

Attachment No. 5
EMKO Hydrogeologic Report, February 26,
2014\



RESOURCE MANAGEMENT AGENCY

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JAKE RAPER JR., AICP, DIRECTOR

MICHAEL C. SPATA, ASSOCIATE DIRECTOR

March 10, 2014

FILE COPY

Re: CA Mine ID# 91-54-0034, Permit No. PMR 98-003 Groundwater Compliance

Dear Interested Parties,

Thank you for submitting your concerns in regard to the groundwater monitoring program for the CEMEX Stillwell Quarry (PMR 98-003).

In accordance with Condition No. 49 of the surface mining permit, the Resource Management Agency (RMA), "upon receipt of a written complaint from any owner of a pre-existing well which details an alleged impact to the well's water level, yield, or water quality" shall make a request for a "report from a licensed hydrogeologist explaining the problem."

The RMA has requested and received the enclosed "Hydrogeologic Evaluation of Current Groundwater Conditions at the CEMEX Stillwell Quarry" report, dated February 26, 2014, from EMKO Environmental, Inc.

RMA is currently reviewing the hydrogeologic evaluation in order to determine future actions for the mining facility.

RMA is sending a copy of the hydrogeologic report to the concerned individuals we received letters from. If you have any questions or comments in regard to this report, please contact Henry Dong, Project Planner, with RMA at 559-624-7126.

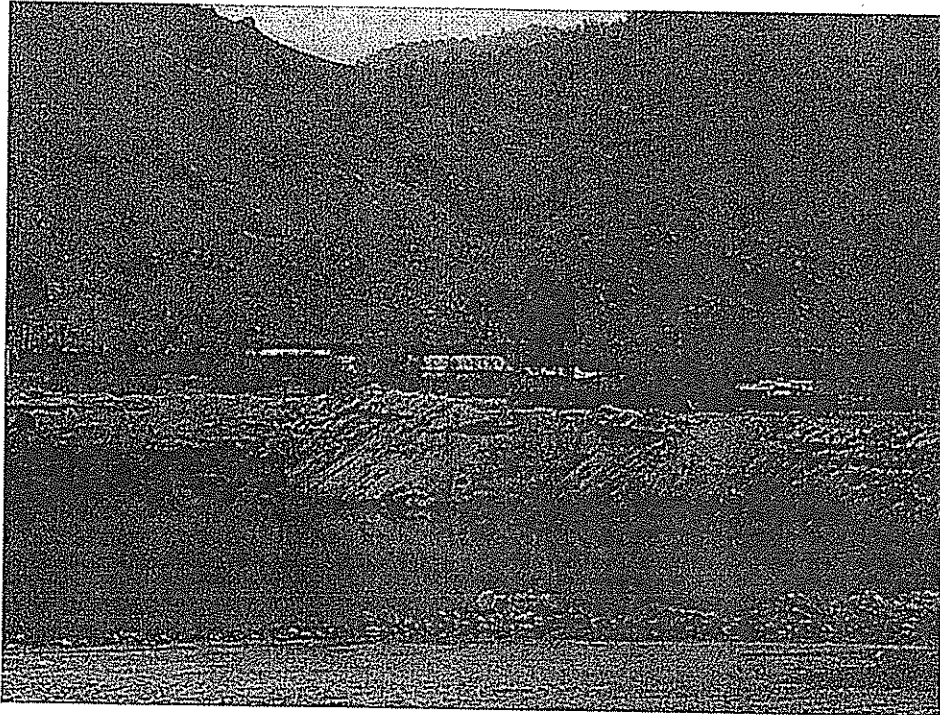
Sincerely,

Michael C. Spata
Associate Director
Resource Management Agency

Enclosure:

(Hydrogeologic Evaluation of Current Groundwater Conditions at the CEMEX Stillwell Quarry Report)

Hydrogeologic Evaluation of Current Groundwater
Conditions at the CEMEX Stillwell Quarry
Tulare County, California



Prepared by:

EMKO Environmental, Inc.

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February 26, 2014

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Hydrogeologic Evaluation of Current Groundwater Conditions at the CEMEX Stillwell Quarry Tulare County, California

1.0 INTRODUCTION

This report has been prepared at the request of Tulare County Resource Management Agency (RMA) to address several written complaints received by RMA in late January 2014 regarding groundwater conditions adjacent to the CEMEX Construction Materials, Inc. (CEMEX) Stillwell Quarry near Lemoncove, California (State Mine ID 91-54-0034). The following Conditions of Approval were adopted by the Tulare County Board of Supervisors as part of the Conditional Use Permit for the Stillwell Quarry:

46. Prior to commencement of mining, the applicant shall prepare and implement the June 2002 Groundwater Monitoring Program adopted for this project. The purpose of the monitoring plan shall be to assess the effectiveness of the V-ditch design in maintaining groundwater levels in wells along the east and southeast boundary of the site and in monitoring the quality of water supplying recharging (sic) the local aquifer. All groundwater monitoring and reporting shall be done in accordance with the approved plan. Any property owner with a water well (or water wells) located within a ½ mile radius of the property boundaries may participate in the groundwater monitoring program. The project applicant shall notify all owners with wells within ½ mile of the property boundaries of the opportunity to participate in the groundwater monitoring program. Participation in the program requires that the wells be accessible and in a condition that allows them to be tested on a regular basis.

And,

49. The project shall not affect the water level, yield, or quality of any well*, both during the mining operations and subsequently as a reclaimed site. Upon receipt of a written complaint from any owner of a pre-existing well which details an alleged impact to the well's water level, yield, or water quality, the RMA shall request a report from a licensed hydrogeologist explaining the problem. If a significant problem can be professionally demonstrated by a licensed hydrogeologist to be caused by mining activities, then immediate action must be taken to correct the condition, which may include (but is not limited to) modifying the recharge ditches to provide more recharge capacity, reducing the amount of pit dewatering, or if necessary, ceasing mining operations. (* As used herein, an impact to a well shall not be deemed to have occurred if the well water level, well yield, and quality are within ranges of existing conditions specified in the EIR).

Conditions of Approval Nos. 46 and 49 are used as the basis for the technical evaluation of the complaints received by the RMA. The technical evaluation presented below considers the history of mining and dewatering at the Stillwell Quarry, the available data regarding water levels in neighboring wells and monitoring wells on the Stillwell Quarry

property, rainfall data for Lemoncove, and hydrologic conditions on the Kaweah River.

2.0 NATURE OF THE COMPLAINTS

Table 1, below, summarizes the complaints received by RMA in January 2014.

Table 1. January 2014 Complaints			
Owner	Address	Date	Nature of Complaint
Packard	33511 ½ Sierra Dr.	1/30/14	For last 2 months, well goes dry quickly
Morton	33511 Sierra Dr.	1/30/14	Well going dry, "pumping air" for over a month; well 17 ft deep, water level at 14 ft
Cloud	33481 Sierra Dr.	1/30/14	Well running dry and "pumping air"
Rodriguez	33513 Sierra Dr. #A	1/29/14	Pump pulling in air due to lack of water, for about a month
Cairns	24822 Ave. 338	1/31/14	Well is pumping properly; concern for neighbors

Figure 1 illustrates the location of the existing quarry excavation, the recharge trench, the 24822 Avenue 338 property, and the 33481 to 33513 Sierra Drive properties. Figure 1 was prepared from a screen-capture image from Google Earth. The imagery date for the aerial photograph in Figure 1 is June 15, 2011.

All of the complaints received by RMA state that the well issues have to do with reduced well yield or low water levels, and that the issues began one to two months prior to the end of January 2014 (i.e. late November to late December 2013).

3.0 MINING OPERATIONS AND MONITORING

According to information provided by CEMEX (Pete LoCastro, plant manager, personal communication, February 13, 2014), dewatering at the Stillwell Quarry began in September 2008. Water from the mining excavation was pumped into a holding basin to allow fines to settle out. The water in the holding basin was then pumped to the recharge trench. Pumping to the recharge trench occurred continuously until June 17, 2013, when the wiring to the pumps was stolen. The wiring was replaced and the pumps restarted on June 21, 2013. The wiring was stolen a second time on September 4, 2013. A decision was made at that time to leave the pumps off and to cease dewatering of the Stillwell Quarry.

stolen
7/17/13
+
9/4/13

A site reconnaissance of the Stillwell Quarry was conducted on February 11, 2014 with Henry Dong of RMA and Peter LoCastro and Ronald Wilson of CEMEX. At that time, the cut wires at the electrical boxes serving the pumps were observed and no water was being pumped from the quarry pit or into the recharge trench. The quarry pit had filled

with water to a depth of approximately 15 feet below ground surface, as shown in Figures 2 and 3.

Consistent with Condition of Approval No. 46, a groundwater monitoring program has been conducted since 2005 by DellaValle Laboratory, Inc. for CEMEX. The monitoring program includes measurement of groundwater levels in nine private wells near the quarry and four monitoring wells at the quarry site. The water levels have been measured monthly since May 2005, which is more than three years prior to the beginning of dewatering and use of the recharge trench. Of the five complaint letters received by RMA (see Section 2.0), only the properties at 33511 Sierra Drive and 24822 Avenue 338 have elected to participate in the groundwater monitoring program. Figure 4 shows the water levels that have been measured in the well at 33511 Sierra Drive. Figure 5 shows the water levels that have been measured in the well at 24822 Avenue 338. Figure 6 shows the water levels that have been measured in the four monitoring wells at the quarry site.

Figures 4, 5, and 6 show that the water levels in the neighboring wells and the onsite monitoring wells were relatively stable from 2005 through the middle of 2011. From approximately August 2011 until May 2012, the water levels in the wells decreased appreciably. The water levels subsequently recovered, peaking in January 2013 at levels that were within the same range as those that were measured in the wells from 2005 through early 2011. Since January 2013, however, the water levels have consistently declined in each of the wells shown on Figures 4, 5, and 6. In May 2012 and October 2013, the water level in the well at 33511 Sierra Drive (Figure 4) was actually slightly lower than the level measured in January 2014.

8/11 - 5/12
Similar
levels

The data on Figures 4 and 5 indicate that the most rapid drawdown in the water levels in the wells at 33511 Sierra Drive and 24822 Avenue 338, respectively, began in August 2013, and that by October 2013 the water levels had stabilized and even recovered slightly.

The data from the groundwater monitoring program, as shown in Figures 4, 5, and 6, indicate that declines in the water levels in the wells adjacent to the Stillwell Quarry occurred from August 2011 to May 2012, and again from January 2013 to the present. The most recent water levels measured in the wells is comparable to the levels measured in May 2012 and again in October 2013. Thus, the low water levels reported in the complaints discussed in Section 2.0 are not a recent incident and have been occurring cyclically since at least August 2011. The data clearly demonstrate that the groundwater level in the area was already dropping rapidly prior to the shutdown on September 4, 2013 of the pumps used for dewatering and for providing water to the recharge trench.

4.0 RAINFALL DATA FOR LEMONCOVE

Rainfall measurements have been collected in Lemoncove since 1905. The data are available from the California Data Exchange Center (CDEC) website at www.CDEC.water.ca.gov, under the station name LMC.

Figure 7 shows the rainfall at Lemoncove from 1905 through Jan 2014. The rainfall data are plotted for each "water year". A water year is the period from October 1 through September 30 of the subsequent year. A water year provides a better representation of the seasonal rainfall patterns in California than does a calendar year. As indicated on Figure 7, the average water year rainfall in Lemoncove is 14 inches per year for the 110-year period of record.

Figure 8 shows the water year rainfall in Lemoncove from 2000 through Jan 2014. Figure 8 demonstrates that the last two water years have been two of the driest ever recorded. Although the 2013-2014 water year is not complete, the first four months of this water year have been the driest October-January period measured in Lemoncove since 1923, based on the CDEC data.

5.0 HYDROLOGIC CONDITIONS ON THE KAWEAH RIVER

The Kaweah River runs along the north and west sides of the Stillwell site. Flows within the river are expected to have an effect on groundwater levels in the area, as local rainfall and the Kaweah River are the only potential sources of groundwater recharge in the Lemoncove area. High river flows can recharge the local groundwater aquifer from the area north of the Stillwell Quarry (see area labeled "Kaweah River" on Figure 1), and minimize discharge from the aquifer to the river farther downstream. Conversely, low river flows may not provide any recharge and can also allow the aquifer to drain more rapidly toward the river.

Average daily flow data for the Kaweah River below Terminus Dam is available from the CDEC website (www.CDEC.water.ca.gov) for Station TRM. The average daily flow data from 1994 through February 9, 2014 were obtained for this evaluation, and are shown on Figure 9. The data indicate that there are two primary flow periods in the river each water year. During the winter, flood control releases may occur for short durations, typically between November and February. The predominant flow period, however, occurs during the summer months, when large volumes of water are released from the dam for irrigation deliveries. The irrigation releases typically occur for longer durations and at higher flows than winter flood control releases, often extending from March through September. However, during dry years, both the flood control and irrigation releases can be substantially curtailed. These variations can be seen by comparing the river flows over the past three to four years.

The 2010-2011 water year was an exceptionally wet year, with total rainfall of 21.86 inches, more than 56 percent above average. Figure 10 shows the flows in the Kaweah

River for the 2010-2011 water year, and extending into early 2012. Flood releases occurred almost constantly from early November 2010 through February 2011, with a peak rate of almost 1,800 cubic feet per second (cfs). Irrigation releases occurred continuously from early March 2011 until the first week of October 2011, with a peak rate of almost 3,000 cfs.

The 2011-2012 water year was a below-normal year, with total rainfall of 11.68 inches, or about 17 percent below average. Figure 11 shows the flows in the Kaweah River for the 2011-2012 water year, and extending into early 2013. Flood releases occurred intermittently from early November 2011 into mid-December 2011, with a peak rate of about 500 cfs. Irrigation releases did not begin until mid-May 2012 and were terminated by mid-August 2012, with a peak rate of about 2,200 cfs briefly reached.

The 2012-2013 water year was even drier than the prior year, with total rainfall of only 7.30 inches, or 48 percent below average. Figure 12 shows the flows in the Kaweah River for the 2012-2013 water year, and extending into early February 2014. There were two very brief flood releases, one in mid-December 2012 and another at the end of January 2013. Although the peak flood release reached as high as 1,100 cfs at the end of January 2013, that release period occurred for only seven days. Irrigation releases did not begin until May 2013 and were terminated before the end of July 2013, with a peak rate of only 1,000 cfs.

Figure 12 also shows that there have not been any flood control releases since the beginning of the 2013-2014 water year through February 9, 2014.

6.0 SUMMARY AND CONCLUSIONS

This technical report has been prepared at the request of Tulare County RMA in accordance with Condition of Approval No. 49 for the CEMEX Stillwell Quarry near Lemoncove, California. In late January 2014, RMA received five complaint letters from residents located to the east of the Stillwell Quarry and the associated recharge trench. Four of the letters allege that the cessation of discharge to the trench is causing a decrease in groundwater levels and a decrease in well yield. The fifth letter states that effects have not been noted in that owners well. The complaints state that the decreasing well yields have been an issue for the past one to two months.

Dewatering of the Stillwell Quarry, and pumping of water to the recharge trench, has been occurring since September 2008. On September 4, 2013, theft of the wiring to the discharge pumps occurred for a second time. At that time, dewatering activities and discharge to the recharge trench ceased.

Consistent with Condition of Approval 46, CEMEX has been conducting a groundwater monitoring program at the Stillwell site since May 2005. Only two of the property owners

that submitted letters to RMA in January 2013 elected to participate in the groundwater monitoring program, and only one of those two owners has indicated that his well is experiencing a diminishing yield. The data from the groundwater monitoring program shows that declining water levels in the wells occurred from August 2011 to May 2012, and again from January 2013 to the present. The January 2014 water levels measured in the wells is comparable to the levels measured in May 2012 and again in October 2013. Thus, the low water levels reported in the letters to RMA are not a recent incident and have been occurring cyclically since at least August 2011. The data clearly demonstrate that the groundwater level in the area was already dropping rapidly prior to the September 4, 2013 shutdown of the pumps used for dewatering and for providing water to the recharge trench. The data also show that since October 2013, the water levels in the wells have actually increased slightly.

Evaluation of historical rainfall data for Lemoncove shows that the last two water years have been two of the driest ever recorded. In addition, the first four months of the current (2013-2014) water year have been the driest October-January period measured in Lemoncove since 1923.

An evaluation of hydrologic conditions on the Kaweah River demonstrates that releases from Terminus Dam and flows within the river have been diminishing over the last three water years and that there have not been any releases to the river above base-flow levels since July 2013. These hydrologic conditions on the Kaweah River indicate that groundwater recharge has been decreasing for several years and that there has likely been little or no recharge of groundwater for at least the last six months.

Based on the data presented in this report, the declining water levels in the wells in the Lemoncove area occurred in 2012, and in 2013. The declining trend in 2013 began as early as February, six months before the discharge of water to the recharge trench was stopped. There is not a correlation between the cessation of discharge to the recharge trench and the water levels in the wells. Evaluation of local rainfall and river flow data shows that the Lemoncove area has been experiencing the most severe drought conditions ever recorded in the area. Substantially diminished rainfall amounts and curtailed flows in the Kaweah River have reduced, if not eliminated, local groundwater recharge. The historically low rainfall and river discharge amounts are the most likely cause of the lower groundwater levels observed in the wells in the area.

In accordance with Condition of Approval No. 49, RMA has requested this report, which was prepared by a licensed hydrogeologist. The available data and documentation demonstrate that the concerns identified in the letters received in late January 2014 are not caused by mining activities. It is also worthwhile to note that, had the data supported the opposite conclusion, two of the potential remedies identified in Condition of Approval No. 49 are to reduce the amount of pit dewatering, or if necessary, cease mining operations. Both of these conditions have existed at the site since September 2013.

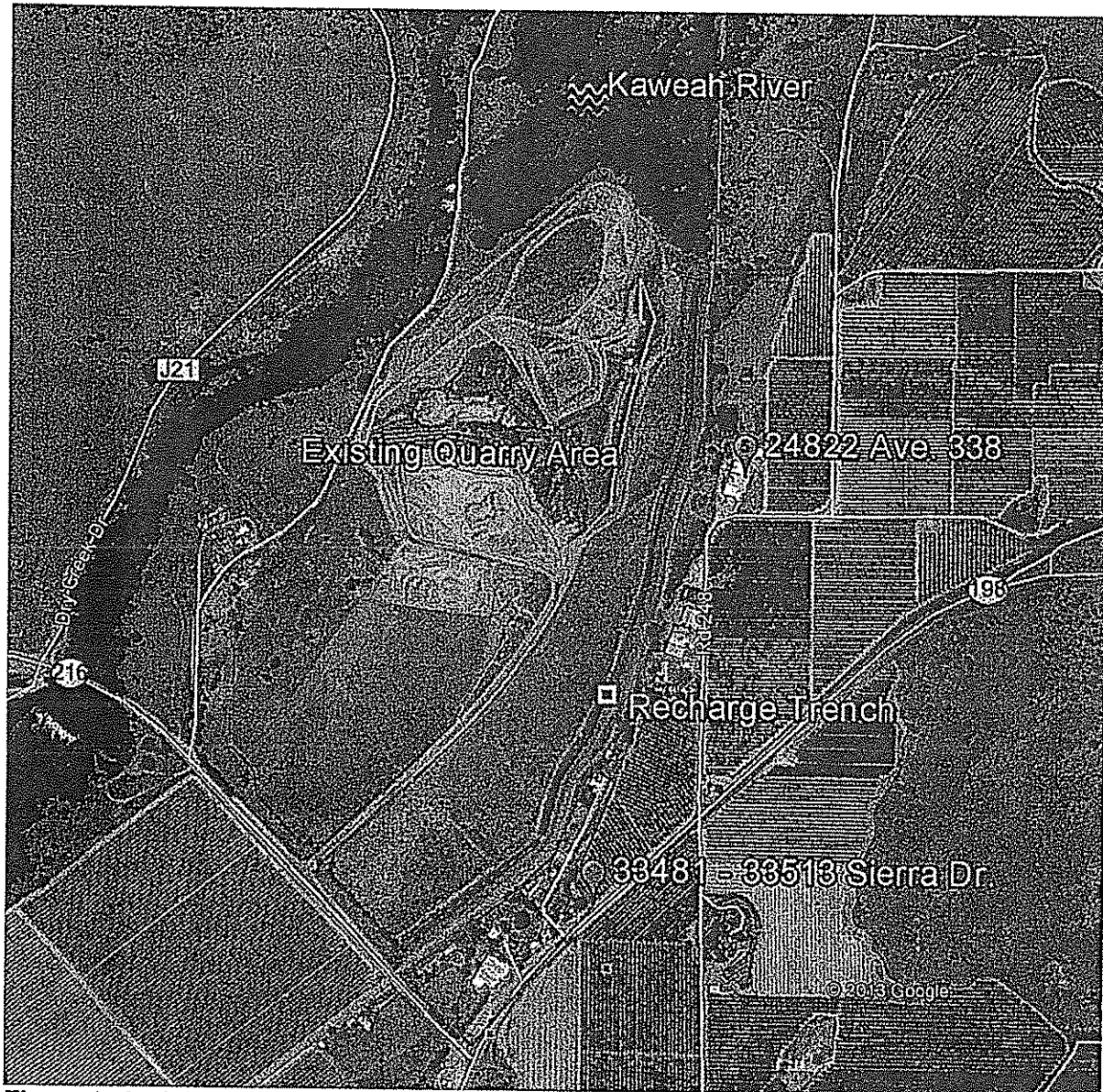


Figure 1. Aerial map of Stillwell Quarry area.



Figure 2. View looking east across Stillwell Quarry pit on February 11, 2013. The buildings in the background are at the 24822 Avenue 338 property.

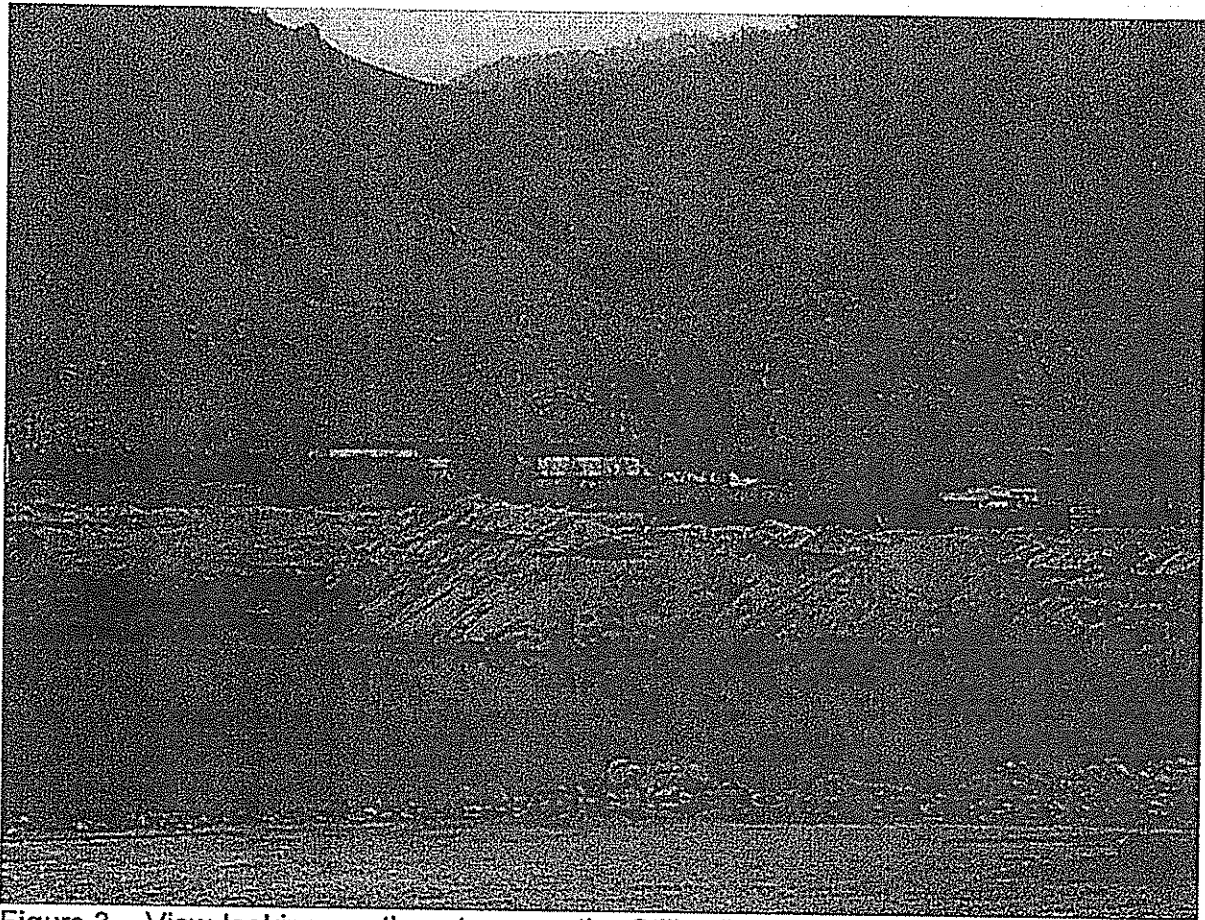


Figure 3. View looking southeast across the Stillwell Quarry pit on February 11, 2013. The buildings in the background are located approximately $\frac{1}{4}$ mile north of the 33513 Sierra Drive property.

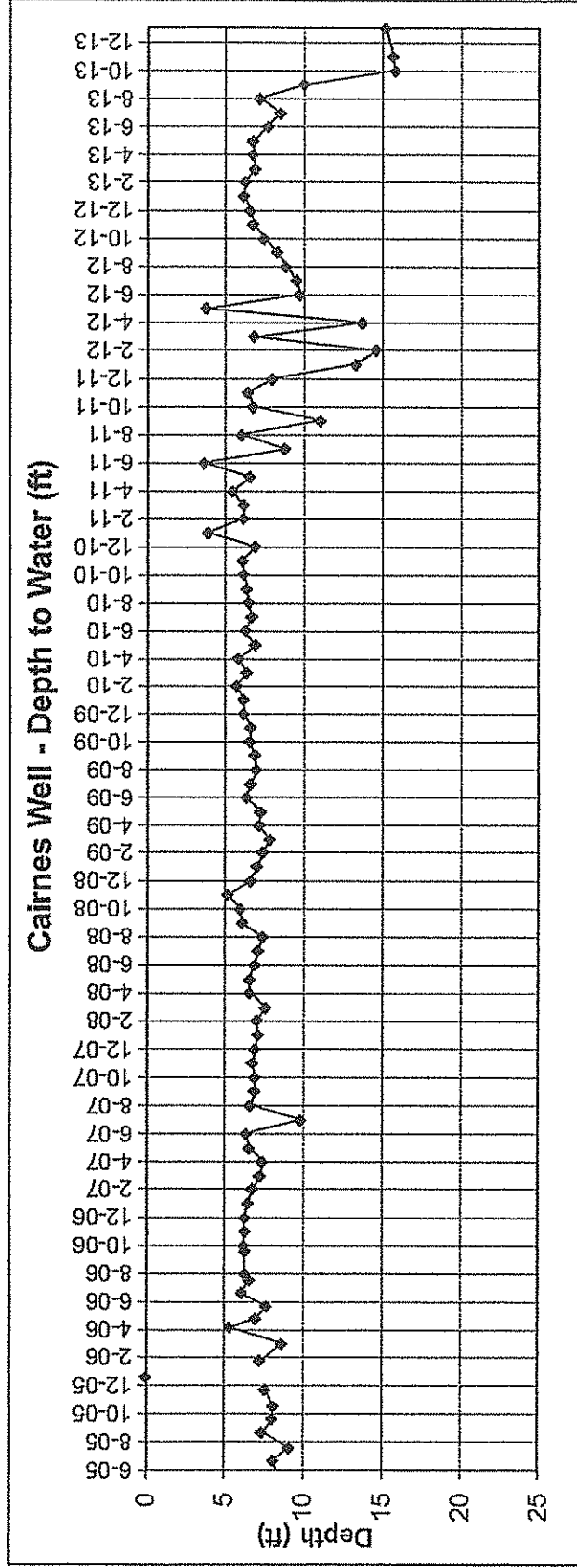


Figure 5. Water levels versus time for the well at 24822 Avenue 338.

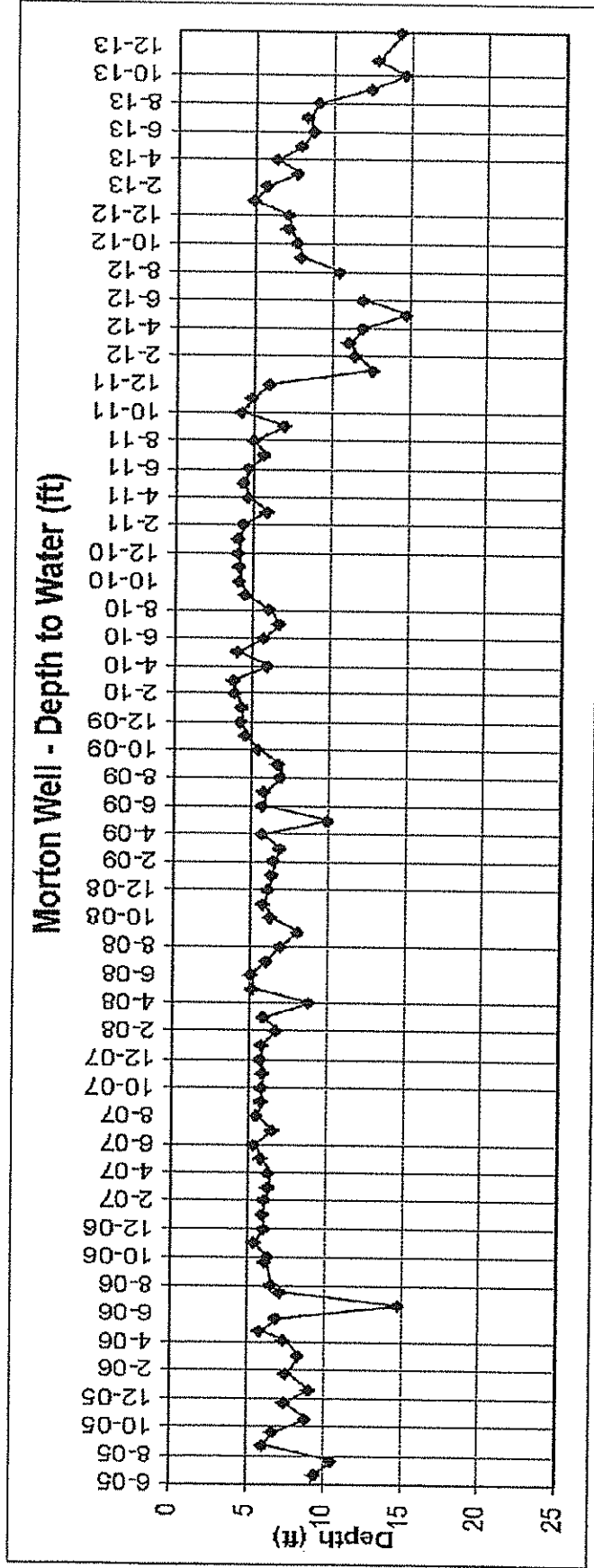


Figure 4. Water levels versus time for the well at 33511 Sierra Drive.

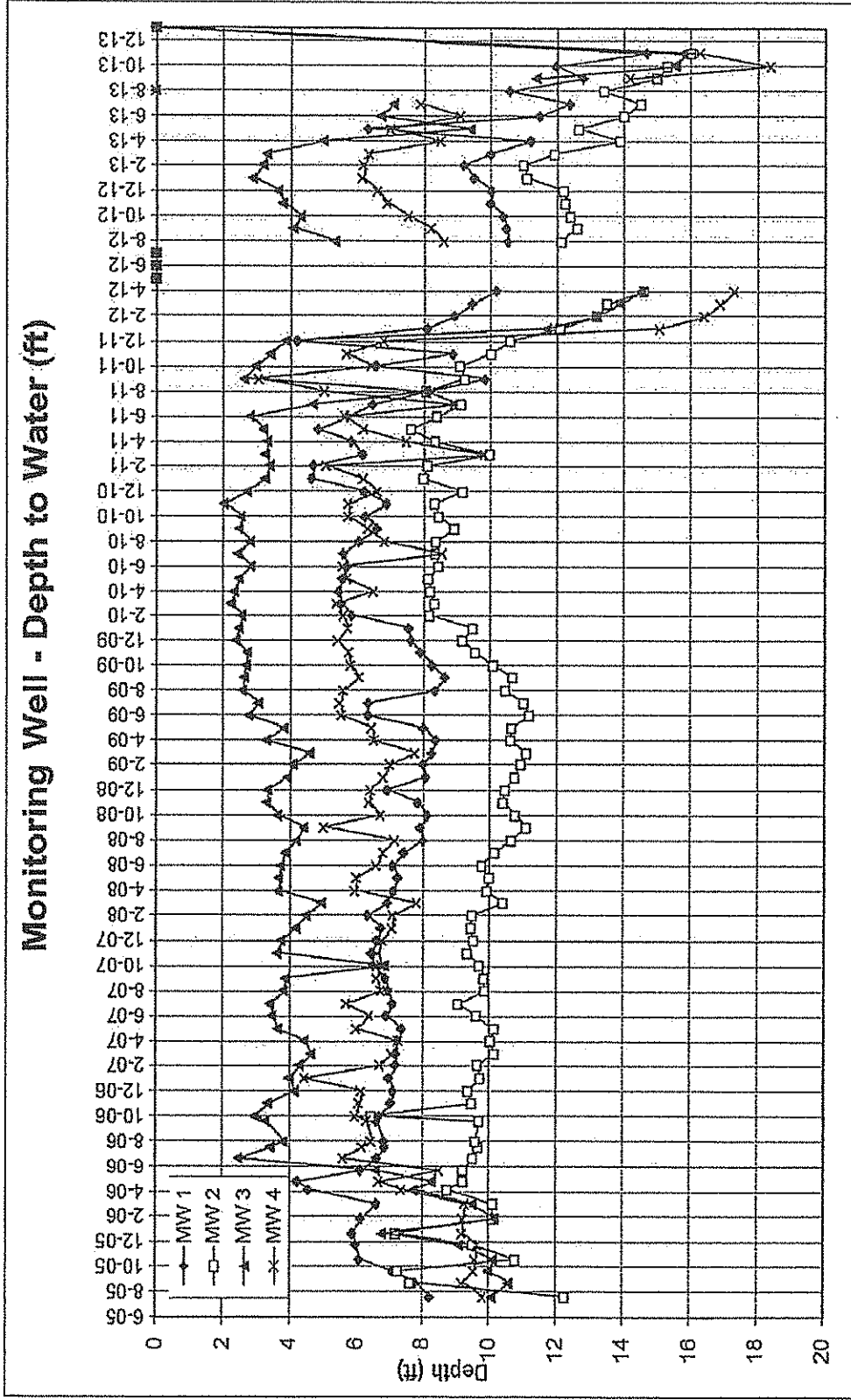


Figure 6. Water levels versus time for the onsite monitoring wells at the Stillwell Quarry.

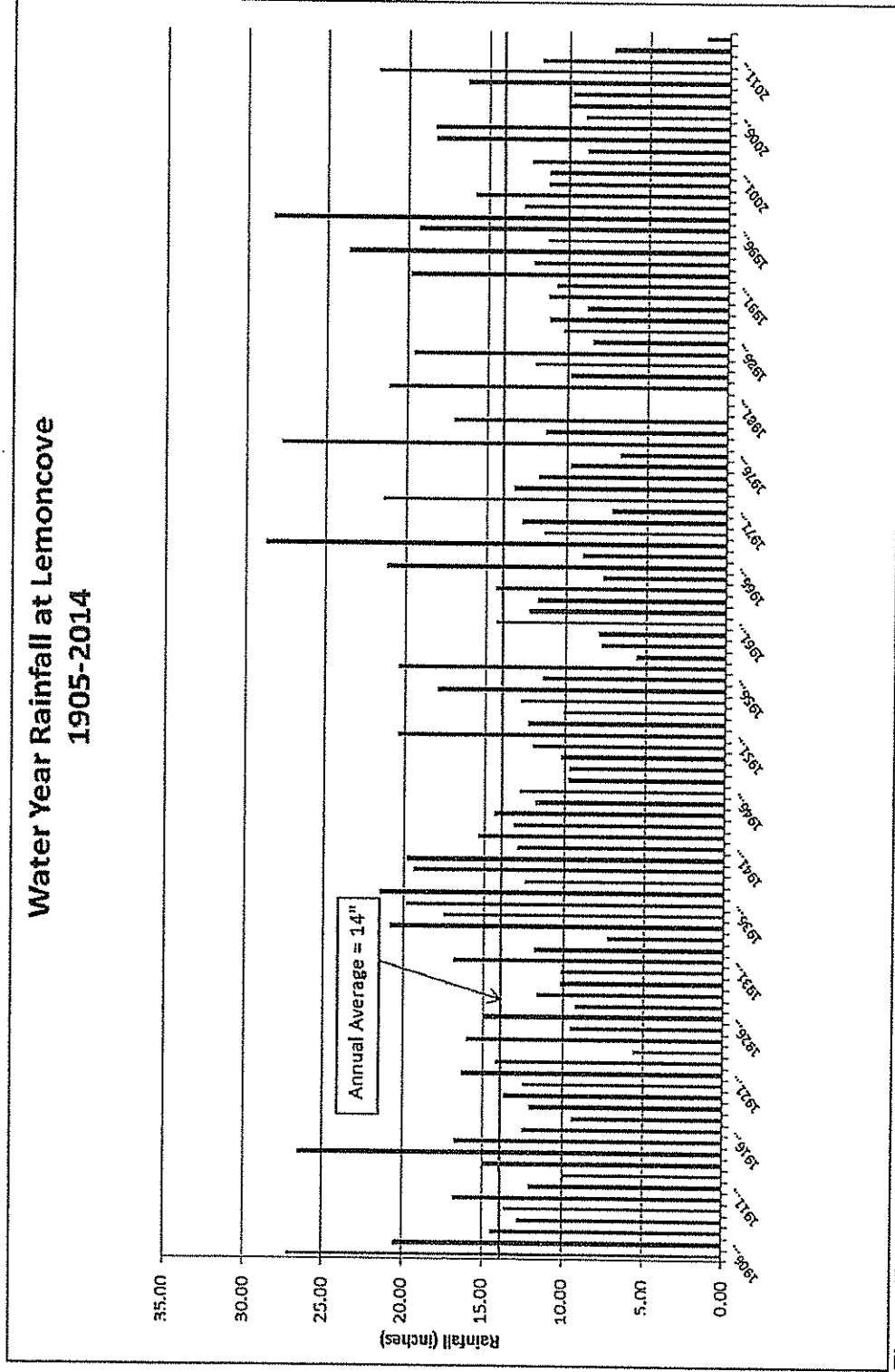


Figure 7. Rainfall at Lemoncove, 1905 through January 2014.

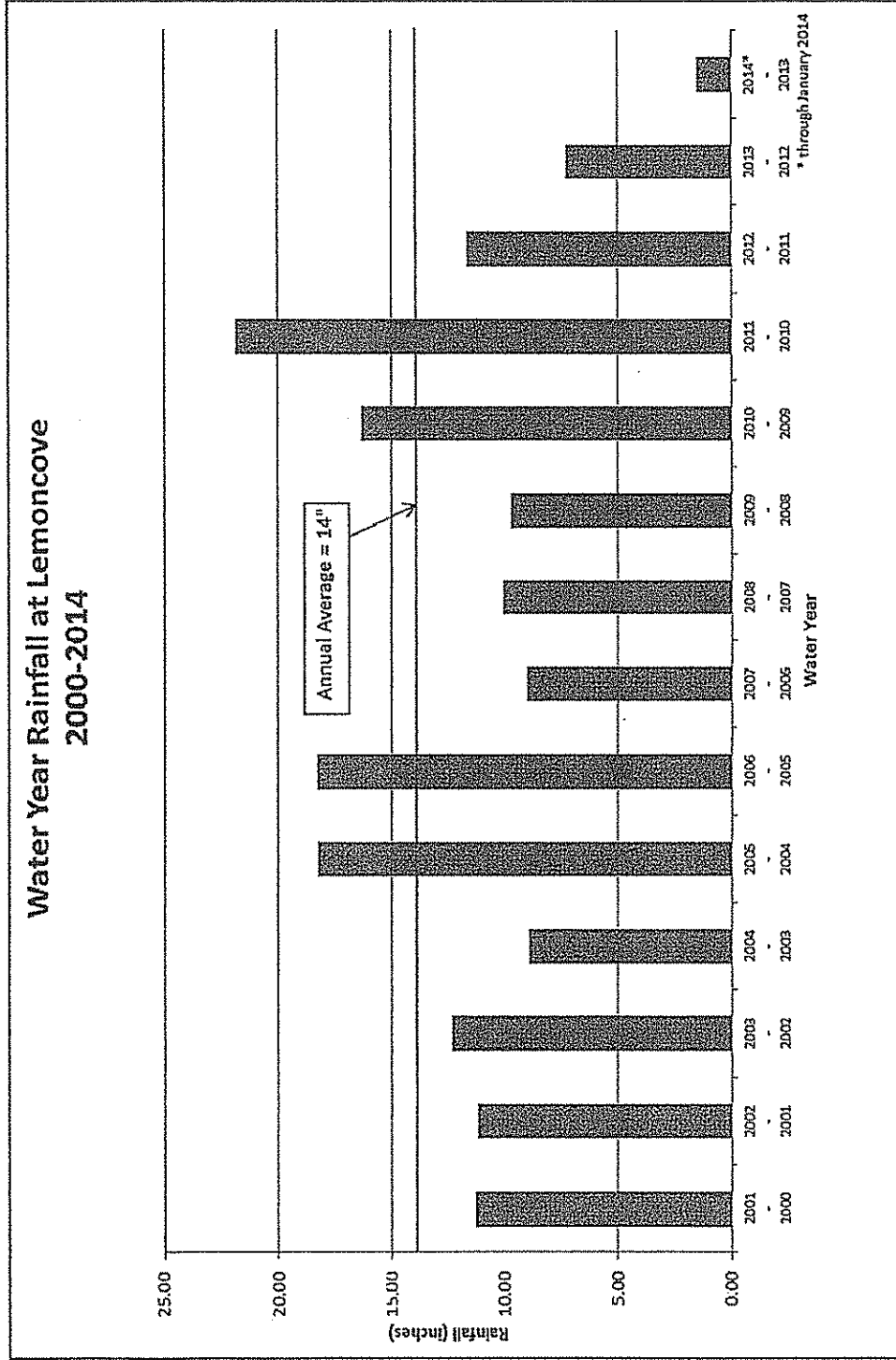


Figure 8. Rainfall at Lemoncove, 2000-2001 water year through January 2014.

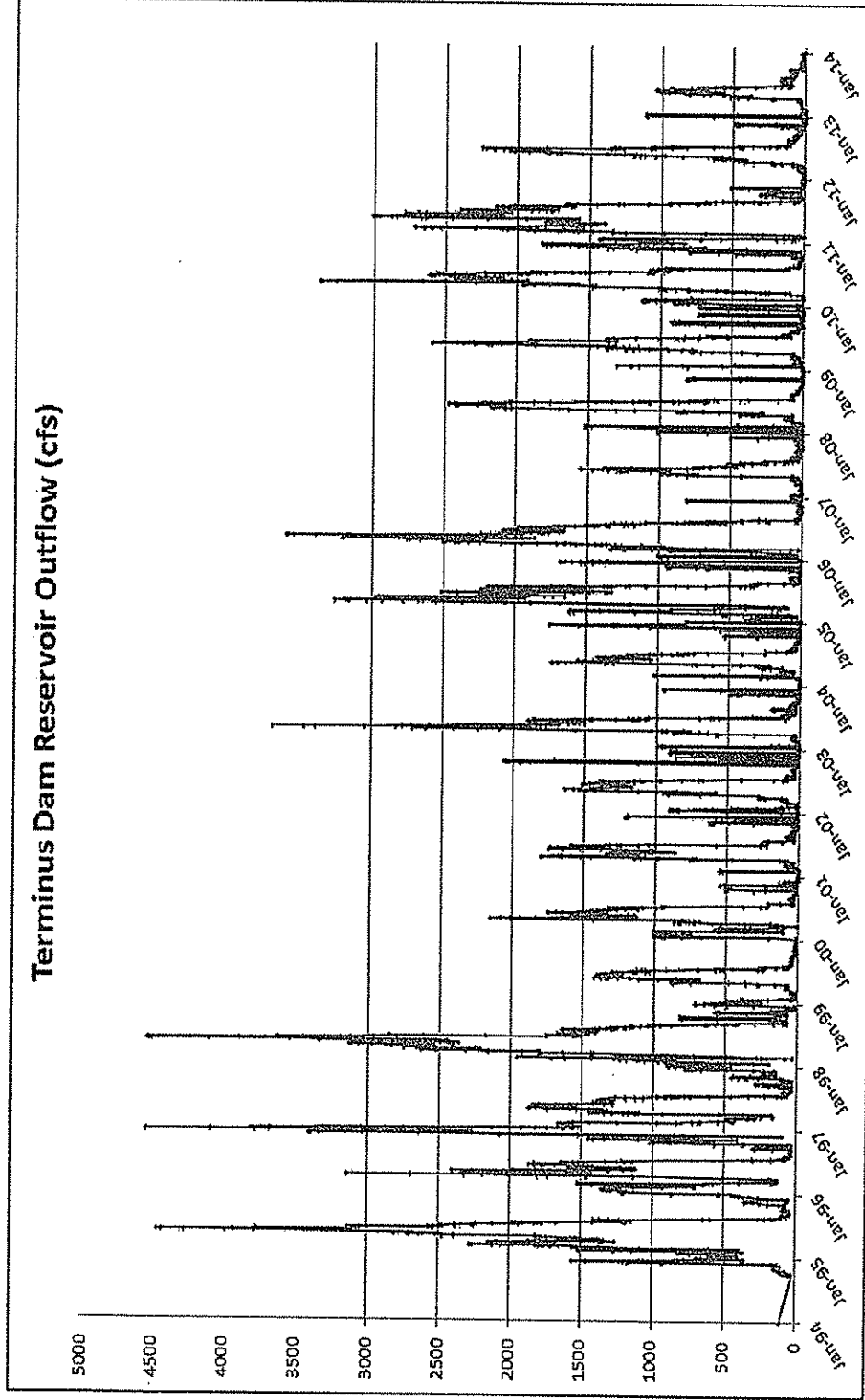


Figure 9. Releases from Terminus Dam to the Kaweah River, 1994 to January 2014.

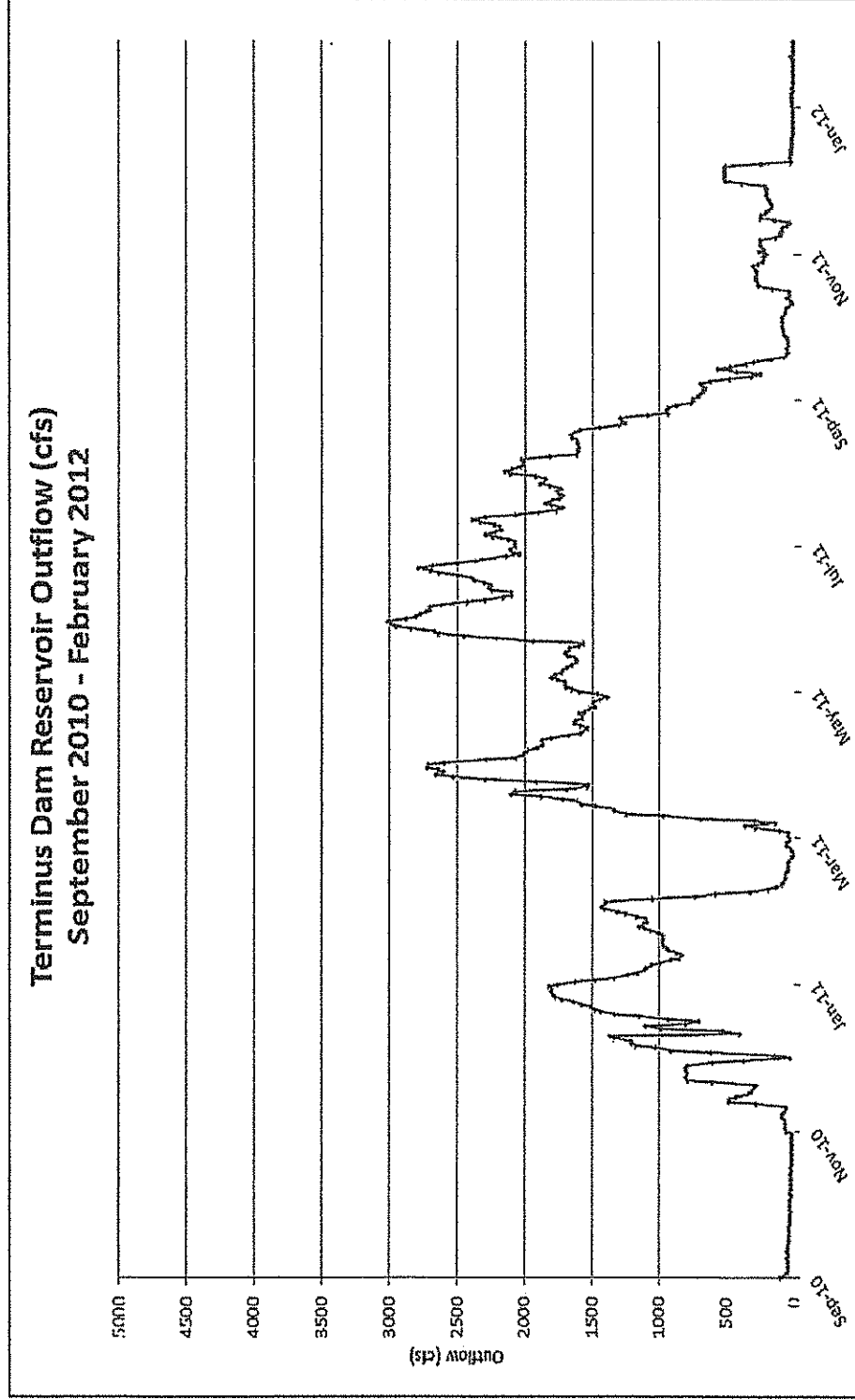


Figure 10. Releases from Terminus Dam to the Kaweah River, September 2010 to January 2012.

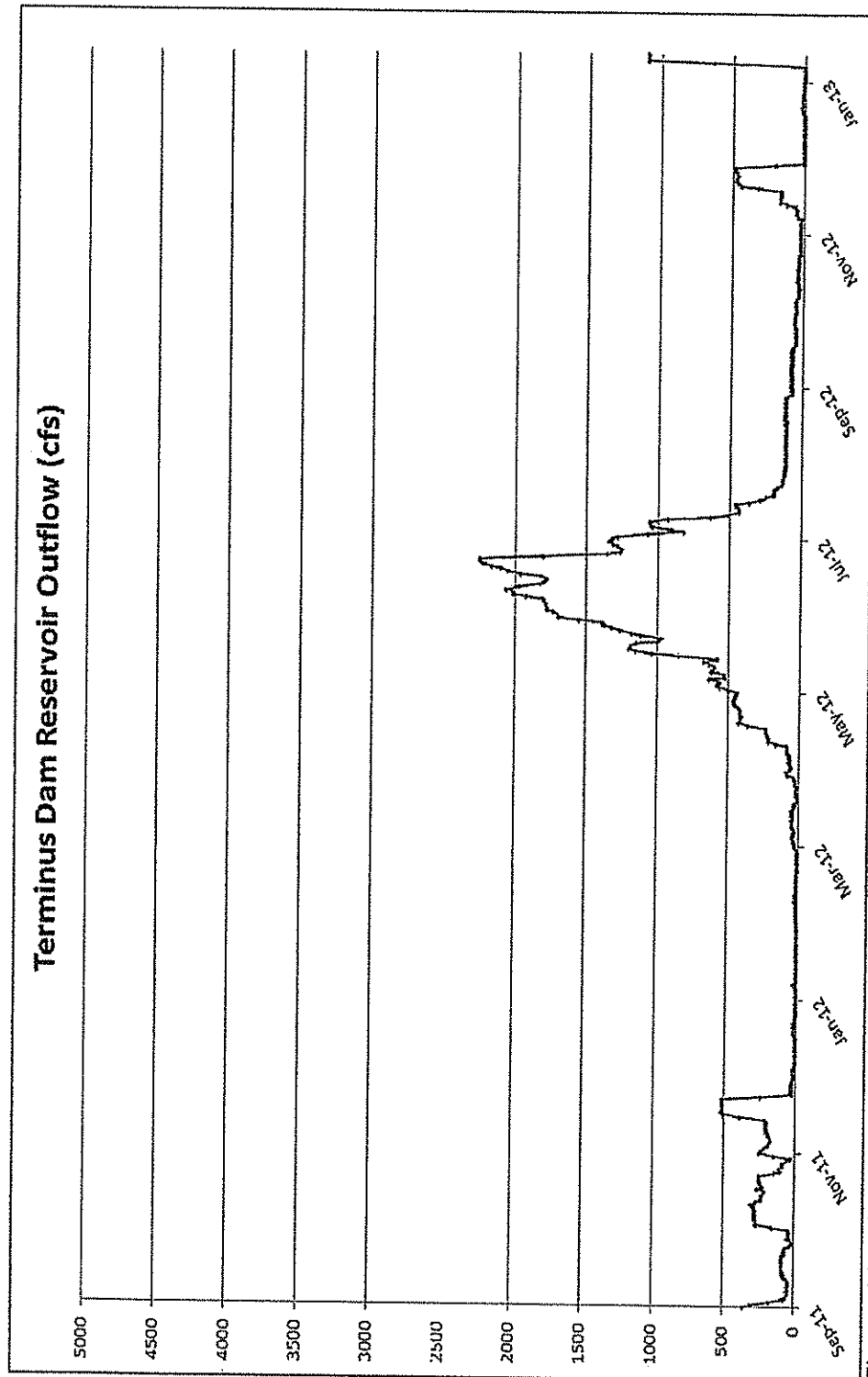


Figure 11. Releases from Terminus Dam to the Kaweah River, September 2011 to January 2013.

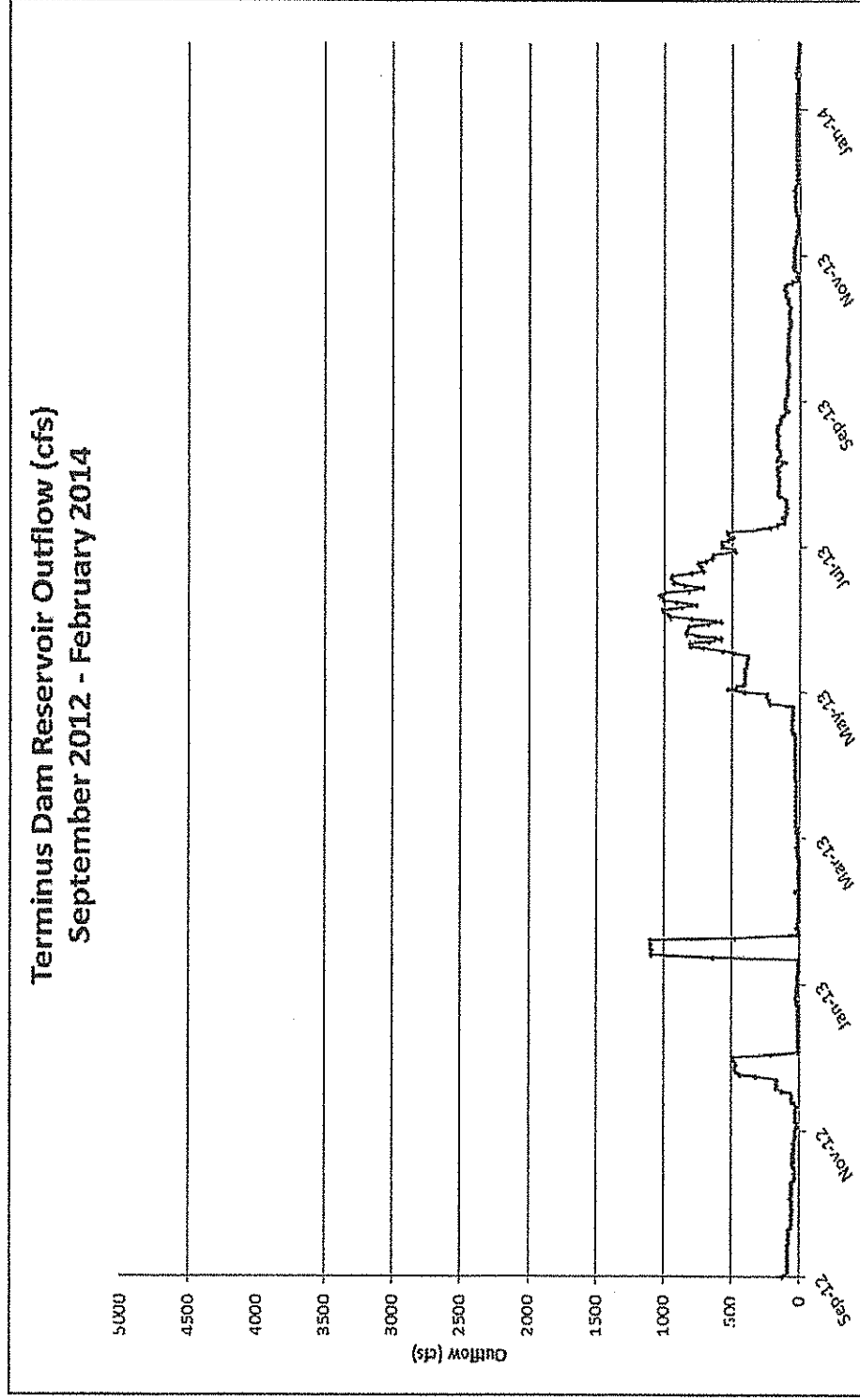


Figure 12. Releases from Terminus Dam to the Kaweah River, September 2012 to January 2014.

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Hydrology:

46. Prior to commencement of mining, the applicant shall prepare and implement a the June, 2002 Groundwater Monitoring Program approved by the Tulare County RMA adopted for this project. The purpose of the monitoring plan shall be to assess the effectiveness of the groundwater recharge system V-ditch design in maintaining groundwater levels in wells along the east and southeast boundary of the site recharging the groundwater aquifer supplying private water wells along the east boundary of the site, and in monitoring the quality of water supplying recharging the local aquifer. All groundwater monitoring and reporting shall be done in accordance with the approved plan. Any property owner with a water well (or water wells) located within a ½ mile radius of the project boundaries may participate in the groundwater monitoring program. The project applicant shall notify all owners with wells within ½ mile of the property boundaries of the opportunity to participate in the groundwater monitoring program. Participation in the program requires that the wells be accessible and in a condition which allows them to be tested on a regular basis.
47. The groundwater monitoring program shall continue to be implemented after reclamation. However, after three (3) years the applicant may request the ~~RMA Director~~ RMA to discontinue the groundwater monitoring program. The monitoring program may be discontinued if the ~~RMA Director~~ determines there are no outstanding complaints with valid documentation still to be resolved and that monitoring is no longer needed to meet the objectives of the monitoring program.
48. In addition to the Annual Groundwater Monitoring Report required by the Groundwater Monitoring Program, the applicant shall make available to the ~~Tulare County RMA~~ on a monthly basis, data concerning (1) the locations and amounts of mine dewatering, (2) the locations and amounts of water delivered to the recharge trench, and (3) the locations and amounts of dewatering delivered elsewhere. This data shall be tabulated and provided in a form acceptable to the ~~Tulare County RMA~~.
- X 49. The project shall not affect the water level, yield, or quality of any well*, both during the mining operations and subsequently as a reclaimed site. Upon receipt of a written complaint from any owner of a pre-existing well which details an alleged impact to the well's water level, yield, or water quality, the ~~RMA Director~~ shall request a report from a licensed hydrogeologist explaining the problem. If a significant problem can be professionally demonstrated by a licensed hydrogeologist to be caused by mining activities, then immediate action must be taken to correct the condition, which may include (but is not limited to) modifying the recharge ditches to provide more recharge capacity, reducing the amount of pit dewatering, or if necessary, ceasing mining operations. (* As used

Division approval. The applicant shall be required to provide any maps, drawings, schematics, or specifications the Division deems necessary in making its determination.

54. ~~53.~~ Upon completion of reclamation, the property owner (or future property owner should the site be sold or otherwise transferred) shall be responsible for maintaining the condition of the berm separating the reclamation lakes and weirs providing water flow from the east lake to the west lake in accordance with Condition No. 52 above.

- X 55. The proposed "V" ditch along the east side of the project site shall contain a sufficient amount of water in order to establish a groundwater mound (groundwater barrier) to maintain water levels in neighboring wells. The trench shall be constructed to a depth sufficient to intersect the layer (substrata) of cobbles, or comparable pervious material, that occurs locally beneath the site (a depth of approximately 6 to 8 feet). The sides and bottom of the "V" ditch shall be designed and maintained to maximize the amount infiltration necessary in establishing the groundwater mound. Water produced from dewatering the mine site shall not be pumped directly into the "V" ditch, but shall initially be pumped into a holding basin(s) to allow fines in the water to settle out and flocculation and precipitation of dissolved iron minerals to occur.

Utilities:

- MM 4.9-1(b) 56. ~~54.~~ The applicant shall provide replacement rights to Southern California Edison (SCE) for any access roads which may need to be relocated due to mining, at no cost to SCE.
- MM 4.9-1(a) 57. ~~55.~~ Construction of the utility access road crossing shall be adequately sloped to ensure access to SCE vehicles and equipment onto tower access roads. Any earth disturbed within the right of way and/or backfill shall be compacted to a minimum of 90% relative compaction. Road conditions shall not be allowed to deteriorate so as to prevent access to SCE vehicles.
- MM 4.9-1(c) 58. ~~56.~~ The applicant shall install commercial-type driveways, 16-feet wide, with curb depressions capable of supporting 40 tons on a three axle vehicle when and where access points dictate.
- MM 4.9-1(d) 59. ~~57.~~ The mine operator shall establish and observe a fifty (50) foot setback around existing SCE utility towers, with an additional 50-foot setback added northwesterly of the towers to provide SCE adequate access for reconstruction of the towers, if necessary. Setbacks shall be staked and marked for easy identification by onsite personnel and SCE employees.