DIVISION OF MINES AND GEOLOGY
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STATE OF CALIFORNIA---PETE WILSON, GOVERNOR
THE RESOURCES AGENCY---DOUGLAS P. WHEELER, SECRETARY
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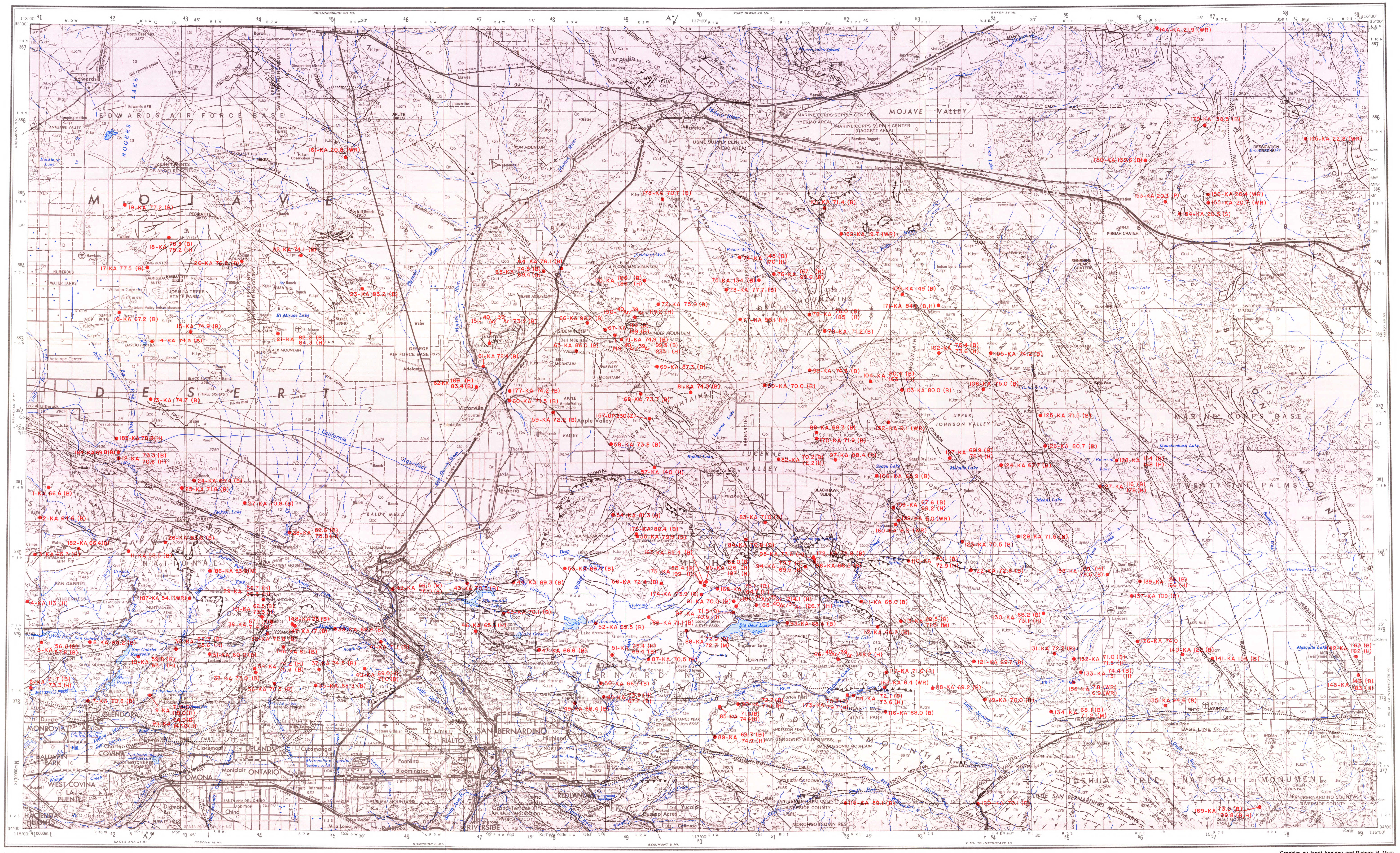
REGIONAL GEOLOGIC MAP SERIES
SAN BERNARDINO QUADRANGLE---MAP NO. 3A (GEOLOGY)
SHEET 4 OF 5



Geology compiled 1981-83

Graphics by Janet Appleby and Richard R. Moar

Base Map

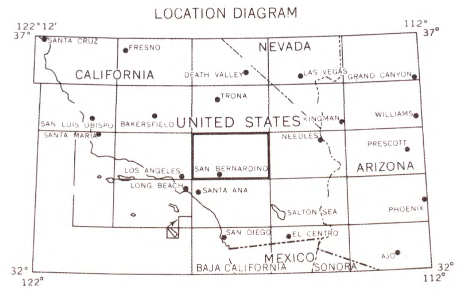
Prepared by the U.S. Army Topographic Command (KCLD), Washington, D.C. Compiled in 1957 by photogrammetric methods and from United States quadrangles, 1:20,000, 1:24,000, 1:25,000, 1:48,000, 1:50,000, 1:62,500, and 1:125,000, 1952-55. Map field checked 1958. Revised in 1969 by the U.S. Geological Survey from aerial photographs taken 1968.

Area covered by dashed light-blue pattern is subject to controlled inundation.

Certain land grant names and boundaries are omitted to avoid congestion.

Minor corrections and additions to culture by California Division of Mines and Geology 1983.

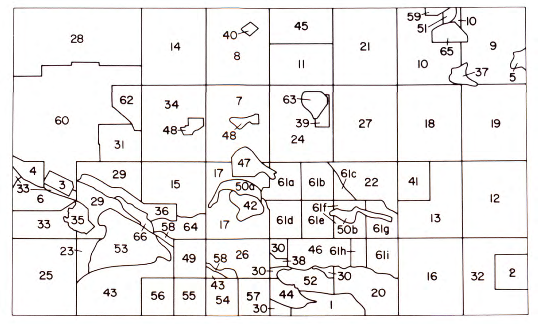
LOCATION DIAGRAM



Scale 1:250,000

20 Statute Miles
30 Kilometers
15 Nautical Miles

CONTOUR INTERVAL 200 FEET
WITH SUPPLEMENTARY CONTOURS AT 100 FOOT INTERVALS
TRANSVERSE MERCATOR PROJECTION
BLACK NUMBERED LINES INDICATE THE 10,000 METER UNIVERSAL TRANSVERSE MERCATOR GRID, ZONE 11
1965 MAGNETIC DECLINATION FROM TRUE NORTH VARIES FROM 15½° (280 MILS) EASTERLY FOR THE CENTER OF THE WEST EDGE TO 15° (270 MILS) EASTERLY FOR THE CENTER OF THE EAST EDGE



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65. Williamson, D.A, 1980
66. Woodburne, M.O., and Golz, D.J., 1972

EXPLANATION

method * — mineral ** — **1-KA 66.6 (H)** — location no. — age (m.y.) — sample location

* method
KA=K–Ar
UP=U–Pb
$^{40}Ar/^{39}Ar$= Argon/Argon

** mineral or material
B=biotite; H=hornblende;
M=muscovite; Pl= plagioclase;
S=sanidine; WR=whole rock;
Z=zircon

ABBREVIATED EXPLANATION

Approximate stratigraphic relationships only; see Geologic Map Explanation for more accurate age determinations and unit descriptions.

CENOZOIC — QUATERNARY — Holocene

- Q — Alluvium *(Undifferentiated)*
- Qw — Wash deposits *(Alluvial deposits of modern washes)*
- Qow — Older wash deposits *(Alluvial deposits of abandoned washes)*
- Qls — Landslide deposits
- Qs — Wind-blown sand
- Qyf — Younger fan deposits
- Qf — Fan deposits
- Qya — Younger alluvium
- Ql — Lake deposits

Pleistocene

- Qof — Older fan deposits
- Qo — Older alluvium *(Undifferentiated)*
- Qv — Basalt; Cinder cone
- Qg — Glacial till and outwash
- Qod — Well dissected alluvial fans
- Qh — Harold Formation and Shoemaker Gravel *(Fine- to coarse-grained sediments, nonmarine)*
- Qol — Older lake deposits
- QT — Continental deposits *(Undifferentiated; fluvial gravel, sand, silt, and clay)*
- QTst — San Timoteo Formation *(Nonmarine sandstone, siltstone, conglomerate, and shale)*

TERTIARY — Pliocene

- Pj — Juniper Hills Formation *(Nonmarine sandstone, conglomerate, siltstone, and shale)*
- Pow — Old Woman Sandstone *(Arkosic sandstone and conglomerate; nonmarine)*
- Pcr — Crowder Formation *(Nonmarine arkosic sandstone and conglomerate)*
- Pa — Anaverde Formation *(Nonmarine sandstone and shale)*
- Pf — Fernando Formation *(Siltstone, sandstone, conglomerate; marine)*
- Ppb — Punchbowl Formation *(Nonmarine cobbly to pebbly sandstone)*

Miocene

- Mp — Potato Sandstone
- Msa — Santa Ana Sandstone *(Nonmarine)*
- Mcf — Coachella Fanglomerate *(Boulder, cobble, and pebble fanglomerate)*
- Mpe — Puente Formation *(Marine siltstone, sandstone, and shale)*
- Mb, Mbᵛ — Barstow Formation *(Nonmarine sandstone, siltstone, conglomerate, and tuff)* Mbᵛ-volcanic rocks
- Mcv — Punchbowl (?) Formation of Cajon Valley *(Nonmarine arkosic conglomerate and sandstone)*
- Mtp — Topanga Formation *(Marine sandstone and conglomerate)*
- Mt — Tropico Group *(Conglomerate, arkosic sandstone, siltstone, tuff, shale and limestone)*
- Mc, Mcls — Unnamed Miocene continental deposits *(Poorly sorted sandstone and conglomerate)* Mcls-limestone and claystone
- Mph — Pickhandle and Jackhammer Formations *(Nonmarine tuff, agglomerate, sandstone, and mudflows)*
- Mh — Hector Formation *(Nonmarine volcaniclastic sediments)*
- Mvq — Vaqueros (?) Formation *(Marine arkosic sandstone, siltstone, and conglomerate)*
- MPv — Miocene–Pliocene volcanic rocks *(b-basalt; t-rhyolite tuff)*
- Mi — Miocene shallow intrusive rocks *(a-andesitic; d-dacitic and rhyolitic; b-basaltic)*
- Mgv — Glendora Volcanics *(a-andesite; b-basalt; r-rhyolite)*
- Mv — Miocene volcanic rocks *(a-andesite; b-basalt; d-dacite; p-pyroclastic rocks)*

Oligocene

- Tgr — Tertiary granitic rocks
- Φvz — Vasquez Formation, volcanic member *(Andesite, dacite, and tuff)*
- Φm — Mountain Meadows Biotite, Dacite Porphyry

Paleocene

- Tsf — San Francisquito Formation *(Massive marine sandstone)*
- TKsf — San Francisquito (?) Formation *(Marine sandstone and siltstone)*

MESOZOIC

- ps — Pelona Schist *(Feldspar-quartz-mica schist)*
- Mzq — Mesozoic quartzite
- Mzv — Mesozoic metavolcanic rocks
- Trfv — Fairview Valley Formation *(Limestone, calcareous sandstone and siltstone)*

MESOZOIC PLUTONIC ROCKS

- Kgr — Cretaceous granitic rocks
- Kqd — Cretaceous quartz diorite
- Kgb — Gabbroic and dioritic rocks
- KJqm — Cretaceous or Jurassic quartz monzonite; Quartz Monzonite of Pleasant View Ridge
- JKgr — Jurassic or Cretaceous granite
- JKgd — Jurassic or Cretaceous granodiorite
- Jqd — Jurassic quartz diorite
- Jhd — Jurassic hornblende diorite and minor gabbro
- J?mz — Jurassic ? monzonite
- Trgd — Mt. Lowe Granodiorite
- Trmz — Triassic monzonite
- gb — Gabbro of Pleasant View Ridge

m₁ m₂ m₃ m₄ — Sheared and deformed metamorphic rocks (age uncertain)

- m_1 - Gneiss
- m_2 - Mylonite of Vincent Thrust
- m_3 - "Black Belt" Mylonite
- m_4 - High-grade metamorphic rocks

Locally contain undeformed to slightly deformed plutonic rocks.

PALEOZOIC

- Pzls — Upper Paleozoic limestone and marble
- wg — Waterman Gneiss
- ms, ls — Metasedimentary rocks of uncertain age *(Quartzite, phyllite, and schist)* ls - limestone and marble
- Єls, Єq — Cambrian and uppermost Precambrian metasedimentary rocks. Єls - Crystalline limestone; Єq - Quartzite

PRECAMBRIAN

- pЄs, pЄq — Late Precambrian metasedimentary rocks. pЄs - undivided; pЄq - quartzite
- pЄb — Baldwin Gneiss

MAP SYMBOLS

Contact
Observed or approximately located; queried where gradational or inferred.

Fault
Solid where well located; dashed where approximately located or inferred; queried where continuation or existance is uncertain; dotted where concealed by younger rocks. Arrows show relative or apparent direction of movement. U, upthrown side and D, downthrown side (relative or apparent).

Thrust fault - barbs on the upper plate. Generally dips less than 45°, but locally may have been subsequently steepened. Dashed where approximately located or inferred; dotted where concealed by younger rocks; queried where continuation or existance is uncertain.

Anticlinal fold
Dashed where inferred; dotted where concealed by younger rocks.

Synclinal fold
Dashed where inferred; dotted where concealed by younger rocks.

Overturned fold
Dashed where inferred; dotted where concealed by younger rocks.

Strike and dip of beds
General strike and dip of stratified rocks.

Most conspicuous foliation strike and dip

Joints
Selected areas of prominently jointed plutonic rocks

Dikes

LOCATION MAP OF ROCK SAMPLES DATED RADIOMETRICALLY
SAN BERNARDINO QUADRANGLE, CALIFORNIA, 1:250,000

Compilation by E.J. Bortugno and T.E. Spittler.

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