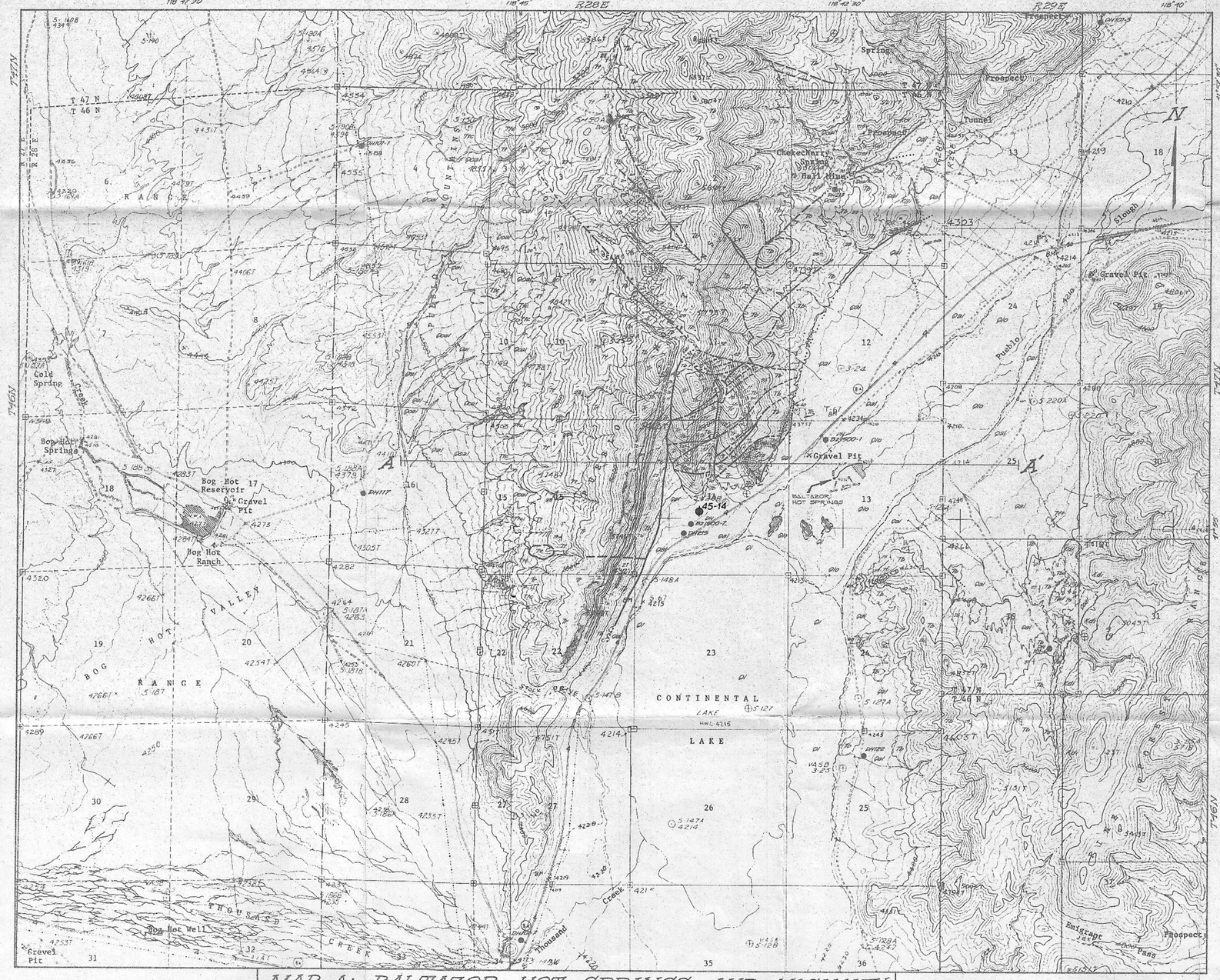
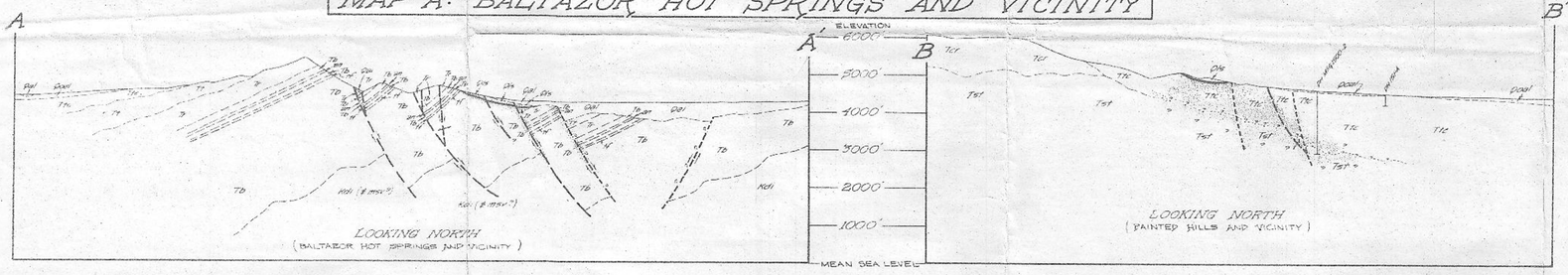
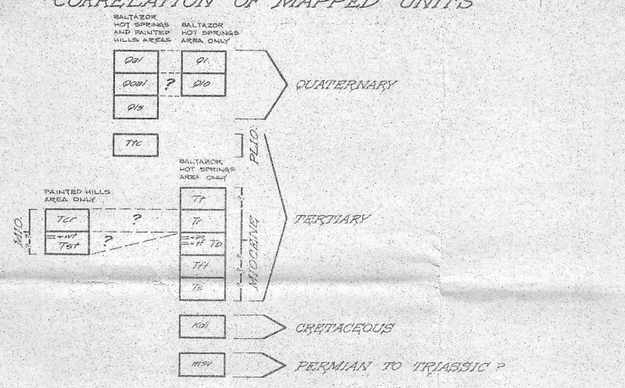


MAP A: BALTAZOR HOT SPRINGS AND VICINITY



MAP B: PAINTED HILLS AND VICINITY

CORRELATION OF MAPPED UNITS



DESCRIPTION OF MAPPED UNITS

Qal ALLUVIAL DEPOSITS (QUATERNARY)

Qoal OLDER ALLUVIAL DEPOSITS (QUATERNARY)

Ql LACUSTRINE (PLAYA) DEPOSITS (QUATERNARY)

UNCONSOLIDATED CLAY AND SILT

Qlo OLDER LACUSTRINE (PLAYA) DEPOSITS (QUATERNARY)

UNCONSOLIDATED CLAY AND SILT, PARTIALLY REWORKED — INCLUDES MINOR FLUVIAL AND ALLUVIAL DEPOSITS

Qls LANDSLIDE DEBRIS (QUATERNARY)

CHAOTIC RUBBLE IN WHICH INDIVIDUAL ROCK UNITS CANNOT BE READILY MAPPED

Tlc THOUSAND CREEK FORMATION (PLIOCENE)

LIGHT GRAY TO BUFF, POORLY SORTED, ASH AND PUMICE-RICH SILTSTONE, SANDSTONE AND CONGLOMERATE; TUFFACEOUS MUDSTONE, AIR-FALL AND WATER-LAIN TUFF AND PUMICE LAPILLI TUFF AND NON-WELDED VITRIC TO VITRIC-LITHIC ASH-FLOW TUFFS. COARSER-GRAINED UNITS PREDOMINATE NEAR PRESENT TOPOGRAPHIC HIGHS; FINE, WATER-LAID TUFFS AND TUFFACEOUS MUDSTONES BECOME PROGRESSIVELY DOMINANT BASINWARD

Tf FELSIC ASH-FLOW TUFF AND TUFFACEOUS SEDIMENTARY SEQUENCE (MIOCENE?)

LIGHT GRAY, REDDISH-GRAY, GRAYISH-BROWN, PINKISH-BROWN AND YELLOWISH-BROWN, NON-WELDED TO DENSELY WELDED, RHYOLITIC TO TRACHYTIC, VITRIC TO VITRIC-CRYSTAL ASH-FLOW TUFFS, WITH MINOR INTERBEDDED TUFFACEOUS MUDSTONE, SILTSTONE, SANDSTONE AND CONGLOMERATE; CRYSTALS IN THE TUFFS ACCOUNT FOR 5 - 20 VOLUME PER CENT AND COMPRISE ANORTHOCLASE, SANIDINE, QUARTZ, BIOTITE, AND MAGNETITE-ILMENITE (TRACE AMOUNTS OF ARGENTITE AND TENNANTITE ARE LOCALLY PRESENT); SEDIMENTARY UNITS CONCENTRATED IN LOWER PORTION OF SEQUENCE

Tr RHYOLITE OF BALTAZOR HOT SPRINGS AREA (MIOCENE)

LIGHT TO MEDIUM REDDISH-GRAY TO PURPLISH-GRAY RHYOLITE AND RHYOLITE FLOW-BRECCIA, DENSE TO VESICULAR, LOCALLY SPHERULITIC AND LITHOPHYSAL COMMONLY FLOW-FOLIATED; LESS THAN 1 VOLUME PER CENT PHENOCRYSTS, DOMINANTLY EUHEDRAL SANIDINE WITH MINOR EUHEDRAL QUARTZ; VERY RESISTANT, TYPICALLY FORMS RIDGES AND CAPROCKS

Tcr CANYON RHYOLITE OF PAINTED HILLS AREA (MIOCENE)

SAME DESCRIPTION AS RHYOLITE OF BALTAZOR HOT SPRINGS (Tr) BUT ALSO INCLUDING LIGHT TO MEDIUM GRAY PERLITE AND DARK GRAY RHYOLITIC VITROPHYRE; AGE RELATION TO RHYOLITE OF BALTAZOR HOT SPRINGS AREA UNKNOWN

Tsf TUFF AND TUFFACEOUS SEDIMENTARY SEQUENCE (MIOCENE?)

LIGHT GRAY, BUFF AND PINK, POORLY SORTED AND POORLY INDURATED VOLCANIC SILTSTONES, SANDSTONES, AND CONGLOMERATES INTERBEDDED WITH VITRIC AIR-FALL TUFFS AND NON-WELDED TO DENSELY WELDED VITRIC ASH-FLOW TUFFS; MOST OF THE UNIT IS EASILY ERODED, FORMING SLOPES COVERED WITH TALUS FROM OVERLYING CANYON RHYOLITE (Tcr)

—W7 WELDED TUFF MARKER HORIZON: MEDIUM TO DARK BROWNISH-RED DENSELY WELDED FELSIC VITRIC ASH-FLOW TUFF; PROMINENT EUTAXITIC TEXTURE; 15% CRYSTALS, PREDOMINANTLY SANIDINE WITH MINOR QUARTZ, BIOTITE AND MAGNETITE; UNIFORMLY MODERATELY TO INTENSELY SILICIFIED AND HEMATIZED

Tb BASALT SEQUENCE (MIOCENE)

THICK SEQUENCE (ABOUT 2500 FEET IN THE BALTAZOR HOT SPRINGS AREA) OF THIN (AVERAGE LESS THAN 30 FEET), DOMINANTLY OLIVINE-AUGITE BASALT AND PORPHYRITIC BASALT FLOWS AND FLOW-BRECCIAS; VERY MINOR INTERBEDDED BASALTIC TEPHRA AND THIN (< 50 FEET) TO INTERMEDIATE ASH-FLOW TUFFS AND RARE THIN (LESS THAN 5 FEET) VOLCANIC SILTSTONES AND SANDSTONES; BASALTIC UNITS ARE MEDIUM TO DARK GRAY AND COMMONLY WEATHER TO MEDIUM GRAYISH-RED TO GRAYISH-PURPLE; PORPHYRITIC BASALTS CONTAIN TABULAR LABRADORITE PHENOCRYSTS WHICH IN SOME BEDS REACH 3 CM IN LENGTH; VESICULAR BASALT UNITS COMMONLY CONTAIN CALCITE ± STILBITE-NATROLITE AMYGDULES

—B7 ANDESITE MARKER HORIZON: DENSE, MEDIUM-GRAY PILOTAXITIC HORNBLENDE ANDESITE; STRONGLY FLOW-FOLIATED IN OUTCROP — FOLIATION LOCALLY HIGHLY CONTORTED; FLOW LAMINAE COMMONLY DISCONTINUOUS, RESEMBLING COMPRESSED PUMICE LAPILLI

—M ASH-FLOW TUFF MARKER HORIZON: PARTIALLY WELDED (LIGHT GRAY TO PINKISH-GRAY) TO DENSELY WELDED (DARK GRAY) LITHOPHYSAL VITRIC TO VITRIC-CRYSTALLINE (ASH-FLOW TUFF); UP TO 10% CRYSTALS, DOMINANTLY SANIDINE WITH MINOR SANIDINE, ALBITE, HYPERSTHENE, BIOTITE AND MAGNETITE

THf FELSIC ASH-FLOW TUFF (MIOCENE?)

VERY LIGHT REDDISH-BROWN, PARTIALLY WELDED TO DENSELY WELDED FELSIC VITRIC TO VITRIC-CRYSTAL ASH-FLOW TUFF; UP TO 10% SANIDINE CRYSTALS, 8% QUARTZ CRYSTALS, AND 5% LITHIC FRAGMENTS

Ts VOLCANIC SANDSTONE AND SILTSTONE (MIOCENE?)

VERY LIGHT GRAY TO ORANGE- OR BROWNISH-GRAY VOLCANIC SANDSTONE AND SILTSTONE; REDDISH-BROWN BAKED ZONE AT TOP OF UNIT WHERE OVERLAIN BY BASALT (Tb)

Kdi DIORITE AND QUARTZ DIORITE, UNDIVIDED (CRETACEOUS?)

MEDIUM TO DARK GRAY TO GREENISH-GRAY; GENERALLY MEDIUM-GRAINED BUT MAY BE FINE-GRAINED AT PLUTONIC MARGINS; HYPIDIOMORPHIC-GRANULAR, LOCALLY PORPHYRITIC, LOCALLY FOLIATED; MAJOR ACCESSORY MINERALS INCLUDE BIOTITE, HORNBLENDE, MAGNETITE AND CLINOPYROXENE IN VARIABLE RATIOS; COMMONLY EPIDOTIZED; INCLUDES DARK GREENISH-GRAY ANDESITE PORPHYRY AND LIGHT GRAY TO PINKISH-GRAY APLITIC DIKES

mzv METASEDIMENTARY AND METAVOLCANIC ROCKS, UNDIVIDED (PERMIAN TO TRIASSIC?)

LIGHT-COLORED QUARTZ-SERICITE ± CHLORITE SCHIST AND PHYLLITE WITH MINOR METAQUARTZITE, GREENSTONE, MUSCOVITE-GARNET SCHIST, AND FELDSPAR-QUARTZ-BIOTITE GNEISS

MAP SYMBOLS

CONTACTS: LONG DASHES WHERE APPROXIMATELY LOCATED; SHORT DASHES WHERE INFERRED

FAULTS: LONG DASHES WHERE APPROXIMATELY LOCATED; SHORT DASHES WHERE INFERRED; DOTTED LINE WHERE CONCEALED; BROKEN DOTTED LINE WHERE INFERRED AND CONCEALED

BOUNDARY OF LANDSLIDE (Qls); DASHED WHERE APPROXIMATELY LOCATED; ARROWS INDICATE DIRECTION OF MOVEMENT

STRIKE AND DIP OF SEDIMENTARY BEDS AND OF INDIVIDUAL BASALT FLOWS IN THE MIOCENE BASALT SEQUENCE (Tb) OF THE BALTAZOR HOT SPRINGS AREA

STRIKE AND DIP OF HORIZONTAL SEDIMENTARY BEDS

STRIKE AND DIP OF FLOW FOLIATION IN VOLCANIC FLOW ROCKS AND OF COMPACTION FOLIATION IN ASH-FLOW TUFFS

STRIKE AND DIP OF SCHISTOSITY IN METAMORPHIC ROCKS

STRIKE AND DIP OF VERTICAL SCHISTOSITY

CH101-7 THERMAL GRADIENT DRILL HOLE

SPRING DEPOSITS AND ALTERATION

BALTAZOR HOT SPRINGS AND VICINITY

OPALINE SINTER; LIGHT BROWNISH-GRAY TO MEDIUM GRAY; GENERALLY POROUS INCORPORATES ABUNDANT SILICIFIED PLANT DEBRIS; OPEN SPACES MAY BE LINED OR PARTIALLY FILLED WITH WHITE TO LIGHT GRAY CRYPTOCRYSTALLINE CALCITE (CALICHE)

APPROXIMATE AREA OF PERVASIVE DEVELOPMENT OF CALCITE ± CHALCEDONY VEINS AND VEINLETS, COMMONLY ACCOMPANIED BY WEAK TO MODERATE CLAY-CALCITE ALTERATION OF HOST ROCKS; GOETHITE ± HEMATITIC JASPEROID OBSERVED IN FLOAT WITHIN THIS ZONE, BUT NOT IN SITU

CHALCEDONY-CALCITE VEIN; WHITE TO LIGHT GRAY; CALCITE IS COARSE- TO VERY COARSE-CRYSTALLINE AND LOCALLY CRUDELY BANDED; CHALCEDONY GENERALLY SHOWS DELICATE BANDING PARALLEL TO BRUSH BANDING IN CALCITE; A FEW ANGULAR CLASTS OF CHALCEDONY ARE IMBEDDED IN THE CALCITE, INDICATING MULTIPLE PERIODS OF EMPLACEMENT BY BRECCIATION

MASSIVE PYRITE- AND CHALCOPYRITE-BEARING QUARTZ; WHITE TO LIGHT GRAY; SULFIDES ARE PARTIALLY OXIDIZED, YIELDING VARIABLE COMPOSITIONS OF GOETHITE, PITCH LIMONITE, HEMATITE, MALACHITE, AZURITE, AND CHRYSOCOLLA; PRE-DATES TERTIARY VOLCANISM AND SEDIMENTATION

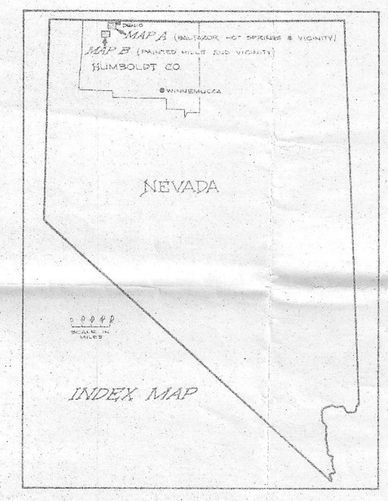
PAINTED HILLS AND VICINITY

OUTER LIMITS OF PERVASIVE, MODERATE TO INTENSE ARGILLIC ALTERATION; INCLUDES PATCHY GOETHITE AND HEMATITE STAINING AND LOCAL SILICIFICATION; CALCITE VEINLETS APPEAR TOWARD THE PERIPHERY OF THIS ZONE

INTENSE HEMATIZATION, INTENSE ARGILLIC ALTERATION, AND WEAK TO MODERATE SILICIFICATION; OPAL AND CHALCEDONY VEINLETS ARE COMMON; ALTERED ROCKS OF THIS ZONE ARE STAINED BRIGHT BRICK-RED BY FINELY DIVIDED HEMATITE

INTENSE SILICIFICATION AND INTENSE HEMATIZATION OF DENSELY WELDED ASH-FLOW TUFF HORIZON (W7) IN MIOCENE(?) TUFFS AND TUFFACEOUS SEDIMENTARY SEQUENCE (Tsf)

ZONE OF PERVASIVE CHALCEDONY & OPAL VEINS AND VEINLETS IMMEDIATELY EAST AND NORTH OF THE PAINTED HILLS MERCURY PROSPECT; ALSO INCLUDES LOCALLY INTENSE CHALCEDONY-OPAL CEMENTATION OF PUMICE-RICH SANDSTONES AND CONGLOMERATES



SCALE (MAPS A & B) 1:24 000

1 MILE
2000 0 2000 4000 6000 FEET
1 0 1 2 KILOMETER

PLATE I. GEOLOGIC AND HYDROTHERMAL ALTERATION MAPS, BALTAZOR HOT SPRINGS AND PAINTED HILLS THERMAL AREAS HUMBOLDT COUNTY, NEVADA

GEOLOGY BY J. B. HULEN
1979

EARTH SCIENCE LABORATORY
UNIVERSITY OF UTAH RESEARCH INSTITUTE

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