GROUNDWATER STUDY

WHITE MESA FACILITY

BLANDING, UTAH

PREPARED BY

UMETCO MINERALS CORPORATION

PEEL ENVIRONMENTAL SERVICES

JANUARY 1993

EXECUTIVE SUMMARY

(1) Umetco Minerals Corporation conducted additional groundwater studies for the White Mesa facility during November-December, 1992.

(2) Four new borings were drilled and completed as monitoring wells. Two wells were established upgradient and two downgradient of the facility.

(3) The borings encountered an average of 98 feet of very dry to dry sandstones with claystone layers overlying a saturated zone in the Burro Canyon Formation of limited thickness (average 26 feet).

(4) Some investigators (U.S. DOE consultants) consider water in the Dakota Burro Canyon sequence not to be an aquifer because of its limited extent and low hydraulic conductivity properties. (Naturita Tailings Remedial Action Project)

(5) Travel times to the Burro Canyon saturated zone from pond releases have been estimated based on analysis on the boring and well test data. Travel times can be as short as a few weeks for joints directly in contact with tailings solutions to 60+ years for partially saturated flow conditions.

(6) The chemistry of groundwater from the monitoring wells is extremely variable, but all tend to be dominated by the sulfate ion.

(7) Use of a single monitoring well for background purposes appears to be inappropriate. Time comparisons of a specific ion species (chlorides) within specific wells is recommended for determining operational impacts on the saturated zone in the Burro Canyon Formation.

(8) Statistical "T" tests (at the 0.05 level of significance) performed on samples of chloride populations from specific wells over time show no significant change in chloride concentrations. Some downgradient wells analyzed do show a statistical significant decrease in the chloride ion populations.

(9) The statistical analysis is confirmed by the chemistry of Cell 2 leak detection system.

(10) Analyses of subsurface data collected from the present and past studies and analysis of groundwater chemistry show that uranium recovery operations at White Mesa have not affected the groundwater in the saturated zone of the Burro Canyon Formation.

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1.0 INTRODUCTION

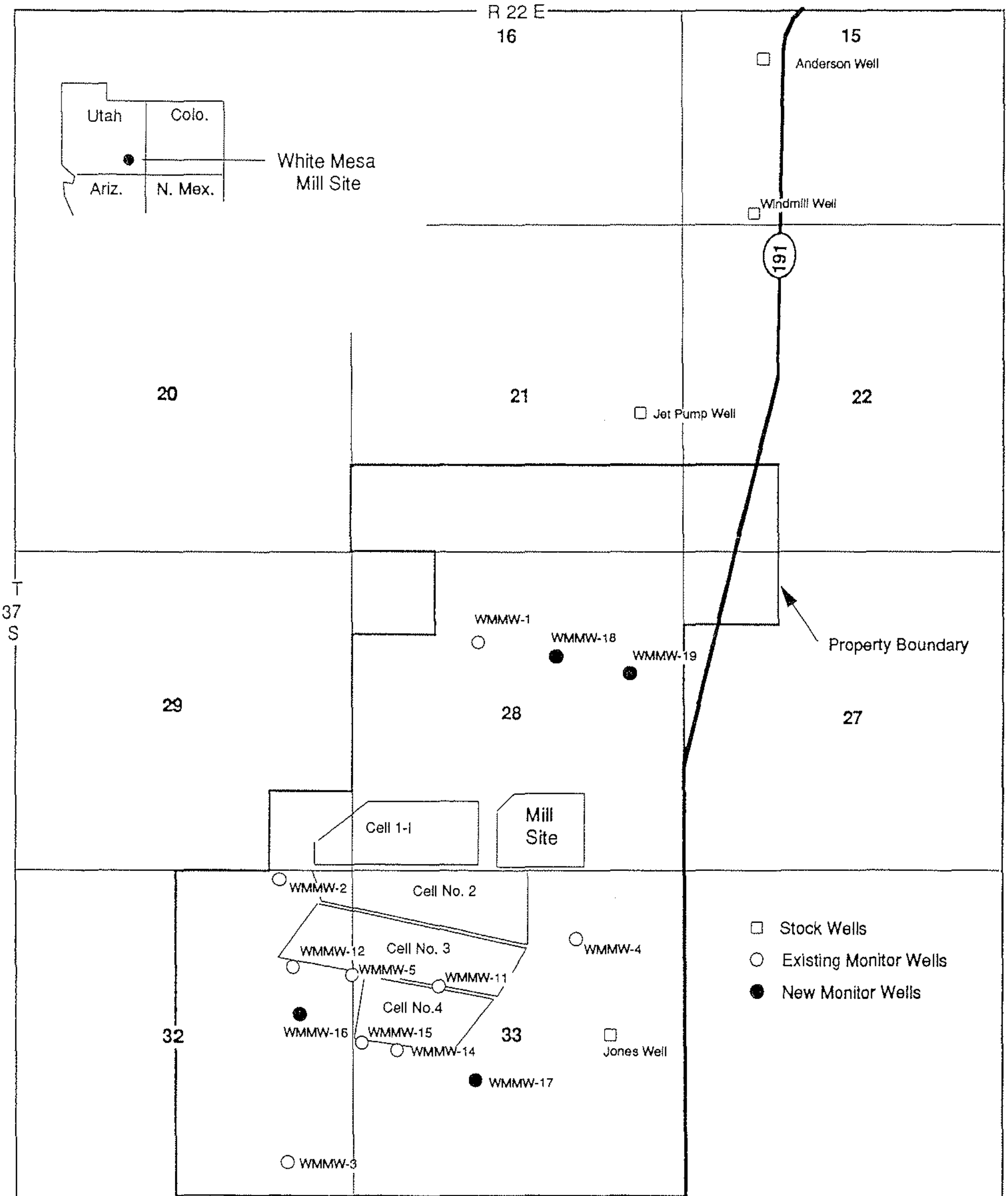
Umetco Minerals Corporation in conjunction with Peel Environmental Services has conducted a geotechnical/geohydrological investigation at the White Mesa Mill site near Blanding, Utah (see Figure 1.0-1). The study was performed to update and verify previous investigations and studies of the geohydrology of the White Mesa facility.

The work consisted of the following:

- Review of existing data and previous studies.
- Preparation of study and data acquisition plan.
- Site inspection and mapping by a geologist and geotechnical engineer.
- Aquifer pump testing and geophysical logging of existing monitor wells.
- Drilling, geophysical logging and testing hydrogeologic properties of four new borings.
- Construction of the four new borings as monitor wells.

The following report presents our methods of investigation, the geotechnical and geohydrological conditions encountered at the project area, and presents our conclusions as to the impact of uranium recovery operations on groundwater.

This report supplements the "Environmental Report 1978" by Dames and Moore and the "1991 License Renewal Application (License SUA-1358)." It also incorporates data and analysis from the report "Ground-water Hydrology at the White Mesa Tailings Facility" by Hydro-Engineering, July, 1991.



White Mesa Mill Site

Figure 1.0 - 1

2.0 REGIONAL GEOLOGY

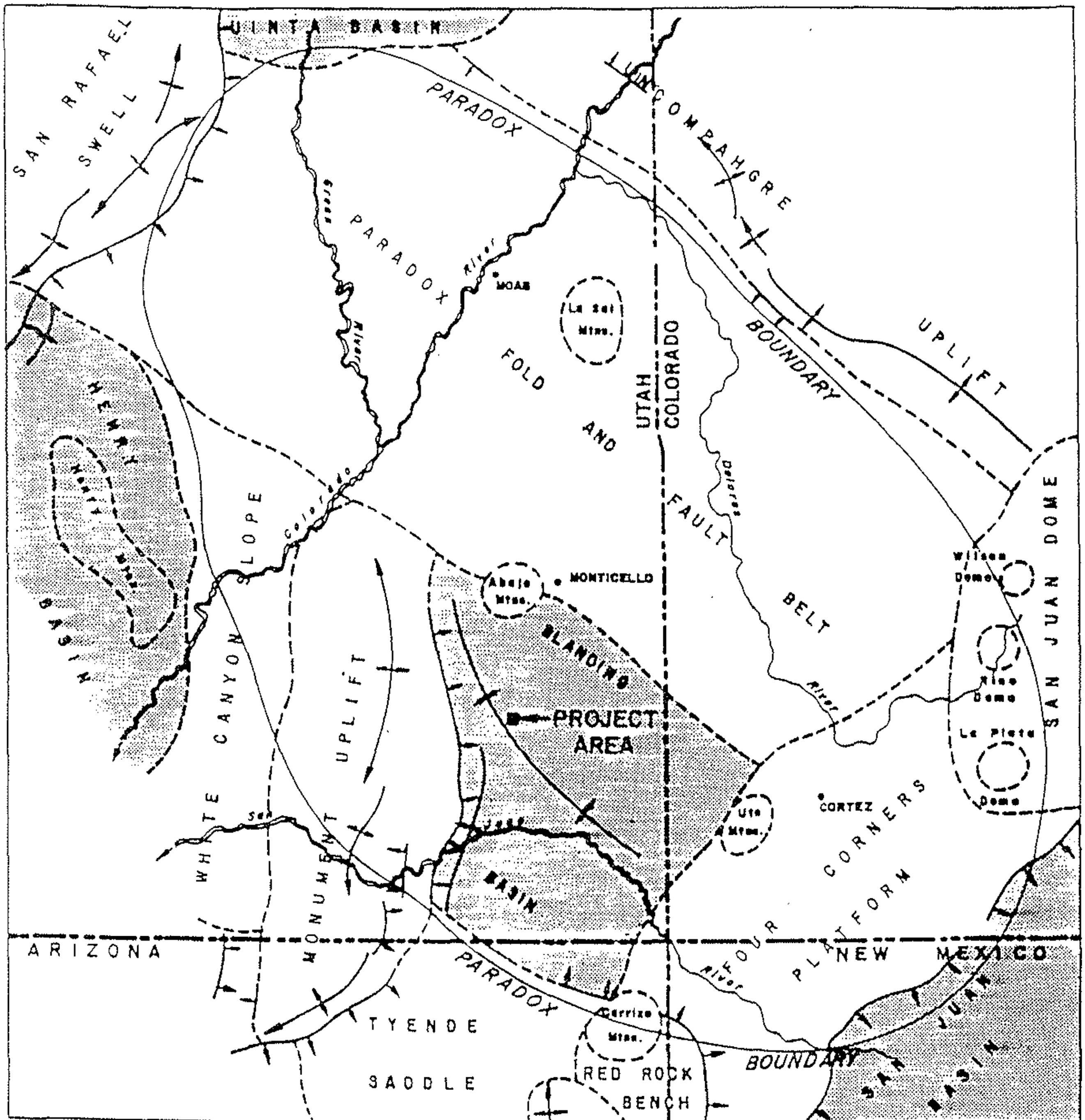
The White Mesa Mill is situated near the western margin of the Blanding Basin in southeastern Utah. Thousands of feet of multi-colored marine and non-marine sedimentary rocks have been uplifted and warped, and subsequent erosion has carved a spectacular landscape for which the region is famous.

2.1 Physiography and Structure

The White Mesa Mill site is located within the Canyon Lands section of the Colorado Plateau physiographic province (Figure 2.1-1). To the north, this region is bounded by the Bookcliffs and Grand Mesa of the Uinta Basin; the western margins are defined by the tectonically controlled high plateaus of the Monument Uplift. The eastern boundary, less distinct, falls where the elevated surface of the Canyon Lands section merges with the Southern Rocky Mountain province. The southern boundary is arbitrarily defined as the San Juan River.

The Canyon Lands has undergone epirogenic uplift and subsequent erosion which have produced the region's characteristic topography represented by high plateaus, mesas, buttes, and deep canyons incised into relatively flat lying sedimentary rocks of pre-Tertiary age. Elevations range from approximately 3,000 feet in the bottoms of the deep canyons along the southwestern margins of the region to more than 11,000 feet in the Henry, Abajo and La Sal Mountains located to the north and northeast of the White Mesa Mill. With the exception of the deep canyons and isolated mountain peaks, an average elevation slightly in excess of 5,000 feet persists over most of the Canyon Lands.

The Mill site is located near the western edge of the Blanding Basin, which is situated east of the north-south trending Monument Uplift, south of the Abajo Mountains and southwest of the northwest-trending Paradox fold and fault belt. The southern boundary is defined by the Tyende Saddle and Carrizo Mountains just south of the Utah-Arizona border.



Tectonic Map of Southeastern Utah and Southwestern Colorado

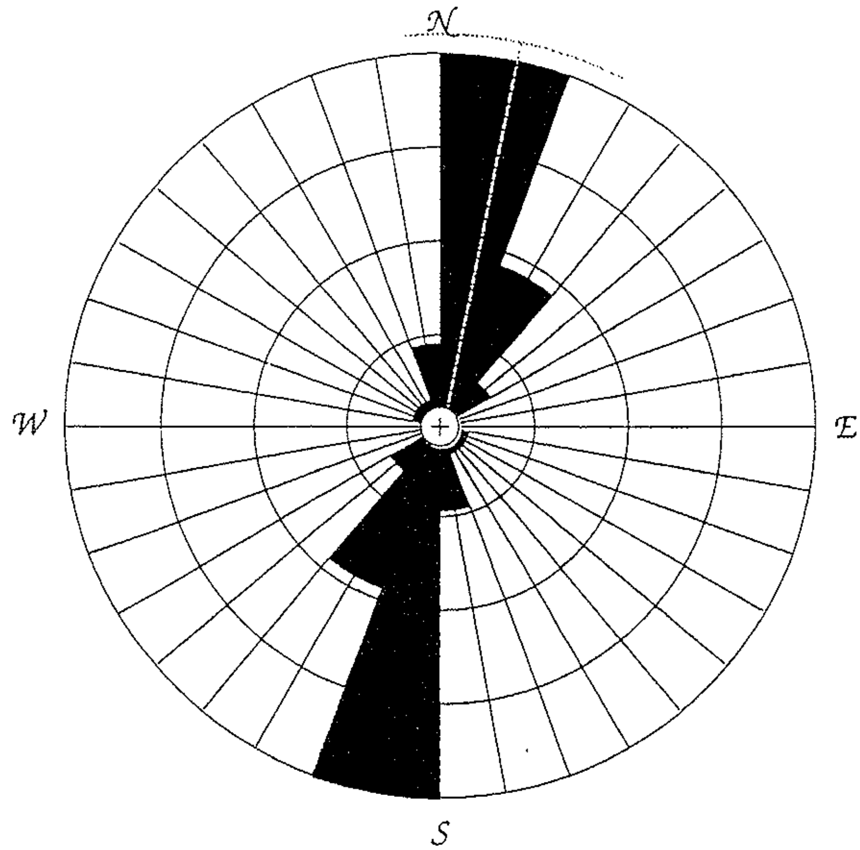
Figure 2.1 - 1

Topographically, the Abajo Mountains are the most prominent feature in the region, rising more than 4,000 feet above the broad, flat surface of the Great Sage Plain. The Great Sage Plain is a structural slope, capped by the resistant Burro Canyon Formation and Dakota sandstone. These strata lie almost horizontal in an east-west direction, but dip to the south with a regional dip of about 2,000 feet over a distance of nearly 50 miles. Though not as deeply or intricately dissected as other parts of the Canyon Lands, the plain is cut by narrow, vertical-walled south-trending valleys which range from 100 to more than 500 feet in depth.

The strata underlying White Mesa have a regional dip of 1/2° to 1° to the south; however, local dips of 5° have been measured. Haynes, et al (1972) includes a map showing the structure at the base of the Dakota Formation. No faults have been mapped in the immediate vicinity of White Mesa. During an investigation of the site a number of fracture attitudes were measured along the rims of Corral and Cottonwood Canyons. Analysis of these data indicates that there are two joint sets. The distance between the joints in each set varies 5 to 20 feet. The primary joints strike from north-south to N20E with a vector mean of N11E (Figure 2.1-2) and the secondary fractures have a strike ranging between N40W to N60W with a vector mean of N47W (Figure 2.1-3). All joint sets are near vertical to vertical. Only one small fracture was found in the cores during recent drilling. However, this is to be expected in an area of widely-spaced vertical joints.

2.2 Stratigraphy

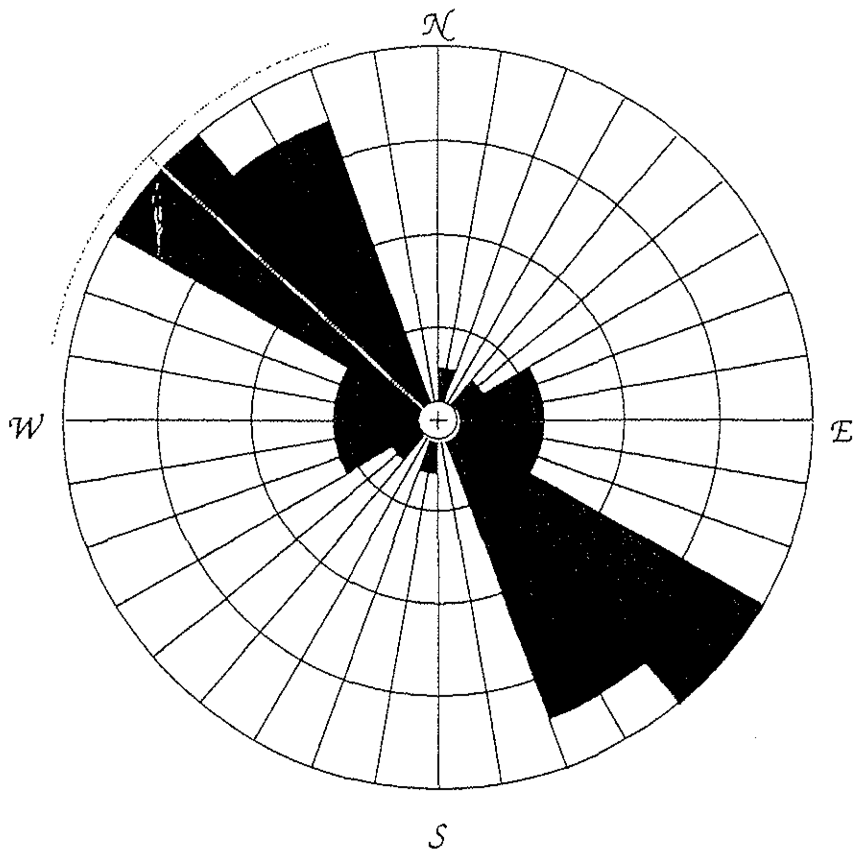
Rocks of Upper Jurassic and Cretaceous age are exposed in the canyon walls in the vicinity of the White Mesa Mill site (Figure 2.2-1). These rock units include, in ascending order, the Salt Wash sandstone, the Recapture shale, the Westwater Canyon sandstone and the Brushy Basin shale members of the Upper Jurassic Age Morrison Formation. Overlaying these units are the Cretaceous Age Burro Canyon Formation, Dakota sandstone, and erosional remnants



Number of readings = 27
Class Interval = 20 degrees
Maximum Percentage = 48.1
Mean Percentage = 14.29
Standard Deviation = 15.70
Vector Mean = N11E

White Mesa Primary Joints
Dakota and Burro Canyon Formations

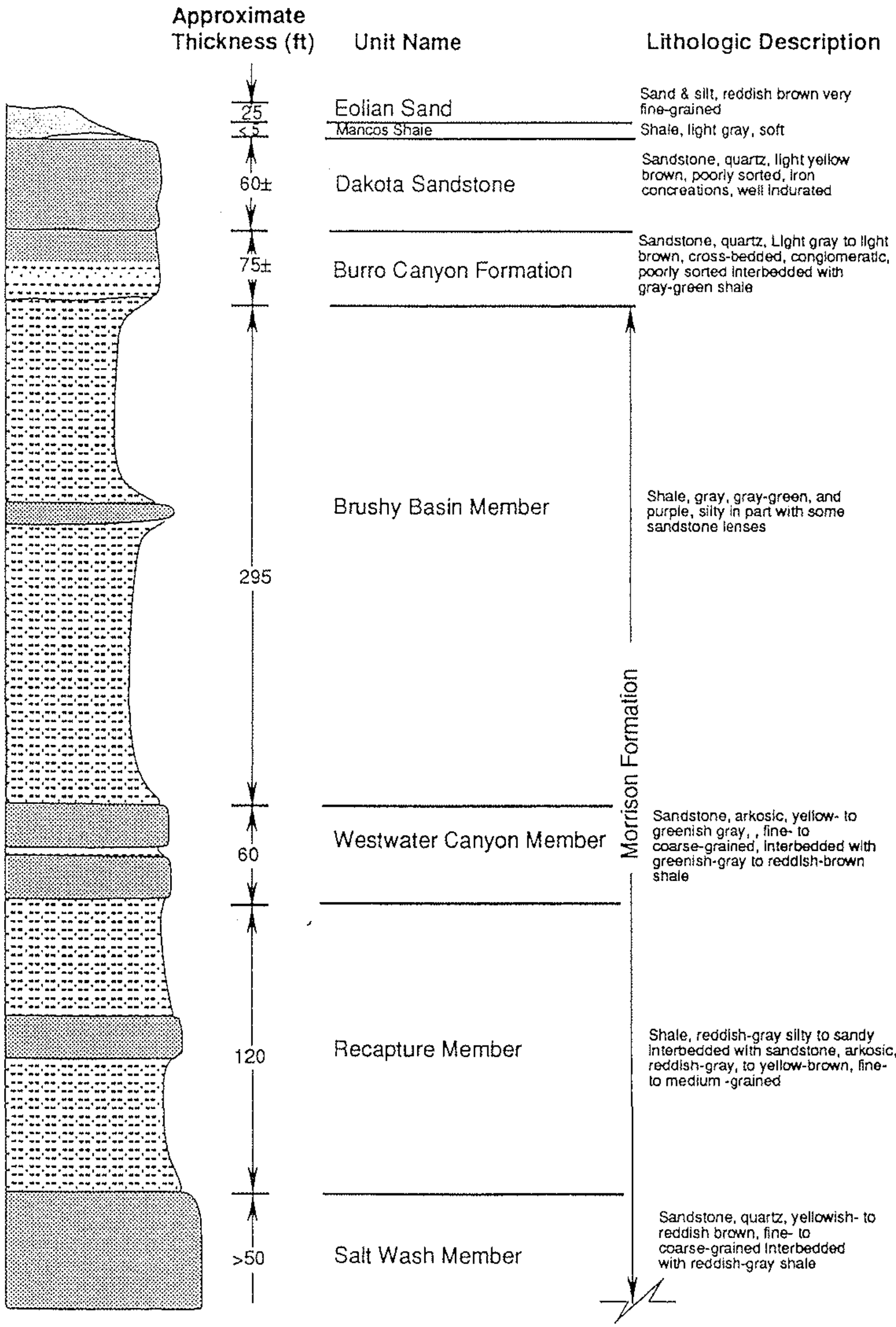
Figure 2.1 - 2



Number of readings = 25
Class Interval = 20 degrees
Maximum Percentage = 28.0
Mean Percentage = 12.50
Standard Deviation = 8.87
Vector Mean = N47W

White Mesa Secondary Joints
Dakota and Burro Canyon Formations

Figure 2.1 - 3



Local Stratigraphic Section

Figure 2.2 - 1

of Mancos shale. Erosional remnants of Mancos shale are only found north of the Mill site. Eolian sand of Quaternary age and varying of thickness overlies the Dakota sandstone and Mancos shale on the mesa, and alluvium, also of Quaternary age, occurs in the bottoms of steam valleys. A thin deposit of talus derived from rock falls of Dakota sandstone and Burro Canyon Formation mantles the lower valley flanks.

A description of each stratigraphic unit at the project area, based on borehole information, field reconnaissance and information provided by other investigators follow:

Salt Wash Member - Medium to thick bedded, hard, gray to bluish-gray, fine- to coarse-grained sandstone, fractured to slightly fractured in the outcrop, interbedded with thinly laminated, hard, light bluish-gray siltstone. This unit is approximately 105 feet thick.

Recapture Member - Thinly laminated, friable to well indurated, yellowish brown to reddish-gray argillaceous siltstone, unfractured. Interbedded with a 20-foot thick grayish brown sandstone layer which pinches out to the south of the Mill site (D'Appolonia, 1982). The thickness of this unit is 120± feet.

Westwater Canyon Member - Thick bedded, well indurated, light grayish green silty sandstone (fine- to corase-grained), fractured to slightly fractured, fine- to coarse-grained, interbedded with thinly laminated greenish-gray silty claystone and clayey siltstone. The thickness of this unit is 60± feet.

Brushy Basin Member - Thinly laminated to medium bedded, soft to hard, variegated claystone and siltstone, interbedded with thick lenses of gray sandstone. Total thickness is approximately 300 feet.

Burro Canyon Formation - Thin cross-bedded, well indurated, light to dark greenish-gray, gray and light brown sandstone occasionally conglomeratic, interbedded with thick, soft, light greenish-gray, waxy shale and siltstone. Thickness is 75± feet.

Dakota Sandstone - Thin bedded, well indurated, light yellowish-brown, poorly sorted, very fine- to medium-grained, kaolinitic, sandstone. The thickness of this formation is 60± feet.

Mancos Shale - Light gray, thin bedded, soft, shale. Only random occurring thin <5-foot thick remnants occur in the area north of the mill site.

Eolian Sand - Reddish brown, very fine sand and silt, unconsolidated to partially cemented with caliche, approximately 20 feet thick. In some areas, particularly south of the Mill site, a 3- to 6-inch layer of caliche was encountered at a depth of 5 feet.

Talus and Colluvium - Sandstone rock fall debris, talus and slope wash, sizes range from cobbles to massive blocks derived from Dakota sandstone and Burro Canyon Formation. Talus is commonly incorporated with clay and silt slopewash, forming a matrix of angular sandstone cobbles mixed with inner materials and containing numerous voids. Thickness of this unit varies considerably, probably from zero to a maximum of 20 feet (D'Appolonia, 1982).

Alluvium - Soft, reddish-brown to yellowish-brown sandy silt with lenses of loose sandy gravel, slightly calcareous.

3.0 HYDROGEOLOGY

3.1 Regional Hydrogeology

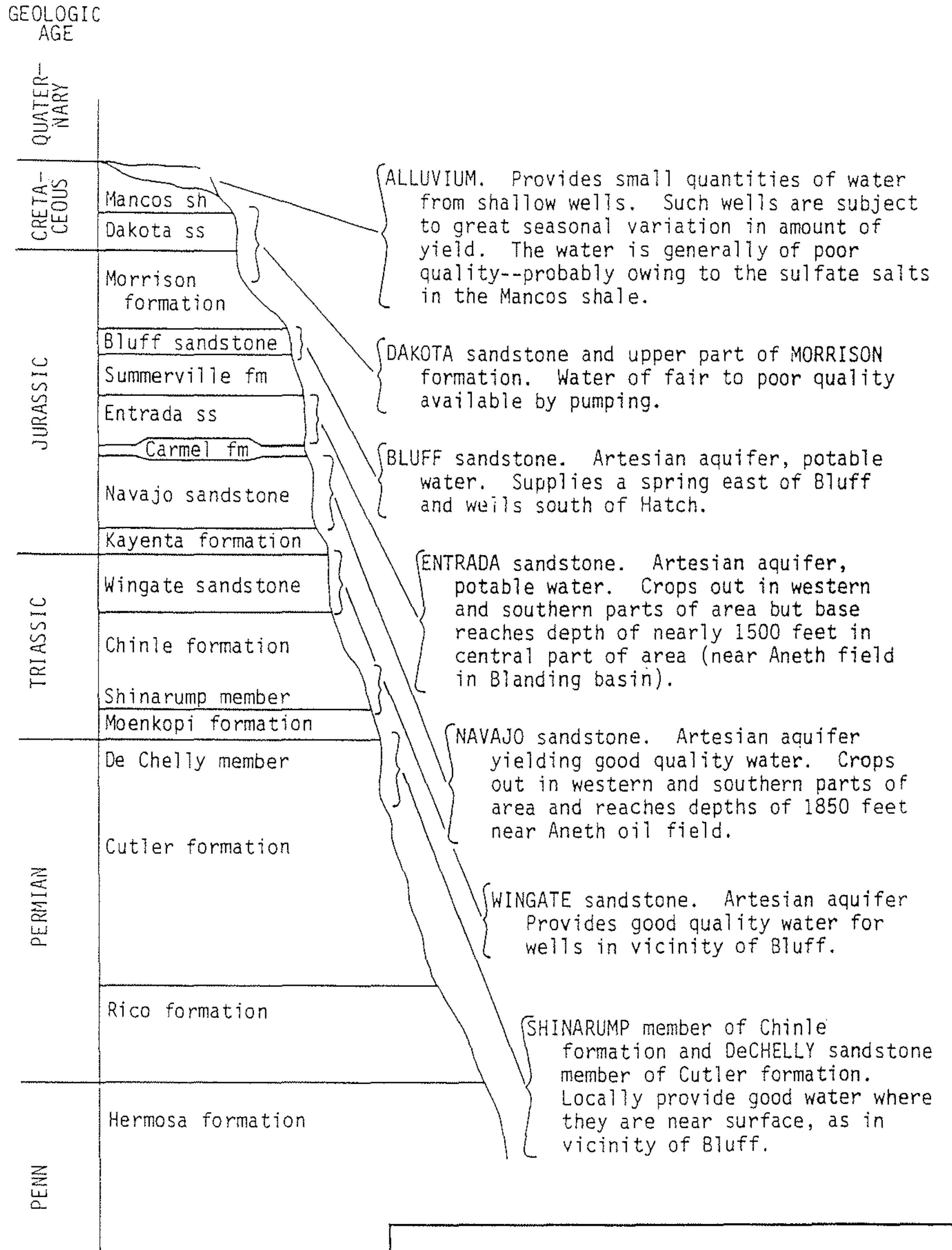
The regional occurrence and distribution of groundwater in the project area are controlled by the type and extent of rock formations and the structural features of the Canyon Lands section of the Colorado Plateau Physiographic Province.

An intricate system of deep canyons along and across hogbacks and cuestas has resulted from faulting, upwarps and dislocation of rocks around the intrusive rock masses such as Abajo Mountains, approximately 25 miles to the north of the project site. Thus, the region is divided into numerous hydrological areas controlled by structural features such as the San Rafael Swell, the Monument Upwarp, and the Abajo, Henry and La Sal Mountains, as well as the faulted anticlines in Salt, Spanish and Lisbon Valleys.

Water-bearing sedimentary rock formations of Cambrian and Devonian through Cretaceous age are exposed in the region or have been identified in the Blanding Basin.

3.1.1 Bedrock Aquifers

Regionally, the formations that are recognized as bedrock aquifers are the Cretaceous-age Dakota sandstone and sandstones within the upper part of the Morrison Formation of late Jurassic age; the Bluff, the Entrada and the Navajo sandstones of Jurassic age; the Wingate sandstone and the Shinarump member of the Chinle Formation of Triassic age, and the DeChelle member of the Cutler Formation of Permian age. These units are shown in Figure 3.1.1-1, a generalized section of stratigraphic units showing the fresh water-bearing units in southeastern Utah.



After Goode (1958)

Generalized Stratigraphic Section Showing Fresh Waterbearing Units in Southeastern Utah

Figure 3.1.1 - 1

Other formations within this sequence also contain water but its quality varies from slightly saline to very saline. Beneath the Permian, Cutler Formation are saline water-bearing units within the Rico and the Hermosa Formations of Pennsylvanian age from which oil is produced in the Blanding Basin. Hydrogeologic data on the formations in the area are limited.

The Bluff sandstone, found only in southern San Juan County, has reportedly yielded 13 and 25 gpm in two wells drilled near Bluff (Feltis, 1966). The Entrada sandstone is reported to yield an average of 143 gpm at five wells drilled in San Juan County, but yields as high as 1200 gpm have been reported in other areas of southeast Utah (Feltis, 1966).

The Navajo sandstone is one of the most permeable bedrock aquifers in the region with reported yields as high as 1335 gpm (Feltis, 1966), although many wells drilled into the Navajo in southeast Utah only have yields varying between 35 to 72 gpm. The Umetco/Energy Fuels industrial well drilled into the Navajo sandstone is reported to have yielded 120 gpm after 1.5 hours of pumping shortly after it was drilled.

Throughout the area, small quantities of water are produced from shallow wells constructed in the alluvium that occurs in stream valleys and as a veneer on the flattop mesas. These wells are subject to great seasonal variation in yield and the water withdrawn is generally of poor quality.

3.1.2 Regional Recharge

The source of recharge to bedrock aquifers of the region is precipitation. Precipitation in southeastern Utah is characterized by wide variations in seasonal and annual rainfall and by long periods of deficient rainfall. Short duration summer storms furnish rain in small areas of a few square miles and this is frequently the total rainfall for an entire month within a given area. The average annual precipitation in the region ranges from less than 8 inches at Bluff to more than 16 inches on the eastern flank of the Abajo Mountains, as recorded at Monticello. The mountain peaks in the

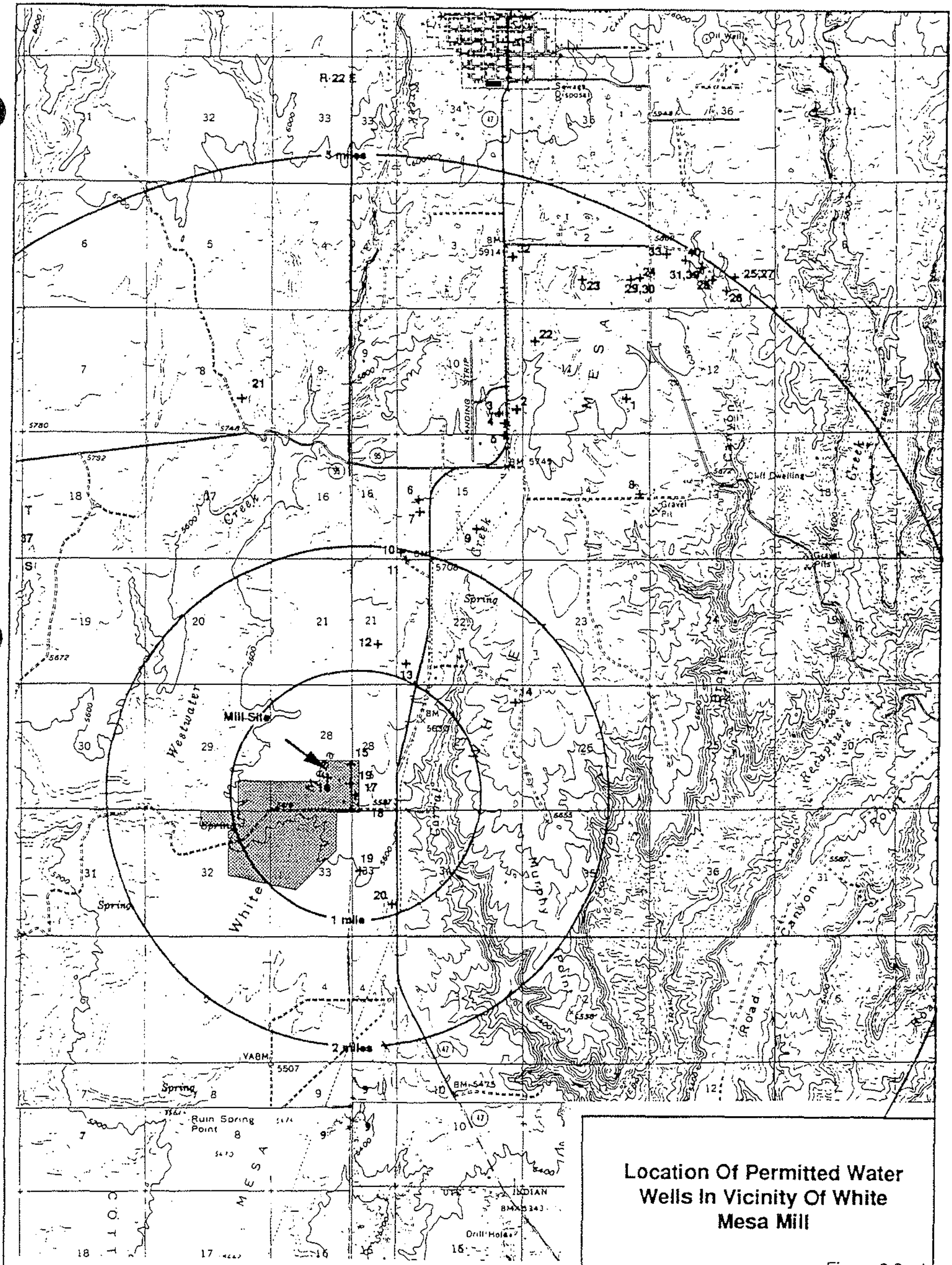
Henry, La Sal and Abajo Mountains may receive more than 30 inches of precipitation, but these areas are very small in comparison to the vast area of much lower precipitation in the region.

Recharge to bedrock aquifers in the region occurs by direct infiltration of precipitation into the aquifers along the flanks of the Abajo, Henry and La Sal Mountains and along the flanks of the folds, such as Comb Ridge Monocline and the San Rafael Swell, where the permeable formations are exposed at the surface. Recharge also occurs on the wide expanses of flat lying beds that cap the mesas between these major structural features. In these cases, some precipitation has been to percolate through the near surface joints, fractures and intergranular porosity in the shales and sandstones.

3.2 Groundwater Use

Forty groundwater appropriation applications, within a five-mile radius of the Mill site, are on file with the Utah State Engineer's office. The location of the applications is shown on Figure 3.2-1 and is listed on Table 3.2-1. The majority of the applications are by private individuals and are for wells drawing small quantities of water, less than 8 gallons per minute (gpm), from the Burro Canyon Formation. For the most part, these wells are located upgradient (north) of the White Mesa Mill site. Stockwatering and irrigation are listed as primary use of the majority of the wells. (Studies by consultants performed at the U.S. Department of Energy's disposal site at Naturita also note that the Dakota sandstones, Burro Canyon Formation and upper sandstones of the Brushy Basin member are not considered an aquifer due to the low permeability, discontinuous nature and limited thickness of these units.) Union Carbide and Plateau Resources have appropriation applications on file for deep wells (Entrada Formation) capable of much larger volumes of water production for industrial use.

Two water wells exist approximately 4.5 miles southeast of the site on the Ute Indian Reservation. These wells supply domestic water for the village on the mesa along Highway 191. Both wells are completed in the Entrada sandstone which is 1500± feet below the ground surface.



Location Of Permitted Water Wells In Vicinity Of White Mesa Mill

Figure 3.2 - 1

Table 3.2-1
Wells Located Within A 5-Mile Radius of
The White Mesa Mill Site
White Mesa Project
San Juan County, Utah

Map No.	Water Right	SEC	TWP	RNG	CFS	USE	Depth
1	Nielson, Norman and Richard C.	11	37S	22E	0.015	IDS	150-200
2	Guymon, Willard M.	10	37S	22E	0.015	S	82
3	Nielson, J. Rex	10	37S	22E	0.015	IDS	160
4	Nielson, J. Rex	10	37S	22E	0.013	S	165
5	Lyman, Fred S.	10	37S	22E	0.022	IDS	120
6	Plateau Resources	15	37S	22E	0.015	O	740
7	Plateau Resources	15	37S	22E	0.015	O	135
8	Nielson, Norman and Richard C.	14	37S	22E	0.015	IS	150-200
9	Lyman, George F.	15	37S	22E	0.015	S	135
10	Holt, N. E., McLaws, W	15	37S	22E	0.007	S	195
11	Perkins, Dorothy	21	37S	22E	0.015	S	150
12	Union Carbide Corporation	21	37S	22E	0.6	O	1600
13	Union Carbide Corporation	22	37S	22E	1.11	O	1820
14	Utah Launch Complex	27	37S	22E	0.015	D	650
15	Union Carbide Corporation	28	37S	22E	1.11	O	1885
16	Union Carbide Corporation	28	37S	22E	1.11	O	1850
17	Union Carbide Corporation	28	37S	22E	0.015	DSO	1800
18	Union Carbide Corporation	28	37S	22E	0.6	O	1600
19	Jones, Alma U.	33	37S	22E	0.015	S	200
20	Union Carbide Corporation	33	37S	22E	0.6	O	1600
21	BLM	8	37S	22E	0.01	S	170
22	Halliday, Fred L.	11	37S	22E	0.015	IS	180
23	Perkins, Paul	2	37S	22E	0.015	ID	180
24	Redd, James D.	2	37S	22E	0.1	ID	200
25	Brown, Aroe G.	1	37S	22E	0.015	IS	210
26	Brown, George	1	37S	22E	0.015	IDS	140
27	Brown, Ilo M.	1	37S	22E	0.004	IDS	141
28	Rentz, Alyce M.	1	37S	22E	0.015	ID	180
29	Rogers, Clarence	2	37S	22E	0.015	S	142
30	Perkins, Dorothy	2	37S	22E	0.015	S	100-200
31	Brandt J.R. & C.J.	1	37S	22E	0.015	IDS	160
32	Montella, Frank A.	3	37S	22E	0.015	IDO	190
33	Snyder, Bertha	1	37S	22E	0.1	IDS	160
34	Martineau, Stanley D.	1	37S	22E	0.015	ID	160
35	Kirk, Ronald D. & Catherine A.	1	37S	22E	0.015	IDS	160
36	Palmer, Ned J. and Marilyn	1	37S	22E	0.015	IDS	0
37	Grover, Jess M.	1	37S	22E	0.015	S	160
38	Monson, Larry	1	37S	22E	0.015	IDS	140
39	Neilson, Norman and Richard	1	37S	22E	0.015	IS	132
40	Watkins, Henry Clyde	1	37S	22E	0.015	IS	150

D - Domestic
I - Irrigation
S - Stockwatering
O - Industrial

4.0 SUBSURFACE CONDITIONS

4.1 General

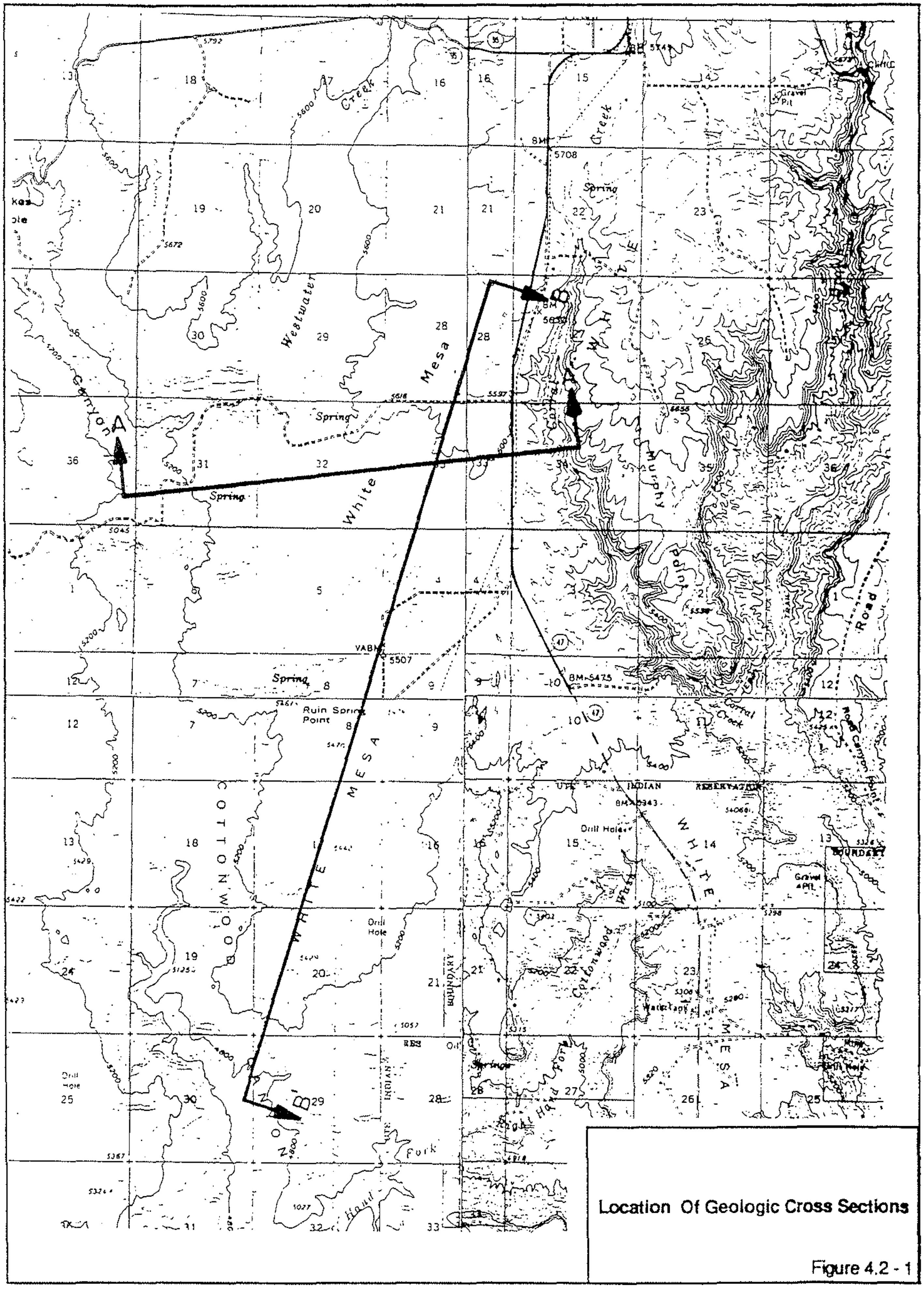
The subsurface conditions at the White Mesa facility have been previously investigated by Dames & Moore (1978), D'Appolonia (1980), and Chen & Associates (1978). Monitoring wells have been previously installed by D'Appolonia and Sampson & Associates.

This investigation consisted of drilling four new borings (WMMW-16 through WMMW-19). The physical and hydrogeological properties of the bedrock were evaluated by performing field aquifer and laboratory tests on core samples.

4.2 White Mesa Stratigraphy

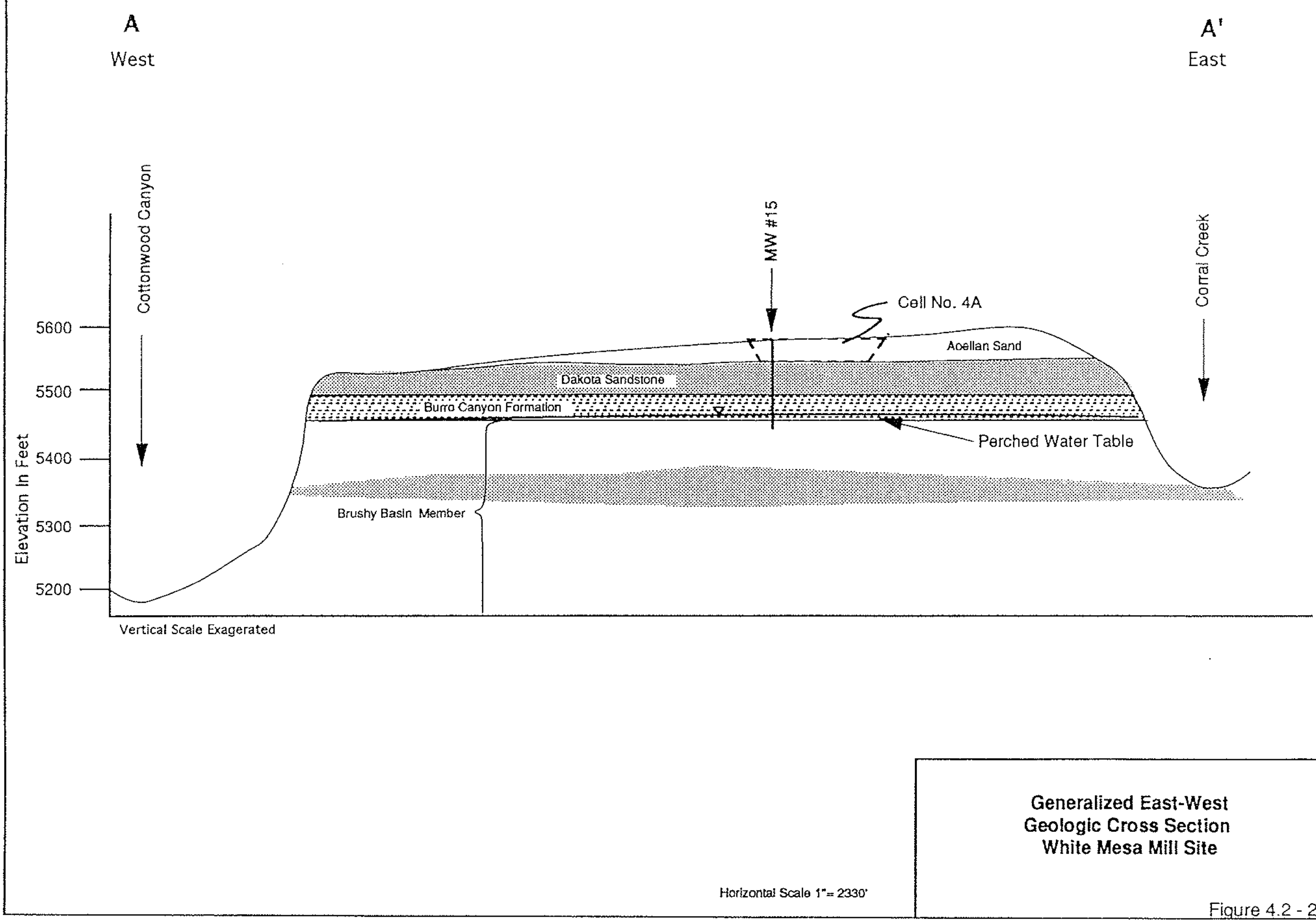
The lithology of the bedrock at White Mesa was verified by drilling four new borings to depths from 95 to 150 feet below the existing ground surface.

The generalized stratigraphy through White Mesa (Figure 4.2-1) is shown on Figures 4.2-2 and 4.2-3. The description of the drilling process and boring logs is shown in Appendix A. All of the borings were drilled through the Dakota/Burro Canyon Formations and were terminated in the Brushy Basin member of the Morrison Formation. The boring log descriptions are based on visual descriptions of air rotary cuttings and core samples. The contacts between the different rock types or beds are based on examination of samples, gamma-ray logging and drilling characteristics. It was apparent from drilling and logging that the physical characteristics of the bedrock materials vary considerably, both vertically and laterally. This reflects the nature of the fluvial and coastal plain depositional environments in which they were deposited.



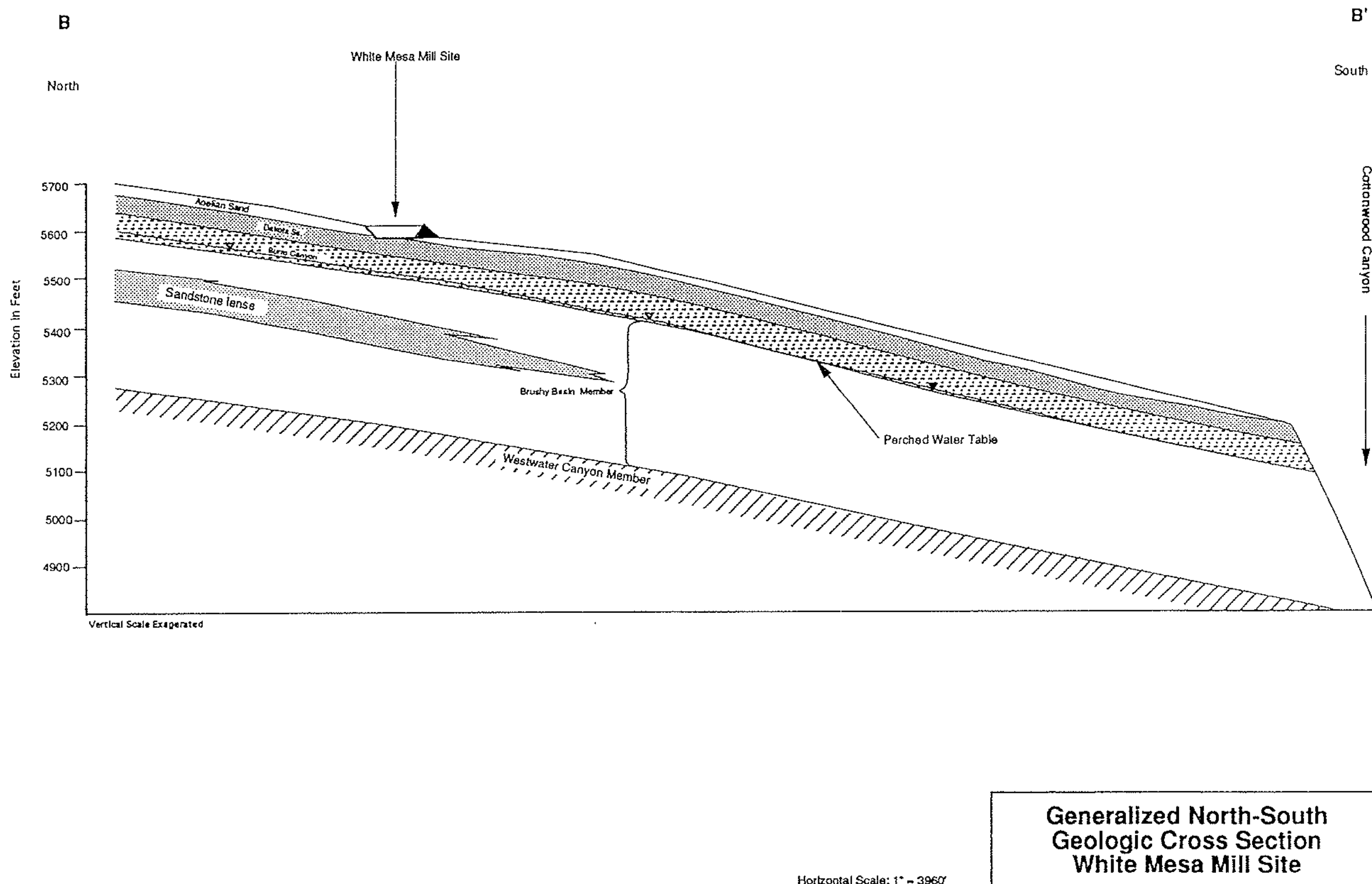
Location Of Geologic Cross Sections

Figure 4.2 - 1



Generalized East-West Geologic Cross Section White Mesa Mill Site

Figure 4.2 - 2



Generalized North-South Geologic Cross Section White Mesa Mill Site

Figure 4.2 - 3

4.2.1 Dakota Formation

Directly below 3 to 6 feet of very silty clays to clayey silts and silts, the borings penetrated the Dakota Formation at depths of 43 to 66 feet (elevations 5572 to 5518 feet) below the surface. The Dakota at this site is typically composed of moderately hard to hard sandstones with random discontinuous shale (claystone) and siltstone layers. The sandstones have beds varying from a few inches to 10 feet in thickness and are occasionally cross bedded. The sandstones are moderately cemented (upper part of formation) to well cemented with kaolinitic clays. The porosity of the Dakota is predominately intergranular. Laboratory tests performed (see Table 4.2-1) show the total porosity of the sandstones varies from 13.4 to 26.0 percent with an average value of 19.9 percent. The effective porosity of the formation is estimated to be 15.0 percent. The formation is very dry to dry with volumetric water contents varying from 0.6 to 7.1 percent with an average value of 3 percent. Saturation values for the sandstones vary from 3.7 to 27.2 percent. The claystones and siltstones are typically 2 to 3 feet thick. Boring WMMW-19 encountered a siltstone layer having a thickness of 8 feet at a depth of 33 to 41 feet. No groundwater or perched water conditions were found in drilling of the four borings in the Dakota Formation.

4.2.2 Burro Canyon Formation

Previous investigators have made no distinction between the Dakota and Burro Canyon Formations. However, examination of borehole cuttings, cores and geophysical logging methods has allowed separation of the two formations for analysis purposes. Directly below the Dakota Formation, the borings encountered sandstones and random discontinuous shale layers of the Burro Canyon Formation were found to extend to depths of 91 to 141 feet (elevation 5509 to 5421 feet).

Table 4.2-1
Rock Properties
White Mesa Project
San Juan County, Utah

Well No. and Sample Interval		Moisture Content (Percent)	Moisture Content Volumetric	Dry Unit Weight (lbs/cuft)	Porosity (Percent)	Particle Sp. Gr.	Saturation (Percent)	Absorption (Percent)	Liquid Limit	Plastic Limit	Plasticity Index	Rock Type	Formation
WMMW-16	26.4' - 27.1'	1.51	3.3	135.2	17.9	2.64	18.2	5.10				Sandstone	Dakota
WMMW-16	37.8' - 38.4'	0.40	0.8	127.4	22.4	2.63	3.7	6.30				Sandstone	Dakota
WMMW-16	45.0' - 45.5'	5.60	12.6	140.9	16.4	2.7	77.2		29.6	15.4	14.2	Sandy Mudstone	Burro Canyon
WMMW-16	47.5' - 48.0'	2.56	5.9	142.8	12	2.60	48.9	4.37				Sandstone	Burro Canyon
WMMW-16	53.5' - 54.1'	0.68	1.4	129.0	19.9	2.58	7.1	6.38				Sandstone	Burro Canyon
WMMW-16	60.5' - 61.0'	0.11	0.2	117.9	27.6	2.61	0.8	9.89				Sandstone	Burro Canyon
WMMW-16	65.5' - 66.0'	2.62	5.5	131.5	19.6	2.62	28.2	7.13				Sandstone	Burro Canyon
WMMW-16	73.0' - 73.5'	0.13	0.3	130.3	20.6	2.63	1.3	5.50				Sandstone	Burro Canyon
WMMW-16	82.0' - 82.4'	0.05	0.1	134.3	18.5	2.64	0.6	4.78				Sandstone	Burro Canyon
WMMW-16	90.0' - 90.7'	0.12	0.3	161.5	2	2.64	15.8	0.85				Sandstone	Burro Canyon
WMMW-16	91.1' - 91.4'	5.20	9.8	118.1	29.1	2.67	33.8		33.7	16.2	17.5	Claystone	Burro Canyon
WMMW-17	27.0' - 27.5'	0.29	0.6	138.8	13.4	2.57	4.8	5.11				Sandstone	Dakota
WMMW-17	49.0' - 49.5'	3.62	7.1	121.9	26	2.64	27.2	9.60				Sandstone	Dakota
WMMW-17	104.0' - 104.5'	0.17	0.4	161.4	1.7	2.67	26.6	0.81				Sandstone	Burro Canyon

Although similar to the Dakota, the Burro Canyon Formation varies from a very fine- to coarse-grained sandstone. The sand grains are generally poorly sorted. The coarse- grained layers also tend to be conglomeratic. The grains are cemented with both silica and kaolin but the silica cemented sandstones are prominent. The formation is extremely argillaceous near the contact with the Brushy Basin member of the Morrison Formation.

Based on the core samples tested, the sandstones of the Burro Canyon Formation vary in total porosity from 1.7 to 27.6 percent; the average being 16.0 percent. Volumetric water content in these sandstones ranges from 0.1 to 7.1 percent, averaging 2.2 percent, with the fine grained materials having the higher moisture content. Porosities in the claystone layers vary from 16.4 to 29.1 percent with saturation values ranging from 33.8 to 77.2 percent. A perched groundwater table was found at the base of the Burro Canyon Formation.

4.2.3 Brushy Basin Member

Each of the borings penetrated the Burro Canyon Formation and was terminated within the Brushy Basin member of the Morrison Formation. The borings encountered moderately plastic dark green to dark reddish-brown mudstones of medium consistency.

5.0 SITE GROUNDWATER

5.1 Occurrence

At White Mesa a vadose (unsaturated) zone occurs to depths of approximately 73 to 109 feet. Fluids in this zone are held in the bedrock pores under negative pressure conditions. The saturated (groundwater) zone occurs as discontinuous perched water within the Burro Canyon Formation at its contact with the Brushy Basin member of the Morrison Formation. The Brushy Basin member acts as an aquitard to vertical flow. Figures 5.1-1 and 5.1-2 show the depth of thickness of both the vadose and saturated zones below the site. Table 5.1-1 is a list of monitor wells constructed at White Mesa to monitor the saturated zone. Table 5.1-2 shows the data obtained from the existing and new observation wells.

5.1.2 Aquifer Tests

As part of this investigation, all existing monitor wells and the new wells (where feasible) were tested to determine hydrogeological properties. The existing wells were pumped at extremely low rates to extend the test duration as long as possible. Methods developed by Strausberg (1982) (see Appendix C) were used to determine bedrock permeability values in the tight formations. Injection tests were performed in three wells because of the extremely low permeability of the bedrock. The recent test results compare favorably with the work done by Hydro-Engineering in 1991. Field permeability tests by the Bureau of Reclamation method E-18 were performed both in the unsaturated and saturated zones to determine rock permeability in the new borings. Wells completed in these borings will be developed and pump-tested at a later date. Weather conditions prevented these activities in December, 1992.

A description of the aquifer tests performed in each respective boring, and/or completed well with the test results is presented in Appendix C. The results are also summarized in Tables 5.1.2-1 and 5.1.2-2. For the pump tests, hydraulic conductivity values have been corrected for the portion of the plotted wells below the shales of the Brushy Basin member of the Morrison Formation.

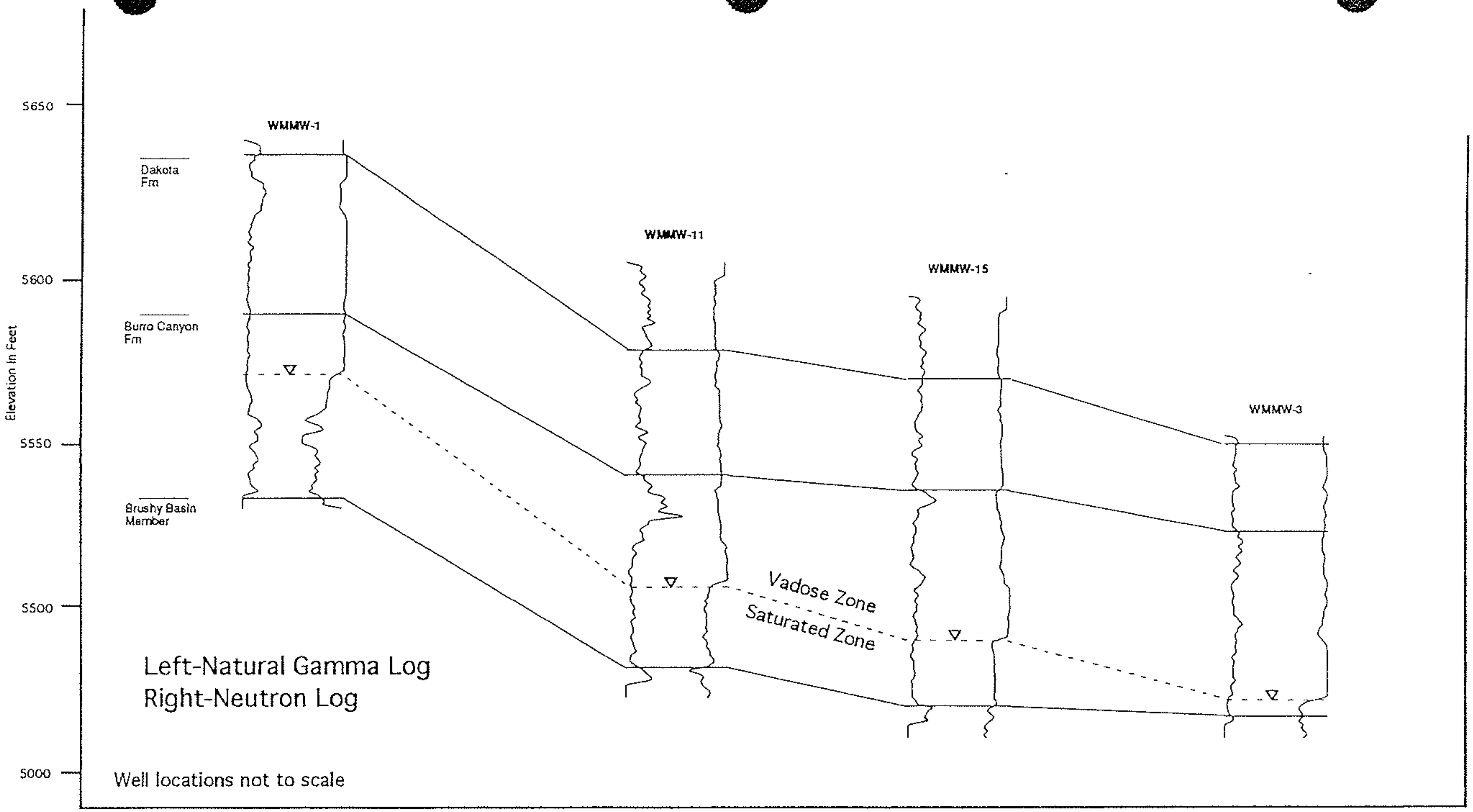


Figure 5.1-1 - North-South Stratigraphic Section Through The White Mesa Mill Site

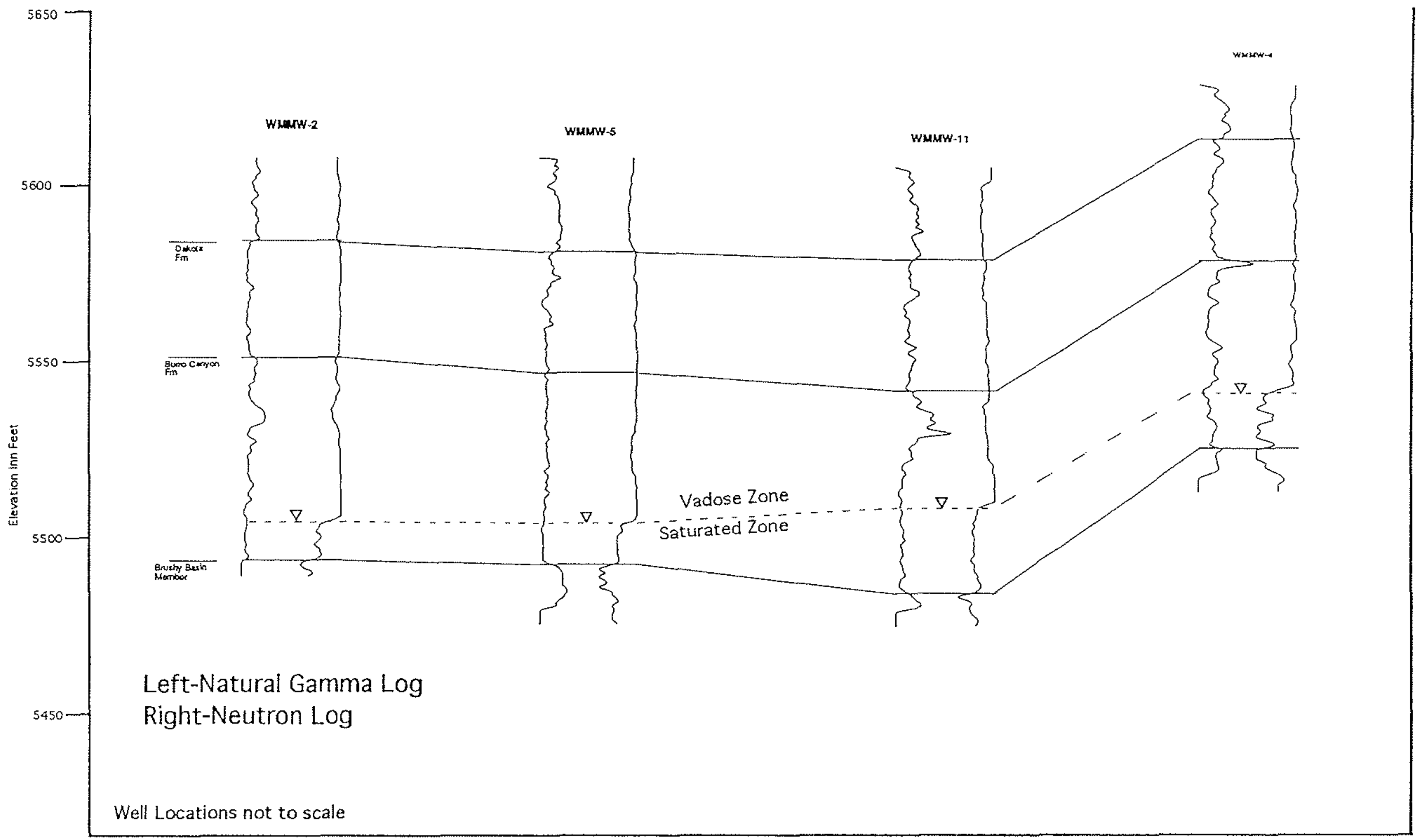


Figure 5.1-2 - East -West Stratigraphic Section Through The White Mesa Mill Site

Table 5.1-1
White Mesa Monitor Wells
White Mesa Project
San Juan County, Utah

				Water Level			Measuring Point	
Well Name	DateInstalled	Total Depth	Perforations	Date	Depth (ft)	Elevation (ft-MSL)	Above LSD (ft)	Elev. (ft - MSL)
WMMW-1	Sep-79	117'	92'-112'	19/11/92	75.45	5572.77	2.0	5648.22
WMMW-2	Sep-79	128.8'	85'-125'	19/11/92	110.06	5503.43	1.8	5613.49
WMMW-3	Sep-79	98'	67'-87'	19/11/92	83.74	5471.58	2.0	5555.32
WMMW-4	Sep-79	123.6'	92'-112'	19/11/92	92.42	5530.15	1.6	5622.57
WMMW-5	May-80	136'	95.5'-133.5'	19/11/92	108.32		0.6	5609.33
WMMW-6	May-80	This well was destroyed in March 1993 during construction of Cell 3						
WMMW-7	May-80	This well was destroyed in March 1993 during construction of Cell 3						
WMMW-8	May-80	This well was destroyed in March 1993 during construction of Cell 3						
WMMW-11	Oct-82	135'	90.7'-130.4'	19/11/92	102.53	5508.55	2.4	5611.08
WMMW-12	Oct-82	130.3'	84'-124'	19/11/92	109.68	5499.77	0.9	5609.45
WMMW-13	Oct-82	116.5'	This well was destroyed in during construction of Cell 4A					
WMMW-14	Sep-89	129.1'	90'-120'	19/11/92	105.34	5491.05	0.0	5596.39
WMMW-15	Sep-89	138'	99'-129'	19/11/92	108.28	5490.34	0.8	5598.62
WMMW-16	Dec-92	91.5'	78.5'-88.5'	7/12/92	Dry		1.5	
WMMW-17	Dec-92	110'	90'-100'	11/30/92	87.46		1.5	
WMMW-18	Dec-92	148.5'	103.5'-133.5'	11/30/92	92.11		1.5	
WMMW-19	Dec-92	149'	101'-131'	10/12/92	85.00		1.5	
#9-1	May-80	33.5'	10'-30'	3/4/91	Dry		1.8	5622.83
#9-2	May-80	62.7'	39.7-59.7	3/4/91	Dry		2	5622.58
#10-2	May-80	33.5'	11.3-31.3	3/4/91	Dry		2	5633.58
#10-2	May-80	62.2'	39.2-59.2	3/4/91	Dry		2.1	5633.39

Table 5.1-2

Ground Water Occurrence
White Mesa Project
San Juan County, Utah

Well Name	Ground Elev.	Top Saturated Zone	Depth To Sat Zone	Thickness Sat Zone
WMMW-1	5646.22	5572.77	73.45	37
WMMW-2	5611.69	5503.43	108.26	12.5
WMMW-3	5553.32	5471.58	81.74	5.25
WMMW-4	5620.97	5530.15	90.82	17
WMMW-5	5608.73	5500.95	107.78	12
WMMW-11	5608.68	5508.55	100.13	25.75
WMMW-12	5608.55	5499.77	108.78	7
WMMW-14	5596.39	5491.05	105.34	15.25
WMMW-15	5597.82	5490.34	107.48	20
Max=	5646.22	5572.77	108.78	37
Min=	5553.32	5471.58	73.45	5.25
Average=	5605.82	5507.62	98.20	16.86
New Wells				
WMMW-16			Dry	0
WMMW-17			87.46	17.7
WMMW-18			92.11	46.6
WMMW-19			85	46.3
		Max=	92.11	46.6
		Min=	85	0
		Average=	88.19	27.65
		All Wells		
		Max=	108.78	46.6
		Min=	0	0
		Average=	89.97	21.67

Table 5.1.2-1

Aquifer Test Results, Existing Wells
White Mesa Project
San Juan County, Utah

			Hydro-Engineering	Peel Enviromental		
Well No.	Interval(ft)	Type of Test	Interval Transmissivity gpd/ft	Interval Transmissivity gpd/ft	Hydraulic Conductivity ft/d	Sustained Well Yield (Est.) gpm
WMMW-1	92-111	Slug		2.0	0.03	0.04
WMMW-2	107-119	Pump		9.0	0.13	0.02
WMMW-3	82.5-87.5	Slug		0.3	0.01	0.001
WMMW-4	91-107.5	Pump		1.6	0.03	0.19
WMMW-5	107.5-119.5	Slug	3.1	8.8	0.10	0.02
WMMW-11	114-125	Pump	808	604.3	3.97	0.24
WMMW-12	108.5-115.5	Pump	5.1	2.9	0.06	0.03
WMMW-14	105.5-121	Pump	298	224.0	2.13	0.34
WMMW-15	106.5-126.5	Pump	10.5	7.9	0.05	0.67
		Average		95.6	0.7	0.2
		Median		7.9	0.1	0.04

Table 5.1.2-2

Borehole Permeability Test Results
White Mesa Project
San Juan County, Utah

Well No.	Interval(ft)	Type of Test	Formation	Hydraulic Conductivity gpd/ft^2	Hydraulic Conductivity cm/sec	Hydraulic Conductivity ft/d
WMMW-16	28.5-31.5	Constant Head	Dakota	19.3	9.10E-04	2.58
	45.5-51.5	Constant Head	Burro Canyon	1.1	5.10E-05	0.14
	65.5-71.5	Constant Head	Burro Canyon	1.7	7.80E-05	0.22
	85.5-91.5	Constant Head	Burro Canyon	0.6	2.90E-05	0.08
WMMW-17	45-50	Constant Head	Dakota	0.1	3.00E-06	0.01
	90-95	Constant Head	Burro Canyon	0.1	3.50E-06	0.01
	100-105	Constant Head	Burro Canyon	0.1	5.50E-06	0.02
WMMW-18	27-32	Constant Head	Dakota	2.3	1.10E-04	0.31
	85-90	Constant Head	Burro Canyon	0.5	2.50E-05	0.07
	115-120	Constant Head	Burro Canyon	0.1	4.50E-06	0.01
WMMW-19	55-60	Constant Head	Dakota	0.2	8.40E-06	0.02
	95-100	Constant Head	Burro Canyon	0.03	1.40E-06	0.004
		Average Dakota		5.5	2.58E-04	0.7
		Median Dakota		1.3	5.92E-05	0.2
		Average Burro Canyon		0.6	2.83E-05	0.08
		Median Burro Canyon		0.5	2.50E-05	0.07

5.2 Groundwater Water Movement

5.2.1 Vadose Zone

Fluid movement in the vadose zone (Dakota Formation) occurs principally in the vertical direction from the driving forces of both capillary pressure gradients and gravity. When seepage occurs through a nearly dry foundation material, as is the case at White Mesa, the capillary gradients act in the same direction as gravity and the rate of downward flow is enhanced. Capillary gradients, however, are most important in the vicinity of the "wetting front." As seepage proceeds, the driving force due to gravity becomes increasingly important relative to capillary pressure. In the horizontal direction, the gradient of capillary pressure is the only driving force. Just as in the vertical direction, the capillary gradients decrease as the seepage spreads laterally.

When the wetting front encounters a layer with smaller pore size and lower permeability, the invading fluid is readily absorbed. There is, however, a corresponding decrease in the capillary gradient as the tight layer wets up and gravity becomes the dominant driving force. The maximum flux that can be sustained by gravity alone is that which is equal to the permeability of the layer. If the seepage rate from the impoundment is greater than the permeability, water will perch on the tight layer.

The permeability of the strata relative to the seepage rate is of critical importance to the question of whether or not perched water will develop. Field measurements of permeability indicate that the permeability of the tightest layers (claystones) within the Dakota Formation is about 1.0×10^{-7} cm/s (0.1 ft/yr). Downward flow from net infiltration in the current natural state is expected to be much, much smaller than 0.1 ft/yr. Therefore, it is to be expected that no water perched on the claystones would be encountered, as indeed, is the case. Assuming that natural, net infiltration is 5 percent of precipitation, a layer with permeability of 0.05 ft/yr, or less, would be required to cause sustained perched water to occur. The fact that no perched water was encountered in drilling the four new borings suggests that the permeability of the claystone layers present in the formation have a permeability greater than 0.05 ft/yr. It is believed that the most reasonable value for permeability of the mudstone layers is about 1×10^{-7} cm/s (0.1 ft/yr), but it may range downward to perhaps 5.0×10^{-8} cm/s (0.05 ft/yr).

Considering the above, travel times for partially saturated flow through the vadose zone to the Burro Canyon can be estimated based on estimated infiltration rates of permeability and water content of the formation. Assuming an average volumetric water content of 3 percent, the velocity through the Dakota sandstone is estimated to range from 1.7 to 3.3 feet per year. Taking the average depth to the saturated zone as 98 feet, it would take approximately 29 to 57 years for pond seepage to reach the perched water table in the Burro Canyon Formation. In the absence of shale layers, the McWhorter-Nelson model predicts a travel time of 15.0 years for (pond) seepage to reach the water table. This analysis is valid for parts of the site where the discontinuous lenticular claystones do not exist. Considering the variability of the strata, more refined estimates would be pointless.

If pond leakage occurred, there is a possibility that seepage under positive pressure could be in direct contact with vertical joints at the base of the ponds. For this condition, seepage would occur as localized saturated flow through the joints within the Dakota into the Burro Canyon. For this case, the travel time to the saturated zone is difficult to estimate but could be on the order of a few weeks to months.

5.2.2 Saturated Zone

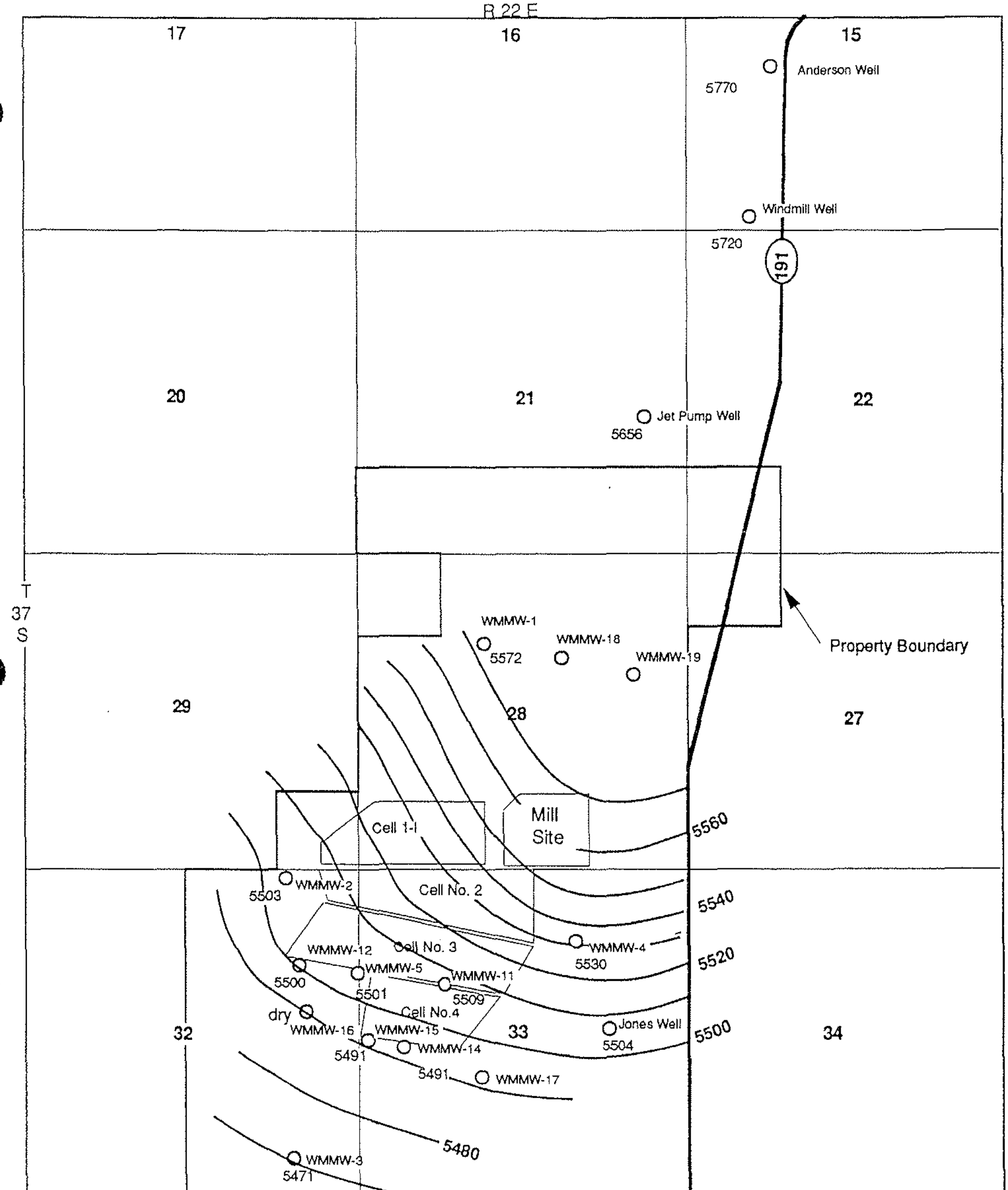
The groundwater in the Burro Canyon Formation exists as an unconfined perched water body on top of the Brushy Basin member. Its occurrence is discontinuous and hydraulic conductivity values determined from tests are low to extremely low (see Table 5.1.2-1). Consequently, based on the low hydraulic conductivities and extent of the saturated zone, it is not considered to be a viable aquifer in the immediate project area.

Water movement within this zone is in a south-southwest direction, the same as the dip of the bedrock strata. Using an average hydraulic conductivity value of 0.7 feet per day, an effective porosity of 15 percent, and an average hydraulic gradient of 0.01 foot/foot, the average velocity of groundwater movement is 0.047 feet per day (17 feet per year). Hydro-Engineering (1991) estimated an average groundwater movement rate of 44 feet per year in the saturated zone in the vicinity of the tailings cells. For a saturated thickness of 26 feet and a length of 3,500 feet across the mesa, the flow rate through the saturated zone of the Burro Canyon is 22 gallons per minute.

5.3 Water Quality

Groundwater monitoring has been conducted at the White Mesa facility since 1979. Table 5.1-2 presented previously shows a list of wells that has been constructed for monitoring purposes at White Mesa. The water quality data obtained from these wells are shown both in tabular and graphical form in Appendix B.

Comparisons of the water chemistries from the various wells were analyzed by graphical techniques. The trilinear plot and the Stiff diagram were used in "fingerprinting" site groundwater and differentiating the groundwater from different sources or wells. The trilinear plot is a graphical technique (Figure 5.3-1A) in which the percentage composition of the major anions and cations in a water sample is plotted onto triangular plotting fields. The resultant plotting positions are then projected into a central plotting diamond, defining the sample's composition. The plot is so designed that mixtures of water are shown by progression along a straight line connecting the plotted points of both waters in the central plotting diamond. Thus, the trilinear plot is extremely useful in determining the percentage mixtures, based on the major ion compositional profile of the two-end point solutions.



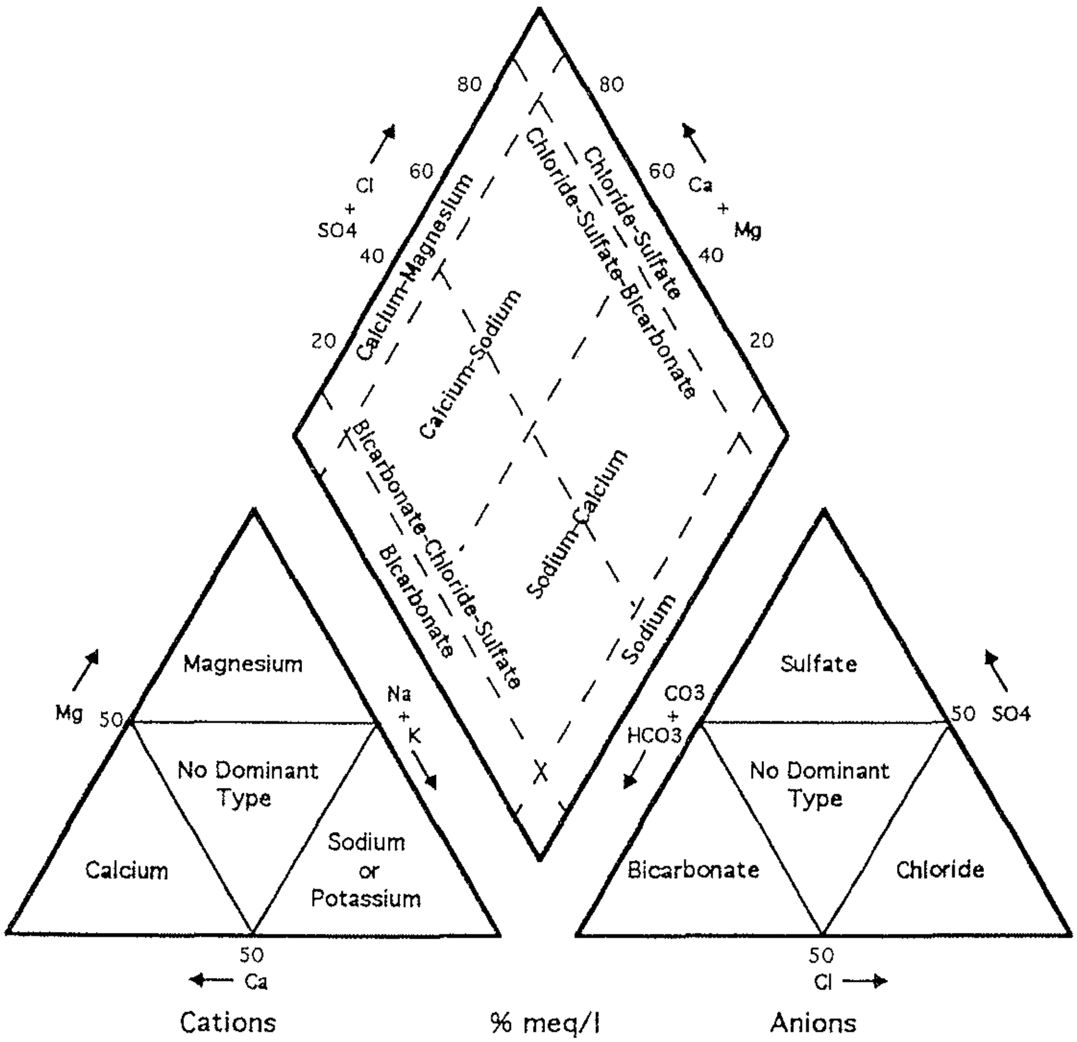
Phreatic Surface of the Ground Water in the Burro Canyon Formation Beneath the White Mesa Mill Site.

Figure 5.2 .2 - 1

The Stiff diagram is a "signature" formed by plotting the relative percentage of major cations to the left of a central axis and the anions to the right of the central axis and connecting the plotted points. In the computer mapping program utilized, the cations are plotted in the order of sodium plus potassium, calcium, and magnesium to the left of the central axis. The anions are plotted in the order of chloride, carbonate plus bicarbonate, and sulfate to the right of the central axis. Such a graphical signature is useful in making visual comparisons of various water chemistries.

Figure 5.3-1 is a trilinear plot for the water sampled in wells in the immediate vicinity of the Mill site during the fall of 1992. Figures 5.3-2 through 5.3-4 are Stiff diagrams presenting the same data. It can be seen from these plots that the water from all wells is of the sulfate (anion type). The cation definition of the water type is extremely variable. Of the thirteen wells analyzed for water chemistry four fall in the calcium-sulfate type category, four fall in the (sodium plus potassium) - sulfate type, two samples classify in the magnesium-sulfate type. Five samples have no dominant cation type. These five samples tend, however, to classify close to the (sodium plus potassium) - sulfate and calcium-sulfate types.

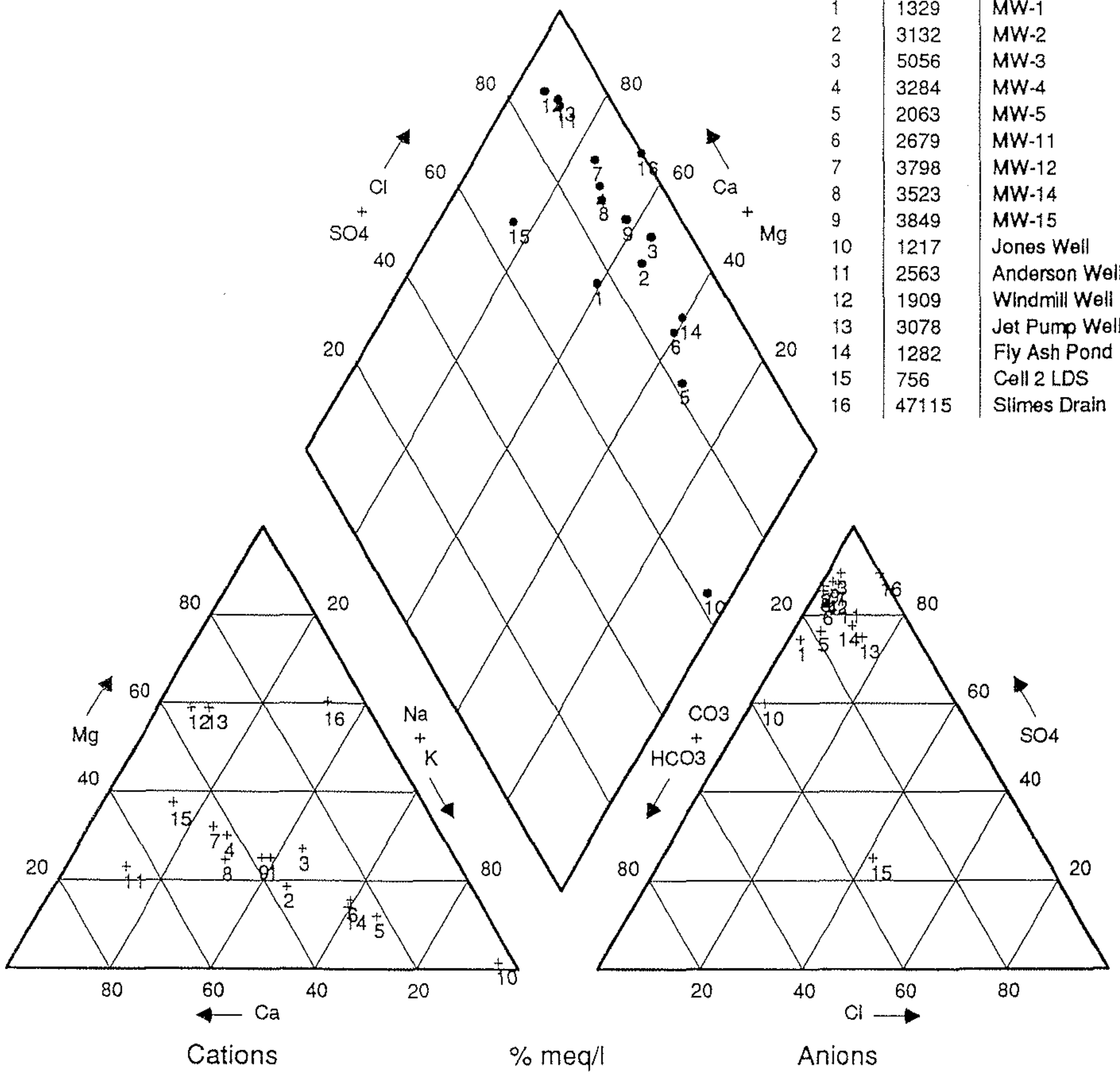
A time sequence change of water chemistries from four sampling periods for wells WMMW-1, WMMW-2 and WMMW-3 using the trilinear plotting technique is shown in Figures 5.3-5 through 5.3-7. These figures present the change in water chemistries from October, 1979 through February 1991. The change in water chemistry is attributed to initial incomplete cleaning of wells, groundwater variation, laboratory analytical errors or a combination. The data for 1979 appears to be suspect with respect to providing an accurate representation of the groundwater chemistry. This is probably due to incomplete cleaning of the well after drilling and prior to the first sample.



CLASSIFICATION OF WATER TYPES USING THE TRILINEAR DIAGRAM

UMETCO MINERALS CORPORATION

DATE: 12/92	FIG. NO. 5.3-1A



No.	TDS	Well Name
1	1329	MW-1
2	3132	MW-2
3	5056	MW-3
4	3284	MW-4
5	2063	MW-5
6	2679	MW-11
7	3798	MW-12
8	3523	MW-14
9	3849	MW-15
10	1217	Jones Well
11	2563	Anderson Well
12	1909	Windmill Well
13	3078	Jet Pump Well
14	1282	Fly Ash Pond
15	756	Cell 2 LDS
16	47115	Slimes Drain

Figure 5.3 - 1 Trilinear Plot of Water From White Mesa Mill Monitor Wells, Fly Ash Pond and Slimes Drain, and Surrounding Stock Wells

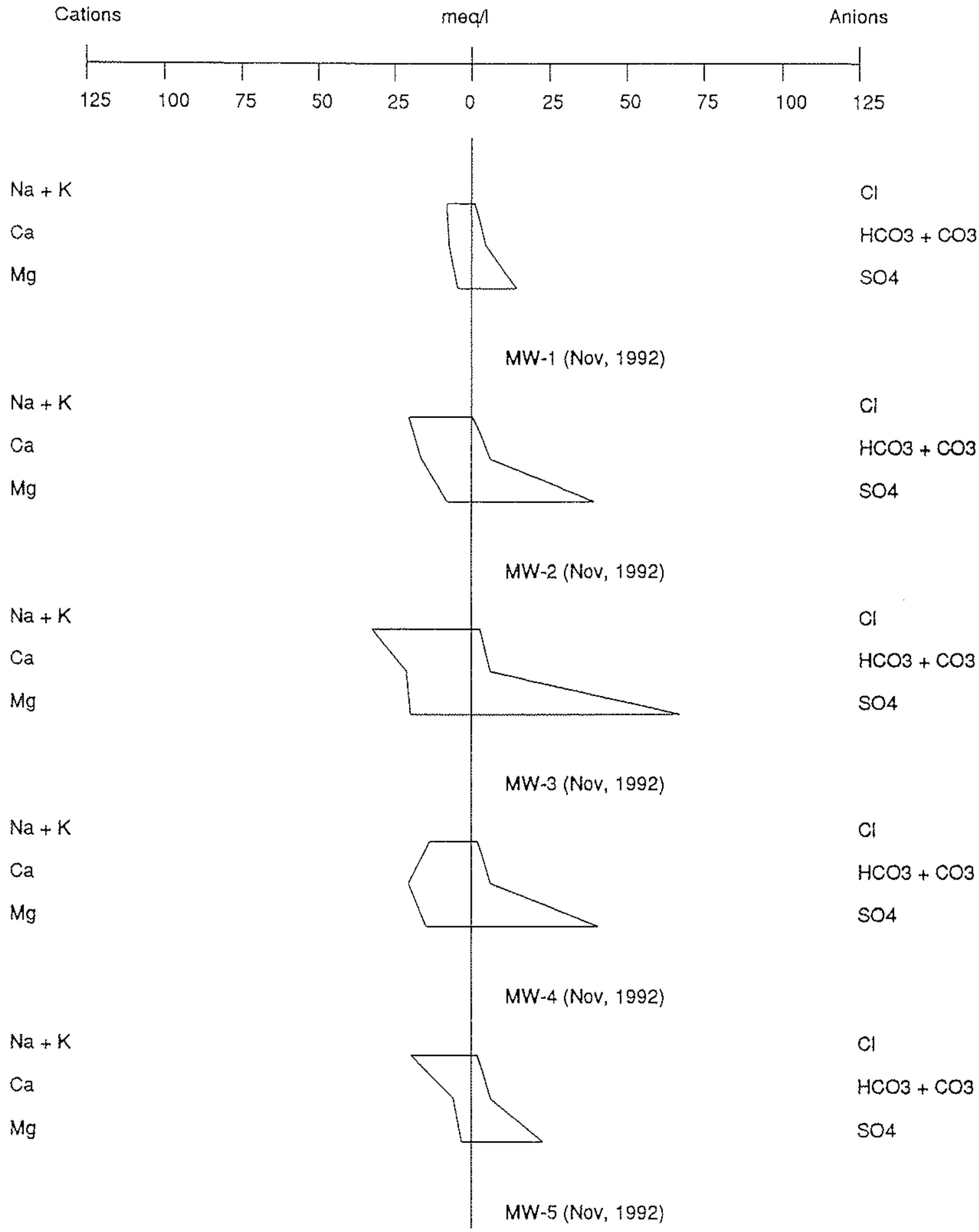


Figure 5.3 - 2 Stiff Diagrams Of Water From Monitor Wells

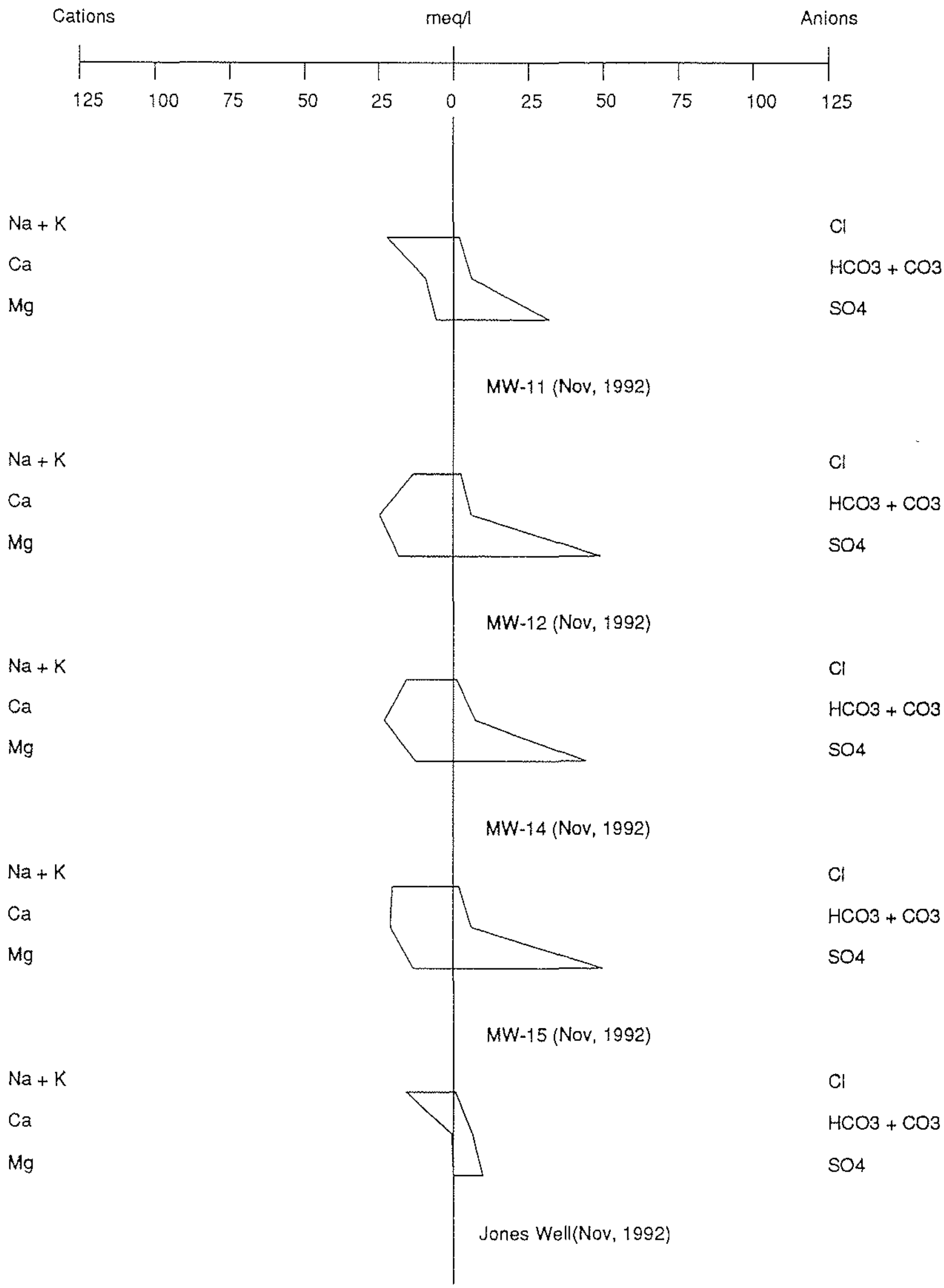


Figure 5.3 -3 Stiff Diagrams Of Water From Monitor Wells and Stock Well

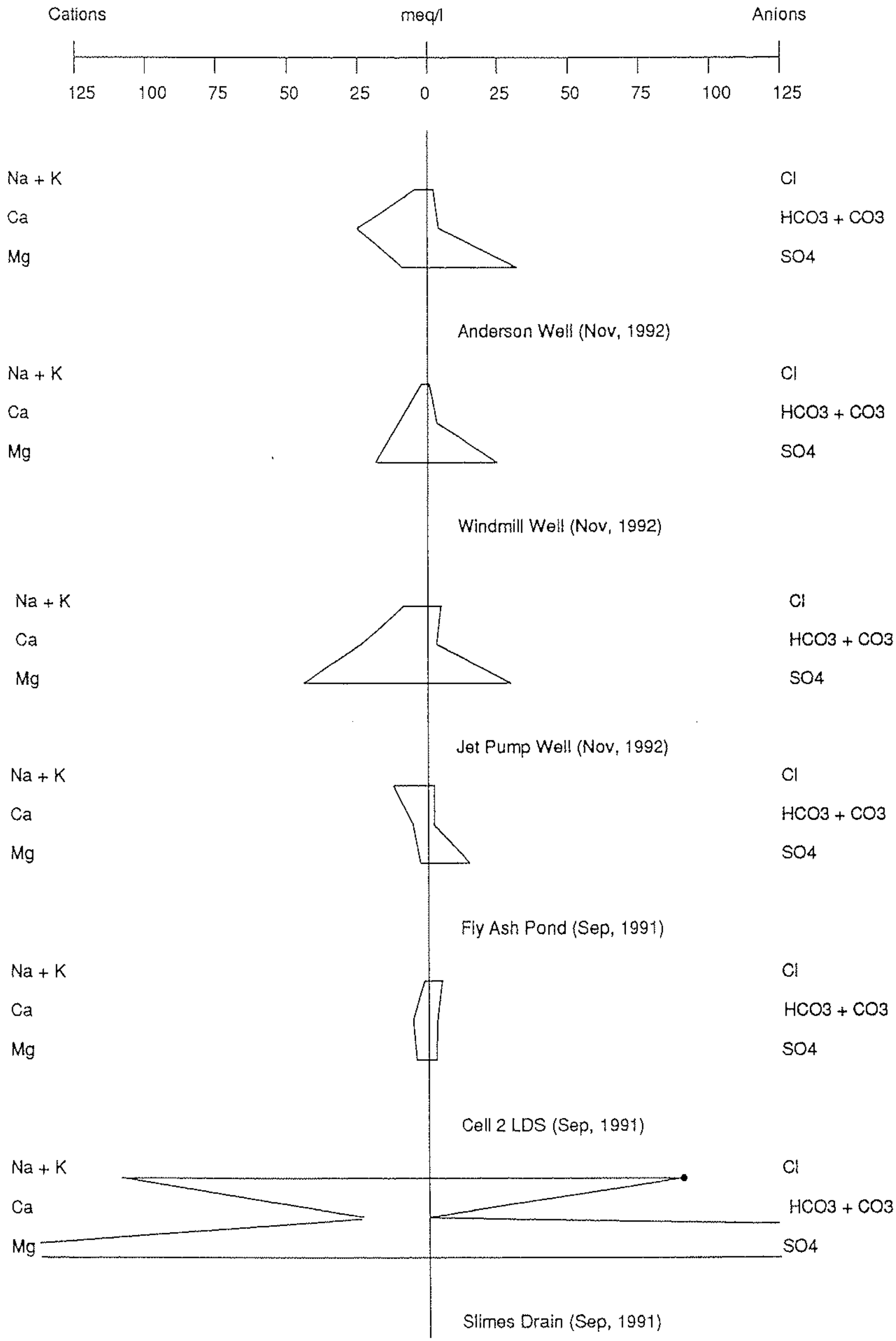


Figure 5.3-4 Stiff Diagrams Slimes Drain, Fly Ash Pond and Surrounding Stock Wells

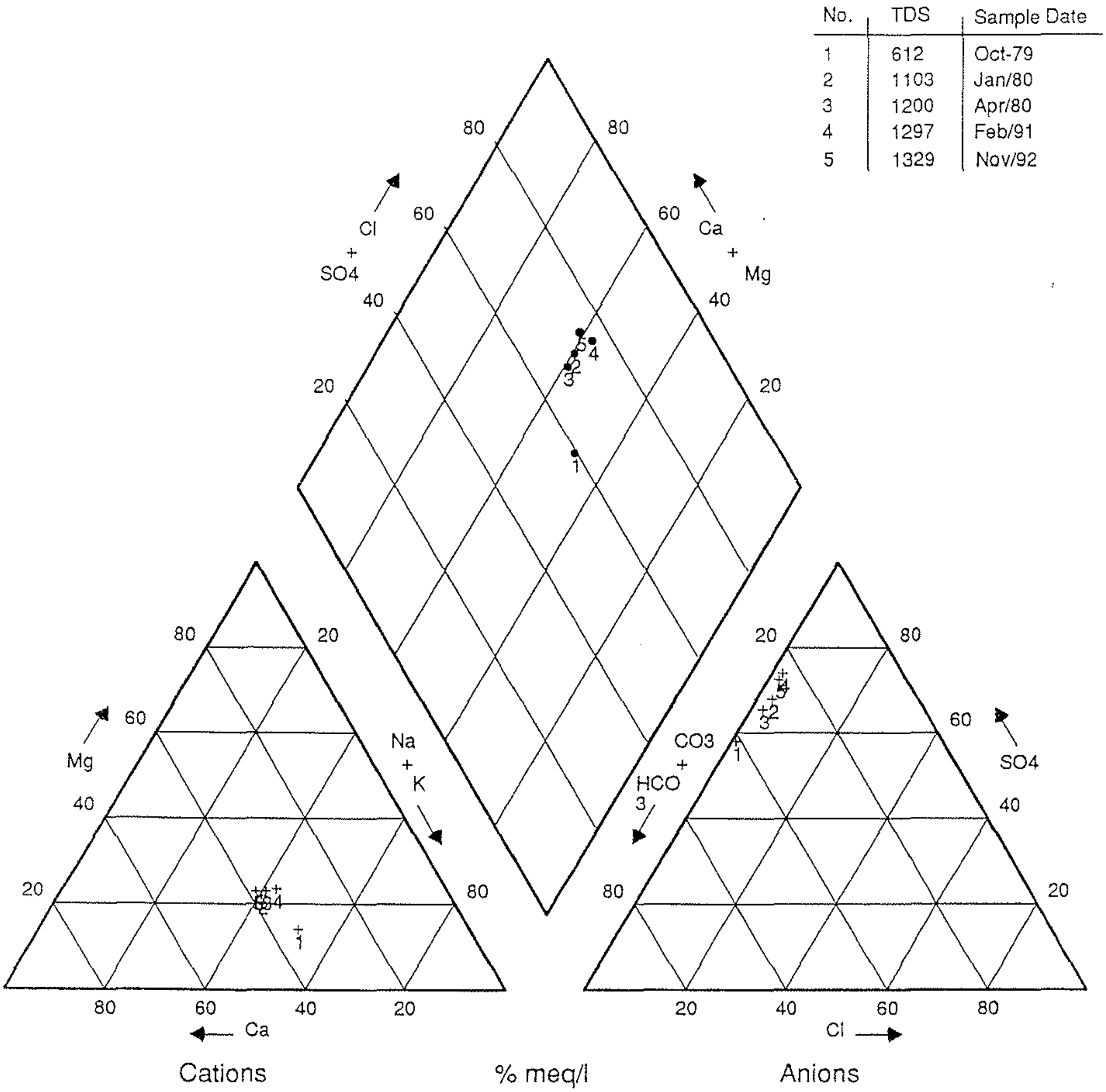


Figure 5.3 - 5 Time -Sequence Trilinear Plot of WMMW-1

No.	TDS	Sample Date
1	1837	Oct/79
2	3298	Jan/80
3	3288	Apr/80
4	4358	Feb/91
5	5056	Nov/92

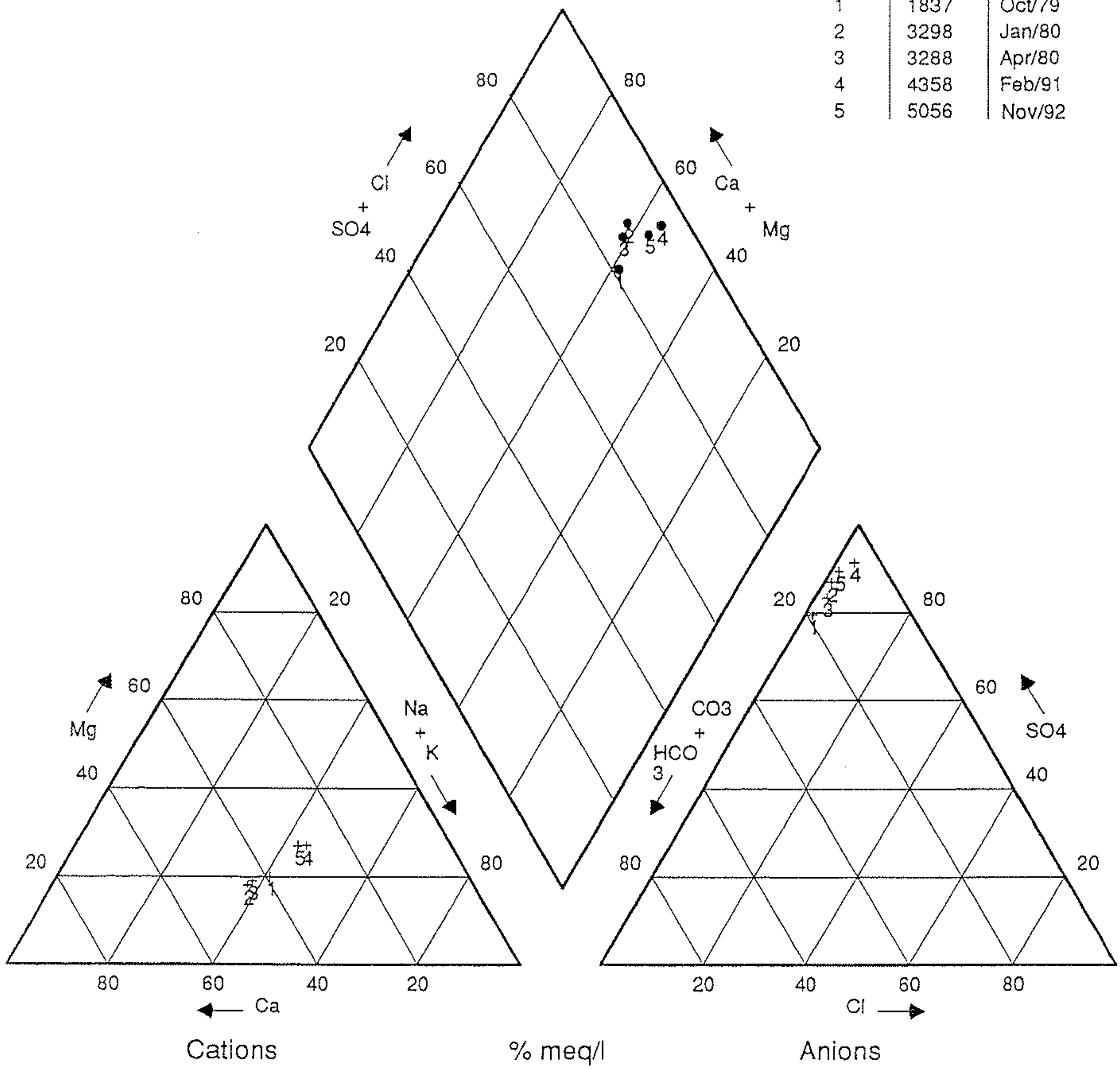


Figure 5.3 - 6 Time -Sequence Trilinear Plot of WMMW-3

No.	TDS	Sample Date
1	2524	Oct/79
2	3031	Jan/80
3	3486	Apr/80
4	3223	Feb/91
5	3284	Nov/92

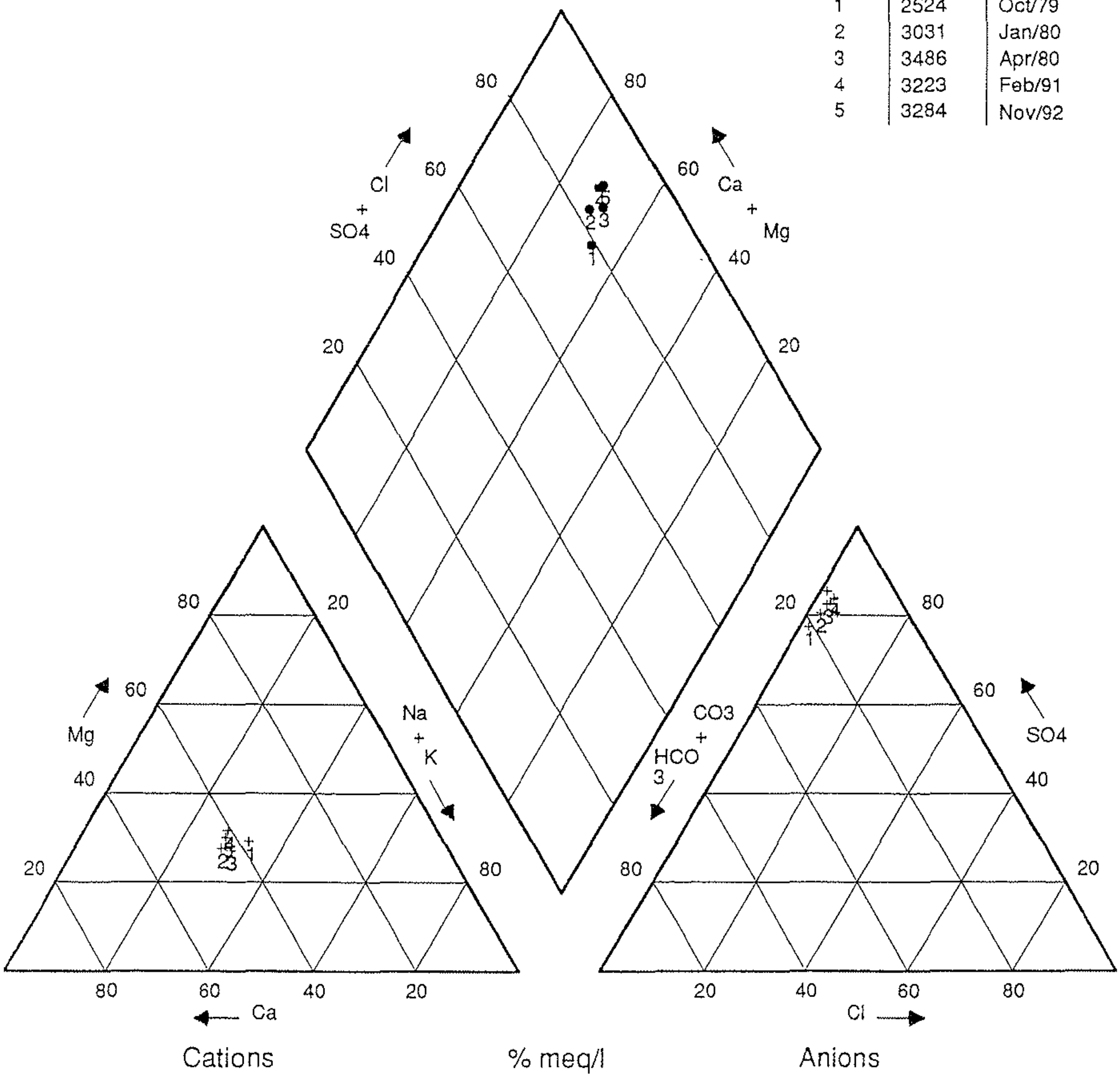


Figure 5.3 - 7 Time -Sequence Trilinear Plot of WMMW-4

Comparison of well chemistries to a common background well (chemistry) will not provide correct information on the possible effects of pond seepage on groundwater. However, by evaluating the possible chemical change of a specific ionic species within individual wells over time is plausible. The statistical "T" test was performed on samples from chloride populations within specific wells over time (see Appendix E). Because chlorides are a conservative species and are concentrated in the tailings solutions, analyses using this parameter offers the best method of detecting detrimental changes to the groundwater. In addition, information on Cell 2 leak detection system chemistry provides a useful picture of the water chemistry directly below Cell 2. The following is a discussion of the analyses.

Cell 2 Leak Detection System - The water found in Cell 2 leak detection system (LDS) contains the lowest total dissolved solids (TDS) content (756 mg/l) of any water sampled in the area (Figure 5.3-1). Excepting the Jones wells, it also contains the highest percentage of carbonate and bicarbonate when compared to the other monitoring wells. The slimes drain contains a TDS value of 47,115 mg/l and no carbonates due to its extremely low pH (typically 1.5 to 3). Any leakage of tailings solution into the LDS would react with the carbonates and raise the TDS levels which has not occurred to date.

WMMW-1 (Installed September 1979) - This well was originally chosen as the background well for the site. It is believed that improper well completion and/or analytical errors gave erroneous chemistry values for this well in 1979 (see Figure 5.3-5). Chlorides in this well have been relatively low (varying from 11 to 53.2) since 1980.

A "T" test was performed on sample population from 1980-81 to a sample population from 1990-92. The tests indicate that there is a significant difference in the mean of the populations at the 0.05 level of significance. Statistically, the chloride levels are shown to have decreased significantly. Tests performed on a sulfate population from the period 1980-81 to a population from 1990-92 show the sulfates in this well have significantly increased.

WMMW-3 (Installed September 1979) - This well was originally constructed to serve as the "point of compliance well", Statistical testing ("T" test) on a chloride population from 1980-81 compared to a chloride population from 1990-92 shows that there is no significant difference in the two chloride populations. Sulfate samples taken 1980-81 compared to samples taken 1988-91 show there is a significant increase in sulfates.

WMMW-5 (Installed May 1980) - Statistical tests ("T" test) performed on a sample from the chloride population (1981-83) to a sample from a chloride population (1990-92) shows there is a significant difference in the means of the chloride populations and that the chloride content has decreased.

WMMW-12 (Installed December 1982) - The statistical "T" test performed on a sample from the chloride population from 1982-85 compared to the chloride population from 1990-91 shows there is a significant difference in the means of the chloride populations of these two sampling periods and that the chloride content has decreased.

WMMW-14 and 15 (Installed September 1989) - These monitor wells were installed in the south embankment of Tailings Cell No. 3 in 1989. Wells 14 and 15 have similar water chemistry as monitor well 12 which was installed in 1980 (see Figures 5.3-1 and 5.3-3). A statistical "T" test performed on samples from a chloride population from November 1989 through November 1992 show wells 14 and 15 to have different mean population values from 12 and they are significantly lower than the mean chloride population of well 12. Since well 12 has had a significant decrease in chloride content, it is likely that the groundwater chemistry in the vicinity of these wells has undergone similar changes. Analyses of these wells also show a decrease in chlorides since 1989-90 to 1990-91.

5.4 Impact of Operations on Groundwater

Uranium recovery operations at White Mesa has produced tailings solutions wit high concentrations of sulfates and chlorides. Using the chloride ion to track changes in groundwater chemistry is the most feasible method to detect changes in groundwater chemistry. To date, all indications show that operations at White Mesa have not impacted the saturated zone of the Burro Canyon Formation.

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APPENDIX A

Drilling, Geophysical Logging
and
New Monitor Well Construction

DRILLING AND WELL CONSTRUCTION PROCEDURES

DRILLING

Four new observation wells were drilled and constructed at the White Mesa Mill site during November and December, 1992.

Twelve-inch borings were drilled to a depth of 19.5 feet for each of the new monitor wells. Steel surface casing 10-inch in diameter and 0.25-inch thick was set to this depth and cemented into place with a cement/bentonite grout and allowed to set up for 72 hours.

WMMW-16 was cored to total depth using an HQ diamond bit with an outer diameter of 4.25 inches. Once the total depth was achieved, the well was reamed using a 7 7/8-inch tricone bit. Ten-foot, 2.34-inch cores were obtained during each.

WMMW-17, -18 and -19 were drilled in a similar manner as WMMW-16 except these wells were not cored over the total depth of the hole. Once the surface casing was set, the borehole was drilled down to the first core point using a 7 7/8-inch tricone bit. (Drilling was conducted with air using small quantities of water from the White Mesa Culinary Well to keep the cuttings moist and reduce dust.) A 10-foot core was obtained using the equipment described for WMMW-16. Upon completion of the coring, the hole was then reamed with the tricone bit and drilled down to the next core point. It should be noted that core recoveries in WMMW-17, -18 and -19 are well below the 100 percent recoveries achieved in WMMW-16. The low core recovery rate in these boring is due to the following conditions:

- Each new core run was started in an 8-inch hole which allowed the barrel and pipe to wobble in the hole resulting in the core not being held firmly in the core catcher as it was cut.

- In order to recover an uncontaminated core, the driller was not allowed to use a "core-loss polymer" which would have enhanced recovery.

- The drill rig, bit and pipe were decontaminated upon completion of each hole, prior to moving to the next location.

WELL DEVELOPMENT

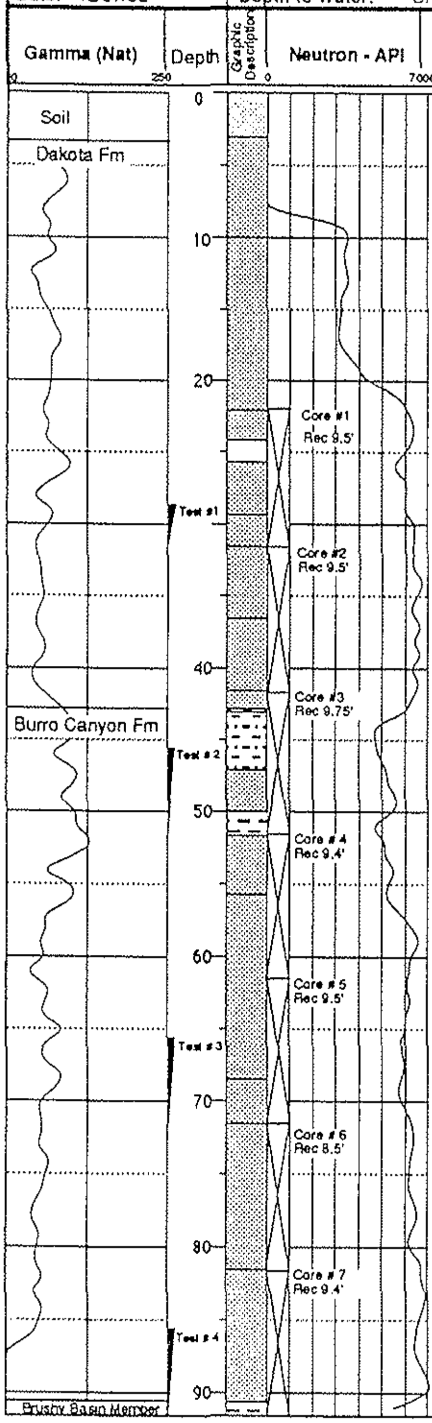
Once the borehole had been logged, the well was developed by jetting the groundwater and residual cuttings out of the borehole, then allowing the well to partially recover, then jetting once again. This was repeated until all the cuttings were removed and the water was clear.

WELL CONSTRUCTION

Each observation well was constructed using 4-inch flush-joint schedule 40 PVC pipe, 20-slot (0.02-inch) was used for the slotted section, 10 - 20 Colorado silica sand gravel pack, bentonite pellets, and cement/bentonite grout. A cap was placed on the bottom of the 4-inch PVC-riser pipe. This was followed by an interval of blank PVC pipe to act as a sump for the well. A screened interval was placed above of the sump, followed by blank PVC pipe to surface. A gravel pack was then placed between the 4-inch PVC pipe and the wall of the borehole from the bottom of the hole to a selected point above the slotted portion of the PVC pipe. Five feet of bentonite pellets were then placed above the gravel pack. Bentonite/cement grout was placed from the top of the bentonite pellet seal to surface. PVC caps were then placed on the pipe and a locking cap constructed on the steel casing.

PEEL Environmental Services, Arvada, CO (303)422-6116	Bore Hole No. : WMMW-16
Project: White Mesa | Surface Elev. 5587 est | T. D. = 91.5	UMETCO Minerals Corporation
Date: 12/07/92 | Depth to Water: Dry | Geologist: F. A. Peel	

Gamma (Nat) | Depth | Graphic Description | Neutron - API | Sample Description | Comments | Well Costruction



Sample Description

Sand: quartz,reddish brown,fine-grained subrounded silty.

Sandstone: quartz, reddish brown, very fine grained, subround, silty friable.

Sandstone: quartz, light buff, very fine- to fine-grained, subangular to angular, friable, good inter granular porosity.

Sandstone: quartz, light buff to light gray, very fine- to fine-grained,kaolinitic, massive to thin bedded,trough cross bedding trace porosity.

Claystone: light gray, silty, slightly sandy,thin carbonaceous partings, hard.

Sandstone: quartz, light gray, very fine grained, subrounded, kaolinitic, thin cross bedding, hard.

Sandstone: quartz, light yellow gray, fine to medium grained, subrounded to round kaolinitic, tr iron staining, thin cross bedding.

Sandstone: quartz, light gray, medium to coarse grained, kaolinitic, conglomeratic pebbles are angular lithic fragments.

Sandstone: quartz, light gray, fine to medium grained, subrounded, silty, trace intergranular porosity, occasionally coarse grained, occasional pebble.

Sandstone: quartz, light gray, fine- to medium-grained, subround to rounded,
Conglomerate: Brownish gray, angular to subangular, chert & sandstone clasts,
Siltstone: greenish gray,sandy in part, occasional iron staining.

Sandstone: quartz, light greenish gray, very fine grained silty.

Shale: greenish gray, thinbedded soft, bentonitic.

Sandstone: quartz, light buff to light gray, very fine grained, sub angular, trace intergranular porosity, limonite concretions, trace iron staining.

Sandstone: quartz, light brownish gray, fine grained, thin cross bedding, trace porosity, becomming greenish gray & very fine grained toward base, shale parting at 64'

Sandstone: quartz, light brownish gray, fine grained, well sorted, good intergranular porosity, 1" shale iron stained shale parting at top.

Sandstone: quartz, light gray, grading downward from very fine grained to medium grained, subrounded, layers well sorted, kaolinitic, conglomeratic in part, trace iron staining.

Sandstone: quartz, light gray, medium grained, subangular to subround, well sorted, kaolinitic, poor to good intergranular porosity, occasional coarse sand grains and pebble conglomerate stringers, trace iron staining.

Shale: dark green, thinbedded, soft.

Comments

1/4" Steel Surface Csg

Cement/Bentonite Grout

4" schedual 40 PVC

K= 9.1E-4 cm/sec

K= 6.1E-5 cm/sec

Centralizer

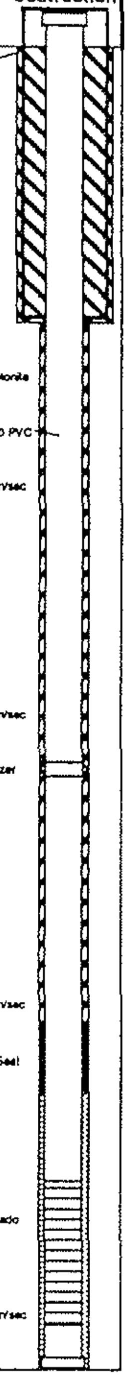
K= 7.8E-5 cm/sec

Bentonite Seal

10-20 Colorado Silica Sand

K= 2.9E-5 cm/sec

Well Dry

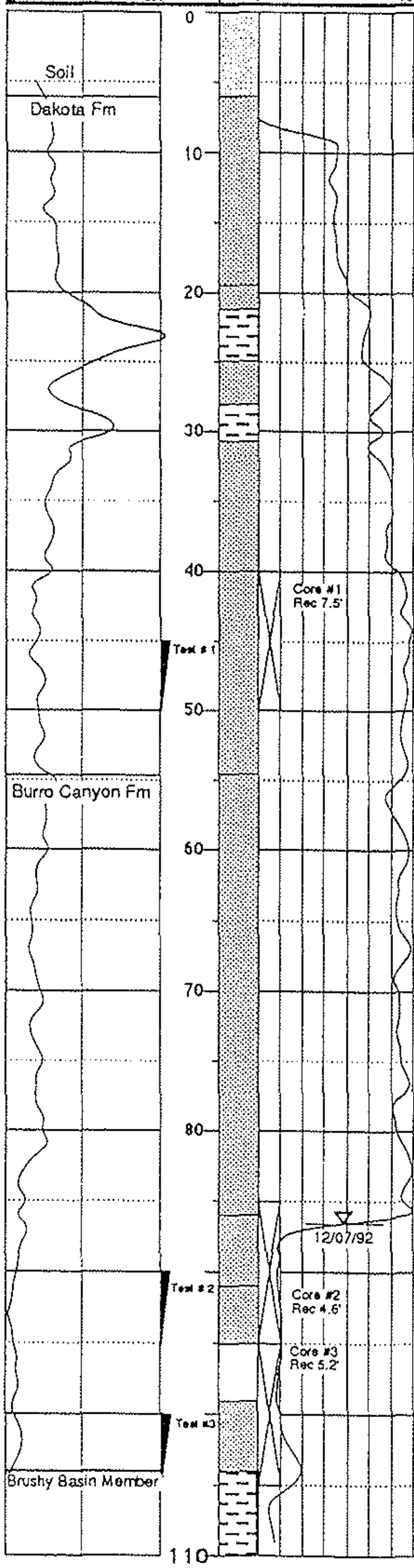


PEEL Environmental Services
Arvada, CO (303)422-6115

Bore Hole No. : WMMW-17

Project: White Mesa	Surface Elev. 5580 est	T. D. = 110'	UMETCO Minerals Corporation
Date: 12/07/92	Depth to Water: 86.5'	Geologist: F. A. Peel	

Gamma (Nat) 0–250 | Depth | Graphic Description | Neutron - API 0–7000 | Sample Description | Comments | Well Costruction



Sample Description

Sand: quartz, reddish brown, fine to medium grained round to sub round.

Sandstone: quartz, light buff, fine to medium grained, subround, kaolinitic, tight, occ thin limestone lenses.

Sandstone: quartz, light gray, very fine- to fine grained, subround, kaolinitic, trace iron stain, friable.

Shale; greenish brown to greenish gray, slightly silty in part, bentonitic, soft.

Shale: greenish brown to greenish gray, slightly silty in part, bentonitic, soft.

Sandstone: quartz, light gray to light green gray, very fine- to to fine grained, subround, kaolinitic, tr iron stain, occ chert pebble.

Sandstone: quartz, greenish gray, fine- to medium-grained, subround, conglomeratic (chert and lithic pebbles) friable, damp.

Sandstone: quartz, light gray, fine-grained, subround, fair intergranular porosity.

Sandstone: quartz, light buff, medium- to very coarse-grained, subround, kaolinitic, occ conglomeratic, trace iron stain.

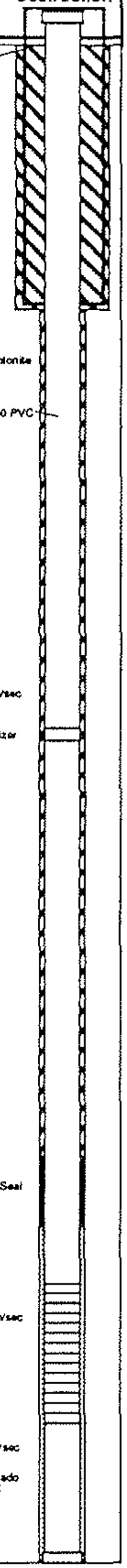
Sandstone: quartz, light brown gray, green gray at top, fine- grained, subround, argillaceous, interbedded with, congglomerate, pebble (chert & lithic fragments).

Lost Core

Sandstone: quartz, light gray, fine-grained, subround, kaolinitic, hard, coarse sand grains and pebbles in some thin beds, top 1' is pebble conglomerate, very sandy.

Shale: dark green, silty, soft.

Comments / Well Construction

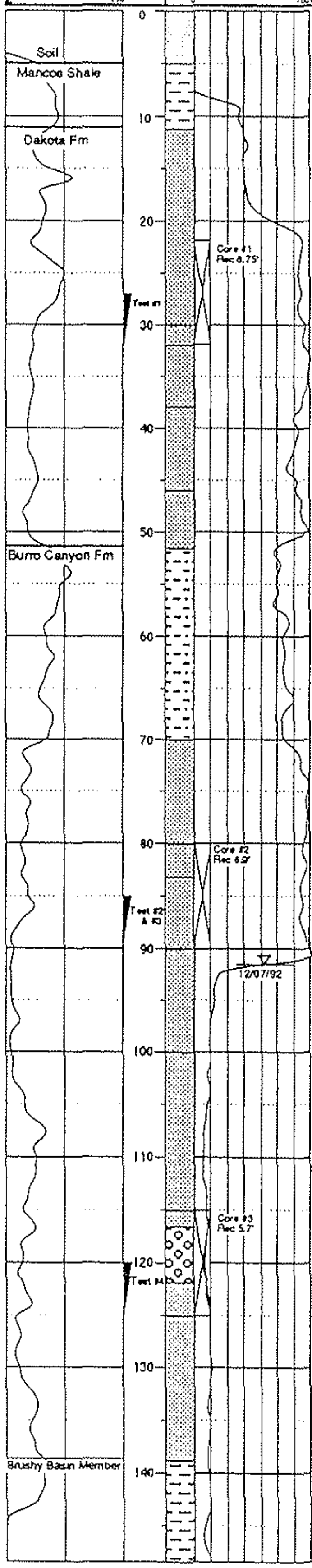


PEEL Environmental Services
Aneata, CO (###)###-####

Bore Hole No. : WMMW-18

Project: White Mesa	Surface Elev. 5660	T. D. = 148.5'	UMETCO Minerals Corporation
Date: 12/07/92	Depth to Water: 92'	Geologist: F. A. Peel	

Gamma (Nat) 0–250	Neutron - API 0–7000	Sample Description	Comments	Well Costruction



Sample Description

Sand: quartz, red brown, silty.

Shale: black, platy, hard.

Sandstone: quartz, light buff to light gray, subround, kaolinitic, trace iron staining >>> less toward base, Occ lithic pebble, occ thin shale parting.

Sandstone: as above >>> very conglomeratic in part, pebble size chert an lithic fragments.
Sandstone: quartz, buff, fine-grained, subrounded, slightly argillaceous, kaolinitic, trace iron staining.

Sandstone: quartz, light yellow gray, fine-grained, subangular, iron staining.

Sandstone: as above >>> very fine-grained.

Siltstone: light greenish gray, argillaceous, platy.

Sandstone: quartz, light gray, very fine-grained, subangular, trace kaolinite.

Sandstone: quartz, light grey, very fine- to medium-grained, subangular, occ pebble.

Sandstone: as above interbedded with Conglomerate, pebble (lithic), light gray, sandy in part.

Sandstone: as above.

Sandstone: quartz, greenish gray, fine-grained, subangular, to subround, kaolinitic, friable, interbedded with occasional thin shale layer reddish brown, soft.

Sandstone: quartz, light green to greenish gray, very fine- to fine-grained, subround, argillaceous.
Conglomerate: pebble, lithic fragments, very friable, sandy to very sandy in part.

Sandstone: quartz, light green, very fine-grained, argillaceous with thin red and green shale stringers.

Sandstone: as above.

Shale: reddish brown platy, soft.

Comments

1/4" Steel Surface Csg

Cement/Bentonite Grout

4" schedual 40 PVC

K= 1.1E-4 cm/sec

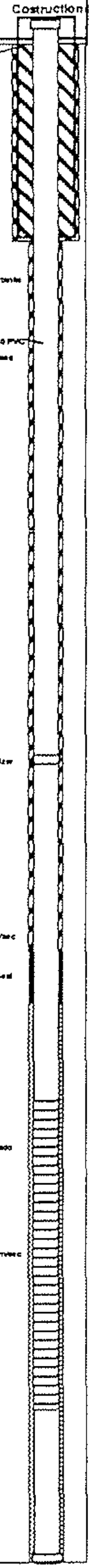
Centralizer

K= 2.5E-5 cm/sec

Bentonite Seal

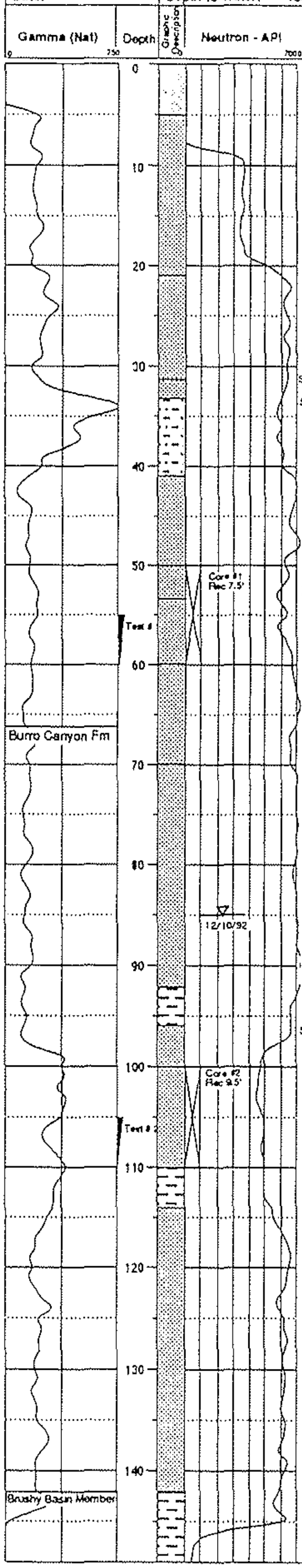
10-20 Colorado Silica Sand

K= 4.5E-6 cm/sec



PEEL *Environmental Services*
Arvada, CO (303)420-8114

Bore Hole No. : WMMW-19			
Project: White Mesa	Surface Elev. 5650	T. D. = 149	UMETCO Minerals Corporation
Date: 12/07/92	Depth to Water: 150	Geologist: F. A. Peel	



Sample Description

Sand: quartz, reddish brown, fine-grained, silty.

Sandstone: quartz, light gray, fine-grained, subround, kaolinitic.

Sandstone: quartz, light buff, very fine- to medium-grained, subangular to subround, kaolinitic, iron staining.

Sandstone: as above >>> less iron stained.

Siltstone: quartz, medium gray, sandy hard.

Sandstone: quartz, light buff, very fine- to medium-grained, subangular to subround, kaolinitic, iron staining.

Sandstone: quartz, light gray to buff, coarse-grained, subangular to subround, poorly sorted, kaolinitic, red iron staining, conglomeratic (chert & lithic pebbles).

Sandstone: quartz, very fine- to fine-grained, subround, very kaolinitic trace iron staining, occ shale parting, >>> very hard at base.

Sandstone: quartz, light buff, very fine- to medium-grained, subround, kaolinitic, red and brown iron staining.

Sandstone: quartz, light gray, very fine- to fine-grained, subround, Kaolinitic.

Shale: reddish brown, platy, waxy, soft.

Sandstone: quartz, light gray, fine- to medium-grained, conglomeratic.

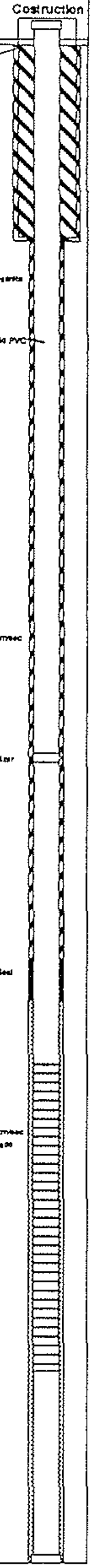
Sandstone: quartz, light greenish gray, very fine-grained, subround, argillaceous to very argillaceous, thin green shale partings, waxy, reddish brown shale parting at base.

Shale: as above.

Sandstone: quartz, light greenish gray, fine-grained, occ medium-grained, subround, Kaolinitic.

Shale: dark reddish brown, soft.

Comments / Well Construction



1/4" Steel Surface Csg
Cement/Bentonite Grout
4" schedual 40 PVC
K= 8.4E-8 cm/sec
Centralizer
Bentonite Seal
K= 1.4E-8 cm/sec
10-20 Colorado Silica Sand

Note: well was logged before the well recharged

NO... OF ...ENT... TO DRILL
(Start Card)

FILL THIS CARD OUT COMPLETELY

On or about 11/23/92, I will

DRILL NEW WELL ☑ REPLACE OLD WELL ☐ CLEAN/REPAIR ☐ DEEPEN ☐ PLUG ☐

a 8 Inch Well for UMETCO Minerals Corp
(Water User's Name)

PO Box 1029 Grand Junction CO 81502
(Water User's Address)

Under State Engineer's Authorization, RE: 92-09-03MW

Well Location Aprox ~~N~~ S 2100 ft. ~~E~~ W 950 ft. from NE Cor.

of Sec. 32 Township 32 ~~N~~ S, Range 22 E ~~W~~, SLM or USM.

646 — Gordon R Smith

Well Driller No. Well Driller's Signature

*Strike out words not applicable.

NOTICE OF INTENTION TO DRILL
(Start Card)

FILL THIS CARD OUT COMPLETELY

On or about 11/23/92, I will

DRILL NEW WELL ☒ REPLACE OLD WELL ☐ CLEAN/REPAIR ☐ DEEPEN ☐ PLUG ☐

a 8 Inch Well for UMETCO Minerals Corp
(Water User's Name)

PO Box 1029 Grand Junction CO 81502
(Water User's Address)

Under State Engineer's Authorization, RE: 92-09-03MW

Well Location *N S 1610 ft. E ~~W~~ 2150 ft. from SW Cor.

of Sec. 33 Township 37 ~~N~~ S, Range 22 E ~~W~~, SLM or USM.

646 — Gordon R Smith

Well Driller No. Well Driller's Signature

*Strike out words not applicable.

Note: An accurate survey of the wells will be done when completed

NOTICE OF INTENTION TO DRILL
(Start Card)

FILL THIS CARD OUT COMPLETELY

On or about 11/23/92, I will

DRILL NEW WELL ☑ REPLACE OLD WELL ☐ CLEAN/REPAIR ☐ DEEPEN ☐ PLUG ☐

a 8 Inch Well for UMETCO Minerals Corp
(Water User's Name)

PO Box 1029 Grand Junction CO 81502
(Water User's Address)

Under State Engineer's Authorization, RE: 92-09-03 MW

Well Location ~~N~~ S 1660 ft. ~~E~~ W 1660 ft. from NE Cor.

of Sec. 28 Township 37 ~~N~~ S, Range 22 E ~~W~~, SLM or USM.

646 — Gordon R Smith

Well Driller No. Well Driller's Signature

*Strike out words not applicable.

NOTICE OF INTENTION TO DRILL
(Start Card)

FILL THIS CARD OUT COMPLETELY

On or about 11/23/92, I will

DRILL NEW WELL ☑ REPLACE OLD WELL ☐ CLEAN/REPAIR ☐ DEEPEN ☐ PLUG ☐

a 8 Inch Well for UMETCO Minerals Corp
(Water User's Name)

PO Box 1029 Grand Junction CO 81502
(Water User's Address)

Under State Engineer's Authorization, RE: 92-09-03MW

Well Location ~~N~~ S 2340 ft. ~~E~~ W 390 ft. from NE Cor.

of Sec. 28 Township 37 ~~N~~ S, Range 22 E ~~W~~, SLM or USM.

646 — Gordon R Smith

Well Driller No. Well Driller's Signature

*Strike out words not applicable.

APPENDIX B

Geophysical Logs
of
Existing Monitor Wells

GEOPHYSICAL SURVEYS

Each hole was logged with the gamma (natural)/neutron geophysical probe. For the new wells, these geophysical logs have been incorporated with the lithological log (see Appendix A). Geophysical logs of previously installed wells are shown on the following pages.

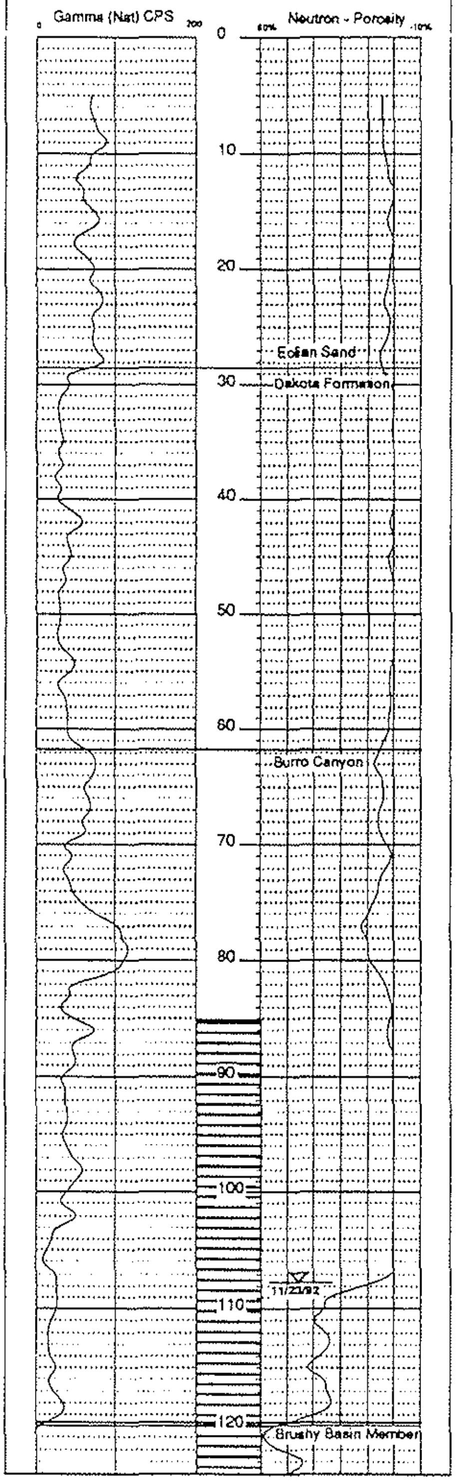
Umetco Minerals Corporation

Location: Montrose County   Date: 11/23/92

Gamma (Nat) - Neutron Porosity

Gd. Elev. 5611.6
T.D. 124

WMMW-2



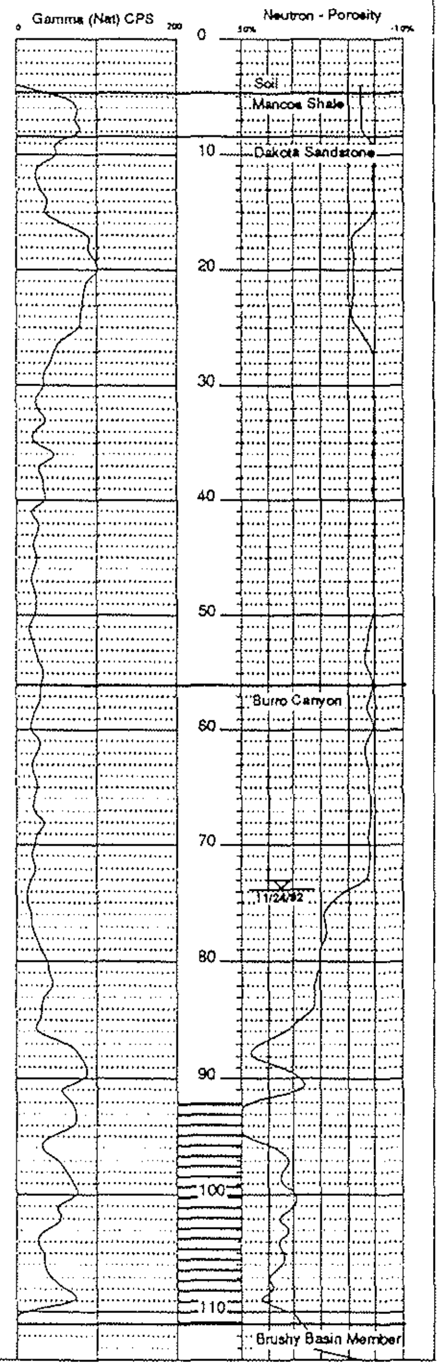
Umetco Minerals Corporation

Location: San Juan County, Utah   Date: 11/24/92

Gamma (Nat) - Neutron Porosity

Gd. Elev. 5642.2
T.D. 114

WMMW-1



Umetco Minerals Corporation

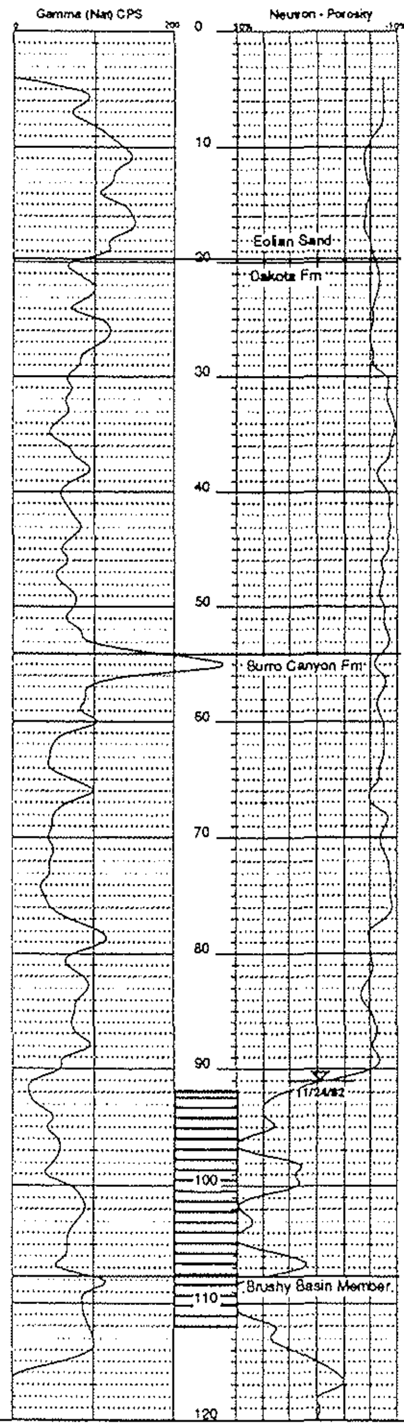
Location: San Juan County, Utah   Date: 11/24/92

Gamma (Nat) - Neutron Porosity

Gd. Elev. 5621

T.D. 120

WMMW-4



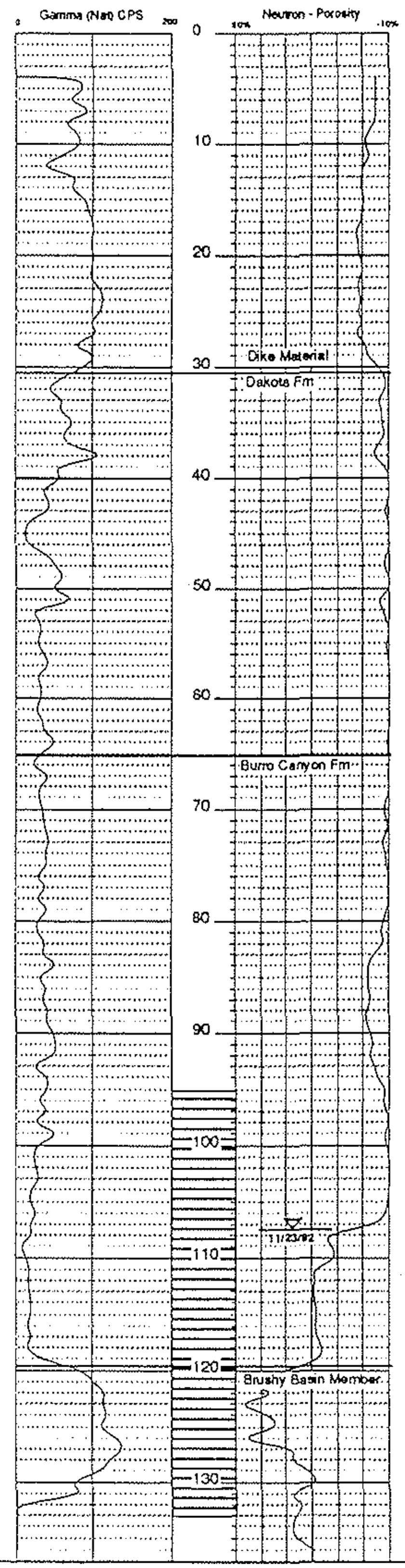
Umetco Minerals Corporation

Location: San Juan County, Utah Date: 11/23/92

Gamma (Nat) - Neutron Porosity

Gd. Elev. 5608.9
T.D. 136

WMMW-5



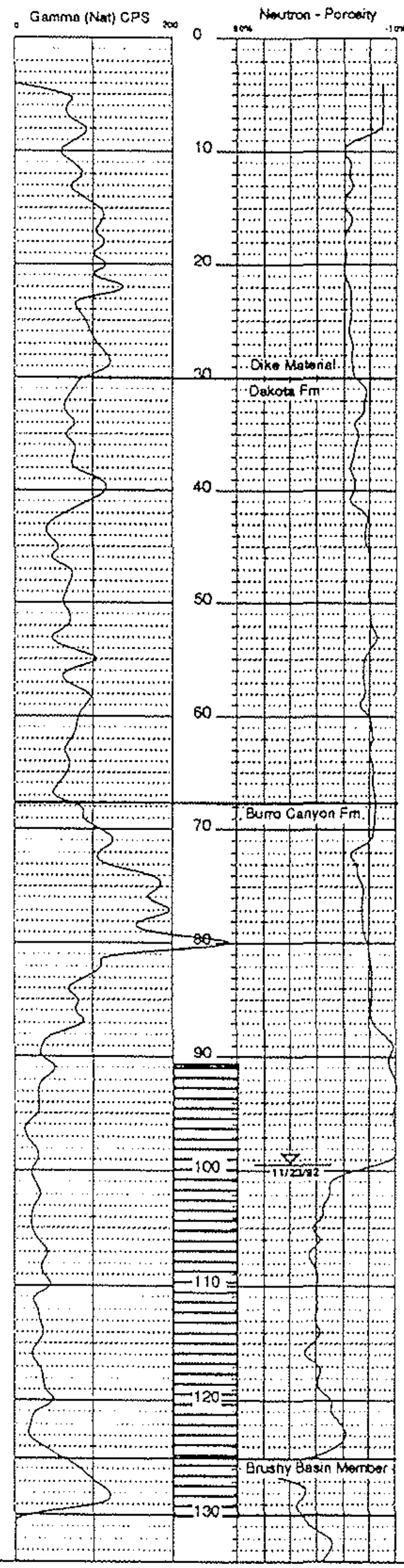
Umetco Minerals Corporation

Location: San Juan County, Utah   Date: 11/23/92

Gamma (Nat) - Neutron Porosity

Gd. Elev. 5608.6
T.D. 134

WMMW-11



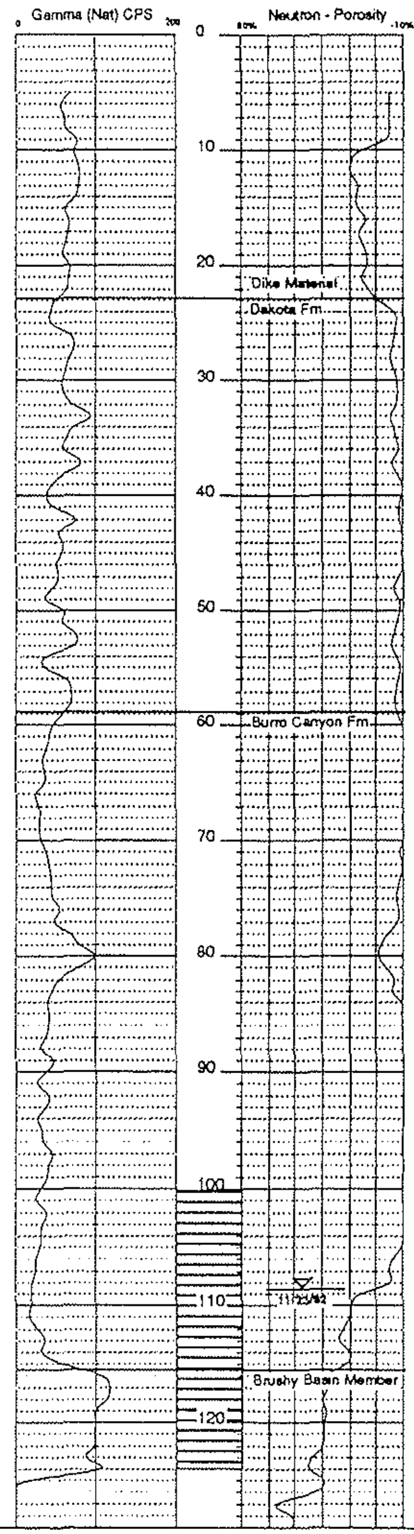
Umetco Minerals Corporation

Location: San Juan County, Utah | Date: 11/23/92

Gamma (Nat) - Neutron Porosity

Gd. Elev. 5608.5
T.D. 129

WMMW-12



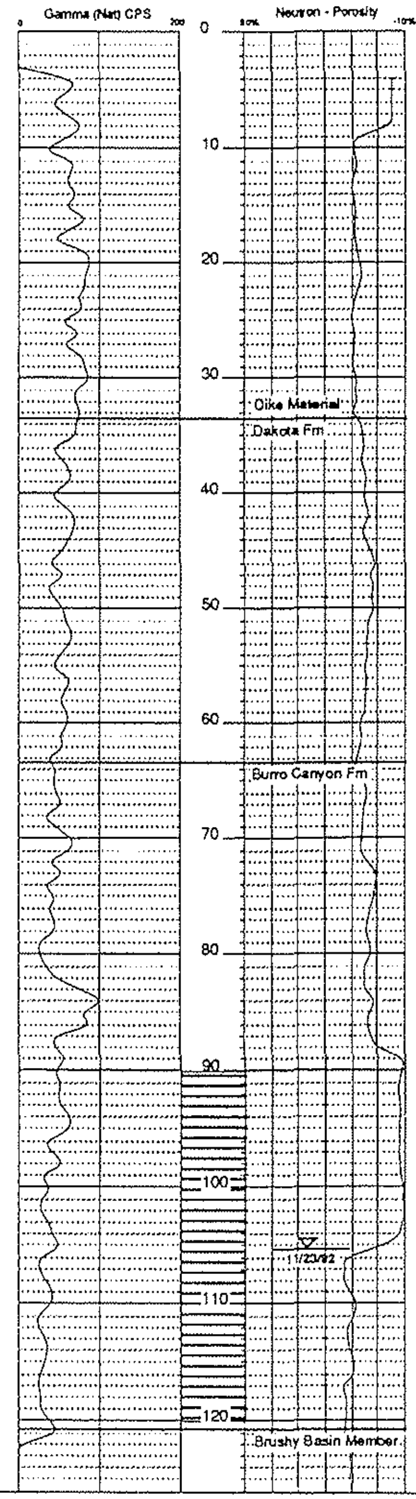
Umetco Minerals Corporation

Location: San Juan County, Utah   Date: 11/23/92

Gamma (Nat) - Neutron Porosity

Gd. Elev. 5596
T.D. 127

WMMW-14



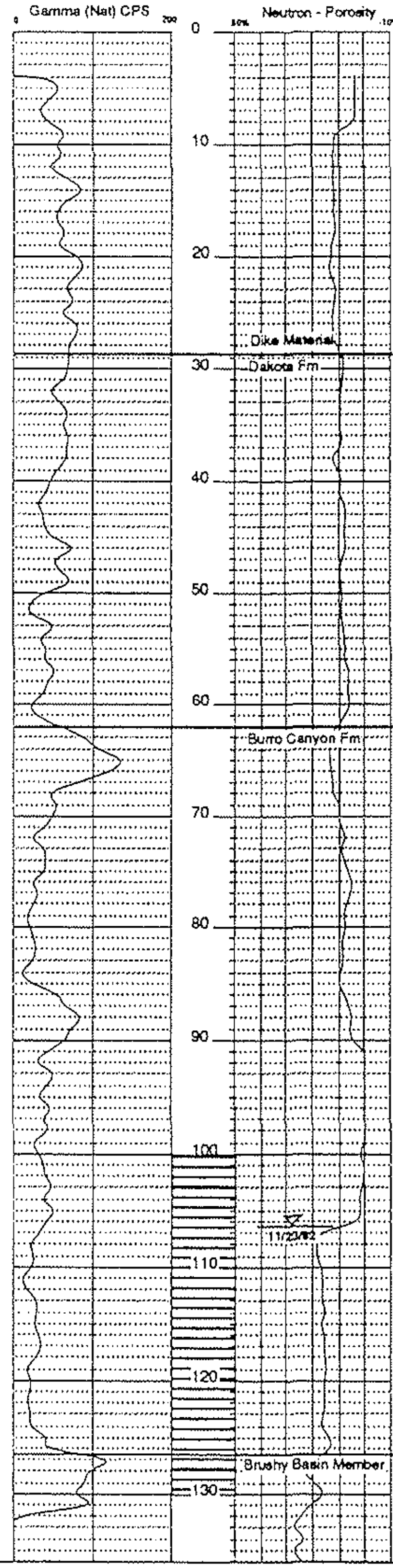
Umetco Minerals Corporation

Location: San Juan County, Utah **Date:** 11/23/92

Gamma (Nat) - Neutron Porosity

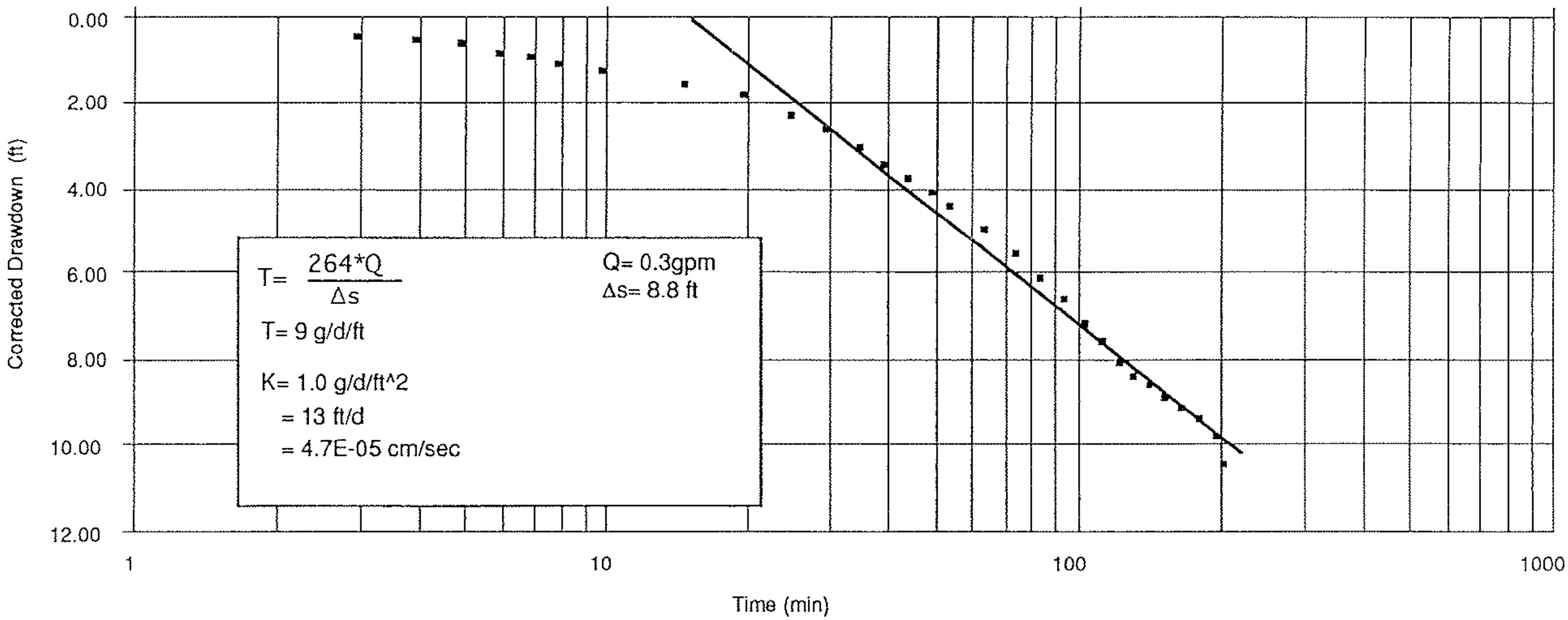
Gd. Elev. 5596.8
T.D. 136

WMMW-15



APPENDIX C

AQUIFER TESTS

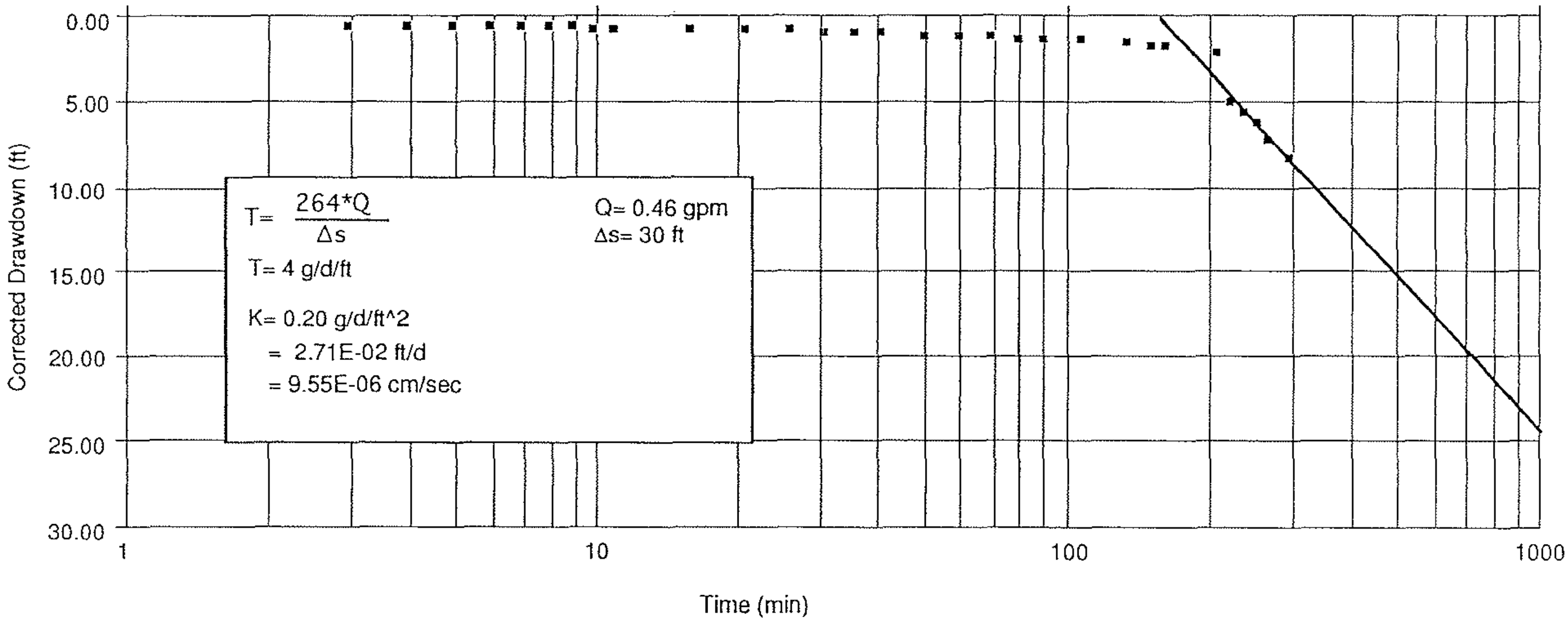


WMMW-2 Semi-Log Plot Of Time vs Drawdown (Corrected For Dewatering)

Aquifer Test Data For WMMW-2

Facility	Whit Mesa Mill
Monitor Well	WMMW-2
Date Pump	11/19/92

	Time (min)	Depth to Water(ft)	Drawdown(ft)	Drawdown Corrected(ft)
Pump Started	0.1	110.03	0	
	I	110.24	0.21	0.21
	3	110.57	0.54	0.53
	4	110.63	0.6	0.59
	5	110.79	0.76	0.75
	6	111	0.97	0.95
	7	111.11	1.08	1.05
	8	111.22	1.19	1.16
	10	111.39	1.36	1.32
	15	111.79	1.76	1.69
	20	112.08	2.05	1.96
	25	112.63	2.6	2.45
	30	113	2.97	2.78
	35	113.45	3.42	3.17
	40	113.89	3.86	3.54
	45	114.27	4.24	3.85
	50	114.68	4.65	4.18
	55	115.15	5.12	4.55
	65	115.87	5.84	5.10
	75	116.68	6.65	5.69
	85	117.45	7.42	6.22
	95	118.23	8.2	6.74
	105	119.05	9.02	7.25
	115	119.83	9.8	7.71
	125	120.62	10.59	8.15
	135	121.3	11.27	8.51
	145	121.8	11.77	8.76
	155	122.27	12.24	8.98
	170	122.85	12.82	9.25
	185	123.47	13.44	9.51
	200	124.47	14.44	9.91
Well out of Water	206	126.35	16.32	10.53
	208	125.9	15.87	
	209	125.77	15.74	
	210	125.69	15.66	
	211	125.6	15.57	
	212	125.56	15.53	
	213	125.54	15.51	
	214	125.53	15.5	
	215	125.49	15.46	
	225	125.37	15.34	
	235	125.3	15.27	
	245	125.25	15.22	
	255	125.18	15.15	
	265	125.11	15.08	
	275	125.07	15.04	
	290	125.09	15.06	
	305	125.01	14.98	
	375	124.77	14.74	
	435	124.49	14.46	

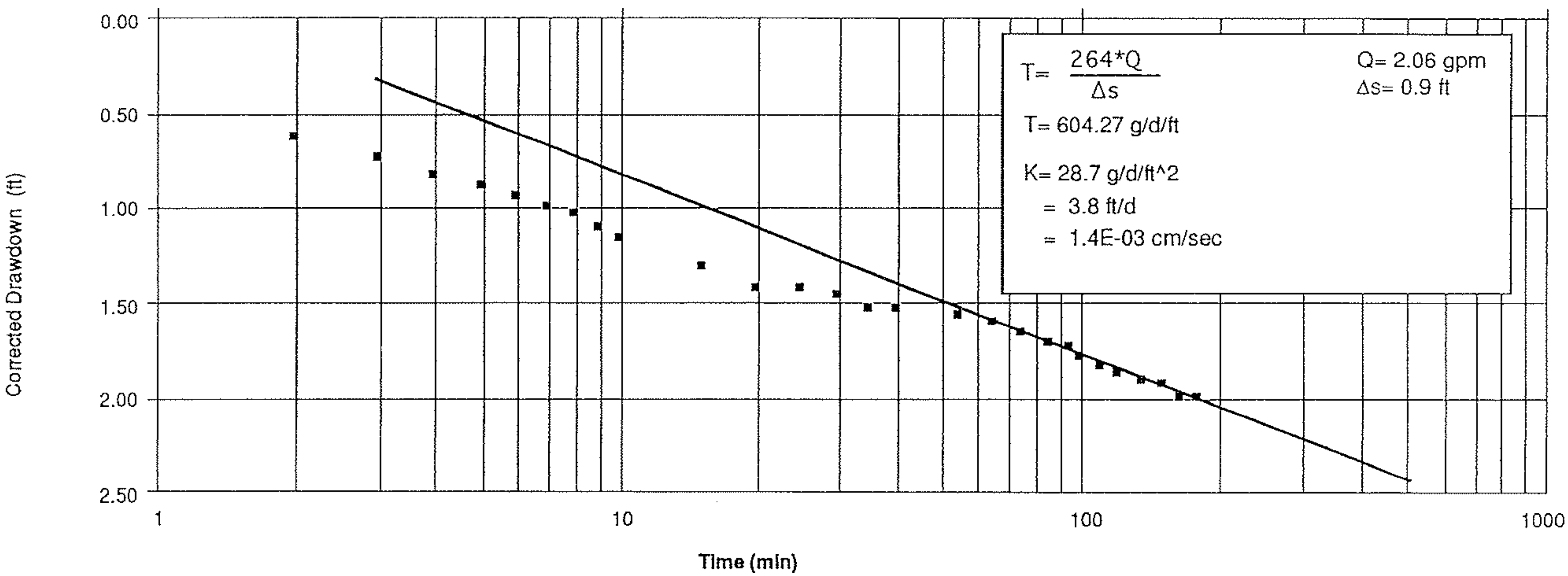


WMMW-4 Semi-Log Plot Of Time vs Drawdown (Corrected For Dewatering)

Aquifer Test Data For WMMW-4

Facility	Whit Mesa Mill
Monitor Well	WMMW-4
Date Pump	11/17/92

	Time (min)	Depth to Water(ft)	Drawdown(ft)	Drawdown Corrected(ft)
Pump Started	0.1	92.41	0	
	I	92.69	0.28	0.28
	2	92.88	0.47	0.47
	3	93.03	0.62	0.61
	4	93.03	0.62	0.61
	5	93.07	0.66	0.65
	6	93.05	0.64	0.63
	7	93.02	0.61	0.60
	8	93.06	0.65	0.64
	9	93.09	0.68	0.67
	10	93.11	0.7	0.69
	11	93.15	0.74	0.73
	16	93.21	0.8	0.79
	21	93.28	0.87	0.86
	26	93.38	0.97	0.95
	31	93.45	1.04	1.02
	36	93.49	1.08	1.06
	41	93.53	1.12	1.10
	51	93.67	1.26	1.23
	61	93.66	1.25	1.22
	71	93.73	1.32	1.29
	81	93.85	1.44	1.40
	91	93.9	1.49	1.45
	109	94.1	1.69	1.64
	137	94.17	1.76	1.70
	152	94.26	1.85	1.79
	165	94.62	2.21	2.12
	212	97.98	5.57	5.02
	227	98.84	6.43	5.69
	242	99.69	7.28	6.33
	257	101.03	8.62	7.29
	272	102.35	9.94	8.18
	302	104.11	11.7	9.26
	332	105.45	13.04	10.00
Well out of Water	333	105.49	13.08	10.02

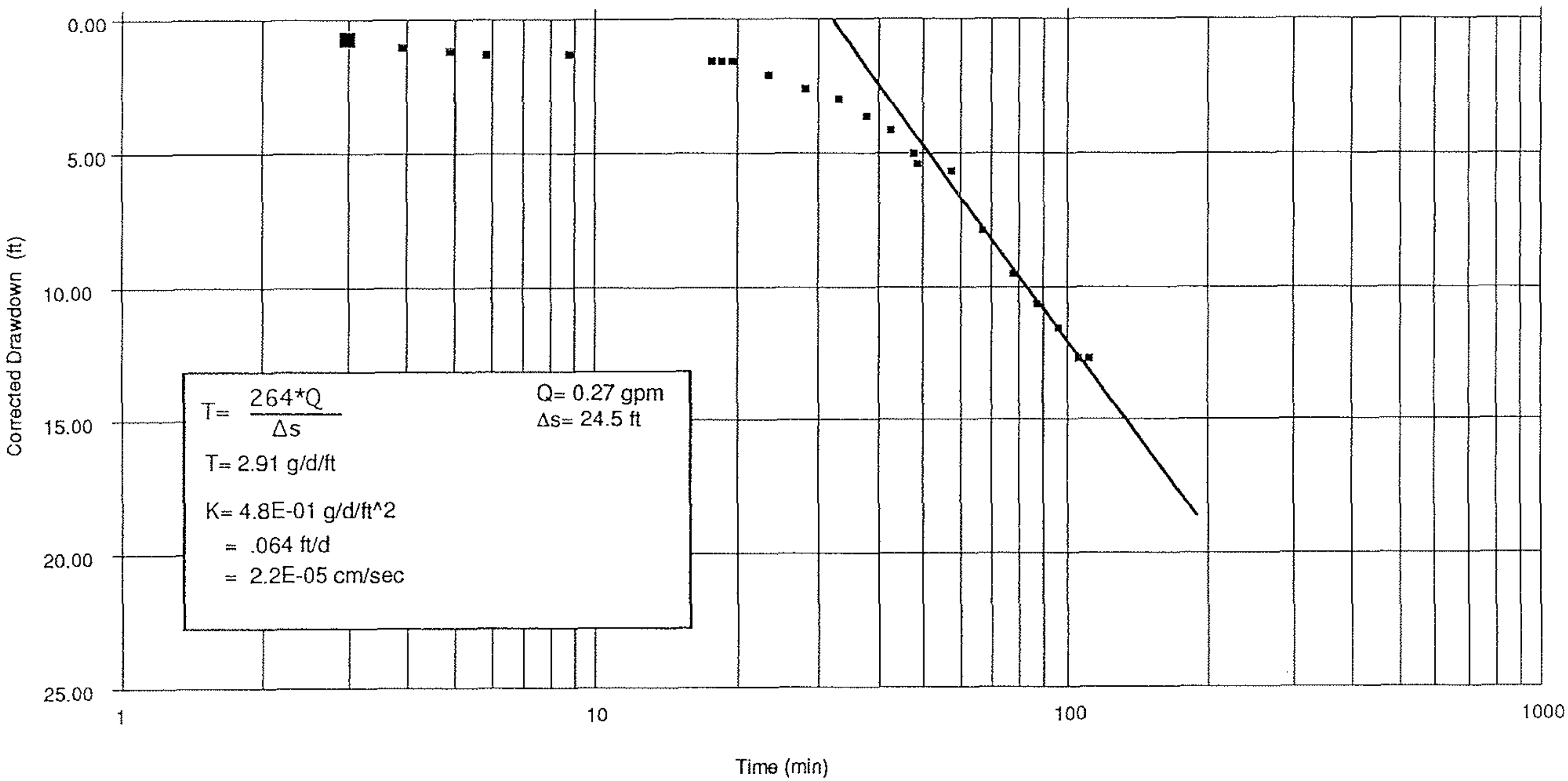


WMMW-11 Semi-Log Plot Of Time vs Drawdown (Corrected For Dewatering)

Aquifer Test Data For WMMW-11

Facility Whit Mesa Mill
Monitor Well WMMW-11
Date Pump 11/12/92

	Time (min)	Depth to Water(ft)	Drawdown(ft)	Drawdown Corrected(ft)
Pump Started	0.1	102.27	0	
	I	102.71	0.44	0.44
	2	102.92	0.65	0.64
	3	103.02	0.75	0.74
	4	103.12	0.85	0.84
	5	103.18	0.91	0.90
	6	103.24	0.97	0.95
	7	103.29	1.02	1.00
	8	103.33	1.06	1.04
	9	103.4	1.13	1.11
	10	103.47	1.2	1.17
	15	103.61	1.34	1.31
	20	103.72	1.45	1.41
	25	103.72	1.45	1.41
	30	103.76	1.49	1.45
	35	103.85	1.58	1.54
	40	103.85	1.58	1.54
	55	103.88	1.61	1.56
	65	103.93	1.66	1.61
	75	103.98	1.71	1.66
	85	104.03	1.76	1.70
	95	104.05	1.78	1.72
	100	104.12	1.85	1.79
	110	104.18	1.91	1.84
	120	104.22	1.95	1.88
	135	104.25	1.98	1.91
	150	104.27	2	1.93
	165	104.35	2.08	2.00
	180	104.35	2.08	2.00
Pump off	200	104.38	2.11	2.03
	205	104.38	2.11	2.03
	206	104.03	0.35	
	207	103.8	0.58	
	208	103.66	0.72	
	209	103.58	0.8	
	210	103.5	0.88	
	211	103.44	0.94	
	212	103.41	0.97	
	213	103.33	1.05	
	214	103.35	1.03	
	215	103.34	1.04	
	220	103.18	1.2	
	225	103.09	1.29	
	235	103.03	1.35	
	250	102.92	1.46	
	270	102.88	1.5	
	290	102.78	1.6	
	310	102.78	1.6	

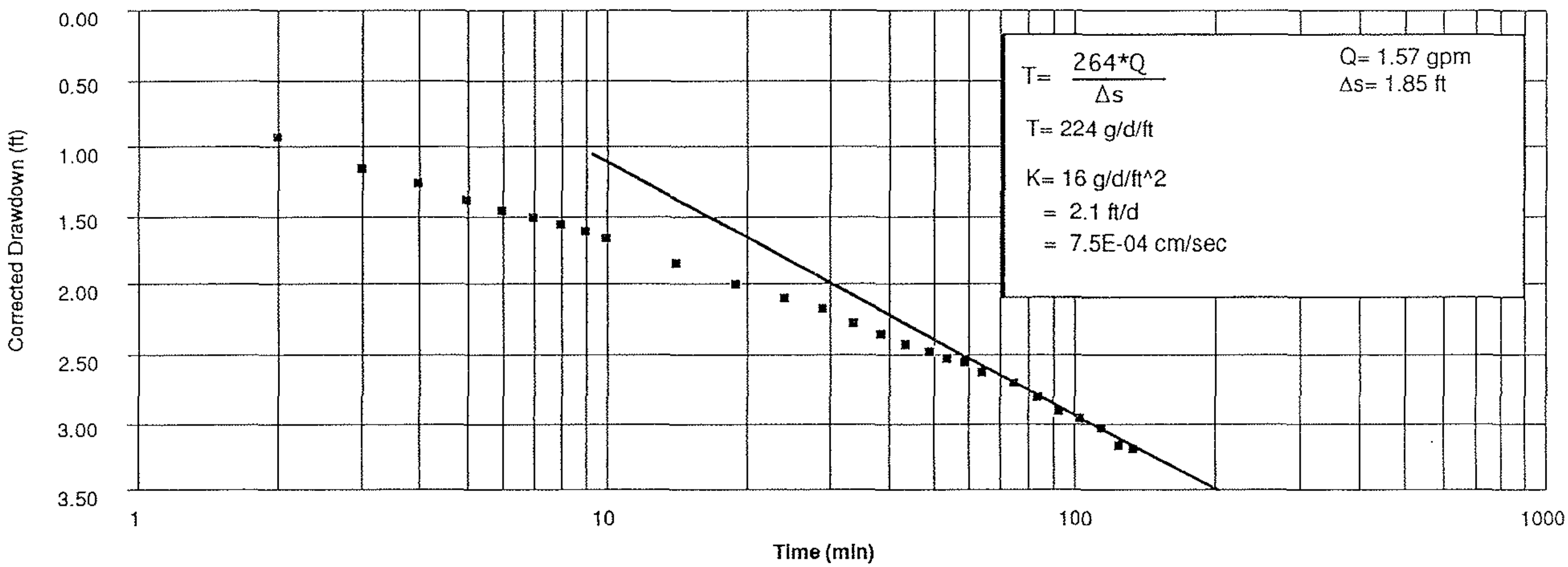


WMMW-12 Semi-Log Plot Of Time vs Drawdown (Corrected For Dewatering)

Aquifer Test Data For WMMW-12

Facility	Whit Mesa Mill
Monitor Well	WMMW-12
Date Pump	11/19/92

	Time (min)	Depth to Water(ft)	Drawdown(ft)	Drawdown Corrected(ft)
Pump Started	0.1	109.45	0	
	2	110	0.55	0.54
	3	110.24	0.79	0.78
	4	110.47	1.02	1.00
	5	110.63	1.18	1.16
	6	110.68	1.23	1.20
	9	110.79	1.34	1.31
	18	110.95	1.5	1.46
	19	111	1.55	1.51
	20	111.07	1.62	1.57
	24	111.61	2.16	2.08
	29	112.08	2.63	2.51
	34	112.6	3.15	2.97
	39	113.3	3.85	3.59
	44	113.83	4.38	4.04
	49	114.93	5.48	4.94
	50	115.52	6.07	5.41
	59	115.84	6.39	5.66
	69	118.77	9.32	7.77
	79	121.47	12.02	9.44
	89	123.64	14.19	10.59
	99	125.66	16.21	11.52
Well dry	109	128.92	19.47	12.70
	114	128.91	19.46	12.70
	115	128.83	19.38	12.67
	117	128.65	19.2	12.62
	118	128.49	19.04	12.57
	119	128.48	19.03	12.56
	120	128.44	18.99	12.55
	121	128.37	18.92	12.53
	122	128.35	18.9	12.52
	123	128.34	18.89	12.52
	124	128.29	18.84	12.50
	129	128.15	18.7	12.46
	139	128	18.55	12.41
	149	127.8	18.35	12.34
	164	127.97	18.52	12.40
	179	127.75	18.3	12.32
	209	127.35	17.9	12.18
	339	125.84	16.39	11.59
	399	125.18	15.73	11.31
	464	124.48	15.03	11.00
	1414	116.12	6.67	5.88

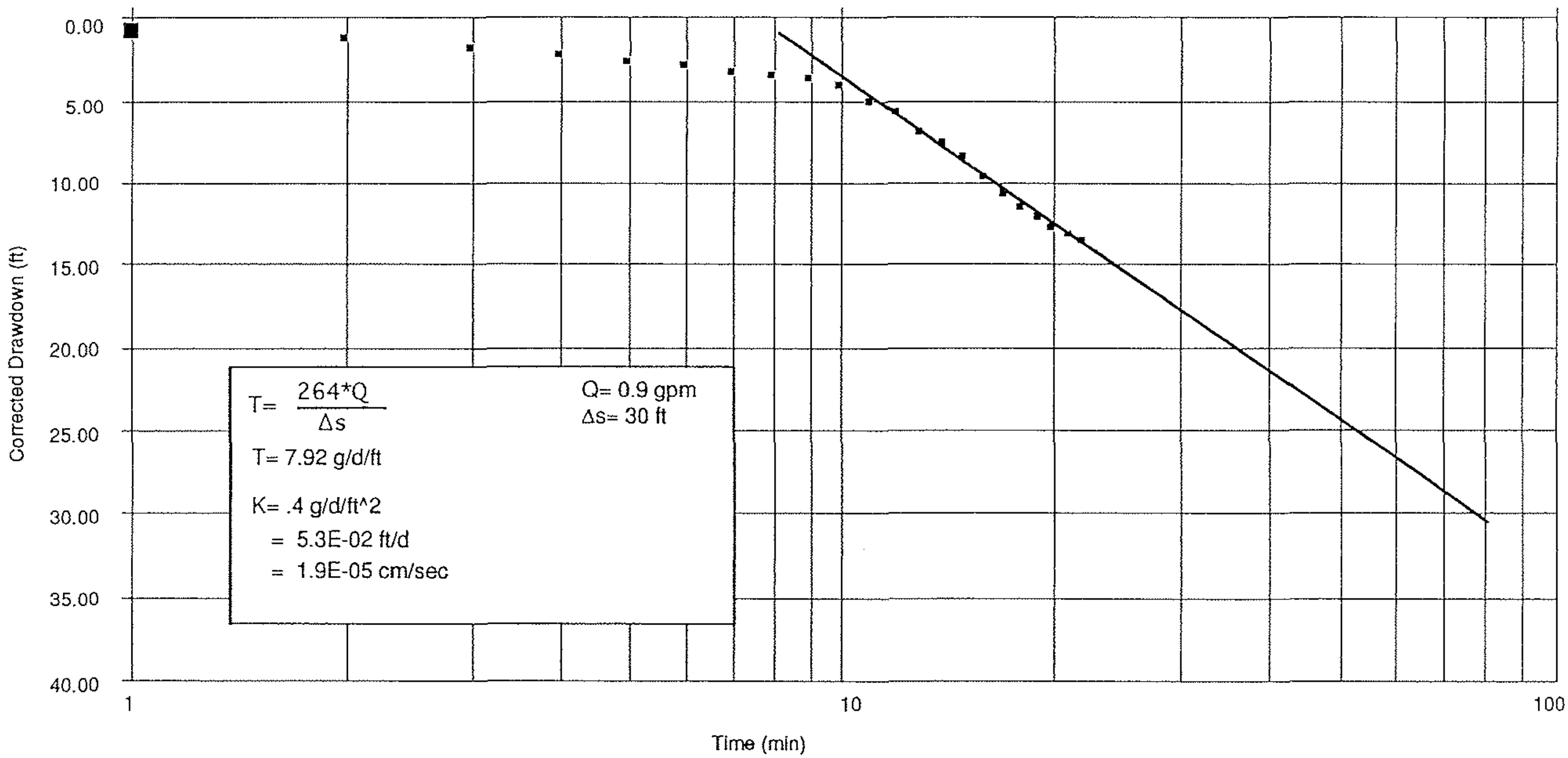


WMMW-14 Semi-Log Plot Of Time vs Drawdown (Corrected For Dewatering)

Aquifer Test Data For WMMW-14

Facility Whit Mesa Mill
Monitor Well WMMW-14
Date Pump 11/13/92

	Time (min)	Depth to Water (ft)	Drawdown (ft)	Drawdown Corrected (ft)
Pump Started	0.1	105.43	0	
	1	106.21	0.78	0.77
	2	106.4	0.97	0.95
	3	106.62	1.19	1.16
	4	106.74	1.31	1.28
	5	106.88	1.45	1.41
	6	106.94	1.51	1.47
	7	107.01	1.58	1.54
	8	107.07	1.64	1.59
	9	107.12	1.69	1.64
	10	107.17	1.74	1.69
	14	107.36	1.93	1.86
	19	107.51	2.08	2.00
	24	107.64	2.21	2.12
	29	107.72	2.29	2.20
	34	107.83	2.4	2.30
	39	107.91	2.48	2.37
	44	107.99	2.56	2.44
	49	108.04	2.61	2.49
	54	108.11	2.68	2.55
	59	108.13	2.7	2.57
	64	108.22	2.79	2.65
	74	108.32	2.89	2.74
	84	108.41	2.98	2.82
	94	108.53	3.1	2.93
	104	108.6	3.17	2.99
	114	108.69	3.26	3.07
	124	108.81	3.38	3.18
	134	108.85	3.42	3.21
	149	108.99	3.56	3.33
	164	109.14	3.71	3.46
	179	109.18	3.75	3.50
	194	109.28	3.85	3.59
	211	109.39	3.96	3.68
Pump Shut Down	224	109.53	4.1	3.80
	226	109.48	4.05	
	227	108.86	3.43	
	228	108.56	3.13	
	229	108.32	2.89	
	230	108.2	2.77	
	231	108.08	2.65	
	232	108	2.57	
	233	107.91	2.48	
	234	107.84	2.41	
	239	107.67	2.24	
	244	107.5	2.07	
	254	107.33	1.9	
	269	107.15	1.72	
	284	107.02	1.59	
	299	106.96	1.53	
	314	106.92	1.49	
	329	106.86	1.43	

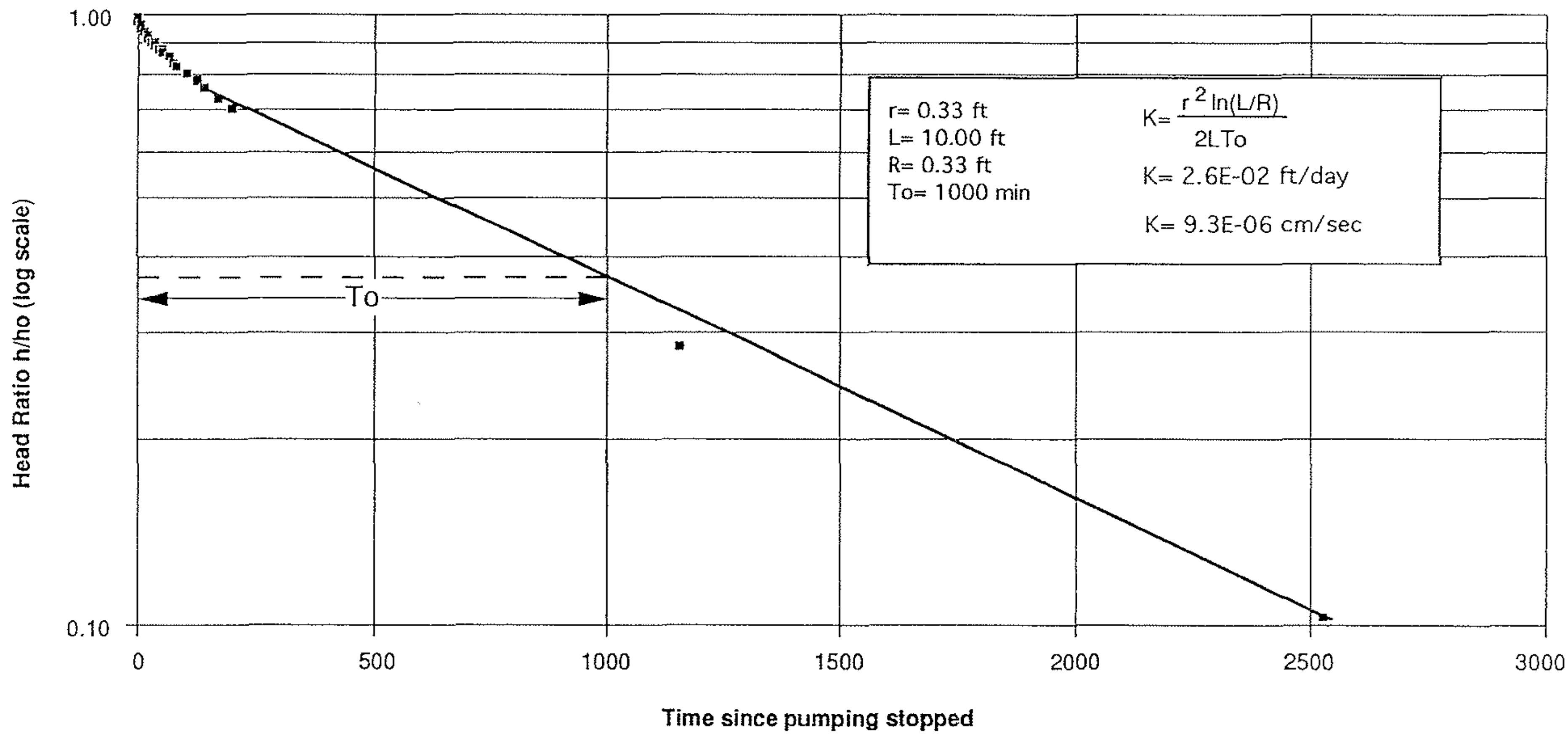


WMMW-15 Semi-Log Plot Of Time vs Drawdown (Corrected For Dewatering)

Aquifer Test Data For WMMW-15

Facility	Whit Mesa Mill
Monitor Well	WMMW-15
Date Pump	11/13/92

	Time (min)	Depth to Water(ft)	Drawdown(ft)	Drawdown Corrected(ft)
Pump Started	0.1	107.25	0	
	l	108	0.75	0.74
	2	108.53	1.28	1.25
	3	109.02	1.77	1.71
	4	109.53	2.28	2.19
	5	110	2.75	2.61
	6	110.35	3.1	2.93
	7	110.67	3.42	3.21
	8	111	3.75	3.50
	9	111.25	4	3.71
	10	111.55	4.3	3.97
	15	112.85	5.6	5.04
	20	113.8	6.55	5.78
	25	115.23	7.98	6.84
	30	116.37	9.12	7.63
	35	117.46	10.21	8.35
	45	119.48	12.23	9.56
	55	121.43	14.18	10.59
	65	123.28	16.03	11.44
	75	124.94	17.69	12.10
	85	126.45	19.2	12.62
	95	128.44	21.19	13.17
Out of water	108	130.2	22.95	13.54
	110	129.79	22.54	13.47
	111	129.5	22.25	13.41
	112	129.19	21.94	13.34
	113	128.91	21.66	13.28
	114	128.66	21.41	13.22
	115	128.4	21.15	13.16
	120	127.06	19.81	12.80
	125	125.66	18.41	12.36
	130	124.19	16.94	11.82
	135	123.06	15.81	11.35
	140	121.99	14.74	10.86
	146	120.21	12.96	9.96
	150	118.15	10.9	8.78
	160	116.1	8.85	7.45
	170	114.35	7.1	6.20
	180	112.83	5.58	5.02
	195	111.31	4.06	3.77
	210	110.18	2.93	2.78
	225	109.9	2.65	2.52
	320	108.41	1.16	1.14
	420	107.94	0.69	0.68

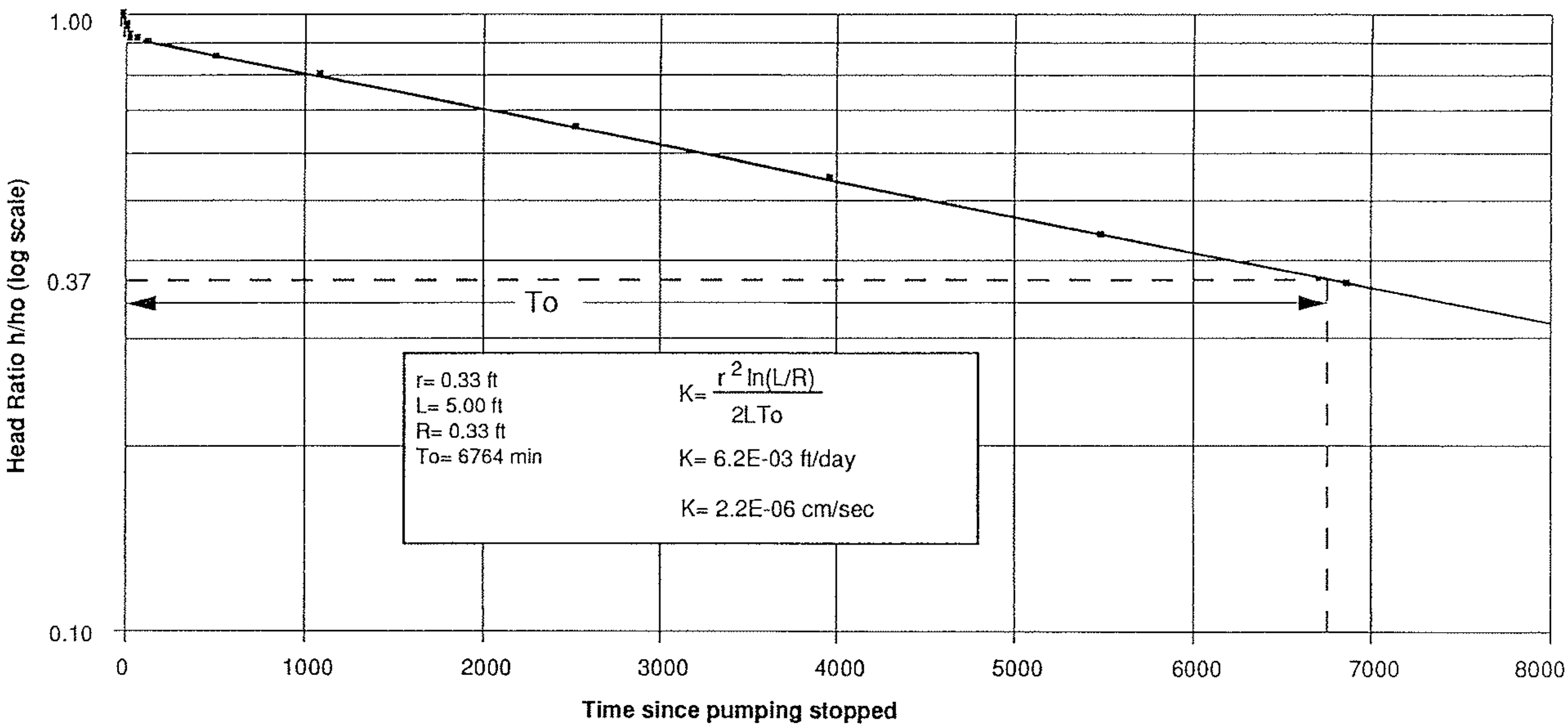


WMMW-1 Semi log Plot of Head Ratio vs Time

Aquifer Test Data For WMMW-1

Facility	Whit Mesa Mill
Monitor Well	WMMW-1
Date Pump	11/19/92

Time(min)	Depth to Water(ft)	Drawdown(ft)	t/t'	h/ho
0.1	75.67	0		
Well out of Water				
3	89.1	13.43	0.03	1.00
4	89.04	13.37	1.00	1.00
5	88.88	13.21	1.33	0.98
6	88.74	13.07	1.67	0.97
7	88.67	13	2.00	0.97
8	88.64	12.97	2.33	0.97
9	88.63	12.96	2.67	0.97
10	88.6	12.93	3.00	0.96
11	88.59	12.92	3.33	0.96
12	88.55	12.88	3.67	0.96
17	88.38	12.71	4.00	0.95
22	88.23	12.56	5.67	0.94
27	88.11	12.44	7.33	0.93
32	88.01	12.34	9.00	0.92
37	87.89	12.22	10.67	0.91
42	87.75	12.08	12.33	0.90
47	87.67	12	14.00	0.89
52	87.58	11.91	15.67	0.89
57	87.47	11.8	17.33	0.88
67	87.27	11.6	19.00	0.86
77	87.07	11.4	22.33	0.85
87	86.91	11.24	25.67	0.84
107	86.54	10.87	29.00	0.81
127	86.26	10.59	35.67	0.79
147	86	10.33	42.33	0.77
172	85.58	9.91	49.00	0.74
207	85.17	9.5	57.33	0.71
1152	79.51	3.84	69.00	0.29
2530	77.08	1.41	384.00	0.10



WMMW-3 Semi log Plot of Head Ratio vs Time

Aquifer Test Data For WMMW-3

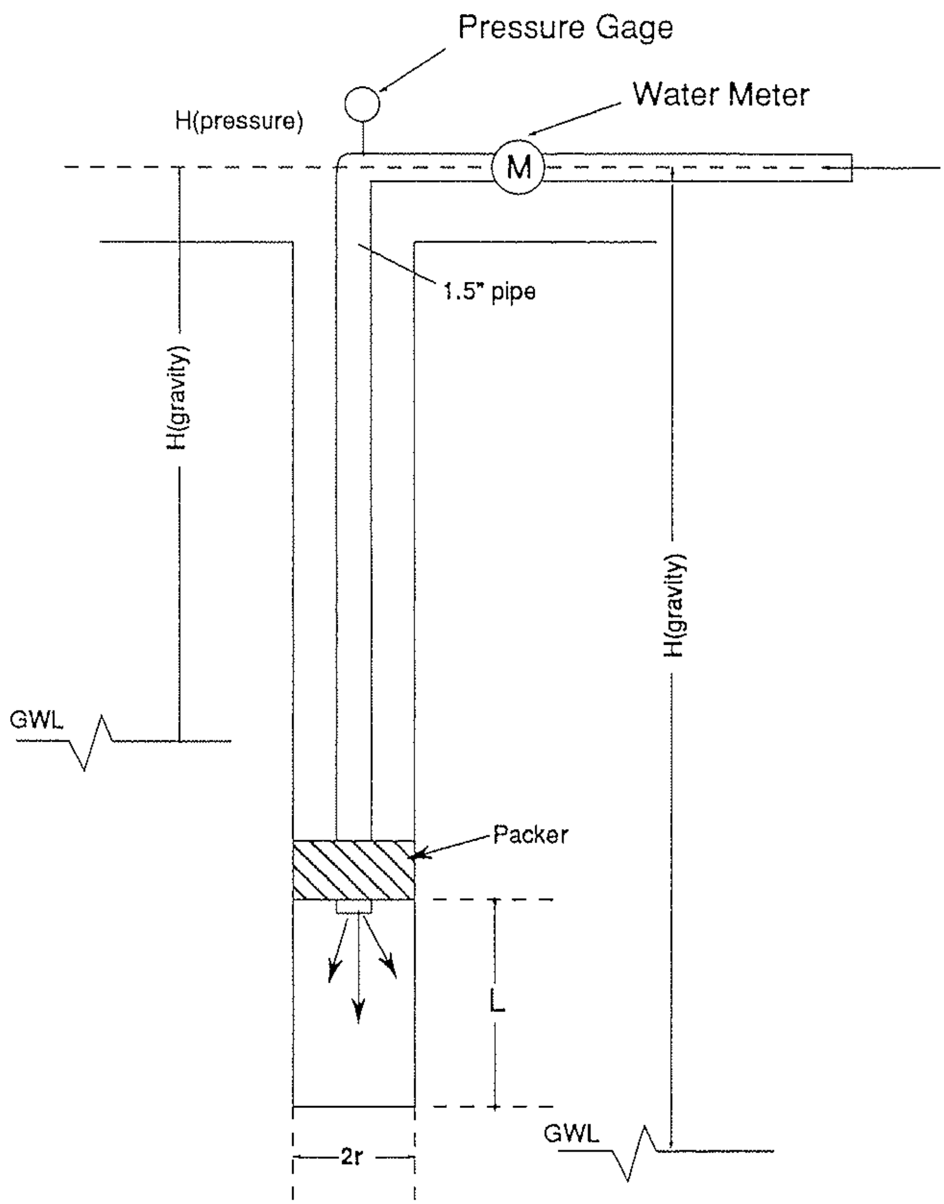
Facility	Whit Mesa Mill
Monitor Well	WMMW-3
Date Pump	11/16/92

	Time(min)	Depth to Water(ft)	Drawdown(ft)	t/t'	h/ho
	0.1	83.81	0		
Well dry	7	88.99	5.18	0.01	1.00
	8	88.92	5.11	1.00	0.99
	9	88.89	5.08	1.14	0.98
	10	88.86	5.05	1.29	0.97
	11	88.85	5.04	1.43	0.97
	12	88.83	5.02	1.57	0.97
	14	88.8	4.99	1.71	0.96
	19	88.78	4.97	2.00	0.96
	24	88.68	4.87	2.71	0.94
	29	88.61	4.8	3.43	0.93
	34	88.59	4.78	4.14	0.92
	39	88.58	4.77	4.86	0.92
	49	88.57	4.76	5.57	0.92
	74	88.55	4.74	7.00	0.92
	134	88.5	4.69	10.57	0.91
	514	88.24	4.43	19.14	0.86
	1094	87.96	4.15	73.43	0.80
	2534	87.2	3.39	156.29	0.65
	3974	86.64	2.83	362.00	0.55
	5489	86.08	2.27	567.71	0.44
	6884	85.7	1.89	784.14	0.36

Aquifer Test Data For WMMW-5

Facility	Whit Mesa Mill
Monitor Well	WMMW-5
Date Pump	11/17/92

Time(min)	Depth to Water(ft)	Drawdown(ft)	t/t'	h/ho
0.1	108.39	0		
5	113.53	5.14	0.02	1.00
6	113.47	5.08	1.00	0.99
7	113.38	4.99	1.20	0.97
8	113.35	4.96	1.40	0.96
9	113.32	4.93	1.60	0.96
10	113.3	4.91	1.80	0.96
11	113.25	4.86	2.00	0.95
12	113.2	4.81	2.20	0.94
13	113.18	4.79	2.40	0.93
18	113.06	4.67	2.60	0.91
23	112.96	4.57	3.60	0.89
28	112.82	4.43	4.60	0.86
33	112.72	4.33	5.60	0.84
38	112.6	4.21	6.60	0.82
43	112.55	4.16	7.60	0.81
48	112.45	4.06	8.60	0.79
53	112.4	4.01	9.60	0.78
58	112.3	3.91	10.60	0.76
63	112.22	3.83	11.60	0.75
68	112.13	3.74	12.60	0.73
83	111.96	3.57	13.60	0.69
98	111.78	3.39	16.60	0.66
113	111.62	3.23	19.60	0.63
128	111.45	3.06	22.60	0.60
258	110.42	2.03	25.60	0.39
323	110.09	1.7	51.60	0.33
518	109.45	1.06	64.60	0.21



Single-Packer Permeability Test, Equipment Set-Up

CONSTANT HEAD TESTS

Location	White Mesa Mill, Utah
Date	11/30/92
Geohydrologist	F. A. Peel
Borehole Tested	MW-16

Test #	1	
Depth to Bottom of Borehole	31.5	ft
Depth to Top of Test Section	28.5	ft
Depth to Base of Test Section	31.5	ft
Diameter of Borehole	4.25	in
Depth to Ground Water	NA	ft
Height of Press Gage Above G.L.	9.5	ft
Pressure (static conditions)	12	psi
Pump Rate (static conditions)	6	gal/min

Q= 6 gal/min
L= 3 ft
H= 67.22 ft
r= 0.18 ft

Permeability (k) = **1.3E-02** gal/min/ft^2
9.1E-04 cm/sec

Test #	2	
Depth to Bottom of Borehole	51.5	ft
Depth to Top of Test Section	45.5	ft
Depth to Base of Test Section	51.5	ft
Diameter of Borehole	4.25	in
Depth to Ground Water	NA	ft
Height of Press Gage Above G.L.	7.92	ft
Pressure (static conditions)	120	psi
Pump Rate (static conditions)	2.7	gal/min

Q= 2.7 gal/min
L= 6 ft
H= 333.62 ft
r= 0.18 ft

Permeability (k) = **7.6E-04** gal/min/ft^2
5.1E-05 cm/sec

$$K = \frac{Q}{2\pi \times L \times H} \times \ln\left(\frac{L}{R}\right)$$

Q = Pump rate under static conditions
L = Length of test section
H = Differential head under static conditions
r = radius of hole tested

CONSTANT HEAD TESTS

Location	White Mesa Mill, Utah
Date	1/1/92
Geohydrologist	F. A. Peel
Borehole Tested	MW-16

Test #	3	
Depth to Bottom of Borehole	71.5	ft
Depth to Top of Test Section	65.5	ft
Depth to Base of Test Section	71.5	ft
Diameter of Borehole	4.25	in
Depth to Ground Water	NA	ft
Height of Press Gage Above G.L.	8.6	ft
Pressure (static conditions)	65	psi
Pump Rate (static conditions)	2.8	gal/min

Q = 2.8 gal/min
L = 6 ft
H = 227.25 ft
r = 0.18 ft

Permeability (k) = **1.2E-03** gal/min/ft^2
7.8E-05 cm/sec

Test #	4	
Depth to Bottom of Borehole	91.5	ft
Depth to Top of Test Section	85.5	ft
Depth to Base of Test Section	91.5	ft
Diameter of Borehole	4.25	in
Depth to Ground Water	NA	ft
Height of Press Gage Above G.L.	9.75	ft
Pressure (static conditions)	91.5	psi
Pump Rate (static conditions)	1.4	gal/min

Q = 1.4 gal/min
L = 6 ft
H = 309.615 ft
r = 0.18 ft

Permeability (k) = **4.2E-04** gal/min/ft^2
2.9E-05 cm/sec

Q = Pump rate under static conditions
L = Length of test section
H = Differential head under static conditions
r = radius of hole tested

CONSTANT HEAD TESTS

Location	White Mesa Mill, Utah
Date	1/1/92
Geohydrologist	F. A. Peel
Borehole Tested	MW-17

Test #	1	
Depth to Bottom of Borehole	50	ft
Depth to Top of Test Section	45	ft
Depth to Base of Test Section	50	ft
Diameter of Borehole	4.25	in
Depth to Ground Water	NA	ft
Height of Press Gage Above G.L.	8.8	ft
Pressure (static conditions)	99	psi
Pump Rate (static conditions)	0.12	gal/min

Q = 0.12 gal/min
L = 5 ft
H = 284.99 ft
r = 0.18 ft

Permeability (k) = **4.5E-05** gal/min/ft^2
3.0E-06 cm/sec

Test #	2	
Depth to Bottom of Borehole	95	ft
Depth to Top of Test Section	90	ft
Depth to Base of Test Section	95	ft
Diameter of Borehole	4.25	in
Depth to Ground Water	89	ft
Height of Press Gage Above G.L.	6.1	ft
Pressure (static conditions)	135	psi
Pump Rate (static conditions)	0.2	gal/min

Q = 0.2 gal/min
L = 5 ft
H = 406.95 ft
r = 0.18 ft

Permeability (k) = **5.2E-05** gal/min/ft^2
3.5E-06 cm/sec

Q = Pump rate under static conditions
L = Length of test section
H = Differential head under static conditions
r = radius of hole tested

CONSTANT HEAD TESTS

Location	White Mesa Mill, Utah
Date	1/1/92
Geohydrologist	F. A. Peel
Borehole Tested	MW-17

Test #	3	
Depth to Bottom of Borehole	105	ft
Depth to Top of Test Section	100	ft
Depth to Base of Test Section	105	ft
Diameter of Borehole	4.25	in
Depth to Ground Water	89	ft
Height of Press Gage Above G.L.	10.5	ft
Pressure (static conditions)	300	psi
Pump Rate (static conditions)	0.6	gal/min

Q = 0.6 gal/min
L = 5 ft
H = 792.5 ft
r = 0.18 ft

Permeability (k) = **8.0E-05** gal/min/ft^2
5.5E-06 cm/sec

Q = Pump rate under static conditions
L = Length of test section
H = Differential head under static conditions
r = radius of hole tested

CONSTANT HEAD TESTS

Location	White Mesa Mill, Utah
Date	1/3/92
Geohydrologist	F. A. Peel
Borehole Tested	MW-18

Test #	1	
Depth to Bottom of Borehole	32	ft
Depth to Top of Test Section	27	ft
Depth to Base of Test Section	32	ft
Diameter of Borehole	4.25	in
Depth to Ground Water	NA	ft
Height of Press Gage Above G.L.	7.1	ft
Pressure (static conditions)	30	psi
Pump Rate (static conditions)	1.6	gal/min

Q = 1.6 gal/min
L = 5 ft
H = 105.9 ft
r = 0.18 ft

Permeability (k) = 1.6E-03 gal/min/ft^2
1.1E-04 cm/sec

Test #	2	
Depth to Bottom of Borehole	90	ft
Depth to Top of Test Section	85	ft
Depth to Base of Test Section	90	ft
Diameter of Borehole	4.25	in
Depth to Ground Water	NA	ft
Height of Press Gage Above G.L.	6.7	ft
Pressure (static conditions)	40	psi
Pump Rate (static conditions)	0.65	gal/min

Q = 0.65 gal/min
L = 5 ft
H = 186.6 ft
r = 0.18 ft

Permeability (k) = 3.7E-04 gal/min/ft^2
2.5E-05 cm/sec

Q = Pump rate under static conditions
L = Length of test section
H = Differential head under static conditions
r = radius of hole tested

CONSTANT HEAD TESTS

Location	White Mesa Mill, Utah
Date	1/3/92
Geohydrologist	F. A. Peel
Borehole Tested	MW-18

Test #	3*	
Depth to Bottom of Borehole	90	ft
Depth to Top of Test Section	85	ft
Depth to Base of Test Section	90	ft
Diameter of Borehole	4.25	in
Depth to Ground Water	NA	ft
Height of Press Gage Above G.L.	6.7	ft
Pressure (static conditions)	80	psi
Pump Rate (static conditions)	1	gal/min

Q = 1 gal/min
L = 5 ft
H = 279 ft
r = 0.18 ft

Permeability (k) = **3.8E-04** gal/min/ft^2
2.6E-05 cm/sec

Test #	4	
Depth to Bottom of Borehole	125	ft
Depth to Top of Test Section	120	ft
Depth to Base of Test Section	125	ft
Diameter of Borehole	4.25	in
Depth to Ground Water	91	
Height of Press Gage Above G.L.	12.1	ft
Pressure (static conditions)	115	psi
Pump Rate (static conditions)	0.231	gal/min

Q = 0.231 gal/min
L = 5 ft
H = 368.75 ft
r = 0.18 ft

Permeability (k) = **6.7E-05** gal/min/ft^2
4.5E-06 cm/sec

* This test covers the same interval that was tested in Test #2. The constant head pressure, however, was changed.

Q = Pump rate under static conditions
L = Length of test section
H = Differential head under static conditions
r = radius of hole tested

CONSTANT HEAD TESTS

Location	White Mesa Mill, Utah
Date	1/7/92
Geohydrologist	F. A. Peel
Borehole Tested	MW-19

Test #	1	
Depth to Bottom of Borehole	60	
Depth to Top of Test Section	55	
Depth to Base of Test Section	60	
Diameter of Borehole	4.25	in
Depth to Ground Water	NA	
Height of Press Gage Above G.L.	5.4	ft
Pressure (static conditions)	55	psi
Pump Rate (static conditions)	0.22	gal/min

Q = 0.22 gal/min
L = 5 ft
H = 189.95 ft
r = 0.18 ft

Permeability (k) = **1.2E-04** gal/min/ft^2
8.4E-06 cm/sec

Test #	2	
Depth to Bottom of Borehole	100	
Depth to Top of Test Section	95	
Depth to Base of Test Section	100	
Diameter of Borehole	4.25	in
Depth to Ground Water	97	
Height of Press Gage Above G.L.	7.0	ft
Pressure (static conditions)	180	psi
Pump Rate (static conditions)	0.1	gal/min

Q = 0.1 gal/min
L = 5 ft
H = 519.8 ft
r = 0.18 ft

Permeability (k) = **2.0E-05** gal/min/ft^2
1.4E-06 cm/sec

Q = Pump rate under static conditions
L = Length of test section
H = Differential head under static conditions
r = radius of hole tested

APPENDIX D

WATER QUALITY DATA

Ground Water Quality Data

U-Nat uCi/ml

	MW#1	MW#2	MW#3	MW#4	MW#5	MW#11	MW#12	MW#13	CULINARY	MW#14	MW#15
30-Sep-81	2.7E-09	3.2E-08	2.4E-08	1.5E-08	1.4E-08				6.8E-10		
31-Dec-81	6.5E-10	3.0E-09	1.4E-08	2.0E-09	3.0E-09				6.9E-10		
31-Mar-82	6.5E-10	2.0E-09	2.7E-09	6.9E-10	6.8E-10				6.9E-10		
30-Jun-82	1.4E-09	4.7E-09	2.4E-08	1.3E-09	2.7E-09				7.0E-10		
30-Sep-82	6.8E-10	2.7E-09	8.9E-09	6.8E-10	6.7E-10				4.5E-09		
31-Dec-82	6.8E-10	6.6E-10	2.5E-08	6.7E-10	6.7E-10				6.6E-10		
31-Mar-83	7.4E-09	2.0E-08	1.0E-08	5.5E-09	8.0E-10	3.4E-10	5.0E-09	4.1E-09			
30-Jun-83	6.7E-10	3.4E-09	2.0E-08	6.8E-10	6.7E-10	6.8E-10	2.0E-09	4.0E-09			
30-Sep-83	2.3E-09	2.3E-09	1.4E-08	2.3E-09	5.6E-09	8.5E-09	1.1E-08	6.8E-09			
31-Dec-83	2.3E-09	6.0E-09	2.8E-08	6.7E-10	6.8E-10	6.9E-10	1.0E-08	1.4E-08			
31-Mar-84	2.71E-09	1.35E-09	1.49E-08	1.35E-09	1.35E-09	7.45E-09	2.91E-08	5.24E-09	3.25E-08		
30-Jun-84	2.71E-09	2.71E-09	1.29E-08	2.71E-09	2.71E-09	2.71E-09	1.83E-08	1.83E-08	2.71E-09		
30-Sep-84	8.12E-10	4.06E-10	1.22E-09	4.06E-10	4.06E-10	4.06E-10	4.06E-10	4.06E-10	4.06E-10		
31-Dec-84	4.06E-10	0.00E+00	1.49E-09	8.12E-10	0.00E+00	1.76E-09	1.62E-09	1.49E-09	1.35E-09		
31-Mar-85	1.76E-09	1.90E-09	1.56E-09	4.20E-09	6.09E-10	2.71E-10	4.74E-10	2.30E-09	2.03E-10		
30-Jun-85	7.99E-10	6.20E-09	1.08E-09	9.00E-10	6.03E-10	2.98E-10	6.80E-09	2.50E-09	1.50E-09		
30-Sep-85	1.35E-09	1.69E-08	3.05E-08	1.35E-09	3.39E-09	8.80E-09	3.39E-09	2.03E-09	1.66E-09		
31-Dec-85	1.70E-09	9.40E-09	2.06E-08	1.60E-09	5.00E-10	5.00E-10	6.60E-09	1.35E-08	2.15E-09		
31-Mar-86	1.90E-09	8.80E-09	1.90E-08	2.20E-09	1.10E-09	1.70E-09	9.60E-09	1.48E-08			
30-Jun-86	1.90E-09	6.40E-09	1.50E-08	1.80E-09	5.00E-09	1.50E-09	9.60E-09	1.10E-08	1.00E-09		
04-Sep-86	2.30E-09	5.80E-09	1.67E-08	1.00E-09	7.00E-10	4.00E-10	9.00E-09	1.17E-08	2.00E-09		
10-Dec-86	2.90E-09	8.20E-09	1.21E-08	1.90E-10	1.60E-09	1.90E-10	1.29E-08	1.17E-08	2.20E-09		
20-Feb-87	1.90E-10	3.50E-09	1.10E-08	1.90E-10	1.90E-10	1.90E-10	9.10E-09	7.00E-09	1.90E-10		
29-Apr-87	1.50E-09	3.10E-09	1.26E-08	1.30E-09	9.00E-10	3.00E-10	1.05E-08	9.50E-09	7.00E-10		
19-Aug-87	2.40E-09	6.20E-09	2.30E-08	1.50E-09	2.10E-09	7.00E-10	9.00E-09	1.20E-08	5.00E-10		
20-Nov-87	1.30E-09	4.10E-09	1.60E-08	9.00E-10	3.00E-10	5.00E-10	9.40E-09	1.20E-08	3.00E-10		
26-Jan-88	1.80E-09	4.10E-09	2.00E-08	1.60E-09	1.00E-09	1.90E-10	8.90E-09	1.20E-08	3.00E-10		
01-Jun-88	7.00E-10	4.70E-09	1.84E-08	1.40E-09	9.00E-10	5.00E-10	1.23E-08	1.43E-08	8.00E-10		
23-Aug-88	7.20E-09	1.10E-09	1.50E-09	5.40E-10	1.20E-10	5.00E-11	1.00E-09	1.20E-09	2.20E-10		
03-Nov-88	1.22E-09	4.94E-09	1.48E-07	3.60E-12	1.08E-09	2.71E-10	1.20E-07	1.23E-07	1.62E-09		
09-Mar-89	1.02E-09	6.00E-09	2.20E-08	1.40E-09	1.50E-09	9.00E-10	1.00E-08	0.00E+00	1.90E-09		
21-Jun-89	2.00E-09	6.80E-09	2.30E-08	1.20E-09	6.00E-10	8.00E-10	1.10E-08	0.00E+00	6.00E-10		
01-Sep-89	9.00E-10	8.80E-09	2.20E-08	2.60E-09	1.10E-09	1.60E-09	1.10E-08	0.00E+00	9.00E-10		
20-Nov-89	2.00E-10	9.50E-09	1.90E-08	9.00E-10	4.00E-10	6.00E-10	5.60E-09		0.00E+00	2.7E-08	4.4E-08
16-Feb-90	2.40E-09	7.40E-09	1.40E-08	1.60E-09	7.00E-10	7.00E-10	8.80E-09		3.00E-10	3.2E-08	3.0E-08
08-May-90	7.00E-10	8.00E-09	2.30E-08	1.60E-09	7.00E-10	8.00E-10	1.00E-08		3.00E-10	3.3E-08	3.0E-08
16-Aug-90	4.67E-10	5.87E-09	1.67E-08	1.27E-09	6.00E-10	4.67E-10	1.07E-08		4.00E-10	3.3E-08	2.5E-08
13-Nov-90	5.00E-10	7.20E-09	1.60E-08	1.20E-09	3.00E-10	6.00E-10	1.00E-08		5.00E-10	3.3E-08	2.4E-08
27-Feb-91	2.20E-10	3.50E-09	8.00E-09	1.30E-09	2.70E-10	2.00E-10	8.80E-09		2.00E-10	2.4E-08	2.0E-08
21-May-91	9.10E-10	4.30E-09	1.30E-08	7.70E-10	1.10E-09	2.30E-10	1.00E-08		8.60E-10	2.2E-08	1.8E-08
24-Sep-91	8.20E-10	7.60E-09	2.20E-08	9.00E-10	8.00E-10	7.40E-10	1.10E-08		9.90E-10	3.1E-08	3.3E-08
03-Dec-91	4.30E-10	9.50E-09	8.10E-09	7.40E-10	5.30E-10	2.40E-10	6.80E-09		2.40E-10	3.0E-08	2.3E-08
17-Mar-92	4.54E-10	7.07E-09	4.53E-09	1.02E-09	1.60E-09	2.70E-09	1.01E-08		1.46E-09	3.03E-08	2.37E-08
11-Jun-92	2.76E-09	4.66E-09	9.13E-09	2.00E-10	2.00E-10	2.00E-10	5.53E-09		2.00E-10	2.6E-08	1.9E-08
03-Sep-92	2.03E-09	1.15E-08	1.9E-08	4.06E-09	4.06E-09	3.39E-09	1.29E-08		2.03E-09	4.27E-08	2.78E-08
19-Nov-92	5.42E-10	1.02E-08	1.12E-08	1.42E-07	6.77E-10	3.18E-09	1.39E-08		1.83E-09	4.3E-08	2.7E-08

Ground Water Quality Data

Cl	mg/l MW#1	MW#2	MW#3	MW#4	MW#5	MW#11	MW#12	MW#13	CULINARY	MW#14	MW#15
31-Oct-79	2.5	5	12.6	20.1							
31-Jan-80	14	18	25	35							
30-May-80	20	18	50	44	60						
30-Jun-80	16	15	51	43	57						
31-Jul-80	20	20	62	48	60						
31-Aug-80	18	16	65	56	60						
30-Sep-80	13	15	62	43	51						
31-Oct-80	30	20	65	50	55						
30-Nov-80	12	8	64	38	49						
31-Dec-80	13	10	65	41	52						
31-Jan-81	15	11	71	48	53						
28-Feb-81	14	9	65	41	54						
31-Mar-81	14	10	66	40	55						
30-Apr-81	13	11	66	41	53						
30-May-81	14	13	110	41	53						
30-Jun-81	12	10	69	43	53						
31-Aug-81	14	7	67	32	52						
31-Dec-81	15	14	66	41	20						
31-Jan-82	13	8	64	42	51						
30-Apr-82	12	7	64	40	50						
31-Aug-82	12	6	67	43	43						
31-Dec-82	10.9	5.5	53	36	47.1	24.4	57.4	40.5	4.6		
25-Jan-83	16	11	71	46	57	32	70	53	6.4		
30-Jun-83	16.5	25	66.5	37.3	48.1	26.8	80.5	43.8	2.8		
31-Dec-83	13	8	63	36	54	32	65				
31-Mar-84	14.3	9.4	67.2	43.1	57.8	31.4	64.1	50.4	2.4		
30-Jun-84	12.0	7.0	63.0	43.0	54.0	32.0	65.0	49.0	3.0		
30-Sep-84	15.4	10.9	57.4	44.6	56.6	33.9	64.6	50.9	1.9		
31-Dec-84	14.2	7.1	67.4	42.5	53.2	31.9	67.4	49.6	3.5		
31-Mar-85	14.0	13.0	68.0	46.0	59.0	34.0	67.0	50.0	10.0		
30-Jun-85	17.0	7.8	73.0	42.0	53.0	31.0	62.0	46.0	1.0		
30-Sep-85	18.0	17.0	78.0	47.0	62.0	38.0	71.0	47.0	47.0		
31-Dec-85	53.2	70.9	35.0	53.0	71.0	71.0	53.0	71.0	62.0		
19-Jun-86	25.0	15.0	140.0	98.0	130.0	77.0	170.0	120.0	7.7		
30-Jun-86	25.0	17.0	140.0	95.0	130.0	70.0	150.0	100.0	9.1		
04-Sep-86	2.0	9.5	64.0	42.0	53.0	32.0	58.0	48.0	8.1		
10-Dec-86	8.8	2.7	68.0	45.0	54.0	33.0	64.0	50.0	3.3		
20-Feb-87	11.0	6.6	66.0	44.0	54.0	32.0	63.0	48.0	32.0		
29-Apr-87	12.1	7.7	65.3	42.4	54.3	43.2	62.7	48.7	1.7		
19-Aug-87	11.0	6.0	65.0	46.0	54.0	33.0	61.0	51.0	0.4		
20-Nov-87	9.3	4.6	62.6	45.3	53.2	31.9	61.2	49.2	0.1		
27-Jan-88	10.0	3.7	64.0	45.0	54.0	31.0	61.0	48.0	0.9		
01-Jun-88	9.9	4.8	66.0	45.0	53.0	32.0	64.0	50.0	0.1		
23-Aug-88	13.2	6.4	66.1	48.5	53.9	33.5	64.8	51.2	0.9		
03-Nov-88	11.8	6.6	67.7	48.2	54.7	35.2	65.1	52.1	2.7		
09-Mar-89	12.0	7.6	64.0	45.0	52.6	32.3	61.5	48.8	5.7		
21-Jun-89	11.3	6.4	66.9	45.9	54.6	32.4	60.8		5.2		
01-Sep-89	10.0	6.0	65.0	46.0	54.0	34.0	59.0		8.0		
15-Nov-89	11.0	5.0	66.0	45.0	54.0	34.0	63.0		7.0	25.0	49.0
20-Feb-90	11.0	5.0	65.0	47.0	55.0	33.0	63.0		4.0	20.0	44.0
08-May-90	12.0	7.0	67.0	48.0	56.0	33.0	62.0		6.0	23.0	44.0
07-Aug-90	11.0	6.0	65.0	48.0	53.0	33.0	63.0		7.0	21.0	44.0
13-Nov-90	12.0	6.0	68.0	50.0	54.0	34.0	63.0		4.0	23.0	44.0
27-Feb-91	12.0	10.0	68.0	50.0	50.0	31.0	61.0		1.0	23.0	41.0
21-May-91	12.0	6.0	56.0	44.0	48.0	30.0	55.0		1.0	21.0	38.0
24-Sep-91	11.0	9.0	60.0	45.0	54.0	30.0	59.0		2.0	15.0	38.0
03-Dec-91	13.0	7.0	64.0	46.0	50.0	31.0	60.0		2.0	19.0	38.0
17-Mar-92	13.0	7.0	64.0	48.0	51.0	32.0	60.0		2.0	22.0	40.0
11-Jun-92	10.0	6.0	76.0	43.0	46.0	29.0	56.0		1.0	18.0	35.0
03-Sep-92	11	6	58	43	46	31	56		1	20	37
19-Nov-92	13.0	6.0	63.0	45.0	50.0	41.0	62.0		1.0	18.0	39.0

Conductance

	MW#1	MW#2	MW#3	MW#4	MW#5	MW#11	MW#12	MW#13	CULINARY	MW#14	MW#15
31-Oct-79	948	1270	3260	3360							
30-May-80	1500	2413	3915	3205	2660						
30-Jun-80	1367	3031	4276	3196	2372						
31-Jul-80	1469	2500	4386	3264	2371						
31-Aug-80	1565	2712	4537	3233	2440						
30-Sep-80	1547	2791	4768	2791	2559						
31-Oct-80	1578	2930	4846	3268	2479						
30-Nov-80	1509	2668	4782	3289	2568						
31-Dec-80	1568	2730	4828	3254	2412						
31-Jan-81	1682	3190	5398	3435	2282						
28-Feb-81	1723	3089	5054	3370	2268						
31-Mar-81	1472		5153	3391	2638						
30-Apr-81	1425	3097	4893	3363	2589						
30-May-81	1543	2985	4918	3064	2422						
30-Jun-81	1303	2806	4433	3108	2699						
14-Aug-81	1716	3702	5632	3963	3077						
27-Jan-82	1450	3450	5100	3370	3050						
07-Apr-82	1635	3402	5489	3630	3275				459		
07-Jul-82	1570	3340	5170	3380	2790				573		
10-Dec-82	1320	2720	4390	3030	2220	2102	3280	3360	530		
25-Jan-83	1310	2680	4260	2910	2150	1630	3130	3290	439		
30-Apr-83	1320	2800	4820	3420	2490	2330	3400	3970	450		
07-Sep-83	1390	2810	4490	2970	2130	2260	3250	3160	412		
26-Oct-83	1680	3560	5550	3700	2840	2600	4000	4380	470		
20-Mar-84	1200	2380	4200	2340	2150	1500	3050	3200	312		
14-Jun-84	1200	2400	4500	2500	2300	1800	3200	3200	370		
05-Dec-84	1100	2275	3975	2325	2000	1900	3000	3050	238		
21-Feb-85	1300	2800	4000	2700	2100	1900	4000	3200	380		
25-Jun-85	1100	2600	4200	2800	2200	1850	3300	3150	300		
30-Sep-85	1500	2500	5000	3300	2800	2350	3800	3800	470		
15-Dec-85	3000	3200	4700	3000	2200	3100	2600	3600			
27-Mar-86	1350	2650	4000	2800	2300	1900	3100	3000	500		
26-Jun-86	1900	3800	5600	3600	3800	3400	5400	4400	700		
04-Sep-86	1800	3700	6000	4100	3250	2700	5500	5000	550		
10-Dec-86	2200	3200	4600	3400	2400	1500	3300	3600	800		
20-Feb-87	1800	3800	5600	3200	2800	3400	5500	4400	460		
29-Apr-87	1800	5000	5600	2600	3700	3250	4400	3900	500		
19-Aug-87	1500	3300	5400	3800	2700	2800	3300	4200	500		
20-Nov-87	1600	3400	5000	3700	2600	2300	3900	4000	600		
27-Jan-88	1300	2600	4500		1900	1800	3000	3050	265		
01-Jun-88	1350	2800	4500	2850	2100	2000	3250	3400	340		
23-Aug-88	1550	3400	4500	3100	2200	1800	3400	3350	310		
03-Nov-88	1250	2850	4400		2000	1950	3000	3300			
09-Mar-89	1300	2800	4200	2700	2100	2000	3200	3150			
21-Jun-89	1694	3660	5660	3690	2710	2520	4000		550		
01-Sep-89	1670	3670	5550	3670	2740	2560	4010		575	3860	4560
15-Nov-89	1680	3620	5590	3640	2750	2510	4020		693	3880	4450
20-Feb-90	1695	3630	5550	3630	2780	2750	3980		684	3830	4300
08-May-90	1694	3630	5650	3650	2750	2550	4000		700	3880	4360
07-Aug-90	1667	3560	5480	3550	2660	2530	3880		688	3710	4240
13-Nov-90	1040	2060	4010	2070	2000	1090	3000		550	2080	3030
27-Feb-91	1700	3720	5530	3730	2640	2680	4120		449	3960	4360
21-May-91	1705	3680	5660	3670	2650	2620	4040		448	3880	4400
24-Sep-91	1726	3660	5570	3660	2650	2690	4030		447	3840	4310
03-Dec-91	1705	3650	5560	3610	2630	2610	4100		442	3900	4220
17-Mar-92	1702	3600	5490	3670	2620	2630	4070		440	3890	4320
11-Jun-92	1669	3640	5480	3620	2600	2600	4000		447	3850	4380
03-Sep-92	1694	3620	5590	3610	2600	2630	4000		411	3810	4200
19-Nov-92	1690	3660	5710	3650	2680	2630	4070		407	3850	4270

pH

	MW#1	MW#2	MW#3	MW#4	MW#5	MW#11	MW#12	MW#13	CULINARY	MW#14	MW#15
31-Oct-79	8.6	7.2	7.3	7.1							
31-Jan-80	7.4	7.2	6.8	7.1							
30-May-80	7.3	7.4	7.2	7.2	7.6						
30-Jun-80	7.5	7.4	7.2	7.3	7.6						
31-Jul-80	7.4	7.5	7.2	7.3	7.7						
31-Aug-80	7.2	7.2	6.9	7.1	7.4						
30-Sep-80	7.6	7.6	7.6	7.7	7.7						
31-Oct-80	7.4	7.3	7.2	7.8	7.6						
30-Nov-80	7.5	7.4	7.1	7.3	7.7						
31-Dec-80	7.4	7.4	7.1	7.2	7.2						
31-Jan-81	7.2	7.2	7	7.1	7.4						
28-Feb-81	7.2	7.1	6.8	7	7.3						
31-Mar-81	7.5	7.15	7	7.7	7.7						
30-Apr-81	7.5	7.2	7.1	7.5	7.5						
30-May-81	7	7	6.5	6.8	7.2						
30-Jun-81	7.3	7.2	6.8	7.3	7.3						
31-Aug-81	7.4	7.4	6.9	7.2	7.8						
31-Dec-81	7.5	7.7	7.3	7.7	7.7						
31-Jan-82	7.3	7.2	6.7	7.1	7.35						
30-Apr-82	7.7	7.5	7.2	7.3	7.8						
31-Aug-82	7.8	7.7	7.5	7.8	8						
31-Dec-82	7.8	7.7	7.5	7.6	8	8.2	7.8	7.85			
31-Mar-83	7.6	7.5	7.2	7.3	8.05	7.4	6.7	7.4			
30-Jun-83	7.8	7.7	7.5	7.7	8.12	8	7.4	8			
31-Dec-83	7.6	7.55	7.4	7.55	7.7	7.2	7.2	7.6			
31-Mar-84	7.7	7.0	6.8	7.8	7.9	7.8	7.2	7.0	7.6		
30-Jun-84	7.6	7.2	7.4	7.8	7.8	7.2	7.8	7.5	8.2		
30-Sep-84	7.5	7.1	6.6	7.0	7.5	7.9	6.8	7.0	7.8		
31-Dec-84	7.7	7.1	6.8	6.8	7.8	7.9	6.7	7.1	8.3		
31-Mar-85	7.8	7.6	6.9	7.1	7.8	7.9	7.1	7.4	8.0		
30-Jun-85	7.6	7.0	6.8	6.7	7.9	8.0	6.8	7.2	7.8		
30-Sep-85	6.8	7.1	6.4	6.3	7.0	7.9	6.9	6.5	7.4		
31-Dec-85	7.3	7.3	6.8	6.9	8.1	7.1	7.7	7.1			
31-Mar-86	7.0	7.0	6.6	6.9	7.0	7.0	6.7	6.9	7.0		
30-Jun-86	7.5	7.0	6.7	7.0	7.5	7.9	6.7	6.9			
04-Sep-86	7.3	6.9	6.7	6.8	7.6	7.9	6.8	7.0	7.0		
10-Dec-86	7.7	6.9	6.5	7.0	7.1	7.9	7.1	7.1	7.6		
20-Feb-87	7.4	7.1	6.5	7.0	7.6	7.9	6.9	7.0	8.5		
29-Apr-87	7.6	6.7	6.5	6.9	7.6	7.8	6.9	7.0	7.6		
19-Aug-87	7.6	6.7	6.6	7.9	7.4	7.5	7.0	7.1	7.4		
20-Nov-87	7.8	7.4	7.2	7.2	8.0	7.8	7.3	7.4	7.4		
27-Jan-88	8.0	7.4	6.8		7.7	7.0	7.1	7.1	7.7		
01-Jun-88	8.1	7.2	7.0	7.1	7.6	7.9	7.1	7.3	8.2		
23-Aug-88	7.6	7.1	6.7	6.8	7.8	7.7	6.7	6.9	7.8		
03-Nov-88	7.5	7.2	6.7		7.5	8.0	6.6	7.0	7.8		
09-Mar-89	7.4	7.1	6.7	7.3	7.6	7.9	6.9	6.8			
21-Jun-89	8.0	7.1	6.7	6.9	7.4	7.8	6.8		7.7		
01-Sep-89	7.3	7.4	6.9	7.0	7.7	7.8	6.8		7.7		
15-Nov-89	7.5	7.0	6.5	6.8	7.8	7.8	7.1		7.6	6.9	6.9
20-Feb-90	7.8	7.5	6.8	7.0	8.0	8.1	7.2		8.0	6.87	7.46
08-May-90	7.5	7.1	6.6	7.0	7.6	7.8	6.8		7.9	6.8	7.07
07-Aug-90	7.5	7.0	6.8	7.7	7.7	7.4	7.0		7.8	6.87	7.18
13-Nov-90	7.9	7.5	6.6	7.7	8.0	8.0	7.5		8.2	6.47	7.06
27-Feb-91	7.9	7.5	6.6	7.7	8.0	8.0	7.5		8.2	6.47	7.06
21-May-91	7.4	7.1	6.3	6.8	7.4	7.9	7.0		7.1	6.82	7.06
24-Sep-91	7.7	7.0	6.7	7.0	7.4	8.0	6.8		7.3	6.69	6.94
03-Dec-91	7.6	7.3	6.8	6.9	7.7	7.9	6.9		7.8	6.8	7
17-Mar-92	6.7	7.2	5.8	6.9	7.6	7.9	7.0		7.1	7	7.21
11-Jun-92	7.1	6.9	6.1	6.7	7.2	7.4	6.6		7.7	6.6	7.33
03-Sep-92	8.1	7.9	6.7	7.0	7.6	7.9	7.4		7.6	6.89	7.03
19-Nov-92	7.5	7.8	7.1	6.9	7.8	6.2	8.1		7.7	6.83	7.16

Ground Water Quality Data

Sodium	mg/l MW#1	MW#2	MW#3	MW#4	MW#5	MW#11	MW#12	MW#13	CULINARY	MW#14	MW#15
31-Oct-79	106	154	282	342							
31-Jan-80	140	213	334	274							
30-May-80	165	346	575	346	478						
30-Jun-80	166	361	642	322	462						
31-Jul-80	160	418	442	335	435						
31-Aug-80	158	410	653	336	465						
30-Sep-80	156	468	586	371	500						
31-Oct-80	162	415	677	341	443						
30-Nov-80	166	419	567	309	428						
31-Dec-80	168	442	699	338	460						
31-Jan-81	170	467	756	335	467						
28-Feb-81	148	462	704	384	487						
31-Mar-81	175	470	745	338	473						
30-Apr-81	161	476	703	314	467						
30-May-81	160	472	718	350	459						
30-Jun-81	162	458	685	351	437						
31-Aug-81	161	460	688	323	426						
31-Dec-81	170	469	730	330	460						
31-Jan-82	170	483	757	340	490						
30-Apr-82	190	460	790	330	510						
31-Aug-82	160	470	750	340	470						
31-Dec-82	170	480	810	334	431	550	310	630	67		
30-Jun-83	170	470	770	330	458	480	310	640	27		
31-Dec-83	170	500	800	320	480	540	290	640			
30-Jun-84	170	500	780	310	470	530	320	650	5.6		
31-Dec-84	182	443	489	340	428	446	328	459	7.2		
30-Jun-85	20	540	790	370	540	610	330	660	7.3		
31-Dec-85	320	490	780	340	530	550	380	600	5.5		
19-Jun-86	262	543	937	326	514	580	430	659	23.6		
04-Sep-86	175	456	746	289	436	477	296	541	29.5		
10-Dec-86	210	529	784	335	501	250	324	562	68.0		
20-Feb-87	116	333	513	209	307	366	197	360	54.3		
29-Apr-87	134	362	518	232	360	378	235	389	7.0		
20-Nov-87	212	618	958	395	564	768	334	677	11.6		
27-Jan-88	185	507	776								
23-Aug-88	157	495	768	286	432	535	244	445	15.2		
03-Nov-88	172	460	659	289	410	486	280	510	17.4		
09-Mar-89	169	464	713	275	321	375	186	564	22.0		
01-Sep-89	163	466	713	287	411	489	269				
15-Nov-89	194	515	637	270	508	567	321		70.1	70.7	72.6
09-May-90	188	504	756	291	456	517	284		70.8	388.0	566.0
13-Nov-90	165	470	698	285	410	475	277		48.9	348.0	540.0
27-Feb-91	171	477	708	284	430	522	213		19.0	265.0	466.0
21-May-91	177	503	796	274	440	549	271		15.0	353.0	590.0
03-Dec-91	179	492	797	324	466	646	336		17.0	366.0	490.0
11-Jun-92	180	490	760	300	410	540	290		15.2	350.0	510.0
03-Sep-92	162	475	742	291	428	538	291		9.5	345	504
19-Nov-92	182	467	736	318	453	520	318		8.5	358.0	478.0

Ground Water Quality Data

TDS	mg/l MW#1	MW#2	MW#3	MW#4	MW#5	MW#11	MW#12	MW#13	CULINARY	MW#14	MW#15
31-Oct-79	625	790	2100	2950							
31-Jan-80	870	1080	2450	2800							
30-May-80	1250	1950	4400	3600	2300						
30-Jun-80	1250	2300	4750	2500	2280						
31-Jul-80	1182	2449	4024	3198	2060						
31-Aug-80	1220	2278	4908	3480	2218						
30-Sep-80	1285	2769	4593	3525	2182						
31-Oct-80	1220	2652	4828	3402	2096						
30-Nov-80	1166	2492	4522	2990	1960						
31-Dec-80	1194	2648	4982	2998	2105						
31-Jan-81	1273	2768	5053	3330	2072						
28-Feb-81	1254	2835	4804	3322	2192						
31-Mar-81	1317		5122	3320	2256						
30-Apr-81	1330	3028	5130	3318	2309						
30-May-81	1306	2998	5198	3296	2297						
30-Jun-81	1188	2983	5387	3608	2114						
31-Aug-81	1197	2932	5124	3337	2119						
31-Dec-81	1199	2901	5167	3377	2190						
31-Jan-82	1200	2800	4950	3200	2250						
30-Apr-82	1200	2800	5125	3200	2500						
31-Aug-82	1200	2950	5300	3500	2250						
31-Dec-82	1326	3056	5366	3470	2180	1812	4116	3780	334		
30-Jun-83	1150	3500	4900	3500	2200	1650	4050	3850			
31-Dec-83	1200	2950	5150	3250	2100	1550	3950	3750			
30-Jun-84	1400	3200	5300	3500	2200	1700	4100	3700	280		
31-Dec-84	693	1479	2733	1581	1300		2000	2033	139		
30-Jun-85	1560	3130		3610	2200	1700	4300	3900	221		
31-Dec-85	4000	3700	5000	4600	6600	5100	5100	6800			
19-Jun-86	1280	3200	5500	3450	2130	1700	4140	3870	277		
30-Jun-86	1330	3250	5500	3610	3210	1700	4210	3850	292		
04-Sep-86	1250	3240	5320	3450	2040	1710	4040	3770	263		
10-Dec-86	1270	3140	5290	3530	2100	1710	4110	3820	403		
20-Feb-87	1270	3230	5330	3480	2050	1710	4120	3780	311		
29-Apr-87	1270	3180	5400	3340	2380	1880	4120	3810	249		
19-Aug-87	1280	3190	5320	3530	1990	1690	3990	3750	234		
20-Nov-87	1330	3260	5520	3570	1970	1720	4130	3840	236		
27-Jan-88	1310	3270	5100	3460	2030	1640	3960	3740	22		
01-Jun-88	1250	3140	5240	3430	1890	1660	4060	3720	25		
23-Aug-88	1220	3080	5230	3320	1930	1620	3010	3720	207		
03-Nov-88	1250	3150	5430	3450	1890	1710	4060	3670	170		
09-Mar-89	1280	3140	5270	3530	2010	1730	3960	3780			
21-Jun-89	1280	3210	5450	3580	2020	1750	4030		316		
01-Sep-89	1210	3040	5290	3430	1940	1760	3630		296		
15-Nov-89	1200	3060	5250	3370	2090	1860	3900		544	3430	3990
20-Feb-90	1280	3190	5300	3540	2110	1780	4030		202	3710	3970
08-May-90	1160	3050	5060	3240	1950	1660	3700		338	3000	3740
07-Aug-90	1210	3080	5220	3320	1970	1700	3750		344	3500	3770
13-Nov-90	1170	3150	5290	3280	1880	1720	3760		308	3440	3780
27-Feb-91	1272	3154	5268	3424	1850	1686	3260		252	2684	3356
21-May-91	1275	3037	5326	3348	1871	1740	3943		250	3613	3950
24-Sep-91	1352	3149	5309	3471	2139	1819	3810		266	3818	3817
03-Dec-91	1286	3179	5188	3462	1943	1810	3930		238	3661	3843
17-Mar-92	1285	3206	5317	3523	1922	1797	4024		237	3704	3910
11-Jun-92	990	2910	4930	3190	1810	1740	3900		219	3580	3800
03-Sep-92											
19-Nov-92											

Ground Water Quality Data

Sulfates	mg/l										
	MW#1	MW#2	MW#3	MW#4	MW#5	MW#11	MW#12	MW#13	CULINARY	MW#14	MW#15
31-Oct-79	220	240	930	1220							
31-Jan-80	520	630	2100	1700							
30-May-80	635	1075	2430	1860	1290						
30-Jun-80	632	1290	2625	1850	1200						
31-Jul-80	610	1400	2450	1980	1100						
31-Aug-80	612	1345	2975	1980	1150						
30-Sep-80	640	1550	2800	2075	960						
31-Oct-80	570	1535	3050	2020	1060						
30-Nov-80	613	1425	2750	1780	1050						
31-Dec-80	620	1520	3060	1780	1150						
31-Jan-81	638	1530	3012	1900	1140						
28-Feb-81	600	1550	2780	1980	1260						
31-Mar-81	658		3150	1890	1210						
30-Apr-81	620	1660	3030	1880	1220						
30-May-81	650	1730	3100	1910	1190						
30-Jun-81	626	1690	3040	2070	1105						
31-Aug-81	630	1750	3050	1910	1115						
31-Jan-82	613	1590	3100	1920	1260						
30-Apr-82	697	1766	3239	2056	1518						
31-Aug-82	662	1788	3185	2047	1295						
31-Dec-82	653	1749	3259	1979	1182	926	2395	2288	39		
30-Jun-83	658	1801	3226	2109	1228	943	2420	2324	41		
31-Dec-83	660	1820	3200	2075	1200	900	2338	2265	64		
29-Feb-84	637	1835	3235	2056	1175	937	2400	2250	77		
30-Jun-84	680	1900	3300	2075	1200	920	2400	2200	32		
31-Dec-84	637	1835	3235	2056	1175	937	2400	2250			
30-Jun-85	816	1890		2040	1210	909	2440	2300	18		
31-Dec-85	1080	1270	2870	2020	7820	79	7820	2120	79		
19-Jun-86	703	2010	3450	2120	1240	943	2500	2420	45		
30-Jun-86	691	2040	3400	2150	1890	949	2520	2420	43		
04-Sep-86	707	2020	3410	2160	1230	956	2470	2400	49		
10-Dec-86	680	1860	2620	2000	1140	911	2370	2240	77		
20-Feb-87	657	1910	2640	2030	1120	895	2100	1990	62		
29-Apr-87	664	1920	3200	1930	1310	1020	2300	2270	22		
19-Aug-87	691	2000	3400	2130	1140	951	2430	2380	26		
20-Nov-87	697	2040	3520	2170	1120	961	2560	2450	25		
27-Jan-88	690	1930	3020	2060	1130	919	2380	2300	22		
01-Jun-88	681	1900	3360	2120	1030	947	2450	2370	25		
23-Aug-88	648	1970	3330	2100	1050	915	2290	2330	7		
03-Nov-88	688	1980	3410	2120	1090	974	2500	2240	34		
09-Mar-89	694	1990	3410	2070	1180	975	2530	2400	41		
21-Jun-89	718	2040	3500	2180	1180	1020	2500		65		
01-Sep-89	352	2000	3500	2140	1140	1020	2250		60		
15-Nov-89	697	1990	2670	2150	1180	993	2250		105	2230	2560
20-Feb-90	692	2020	3330	2140	1210	1010	2460		98	2250	2490
08-May-90	684	2020	3480	2080	1180	1000	2070		51	1160	1260
07-Aug-90	685	1970	3400	2080	1140	973	2450		88	2240	2445
13-Nov-90	687	1980	3460	2130	1100	975	2460		89	2230	2470
27-Feb-91	662	1849	2712	1946	1028	967	1850		45	1512	1876
21-May-91	652	1885	2947	1988	1010	936	2255		51	2112	2299
24-Sep-91	692	1848	2532	1939	860	956	2240		49	1971	2215
03-Dec-91	677	1883	2214	1958	1035	968	2326		27	1919	2253
17-Mar-92	667	1899	3220	2035	1022	976	2330		21	2162	2314
11-Jun-92	642	1862	2894	1993	998	976	2304		26	2138	2293
03-Sep-92	670	1933	3312	2029	1033	1005	2352		30	2208	2366
19-Nov-92	654	1864	3200	1951	1055	1507	2343		21	2098	2362

ARSENIC

	MW#1	MW#2	MW#3	MW#4	MW#5	MW#11	MW#12	MW#13	CULINARY	MW#14	MW#15
31-Jul-80	0.0009	0.016	0.012	0.008	0.006						
31-Aug-80	0.004	0.004	0.0009	0.002	0.0009						
30-Sep-80	0.002	0.002	0.002	0.0009	0.0009						
31-Oct-80	0.0009	0.0009	0.0009	0.0009	0.0009						
30-Nov-80	0.002	0.004	0.004	0.002	0.002						
31-Dec-80	0.0009	0.0009	0.0009	0.0009	0.0009						
31-Jan-81	0.0009	0.0009	0.0009	0.0009	0.0009						
28-Feb-81	0.0009	0.0009	0.0009	0.0009	0.0009						
31-Mar-81	0.0009	0.0009	0.0009	0.0009	0.0009						
30-Apr-81	0.0009	0.0009	0.0009	0.0009	0.0009						
30-May-81	0.0009	0.0009	0.0009	0.0009	0.0009						
30-Jun-81	0.0009	0.0009	0.0009	0.0009	0.0009						
31-Aug-81	0.0009	0.0009	0.0009	0.0009	0.0009						
31-Jan-82	0.0009	0.0009	0.0009	0.0009	0.0009						
05-May-85	0.0009	0.0009	0.0009								
28-Jun-85	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.008		
23-Jul-85	0.0009	0.021	0.0009								
06-Aug-85	0.001	0.001	0.0009								
30-Sep-85	0.0009	0.0009	0.0009								
30-Oct-85	0.0009	0.0009	0.0009								
27-Nov-85	0.0009	0.0009	0.0009								
15-Dec-85	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009		
24-Jan-86	0.0009	0.0009	0.0009								
28-Feb-86	0.0009	0.0009	0.0009								
27-Mar-86	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.002	0.0009		
08-Apr-86	0.0009	0.0009	0.0009								
02-May-86	0.0009	0.0009	0.0009								
04-Sep-86	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009		
10-Dec-86	0.001	0.003	0.005								
20-Feb-87	0.0009	0.002	0.002	0.002	0.002	0.001	0.002	0.002	0.0009		
29-Apr-87	0.002	0.002	0.001	0.0009	0.0009	0.002	0.003	0.002	0.011		
20-Nov-87	0.003	0.005	0.006	0.002	0.001	0.001	0.009	0.008	0.013		
27-Jan-88	0.0030	0.0009	0.0030								
23-Aug-88	0.0140	0.0190	0.0250	0.0220	0.0170	0.0180	0.0230	0.0190	0.0070		
03-Nov-88	0.0009	0.0040	0.0110	0.0009	0.0009	0.0009	0.0009	0.0030	0.0009		
09-Mar-89	0.0150	0.0320	0.0460	0.0330	0.0190	0.0150	0.0360	0.0300	0.0070		
22-Jun-89	0.0040	0.0140	0.0330	0.0170	0.0100	0.0050	0.0210		0.0150		
01-Sep-89	0.0010	0.0050	0.0060	0.0030	0.0010	0.0000	0.0030		0.0060		
15-Nov-89	0.0010	0.0080	0.0100	0.0020	0.0070	0.0020	0.0030		0.0130	0.0030	0.0060
08-May-90	0.0020	0.0010	0.0050	0.0010	0.0009	0.0010	0.0010		0.0120	0.0010	0.0020
13-Nov-90	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009		0.0110	0.0009	0.0009
27-Feb-91	0.0010	0.0009	0.0009	0.0020	0.0009	0.0020	0.0010		0.0140	0.0009	0.0009
24-Sep-91	0.0009	0.0010	0.0009	0.0020	0.0080	0.0009	0.0010		0.0130	0.0009	0.0010
17-Mar-92	0.0009	0.0009	0.0009	0.0020	0.0100	0.0020	0.0009		0.0130	0.0009	0.0020
03-Sep-92	0.0009	0.0009	0.0009	0.0009	0.0060	0.0060	0.0009		0.0210	0.0009	0.0009

Ground Water Quality Data

SELENIUM

	MW#1	MW#2	MW#3	MW#4	MW#5	MW#11	MW#12	MW#13	CULINARY	MW#14	MW#15
31-Jul-80	0.0009	0.025	0.0009	0.0009	0.0009						
31-Aug-80	0.002	0.026	0.005	0.002	0.003						
30-Sep-80	0.0009	0.012	0.0009	0.0009	0.0009						
31-Oct-80	0.0009	0.017	0.0009	0.0009	0.0009						
30-Nov-80	0.001	0.011	0.003	0.001	0.001						
31-Dec-80	0.0009	0.0009	0.0009	0.0009	0.0009						
31-Jan-81	0.0009	0.016	0.0009	0.0009	0.0009						
28-Feb-81	0.0009	0.0009	0.0009	0.0009	0.0009						
31-Mar-81	0.0009		0.0009	0.0009	0.0009						
30-Apr-81	0.0009	0.0009	0.0009	0.0009	0.0009						
30-May-81	0.0009	0.002	0.0009	0.0009	0.0009						
30-Jun-81	0.0009	0.01	0.0009	0.0009	0.0009						
31-Aug-81	0.0009	0.004	0.0009	0.0009	0.0009						
31-Jan-82	0.0009	0.009	0.003	0.003	0.0009						
30-Jun-84	0.0049	0.015	0.031	0.009	0.0049	0.0049	0.0049	0.005	0.0049		
05-May-85	0.0009	0.0009	0.0009								
28-Jun-85	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009		
23-Jul-85	0.037	0.0009	0.0009								
06-Aug-85	0.0009	0.0009	0.0009								
30-Sep-85	0.0009	0.0009	0.0009								
30-Oct-85	0.0009	0.0009	0.0009								
27-Nov-85	0.0009	0.0009	0.0009								
15-Dec-85	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009		
24-Jan-86	0.0009	0.0009	0.0009								
28-Feb-86	0.0009	0.0009	0.0009								
27-Mar-86	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009		
08-Apr-86	0.0009	0.003	0.0009								
02-May-86	0.0009	0.0009	0.0009								
04-Sep-86	0.0009	0.0009	0.001	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009		
10-Dec-86	0.0019	0.0019	0.0019								
20-Feb-87	0.0009	0.0009	0.002	0.0009	0.001	0.003	0.001	0.007	0.0009		
29-Apr-87	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009			
20-Nov-87	0.005	0.023	0.036	0.01	0.018	0.02	0.004	0.027	0.0009		
27-Jan-88	0.009	0.01	0.016								
23-Aug-88	0.014	0.045	0.091	0.008	0.061	0.072	0.015	0.057	0.0009		
03-Nov-88	0.005	0.024	0.037	0.005	0.026	0.029	0.003	0.03	0.0009		
09-Mar-89	0.004	0.017	0.027	0.019	0.005	0.002	0.021	0.027	0.001		
22-Jun-89	0.001	0.002	0.003	0.003	0.004	0.004	0.001		0.001		
01-Sep-89	0.001	0.001	0.004	0.003	0	0	0		0.001		
15-Nov-89	0.005	0.015	0.019	0.015	0.006	0.02	0.02		0.001	0.014	0.019
08-May-90	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009		0.0009	0.0009	0.0009
13-Nov-90	0.0009	0.004	0.003	0.0009	0.0009	0.0009	0.0009		0.0009	0.0009	
27-Feb-91	0.002	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019		0.0019	0.0019	0.0019
24-Sep-91	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019		0.0019	0.0019	0.0019
17-Mar-92	0.0019	0.002	0.0019	0.0019	0.0019	0.0019	0.0019		0.0019	0.0019	0.0019
03-Sep-92	0.0019	0.003	0.011	0.0019	0.0019	0.0019	0.0019		0.0019	0.0019	0.017

Ra-226

pCi/l	MW#1	MW#2	MW#3	MW#4	MW#5	MW#11	MW#12	MW#13	CULINARY	MW#14	MW#15
31-Jul-80	1	1.3	1	0.7	1						
31-Aug-80	0.7	1.7	0.6	0.7	0.6						
30-Sep-80	0.7	0.3	0.5	0.4	0.2						
31-Oct-80	0.8	1.9	1.1	0.9	1.1						
30-Nov-80	0.7	1.1	0.8	0.8	0.8						
31-Dec-80	0.5	0.4	0.3	0.7	0.4						
31-Jan-81	0.5	1.3	1.3	0.5	0.6						
28-Feb-81	0.6	1.7	0.6	0.9	0.6						
31-Mar-81	2	1.6	0.8	0.9	0.7						
30-Apr-81	2.2	1.3	1.8	0.5	0.3						
30-May-81	3.5	2.3	1.5	1.3	0.8						
30-Jun-81	1.5	2	2.3	1.2	1.8						
31-Aug-81	0.8	7.5	15.5	1.1	1.6						
30-Sep-81	0.4	1.1	0.5	0.8	0.2						
31-Jan-82	0.8	1.6	1.1	1	0.9						
30-Apr-82	0.3	0.6	0.5	1	0.3						
30-Jun-83	0.4	0.17	1.4	1	1.2	0.4	0.6	0.6	0.4		
30-Jun-84	3	8	8	7	2	2	6	3	7		
30-Jun-85	1	1.3	1	1.4	0.3	0.1	1.1	0.9	2		
31-Dec-85	0.5	0.9	5.3	0.9	0.8	0.1	0.7	0.4	0.55		
21-Mar-86	0.5	1	0.8	0.6	0.2	0.1	0.6	0.1	0.4		
19-Jun-86	0.5	0.9	5.3	0.9	0.8	0.1	0.7	0.4	0.055		
04-Sep-86	1.5	0.8	0.9	0.6	0.2	0.2	0.9	0.1	1.3		
10-Dec-86	0.4	0.5	1.1	0.7	0.3	0.3	0.7	0.3	0.3		
20-Feb-87	0.2	0.5	1.1	0.5	0.4	0.4	0.7	0.2	0.3		
29-Apr-87	0.6	0	0.3	0.4	0.3	0.2	0.6	0.3	0.5		
20-Nov-87	0.3	0.2	0.3	0.1	0	0.2	0.3	0	0.6		
27-Jan-88	0.6	0.2	0.8								
23-Aug-88	0.5	0.2	0.7	0.3	0.1	0.1	0.5	0.1	0.5		
03-Nov-88	0.1	0.2	0.3	0.1	0	0.2	0.7	0	0.5		
09-Mar-89	0.1	0.2	0.3	0.1	0.1	0.1	0.2	0.2	0.9		
01-Sep-89	0	0.5	0.2	0.2	0	0.1	0.5		0.2		
15-Nov-89	0.2	0.2	0.4	0.2	0.1	0.2	0.1		0.1	0.1	0.1
08-May-90	0.2	0.3	0.6	0.4	0.2	0.1	0.4		0.3	0.1	0.1
13-Nov-90	0.2	0.4	0.2	0.1	0.2	0.4	0.1		0.4	0.2	0.3
27-Feb-91	0.1	0.3	0.2	0.3	0	0.1	0.3		0.3	0.3	0
24-Sep-91	0.4	0.1	0.2	0	0	0	0.3		0.2	0.2	0
17-Mar-92	0.4	0.2	0.7	0.9	0.4	0.3	0.2		0.3	0.4	0.3
03-Sep-92	0.2	0.8	0.8	0.4	0.1	0.1	0.4		0.7	0.2	0

Ground Water Quality Data

Ra-228 pCi/l	MW#1	MW#2	MW#3	MW#4	MW#5	MW#11	MW#12	MW#13	CULINARY	MW#14	MW#15
27-Feb-91	1.7	2.5	1.1	2.1	1.2	0.9	2.8		1.4	0.5	1.2
24-Sep-91	1.8	2.2	1.9	1.9	0.8	0.7	2.1		0	0	0.3
17-Mar-92	1.6	1.6	0	2.1	0.4	0	1.6		0.6	0.9	0.3
03-Sep-92	1.8	0	2.5	1.4	0	0	0		0	0.6	0.4
Average	1.725	1.575	1.375	1.875	0.600	0.400	1.625	#DIV/0!	0.500	0.500	0.550
Standard Deviation	0.083	0.965	0.936	0.286	0.447	0.406	1.030	#NUM!	0.574	0.324	0.377
Minimum	1.600	0.000	0.000	1.400	0.000	0.000	0.000	0.000	0.000	0.000	0.300
Maximum	1.800	2.500	2.500	2.100	1.200	0.900	2.800	0.000	1.400	0.900	1.200

Th-230

pCi/l	MW#1	MW#2	MW#3	MW#4	MW#5	MW#11	MW#12	MW#13	CULINARY	MW#14	MW#15
31-Jul-80	0.4	0.3	0.3	0.4	0.5						
31-Aug-80	0.4	0.4	0.5	0.3	0.3						
30-Sep-80	0.8	0.5	0.4	0.7	0.9						
31-Oct-80	0.5	0.9	0.4	0.9	1.1						
30-Nov-80	0.8	0.6	0.5	0.6	0.9						
31-Dec-80	0.5	0.4	0.8	0.9	0.6						
31-Jan-81	0.5	1.3	1.3	0.5	0.6						
28-Feb-81	0.5	0.8	0.6	0.7	0.6						
31-Mar-81	0.8	0.4	0.8	0.8	0.5						
30-Apr-81	0.5	0.6	0.6	0.5	0.9						
30-May-81	1.1	0.7	0.5	1.2	0.8						
30-Jun-81	1.7	1.1	0.8	1.3	0.7						
31-Aug-81	0.7	1.2	1.1	1.4	0.9						
31-Jan-82	1.1	0	0	1	2.9						
30-Apr-82	0.8	0.9	1.5	0.8	1.7						
31-Aug-82	0.2	0	0	0	0						
30-Jun-83	0	0.4	0.5	0.1	0.2	0	0.1	0.1	0		
30-Jun-84	2	4	1	0	0.1	2	0	5	2		
30-Jun-85	1.2	0.5	0.5	0.9	0.1	1.2	0.6	0.5	0.3		
31-Dec-85	0.1	0	0.7	0.1	0.1	0.1	0.5	0.1	0.05		
21-Mar-86	0.1	0	0.7	0.1	0.1	0.1	0.5	0.1	0.05		
19-Jun-86	0.1	0	0.7	0.1	0.1	0.1	0.5	0.1	0.05		
04-Sep-86	0.4	0.7	0.9	2.4	1.8	1.2	0	0.5	0.5		
10-Dec-86	0	0	0	0.5	0.1	0	0	0	0		
20-Feb-87	0.2	1.5	0	0	0.9	0	0	0	0.1		
29-Apr-87	0.1	0.1	0.2	0.6	0.3	1.9	5.4	4.3	1.2		
20-Nov-87	0	0	0	0.1	0	0.1	0	0.1	0		
27-Jan-88	0.1	0.1	0.3								
23-Aug-88	0.9	0	0.7	0	0.4	0	0	0	0.4		
03-Nov-88	0.7	0.2	0.3	0.4	0	0	0.5	0.5	0.2		
09-Mar-89	0	0	0	0.1	0	0.2	0.2	0.2	0		
01-Sep-89	0	0	0	0	0.1	0	0.4		0		
20-Nov-89	0	0	10	0.1	0	0	0		3.2	0	4.7
08-May-90	0.1	0	0.1	0	0	0	0		0	0	0
13-Nov-90	0.2	0.1	0	0.1	0	0.2	0.2		0	0	0.2
27-Feb-91	0	0	0.1	0	0	0	0		0.1	0	0.1
24-Sep-91	0	0	0	0	0	0	0.1		0	0	0.1
17-Mar-92	0	0	0	0	0	0	0		0	0	0
03-Sep-92	0	0	0	0	0	0	0		0	0	0.2

Pb-210

pCi/l	MW#1	MW#2	WM#3	WM#4	WM#5	WM#11	WM#12	WM#13	CULINARY	WM#14	WM#15
31-Jul-80	3	3	3	3	5						
31-Aug-80	3	3	5	2	3						
30-Sep-80	3	3	2	3	5						
31-Oct-80	3	3	3	2	3						
30-Nov-80	3	2	4	5	4						
31-Dec-80	5	3	3	4	2						
31-Jan-81	3	3	4	2	4						
28-Feb-81	4	5	4	3	5						
31-Mar-81	4		5	3	5						
30-Apr-81	4	5	5	3	5						
30-May-81	4	3	5	3	4						
30-Jun-81	3	5	6	3	5						
31-Aug-81	2	3	6	5	3						
31-Jan-82	0	5	0	0	8						
30-Apr-82	1.3	1.2	1.8	0.9	1.1						
31-Aug-82	0	0.5	1.03	0.9	0						
30-Jun-83	0	0	0.5	0	0	0	0	0	0		
30-Jun-84	1.2	9	7	1	3	1	8	1.2	8.8		
30-Jun-85	2.7	8.3	1.2	0	0.3	0.8	0	0.2	1.6		
31-Dec-85	0	1	0.4	0.2	0.3	0.9	0.1	0.2	0.2		
21-Mar-86	0	1	0.4	0.2	0.3	0.9	0.1	0.2	0.2		
19-Jun-86	0	1	0.4	0.2	0.3	0.9	0.1	0.2	0.2		
04-Sep-86	0.3	0	0	0	3.6	0.1	0.3	0	0		
10-Dec-86	2.2	3	0	0	0	0.8	0	0	0		
20-Feb-87	2.2	2.3	1.8	1.5	2.7	1.5	2.1	1.1	1.3		
29-Apr-87	3.1	0.2	0.5	6.6	2.4	4	0	1.8	0.9		
20-Nov-87	0.7	0.0	0.0	1.7	0.6	6.7	2.3	1.2	0.9		
27-Jan-88	0.0	0.0	0.0								
23-Aug-88	0.0	0.4	0.0	0.0	0.0	0.4	0.0	0.0	0.0		
03-Nov-88	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0		
09-Mar-89	0.2	0.8	0.1	0.8	0.1	0.7	0.3	0.8	0.9		
01-Sep-89	0.0	0.1	0.0	0.5	0.0	0.1	0.0		0.3		
20-Nov-89	0.4	1.3	1.3	0.1	1.0	0.1	0.2		1.2	1.0	0.0
08-May-90	0.4	0.0	1.0	0.4	1.1	0.7	0.8		0.0	0.7	1.3
13-Nov-90	0.7	1.3	0.4	0.9	0.0	1.1	0.3		0.0	0.6	0.1
27-Feb-91	0.0	0.4	0.1	2.6	0.9	0.6	0.3		0.8	0.6	0.7
24-Sep-91	0.5	0.7	1.1	0.0	0.0	0.1	1.8		1.8	1.7	0.0
17-Mar-92	1.4	2.6	1.3	1.5	1.8	1.5	2.2		2.0	2.3	2.2
03-Sep-92	0.0	0.0	0.0	0.0	1.1	0.4	0.0		0.6	0.6	0.0

Ground Water Quality Data

Water Depth	WM#1	WM#2	WM#3	WM#4	WM#5	WM#11	WM#12	WM#13	CULINARY	WM#14	WM#15
06-Sep-79				93.0							
07-Sep-79				94.7							
10-Sep-79	108.5	115.2		94.6							
14-Sep-79	77.3	109.6		94.6							
25-Sep-79	76.6	110.1	83.4	94.7							
10-Oct-79	81.7	110.2	84.9	94.7							
10-Jan-80	76.0	109.5	83.2	93.9							
28-Feb-80	74.0	108.1	81.9	92.8							
20-Mar-80	74.0	107.9	80.8	92.4							
30-May-80	75.9	110.0	83.1	94.3	112.2						
17-Jun-80	75.4	110.0	83.7	94.3	108.0						
16-Jul-80	75.4	110.0	83.6	94.3	108.0						
19-Aug-80	75.1	110.0	83.6	94.2	108.0						
07-Sep-80	76.2	111.1	83.7	94.4	108.4						
11-Sep-80	74.3	110.5	83.7	94.3	108.5						
08-Oct-80	76.2	111.1	84.4								
27-Jan-82	75.3	110.0	83.6	94.3	108.6	104.0	118.7	78.0			
26-Sep-84	83.2	112.3	87.5	96.4	108.2	113.4	111.8	77.3			
05-Dec-84	76.0	110.4	84.0	94.0	108.0	104.0	109.6	73.0			
21-Feb-85	76.0	110.3	84.3	94.2	108.0	104.0	110.1	73.3			
25-Jun-85	76.2	110.5	84.5	94.0	108.2	103.9	109.8	73.2			
30-Sep-85	75.4	110.0	83.7	93.4	107.5	102.9	108.8	77.0			
31-Oct-85	75.0	110.8	83.0								
27-Nov-85	75.9	112.2									
15-Dec-85	75.5	110.3	83.7	93.5	108.1	103.7	109.7	77.5			
24-Jan-86	80.2	110.0	83.7								
28-Feb-86	75.8	110.1	83.8								
20-Mar-86	76.2	110.5	84.5	94.0	108.2	103.9	110.8	73.3			
27-Mar-86	75.8	110.3	84.0			103.0	110.0	77.0			
08-Apr-86	75.6	109.9	84.8								
19-Jun-86	75.7	109.8	83.4	93.4	107.9	102.8	109.3	77.2			
26-Jun-86	75.7	109.8	83.4	93.4	107.9	102.8	109.3	77.2			
04-Sep-86	75.9	110.1	83.8	93.5	107.9	103.0	109.3	77.1			
10-Dec-86	76.5	111.3	83.8	95.7	108.2	103.2	111.2	79.3			
20-Feb-87	76.8	111.3	83.8	95.7	108.2	103.2	110.2	79.3			
28-Apr-87	75.7	110.2	83.8	93.2	108.0	102.4	109.7	78.0			
14-Aug-87	76.3	111.1	83.3	93.3	108.3	102.6	108.5	78.0			
20-Nov-87	76.0	110.4	83.9	93.3	108.3	103.2	109.7	77.3			
27-Jan-88	75.9	110.4	83.8	93.6	108.3	102.8	109.7	77.2			
01-Jun-88	75.8	110.4	83.8	93.4	108.3	101.9	109.6	77.2			
23-Aug-88	75.2	110.1	83.4	93.1	110.5	102.0	109.1	77.4			
03-Nov-88	75.3	110.0	83.5	93.3	108.1	102.6	109.2	76.9			
09-Mar-89	73.0	110.1	83.8	93.8	108.7	102.5	109.5	77.4			
21-Jun-89	76.1	110.3	83.7	93.2	108.1	102.5	109.2				
01-Sep-89	75.6	110.0	85.7	93.3	108.2	102.6	109.4				
15-Nov-89	75.8	110.1	83.7	93.1	108.3	102.5	109.5			105.2	107.67
16-Feb-90	75.81	110.01	83.64	93.11	108.14	102.52	109.45			105.34	107.47
08-May-90	75.5	109.8	83.6	92.9	108.1	102.2	109.5			105.44	107.4
07-Aug-90	75.0	110.0	83.9	92.9	108.2	102.6	109.4			105.47	107.59
13-Nov-90	75.8	109.8	84.2	92.8	109.0	102.5	109.0			105	107.7
27-Feb-91	75.6	110.1	83.7	92.5	108.1	102.1	109.2			105.37	108.45
21-May-91	75.5	110.0	83.7	92.4	108.3	102.5	109.6			105.4	107.56
24-Sep-91	75.0	110.3	84.0	92.6	108.5	102.6	109.7			105.46	107.62
03-Dec-91	75.7	110.4	83.9	92.5	108.5	102.5	109.7			105.6	107.76
17-Mar-92	75.7	110.0	83.8	92.2	108.2	101.9	109.4			105.25	107.71
11-Jun-92	75.7	110.2	83.7	92.5	108.5	102.3	109.5			105.29	107.52
03-Sep-92	75.2	110.1	83.7	92.4	108.4	102.2	109.5			105.43	107.71
19-Nov-92	75.7	110.0	83.9	92.4	108.4	102.4	109.6			105.58	107.58

Ground Water Quality Data

Phreatic	WM#1	WM#2	WM#3	WM#4	WM#5	WM#11	WM#12	WM#13	CULINARY	WM#14	#15
Elevation	5648.22	5613.49	5555.32	5622.57	5609.33	5609.45	5611.08	5570.35		5596.39	5598.62
06-Sep-79				5529.57							
07-Sep-79				5527.87							
10-Sep-79	5539.72	5498.29		5527.97							
14-Sep-79	5570.92	5503.89		5527.97							
25-Sep-79	5571.62	5503.39	5471.92	5527.87							
10-Oct-79	5566.52	5503.29	5470.42	5527.87							
10-Jan-80	5572.22	5503.99	5472.12	5528.67							
28-Feb-80	5574.22	5505.39	5473.42	5529.77							
20-Mar-80	5574.22	5505.59	5474.52	5530.17							
30-May-80	5572.32	5503.49	5472.22	5528.27	5497.13						
17-Jun-80	5572.82	5503.49	5471.62	5528.27	5501.33						
16-Jul-80	5572.82	5503.49	5471.72	5528.27	5501.33						
19-Aug-80	5573.12	5503.49	5471.72	5528.37	5501.33						
07-Sep-80	5572.02	5502.39	5471.62	5528.17	5500.93						
11-Sep-80	5573.92	5502.99	5471.62	5528.27	5500.83						
08-Oct-80	5572.02	5502.39	5470.92								
27-Jan-82	5572.92	5503.49	5471.72	5528.27	5500.73	5505.45	5502.41	5492.35			
26-Sep-84	5565.01	5501.20	5467.78	5526.13	5501.16	5506.08	5499.33	5493.06			
05-Dec-84	5572.22	5503.07	5471.32	5528.57	5501.33	5505.45	5501.50	5497.35			
21-Feb-85	5572.22	5503.16	5471.07	5528.40	5501.33	5505.45	5501.00	5497.10			
25-Jun-85	5572.05	5502.99	5470.82	5528.57	5501.16	5505.53	5501.25	5497.18			
30-Sep-85	5572.80	5503.49	5471.65	5529.15	5501.83	5506.53	5502.25	5493.35			
31-Oct-85	5573.22	5502.66	5472.32								
27-Nov-85	5572.30	5501.32									
15-Dec-85	5572.72	5503.16	5471.65	5529.07	5501.25	5505.78	5501.41	5492.85			
24-Jan-86	5568.05	5503.49	5471.65								
28-Feb-86	5572.39	5503.41	5471.57								
20-Mar-86	5572.05	5502.99	5470.82	5528.57	5501.16	5505.53	5500.28	5497.10			
27-Mar-86	5572.39	5503.16	5471.32			5506.45	5501.08	5493.35			
08-Apr-86	5572.64	5503.57	5470.57								
19-Jun-86	5572.55	5503.66	5471.90	5529.15	5501.41	5506.62	5501.83	5493.18			
26-Jun-86	5572.55	5503.66	5471.90	5529.15	5501.41	5506.62	5501.83	5493.18			
04-Sep-86	5572.30	5503.41	5471.49	5529.07	5501.41	5506.45	5501.83	5493.27			
10-Dec-86	5571.72	5502.19	5471.52	5526.87	5501.13	5506.25	5499.88	5491.05			
20-Feb-87	5571.47	5502.24	5471.57	5526.90	5501.16	5506.28	5500.91	5491.02			
28-Apr-87	5572.55	5503.32	5471.57	5529.40	5501.33	5507.03	5501.41	5492.35			
14-Aug-87	5571.89	5502.41	5471.99	5529.32	5501.00	5506.87	5502.58	5492.35			
20-Nov-87	5572.22	5503.07	5471.40	5529.24	5501.00	5506.28	5501.41	5493.10			
27-Jan-88	5572.30	5503.07	5471.49	5528.99	5501.00	5506.62	5501.41	5493.18			
01-Jun-88	5572.47	5503.12	5471.49	5529.15	5501.08	5507.55	5501.50	5493.18			
23-Aug-88	5573.05	5503.37	5471.90	5529.45	5498.83	5507.45	5502.00	5492.93			
03-Nov-88	5572.12	5503.19	5471.62	5529.34	5501.24	5506.96	5501.85	5570.35			
09-Mar-89	5575.22	5503.39	5471.52	5528.77	5500.63	5506.95	5501.58				
21-Jun-89	5572.12	5503.19	5471.62	5529.34	5501.24	5506.96	5501.85				
01-Sep-89	5572.67	5503.45	5469.59	5529.30	5501.18	5506.85	5501.72				
15-Nov-89	5572.43	5503.37	5471.60	5529.45	5501.08	5506.95	5501.63			5491.19	5490.95
16-Feb-90	5572.41	5503.48	5471.68	5529.46	5501.19	5506.93	5501.63			5491.05	5491.15
08-May-90	5572.71	5503.69	5471.68	5529.67	5501.20	5507.29	5501.55			5490.95	5491.22
07-Aug-90	5573.19	5503.48	5471.45	5529.64	5501.09	5506.89	5501.68			5490.92	5491.03
13-Nov-90	5572.42	5503.69	5471.12	5529.77	5500.33	5506.95	5502.08			5491.39	5490.92
27-Feb-91	5572.64	5503.42	5471.67	5530.10	5501.26	5507.39	5501.86			5491.02	5490.17
21-May-91	5572.77	5503.45	5471.58	5530.15	5501.03	5507.00	5501.52			5490.99	5491.06
24-Sep-91	5573.26	5503.19	5471.36	5529.97	5500.80	5506.89	5501.43			5490.93	5491.00
03-Dec-91	5572.52	5503.11	5471.42	5530.03	5500.84	5506.94	5501.36			5490.79	5490.86
17-Mar-92	5572.52	5503.47	5471.57	5530.37	5501.15	5507.53	5501.64			5491.14	5490.91
11-Jun-92	5572.52	5503.27	5471.64	5530.09	5500.86	5507.18	5501.55			5491.10	5491.10
03-Sep-92	5572.99	5503.40	5471.64	5530.14	5500.96	5507.27	5501.55			5490.96	5490.91
19-Nov-92	5572.55	5503.46	5471.46	5530.16	5500.89	5507.10	5501.44			5490.81	5491.04

Ground Water Quality Data

Alkalinity (mg/l) Date	MW#1	MW#2	WM#3	WM#4	WM#5	WM#11	WM#12	WM#14	WM#15	Culinary
01-Nov-89					326	316	346	428	374	0
20-Nov-89	260	344	277	347	322	301	342	379	353	240
15-Dec-89					314	304	324	392	355	
24-Jan-90					300	300	319	382	353	
27-Feb-91	271	349	204	384	303	301	296	361	356	201
19-Nov-92	258	345	352	350	322	329	334	406	357	189

Ground Water Quality Data

Ammonia (mg/l) Date	MW#1	MW#2	WM#3	WM#4	WM#5	WM#11	WM#12	WM#14	WM#15	Culinary
01-Nov-89					0.7	0.6	0.2	0.1	0.1	
20-Nov-89	0.5	0.009	0.009	0.7	0.7	0.6	0.1	0.009	0.2	0.2
15-Dec-89					0.7	0.6	0.1	0.1	0.1	
24-Jan-90					0.5	0.5	0.09	0.09	0.09	

Ground Water Quality Data

Cadmium (mg/l) Date	MW#1	MW#2	WM#3	WM#4	WM#5	WM#11	WM#12	WM#14	WM#15	Culinary
01-Nov-89					0.0049	0.0049	0.0049	0.0049	0.0049	
20-Nov-89	0.0049	0.0049	0.0049	0.0049	0.0049	0.0049	0.0049	0.0049	0.0049	0.0049
15-Dec-89					0.0049	0.007	0.006	0.0049	0.0049	
24-Jan-90					0.0049	0.007	0.007	0.0049	0.0049	
24-Sep-91	0.001	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009
17-Mar-92	0.0009	0.0009	0.0009	0.0009	0.0009	0.001	0.001	0.0009	0.0009	0.0009
14-Sep-92	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009

Ground Water Quality Data

Chromium (mg/l) Date	MW#1	MW#2	WM#3	WM#4	WM#5	WM#11	WM#12	WM#14	WM#15	Culinary
01-Nov-89					0.009	0.009	0.009	0.009	0.009	
20-Nov-89	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
15-Dec-89					0.009	0.009	0.009	0.009	0.009	
24-Jan-90					0.009	0.009	0.009	0.009	0.009	

Ground Water Quality Data

Cyanide (mg/l) Date	MW#1	MW#2	WM#3	WM#4	WM#5	WM#11	WM#12	WM#14	WM#15	Culinary
01-Nov-89					0.009	0.009	0.009	0.009	0.009	
20-Nov-89	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
15-Dec-89					0.009	0.009	0.009	0.009	0.009	
24-Jan-90					0.009	0.009	0.009	0.009	0.009	

Ground Water Quality Data

Mercury (mg/l) Date	MW#1	MW#2	WM#3	WM#4	WM#5	WM#11	WM#12	WM#14	WM#15	Culinary
01-Nov-89					0.00019	0.00019	0.00019	0.00019	0.00019	
20-Nov-89	0.00019	0.00019	0.00019	0.00019	0.00019	0.00019	0.00019	0.00019	0.00019	0.00019
15-Dec-89					0.00019	0.00019	0.00019	0.00019	0.00019	
24-Jan-90					0.00019	0.00019	0.00019	0.00019	0.00019	

Ground Water Quality Data

Molybdenum (mg/l) Date	MW#1	MW#2	WM#3	WM#4	WM#5	WM#11	WM#12	WM#14	WM#15	Culinary
01-Nov-89					0.009	0.009	0.02	0.02	0.04	
20-Nov-89	0.01	0.02	0.009	0.02	0.009	0.009	0.02	0.02	0.009	0.009
15-Dec-89					0.009	0.009	0.02	0.02	0.03	
24-Jan-90					0.009	0.009	0.009	0.009	0.01	
24-Sep-91	0.001	0.003	0.01	0.014	0.0009	0.0009	0.006	0.025	0.001	
17-Mar-92	0.001	0.001	0.0009	0.0009	0.0009	0.0009	0.002	0.003	0.003	0.001
14-Sep-92	0.0009	0.0009	0.0009	0.0009	0.001	0.001	0.001	0.002	0.0009	0.001

Ground Water Quality Data

Nickel (mg/l) Date	MW#1	MW#2	WM#3	WM#4	WM#5	WM#11	WM#12	WM#14	WM#15	Culinary
01-Nov-89					0.009	0.009	0.03	0.03	0.02	
20-Nov-89	0.009	0.009	0.05	0.02	0.009	0.009	0.02	0.02	0.02	0.009
15-Dec-89					0.009	0.009	0.02	0.03	0.02	
24-Jan-90					0.009	0.009	0.009	0.01	0.009	
27-Feb-91	0.02	0.06	0.1	0.07	0.04	0.05	0.06	0.05	0.07	0.01
24-Sep-91	0.009	0.01	0.02	0.009	0.009	0.009	0.009	0.009	0.009	0.009
17-Mar-92	0.009	0.01	0.01	0.009	0.009	0.009	0.009	0.009	0.009	0.009
14-Sep-92	0.0009	0.0009	0.019	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009

Ground Water Quality Data

Vanadium (mg/l) Date	MW#1	MW#2	WM#3	WM#4	WM#5	WM#11	WM#12	WM#14	WM#15	Culinary
01-Nov-89					0.009	0.009	0.009	0.009	0.009	
20-Nov-89	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.03	0.04
15-Dec-89					0.009	0.009	0.009	0.009	0.01	
24-Jan-90					0.009	0.009	0.009	0.009	0.009	

Ground Water Quality Data

Thallium (mg/l) Date	MW#1	MW#2	WM#3	WM#4	WM#5	WM#11	WM#12	WM#14	WM#15	Culinary
01-Nov-89					0.009	0.009	0.009	0.009	0.009	
20-Nov-89	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
15-Dec-89					0.009	0.009	0.009	0.009	0.009	
24-Jan-90					0.009	0.009	0.009	0.009	0.009	

Ground Water Quality Data

Gross Alpha Dissolved (pCi/l) Date	MW#1	MW#2	WM#3	WM#4	WM#5	WM#11	WM#12	WM#14	WM#15	Culinary
01-Nov-89					7	42	47	53	89	
20-Nov-89	6.3	39	65	4	8	17	27	68	81	1.9
15-Dec-89					7	13	62	67	90	
24-Jan-90					0	0	16	40	68	
27-Feb-91	0	4	0	10	15	17	24	48	19	0.1
24-Sep-91	0	21	76	2	5	5	27	62	24	5.9
17-Mar-92	0	67	38	31	12	10	0	82	47	0.2
03-Sep-92	5	36	34	5	10	0	10	48	27	0

Ground Water Quality Data

Gross Beta Dissolved (pCi/l) Date	MW#1	MW#2	WM#3	WM#4	WM#5	WM#11	WM#12	WM#14	WM#15	Culinary
01-Nov-89					12	21	30	43	55	
20-Nov-89	11	31	50	15	18	7	34	40	29	6.7
15-Dec-89					19	16	44	37	51	
24-Jan-90					13	10	29	37	41	
27-Feb-91	7.1	21	31	13	6.3	8.3	26	25	18	
24-Sep-91	15	21	63	40	17	18	25	33	42	5.6
17-Mar-92	20	28	42	22	13	16	25	56	29	4.2
03-Sep-92	12	58	60	10	10	14	38	67	39	4.2

Ground Water Quality Data

Methylene Chloride (ug/l) Date	MW#1	MW#2	WM#3	WM#4	WM#5	WM#11	WM#12	WM#14	WM#15	Culinary
01-Nov-89					4.9	4.9	4.9	4.9	4.9	
20-Nov-89	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	130
15-Dec-89					4.9	4.9	4.9	4.9	4.9	
24-Jan-90					4.9	4.9	4.9	4.9	4.9	

Ground Water Quality Data

Acetone (ug/l) Date	MW#1	MW#2	WM#3	WM#4	WM#5	WM#11	WM#12	WM#14	WM#15	Culinary
01-Nov-89					99	99	99	99	99	
20-Nov-89	99	99	99	99	99	99	99	99	99	99
15-Dec-89					9.9	9.9	9.9	9.9	9.9	
24-Jan-90					9.9	9.9	9.9	9.9	9.9	

Ground Water Quality Data

Carbon Disulfide (ug/l) Date	MW#1	MW#2	WM#3	WM#4	WM#5	WM#11	WM#12	WM#14	WM#15	Culinary
01-Nov-89					4.9	4.9	4.9	4.9	4.9	
20-Nov-89	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9
15-Dec-89					4.9	4.9	4.9	4.9	4.9	
24-Jan-90					4.9	4.9	4.9	4.9	4.9	

Ground Water Quality Data

Chloroform (ug/l) Date	MW#1	MW#2	WM#3	WM#4	WM#5	WM#11	WM#12	WM#14	WM#15	Culinary
01-Nov-89					4.9	4.9	4.9	4.9	4.9	
20-Nov-89	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9
15-Dec-89					4.9	4.9	4.9	4.9	4.9	
24-Jan-90					4.9	4.9	4.9	4.9	4.9	

Ground Water Quality Data

2-Butanone

(ug/l) Date	MW#1	MW#2	WM#3	WM#4	WM#5	WM#11	WM#12	WM#14	WM#15	Culinary
01-Nov-89					99	99	99	99	99	
20-Nov-89	99	99	99	99	99	99	99	99	99	99
15-Dec-89					9.9	9.9	9.9	9.9	9.9	
24-Jan-90					9.9	9.9	9.9	9.9	9.9	

Ground Water Quality Data

Beryllium (mg/l) Date	MW#1	MW#2	WM#3	WM#4	WM#5	WM#11	WM#12	WM#14	WM#15	Culinary
24-Sep-91	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009
17-Mar-92	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009
03-Sep-92	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009

Ground Water Quality Data

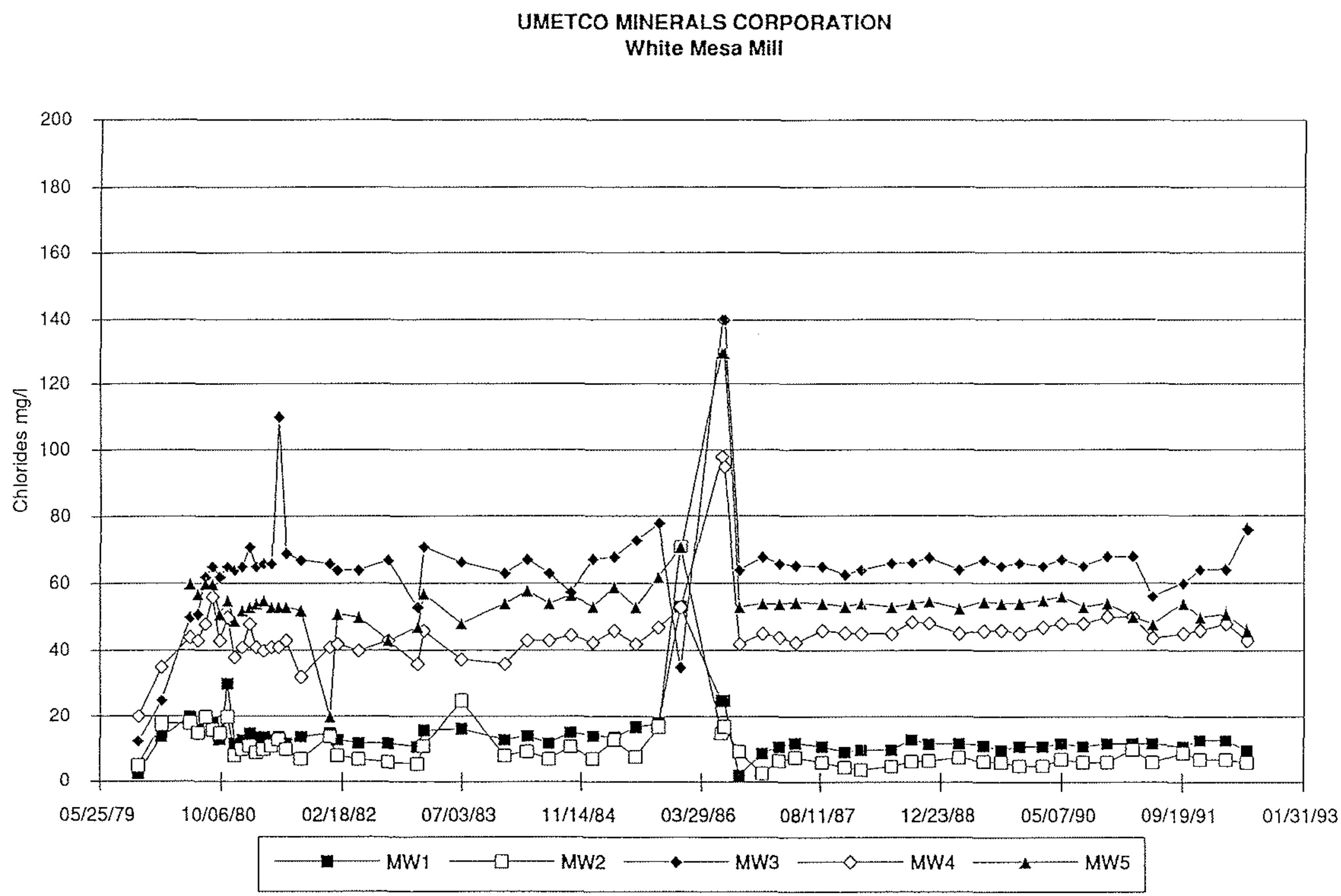
Calcium (mg/l) Date	MW#1	MW#2	WM#3	WM#4	WM#5	WM#11	WM#12	WM#14	WM#15	Culinary
03-Sep-92	126	306	377	377	110	34.5	488	467	359	47
14-Nov-92	152	334	437	424	132	198	504	474	431	49

Ground Water Quality Data

Potassium (mg/l) Date	MW#1	MW#2	WM#3	WM#4	WM#5	WM#11	WM#12	WM#14	WM#15	Culinary
03-Sep-92	6.77	11.4	23.9	10.17	7.7	6.3	13.8	12	10.2	3.27
14-Nov-92	6.65	12.25	24.3	10.6	7.85	10.55	13.25	11.5	10.1	3.15

Ground Water Quality Data

Magnesium (mg/l) Date	MW#1	MW#2	WM#3	WM#4	WM#5	WM#11	WM#12	WM#14	WM#15	Culinary
03-Sep-92	60.5	105	252	192	42	12	231	161	166	23
14-Nov-92	63	104	244	185	43	73	224	157	172	21


UMETCO MINERALS CORPORATION
White Mesa Mill
Chlorides mg/l
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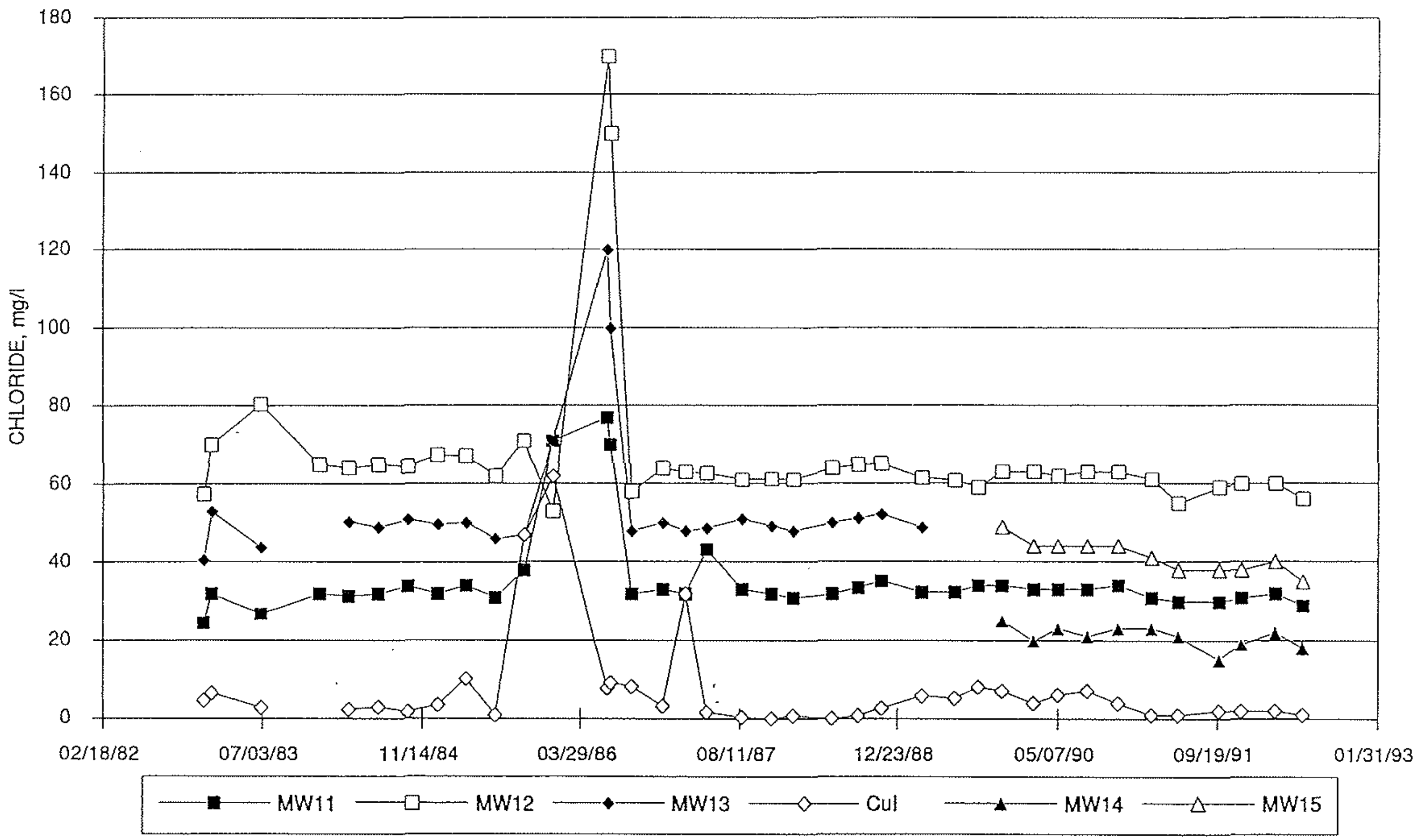
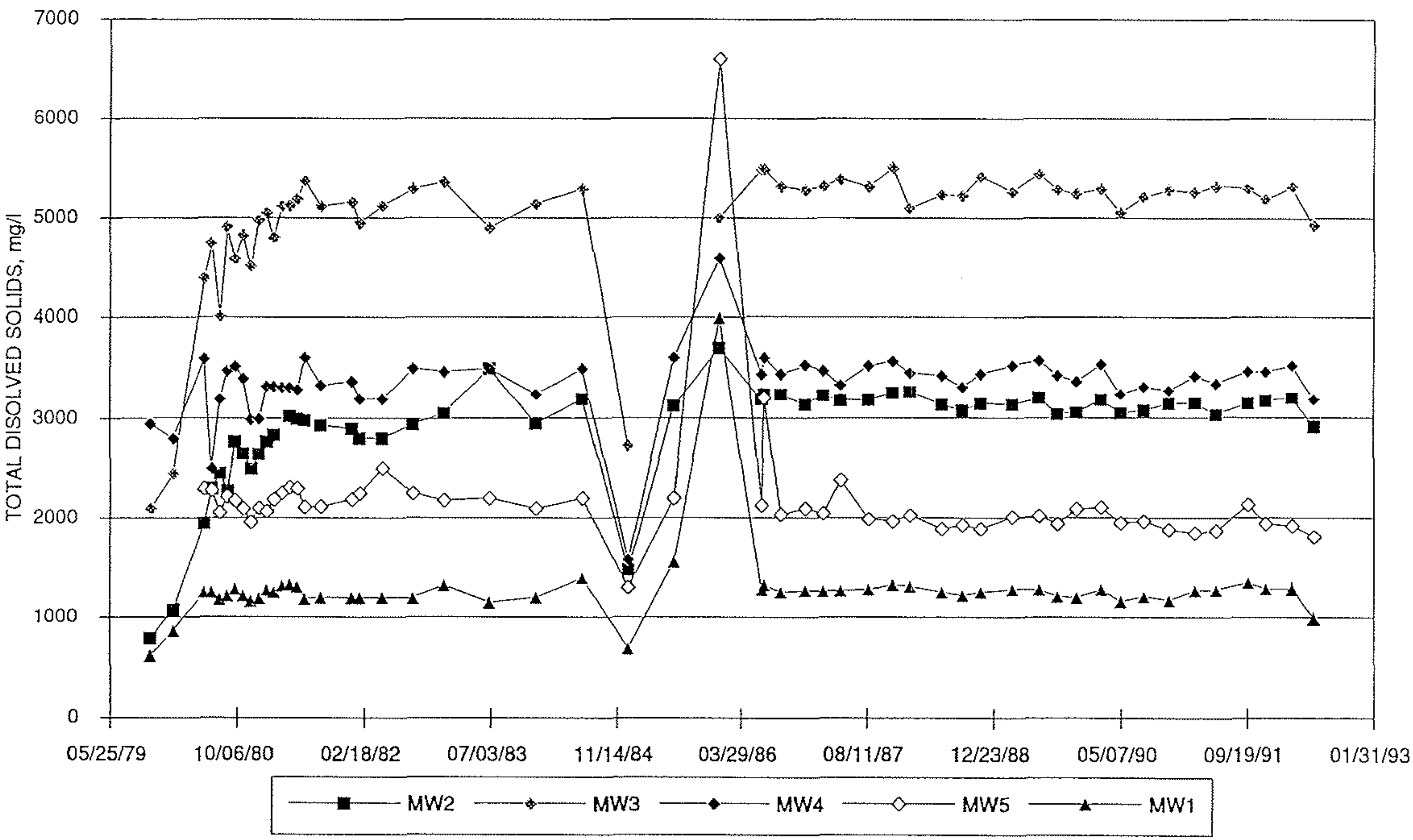
40
60
80
100
120
140
160
180
200
05/25/79
10/06/80
02/18/82
07/03/83
11/14/84
03/29/86
08/11/87
12/23/88
05/07/90
09/19/91
01/31/93
MW1
MW2
MW3
MW4
MW5

UMETCO MINERALS CORPORATION
Wite Mesa Mill



UMETCO MINERALS CORPORATION
WHITE MESA MILL



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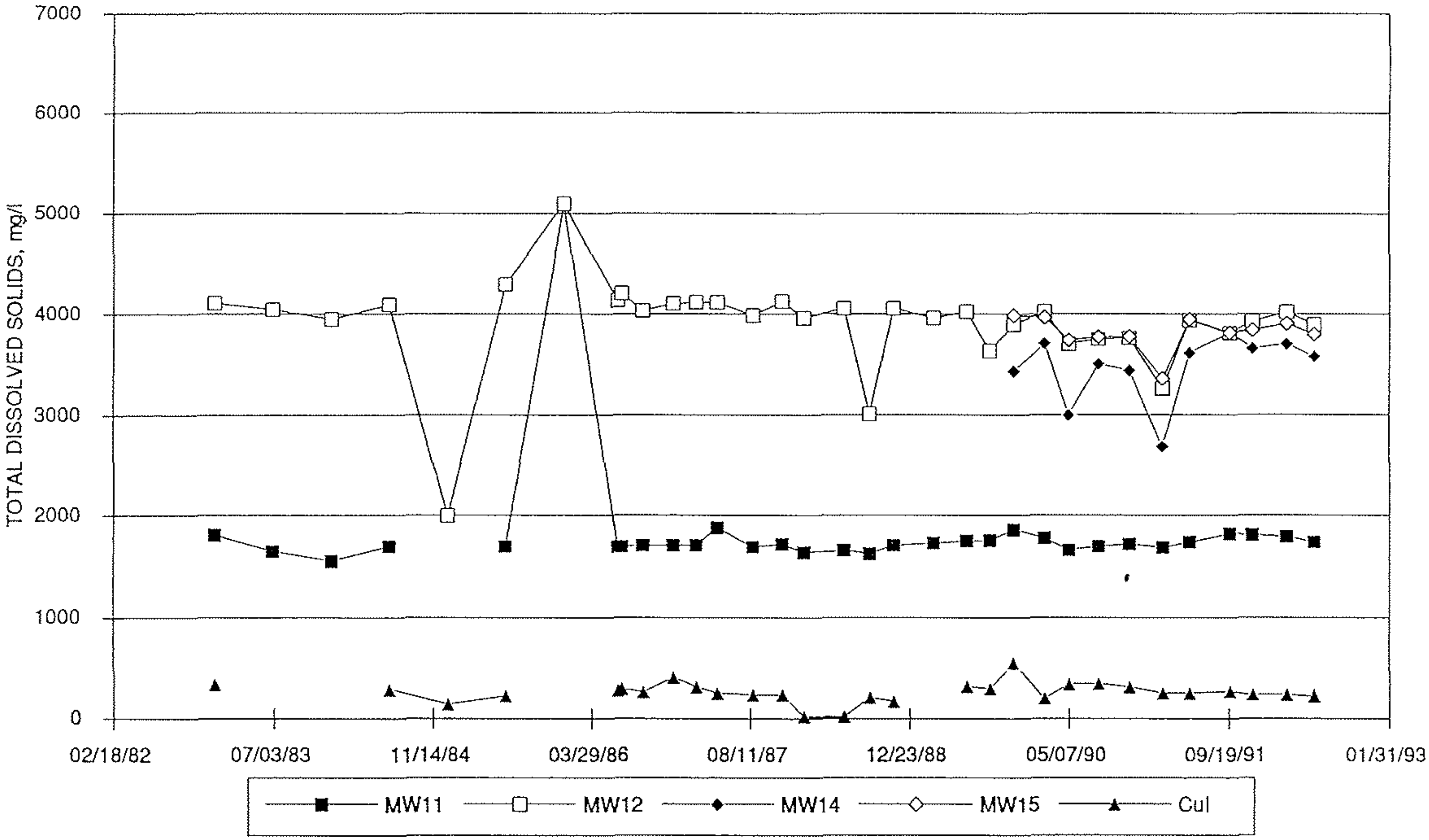
WHITE MESA MILL



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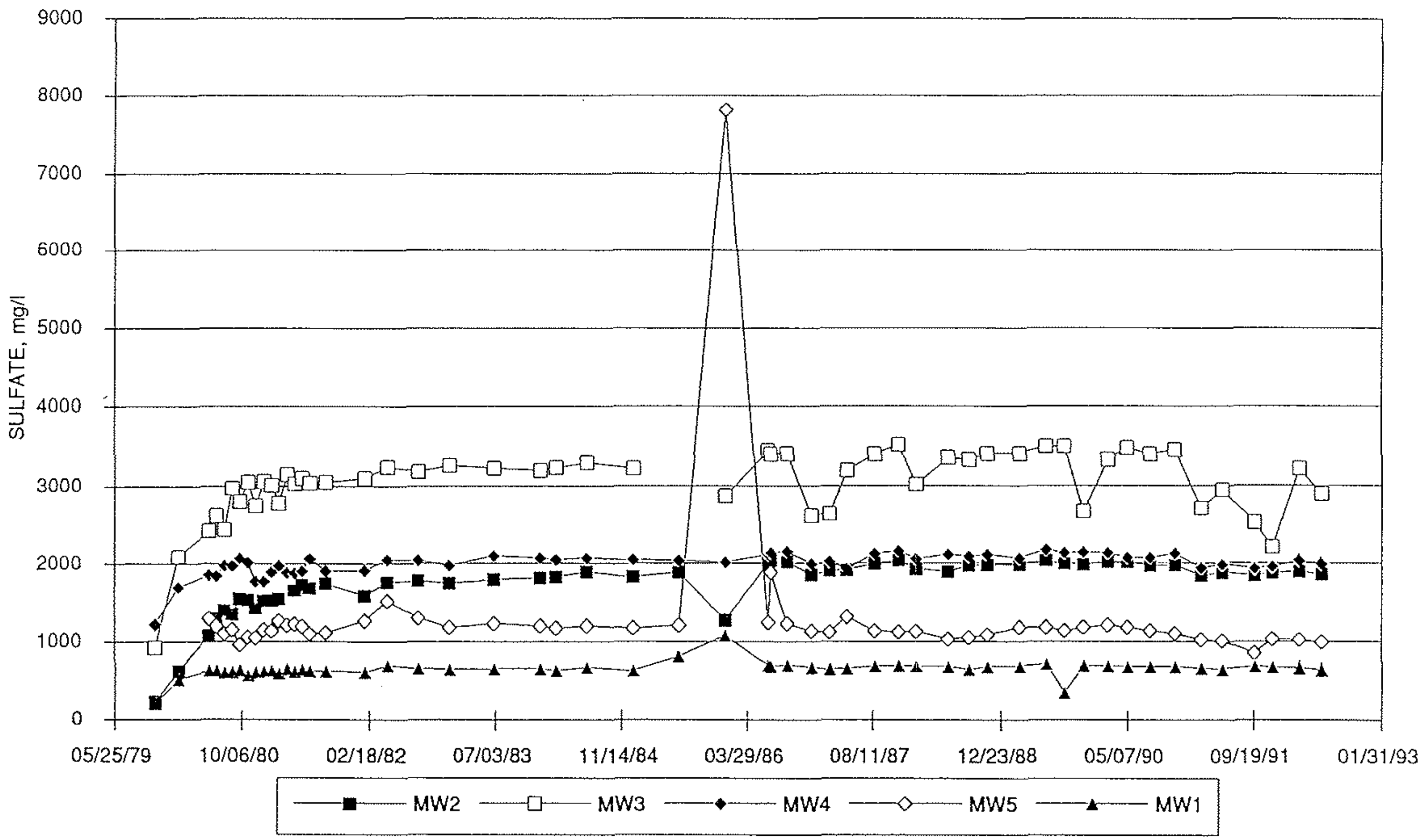
WHITE MESA MILL



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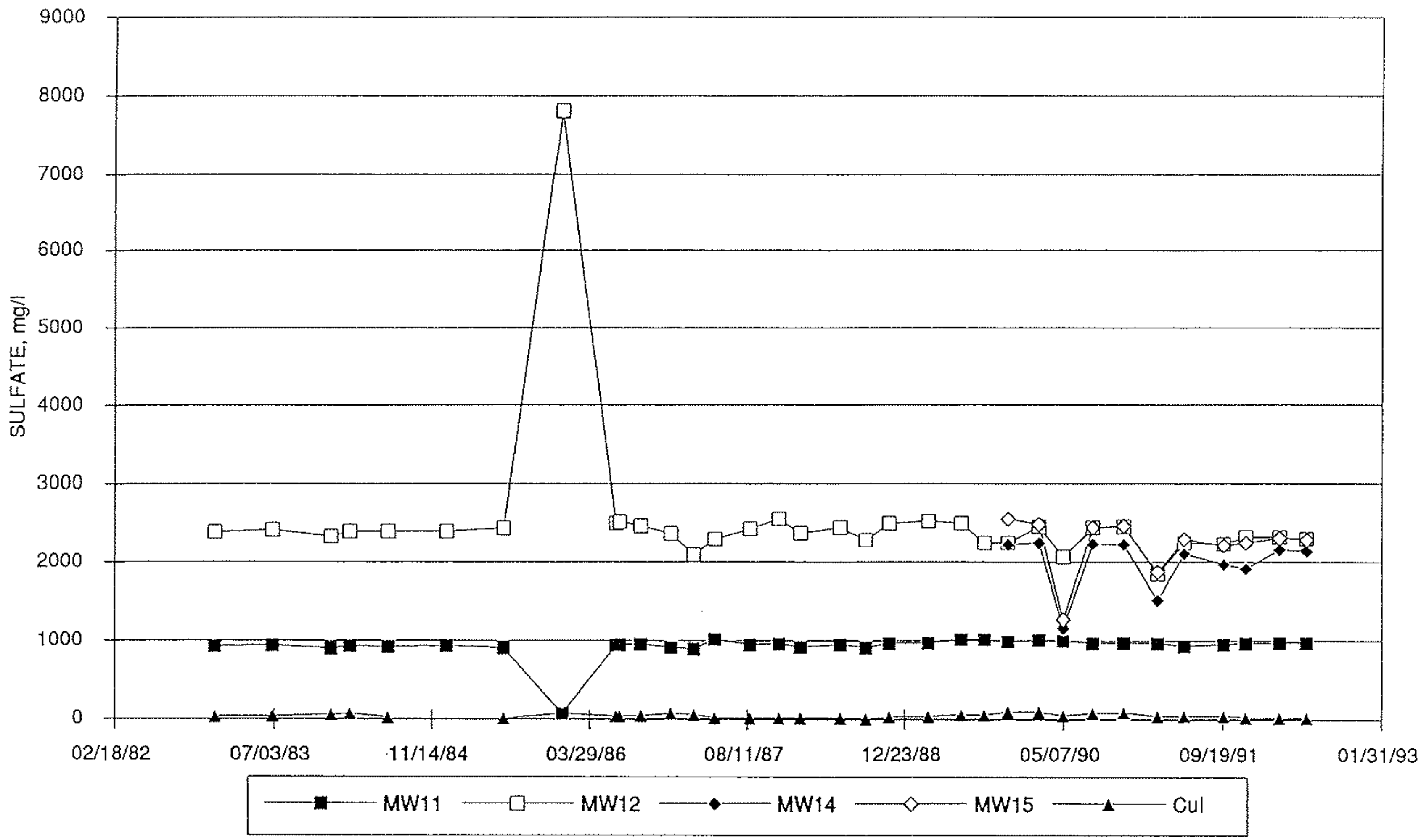
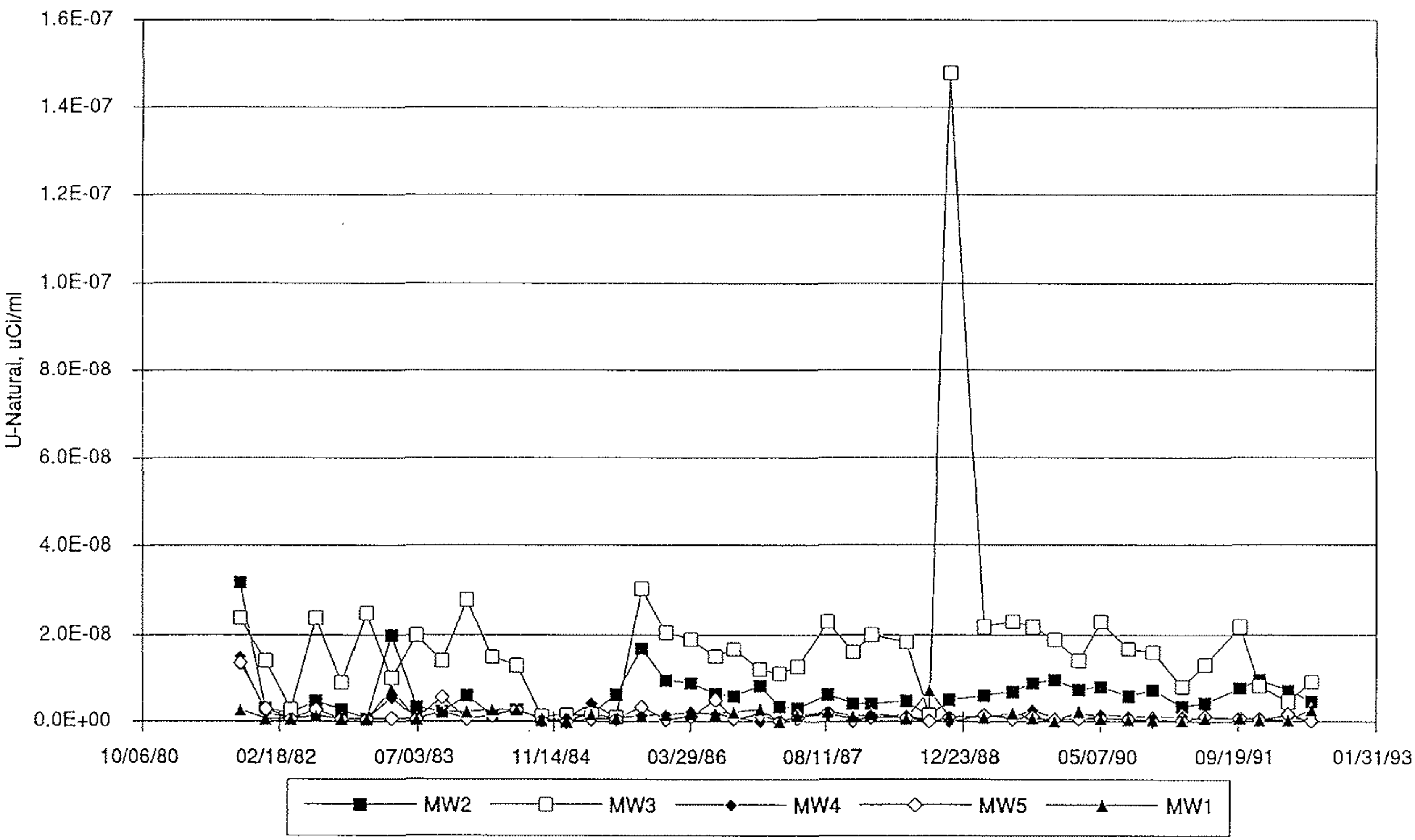
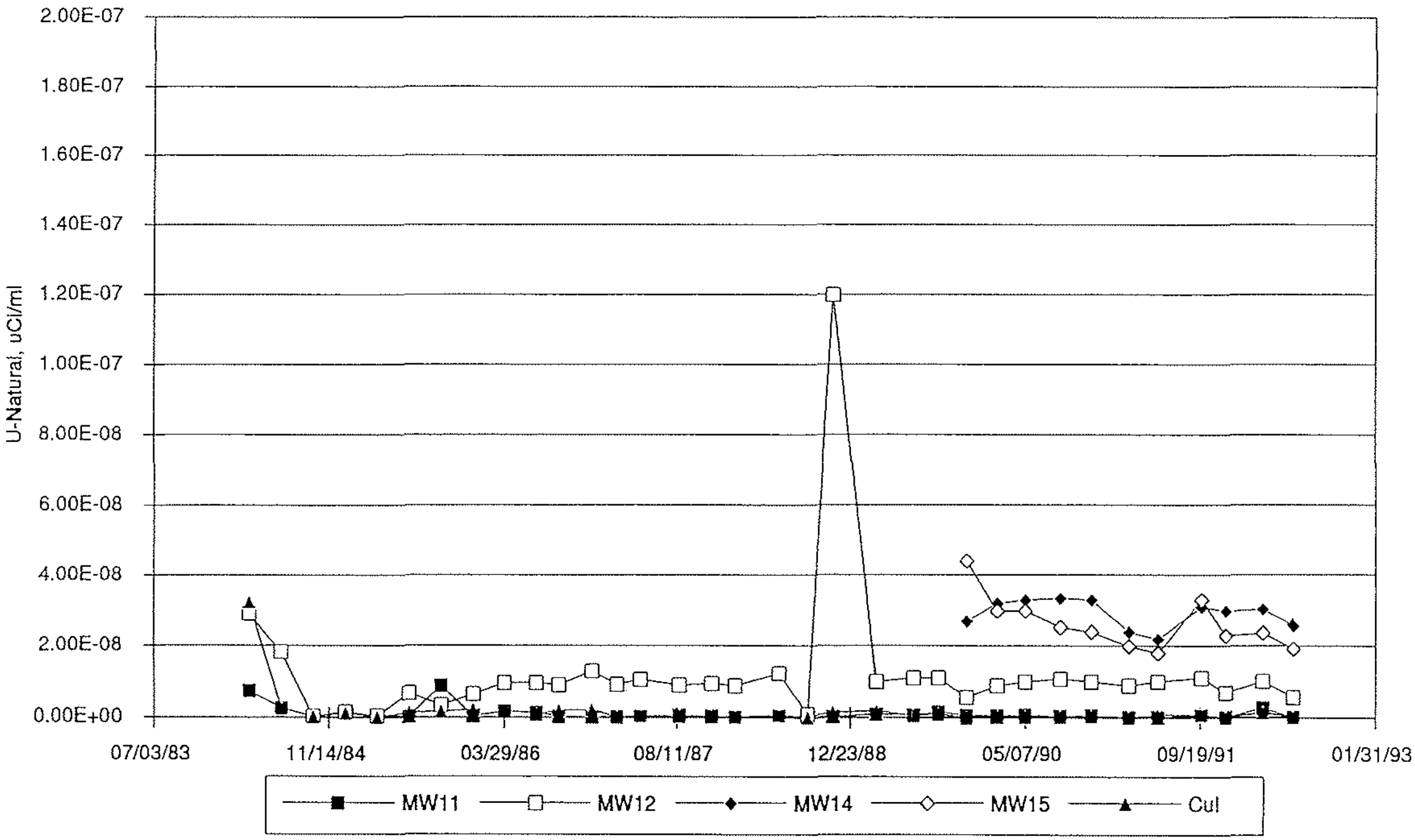
WHITE MESA MILL



UMETCO MINERALS CORPORATION
WHITE MESA MILL



UMETCO MINERALS CORPORATION
WHITE MESA MILL



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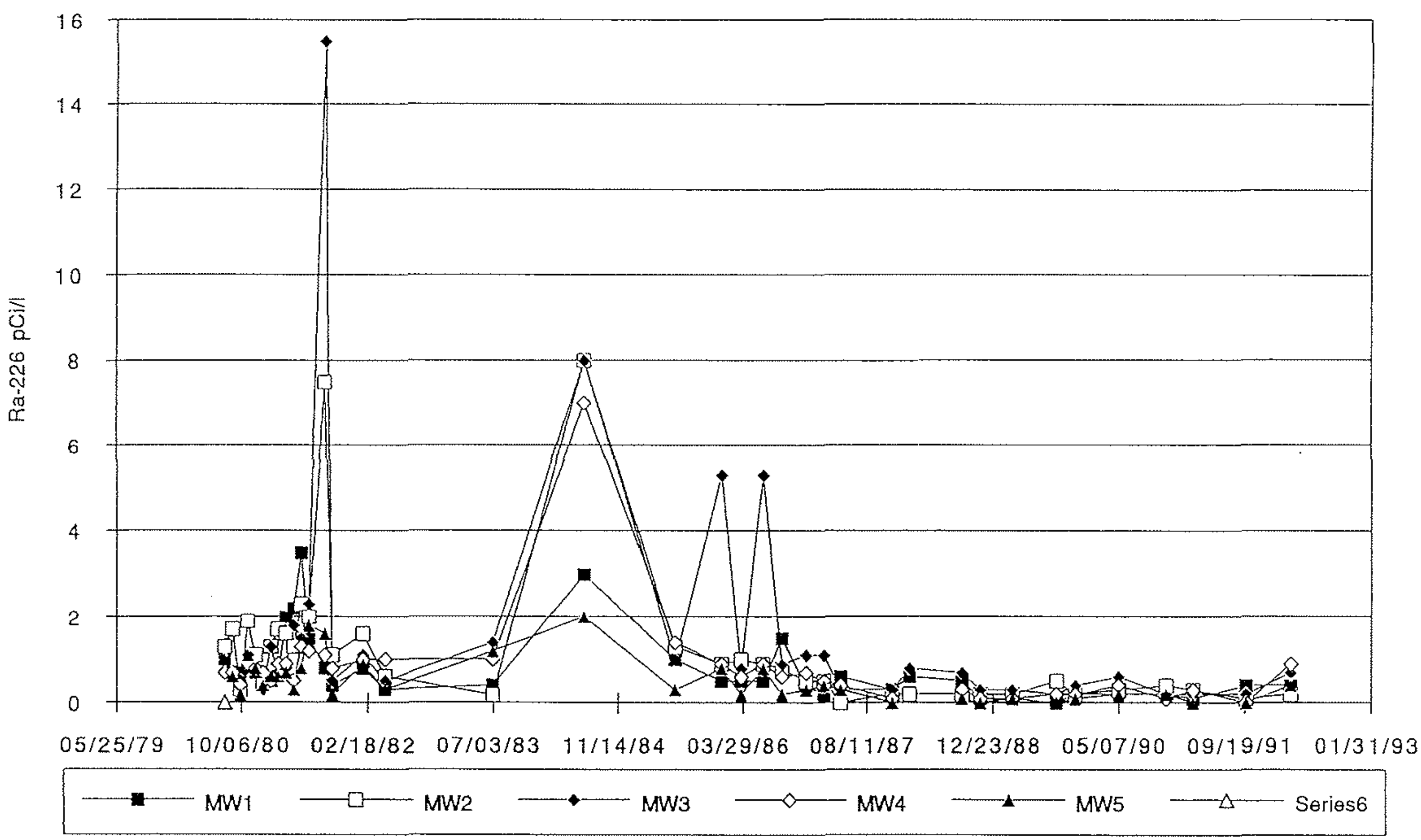
WHITE MESA MILL



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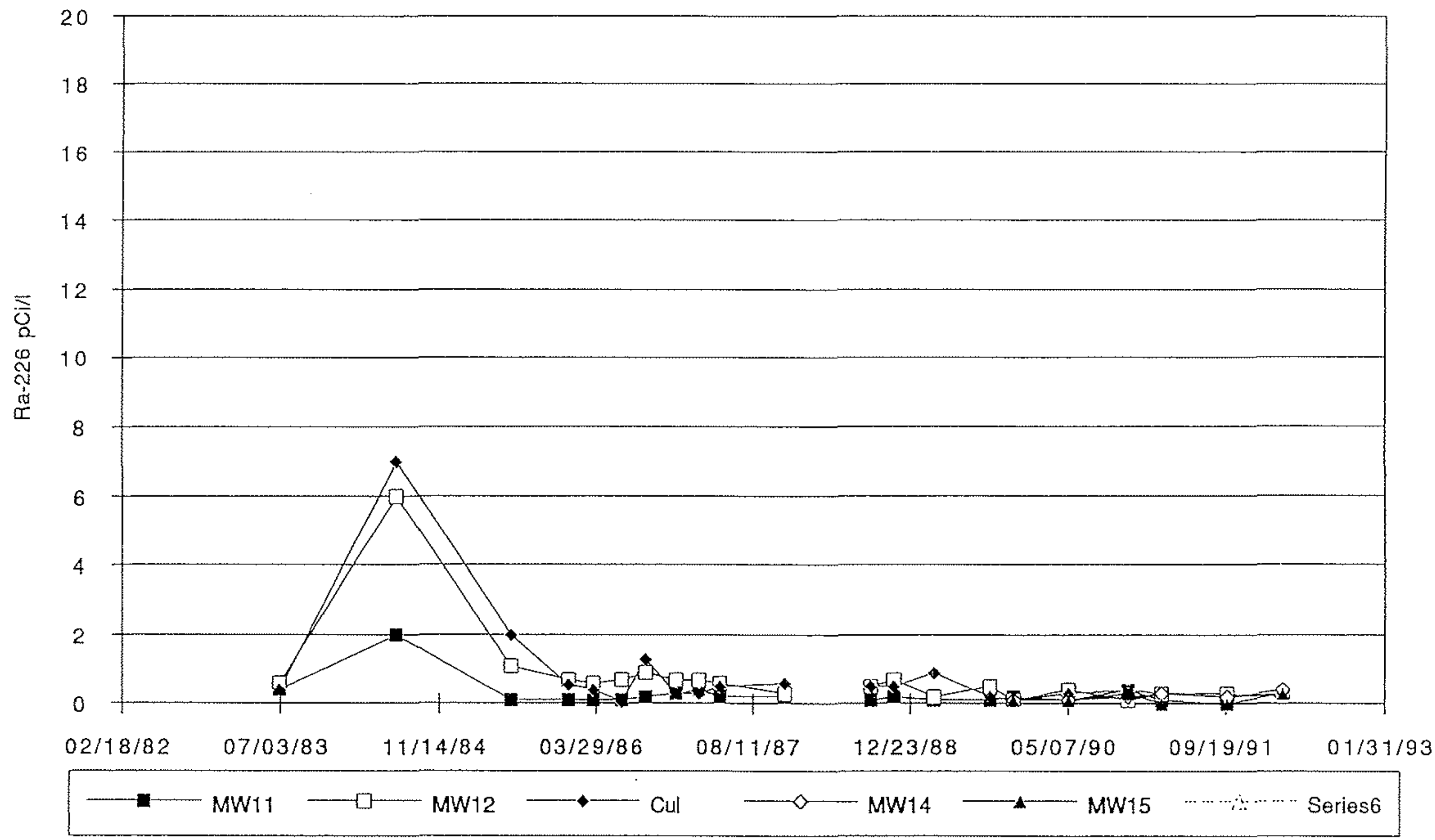
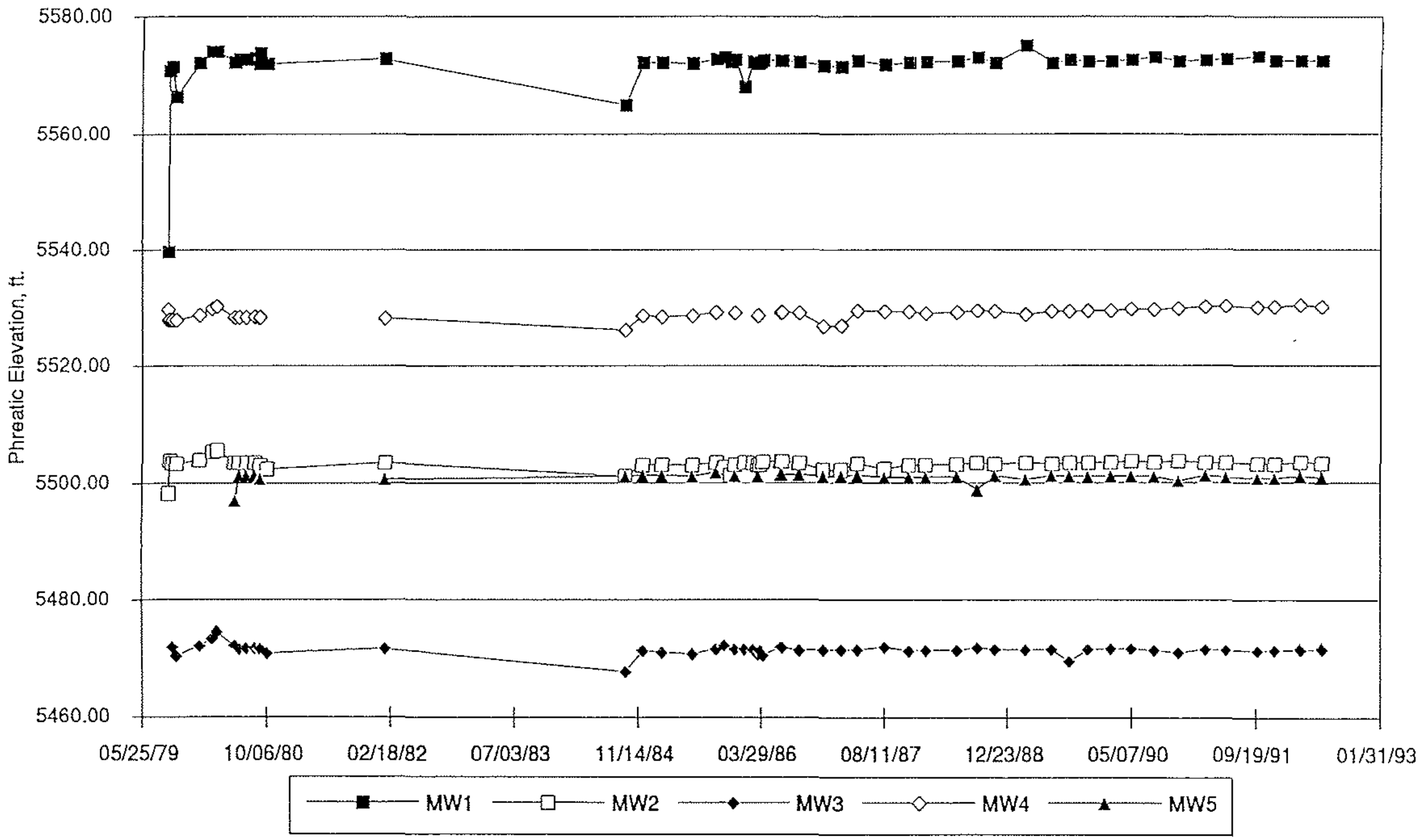
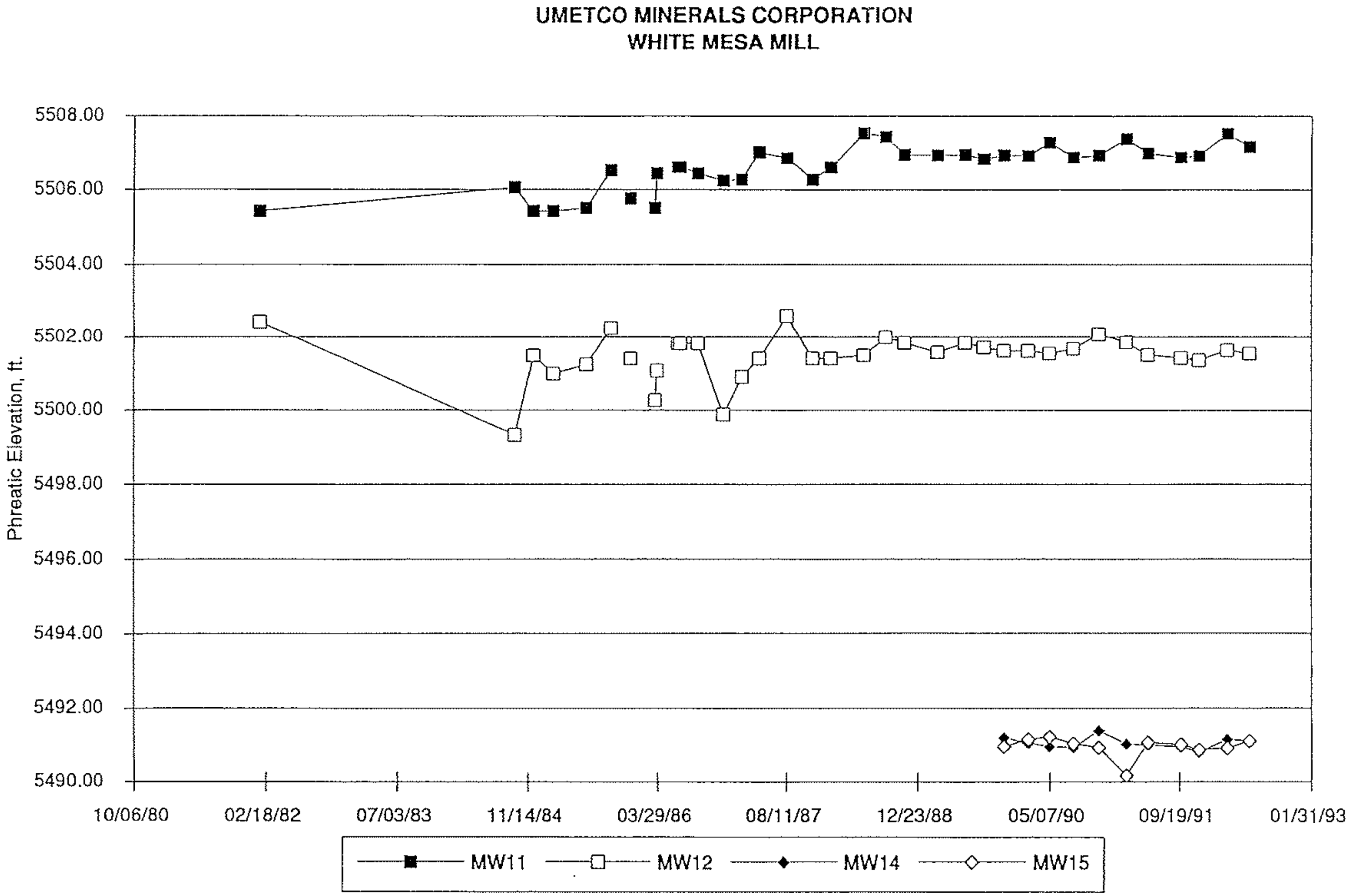
WHITE MESA MILL

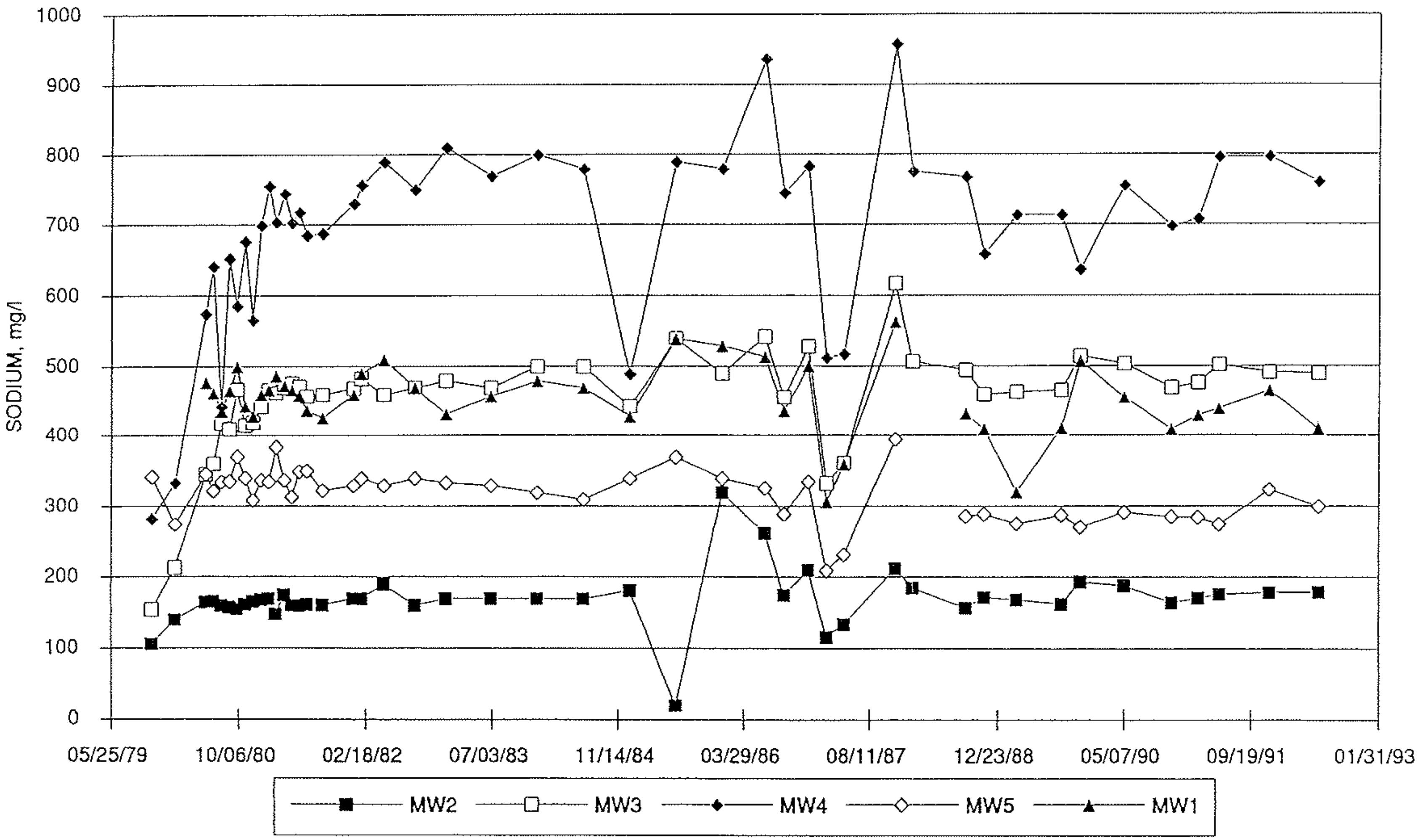


UMETCO MINERALS CORPORATION
White Mesa Mill




UMETCO MINERALS CORPORATION
WHITE MESA MILL
Phreatic Elevation, ft.
5508.00
5506.00
5504.00
5502.00
5500.00
5498.00
5496.00
5494.00
5492.00
5490.00
10/06/80
02/18/82
07/03/83
11/14/84
03/29/86
08/11/87
12/23/88
05/07/90
09/19/91
01/31/93
MW11
MW12
MW14
MW15

UMETCO MINERALS CORPORATION
WHITE MESA MILL



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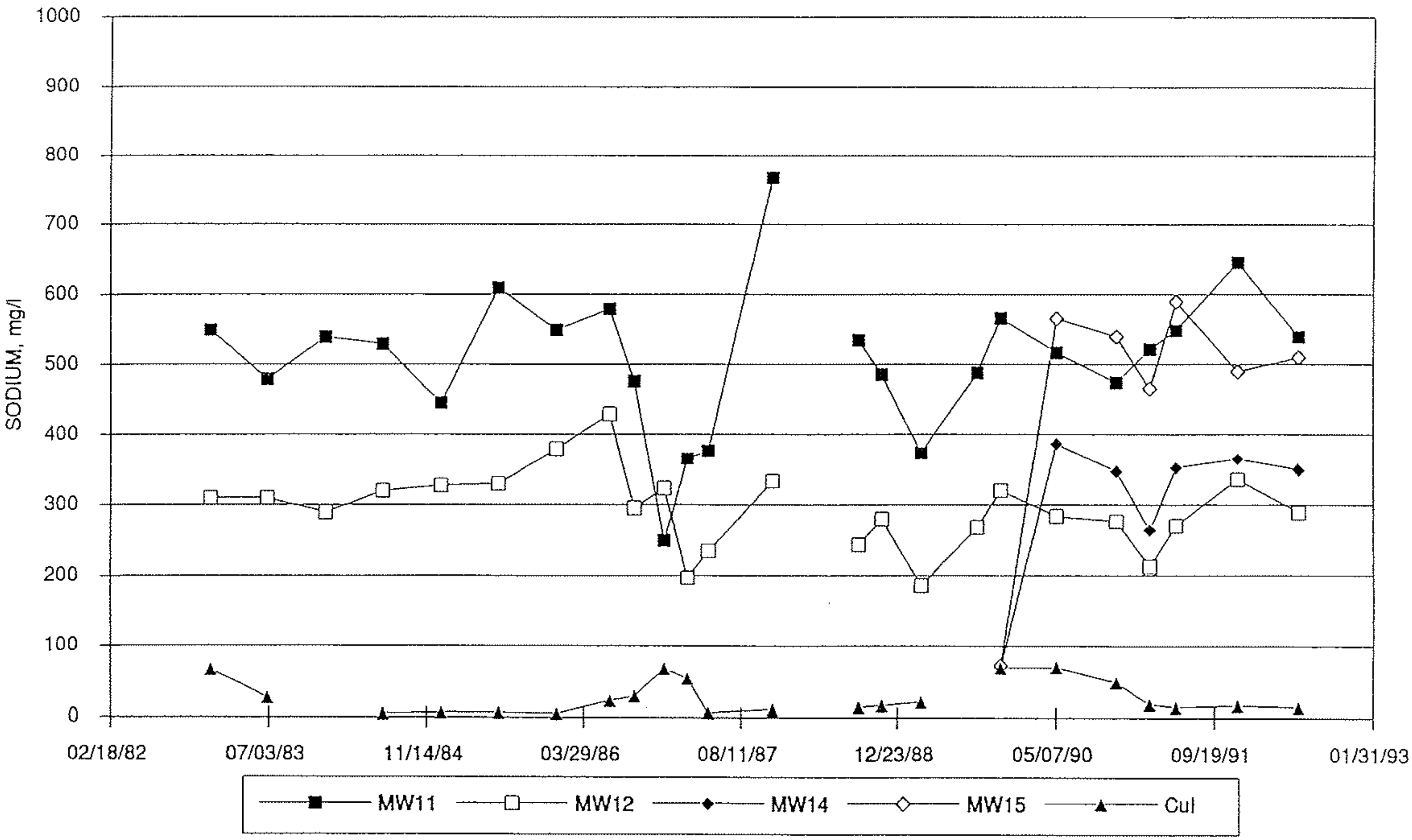
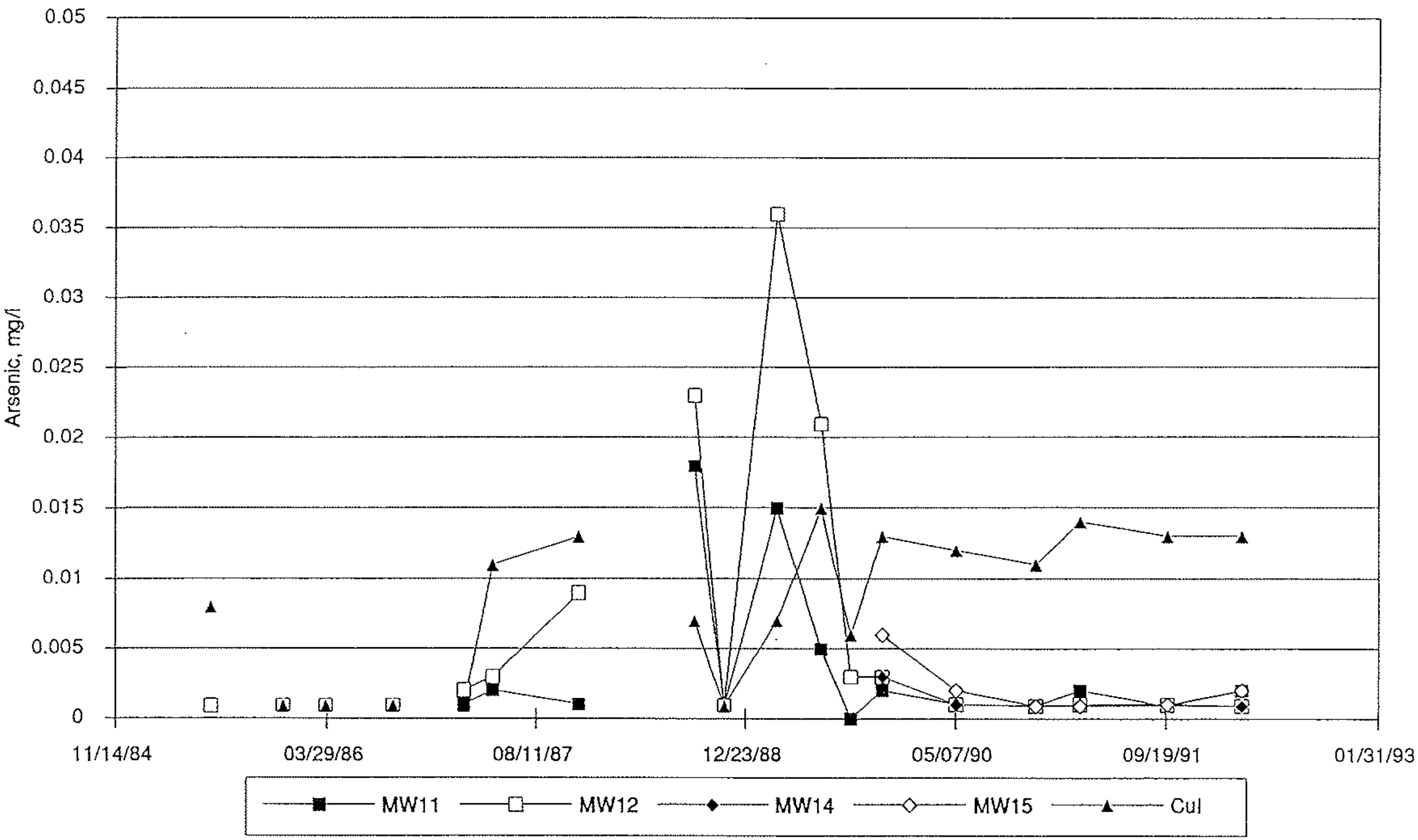
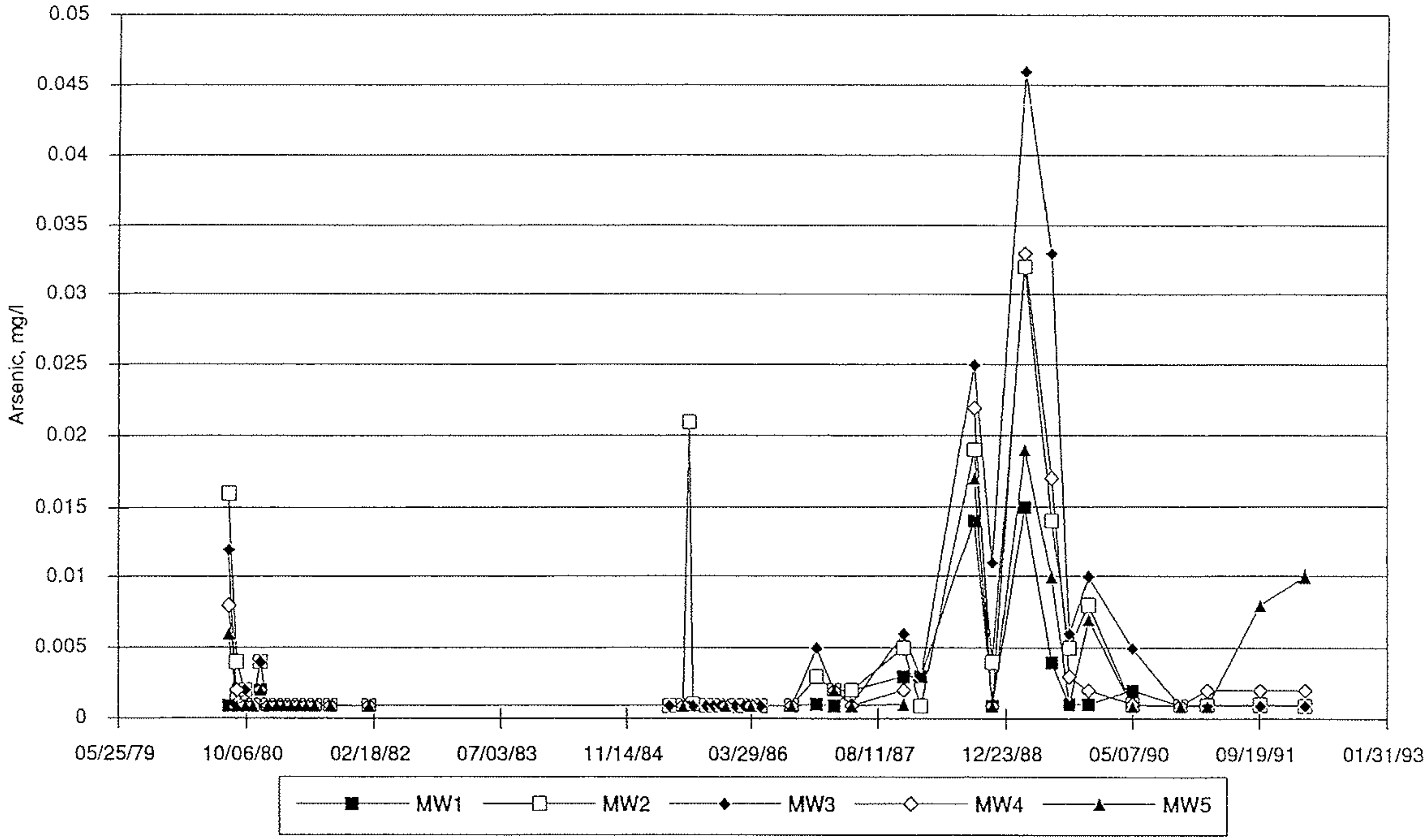
WHITE MESA MILL



UMETCO MINERALS CORPORATION
White Mesa Mill



UMETCO MINERALS CORPORATION
White Mesa Mill



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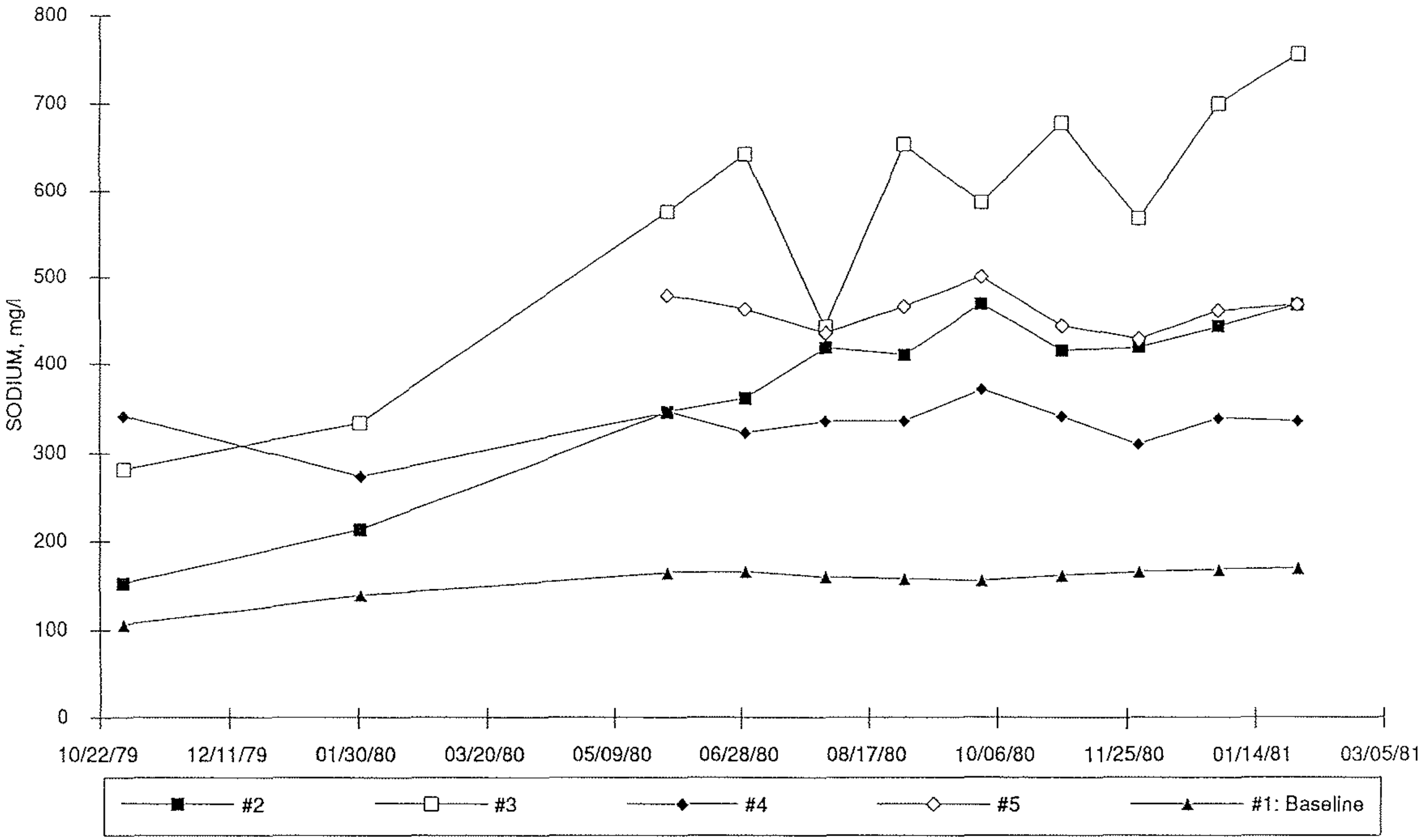
WHITE MESA MILL



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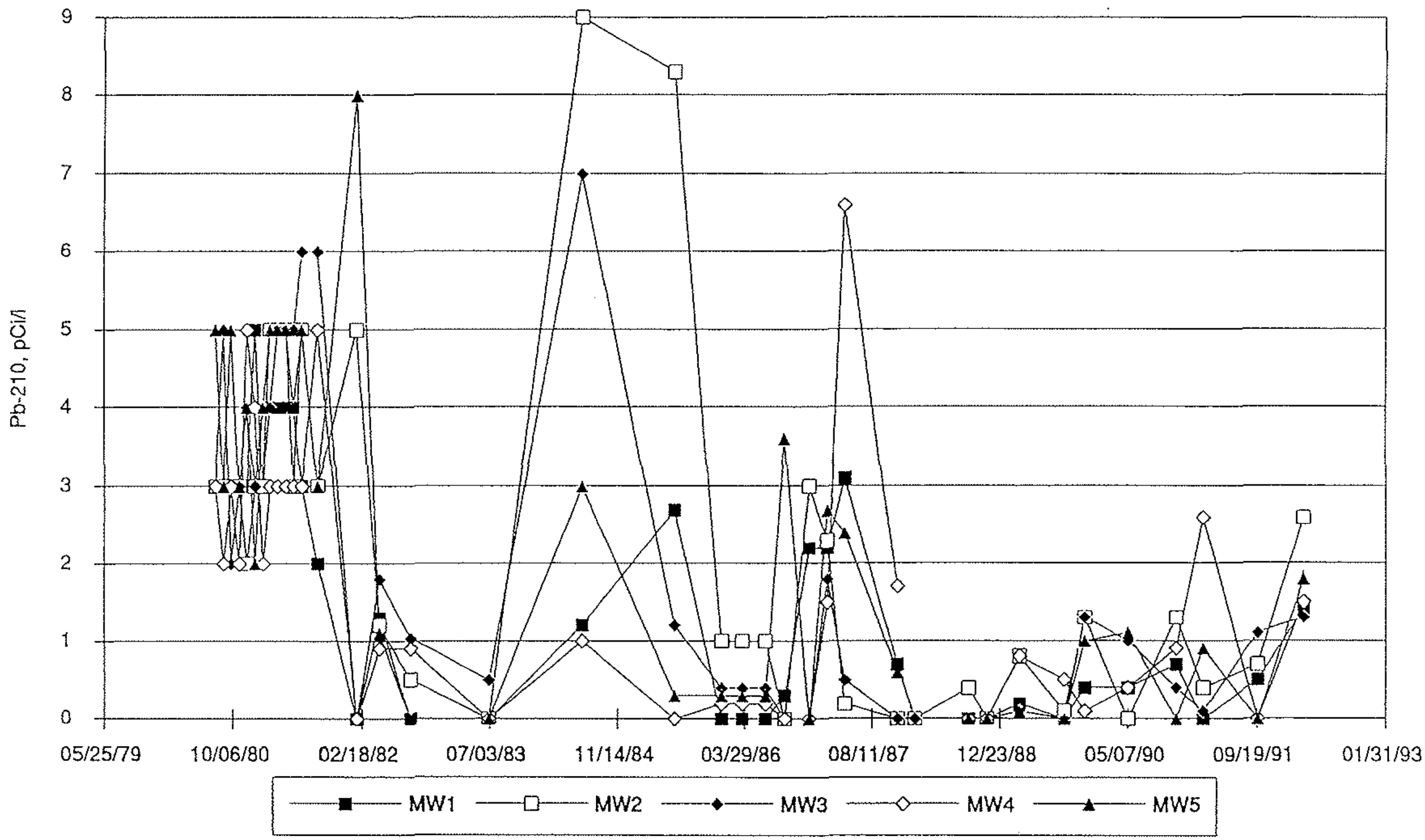
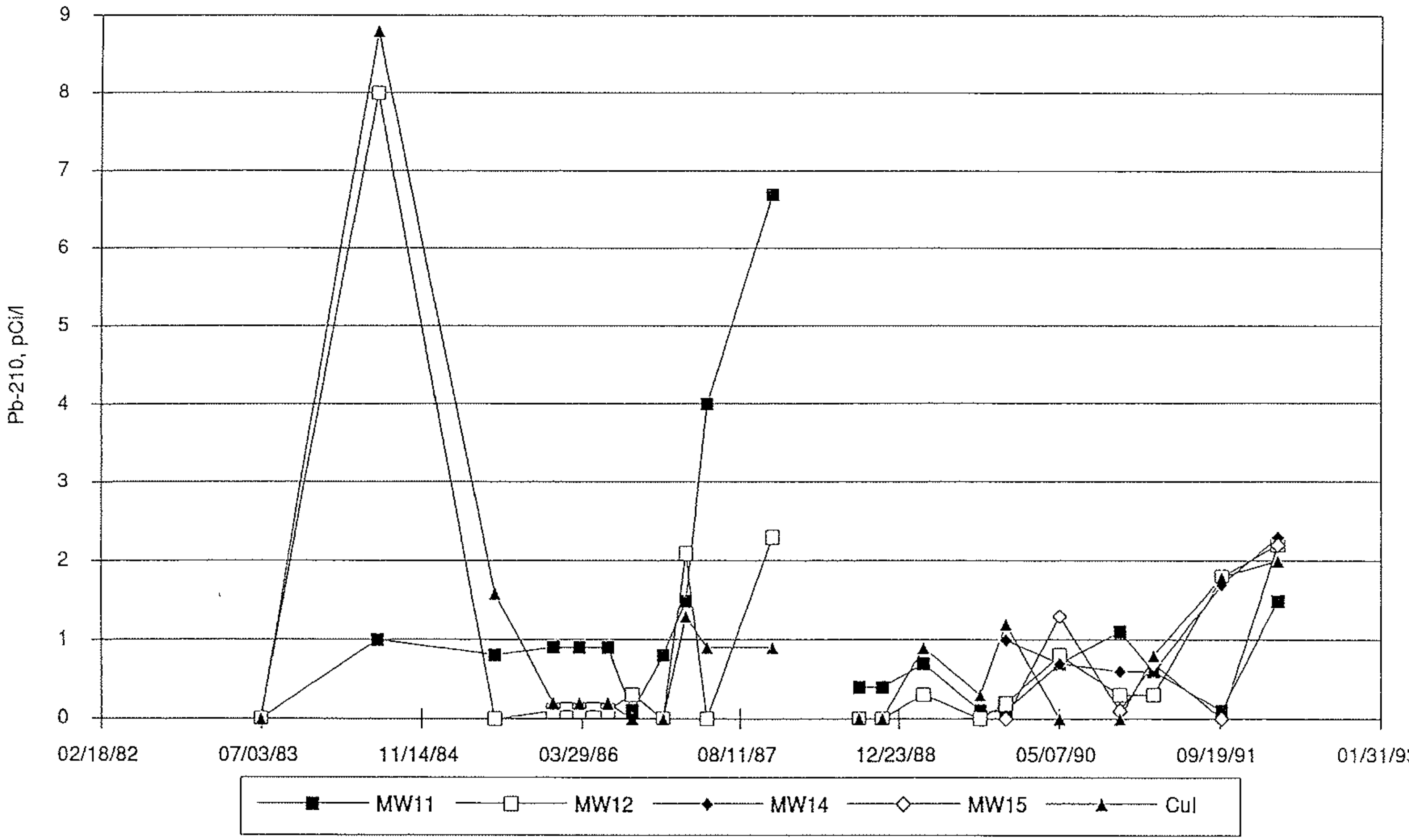
WHITE MESA MILL



UMETCO MINERALS CORPORATION
WHITE MESA MILL



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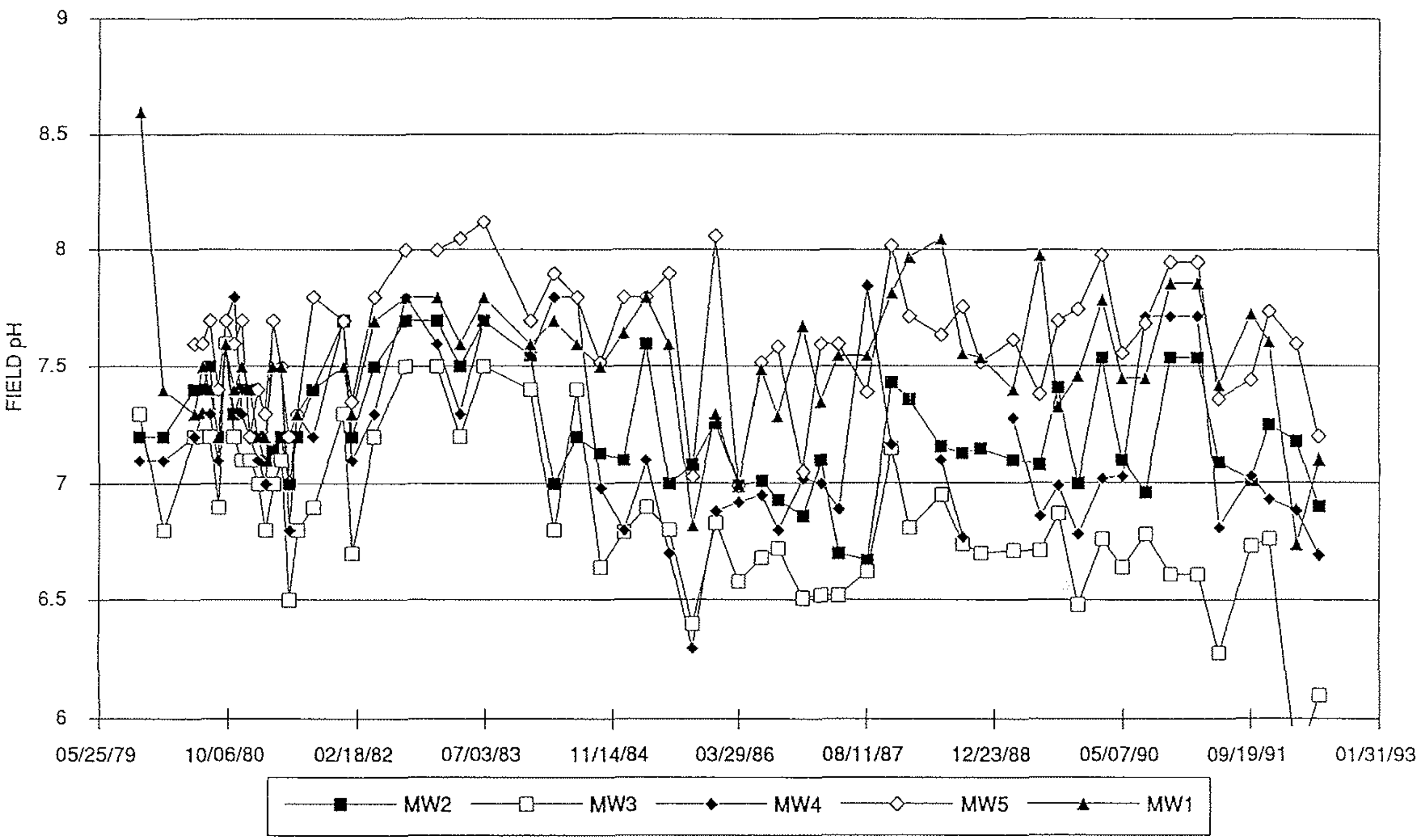
WHITE MESA MILL



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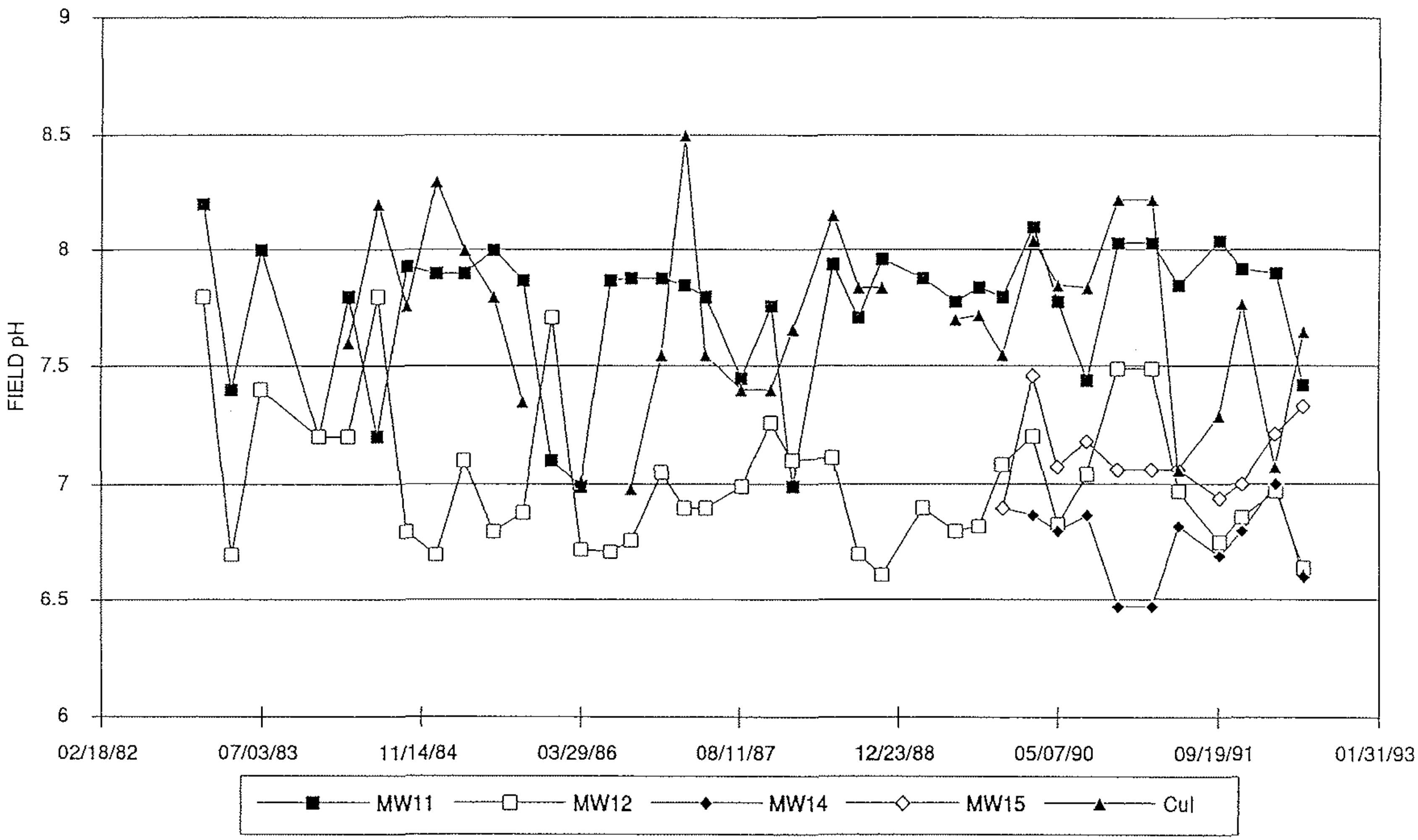
WHITE MESA MILL



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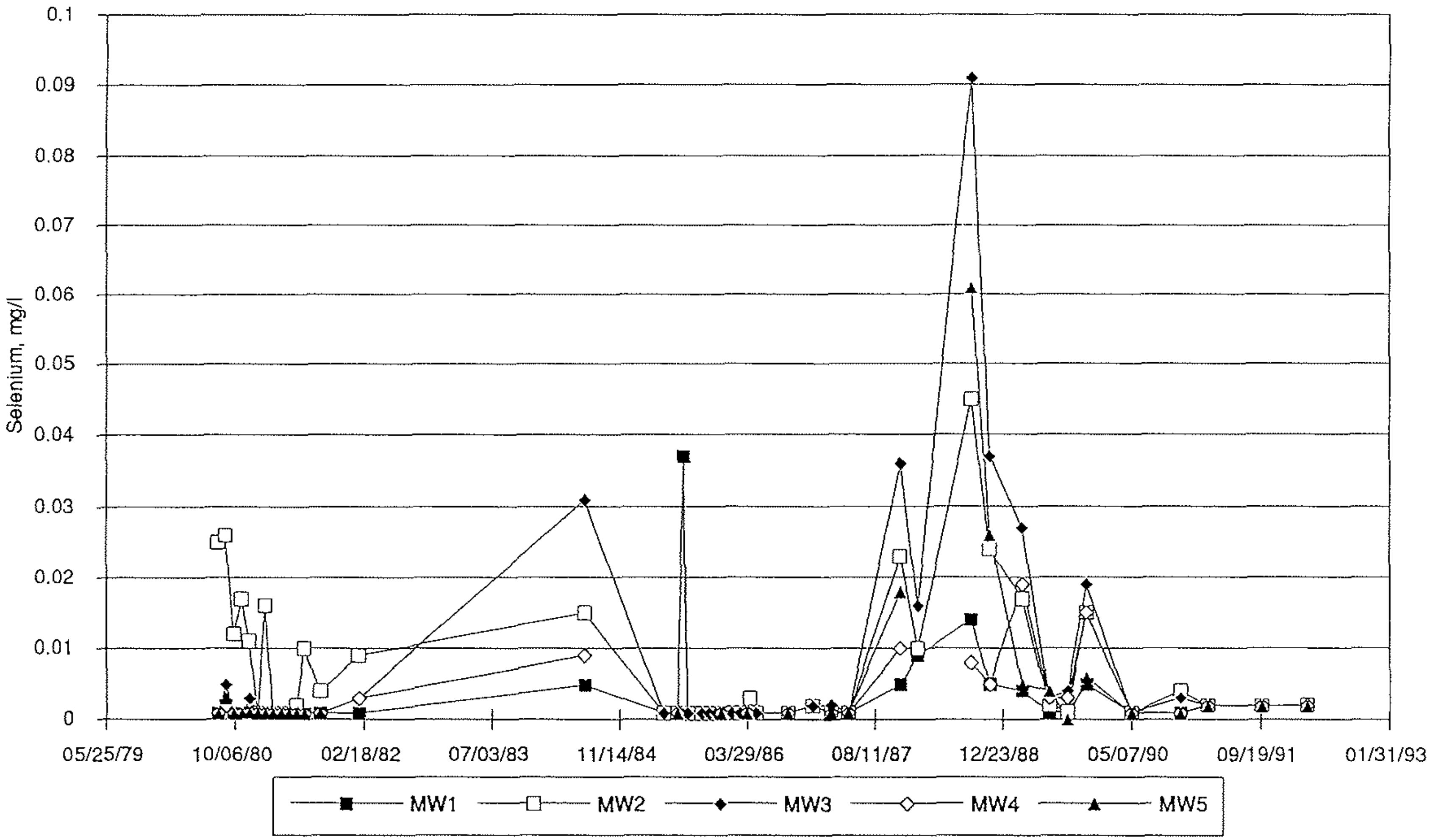
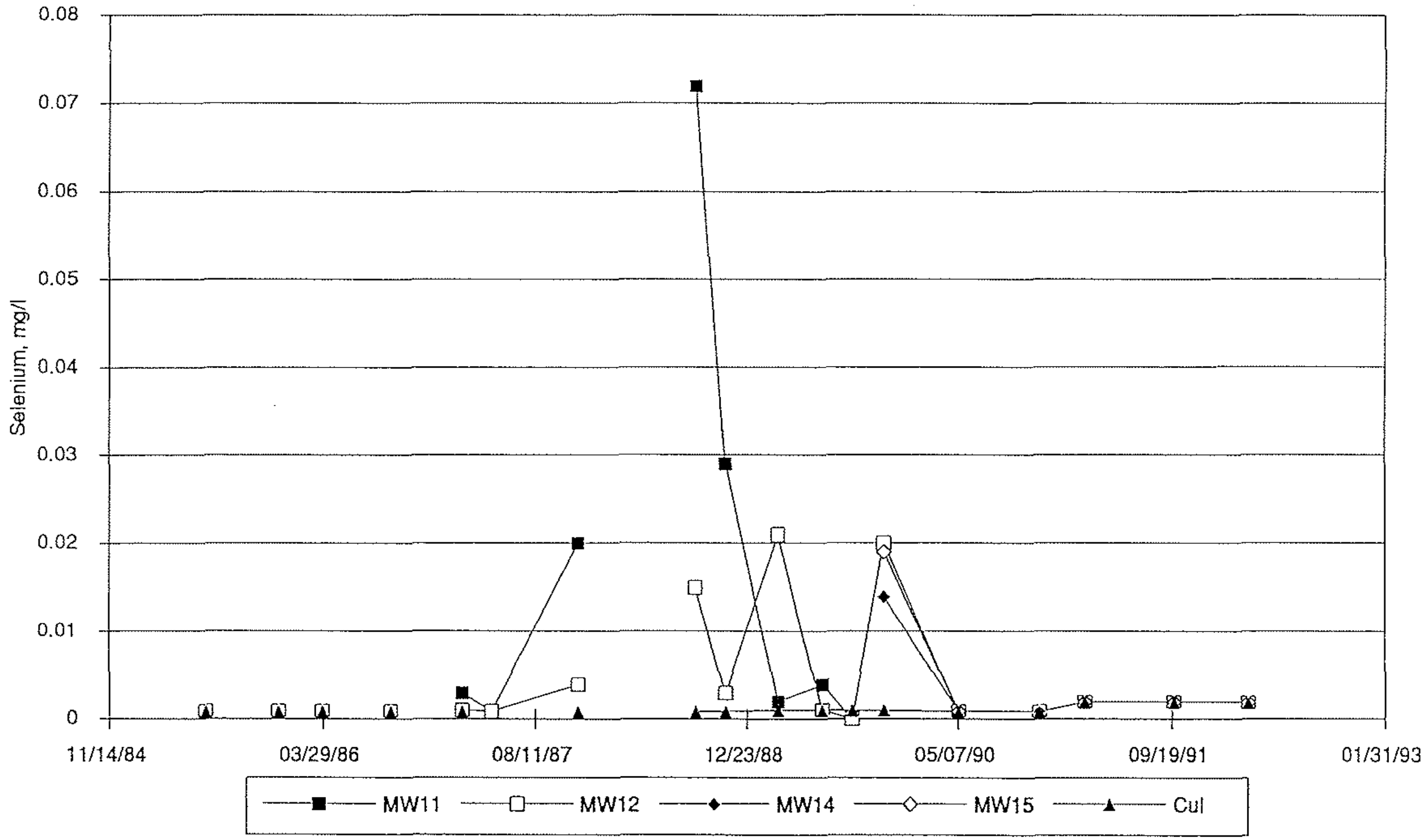
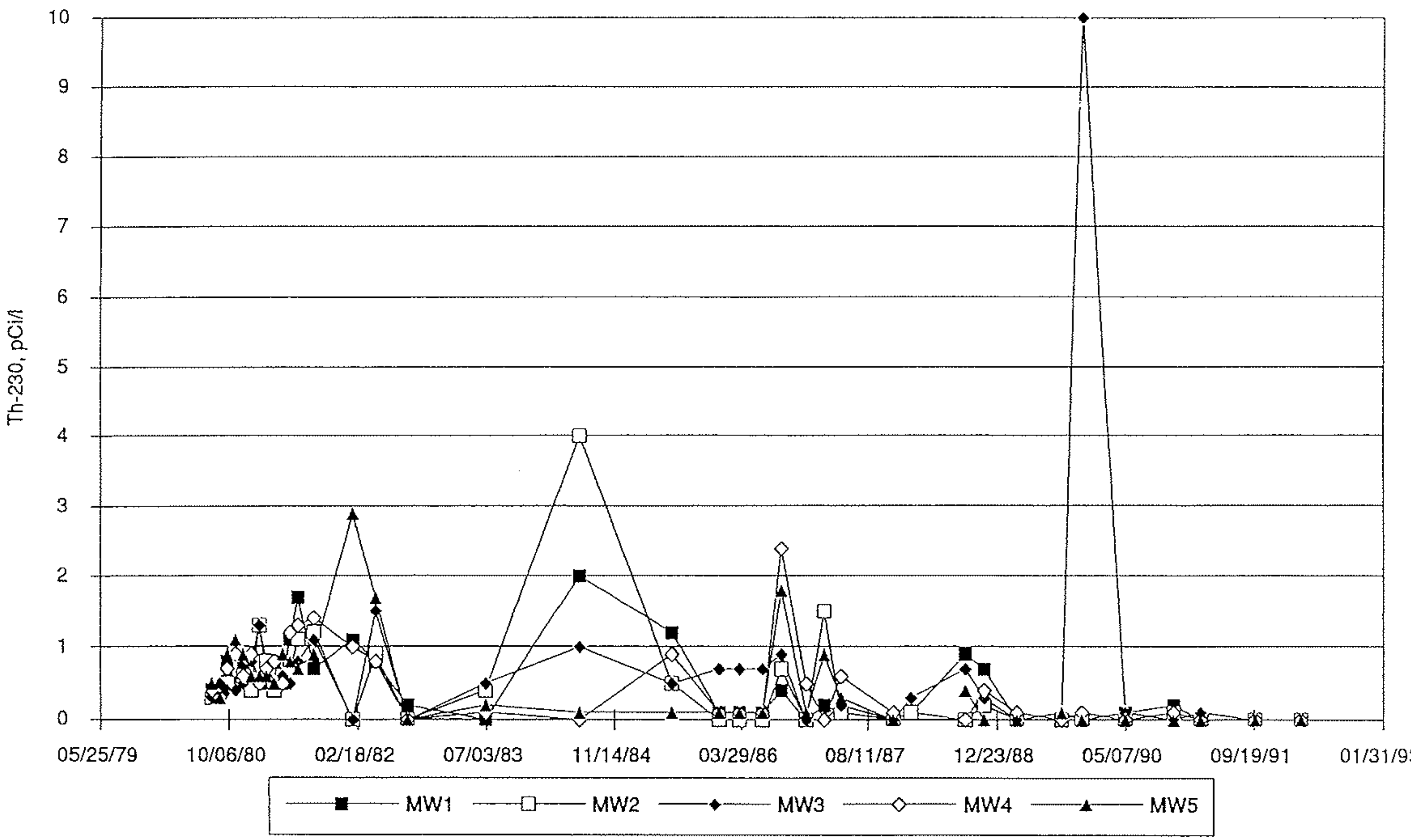
WHITE MESA MILL



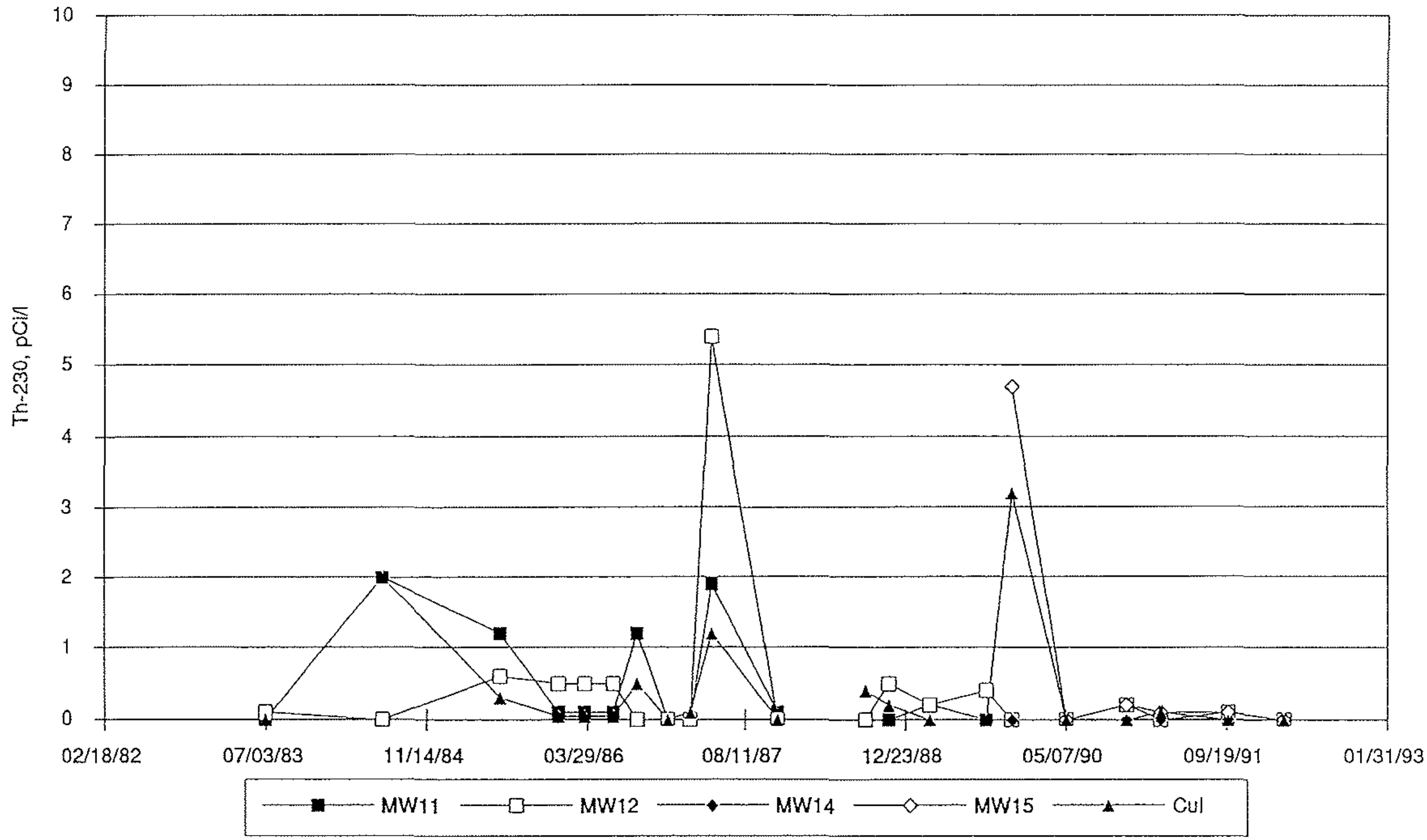
UMETCO MINERALS CORPORATION
WHITE MESA MILL



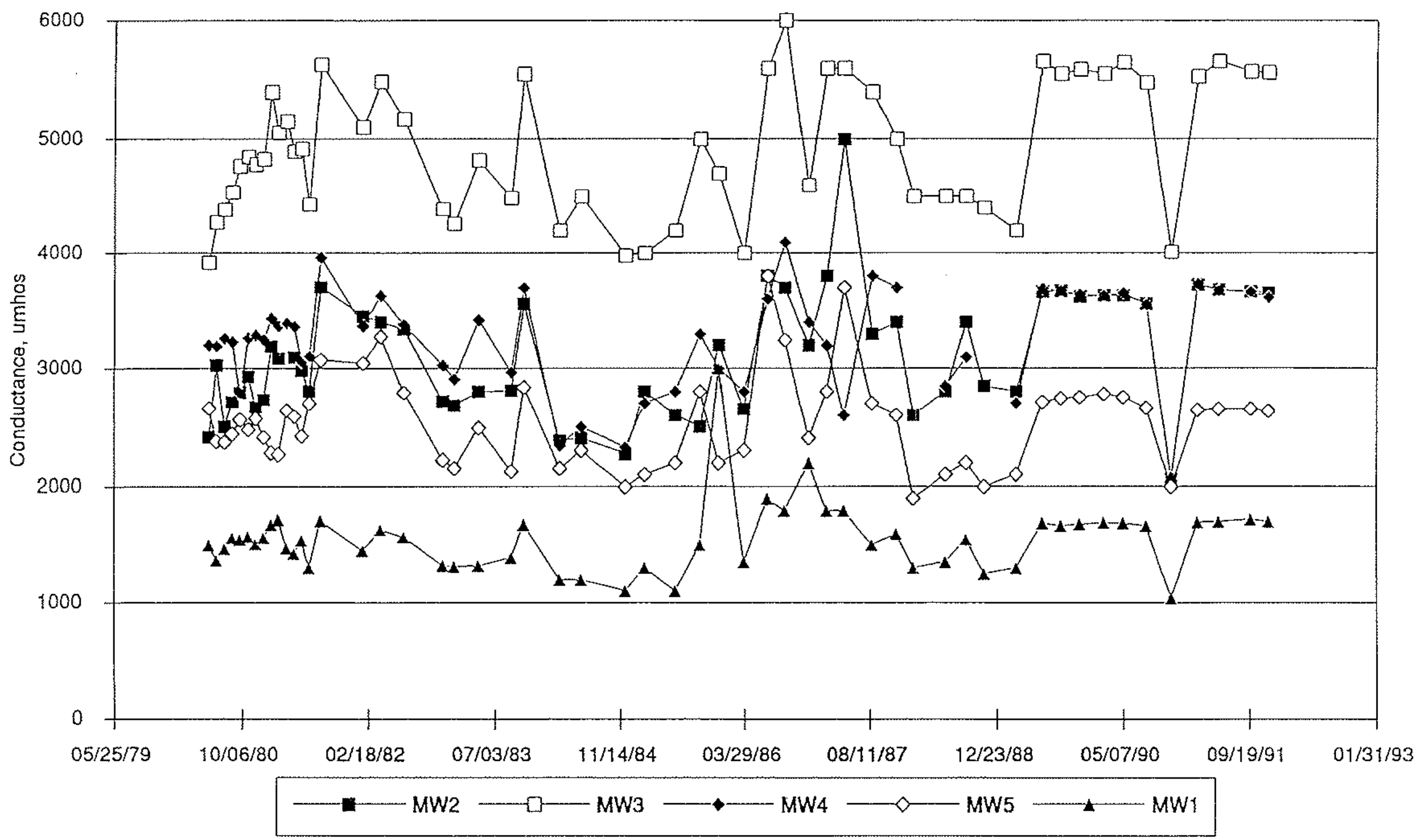
UMETCO MINERALS CORPORATION
WHITE MESA MILL



UMETCO MINERALS CORPORATION
WHITE MESA MILL



UMETCO MINERALS CORPORATION
WHITE MESA MILL



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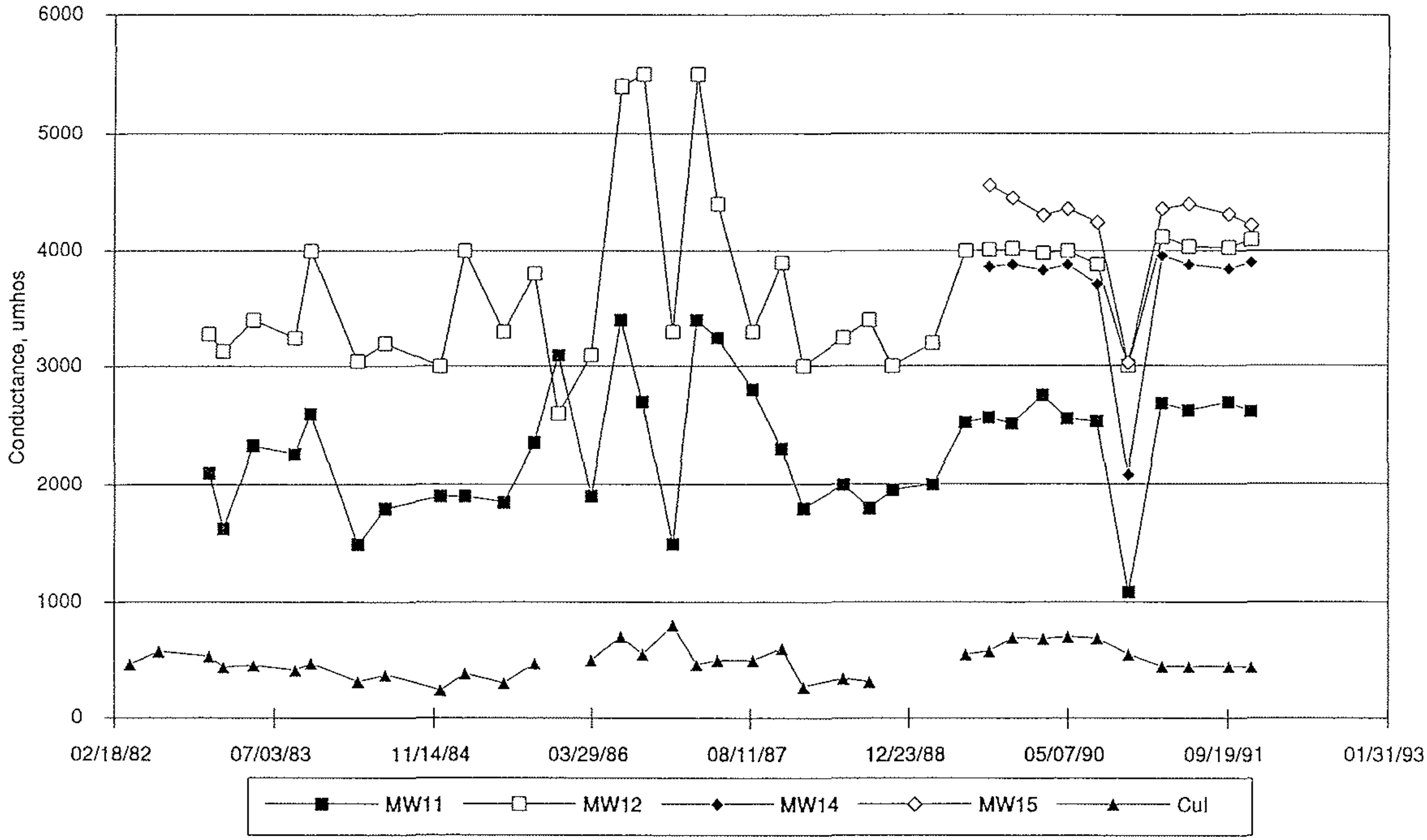
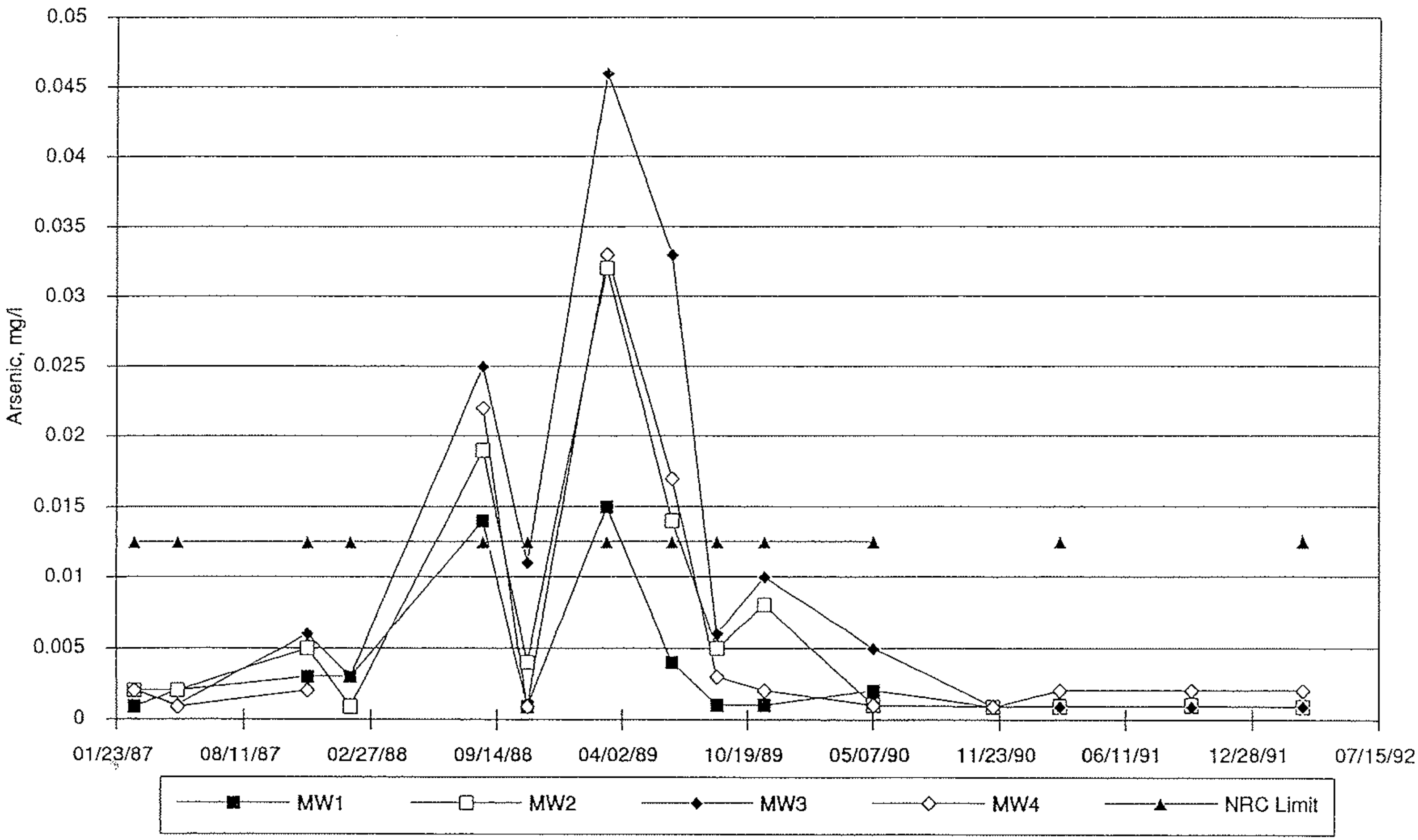
WHITE MESA MILL



UMETCO MINERALS CORPORATION
WHITE MESA MILL



APPENDIX E

STATISTICAL ANALYSES

Basic Data For White Mesa Monotor Wells
White Mesa Project
San Juan County, Utah

Well Name	DateInstalled	Total Depth	Perforations	Water Level Date	Water Level Depth (ft)	Water Level Elevation (ft-MSL)	Measuring Point Above LSD (ft)	Measuring Point Elev. (ft - MSL)
WMMW-1	Sep-79	117'	92'-112'	19/11/92	75.45	5572.77	2.0	5648.22
WMMW-2	Sep-79	128.8'	85'-125'	19/11/92	110.06	5503.43	1.8	5613.49
WMMW-3	Sep-79	98'	67'-87'	19/11/92	83.74	5471.58	2.0	5555.32
WMMW-4	Sep-79	123.6'	92'-112'	19/11/92	92.42	5530.15	1.6	5622.57
WMMW-5	May-80	136'	95.5'-133.5'	19/11/92	108.32		0.6	5609.33
WMMW-6	May-80	This well was destroyed in March 1993 during construction of Cell 3						
WMMW-7	May-80	This well was destroyed in March 1993 during construction of Cell 3						
WMMW-8	May-80	This well was destroyed in March 1993 during construction of Cell 3						
WMMW-11	Oct-82	135'	90.7'-130.4'	19/11/92	102.53	5508.55	2.4	5611.08
WMMW-12	Oct-82	130.3'	84'-124'	19/11/92	109.68	5499.77	0.9	5609.45
WMMW-13	Oct-82	116.5'	This well was destroyed in during construction of Cell 4A					
WMMW-14	Sep-89	129.1'	90'-120'	19/11/92	105.34	5491.05	0.0	5596.39
WMMW-15	Sep-89	138'	99'-129'	19/11/92	108.28	5490.34	0.8	5598.62
WMMW-16	Dec-92	91.5'	78.5'-88.5'	7/12/92	Dry		1.5	
WMMW-17	Dec-92	110'	90'-100'	11/30/92	87.46		1.5	
WMMW-18	Dec-92	148.5'	103.5'-133.5'	11/30/92	92.11		1.5	
WMMW-19	Dec-92	149'	101'-131'	10/12/92	85.00		1.5	
#9-1	May-80	33.5'	10'-30'	3/4/91	Dry		1.8	5622.83
#9-2	May-80	62.7'	39.7-59.7	3/4/91	Dry		2	5622.58
#10-2	May-80	33.5'	11.3-31.3	3/4/91	Dry		2	5633.58
#10-2	May-80	62.2'	39.2-59.2	3/4/91	Dry		2.1	5633.39

Chlorides-"T"Test
Monitor Well-MW-1

Date	Data set 1	Date	Data set 2
30-Nov-80	12	07-Aug-90	11.0
31-Dec-80	13	13-Nov-90	12.0
31-Jan-81	15	27-Feb-91	12.0
28-Feb-81	14	21-May-91	12.0
31-Mar-81	14	24-Sep-91	11.0
30-Apr-81	13	03-Dec-91	13.0
30-May-81	14	17-Mar-92	13.0
30-Jun-81	12	11-Jun-92	10.0
31-Aug-81	14	03-Sep-92	11
31-Dec-81	15	19-Nov-92	13.0

t-Test: Two-Sample Assuming Equal Variances

	Data set 1	Data set 2
Mean	13.6	11.8
Variance	1	1
Observations	10	10
Pooled Variance	1.11	
Hypothesized Mean Differenc	0.00	
df	18.00	
t	3.82	
P(T<=t) one-tail	0.00	
t Critical one-tail	1.73	
P(T<=t) two-tail	0.00	
t Critical two-tail	2.10	

Data set 1		Data set 2	
Mean	13.60	Mean	11.80
Standard Error	0.34	Standard Error	0.33
Median	14.00	Median	12.00
Mode	14.00	Mode	11.00
Standard Deviation	1.07	Standard Deviation	1.03
Variance	1.16	Variance	1.07
Kurtosis	-0.88	Kurtosis	-0.90
Skewness	-0.32	Skewness	-0.27
Range	3.00	Range	3.00
Minimum	12.00	Minimum	10.00
Maximum	15.00	Maximum	13.00
Sum	136.00	Sum	118.00
Count	10	Count	10

U-nat-"T"Test
Monitor Well-MW-1

Date	Data set 1	Date	Data set 2
30-Sep-81	2.7E-09	16-Aug-90	4.67E-10
31-Dec-81	6.5E-10	13-Nov-90	5.00E-10
31-Mar-82	6.5E-10	27-Feb-91	2.20E-10
30-Jun-82	1.4E-09	21-May-91	9.10E-10
30-Sep-82	6.8E-10	24-Sep-91	8.20E-10
31-Dec-82	6.8E-10	03-Dec-91	4.30E-10
31-Mar-83	7.4E-09	17-Mar-92	4.54E-10
30-Jun-83	6.7E-10	11-Jun-92	2.76E-09
30-Sep-83	2.3E-09	03-Sep-92	2.03E-09
31-Dec-83	2.3E-09	19-Nov-92	5.42E-10

t-Test: Two-Sample Assuming Equal Variances

	Data set 1	Data set 2
Mean	1.938E-09	9.133E-10
Variance	0	0
Observations	10	10
Pooled Variance	0.00	
Hypothesized Mean Differenc	0.00	
df	18.00	
t	1.45	
P(T<=t) one-tail	0.08	
t Critical one-tail	1.73	
P(T<=t) two-tail	0.17	
t Critical two-tail	2.10	

Data set 1		Data set 2	
Mean	1.94E-09	Mean	9.13E-10
Standard Error	6.59E-10	Standard Error	2.60E-10
Median	1.02E-09	Median	5.21E-10
Mode	6.50E-10	Mode	#N/A
Standard Deviation	2.08E-09	Standard Deviation	8.23E-10
Variance	4.35E-18	Variance	6.78E-19
Kurtosis	6.10E+00	Kurtosis	2.13E+00
Skewness	2.35E+00	Skewness	1.73E+00
Range	6.75E-09	Range	2.54E-09
Minimum	6.50E-10	Minimum	2.20E-10
Maximum	7.40E-09	Maximum	2.76E-09
Sum	1.94E-08	Sum	9.13E-09
Count	10	Count	10

Sulfates-"T"Test
Monitor Well-MW-1

Date	*Data set 1*	*Date*	*Data set 2*
31-Jan-80	520	07-Aug-90	685
30-May-80	635	13-Nov-90	687
30-Jun-80	632	27-Feb-91	662
31-Jul-80	610	21-May-91	652
31-Aug-80	612	24-Sep-91	692
30-Sep-80	640	03-Dec-91	677
31-Oct-80	570	17-Mar-92	667
30-Nov-80	613	11-Jun-92	642
31-Dec-80	620	03-Sep-92	670
31-Jan-81	638	19-Nov-92	654

t-Test: Two-Sample Assuming Equal Variances

	Data set 1	*Data set 2*
Mean	609	668.8
Variance	1400	274
Observations	10	10
Pooled Variance	836.98	
Hypothesized Mean Difference	0.00	
df	18.00	
t	-4.62	
P(T<=t) one-tail	0.00	
t Critical one-tail	1.73	
P(T<=t) two-tail	0.00	
t Critical two-tail	2.10	

Data set 1	
Mean	6.09E+02
Standard Error	1.18E+01
Median	6.17E+02
Mode	#N/A
Standard Deviation	3.74E+01
Variance	1.40E+03
Kurtosis	3.18E+00
Skewness	-1.80E+00
Range	1.20E+02
Minimum	5.20E+02
Maximum	6.40E+02
Sum	6.09E+03
Count	10

Data set 2	
Mean	6.69E+02
Standard Error	5.24E+00
Median	6.69E+02
Mode	#N/A
Standard Deviation	1.66E+01
Variance	2.74E+02
Kurtosis	-1.10E+00
Skewness	-1.29E-01
Range	5.00E+01
Minimum	6.42E+02
Maximum	6.92E+02
Sum	6.69E+03
Count	10

Chlorides-"T"Test
Monitor Well-MW-3

Date	Data set 1	Date	Data set 2
30-Nov-80	64	07-Aug-90	65.0
31-Dec-80	65	13-Nov-90	68.0
31-Jan-81	71	27-Feb-91	68.0
28-Feb-81	65	21-May-91	56.0
31-Mar-81	66	24-Sep-91	60.0
30-Apr-81	66	03-Dec-91	64.0
30-May-81	110	17-Mar-92	64.0
30-Jun-81	69	11-Jun-92	76.0
31-Aug-81	67	03-Sep-92	58
31-Dec-81	66	19-Nov-92	63.0

t-Test: Two-Sample Assuming Equal Variances

	Variable 1	Variable 2
Mean	70.9	64.2
Variance	193	33
Observations	10	10
Pooled Variance	112.81	
Hypothesized Mean Difference	0.00	
df	18.00	
t	1.41	
P(T<=t) one-tail	0.09	
t Critical one-tail	1.73	
P(T<=t) two-tail	0.18	
t Critical two-tail	2.10	

Data set 1	
Mean	70.90
Standard Error	4.39
Median	66.00
Mode	66.00
Standard Deviation	13.89
Variance	192.99
Kurtosis	9.40
Skewness	3.04
Range	46.00
Minimum	64.00
Maximum	110.00
Sum	709.00
Count	10

Data set 2	
Mean	64.20
Standard Error	1.81
Median	64.00
Mode	68.00
Standard Deviation	5.71
Variance	32.62
Kurtosis	1.02
Skewness	0.66
Range	20.00
Minimum	56.00
Maximum	76.00
Sum	642.00
Count	10

U-Nat-"T"Test
Monitor Well-MW-3

Date	*Data set 1*	*Date*	*Data set 1*
30-Sep-81	2.4E-08	16-Aug-90	1.67E-08
31-Dec-81	1.4E-08	13-Nov-90	1.60E-08
31-Mar-82	2.7E-09	27-Feb-91	8.00E-09
30-Jun-82	2.4E-08	21-May-91	1.30E-08
30-Sep-82	8.9E-09	24-Sep-91	2.20E-08
31-Dec-82	2.5E-08	03-Dec-91	8.10E-09
31-Mar-83	1.0E-08	17-Mar-92	4.53E-09
30-Jun-83	2.0E-08	11-Jun-92	9.13E-09
30-Sep-83	1.4E-08	03-Sep-92	1.9E-08
31-Dec-83	2.8E-08	19-Nov-92	1.12E-08

t-Test: Two-Sample Assuming Equal Variances

	Data set 1	*Data set 2*
Mean	1.706E-08	1.277E-08
Variance	0	0
Observations	10	10
Pooled Variance	0.00	
Hypothesized Mean Difference	0.00	
df	18.00	
t	1.35	
P(T<=t) one-tail	0.10	
t Critical one-tail	1.73	
P(T<=t) two-tail	0.19	
t Critical two-tail	2.10	

Data set 1		*Data set 1*	
Mean	1.71E-08	Mean	1.28E-08
Standard Error	2.64E-09	Standard Error	1.76E-09
Median	1.70E-08	Median	1.21E-08
Mode	2.40E-08	Mode	#N/A
Standard Deviation	8.36E-09	Standard Deviation	5.56E-09
Variance	6.99E-17	Variance	3.09E-17
Kurtosis	-1.09E+00	Kurtosis	-9.33E-01
Skewness	-3.35E-01	Skewness	2.46E-01
Range	2.53E-08	Range	1.75E-08
Minimum	2.70E-09	Minimum	4.53E-09
Maximum	2.80E-08	Maximum	2.20E-08
Sum	1.71E-07	Sum	1.28E-07
Count	10	Count	10

Sulfates-"T"Test
Monitor Well-MW-3

Date	Data set 1	Date	Data set 2
1/30/80	2100	11/3/88	3410
5/30/80	2430	3/9/89	3410
6/30/80	2625	6/21/89	3500
7/31/80	2450	9/1/89	3500
8/31/80	2975	11/15/89	2670
9/30/80	2800	2/20/90	3330
10/31/80	3050	5/8/90	3480
11/30/80	2750	8/7/90	3400
12/31/80	3068	11/13/90	3468
1/31/81	3012	2/27/91	2712

t-Test: Paired Two-Sample for Means

	Data set 1	Data set 2
Mean	2726	3288
Variance	104184	101881
Observations	10	10
Pearson Correlation	-0.41	
Pooled Variance	-42384.67	
Hypothesized Mean Differen	0.00	
df	9.00	
t	-3.30	
P(T<=t) one-tail	0.00	
t Critical one-tail	1.83	
P(T<=t) two-tail	0.01	
t Critical two-tail	2.26	

Data set 1	
Mean	2726.00
Standard Err	102.07
Median	2775.00
Mode	#N/A
Standard Dev	322.78
Variance	104184.22
Kurtosis	-0.27
Skewness	-0.74
Range	968.00
Minimum	2100.00
Maximum	3068.00
Sum	27260.00
Count	10

Data set 2	
Mean	3288.00
Standard Error	100.94
Median	3410.00
Mode	#N/A
Standard Deviation	319.19
Variance	101880.89
Kurtosis	1.19
Skewness	-1.67
Range	830.00
Minimum	2670.00
Maximum	3500.00
Sum	32880.00
Count	10

Chlorides-"T"Test
Monitor Well-MW-5

Date	Data set 1	Date	Data set 2
30-Nov-80	64	07-Aug-90	49
31-Dec-80	65	13-Nov-90	52
31-Jan-81	71	27-Feb-91	53
28-Feb-81	65	21-May-91	54
31-Mar-81	66	24-Sep-91	55
30-Apr-81	66	03-Dec-91	53
30-May-81	110	17-Mar-92	53
30-Jun-81	69	11-Jun-92	53
31-Aug-81	67	03-Sep-92	52
31-Dec-81	66	19-Nov-92	20

t-Test: Two-Sample Assuming Equal Variances

	Variable 1	Variable 2
Mean	70.9	49.4
Variance	193	109
Observations	10	10
Pooled Variance	151.07	
Hypothesized Mean Difference	0.00	
df	18.00	
t	3.91	
P(T<=t) one-tail	0.00	
t Critical one-tail	1.73	
P(T<=t) two-tail	0.00	
t Critical two-tail	2.10	

Data set 1	
Mean	70.90
Standard Error	4.39
Median	66.00
Mode	66.00
Standard Deviation	13.89
Variance	192.99
Kurtosis	9.40
Skewness	3.04
Range	46.00
Minimum	64.00
Maximum	110.00
Sum	709.00
Count	10

Data set 2	
Mean	49.40
Standard Error	3.30
Median	53.00
Mode	53.00
Standard Deviation	10.45
Variance	109.16
Kurtosis	9.39
Skewness	-3.03
Range	35.00
Minimum	20.00
Maximum	55.00
Sum	494.00
Count	10

U-Nat-"T"Test
Monitor Well-MW-5

Date	Data set 1	Date	Data set 2
30-Sep-81	1.4E-08	16-Aug-90	6.00E-10
31-Dec-81	3.0E-09	13-Nov-90	3.00E-10
31-Mar-82	6.8E-10	27-Feb-91	2.70E-10
30-Jun-82	2.7E-09	21-May-91	1.10E-09
30-Sep-82	6.7E-10	24-Sep-91	8.00E-10
31-Dec-82	6.7E-10	03-Dec-91	5.30E-10
31-Mar-83	8.0E-10	17-Mar-92	1.60E-09
30-Jun-83	6.7E-10	11-Jun-92	2.00E-10
30-Sep-83	5.6E-09	03-Sep-92	4.06E-09
31-Dec-83	6.8E-10	19-Nov-92	6.77E-10

t-Test: Two-Sample Assuming Equal Variances

	Data set 1	Data set 2
Mean	2.897E-09	1.014E-09
Variance	0	0
Observations	10	10
Pooled Variance	0.00	
Hypothesized Mean Difference	0.00	
df	18.00	
t	1.41	
P(T<=t) one-tail	0.09	
t Critical one-tail	1.73	
P(T<=t) two-tail	0.18	
t Critical two-tail	2.10	

Data set 1	
Mean	2.90E-09
Standard Error	1.29E-09
Median	7.40E-10
Mode	6.70E-10
Standard Deviation	4.07E-09
Variance	1.65E-17
Kurtosis	5.90E+00
Skewness	2.37E+00
Range	1.28E-08
Minimum	6.70E-10
Maximum	1.35E-08
Sum	2.90E-08
Count	10

Data set 2	
Mean	1.01E-09
Standard Error	3.64E-10
Median	6.39E-10
Mode	#N/A
Standard Deviation	1.15E-09
Variance	1.32E-18
Kurtosis	6.53E+00
Skewness	2.45E+00
Range	3.86E-09
Minimum	2.00E-10
Maximum	4.06E-09
Sum	1.01E-08
Count	10

Chlorides-"T"Test
Monitor Well-MW-11

Date	Data set 1	Date	Data set 2
31-Mar-84	31.4	07-Aug-90	33.0
30-Jun-84	32.0	13-Nov-90	34.0
30-Sep-84	33.9	27-Feb-91	31.0
31-Dec-84	31.9	21-May-91	30.0
31-Mar-85	34.0	24-Sep-91	30.0
30-Jun-85	31.0	03-Dec-91	31.0
30-Sep-85	38.0	17-Mar-92	32.0
31-Dec-85	71.0	11-Jun-92	29.0
19-Jun-86	77.0	03-Sep-92	31
30-Jun-86	70.0	19-Nov-92	41.0

t-Test: Two-Sample Assuming Equal Variances

	Data set 1	Data set 2
Mean	45.016	32.2
Variance	371	12
Observations	10	10
Pooled Variance	191.46	
Hypothesized Mean Difference	0.00	
df	18.00	
t	2.07	
P(T<=t) one-tail	0.03	
t Critical one-tail	1.73	
P(T<=t) two-tail	0.05	
t Critical two-tail	2.10	

Data set 1	
Mean	45.02
Standard Error	6.09
Median	33.93
Mode	#N/A
Standard Deviation	19.27
Variance	371.19
Kurtosis	-1.08
Skewness	1.03
Range	46.00
Minimum	31.00
Maximum	77.00
Sum	450.16
Count	10

Data set 2	
Mean	32.20
Standard Error	1.08
Median	31.00
Mode	31.00
Standard Deviation	3.43
Variance	11.73
Kurtosis	5.44
Skewness	2.17
Range	12.00
Minimum	29.00
Maximum	41.00
Sum	322.00
Count	10

U-Nat-"T"Test
Monitor Well-MW-11

Date	Data set 1	Date	Data set 2
31-Mar-84	7.45E-09	07-Aug-90	4.67E-10
30-Jun-84	2.71E-09	13-Nov-90	6.00E-10
30-Sep-84	4.06E-10	27-Feb-91	2.00E-10
31-Dec-84	1.76E-09	21-May-91	2.30E-10
31-Mar-85	2.71E-10	24-Sep-91	7.40E-10
30-Jun-85	2.98E-10	03-Dec-91	2.40E-10
30-Sep-85	8.80E-09	17-Mar-92	2.70E-09
31-Dec-85	5.00E-10	11-Jun-92	2.00E-10
19-Jun-86	1.70E-09	03-Sep-92	3.39E-09
30-Jun-86	1.50E-09	19-Nov-92	3.18E-09

t-Test: Two-Sample Assuming Equal Variances

	Data set 1	Data set 2
Mean	2.54E-09	1.195E-09
Variance	0	0
Observations	10	10
Pooled Variance	0.00	
Hypothesized Mean Difference	0.00	
df	18.00	
t	1.27	
P(T<=t) one-tail	0.11	
t Critical one-tail	1.73	
P(T<=t) two-tail	0.22	
t Critical two-tail	2.10	

Data set 1	
Mean	2.54E-09
Standard Error	9.70E-10
Median	1.60E-09
Mode	#N/A
Standard Deviation	3.07E-09
Variance	9.40E-18
Kurtosis	1.12E+00
Skewness	1.54E+00
Range	8.53E-09
Minimum	2.71E-10
Maximum	8.80E-09
Sum	2.54E-08
Count	10

Data set 2	
Mean	1.19E-09
Standard Error	4.21E-10
Median	5.34E-10
Mode	2.00E-10
Standard Deviation	1.33E-09
Variance	1.77E-18
Kurtosis	-9.99E-01
Skewness	1.02E+00
Range	3.19E-09
Minimum	2.00E-10
Maximum	3.39E-09
Sum	1.19E-08
Count	10

Chlorides-"T"Test
Monitor Well-MW-12

Date	Data set 1	Date	Data set 2
31-Dec-82	57.4	07-Aug-90	63.0
25-Jan-83	70	13-Nov-90	63.0
30-Jun-83	80.5	27-Feb-91	61.0
31-Dec-83	65	21-May-91	55.0
31-Mar-84	64.1	24-Sep-91	59.0
30-Jun-84	65.0	03-Dec-91	60.0
30-Sep-84	64.6	17-Mar-92	60.0
31-Dec-84	67.4	11-Jun-92	56.0
31-Mar-85	67.0	03-Sep-92	56
30-Jun-85	62.0	19-Nov-92	62.0

t-Test: Two-Sample Assuming Equal Variances

	Variable 1	Variable 2
Mean	66.301	59.5
Variance	36	9
Observations	10	10
Pooled Variance	22.46	
Hypothesized Mean Difference	0.00	
df	18.00	
t	3.21	
P(T<=t) one-tail	0.00	
t Critical one-tail	1.73	
P(T<=t) two-tail	0.00	
t Critical two-tail	2.10	

Data set 1	
Mean	66.30
Standard Error	1.90
Median	65.00
Mode	65.00
Standard Deviation	6.02
Variance	36.20
Kurtosis	3.57
Skewness	1.35
Range	23.10
Minimum	57.40
Maximum	80.50
Sum	663.01
Count	10

Data set 2	
Mean	59.50
Standard Error	0.93
Median	60.00
Mode	63.00
Standard Deviation	2.95
Variance	8.72
Kurtosis	-1.31
Skewness	-0.39
Range	8.00
Minimum	55.00
Maximum	63.00
Sum	595.00
Count	10

U Nat-"T"Test
Monitor Well-MW-12

Date	Data set 1	Date	Data set 2
31-Mar-83	5.0E-09	07-Aug-90	1.07E-08
30-Jun-83	2.0E-09	13-Nov-90	1.00E-08
30-Sep-83	1.1E-08	27-Feb-91	8.80E-09
31-Dec-83	1.0E-08	21-May-91	1.00E-08
31-Mar-84	2.91E-08	24-Sep-91	1.10E-08
30-Jun-84	1.83E-08	03-Dec-91	6.80E-09
30-Sep-84	4.06E-10	17-Mar-92	1.01E-08
31-Dec-84	1.62E-09	11-Jun-92	5.53E-09
31-Mar-85	4.74E-10	03-Sep-92	1.29E-08
30-Jun-85	6.80E-09	19-Nov-92	1.39E-08

t-Test: Two-Sample Assuming Equal Variances

	Data set 1	Data set 2
Mean	8.47E-09	9.973E-09
Variance	0	0
Observations	10	10
Pooled Variance	0.00	
Hypothesized Mean Difference	0.00	
df	18.00	
t	-0.50	
P(T<=t) one-tail	0.31	
t Critical one-tail	1.73	
P(T<=t) two-tail	0.62	
t Critical two-tail	2.10	

Data set 1		Data set 2	
Mean	8.47E-09	Mean	9.97E-09
Standard Error	2.91E-09	Standard Error	7.94E-10
Median	5.90E-09	Median	1.01E-08
Mode	#N/A	Mode	1.00E-08
Standard Deviation	9.21E-09	Standard Deviation	2.51E-09
Variance	8.48E-17	Variance	6.31E-18
Kurtosis	1.81E+00	Kurtosis	7.89E-02
Skewness	1.44E+00	Skewness	-2.99E-01
Range	2.87E-08	Range	8.37E-09
Minimum	4.06E-10	Minimum	5.53E-09
Maximum	2.91E-08	Maximum	1.39E-08
Sum	8.47E-08	Sum	9.97E-08
Count	10	Count	10