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THE HYDROGEOLOGY IN THE VICINITY OF CYPRUS TONOPAH MINING BIG SMOKY VALLEY, NYE COUNTY, NEVADA

March 5, 1991

Project No. 91-542

Prepared for:

CYPRUS TONOPAH MINING, INC.

WILLIAM E. NORK, Inc.

Reno, Nevada 89503

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1.Ø SUMMARY AND CONCLUSIONS

1. The principal aquifer in the vicinity of Cyprus Tonopah Mining comprises as much as 3,ØØØ feet of alluvial deposits. The transmissivity of this hydrostratigraphic unit is greater than 1ØØ,ØØØ gpd/ft. The coefficient of storage is Ø.ØØ65 which suggests vertical anisotropy or a degree of confinement.

2. Under natural conditions, ground-water flow beneath the tailings impoundment is to the south at a rate of approximately 17Ø feet per year. Withdrawals of approximately 6,ØØØ AFA by the mine's production wells has created a trough of depression in the piezometric surface of the aquifer surrounding the well field. This has altered the natural ground-water flow paths. Under operating conditions, ground-water velocity in the immediate vicinity of the tailings impoundment increases to a maximum of more than 5ØØ feet per year and converges on the well field.

3. The depth to ground water beneath the tailings impoundment ranges from approximately 5ØØ to 7ØØ feet below land surface. The vertical unsaturated hydraulic conductivity of these deposits ranges from Ø.Ø6 to Ø.ØØ25 ft/day (2 x 1ØE-5 to 9 x E1Ø-7 cm/sec). Assuming these values, the time for fluids released at the surface to reach the water table ranges from three to 8Ø years.

4. Ground water in the alluvial aquifer is a sodium-potassium-bicarbonate type. Total dissolved solids is approximately 3ØØ mg/l and the water meets all State of Nevada and Federal Drinking Water Standards. By comparison, tailings water is a mixed-anion-sulfate water type with a TDS of approximately 7ØØ mg/l. Except for fluoride, the tailings water also meets drinking water standards.

5. The mine's production wells nearest to the tailings impoundment have the potential to intercept any fluids released into the aquifer. However, because of dilution in the well bore by ambient ground water and little contrast between the ground water and tailings fluids, releases will be difficult but not impossible to detect and discern.

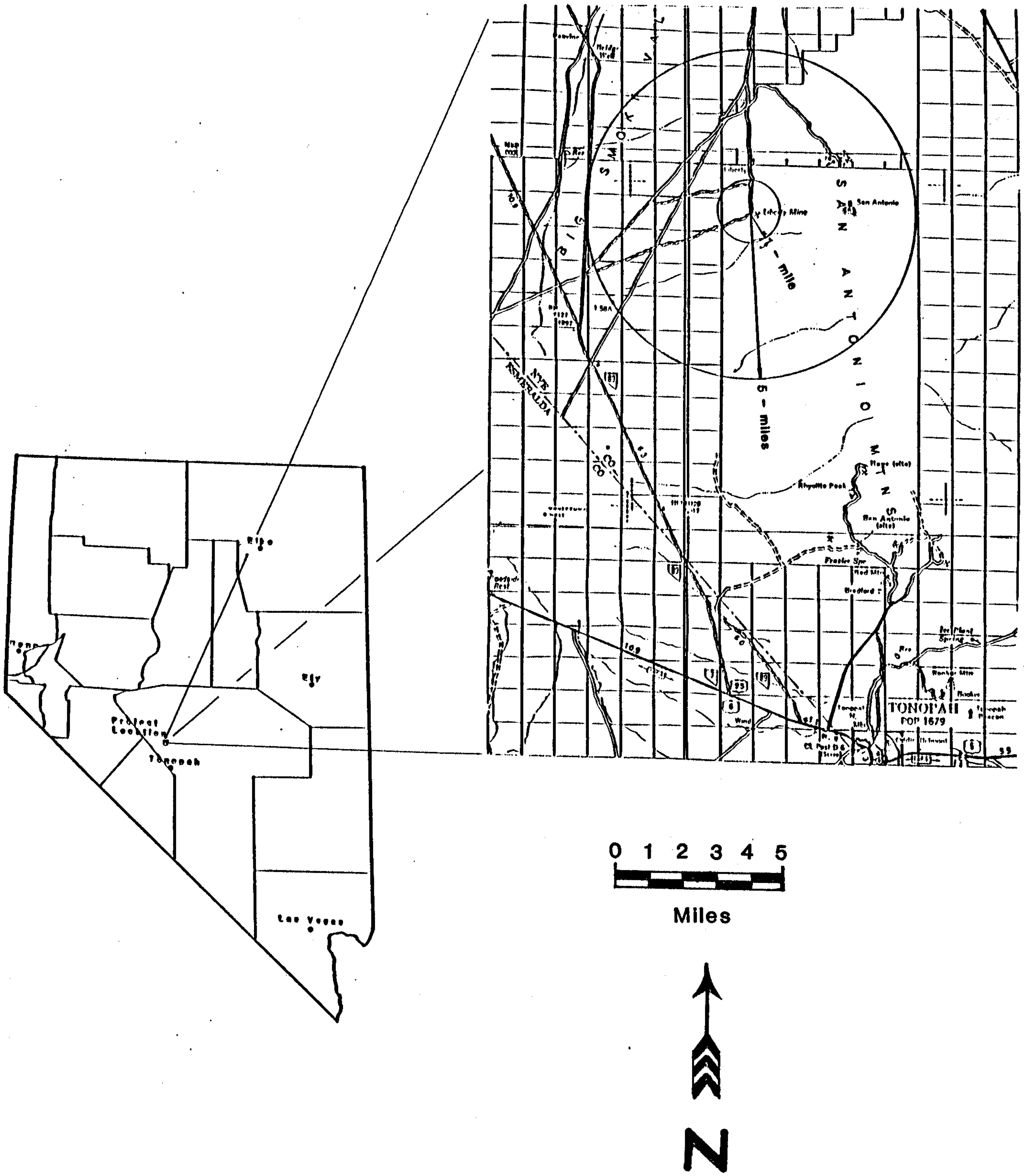


Figure 1. Project reference map.

3.0 HYDROGEOLOGY

3.1 GROUNDWATER HYDROGEOLOGY

CYPRUS Tonopah Mining is located within the Tonopah Flat Hydrographic Basin. This 1,600 square mile area represents slightly more than the southern half of Big Smoky Valley. Tonopah Flat is bordered by the Toiyabe Range to the north, the San Antonio Mountains to the east, and the Cedar Mountains and Monte Cristo Mountains to the west. Elevation within the basin varies from less than 4,700 feet on the valley floor southwest of the mine to nearly 11,000 feet in the Toiyabe Range. Precipitation ranges from four to seven inches on the valley floor to more than 20 inches in the mountains to the north (Rush and Schroer, 1970). Average annual potential evaporation in the vicinity of the mine is approximately 56 inches (State of Nevada, 1972).

The average ground-water recharge to Tonopah Flat that can be expected on an annual basis is estimated at between 14,000 and 15,000 acre-feet per year (AFA) (Rush and Schroer, 1970). Approximately 11,000 AFA originates in the Toiyabe Range, 2,000 to 3,000 AFA originates as underflow from the northwest in the alluvial deposits from Ione Valley, and 1,300 AFA originates from other areas, principally the San Antonio Mountains. Of this total, it is estimated that as much as 12,500 AFA passes through the alluvial aquifer beneath the project and its environs (Hydro-Search, 1975b).

Of the total basin area, approximately 900 square miles are underlain by valley-fill alluvial deposits. The remainder (700 square miles), comprises bedrock in the highlands which rim the basin. The maximum thickness of the alluvial deposits near the project is estimated at 2,000 to 3,000 feet along a north-trending axis positioned one to two miles west of the project, thinning toward the margin of the basin (Rush and Schroer, 1970). Immediately beneath the tailings dam, the thickness varies from approximately 800 feet to more than 1,600 feet. The valley fill, at least in the vicinity of the project, is bounded on the east by a fault, with the valley floor down-thrown relative to the consolidated rocks which make up the San Antonio Mountains. As opposed to a single range-front fault, a series of buried en echelon faults may be present on the basis of interpretations of aquifer stress test results and geophysical data (see below).

The alluvial aquifer in the vicinity of the project is highly transmissive. On the basis of data from two controlled aquifer stress tests performed in production wells at the mine, the transmissivity was determined to be more than 100,000 gpd/ft (gallons per day per foot width of aquifer; ESA, 1982 and Hydro-Search, INC.; 1975b). The coefficient of storage was determined to be 0.0065 (ESA, 1982) which is representative of semi-confined conditions.

Table 1. Hydraulic characteristics of the alluvial aquifer in the vicinity of CYPRUS Tonopah Mining, Big Smoky Valley, Nevada.

Well Test	Transmissivity (gpd/ft)	Coeff. of Storage	Remarks
RH-142	53,000[a]	--	1. Value influenced by partial penetration boundary or negative boundary.
	123,000[b]	--	2. Value adjusted for partial penetration effects.
PW-9	113,000[c]	0.0065	3. Negative boundary.

References: a. Hydro-Search, Inc.; 1975a.
b. Hydro-Search, Inc.; 1975b.
c. ESA, 1982.

The hydraulic characteristics of the aquifer listed above are consistent with observations made during drilling of the production water supply wells for the mine. That is, the high transmissivity can be accounted for by a large saturated thickness of very coarse, permeable alluvial deposits penetrated by the well bores. Also, the semi-confined nature of the aquifer is consistent with the presence of silty and clayey beds or lenses which would be expected to impede vertical movement of ground water, thereby providing a degree of vertical anisotropy or confinement.

Ground water is present at a substantial depth beneath the project area. Within the well field, located on the alluvial fan a few hundred feet west of the tailings dam, ground water ranges from 470 to 599 feet below land surface. Approximately two miles west of the well field the depth to water decreases to less than 300 feet. The piezometric surface within the area of investigation, then, represents a subdued version of the land surface where the depth to water is shallowest near the axis of the valley and increases toward the highlands along its margins. Extrapolating the hydraulic gradient (west of the well field) toward the east indicates that the depth to ground water beneath the tailings impoundment is approximately 500 to 700 feet.

The hydraulic gradient increases abruptly between the well field and the range front to the east. This change is interpreted as a consequence of a substantial decrease in the transmissivity of the aquifer materials in this area and is probably related to the negative boundary which was identified as a result of the testing of PW-9. This negative boundary is most likely a fault which displaces the highly transmissive alluvial deposits against the less permeable consolidated rocks which make up the San Antonio Mountains.

There is supporting evidence for a fault in this area. The proposed location shown in Plate I and Figure 2 lines up with north trending faults which have been mapped north and south of the project (Hydro-Search, 1975b). The suspected fault probably is an extension of these faults and connects them. Moreover, we interpret a relatively steep gravity gradient in this area (Erwin, 1965) as evidence of a buried fault.

There are few data regarding the hydrologic properties of the geologic materials which make up the San Antonio Mountains east of the tailings impoundment. On the basis of aquifer testing of the consolidated rocks north of Tonopah by WEN, INC. for unrelated consulting projects, the transmissivity of the rocks is believed to be at least one order of magnitude less than that of the alluvial aquifer.

Figure 2 is a hydrogeologic cross section oriented roughly east-west through the project which serves to illustrate the points discussed above.

Ground water passing beneath the study area originates primarily in the Toiyabe Range to the north and is discharged to the southwest. Therefore, the general direction of ground-water flow within Tonopah Flat is from north to south. This is true in the alluvial deposits beneath and in the immediate vicinity of the tailings impoundment. A relatively small component of recharge from the San Antonio Mountains exerts some influence on ground-water flow in the tailings impoundment area, deflecting the flow lines toward the west. Down gradient of the study area, ground water flow gradually changes direction as it moves toward the discharge area(s) southwest of Millers.

3.2 NUMERICAL MODELLING OF THE AQUIFER

The validity of the assumptions of the conceptual model of the study area was tested through the use of a reconnaissance-level numerical model of an approximately 100 square-mile area surrounding the project. The specific computer code which was employed is FLOWPATH, a two-dimensional steady-state finite difference model (Franz & Guiguer, 1990). Appendix A provides: background information regarding the model such as the governing equations; the model grid; input such as the distribution of aquifer characteristics, and boundary conditions; and output such as contours of the piezometric surface of the aquifer and ground-water flow vectors.

The model was calibrated to conditions which existed in the alluvial aquifer near the mine prior to the start of operations by

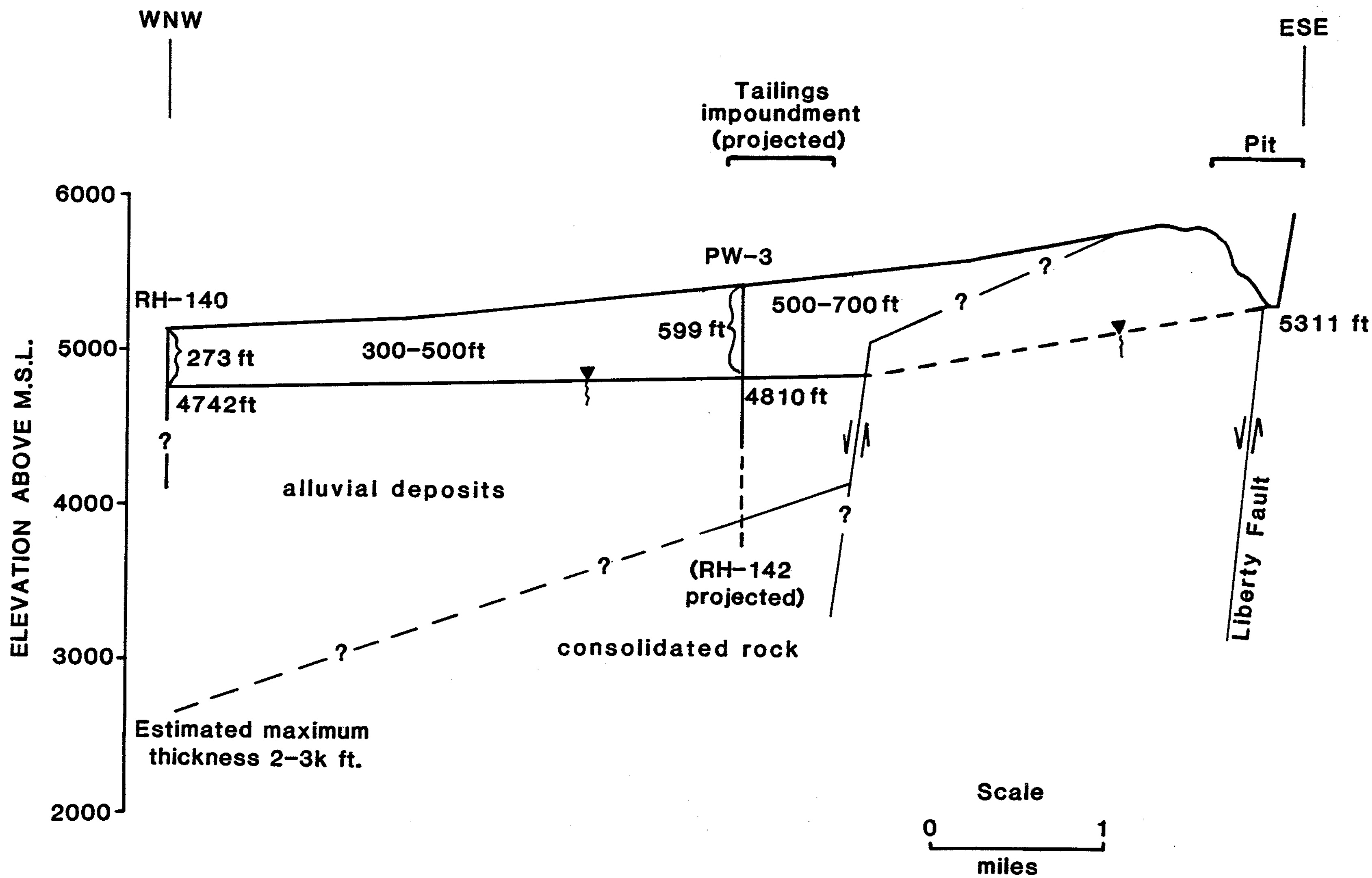


Figure 2. Hydrogeologic cross section.

Anaconda to illustrate the direction and rate of ground water flow under "natural" conditions. The model simulated observed waterlevels near the mine with reasonable accuracy. It also was able to closely simulate the water level in the pit. As a consequence, the model provides an acceptable level of confidence for the distribution of aquifer characteristics in the alluvial aquifer beneath the tailings impoundment and vicinity, the postulated lower transmissivity of the rocks in the mountains east of the project, and the estimates of recharge to the aquifer.

The model did not simulate observed water levels four to five miles northwest of the mine very well. Minimal effort was expended to reconcile the differences between observed and calculated piezometric levels in that area because the ground water regime at the mine was not significantly influenced by a wide range in assumed conditions for this "problem" area. Also, because sparce data are available for this area, several miles northwest of the mine, there is little justification for any assumptions which would be made. It is clear, however, that the area is well up gradient from the project and, therefore, is not impacted by it.

Withdrawals of ground water by the mine's production wells was superimposed on the "calibrated" water levels to illustrate how the natural ground-water flow field might be affected by these operations. In 1990, the total withdrawals by the mine approached 6,000 AFA, or nearly 50 percent of the estimated ground-water recharge to the Tonopah Flat Hydrographic Basin. As expected, the steady-state water levels generated by the model show a trough of depression centered around the well field. Given sufficient time (for steady-state conditions to be developed) the influence of the wells will be felt over a very large area and the well field becomes an important regional ground-water sink. This result is significant because it illustrates that the wells can be expected to capture any releases from the tailings impoundment which might migrate through several hundred feet of unsaturated geologic materials to reach the aquifer.

The model results were used to quantify the ground-water velocity vector in the vicinity of the project. Under pre-development conditions, the average ground water velocity within the study area is believed to be 0.11 ft/day (40 feet/yr) with a maximum of 0.47 ft/day (170 ft/yr) to the south. Under the present pumping regime, flow converges on the centroid of pumping in the well field and the maximum velocity exceeds 1.5 ft/day (511 ft/yr).

Once operations cease, ground water conditions should return to a pre-development state. That is, the ground water trough surrounding the well field will decay and the direction of ground-water flow directly beneath the tailings impoundment and vicinity will be again be toward the south.

3.3 UNSATURATED ZONE HYDROLOGY

Detailed hydrological and geotechnical investigations were conducted by Anaconda's consultants prior to the acquisition of the property by CYPRUS. Additional work was commissioned by CYPRUS in the early stages of their mining efforts. All of this earlier work focused on the design and construction of the tailings dam and impoundment plus an evaluation of the performance of the dam through 1989. These efforts included drilling a total of eight test borings to a depth of approximately 100 feet, the performance of more than forty in-situ permeability tests of the upper 100 feet of the alluvial fan deposits, laboratory permeability testing of soil samples taken from test pits in the impoundment area and cores obtained through the soil borings, large-scale in-situ permeability testing, and investigations into the permeability of the tailings, themselves.

The measured in-situ vertical permeability of the unsaturated alluvial fan deposits beneath the tailings impoundment (Bechtel, 1980) range from 0.027 ft/day (9.6 x 10E-6 cm/sec) to 27 ft/day (9.6 x 10E-3 cm/sec). The average value was taken as 1.35 ft/day (5 x 10E-4 cm/sec). The average horizontal permeability was estimated to be 12.1 ft/day (4.3 x 10E-3 cm/sec). The variation in the data clearly shows that these heterogeneous deposits comprise discontinuous lenticular deposits of various size gradations.

From the data presented above, it is apparent that some, albeit small, potential exists for fluid, in the form of seepage from the tailings impoundment, to migrate downward and eventually intercept the water table.

A detailed investigation of the potential for seepage through the tailings dam (Welsh Engineering, 1989) provides a rigorous analysis of the potential for leakage from the tailings impoundment and serves as a basis for estimates of the travel time involved. This analysis employed a two-dimensional finite element numerical model of a vertical section through the tailings dam, the tailings themselves, and the underlying alluvial fan deposits.

For the model, the vertical saturated hydraulic conductivity of the alluvial fan deposits was taken to be 0.28 ft/day (1 x10E-4 cm/sec). Because these deposits are unsaturated, the vertical hydraulic conductivity under different soil moisture conditions were used to calculate travel times from land surface to the water table. These values range between 0.06 to .0025 ft/day (2 x 10E-5 to 9 x 10E-7 cm/sec).

Because the unsaturated thickness of the alluvial fan deposits beneath the impoundment approaches 500 feet or more, the hydraulic properties of these deposits control the time for fluids to reach the water table. Applying the values of unsaturated hydraulic conductivity given above to Darcian flow, assuming a unit vertical hydraulic gradient and an effective porosity of 0.15, the time for fluid to migrate from land surface to the water table,

```
t = (L x 0) / (K x i)
  = (500 feet x 0.15) / (21.9 ft/yr x 1) = 3.4 years
to
  = (500 feet x 0.15) / (0.09 ft/yr x 1) = 82.4 years
```

That any fluid from the tailings impoundment will reach the water table is, of course, dependant upon the potential for seepage from the impoundment. The review of the tailings dam performance to date (Welsh Engineering, 1989) strongly suggests that some leakage should be anticipated.

A layer of "old slimes" effectively lines the tailings impoundment. These were deposited during the operation of the process facilities to date. The unsaturated vertical hydraulic conductivity of these deposits ranges from 6 x 10E-3 ft/day (2 x 10E-6 cm/sec) to 2 x 10E-4 ft/day (9 x 10E-8 cm/sec). The unsaturated vertical hydraulic conductivity of the underlying alluvial fan deposits is at least one order of magnitude lower. Given that the area of the tailings impoundment is approximately 640 acres and a vertical hydraulic gradient of 1:1, an estimate of the seepage from the tailings impoundment is

```
Q = K x i x A
  = (0.0002 ft/day x 365 days/yr) x 1 x 640 acres
  = 47 AFA
```

This compares to a volume of ground water pumped from the mine's production wells during 1990 of approximately 6,000 AFA.

Table 2. Summary of hydraulic characteristics of the vadose zone, Cyprus Tonopah Mining.

Material	Hydraulic Conductivity Saturated	Unsaturated
Alluvial-fan deposits Range	0.27 to 27 ft/day[a]. (9.6x10E-6 to 9.6x10E-3 cm/sec)	0.06 to 0.0025 ft/day[b]. (2x10E-5 to 9x10E-7 cm/sec)
Old slimes Range		0.006 to 2x10E-4 ft/day[c]. (2x10E-6 to 9x10E-8 cm/sec)

Notes: a. Measured vertical hydraulic conductivity.
b. Estimated for a range of soil moisture conditions based on measured data.
c. Estimated for a range of soil moisture conditions based on measured data.

4.0 WATER CHEMISTRY

Chemical data for the ground water derived from the mine's production wells, the ground water derived from the pit, and water from the tailings impoundment are listed in Table 3. Examination of these data and those summarized in Figure 3 show that the ground water in the alluvial aquifer may be categorized as a sodium-potassium-bicarbonate water. It is very soft and meets all applicable State of Nevada and Federal Drinking Water Standards. Total dissolved Solids (TDS) ranges from 290 to 313 mg/l (milligrams per liter). Figure 3 illustrates that the ground water from the mine's water supply wells are all very similar in gross chemistry. Of all of the constituents listed, only fluoride is elevated.

By comparison, the water in the tailings impoundment is a mixed-anion-sulfate type. As expected for fluids resulting from a flotation process, the water is reasonably good quality with a total dissolved solids of less than 700 mg/l. Only fluoride and pH exceed drinking-water standards.

Although a complete chemical analysis of ground water derived from the pit does not exist, the available data indicate that the ground water within the mineralized rocks at the mine is of poor chemical quality.

Table 3. Chemical data for waters in the vicinity of CYPRUS Tonopah Mining, Big Smoky Valley, Nevada.
(Note: All results given in milligrams per liter unless otherwise indicated.)

Sample source	PW-2	PW-3	PW-5	PW-6	PW-7	PW-9	Tailings pond	Pit
Sample Date	01/25/91	01/25/91	01/25/91	01/25/91	01/25/91	11/03/88	11/08/90	11/89
Laboratory	ACZ	ACZ	ACZ	ACZ	ACZ	NDOH	CHEMAX	CHEMAX
pH (Std. Units)	8.2	8.2	8.2	8.2	8.2	8.34	9.69	7.9
E.C. (uMHO/CM)	--	--	--	--	--	382	--	--
TDS	280	270	304	286	288	307	680	--
Hardness (as $CaCO_3$)	--	--	--	--	--	34	--	--
Turbidity (S.U.)	--	--	--	--	--	0.3	--	--
Color (S.U.)	--	--	--	--	--	3	--	--
Ca	14	13	12	13	10	12	83	--
Mg	1	<1	<1	<1	<1	1	0.34	--
Na	54	52	55	50	53	58	100	--
K	11	11	13	12	12	12	11	--
Alkalinity (as $CaCO_3$)	104	100	104	108	96	118	206	--
HCO_3	127	122	127	132	117	134	--	--
CO_3	0	0	0	0	0	5	--	--
SO_4	49	49	49	45	42	49	271	920
Cl	12	12	13	12	12	13	17	--
NO_3	1.0	1.7	1.9	1.9	2.2	2.9	<4	--
F	1.37	1.39	1.61	1.79	1.48	1.81	31	--
CN (W.A.D.)	<0.002	<0.002	<0.002	<0.002	<0.002	--	--	--
Al	--	--	--	--	--	--	23	--
Sb	--	--	--	--	<0.1	--	<0.1	--
As	0.043	<0.001	0.041	0.025	0.043	0.043	<0.005	0.001
Ba	0.04	0.05	0.05	0.01	0.02	0	0.5	--
Be	--	--	--	--	--	--	<0.05	--
Bi	--	--	--	--	--	--	<0.05	--
Cd	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	<0.01	0.45
Cr	<0.01	<0.01	<0.01	<0.01	<0.01	<0.005	--	--
Co	--	--	--	--	--	--	<0.05	--
Cu	0.02	<0.01	<0.01	<0.01	<0.01	0	<0.025	0.37
Ga	--	--	--	--	--	--	<0.05	--
Fe	0.69	0.02	0.10	0.16	<0.02	0	<0.05	1.0
La	--	--	--	--	--	--	<0.05	--
Pb	<0.003	<0.001	<0.001	<0.001	<0.001	<0.005	<0.1	<0.05
Li	--	--	--	--	--	--	<0.1	--
Mn	0.02	<0.01	<0.01	<0.01	<0.01	0	<0.03	--
Hg	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.005	0.001	<0.001
Mo	--	--	--	--	--	--	1.3	--
Ni	--	--	--	--	--	--	<0.05	--
Sc	--	--	--	--	--	--	<0.05	--
Se	0.001	<0.001	0.001	0.001	<0.001	0.001	<0.005	<0.001
Ag	<0.01	<0.01	<0.01	<0.01	<0.01	<0.005	<0.05	--
Sr	--	--	--	--	--	--	<0.05	--
Tl	--	--	--	--	--	--	<0.05	--
Sn	--	--	--	--	--	--	<0.25	--
Ti	--	--	--	--	--	--	<0.05	--
V	--	--	--	--	--	--	<0.05	--
Zn	0.01	<0.01	<0.01	<0.01	<0.01	0	<0.05	5.0

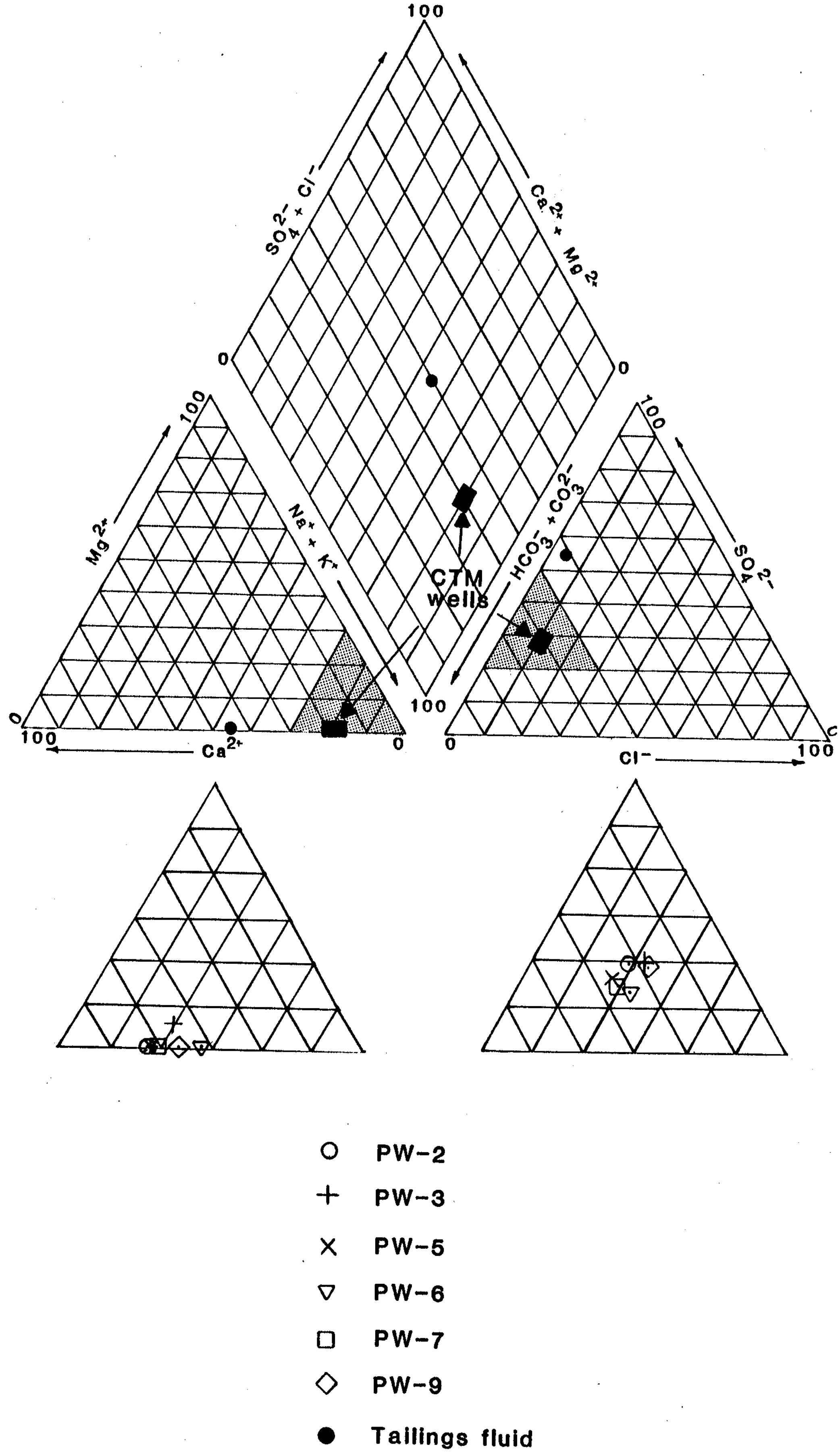


Figure 3. Trilinear diagram of water chemistry data.

5.0 WELL INVENTORY

Very few wells exist in the area of Tonopah Flat near the project. Only twelve wells were inventoried within a radius of five miles of the project. These are listed below, locations are depicted in Plate I, and the Drillers Reports are provided in Appendix B.

Table 4. Summary of wells in the vicinity of Cyprus Tonopah Mining.

Well	Location	Total Depth (feet) Borehole	Total Depth (feet) Well	Depth to water (feet)	Remarks
RH-140	6N/41E-34cc	1,818	280	273	2 mi NW
RH-142	5N/41E-2aa	1,580	803	599	PW-3 site
PW-1	6N/41E-35da	826	820	575	
PW-2	6N/41E-35dd	1,007	1,007	470	
PW-3	5N/41E-2aa	1,090	1,015	590	
PW-5	5N/41E-2ad	1,300	1,300	561	
PW-6	5N/41E-2da	1,300	1,300	526	
PW-7	5N/41E-2dd	1,294	1,207	490	
PW-9	5N/41E-11ad	1,605	1,105	478	
Midway	5N/41E-5cb	180	180	125	3 mi west
?	5N/41E-3bd	?	?	?	1.5 mi west (unused)
Bridge	6N/41E-16cc	230	230	141	4.3 mi NW

From the information in Table 4. above, it is obvious that the principal water supply wells in the vicinity of the mine are those production supply wells operated by the mine. All other wells are essentially up-gradient of these wells with the exception of the unknown well in Section 3. No information is available for this well.

The nearest well located down gradient of the project is the well at Millers which serves the rest area there and the production wells at TWMNR, all of which are approximately 12 to 15 miles downgradient.

6.0 MONITORING NETWORK

6.1 CURRENT MONITORING PROGRAM

The current monitoring program at the mine is comprised of two basic elements. These are described below, and their locations are depicted in Figure 4 and Plate I.

I.	Production wells	Sampled annually and analyzed for Ph, alkalinity, bicarbonate, color, turbidity, TDS, fluoride, arsenic, and mercury.
II.	Seepage detection	
a.	Chimney drain	Present within the full length of the dam. Finger drains daylight every 200 meters +/- along the face of the dam. Monitored daily for visible indication of seepage through the dam.
b.	Dam piezometers	Originally four sets of three; one above the foundation, one at the foundation, and one below the foundation. Of these, 11 are still accessible. Monitored monthly for changes in piezometric level.
c.	Down slope piezometers	Three completed to a depth of 100 feet and located downslope of the tailings impoundment.

To date there is no evidence of a significant release of fluid from the tailings impoundment. Examination of time-series chemical data from the production well for which there is a good record (Figures 5, 6, and 7), shows variation in the data, but no clear trend in any constituent except for pH for PW-3. The significance of this increase is unknown because of the number of factors which can influence pH values such as sampling technique and the time lag between collection and analysis. Constituents such as sulfate or to a lesser extent, alkalinity, show only modest changes over time and these changes for the most part are within one standard deviation of the respective mean values.

Data collected from the chimney drain and piezometer network designed to monitor the performance of the dam show no leakage (Welsh Engineering, 1989 and Van Zyl, 1990). Fluids have never been observed exiting the finger drains (Ron Graham, personal communication). This is consistent with the analysis by Welsh Engineering

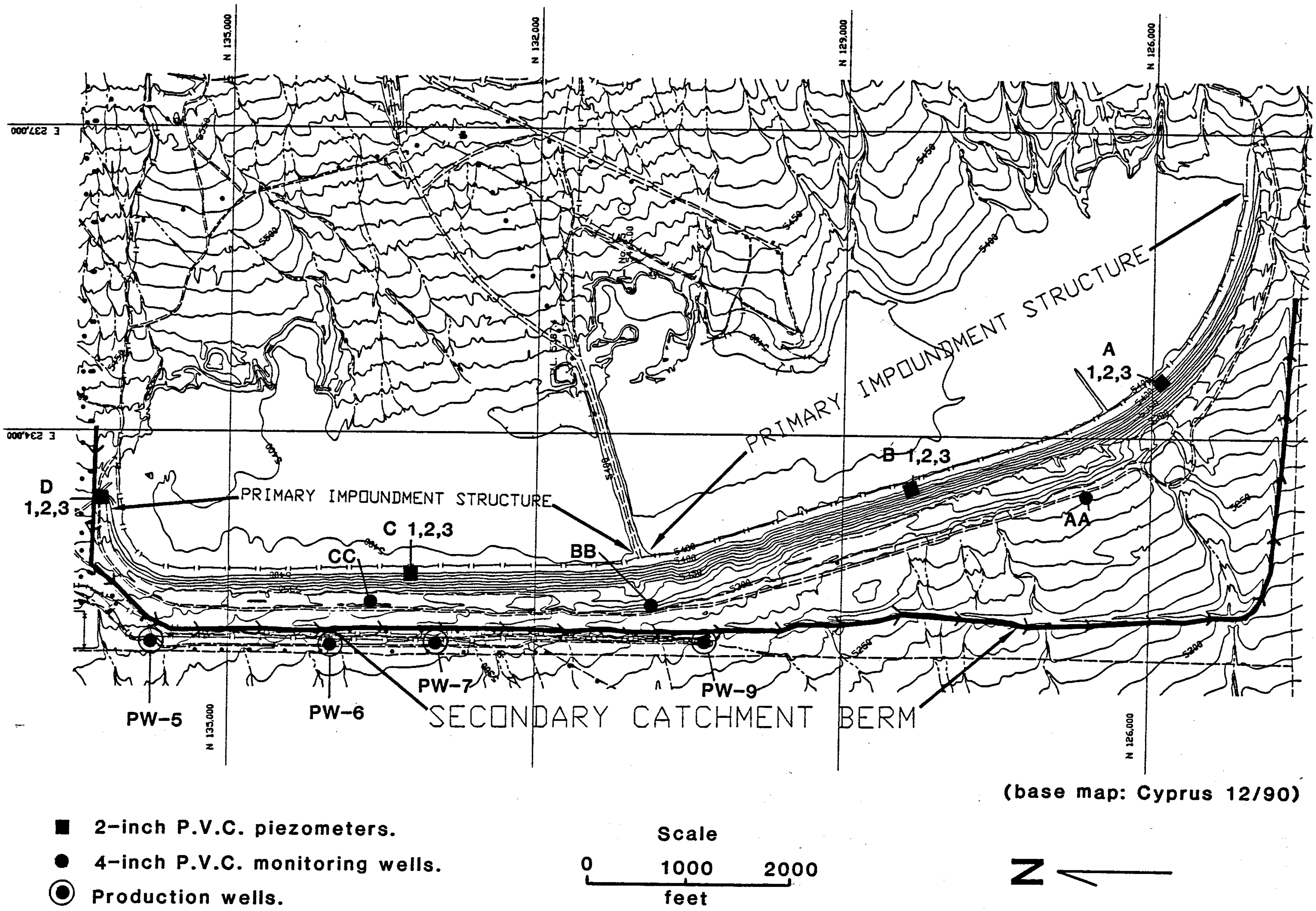


Figure 4. Location of existing monitoring stations.

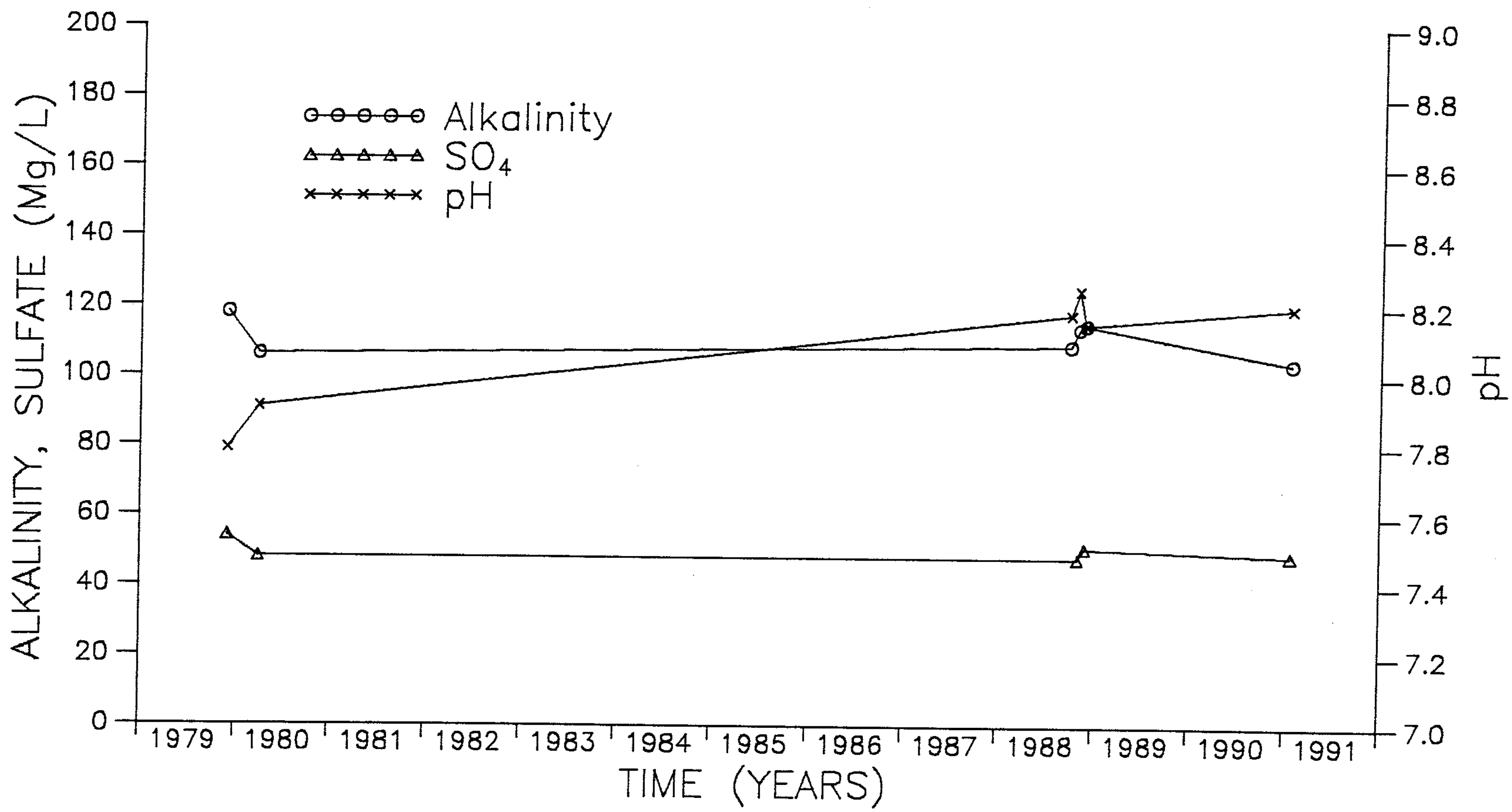


Figure 5. Historical water chemistry data for Cyprus Tonopah Mining PW-3.

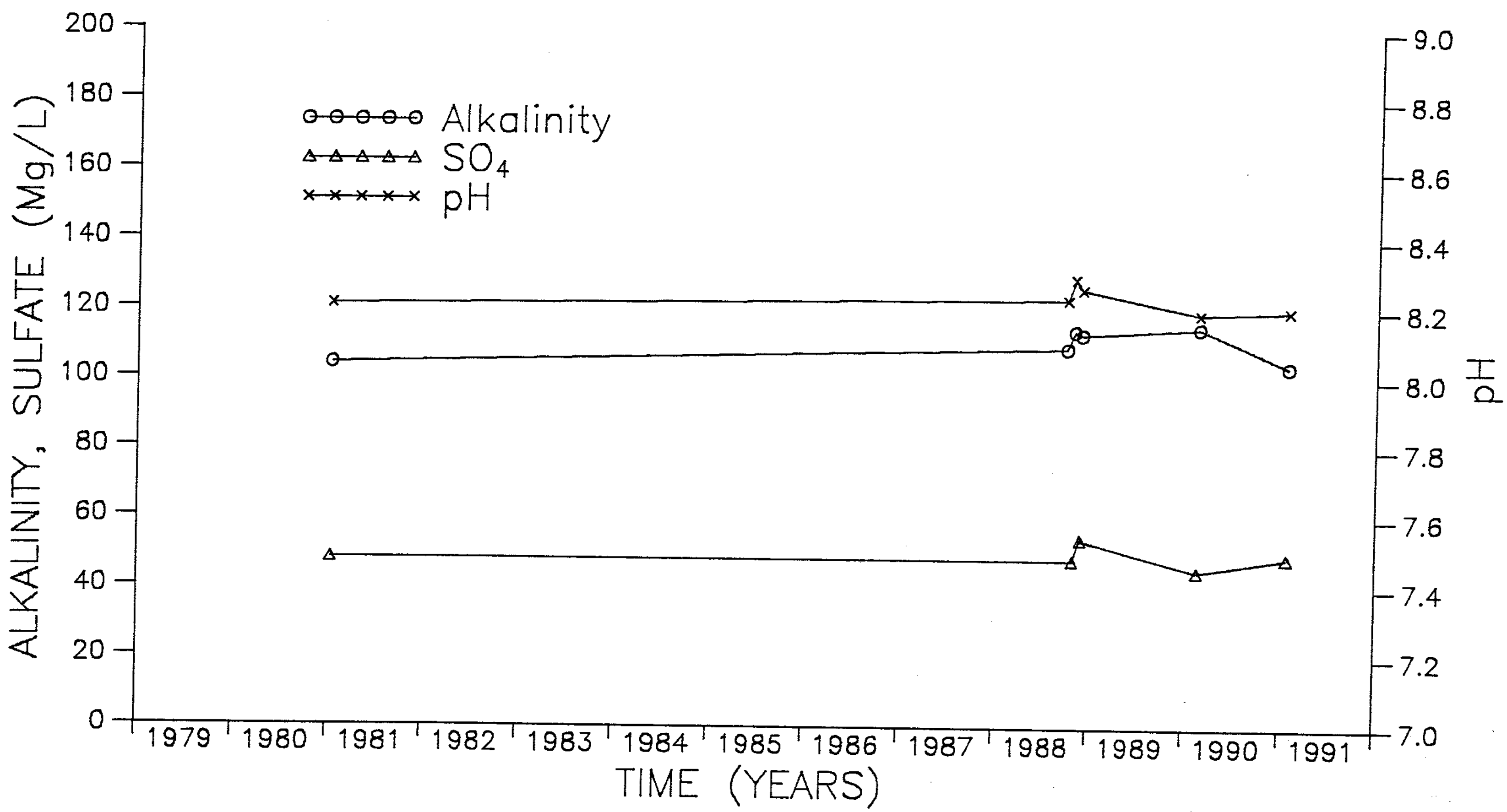


Figure 6. Historical water chemistry data for Cyprus Tonopah Mining PW–5.

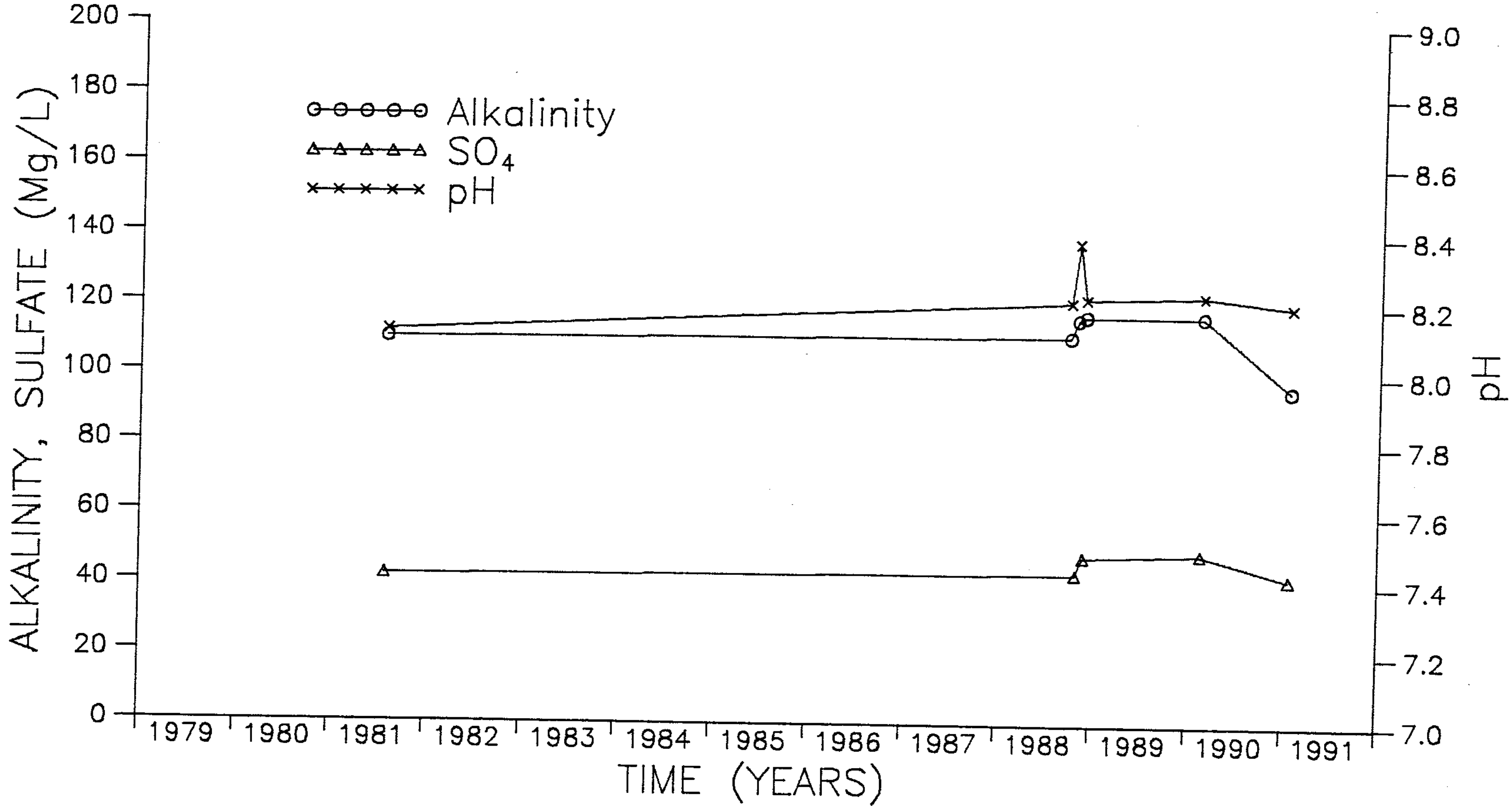


Figure 7. Historical water chemistry data for Cyprus Tonopah Mining PW-7.

[1989] which showed that no fluids should be observed in the drains, ever. Moisture was detected in some of the dam piezometers, and its presence was examined to determine the cause. Three piezometers were constructed downslope of the tailings impoundment in 1989 to investigate the apparent changes in piezometric level referenced above. Examination of fluid level data from these piezometers and an inspection by WEN, INC. in November 1990, showed that fluid within the piezometers was related to residual polymer drilling fluid and suspended cuttings left over from well construction. Since then, the residual fluid has been bailed from each down-slope piezometer and no rise in fluid level attributable to a release from the impoundment has been observed (refer to Figure 8). The probable source of moisture in the dam piezometers was ascribed by CYPRUS's consultants to the introduction of moisture through accidental filling of the piezometer with wet sand or condensation within the piezometer.

6.2 MONITORING ALTERNATIVES

Because of the unique conditions which exist at the site, no currently practiced monitoring strategy is entirely satisfactory. A number of monitoring strategies considered for the project, however, are discussed below.

1. Sampling the unsaturated zone beneath the impoundment.

The unsaturated zone beneath the impoundment might be sampled by drilling inclined drill holes. Samples of the underlying alluvial fan deposits could then be collected and analyzed for soil moisture and fluids extracted from the samples might then be analyzed for chemical constituents characteristic of the tailings fluids.

This methodology is not viewed favorably for a number of reasons.

a. Drilling an inclined borehole several hundred feet in order to sample directly beneath the impoundment in unconsolidated or semi-consolidated alluvial deposits without the use of drilling fluids to maintain borehole stability may not be feasible. The use of such fluids might invalidate an samples collected to detect soil moisture.

b. In the event a deep inclined borehole could be completed, the effective area of investigation of such a borehole is small in comparison to the large area of this particular impoundment. A vast number of boreholes to sample a representative area beneath the impoundment would be necessary to achieve a high level of confidence that a leak could be detected. A borehole which yields negative results provides little information of the much larger area not sampled by it.

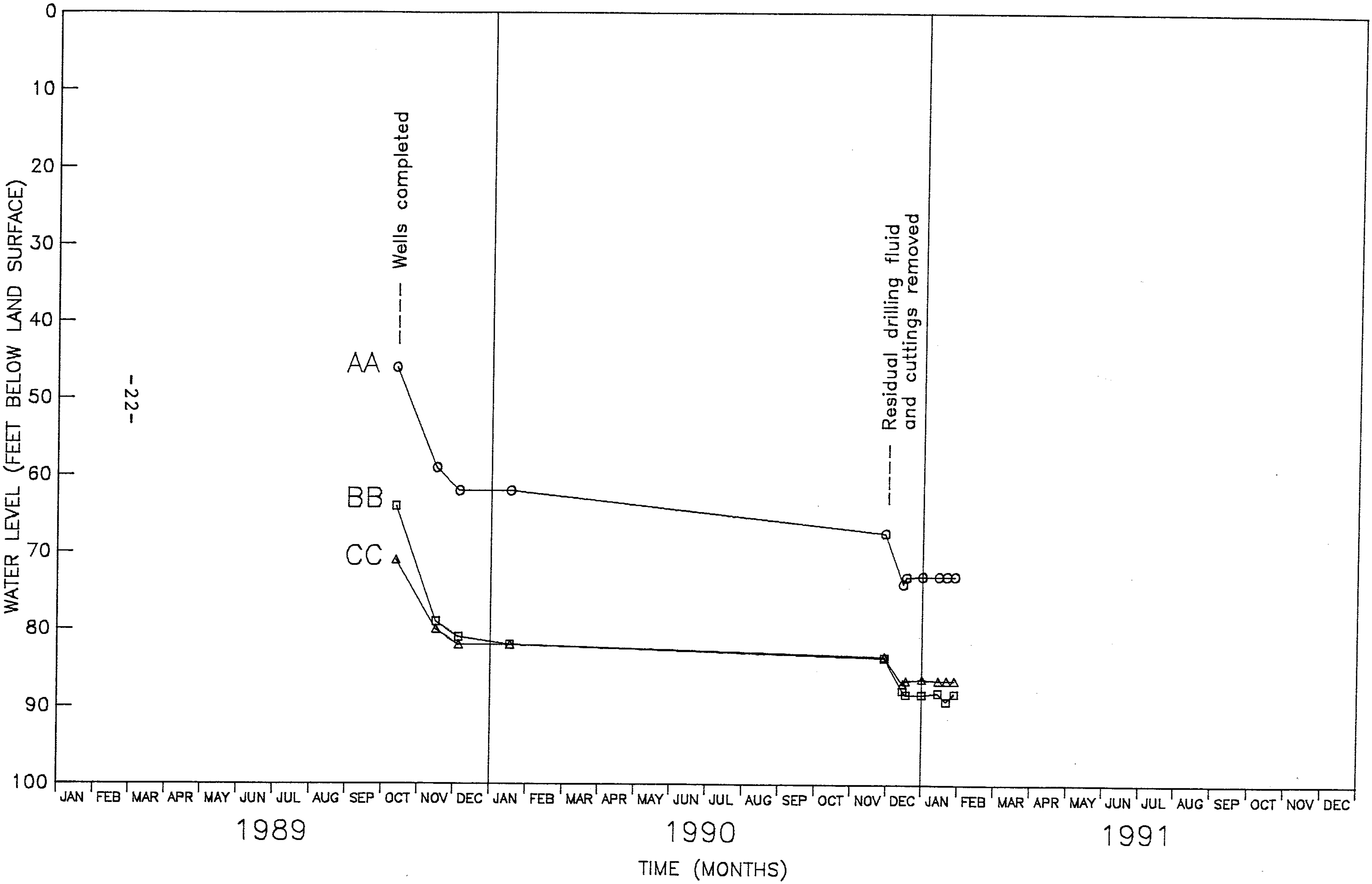


Figure 8. Water level data for down-slope piezometers.

c. Devices installed in the boreholes to provide long-term monitoring of the unsaturated zone would suffer the deficiencies as in 1.b., above, viz., inability to provide representative samples.

2. Existing piezometer and drain network.

The existing network of piezometers and the chimney drain was designed and constructed to monitor seepage in the tailings dam, only. They have no demonstrated capability to intercept leakage through the bottom of the impoundment. In fact, the seepage analysis by Welsh Engineering [1989] indicates that there should be no fluid in the drain, ever. This conclusion is borne out by the observation that no discharge from any of the finger drains was observed during the November 1990 site inspection or has yet to be observed by mine personnel (Ron Graham, personal communication).

3. Monitoring the water balance of the process fluids.

Closely monitoring the volume of make up water used by the flotation process can provide a semi-quantitative assessment of leakage from the system. The majority of water in the flotation circuit is recycled. At an average production of 25,000 tons per day, the amount of water which is not "consumed" by inclusion in the tailings is calculated at approximately 1,494 AFA (Ron Graham, 1991). Given the 640 +/- acre wetted area of the tailings impoundment, this amounts to approximately 2.33 feet of water per acre per year which is approximately one-half of the potential evaporation for this area of 4.67 feet. On average, then, there is little likelihood of there being "excess" water which might leak from the impoundment.

A number of problems exist for this approach.

a. The operation of the flotation circuit varies daily. As a result, the water balance may be accurate only in terms of a week to several months.

b. It does not account for fluids which drain from the interstices within the tailings.

c. The attainable accuracy of the various components of the budget is questionable. As a result, the level of confidence of the water budget approach is low.

Despite the problems, this method may be useful in combination with other monitoring schemes.

4. Monitoring wells.

Under normal conditions, monitoring wells are the most direct means of detecting a release of process fluids into an aquifer. However, the unique conditions at the site reduce their effectiveness. These include:

a. The thickness of the unsaturated zone results in travel times of between three and 80 years for a leak to reach the water table.

b. The high yields of the existing production wells at the mine limits their effectiveness as monitoring wells. Unless a release is extremely large, dilution with ambient ground water may mask detection.

c. Detection is further complicated by minimal contrast between ambient ground water and the tailings fluid.

d. The high transmissivity of the aquifer limits the effectiveness of dedicated monitoring wells. Given a high transmissivity and a steep gradient in the vicinity of the well field, the area of influence of a low yield monitoring well (necessary to obtain an undiluted sample of a plume, if one exists) would be small compared to the size of the tailings impoundment. Therefore, a very large number of monitoring wells is required to provide the desired level of confidence that they will detect a leak.

6.3 PROPOSED MONITORING NETWORK

With the realization that no single monitoring scheme offers a high degree of confidence that an unauthorized release of process fluid can be detected, a combination of technologies is proposed. These include:

- Collecting water samples from existing production wells and the tailings pond (quarterly).
- Monitoring the finger drains for seepage (daily).
- Maintaining an accurate water balance for the process fluids in the tailings circuit (quarterly).

As discussed in Section 3.3, a trough of depression develops surrounding the well field when the mine is in operation. This widespread feature represents a sink which captures a large proportion of the ground water flow within the Tonopah Flat Hydrographic Basin. If not for dilution by ambient ground water and little contrast between process fluids and natural ground waters, the production wells would be ideally suited to document any changes in the ground water quality caused by the mining operation. These facts do not render them useless, however.

The process fluids include some constituents which might be useful to detect a release from the impoundment. These include sulfate, Ph (field and lab), fluoride, TDS, E.C. (field and lab), and alkalinity. Of the eight production wells, either PW-1 or PW-2 could be sampled to provide background water chemistry data because either one is removed from the impoundment. Under natural conditions it is up gradient of the impoundment and during operating conditions, the well field produces a hydrodynamic barrier which precludes any effluent from ever reaching this well. PW-7 and PW-9 may be sampled to provide down gradient chemical data because of their relative positions.

During production, the tailings water should be sampled and analyzed for the same constituents as the ground water to allow for a comparison between the fluids. Obviously, during temporary shut down of the mill, there will be no water in the pond to sample.

Preparation of a process water budget on a quarterly basis will allow for a gross evaluation of a potential for leaks. A gross imbalance would signal an increase in the sampling frequency in an attempt to detect a release.

The other monitoring stations should be supplemented by daily observations of the finger drains.

6.0 SOURCES OF INFORMATION

Bechtel, Inc., 1980. Design Report Tailings Embankment: private consulting report prepared for the Anaconda Copper Company.

Erwin, John W., 1968. Gravity map of the Tonopah, Baxter Spring, Lone Mountain, and San Antonio Ranch Quadrangles, Nevada: Nv. Bureau of Mines Map 36.

Franz,. T. and N. Guiguer, 1990. Flowpath (ver. 2.0) Two dimensional horizontal aquifer simulation model.

Hydro-Search, Inc., 1975 (a). Development and testing Well R.H. No. 142 Hall Property, Tonopah, Nevada: private consulting report prepared for the Anaconda Company.

- 1975 (b). Ground-water characteristics of northern Tonopah Flat Big Smoky Valley Nevada: private consulting report prepared for the Anaconda Company.

Rush, F.E. and C.V. Schroer, 1970. Water Resources of Big Smoky Valley, Lander, Nye, and Esmeralda Counties, Nevada: Nv. Dept. Cons. and Nat. Res. Water Resources Bull. No. 41.

State of Nevada, 1972. Water for Nevada; Hydrologic Atlas Map S-5, Average annual evaporation.

Welsh Engineering, 1989. Design for Upstream Construction of Cyprus Tonopah Tailings Impoundment at Cyprus Tonopah: private consulting report prepared for Cyprus Tonopah Mining Corporation.

Other sources:

Drillers Report to the State Engineer.
ESA Geotechnical Consultants, 1986. Pumping test data.
Graham, Ron. Personal communications.
Van Zyl, Dirk, Ph.D. Personal communication.

APPENDIX A

DRILLERS REPORTS TO THE STATE ENGINEER

WELL LOG AND REPORT TO THE STATE ENGINEER OF NEVADA

Log No. 8302
Rec. Jan 6 1965
Well No.
Permit No.
Do not fill in.

13192

PLEASE COMPLETE THIS FORM IN ITS ENTIRETY

Owner R.O. Ranch Inc. Driller A.O.Large

Address Round Mountiam Nevada Address Box845 Elko Nev. Lic. No 397

Location of well: S 1/4 W 1/4 Sec. 5, T 5 N/S, R 41 E, in Nye Nevada County

or New Midway

Water will be used for Stock well Total depth of well 180 Ft.

Size of drilled hole 10.3/4 Weight of casing per linear foot 2.75

Thickness of casing .188 Temp. of water 54%

Diameter and length of casing 10¼ 180 Ft.
(Casing 12" in diameter and under give inside diameter; casing 12" in diameter give outside diameter.)

If flowing well give flow in c.f.s. or g.p.m. and pressure

If nonflowing well give depth of standing water from surface 125 ft.

If flowing well describe control works
(Type and size of valve, etc.)

Date of commencement of well Dec. 24 1964 Date of completion of well Dec. 29 1964

Type of well rig Speedstar 71

LOG OF FORMATIONS

From feet	To feet	Thickness feet	Type of material
0	2	2	Sandy Top soil
2	40	38	Bolders in clay
40	75	35	Sand fine gravel in clay
75	135	60	Dry sand & corse gravel in clay.
135	155	20	Fine water sand & gravel
155	180	25	Corse water sand & gravel

Water-bearing Formation, Casing Perforations, etc.

Chief aquifer (water-bearing formation) from 155.' to 180' ft.

Other aquifers

First water at 135' feet.

Casing perforated from 160' to 180' ft.

Size of perforations 3/16 2" Long

(OVER)

919

LOG OF FORMATIONS—Continued

From feet	To feet	Thickness	Type of material

CASING RECORD

Diam. casing	From feet	To feet	Length	REMARKS—Seals, Grouting, etc.
10 3/4	0	180	180	

GENERAL INFORMATION—Pumping Test, Quality of Water, etc.

Bailed Tested 600 gal. 30 minutes.

WELL DRILLER'S STATEMENT

This well was drilled under my jurisdiction and the above information is true to my best information and belief.

Signed A.O.Large
Well Driller

By [signature]

License No. 397

Dated Dec. 31. 1964, 19......

(Not to be filled in by Driller)

02 11 17 9 [illegible]

STATE OF NEVADA
DIVISION OF WATER RESOURCES

WELL DRILLERS REPORT

Please complete this form in its entirety

OFFICE USE ONLY
Log No. 10982
Permit No. 23801
Basin Big Smoky

140

1. OWNER Anaconda Co ADDRESS Weed Heights Nev

2. LOCATION SW ¼ SW ¼ Sec. 34 T. 6 N/S R. 41 E. Nye County
PERMIT NO.

3. TYPE OF WORK
New Well ☐ Recondition ☐
Deepen ☐ Other ☐

4. PROPOSED USE
Domestic ☐ Irrigation ☐ Test ☐
Municipal ☐ Industrial ☐ Stock ☐

5. TYPE WELL
Cable ☐ Rotary ☐
Other ☐

6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thick-ness
Alluvium		0	88	
Fragments Qtz + Volcanics		88	183	
Sand Coarse Frag. Qtz.		183	311	
Compacted Sand		311	316	
Bas grag. Qtz		316	500	
Gray Sand		500	694	
Sand & Rock Frag		694	856	
Coarse Sand + gravel		856	902	
Volcanics		902	920	
Coarse Round Fragments		920	1178	
Compacted Sand		1178	1183	
" "		1183	1408	
Basalt Angular Cuttings		1408	1435	

Date started ...., 19......
Date completed ...., 19......

7. WELL TEST DATA

Pump RPM	G.P.M.	Draw Down	After Hours Pump

BAILER TEST
G.P.M. .... Draw down .... feet .... hours
G.P.M. .... Draw down .... feet .... hours
G.P.M. .... Draw down .... feet .... hours

8. WELL CONSTRUCTION
Diameter hole .... inches Total depth 1435 feet
Casing record
Weight per foot .... Thickness

Diameter	From	To
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet

Surface seal: Yes ☐ No ☐ Type
Depth of seal .... feet
Gravel packed: Yes ☐ No ☐
Gravel packed from .... feet to .... feet

Perforations:
Type perforation
Size perforation
From .... feet to .... feet
From .... feet to .... feet
From .... feet to .... feet
From .... feet to .... feet
From .... feet to .... feet

9. WATER LEVEL
Static water level 273' Feet below land surface
Flow .... G.P.M.
Water temperature .... ° F. Quality

10. DRILLERS CERTIFICATION
This well was drilled under my supervision and the report is true to the best of my knowledge.

Original log in file

Name
Address
Nevada contractor's license number
Nevada driller's license number
Signed
Date

USE ADDITIONAL SHEETS IF NECESSARY

5471

DIVISION OF WATER RESOURCES

RH-142

STATE OF NEVADA
DIVISION OF WATER RESOURCES

WELL DRILLERS REPORT

Please complete this form in its entirety

OFFICE USE ONLY
Log No. ~~22~~ 10983
Permit No. 24009
Basin 35776, 28419

1. OWNER Anaconda Company ADDRESS

2. LOCATION NE ¼ NE ¼ Sec. 2 T. 5 N/S R. 41 E. Nye County
PERMIT NO. 24009

3. TYPE OF WORK
New Well ☐ Recondition ☐
Deepen ☐ Other ☐

4. PROPOSED USE
Domestic ☐ Irrigation ☐ Test ☐
Municipal ☐ Industrial ☐ Stock ☐

5. TYPE WELL
Cable ☐ Rotary ☐
Other ☐

6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thick-ness
Alluvium - Volcanics.		0	59	59
Drk. Buff sand.		59	119	60
~~Lt Buff Sand.~~		119	200	
		200	205	
"		205	247	
"		247	310	
Coarse Sand + Gravel		310	412	
" " Some Megaliths		412	439	
"		439	601	
Pebbles to 2"		601	733	
Buff Sand		733	983	
Buff Sand		983	1016	
Gray Sand.		1016	1113	
Qtz. White-gray Sand		1113	1209	
Hard Sand.		1209	1270	
Dark Red Sand - + Andesite		1270	1370	
Red Sand + Red andesite.		370	1467	
Andesite		1467	1499	
Volcanics.		1499	1580	

Date started April 8, 19 67
Date completed April 2, 19 67

7. WELL TEST DATA

Pump RPM	G.P.M.	Draw Down	After Hours Pump

BAILER TEST
G.P.M. .... Draw down .... feet .... hours
G.P.M. .... Draw down .... feet .... hours
G.P.M. .... Draw down .... feet .... hours

8. WELL CONSTRUCTION
Diameter hole .... inches Total depth .... feet
Casing record ....
Weight per foot .... Thickness ....

Diameter	From	To
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet

Surface seal: Yes ☐ No ☐ Type ....
Depth of seal .... feet
Gravel packed: Yes ☐ No ☐
Gravel packed from .... feet to .... feet

Perforations:
Type perforation ....
Size perforation ....
From .... feet to .... feet
From .... feet to .... feet
From .... feet to .... feet
From .... feet to .... feet
From .... feet to .... feet

9. WATER LEVEL
Static water level .... Feet below land surface ....
Flow .... G.P.M. ....
Water temperature .... ° F. Quality ....

10. DRILLERS CERTIFICATION
This well was drilled under my supervision and the report is true to the best of my knowledge.

Name ....
Address ....

Original log in file 24009

Nevada contractor's license number ....
Nevada driller's license number ....
Signed ....
Date ....

USE ADDITIONAL SHEETS IF NECESSARY

5471

WHITE—DIVISION OF WATER RESOURCES
CANARY—CLIENT'S COPY
PINK—WELL DRILLER'S COPY

PW-1

STATE OF NEVADA

DIVISION OF WATER RESOURCES

WELL DRILLERS REPORT

Please complete this form in its entirety

OFFICE USE ONLY
Log No.
Permit No.
Basin

1. OWNER Anaconda Copper Co. ADDRESS P. O. Box 1268
Tonopah, Nevada 89049

2. LOCATION NE ¼ SE ¼ Sec. 35 T. 6 N/S R. 41 E. Nye County
PERMIT NO. 40521

3. TYPE OF WORK
New Well ☒ Reconditon ☐
Deepen ☐ Other ☐

4. PROPOSED USE Mining
Domestic ☐ Irrigation ☐ Test ☐
Municipal ☐ Industrial ☐ Stock ☐

5. TYPE WELL
Cable ☐ Rotary ☒
Other ☐

6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
Sand & grav. w/bldrs.		0	110	110
Sand & gravel		110	140	30
Cem. sand & gravel		140	160	20
Cem gravel		160	180	20
Tan sandy clay, stks grav		180	220	40
Cem. gravel		220	297	77
Hard clay		297	300	3
Cem. gravel		300	350	50
Cem. fine sand		350	360	10
Cem. fine gravel		360	380	20
Cem. sand		380	400	20
Tan sandy clay		400	440	40
Hard sandy clay		440	475	35
Sand & gravel		475	500	25
Cem. sand & gravel		500	580	80
Tan clay		580	640	60
Tan sandy clay		640	660	20
Cem. coarse sand		660	680	20
Tan sandstone		680	704	24
Cem. small gravel		704	715	11
Tan sandstone w/stks sandy clay		715	769	54
Cem. sand & grav.		769	775	6
Tan sandy clay		775	796	21
Grey, brn & dk. red rock		796	809	13
Dark grey rock		809	826	17

Date started August 15, 1980
Date completed November 18, 1980

7. WELL TEST DATA

Pump RPM	G.P.M.	Draw Down	After Hours Pump

BAILER TEST

G.P.M. .... Draw down .... feet .... hours
G.P.M. .... Draw down .... feet .... hours
G.P.M. .... Draw down .... feet .... hours

8. WELL CONSTRUCTION

Diameter hole 28 inches Total depth 826 feet
Casing record
Weight per foot .... Thickness .250

Diameter	From	To
20 inches	+1 feet	820 feet
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet

Surface seal: Yes ☒ No ☐ Type Cement
Depth of seal 50 feet
Gravel packed: Yes ☒ No ☐
Gravel packed from 50 feet to 826 feet

Perforations:
Type perforation Mill slots
Size perforation 5/32x3" 4 rows
From .... feet to .... feet
From .... feet to .... feet
From .... feet to .... feet
From .... feet to .... feet
From .... feet to .... feet

9. WATER LEVEL

Static water level 575 Feet below land surface
Flow .... G.P.M.
Water temperature .... ° F. Quality

10. DRILLERS CERTIFICATION

This well was drilled under my supervision and the report is true to the best of my knowledge.

Name THOMPSON DRILLING CO., INC.
Address 3215 Cinder Lane
Las Vegas, Nevada 89103

Nevada contractor's license number 4286A

Nevada driller's license number 582

Signed [signature]

Date November 24, 1980

USE ADDITIONAL SHEETS IF NECESSARY

O-627

WHITE—DIVISION OF WATER RESOURCES
CANARY—CLIENT'S COPY
PINK—WELL DRILLER'S COPY

#2

STATE OF NEVADA

DIVISION OF WATER RESOURCES

WELL DRILLERS REPORT

Please complete this form in its entirety

OFFICE USE ONLY
Log No. 21577
Permit No. 40520
Basin

1. OWNER Anaconda Copper Co. ADDRESS P.O. Box 1268
Tonopah, Nevada 89049

2. LOCATION SE ¼ SE ¼ Sec. 35 T. 6 N/S R. 41 E. Nye County
PERMIT NO. 40520

3. TYPE OF WORK
New Well ☒ Recondition ☐
Deepen ☐ Other ☐

4. Mining PROPOSED USE
Domestic ☐ Irrigation ☐ Test ☐
Municipal ☐ Industrial ☐ Stock ☐

5. TYPE WELL
Cable ☐ Rotary ☒
Other ☐

6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
Sand & grav. w/ clay		0	120	120
Clay w/ gravel		120	140	20
Gravel		140	143	3
Gravel w/ clay		143	168	25
Light gravel		168	175	7
Cemented gravel		175	200	25
Clay w/ sand & gravel		200	220	20
Clay w/ gravel		220	245	25
Sand		245	257	12
Clay		257	275	18
Clay w/ gravel		275	280	5
Cemented gravel		280	320	40
Clay w/ gravel		320	400	80
Clay & cemented gravel		400	420	20
Cemented gravel		420	440	20
Hard clay		440	445	5
Cemented gravel		445	519	74
Brown clay & gypsum		519	525	6
Hd. sandstone, some clay		525	555	30
Brn. clay w/ sandstone, sm.grav		555	588	33
Cemented gravel		588	598	10
Brown clay w/ gravel		598	605	7
Hd. sandstone, sandy clay		605	640	35
Sandy clay		640	676	36
Cemented sand & gravel		676	760	84
Grey clay		760	804	44
Hard mud, stone		804	806	2

(continued)

Date started June 30, 19 80
Date completed August 30, 19 80

8. 36" - 100' WELL CONSTRUCTION
Diameter hole 28 inches Total depth 1007 feet
Casing record
Weight per foot Thickness .250

Diameter	From	To
30 inches	+1 feet	99 feet
20 inches	+2 feet	1007 feet
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet

Surface seal: Yes ☒ No ☐ Type Cement
Depth of seal 100 feet
Gravel packed: Yes ☒ No ☐
Gravel packed from 0 feet to 1007 feet

Perforations:
Type perforation Double saw cut
Size perforation 5/32 x 3"
From 721 feet to 1007 feet
From feet to feet
From feet to feet
From feet to feet
From feet to feet

9. WATER LEVEL
Static water level 470 Feet below land surface
Flow G.P.M.
Water temperature ° F. Quality

7. WELL TEST DATA

Pump RPM	G.P.M.	Draw Down	After Hours Pump

BAILER TEST
G.P.M. Draw down feet hours
G.P.M. Draw down feet hours
G.P.M. Draw down feet hours

10. DRILLERS CERTIFICATION
This well was drilled under my supervision and the report is true to the best of my knowledge.

Name THOMPSON DRILLING CO., INC.
3215 Cinder Lane
Address Las Vegas, Nevada 89103

Nevada contractor's license number 4286A

Nevada driller's license number 582

Signed Richard K. Thompson

Date September 8, 1980

USE ADDITIONAL SHEETS IF NECESSARY

5471

WHITE—DIVISION OF WATER RESOURCES
CANARY—CLIENT'S COPY
PINK—WELL DRILLER'S COPY

#2

STATE OF NEVADA
DIVISION OF WATER RESOURCES

WELL DRILLERS REPORT

Please complete this form in its entirety

OFFICE USE ONLY
Log No.
Permit No.
Basin

1. OWNER Anaconda Copper Co. ADDRESS

2. LOCATION SE ¼ SE ¼ Sec. 35 T. 6 N/S R. 41 E. Nye County
PERMIT NO. 40520

3. TYPE OF WORK
New Well [x] Reconditon [ ]
Deepen [ ] Other [ ]

4. Mining PROPOSED USE
Domestic [ ] Irrigation [ ] Test [ ]
Municipal [ ] Industrial [ ] Stock [ ]

5. TYPE WELL
Cable [ ] Rotary [x]
Other [ ]

6. (continued) LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
Soft brown clay		806	837	31
Soft grey clay		837	840	3
Tan silt, stone & cemented gravel stks.		840	888	48
Dk. grey sandstone		888	905	17
Soft brown clay		905	940	35
Gravel		940	944	4
Hard sandy clay		944	960	16
Cemented sand & gravel		960	970	10
Clay w/ gravel		970	972	2
Gravel		972	977	5
Clay		977	980	3
Clay w/ gravel		980	990	10
Clay		990	1007	17

Date started June 30, 19 80
Date completed August 30, 19 80

7. WELL TEST DATA

Pump RPM	G.P.M.	Draw Down	After Hours Pump

BAILER TEST

G.P.M. Draw down feet hours
G.P.M. Draw down feet hours
G.P.M. Draw down feet hours

8. WELL CONSTRUCTION

Diameter hole inches Total depth feet
Casing record
Weight per foot Thickness

Diameter	From	To
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet

Surface seal: Yes [ ] No [ ] Type
Depth of seal feet
Gravel packed: Yes [ ] No [ ]
Gravel packed from feet to feet

Perforations:
Type perforation
Size perforation
From feet to feet
From feet to feet
From feet to feet
From feet to feet
From feet to feet

9. WATER LEVEL

Static water level Feet below land surface
Flow G.P.M.
Water temperature ° F. Quality

10. DRILLERS CERTIFICATION

This well was drilled under my supervision and the report is true to the best of my knowledge.

Name THOMPSON DRILLING CO., INC.
Address 3215 Cinder Lane
Las Vegas, Nevada 89103

Nevada contractor's license number 4286A

Nevada driller's license number 582

Signed Richard K. Thompson

Date September 8, 1980

USE ADDITIONAL SHEETS IF NECESSARY

5471

WHITE—DIVISION OF WATER RESOURCES
CANARY—CLIENT'S COPY
PINK—WELL DRILLER'S COPY

(PW-3)

STATE OF NEVADA
DIVISION OF WATER RESOURCES

WELL DRILLERS REPORT

Please complete this form in its entirety

OFFICE USE ONLY
Log No.
Permit No.
Basin.

1. OWNER Anaconda Copper Co. ADDRESS 555 Seventeenth St. Denver, Colorado

2. LOCATION NE ¼ NE ¼ Sec. 2 T. 5 N/S R. 51 E. Nye County
PERMIT NO. 35776

3. TYPE OF WORK
New Well [X] Recondition [ ]
Deepen [ ] Other [ ]

4. PROPOSED USE
Domestic [ ] Irrigation [ ] Test [ ]
Municipal [ ] Industrial [X] Stock [ ]

5. TYPE WELL
Cable [ ] Rotary [X]
Other [ ]

6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thick-ness
Sand & gravel		0	30	30
Boulders, sand, cem.grav.		30	40	10
Sand & cem. gravel		40	100	60
Grav.,some cement, stks of sandstone		100	120	20
Cem. grav. & sand		120	140	20
Sand, gravel, rocks		140	155	15
Cem. sand & grav., some sandstone		155	162	7
Cem. grav. & rocks		162	172	10
Sandstone, grav. & sand		172	175	3
Cem. grav. & sand		175	185	10
Sandstone & gravel		185	189	4 ~~10~~
Gravel & cem. grav.		189	205	16
Grav. & coarse sand		205	242	37
Cem. sand & grav.		242	280	38
Grav./clay, cem. grav.		280	285	5
Small cem. grav.		285	312	27
Sand, grav. & brn. clay		312	330	18
Sandstone		330	335	5
Grav. & cem. grav.		335	341	6
Sandy clay		341	345	4
Fine sand		345	350	5
Fine grav. cem.		350	360	10
Cem. sand & grav.,someclay		360	371	11
Cem. sand & grav.		371	393	22
Sandy clay		393	395	2

(continued)

Date started October 12, 1979
Date completed January 12, 1980

7. WELL TEST DATA

Pump RPM	G.P.M.	Draw Down	After Hours Pump
	1200	57	5
	1600	77	10
	2000	100	17
	2300	-	25

BAILER TEST
G.P.M. Draw down feet hours
G.P.M. Draw down feet hours
G.P.M. Draw down feet hours

8. 0-100'-36" WELL CONSTRUCTION 100-
Diameter hole 28 inches Total depth 1090 feet
Casing record
Weight per foot Thickness .250

Diameter	From	To
20 inches	+2 feet	1015 feet
30 inches	+1 feet	100 feet
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet

Surface seal: Yes [X] No [ ] Type Cement
Depth of seal 100 feet
Gravel packed: Yes [X] No [ ]
Gravel packed from 100 feet to 1090 feet

Perforations:
Type perforation Milled
Size perforation 1/8 x 3 ≠ 6 centers
From 715 feet to 1015 feet
From feet to feet
From feet to feet
From feet to feet
From feet to feet

9. WATER LEVEL
Static water level 590 Feet below land surface
Flow G.P.M.
Water temperature ° F. Quality

10. DRILLERS CERTIFICATION
This well was drilled under my supervision and the report is true to the best of my knowledge.

Name THOMPSON DRILLING CO., INC.
Address 3215 Cinder Lane Las Vegas, Nevada 89103
Nevada contractor's license number 4286A
Nevada driller's license number 582
Signed January 16, 1980
Date [signature]

USE ADDITIONAL SHEETS IF NECESSARY

O-627

WHITE—DIVISION OF WATER RESOURCES
CANARY—CLIENT'S COPY
PINK—WELL DRILLER'S COPY

PW-3

#1 - Page 2 of 3

STATE OF NEVADA
DIVISION OF WATER RESOURCES

WELL DRILLERS REPORT

Please complete this form in its entirety

OFFICE USE ONLY
Log No.
Permit No.
Basin.

1. OWNER Anaconda Copper Co. ADDRESS

2. LOCATION NE ¼ NE ¼ Sec. 2 T. 5 N/S R. 51 E Nye County
PERMIT NO. 35776

3. TYPE OF WORK
New Well ☐ Reconditon ☐
Deepen ☐ Other ☐

4. PROPOSED USE
Domestic ☐ Irrigation ☐ Test ☐
Municipal ☐ Industrial ☐ Stock ☐

5. TYPE WELL
Cable ☐ Rotary ☐
Other ☐

6. (continued) LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
Cem. sand & grav.		395	427	32
Hard sandy clay		427	442	15
Coarse sand & grav.		442	445	3
Hard sandy clay & grav.		445	462	17
Brn. clay & sand		462	467	5
Sand & gravel		467	520	53
Cem. sand & grav.		520	596	76
Sand, grav., some clay		596	600	4
Brn. clay & sand		600	605	5
Sand, grav.w/stks cem. grav		605	621	16
Cem.grav w/stks loose grav		621	625	4
Clay		625	630	5
Cem. gravel		630	643	13
Sand & grav.,some rock		643	663	20
Sandy clay & grav.		663	675	12
Loose grav.& coarse sand		675	692	17
Firm brn. clay		692	704	12
Sand, grav. & clay		704	708	4
Sand & gravel		708	745	37
Hard brn. clay & sand		745	810	65
Sandstone & clay		810	820	10
Fine cem. gravel		820	830	10
Cem. sand & grav.		830	849	19
Sandy clay		849	855	6
Sand, grav., clay		855	858	3
Brn. clay		858	862	4
Sand, grav., sandy clay		862	945	83

(continued)

Date started ...., 19......
Date completed ...., 19......

7. WELL TEST DATA

Pump RPM	G.P.M.	Draw Down	After Hours Pump

BAILER TEST

G.P.M. .... Draw down ....feet ....hours
G.P.M. .... Draw down ....feet ....hours
G.P.M. .... Draw down ....feet ....hours

8. WELL CONSTRUCTION

Diameter hole ....inches Total depth ....feet
Casing record
Weight per foot .... Thickness ....

Diameter	From	To
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet

Surface seal: Yes ☐ No ☐ Type........
Depth of seal ....feet
Gravel packed: Yes ☐ No ☐
Gravel packed from ....feet to ....feet

Perforations:
Type perforation........
Size perforation........
From ....feet to ....feet
From ....feet to ....feet
From ....feet to ....feet
From ....feet to ....feet
From ....feet to ....feet

9. WATER LEVEL

Static water level ....Feet below land surface
Flow ........G.P.M.
Water temperature ....° F. Quality........

10. DRILLERS CERTIFICATION

This well was drilled under my supervision and the report is true to the best of my knowledge.

Name THOMPSON DRILLING CO., INC.
Address 3215 Cinder Lane
Las Vegas, Nevada 89103

Nevada contractor's license number 4286A

Nevada driller's license number 582

Signed [signature]

Date January 16, 1980

USE ADDITIONAL SHEETS IF NECESSARY

O-627

WHITE—DIVISION OF WATER RESOURCES
CANARY—CLIENT'S COPY
PINK—WELL DRILLER'S COPY

(1 P10-3)

#1 - Page 3 of 3

STATE OF NEVADA
DIVISION OF WATER RESOURCES

WELL DRILLERS REPORT

Please complete this form in its entirety

OFFICE USE ONLY
Log No.
Permit No.
Basin

1. OWNER Anaconda Copper Co. ADDRESS

2. LOCATION NE ¼ NE ¼ Sec. 2 T. 5 N/S R. 51 E. Nye County
PERMIT NO.

3. TYPE OF WORK
New Well ☐ Recondition ☐
Deepen ☐ Other ☐

4. PROPOSED USE
Domestic ☐ Irrigation ☐ Test ☐
Municipal ☐ Industrial ☐ Stock ☐

5. TYPE WELL
Cable ☐ Rotary ☐
Other ☐

6. (continued) LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
Sand & grav.		945	950	5
Sandy clay w/ gravel		950	965	15
Sand & gravel		965	970	5
Sandy clay		970	985	15
Gravel, cand & clay		985	990	5
Coarse sand & gravel		990	998	8
Cemented sand		998	1005	7
Sand & gravel		1005	1015	10
Hard brn. sandy clay		1015	1090	75

Date started October 12, 1979
Date completed January 12, 1980

7. WELL TEST DATA

Pump RPM	G.P.M.	Draw Down	After Hours Pump

BAILER TEST
G.P.M. Draw down feet hours
G.P.M. Draw down feet hours
G.P.M. Draw down feet hours

8. WELL CONSTRUCTION
Diameter hole inches Total depth feet
Casing record
Weight per foot Thickness

Diameter	From	To
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet

Surface seal: Yes ☐ No ☐ Type
Depth of seal feet
Gravel packed: Yes ☐ No ☐
Gravel packed from feet to feet

Perforations:
Type perforation
Size perforation
From feet to feet
From feet to feet
From feet to feet
From feet to feet
From feet to feet

9. WATER LEVEL
Static water level Feet below land surface
Flow G.P.M.
Water temperature ° F. Quality

10. DRILLERS CERTIFICATION
This well was drilled under my supervision and the report is true to the best of my knowledge.

Name THOMPSON DRILLING CO., INC.
Address 3215 Cinder Lane
Las Vegas, Nevada 89103

Nevada contractor's license number 4286A

Nevada driller's license number 582

Signed Richard K. Thompson

Date January 16, 1980

USE ADDITIONAL SHEETS IF NECESSARY

O-627

WHITE—DIVISION OF WATER RESOURCES
CANARY—CLIENT'S COPY
PINK—WELL DRILLER'S COPY

Page 1 of 2
Well #5

STATE OF NEVADA
DIVISION OF WATER RESOURCES
WELL DRILLERS REPORT
Please complete this form in its entirety

OFFICE USE ONLY
Log No.
Permit No.
Basin.

1. OWNER Anaconda Copper Co. ADDRESS Nevada Moly Project
P.O. Box 1268
Tonopah, Nevada 89049

2. LOCATION SE 1/4 NE 1/4 Sec. 2 T. 5 N/S R. 41 E. Nye County
PERMIT NO. 40524

3. TYPE OF WORK
New Well ☒ Reconditions ☐
Deepen ☐ Other ☐

4. Mining PROPOSED USE
Domestic ☐ Irrigation ☐ Test ☐
Municipal ☐ Industrial ☐ Stock ☐

5. TYPE WELL
Cable ☐ Rotary ☒
Other ☐

6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
Sand & gravel		0	34	34
Sand, gravel & boulders		34	200	166
Boulders in sand		200	220	20
Sandy clay & gravel		220	240	20
Cem. sand & gravel		240	450	210
Tan clay		450	453	3
Cem. sand & gravel		453	503	50
Clay		503	504	1
Sand & gravel		504	540	36
Tan sandy clay w/sand/grav.		540	572	32
Sand & gravel		572	588	16
Tan sandy clay w/gravel		588	600	12
Sand & gravel		600	674	74
Tan sandy clay		674	679	5
Sand & gravel		679	695	16
Tan sandy clay		695	706	11
Sand & gravel		706	711	5
Tan sandy clay		711	723	12
Sand & gravel		723	782	59
Tan sandy clay		782	797	15
Sand & gravel		797	802	5
Tan sandy clay		802	803	1
Hard cem grav.w/stks clay		803	860	57
Sandy clay		860	875	15
Gravel		875	880	5
Gravel w/clay layers		880	900	20
Sand & gravel		900	941	41

(continued Pg. 2)

Date started August 22, 1980
Date completed October 30, 1980

7. WELL TEST DATA

Pump RPM	G.P.M.	Draw Down	After Hours Pump

BAILER TEST
G.P.M. Draw down feet hours
G.P.M. Draw down feet hours
G.P.M. Draw down feet hours

8. 36"-100' WELL CONSTRUCTION
Diameter hole 28 inches Total depth 1,300 feet
Casing record
Weight per foot Thickness .250

Diameter	From	To
20 inches	+1 feet	1300 feet
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet

Surface seal: Yes ☒ No ☐ Type Cement
Depth of seal 100' feet
Gravel packed: Yes ☒ No ☐
Gravel packed from 100 feet to 1300 feet

Perforations:
Type perforation Mill slots
Size perforation 5/32 x 3, 20 rows dbl cut
From 700 feet to 740 feet
From 800 feet to 1300 feet
From feet to feet
From feet to feet
From feet to feet

9. 561 WATER LEVEL
Static water level 700 Feet below land surface
Flow G.P.M.
Water temperature ° F. Quality

10. DRILLERS CERTIFICATION
This well was drilled under my supervision and the report is true to the best of my knowledge.

Name THOMPSON DRILLING CO., INC.
Address 3215 Cinder Lane
Las Vegas, Nevada 89103
Nevada contractor's license number 4286A
Nevada driller's license number 582
Signed [signature]
Date November 19, 1980

USE ADDITIONAL SHEETS IF NECESSARY

O-627

WHITE—DIVISION OF WATER RESOURCES
CANARY—CLIENT'S COPY
PINK—WELL DRILLER'S COPY

Well #6 #5

STATE OF NEVADA
DIVISION OF WATER RESOURCES

WELL DRILLERS REPORT

Please complete this form in its entirety

OFFICE USE ONLY
Log No.
Permit No.
Basin.

1. OWNER Anaconda Copper Co. ADDRESS Nevada Moly Project P.O. Box 1268 Tonopah, Nevada 89049

2. LOCATION SE ¼ NE ¼ Sec. 2 T. 5 N/S R. 41 E. Nye County
PERMIT NO. 40524 #3

3. TYPE OF WORK
New Well ☒ Reconditon ☐
Deepen ☐ Other ☐

4. Mining PROPOSED USE
Domestic ☐ Irrigation ☐ Test ☐
Municipal ☐ Industrial ☐ Stock ☐

5. TYPE WELL
Cable ☐ Rotary ☒
Other ☐

6. (Continued) LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
Gray sandy clay		941	980	39
Brn. sandy clay		980	1000	20
Brn sandstone		1000	1008	8
Cemented med. gravel		1008	1031	23
Sandy clay		1031	1036	5
Brn. sandstone		1036	1042	6
Brown clay		1042	1045	3
Hd.dark sandstone w/grav.		1045	1063	18
Brown clay		1063	1080	17
Cem. sand & gravel		1080	1160	80
Tan sandy clay		1160	1191	31
Sand & gravel		1191	1197	6
White clay		1197	1204	7
White ash		1204	1208	4
Brown sandy clay		1208	1218	10
Gravel		1218	1227	9
Brn.sandy clay & sandstn.		1227	1237	10
Gravel		1237	1250	13
Grey clay		1250	1252	2
Brown clay		1252	1258	6
Gravel		1258	1262	4
Lt. tan clay		1262	1263	1
Hd. clay & sandstone		1263	1280	17
Brown sandy clay		1280	1300	20

Date started, 19
Date completed, 19

7. WELL TEST DATA

Pump RPM	G.P.M.	Draw Down	After Hours Pump

BAILER TEST
G.P.M. Draw down feet hours
G.P.M. Draw down feet hours
G.P.M. Draw down feet hours

8. WELL CONSTRUCTION
Diameter hole inches Total depth feet
Casing record
Weight per foot Thickness

Diameter	From	To
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet

Surface seal: Yes ☐ No ☐ Type
Depth of seal feet
Gravel packed: Yes ☐ No ☐
Gravel packed from feet to feet

Perforations:
Type perforation
Size perforation
From feet to feet
From feet to feet
From feet to feet
From feet to feet
From feet to feet

9. WATER LEVEL
Static water level Feet below land surface
Flow G.P.M.
Water temperature ° F. Quality

10. DRILLERS CERTIFICATION
This well was drilled under my supervision and the report is true to the best of my knowledge.

Name THOMPSON DRILLING CO., INC.
Address 3215 Cinder Lane Las Vegas, Nevada 89103
Nevada contractor's license number 4286A
Nevada driller's license number 582
Signed [signature]
Date November 19, 1980

USE ADDITIONAL SHEETS IF NECESSARY

O-627

WHITE—DIVISION OF WATER RESOURCES
CANARY—CLIENT'S COPY
PINK—WELL DRILLER'S COPY

#6

~~Well #2~~

STATE OF NEVADA
DIVISION OF WATER RESOURCES

WELL DRILLERS REPORT

Please complete this form in its entirety

OFFICE USE ONLY
Log No.
Permit No.
Basin

1. OWNER Anaconda Copper Co. ADDRESS Post Office Box 1268
Tonopah, Nevada 89049

2. LOCATION NE ¼ SE ¼ Sec. 2 T. 5 N/~~S~~ R. 41 E. MDB&M Nye County
PERMIT NO. 42480 Waiver #058

3. TYPE OF WORK
New Well ☒ Recondition ☐
Deepen ☐ Other ☐

4. PROPOSED USE — Mining
Domestic ☐ Irrigation ☐ Test ☐
Municipal ☐ Industrial ☐ Stock ☐

5. TYPE WELL
Cable ☐ Rotary ☒
Other ☐

6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
Top soil		0	10	10
Sand & gravel		10	79	69
Cemented sand & gravel		79	82	3
Sand & gravel		82	98	16
Cemented sand & gravel		98	160	62
Sand & gravel		160	200	40
Sand, grav. & sm bldrs.		200	255	55
Tan sandy clay		255	272	17
Sand, grav. & boulders		272	280	8
Sand & gravel		280	320	40
Gravwel w/ boulders		320	340	20
Brown sandstone		340	360	20
Sand & gravel		360	390	30
Sand & grav. w/ clay stks		390	440	50
Sand & gravel		440	466	26
Gray sandstone		466	474	8
Cemented gravel		474	493	9
Tan sandy clay		493	498	5
Sand & gravel		498	520	22
Sand & grav w/ stks clay		520	540	20
Cemented sand & gravel		540	617	77
Tan sandy clay		617	625	8
Cem. sand & gravel		625	642	17
Tan sandy clay		642	661	19
Cemented gravel		661	700	39
Tan clay		700	722	22
Cemented gravel		722	860	138

(continued)

Date started November 20, 19 80
Date completed January 14, 19 81

7. WELL TEST DATA

Pump RPM	G.P.M.	Draw Down	After Hours Pump

BAILER TEST
G.P.M. .... Draw down .... feet .... hours
G.P.M. .... Draw down .... feet .... hours
G.P.M. .... Draw down .... feet .... hours

8. 36" 0-100 WELL CONSTRUCTION
Diameter hole 28 inches Total depth 1300 feet
Casing record
Weight per foot .... Thickness .250

Diameter	From	To
30 inches	+2 feet	100 feet
20 inches	+1 feet	1300 feet
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet

Surface seal: Yes ☒ No ☐ Type Cement
Depth of seal 100 feet
Gravel packed: Yes ☒ No ☐
Gravel packed from 100 feet to 1300 feet

Perforations:
Type perforation Mill slots
Size perforation 1/8 x 3 dbl cut 20 rows
From 800 feet to 1300 feet
From .... feet to .... feet
From .... feet to .... feet
From .... feet to .... feet
From .... feet to .... feet

9. WATER LEVEL
Static water level 526 Feet below land surface
Flow .... G.P.M.
Water temperature .... ° F. Quality

10. DRILLERS CERTIFICATION
This well was drilled under my supervision and the report is true to the best of my knowledge.

Name THOMPSON DRILLING CO., INC.
Address 3215 Cinder Lane
Las Vegas, Nevada 89103
Nevada contractor's license number 4286A
Nevada driller's license number 582
Signed [signature]
Date January 21, 1981

USE ADDITIONAL SHEETS IF NECESSARY

O-627

WHITE—DIVISION OF WATER RESOURCES
CANARY—CLIENT'S COPY
PINK—WELL DRILLER'S COPY

#7 Page 2
Well #2

STATE OF NEVADA
DIVISION OF WATER RESOURCES

WELL DRILLERS REPORT

Please complete this form in its entirety

OFFICE USE ONLY
Log No.
Permit No.
Basin

1. OWNER Anaconda Copper Co. ADDRESS

2. LOCATION NE ¼ SE ¼ Sec. 2 T. 5 N/S R. 41 E. MDB&M Nye County
PERMIT NO. 42480 Waiver #058

3. TYPE OF WORK
New Well ☒ Reconditon ☐
Deepen ☐ Other ☐

4. Mining PROPOSED USE
Domestic ☐ Irrigation ☐ Test ☐
Municipal ☐ Industrial ☐ Stock ☐

5. TYPE WELL
Cable ☐ Rotary ☒
Other ☐

6. (continued) LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
Clay w/ gravel		860	880	20
Clay		880	900	20
Cemented gravel		900	936	36
Tan sandy clay		936	942	6
Cemented gravel		942	1100	158
Cem. sand & gravel		1100	1121	21
Grey sandy clay		1121	1140	19
Cem. sand & gravel		1140	1161	21
Cemented gravel		1161	117[illegible]	[illegible]
Cem. sand & gravel		1170	122[illegible]	50
Cem. sand & grav. w/ stks tan sandy clay		1220	128[illegible]	60
Cem. sand & gravel		1280	130[illegible]	20

Date started November 20, 198[illegible]
Date completed January 14, 198[illegible]

7. WELL TEST DATA

Pump RPM	G.P.M.	Draw Down	After Hours Pump

BAILER TEST
G.P.M. Draw down feet hours
G.P.M. Draw down feet hours
G.P.M. Draw down feet hours

8. 36" 0-100' WELL CONSTRUCTION
Diameter hole 28 inches Total depth 1300 feet
Casing record
Weight per foot Thickness .250

Diameter	From	To
30 inches	+2 feet	~~1300~~ 100 feet
20 inches	+1 feet	1300 feet
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet

Surface seal: Yes ☒ No ☐ Type Cement
Depth of seal 100 feet
Gravel packed: Yes ☒ No ☐
Gravel packed from 100 feet to 1300 feet

Perforations:
Type perforation Mill slots
Size perforation 1/8 x 3 dbl cut 20 rows
From 800 feet to 1300 feet
From feet to feet
From feet to feet
From feet to feet
From feet to feet

9. WATER LEVEL
Static water level 526 Feet below land surface
Flow G.P.M.
Water temperature °F. Quality

10. DRILLERS CERTIFICATION
This well was drilled under my supervision and the report is true to the best of my knowledge.

Name THOMPSON DRILLING CO., INC.
Address 3215 Cinder Lane
Las Vegas, Nevada 89103
Nevada contractor's license number 4286A
Nevada driller's license number 582
Signed Richard K. Thompson
Date January 21, 1981

USE ADDITIONAL SHEETS IF NECESSARY

O-627

WHITE—DIVISION OF WATER RESOURCES
CANARY—CLIENT'S COPY
PINK—WELL DRILLER'S COPY

CORRECTED COPY

Well #7

STATE OF NEVADA
DIVISION OF WATER RESOURCES

WELL DRILLERS REPORT

Please complete this form in its entirety

OFFICE USE ONLY
Log No. 22688
Permit No. 42479
Basin

1. OWNER Anaconda Copper Co. Nevada Moly Project ADDRESS Post Office Box 1268 Tonopah, Nevada 89049

2. LOCATION SE ¼ SE ¼ Sec. 2 T. 5 N/☒ R. 41 E. Nye County
PERMIT NO. 42479

3. TYPE OF WORK
New Well ☒ Recondition ☐
Deepen ☐ Other ☐

4. PROPOSED USE Mining
Domestic ☐ Irrigation ☐ Test ☐
Municipal ☐ Industrial ☐ Stock ☐

5. TYPE WELL
Cable ☐ Rotary ☒
Other ☐

6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
Sand		0	20	20
Sand & gravel		20	75	55
Boulders & lg. gravel		75	85	10
Sand, gravel, boulders		85	124	39
Sand & fine gravel		124	125	1
Large gravel		125	140	15
Sand & gravel		140	180	40
Grav., sand & boulders		180	251	71
Boulders		251	266	15
Sand & gravel		266	327	61
Cem. sand & gravel		327	393	66
Boulders		393	407	14
Sand & gravel		407	427	20
Cem. gravel		427	447	20
" " &sandstone stks		447	467	20
" " stks tan clay		467	487	20
Tan sandy clay & gravel		487	527	40
Sand & gravel		527	567	40
Cem. sand & gravel		567	587	20
Sandy tan clay & grav.		587	624	37
Sand & fine gravel		624	684	60
Tan clay, sand & grav.		684	784	100
Tan sandy clay		784	812	28
Sand & gravel		812	884	72
Tan clay, sand & grav.		884	1164	280
Grey sndy clay & grav.		1164	1264	100
Gravel & sand		1264	1294	30

Date started January 9, 19 81
Date completed March 25, 19 81

7. WELL TEST DATA

Pump RPM	G.P.M.	Draw Down	After Hours Pump

BAILER TEST
G.P.M. .... Draw down .... feet .... hours
G.P.M. .... Draw down .... feet .... hours
G.P.M. .... Draw down .... feet .... hours

8. 36"-195' WELL CONSTRUCTION
Diameter hole 28 inches Total depth 1207 feet
Casing record
Weight per foot Thickness .250

Diameter	From	To
28 inches	+1 feet	195 feet
20 inches	+1 feet	1207 feet
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet

Surface seal: Yes ☒ No ☐ Type Cement
Depth of seal 100' & 190-195' feet
Gravel packed: Yes ☒ No ☐
Gravel packed from 100 feet to 1207 feet

Perforations:
Type perforation Mill slots
Size perforation 1/8x3 dbl cut 20 rows
From 684 feet to 1207 feet
From .... feet to .... feet
From .... feet to .... feet
From .... feet to .... feet
From .... feet to .... feet

9. WATER LEVEL
Static water level 490 Feet below land surface
Flow .... G.P.M.
Water temperature .... ° F. Quality

10. DRILLERS CERTIFICATION
This well was drilled under my supervision and the report is true to the best of my knowledge.

Name THOMPSON DRILLING CO., INC.
Address 3215 Cinder Lane Las Vegas, Nevada 89103

Nevada contractor's license number 4286A

Nevada driller's license number 582

Signed Richard K. Thompson

Date March 31, 1981
(CORRECTED COPY)

USE ADDITIONAL SHEETS IF NECESSARY

STATE OF NEVADA
DIVISION OF WATER RESOURCES

WELL DRILLERS REPORT

Please complete this form in its entirety

OFFICE USE ONLY
Log No.
Permit No.
Basin.

WELL #9

1. OWNER Anaconda Minerals Company Nevada Moly Project ADDRESS P.O. Box 1268, Tonopah, NV 89049

2. LOCATION SE ¼ NE ¼ Sec. 11 T. 5 (N)/S R. 41 E. Nye County
PERMIT NO. 42835 Notice of Intent #0392

3. TYPE OF WORK
New Well XX Reconditioned ☐ Deepen ☐ Other ☐

4. PROPOSED USE
Domestic ☐ Irrigation ☐ Test ☐ Municipal ☐ Industrial XX Stock ☐

5. TYPE WELL
Cable ☐ Rotary XX Other ☐

6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
Sand with cobbles		0	8	
Fine sand w/gravel (some large)		8	90	
Coarse sand w/med. gravel rock lenses, trace of clay		90	193	
Rock		193	194	
Sand to coarse gravel w/a few clay streaks		194	480	
Sand to coarse sand, small gravel w/some clay streaks		480	840	
Sand to coarse sand w/clay stringers (2'-3')		840	945	
Sand to coarse sand w/thin clay streaks (50-50)		945	1410	
Fine to coarse sand		1410	1426	
Coarse sand and clay		1426	1450	
Brown soft clay and sand mix		1450	1520	
Fine to coarse sand		1520	1535	
Coarse sand and clay		1535	1605	

Date started December 2, 1981
Date completed March 6, 1982

7. WELL TEST DATA

Pump RPM	G.P.M.	Draw Down	After Hours Pump
	2000	140.9	46

BAILER TEST
G.P.M. - Draw down ...... feet ...... hours
G.P.M. ...... Draw down ...... feet ...... hours
G.P.M. ...... Draw down ...... feet ...... hours

8. 672-1111=24" WELL CONSTRUCTION
Diameter hole 0-672=30" inches Total depth 1,111 feet
Casing record 0-150'=32", 0-501=26"x3/8 conductor
Weight per foot 18"O.D. Blank 70.58 lbs. Louvered=58.93lbs. Thickness 3/8" 5/16"

Diameter	From	To
32"x7/16" inches	0 feet	150 feet
26"x3/8" inches	0 feet	501 feet
18"O.D.x3/8" inches	0 feet	505 feet

Surface seal: Yes XX No ☐ Type Cement Grout
Depth of seal 50'-40" borex32"x7/16 conductor feet
Gravel packed: Yes XX No ☐
Gravel packed from 0 feet to 1097 feet
1105' to 1097' cement plug
Perforations: Roscoe Moss
Type perforation Standard and Full-Flow
Size perforation 3/32"
From 505 feet to 625 Standard feet
From 625 feet to 905 Full-Flow feet
From 905 feet to 1105 Standard feet

9. WATER LEVEL
Static water level 478 Feet below land surface
Flow - G.P.M. -
Water temperature - ° F. Quality -

10. DRILLERS CERTIFICATION
This well was drilled under my supervision and the report is true to the best of my knowledge.

Name E.E. Luhdorff Co./Div. of Layne-Western Co., Inc.
Address P.O. Box 1326, Woodland, CA 95695
Nevada contractor's license number 013647
Nevada driller's license number M.E. Siefer's ~~889~~
Signed Robert L. Vincent
Date May 26, 1982

APPENDIX B

SUPPORTING INFORMATION
FOR THE MODEL

FLOWPATH

version 2.0

Two-dimensional Horizontal Aquifer Simulation Model

developed by:

Thomas Franz
&
Nilson Guiguer

waterloo
hydrogeologic
software

113-106 Seagram Drive, Waterloo, Ont., Canada N2L 3B8 tel.:(519) 746 1798

CHAPTER II - THEORETICAL BACKGROUND

2.1 Two-Dimensional Steady-State Flow

The governing equation for two-dimensional, steady-state flow in heterogeneous, saturated, anisotropic, porous media, is:

$$\frac{\partial}{\partial x}\left(T_{xx}\frac{\partial h}{\partial x}\right)+\frac{\partial}{\partial y}\left(T_{yy}\frac{\partial h}{\partial y}\right)\pm Q(x,y)=0 \qquad (1)$$

where:

T_{xx} , T_{yy} = principal components of the transmissivity tensor (L^2T^{-1})

h = hydraulic head (L)

$Q(x,y)$ = volumetric fluxes of sinks (-) and sources (+) per unit surface area of aquifer. This term can represent pumping/injection wells, evapotranspiration, infiltration, and leakage from surface water bodies or over- and underlying aquifer-aquitard systems (LT^{-1})

x,y = Cartesian coordinates

The components of the transmissivity tensor are given by:

$$T_{xx}=bK_{xx} \qquad T_{yy}=bK_{yy} \qquad (2)$$

where:

b = saturated thickness for unconfined aquifers, or aquifer thickness for confined aquifers (L)

K_{xx} , K_{yy} = principal components of the hydraulic conductivity tensor (LT^{-1})

2.2 Velocities

The relationship between the properties of the porous medium, the hydraulic gradient and the groundwater flux is given by Darcy's law:

$$q_x = -K_{xx}\frac{\partial h}{\partial x} \qquad q_y = -K_{yy}\frac{\partial h}{\partial y} \tag{3}$$

where:

q_x, q_y = components of the Darcy flux in the directions x and y (LT^{-1})

The components of the average linear groundwater velocity are given by:

$$v_x = \frac{q_x}{\theta} \qquad v_y = \frac{q_y}{\theta} \tag{4}$$

where:

θ = effective porosity for flow (dimensionless)

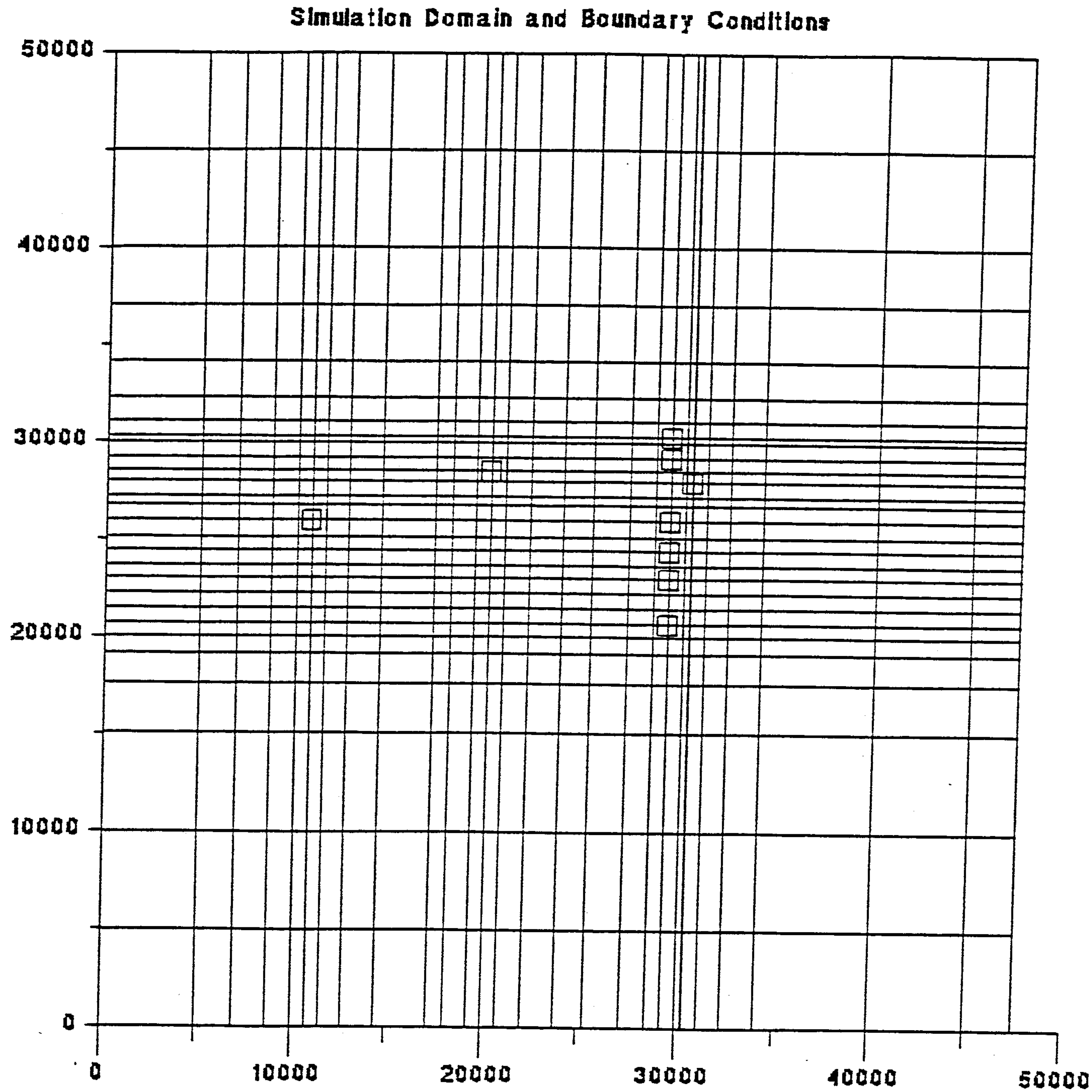
2.3 Pathline Calculation

Pathlines provide a clear visual description of the groundwater flow regime. In a steady-state flow field with no areally distributed recharge, pathlines coincide with streamlines.

The two-dimensional characteristic equation of a pathline is given by :

$$p(x,y) = p(x_0, y_0) + \int v\,dt \tag{5}$$

where p is a vector containing the x, y coordinates of the pathlines, $p(x_0, y_0)$ defines the starting point of the pathline (initial condition), v is the average linear groundwater velocity and t is time.



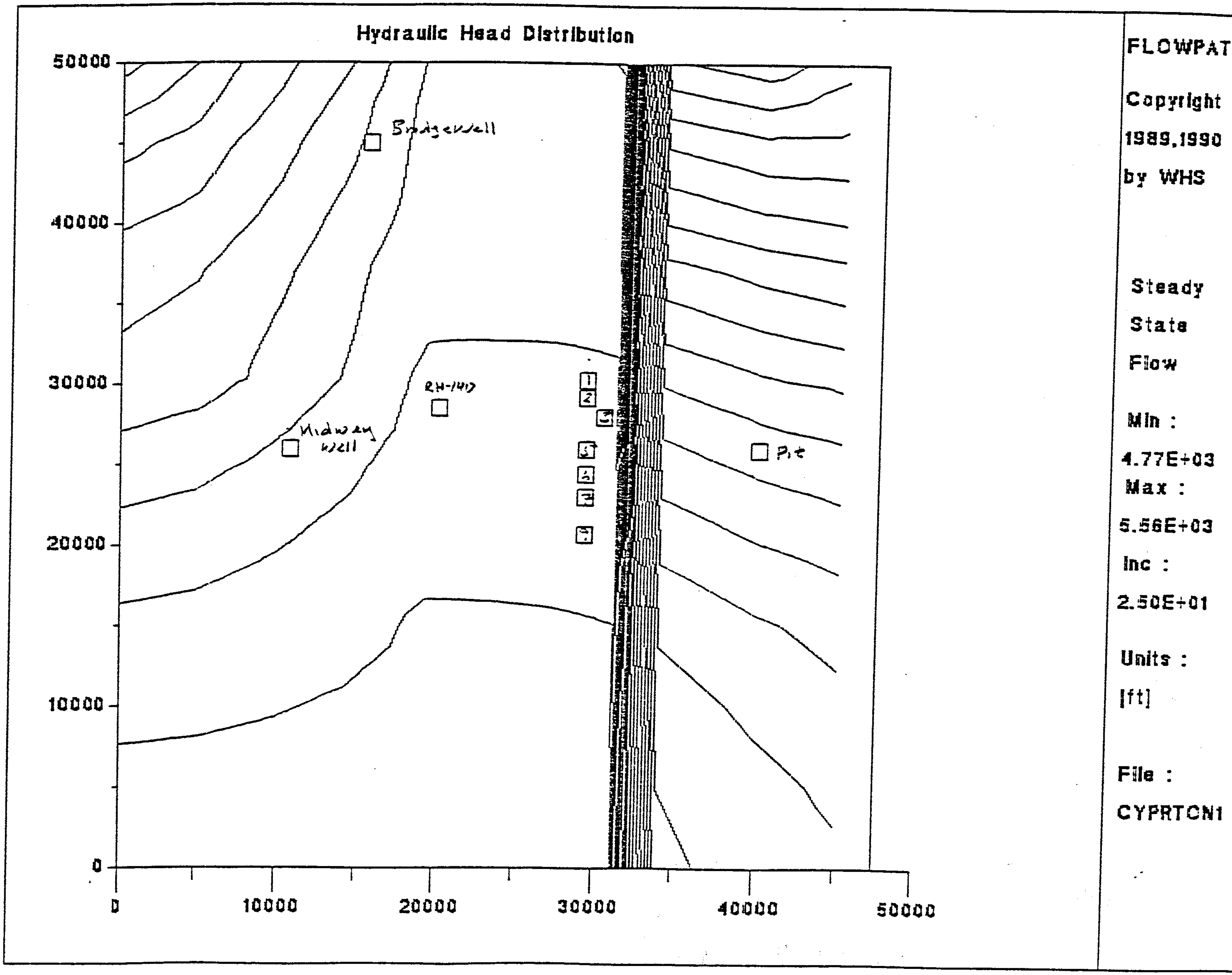
FLOWPATH

Copyright
1989,1990
by WHS

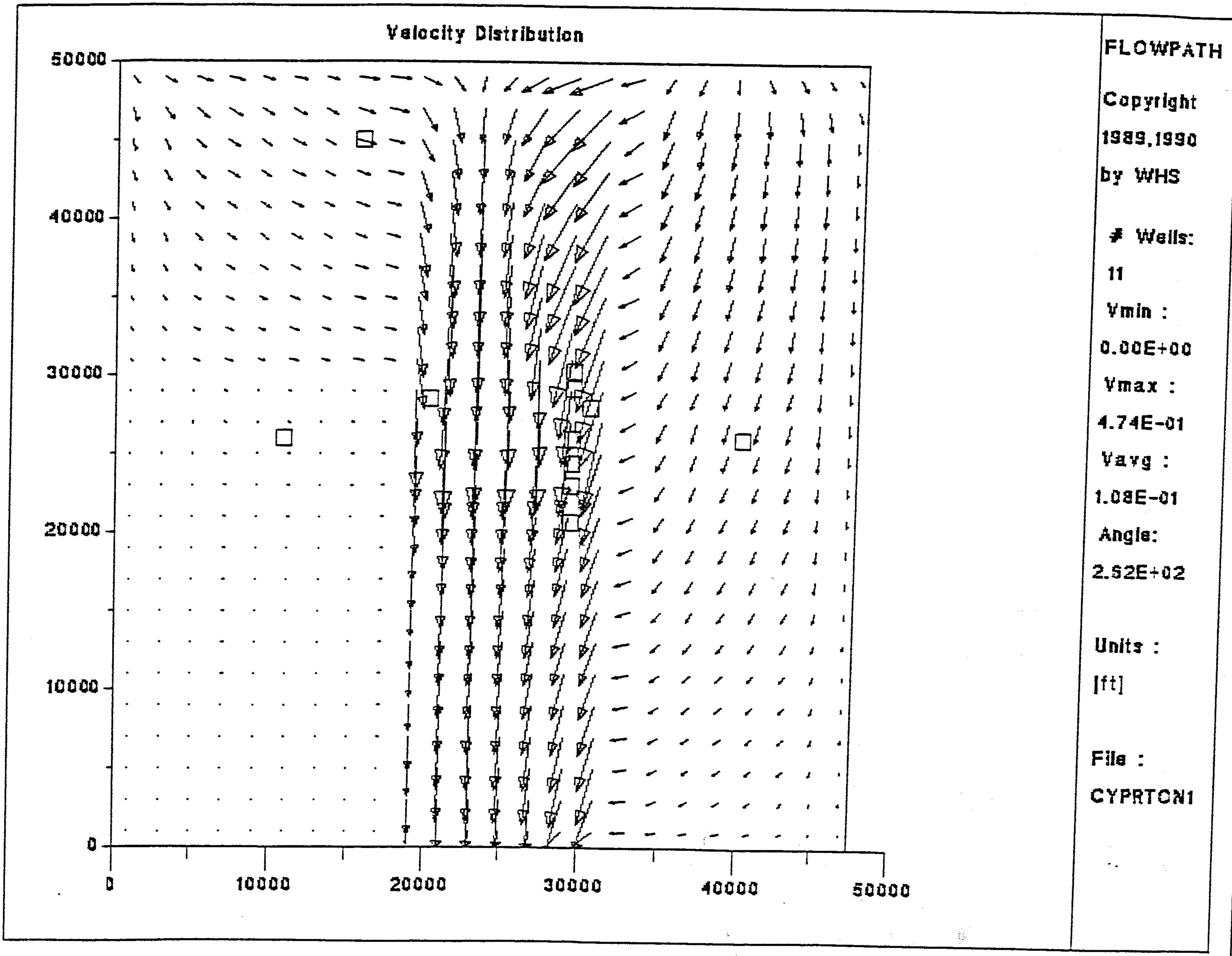
Rows :
29
Cols :
28
Wells:
9

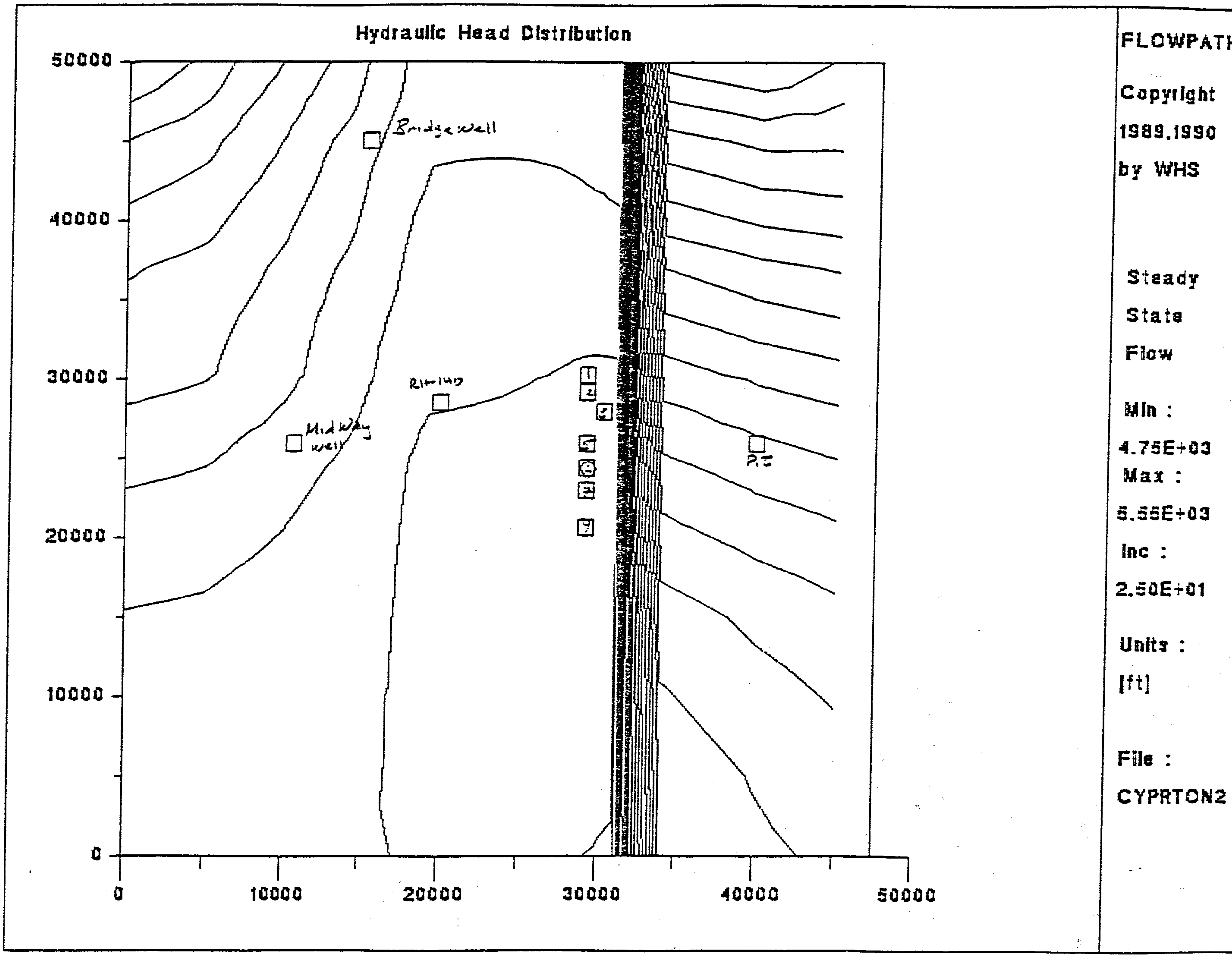
Units :
[ft]

File :
CYPRTCN1



Hydraulic Head Distribution
50000
40000
30000
20000
10000
0
10000
20000
30000
40000
50000
Bridgewell
Midway well
RH-1417
Pit
1
2
FLOWPATH
Copyright
1989,1990
by WHS
Steady
State
Flow
Min :
4.77E+03
Max :
5.56E+03
Inc :
2.50E+01
Units :
[ft]
File :
CYPRTCN1

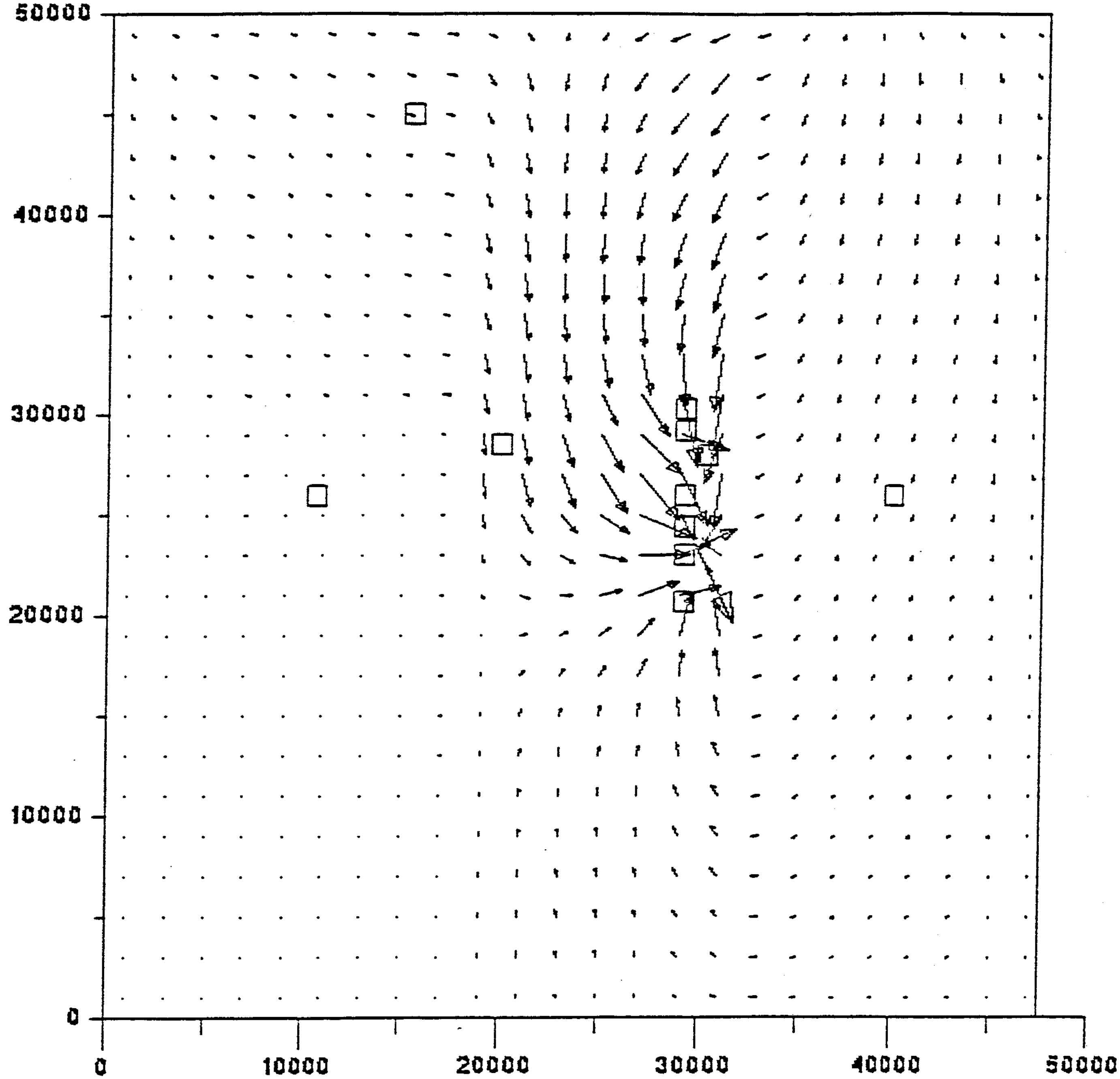

Velocity Distribution
50000
40000
30000
20000
10000
0
0
10000
20000
30000
40000
50000
FLOWPATH
Copyright
1989,1990
by WHS
Wells:
11
Vmin :
0.00E+00
Vmax :
4.74E-01
Vavg :
1.08E-01
Angle:
2.52E+02
Units :
[ft]
File :
CYPRTON1



Hydraulic Head Distribution
50000
40000
30000
20000
10000
0
10000
20000
30000
40000
50000
Bridge well
Mid Way well
RI-1 ...
PT
FLOWPATH
Copyright
1989,1990
by WHS
Steady
State
Flow
Min :
4.75E+03
Max :
5.55E+03
Inc :
2.50E+01
Units :
[ft]
File :
CYPRTON2

STEADY STATE

Velocity Distribution



FLOWPATH

Wells: 11

Vmin : 0.00E+00

Vmax : 1.53E+00

Vavg : 1.11E-01

Angle: 2.77E+02

Units : [ft]

File : CYPRTON2

```
*****************************************************************************
*                          E C H O P R I N T                                *
*                                                                           *
*                           F L O W P A T H                                 *
*                            Version 3.0                                    *
*                                                                           *
*  FLOWPATH was written by Thomas Franz and Nilson Guiguer                  *
*                                                                           *
*****************************************************************************
*                                                                           *
*                       Copyright 1989, 1990                                *
*                               by                                          *
*                  Waterloo Hydrogeologic Software                          *
*                      113-106 Seagram Drive                                *
*                        Waterloo, Ontario                                  *
*                         N2L 3B8, Canada                                   *
*                                                                           *
*                        ph (519) 746-1798                                  *
*                                                                           *
*****************************************************************************
```

FLOWPATH logbook for data set : CYPRTON2

3rd run 1/14/91

Unit System : English units [ft/gal/d]

***** GRID PARAMETERS *****

Number of x-grid lines : 29

Number of y-grid lines : 29

Grid coordinates (x-grid lines) [ft] :

1	0.00000E+00
2	4.97788E+03
3	6.96903E+03
4	8.73894E+03
5	9.95575E+03
6	1.07301E+04
7	1.15044E+04
8	1.27212E+04
9	1.44912E+04
10	1.54867E+04
11	1.71460E+04
12	1.80310E+04
13	1.92478E+04
14	2.00221E+04
15	2.07965E+04
16	2.20133E+04
17	2.37832E+04
18	2.53319E+04
19	2.72124E+04
20	2.84292E+04
21	2.92035E+04
22	2.99779E+04
23	3.03097E+04
24	3.10841E+04
25	3.23009E+04
26	3.40708E+04
27	4.00442E+04
28	4.50221E+04
29	5.00000E+04

Grid coordinates (y-grid lines) [ft] :

1	0.00000E+00
2	4.97788E+03
3	9.95575E+03
4	1.50442E+04
5	1.75885E+04
6	1.91372E+04
7	2.00221E+04
8	2.06858E+04
9	2.14602E+04
10	2.22345E+04
11	2.30088E+04
12	2.36726E+04
13	2.44469E+04
14	2.51106E+04
15	2.59956E+04
16	2.67699E+04
17	2.72124E+04
18	2.79867E+04
19	2.85398E+04

21	2.99779E+04
22	3.03097E+04
23	3.10841E+04
24	3.23009E+04
25	3.41814E+04
26	3.70575E+04
27	4.00442E+04
28	4.50221E+04
29	5.00000E+04

***** WELL PARAMETERS *****

Number of wells : 11

	No.	i	j	X [ft]	Y [ft]	well discharge [gpd]
MIDWAY	1	14	19	2.00221E+04	2.85398E+04	0.00000E+00
140	2	6	15	1.07301E+04	2.59956E+04	0.00000E+00
PIT	3	27	15	4.00442E+04	2.59956E+04	0.00000E+00
2	4	23	18	3.03097E+04	2.79867E+04	-8.84160E+03
(142) 3	5	21	22	2.92035E+04	3.03097E+04	-1.24739E+05
5	6	21	15	2.92035E+04	2.59956E+04	-1.20681E+05
6	7	21	13	2.92035E+04	2.44469E+04	-1.63971E+06
7	8	21	11	2.92035E+04	2.30088E+04	-6.07810E+05
1	9	21	20	2.92035E+04	2.92035E+04	-7.61602E+05
Bridge	10	10	28	1.54867E+04	4.50221E+04	0.00000E+00
9	11	21	8	2.92035E+04	2.06858E+04	-9.74794E+05

***** CONSTRAINED HEAD NODES *****

Number of constant head nodes : 20

No.	i	j	X [ft]	Y [ft]	const. head [ft]
1	1	1	0.00000E+00	0.00000E+00	4.77500E+03
2	2	1	4.97788E+03	0.00000E+00	4.77500E+03
3	3	1	6.96903E+03	0.00000E+00	4.77500E+03
4	4	1	8.73894E+03	0.00000E+00	4.77500E+03
5	5	1	9.95575E+03	0.00000E+00	4.77500E+03
6	6	1	1.07301E+04	0.00000E+00	4.77500E+03
7	7	1	1.15044E+04	0.00000E+00	4.77500E+03
8	8	1	1.27212E+04	0.00000E+00	4.77500E+03
9	9	1	1.44912E+04	0.00000E+00	4.77500E+03
10	11	1	1.71460E+04	0.00000E+00	4.77500E+03
11	12	1	1.80310E+04	0.00000E+00	4.77500E+03
12	13	1	1.92478E+04	0.00000E+00	4.77500E+03
13	14	1	2.00221E+04	0.00000E+00	4.77500E+03
14	15	1	2.07965E+04	0.00000E+00	4.77500E+03
15	16	1	2.20133E+04	0.00000E+00	4.77500E+03
16	17	1	2.37832E+04	0.00000E+00	4.77500E+03
17	18	1	2.53319E+04	0.00000E+00	4.77500E+03
18	19	1	2.72124E+04	0.00000E+00	4.77500E+03
19	20	1	2.84292E+04	0.00000E+00	4.77500E+03
20	21	1	2.92035E+04	0.00000E+00	4.77500E+03

***** SPECIFIED FLUX NODES *****

Number of flux nodes : 54

No.	i	j	X [ft]	Y [ft]	nodal flow [ft^3/ft^2/d]
1	27	29	4.00442E+04	5.00000E+04	5.03000E-02
2	26	29	3.40708E+04	5.00000E+04	3.56000E-02
3	25	29	3.23009E+04	5.00000E+04	1.37000E-02
4	24	29	3.10841E+04	5.00000E+04	9.10000E-03
5	23	29	3.03097E+04	5.00000E+04	5.10000E-03
6	22	29	2.99779E+04	5.00000E+04	5.10000E-03
7	21	29	2.92035E+04	5.00000E+04	7.10000E-03
8	20	29	2.84292E+04	5.00000E+04	9.20000E-03
9	19	29	2.72124E+04	5.00000E+04	1.42000E-02
10	18	29	2.53319E+04	5.00000E+04	1.58000E-02
11	17	29	2.37832E+04	5.00000E+04	1.53000E-02
12	16	29	2.20133E+04	5.00000E+04	1.37000E-02
13	15	29	2.07965E+04	5.00000E+04	9.10000E-03
14	14	29	2.00221E+04	5.00000E+04	7.10000E-03
15	13	29	1.92478E+04	5.00000E+04	9.10000E-03
16	12	29	1.80310E+04	5.00000E+04	9.70000E-03
17	11	29	1.71460E+04	5.00000E+04	1.63000E-02
18	9	29	1.44912E+04	5.00000E+04	2.03000E-02
19	8	29	1.27212E+04	5.00000E+04	1.37000E-02
20	7	29	1.15044E+04	5.00000E+04	9.10000E-03
21	6	29	1.07301E+04	5.00000E+04	7.10000E-03
22	5	29	9.95575E+03	5.00000E+04	9.10000E-03
23	28	15	4.50221E+04	2.59956E+04	3.80000E-04
24	28	9	4.50221E+04	9.95575E+03	2.34000E-03
25	28	4	4.50221E+04	1.50442E+04	1.77000E-03

26	28	5	4.50221E+04	1.75885E+04	9.60000E-04
27	28	6	4.50221E+04	1.91372E+04	5.60000E-04
28	28	7	4.50221E+04	2.00221E+04	3.60000E-04
29	28	8	4.50221E+04	2.06858E+04	3.90000E-04
30	28	29	4.50221E+04	5.00000E+04	2.31000E-03
31	28	28	4.50221E+04	4.50221E+04	2.31000E-03
32	28	27	4.50221E+04	4.00442E+04	1.85000E-03
33	28	26	4.50221E+04	3.70575E+04	1.36000E-03
34	28	25	4.50221E+04	3.41814E+04	1.10000E-03
35	28	24	4.50221E+04	3.23009E+04	7.20000E-04
36	28	23	4.50221E+04	3.10841E+04	4.60000E-04
37	28	22	4.50221E+04	3.03097E+04	2.60000E-04
38	28	21	4.50221E+04	2.99779E+04	2.60000E-04
39	28	20	4.50221E+04	2.92035E+04	3.30000E-04
40	28	19	4.50221E+04	2.85398E+04	2.50000E-04
41	28	18	4.50221E+04	2.79867E+04	3.10000E-04
42	28	17	4.50221E+04	2.72124E+04	2.80000E-04
43	28	16	4.50221E+04	2.67699E+04	2.80000E-04
44	28	2	4.50221E+04	4.97788E+03	2.31000E-03
45	28	14	4.50221E+04	2.51106E+04	3.60000E-04
46	28	13	4.50221E+04	2.44469E+04	3.30000E-04
47	28	12	4.50221E+04	2.36726E+04	3.30000E-04
48	28	11	4.50221E+04	2.30088E+04	3.30000E-04
49	28	10	4.50221E+04	2.23345E+04	3.60000E-04
50	28	9	4.50221E+04	2.14602E+04	3.60000E-04
51	1	29	0.00000E+00	5.00000E+04	1.56000E-02
52	2	29	4.97788E+03	5.00000E+04	1.09000E-02
53	3	29	6.96903E+03	5.00000E+04	5.90000E-03
54	4	29	8.73894E+03	5.00000E+04	4.70000E-03

***** SURFACE WATER BODIES *****

Number of surface water body nodes : 0

***** AQUIFER PROPERTIES *****

Number of different material properties : 42

No.	Kxx [ft/d]	Kyy [ft/d]	Porosity [-]	
1	1.33700E+01	1.33700E+01	1.20000E-01	(default)
2	1.33700E+00	1.33700E+00	1.20000E-01	
3	6.00000E+00	6.00000E+00	1.20000E-01	
4	4.50000E+00	4.50000E+00	1.20000E-01	
5	2.00000E+00	2.00000E+00	1.20000E-01	
6	1.33700E-01	1.33700E-01	1.20000E-01	
7	6.50000E-01	6.50000E-01	1.20000E-01	
8	1.30000E-02	1.30000E-02	1.20000E-01	
9	6.00000E-01	6.00000E-01	1.20000E-01	
10	3.50000E-01	3.50000E-01	1.20000E-01	
11	6.50000E-01	6.50000E-01	1.20000E-01	
12	2.60000E+01	2.60000E+01	1.20000E-01	
13	1.00000E+00	1.00000E+00	1.20000E-01	
14	1.30000E+02	1.30000E+02	1.20000E-01	
15	6.00000E-02	6.00000E-02	1.20000E-01	
16	3.00000E-01	3.00000E-01	1.20000E-01	
17	4.00000E-02	4.00000E-02	1.20000E-01	
18	2.00000E-02	2.00000E-02	1.20000E-01	
19	3.00000E-02	3.00000E-02	1.20000E-01	
20	6.00000E-01	6.00000E-01	1.20000E-01	
21	9.50000E-01	9.50000E-01	1.20000E-01	
22	7.50000E+01	7.50000E+01	1.20000E-01	
23	1.00000E+02	1.00000E+02	1.20000E-01	
24	1.70000E+01	1.70000E+01	1.20000E-01	
25	1.90000E+01	1.90000E+01	1.20000E-01	
26	5.00000E+01	5.00000E+01	1.20000E-01	
27	7.50000E+01	7.50000E+01	1.20000E-01	
28	1.00000E+02	1.00000E+02	1.20000E-01	
29	1.15000E+02	1.15000E+02	1.20000E-01	
30	2.50000E+01	2.50000E+01	1.20000E-01	
31	2.00000E+01	2.00000E+01	1.20000E-01	
32	5.00000E-01	5.00000E-01	1.20000E-01	
33	9.50000E-01	9.50000E-01	1.20000E-01	
34	2.50000E-01	2.50000E-01	1.20000E-01	
35	5.00000E-01	5.00000E-01	1.20000E-01	
36	2.50000E-01	2.50000E-01	1.20000E-01	
37	2.50000E+01	2.50000E+01	1.20000E-01	
38	5.00000E+01	5.00000E+01	1.20000E-01	
39	2.50000E+01	2.50000E+01	1.20000E-01	
40	5.00000E+01	5.00000E+01	1.20000E-01	
41	4.00000E+01	4.00000E+01	1.20000E-01	
42	3.00000E+01	3.00000E+01	1.20000E-01	

********** DISTRIBUTION OF AQUIFER MATERIAL PROPERTIES **********

|	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
29 |	33	33	33	33	33	33	33	33	33	33	33	33	39	39	39	39	39

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
26	33	33	33	33	33	33	33	33	33	33	33	33	39	39	39	39	39
25	33	33	33	33	33	33	33	33	33	33	33	33	39	39	39	39	39
24	33	33	33	33	33	33	33	33	33	33	33	33	39	39	39	39	39
23	33	33	33	33	33	33	33	33	33	33	33	33	39	39	39	39	39
22	33	33	33	33	33	33	33	33	33	33	33	33	39	39	39	39	39
21	6	6	6	6	6	6	6	6	6	6	6	6	39	39	39	39	39
20	6	6	6	6	6	6	6	6	6	6	6	6	39	39	39	39	39
19	6	6	6	6	6	6	6	6	6	6	6	6	39	39	39	39	39
18	6	6	6	6	6	6	6	6	6	6	6	6	39	39	39	39	39
17	6	6	6	6	6	6	6	6	6	6	6	6	39	39	39	39	39
16	6	6	6	6	6	6	6	6	6	6	6	6	39	39	39	39	39
15	6	6	6	6	6	6	6	6	6	6	6	6	39	39	39	39	39
14	6	6	6	6	6	6	6	6	6	6	6	6	39	39	39	39	39
13	6	6	6	6	6	6	6	6	6	6	6	6	39	39	39	39	39
12	6	6	6	6	6	6	6	6	6	6	6	6	39	39	39	39	39
11	6	6	6	6	6	6	6	6	6	6	6	6	39	39	39	39	39
10	6	6	6	6	6	6	6	6	6	6	6	6	39	39	39	39	39
9	6	6	6	6	6	6	6	6	6	6	6	6	39	39	39	39	39
8	6	6	6	6	6	6	6	6	6	6	6	6	39	39	39	39	39
7	6	6	6	6	6	6	6	6	6	6	6	6	39	39	39	39	39
6	6	6	6	6	6	6	6	6	6	6	6	6	39	39	39	39	39
5	6	6	6	6	6	6	6	6	6	6	6	6	39	39	39	39	39
4	6	6	6	6	6	6	6	6	6	6	6	6	39	39	39	39	39
3	6	6	6	6	6	6	6	6	6	6	6	6	39	39	39	39	39
2	6	6	6	6	6	6	6	6	6	6	6	6	39	39	39	39	39
1	6	6	6	6	6	6	6	6	6	6	6	6	39	39	39	39	39

	18	19	20	21	22	23	24	25	26	27	28	29
29	39	39	39	39	39	39	39	19	2	2	2	*
28	39	39	39	39	39	39	39	19	2	2	2	*
27	39	39	39	39	39	39	39	19	2	2	2	*
26	39	39	39	39	39	39	39	19	2	2	2	*
25	39	39	39	39	39	39	39	19	2	2	2	*
24	39	39	39	39	39	39	39	19	2	2	2	*
23	39	39	39	39	39	39	39	19	2	2	2	*
22	39	39	39	39	39	39	39	19	2	2	2	*
21	39	39	39	39	39	39	39	19	2	2	2	*
20	39	39	39	39	39	39	39	19	2	2	2	*
19	39	39	39	39	39	39	39	19	2	2	2	*
18	39	39	39	39	39	39	39	19	2	2	2	*
17	39	39	39	39	39	39	39	19	2	2	2	*
16	39	39	39	39	39	39	39	19	2	2	2	*
15	39	39	39	39	39	39	39	19	2	2	2	*
14	39	39	39	39	39	39	39	19	2	2	2	*
13	39	39	39	39	39	39	39	19	2	2	2	*
12	39	39	39	39	39	39	39	19	2	2	2	*
11	39	39	39	39	39	39	39	19	2	2	2	*
10	39	39	39	39	39	39	39	19	2	2	2	*
9	39	39	39	39	39	39	39	19	2	2	2	*
8	39	39	39	39	39	39	39	19	2	2	2	*
7	39	39	39	39	39	39	39	19	2	2	2	*
6	39	39	39	39	39	39	39	19	2	2	2	*
5	39	39	39	39	39	39	39	19	2	2	2	*
4	39	39	39	39	39	39	39	19	2	2	2	*
3	39	39	39	39	39	39	39	19	2	2	2	*
2	39	39	39	39	39	39	39	19	2	2	2	*
1	39	39	39	39	39	39	39	19	2	2	2	*

***** AQUIFER TYPE *****

Unconfined aquifer

***** AQUIFER BOTTOM ELEVATIONS *****

Number of different aquifer bottom elevations : 19

No.	aquifer bottom elevation [ft]
1	3.50000E+03 (default)
2	3.70000E+03
3	3.75000E+03
4	4.70000E+03
5	4.10000E+03
6	3.30000E+03
7	3.20000E+03
8	3.10000E+03
9	5.00000E+03
10	4.80000E+03
11	4.00000E+03
12	4.90000E+03
13	4.50000E+03
14	4.02000E+03
15	4.52000E+03

[illegible]
17 4.40000E+03
18 4.30000E+03
19 4.20000E+03

********** DISTRIBUTION OF AQUIFER BOTTOM ELEVATIONS **********

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
29	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
28	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
27	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
26	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
25	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
24	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
23	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
22	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
21	3	3	3	3	3	3	3	3	3	3	14	14	14	14	14	14	14
20	3	3	3	3	3	3	3	3	3	3	5	5	5	5	18	18	18
19	3	3	3	3	3	3	3	3	3	3	5	5	5	5	18	18	18
18	3	3	3	3	3	3	3	3	3	3	5	5	5	5	18	18	18
17	3	3	3	3	3	3	3	3	3	3	5	5	5	5	18	18	18
16	3	3	3	3	3	3	3	3	3	3	5	5	5	5	18	18	18
15	3	3	3	3	3	3	3	3	3	3	5	5	5	5	18	18	18
14	3	3	3	3	3	3	3	3	3	3	5	5	5	5	18	18	18
13	3	3	3	3	3	3	3	3	3	3	5	5	5	5	19	19	19
12	3	3	3	3	3	3	3	3	3	3	5	5	5	5	19	19	19
11	3	3	3	3	3	3	3	3	3	3	5	5	5	5	19	19	19
10	3	3	3	3	3	3	3	3	3	3	5	5	5	5	19	19	19
9	3	3	3	3	3	3	3	3	3	3	5	5	5	5	19	19	19
8	3	3	3	3	3	3	3	3	3	3	5	5	5	5	19	19	19
7	2	2	2	2	2	2	2	2	2	2	5	5	5	5	19	19	19
6	2	2	2	2	2	2	2	2	2	2	5	5	5	5	5	5	5
5	2	2	2	2	2	2	2	2	2	2	5	5	5	5	5	5	5
4	2	2	2	2	2	2	2	2	2	2	5	5	5	5	5	5	5
3	2	2	2	2	2	2	2	2	2	2	5	5	5	5	5	5	5
2	2	2	2	2	2	2	2	2	2	2	5	5	5	5	5	5	5
1	2	2	2	2	2	2	2	2	2	2	5	5	5	5	5	5	5
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

	18	19	20	21	22	23	24	25	26	27	28	29
29	14	15	15	15	15	15	15	15	15	15	15	*
28	14	15	15	15	15	15	15	15	15	15	15	*
27	14	15	15	15	15	15	15	15	15	15	15	*
26	14	15	15	15	15	15	15	15	15	15	15	*
25	14	15	15	15	15	15	15	15	15	15	15	*
24	14	15	15	15	15	15	15	15	15	15	15	*
23	14	13	13	13	13	13	13	15	15	15	15	*
22	14	13	13	13	13	13	13	15	15	15	15	*
21	18	13	13	13	13	13	13	15	15	15	15	*
20	18	13	13	13	13	13	13	15	15	15	15	*
19	18	13	13	13	13	13	13	15	15	15	15	*
18	18	13	13	13	13	13	13	15	15	15	15	*
17	18	13	13	13	13	13	13	15	15	15	15	*
16	18	17	17	17	17	17	17	15	15	15	15	*
15	18	17	17	17	17	17	17	15	15	15	15	*
14	19	17	17	17	17	17	17	15	15	15	15	*
13	19	17	17	17	17	17	17	15	15	15	15	*
12	19	17	17	17	17	17	17	15	15	15	15	*
11	19	17	17	17	17	17	17	15	15	15	15	*
10	19	17	17	17	17	17	17	15	15	15	15	*
9	19	17	17	17	17	17	17	15	15	15	15	*
8	19	17	17	17	17	17	17	15	15	15	15	*
7	5	17	17	17	17	17	17	15	15	15	15	*
6	5	18	18	18	18	18	18	15	15	15	15	*
5	5	18	18	18	18	18	18	15	15	15	15	*
4	5	18	18	18	18	18	18	15	15	15	15	*
3	5	18	18	18	18	18	18	15	15	15	15	*
2	5	18	18	18	18	18	18	15	15	15	15	*
1	5	18	18	18	18	18	18	15	15	15	15	*
	18	19	20	21	22	23	24	25	26	27	28	29

***** AREAL RECHARGE *****

Number of different infiltration/evapotranspiration rates : 1

No.	infiltration [L/T]	evapotranspiration [L/T]	effective recharge [L/T]	
1	0.00000E+00	0.00000E+00	0.00000E+00	(default)

********** DISTRIBUTION OF AREAL IN/OUT-FLUXES **********

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
29	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
28	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
25	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
24	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
23	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
22	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
21	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
19	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
18	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
17	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
16	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
15	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
14	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
13	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
12	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
11	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

	18	19	20	21	22	23	24	25	26	27	28	29
29	1	1	1	1	1	1	1	1	1	1	1	*
28	1	1	1	1	1	1	1	1	1	1	1	*
27	1	1	1	1	1	1	1	1	1	1	1	*
26	1	1	1	1	1	1	1	1	1	1	1	*
25	1	1	1	1	1	1	1	1	1	1	1	*
24	1	1	1	1	1	1	1	1	1	1	1	*
23	1	1	1	1	1	1	1	1	1	1	1	*
22	1	1	1	1	1	1	1	1	1	1	1	*
21	1	1	1	1	1	1	1	1	1	1	1	*
20	1	1	1	1	1	1	1	1	1	1	1	*
19	1	1	1	1	1	1	1	1	1	1	1	*
18	1	1	1	1	1	1	1	1	1	1	1	*
17	1	1	1	1	1	1	1	1	1	1	1	*
16	1	1	1	1	1	1	1	1	1	1	1	*
15	1	1	1	1	1	1	1	1	1	1	1	*
14	1	1	1	1	1	1	1	1	1	1	1	*
13	1	1	1	1	1	1	1	1	1	1	1	*
12	1	1	1	1	1	1	1	1	1	1	1	*
11	1	1	1	1	1	1	1	1	1	1	1	*
10	1	1	1	1	1	1	1	1	1	1	1	*
9	1	1	1	1	1	1	1	1	1	1	1	*
8	1	1	1	1	1	1	1	1	1	1	1	*
7	1	1	1	1	1	1	1	1	1	1	1	*
6	1	1	1	1	1	1	1	1	1	1	1	*
5	1	1	1	1	1	1	1	1	1	1	1	*
4	1	1	1	1	1	1	1	1	1	1	1	*
3	1	1	1	1	1	1	1	1	1	1	1	*
2	1	1	1	1	1	1	1	1	1	1	1	*
1	1	1	1	1	1	1	1	1	1	1	1	*

***** PATHLINE & PARTICLE TRACKING DATA *****

Number of forward particles : 0

Number of reverse particles : 0

Particles released at wells :

Well-No.	Particles released
1	0
2	0
3	0
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	0

************ HYDRAULIC HEAD DISTRIBUTION ************

	1	2	3	4	5	6

	1	2	3	4	5	6
29	4.9771E+03	4.9420E+03	4.9198E+03	4.9067E+03	4.8978E+03	4.8912E+03
28	4.9249E+03	4.9063E+03	4.8912E+03	4.8809E+03	4.8728E+03	4.8668E+03
27	4.8937E+03	4.8815E+03	4.8698E+03	4.8614E+03	4.8546E+03	4.8496E+03
26	4.8775E+03	4.8674E+03	4.8574E+03	4.8500E+03	4.8439E+03	4.8394E+03
25	4.8686E+03	4.8595E+03	4.8503E+03	4.8434E+03	4.8377E+03	4.8334E+03
24	4.8640E+03	4.8554E+03	4.8465E+03	4.8399E+03	4.8344E+03	4.8303E+03
23	4.8618E+03	4.8533E+03	4.8447E+03	4.8382E+03	4.8328E+03	4.8287E+03
22	4.8607E+03	4.8524E+03	4.8438E+03	4.8374E+03	4.8320E+03	4.8280E+03
21	4.8585E+03	4.8504E+03	4.8420E+03	4.8357E+03	4.8304E+03	4.8265E+03
20	4.8548E+03	4.8470E+03	4.8389E+03	4.8328E+03	4.8277E+03	4.8239E+03
19	4.8511E+03	4.8435E+03	4.8358E+03	4.8299E+03	4.8250E+03	4.8214E+03
18	4.8476E+03	4.8404E+03	4.8329E+03	4.8272E+03	4.8226E+03	4.8190E+03
17	4.8443E+03	4.8373E+03	4.8301E+03	4.8247E+03	4.8202E+03	4.8168E+03
16	4.8413E+03	4.8345E+03	4.8276E+03	4.8223E+03	4.8180E+03	4.8147E+03
15	4.8378E+03	4.8313E+03	4.8247E+03	4.8197E+03	4.8155E+03	4.8124E+03
14	4.8341E+03	4.8280E+03	4.8216E+03	4.8168E+03	4.8129E+03	4.8099E+03
13	4.8308E+03	4.8250E+03	4.8189E+03	4.8143E+03	4.8105E+03	4.8077E+03
12	4.8278E+03	4.8222E+03	4.8164E+03	4.8120E+03	4.8084E+03	4.8057E+03
11	4.8248E+03	4.8195E+03	4.8140E+03	4.8098E+03	4.8064E+03	4.8037E+03
10	4.8220E+03	4.8169E+03	4.8116E+03	4.8076E+03	4.8044E+03	4.8019E+03
9	4.8191E+03	4.8143E+03	4.8093E+03	4.8055E+03	4.8024E+03	4.8000E+03
8	4.8165E+03	4.8119E+03	4.8071E+03	4.8035E+03	4.8006E+03	4.7983E+03
7	4.8140E+03	4.8096E+03	4.8051E+03	4.8017E+03	4.7989E+03	4.7967E+03
6	4.8109E+03	4.8069E+03	4.8027E+03	4.7995E+03	4.7968E+03	4.7948E+03
5	4.8063E+03	4.8027E+03	4.7989E+03	4.7961E+03	4.7937E+03	4.7920E+03
4	4.7989E+03	4.7960E+03	4.7931E+03	4.7908E+03	4.7890E+03	4.7876E+03
3	4.7899E+03	4.7881E+03	4.7861E+03	4.7847E+03	4.7835E+03	4.7826E+03
2	4.7819E+03	4.7811E+03	4.7801E+03	4.7794E+03	4.7789E+03	4.7784E+03
1	4.7750E+03	4.7750E+03	4.7750E+03	4.7750E+03	4.7750E+03	4.7750E+03

	7	8	9	10	11	12
29	4.8847E+03	4.8750E+03	4.8618E+03	4.8456E+03	4.8310E+03	4.8150E+03
28	4.8606E+03	4.8515E+03	4.8402E+03	4.8289E+03	4.8175E+03	4.8070E+03
27	4.8449E+03	4.8365E+03	4.8270E+03	4.8176E+03	4.8084E+03	4.7999E+03
26	4.8346E+03	4.8276E+03	4.8190E+03	4.8105E+03	4.8020E+03	4.7942E+03
25	4.8290E+03	4.8223E+03	4.8140E+03	4.8058E+03	4.7975E+03	4.7899E+03
24	4.8259E+03	4.8194E+03	4.8113E+03	4.8031E+03	4.7948E+03	4.7869E+03
23	4.8244E+03	4.8180E+03	4.8101E+03	4.8019E+03	4.7935E+03	4.7852E+03
22	4.8237E+03	4.8174E+03	4.8095E+03	4.8015E+03	4.7930E+03	4.7844E+03
21	4.8223E+03	4.8161E+03	4.8084E+03	4.8007E+03	4.7924E+03	4.7835E+03
20	4.8199E+03	4.8140E+03	4.8066E+03	4.7994E+03	4.7911E+03	4.7820E+03
19	4.8175E+03	4.8118E+03	4.8048E+03	4.7979E+03	4.7897E+03	4.7807E+03
18	4.8153E+03	4.8098E+03	4.8031E+03	4.7964E+03	4.7884E+03	4.7795E+03
17	4.8132E+03	4.8079E+03	4.8014E+03	4.7950E+03	4.7872E+03	4.7784E+03
16	4.8113E+03	4.8062E+03	4.7999E+03	4.7937E+03	4.7860E+03	4.7774E+03
15	4.8091E+03	4.8042E+03	4.7982E+03	4.7921E+03	4.7847E+03	4.7763E+03
14	4.8067E+03	4.8021E+03	4.7963E+03	4.7905E+03	4.7834E+03	4.7752E+03
13	4.8047E+03	4.8002E+03	4.7947E+03	4.7891E+03	4.7822E+03	4.7743E+03
12	4.8028E+03	4.7985E+03	4.7932E+03	4.7879E+03	4.7812E+03	4.7735E+03
11	4.8010E+03	4.7969E+03	4.7918E+03	4.7867E+03	4.7803E+03	4.7729E+03
10	4.7992E+03	4.7953E+03	4.7905E+03	4.7856E+03	4.7794E+03	4.7723E+03
9	4.7975E+03	4.7938E+03	4.7892E+03	4.7845E+03	4.7786E+03	4.7718E+03
8	4.7959E+03	4.7924E+03	4.7880E+03	4.7835E+03	4.7779E+03	4.7714E+03
7	4.7945E+03	4.7911E+03	4.7869E+03	4.7827E+03	4.7774E+03	4.7711E+03
6	4.7927E+03	4.7896E+03	4.7857E+03	4.7817E+03	4.7767E+03	4.7709E+03
5	4.7901E+03	4.7873E+03	4.7838E+03	4.7803E+03	4.7759E+03	4.7707E+03
4	4.7861E+03	4.7839E+03	4.7811E+03	4.7784E+03	4.7749E+03	4.7709E+03
3	4.7816E+03	4.7802E+03	4.7784E+03	4.7767E+03	4.7745E+03	4.7720E+03
2	4.7780E+03	4.7773E+03	4.7765E+03	4.7757E+03	4.7747E+03	4.7736E+03
1	4.7750E+03	4.7750E+03	4.7750E+03	4.7750E+03	4.7750E+03	4.7750E+03

	13	14	15	16	17	18
29	4.8068E+03	4.8065E+03	4.8062E+03	4.8060E+03	4.8060E+03	4.8063E+03
28	4.8020E+03	4.8017E+03	4.8016E+03	4.8014E+03	4.8013E+03	4.8015E+03
27	4.7959E+03	4.7957E+03	4.7955E+03	4.7954E+03	4.7953E+03	4.7954E+03
26	4.7906E+03	4.7904E+03	4.7902E+03	4.7900E+03	4.7898E+03	4.7897E+03
25	4.7863E+03	4.7861E+03	4.7858E+03	4.7855E+03	4.7852E+03	4.7848E+03
24	4.7831E+03	4.7829E+03	4.7826E+03	4.7823E+03	4.7817E+03	4.7809E+03
23	4.7810E+03	4.7808E+03	4.7806E+03	4.7802E+03	4.7795E+03	4.7784E+03
22	4.7798E+03	4.7796E+03	4.7795E+03	4.7791E+03	4.7782E+03	4.7770E+03
21	4.7787E+03	4.7786E+03	4.7785E+03	4.7781E+03	4.7772E+03	4.7757E+03
20	4.7776E+03	4.7774E+03	4.7772E+03	4.7767E+03	4.7757E+03	4.7740E+03
19	4.7764E+03	4.7762E+03	4.7760E+03	4.7754E+03	4.7742E+03	4.7723E+03
18	4.7753E+03	4.7751E+03	4.7748E+03	4.7741E+03	4.7728E+03	4.7708E+03
17	4.7742E+03	4.7741E+03	4.7737E+03	4.7730E+03	4.7716E+03	4.7695E+03
16	4.7733E+03	4.7731E+03	4.7728E+03	4.7720E+03	4.7705E+03	4.7682E+03
15	4.7723E+03	4.7721E+03	4.7717E+03	4.7708E+03	4.7693E+03	4.7669E+03
14	4.7713E+03	4.7711E+03	4.7707E+03	4.7698E+03	4.7683E+03	4.7658E+03
13	4.7706E+03	4.7703E+03	4.7699E+03	4.7691E+03	4.7675E+03	4.7651E+03
12	4.7699E+03	4.7697E+03	4.7693E+03	4.7685E+03	4.7670E+03	4.7646E+03
11	4.7694E+03	4.7692E+03	4.7688E+03	4.7681E+03	4.7666E+03	4.7643E+03
10	4.7689E+03	4.7688E+03	4.7684E+03	4.7677E+03	4.7663E+03	4.7641E+03
9	4.7686E+03	4.7684E+03	4.7681E+03	4.7674E+03	4.7662E+03	4.7642E+03
8	4.7684E+03	4.7682E+03	4.7679E+03	4.7673E+03	4.7662E+03	4.7644E+03
7	4.7682E+03	4.7681E+03	4.7678E+03	4.7673E+03	4.7663E+03	4.7648E+03
6	4.7681E+03	4.7680E+03	4.7678E+03	4.7673E+03	4.7665E+03	4.7653E+03
5	4.7683E+03	4.7682E+03	4.7680E+03	4.7677E+03	4.7671E+03	4.7663E+03
4	4.7690E+03	4.7690E+03	4.7689E+03	4.7688E+03	4.7685E+03	4.7683E+03
3	4.7709E+03	4.7709E+03	4.7709E+03	4.7708E+03	4.7708E+03	4.7709E+03
2	4.7730E+03	4.7730E+03	4.7730E+03	4.7731E+03	4.7731E+03	4.7732E+03
1	4.7750E+03	4.7750E+03	4.7750E+03	4.7750E+03	4.7750E+03	4.7750E+03

	19	20	21	22	23	24
29	4.8073E+03	4.8085E+03	4.8094E+03	4.8101E+03	4.8108E+03	4.8118E+03
28	4.8022E+03	4.8032E+03	4.8040E+03	4.8046E+03	4.8051E+03	4.8058E+03
27	4.7958E+03	4.7966E+03	4.7972E+03	4.7977E+03	4.7981E+03	4.7988E+03
26	4.7898E+03	4.7902E+03	4.7906E+03	4.7910E+03	4.7914E+03	4.7919E+03
25	4.7844E+03	4.7842E+03	4.7843E+03	4.7845E+03	4.7847E+03	4.7852E+03
24	4.7798E+03	4.7786E+03	4.7782E+03	4.7782E+03	4.7784E+03	4.7787E+03
23	4.7764E+03	4.7742E+03	4.7732E+03	4.7733E+03	4.7735E+03	4.7740E+03
22	4.7742E+03	4.7712E+03	4.7691E+03	4.7698E+03	4.7703E+03	4.7711E+03
21	4.7726E+03	4.7691E+03	4.7664E+03	4.7673E+03	4.7681E+03	4.7690E+03
20	4.7708E+03	4.7666E+03	4.7614E+03	4.7644E+03	4.7657E+03	4.7668E+03
19	4.7691E+03	4.7653E+03	4.7628E+03	4.7634E+03	4.7640E+03	4.7648E+03
18	4.7675E+03	4.7641E+03	4.7623E+03	4.7622E+03	4.7624E+03	4.7629E+03
17	4.7658E+03	4.7625E+03	4.7609E+03	4.7606E+03	4.7607E+03	4.7610E+03
16	4.7644E+03	4.7610E+03	4.7592E+03	4.7590E+03	4.7590E+03	4.7594E+03
15	4.7630E+03	4.7591E+03	4.7567E+03	4.7568E+03	4.7572E+03	4.7577E+03
14	4.7617E+03	4.7567E+03	4.7532E+03	4.7540E+03	4.7549E+03	4.7560E+03
13	4.7607E+03	4.7544E+03	4.7459E+03	4.7510E+03	4.7532E+03	4.7548E+03
12	4.7603E+03	4.7547E+03	4.7504E+03	4.7518E+03	4.7531E+03	4.7544E+03
11	4.7602E+03	4.7551E+03	4.7504E+03	4.7524E+03	4.7535E+03	4.7546E+03
10	4.7604E+03	4.7562E+03	4.7536E+03	4.7539E+03	4.7545E+03	4.7553E+03
9	4.7609E+03	4.7569E+03	4.7544E+03	4.7549E+03	4.7555E+03	4.7563E+03
8	4.7615E+03	4.7576E+03	4.7525E+03	4.7554E+03	4.7566E+03	4.7576E+03
7	4.7624E+03	4.7596E+03	4.7576E+03	4.7581E+03	4.7586E+03	4.7593E+03
6	4.7636E+03	4.7619E+03	4.7611E+03	4.7610E+03	4.7611E+03	4.7614E+03
5	4.7653E+03	4.7646E+03	4.7642E+03	4.7642E+03	4.7642E+03	4.7643E+03
4	4.7680E+03	4.7679E+03	4.7679E+03	4.7680E+03	4.7681E+03	4.7683E+03
3	4.7710E+03	4.7711E+03	4.7713E+03	4.7715E+03	4.7716E+03	4.7719E+03
2	4.7734E+03	4.7736E+03	4.7738E+03	4.7739E+03	4.7741E+03	4.7743E+03
1	4.7750E+03	4.7750E+03	4.7750E+03	4.7752E+03	4.7753E+03	4.7755E+03
	19	20	21	22	23	24

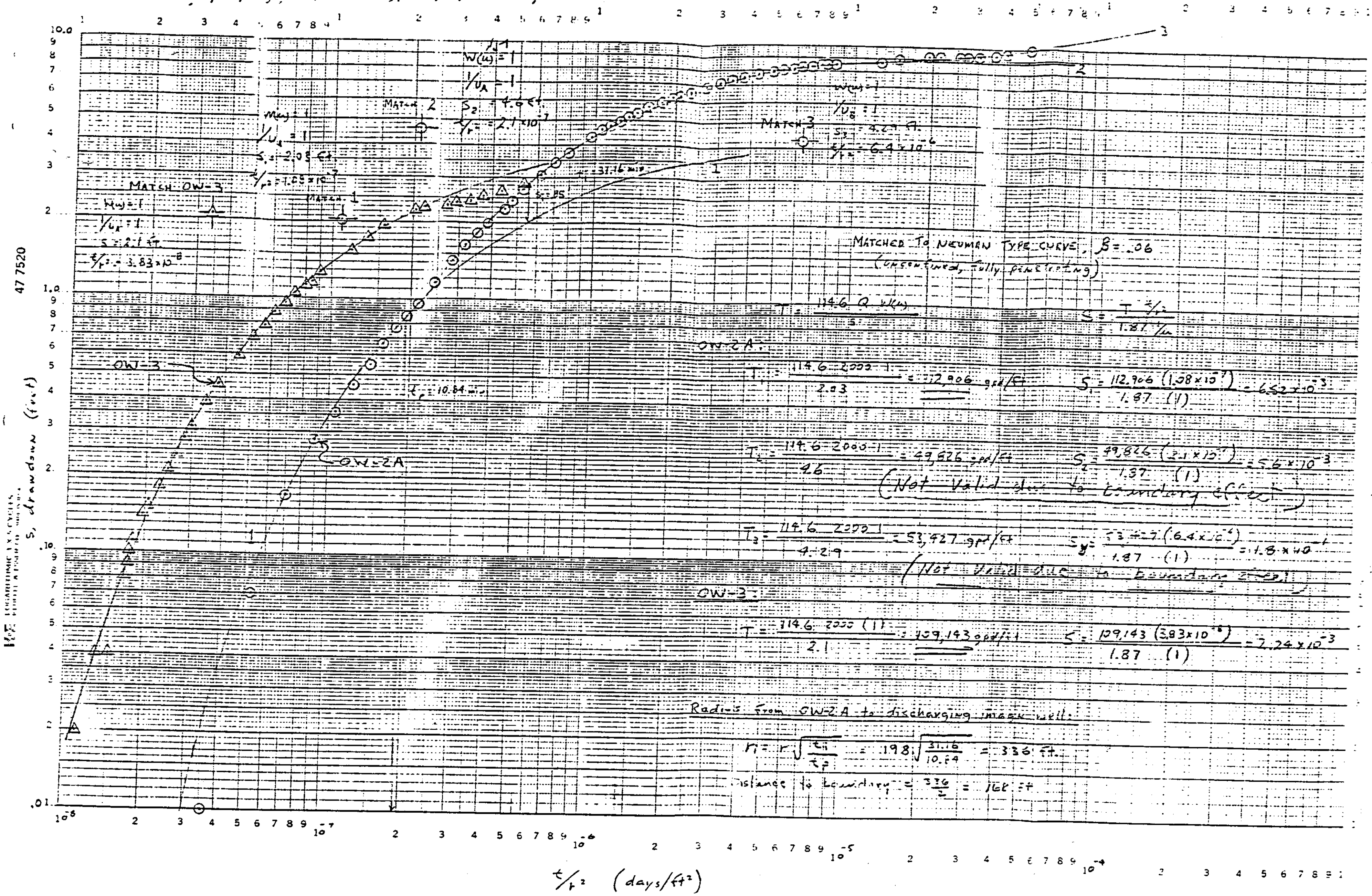
	25	26	27	28	29
29	5.3168E+03	5.5342E+03	5.5510E+03	5.5206E+03	*
28	5.2239E+03	5.4646E+03	5.4810E+03	5.4801E+03	*
27	5.1843E+03	5.4118E+03	5.4292E+03	5.4363E+03	*
26	5.1578E+03	5.3756E+03	5.3932E+03	5.4024E+03	*
25	5.1387E+03	5.3499E+03	5.3675E+03	5.3772E+03	*
24	5.1246E+03	5.3321E+03	5.3496E+03	5.3593E+03	*
23	5.1131E+03	5.3210E+03	5.3384E+03	5.3482E+03	*
22	5.1074E+03	5.3144E+03	5.3318E+03	5.3416E+03	*
21	5.1035E+03	5.3098E+03	5.3272E+03	5.3369E+03	*
20	5.0991E+03	5.3046E+03	5.3219E+03	5.3317E+03	*
19	5.0943E+03	5.2992E+03	5.3166E+03	5.3263E+03	*
18	5.0889E+03	5.2942E+03	5.3116E+03	5.3213E+03	*
17	5.0816E+03	5.2893E+03	5.3067E+03	5.3164E+03	*
16	5.0707E+03	5.2846E+03	5.3021E+03	5.3118E+03	*
15	5.0627E+03	5.2793E+03	5.2967E+03	5.3066E+03	*
14	5.0569E+03	5.2735E+03	5.2910E+03	5.3009E+03	*
13	5.0526E+03	5.2683E+03	5.2858E+03	5.2957E+03	*
12	5.0490E+03	5.2635E+03	5.2809E+03	5.2909E+03	*
11	5.0458E+03	5.2588E+03	5.2762E+03	5.2862E+03	*
10	5.0427E+03	5.2540E+03	5.2715E+03	5.2816E+03	*
9	5.0394E+03	5.2493E+03	5.2667E+03	5.2769E+03	*
8	5.0360E+03	5.2448E+03	5.2623E+03	5.2726E+03	*
7	5.0314E+03	5.2405E+03	5.2581E+03	5.2685E+03	*
6	5.0205E+03	5.2350E+03	5.2526E+03	5.2632E+03	*
5	5.0136E+03	5.2265E+03	5.2441E+03	5.2552E+03	*
4	5.0062E+03	5.2129E+03	5.2306E+03	5.2425E+03	*
3	4.9976E+03	5.1968E+03	5.2143E+03	5.2269E+03	*
2	4.9910E+03	5.1844E+03	5.2015E+03	5.2136E+03	*
1	4.9876E+03	5.1781E+03	5.1945E+03	5.2044E+03	*
	25	26	27	28	29

************* End of logbook *************

APPENDIX C

CALCULATIONS IN SUPPORT OF THE TEXT

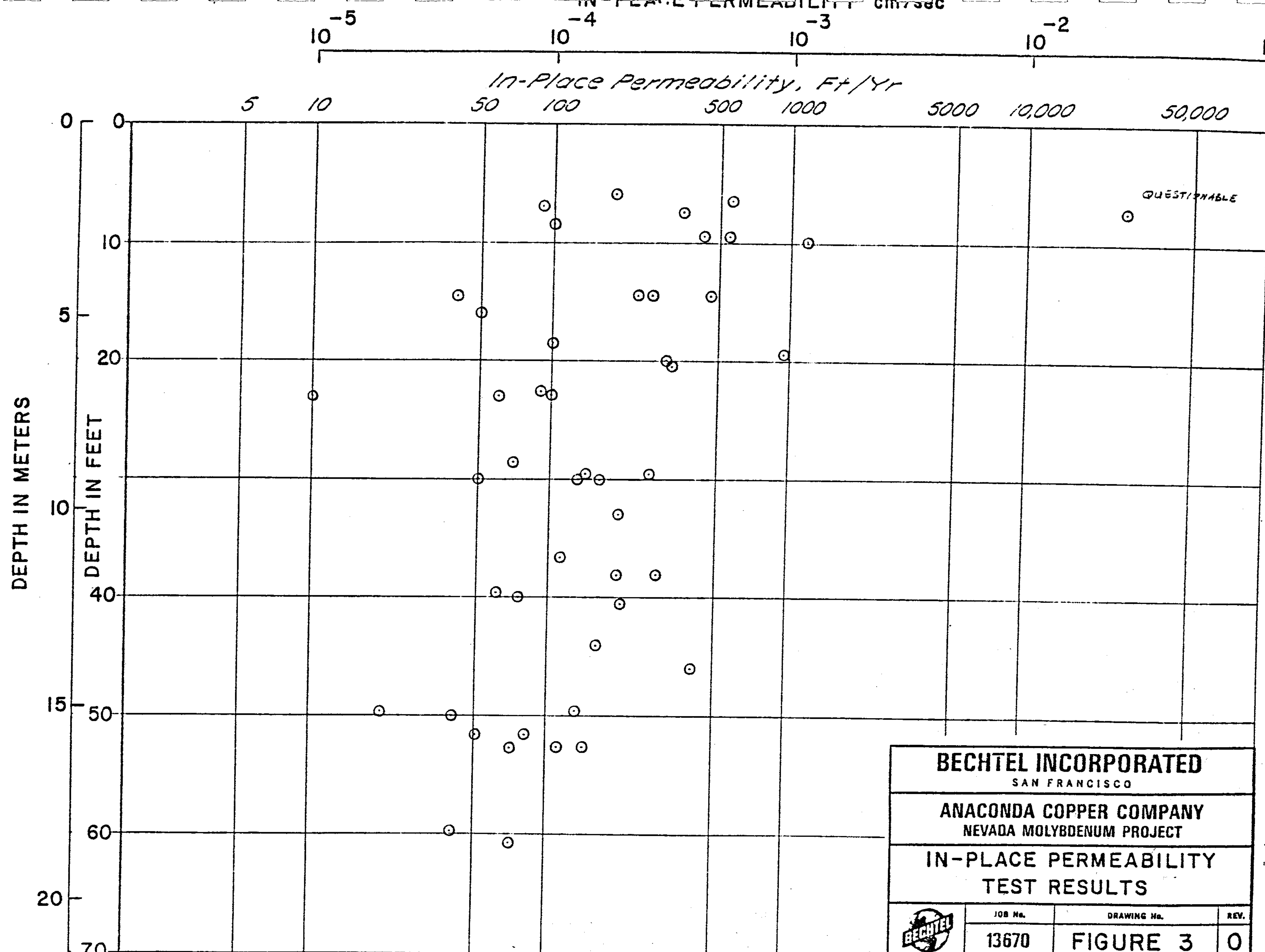
Well No. 9 pumping, Q = [illegible] gpm, April 16-18, 1982



WILLIAM E. NORK, INC.
1026 West First Street
RENO, NEVADA 89503
(702) 322-2604

JOB 91-542
SHEET NO. ____ OF ____
CALCULATED BY DCR DATE 3/91
CHECKED BY ____ DATE ____
SCALE ____

		pH	Alkalinity	Sulfate
PW-3		7.79	113	54
		7.91	106	48
		8.18	107	
		8.25	114	48
		8.15	115	52
		8.20	104	47
	MEAN	8.08	111	50
	STD DEVIATION	0.17	5.5	2.6
PW-5		8.21	104	48
		8.23	109	
		8.27	114	48
		8.26	113	54
		8.17	113	45
		8.20	104	49
	MEAN	8.23	[illegible]	48.8
	STD. DEVIATION	0.04	5.0	3.3
PW-7		8.12	110	42
		8.21	111	
		8.38	116	43
		8.22	117	48
		8.23	117	49
		8.20	96	42
	MEAN	8.23	111.2	44.8
	STD. DEVIATION	0.09	8.0	3.4

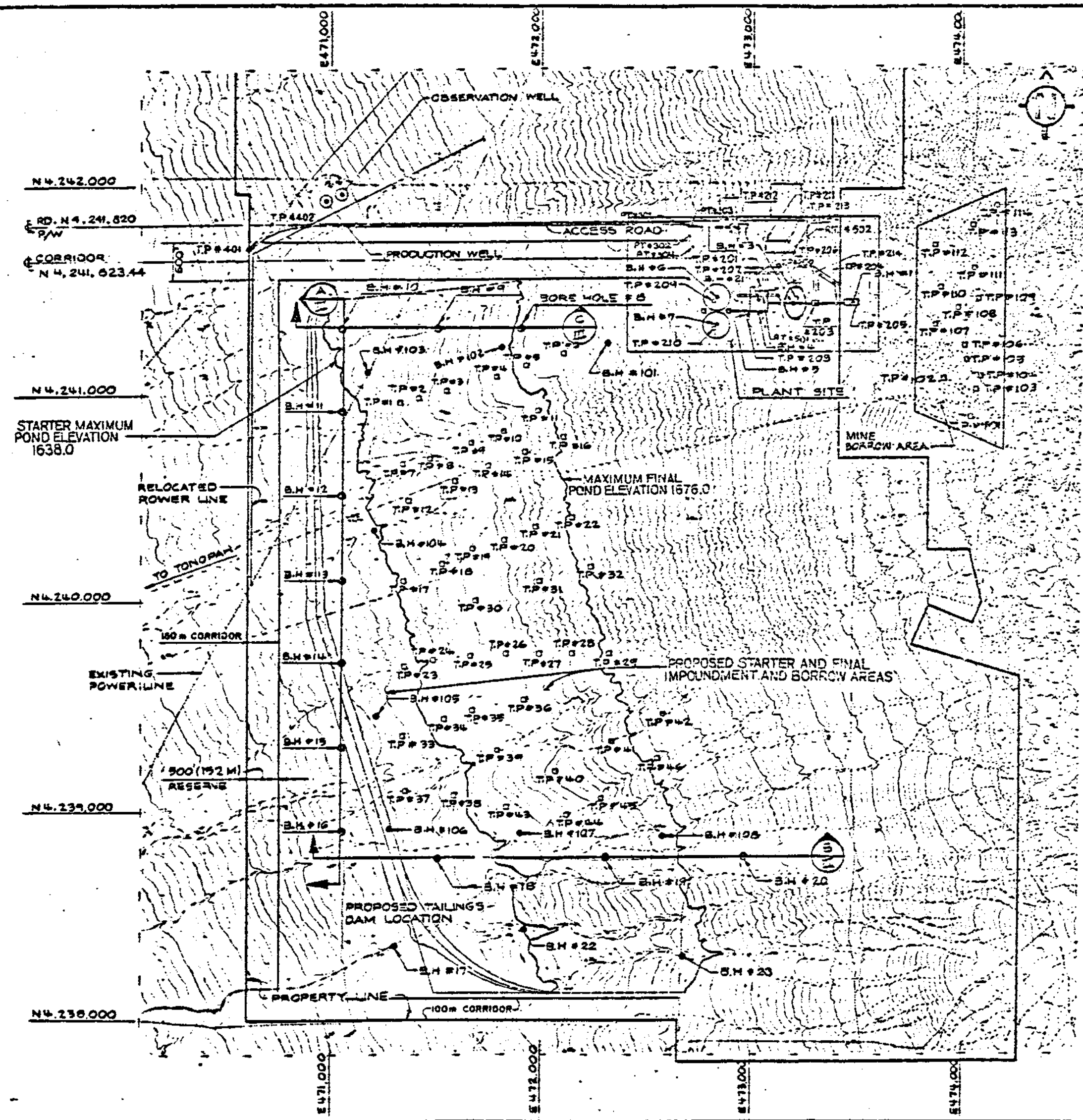


BECHTEL INCORPORATED
SAN FRANCISCO

ANACONDA COPPER COMPANY
NEVADA MOLYBDENUM PROJECT

IN-PLACE PERMEABILITY TEST RESULTS

JOB No.	DRAWING No.	REV.
13670	FIGURE 3	0



BORE HOLE NO.	COORDINATES		DEPTH	
	NORTHING	EASTING	FEET	METERS
1	4,241,423	473,480	150	45.9
2	4,241,679	473,191	50	15.3
3	4,241,423	473,190	50	15.3
4	4,241 394	473,026	150	15.3
5	4,241,391	472,972	50	15.3
6	4,241,466	472,827	150	45.9
7	4,241,339	472,827	50	15.3
8	4,241,290	471,900	53	16.2
9	4,241,290	471,500	51	15.6
10	4,241,290	471,050	50	15.3
11	4,240,900	471,050	100	30.5
12	4,240,500	471,050	52	15.9
13	4,240,100	471,050	100	30.5
14	4,239,700	471,050	51	15.6
15	4,239,300	471,050	100	30.5
16	4,238,900	471,050	51	15.6
17	4,238,350	471,300	52	15.9
18	4,238,760	471,900	100	30.5
19	4,238,760	472,300	50	15.3
20	4,238,760	472,950	75	22.9
21	4,241,438	473,022	150	45.9
22	4,238,420	471,300	50	15.3
23	4,238,290	472,550	75	22.9

BORE HOLE NO.	COORDINATES		DEPTH	
	NORTHING	EASTING	FEET	METERS
101	4,241,240	472,300	64	19.5
102	4,241,225	471,795	64	19.5
103	4,241,100	471,160	63	19.2
104	4,240,340	471,195	53	16.2
105	4,239,450	471,205	56	17.1
106	4,238,910	471,270	56	17.1
107	4,238,890	471,900	55	16.8
108	4,238,867	472,570	55	16.8

NOTES:

1. ALL 100 SERIES BORE HOLES WERE USED FOR PERMEABILITY TESTS.
2. BORE HOLES 1 THROUGH 7 AND 21 WERE DRILLED IN THE PLANT SITE AREA.
3. TEST PITS 201 THROUGH 214 WERE EXCAVATED FOR PLANT SITE INVESTIGATION.
4. TEST PITS 401 AND 402 WERE EXCAVATED FOR ACCESS ROAD INVESTIGATION.
5. FOR SECTIONS A, B, & C, SEE PLATE III.

GRAPHIC SCALE
0 100 200 500 1000m
1:10000

BECHTEL INC.
SAN FRANCISCO

ANACONDA COPPER COMPANY
NEVADA MOLYBDENUM PROJECT

PLAN OF BORE HOLES AND TEST PITS

JOB No. 13570 | DRAWING No. PLATE II | REV. B

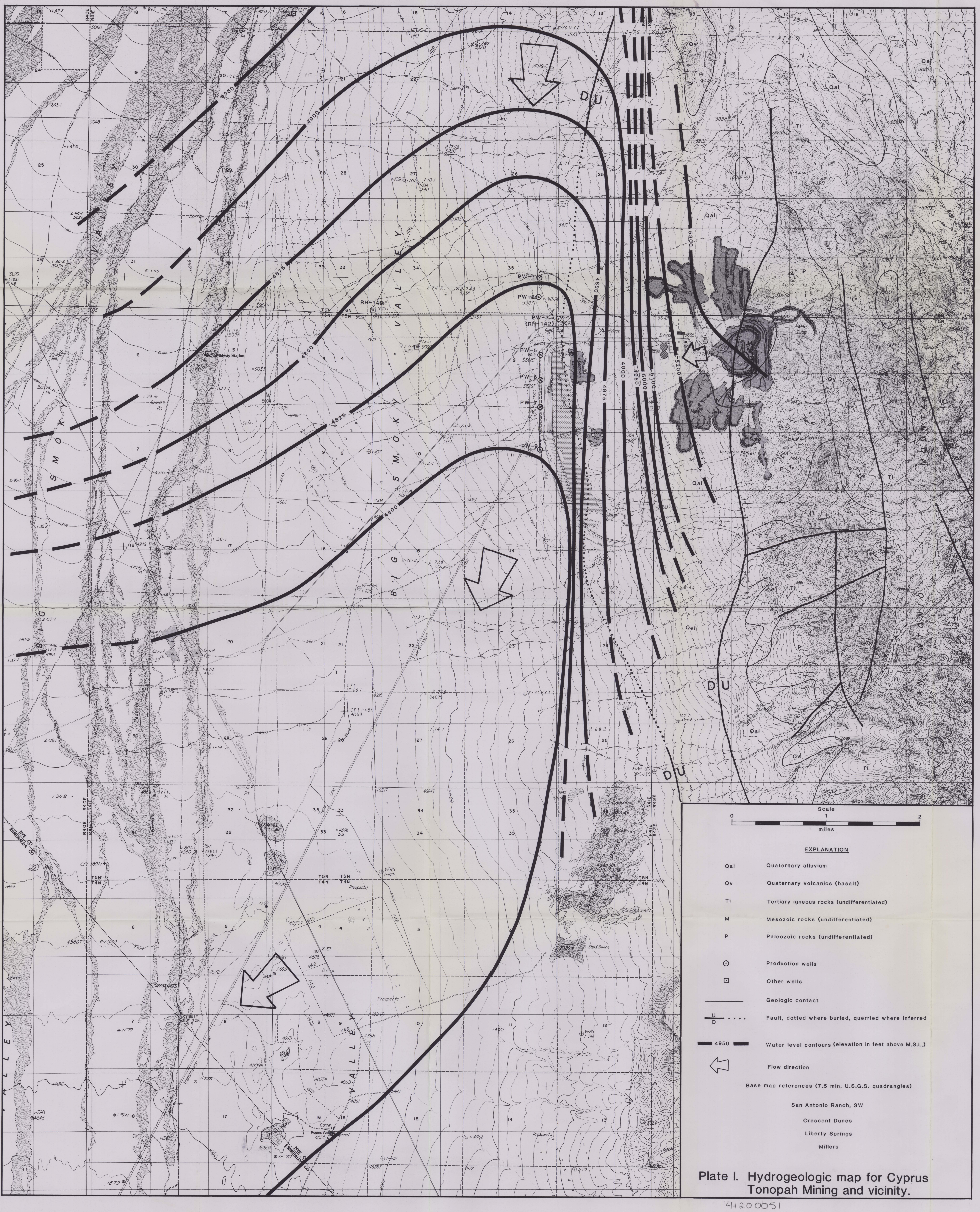


Plate I. Hydrogeologic map for Cyprus Tonopah Mining and vicinity.