

Age				Stratigraphic Unit	Thickness (ft)	Lithology	Occurrence	Hydrologic Properties			
Mybp	Era	Period	Epoch								
0.01	Cenozoic	Quaternary	Holocene (Recent)	Mostly Unconsolidated Basin Fill	Holocene Surficial and Playa Deposits	± 25 to ± 300	Playa deposits (silty sand), eolian (we sorted) sand, younger fan deposits, and alluvium.	Playa deposits of China, Satellite, Mirror, North Dry, and Airport Lakes. Windblown sand mostly adjacent to playas and west side of Argus Range. Some thicker alluvial fans on basin margins.	Mostly above water table. Saline water when evaporation occurs in saturated playas. Young fans may have water table developed within permeable sands.		
2.0			Pleistocene		Alluvial, Quaternary Fan, and Lacustrine Deposits	Coso Volcanics	Flows ± 100	Contemporaneous and Interfingering	Lacustrine deposits - silt and clay with occasional sandy and/or calcareous horizons.	Beneath present playas and past lakes, which extended outward into alluvium during periods of high levels. Mid-Pleistocene Christmas Canyon Formation in southern Teagle Wash and western Pilot Knob Valley.	Low permeability. Forms semiconfining layer in central Indian Wells Valley.
									Alluvial deposits - lenticular, fluvial deposits of clay, silt, sand, and gravel of the gentle bajadas.	Occupies gentle bajadas between playas (and/or lakes) and the fan deposits. Topographic slope generally less than 50 ft/mi.	Moderate to high permeability. Primary water bearing unit of Indian Wells Valley. Includes parts of water table and deep aquifers.
									Fan deposits - highly variable, poorly sorted, sandy to boulder conglomerates; locally includes very poorly sorted mud flows; deposited on the steep fan heads. Includes intermediate and old alluvial fan and deltaic deposits on major drainages.	Tongues extending from perimeter of basin. Present where topographic slope generally greater than 100 ft/mi; especially large at foot of Sierra Nevada. Fan-delta where fans prograde into lakes. Delta where large streams or rivers enter basin (Owens River and ancestral Owens River).	Highly variable permeability. Primary recharge area of Indian Wells Valley; highest quality groundwater (low total dissolved solids).
5.0			Pliocene		Coso Formation	Coso Volcanics	± 300 to ± 4,500	White Hills Sequence and Coso Volcanics	White Hills Sequence includes lacustrine, fan-delta, debris flow, mega-breccia, and alluvial deposits.	Outcrops in White Hills anticline; identified under Pleistocene basin fill and lacustrine sediments. Likely begins in Miocene.	Highly variable permeability; deepest portion of deep hydrogeologic zone in Indian Wells Valley; water quality unknown.
									Fan and lacustrine deposits, basalt flows, andesite, and rhyolite.	West and north of Coso Range. Coeval with mid-Pliocene White Hills Sequence.	Highly variable
23			Neogene		Miocene	Miocene to Quaternary Volcanics	Black Mountain Basalt	Flows ± 100	Olivine basalt flows and intrusions.	Southwest edge of Indian Wells Valley (western El Paso Mountains).	Impermeable unless fractured.
34			Paleogene		Eocene	Goler Formation	± 7,000	Fanglomerate and alluvial gravel, sand, and clay.	El Paso Mountains and Basin; southwest corner of Indian Wells Valley; found beneath central Indian Wells Valley.		
										55	Paleocene
63	Mesozoic	Triassic Jurassic Cretaceous	Jurassic Basament Complex	Unknown	Primarily quartz monzonite to granodiorite of Sierra Nevada batholith with granitic to mafic dikes.	Underlies valley and outcrops in surrounding mountain ranges. Independence Dike Swarm of both Jurassic and Cretaceous ages.	Generally impermeable unless fractured. Carbonates may contain solution cavities.				
								240	Paleozoic	Mississippian-Permian	Paleozoic Sediments
570											

Notes: All ages based on best available data; thicknesses approximate.

¹ Alluvial fans as defined by Christenson and Purcell (1985).

ft = Feet

ft/mi = Feet per mile

mybp = Million years before present

Sources: Monastero and others (2001); PRC Environmental Management, Inc. and Montgomery Watson (1996); Geological Society of America (1999); American Geological Institute (1982); Duffield and others (1980)

INDIAN WELLS VALLEY BASIN, CALIFORNIA

FIGURE 3-2
STRATIGRAPHY OF THE INDIAN WELLS VALLEY



Tetra Tech EM Inc.