Rio Algom

Quivira Mining Company
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July 26, 2001

Certified mail
Return Receipt (7099 3400 0014 5548 6562)

Mr. M. Leach, Chief
Fuel Cycle Licensing Branch, NMSS
Mail Stop T-8-A-33
One White Flint North
11555 Rockville Pike
Rockville, MD 20850

Re: **License SUA-1473, Docket No. 40-8905**
Annual Report, Corrective Action Plan

Dear Mr. Leach,

Pursuant to license condition #34 of the above referenced license, please find attached the annual Corrective Action Plan (CAP) review for the above referenced facility. The review describes the groundwater corrective action implemented and associated results subsequent to the plan's approval on December 29, 1989.

As a result of Quivira's belief that the present CAP has reached the limits of effectiveness, Quivira submitted an application to the NRC on February 19, 2000 requesting alternate concentration limits ("ACL") for the bedrock units (Dakota and Tres Hermanos units). Additionally, Quivira recently submitted an ACL application for the alluvial unit in the vicinity of Quivira's impoundments. Both applications are presently undergoing review by NRC.

If you have any questions concerning this submittal, please contact me at (505) 287-8851, extension 205.

Regards,

Peter Luthiger
Supervisor, Radiation Safety
and Environmental Affairs

Enclosure

xc: P. Goranson
NMED - GWPB
NRC-Arlington
file

NMSS01Public

Rio Algom
Quivira Mining Company

ANNUAL CAP REPORT 2001

Source Material License SUA-1473
Docket Number 40 -8905

July 26, 2001

QUIVIRA MINING COMPANY
AMBROSIA LAKE FACILITY
CORRECTIVE ACTION PLAN - ANNUAL REPORT

In accordance with Quivira Mining Company's NRC source material license SUA-1473, condition #34(D), the licensee is to review and submit on or before August 1 of each year, a progress report on the facility's Corrective Action Plan (CAP). This report reviews those effects and the progress of the Ambrosia Lake CAP. This report also contains the semi annual monitoring results for the alluvium, Tres Hermanos A, Tres Hermanos B, and Dakota monitoring wells in accordance with license condition #34(A).

General Hydrogeologic Setting

Quivira's mill and tailings facility are located north of the Zuni Uplift portion within the San Juan Basin. The basin is characterized by broad areas of relatively flat lying sedimentary rocks, dipping to the northeast, with portions of the basin covered with alluvium and basalt flows. The site is within the Ambrosia Lake valley that extends from the western side of Mount Taylor. The stratigraphic sequence of hydrologic significance at the site consists, in descending order, of the alluvium, the Mancos shale and the Tres Hermanos sandstones, the Dakota Sandstone, the Brushy Basin and the Westwater Canyon members of the Morrison Formation. The ore bearing unit in the vicinity is the Westwater Canyon. The bedrock formations above the Westwater Canyon Member of the Morrison Formation have essentially been dewatered by ventilation holes and mine shafts located to the north of Quivira's mill and tailings facility. The units that have been affected by milling activities are the alluvium, Tres Hermanos B sandstone, and the Dakota sandstone.

Tailings were first produced at the site in 1958. Tailings impoundment #1 encompasses 260 acres and contains approximately 30 million tons of uranium mill tailings, while tailings impoundment #2 consists of approximately 90 acres and contains three million tons of mill tailings. Both tailings impoundments have been reclaimed in accordance with license

requirements. Tailings effluents were also previously placed into unlined evaporation ponds (ponds 4, 5, 6, 7, and 8). The use of these unlined ponds were discontinued in 1983 pursuant to the Assurance of Discontinuance with the State of New Mexico.

The CAP for the Dakota and Tres Hermanos B sandstones consists of continued pumping of the Section 30 and 30 West mines which intercepts the impacted waters from the tailings facility through the cone of depression formed as a result of drainage from these units into the surrounding ventilation holes and mine shafts. These intercepted solutions commingle with ground water entering the mine workings and are then pumped to the mill facility and undergo mine water treatment prior to being available for discharge pursuant to the federal NPDES program. The remediation of the alluvium incorporates an interceptor trench to intercept, collect and remove impacted waters from the tailings impoundments. In addition to this, the treated mine water infiltrates and flushes the alluvium from the fresh water creek back towards the intercept trench resulting in the collection and removal of additional impacted waters from the alluvium. All solutions removed from the intercept trench are disposed into lined evaporation cells.

The CAP monitoring program consists of semi-annual monitoring of several wells within the alluvium, Tres Hermanos B sandstone, Tres Hermanos A sandstone, and the Dakota sandstone for specific parameters as outlined within condition #34 of the facility source material license.

Review of Corrective Action Plan - Bedrock Units

Dakota Sandstone

The Dakota formation is described as a sandstone unit deposited over an erosional surface developed on the Brushy Basin. The unit is dipping approximately three (3) degrees to the northeast and is characterized as a fine to medium grained, clean sandstone with fair to good permeability. The Dakota is approximately 80 feet thick across most of the Ambrosia Lake area. Groundwater movement in the Dakota was generally down dip and down gradient to the north-northeast to areas of lower elevation and lower potentiometric head.

As a result of the uranium mining activity within the Ambrosia Lake area, much of the Dakota formation has been dewatered by drainage to the lower mining levels through the vast network of mine workings; creating a low pressure area or hydrologic depression trough in the area in the Dakota piezometric surface. In the vicinity of the Section 30 and Section 30 West mining areas, only a few feet at the base of the Dakota is saturated. This was verified in 1983, and again in 1989, through the downhole investigations performed by Quivira within the ventilation holes and mine shafts to determine the potentiometric surfaces and water quality in the Dakota formation.

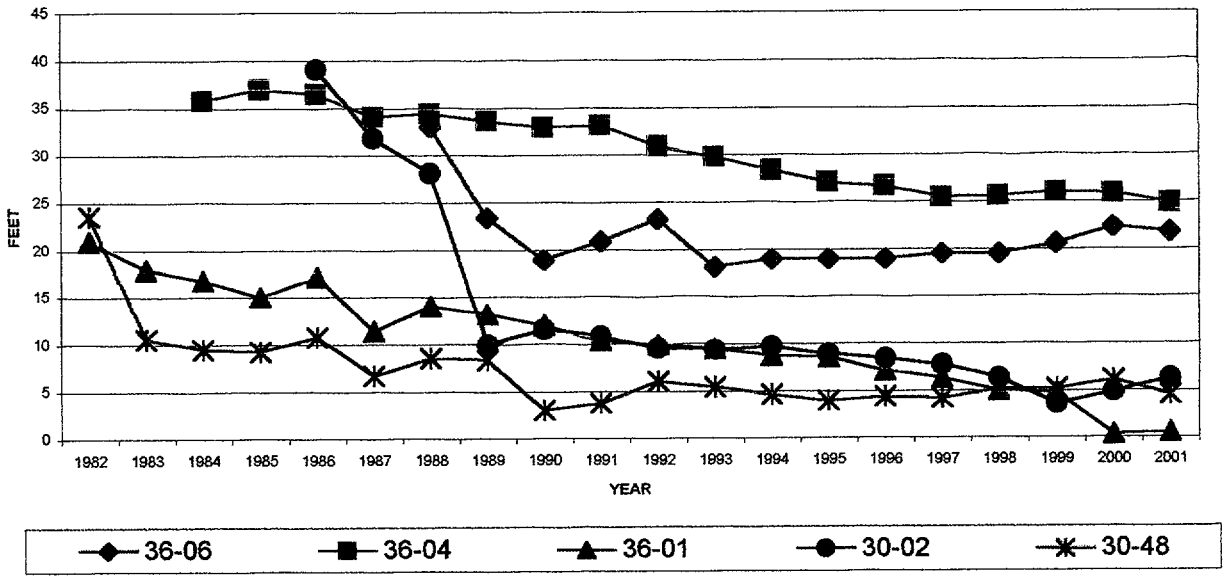
The Dakota formation has been impacted as a result of tailings solutions migrating into the Dakota formation in the vicinity of the unlined tailings evaporation pond #7. The Dakota formation in this area outcrops just south of this unlined evaporation pond and dips beneath the shallow alluvium near evaporation pond #7. The unlined evaporation pond #7 was constructed in 1961 and utilized for evaporating mill solutions until 1983. Its use was discontinued in 1983 pursuant to the Assurance of Discontinuance (AOD) with the State of New Mexico. The mill processing solutions were removed in 1983, thereby eliminating the source of recharge for the Dakota. Evaporation pond #7 is currently in the process of being reclaimed.

Analysis of the Dakota monitoring well data indicates that this seepage created a narrow plume that originated from pond #7. These solutions commingled with the minimal groundwater within the Dakota, and migrated down gradient towards the mining areas located north of the mill facility.

As a result of continued dewatering of the Section 30 and 30 West mines, remediation of the impacted areas of the Dakota formation continues with the interception, collection, and removal of the impacted waters. During the review period of July 2000 to June 2001, Section 30 and 30 West mines pumped 294 million gallons of water, containing intercepted solutions from the Dakota formation.

Figure 1 demonstrates the reduction in the saturated thickness within the Dakota formation for the Dakota wells located along the path from pond 7 to the Section 30 and 30 West mines. This graph depicts that through elimination of the recharge source of contamination along with continued pumping of the downgradient mines continues to provide a dewatering mechanism for the Dakota Although well 36-06 has indicated a slight increase in saturated thickness over the last two years, the water quality within the well indicates a continued decrease in concentrations. Hydrodynamic and geochemical processes remove certain constituents from the plume through adsorption, precipitation, and co-precipitation.

FIGURE 1
SATURATION THICKNESS
DAKOTA FORMATION WELLS



Although the NRC approved CAP requires the continued pumping of the Section 30/30West mines to recover the minimal amount of impacted Dakota water draining into the mines, evaluation of water quality data within the NRC POC wells for the Dakota demonstrates that the wells located downgradient from the mill facility but upgradient from the drainage area at the Section 30 West mine exhibit concentrations below the groundwater

protection standards and the effluent limitations for radionuclides specified within 10 CFR 20, Appendix B.

In accordance with requirements of the license condition #34, contained within Appendix A are the July 2000 through June 2001 analytical results for the Dakota formation. Presented within Appendix B are time versus concentration plots for the NRC CAP program wells for the Dakota. Contained in Appendix C are areal plume plots based on the current analytical information for the Dakota unit.

Tres Hermanos A Unit

Analytical results for the Tres Hermanos A sandstone unit continue to indicate the formation has not been impacted from the operations. Monitoring results for this unit have remained constant and consistent with previous results. Analytical results on this unit are presented in Appendix A. Appendix B contains time versus concentration plots for the NRC CAP program wells for the Tres Hermanos A unit.

Tres Hermanos B Unit

The Tres Hermanos B unit is the middle of three sandstone units interbedded within the Mancos shale. The formation dips to the north-northeast at approximately three (3) degrees. The sands are characterized as consisting of fine grained material with low porosity and permeability. Due to their fine grained texture, the sands do not yield much water.

At the Ambrosia Lake milling facility, a large portion of the mill tailings were deposited in contact with or near to the Tres Hermanos B sandstone outcrop. As a result, tailings solutions have migrated into the Tres Hermanos B unit.

The Tres Hermanos B sandstone is continuous from the outcrop area near the mill facility toward the mining area to the north-northeast of the mill. As with the Dakota formation, seepage from the Tres Hermanos B sandstone migrated down gradient and down

dip in a north-northeast direction. In the event these impacted waters are transported far enough within the Tres Hermanos B unit, they will be intercepted, collected and removed from the formation by the dewatering action of the down dip ventilation holes, shafts, and mine workings similar to the Dakota. However, migration distance is expected to be curtailed due to the geologic characteristics of the Tres Hermanos B unit and the natural attenuation processes occurring within the formation

As required by the NRC approved CAP, remediation of the Tres Hermanos B formation consists of pumping and dewatering of the Section 30 and Section 30 West mines. As previously stated, during the review period of July 2000 through June 2001, the Section 30 and 30 West mines pumped 294 million gallons of water.

Reclamation associated with tailings impoundments #1 and #2 have resulted in essentially eliminating recharge into the impacted areas of the Tres Hermanos B unit. On tailings impoundment #2, this has been achieved by the removal of ponded solutions, placement of an impermeable barrier over the entire surface of the impoundment, and continued operation and maintenance of the dewatering trench located on the west side of pond #2. To date, the dewatering trench for tailings impoundment #2, constructed in May 1989, has pumped a total of approximately 85 million gallons of water to lined evaporation ponds for disposal. During this report period, the dewatering trench removed approximately 1 million gallons of water, consisting of seepage and storm runoff, which were pumped to the facility's evaporation pond system.

Recharge potential via tailings impoundment #1 has been minimized by the removal of ponded solutions, placement of an impermeable barrier upon the impoundment, and collection of impacted water migrating from tailings impoundment #1 into the intercept trench.

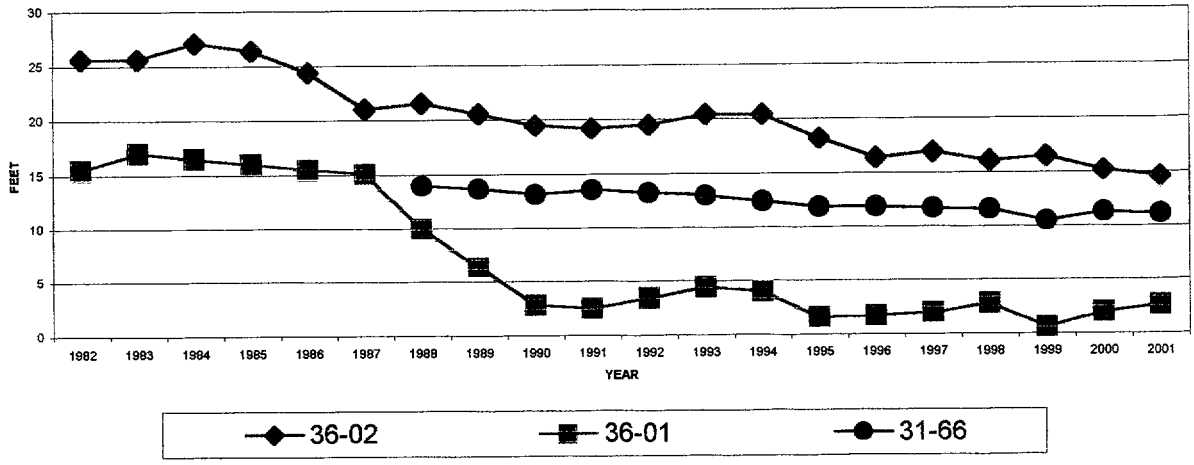
Since the Tres Hermanos B sandstone is stratigaphically above the Dakota formation, the Tres Hermanos B has also been dewatered due to mining operations in the area. Monitoring well data indicates that the saturated zone within the Tres Hermanos B sandstone

continues to decrease. This is due to the removal of the recharge source at the tailings impoundments along with continued pumping of the downgradient mines.

Figure 2 provides a graphical presentation of the reduction in the saturated thickness within the Tres Hermanos B formation. This graph depicts that through elimination of the recharge source of contamination along with continued pumping of the downgradient mines continues to provide a dewatering mechanism for the Tres Hermanos B formation resulting in continued capture, collection and removal of water from the unit.

In accordance with license condition #34, presented in Appendix A are the July 2000 through June 2001 analytical results for the Tres Hermanos B unit. Appendix B contains time versus concentration plots for Tres Hermanos B unit wells. Appendix C contains the areal plume plots, based on current analytical information, for the Tres Hermanos B sandstone.

FIGURE 2
SATURATION THICKNESS
TRES HERMANOS B FORMATION WELLS



Effectiveness of CAP - Bedrock Units

Quivira believes that continuation of mine pumping is not necessary to accomplish the interception of groundwater from the bedrock units. Regional groundwater modeling studies have shown that it will take hundreds of years for the dewatering centers to recover following termination of mine pumping in order for resaturation to occur at potential point of exposure

(POE) locations within the Dakota and Tres Hermanos units. Continued mine pumping has not dewatered the Dakota unit at the potential POE location downgradient of former evaporation pond 7 and 8. Nevertheless, removal of solutions and byproduct material from these ponds has been effective in reducing concentrations at the point of compliance locations in the Dakota sufficiently to protect groundwater in the Dakota at all potential POE locations.

Evaluation of alternative corrective actions (enhanced tailings dewatering and groundwater interception and treatment) indicated that these actions will not significantly improve groundwater concentrations in the bedrock units. A cost-effectiveness evaluation of the CAP alternatives was performed with results indicating that either alternative would cost approximately $1.7 million for averting one person-rem. Quivira believes that this cost, which is far in excess of the NRC ALARA guidance cost estimates ($2,000 to $20,000 per person-rem averted), demonstrates that groundwater concentrations within the bedrock units are ALARA. Quivira submitted an application to the NRC on February 19, 2000 requesting alternate concentration limits ("ACL") for the bedrock units (Dakota and Tres Hermanos units), which is presently under review by NRC.

Review of Corrective Action Plan - Alluvial Unit

Alluvium

Prior to mining, the alluvium within the Ambrosia Lake valley was dry. With the commencement of mining and milling activities in the area during the 1950's by numerous mining companies, dewatering of the mines resulted in two actions: 1) development of a cone of depression within the underlying geologic units (Tres Hermanos, Dakota, and Westwater); 2) recharge into the alluvium. As milling activities were initiated, solutions from the unlined tailings impoundments seeped into the alluvium. This resulted in a gradual commingling of the two sources of recharge to the alluvium.

Corrective actions that have been initiated to mitigate water migration were: 1)re-alignment of the Arroyo del Puerto in 1976 to divert surface water flows around the

evaporation ponds; 2)discontinued use and removal of ponded solutions from all unlined evaporation ponds; 3)construction of an intercept trench adjacent to tailings impoundment #1. As a result of the intercept trench forming a reverse hydraulic gradient within the alluvium, the treated mine water infiltrates and flushes the alluvium from the creek towards the intercept trench improving water quality within the impacted alluvium.

During the period of July 2000 through June 2001, more than 43 million gallons of water consisting of impacted water and treated mine water were recovered and removed from the alluvium via the intercept trenches and disposed within lined evaporation ponds. This volume also included storm water runoff that accumulated within the trench.

In addition to the flushing action, resulting in the dilution and collection of water into the intercept trench, geochemical processes also act upon the water present within the alluvium. This results in neutralization of the water and reduced solubility of the parameters. In accordance with requirements of the license condition #34, contained within Appendix A are the July 2000 through June 2001 analytical results for the alluvial monitoring wells. Appendix B contains time versus concentration plots for the NRC alluvial wells. Contained in Appendix C are areal plume plots, based on the current analytical information, for the alluvium.

Effectiveness of CAP - Alluvium Units

Recently a groundwater modeling effort was performed involving the assessment of the current CAP, modeling of the life expectancy of the program, including alternatives, and the feasibility of applying for alternate concentration limits in the alluvial units. The modeling effort indicated that the tailings pile will continue to drain for the next 50 to 100 years, however, it is expected that the seepage from the pile will naturally attenuate before reaching the institutional control boundary proposed in the Bedrock unit ACL application. Additionally, the modeling effort indicated that in order to continue to actively collect the impacted water, the existing CAP would have to be continued for a period twice as long after the time the pile completely drains. Quivira submitted an ACL application for the alluvial unit in May 2001, which is currently under review by NRC.

APPENDIX A

MONITORING RESULTS

NRC CAP PROGRAM
JULY 2000 – JUNE 2001

QUIVIRA MINING COMPANY

NRC CAP MONITORING RESULTS

DAKOTA FORMATION

Well	Date	Depth to Water	Total Depth	Water Level	Spec. Cond.	Temp. (C)	pH	Sulfate (mg/l)	Chloride (mg/l)	As (mg/l)	Be (mg/l)	Cd (mg/l)	CN (mg/l)
17-01KD	02-Dec-00	684.9	810.3	6441.4	2790.0	20.0	13.5	4850	300	0.003	-0.001	-0.0005	-0.0100
17-01KD	21-May-01	684.9	810.4	6441.4	2890	22.0	12.8	520	310	0.003	-0.001	-0.0005	-0.0100
30-02KD	28-Nov-00	307.5	314.5	6642.9	3550	15.0	7.7	400	1190	-0.001	-0.001	-0.0005	-0.1000
30-02KD	20-May-01	307.9	314.2	6642.5	3500	15.0	7.9	290	1120	-0.001	-0.001	-0.0005	-0.0100
30-48KD	03-Dec-00	336.9	341.9	6609.7	3810	14.0	7.2	2220	400	-0.001	-0.001	-0.0005	-0.1000
30-48KD	21-May-01	337.1	341.7	6609.5	5000	16.5	7.0	240	560	-0.002	-0.001	-0.0005	-0.0100
32-45KD	28-Nov-00	252.3	278.7	6666.3	1600	14.0	7.7	830	207	-0.001	-0.001	-0.0005	-0.1000
32-45KD	19-May-01	252.6	278.5	6666.0	1680	14.0	8.2	870	210	-0.001	-0.001	-0.0005	-0.0100
36-06KD	22-May-01	176.3	198.1	6845.1	6100	15.0	3.0	380	1060	-0.005	0.020	0.0017	-0.0100
36-06KD	02-Dec-00	177.2	198.8	6844.2	5200	12.0	4.1	380	970	0.002	0.012	0.0011	-0.5000

Well	Pb (mg/l)	Se (mg/l)	Sb (mg/l)	Mo (mg/l)	Ni (mg/l)	Nitrate (mg/l)	U-nat (mg/l)	Pb-210 (pCi/l)	Ra-226 (pCi/l)	Ra-228 (pCi/l)	Th-230 (pCi/l)	Gross Alpha (pCi/l)
17-01KD	0.001	-0.001	-0.002	0.1140	0.0520	-0.02	0.0018	1.6	0.3	2.4	2.5	9
17-01KD	-0.001	-0.001	-0.002	0.1080	0.0487	0.02	0.0003	0.0	0.1	0.2	0.0	35
30-02KD	-0.001	-0.001	-0.002	0.0040	0.0270	-0.02	0.0020	8.4	1.0	1.4	0.7	0
30-02KD	-0.001	-0.001	-0.002	0.0026	0.0257	0.07	0.0006	0.0	0.6	0.1	0.0	0
30-48KD	-0.001	-0.001	-0.002	0.0040	0.0020	-0.02	0.0355	1.8	3.8	2.6	2.9	0
30-48KD	-0.001	0.002	-0.002	0.0040	0.0060	-0.02	0.0418	0.0	2.6	2.6	0.1	72
32-45KD	-0.001	-0.001	-0.002	0.0200	-0.0010	-0.02	0.0049	20.0	1.4	1.5	1.1	0
32-45KD	-0.001	-0.001	-0.002	0.0258	0.0061	0.06	0.0011	0.0	0.7	1.0	0.2	5
36-06KD	-0.001	0.005	-0.002	0.0020	0.1650	1.00	0.6210	0.0	38.0	7.6	8.4	190
36-06KD	0.001	-0.001	-0.002	0.0007	0.1170	0.13	0.6850	4.0	30.0	8.1	7.6	0

QUIVIRA MINING COMPANY

NRC CAP MONITORING RESULTS
TRES HERMANOS A FORMATION

Well	Date	Depth to Water	Total Depth	Water Level	Spec. Cond.	Temp. (C)	pH	Sulfate (mg/l)	Chloride (mg/l)	Nitrate (mg/l)	CN (mg/l)	Mo (mg/l)
31-01	25-Nov-00	202.9	251.2	6777,6	1900	13.5	7.8	1260	155	-0.02	-0.10	0.002
31-01	20-Mar-01	202.9	251.2	6777,6	2290	15.0	7.4	1380	220	0.03	-0.01	0.002
33-01TRA	25-Nov-00	120.0	181.5	6798,0	2400	11.5	7.8	1810	41	-0.02	-0.10	0.003
33-01TRA	07-May-01	119.9	181.5	6798,1	2720	16.0	8.5	1790	32	0.04	-0.01	0.004

Well	Ni (mg/l)	Se (mg/l)	U-nat (mg/l)	Pb-210 (pCi/l)	Ra-226 (pCi/l)	Ra-228 (pCi/l)	Th-230 (pCi/l)	Gross Alpha (pCi/l)
31-01	-0.001	-0.001	0.0100	18.0	0.6	0.8	0.0	1
31-01	0.002	-0.001	0.0056	6.6	1.0	1.0	-0.1	15
33-01TRA	0.001	-0.001	0.0200	19.0	1.8	1.4	4.1	27
33-01TRA	0.005	-0.001	0.0083	0.4	1.0	1.7	0.2	5

QUIVIRA MINING COMPANY

NRC CAP MONITORING RESULTS
TRES HERMANOS B FORMATION

Well	Date	Depth to Water	Total Depth	Water Level	Spec. Cond.	Temp. (C)	pH	Sulfate (mg/l)	Chloride (mg/l)	Nitrate (mg/l)	CN (mg/l)	Mo (mg/l)
19-77	11-Dec-00	284.5	288.5	6726.6	3475.0	15.0	7.2	2140	18	0.65	-0.01	0.014
19-77	22-May-01	281.7	288.6	6729.4	3710.0	18.0	7.0	200	20	0.65	-0.01	0.009
31-66	25-Nov-00	112.1	123.3	6891.9	28750.0	12.5	5.5	5090	16600	0.53	-0.10	0.002
31-66	19-Mar-01	112.2	123.3	6891.8	3280.0	13.5	5.9	5380	19900	0.89	-0.01	0.003
31-67	26-Nov-00	18.3	96.3	6910.1	4500.0	11.5	7.5	3030	690	0.16	-0.10	0.002
31-67	19-Mar-01	18.7	96.3	6909.7	4520.0	12.0	6.9	3150	730	0.25	-0.01	0.002
36-01	20-Mar-01	56.1	58.7	6909.7	2980.0	13.0	7.0	10	1060	0.08	-0.01	0.001
36-01	25-Nov-00	56.3	58.8	6909.5								
36-02	25-Nov-00	43.4	58.1	6954.1	7800.0	11.5	7.2	4120	2480	0.70	-0.10	0.003
36-02	19-Mar-01	43.4	58.1	6954.1	8100.0	13.0	7.6	-100	2400	0.74	-0.01	0.001

Well	Ni (mg/l)	Se (mg/l)	U-nat (mg/l)	Pb-210 (pCi/l)	Ra-226 (pCi/l)	Ra-228 (pCi/l)	Th-230 (pCi/l)	Gross Alpha (pCi/l)
19-77	0.006	0.002	0.0321	3.0	1.3	1.7	3.1	4
19-77	0.001	-0.001	0.0131	0.0	1.3	1.2	-0.1	32
31-66	0.192	0.009	0.2170	16.0	3.8	12.0	7.0	93
31-66	0.152	0.010	0.1750	4.2	10.0	0.7	-0.2	132
31-67	0.001	-0.006	0.0110	3.1	2.2	3.6	2.0	15
31-67	0.001	-0.001	0.0060	5.3	2.5	2.4	-0.1	7
36-01	-0.001	-0.001	0.0049	8.1	0.6	0.1	0.1	11
36-01								
36-02	0.008	-0.006	0.0150	1.1	0.9	0.9	0.3	18
36-02	0.007	0.003	0.0095	5.1	0.6	1.2	-0.2	47

Monitor well 36-02 contained insufficient water for sample collection during 2nd half of 2000.

QUIVIRA MINING COMPANY

NRC CAP MONITORING RESULTS
ALLUVIUM

Well	Date	Depth to Water	Total Depth	Water Level	Spec. Cond.	Temp. (C)	pH	Sulfate (mg/l)	Chloride (mg/l)	Nitrate (mg/l)	Mo (mg/l)	Ni (mg/l)
31-61	14-Aug-00	17.72	27.08	6900.98	5500	15.5	6.8	3990	530	1.5	0.002	0.023
31-61	06-May-01	17.7	27.06	6901	5500	12	6.8	3980	550	1.64	0.004	0.028
32-59	14-Aug-00	8.81	39.24	6887.39	3575	13.5	7.2	2140	390	-0.1	0.008	0.004
32-59	25-Mar-01	8.07	39.22	6888.13	3390	12.5	7.1	2320	400	-0.02	0.0037	0.011
5-03	14-Aug-00	10.77	40.57	6890.23	3000	14.8	9.4	770	400	0.3	-0.001	0.002
5-03	25-Mar-01	10.5	40.63	6890.5	2720	12.5	9.5	480	400	0.04	0.0006	-0.001
MW-24	15-Aug-00	49.38	50.21	6818.62								
MW-24	10-May-01	49.37	50.18	6818.63								

Well	Se (mg/l)	U-nat (mg/l)	Pb-210 (pCi/l)	Ra-226 (pCi/l)	Ra-228 (pCi/l)	Th-230 (pCi/l)	Gross Alpha (pCi/l)
31-61	-0.001	0.174	30.0	1.1	0.7	0.1	0
31-61	-0.001	0.165	0.9	1.4	0.7	-0.2	0
32-59	-0.001	0.235	29.0	0.9	0.4	0.1	0
32-59	-0.001	0.202	9.1	0.3	1.1	-0.4	43
5-03	-0.001	0.0217	5.7	0.6	0.3	0.1	0
5-03	-0.001	0.0197	0.0	0.1	1.1	-0.5	4
MW-24							
MW-24							

Monitor well MW-24 contained insufficient water for sample collection.

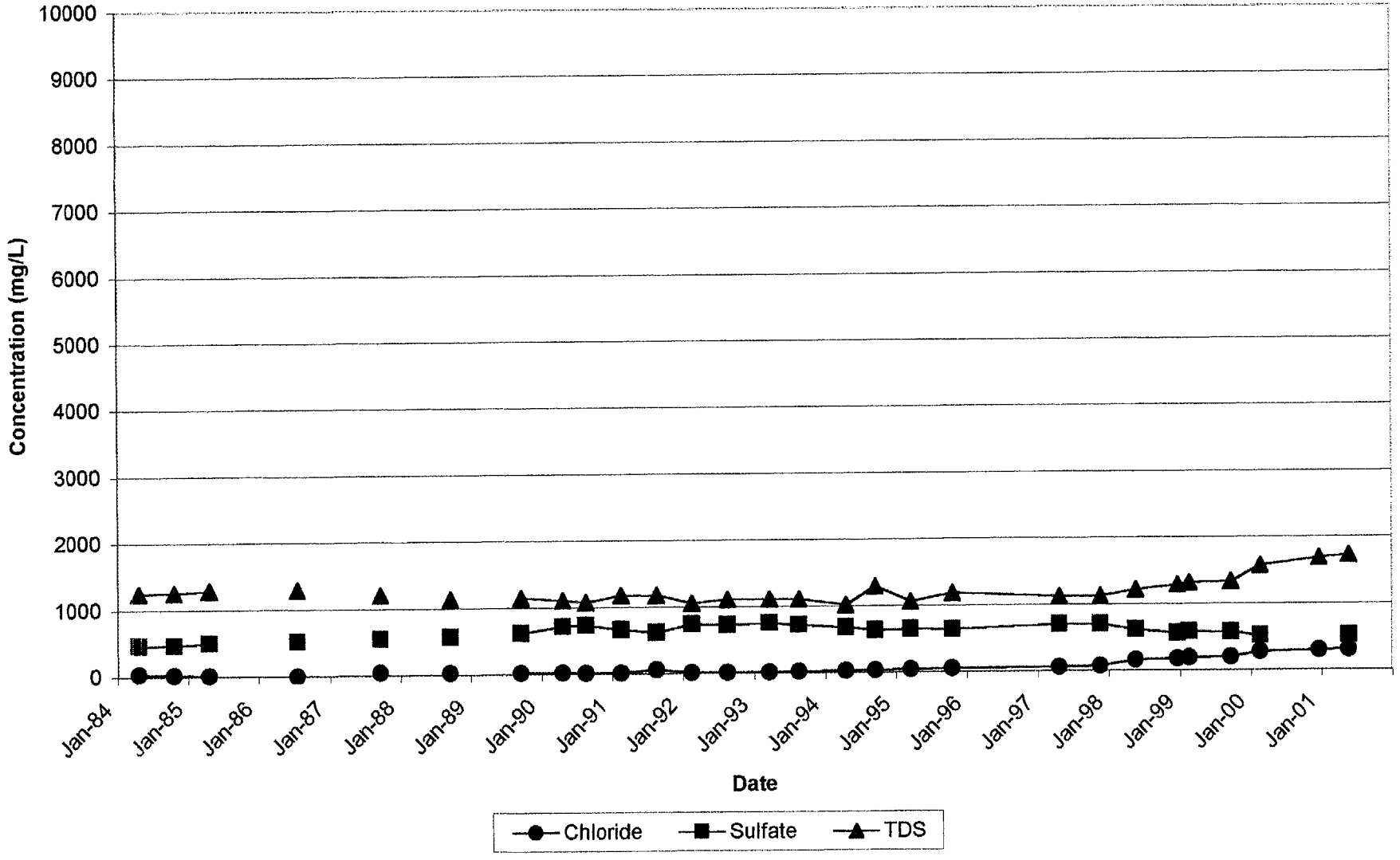
APPENDIX B

TIME vs CONCENTRATION PLOTS
NRC CAP WELLS

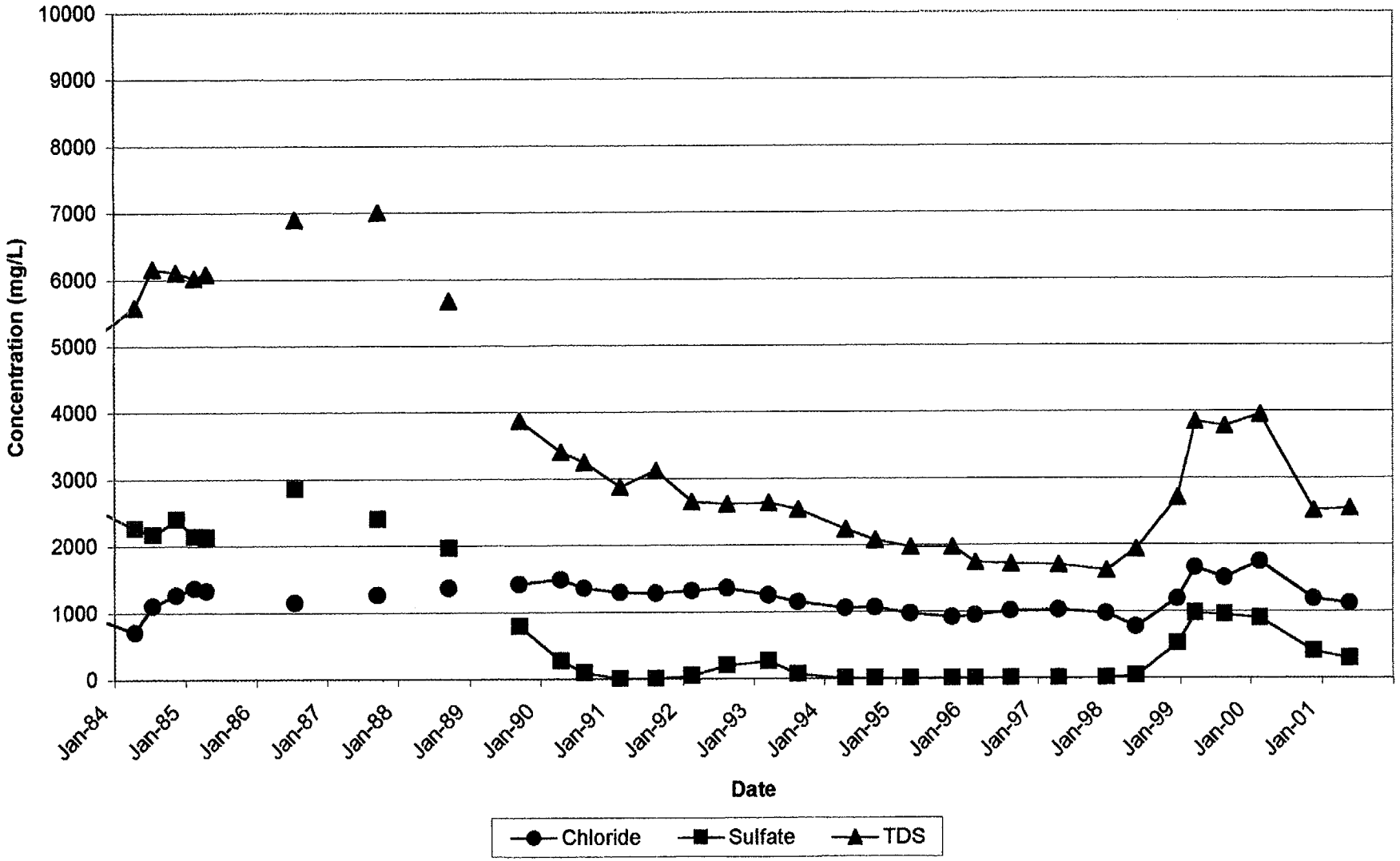
TIME vs CONCENTRATION PLOTS

DAKOTA

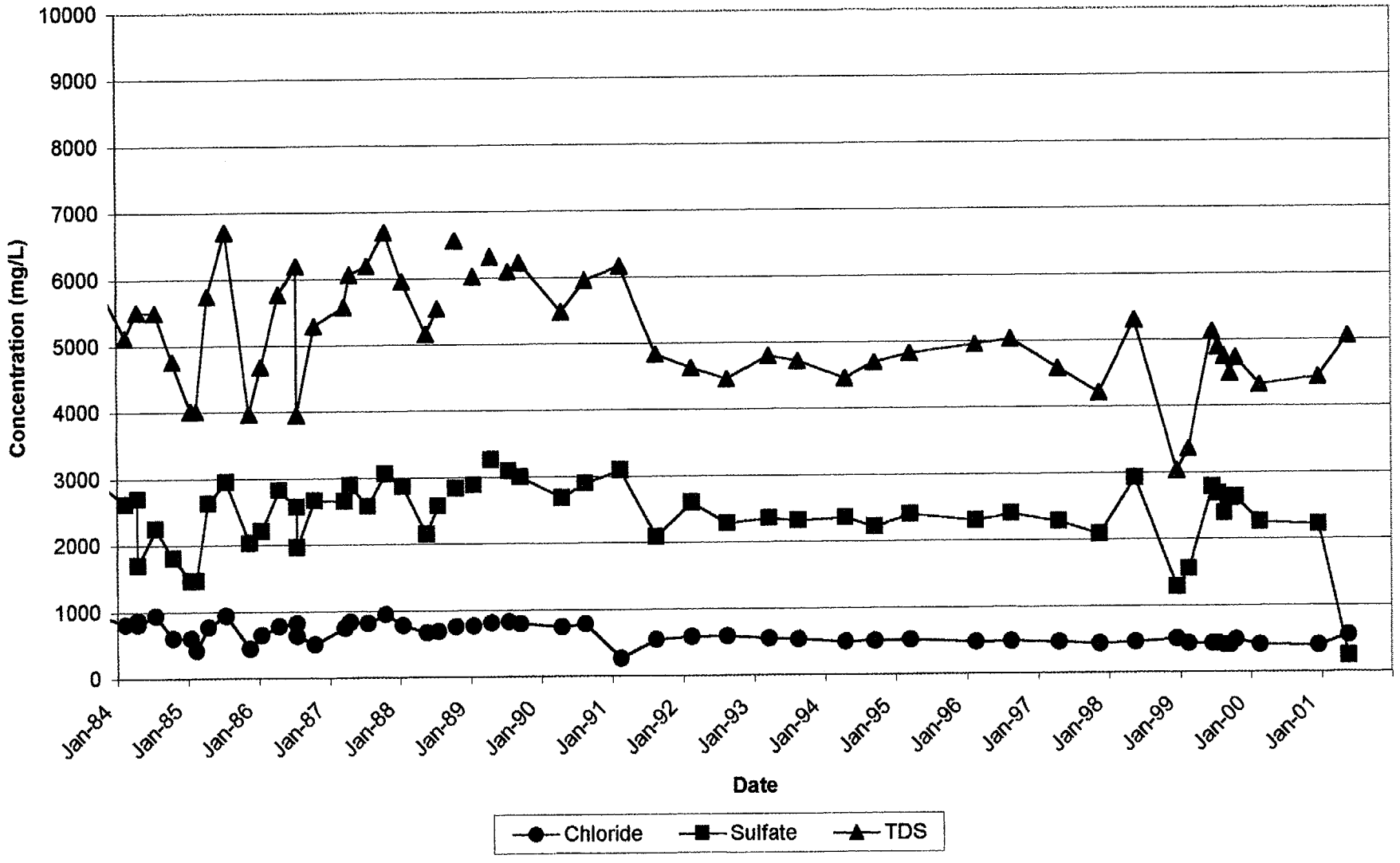
Monitor Well 17-01KD



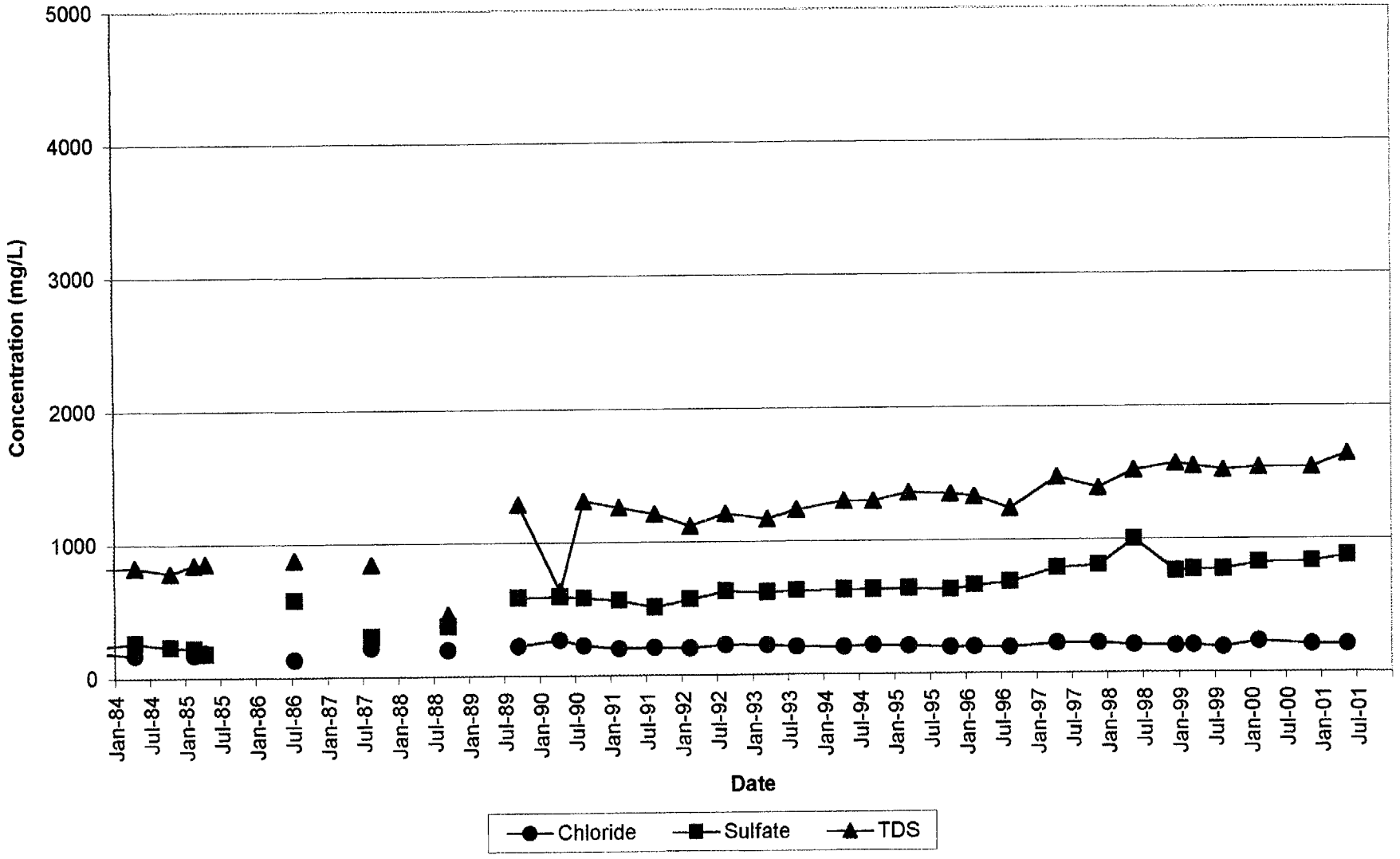
Monitor Well 30-02KD



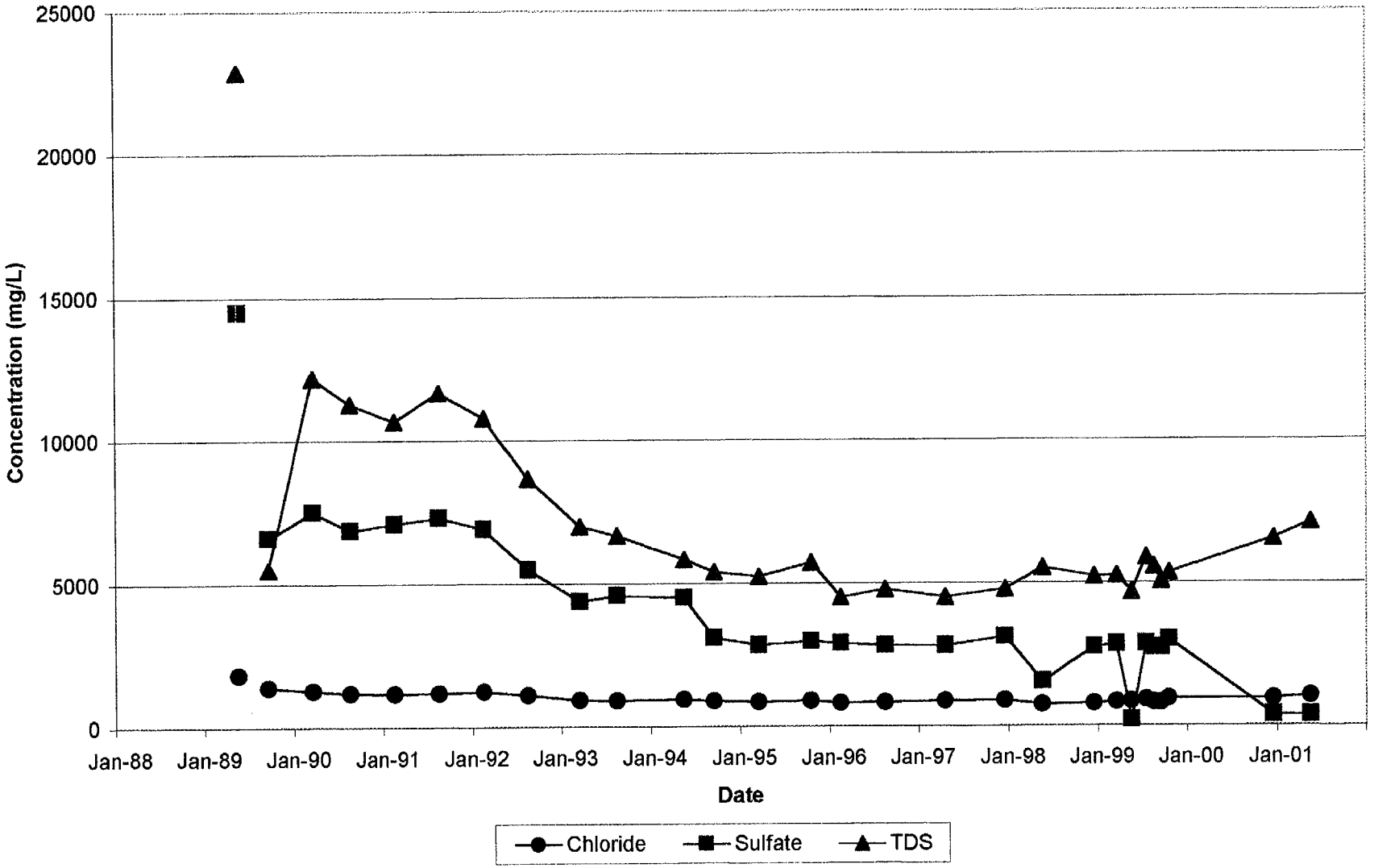
Monitor Well 30-48KD



Monitor Well 32-45KD



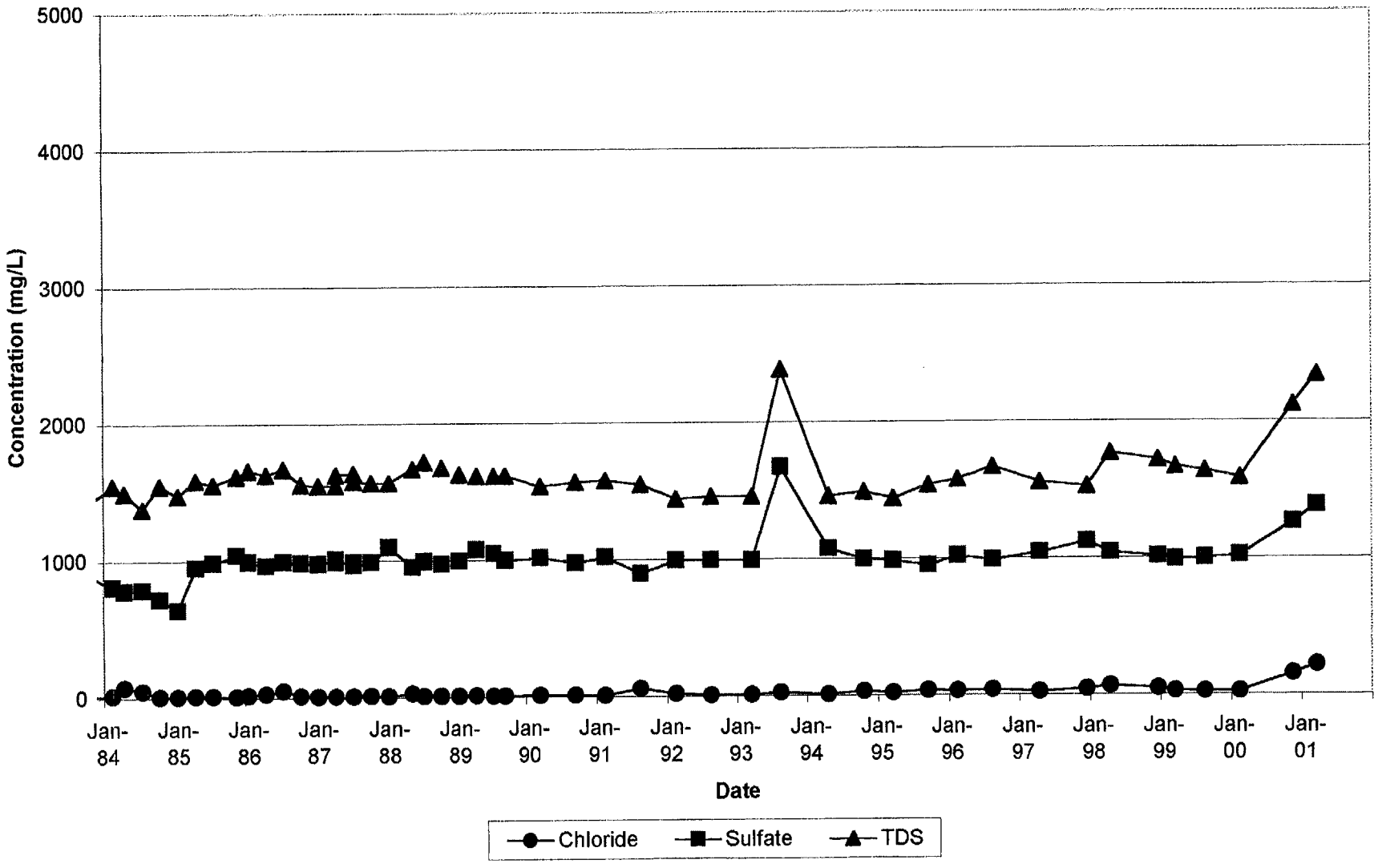
Monitor Well 36-06KD



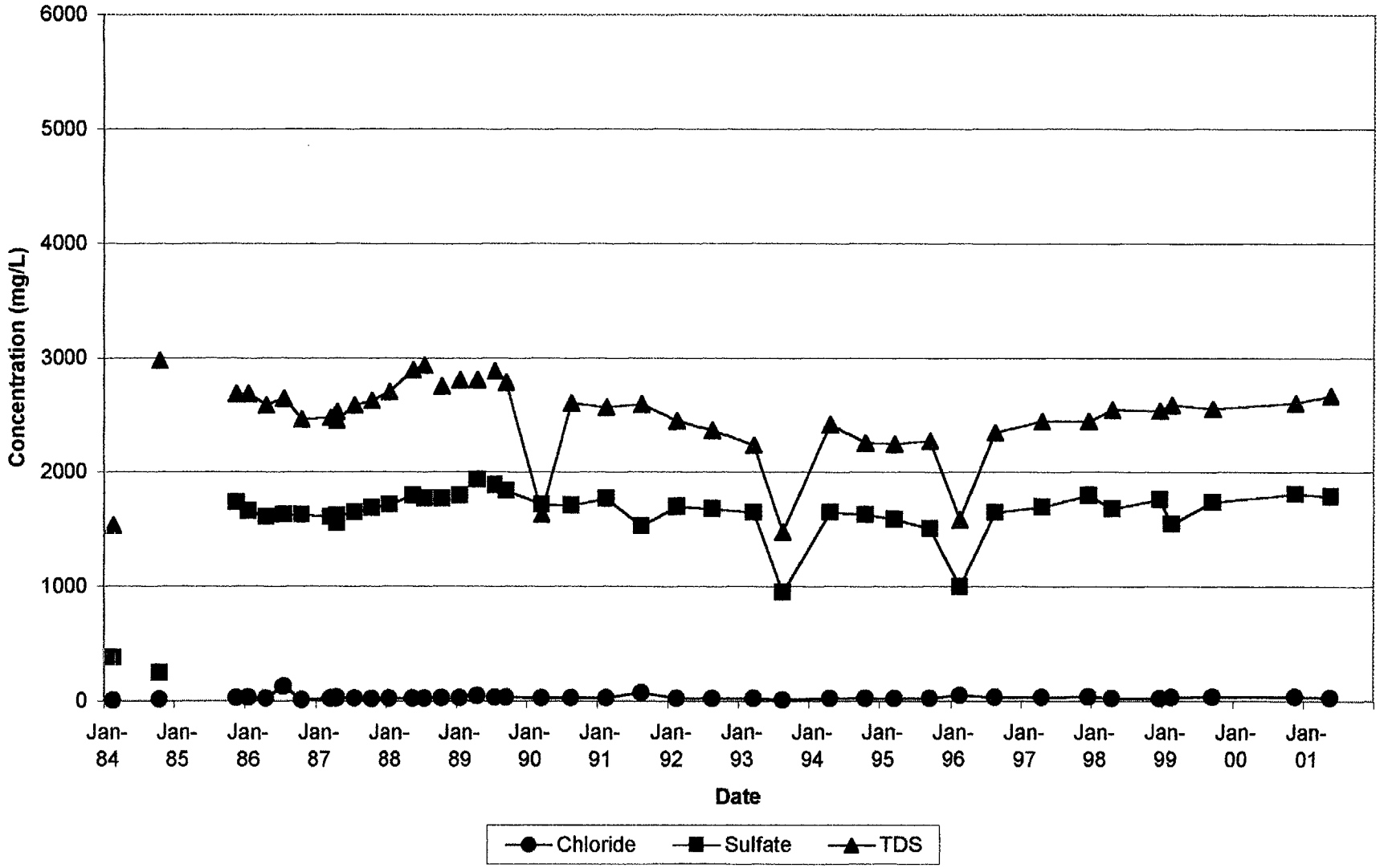
TIME vs CONCENTRATION PLOTS

TRES HERMANOS A

Monitor Well 31-01Tra



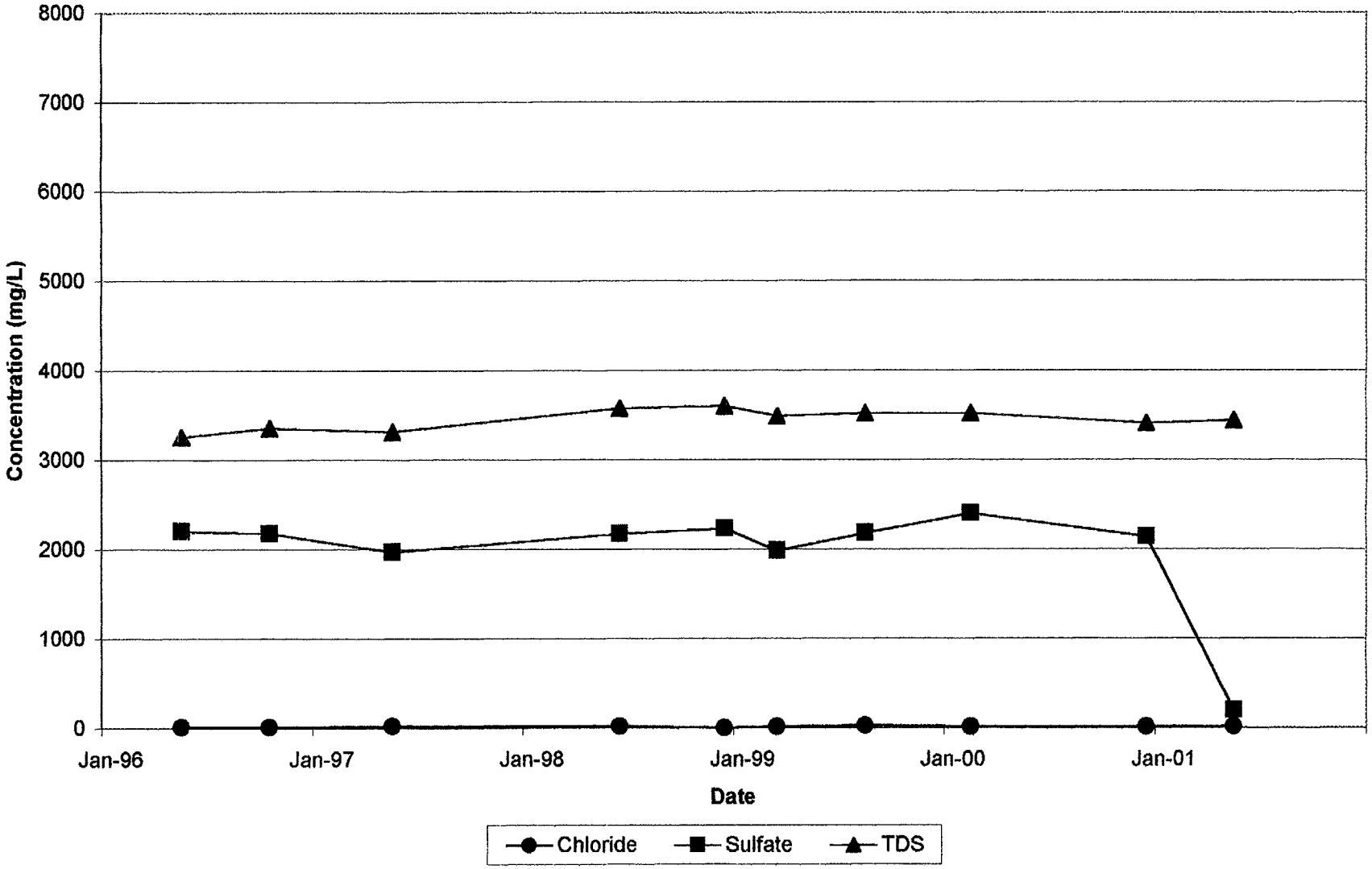
Monitor Well 33-01Tra

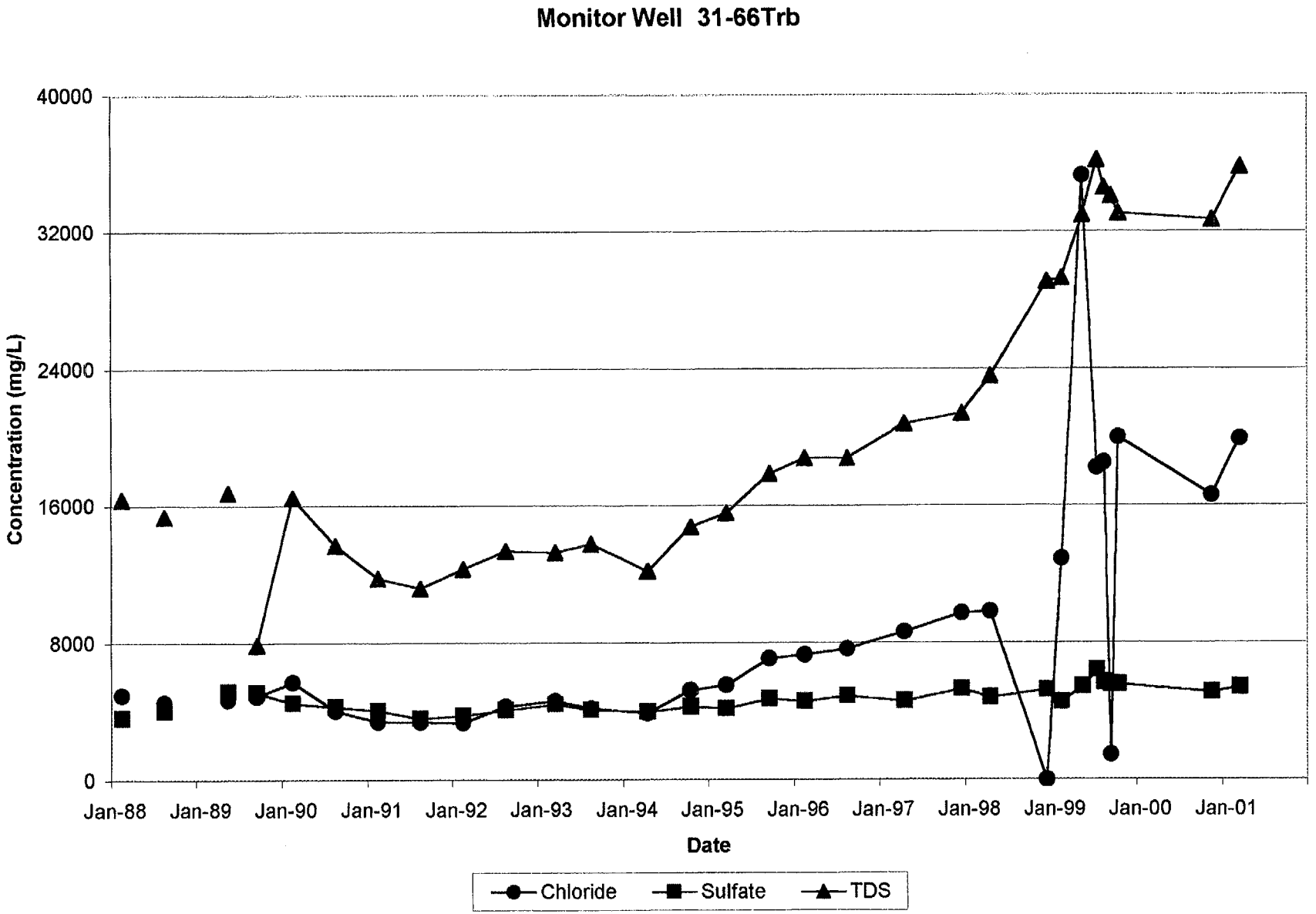


TIME vs CONCENTRATION PLOTS

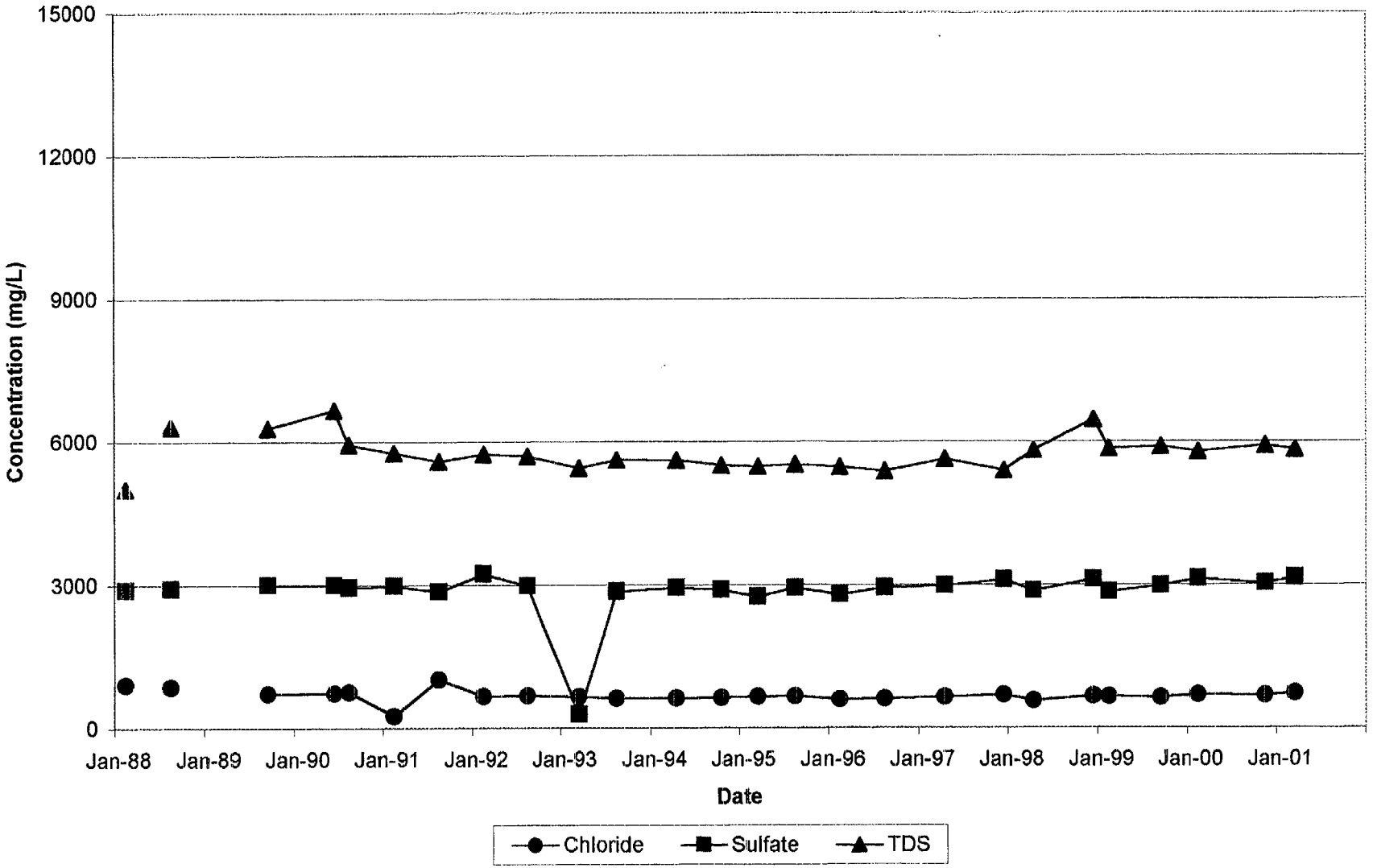
TRES HERMANOS B

Monitor Well 19-77Trb

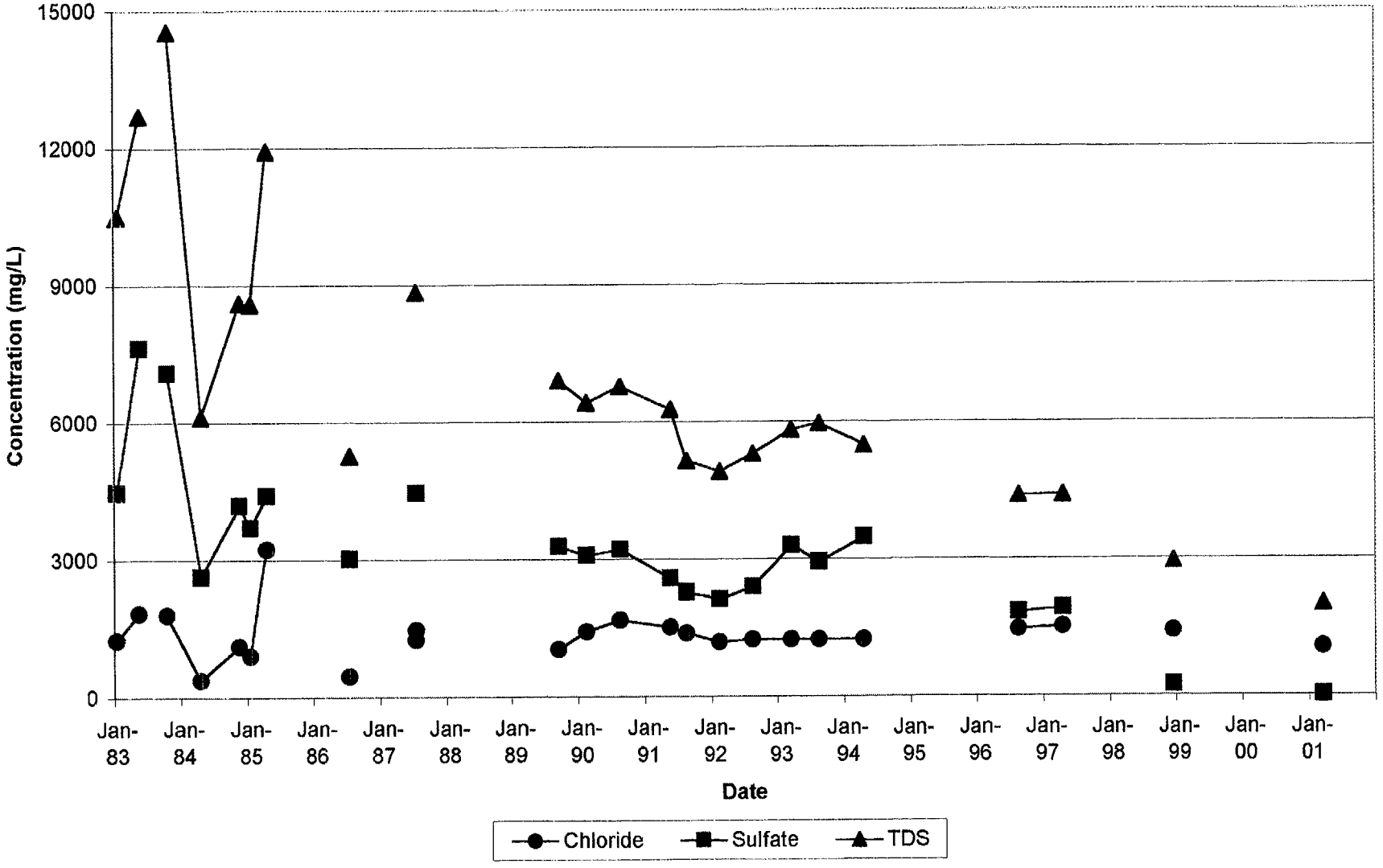



Monitor Well 31-66Trb
40000
32000
24000
16000
8000
0
Concentration (mg/L)
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Date
Chloride
Sulfate
TDS

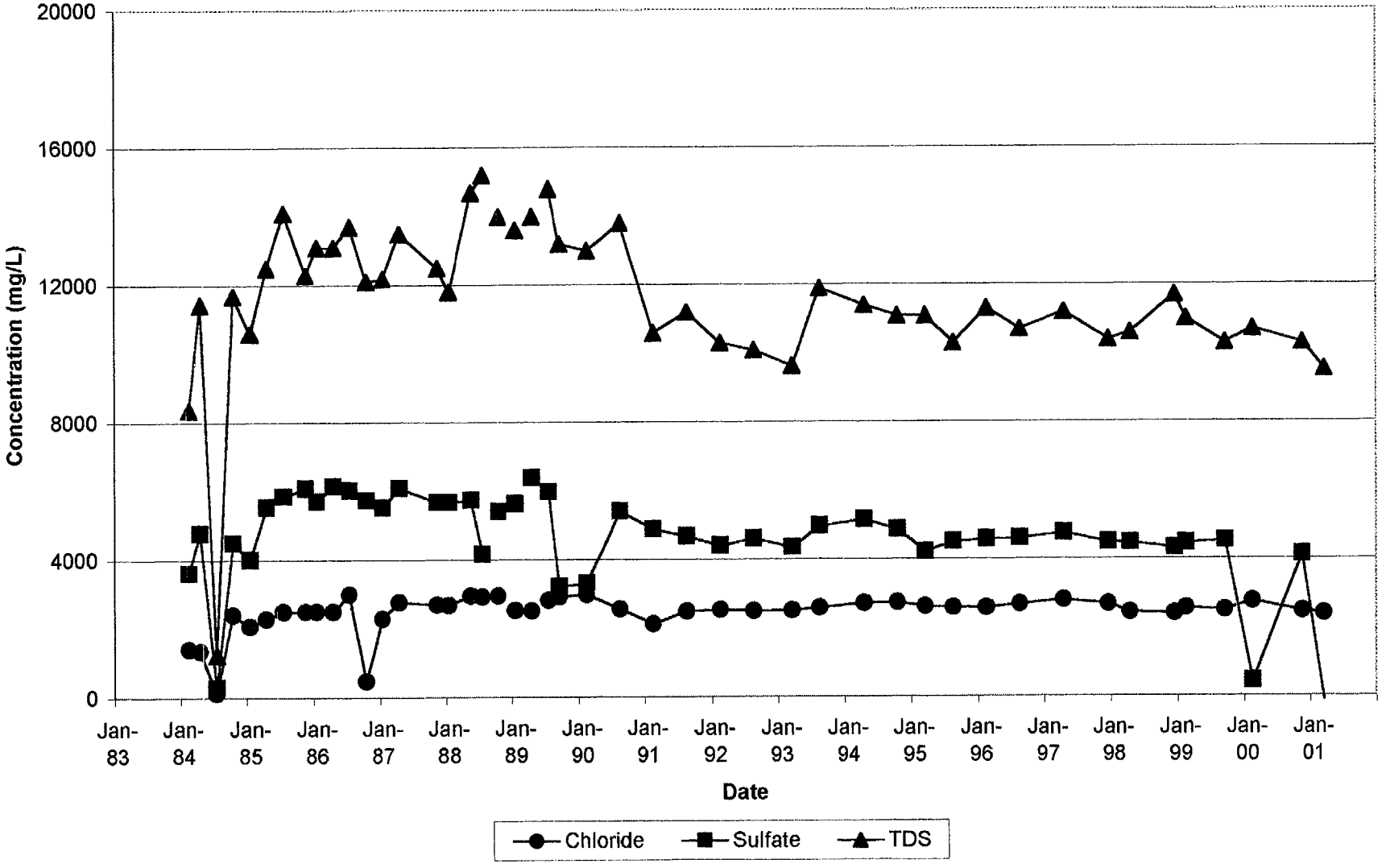
Monitor Well 31-67Trb



Monitor Well 36-01Trb



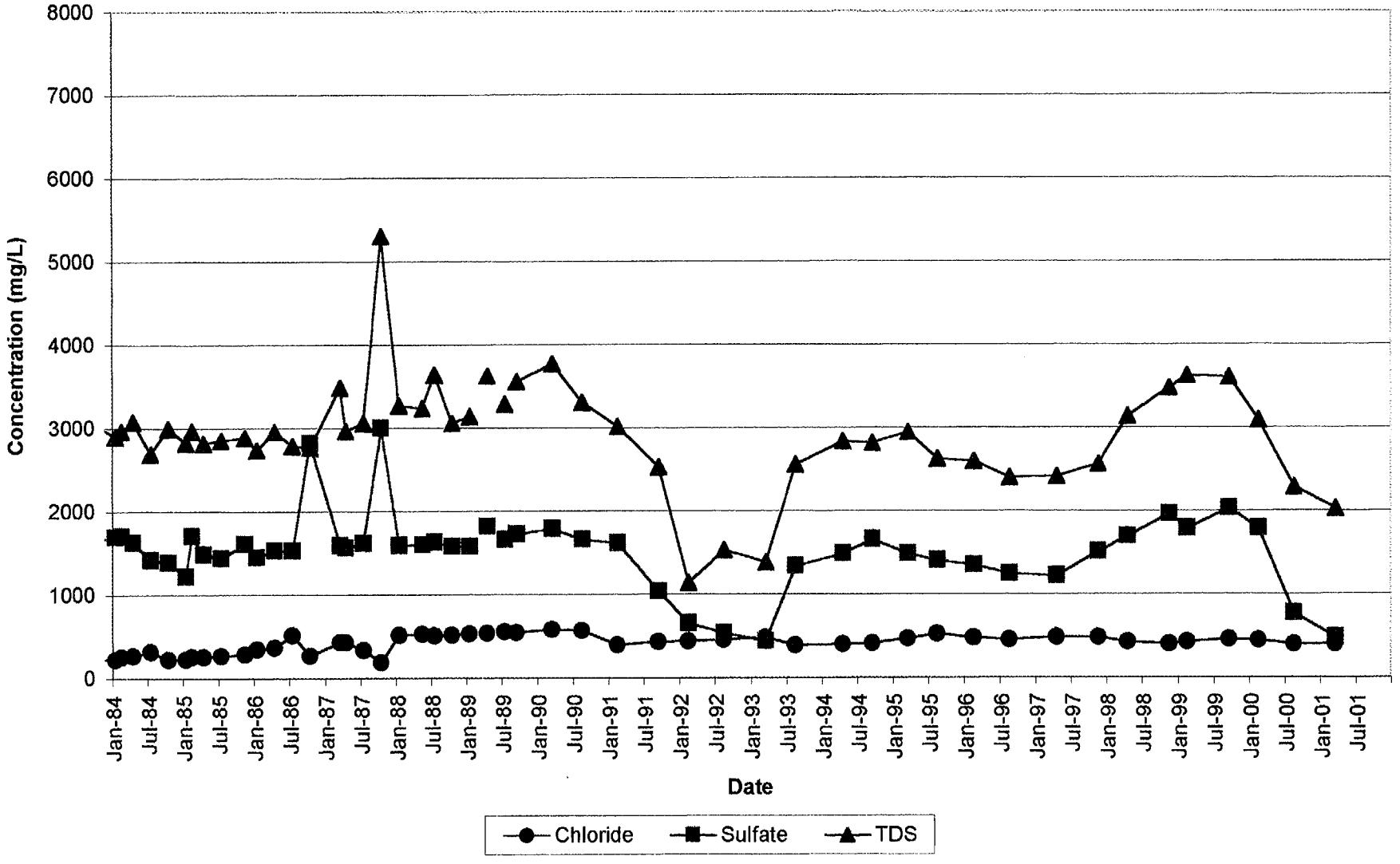
Monitor Well 36-02Trb

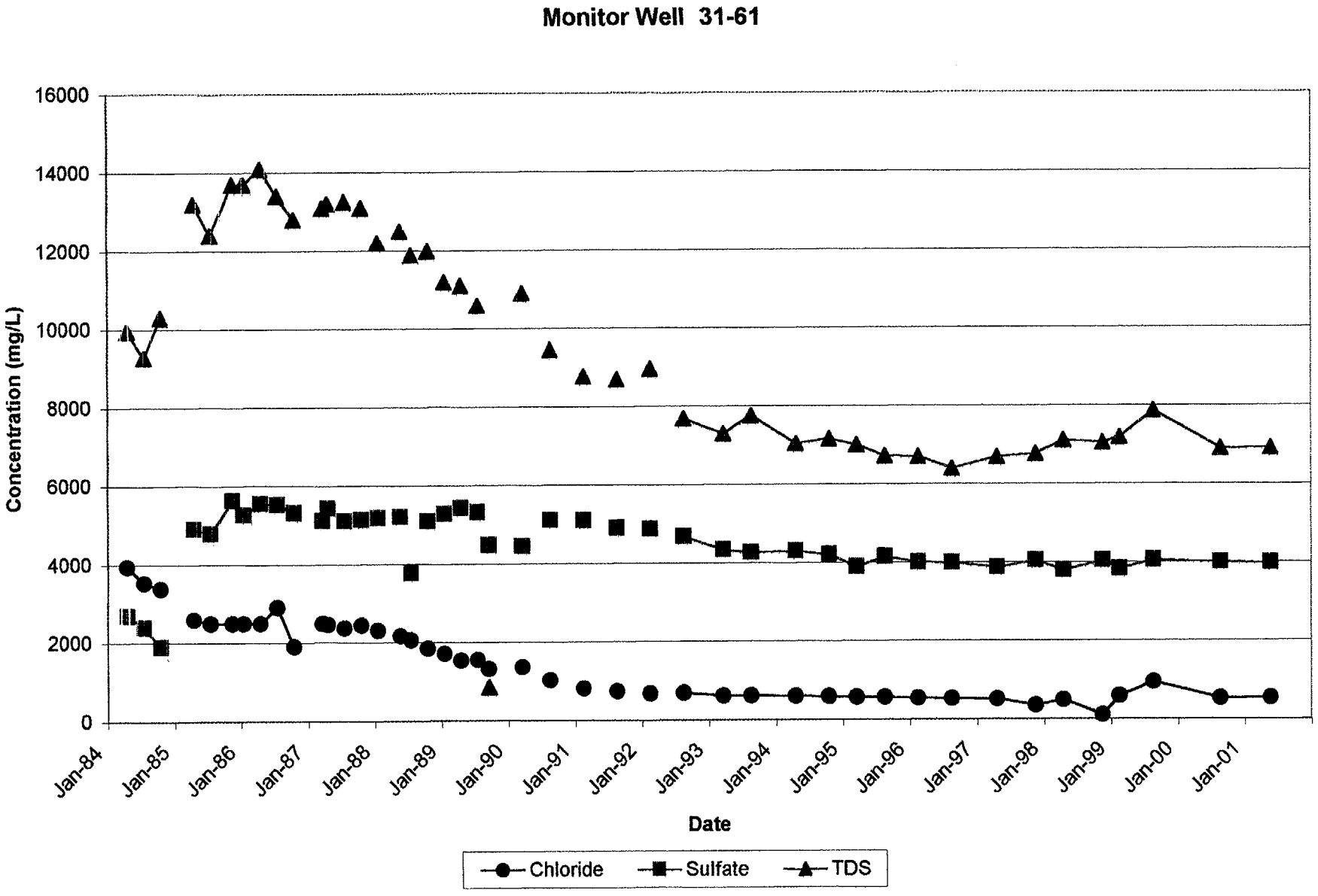


TIME vs CONCENTRATION PLOTS

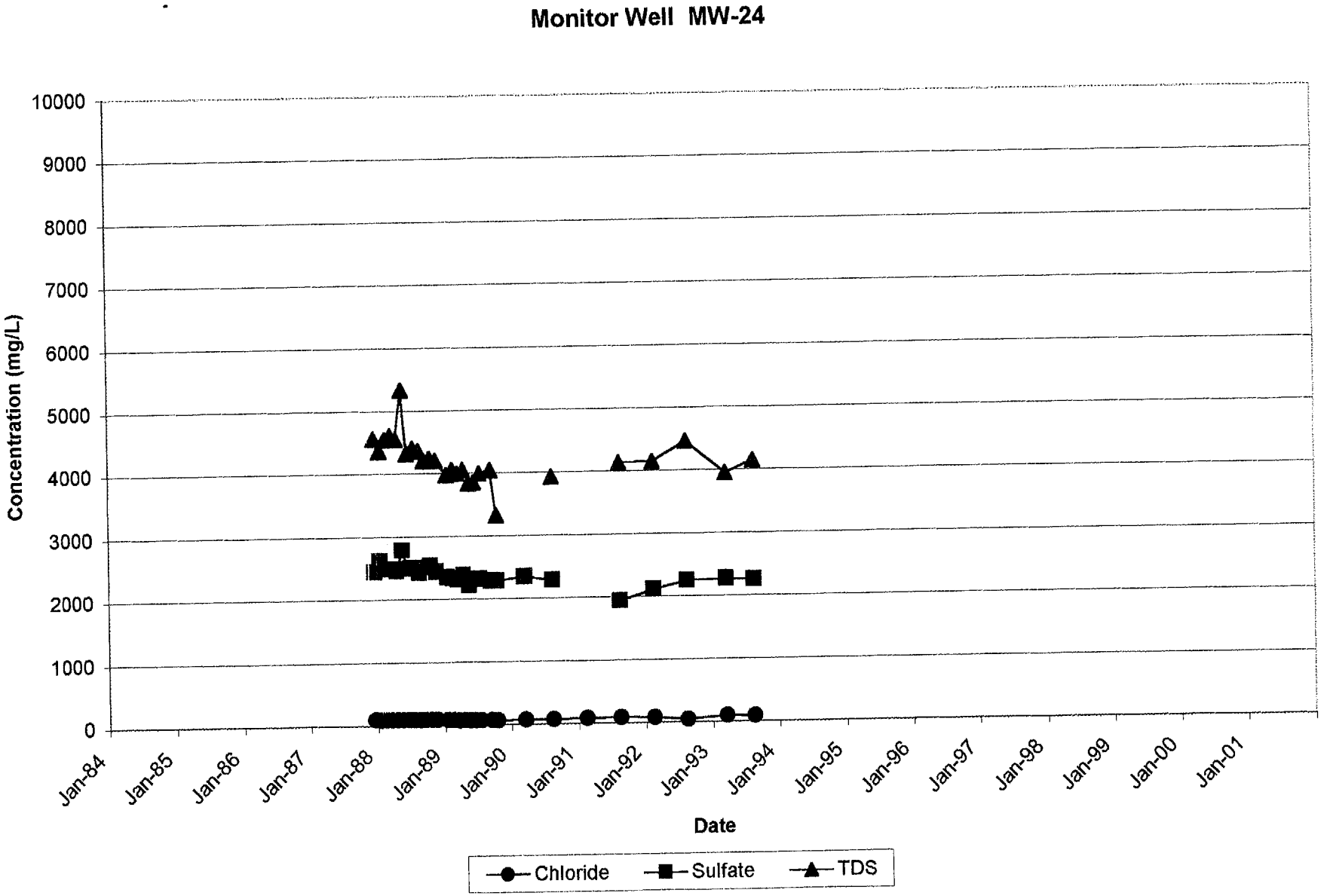
ALLUVIUM

Monitor Well 5-03




Monitor Well 31-61
Concentration (mg/L)
16000
14000
12000
10000
8000
6000
4000
2000
0
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Date
Chloride
Sulfate
TDS

Monitor Well 32-59
Chloride
Sulfate
TDS
Date
Concentration (mg/L)
0
1000
2000
3000
4000
5000
6000
Jan-84
Jul-84
Jan-85
Jul-85
Jan-86
Jul-86
Jan-87
Jul-87
Jan-88
Jul-88
Jan-89
Jul-89
Jan-90
Jul-90
Jan-91
Jul-91
Jan-92
Jul-92
Jan-93
Jul-93
Jan-94
Jul-94
Jan-95
Jul-95
Jan-96
Jul-96
Jan-97
Jul-97
Jan-98
Jul-98
Jan-99
Jul-99
Jan-00
Jul-00
Jan-01
Jul-01


Monitor Well MW-24
Concentration (mg/L)
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Date
Chloride
Sulfate
TDS

APPENDIX C

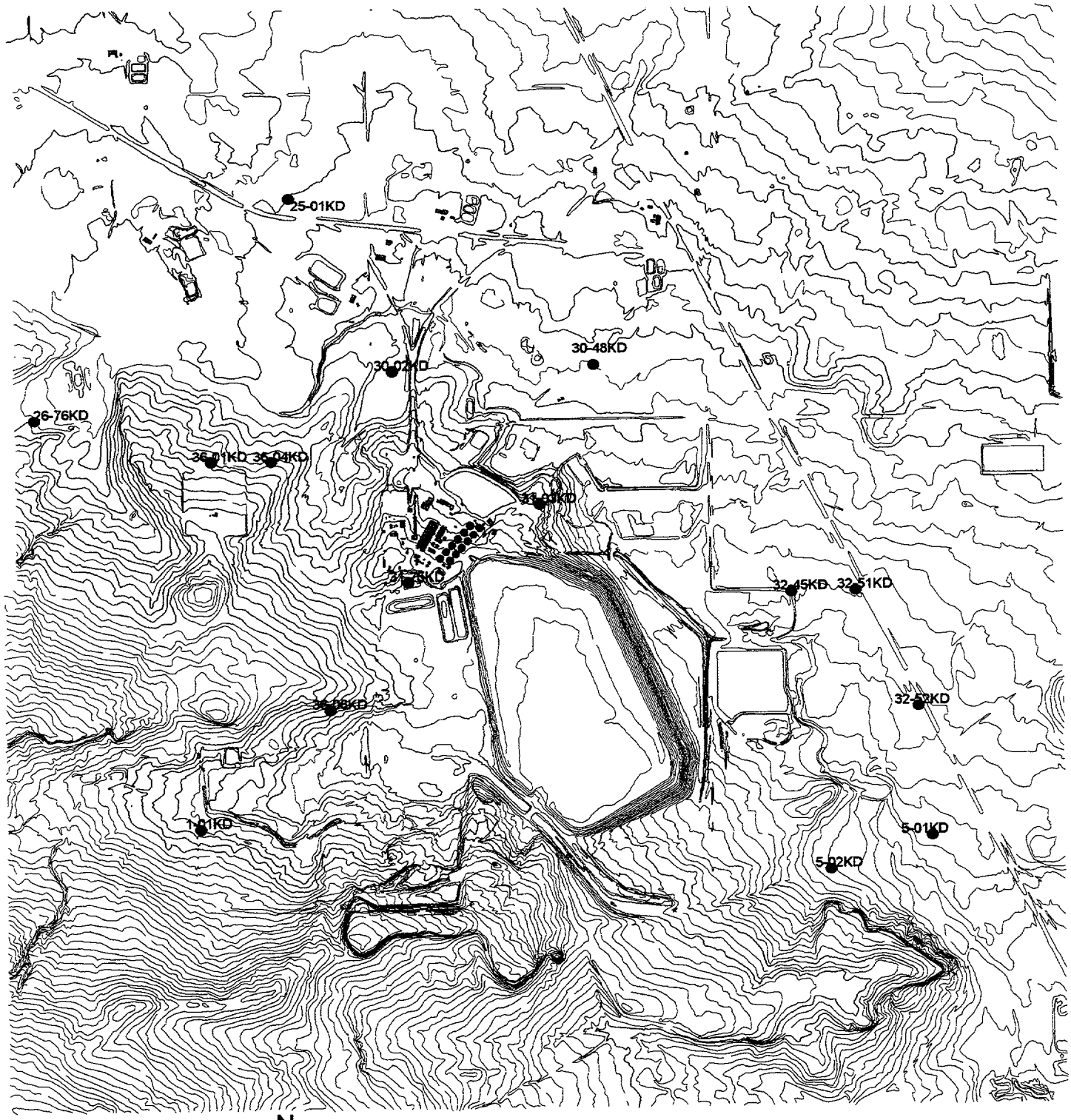
AREAL PLUME PLOTS

AREAL PLUME PLOTS

DAKOTA

QUIVIRA MINING COMPANY
LICENSE SUA-1473
ANTIMONY

2001 CONCENTRATION ISOPLETH
GROUND WATER PROTECTION STANDARD = 0.05 mg/L



N

1 inch = 2300 feet

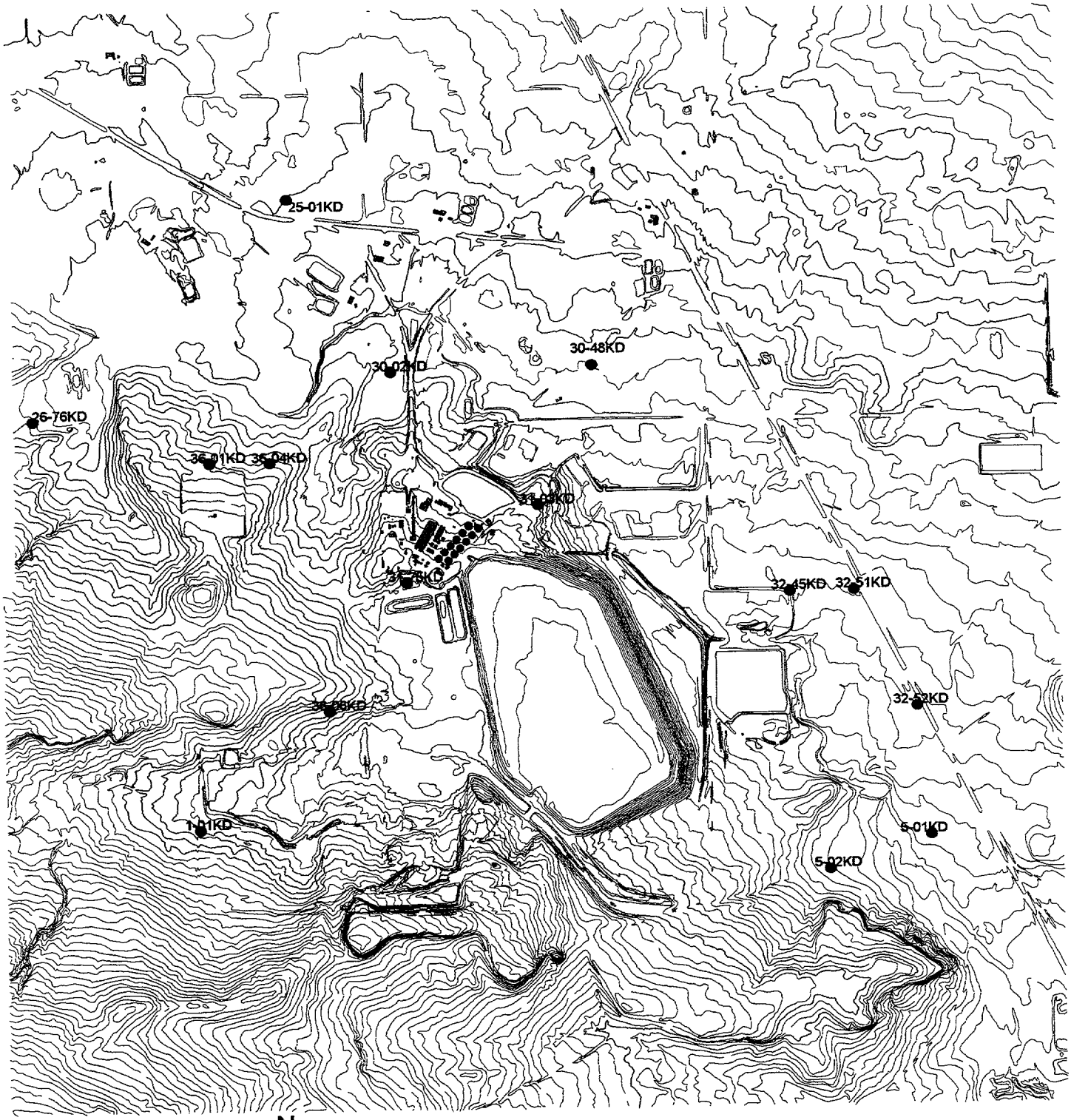
Antimony concentrations in all wells are at or below the groundwater protection standard.

DAKOTA

QUIVIRA MINING COMPANY
LICENSE SUA-1473

ARSENIC

2001 CONCENTRATION ISOPLETH
GROUND WATER PROTECTION STANDARD = 0.1 mg/L



N

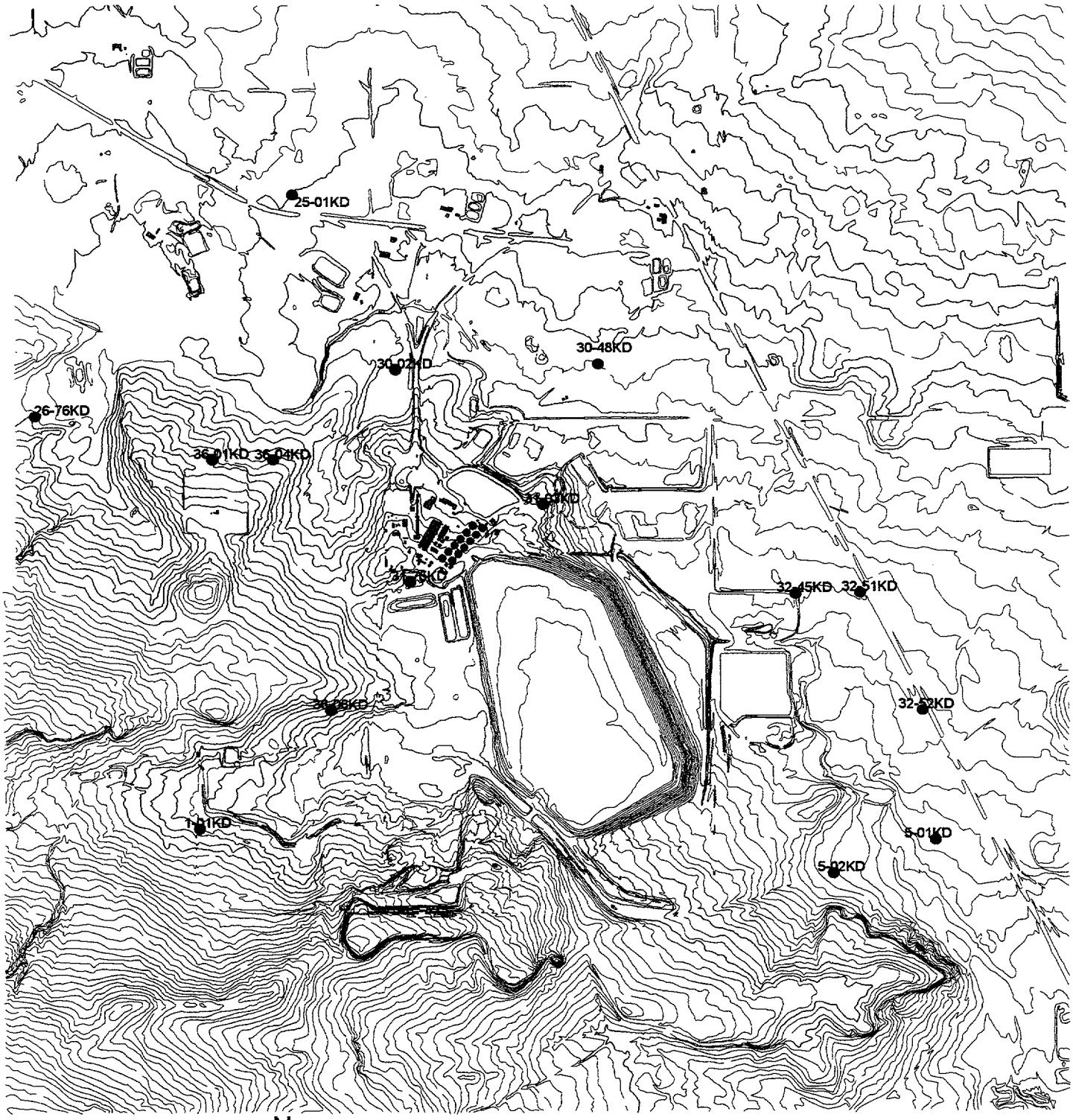
1 inch = 2300 feet

Arsenic concentrations in all wells are at or below the groundwater protection standard.

DAKOTA

QUIVIRA MINING COMPANY
LICENSE SUA-1473
BERYLLIUM

2001 CONCENTRATION ISOPLETH
GROUND WATER PROTECTION STANDARD = 0.01 mg/L



N

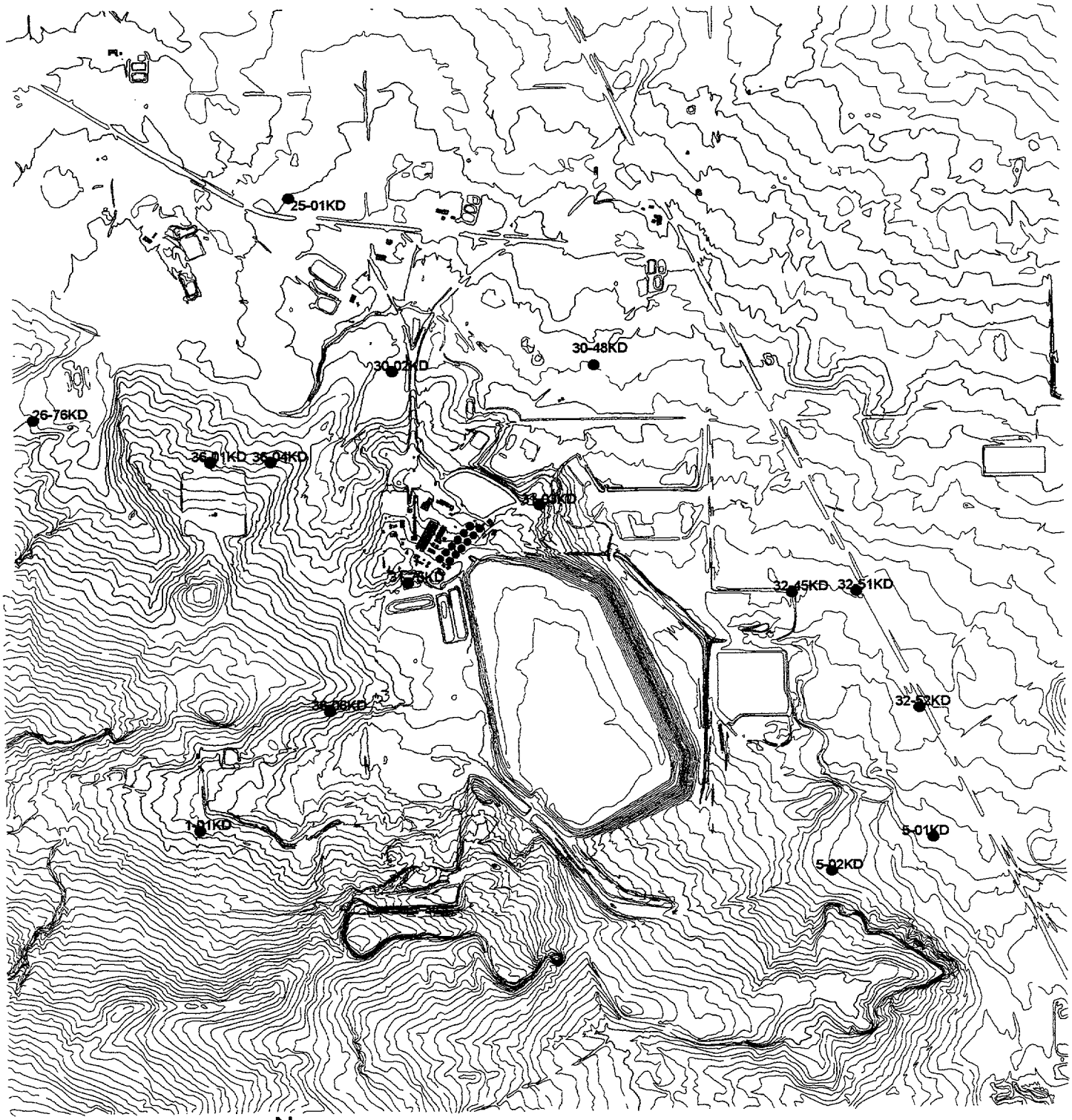
1 inch = 2300 feet

Beryllium concentrations in all wells are at or below the groundwater protection standard.

DAKOTA

QUIVIRA MINING COMPANY
LICENSE SUA-1473
CADMIUM

2001 CONCENTRATION ISOPLETH
GROUND WATER PROTECTION STANDARD = 0.01 mg/L



N

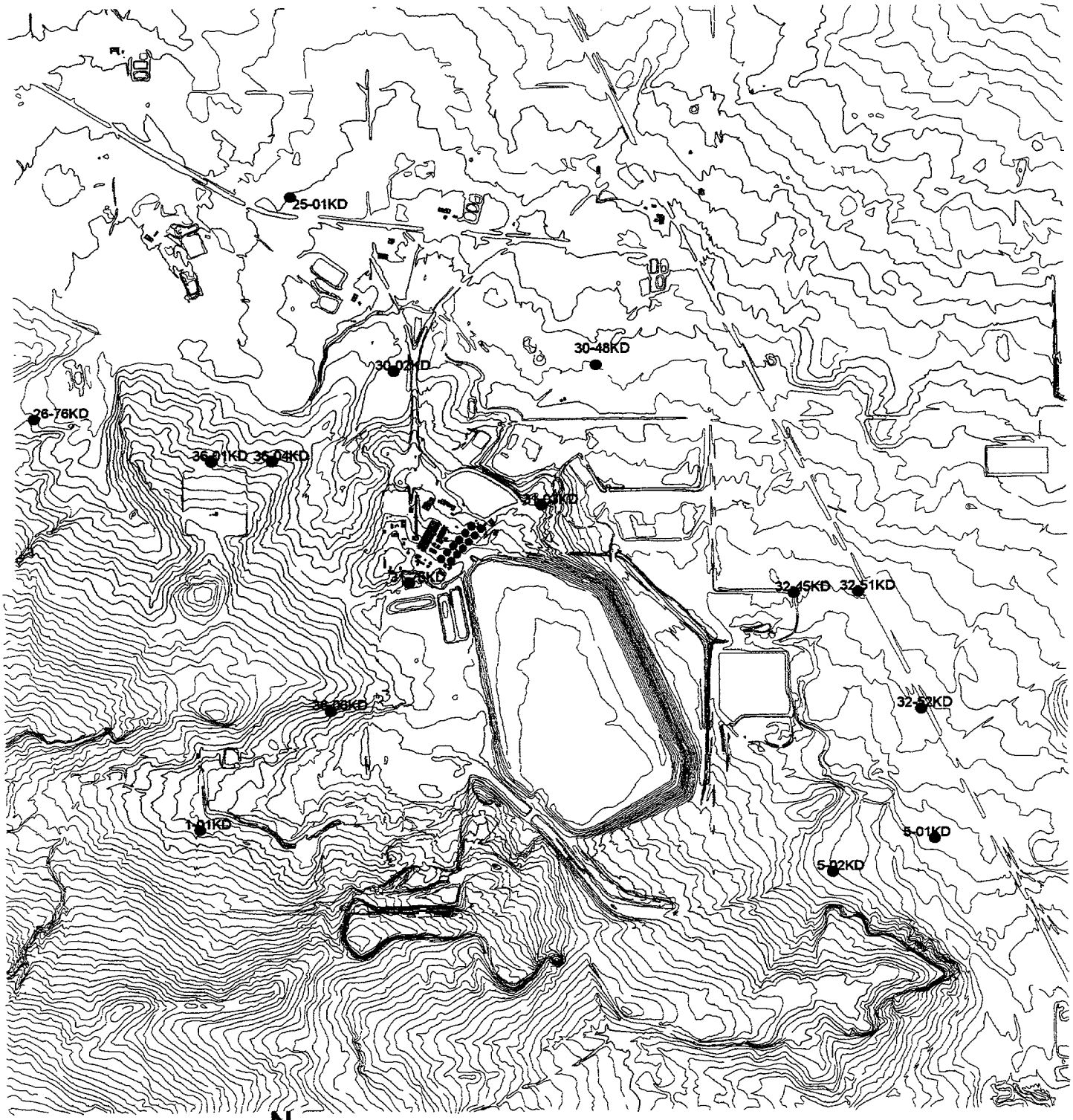
1 inch = 2300 feet

cadmium concentrations in all wells are at or below the groundwater protection standard.

DAKOTA

QUIVIRA MINING COMPANY
LICENSE SUA-1473
CYANIDE

2001 CONCENTRATION ISOPLETH
GROUND WATER PROTECTION STANDARD = 0.04 mg/L



N

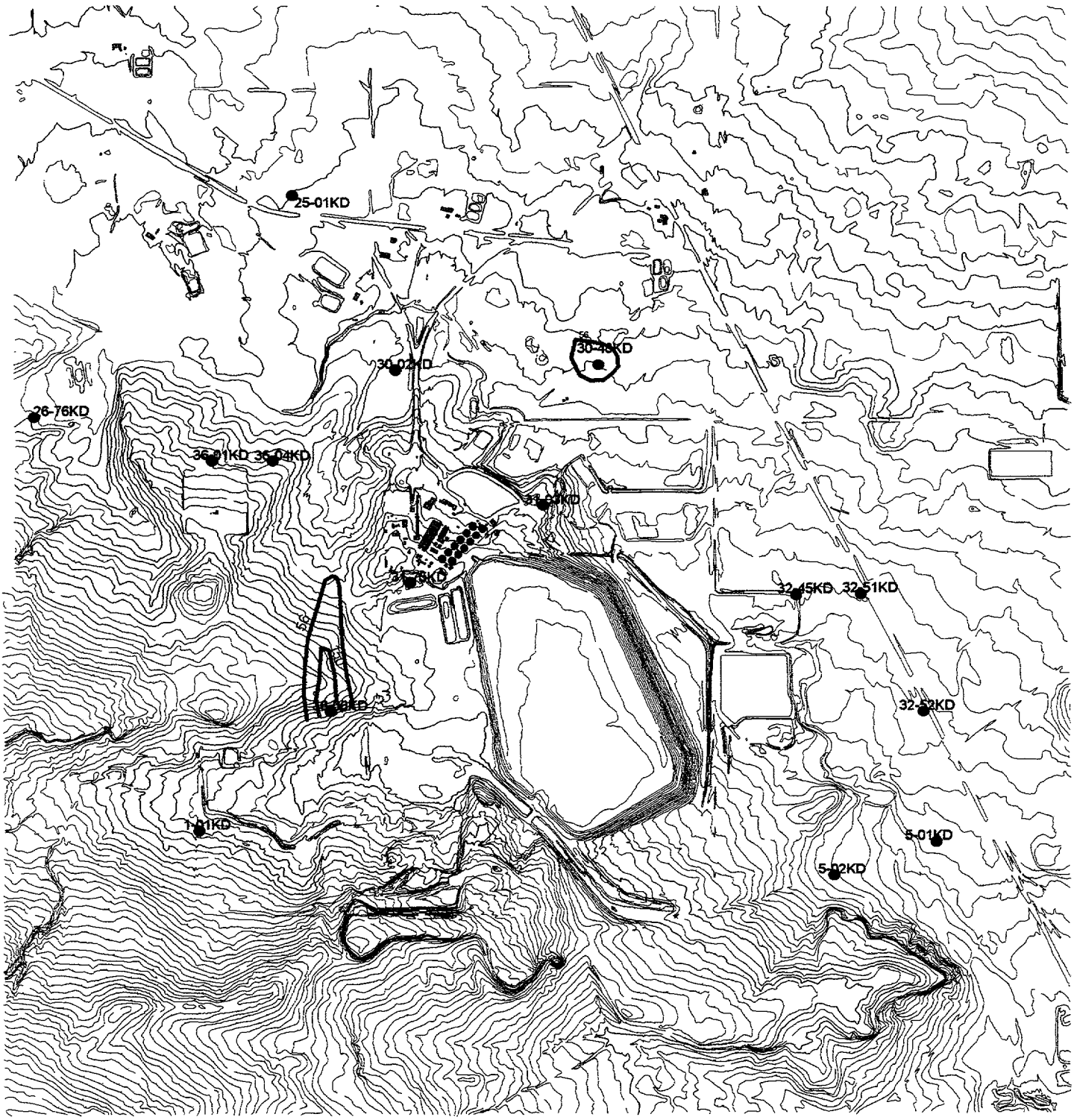
1 inch = 2300 feet

Cyanide concentrations in all wells are at or below the groundwater protection standard.

DAKOTA

QUIVIRA MINING COMPANY
LICENSE SUA-1473
GROSS ALPHA
(EXCLUDES URANIUM AND RADON)

2001 CONCENTRATION ISOPLETH
GROUND WATER PROTECTION STANDARD = 56 pCi/L



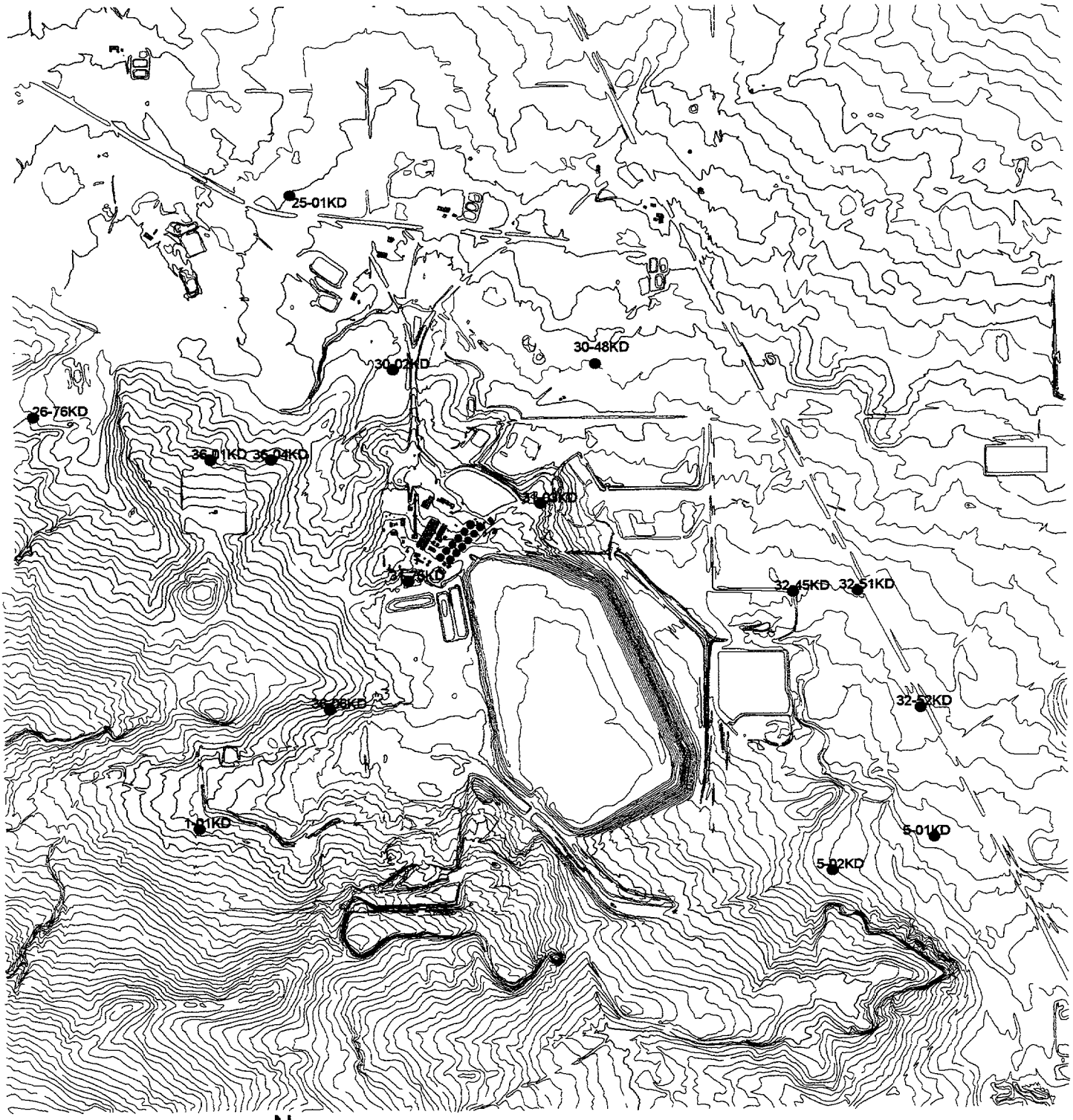
1 inch = 2300 feet

DAKOTA

N

QUIVIRA MINING COMPANY
LICENSE SUA-1473
LEAD

2001 CONCENTRATION ISOPLETH
GROUND WATER PROTECTION STANDARD = 0.14 mg/L



N

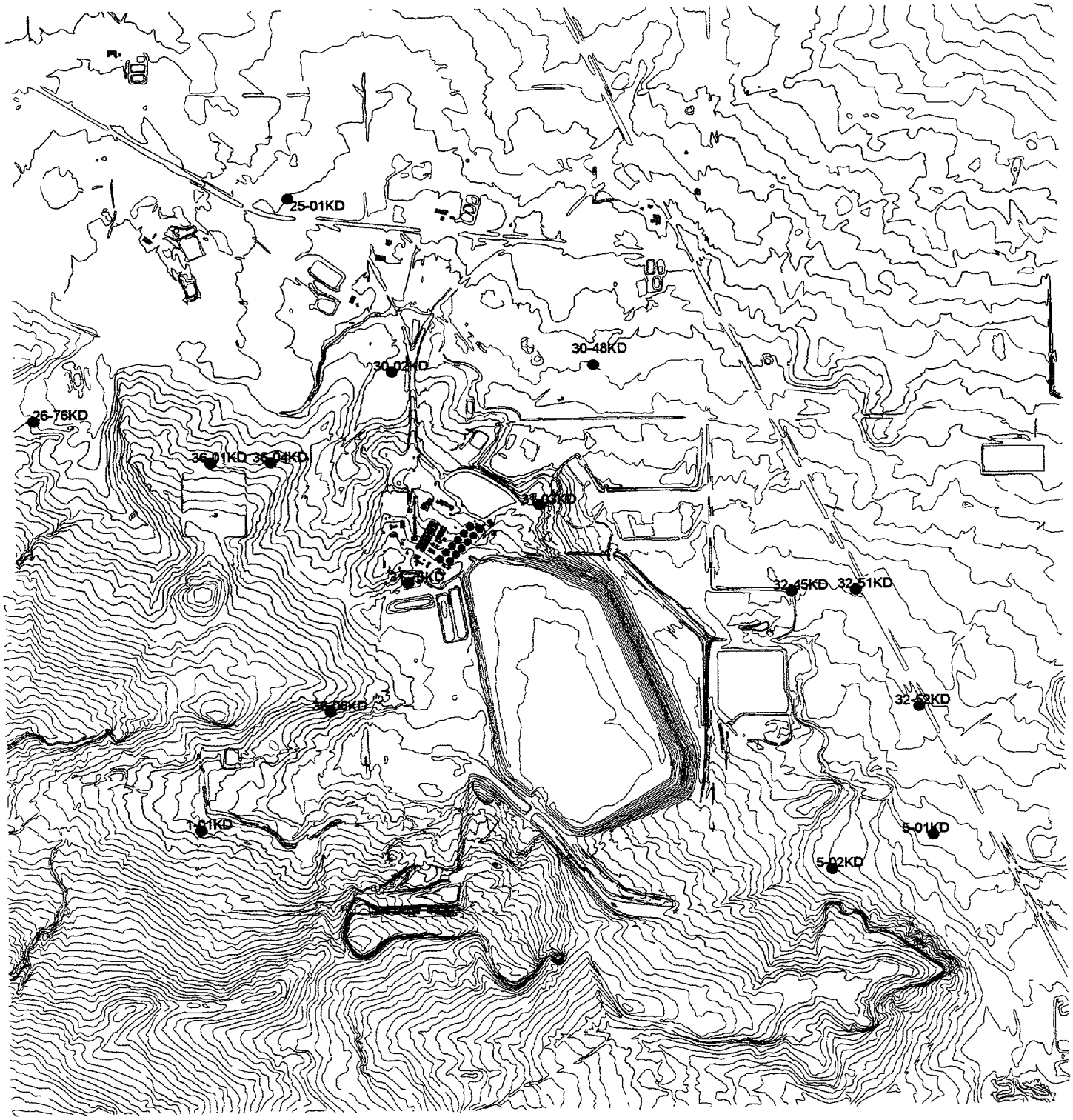
1 inch = 2300 feet

Lead concentrations in all wells are at or below the groundwater protection standard.

DAKOTA

QUIVIRA MINING COMPANY
LICENSE SUA-1473
LEAD-210

2001 CONCENTRATION ISOPLETH
GROUND WATER PROTECTION STANDARD = 1.9 pCi/L



1 inch = 2300 feet

N

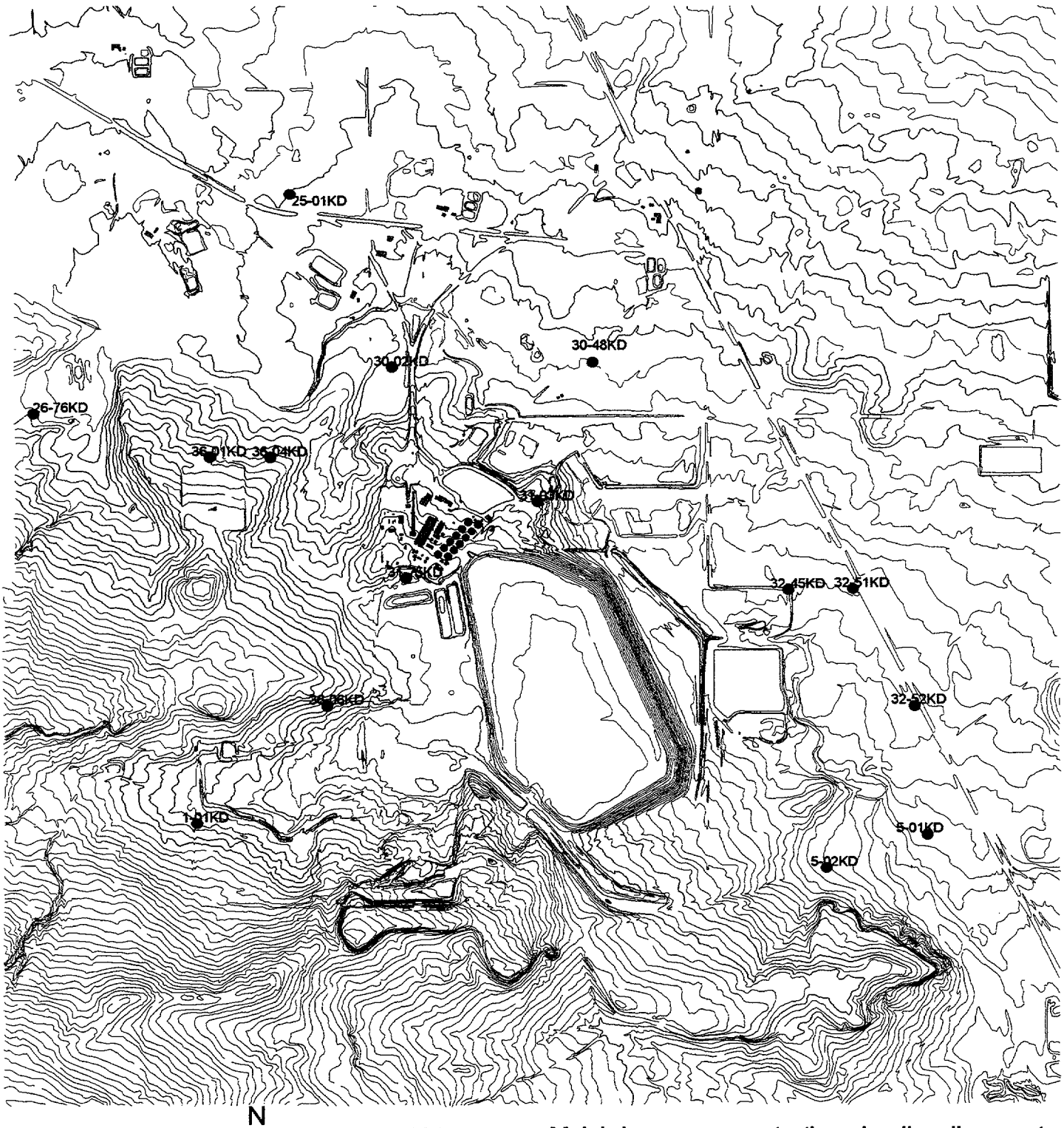
DAKOTA

Lead-210 concentrations in all wells are at or below the groundwater protection standard.

QUIVIRA MINING COMPANY
LICENSE SUA-1473

MOLYBDENUM

2001 CONCENTRATION ISOPLETH
GROUND WATER PROTECTION STANDARD = 0.06 mg/L



N

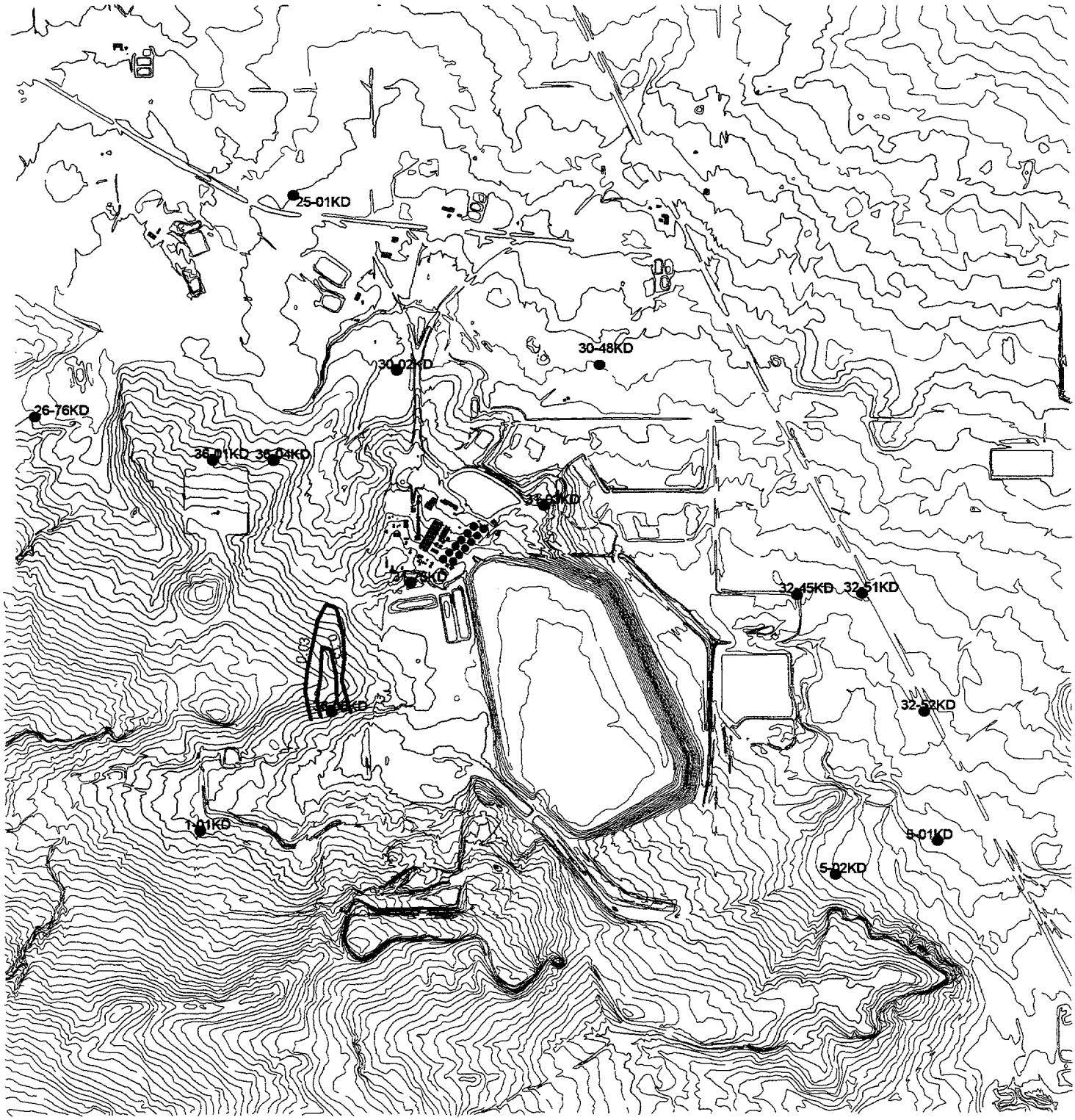
1 inch = 2300 feet

DAKOTA

Molybdenum concentrations in all wells are at or below the groundwater protection standard except background well (17-01KD @ 0.1 mg/L)

QUIVIRA MINING COMPANY
LICENSE SUA-1473
NICKEL

2001 CONCENTRATION ISOPLETH
GROUND WATER PROTECTION STANDARD = 0.03 mg/L



DAKOTA

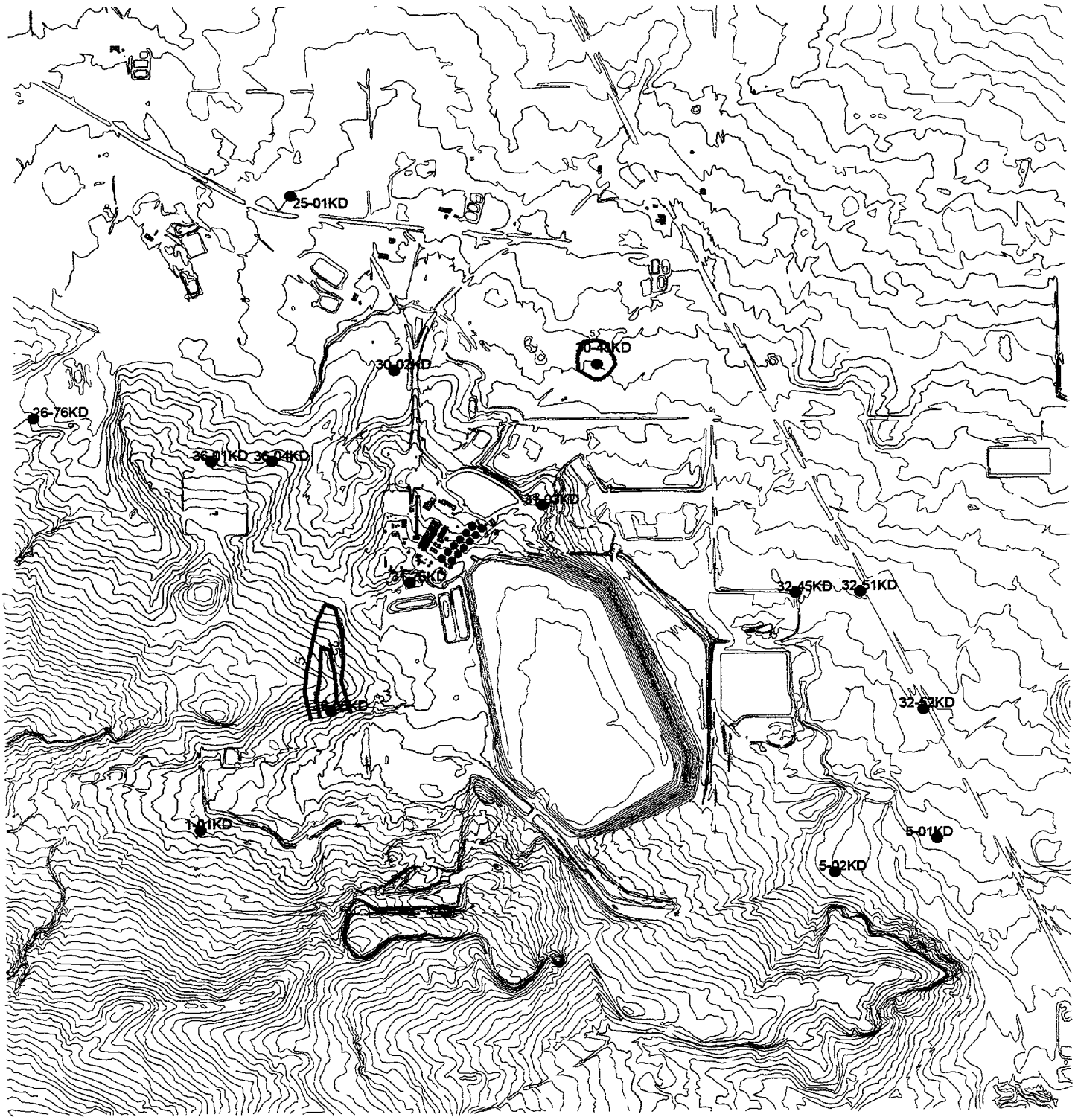
1 inch = 2300 feet

N

QUIVIRA MINING COMPANY
LICENSE SUA-1473

RADIUM-226/228

2001 CONCENTRATION ISOPLETH
GROUND WATER PROTECTION STANDARD = 5 pCi/L



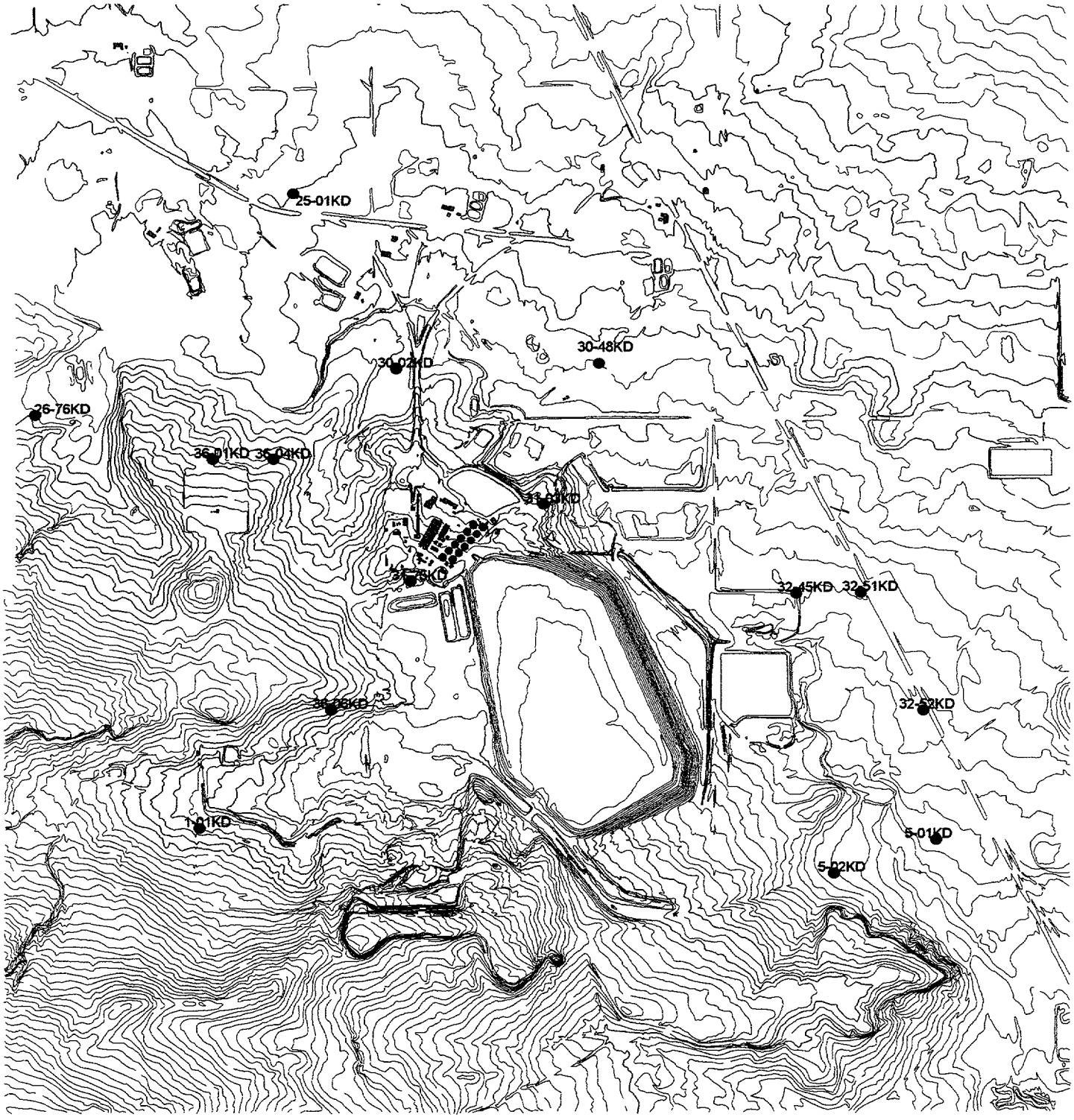
1 inch = 2300 feet

N

DAKOTA

QUIVIRA MINING COMPANY
LICENSE SUA-1473
SELENIUM

2001 CONCENTRATION ISOPLETH
GROUND WATER PROTECTION STANDARD = 0.04 mg/L



DAKOTA

N

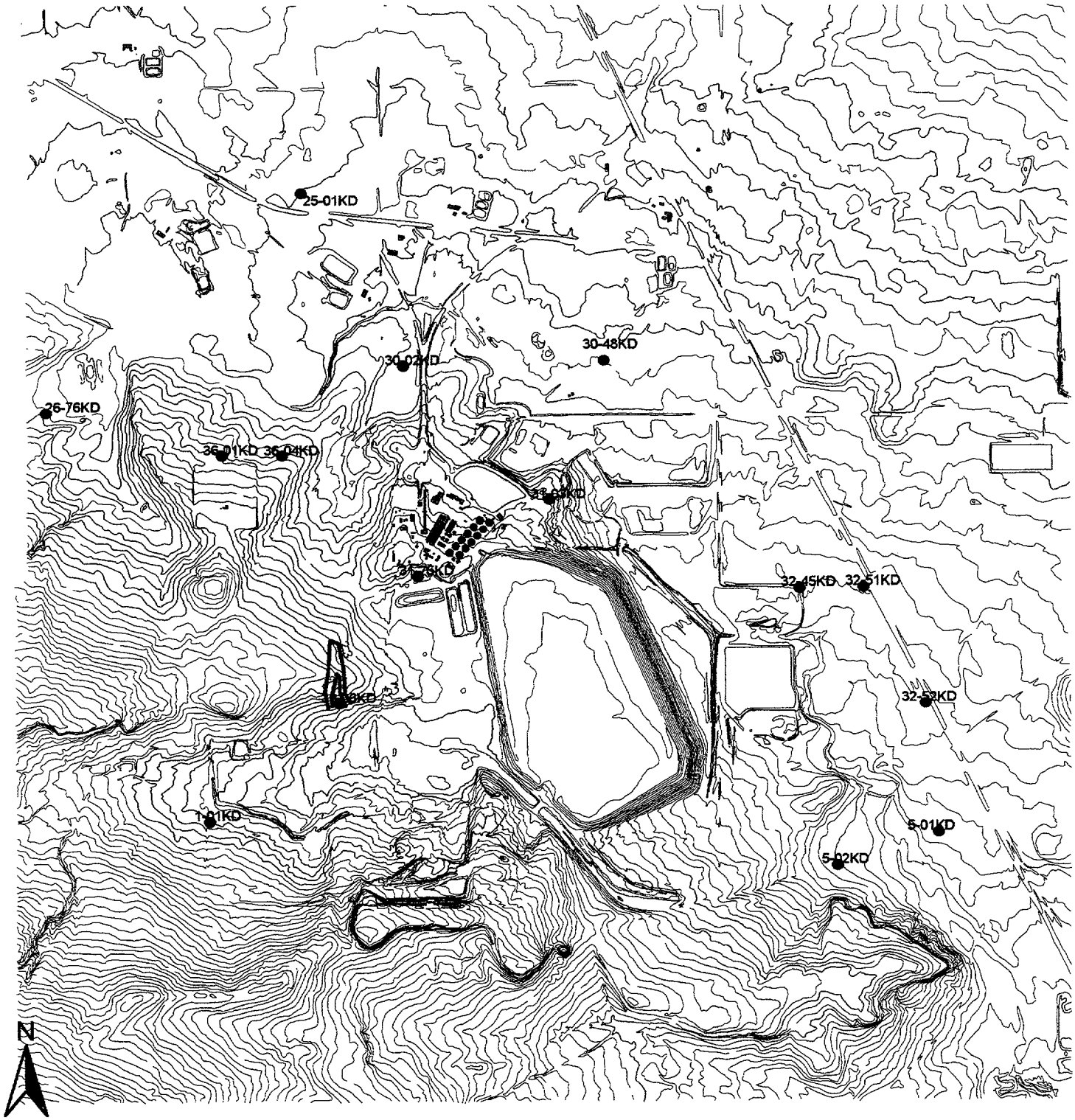
1 inch = 2300 feet

Selenium concentrations in all wells are at or below the groundwater protection standard.

QUIVIRA MINING COMPANY
LICENSE SUA-1473

THORIUM-230

2001 CONCENTRATION ISOPLETH
GROUND WATER PROTECTION STANDARD = 2.3 pCi/L

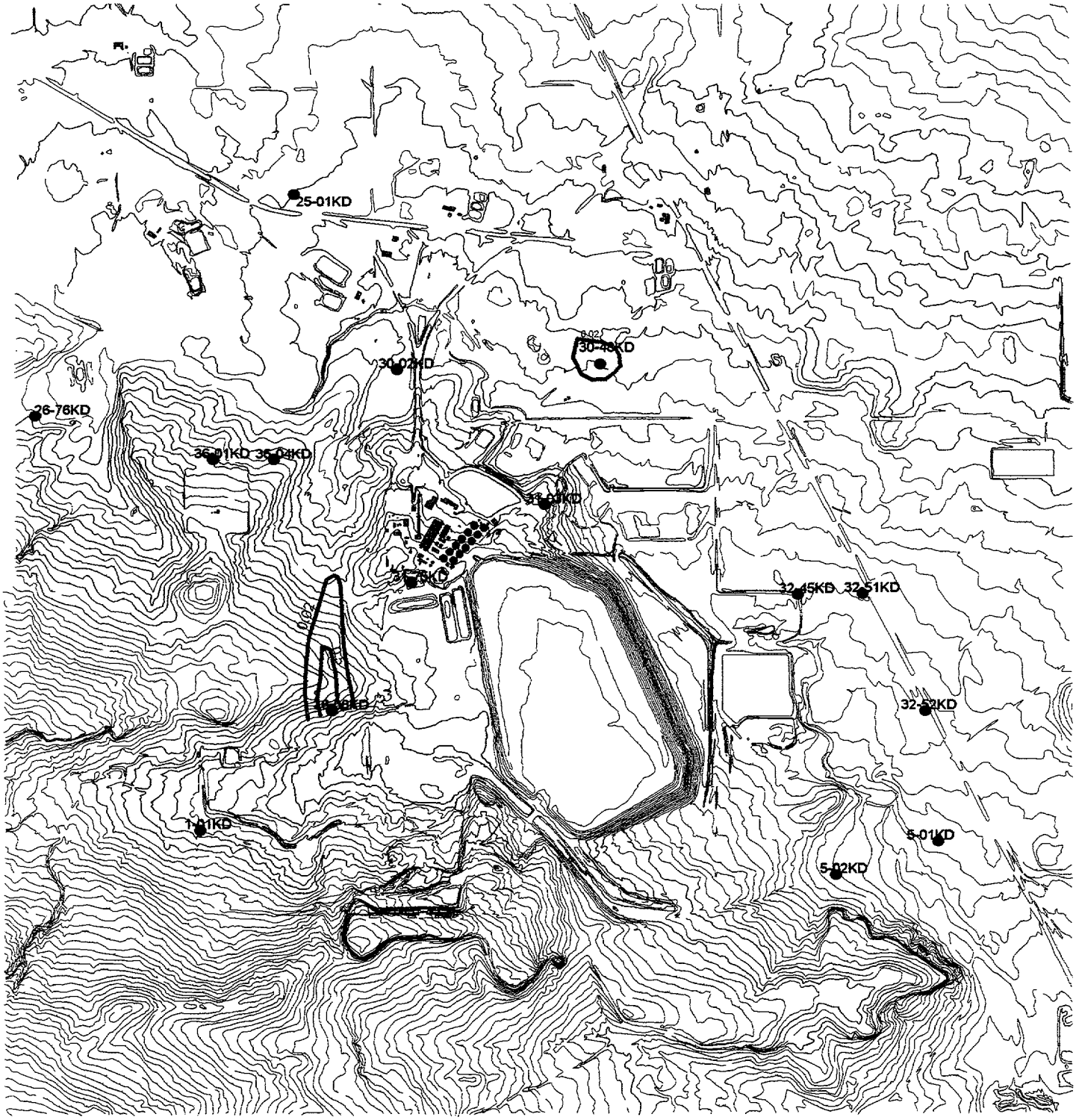


1 inch = 2300 feet

DAKOTA

QUIVIRA MINING COMPANY
LICENSE SUA-1473
URANIUM

2001 CONCENTRATION ISOPLETH
GROUND WATER PROTECTION STANDARD = 0.02 mg/L



1 inch = 2300 feet

N

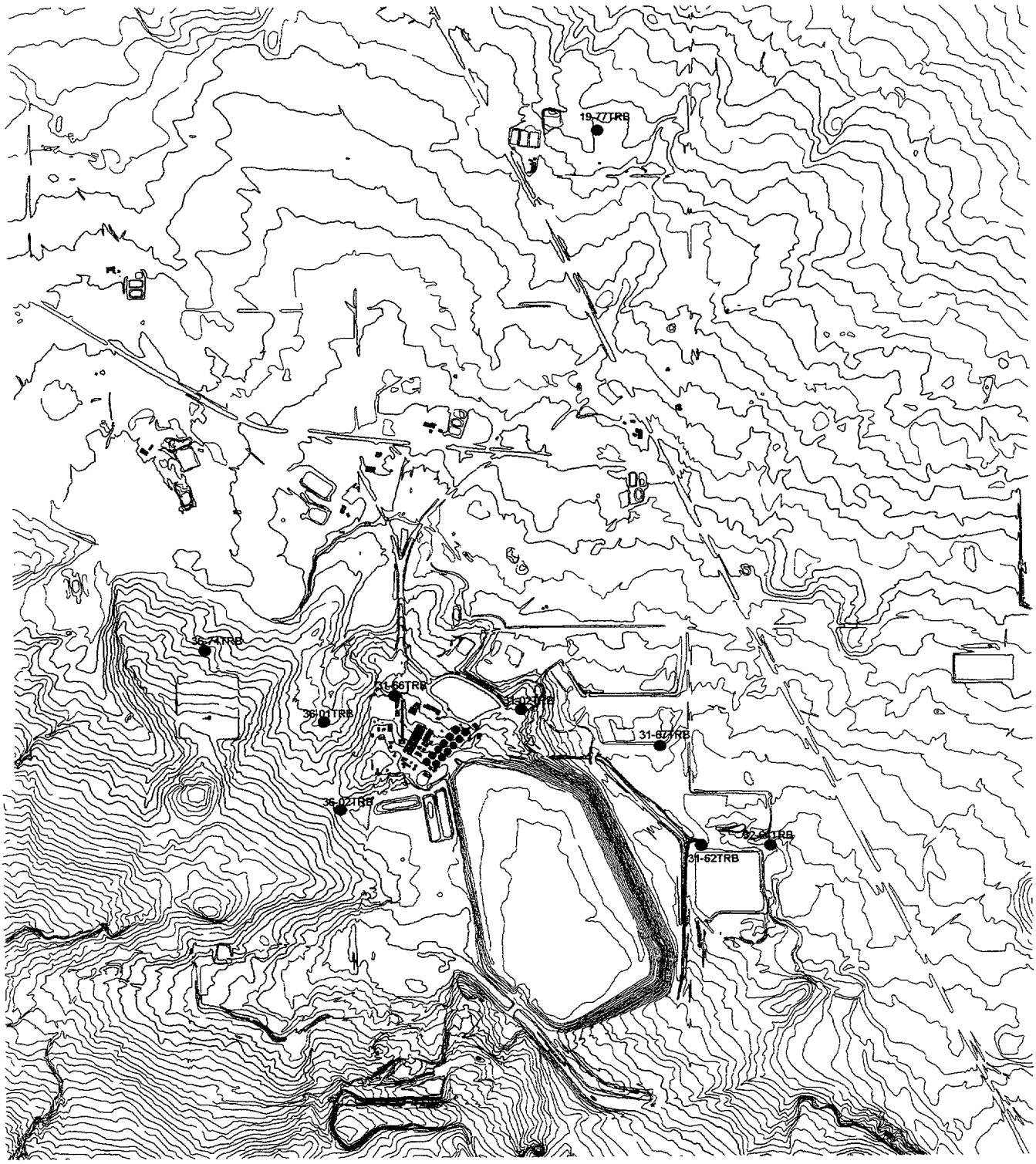
DAKOTA

AREAL PLUME PLOTS

TRES HERMANOS B

QUIVIRA MINING COMPANY
LICENSE SUA-1473
CYANIDE

2001 CONCENTRATION ISOPLETH
GROUND WATER PROTECTION STANDARD = 0.01 mg/L



1 inch = 2400 feet

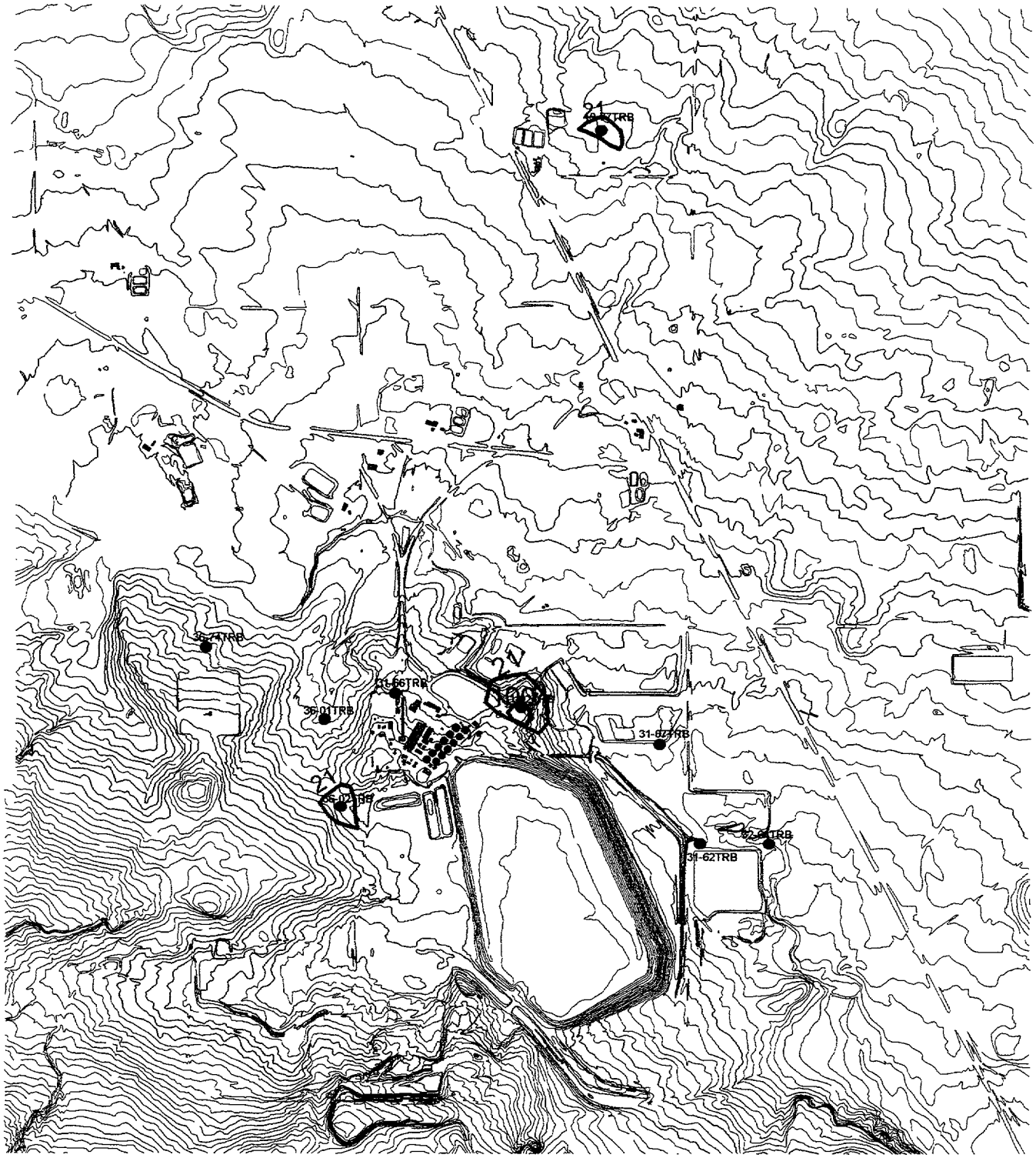
TRES HERMANOS B

Cyanide concentrations in all wells are at or below the groundwater protection standard.

QUIVIRA MINING COMPANY
LICENSE SUA-1473

GROSS ALPHA
(EXCLUDES URANIUM AND RADON)

2001 CONCENTRATION ISOPLETH
GROUND WATER PROTECTION STANDARD = 21 pCi/L

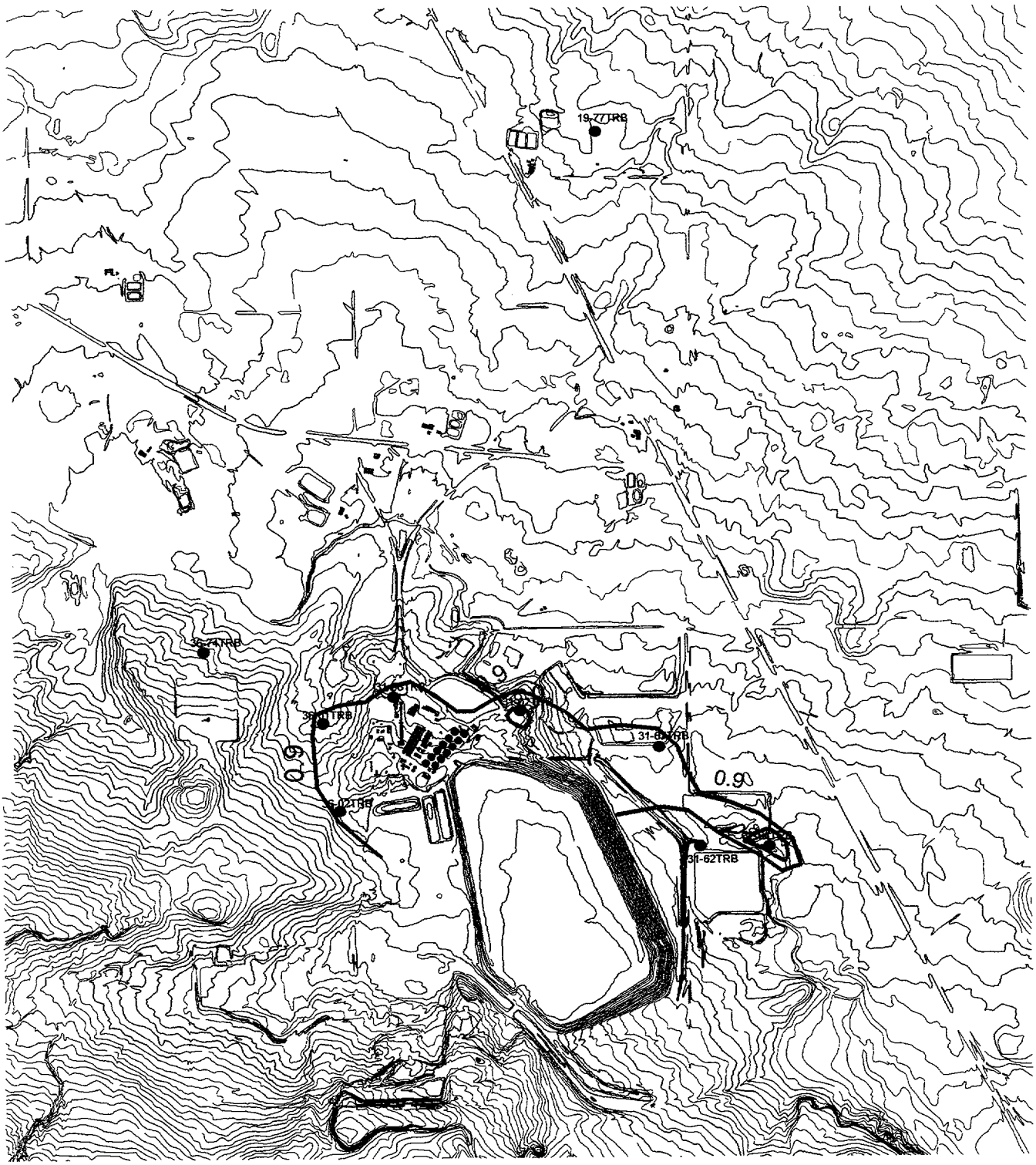


1 inch = 2400 feet N

TRES HERMANOS B

QUIVIRA MINING COMPANY
LICENSE SUA-1473
LEAD-210

2001 CONCENTRATION ISOPLETH
GROUND WATER PROTECTION STANDARD = 0.9 pCi/L



1 inch = 2400 feet

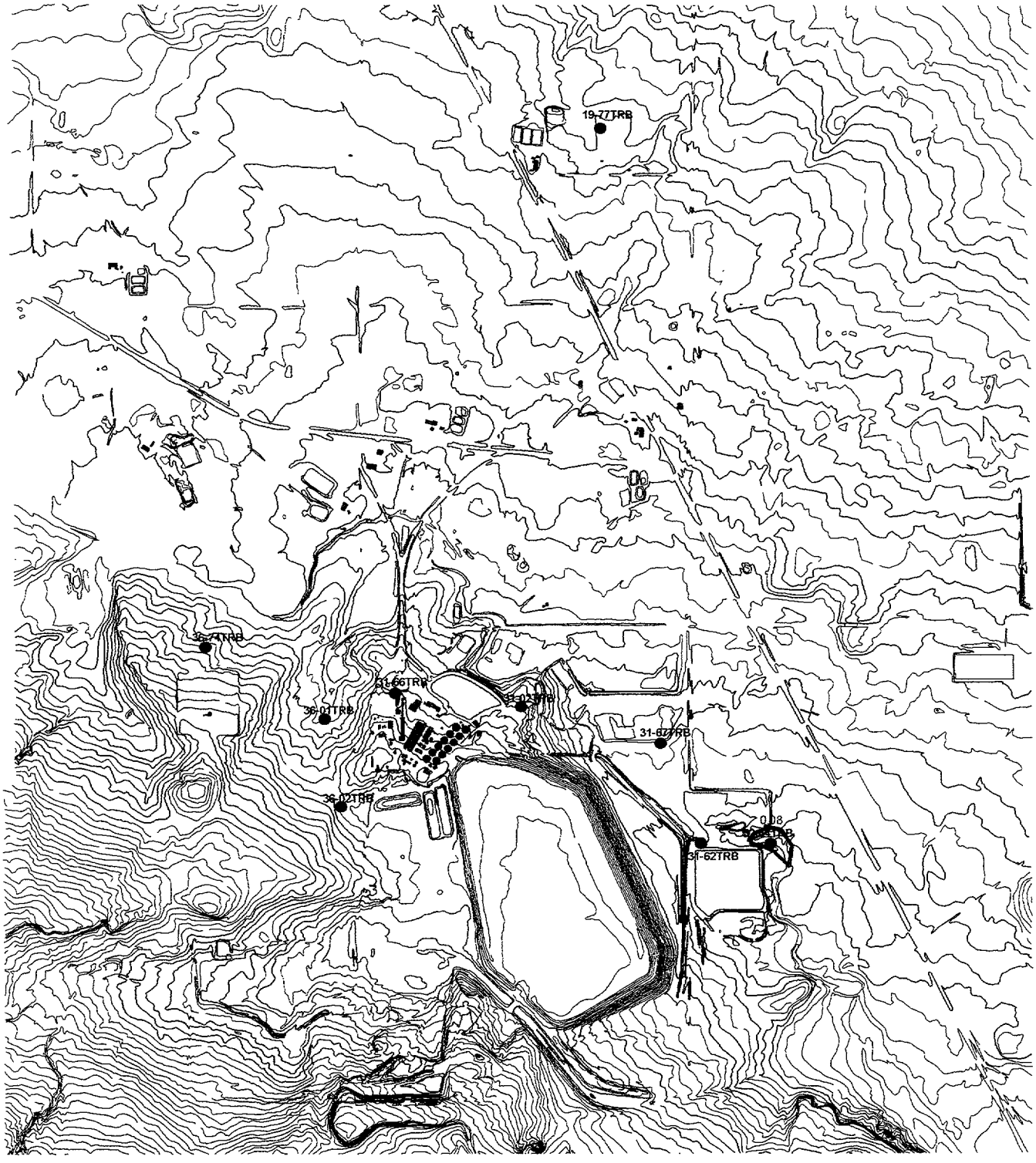
N

TRES HERMANOS B

QUIVIRA MINING COMPANY
LICENSE SUA-1473

MOLYBDENUM

2001 CONCENTRATION ISOPLETH
GROUND WATER PROTECTION STANDARD = 0.08 MG/L

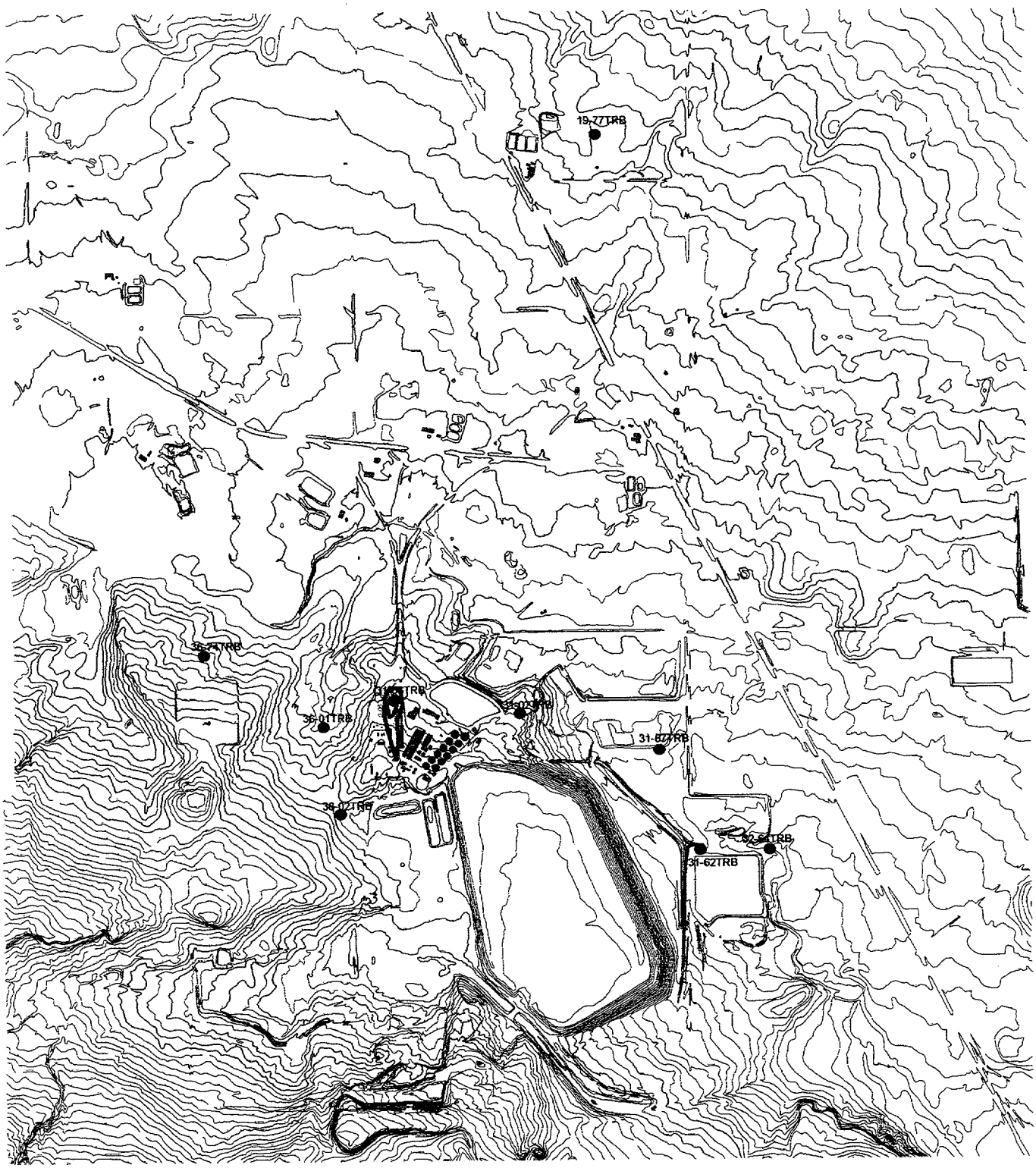


1 inch = 2400 feet

TRES HERMANOS B

QUIVIRA MINING COMPANY
LICENSE SUA-1473
NICKEL

2001 CONCENTRATION ISOPLETH
GROUND WATER PROTECTION STANDARD = 0.06 MG/L



TRES HERMANOS B

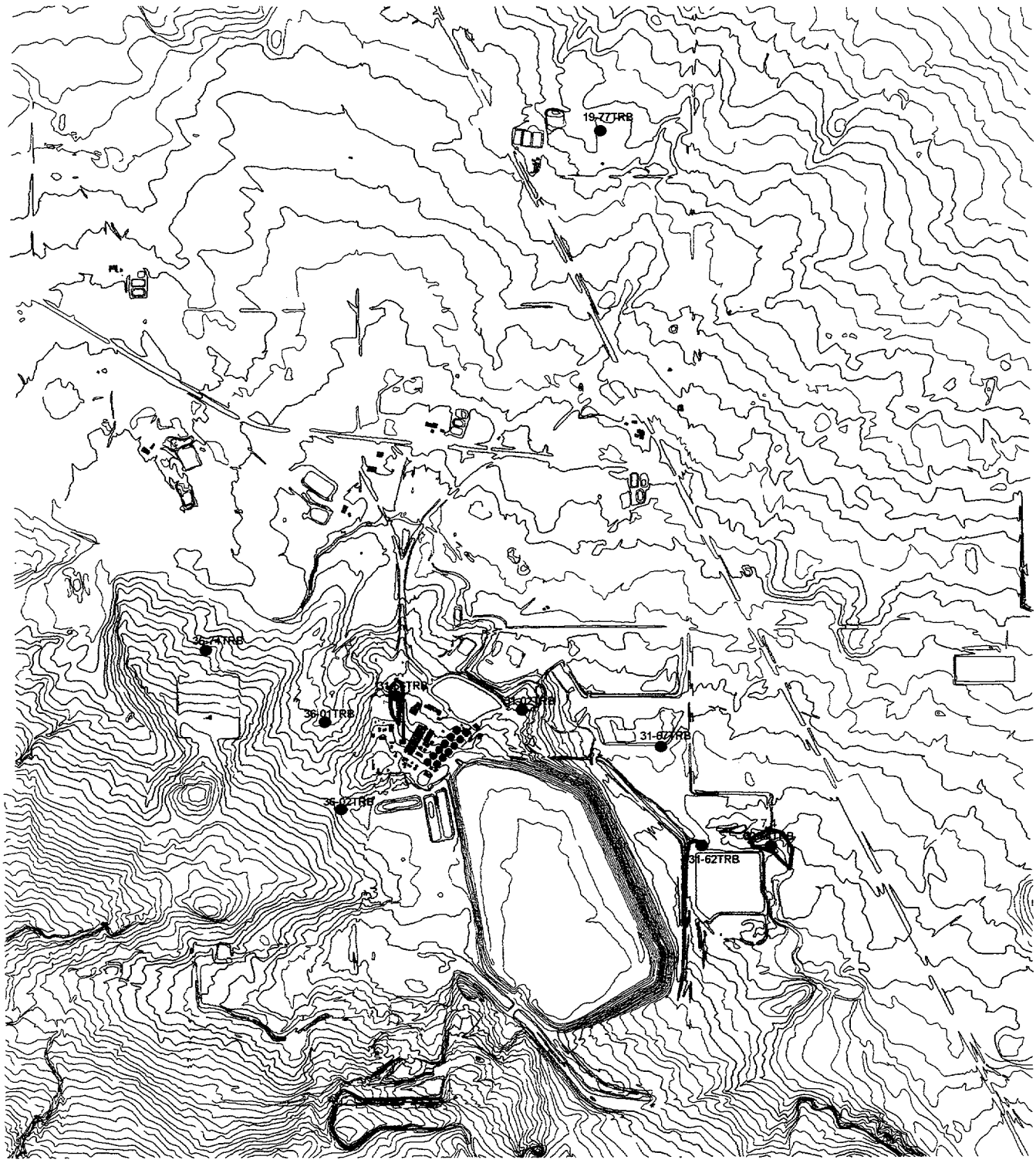
1 inch = 2400 feet

N

QUIVIRA MINING COMPANY
LICENSE SUA-1473

RADIUM-226/228

2001 CONCENTRATION ISOPLETH
GROUND WATER PROTECTION STANDARD = 7.4 pCi/L



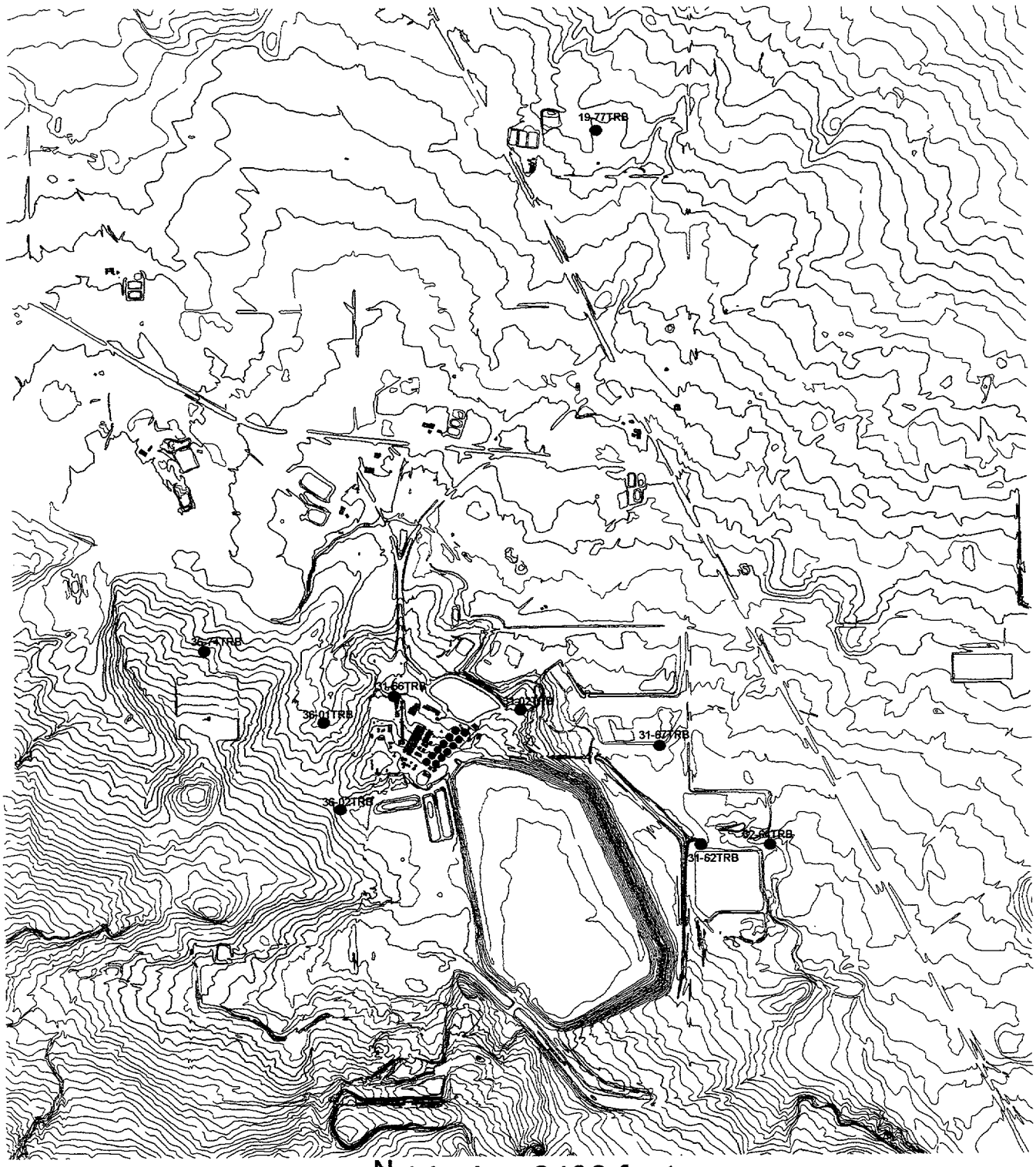
1 inch = 2400 feet

N

TRES HERMANOS B

QUIVIRA MINING COMPANY
LICENSE SUA-1473
SELENIUM

2001 CONCENTRATION ISOPLETH
GROUND WATER PROTECTION STANDARD = 0.04 mg/L



TRES HERMANOS B

N

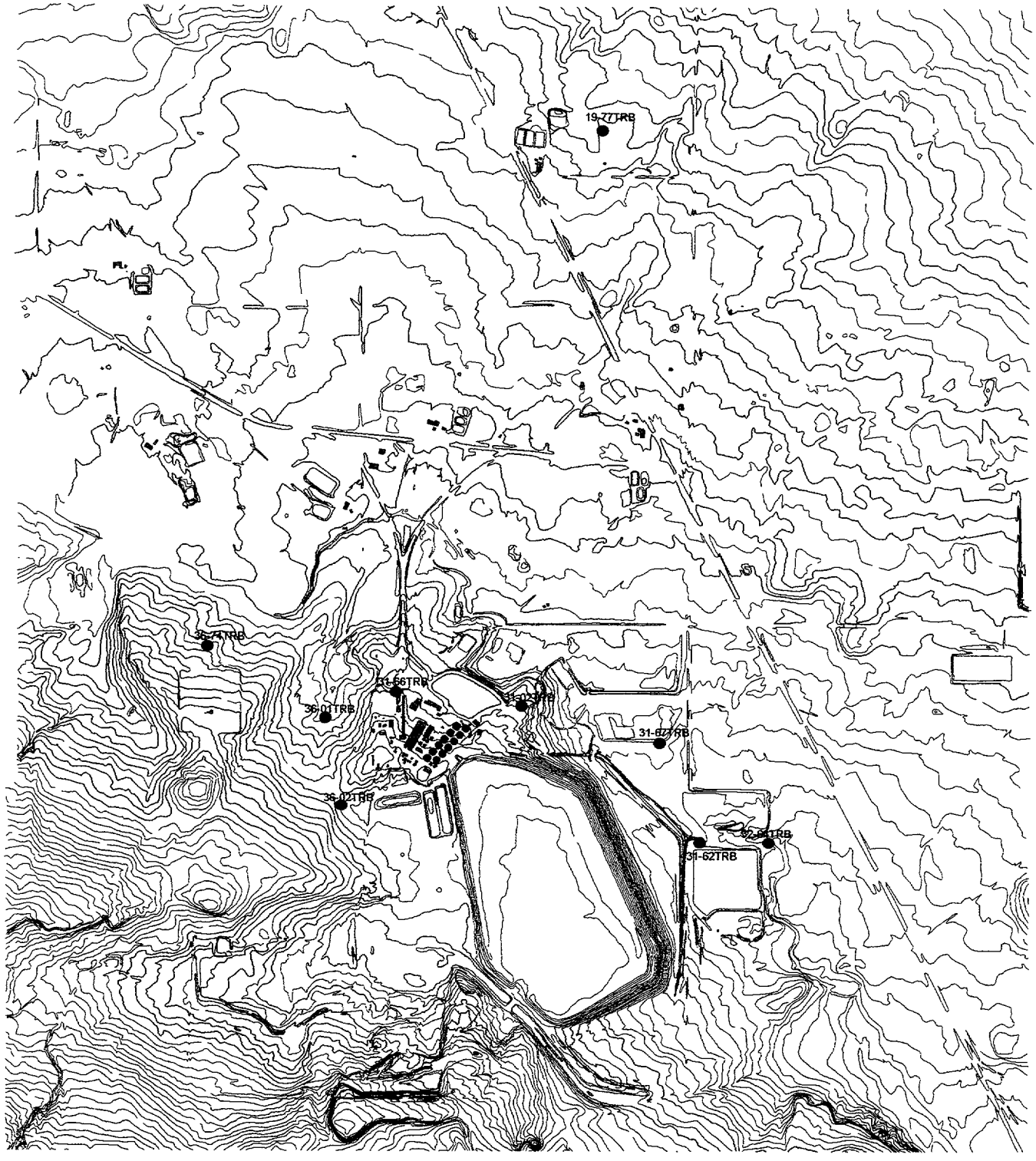
1 inch = 2400 feet

Selenium concentrations in all wells are at or below the groundwater protection standard.

QUIVIRA MINING COMPANY
LICENSE SUA-1473

THORIUM-230

2001 CONCENTRATION ISOPLETH
GROUND WATER PROTECTION STANDARD = 2.2 pCi/L



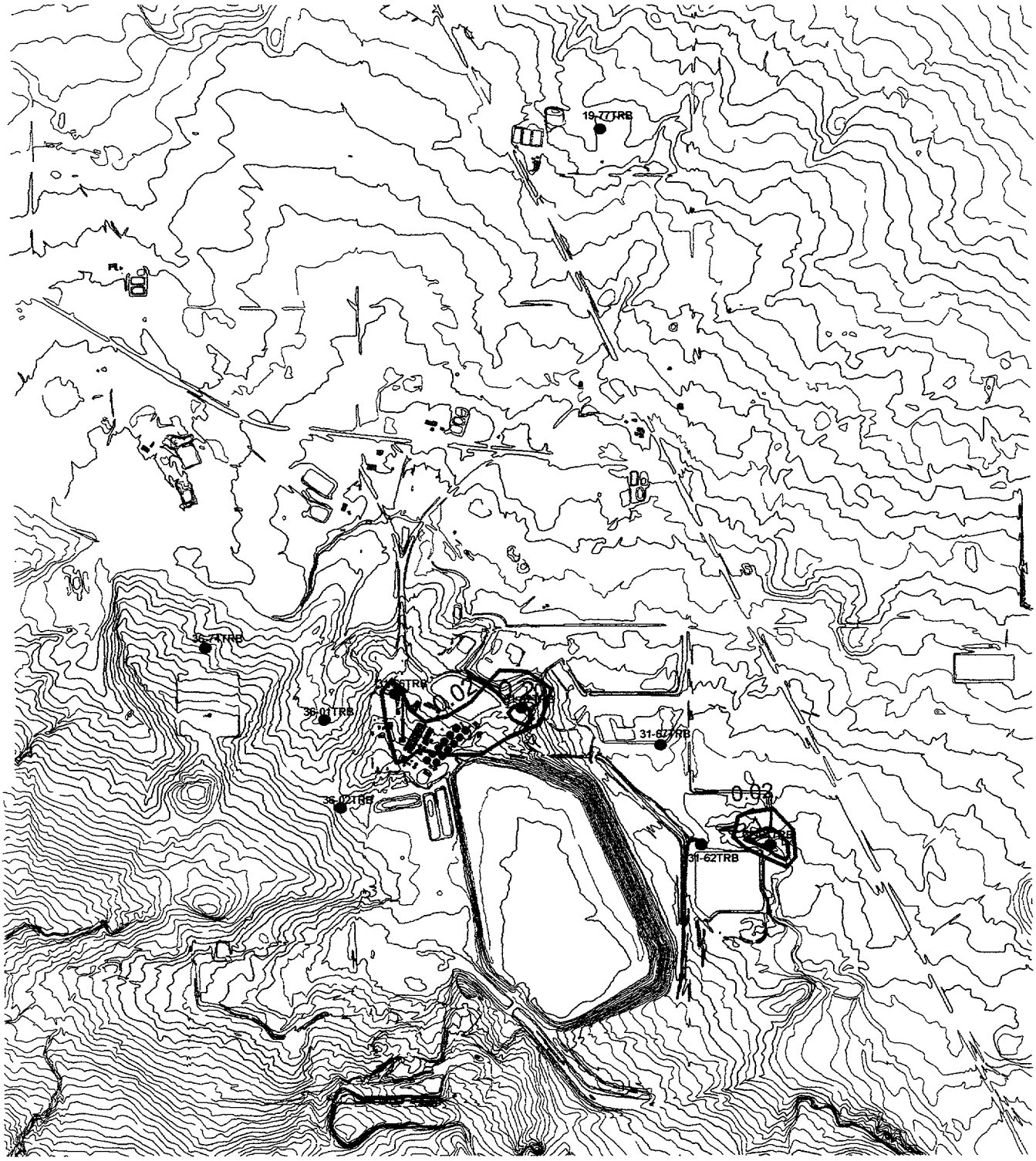
1 inch = 2400 feet

TRES HERMANOS B

Thorium-230 concentrations in all wells are at or below the groundwater protection standard.

QUIVIRA MINING COMPANY
LICENSE SUA-1473
URANIUM

2001 CONCENTRATION ISOPLETH
GROUND WATER PROTECTION STANDARD = 0.02 mg/L



1 inch = 2400 feet

N

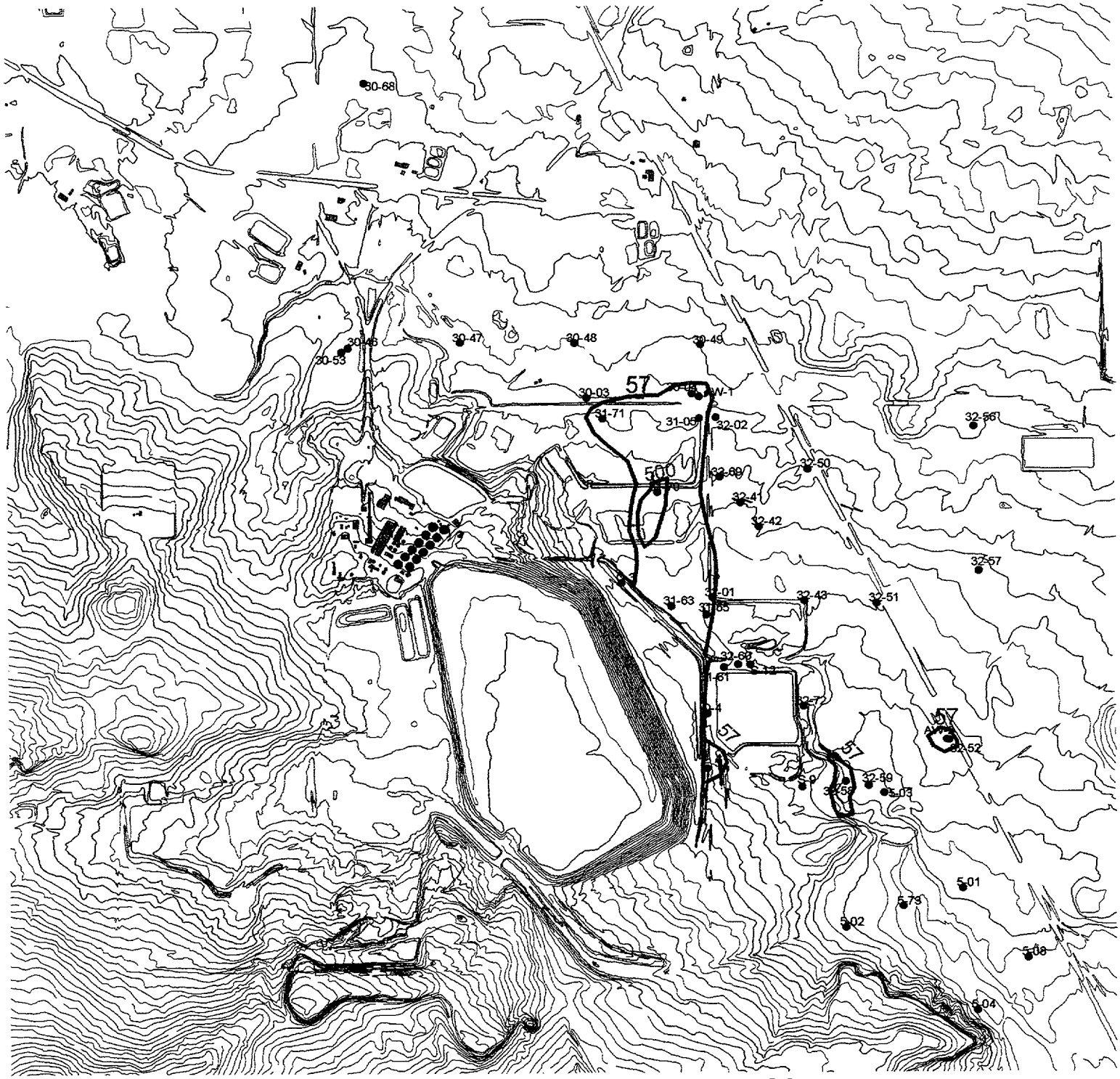
TRES HERMANOS B

AREAL PLUME PLOTS

ALLUVIUM

QUIVIRA MINING COMPANY
LICENSE SUA-1473
GROSS ALPHA
(EXCLUDES URANIUM AND RADON)

2001 CONCENTRATION ISOPLETH
GROUND WATER PROTECTION STANDARD = 57 pCi/L

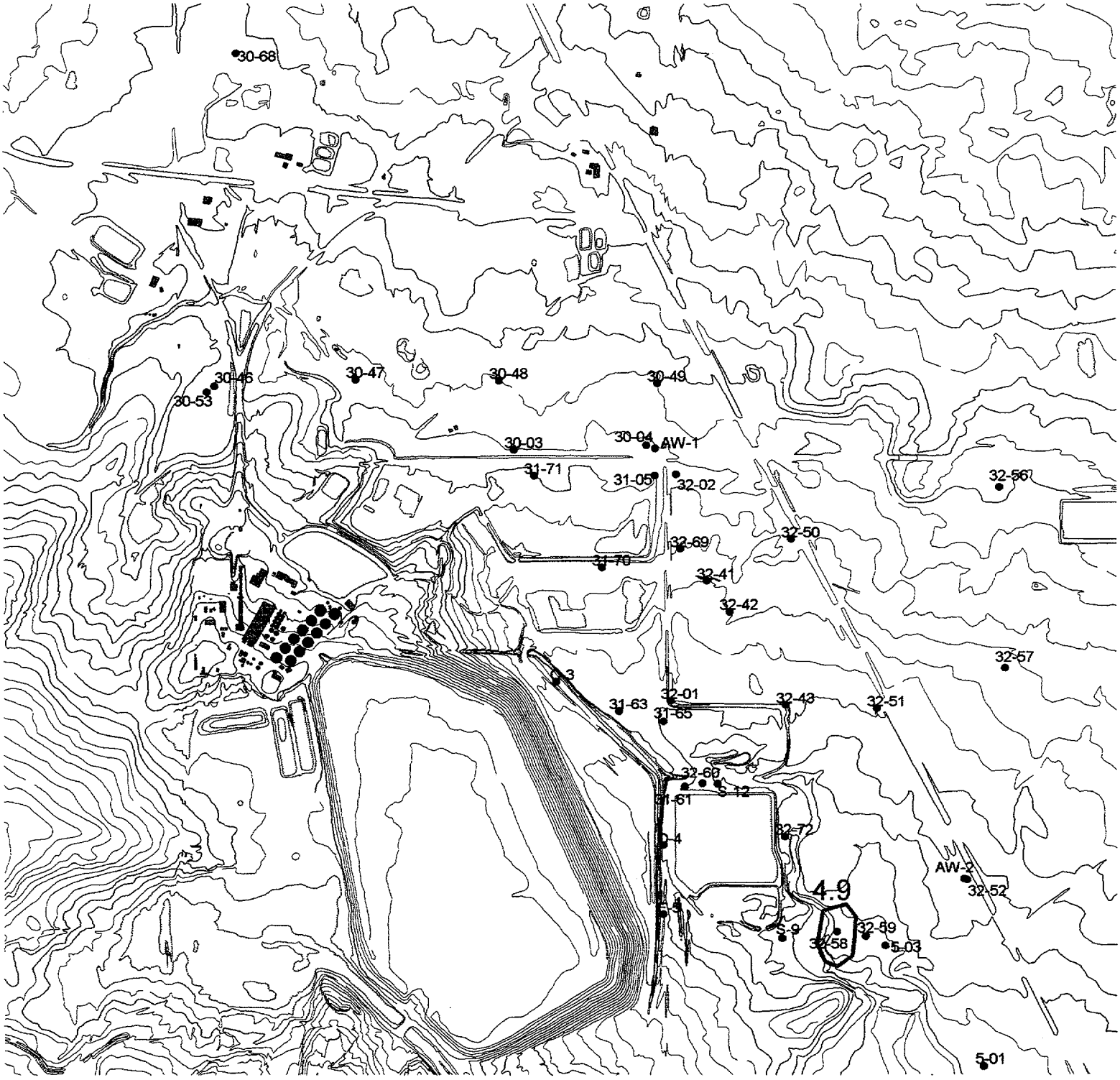


1 inch = 2000 feet

ALLUVIUM

QUIVIRA MINING COMPANY
LICENSE SUA-1473
LEAD-210

2001 CONCENTRATION ISOPLETH
GROUND WATER PROTECTION STANDARD = 4.9 pCi/L



ALLUVIUM

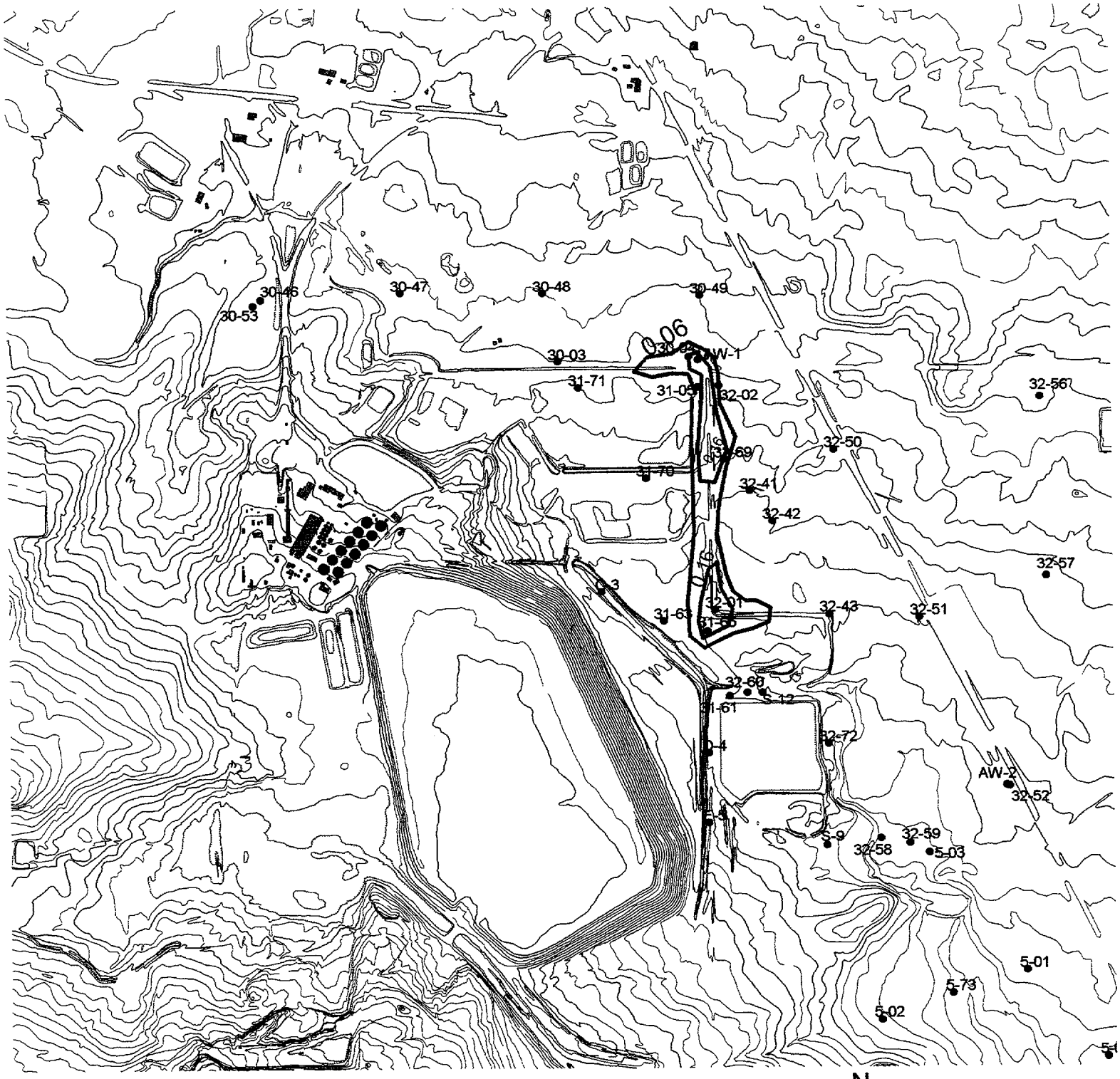
1 inch = 2000 feet

N

QUIVIRA MINING COMPANY
LICENSE SUA-1473

MOLYBDENUM

2001 CONCENTRATION ISOPLETH
GROUND WATER PROTECTION STANDARD = 0.06 MG/L



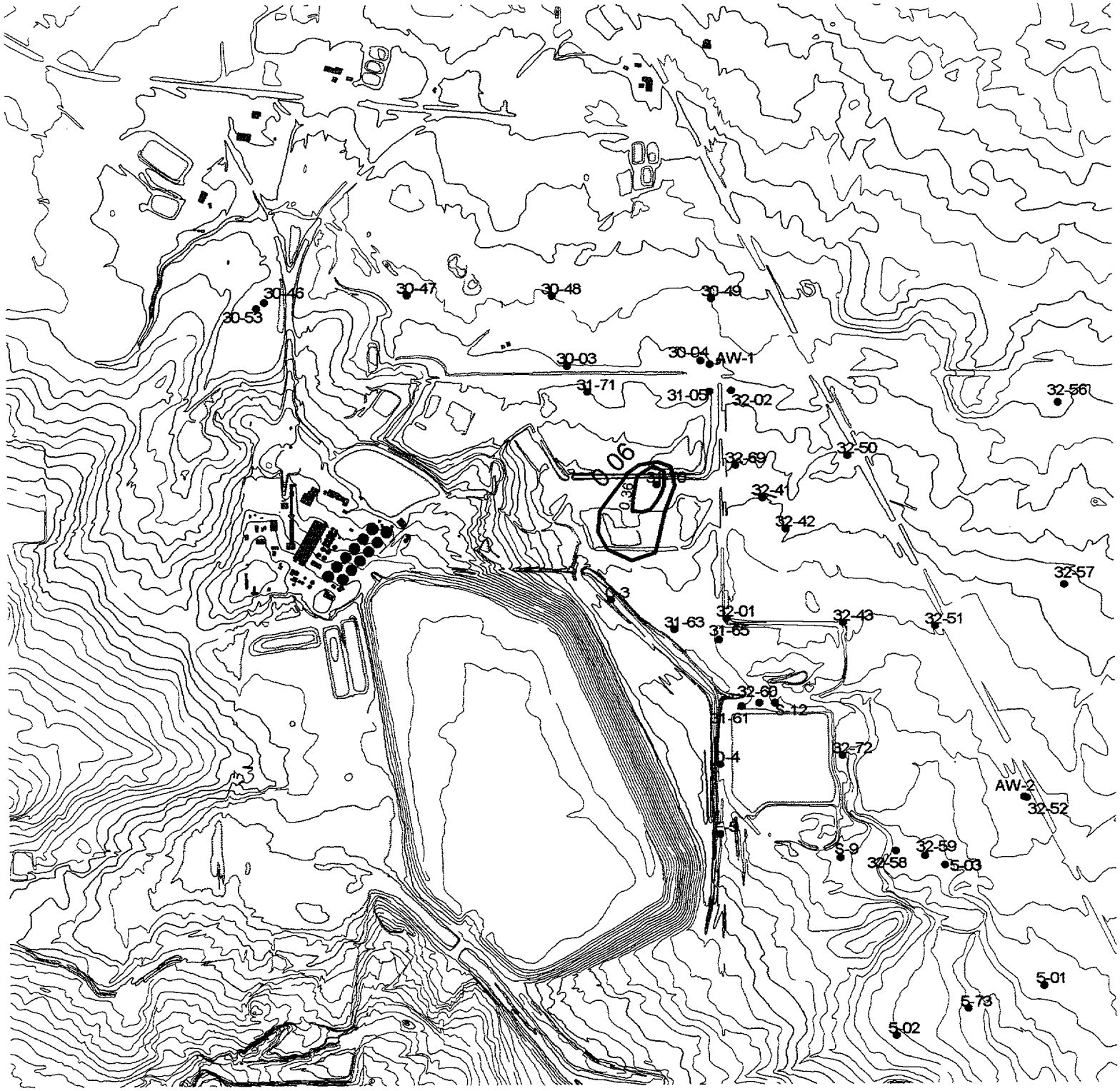
1 inch = 2000 feet

N

ALLUVIUM

QUIVIRA MINING COMPANY
LICENSE SUA-1473
NICKEL

2001 ONCENTRATION ISOPLETH
GROUND WATER PROTECTION STANDARD = 0.06 MG/L



ALLUVIUM

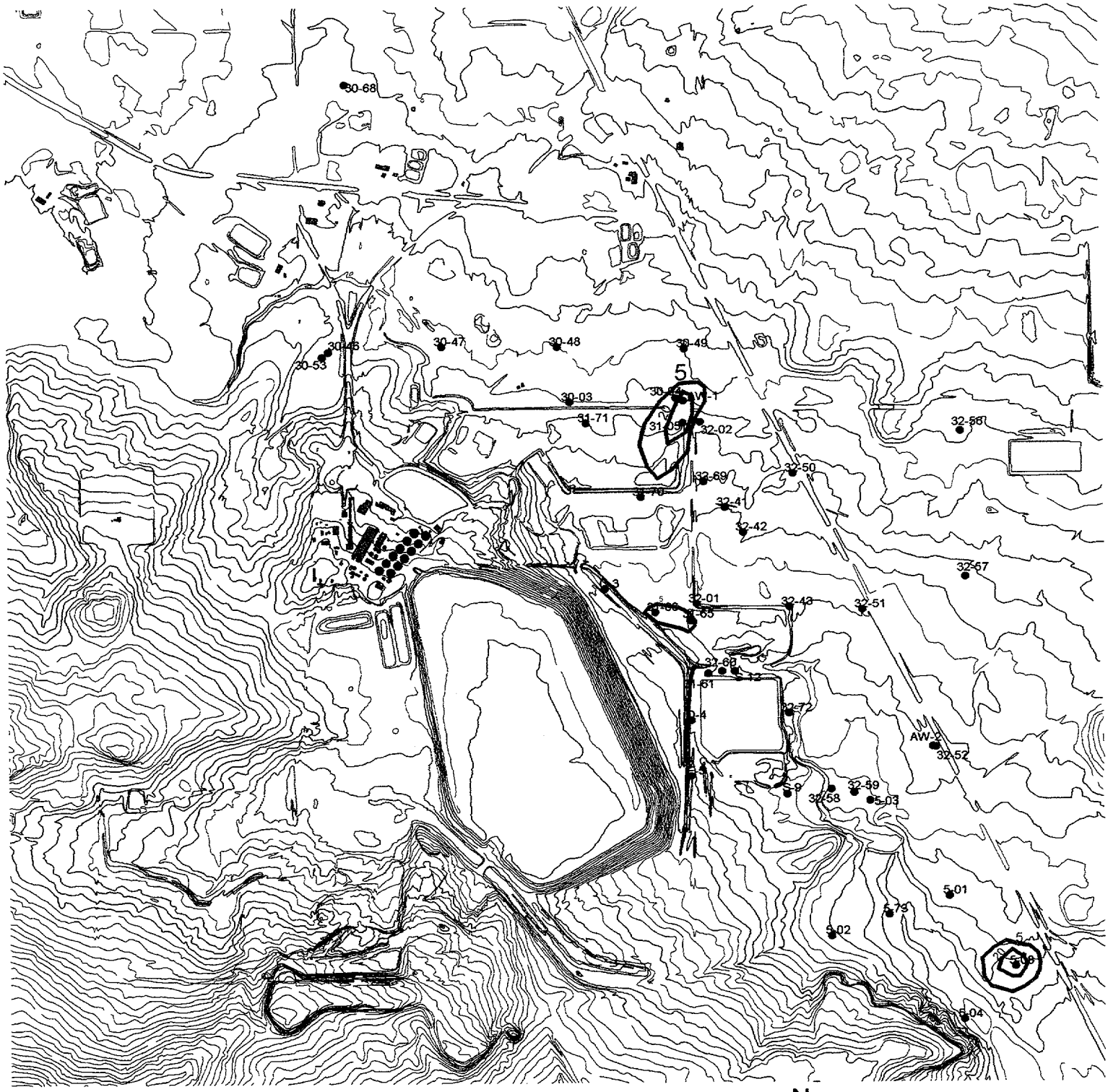
N

1 inch = 2000 feet

QUIVIRA MINING COMPANY
LICENSE SUA-1473

RADIUM-226/228

2001 CONCENTRATION ISOPLETH
GROUND WATER PROTECTION STANDARD = 5 pCi/L



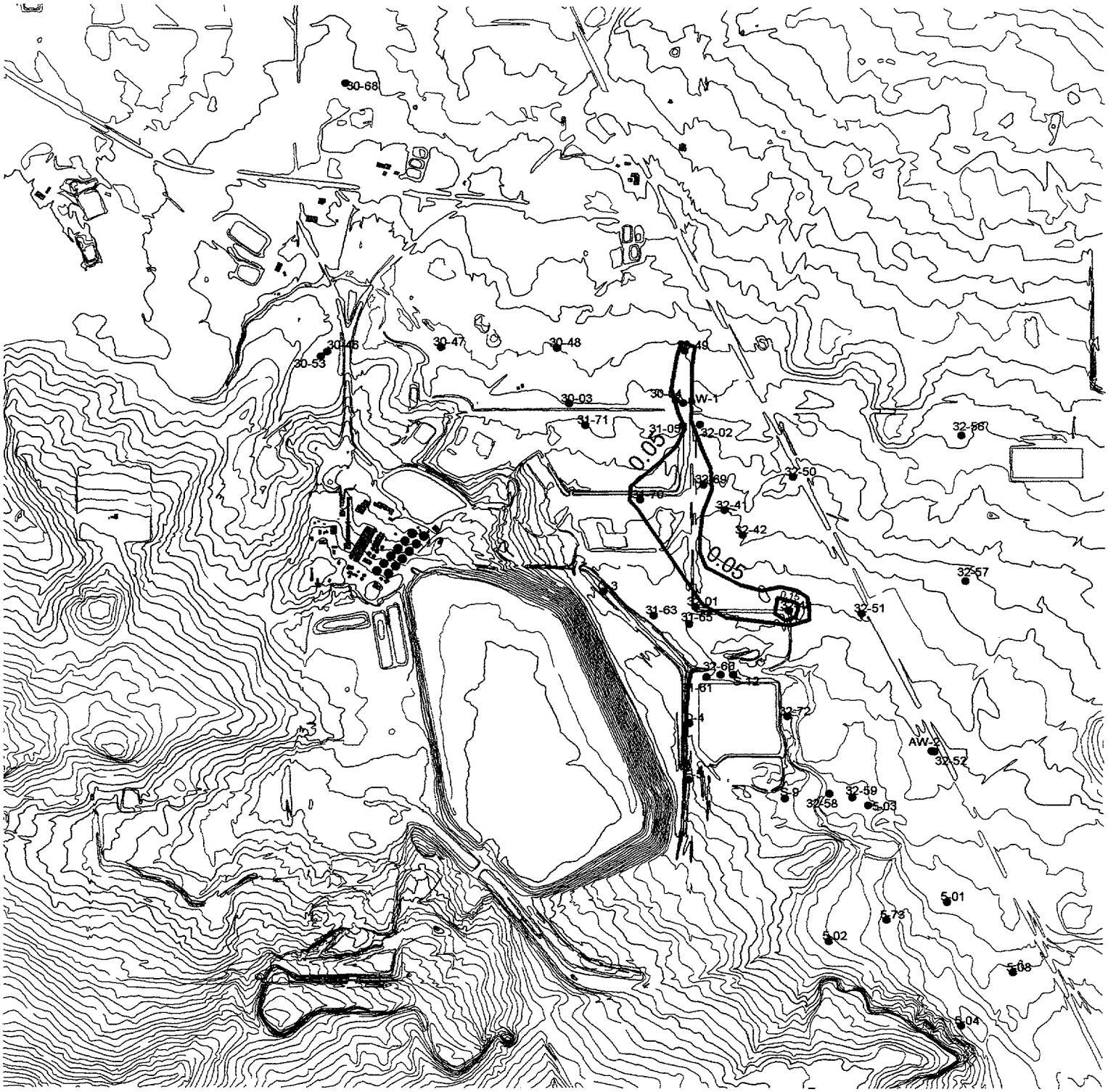
ALLUVIUM

1 inch = 2000 feet

N

QUIVIRA MINING COMPANY
LICENSE SUA-1473
SELENIUM

2001 CONCENTRATION ISOPLETH
GROUND WATER PROTECTION STANDARD = 0.05 MG/L



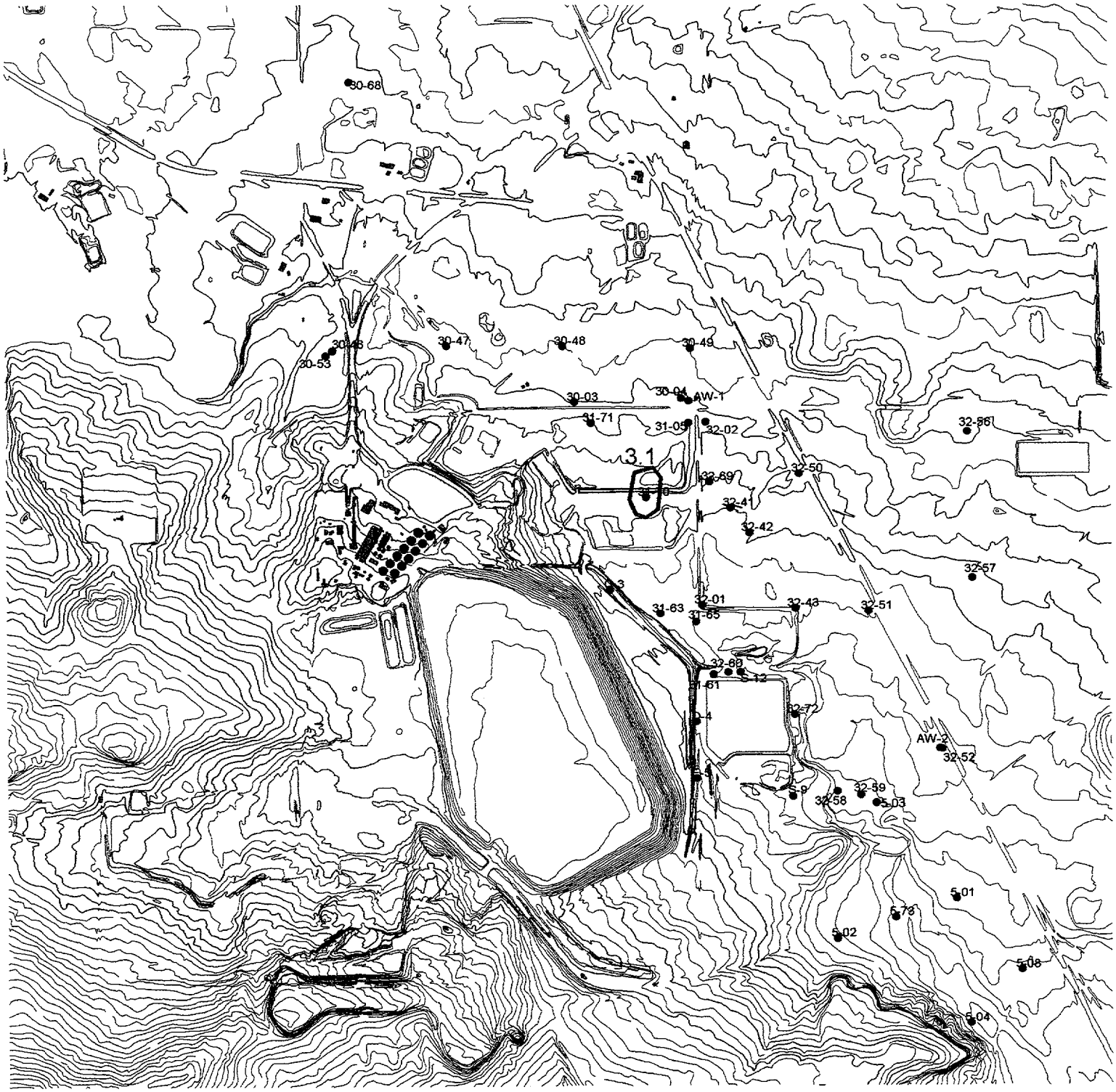
1 inch = 2000 feet

ALLUVIUM

QUIVIRA MINING COMPANY
LICENSE SUA-1473

THORIUM-230

2001 CONCENTRATION ISOPLETH
GROUND WATER PROTECTION STANDARD = 3.1 pCi/L



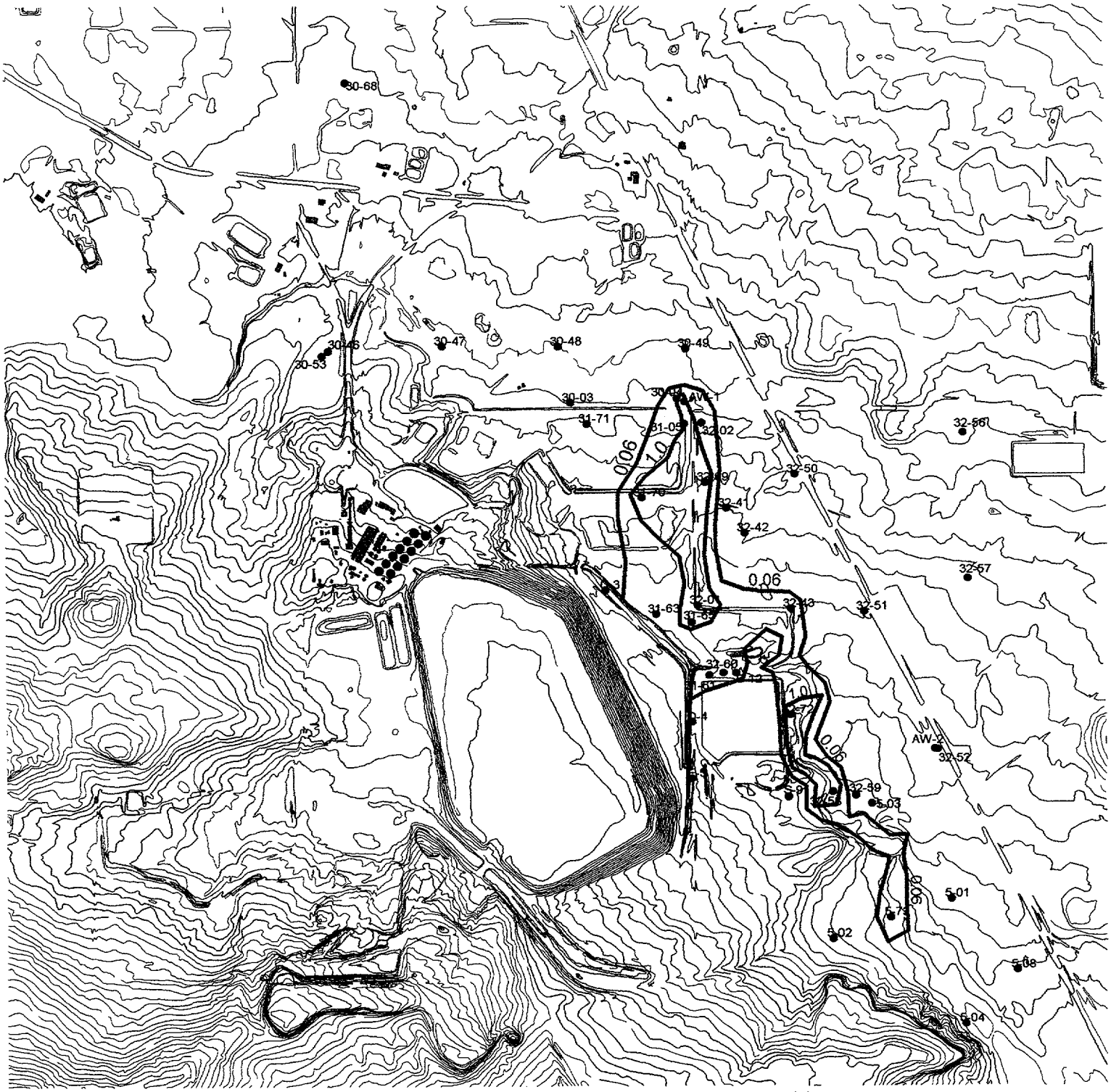
ALLUVIUM

N

1 inch = 2000 feet

QUIVIRA MINING COMPANY
LICENSE SUA-1473
URANIUM

2001 CONCENTRATION ISOPLETH
GROUND WATER PROTECTION STANDARD = 0.06 MG/L



1 inch = 2000 feet

N

ALLUVIUM