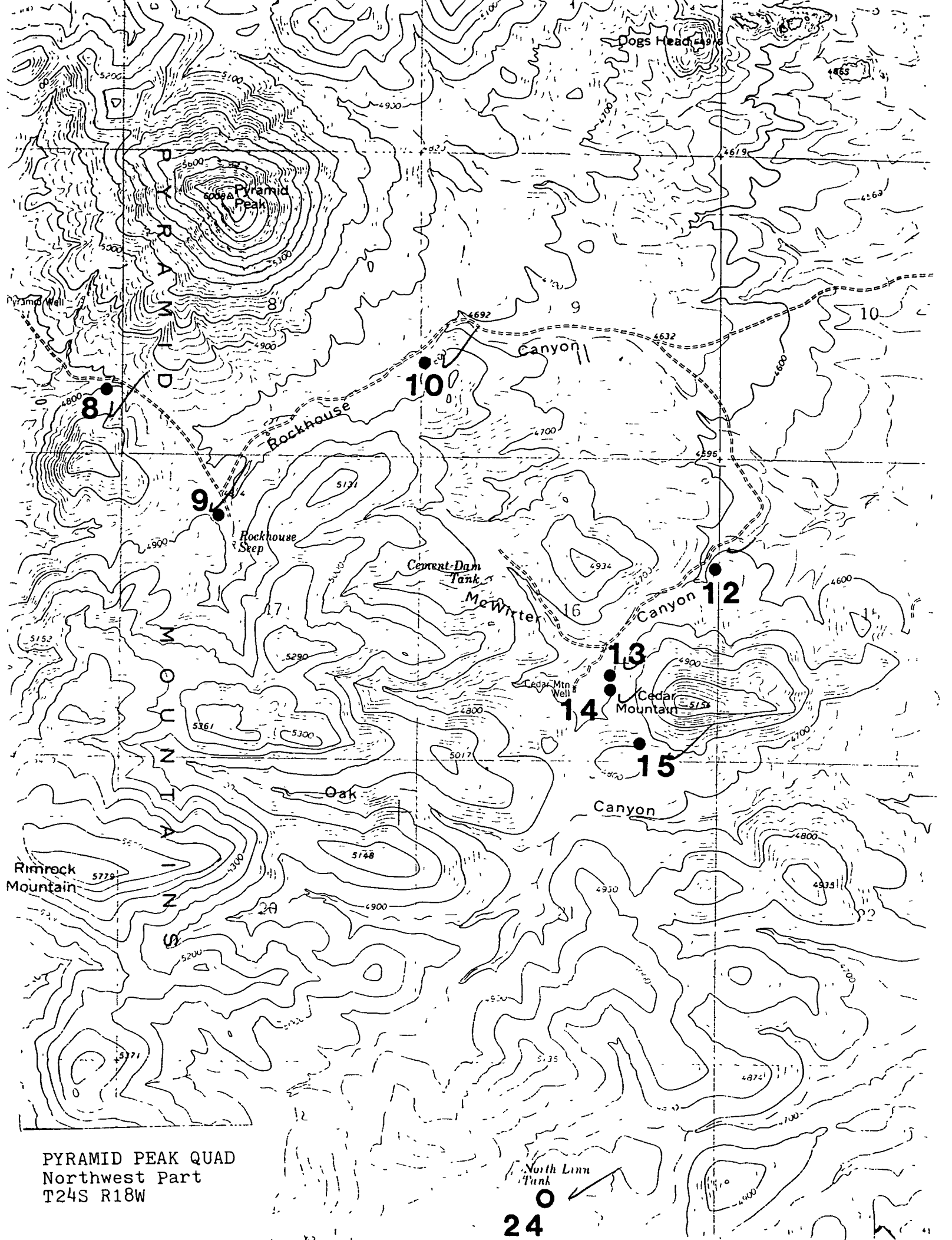
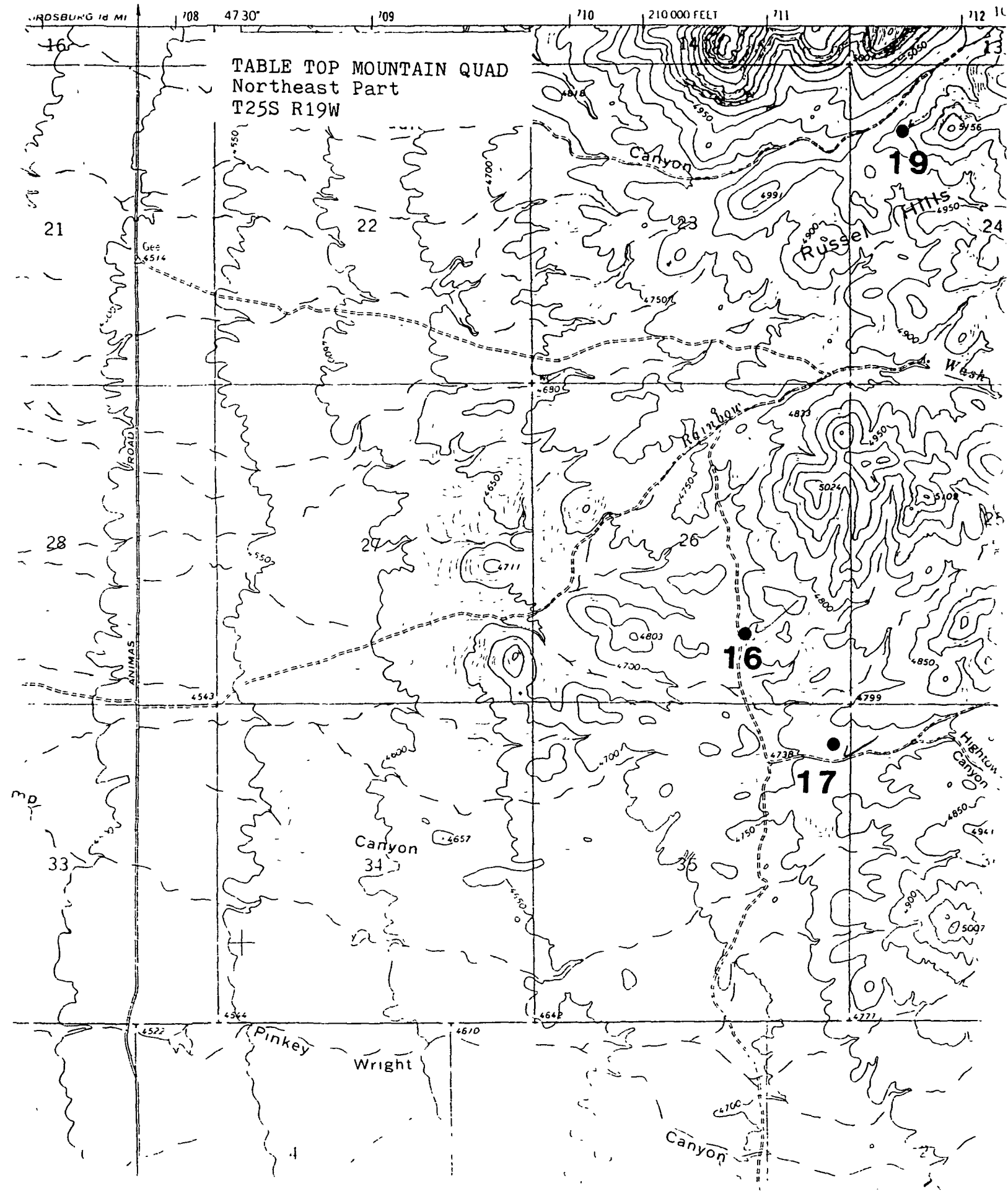
Jim Crow Mine
Tailings Ponds
Nellie Gray Mine
Water Tanks
Badger Mine
Water Tank
Aberdeen Peak
Misers Chest Mine
Francis Kay Mine
Owl Mine
Pokrana Mine
Gamco Mine
Bluebird Draw
GARY QUAD
Southeast Part
T23S R19W
ANIMAS
Robert E. Lee Mine
LOKOSBURG
3575
3574
3573
17'30"



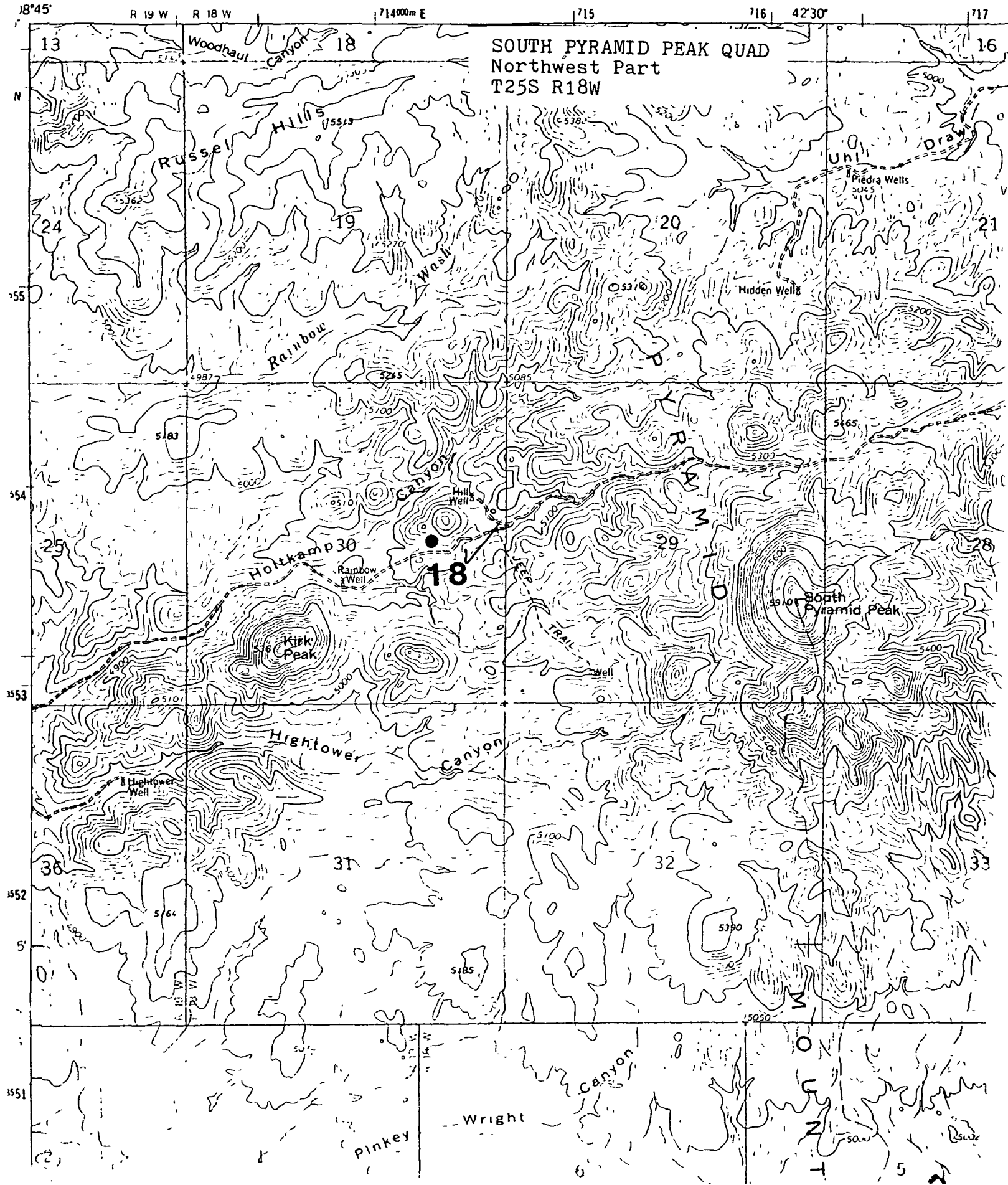


PYRAMID PEAK QUAD
Northwest Part
T24S R18W

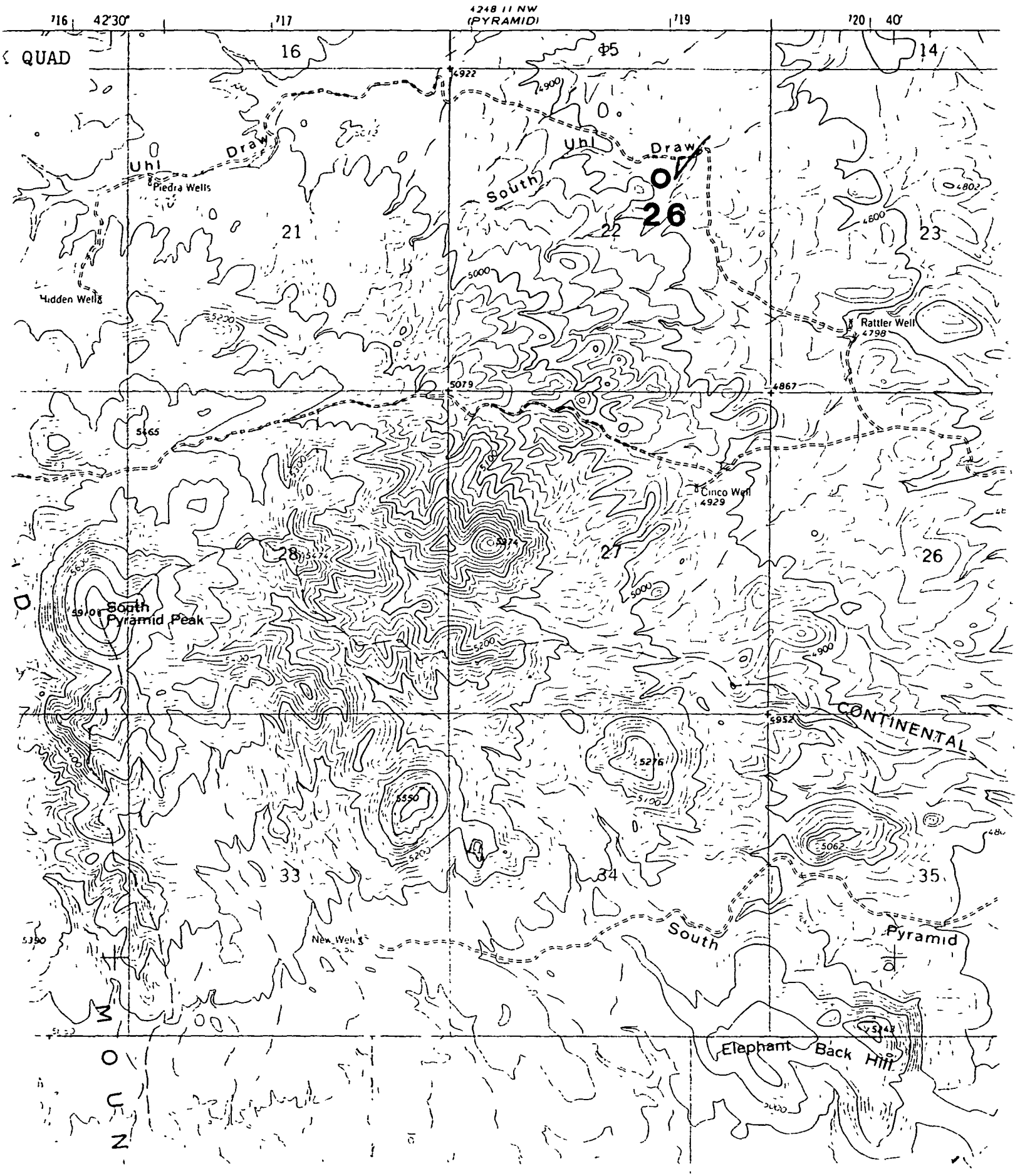
TABLE TOP MOUNTAIN QUADRANGLE
NEW MEXICO-HIDALGO CO
7 5 MINUTE SERIES (TOPOGRAPHIC)



UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY



SOUTH PYRAMID PEAK QUAD
North Part
T25S R18W



Part II Hand Specimen Descriptions

Samples from the 24 sites in the Pyramid Mountains of New Mexico were examined under a binocular microscope for their mineral content. As a rule, only grains 1mm or larger could be recognized. Identifications are tentative and should be verified by thin section techniques.

Rock colors are tied to the Munsell Soil Color Charts of the Munsell Color Company, Inc. of Baltimore, Maryland, 1954 Edition. Form of the parent igneous body sampled was obtained from field observations and published maps. Rock names were derived from chemical analyses for silica, potash, and lime. Better names might result from thorough study of all the oxides.

Samples from sites 20-26 were quite altered and could not be as thoroughly described as at the other sites. These were not collected by the UMR representative, and their correlation to rock bodies on the published maps is not firm.

Sample	Hand Specimen Description
1r	Very dark gray; lava flow; groundmass aphanitic 90-95%; phenocrysts ½mm 5-10%: plagioclase 0-5%, olivine 0-5%; basalt or andesite; Taa of Thorman and Drewes
2r	Dark reddish gray; lava flow; groundmass aphanitic 95%; pods of secondary quartz and calcite 1mm 5%; dacite to dellenite; Kas of Thorman and Drewes
3r	Mottled light brownish gray; silicified volcanic; very fine grained secondary quartz with ghosts of prismatic quartz crystals and rounded quartz relict masses; Tib of Thorman and Drewes
4-1r	Dark gray; chilled phase of pluton; phaneritic 1-2mm: plagioclase 20-30%, quartz 5-25%, biotite 5-25%, Kspar 0-10%, some altered hornblende(?); granodiorite; Tap of Thorman and Drewes
4-2r	Pinkish gray; pluton; phaneritic variable from 1mm in some spots to 5mm in others: altered feldspar 25-50%, altered biotite(?) 5-25%, quartz 5-25%; altered granodiorite; Tap
5-1r	Gray; margin of pluton; phaneritic 1-2mm: plagioclase 25-50%, biotite 5-25%, Kspar 5-25%, quartz 0-5%; diorite to quartz diorite; Tgd of Thorman and Drewes
5-2r	Dark gray; same as 5-1r
5-3r	Brownish gray; same as 5-1r
6r	Light gray; plug or flow dome; groundmass aphanitic 100%; contains quartz veins 1mm wide; rhyolite; Tib of Thorman and Drewes
7-1r	Light gray; volcaniclastic conglomerate; groundmass (clasts) aphanitic 100%, slightly silicified; rhyolite(?) clasts; QTg of Thorman and Drewes
7-2r	Mottled light and dark yellowish brown; same as 7-1r
8-1r	Pinkish gray; lava flow; groundmass aphanitic 95%; phenocrysts 1mm 5%: sanidine 0-5%, biotite 0-5%; pods 1mm of deuteric minerals; rhyolite; Tpf of Deal and Elston
8-2r	Brown; same as 8-1r except contains plagioclase 0-5%
8-3r	Mottled reddish gray and orange pink; same as 8-1r except somewhat altered
8'r	Pinkish gray; same as 8-1r
9r	Pale red; ash-flow tuff; groundmass aphanitic 50% contains sparce white pumice fragments; phenocrysts 2-4mm 50%: quartz 5-25%, sanidine 5-25%, hornblende 0-5%, biotite 0-5%, plagioclase (?); rhyolite; Trt6 of Deal and Elston

Sample	Hand Specimen Description
10-1r	Dark reddish gray; lava flow; groundmass aphanitic 100%; streaky flow layered; dacite; Trb2 of Deal and Elston
10-2r	Dark gray; same as 10-1r except contains phenocrysts 1mm 5-10%: quartz 0-5%, plagioclase 0-5%
12r	Light gray; ash-flow tuff; groundmass aphanitic 85% has some pumice fragments; phenocrysts 1mm 15%: quartz 5-25%, sanidine 5-25%, altered biotite 0-5%; rhyolite; Trt7 of Deal and Elston
13r	Light gray; ash-flow tuff; groundmass aphanitic 80% has abundant altered pumice fragments; phenocrysts 2mm 20%: quartz 5-25%, sanidine 5-25%, altered biotite 0-5%; rhyolite; Trt4 of Deal and Elston
14r	White; ash-flow tuff; groundmass aphanitic 70% has abundant altered pumice fragments; lithic fragments 5mm 5%; phenocrysts 2mm 25%: quartz 5-25%, sanidine 5-25%, altered biotite 0-5%; rhyolite; Trt3 of Deal and Elston
15r	Very gray dark; lava flow; groundmass vesicular aphanitic 95-100% (vesicles 1mm have thin coating of light mineral matter); phenocrysts 1mm 0-5%: olivine(?); dacite; Trb1 of Deal and Elston
16-1r	Weak red; ash-flow tuff; groundmass aphanitic 80% has faint pumice streaks; phenocrysts 3mm 20%: plagioclase 5-25%, sanidine (?) 0-5%, oxides 0-5%; rhyolite to rhyodacite; Tw of Deal and Elston
16-2r	Weak red; same as 16-1r except some thin carbonate veins
17-1r	Reddish gray; ash-flow tuff; groundmass aphanitic 85-90% has small altered pumice; lithic fragments 5mm 0-5%; phenocrysts 1mm 10%: biotite 0-5%, sanidine 0-5%, quartz 0-5%, plagioclase 0-5%; rhyolite; Tw of Deal and Elston
17-2r	Reddish brown; same as 17-1r
17'r	Black; same as 17-1r except groundmass is glass and phenocrysts are 2mm
17"r	Dark gray; same as 17-1r except more pumice and lithic fragments
18r	Dark gray; lava flow; groundmass aphanitic 75%; phenocrysts 3mm 25%: hornblende 5-25%, plagioclase 5-25%, sanidine 0-5%, biotite 0-5%; dacite or rhyodacite; Th of Deal and Elston

Sample	Hand Specimen Description
19-1r	Pale brown; flow or flow dome; groundmass aphanitic 95-100% has streaky flow bands and disseminated oxides .05mm; phenocrysts 1mm 0-5%: sanidine; rhyolite; Tj of Deal and Elston
19-2r	Gray; same as 19-1r
19'r	Gray; altered lava flow; groundmass aphanitic 75%; phenocrysts 2-3mm 25%: altered plagioclase 5-25%, altered mafic mineral 5-25%; rhyodacite or dellenite; megabreccia block (Th of Deal and Elston(?))
19"r	Very dark gray; altered lava flow; groundmass aphanitic 95-100% has quartz veins 1mm wide; phenocrysts 1-2mm 0-5%: plagioclase; dacite; megabreccia block (not mapped by Deal and Elston)
20-1r	Gray; silicified volcanic; very fine grained secondary quartz; alluvial clast; Qgt of Thorman and Drewes
20-2r	Mottled olive yellow and gray; unknown origin; grains 2mm of quartz and carbonate; alluvial clast; Qgt
20-3r	Olive; altered porphyry; unknown origin; alluvial clast; Qgt
20-4r	Dark gray; altered porphyry (?); unknown origin; alluvial clast; Qgt
20-5r	Olive gray; like 20-3r
20A-1r	Light brownish gray; altered volcanic; 1mm quartz and sanidine may be present; unknown origin; alluvial clast; Qgt
20A-2r	Grayish brown; altered volcanic; groundmass aphanitic 70%; phenocrysts 1mm 30%: biotite 5-25%, plagioclase 5-25%, oxides 0-5%; rhyolite(?); alluvial clast; Qgt
21-1r	Light olive gray; altered chilled pluton(?); equigranular 1mm; minerals unknown; diorite(?); Tgd of Thorman and Drewes
21-2r	White; altered pluton; equigranular 1-2mm; mostly feldspar and lesser mafics; granite(?); Tgd
21-3r	Very pale brown; same as 21-2r
21-4r	Pale brown; same as 21-5r except plagioclase visible (remaining minerals altered)
21-5r	Dark gray; altered porphyry; groundmass 75%; phenocrysts 1-2mm 25%: quartz 5-25%, plagioclase 5-25%; tonalite (?); Tgd

Sample	Hand Specimen Description
22-1r	Brownish gray; altered pluton(?); equigranular 1-2mm minerals: plagioclase and lesser biotite; granodiorite or adamellite; Tgd of Thorman and Drewes
22-2r	Light brownish gray; altered or weathered pluton; equigranular 2mm minerals: feldspar and lesser biotite; like 22-1r
22-3r	Light olive gray; altered porphyry(?); Tgd
22-4r	Gray; like 22-3r
22-5r	Gray; like 22-3r
23-1Br	Light gray; altered igneous rock 1mm grains
23-1Gr	Light gray; same sample as 23-1Br
23-2Dr	Light olive gray; altered igneous rock 1mm grains
23-2Lr	Light olive gray; altered porphyry; groundmass aphanitic 90-95%; phenocrysts 2mm 5-10%: feldspar 0-5%, biotite 0-5%; dellenite(?)
23-3r	Black; altered rock with $\frac{1}{2}$mm biotite 5-10%
24-1r	Pale red; ash-flow tuff; groundmass aphanitic 80% has tiny pumice streaks; lithic fragments 3-5mm 5%; phenocrysts 1mm 15%: biotite 5-10%, sanidine 5-10%, quartz 0-5%, hornblende 0-5%; dellenite; Trt2 of Deal and Elston
24-2r	Pale red; same as 24-1r except slightly altered
24-3r	Light reddish gray; same as 24-1r except more altered than 24-2r
26-1r	Pale gray; altered flow; groundmass aphanitic 70% has visible quartz between grains; phenocrysts 1-2mm 30%: plagioclase 5-25%, biotite 5-25%, altered hornblende (?); dellenite; Tjr of Deal and Elston
26-2r	Pale gray; same as 26-1r
26-3r	Gray; same as 26-1r
26-4r	Pale gray; same as 26-1r
26-5r	Gray; same as 26-1r

Part III Chemical Analyses by X-ray Fluorescence

Rocks from the 24 sample sites in the Pyramid Mountains of New Mexico were analyzed by XRF at the University of Missouri-Rolla. The instrument was a Philips 1410 wavelength dispersive vacuum spectrometer equipped with a Chromium tube and LiF, PE, and TLAP crystals. Power settings were 30 KVP and 40 ma. Counting times were 10 to 30 seconds. Detectors included both scintillation and gas-flow proportional counters, arranged in series. Special features included gas-flow stabilization, automatic PHS, and a sequential rock-slab monitor. Samples were run as pelletized powders pressed into boric acid cups at 10,000 psi after two-minute grinds in a shatterbox. Standards were ten USGS reference rock powders. Supplementary standards were made by fusing seven of the Pyramid rocks into beads in an induction furnace and comparing these to USGS rocks similarly prepared.

The analyses are presented as weight percent oxides, normalized to a total of 100% for the ten oxides. The raw total, before normalizing, is also given. The raw values for each oxide can be obtained by multiplying the normalized values by the raw total. The analyses are generally very precise. The accuracy is within about 1-10 parts per hundred of the stated value for most of the major elements. Some of the samples are outside the concentration range of the USGS standards, leading to less accuracy. The analyses involved are enclosed in parentheses.

The analytical technique was designed to obtain good analyses for silica. The other elements were run so that matrix factor logic could be used to adjust the silica intensities, to compensate for the interaction of elements. For this purpose, it was not necessary to obtain maximum accuracy for the matrix oxides.

1 = soil
2 = rock

Sample	SiO_2	Al_2O_3	Fe_2O_3	MgO	CaO	Na_2O	K_2O	TiO_2	P_2O_5	MnO	Raw Total
1s	50.3	16.9	8.6	8.0	10.2	3.2	1.1	1.27	.47	.09	94.2
1r	49.9	17.6	8.5	9.2	8.2	3.9	0.8	1.28	.50	.12	99.3
2s	64.4	16.2	4.5	2.8	4.5	3.4	3.0	.70	.36	.06	94.6
2r	65.0 66.5	16.4 15.4	4.5 4.23	2.9 2.38	3.3 3.61	4.2 3.52	2.9 3.13	.69 0.72	.21 0.194	.07 0.05	97.8
3s	84.2 (87.8)	(4.3)	(2.5)	(.9)	(1.7)	(1.4)	(.2)	(1.15)	(.12)	(.0)	(100)
3r	(96.3)	(1.0)	(.1)	(.5)	(.2)	(1.2)	(.0)	(.67)	(.0)	(.01)	(100)
4s	63.4	17.4	5.1	4.1	2.2	3.3	3.4	.64	.35	.06	94.7
4-1r	64.9	16.6	4.4	2.5	3.1	4.1	3.7	.58	.25	.12	98.4
4-2r	66.3	15.7	5.0	3.6	0.8	3.7	3.9	.54	.32	.08	99.2
5s	63.2	16.9	5.0	4.3	3.4	3.3	3.0	.64	.33	.07	95.5
5-1r	57.9	16.7	6.5	5.7	6.0	3.9	1.8	1.01	.44	.12	99.6
5-2r	56.9	17.2	6.6	5.8	5.9	4.3	1.6	1.05	.44	.08	98.6
5-3r	59.8	16.6	5.6	5.2	5.0	3.8	2.7	.82	.37	.08	97.9
6s	71.9	16.9	3.2	2.5	1.1	0.1	3.8	.29	.11	.06	98.6
6r	74.9	15.6	1.6	3.9	0.3	0.0	3.6	.10	.04	.04	98.4
6's	59.2	18.4	8.9	2.7	4.7	0.2	4.5	.80	.31	(.30)	96.0
7s	(75.0)	(19.0)	(2.8)	(.1)	(.3)	(1.0)	(.8)	(.79)	(.20)	(.01)	(95.2)
7-1r	(82.0)	(15.5)	(.0)	(.1)	(.2)	(1.3)	(.2)	(.59)	(.21)	(.00)	(97.6)
7-2r	(79.7)	(15.8)	(1.8)	(.1)	(.3)	(1.3)	(.0)	(.63)	(.36)	(.00)	(98.3)
8s	70.4	17.0	2.5	0.3	1.1	3.4	4.7	.46	.09	.04	97.4
8-1r	73.2	15.3	1.9	0.4	0.8	3.1	4.9	.30	.05	.04	98.7
8-2r	70.9	16.4	2.4	0.4	1.5	3.2	4.6	.47	.13	.05	97.2
8-3r	71.5	16.1	2.4	0.8	1.4	2.7	4.6	.42	.12	.04	97.1
8'r	72.8	15.7	1.6	0.4	0.8	3.1	5.2	.31	.05	.06	97.8
9s	73.7	14.5	1.7	0.5	1.4	2.6	5.0	.25	.36	.06	96.1
9r	73.4	14.8	1.7	0.8	1.4	3.0	4.7	.26	.08	.05	97.1
10s	62.1	18.0	6.3	1.2	4.8	3.7	2.4	.98	.40	.04	96.5
10-1r	61.8	17.8	6.5	1.2	5.1	3.8	2.4	1.06	.35	.07	97.9
10-2r	63.3	17.0	6.0	1.2	4.8	3.9	2.4	1.03	.30	.08	98.5
12s	74.2	14.0	1.6	0.2	0.9	3.2	5.3	.24	.22	.06	98.5
12r	75.5	13.0	1.1	0.1	1.9	3.4	4.8	.14	.12	.06	98.4
13s	75.6	14.1	1.4	0.1	0.7	2.9	4.9	.20	.07	.06	98.2
13r	75.3	13.5	1.3	0.3	0.9	2.3	(6.1)	.16	.04	.06	99.0
14r	76.3	13.5	1.5	0.9	2.5	0.7	4.5	.17	.00	.06	95.2
15s	64.1	17.2	6.2	1.5	4.0	2.8	3.2	.78	.20	.06	96.3
15r	61.7	17.1	6.1	2.5	5.2	3.4	2.9	.77	.16	.09	98.0

Sample	SiO_2	Al_2O_3	Fe_2O_3	MgO	CaO	Na_2O	K_2O	TiO_2	P_2O_5	MnO	Raw Total
16s	72.1	15.4	2.7	0.9	1.3	2.1	4.7	.45	.18	.07	96.9
16-1r	67.5	16.7	3.5	0.3	1.3	5.0	4.8	.68	.24	.07	98.3
16-2r	72.7	13.6	2.7	0.1	2.4	3.5	4.4	.45	.17	.04	98.7
17s	74.6	15.4	1.5	0.2	0.4	2.6	5.0	.26	.05	.05	96.2
17-1r	75.6	14.4	1.7	0.2	0.6	2.6	4.6	.22	.09	.05	98.5
17-2r	74.5	14.6	1.7	0.3	0.6	3.1	4.9	.24	.05	.05	98.9
17'r	74.3	14.6	1.7	0.2	0.9	3.8	4.3	.24	.04	.08	95.4
17"r	73.1	14.2	2.1	0.1	0.7	3.0	(6.3)	.30	.12	.08	98.5
18s	66.5	17.9	4.2	1.0	1.2	4.1	4.1	.70	.33	.05	97.7
18r	66.7	16.3	4.5	0.8	3.3	3.8	3.5	.78	.31	.08	99.3
19s	74.7	15.2	2.0	0.2	0.3	2.4	4.8	.29	.06	.04	98.4
19-1r	76.5	14.1	1.4	0.2	0.3	2.6	4.7	.18	.04	.03	99.6
19-2r	77.5	13.9	1.1	0.1	0.2	2.5	4.6	.17	.02	.02	99.5
19'r	68.5	16.0	3.2	0.6	3.3	3.8	3.9	.50	.16	.07	97.8
19"r	59.8	16.9	7.2	3.4	5.0	3.7	2.9	.90	.19	.08	96.7
20s	51.6	15.0	11.0	(11.2)	6.6	1.7	1.1	1.27	.41	.13	94.2
53 20-1r	(92.2)	(3.9)	(.0)	(.6)	(.2)	(1.4)	(.4)	(1.19)	(.00)	(.00)	(100)
20-2r	70.3 71.3	(10.3) 10.1	7.0 5.93	3.1 4.28	8.0 5.85	0.7 0.74	0.3 1.94	.13 0.13	.08 0.221	.11 0.07	101.5
20-3r	55.5	13.6	10.7	2.6	(14.8)	0.9	0.0	1.35	.49	.10	99.5
20-4r	53.1	15.1	8.6	(11.0)	5.3	3.0	2.1	1.35	.44	.11	94.0
20-5r	47.3	15.1	(12.4)	5.4	(16.4)	1.5	0.0	1.42	.38	.11	95.2
20A-1r	54.0	14.0	9.6	2.4	(17.7)	0.6	0.0	1.37	.24	.12	95.8
20A-2r	70.7	17.0	2.1	0.7	1.0	4.1	3.9	.26	.30	.04	94.7
21s	66.7	18.4	5.9	0.7	0.4	3.8	3.2	.65	.32	.03	96.4
21-1r	57.0	(19.4)	8.2	3.4	1.3	2.8	5.6	1.33	(.83)	.09	96.4
21-2r	73.3	16.1	1.8	0.4	0.3	4.5	3.2	.25	.11	.03	96.8
21-3r	71.4	16.6	2.8	0.7	0.5	5.0	2.6	.20	.19	.01	98.7
21-4r	62.5	17.9	7.2	3.8	1.0	3.8	2.3	1.01	.46	.09	97.4
21-5r	62.5	17.6	7.8	1.6	1.3	3.9	3.8	1.03	.36	.07	100.1
22s	64.2	17.5	4.0	3.7	1.5	3.8	4.3	.61	.42	.07	97.2
22-1r	66.2	16.4	3.9	1.8	1.6	3.9	5.2	.58	.33	.10	99.2
22-2r	67.0	16.7	3.7	1.7	1.4	3.5	5.3	.53	.22	.06	99.7
22-3r	61.4	17.5	5.1	3.6	2.6	5.0	3.6	.73	.42	.08	98.2
22-4r	61.5	17.3	4.6	4.2	2.7	5.2	3.4	.71	.40	.09	97.1
22-5r	60.0	17.0	5.3	5.4	3.2	4.7	3.4	.31	.55	.11	96.7

Sample	SiO_2	Al_2O_3	Fe_2O_3	MgO	CaO	Na_2O	K_2O	TiO_2	P_2O_5	MnO	Raw Total
23s	68.9	(19.1)	2.7	1.4	1.0	1.8	4.5	.35	.15	.06	96.3
23-1Br	69.9	18.0	2.0	1.0	1.9	1.7	5.1	.28	.12	.04	97.1
23-1Gr	70.5	17.8	2.1	0.9	1.6	2.3	4.4	.26	.11	.03	97.0
23-2Dr	72.4	17.0	1.8	1.0	0.4	2.6	4.4	.26	.12	.02	99.0
23-2Lr	70.3	17.8	2.0	0.9	1.7	2.5	4.4	.26	.11	.03	97.6
23-3r	71.1	17.5	2.1	1.1	1.1	2.3	4.4	.27	.12	.05	97.9
24s	70.1	16.2	2.8	0.6	1.5	3.1	4.8	.57	.18	.08	97.5
24-1r	69.0	15.6	2.9	0.8	1.8	2.8	(6.3)	.59	.18	.08	98.6
24-2r	68.8	15.6	2.7	0.7	1.3	2.2	(7.8)	.60	.21	.06	99.2
24-3r	68.0	16.4	2.9	0.7	1.2	2.7	(7.5)	.61	.15	.06	98.5
26s	71.4	17.1	2.5	0.8	1.0	2.6	4.1	.36	.13	.03	98.3
26-1r	68.9	18.4	2.9	0.8	1.2	3.0	4.4	.43	.12	.03	98.3
26-2r	69.9	17.8	2.7	0.8	1.3	2.7	4.2	.40	.15	.03	98.9
26-3r	68.0	(19.2)	3.0	0.9	1.2	2.9	4.2	.44	.12	.04	98.0
26-4r	68.7	18.2	2.7	0.9	2.2	2.5	4.2	.40	.11	.03	98.1
26-5r	70.5	17.3	2.7	0.6	1.3	2.9	4.2	.42	.13	.02	100.2