WATER DEVELOPMENT POTENTIAL OF HUACHUCA CANYON FORT HUACHUCA, ARIZONA

for

DIRECTOR OF FACILITY ENGINEER
FORT HUACHUCA, ARIZONA

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INTRODUCTION

Several previous studies have addressed to some extent the water development potential of Huachuca Canyon. This paper is based on no new data but presents an analysis of the water development which has occurred in accordance with past engineering recommendations and an evaluation of the current water supply potential.

SOURCES OF INFORMATION

Major sources of hydrologic and geologic data for the study were the U.S. Geologic Survey Water Supply Paper 1819-D by S. G. Brown (1966) and "Arizona Climate" by W. D. Sellers (1960). Various engineering reports were also referred to as listed in the References. Field work involved inspecting the canyon to verify geologic characteristics of critical areas. Additional information was obtained by interviewing facility engineer personnel about the water supply and effectiveness of existing structures in the canyon to develop the water supply. Persons interviewed included Mr. Richard Stokes, Mr. Nacho Valenzuela and Mr. Robert King.

WATERSHED CHARACTERISTICS

The canyon is characterized by steep slopes and moderate to sparse vegetation consisting primarily of shrub oak and grasses. Soils are shallow permeable to semi permeable underlain by dense bedrock formations.

In the upper elevations the bedrock formations are sandstones, mudstones and limestone which tend to form solution channels to convey water. At lower

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elevations starting at the old gage station, the permeable overburden is underlain by impermeable quartzite and granite bedrock.

The canyon bottom appears to have been fractured probably during the upthrust of the Huachuca Mountains making subsurface conveyance channels possible even in the dense impermeable formations.

OCCURRENCE OF SPRINGS

Most of the major springs in the canyon are presently developed as water supplies. A study of the geologic map of the canyon area (plate 1, Brown, 1966, see the appendix) reveals that these springs occur at the base of the limestone formations where the Bolsa Quartzite and Granite come to the surface. Most of the canyon water probably emerges in the spring areas at the formations interface or is conveyed as shallow subsurface flow.

HYDROLOGY

Average precipitation in the canyon ranges from 16 inches near the mouth to 26 inches near the upper divide for a mean of 21 inches over the watershed. Evaporation has been estimated at 72 inches near the mouth and is likely greater than 48 inches near the head. Vegetation is another major water consumer in the canyon. A large portion of the annual rainfall occurs during summer months when evaporation and vegetative water requirements are highest. Thus only a portion of the precipitation is available for development as most of the precipitation is consumed in the canyon by evapotranspiration or quickly runs off as surface flow. A perusal of the rainfall and precipitation records in the appendix reveals that the response time of the spring flow with rainfall is a matter of a few months. Annual

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flows seem to vary greatly so that the canyon supply will be susceptible to drought conditions.

The following calculations are to illustrate feasible runoff quantities only and are not based on actual field measurements.

Assumptions:

1. Fort Huachuca rainfall records should be adjusted for elevation by twenty-one/sixteenths.
2. 15% of summer precipitation occurs as run off while 85% is consumed in the canyon.
3. 30% of winter precipitation occurs as runoff while 70% is consumed in the canyon.
4. 30% of the runoff is subsurface flow while 70% is surface flow.
5. Watershed area equal 3.21 square miles or 2074 acres.
6. QT = total runoff; QSS = subsurface runoff; QS = surface runoff.

Summer Runoff (May to Sep):

$$QT = \frac{10 \text{ in. ft. } 2074 \text{ acres X } 0.15 \text{ X } 21}{12 \text{ in. } \quad 16} = 340 \text{ acre ft.} = 110{,}900{,}000 \text{ gal/yr}$$

QSS = QT X 0.30 = 33,270,000 gal/yr (150 gpm)

QS = 77,630,000 gal/yr

Winter Runoff (Oct to Apr):

$$QT = \frac{6.5 \text{ X } 2074 \text{ X } 0.30 \text{ X } 21}{12 \quad 16} = 440 \text{ acre ft.} = 114{,}100{,}000 \text{ gal/yr}$$

QSS = 43,240,000 gal/yr (140 gpm)

QS = 100,870,000 gal/yr

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Annual Total:

QT = 110,900,000 + 114,100,000 = 225,000,000 gal/yr

QSS = 33,270,000 + 43,240,000 = 76,510,000 gal/yr (145 gpm)

QS = 77,630,000 + 100,870,000 = 178,500,000 gal/yr

Since the above calculations are based on subjective estimates they should be used cautiously. Extensive field work would be required to establish the precipitation-runoff retationships of the watershed.

UNDEVELOPED SUBSURFACE FLOW

During October through November of 1959 a 30 foot excavation was made across the bottom of the canyon near the picnic area. Reportedly 200 to 300 gpm were pumped from the excavation without lowering the water level. The incident gave evidence of a larger subsurface water supply than was assumed previously.

The following schematic shows the profile of the excavated area as remembered by Mr. Nacho Valenzuela.

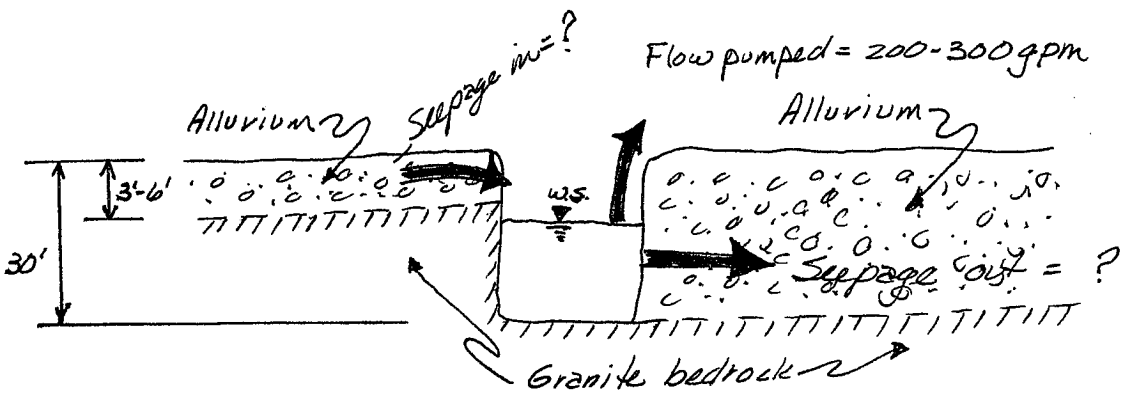

Figure 1. Geo-Hydrologic Profile of Excavated Area in Huachuca Canyon 1959.

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Since 1959 several consultants have considered the reported phenomenon. In a report prepared by Yost and Gardner Engineers two methods of developing the potential underground flow where considered. One method involved placement of a 43 ft. subsurface cut off wall at an estimated cost of $116,700 in 1969 which would be more than $230,000 at today's prices. The second method was to place a well immediately downstream from the excavated area and drainpipes upstream. The second method has been constructed but is yielding less than 30 gpm.

SUMMARY

Hydrologic data are inadequate to determine the precipitation-runoff relationship of the watershed. The data reveal a rather rapid response of spring flow with precipitation. Thus, the supply will be subject to annual and seasonal variations.

Estimates of spring flow made by using precipitation data and watershed characteristics do indicate that a significant portion of subsurface flow is currently undeveloped. (76,510,000-30,000,000=46,510,000 gal/yr undev.)

The large subsurface flows observed during the excavation of 1959 have not been substantiated by subsequent water development projects. Watershed characteristics also do not indicate the presence of large subsurface water supplies adequate to supply the 900,000,000 gal annual requirement.

CONCLUSIONS

According to present information Huachuca Canyon should continue to be considered a supplemental water supply and not a major source for the Post. Current plans to develop a well field in the east range represent a potential supply not as susceptible to droughts as the small watershed in the canyon.

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Water supplies developed in the canyon at low capitol costs are econical supplements to pumped water from basin aquifers. (Water is presently supplied at less than $0.95 per 1000 gal annually)

RECOMMENDATIONS

Since the findings concerning subsurface flows in the vicinity of the 1959 excavation are inconclusive some inexpensive procedures to verify quantities may be in order. If the granite bedrock is indeed 3 ft. to 6 ft. below the surface as shown in Figure 1 then a trench could be readily excavated accross the canyon and the flow monitored as demonstrated in Figure 2.

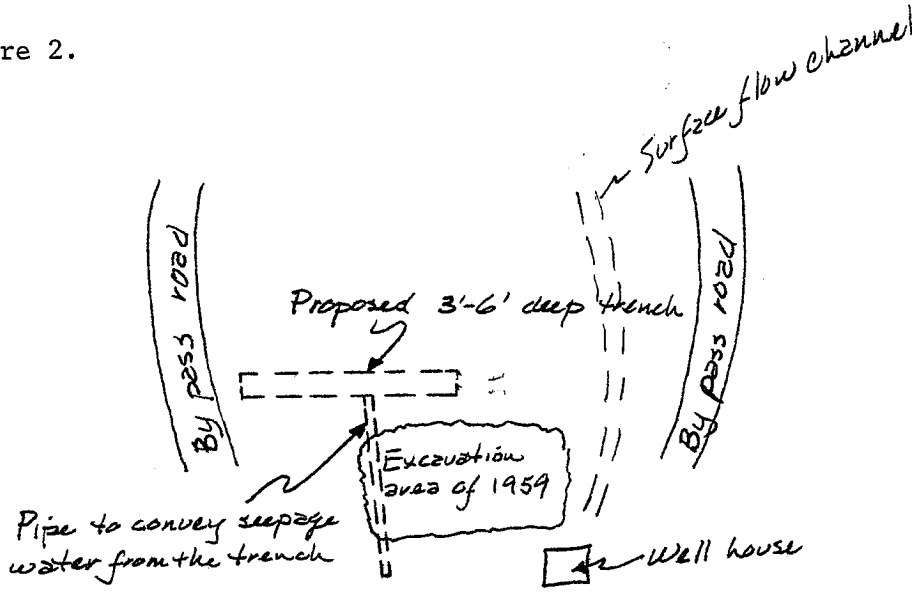

Figure 2. Plan View of Trench to Measure Subsurface Flow.

The flow should be monitored for at least several months to assure that seepage is not simply bank or soil storage but rather subsurface flow which can be maintained.

Surface storage such as a small in-stream reservoir to capture surface and subsurface flows does not appear to be a viable alternative to developing perenial canyon springs. Sediments carried by runoff resulting

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from thunder showers characteristic of the area would present a major maintenance problem. Also losses from seepage and evaporation would likely be excessive.

A preliminary economic evaluation of a reservoir in the canyon to develop the full canyon supply reveals the following:

Potential average annual water supply:

Measured by USGS 91,200,000 gal (Measurements were apparently spot checked rather than continous so that storm run off may have been missed, resulting in a lower figure than actually occurred.) See appendix for USGS flow records.

Estimated 225,000,000 gal/yr

Losses from evaporation and seepage:

21,500,000 - 27,400,000 gal/yr

Cost of dam:

Capital cost: $2,000,000 - $3,500,000

Annual costs per 1000 gal (Capital at 10% for 100 years and O&M costs at 2% of capital costs)

Cost per 1,000 gal = $2.10 - $3.50

Since the present system can deliver water for $0.95 per 1,000 gal, a reservoir does not appear to be an economical alternative at the present time.

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REFERENCES

1. Brown, S.G., 1966, Water Resources of Fort Huachuca Military Reservation, Southeastern Arizona, U.S.G.S. Water-Supply Paper 1819-D

2. John Carollo Engineers, 1971, Water Supply Study, Phase I, Fort Huachuca, Arizona.

3. Sellers, W.D., ed., 1960, Arizona Climate: Tucson, Arizona Univ. Press, 60 p.

4. Yost and Gardner Engineers, 1969, Concept Study Water Development Canyons Fort Huachuca, Arizona.

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APPENDIX

GEOLOGY OF

HUACHUCA CANYON

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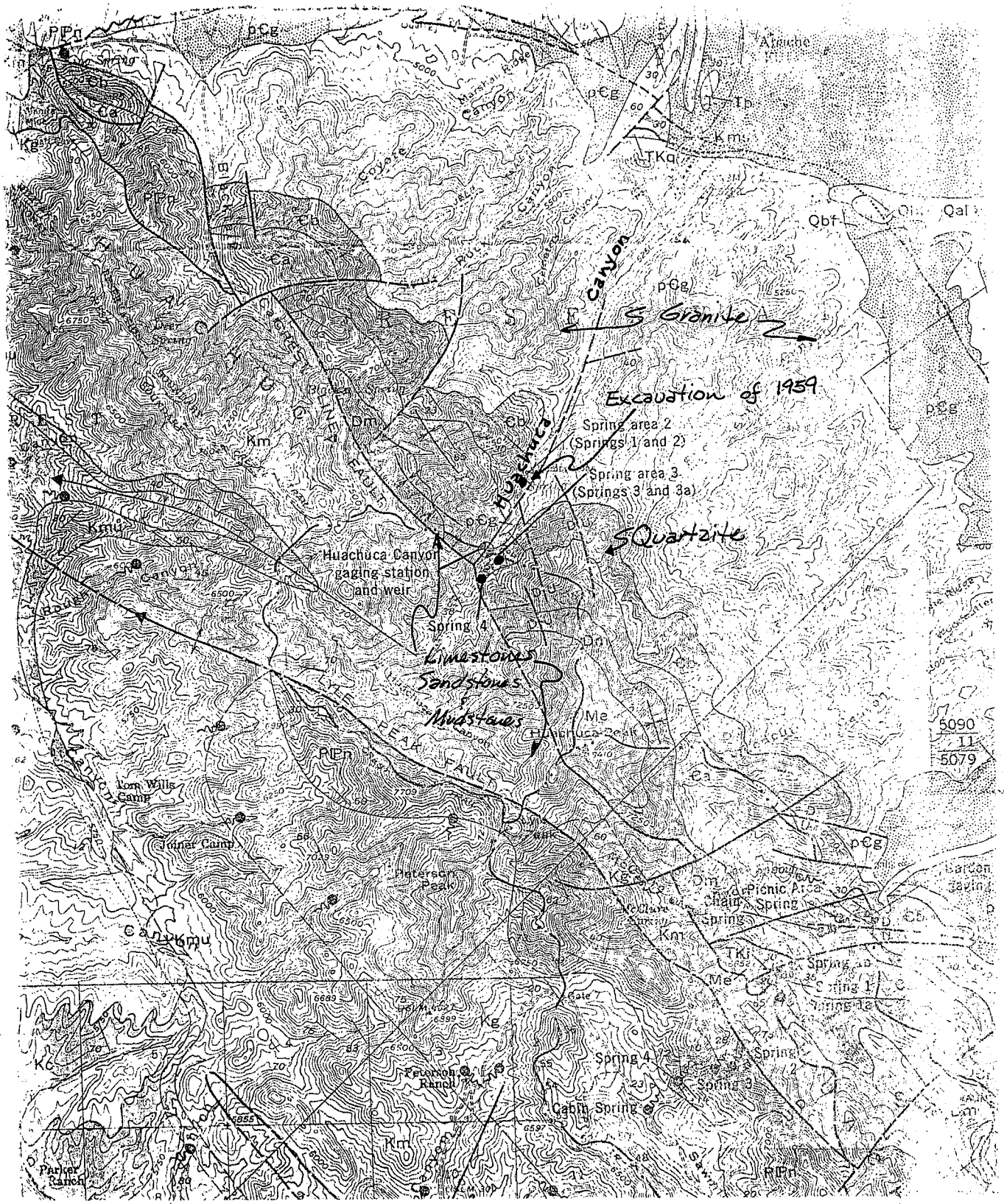

Figure 3. Geologic Map of Huachuca Canyon.
Copied from Plate 1 WSP No. 1819-D (Brown, 1966)

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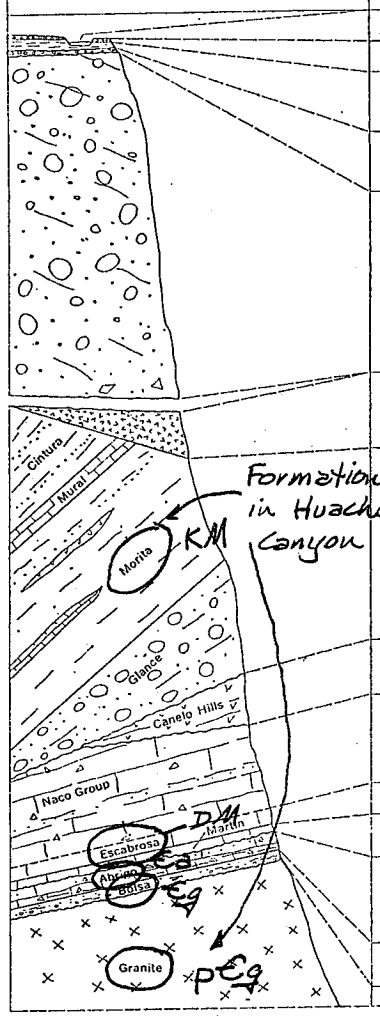

SECTION	GEOLOGIC UNIT		THICKNESS, IN FEET (APPROXIMATE)	DESCRIPTION	HYDROLOGIC CHARACTERISTICS
	Stream alluvium		0-100	Light-brown sand, silt, and gravel	Moderate to very permeable; yields water to wells along Babocomari and San Pedro Rivers
	UNCONFORMITY				
	Terrace deposits		5-150	Light-reddish-brown to light-brown sand, gravel, and clay, locally derived	Very permeable but above regional water table; locally may contain small amounts of perched water
	UNCONFORMITY				
	Upper unit of basin fill		0-650	Reddish-brown gravel, sand, and silt, some red and green clay, and limy silt	Most productive aquifer in Fort Huachuca well field; permeability moderate to very low; very permeable in some areas; thin on the west side of the mountains yielding little water
	UNCONFORMITY				
	Lower unit of basin fill		0-250	Light-gray to light-pinkish-gray gravel and sandstone, strong to weakly cemented, lenticular; locally derived cobbles and pebbles of quartz, granite, limestone, quartzite, and rhyolite tuff	Secondary aquifer in Fort Huachuca well field; permeability moderate to low; yields little water to wells on the west side of the mountains
	UNCONFORMITY				
	Pantano(?) Formation (Miocene) Brennan (1957, 1962)		15,000±	Dark-reddish-brown to brownish-gray conglomerate, sandstone, and well-cemented gravel; boulders as much as 4 ft in diameter; materials composed of purple to red rhyolitic tuff, gray to pink felsitic tuff, purple to dark-green andesite, red and maroon shale and siltstone, light-yellow granite, dark-gray limestone, and light-gray to white quartzite	Very low to low permeability; generally reported "dry" by well drillers
	UNCONFORMITY				
	Volcanic and intrusive rocks in the Charleston-Fairbank area		------	Gray-green andesite flow breccia, fine-grained light-gray to pinkish- and greenish-gray quartz latite tuff, subordinate pink to dark-gray quartz latite flows; intrusive rocks are gray to pink quartz-latite porphyry and light-gray granodiorite	Very low permeability
	UNCONFORMITY				
	Bisbee Group	Cintura Formation	2750±	Dark-red to reddish-brown shale and mudstone, and subordinate gray and brown sandstone, pebble and cobble conglomerate	Contains small springs and seeps; very low permeability; low to moderately permeable where abundantly fractured
		Mural Limestone	500-675	Light-gray limestone, fossiliferous; thin interbeds of yellow and olive limy shale and gray to light-brown sandstone; grades into overlying and underlying units	
		Morita Formation	4000-4400	Dark-red to reddish-brown shale and mudstone, gray and brown sandstone and grit, and minor limestone and greenish-gray shale	
		Glance Conglomerate	0-3000±	White, light-gray to light-reddish-gray conglomerate, well-rounded cobbles of limestone, rhyolite, andesite, granite, and quartzite; locally interbedded with andesitic lava flows; grades into overlying unit	
	UNCONFORMITY				
	Canelo Hills Volcanics		6000+	Pinkish-gray to yellowish-brown rhyolite to latite flows, volcanic conglomerate, limestone conglomerate, pale-red tuffaceous sandstone, and reddish-brown rhyolitic welded tuff	Very low permeability; low permeability where fractured; small seeps and springs in unit
	UNCONFORMITY				
	Naco Group undivided, probably includes, from top down, Concha Limestone, Epitaph Dolomite, Scherrer Formation, Colina Limestone, Earp Formation, and Horquilla Limestone		3000-4000	Dominantly gray to pinkish-gray limestone and dolomite in 6-in. to 5-ft-thick beds; pale-red calcareous siltstone and mudstone and yellowish-brown sandstone are common in parts of the group	Main ground-water reservoirs and conduits for springs in Garden Canyon; very permeable where carbonate units are fractured and dissolved along fractures; claystone, siltstone, and mudstone units are impermeable and cause ground water to emerge as springs
	Escabrosa Limestone		700±	Light- to medium-gray very thick bedded limestone; contains abundant crinoid stems; forms bold rounded cliffs	
	Martin Limestone		300	Dark-gray to brownish-gray dolomite; minor beds of gray claystone and sandstone; medium to very thick bedded; forms benches and slopes	
	UNCONFORMITY				
	Abrigo Limestone		750-800	Laminated claystone and gray limestone, claystone weathers yellowish brown; subordinate interbedded limestone in 6-in. to 1-ft- thick beds in lower half; thinly laminated limestone separated by partings and 1-in.-thick beds of edgewise conglomerate and claystone in upper part; forms rounded cliffs	
	Bolsa Quartzite		350-500	Light-gray locally banded pale-red-purple quartzitic to feldspathic conglomerate and quartzitic sandstone; grades into overlying shale and limestone	No known springs; very low permeability, slightly more permeable where fractured
	UNCONFORMITY				
	Granite			Pinkish-gray coarse-grained granite	

* FIGURE 3.—Columnar section, stratigraphic table, and hydrologic characteristic of rock units in the Fort Huachuca area.

* Copied from WSP 1819-D (Brown, 1966)

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CLIMATOLOGICAL DATA

AT FORT HUACHUCA

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INSTITUTE OF ATMOSPHERIC PHYSICS, UNIVERSITY OF ARIZONA,
AND THE U. S. DEPARTMENT OF COMMERCE, WEATHER BUREAU,
CLIMATOGRAPHY OF THE UNITED STATES NO. 20-2

LATITUDE: 31° 34'
LONGITUDE: 110° 20'
ELEV. (GROUND): 4664 feet

CLIMATOLOGICAL SUMMARY

STATION: FORT HUACHUCA

STATION NO: 02-3120-7

MEANS AND EXTREMES FOR PERIOD 1901 - 1957

Month	Temperature (°F) Means: Daily maximum	Daily minimum	Monthly	Extremes: Record highest	Year	Record lowest	Year	Estimated mean degree days**	Precipitation Totals (Inches): Mean	Greatest daily	Year	Snow, Sleet, Hail: Mean	Maximum monthly	Year	Estimated mean relative humidity (percent): 0600 MST	1800 MST	Mean number of days: precip. .10 inch or more	Temperatures: Max. 90° and above	Max. 32° and below	Min. 32° and below	Min. 0° and below	Month
(a)	21	21	20	21	21	21	21		22	22	22	21	21	21			22	20	20	20	20	
J	58.5	33.9	46.2	77	1914#	1	1913	583	1.39	3.90	1905	0.9	7.5	1913	57	35	3	0	*	14	0	J
F	61.0	35.6	48.4	84	1957	7	1912	465	1.28	1.80	1913	2.6	11.5	1918	62	33	3	0	*	10	0	F
M	68.1	41.5	55.0	88	1916	19	1916	316	0.64	1.80	1912	0.4	7.5	1909	49	27	1	0	0	4	0	M
A	74.3	46.0	60.0	96	1907	25	1912	180	0.28	0.76	1905	T	0.4	1956	46	22	1	*	0	1	0	A
M	81.0	52.8	66.9	104	1910	32	1907	56	0.36	1.60	1907	0.0	0.0		42	25	1	2	0	*	0	M
J	90.7	62.2	76.4	104	1909	38	1907	0	0.68	1.80	1905	0.0	0.0		40	25	1	19	0	0	0	J
J	89.3	63.9	76.7	105	1909	44	1914	0	3.72	2.08	1956	0.0	0.0		59	42	8	16	0	0	0	J
A	87.1	62.4	74.6	101	1917#	46	1907	0	3.93	1.96	1955	0.0	0.0		69	47	8	11	0	0	0	A
S	85.2	59.0	72.1	102	1917	35	1907#	0	1.30	1.87	1905	0.0	0.0		63	42	3	6	0	0	0	S
O	77.6	50.8	64.2	99	1901	27	1906#	102	0.67	2.00	1911	0.0	0.0		55	39	2	1	0	1	0	O
N	66.7	39.0	52.9	89	1912	10	1911	363	1.01	1.81	1905	0.4	7.0	1919	53	41	2	0	0	7	0	N
D	59.1	34.3	46.7	81	1917	8	1911	567	1.19	2.60	1902	1.8	9.2	1905	60	41	2	0	0	12	0	D
Year	74.9	48.4	61.7	105	July 1909	1	Jan. 1913	2632	16.45	3.90	Jan. 1905	6.1	11.5	Feb. 1918	55	35	35	55	*	49	0	Year

(a) Average length of record, years.
T Trace, an amount too small to measure.
** Base 65° F.
# Also on earlier dates, months, or years.
* Less than one half.

CLIMATE OF FORT HUACHUCA, ARIZONA

Fort Huachuca is located at an elevation of about 5000 feet on the northeast slopes of the scenic Huachuca Mountains in southeastern Arizona, fifteen miles north of the Mexican border. It is currently the home of one of the largest military installations in the western part of the United States. The surrounding countryside is dotted with a series of minor mountain ranges, the adjoining Huachucas, the Santa Ritas, 30 miles to the northwest, the Whetstones, 20 miles to the north, and the Mules, 27 miles to the east. The highest elevations are reached on Huachuca Peak (8406 feet) and Miller Peak (9445 feet) in the Huachuca Mountains and on Mt. Wrightson (9432 feet) in the Santa Rita Mountains. Several peaks south of the border also exceed 8000 feet. The San Pedro Valley which runs from the south-southeast to the north-northwest, is centered fourteen miles to the east of Fort Huachuca. Mesquite grass is the prevailing type of vegetation on the valley floor but at higher elevations chaparral and oak woodland are more common. Above 6500 feet stands of yellow pine may be observed.

The two dominating features of the climate of Fort Huachuca are its abundant rainfall in summer and its mild temperatures throughout the year. Being located on the eastern slopes of a mountain range in southern Arizona, Fort Huachuca is in a perfect position to get a maximum amount of rain from the moist tropical air masses which move into the area in the summer from the east and southeast. Under the combined influence of strong surface heating and orographic uplift of the air over the Huachuca Mountains, numerous showers and thundershowers often develop near the Fort during the warmer hours of the day. Although these showers are brief, they are intense enough and frequent enough to account for about fifty percent of the Fort's annual precipitation.

Relatively little precipitation falls during the remainder of the year. Most of this is concentrated in the colder months and is associated with middle latitude cyclonic storms that move into the state from the Pacific Ocean. The intensity and frequency of these storms varies greatly from one year to the next, so that the seasonal precipitation is normally either much below or much above the long-term average value, usually the former. Roughly one tenth of the winter precipitation falls as snow and this rarely stays on the ground for more than a day or two. It is interesting to note that the heaviest 24 hour precipitation at the Fort occurred, not during a summer thundershower, but during a winter storm in January 1905.

(continued on the last page)

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AVERAGE MONTHLY TEMPERATURES (°F) FOR FORT HUACHUCA, ARIZONA

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Annual
1900		45.9	55.5	54.0	68.2	78.2	79.4	76.6	69.4	62.2	57.1	49.7	
1901	48.3	47.2	56.4	60.3	70.9	77.3	80.1	75.0	73.3	65.5	56.7	52.2	63.4
1902	47.2	53.8			71.4	82.8	80.6	79.3	74.8	70.4	55.8	51.0	
1903	47.0	44.5	55.3	61.5	66.1	79.5	81.2		76.4	69.3	58.7	46.8	
1904	45.0	52.2	59.8	63.0	67.6	75.5	77.2	73.4	68.2	61.2	54.7	46.5	62.0
1905	48.2	49.1		56.7	60.7	72.5	73.6	70.2	65.5	58.2	45.7	40.7	
1906	43.1	47.8	52.6	58.1*	65.7	76.8	76.7	71.5	71.6	62.0	52.0	47.0	60.4
1907	45.3	49.7	55.9	61.7	59.9	69.1	72.5	68.5	67.7	60.9	44.7	47.3	58.6
1908	44.9	49.4	55.3	58.7	63.5	74.7	73.0	71.9	70.9	62.1		45.6	
1909	45.8	45.9	52.4	62.3	74.3	82.7	81.9	76.8	72.5	66.5	57.2	44.3	63.6
1910	48.5	50.3	60.6	63.5	71.1	76.1	75.9	74.2	71.3	61.4	52.3	46.3	62.0
1911	49.5	47.4	60.2	62.8	68.9	74.9	74.8	77.7	72.3	63.0	44.2	33.9	60.8
1912	40.9	42.8	51.1	54.8	67.6	76.7	74.9	74.0	71.6	60.5	53.6	41.7	59.2
1913	41.3	44.0	50.2	59.1	66.9	73.0	76.9	75.3	72.7	71.5	50.6	42.5	60.3
1914	48.4	48.4	53.9	62.5	68.8	73.6	70.3	75.6	70.3	60.3	53.5		
1915			48.5	57.5	62.8	74.6	75.5	74.8	68.5	63.9	52.4*	46.8	
1916	45.8*	54.0	55.2	59.9	65.4	74.1		75.1	72.5	63.4	55.5	47.4	
1917	47.2	48.7	54.2*	59.9	61.7	74.9	74.7	77.7*	74.5	69.9	60.7	54.6*	63.2
1918			59.5*	59.5		78.9	80.7						
1919													
1920					station	closed,	Apr. 1920	- Nov	1939				
1939												51.6	
1940	46.5	47.4	54.0	58.4	68.9								
1954					station	closed,	June 1940	- Aug	1954				
1955	42.1	45.1	54.5	60.8	66.6	77.8	77.0	74.3	75.3	68.0	57.8	50.0	
1956	51.9	45.2	57.3	59.9	72.1	80.3	76.9	75.5	75.3	69.1	55.5	53.7	62.6
1957	48.0	56.0	53.3	59.7	64.7	79.1	79.4	75.9	77.0	64.9	51.2	46.0	63.2
1958	45.3	50.6	48.2	59.7	72.7	79.0	77.9	75.9	75.1	62.2	49.2	49.7	62.7
1959	50.6	48.7	54.5	63.8	67.4	79.2	77.6	73.2	71.8	63.1	53.2	51.6	62.4
									73.1	64.0	51.7	45.3	62.5
1960	41.8	44.4	57.5	61.8	67.9	78.9	77.5	[illegible]	74.9	[illegible]	[illegible]		
1961	[illegible]	50.0	54.4	62.2	67.1	78.1	77.5	[illegible]	70.5	[illegible]	[illegible]		
1962	45.3	51.7	49.2	45.6	67.7	75.4	76.6	80.0	[illegible]	[illegible]	50.2		
1963	45.0	53.2	54.2	62.6	71.9	75.7	78.5	73.4	73.4	67.[illegible]	53.3	[illegible]	
1964	43.2	43.7	50.0	58.1	63.4	75.6	77.8	74.4	69.4	65.2	[illegible]	[illegible]	
1965	45.8	46.5	51.1	60.5	65.7	72.6	76.9	76.2	70.0	[illegible]	52.7	[illegible]	
1966	42.4	42.6	55.5	61.7	73.1	76.0	78.7	[illegible]	73.3	62.7	56.5	[illegible]	
1967	46.8	50.6	57.0	58.4	66.7	73.7	76.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	129	3[illegible]	27	30	31	31	3[illegible]	30	32	32	37	37	
	13[illegible]	14497	15738	18091	20925	23634	23082	22468	[illegible]	21[illegible]	16[illegible]	145[illegible]	
[illegible]	45.9	48.3	54.2	60.3	67.5	76.4	76.9	74.9	72.0	64.4	53.7	46.9	[illegible]
High	51.9	56.0	60.6	65.6	74.3	82.8	81.9	80.0	77.0	71.5	[illegible]	[illegible]	
	1956	1957	1910	1962	1969	1902	1909	1962	1956	1913	[illegible]	[illegible]	
Low	40.9	42.6	48.2	54.0	59.9	69.1	70.3	70.2	65.5	58.[illegible]	[illegible]	35.[illegible]	
	1912	1966	1958	1900	1907	1967	1914	1905	1905	1905	1914	[illegible]	
1937-1967													
	13	13	13	13	13	13	13	13	14	14	14	14	
	5958	6286	6967	7928	8910	10014	10099	9992	10[illegible]	9[illegible]	7579	6[illegible]	
	45.8	48.4	53.6	61.0	68.5	77.0	77.6	75.3	72.9	63.[illegible]	54.6	47.[illegible]	[illegible]
[illegible]	17	18	18	19	19	19	18	17	18	18	17	15	
1917	7829	9[illegible]55	9906	11342	12704	14459	13799	12676	12870	1[illegible]	[illegible]	[illegible]	
[illegible]	46.1	48.3	55.0	59.7	66.9	76.1	76.7	74.6	71.5	63.9	52.2	[illegible]	[illegible]
	14	14	14	14	14	14	14	14	15	[illegible]	[illegible]	[illegible]	
Temp	[illegible]	53.2	52.4	[illegible]	67.5	77.6	75.2	[illegible]					
1968	[illegible]	681.8	749.1	8436	[illegible]	[illegible]	[illegible]	1051.5	[illegible]				
	45.8	49.7	5[illegible].5	[illegible]	69.5	77.1	77.4	[illegible]					

* average temperature missing on one through five days during the month

USF200001948

TOTAL PRECIPITATION (INCHES) FOR FORT HUACHUCA, ARIZONA

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Annual
1900		1.15	0.86	1.29	T	T	2.30	1.66	3.82	0.20	0.55	0.15	
1901	1.70	2.39	0.72	0.30	0.90	0.00	4.19	4.79	0.74	1.80	1.10	0.01	18.64
1902	0.17	0.00	0.02	0.00	0.00	1.03	0.89	4.43	1.21	0.10	2.45	3.37	13.67
1903	0.44	0.95	1.47	0.00	0.00	0.43	3.76	3.62	1.83	0.00	0.00	0.18	12.68
1904	0.15	0.49	0.14	0.00	1.39	0.10	5.70	6.94	0.92	1.50	0.00	0.70	18.03
1905	4.65	3.90		1.94	0.00	2.34	1.19	3.55	4.85	0.21	6.23	1.34	
1906	0.30	2.42	1.10	0.24	T	T	2.97	2.74	0.54	1.07	1.00	3.75	16.13
1907	4.80	0.70	0.10	T	1.80	T	4.18	8.50	2.31	0.33	1.72	0.00	24.44
1908	0.45	2.28	0.52	0.36	0.07	T	3.89	4.38	1.40	0.00	0.07	2.18	15.60
1909	0.30	1.27	1.75	0.00	0.00	0.03	0.99	3.32	1.65	0.00	0.50	1.79	11.60
1910	0.60	0.00	T	T	0.00	1.35	3.40	2.95	0.02	0.20	1.02	T	9.54
1911	0.68	0.73	0.71	0.20	T	1.41	2.15	0.97	1.58	3.30	0.00	0.44	12.17
1912	0.00	1.65	2.08	1.00	0.20	0.20	6.50	6.60	0.65	T	0.24	0.68	19.80
1913	0.78	4.69	0.18	0.12	0.28	0.01	1.16	3.18	1.04	0.20	3.79	1.50	16.93
1914	1.35	0.31	0.90	0.00	0.30	2.76	4.06	2.87	3.37	2.24	0.90	6.51	25.57
1915	2.93	2.16	1.22	0.71	T	0.00	4.98	1.85	0.09	0.00	0.44	0.84	15.22
1916		T	1.02	T	1.30	0.00	1.59	3.62	2.76	0.12	0.00	0.60	
1917	2.96	0.90	T	0.38	1.13	0.17	8.78	3.31	0.96	0.04	0.00	0.00	18.63
1918	2.08	1.38	0.00	0.10	0.00	0.66	3.15	0.90		0.35			
1919		0.55	0.40	0.50	0.45	2.47	4.24			0.25	1.34		
1920		0.30											
					station	closed,	Apr. 1920	- Nov	1939				
1939												T	
1940	0.11	2.84	0.90	0.41	0.37								
					station	closed,	June 1940	- Aug	1954				
1954									2.79	1.79	0.00	0.10	
1955	2.74	0.60	0.35	0.02	T	T	4.91	7.67	0.05	0.65	0.13	0.22	17.34
1956	0.76	0.17	0.00	0.20	0.02	0.77	6.86	1.88	0.04	0.71	0.02	0.75	12.18
1957	1.15	0.13	0.59	0.02	0.16	1.17	2.25	4.50	T	1.58	0.20	0.10	11.85
1958	0.02	0.89	2.43	0.33	0.03	0.69	3.71	5.06	2.90	0.73	0.73	0.00	17.52
1959	0.00	0.81	T	0.53	0.00	0.81	3.20	3.41	0.03	1.63	1.22	1.22	12.86
1960	1.49	0.39	0.07	[illegible]	.61	.24	[illegible]	[illegible]	[illegible]	.81	[illegible]	[illegible]	[illegible]
1961	.56	T	.05	0.0	T	1.10	3.79	6.98	1.46	2.06	[illegible]	[illegible]	[illegible]
1962	1.52	.15	.97	0.0	T	.12	1.23	[illegible]	.58	.51	.12	1.32	[illegible]
1963	.26	.24	T	.20	.10	0.0	3.88	3.78	.97	.41	[illegible]	[illegible]	[illegible]
[illegible]	.43	.64	.92	.25	T	T	8.72	3.08	5.82	1.28	[illegible]	[illegible]	22.55
1965	.63	.50	.34	.14	.20	.23	3.54	3.26	1.51	T	.32	[illegible]	14.7[illegible]
[illegible]	1.11	1.87	.12	T	.01	.38	4.59	5.07	2.93	T	.40	[illegible]	[illegible]
1967	.02	.32	.41	.34	.12	.33	7.32	1.74	4.15	.15	.26	.72	[illegible]
[illegible]	(31)	(35)	(33)	34	(34)	(33)	(33)	(32)	(33)	(34)	(33)	(33)	(28)
[illegible]	35.13	37.77	20.34	9.58	8.84	18.81	127.97	119.06	53.82	24.26	27.[illegible]	39.36	[illegible]
[illegible]	1.13	1.08	.62	.28	.26	.57	3.88	3.72	[illegible]	.71	.45	1.19	[illegible]
Ext (d)	4.80	4.67	2.08	1.94	1.80	2.76	8.70	8.50	5.[illegible]	3.30	[illegible]	[illegible]	[illegible]
[illegible]	1907	1913	1912	[illegible]	1907	1914	1964	[illegible]	1964	1911	1905	1914	[illegible]
[illegible]	0	T	T	0 or T	0 or T	0 or T	.88	.39	T	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	1959	1916 1961	1910 1917 1959 1963	12 [illegible]	15 [illegible]	10 [illegible]	1962	1962	1957	9	6	5	[illegible]
[illegible]	32	36	34	35	35	34	34	33	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	.22	.91	.72	[illegible]	0	.21	[illegible]	7.01	[illegible]	.11	.35	[illegible]	[illegible]
	[illegible]	[illegible]	21.24	10.19	8.34	18.82	133.[illegible]	12.13	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	1.12	1.07	.63	[illegible]	.25	.55	[illegible]	[illegible]	1.04	.[illegible]	[illegible]	[illegible]	[illegible]

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(continued from the first page)

The mildness of the temperatures at Fort Huachuca, both in winter and summer, would be difficult to exceed elsewhere in the state. In winter, its position on the slopes of the Huachuca mountains, rather than in the adjoining San Pedro Valley, helps to mitigate the severity of cold spells, since the coldest and densest air tends to settle on the valley floor. Winter days are usually bathed in bright sunshine. As a result, midday temperatures rise into the upper fifties and low sixties, or even, during the warmer periods, into the middle and upper seventies.

In summer, the elevation of the Fort and a rather high frequency of afternoon cloudiness combine to keep the maximum temperatures down. Only on rare occasions, during the hottest weather, is air conditioning necessary. The summer nights are usually clear and cool, the temperature often dropping into the low sixties or high fifties just before sunrise.

STATION HISTORY

Observers	Dates	Direction and Distance of Station from Post Office	Elevation (feet)	Station known as
U. S. Army Post Surgeon	Jan. 1886 - Mar. 1920	3 blks. NNW	5060	Fort Huachuca
Sgt. G. R. Faulkner	Dec. 1939 - May 1940	2 blks. NE	"	" "
Avn. & Meteorol. Dept.	Sep. 1954 - July 1956	2.5 NNE ~~2.8 mi. WNW~~	4686	" "
Avn. & Meteorol. Dept.	Aug. 1956 -	2.5 NE ~~3.0 mi. NW~~	4664	" "

The weather records summarized in this publication were made available through the commendable esprit de corps and interest of the above listed observers and organizations.

Relative humidity readings have not been obtained from Fort Huachuca. The values given in the Climatological Summary Table were estimated by a method devised at the Institute of Atmospheric Physics.

Sep 1, 54 - 1-Feb-55
1, 55

This climatological summary has been made possible by a cooperative agreement between the University of Arizona and the United States Weather Bureau. Under the terms of this agreement the Institute of Atmospheric Physics of the University of Arizona has put on IBM punched cards all available daily weather data for the years prior to 1948 for over 100 observation stations in Arizona. In turn, the Weather Bureau has reproduced for the Institute, without charge, cards containing similar, but more recent, information which it has routinely punched since 1948. From these daily cards the Institute has produced, for all stations, summary cards which contain average weather data for each five-day period and each month of record. All of these decks of IBM punched cards are available for research work on request.

Copies of this climatological summary can be obtained from the Institute of Atmospheric Physics, University of Arizona, Tucson 25, Arizona.

USF200001950

CLIMATOLOGICAL SUMMARY FY 73

DATE	TEMPERATURE MAX	MIN	PRECIP "	DEGREE DAYS 70°	65°	50°	AVG MEAN TEMP
JUL 72	97	61	4.47	0	0	0	78.7
AUG	96	59	2.65	0	0	0	75.0
SEP	90	49	1.10	32	1	0	70.1
OCT	87	36	2.71	299	196	28	60.8
NOV	73	26	.92*	627	477	71	49.1
DEC	70	23	.33	740	586	153	46.1
JAN 73	68	23	.47	820	669	213	43.5
FEB	78	29	2.42	613	433	75	49.5
MAR	76	31	1.46	651	486	76	49.3
APR	88	30	.00	373	227	25	57.9
MAY	94	38	.00	70	24	0	69.5
JUN	105	51	.17	9	0	0	75.0
TOTAL			16.70	4234	3099	640	AVG 60.4

* .22 snow - 12 Nov.

FY 74

JUL 73	101	59	2.97	0	0	0	78.7
AUG	99	54	.55	0	0	0	78.4
SEP	98	49	.99	22	4	0	72.7
OCT	87	40	.00	188	64	0	63.9
NOV	89	29	.38	410	285	61	56.4
DEC	74	26	.00	641	486	89	49.3
JAN 74	74	28	.75	682	527	115	48.0
FEB	74	21	-	613	473	85	48.1
MAR	79	28	T	437	282	24	55.9
APR	84	37	T	278	143	0	61.2
MAY	96	42	.05	38	8	0	71.0
JUN	101	60	.05	0	0	0	81.5
TOTAL			5.74	3309	2272	374	63.8 AVG

USF200001951

CLIMATOLOGICAL SUMMARY FY 75

DATE	TEMPERATURE MAX	MIN	PRECIP"	DEGREE DAYS 70°	65°	50°	AVG MEAN TEMP	
JUL 74	95	62	7.12	0	0	0	76.7	
AUG	92	58	2.57	0	0	0	75.2	
SEP	94	52	3.74	65	7	0	70.7	
OCT	84	36	3.08	244	135	13	62.4	
NOV	77	32	T	458	304	9	54.9	
DEC	68	21	0.35	741	586	146	46.1	
JAN 75	76	26	.47	625	470	93	49.8	
FEB	74	24	T	776	441	77	49.3	
MAR	75	30	.71	572	442	109	50.3	
APR	79	44	.30	477	337	57	53.8	
MAY	87	31	0	169	72	0	65.2	
JUN	98	57	0	0	0	0	76.3	
TOTAL			18.07	4127	2794	504	60.8	AVG
				FY 76				
JUL 75	95	64	3.52	0	0	0	77.1	
AUG	99	61	.45	0	0	0	79.3	
SEP	88	53	3.04	43	6	0	70.6	
OCT	85	43	.02	204	86	0	63.5	
NOV	79	30	.75	425	280	34	55.3	
DEC	72	31	.15	662	534	78	48.5	
JAN 76	67	19	.26	757	607	158	45.4	
FEB	76	32	.94	503	362	29	52.5	
MAR	77	27	.20	515	360	53	53.4	
APR	80	26	.26	337	195	34	58.8	
MAY	89	41	.22	94	68	-	68.1	
JUN	98	54	.14	2	0	0	75.6	
TOTAL			9.95	3512	2498	386	62.3	AVG

USF200001952

CLIMATOLOGICAL SUMMARY FY 7T

DATE	MAX	MIN	PRECIP "	70°	65°	50°	AVG MEAN TEMP
JUL 76	96	60	6.27	11	0	0	74.0
AUG	97	61	1.94	0	0	0	74.6
SEP	86	74	1.07	23	0	0	66.0
TOTAL			9.28	34			71.5
				FY 77			
OCT 76	79	19	.70	333	173	30	59.2
NOV	74	22	.60	544	394	66	51.9
DEC	67	28	.50	749	594	134	45.8
JAN 77	68	22	1.23	766	611	151	45.7
FEB	76	28	0	512	372	50	50.9
MAR	74	28	.20	664	509	97	49.0
APR	84	30	.07	302	213	34	60.1
MAY	95	40	.02	171	58	-	65.0
JUN	97	54	.07	21	0	0	76.8
JUL	95	63	3.47	3	0	0	77.0
AUG	96	62	2.83	0	0	0	77.3
SEP	91	58	2.35	1	0	0	73.8
TOTAL			12.04	4,066	2,924	562	61.04 AVG

USF200001953

CLIMATOLOGICAL SUMMARY FY 77

DATE	MAX	MIN	INCHES PRECIP	70°	65°	50°	AVG MEAN TEMP
OCT 76	79	19	.70	333	173	30	57.21
NOV	74	22	.60	544	394	66	51.9
DEC	67	28	.50	749	594	134	45.8
JAN 77	68	22	1.23	766	611	151	45.7
FEB	76	28	0	512	372	50	50.9
MAR	74	28	0.20	664	[illegible]	97	49.[illegible]
APR	84	30	0.07	[illegible]	[illegible]	[illegible]	60.1
MAY	95	40	0.02	171	58	—	65.[illegible]
JUN	[illegible]	54	.07	[illegible]	[illegible]	[illegible]	76.8
JUL	95	63	3.47	3	0	[illegible]	77.0
AUG	96	62	2.83	[illegible]	[illegible]	[illegible]	77.3
SEP	91	58	2.35	1	0	[illegible]	73.8
TOTAL			12.04	4,06[illegible]	2,9[illegible]	5[illegible]	61.04

CLIMATOLOGICAL SUMMARY
FY 78

DATE	MAX	MIN	INCHES PRECIP	70°	65°	50°	AVG MEAN TEMP
OCT 77	89	44	5.65	162	48	—	65.16
NOV	80	35	.18	417	268	12	56.1
DEC	71	34	.55	554	387	29	52.5
JAN 78	68	22	1.23	804	609	133	45.3
FEB	69	25	1.48	630	498	116	47.2
MAR	67	45	0.00	424	272	24	56.3
APR	73	47	0.00	304	163	16	59.9
MAY	80	54	0.00	132	55	2	67.3
JUN	100	56	.43	0	0	0	80.2
JUL							
AUG							
SEP							
TOTAL							

USF200001954

MEASURED FLOWS IN

HUACHUCA CANYON, ARIZONA

USF200001955

TABLE 5.—*Discharge measurements, in gallons per minute, In Huachuca and Garden Canyons* *

[Measurements are rounded to three significant figures except those less than 10 gpm, which are rounded to the nearest one-tenth gallon per minute. Totals are similarly rounded]

Date	Huachuca Canyon				Garden Canyon				
	Measured discharge (gpm)				Measured discharge (gpm)				
	Pipe 2	Pipe 3	Weir	Total	At gaging station	Spring 1	Spring 2	Upper pipe	Spring total
1959									
Oct. 21–22	18.4	13.5	2.2	34.1	269	----------	108	----------	----------
Nov. 3–4	18.4	13.9	0	32.3	287	102	96.0	57.0	255
Dec. 1–2	17.5	22.9	0	40.4	431	139	164	52.1	355
Dec. 15–16	19.3	21.5	0	40.8	377	173	171	58.8	403
1960									
Jan. 4–5	21.1	25.6	17.1	63.8	1,240	480	[1] 289	92.0	870
Jan. 20	28.3	72.3	435	536	4,670	534	[1] 1,180	95.6	1,810
Feb. 2	30.5	79.0	395	504	3,760	557	[1] 1,130	95.6	1,780
Feb. 16	31.4	76.3	242	350	2,170	476	186	98.7	761
Mar. 1–2	31.4	67.3	148	247	1,520	426	[1] 220	98.7	744
Mar. 16–17	30.1	49.4	89.8	169	2,110	467	[1] 618	99.6	1,185
Mar. 31	28.3	44.4	71.8	144	1,160	395	[1] 449	89.8	934
Apr. 19–20	26.9	35.9	45.0	108	794	224	[1] 225	67.3	516
Apr. 28	25.6	31.4	36.8	93.8	368	130	180	61.0	371
May 5	----------	----------	31.4	----------	449	----------	----------	----------	----------
May 18–19	23.8	23.8	19.7	67.3	350	176	118	48.0	342
June 1	22.4	20.2	10.3	52.9	189	126	98.7	36.8	262
June 15–16	20.2	17.5	.7	38.4	112	117	80.8	30.1	228
June 30	18.4	14.8	0	33.2	79.4	97.4	71.4	22.4	191
July 21	20.8	14.2	.1	35.1	93.7	100	62.5	12.3	175
Aug. 2	19.7	13.9	0	33.6	85.3	85.3	53.9	10.8	150
Aug. 31	18.8	18.0	30.1	66.9	----------	----------	----------	----------	----------
Sept. 1	----------	----------	----------	----------	269	112	80.8	2.9	196
Oct. 4	19.8	15.3	47.6	82.7	166	105	79.4	2.7	187
Oct. 31	19.3	12.1	13.9	45.3	76.3	74.9	59.7	1.4	136
Dec. 2	18.0	10.8	2.7	31.5	89.3	73.6	45.3	2.7	122
1961									
Jan. 10	23.3	12.1	7.2	42.6	121	69.6	43.5	33.2	146
Feb. 1	17.5	10.8	8.5	36.8	110	84.4	56.6	39.9	181
Mar. 2	29.6	13.0	9.0	51.6	67.3	69.1	42.2	29.2	140
Apr. 3–4	29.3	12.1	4.2	44.6	43.5	64.2	39.0	23.8	127
May 2	15.3	10.8	1.9	28.0	17.5	54.2	34.9	18.4	108
June 5	14.8	8.5	0	23.3	1.9	40.4	29.6	13.5	83.5
July 5	13.8	8.0	0	21.8	0	42.1	28.9	11.9	82.9
Aug. 10	12.5	8.2	0	20.7	0	67.8	28.9	9.3	106
Oct. 3	7.7	33.8	80.0	122	108	87.1	65.1	14.4	168
Oct. 31	3.0	18.4	22.4	43.8	197	148	130	19.3	297
Dec. 8	.4	27.4	43.1	70.9	117	----------	----------	----------	----------
Dec. 14	----------	----------	----------	----------	----------	458	[1] 246	4.5	686
1962									
Jan. 12	1.4	73.2	165	240	408	359	[1] 245	0	604
Jan. 29	1.1	79.4	548	628	3,180	642	186	2.3	830
Mar. 6	----------	----------	----------	----------	1,280	370	[1] 400	5.5	776
Mar. 8	.1	67.3	184	251	----------	----------	----------	----------	----------
Apr. 27	0	56.1	109	165	875	361	[1] 383	5.8	750
June 13	0	21.5	29.6	51.1	224	130	101	2.2	233
July 25	0	16.6	9.9	26.5	54.7	87.1	68.2	26.5	182
Aug. 23	----------	----------	10.8	----------	188	----------	----------	----------	----------
Sept. 26	0	18.4	10.0	28.4	94.2	89.3	65.8	0	155
Nov. 9	16.5	18.2	5.6	40.3	37.1	55.6	43.7	0	99.3
1963									
Jan. 8	14.4	18.8	10.8	44.0	130	94.2	76.3	3.1	174
Feb. 11	13.9	22.2	20.2	56.3	83.9	134	75.4	----------	----------
Mar. 29	11.7	24.2	14.4	50.3	59.7	112	67.3	----------	----------
May 10	11.7	20.6	5.4	37.7	23.3	65.5	47.1	8.5	121
June 11	10.8	15.3	.4	26.5	0	39.5	35.5	7.2	82.2

* Copied from WSP 1819-D (Brown, 1966)

USF200001956

WATER PRODUCTION FY 71 - M GALS

DATE	WELLS	* H CANYON	* G CANYON	TOTAL CANY	TOTAL PROD	DAILY AVG PROD
JUL 70	99,731				99,731	3,217
AUG	77,656				77,656	2,505
SEP	79,327	1,433	7,074	8,507	87,834	2,928
OCT	67,073	3,961	9,216	13,177	80,250	2,589
NOV	60,775	3,304	6,028	9,332	70,107	2,337
DEC	48,066	2,973	5,426	8,399	56,465	1,822
JAN 71	50,157	1,958	5,544	7,502	57,659	1,860
FEB	50,798	2,575	4,852	7,427	58,225	2,080
MAR	92,909	2,414	5,236	7,650	100,559	3,244
APR	83,860	1,472	4,124	5,596	89,456	2,982
MAY	117,417	1,866	3,509	5,375	122,792	4,093
JUN	131,222	764	1,426	2,190	133,412	4,447
TOTAL	958,991	22,720	52,435	75,155	1,034,146	34,104
MAX	131,222	3,961	9,216	13,177	133,412	4,447
MIN	48,066	764	1,426	2,190	56,465	1,822
AVG	79,916	2,272	5,244	7,516	86,179	2,842

* Canyon reclamation system put into effect. Huachuca Canyon 23 Sep 70 and Garden Canyon 14 Sep 70.

USF200001957

WATER PRODUCTION FY 72 - M GALS

DATE	WELLS	H CANYON	G CANYON	TOTAL CANY	TOTAL PROD	DAILY AVG PROD
JUL 71	84,687	789	2501	3290	87,977	2838
AUG	70,701	43	1989	2032	72,733	2346
SEP	94,195	3375	2023	5398	99,593	3320
OCT	65,613	4958	* 0	4958	70,571	2276
NOV	60,841	4709	0	4709	65,550	2185
DEC	51,768	4076	0	4076	55,844	1801
JAN 72	56,754	4307	0	4307	61,061	1970
FEB	66,323	6988	0	6988	73,311	2528
MAR	96,649	3502	267	3769	100,418	3239
APR	94,634	2001	1647	3648	98,282	3276
MAY	127,534	1610	0	1610	129,144	4166
JUN	110,341	898	35	933	111,274	3709
TOTAL	980,040	37,256	8,462	45,718	1,025,758	33,654
MAX	127,534	6,988	2,501	6,988	129,144	4,166
MIN	51,768	43	0	933	55,844	1,801
AVG	81,670	3,105	705	3,810	85,480	2,805

*Garden Canyon line washed out.

USF200001958

WATER PRODUCTION FY 73 - M GALS

DATE	WELLS	H CANYON	G CANYON	TOTAL CANY	TOTAL PROD	DAILY AVG PROD
JUL 72	103,836	669	2,403	3,072	106,908	3,449
AUG	82,802	620	1,252	1,872	84,674	2,731
SEP	63,624	524	2,098	2,622	66,246	2,208
OCT	61,712	654	3,041	3,695	65,407	2,110
NOV	44,809	1,965	5,630	7,595	52,404	1,747
DEC	46,915	1,477	5,659	7,136	54,051	1,744
JAN 73	40,878	2,165	11,740	13,905	54,783	1,767
FEB	35,847	2,049	19,784	21,833	57,680	2,060
MAR	25,765	7,045	30,944	37,989	63,754	2,057
APR	31,916	9,182	28,990	38,172	70,088	2,336
MAY	63,079	7,576	26,284	33,860	96,939	3,127
JUN	111,026	5,188	17,027	22,215	133,241	4,441
TOTAL	712,209	39,114	154,852	193,966	906,175	29,777
MAX	111,026	9,182	30,944	38,172	133,241	4,441
MIN	25,765	620	1,252	1,872	52,404	1,744
AVG	59,351	3,260	12,904	16,164	75,515	2,481

USF200001959

WATER PRODUCTION FY 74 - M GALS

DATE	WELLS	H CANYON	G CANYON	TOTAL CANY	TOTAL PROD	DAILY AVG PROD
JUL 73	91,987	3,150	11,814	14,964	106,951	3,450
AUG	95,206	2,584	11,555	14,139	109,345	3,527
SEP	102,617	1,462	5,792	7,254	109,871	3,662
OCT	91,362	1,384	3,871	5,255	96,617	3,117
NOV	66,538	1,495	3,620	5,115	71,653	2,388
DEC	47,209	1,680	4,881	6,561	53,770	1,735
JAN 74	44,266	1,999	6,389	8,388	52,654	1,699
FEB	46,366	2,164	4,537	6,701	53,067	1,895
MAR	79,108	1,403	5,586	6,989	86,097	2,777
APR	96,404	1,770	4,277	6,047	102,451	3,415
MAY	116,975	1,506	3,048	4,554	121,529	3,920
JUN	125,247	950	1,668	2,618	127,865	4,262
TOTAL	1,003,285	21,547	67,038	88,585	1,091,870	35,247
MAX	125,247	3,150	11,814	14,964	127,865	4,262
MIN	44,266	950	1,668	2,618	52,654	1,699
AVG	83, 607	1,796	5,587	7,382	90,989	2,987

USF200001960

WATER PRODUCTION FY 75 - K GALS

DATE	WELLS	H. CANYON	G. CANYON	TOTAL	TOTAL PROD.	DAILY AVERAGE
July 74	74,515	712	6,961	7,673	82,188	2,651
Aug.	67,987	2,173	16,330	18,503	86,490	2,790
Sept.	53,926	1,523	8,637	10,160	64,086	2,136
Oct.	50,056	960	6,147	7,107	57,163	1,844
Nov.	41,371	1,922	8,669	10,591	51,962	1,732
Dec.	41,636	1,665	6,233	7,898	49,534	1,598
Jan. 75	42,776	1,560	7,422	8,982	51,758	1,670
Feb.	39,071	1,416	13,038	14,454	53,525	1,912
Mar.	61,330	1,441	6,953	8,394	69,724	2,249
Apr.	53,811	1,968	19,435	21,403	75,214	2,507
*May	85,315	2,219	12,299	14,518	99,833	3,220
Jun.	98,670	993	5,126	6,119	104,789	3,492
TOTAL	710,464	18,552	117,250	135,802	846,266	27,801
MAX.	98,670	2,219	19,435	21,403	104,789	3,492
MIN.	39,071	712	5,126	6,119	49,534	1,586
AVG.	59,205	1,546	9,771	11,317	70,522	2,316

*Well #1 out of service, 13 May 75

Back into production 29 Aug 75. Unsatisfactory so off again from 12 Sep to 7 Oct 75.

USF200001961

WATER PRODUCTION FY 76 - K GALS

DATE	WELLS	H CANYON	G CANYON	TOTAL CANY	TOTAL PROD	DAILY AVG PROD
JUL 75	68,092	598	9,833	10,431	78,523	2,533
AUG	86,060	502	8,135	8,637	94,697	3,055
SEP	61,501	3,222	7,653	10,875	72,376	2,413
OCT	63,080	1,785	5,038	6,823	69,903	2,255
NOV	48,484	847	1,645	*2,492	50,976	1,699
DEC	40,095	736	4,445	5,181	45,276	1,460
JAN 76	46,373	979	1,666	*2,645	49,018	1,581
FEB	34,297	1,554	18,140	19,694	53,991	1,861
MAR	64,770	1,993	12,830	14,823	79,593	2,567
APR	73,633	1,505	8,028	9,533	83,166	2,772
MAY	97,725	1,558	4,506	6,064	103,789	3,348
JUN	116,915	2,050	1,060	3,110	120,025	4,001
TOTAL	801,025	17,329	82,979	100,308	901,333	29,545
MAX.	116,915	3,222	18,140	19,694	120,025	4,001
MIN.	34,297	502	1,060	2,492	45,276	1,460
AVG.	66,752	1,444	6,915	8,359	75,111	2,462

*Garden Canyon diverted to Golf Course Pond 1 - 17 Nov.
*Garden Canyon diverted to Golf Course Pond 8 - 26 Jan.
Well #1 bearing out 15 Apr 76 - Back on line 4 May.
Water line leak put Garden Canyon line out of production 13 May 76.

USF200001962

WATER PRODUCTION FY 7T - K GALS

DATE	WELLS	H CANYON	G CANYON	TOTAL CANY	TOTAL PROD	DAILY AVG PROD
JUL 76	80,828	865	1,703	2,568	83,396	2,690
AUG	79,981	2,336	4,714	7,050	87,031	2,807
SEP	59,751	2,156	7,593	9,749	69,500	2,317
TOTAL	220,560	5,357	14,010	19,367	239,927	7,814
MAX.	80,828	2,336	7,593	9,749	87,031	2,807
MIN.	59,751	865	1,703	2,568	69,500	2,317
AVG.	73,520	1,786	4,670	6,456	79,976	2,605

USF200001963

WATER PRODUCTION FY 77 - K GALS

DATE	WELLS	H CANYON	G CANYON	TOTAL CANY	TOTAL PROD	DAILY AVG PROD
OCT 76	49,025	1,417	4,549	5,966	54,991	1,774
NOV	45,279	1,110	1,778	2,888	48,167	1,606
DEC	45,785	1,395	2,254	3,649	49,434	1,595
JAN 77	43,966	1,532	4,518	6,050	50,016	1,613
FEB	49,154	1,443	6,115	7,558	56,712	2,025
MAR	47,574	1,456	3,591	5,047	52,621	1,697
APR	45,503	1,147	--	1,147	46,650	1,555
MAY	58,884	1,116	--	1,116	60,000	1,935
JUN	74,357	862	318	1,180	75,537	2,518
JUL	69,894	805	480	1,285	71,179	2,296
AUG	63,314	2,460	709	3,169	66,483	2,135
SEP	61,640	2,045	--	2,045	63,685	2,123
TOTAL	654,375	16,788	24,312	41,100	695,475	22,872
MAX.	74,357	2,460	6,115	7,558	75,537	2,518
MIN.	43,966	805	318	1,116	46,650	1,555
AVG.	54,531	1,399	2,026	3,425	57,956	1,906

USF200001964

WATER PRODUCTION

DATE	WELLS	H. CANYON	G. CANYON	TOTAL CANYON	TOTAL PROD.	DAILY AVG.
OCT 77	54,495	—			54,495	[illegible]
NOV	52,152				52,152	1738
DEC	48,099				48,099	1552
JAN 78	37,295	2,635	4,772	7,407	44,702	1,442
FEB	32,192	2685	5486	8171	38,772	1,385
MAR	54,223	—	903	903	55,126	1,778
APR	53,825	—	7397	7397	61,222	2,041
MAY	63,876	—	6837	6837	70,713	2,2[illegible]
JUN	86,822	1158	2889	4047	90,869	3,029
JUL						
AUG						
SEP						
TOTAL						
MAX						
MIN						
AVG						

USF200001965

2182020 OPERATION AND MAINTENANCE, ARMY, 1978—Continued

Section XII. BASE OPERATIONS—Z ACCOUNTS—Continued

(Codes .A0000–.R0000)

Code	Activity and performance factor definitions	Prior code
.H0000	BACHELOR HOUSING FURNISHINGS, SUPPORT Provides for the purchase, control, moving, handling, and maintenance and repair of bachelor housing furnishings. Categories of bachelor housing include: bachelor officer quarters, bachelor enlisted quarters (troop barracks and BEQ), bachelor civilian dormitories, bachelor visitors' quarters, and those bachelor guest houses financed by OMA. Excludes reception stations, processing centers, disciplinary barracks, and confinement facilities. PF: None.	
.H1000	*Initial Issue of Bachelor Quarters Furnishings* Includes the cost of furnishings purchased as part of the initial outfitting of newly acquired bachelor housing spaces and for augmentation up to authorized complement. Also includes cost of new items added to the appropriate Table of Allowances. Excludes cost of items provided by construction funds (MCA). PF: Number of spaces furnished.	
.H2000	*Replacement Issue of Bachelor Quarters Furnishings* Includes cost of replacement of furnishings in the existing inventory. PF: Replacement value of furnishings in the inventory, in thousands of dollars.	
.H3000	*Control, Moving, and Handling of Bachelor Housings Furnishings* Provides for contractual costs of moving and handling of Government-owned bachelor furnishings into and out of bachelor housing; and contractual costs of connection and disconnection of equipment. Includes cost of Government-owned specialized equipment for handling furnishings. Contractual moving and handling costs incident to repair should be charged to .H4000. Costs of in-house personnel should be charged to .N5000. PF: None.	
.H4000	*Maintenance and Repair of Bachelor Housing Furnishings* Includes the contractual cost of repair, refinishing, rebuilding, reupholstering, cleaning, and sterilization. PF: None.	
.HV999	*Base Closures/Reduction-in-Force Actions* This account will reflect the one-time costs attributable to base closures or reduction-in-force (RIF) actions identifiable to Bachelor Housing Furnishings Support. Includes cost of severance pay, terminal leave, and related nonproductive expenses of employees affected by base closures or RIF actions. Also includes other incidental cost associated with base closures/reductions which are directly related to closing or reducing activities within the .H series. PF: None.	
.J0000	OPERATION OF UTILITIES Expenses for procurement or production and distribution of utilities except communications. Includes expenses for purchased electrical energy; operation of electric generating plants and distribution systems; purchased steam and hot water; operation of heating plants and distribution system, including fuels; purchased water; operation of waterplants and systems and sewage and waste systems; operation of air-conditioning and refrigeration plants; other purchased utilities and related administration. PF: (1) Population Served—Resident. The average number of personnel (military and civilian personnel, including dependents) residing on the installation or on satellite installations or	

USF200001966

Code	Activity and performance factor definitions	Prior code
	facilities (including offpost leased housing) receiving support from the installation, plus patients in hospitals and personnel in confinement facilities. Includes personnel residing on post on active duty for training or undergoing annual field or summer camp training. For personnel in such training modify the resident strength figure incorporated as end-of-month (EOM) strength in accordance with ratio of days present to day in month. (Ref. TB ENG 259.) Report active and inactive installations separately.	
	(2) Population Served—Nonresident: The average number of personnel (military and civilian) regularly employed or officially assigned to the installation who live off the installation (except in offpost leased housing) plus personnel attending drill at Army Reserve Centers (both on and offpost Centers) receiving support from the installation. Average nonresident population served attending drills at Reserve Centers will be computed on basis of 1/3 of the attendance per drill times the number of drills during the report period divided by the total days in report period. (Ref. TB ENG 259). See last sentence (1) above.	
	Except for specific adjustments described above, use end-of-month (EOM) strengths for computing average number of personnel. If the report period is 1 month, use the EOM strength as the average. If the report period is 2 or more months, use the average of the EOM figures.	
	(3) and (4). Facilities Engineer Work Force Man-years. Report separately for both active and inactive facilities, military (Element of Expense 1400), US civilians (EOE 11X0), and other civilians (EOE 1600 and 28##), expressed in whole man-years.	
.J1000	*Water Service*	
	Provides for purchased water and operation of water treatment plants, including pumping at treatment and at source pumping plants.	
	PF: Gallons. The total quantity of water produced by the installation plus purchased water. Express in units of 1,000 gallons.	
.J1100	*Purchased Water*	
	Provides for all purchased water, including the purchase coast and associated costs of operation, such as pumping, storage, and chemical treatment subsequent to purchase and delivery to the installation.	
	PF: Gallons: The total quantity of water purchased under utility contracts. Express in units of 1,000 (K) gallons.	
.J1200	*Filtered Water*	
	Provides for the operation of water treatment and filtration plants, including associated pumping operations, impounding reservoirs, and all other equipment and appurtenances used in the production of and distribution of filtered water, to include source and distribution.	
	PF: Gallons: The total quantity of water produced by the plant(s) during the report period. Express in units of 1,000 (K) gallons.	

USF200001967

Section XII. BASE OPERATIONS—Z ACCOUNTS—Continued

(Codes .A0000–.R0000)

Code	Activity and performance factor definitions	Prior code
.J1300	*Unfiltered Water* Provides for the production and distribution of water which requires no treatment other than chlorination and/or threshold treatment. Includes operation of wells, cisterns, springs, chlorinators, chemical feeders, etc., located in pumping plants and other required equipment and appurtenances. PF: Gallons. The total quantity of unfiltered water produced by the units. Express in units of 1,000 (K) gallons.	
.J2000	*Sewage Services* Provides for all purchased sewage disposal, and operation of sanitary sewage and industrial waste pumping plants and treatment plants. PF: Gallons: The total quantity of sewage and industrial waste treated and/or untreated (if not metered, estimate quantity equal to 70 percent of total water used) disposed of by the installation during the report period. Express in units of 1,000 (K) gallons.	
.J2100	*Purchased Sewage Disposal* Provides for all purchased sewage and/or industrial waste disposal, including the contract cost and associated costs of operation, such as pumping, chlorination, and any other costs incurred in delivering the sewage and/or industrial wastes to the point of delivery. PF: Gallons: The total quantity of sewage and/or industrial waste disposed of under contract (including disposal at no charge) during the report period. Express in units of 1,000 (K) gallons.	
.J2200	*Treated Domestic Sewage* Provides for operation of sanitary sewage pumping stations and treatment plants which provide primary, secondary or tertiary sewage treatment and for operation of septic tanks, oxidation ponds and sewage lagoons. Included will be quantities of industrial wastes discharged to the (domestic) sanitary sewage collection and treatment system, exclusive of quantities reported in .J2300. PF: Gallons: The total quantity of domestic sewage treated. Express in units of 1,000 (K) gallons.	
.J2210	*Primary Plant Operation* Provides for operation of primary domestic sewage treatment facilities. This treatment consists essentially of primary settling to remove a high percentage of the suspended solids, followed by sludge digestion. Provides for operation of pumping stations associated with a primary treatment system both at the plant and at locations on the collection system remote from the plant. Includes operation of pumps, motors, auxiliary engines, control equipment, chlorinators, trash racks, and other equipment in connection with primary sewage treatment. PF: Gallons: The total quantity of sanitary sewage afforded primary treatment. Express in units of 1,000 (K) gallons.	
.J2220	*Secondary Plant Operation* Provides for operation of secondary domestic sewage treatment facilities. This treatment consists of wet-burning process or other treatment following primary treatment; namely, filtration, contact aeration, or activated sludge followed by sec-	

USF200001968

Code	Activity and performance factor definitions	Prior code
	ondary settling. Also includes operations of septic tanks, oxidation ponds, and sewage lagoons. Provides for the operation of pumping stations associated with a secondary treatment system both at the plant and at locations on the collection system remote from the plant. Includes operation of pumps, motors, auxiliary engines, control equipment, comminutors, chlorinators, trash racks, and other equipment in connection with secondary sewage treatment.	
	PF: Gallons: The total quantity of sanitary sewage afforded secondary treatment. Express in units of 1,000 (K) gallons.	
.J2230	*Tertiary Plant Operation*	
	Provides tertiary or advanced wastewater treatment in the form of a polishing filter, carbon column, or other process following secondary treatment. Purpose is to remove additional solids, phosphates, and/or nitrates. Provides for the operation of pumping stations both at the plant and at locations on the collection system from the plant.	
	PF: Gallons: The total quantity of sanitary sewage afforded tertiary or advanced treatment. Express in units of 1,000 (K) gallons.	
	Note: If the total capacity of a sewage treatment plant includes primary, secondary and tertiary treatment, all reporting will be applied to tertiary plants. The same will apply to secondary plants i.e. the highest degree of treatment will govern.	
.J2300	*Industrial Waste Treatment Facilities*	
	Provides for the operation of industrial wastewater treatment plants, pumping stations and collection systems where wastewater (including cooling water) is treated in an industrial waste treatment facility.	
	PF: Gallons: The total quantity of industrial wastewater including cooling water wastes disposed. Express in units of 1,000 (K) gallons.	
.J2400	*Untreated Industrial Wastes and/or Cooling Water*	
	Provides for the operation of industrial wastewater pumping stations and collection systems where wastewater (including cooling water) is not treated.	
	PF: Gallons: The total quantity of industrial wastewater, including cooling water, that is not treated. Express in units of 1,000 (K) gallons.	
.J3000	*Electric Service*	
	Provides operation of main electric generating plants and for purchased electric energy (contract or from another Government agency). Excludes auxiliary generators, portable generators, frequency changers, electric motor-driven generator sets and rectifiers, unless installed as generating plant accessory equipment (see .K1900).	
	PF: Megawatt Hours: The total electric energy consumed by the installation. Express in units of megawatt hours (MWH).	
.J3100	*Purchased Electric Energy*	
	Provides for all purchased electric energy.	
	PF: Megawatt Hour: The electric energy purchased during the report period. Express in units of megawatt hours (MWH).	

USF200001969

Section XII. BASE OPERATIONS—Z ACCOUNTS—Continued

(Codes .A0000–.R0000)

Code	Activity and performance factor definitions	Prior code
.J3200	*Electric Generating Plant Operation* Provides for the operation, including fuel, of main electric generating plants designed to supply all or a substantial part of the electric energy. PF: (1) Standard tons of fuel—The number of standard tons of fuel issued for use during the report period. Standard tons are computed by multiplying the BTU contents of the fuel used (determined for each type and grade) by the amount issued, and dividing the product by 25,000,000 as illustrated by the following examples: *a. Fuel or diesel oil used* BTU content of 1 gallon of fuel oil being issued = 150,000. Gallons of fuel oil issued = 25,000. Standard tons of fuel issued: (25,000 times 150,000) divided by 25,000,000 = 150. *b. Gas used.* BTU content of 1 cubic foot of gas being issued = 975. Cubic feet of gas issued = 1,564,000. Standard tons of fuel issued: (1,564,000 times 975) divided by 25,000,000 = 61. *c. Coal used.* BTU content of 1 pound of coal being issued = 13,000. Tons of coal issued = 250. Standard tons of fuel issued: (250 times 2,000 times 13,000) divided by 25,000,000 = 260. *d. Gasoline used.* BTU content of 1 gallon of gasoline being issued = 125,000. Gallons of gasoline = 5,000. Standard tons of fuel issued: (5,000 times 125,000) divided by 25,000,000 = 25. (2) Megawatt Hours—The total electric energy produced by electric generating plants during the report period, expressed in units of megawatt hours (MWH). (3) Man-Days—The total man-days expended in operating the generating plant during the report period.	
.J4000	*Boiler and Heating Plants* Provides for the operation of boiler plants, high pressure, and heating plants, and systems of all types and capacities; purchased steam and hot water and coal storage and handling. PF: None.	
.J4100	*Operation of Boiler Plants, High Pressure, Over 3,500,000 BTU Capacity* Operate high pressure boiler plants of over 3,500,000 BTU per hour capacity for the production of steam and/or high temperature hot water (for capacity determination see .K1410). Excludes costs of electricity and water consumed. PF: (1) BTU Produced—The total number of British thermal units (BTU) on an equivalent basis produced by these boiler plants during the report period, expressed in units of 1,000,000 BTU (M BTU). BTU equivalents will be computed from metered readings whenever possible in accordance with the following examples:	

Section XII. BASE OPERATIONS—Z ACCOUNTS—Continued

(Codes .A0000–.R0000)

Code	Activity and performance factor definitions	Prior code
	a. Steam flow meter reading. 5,435,000 pounds produced by boilers. (1.0 pound steam = 1,075 BTU) 5,435,000 times 1,075 divided by 1,000,000 = 5,843 Mega BTU units of performance.	
	b. Boiler feedwater meter reading. (1.0 pound of water = 0.97 pound of steam. (0.03 = allowance for blowdown); 1.0 pound of steam = 1,075 BTU; 1 gallon water = 8.3 pounds of water; 1 cubic foot of water = 62.4 pounds of water.)	
	1. Reading in gallons. 1,375,400 gallons of feedwater fed to boilers. (1,375,400 times 8.3 times 0.97 times 1,075) divided by 1,000,000 = 11,904 Mega BTU units of performance.	
	2. Reading in pounds. 556,000 pounds of feedwater fed to boilers. (556,000 times 0.97 times 1,075) divided by 1,000,000 = 580 Mega BTU units of performance.	
	3. Reading in cubic feet. 12,535 cubic feet of feedwater fed to boilers. (12,535 times 62.4 times 0.97 times 1,075) divided by 1,000,000 = 810 Mega BTU units of performance.	
	c. BTU meter reading. 5,405,000,000 BTU produced by boilers. 5,405,000,000 divided by 1,000,000 = 5,405 Mega BTU units of performance.	
	d. Fuel used for estimate. (BTU content for 1 pound coal (as received), 13,000; for 1 gallon of fuel oil, 150,000; for 1 cubic foot of gas, 975. 1 ton = 2,000 pounds. 1 pound of standard fuel = 12,500 BTU. 1 pound of standard fuel = 8.0 pounds of steam produced. 1 pound of steam = 1,075 BTU produced.)	
	1. Coal being used. Tons of coal used = 125 (125 times 2,000 times 13,000 times 8.0 times 1,075) divided by (12,500 times 1,000,000) = 2,236 Mega BTU units of performance.	
	2. Fuel oil being used. Gallons of fuel oil used = 98,500. (98,500 times 150,000 times 8.0 times 1,075) divided by (12,500 times 1,000,000) = 10,165 Mega BTU units of performance.	
	3. Gas being used. Cubic feet of gas used = 1,800,000. (1,800,000 times 975 times 8.0 times 1,075) divided by (12,500 times 1,000,000) = 1,207 Mega BTU units of performance.	
	(2) Cubic Feet Heated Space—The total volume of space in buildings at the end of the report period which were heated during the heating season by these boiler plants expressed in units of 1,000 cubic feet (K cu ft).	
	(3) Standard Tons of Fuel—The number of standard tons of fuel issued to these boiler plants during the report period. (See J3200).	
	(4) Total Man-days—The total man-days, including applicable leave, expended in the operation of these boiler	

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Section XII. BASE OPERATIONS—Z ACCOUNTS—Continued

(Codes .A0000–.R0000)

Code	Activity and performance factor definitions	Prior code
	plants by local forces and contractors during the report period (8 hours per man-day). (5) Contract Man-days—Number of man-days for contract operations included in Total Man-days during the report period.	
.J4110	*Gas-Fired Plants* Operate gas-fired high-pressure boiler plants of over 3,500,000 BTU per hour capacity for the production of steam and/or high temperature hot water. PF: (1) BTU Produced. See .J4100. (2) Cubic Feet Heated Space. See .J4100. (3) Standard Tons of Fuel. See .J3200. (4) Total Man-Days. See .J4100. (5) Contract Man-Days. See .J4100.	
.J4120	*Oil-Fired Plants* Operate oil-fired, high-pressure boiler plants of over 3,500,000 BTU per hour capacity for the production of steam and/or high temperature hot water. PF: (1) BTU Produced. See .J4100. (2) Cubic Feet Heated Space. See .J4100. (3) Standard Tons of Fuel. See .J3200. (4) Total Man-Days. See .J4100. (5) Contract Man-Days. See .J4100.	
.J4130	*Coal-Fired Plants* Operate coal-fired, high-pressure boiler plants of over 3,500,000 BTU per hour capacity for the production of steam and/or high temperature hot water. Includes related coal handling. PF: (1) BTU Produced. See .J4100. (2) Cubic Feet Heated Space. See .J4100. (3) Standard Tons of Fuel. See .J3200. (4) Total Man-Days. See .J4100. (5) Contract Man-Days. See .J4100.	
.J4200	*Operation of Heating Plants, Over 3,500,000 BTU per Hour Capacity* Operate steam and hot water boilers (except high-pressure boilers over 3,500,000 BTU capacity), furnaces and direct fired unit heaters in plants over 3,500,000 BTU per hour capacity for production of steam, hot water, or hot air (for capacity determination see .K1410). Excludes cost of electricity and water consumed. PF: (1) BTU Produced. The total number of BTU on an equivalent basis produced by these heating plants during the report period, expressed in units of 1,000,000 BTU (M BTU). BTU equivalents will be computed from metered readings wherever possible or in accordance with the following examples based on totals of all fuel issued to the plant and building served. *a. Fuel used for estimate.* BTU content 1 pound coal (as received), 13,000; for 1 cubic foot of natural gas, 975; for 1 gallon of liquefied petroleum gas, 91,600; for 1 gallon of fuel oil, 150,000. *Note.* In computations use actual BTU content of fuel delivered to the installation. 1 ton = 2,000 pounds. Plant efficiency; hand-fired coal = .60, stoker-fired coal = .65, oil-fired = .70, gas-fired = .75. *b. Coal being used—hand-fired.*	

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Section XII. BASE OPERATIONS—Z ACCOUNTS—Continued

(Codes .A0000–.R0000)

Code	Activity and performance factor definitions	Prior code
	Tons of coal used = 100 (100 times 2,000 times 13,000 times 0.60) divided by 1,000,000 = 1,560 Mega BTU units of performance. *c. Coal being used—stoker-fired.* Tons of coal used = 80 (80 times 2,000 times 13,000 times 0.65) divided by 1,000,000 = 1,352 Mega BTU units of performance. *d. Oil being used.* Gallons of fuel oil used = 20,000 (20,000 times 150,000 times 0.70) divided by 1,000,000 = 2,100 Mega BTU units of performance. *e. Natural gas being used.* Cubic feet of gas used = 150,000 (150,000 times 975 times 0.75) divided by 1,000,000 = 110 Mega BTU units of performance. *f. Liquefied petroleum gas being used.* Gallon of LPG used = 1,800 (1,800 times 91,600 times 0.75) divided by 1,000,000 = 124 Mega BTU units of performance. (2) Cubic Feet Heated Space. See .J4100. (3) Standard Tons of Fuel. The number of standard tons of fuel issued to these heating plants during the report period (see .J3200). (4) Total Man-Days. See .J4100. (5) Contract Man-Days. See .J4100.	
.J4210	*Gas-Fired Plants* Operate gas-fired heating plants of over 3,500,000 BTU per hour capacity for the production of steam, hot water, and hot air. PF: (1) BTU Produced. See .J4200. (2) Cubic Feet Heated Space. See .J4100. (3) Standard Tons of Fuel. See .J3200. (4) Total Man-Days. See .J4100. (5) Contract Man-Days. See .J4100.	
.J4220	*Oil-Fired Plants* Operate oil-fired heating plants of over 3,500,000 BTU per hour capacity for the production of steam, hot water, and hot air. PF: (1) BTU Produced. See .J4200. (2) Cubic Feet Heated Space. See .J4100. (3) Standard Tons of Fuel. See .J3200. (4) Total Man-Days. See .J4100. (5) Contract Man-Days. See .J4100.	
.J4230	*Coal-Fired Plants* Operate coal-fired heating plants of over 3,500,000 BTU per hour capacity for the production of steam, hot water, and hot air. Includes related coal handling costs. PF: (1) BTU Produced. See .J4200. (2) Cubic Feet Heated Space. See .J4100. (3) Standard Tons of Fuel. See .J3200. (4) Total Man-Days. See .J4100. (5) Contract Man-Days. See .J4100.	
.J4300	*Operation of Heating Plants, 750,000 to 3,500,000 BTU per Hour Capacity.* Operate high pressure boilers, low pressure steam and hot water	

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Code	Activity and performance factor definitions	Prior code
	boilers, direct fired unit heaters, warm air furnaces, and domestic water heaters in plants with total output capacities of 750,000 to 3,500,000 BTU per hour (for capacity determination see .K1410), for production of steam, hot water and hot air. Excludes cost of electricity and water consumed. PF: (1) BTU Input: The total number of BTU on an equivalent basis input to these heating plants used to produce steam, hot water, and hot air during the report period, expressed in units 1,000,000 BTU (M BTU). Performance measure equivalents will be computed in accordance with the following examples based on total of all fuel issued to the plant and building served. *a. Fuel used for estimate.* BTU content for 1 pound coal (as received), 13,000; for 1 cubic foot of natural gas, 975; for 1 gallon of liquefied petroleum gas, 91,600; for 1 gallon of fuel oil, 150,000. *Note.* In computations used actual BTU content of fuel delivered to the installation, 1 ton = 2,000 pounds. *b. Coal being used—hand-fired.* Tons of coal used = 150 (150 times 2000, times 13,000) divided by 1,000,000 = 3,870 Mega BTU of performance. *c. Oil being used.* Gallons of fuel used = 30,000 (30,000 times 150,000) divided by 1,000,000 = 4,500 Mega BTU of performance. *d. Natural gas being used.* Cubic feet of gas used = 140,000 (140,000 times 975) divided by 1,000,000 = 137 Mega BTU of performance. *e. Liquefied petroleum gas being used.* Gallon of LPG used = 2,800 (2,800 times 91,600) divided by 1,000,000 = 256 Mega BTU of performance. (2) Cubic Feet Heated Space. See .J4100. (3) Standard Tons of Fuel—The number of standard tons of fuel issued to these heating plants during the report period (see .J3200). (4) Total Man-Days. See .J4100. (5) Contract Man-days. See .J4100.	
.J4310	*Gas-Fired Plants* Operate gas-fired heating plants of 750,000 to 3,500,000 BTU per hour capacity for the production of steam, hot water and hot air. PF: (1) BTU Input. See .J4300. (2) Cubic Feet Heated Space. See .J4100. (3) Standard Tons of Fuel. See .J3200. (4) Total Man-days. See .J4100. (5) Contract Man-Days. See .J4100.	
.J4320	*Oil-Fired Plants* Operate oil-fired heating plants of 750,000 to 3,500,000 BTU per hour capacity for the production of steam and hot water and hot air. PF: (1) BTU Input. See .J4300. (2) Cubic Feet Heated Space. See .J4100. (3) Standard Tons of Fuel. See .J3200.	

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Code	Activity and performance factor definitions	Prior code
	(4) Total Man-Days. See .J4100. (5) Contract Man-Days. See .J4100.	
.J4330	*Coal-Fired Plants* Operate coal-fired heating plants of 750,000 to 3,500,000 BTU per hour capacity for the production of steam, hot water, and hot air. Includes related coal handling costs. PF: (1) BTU Input. See .J4300. (2) Cubic Feet Heated Space. See .J4100. (3) Standard Tons of Fuel. See .J3200. (4) Total Man-Days. See .J4100. (5) Contract Man-Days. See .J4100.	
.J4400	*Operation of Heating Plants Under 750,000 BTU per Hour Capacity* Operation steam and hot water boilers, furnaces, direct fired unit heaters, domestic water heaters and space heaters with less than 750,000 BTU per hour capacities (for capacity determination see .K1410), for production of steam, hot water, hot air and heat for cooking. Excludes costs of electricity and water consumed. Where more than one type of fuel is used in the same building for separate purposes, such as space heating, water heating and/or cooking equipment, the fuels used will be entered under the respective types of plants using similar fuel. PF: (1) BTU Input. See .J4300. (2) Cubic Feet Heated Space. See .J4100. (3) Standard Tons of Fuel. The number of standard tons of fuel issued to these heating plants during the report period (see .J3200). (4) Total Man-Days. See .J4100. (5) Contract Man-Days. See .J4100.	
.J4410	*Gas-Fired Plants* Operate gas-fired heating plants under 750,000 BTU per hour capacity for the production of steam, hot water and hot air, and heat for cooking. PF: (1) BTU Input. See .J4300. (2) Cubic Feet Heated Space. See .J4100. (3) Standard Tons of Fuel. See .J3200. (4) Total Man-Days. See .J4100. (5) Contract Man-Days. See .J4100.	
.J4420	*Oil-Fired Plants* Operate oil-fired heating plants under 750,000 BTU per hour capacity for the production of steam, hot water, hot air, and heat for cooking. PF: (1) BTU Input. See .J4300. (2) Cubic Feet Heated Space. See .J4100. (3) Standard Tons of Fuel. See .J3200. (4) Total Man-Days. See .J4100. (5) Contract Man-Days. See .J4100.	
.J4430	*Coal-Fired Plants* Operate coal-fired heating plants under 750,000 BTU per hour capacity for the production of steam, hot water and hot air, and heat for cooking. Includes related coal handling costs. PF: (1) BTU Input. See .J4300. (2) Cubic Feet Heated Space. See .J4100. (3) Standard Tons of Fuel. See .J3200. (4) Total Man-Days. See .J4100. (5) Contract Man-Days. See .J4100.	

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Section XII. BASE OPERATIONS—Z ACCOUNTS—Continued

(Codes .A0000–.R0000)

Code	Activity and performance factor definitions	Prior code
.J4500	*Purchased Steam and Hot Water* Provides for purchased steam and hot water used for process and/or heating purposes. PF: BTU: The total number of British thermal units (BTU) on an equivalent basis purchased as steam or hot water expressed in units of 1,000,000 BTU. Performance units are computed in accordance with performance factors under .J4100 for steam flow and BTU meter readings.	
.J5000	*Air-Conditioning and Cold Storage Plants* Operate air-conditioning plants, cold storage plants, heat pumps, and ice manufacturing plants. PF: (1) Tons-Capacity. The total of all existing equipment unit refrigeration capacities at design operating conditions as shown on the construction drawings or as indicated in manufacturers catalog, or as based upon standard rating tests. If capacity is indicated in BTU per hour, divide by 12,000 to obtain tons of refrigeration. (2) Man-Days. The total man-days (8 hour man-day), including leave, expended in the operation of air-conditioning system, and other manufacturing plants, and cold storage refrigeration plants, systems, and equipment.	
.J5100	*Air-Conditioning Plants (Over 100-Tons Capacity)* Operate all central and self-contained air-conditioning units and systems over 100-ton capacity. PF: (1) Tons-Capacity. See .J5000. (2) Man-Days. See .J5000.	
.J5200	*Air-Conditioning Plants (26–100 Ton Capacity)* Operate all central and self-contained air-conditioning units and systems of 26 to 100 ton capacity. PF: (1) Tons-Capacity. See .J5000. (2) Man-days. See .J5000.	
.J5300	*Air-Conditioning Plants (under 26 Ton Capacity)* Operate all central and self-contained air-conditioning units and systems under 26 ton capacity. PF: (1) Tons-Capacity. See .J5000. (2) Man-Days. See .J5000.	
.J5400	*Cold Storage Plants (Including Ice Manufacturing)* Operate all cold storage plants (including prefabricated refrigerators used to store products before delivery to individual kitchens), all ice manufacturing plants, and all refrigeration equipment except air conditioning plants. PF: (1) HP Capacity—the total horsepower rating indicated on the compressor motor nameplate for all installed refrigerated compressors in the warehouse cold storage plants (including prefabricated refrigerators used to store products before delivery to individual kitchens), and ice manufacturing plants with a capacity of more than 3 tons per 24 hours, as of the end of the report period. (2) Man-Days. See .J5000.	
.J8000	*Operations of Utilities—Inactive Installations* Provides for activities defined in Code .J1000 through .J5000 at inactive installations. PF: None.	

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Section XII. BASE OPERATIONS—Z ACCOUNTS—Continued

(Codes .A0000–.R0000)

Code	Activity and performance factor definitions	Prior code
.J9000	*Other Utilities Operation* Provides for all utilities operation which cannot be separately identified under accounts listed above. Includes rental costs for intrusion detection systems and portable latrines in support of Facilities Engineer functions. PF: None.	
.JV999	*Base Closures/Reduction-in-Force Actions* This account will reflect the one-time attributable to base closures or reduction-in-force (RIF) actions identifiable to operation of utilities. Includes cost of severance pay, terminal leave, and related nonproductive expenses of employees affected by base closures or RIF actions. Also includes other incidental cost associated with base closures/reductions which are directly related to closing or reducing activities within the .J Series. PF: None.	
.K0000	MAINTENANCE AND REPAIR OF REAL PROPERTY Expenses for the maintenance and repair of real property, less charges made to other functional categories (see Disposal and Overseas Dependent Education). Includes applicable expenses incurred by building trades shops, construction units, grounds and pavements units, machine shops, quarries, construction equipment units. Includes design costs directly associated with accomplishing a designated project undertaking. Excludes cost of minor construction. Costs will be maintained for individual projects as required for complying with statutory and administrative limitations, by suffixing the applicable Army Management Structure Account to identify those projects to be controlled. Funds in this account are subject to the Maintenance of Real Property Facilities (MRPF) Floor. The Maintenance and Repair of Real Property Facilities (MRPF) Floor cost information is accumulated by consolidation of the applicable Maintenance and Repair Property (.K0000) and Minor Construction (.L0000) accounts in accordance with instructions contained in AR 37-108 and AR 37-151. (The Management and Engineering portion of Other Engineering (.M0000) is no longer applicable to the Floor). PF: (1) K Square Feet: The number of square feet of gross floor area of all active and inactive buildings excluding structures except that covered and enclosed walks are considered to be an integral part of the buildings to which they are attached (the floor area of such walks to be included). Express in units of 1,000 (K) square feet as of the end of the report period. The total of square foot quantities reported for this activity will equal the sum of square feet reported in .K2000 and .K8000. (2) Dollar Value of BMAR. The total dollar value of Backlog of Maintenance and Repair (BMAR) at active and inactive installations. Express in units of $1,000 as of end of reporting period. (3) and (4) Facilities Engineer Work Force Man-Years. Report separately for both active and inactive facilities, military (Element of Expense 1400), US civilians (EOE 11X0), and Other civilians (EOE 1600 and 28XX), expressed in whole man-years.	
.K1000	*Utilities Systems* Provides for the maintenance and repair of water pumping plants, purification plants, and distribution systems, sewage pumping plants, treatment plants and sewage collection systems; industrial waste disposal systems; electric distribution systems and exterior lighting, electric distribution transformers and generating plants; boiler and heating plants; steam and hot water distribution systems; gas distri-	

USF200001977

Code	Activity and performance factor definitions	Prior code
	bution, storage and generating systems; and operation of gas storage and generating plants, liquid fueling and dispensing facilities, cold storage plants, and air-conditioning plants; miscellaneous refrigeration; and central and installed air compressors. PF: None.	
.K1100	*Water Systems (Category 840)* Provides for the maintenance and repair of sources of water supply; water distribution systems; treatment and filtration plants, equipment for pumping and storage of water. PF: None.	
.K1110	*Treatment and Filtration* Provides for the maintenance and repair of water filtration and treatment plants. Includes only the sources of water that are associated with treatment and filtration operation. Includes pumps, structures and other items of equipment at source of water to and including the treatment and filtration plant and equipment. Excludes maintenance and repair of buildings housing equipment. PF: None.	
.K1111	*Plants* Provides for the maintenance and repair of water filtration and treatment plants, piping, pumps, controls, meters, and any other structures and equipment necessary for operating a filtration and treatment plant. Excludes maintenance and repair of buildings housing equipment. PF: Plant Capacity: The 24-hour design capacity of the treatment plant(s) at normal filtration rate. Express in units of 1,000 (K) gallons per day.	
.K1112	*Source* Provides for the maintenance and repair of water sources (wells, cisterns, impounding reservoirs, etc.), piping, pumps, mains, and other ancillary items necessary for supplying water to the filtration and treatment plant. PF: Daily Capacity: Capacity (pumps or gravity flow) of each unit is its rated capacity. Quantity is the sum of individual rated capacities of all units including standby units, located between the water source and the filtration and treatment plant. Express in units of 1,000 (K) gallons per day. *Note:* When source includes both gravity flow and pumps, only the pumping capacity will be reported.	
.K1120	*Wells* Provides for the maintenance and repair of wells where pumping is required and chemicals may be added such as chlorine, fluoride, and hexametaphosphates, but filtration is not provided. PF: Pumping Capacity. Pumping capacity of each pumping unit is its rated capacity when operated alone. Quantity is the sum of individual rated capacities of all pumping units including standby units. Express in units of 1,000 (K) gallons per day.	
.K1130	*Distribution Systems* Provides for the maintenance and repair of water distribution mains and services including ground and elevated tanks, chlo-	

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Section XII. BASE OPERATIONS—Z ACCOUNTS—Continued

(Codes .A0000–.R0000)

Code	Activity and performance factor definitions	Prior code
	rinators, chemical feeders not included in treatment and filtration plants and wells. PF: None.	
.K1131	*Mains and Laterals* Provides for the maintenance and repair of all distribution mains and service lines, including valves and other ancillary components. PF: Lineal Feet: The total length of all water mains, laterals and service lines. Express in units of lineal feet (LF).	
.K1132	*Pumping Stations* Provides for the maintenance and repair of pumping stations associated with pumping water (Booster Stations) within the distribution system, including any chemical feed equipment, that could be required, for instance, where the water is purchased and chemical addition is required. Excludes maintenance and repair of buildings housing equipment. PF: Pumping Capacity. Pumping capacity of each pumping unit is its rated design capacity when operated alone. Quantity is the sum of individual rated capacities of all pumping units. Express in units of 1,000 (K) gallons per 24 hour day.	
.K1133	*Storage* Provides for maintenance and repair of all above (and below) ground water storage units located on the distribution system, including cathodic protection equipment. PF: Gallons capacity. The capacity of each storage facility is its designed capacity rating. Quantity is the sum of individual rated capacities of all storage units located within the limits of the distribution system. Express in units of 1,000 (K) gallons.	
.K1200	*Sewage Systems (Categories 831 and 832)* Provides for the maintenance and repair of facilities for collection, transporting, pumping, treatment, and disposal of sanitary sewage and industrial wastes. PF: None.	
.K1210	*Treatment Plants.* Provides for the maintenance and repair of all facilities for treatment of sanitary sewage and industrial wastes including pumping plants adjacent to or a part of the sewage treatment plant. Excludes maintenance and repair of buildings housing equipment. PF: None.	
.K1211	*Primary Plant* Provides for the maintenance and repair of primary sewage treatment plants. PF: Plant Capacity: The 24-hour designed capacity of the plant or plants at an installation. Quantity is the sum of individual rated capacities of all primary treatment plants. Express in units of 1,000 (K) gallons per day.	
.K1212	*Secondary Plant* Provides for the maintenance and repair of secondary sewage treatment plants, septic tanks, oxidation ponds, and sewage lagoons. PF: Plant Capacity: The 24-hour designed (primary	

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Code	Activity and performance factor definitions	Prior code
	and secondary) capacity of the plant or plants at an installation. Quantity is the sum of individual rated capacities of all secondary treatment plants, septic tanks, lagoons and oxidation ponds. Express in units of 1,000 (K) gallons per day.	
.K1213	*Tertiary Plant* Provides for the maintenance and repair of tertiary treatment plants. PF: Plant Capacity. The 24-hour designed (primary, secondary and tertiary) capacity of the plant or plants at the installation. Quantity is the sum of individual rated capacities of all tertiary treatment plants. Express in units of 1,000 (K) gallons per day. *Note:* If the total capacity of a sewage treatment plant includes primary, secondary and tertiary treatment, all reporting will be applied to tertiary plants. The same will apply to secondary plants and primary plants, i.e., the highest degree of treatment will govern.	
.K1214	*Industrial Waste Treatment Facilities* Provides for the maintenance and repair of industrial waste treatment plants. PF: Plant Capacity. The 24-hour designed capacity of the plant or plants at an installation. Quantity is the sum of individual rated capacities of all industrial waste treatment plants. Express in units 1,000 (K) per day.	
.K1220	*Sewage Collection Systems* Provides for the maintenance and repair of sewers to include all facilities and parts of the sewer system (mains and laterals, pumping plants and lift stations) for collection and transporting sanitary sewage and industrial wastes. PF: None.	
.K1221	*Domestic Mains and Laterals* Provides for the maintenance and repair for all sanitary (domestic waste) sewers from the source to the treatment plant and including the outfall sewer from the plant. Includes maintenance and repair of manholes and other components which form the sewers. PF: Lineal Feet: The total lineal feet of all sanitary sewer mains and laterals. Express in units of lineal feet. (LF).	
.K1222	*Domestic Pumping Plants* Provides for the maintenance and repair of sanitary (domestic waste) sewage pumping plants not adjacent to or a part of the treatment plant. Excludes maintenance and repair of buildings housing equipment. PF: Pumping Capacity. See .K1132.	
.K1223	*Industrial Waste (Mains and Laterals)* Provides for the maintenance and repair of all industrial waste sewers from the source to the industrial waste treatment plant and including the outfall sewer from the plant. Includes maintenance and repair of manholes and other components which form the sewers.	

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Section XII. BASE OPERATIONS—Z ACCOUNTS—Continued

(Codes .A0000–.R0000)

Code	Activity and performance factor definitions	Prior code
	PF: Lineal Feet. The total lineal feet of all industrial sewer mains and laterals. Express in units of lineal feet (LF).	
.K1224	*Industrial Waste Pumping Plants* Provides for the maintenance and repair of industrial waste pumping stations not adjacent to or a part of the industrial waste treatment plant. Excludes maintenance and repair of buildings housing equipment. PF: Pumping capacity. See Code .K1132. *Note:* Sewers, laterals and pumping stations serving sources of industrial waste water and discharging into the sanitary sewer system or domestic waste treatment plant shall be considered a part of the sanitary sewage system and reported in .K1221 and/or .K1222.	
.K1300	*Electric Systems* Provides for the maintenance and repair of main electric generating plants, overhead and underground electric lines including building service lines, street lighting and other exterior lighting, airfield and air navigational lighting, distribution and constant-current transformers. Excludes auxiliary generators, portable generators, frequency changers, electric motor-driven generator sets, and rectifiers unless installed as accessory equipment in main electric generating plants (see .K1900); and building electrical systems. PF: None.	
.K1310	*Electric Generating Plants (Category 811)* Provides for maintenance and repair of main electric generating plants equipment excluding building (see .K2920). Excludes auxiliary generators, permanently placed portable generators for emergency service to specified buildings or facilities, and portable generators for general services (see .K1900). PF: (1) Plants—Number of plants. (2) kVA Capacity—The sum of the nameplate kVA ratings of all generators in the plant as of the end of the report period.	
.K1320	*Electric Distribution Systems (Categories 134.50 through 134.80, 136 and 812)* Provides for maintenance and repair of overhead and underground electric distribution lines and services. Excludes exterior lighting fixtures and brackets including airfield lighting fixtures, distribution and constant-current transformers, and main distribution point. PF: Lineal Feet: The total pole-line feet (the sum of the distance between poles) of overhead distribution and the total trench or duct feet of underground electric distribution lines, plus the total length of overhead and underground service lines to the point of attachment on the building or the building service entrance switch, respectively.	
.K1321	*Electric Distribution Systems—Overhead* Provides for maintenance and repair of overhead electric distribution lines and services. PF: Lineal Feet: The total pole-line feet (the sum of	

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Section XII. BASE OPERATIONS—Z ACCOUNTS—Continued

(Codes .A0000-.R0000)

Code	Activity and performance factor definitions	Prior code
	the distance between poles) of overhead distribution lines, plus the total length of overhead service lines to the point of attachment on the building.	
.K1322	*Electric Distribution Systems—Underground* Provides for maintenance and repair of underground electric distribution lines services. PF: Lineal Feet: The total trench or duct feet of underground electric distribution lines, plus the total length of underground service lines to the building or the building service entrance switch.	
.K1330	*Electric Distribution Transformers* Provides for maintenance and repair of all distribution and constant-current transformers installed as a part of the overhead and underground electric distribution system. Excludes power transformers in electric substations, other than those providing utilization voltages. PF: kVA Capacity: The sum of the nameplate kVA ratings of all installed distribution and constant-current transformers as of the end of the report period.	
.K1340	*Exterior Lighting* Provides for the maintenance and repair of all exterior lighting fixtures, accessories and brackets including standards or poles used solely for lighting which are installed for street lighting, including street lights attached to buildings, storage-yard, fence, perimeter, protective, parking area, classification yard, outdoor sports and airfield lighting, floodlighting, and obstruction lights installed on buildings and structures. Excludes porch and entry lighting, platform lighting, fire lights, and other exterior building lights not installed for purposes of street or area illumination. PF: Number of Lights. The total number of lights used for exterior lighting as of the end of the report period.	
.K1350	*Substations and Switching Stations* Provides for maintenance, repair and operation as required of Government-owned substations and switching stations which supply, distribute and/or control the installations electrical distribution system. Excludes transformers or other equipment and devices supplying power at utilization voltage. PF: Number of Plants.	
.K1400	*Boiler and Heating Plants* Provides for the maintenance and repair of high pressure boiler plants, heating plants, and steam, hot water, gas distribution systems, and a proportionate share (50%) of combination hot and chilled water. PF: None.	
.K1410	*Boiler Plants, High Pressure Over 3,500,000 BTU per Hour Capacity* Provides for the maintenance and repair of all high pressure boiler plants over 3,500,000 BTU per hour capacity used for production of steam and/or high temperature hot water. This includes all auxiliaries, boilers, controls, fuel and ash storage, and handling equipment at the plants; water softeners used for boiler feedwater and/or laundries; air compressors for	

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Code	Activity and performance factor definitions	Prior code

operation of controls; standby electric generators for plant operation; and boiler inspection. Excludes maintenance and repair of buildings housing separate boiler plants, category 821 (see .K2920) and for those buildings of other categories housing boiler plants (see .K2100-.K2910).

PF: (1) *BTU Capacity*—The total BTU per hour output capacity in boiler plants, high pressure, over 3,500,000 BTU per hour as of the end of the report period. (Express in units of 1,000,000 BTU per hour capacity). Low pressure boilers installed in the same plant with high pressure boilers will be included in the capacity where capacity of high pressure boiler exceeds 3,500,000 BTU. Capacity units will be computed using the following units and examples.

(*a*) 1 pound high pressure steam = 1,075 BTU.

1 pound low pressure steam = 1,050 BTU.

10 sq ft Boiler Heating Surface Water Tube Boilers = 2 Boiler Horsepower = 66,950 BTU per hour. (For boilers with manufacturer's nameplate ratings use pounds of steam or BTU per hour rating.)

Steel Firetube Boilers

Use SBI (Steel Boiler Institute) gross output rating for type of fuel and firing equipment used for nonpackaged types or 1 sq ft heating surface, hand fired coal = 3,348 BTU per hour.

1 sq ft heating surface stoker, oil or gas fired = 5,040 BTU per hour.

Use ABMA (American Boiler Manufacturers Association) gross output rating for packaged firetube boilers.

Cast Iron Boilers

Use IBR (Institute of Boiler and Radiator Manufacturers) gross output ratings.

1 EDR steam = 240 BTU per hour.

1 EDR water = 150 BTU per hour.

(*b*) Examples used in computing BTU per hour capacity are as follows:

Water Tube Boilers

Manufacturers rating = 50,000 pounds steam per hour. 1 pound high pressure steam = 1,075 BTU (50,000 times 1,075) divided by 1,000,000 = 54 Mega BTU per hour capacity.

Heating surface = 4,500 sq ft (4,500 divided by 10 times 66,950) divided by 1,000,000 = 30 Mega BTU per hour capacity.

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Code	Activity and performance factor definitions	Prior code
	Steel Firetube Boilers. Gross SBI Rating = 8,500 sq ft (8,500 times 240) divided by 1,000,000 = 2 Mega BTU per hour capacity. Heating Surface = 2,536 sq ft. Stoker fired boiler (2,536 times 5,040) divided by 1,000,000 = 13 Mega BTU per hour capacity. *Cast Iron Boilers.* Gross IBR rating = 11,500 EDR water (11,500 times 150) divided by 1,000,000 = 2 Mega BTU per hour capacity. All boilers having BTU ratings. Rating = 15,670,000 BTU per hour divided by 1,000,000 = 16 Mega BTU per hour capacity. *Note.* When multiple boilers are installed, determine the sum of all ratings in the category before making BTU calculations.	
	(2) *Number of Plants*—The number of boiler plants, high pressure, over 3,500,000 BTU per hour capacity, in active use during the report period.	
.K1411	*Gas-Fired Plants* Provides for the maintenance and repair of gas-fired high-pressure boiler plants over 3,500,000 BTU per hour capacity. PF: (1) *BTU Capacity.* See .K1410. (2) *Number of Plants.* See .K1410.	
.K1412	*Oil-Fired Plants* Provides for the maintenance and repair of oil-fired high-pressure boiler plants over 3,500,000 BTU per hour capacity. PF: (1) *BTU Capacity.* See .K1410. (2) *Number of Plants.* See .K1410.	
.K1413	*Coal-Fired Plants* Provides for the maintenance and repair of coal-fired high-pressure boiler plants over 3,500,000 BTU per hour capacity. PF: (1) *BTU Capacity.* See .K1410. (2) *Number of Plants.* See .K1410.	
.K1420	*Heating Plants over 3,500,000 BTU per Hour Capacity* Provides for the maintenance and repair of all low-pressure steam and hot water boilers, direct-fired unit heaters, and fuel storage and handling equipment in plants over 3,500,000 BTU per hour (excludes interior heating equipment, such as radiators, convectors, coils, unit heaters, other than direct-fired, duct work, piping, etc., applicable to .K2000. Excludes maintenance and repair of buildings housing separate heating plants, category 821 (see .K2930) and for those categories housing heating plants (see .K2100 through .K2990). PF: (1) *BTU Capacity.*—The total BTU per hour output capacity of low-pressure steam and hot water boilers and direct-fired unit heaters, as deter-	

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Code	Activity and performance factor definitions	Prior code
	mined from nameplate ratings or in accordance with .K1410 in use during report period. Plant capacity is determined on the basis of the total capacity of all applicable equipment installed in a heating plant, or in a utility room or in a central location. Express in units of 1,000,000 BTU per hour capacity. (2) *Number of Plants.*—The number of plants having output capacities of over 3,500,000 BTU per hour in use during the report period.	
.K1421	*Gas-Fired Plants* Provides for maintenance and repair of gas-fired heating plants over 3,500,000 BTU per hour capacity. PF: (1) *BTU Capacity.* See .K1420. (2) *Number of Plants.* See .K1420.	
.K1422	*Oil-Fired Plants* Provides for the maintenance and repair of oil-fired heating plants over 3,500,000 BTU per hour capacity. PF: (1) *BTU Capacity.* See .K1420. (2) *Number of Plants.* See .K1420.	
.K1423	*Coal-Fired Plants* Provides for the maintenance and repair of coal-fired heating plants over 3,500,000 BTU per hour capacity. PF: (1) *BTU Capacity.* See .K1420. (2) *Number of Plants.* See .K1420.	
.K1430	*Heating Plants 750,000 to 3,500,000 BTU per Hour Capacity* Provides for the maintenance and repair of high pressure boilers, low pressure steam and hot water boilers, direct-fired unit heaters, warm air furnaces, fuel storage and handling equipment and domestic water heaters in plants with total output capacities of 750,000 to 3,500,000 BTU per hour. (Excludes interior heating equipment, such as radiators, convectors, steam coils, duct work piping, unit heaters other than direct-fired, etc., applicable .K2000.) Excludes maintenance and repair of buildings housing separate heating plants, category 821 (see .K2930) and those buildings of other categories housing heating plants (see .K2100 through .K2990). PF: (1) *BTU Capacity*—The total BTU per hour output capacity of heating plants 750,000 to 3,500,000 BTU per hour in use during the report period, expressed in units of 1,000,000 BTU per hour capacity (see .K1410). (2) *Number of Plants*—The number of heating plants with total output capacities of 750,000 to 3,500,000 BTU per hour in use during the report period.	
.K1431	*Gas-Fired Plants* Provides for the maintenance and repair of gas-fired heating plants with total capacities of 750,000 to 3,500,000 BTU per hour. PF: (1) *BTU Capacity.* See .K1430. (2) *Number of Plants.* See .K1430.	
.K1432	*Oil-Fired Plants* Provides for the maintenance and repair of oil-fired heat-	

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Code	Activity and performance factor definitions	Prior code
	ing plants with total capacities of 750,000 to 3,500,000 BTU per hour. PF: (1) *BTU Capacity*. See .K1430. (2) *Number of Plants*. See .K1430.	
.K1433	*Coal-Fired Plants* Provides for maintenance and repair of coal-fired heating plants with total capacities of 750,000 to 3,500,000 BTU per hour. PF: (1) *BTU Capacity*. See .K1430. (2) *Number of Plants*. See .K1430.	
.K1440	*Heating Plants Under 750,000 BTU per Hour Capacity* Provides for the maintenance and repair of high pressure boilers, low pressure steam and hot water boiler, direct-fired unit heaters, warm air furnaces, space heaters, domestic water heaters, and fuel storage and handling equipment in plants with total output capacities of under 750,000 BTU per hour. (Excludes interior heating equipment, such as radiators, convectors, steam coils, duct work piping, unit heaters other than direct-fired, etc., applicable .K2000.) Excludes maintenance and repair of buildings of all categories housing heating plants (see .K2100 through .K2990). PF: (1) *BTU Capacity*—The total BTU per hour output capacity of heating plants under 750,000 BTU per hour in use during the report period, expressed in units of 1,000,000 BTU per hour capacity (see .K1410). (2) *Number of Plants*—The number of heating plants with total output capacities under 750,000 BTU per hour in use during the report period.	
.K1441	*Gas-Fired Plants* Provides for the maintenance and repair of gas-fired heating plants with total capacities under 750,000 BTU per hour. PF: (1) *BTU Capacity*. See .K1440. (2) *Number of Plants*. See .K1440.	
.K1442	*Oil-Fired Plants* Provides for the maintenance and repair of oil-fired heating plants with total capacities under 750,000 BTU per hour. PF: (1) *BTU Capacity*. See .K1440. (2) *Number of Plants*. See .K1440.	
.K1443	*Coal-Fired Plants* Provides for maintenance and repair of coal-fired heating plants with total capacities under 750,000 BTU per hour. PF: (1) *BTU Capacity*. See .K1440. (2) *Number of Plants*. See .K1440.	
.K1450	*Other Heating Support* Provides for maintenance and repair of all steam, condensate return, hot water, a proportionate share (50%) of combination hot and chilled water, and gas (natural, manufactured and liquefied petroleum) distribution systems, both overhead and underground, and gas storage and generating stations and operation costs in connection therewith. This includes all low pressure steam and gas distribution systems up to building	

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Section XII. BASE OPERATIONS—Z ACCOUNTS—Continued

(Codes .A0000–.R0000)

Code	Activity and performance factor definitions	Prior code
	line, high pressure steam and high temperature water systems up to utility rooms, central domestic hot water systems serving more than one building, pressure reducing stations, or heat exchange equipment, condensate return pumps, and central heat exchange stations. PF: None.	
.K1451	*Steam and Hot Water Distribution System (Category 822)* Provides for maintenance and repair of steam, condensate return, and hot water, a proportionate share (50%) of combination hot and chilled water, distribution systems including domestic hot water. PF: Lineal Feet: The total length of steam and hot water distribution mains and returns up to the building utility room or reducing station as of the end of the report period. Each system of steam supply and condensate return or hot water supply and return will be considered as a unit except that where supply and return are located in separate conduits they will be considered as separate units.	
.K1452	*Gas Distribution Systems* Provides for the maintenance and repair, including cathodic protection, of all gas distribution, storage, and generating stations and operation of gas storage and generating plants. PF: Lineal Feet: The total length of gas distribution mains and services up to the building line, as of the end of the report period.	
.K1500	*Air Conditioning and Refrigeration* Provides for the maintenance and repair of central and self-contained air conditioning units and systems, cold storage plants, heat pumps, and other refrigeration units and systems (including ice manufacturing). PF: None.	
.K1510	*Air-Conditioning Plants (Over 100 Tons)* Provides for the maintenance and repair of central and self-contained air conditioning units and systems over 100-ton capacity. Plants which utilize coils in the air handling units for both heating or temperatures and humidity control will be considered part of the air conditioning beginning with the Control Valve and up to the steam trap if steam system or where return line leaves the coil, if hot water system. Includes a proportionate share (50%) of combination exterior hot and chilled water distribution system. Excludes maintenance and repair of interior ducts, etc., applicable to .K2000. PF: Tons-Capacity. The total of all existing equipment unit refrigeration capacities at design operating conditions as shown on the construction drawings, or as indicated in manufacturer's catalog, or as based upon standard rating tests. If the capacity is indicated in BTU per hour, divide by 12,000 to obtain tons of refrigeration.	
.K1520	*Air Conditioning Plants (26–100 tons)* Provides for the maintenance and repair of central and self-	

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Section XII. BASE OPERATIONS—Z ACCOUNTS—Continued

(Codes .A0000–.R0000)

Code	Activity and performance factor definitions	Prior code
	contained air conditioning units and systems of 26 to 100 tons capacity. Plants which utilize coils in the air handling units for both heating and humidity control will be considered part of the air conditioning beginning with the control valve and up to the steam trap, if steam system, or where return line leaves the coil, if hot water system. Includes a proportionate share (50%) of combination exterior hot and chilled water distribution system. Excludes maintenance and repair of interior ducts, etc., applicable to .K2000. PF: Tons-Capacity. See .K1510.	
.K1530	*Air Conditioning (5–25 tons)* Provides for maintenance and repair of all air conditioning units of 5–25 ton capacity. Equipment utilizing air handling units for both heating or temperature and humidity control will be considered part of the air conditioning beginning with the Control Valve and up to the steam trap, if steam system, or where the return line leaves the coil, if hot water system. PF: Tons-Capacity. See .K1510.	
.K1540	*Air Conditioning (under 5 tons)* Provides for maintenance and repair of all conditioning units, including fan coil units, direct expansion coils, controls within the building, and window units of under 5-ton capacity. PF: (1) Tons-Capacity. See .K1500. (2) The total number of individual unitary air-conditioners and heat pumps under 5-ton capacity.	
.K1550	*Refrigeration (5–25 HP) (excluding cold storage plants)* Provides for maintenance and repair of built-in prefabricated walk-in refrigerators (other than those used for cold storage plants), central refrigerated drinking water systems, and other miscellaneous refrigeration systems of 5–25-ton capacity. PF: HP-Capacity—The total horsepower rating indicated on the compressor motor nameplate for all installed refrigerated compressor other than warehouse cold storage plants.	
.K1560	*Refrigeration (under 5 tons) (excluding cold storage plants)* Provides for maintenance and repair of all built-in prefabricated, walk-in refrigeration (other than those used for cold storage plants), reach-in refrigerators, drinking water coolers, ice machines, and other miscellaneous refrigeration systems under 5-ton capacity. PF: HP-Capacity. See .K1550	
.K1570	*Cold Storage Plants (including ice manufacturing)* Provides for the maintenance and repair of all ice manufacturing plants, and all cold storage plants, including prefabricated refrigerators used to store products before delivery to the point of consumption. PF: HP-Capacity. See .J5400.	
.K1900	*Other Utilities Systems* Provides for maintenance and repair of all utilities systems not otherwise provided for. PF: None.	
.K1910	*Mechanical Ventilating and Evaporative Cooling* Provides for maintenance and repair of ventilating fans and evaporative cooling systems.	

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Section XII. BASE OPERATIONS—Z ACCOUNTS—Continued

(Codes .A0000–.R0000)

Code	Activity and performance factor definitions	Prior code
	PF: (1) Number of individual units. (2) Cubic Feet per Minute: The rated nameplate capacity in cubic feet per minute.	
.K1920	*Compressed Air Equipment* Provides for the maintenance and repair of central and installed air compressors and distribution systems, except those auxiliaries required only for operations of plants such as boiler or sewage plants. Central air compressors located in a boiler or other utility plants, which are used as a central air supply for other areas, will be included in this classification. PF: Horsepower Capacity.	
.K1930	*Liquid Fuel Dispensing* Provides for the maintenance and repair of liquid fuel dispensing systems. (Categories 120, 121, 122 & 123.) PF: (1) Number of Facilities. (2) Outlets: The total number of outlets in all the dispensing systems for which the installation is responsible.	
.K1940	*Liquid Storage Facilities* Provides for maintenance and repair of operating fuel storage and accessory equipment, backup fuel oil storage for heat and power plants, except that directly part of the plant and immediately adjacent thereto. Also, depot, terminal, and bulk-type storage for POL, fuel oil, aviation gas, and other liquid fuel, including accessory piping and tank storage for cottonseed oil, soybean oil, linseed oil, and other non-fuel, non-propellant liquids, and liquid propellant storage. (Categories 124, 125, 411 & 412.) PF: (1) Number of Facilities. (2) Number of Barrels: Total number of 42-gallon barrels of storage capacity for which the installation has responsibility.	
.K1950	*Fire Alarm and Intrusion Detection Systems* Provides for maintenance, repair, and testing of fire alarm systems and detection systems, including air raid alarm systems and watch reporting systems, both exterior and interior. PF: Number of Facilities.	
.K1951	*Fire Alarm Systems* Provides for the maintenance, repair, and testing of fire alarm systems, both exterior and interior. PF: Number of Facilities.	
.K1952	*Intrusion Detection Systems* Provides for maintenance, repair, and testing of Government-owned intrusion detection systems, both interior and exterior type. PF: Number of Systems.	
.K1960	*Other Miscellaneous Utilities* Provides for maintenance, repair, and testing of other utilities systems such as auxiliary generator plants, frequency converters, oxygen and acetylene plants, cooling towers (other than those associated with air conditioning or refrigeration equipment), dehumidification equipment, swimming pool purification equipment, air pollution control equipment, etc. PF: Number of Facilities.	

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2182020 OPERATION AND MAINTENANCE, ARMY, 1978—Continued

Section XII. BASE OPERATIONS—Z ACCOUNTS—Continued

(Codes .A0000–.R0000)

Code	Activity and performance factor definitions	Prior code
.K2000	*Buildings* Provides for the maintenance and repair, including structural features; exterior and interior painting and glazing; roofing; interior plumbing; interior electric; interior heating equipment; installed food service and related equipment (AR 420-55), including installation costs of replacement equipment; Government-owned washers and dryers provided under CTA 50-919 and installation costs of initial issue and replacement items, but excluding replacement costs and concessionnaire contracts charged to .H2000; interior air conditioning duct work and grilles; internal building refrigerant and distilled water piping systems; elevators; and other equipment installed as part of the building and not included in other activities. (By categories of construction, see AR 415-28.) These costs will be charged to the appropriate subdivision of this account. PF: Square Feet: The number of square feet of gross floor area of all active buildings excluding structures except that covered and enclosed walks are considered to be an integral part of the buildings to which they are attached (the floor area of such walks to be included). Express in units of 1,000 square feet as of the end of the report period.	
.K2100	*Training Buildings* (Category 171) PF: See Code .K2000.	
.K2200	*Maintenance and Production Buildings* (Categories 211-219. 221-222, 219-228) PF: See Code .K2000.	
.K2300	*Research, Development, and Test Buildings* (Category 310) PF: See Code .K2000.	
.K2400	*Storage Buildings* PF: See Code .K2000.	
.K2410	*Ammunition Storage Buildings* (Categories: 421-424) PF: See Code .K2000.	
.K2420	*Other Covered Storage Buildings* (Categories 441 and 442) PF: See Code .K2000.	
.K2500	*Hospital and Medical Buildings* PF: See Code .K2000.	
.K2510	*Hospitals* (Category 510) PF: See Code .K2000.	
.K2520	*Other Medical* (Categories 530-550) PF: See Code .K2000.	
.K2600	*Administrative Buildings* (Category 610) PF: See Code .K2000.	
.K2700	*Bachelor Housing Buildings* (Categories 721-724) PF: See Code .K2000.	
.K2800	*Community Facilities Building* Includes maintenance repair or replacement of theatre chairs when classified as installed equipment. (Categories 730 and 740.) PF: See Code .K2000.	

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2182020 OPERATION AND MAINTENANCE, ARMY, 1978—Continued

Section XII. BASE OPERATIONS—Z ACCOUNTS—Continued

(Codes .A0000–.R0000)

Code	Activity and performance factor definitions	Prior code
.K2900	*Other Buildings* PF: See .K2000.	
.K2910	*Family Housing* (Categories 711 and 714) PF: See .K2000.	
.K2920	*Operational Buildings* (Categories 131, 133, and 141) PF: See Code .K2000.	
.K2930	*Utility Plant Buildings* (Categories 431–432, 811–813, 821, 823, 826–827, 831–833, 841, 844–845 and 890) Excludes costs of maintenance and repair of plant equipment. PF: See Code .K2000.	
.K2990	*Other Buildings* (Categories not otherwise assigned above) PF: See Code .K2000. (Excludes sq. ft. for tent frames and floors).	
.K3000	*Grounds* (Categories 871, 910, 920, and 932.) Provides for the maintenance, repair, protection, and development of the land, water, and the renewable natural resources thereon. Includes costs for maintenance, protection, and the development of fish and wildlife habitats and management expenses for forest areas. (Excludes costs accounted for under 728012.23000 and 728012.24000). PF: Acres: The total acres of land and water for which the installation is responsible during the reporting period.	
.K3100	*Improved Grounds* Provides for the maintenance and repairs of improved grounds including lawns, drill fields, parade grounds, athletic and recreational facilities (excludes swimming pools, .K6300), cemeteries, turf grass, landing and parking areas of airfields and heliports, other intensively used ground areas, landscape and windbreak plantings; ground cover plantings, crushed rock and gravel blankets within improved ground areas, and accessory drainage systems. These areas normally are subject to annual fixed requirements for grounds maintenance measures consisting of seeding, fertilizing, policing, watering, mowing, weed control, pruning, dust control, and other essential grounds operations. See AR 420-74. PF: Acres: The total acres of improved grounds for which the installation is responsible during the report period.	
.K3200	*Other Than Improved Grounds* Provides for the maintenance and repair of grounds not classified as improved grounds. PF: Unimproved acres—The total acres, including total acres of forest areas, but excluding acres in .K3100, for which the installation is responsible during the report period.	
.K3210	*Wildlife Management* Provides for the development and maintenance of areas suitable for fish and wildlife habitat management. Included are planting of perennial vegetation for food and cover; planting of annual vegetation as an interim to achieving balance between enduring habitat and population; development of drinking	

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Code	Activity and performance factor definitions	Prior code
	water facilities; opening of small clearings in wooded areas; protection of endangered animal wildlife; and management of ponds, lakes, streams, swamps and estuaries for fish and waterfowl habitat. PF: Acres: The average of other than improved grounds within the wildlife management program.	
.K3290	*Grounds (Less Wildlife)* Provides for the maintenance and repair of grounds such as small arms ranges, maneuver areas, testing and artillery ranges, igloo yards, safety and security zones, antenna fields, fire breaks, deserts, swamps and areas covered with woody vegetation uneconomically productive of timber products. These areas normally are subjected to grounds maintenance measures such as maintenance of open drainage and watersheds to preclude erosion and sedimentation; planting vegetation, utilization of structural measures and non-vegetative surface treatments to control dust, erosion and surface water; mowing, prescribed burning and herbicides to control weeds, brush, vegetative fire hazard and poisonous plants; and clean-up of storm damage. Includes areas under buildings, roads and other paved surfaces, railroads, ponds, lakes and other waterways. See AR 420–74. Excludes costs for timber management reimburseable from sale of timber products accounted for under 728012.23000 and 728012.24000. PF: None	
.K4000	*Railroad Maintenance (Category 860)* Provides for the maintenance and repair of all two-rail tracks (narrow and standard gauge), including spurs, sidings, yards, turnouts, frogs, switches, ties, ballast, roadbeds, etc., with accessories and appurtenances, drainage facilities and trestles. PF: (1) Active Track Lineal Feet: The number of lineal feet of all active railroad trackage (including trackage on waterfront facilities), in terms of single track (two rails) for which the installation is responsible during the report period. Express in units of 1,000 (K) lineal feet. (2) Inactive Track Lineal Feet. The number of lineal feet of inactive track expressed in units of 1,000 (K) lineal feet.	
.K5000	*Surface Areas Maintenance* Provides for the maintenance and repair of all rigid, flexible, and miscellaneous graded and stabilized (other than grassed) pavements used for vehicular, aircraft, and pedestrian traffic, and appurtenances. PF: Square Yards: The total square yards of surfaced areas for which the installation is responsible during the report period. Express in units of 1,000 (K) square yards.	
.K5100	*Roads (Category 851)* Provides for the maintenance and repair of all roads, streets, service drives, alleys, and appurtenances such as shoulders, culverts, storm drainage features, and traffic control signs and markings. PF: Square Yards: The total square yards of surfaced road area for which the installation is responsible during the report period. Express in units of 1,000 (K) square yards.	

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2182020 OPERATION AND MAINTENANCE, ARMY, 1978—Continued

Section XII. BASE OPERATIONS—Z ACCOUNTS—Continued

(Codes .A0000-.R0000)

Code	Activity and performance factor definitions	Prior code
.K5110	*Roads—Concrete and Bituminous* Provides for the maintenance and repair of concrete and bituminous roads, streets, service drives, and alleys, and appurtenance items such as shoulders, culverts, storm drainage features, and traffic control signs and markings. PF: Square Yards: The total square yards of concrete and bituminous surfaced road area for which the installation is responsible during the report period. Express in units of 1,000 (K) square yards.	
.K5120	*Roads—Other Miscellaneous* Provides for the maintenance and repair of roads, streets, service drives, and alleys constructed of materials other than concrete or bituminous. Also includes appurtenance items such as shoulders, culverts, storm drainage features, and traffic signs and markings. PF: Square Yards: The total square yards of road area other than that composed of concrete or bituminous for which the installation is responsible during the report period. Express in units of 1,000 (K) square yards.	
.K5200	*Airfield Pavement (Category 110)* Provides for the maintenance and repair of all runways, taxiways, aprons, hardstanding, and other areas used for aircraft traffic, including appurtenances such as shoulders, storm drainage facilities, subgrade drains, pavement numbering and marking, and tie-down anchors. PF: Square Yards: The total square yards of surfaced airfield area for which the installation is responsible during the report period. Express in units of 1,000 (K) square yards.	
.K5210	*Airfield Pavements—Concrete and Bituminous* Provides for the maintenance and repair of concrete and bituminous runways, taxiways, aprons, hardstands, and other areas used for aircraft traffic, including items such as shoulder, storm drainage facilities, subgrade drains, pavement numbering and markings, and tie-down anchors. PF: Square Yards. The total square yards of concrete and bituminous surface airfield area for which the installation is responsible during the report period. Express in units of 1,000 (K) square yards.	
.K5220	*Airfield Pavements—Other Miscellaneous* Provides for the maintenance and repair of all runways, taxiways, aprons, hardstands, and other areas used for aircraft traffic constructed of material other than concrete or bituminous. Also includes appurtenances such as shoulders, storm drainage facilities, subgrade drains, pavement numbering and marking, and tie-down anchors. PF: Square Yards: The total square yards of non-concrete and non-bituminous surface airfield area for which the installation is responsible during the report period. Express in units of 1,000 (K) square yards.	
.K5300	*Parking, Open Storage, and Walks (Categories 451, 452, and 852)* Provides for the maintenance and repair of all surfaced parking and open storage areas and walks.	

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Section XII. BASE OPERATIONS—Z ACCOUNTS—Continued

(Codes .A0000–.R0000)

Code	Activity and performance factor definitions	Prior code
	PF: Square Yards: The total square yards of surfaced parking and open storage areas and walks for which the installation is responsible during the period. Construction categories 451, 452, and 852. See AR 415-28. Express in units of 1,000 (K) square yards.	
.K5310	*Parking, Open Storage, and Walks—Concrete and Bituminous* Provides for the maintenance and repair of concrete and bituminous surfaced parking and open storage areas and walks. PF: Square Yards: The total square yards of parking and open storage and walks constructed of concrete or bituminous for which the installation is responsible for during the report period. Express in units of 1,000 (K) square yards.	
.K5320	*Parking, Open Storage and Walks—Other Miscellaneous* Provides for the maintenance and repair for all parking and open storage areas and walks which are constructed of material other than concrete or bituminous. PF: Square Yards: The total square yards of parking and open storage areas and walks constructed from material other than concrete or bituminous for which the installation is responsible during the report period. Express in units of 1,000 (K) square yards.	
.K5400	*Bridges, Vehicular, Railroad, and Foot* Provides for the maintenance and repair, and the inspection and analysis of the structural strength of all vehicular, railroad, and foot bridges. The posting and maintenance of safe load limit signs is also included. PF: Lineal Feet: The lineal feet of all bridges.	
.K6000	*Miscellaneous Maintenance* Provides for the maintenance and repair of facilities related to waterfront facilities and waterways, ranges, building codes, and national historic facilities. PF: Number of Facilities: The total number of facilities for which the installation is responsible.	
.K6100	*Waterfront Facilities and Waterways* Provides for the maintenance and repair of wharves, piers, docks, transfer bridges, bulkheads, marine railways, dolphins, mooring buoys, seawalls, breakwaters, causeways, jetties, revetments, approaches, turning basins, berth areas, and maintenance dredging. Excludes buildings, grounds, railroads, surfaced areas, waterways maintained under the Corps of Engineers. PF: Number of Facilities. The number of waterfront and waterway facilities for which the installation is responsible.	
.K6200	*Maintenance, Repair, and Acquisition of Power-Operated Shop Machinery and Hand Operated Equipment* Provides for the maintenance, repair, and acquisition of power-operated shop machinery, such as planers, threading machines and lathes, and hand operated equipment, such as bending brakes, squaring shears, etc. PF: None.	
.K6300	*Building Related Facilities* Provides for the maintenance and repair of facilities related to	

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Section XII. BASE OPERATIONS—Z ACCOUNTS—Continued

(Codes .A0000–.R0000)

Code	Activity and performance factor definitions	Prior code
	base building codes including fencing, flag poles, outdoor swimming pools (except water purification plants) guard and watch towers, grease racks, unattached loading ramps, training facilities (other than buildings), monuments, grandstands, bleachers, elevated garbage racks and can washing facilities (except plumbing), fabrication of signs, (excluding traffic signs), and other miscellaneous structures related to base building codes. PF: None.	
.K6310	*Family Housing Facilities* See Code .K6300. PF: None.	
.K6320	*Community Facilities* See Code .K6300. PF: None.	
.K6330	*Operational Facilities* See Code .K6300. PF: None.	
.K6340	*Maintenance Facilities* See Code .K6300. PF: None.	
.K6350	*Production Facilities* See Code .K6300. PF: None.	
.K6360	*RDTE Facilities* See Code .K6300. PF: None.	
.K6370	*Administrative Facilities* See Code .K6300. PF: None.	
.K6380	*Training Facilities* See Code .K6300. PF: None.	
.K6390	*Other Facilities* Those facilities which are installation-wide or cannot be associated with one of the above. PF: None.	
.K6400	*National Historic Preservation Program* Provides for the maintenance, repair, preservation, rehabilitation, restoration, and ruins preservation to Federal standards. Includes historic grounds, structures, and objects listed, or nominated to be listed, in the "National Register of Historic Places". Maintenance and repair provided to historic facilities to Army standards will be reported under other appropriate codes. PF: Number of Facilities. The number of facilities for which the installation is responsible.	
.K8000	*Maintenance and Repair—Inactive Installations/Facilities* Provides for activities defined in .K1000 through .K6000. Inactive installations and for inactive facilities at active installations not otherwise provided for. PF: (1) Square Feet: The number of square feet of gross floor area of all buildings at inactive installations, excluding structures except that covered and enclosed walks are considered to be an integral part of the buildings to which they	

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Section XII. BASE OPERATIONS—Z ACCOUNTS—Continued

(Codes .A0000–.R0000)

Code	Activity and performance factor definitions	Prior code
	are attached. The floor areas of such walks to be included. Express in units of 1000 (K) square feet. (2) Square Feet for Inactive Facilities (not reported in .K2000). Express in units of 1000 (K) square feet. (3) Dollar value of BMAR. Includes total cost of reopening inactive facilities to beneficial occupancy. Express in units of $1,000 as end of the reporting period.	
.K9000	*Facilities Engineering Shops, Suspense Accounts* When accounting procedures provide for use of average effective rates for Facilities Engineering personnel regularly performing work chargeable to more than one detail account, sub-accounts will be established under this activity for each workcenter (shop). See AR 37-108, paragraph 9-63*e*. PF: None.	
.KV999	*Base Closures/Reduction-in-Force Actions* This account will reflect the one-time costs attributable to base closures or reduction-in-force (RIF) actions identifiable to Maintenance and Repair of Real Property. Includes cost of severance pay, terminal leave, and related nonproductive expenses of employees affected by base closures or RIF actions. Also includes other incidental cost associated with base closures/reductions which are directly related to closing or reducing activities within the .K series. PF: None.	
.L0000	MINOR CONSTRUCTION Expenses for the erection, installation, or assembly of a new real property facility; the addition, expansion, extension, alteration, conversion, or replacement of an existing real property facility; or the relocation of a real property facility from one installation to another. Includes design costs directly associated with accomplishing a designated project undertaking. Excludes the costs of minor construction projects financed by military construction funds. Includes equipment depreciation costs (nonfinanced) computed in accordance with hourly use factors in table 2-1, AR 415-35. The Maintenance and Repair of Real Property Facilities (MRPF) Floor cost information is accumulated by consolidation of the applicable Maintenance and Repair of Real Property (.K0000) and Minor Construction (.L0000) accounts in accordance with instructions established in AR 37-108 and AR 37-151. (The Management and Engineering portion of Other Engineering (.M0000) is no longer applicable to the Floor.) PF: (1) Ratio Percentage (computed on a fiscal-year-to-date basis) of the amount of direct expense costs in .K0000. The target ratio (percentage) will be computed exclusive of military personnel and reimbursable expenses for both functional categories .K0000 and .L0000. (2) Facilities Engineer Work Force Man-years for Active Facilities: Report for military, US civilians, and other civilians expressed in whole man-years. (3) Facilities Engineer Work Force Man-years for Inactive Facilities: Report as in (2) above.	
.L1000	*Alterations and Minor Construction—Active Facilities* Provides for alterations and minor construction of facilities when accomplished from funds made available for operation and maintenance of facilities. Excludes work accomplished with Military Construction appropriation. See AR 415-35 and AR 420-10. Costs will be maintained for individual projects as required for complying with	

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Code	Activity and performance factor definitions	Prior code
	statutory and administration limitations by suffixing the applicable Army Management Structure Account to identify those projects to be controlled. PF: None.	
.L8000	*Alterations and Minor Construction—Inactive Installations* Provides for activities defined in Code .L1000. PF: None.	
.LV999	*Base Closures/Reduction-in-Force Actions* This account will reflect the one-time costs attributable to base closures or reduction-in-force (RIF) actions identifiable to Minor Construction. Includes cost of severance pay, terminal leave, and related nonproductive expenses of employees affected by base closures or RIF actions. Also includes other incidental cost associated with base closures/reductions which are directly related to closing or reducing activities within the .L series. PF: None.	
.M0000	OTHER ENGINEERING SUPPORT Expenses for provision of miscellaneous real property services, including fire protection, custodial services, pest control, refuse collection and disposal, and snow removal and ice alleviation. Includes rental of real property when not otherwise identifiable, and Facilities Engineering or public works management and engineering not otherwise identifiable. PF: (1) Facilities Engineer Work Force Man-years for Active Facilities. See .L0000. (2) Facilities Engineer Work Force Man-years for Inactive Facilities. See .L0000. (3) Square Feet (SF). Total square feet of gross floor area of all buildings at active installations (including inactive portions thereof) for which fire protection, custodial services, and pest control services are provided—as of the end of the report period. Express in units of 1,000 (K) square feet.	
.M1000	*Fire Prevention and Protection* Provides for the routine maintenance and repair of fire protection equipment by fire prevention and protection personnel and for fire protection and prevention services, including the procurement and installation of fire extinguishers in newly constructed buildings and their replacement in existing buildings. PF: (1) Number of Military Personnel Assigned—The average number of military personnel assigned to the fire prevention and protection activity during the report period. (2) Number of Civilian Personnel Assigned—The average number of civilian personnel assigned to the fire prevention and protection activity during the report period.	
.M2000	*Refuse Handling* Provides for all methods of refuse collection and disposal. PF: Cubic Yards: The total number of uncompacted cubic yards of refuse collected at the installation during the report period (TM 5-634). Same quantity as .M2100. Express in units of 1,000 (K) cubic yards.	
.M2100	*Collection* Provides for all methods of refuse collection, including contract. PF: Cubic Yards: The total number of uncompacted cubic yards of refuse and salvage collected at the installation by FE forces or FE contractors during the report period (TM	

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Section XII. BASE OPERATIONS—Z ACCOUNTS—Continued

(Codes .A0000–.R0000)

Code	Activity and performance factor definitions	Prior code
	5–634). Express in units of 1,000 (K) cubic yards. This yardage figure should be repeated in .M2000.	
.M2200	*Disposal* Provides for all methods of refuse disposal, including contracts; payment of a fee at a cost to the Government; operation maintenance and repair of incinerators; sanitary fills, regulated dumps; and all other approved methods. PF: Cubic Yards: The total number of uncompacted cubic yards of refuse disposed of at the installation during the report period to include wastes delivered by others, i.e. troop units and construction/demolition contractors (TM 5–634). Express in units of 1,000 (K) cubic yards.	
.M2210	*Sanitary Fill* Provides for opening, operation, and closure of sanitary landfills owned and/or operated by the installation. PF: Cubic Yards—The total number of uncompacted cubic yards of refuse, *excluding residue from resource recovery facilities*, disposed of at sanitary landfills during the report period. Express in units of 1,000 (K) cubic yards.	
.M2220	*Incineration* Provides for the operation and maintenance of incinerators owned and/or operated by the installation used for refuse disposal. PF: Cubic Yards: The total number of uncompacted cubic yards of refuse disposed of through incineration during the report period.	
.M2230	*Resource Recovery/Recycling* Provides for the operation and maintenance of all resource recovery/recycling centers, points and equipment, owned and/or operated by the installation. *This excludes .M2240.* PF: Cubic Yards: The total number of uncompacted cubic yards recycled by methods *other than source separation of hi-grade paper, cardboard and newspapers.* Express in units of 1000 (K) cubic yards.	
.M2240	*Source Separation of Paper* Provides for all costs associated with the source separation of paper for the purpose of sale for recycling. PF: Cubic Yards: The total number of uncompacted cubic yards of hi-grade office paper, cardboard and newspaper separated at the source for the purpose of recycling. Express in units of 1000 (K) cubic yards.	
.M2250	*Other* Provides for all other methods of disposing of refuse (i.e., contract). PF: Cubic Yards—The total number of uncompacted cubic yards of refuse disposed of other than by sanitary landfills or incineration. Express in units of 1,000 (K) cubic yards.	.M2230
.M3000	*Pest Control Services* Provides for all control measures directed against fungi, insects, rodents, and other pests, excluding weeds. PF: None.	

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Section XII. BASE OPERATIONS—Z ACCOUNTS—Continued

(Codes .A0000–.R0000)

Code	Activity and performance factor definitions	Prior code
.M3100	*Pest Control Services—Buildings* Provides for all control measures directed against insects, rodents, birds, fungi, and other pests in buildings. Excludes repair damage to buildings, structures, or screens. PF: Square Feet: The total square feet of gross floor area of all buildings, hutments, winterized tents at active installations (including inactive portions of active installations) as of the end of the reporting period. Express in units of 1,000 (K) square feet.	
.M3200	*Pest Control Services—Grounds* Provides for all control measures directed against insects, rodents, birds, fungi, and other pests. Excludes herbicide and fertilizer applications, tree removal, and similar functions. PF: Acres. The total acres of grounds (improved and other) and water areas for which the installation is responsible during the report period.	
.M4000	*Custodial Services* Provides for custodial and janitorial services performed as a facilities engineering responsibility in accordance with AR 420–81 and TM 5–609, to include cost of materials, supplies, and equipment; maintenance and repair of equipment; supervision and training of the work force engaged in the performance of custodial services at the installation; supervision and inspection of in-house and contract performance. PF: Square Feet: The portion of the floor area of buildings for which custodial services are actually performed as a facilities engineering responsibility during the report period. Express in units of 1,000 (K) square feet.	
.M4100	*Custodial Services—Contract Performance* Provides for contract performance of custodial and janitorial services performed as a facilities engineering responsibility in accordance with AR 420–81, TB Eng 400, and TM 5–609, to include contract costs paid to suppliers, contract preparation, supervision, inspection, administration, and other related costs. Government-furnished materials and supplies should be included, as appropriate. PF: Square Feet (Contract).	
.M4200	*Custodial Services—In-house Performance* Provides for in-house performance of custodial and janitorial services performed as a facilities engineering responsibility in accordance with AR 420–81 and TM 5–609 to include costs of civilian in-house personnel services, materials, supplies, equipment, and maintenance and repair of equipment issued to personnel outlined in column 1–2–3, table I, AR 420–81, training, supervision, and inspections, and other personnel overhead and indirect costs. PF: Square Feet (In-house).	
.M5000	*Snow and Sand Removal and Ice Alleviation* Provides for removing, hauling, and disposing of snow; ice alleviation; erection, maintenance, repair, and removal and storage of snow fences; removal of sand resulting from sand storms. PF: None.	
.M6000	*Management and Engineering—Active Installations (Including Master Planning)* Provides general management (e.g. work coordinating office), supervision, administration, engineering, mapping, planning, and other activi-	

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Section XII. BASE OPERATIONS—Z ACCOUNTS—Continued

(Codes .A0000–.R0000)

Code	Activity and performance factor definitions	Prior code
	ties of a general nature, whether performed in-house or by contract; master planning, which includes preparation of basic information maps, analyses of existing installations, tabulations of total existing and required installations, future development plans including mobilization overlays, analytical reports to accompany general site plan, installation construction programs (permanent and emergency), preparation of mobilization development plans and complete related mobilization planning activities. Includes consultant services where required. Excludes project management, administration, and inspection identified as direct cost to a project (para 1–3*k*, AR 415–35 and para 1–3*f*, AR 420–10). Excludes project design costs directly associated with accomplishing a designated project undertaking. Provides for services associated with joint inspection and acceptance of new construction. PF: Percent: Percentage (computed on a fiscal year-to-date basis) of total cost in Codes .J0000, .K0000, .L0000, and .M0000.	
.M6100	*Management and Engineering (Less Master Planning)* See .M6000. Includes the cost of work described in table 612 of DA Pam 570–551. PF: See .M6000.	
.M6200	*Master Planning.* See .M6000. PF: See code .M6000.	
.M6300	*Environmental Program Management—Active Installations* Provides for all costs incurred for management of environmental programs to include: research contracts and consultant fees, administration, equipment, EIA/EIS, and special studies directly identifiable to environmental management. PF: None.	
.M8000	*Engineering Support—Inactive Installations/Facilities* Provides for activities as defined in .M1000 through .M9000 which are pertinent to inactive installations. PF: None.	
.M8100	*Management and Engineering—Inactive Installations* Provides for activities as defined in .M6000 which are pertinent to inactive installations. PF: None.	
.M8200	*Other Engineer Activities—Inactive Installations* Provides for all Other Engineering Support activities for inactive installations except as provided for in .M8100. PF: None.	
.M8300	*Environmental Program Management—Inactive Installations* Provides for all costs incurred for management of environmental programs to include: research contracts and consultant fees, administration, equipment, EIA/EIS and special studies directly identifiable to environmental management. PF: None.	
.M9000	*Miscellaneous Engineer Activities* Expenses for provision of miscellaneous services described as follows: Rents, initial alterations, and restorations; land payments; deficiency judgments; special maintenance activities; packing and crating (household goods and other items); Facilities Engineering Supply Account; Purchased Facilities Engineering; maintenance and service equipment; operation and maintenance; maintenance and service equipment acquisition; and installation of physical security devices. PF: None.	

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Section XII. BASE OPERATIONS—Z ACCOUNTS—Continued

(Codes .A0000–.R0000)

Code	Activity and performance factor definitions	Prior code
.M9100	*Real Estate Transactions* Includes rents, initial and alterations and restorations, land payments, and deficiency judgments. PF: None.	
.M9110	*Rents, Initial Alteration, and Restoration* Provides for payment for use of real property under lease. Includes resettlement under PL's 155 and 534, 82nd Congress. Includes losses and damages incident to Army leasehold acquisition. Alter real property when initially acquired by lease and restore such property when returned to owner. Rental payments to lessors or their legally constituted representatives for use of real property under lease. Includes resettlement reimbursements under PL's 155 and 435, 82nd Congress. Alter real property when initially acquired by lease to meet the needs of the using service. Restore real property upon termination of leasehold interest. PF: None.	
.M9120	*Land Payments* Payments for real property acquisition for DA as authorized by sections 2672 and 2674 of Title 10, US Code, as amended. PF: None.	
.M9130	*Deficiency Judgments* Payments to satisfy deficiency judgments in condemnation proceedings arising from cases filed in prior fiscal years for which construction funds have either been exhausted or withdrawn. PF: None.	
.M9200	*Installation of Intrusion Detection Systems* Provides for the installation of intrusion detection systems. PF: Number of intrusion detection systems installed during the reporting period.	
.M9300	*Family Housing Household Equipment Maintenance* Includes reimbursable maintenance performed on household equipment as defined in FHMA 1910.16230. Household equipment includes clothes washers and dryers, ranges, refrigerators, freezers, portable dishwashers, and portable fans. Excludes built-in equipment, such as hot water heaters, furnaces, undercounter dishwashers, and garbage disposers. Excludes those payments made directly by the Office, Chief of Engineers, and charged to 728012.15, Real Estate Administration. PF: (1) Man-hours. (2) Number of units of household equipment.	
.M9400	*Special Maintenance Activities* Provides for work performed by the facilities engineer on a nonreimbursable basis at the direction of the commander which is outside the scope of Real Property Maintenance Activities (RPMA) and is not otherwise assigned by the commander to other activity codes in the Army Management Structure (AMS). In addition, it provides for non-RPMA work accomplished on a reimbursable basis by the facilities engineer at the direction of the commander which is included in other non-engineer accounts within the Army Management Structure. Does not include .M9300 above. PF: None.	

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Section XII. BASE OPERATIONS—Z ACCOUNTS—Continued

(Codes .A0000–.R0000)

Code	Activity and performance factor definitions	Prior code
.M9410	*Special Maintenance Activities—Non-Reimbursable* Provides for work performed by the facilities engineer on a non-reimbursable basis at the direction of the commander which is outside the scope of Real Property Maintenance Activities (RPMA) and is not otherwise assigned by the commander to other activity codes in the Army Management Structure (AMS). PF: None.	
.M9420	*Special Maintenance Activities—Reimbursable* Provides for non-RPMA work accomplished on a reimbursable basis by the facilities engineer at the direction of the commander which is included in other non-engineer accounts within the Army Management Structure (AMS). PF: None.	
.M9500	*Packing and Crating* Provides for packing, crating, preservation and marking, facilities engineering supplies and equipment, household goods, and personal property when performed as a facilities engineering activity in accordance with AR 420–79. Includes work performed by facilities engineering personnel for blocking, bracing, and dunnage within railroad cars or motor vehicles of equipment which is shipped, whether crated or uncrated. PF: None.	
.M9600	*Facilities Engineering Supply and Inventory Suspense Accounts* Provides for the receipt, storage, issue, and stock control of facilities engineers operating supplies and equipment. Provides for the recording of supplies and materials procured for stockage, from a commercial vendor or a stock fund, for general use by the facilities engineers. PF: None.	
.M9610	*Facilities Engineering Supply Operations* Operate a facilities engineer supply activity. Provides for the receipt, storage, issue, and stock control of facilities engineers operating supplies and equipment. Includes costs related to coal, except that coal handling will be chargeable to the applicable .J0000 account. Includes costs of the accountable officer, his staff, and related costs. PF: None.	
.M9620	*Inventory Suspense Accounts* Provides for the recording of supplies and materials procured for stockage, from a commercial vendor or a stock fund, for general use by the facilities engineers. Subsequent distribution to the applicable consuming functional account (i.e., .K0000 or .L0000) can be based on requisitions for issue from inventory or issues to a job order. PF: None.	
.M9700	*Purchased Facilities Engineering Services* Provides for purchase of facilities engineering type services by OMA financed tenants which reimburse host installations financed by other than OMA and by Department of the Army tenants occupying other than Department of the Army reportable real property (AR 405–45). PF: None.	

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Section XII. BASE OPERATIONS—Z ACCOUNTS—Continued

(Codes .A0000–.R0000)

Code	Activity and performance factor definitions	Prior code
.M9800	*M & S Equipment Acquisition and Operation and Maintenance* Provides for acquisition of facilities engineering maintenance and service (M&S) equipment and costs incurred in its maintenance and repair for M&S type equipment costing over $1000. PF: None.	
.M9810	*M & S Equipment Acquisition* Provides for acquisition of facilities engineering maintenance and service (M&S) equipment (AR 420-83), exclusive of investment items financed by procurement appropriations and exclusive of equipment costing less than $1,000 which is chargeable to the activity for which procured. Includes M&S type equipment costing over $1,000. Includes cost of capital, non-production equipment at installations operating under the Army Industrial Fund, when such costs are not properly chargeable to the AIF, to other appropriations such as APA or RDTE, or to other OMA accounts. *Note.* Equipment with unit cost of less than $1,000 is a proper charge to AIF accounts. PF: None.	
.M9820	*M & S Equipment, Operation and Maintenance (Net.)* Provides for the net difference between costs incurred for maintenance and repair, including operational fuel and supplies for maintenance and service (M&S) equipment, and cost distributed to activities on which this equipment and other Government-owned (borrowed) equipment is used through application of use (rental) rates. PF: Percent Utilization: Percent of utilization computed by dividing the number of hours of use by potential hours of use (2,000 per year) for M&S equipment valued at $1,000 or more. Exclude from the computation the hours of use and potential hours of use for fire trucks and for seasonal equipment during off-season period. Potential hours will exclude deadlined time for repairs. Hours of use will exclude storage time (nonusage time) at the job site for convenience.	
.M9821	*M & S Equipment, Operation and Maintenance (Dr)* Provides for operating supplies and maintenance of M&S equipment (AR 420-83) valued at $1,000 or more when maintenance is performed by the facilities engineer in-house or by contract. Excludes costs chargeable to .C0000 or .D1000. Excludes rental costs of M&S equipment obtained from commercial sources and/or other Government agencies on a reimbursable agreement, and excludes operating supplies and maintenance of equipment valued at less than $1,000, which are charged to the activity for which the equipment is used. PF: None.	
.M9822	*M & S Equipment, Operation and Maintenance (Cr)* Provides for offset (credit) for operation and maintenance expense on both M&S equipment and other (borrowed) equipment valued at $1,000 or more, distributed to activities on which equipment is used through application of rental rates established by AR 420-83 and AR 415-35. Excludes credits for depreciation (nonfinanced) distributed to .L0000 activities (see para 9-67, AR 37-108). PF: None.	

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