

STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD

In the Matter of the Petition of)
JULIUS A. GLOGOVCSAN, SR.)
For Review of Order No. 84-32 of)
California Regional Water Quality)
Control Board, Los Angeles Region.)
Our File No. A-353.)

ORDER NO. WQ 85-2

BY THE BOARD:

On March 19, 1984, the California Regional Water Quality Control Board, Los Angeles Region (Los Angeles Regional Board) adopted revised waste discharge requirements, Order No. 84-32, for Forest Lakes Recreation Vehicle Park operated by The Great Outdoor American Adventure, Inc., now American Adventure, Inc. On April 20, 1984, the State Water Resources Control Board (State Board) received a timely petition for review of Order No. 84-32.

I. BACKGROUND

American Adventure, Inc. currently operates a recreational vehicle park on 170 acres of land situated in the Lake Hughes/Elizabeth Lake area of unincorporated Los Angeles County. The site, known as the Forest Lakes Recreational Vehicle [hereinafter RV Park], consists of 180 campsites, a swimming pool, three lakes, and recreational facilities. Septic tanks and leachfields are used for on-site waste disposal.

The company proposes to expand the site to 555 spaces. The existing sewage disposal systems will be rehabilitated and new subsurface systems will be installed to accommodate the increase in flow due to the expansion.

The community of Lake Hughes is adjacent to Lake Hughes. Historically, the residents of this community have experienced problems with the failure of on-site subsurface disposal systems because of the presence of high groundwater in the area. As a result, on July 20, 1980, the Los Angeles Regional Board adopted Order No. 80-24, prohibiting the installation of any new private subsurface sewage disposal systems in portions of the community of Lake Hughes. The RV Park is not within the prohibition area.

The petitioner is a part-time resident of the community of Lake Hughes. He also owns property adjacent to the RV Park. He contends that Order No. 84-32 does not adequately protect the quality of ground and surface waters in the vicinity of the project. He seeks a State Board Order directing the Los Angeles Regional Board to prohibit subsurface waste disposal at the RV Park. He also requests that the State Board direct the completion of a hydrologic basin study by the Los Angeles County Engineer, State Department of Health Services and the Los Angeles Regional Board of the declining water quality in the Lake Hughes/Elizabeth Lake drainage basin.

II. CONTENTIONS AND FINDINGS

1. Contention: Petitioner contends that subsurface disposal systems at the RV Park will be installed in close proximity to Lake Hughes Well No. 1, which provides domestic water supply for the community of Lake Hughes, and that the location of these systems threatens to cause an increase in nitrate levels in the waters drawn from Well No. 1. In addition, he contends that the project will further pollute the waters of Lake Hughes.

Finding: Lake Hughes Well No. 1, which is owned by the Dominguez Water Company, is located 900 feet downgradient from the nearest proposed

drainfield at the RV Park. A study of nitrate levels in wells in the Lake Hughes area indicates that the nitrate concentrations are highest in Well No. 1. The elevated levels in Well No. 1, approximately 20 milligrams per liter (mg/l),¹ are probably due to septic tank discharges in the Lake Hughes prohibition area.

Lake Hughes is 1,800 feet downgradient from the nearest proposed leachfield at the RV Park. The Los Angeles Regional Board has classified the lake as eutrophic. This condition is also probably due to excessive nutrient loads from septic tank discharges in the vicinity of Lake Hughes. Large algae blooms occur each summer and fall in Lake Hughes. These blooms and the subsequent die-off have resulted in fish kills due to oxygen depletion. While there is no data in the record detailing the present or historical nitrogen levels in the waters of the lake, elevated nitrogen levels must be present in order for these algae blooms to occur.

A determination whether the proposed drainfields from the RV Park expansion project will result in an increase in the nitrate levels in Well No. 1 and an increase in nitrogen pollution of Lake Hughes requires analysis of two separate questions. First, will the location and design of the proposed drainfields allow nitrogen contamination to reach the groundwater? Secondly, if so, is it geologically possible for contaminated groundwater to reach Well No. 1 and Lake Hughes?

¹ The State Department of Health Services has established a maximum contaminant level for nitrate in domestic water supply of 45 milligrams per liter (mg/l). The nitrate concentration in Well No. 1, approximately 20 mg/l, currently does not exceed the maximum contaminant level.

A. Location and Design of Proposed Drainfields

The location and design of the proposed drainfields at the RV Park meet all applicable local and state requirements. Specifically, the subsurface systems comply with the provisions of the Los Angeles County Plumbing Code, requiring a 10 foot separation between the bottom of the leachfield trenches and seasonal high groundwater. The systems were approved by the Los Angeles County Department of Health Services. Additionally, the drainfields will be located such that no part of the disposal system will be closer than 100 feet from any water well nor closer than 50 feet from any stream channel, as required by the State Department of Health Services.

Although the RV Park expansion project will comply with all applicable requirements for leachfield operation, our review of data in the record indicates that a potential for nitrate contamination of groundwater exists. Most of the nitrogen leaving septic tanks occurs as ammonium ion. This reduced nitrogen form can be oxidized to nitrate ion as it moves through the soil column. A variety of chemical and biological reactions remove nitrogen from sewage water. Nitrogen can be transferred from the soil to the atmosphere by biological or chemical denitrification or by volatilization of ammonia. It also can be taken up by vegetation since nitrogen is a basic plant nutrient. Nitrogen may be immobilized in the soil by absorption of ammonium ion on clay cation exchange sites, fixation by clay minerals, absorption by organic matter, and incorporation into microbial tissue. While all of these mechanisms remove nitrogen from septic tank effluent, there is still a great deal of debate in the scientific literature as to whether a significant nitrogen concentration reduction actually occurs in the soil. Also, it is not possible to quantitatively determine the degree to which a soil will effectively remove nitrogen by an inspection of the physical characteristics of the soil. This

determination can only be made by sampling groundwater after the septic system is installed.

A number of physical site characteristics affect leachfield performance, including depth to groundwater, soil constituents, and soil percolation rates. Sufficient soil depth beneath the disposal field is needed to provide filtration of contaminants and provide for lateral dispersion of wastewater. Silt and clay are the main soil constituents which provide effluent filtration. As the percentage of silt and clay in soil decreases, so does the soil's ability to filter effluent; therefore, proportionately greater separation distances from groundwater must be maintained. The soil percolation rate determines the size of the leachfield and whether the area is suitable for leachfield installation. If the percolation rate is less than 1 minute per inch (too fast) or greater than 60 minutes per inch (too slow), the site is considered unacceptable for use as a leachfield. A soil with a high percolation rate would allow the effluent to percolate too rapidly to be effectively purified. A soil with a low percolation rate might cause the effluent to back up and possible surface.

The percolation rates and the soil sieve analyses for the RV Park indicate that the soil is unlikely to facilitate the nitrogen removal mechanisms previously discussed. The soil percolation rates are high; the average rate is approximately 5 minutes per inch. The soil sieve analyses indicate that the percentage of silt and clay in soils at the RV Park is low, between 1 and 5 percent. These analyses indicate effluent will move through the soil mantle quickly and that the nitrogen concentration might, therefore, not be sufficiently reduced. Consequently, nitrate contamination of groundwater at the site is a possibility.

B. Groundwater Movement

Having concluded that nitrate contamination of groundwater at the RV Park site could occur, we will now consider whether a plume of nitrate contamination could reach Lake Hughes Well No. 1 and Lake Hughes. Representatives of American Adventure, Inc. contend that this should not be a major cause of concern for two reasons.

First, they contend that the hydraulic rate of groundwater motion is slow. American Adventure, Inc. representatives calculate the rate of movement to be approximately 21 to 40 feet per year. At this rate, it would take approximately 22 years from any potential pollution from the drainfields to reach Lake Hughes Well No. 1. We note, however, that the company's calculations of groundwater movement do not consider the effective porosity of the soils² and that, therefore, the calculations reflect only the apparent velocity, not the true seepage velocity. To determine the true seepage velocity, the apparent velocity should be divided by the effective porosity of the soils, which probably ranges from 0.25 to 0.50 for sandy soils. Using these figures, we conclude that the rate of movement of the groundwater at the site could be as high as 160 feet per year, or about six years to travel the 900 feet to Lake Hughes Well No. 1.

Secondly, the company contends that a bedrock sill exists between Well No. 1 and the nearest proposed drainfield, providing a hydraulic barrier between the RV Park and the water supply for the community of Lake Hughes. The term bedrock sill describes an area where bedrock rises close to the surface and presents a barrier to groundwater flow.

² Effective porosity is the ratio of the void space through which flow can occur to the total volume.

A review of the data in the record indicates that localized areas of bedrock do occur at the surface in the "narrows" between Lake Hughes and Forest Lakes. However, there is no data in the record to indicate the depth of the bedrock/alluvium contact across the "narrows", the amount of bedrock fracturing, or the elevation of the groundwater. Consequently, the extent to which the shallow groundwater can flow over the bedrock sill or through the bedrock fractures cannot be determined on the basis of the existing record. We are, therefore, unable to conclude, from the data presently available, that a hydraulic barrier exists between the RV Park site and the Lake Hughes area.

We have previously determined that nitrate contamination from the proposed leachfields at the RV Park can reach groundwater and that there is insufficient data in the record to determine whether a hydraulic barrier exists to groundwater movement from the site to the Lake Hughes area. We note that, as stated previously, subsurface facilities at the site will be designed and located to meet all applicable local and state requirements, which have been incorporated into Order No. 84-32.

In reviewing petitioner's request that we direct the Regional Board to prohibit subsurface waste disposal at the RV Park, we are guided by Water Code Section 13280. That section provides:

"13280. A determination that discharge of waste from existing or new individual disposal systems or from community collection and disposal systems which utilize subsurface disposal should not be permitted shall be supported by substantial evidence in the record that discharge of waste from such disposal systems will result in violation of water quality objectives, will impair present or future beneficial uses of water, will cause pollution, nuisance, or contamination, or will unreasonably degrade the quality of any waters of the state."

Based on our review of the record, we do not feel that there is substantial evidence to support a prohibition. Inspection of nitrate data for Well No. 1 indicates that the nitrate levels in groundwater in the area have stabilized. We are concerned, however, about the impact that the additional nitrate load from the RV Park will have on drinking water supplies in the community of Lake Hughes. Because the potential for nitrate contamination of the Lake Hughes area exists, and because the Lake Hughes area already suffers from excessive nutrient loads, we conclude that additional monitoring should be instituted at the site. The monitoring should be performed to detect any possible groundwater degradation in sufficient time to take any necessary remedial action.

A monitoring well should be placed at the western edge of the RV Park so that the quality of the water flowing from the property to Lake Hughes can be measured. This well should extend through the alluvium and into bedrock and should be constructed so that at least 10 feet of groundwater can be sampled all year. The well should be placed about 500 feet east of the western property line, so that it is east of the bedrock sill. The purpose of this well would be to provide early detection of groundwater degradation. Nitrate concentrations in the monitoring well should be determined in March and September of each year and the results included in the monitoring reports due on April 15 and October 15, respectively.

2. Contention: Petitioner requests that the State Board mandate a hydrologic study of water quality problems in the Lake Hughes/Elizabeth Lake drainage basin.

Finding: On the basis of the existing record, we are unable to determine whether such a study is needed. There is clearly a local problem,

caused by high groundwater conditions, resulting in septic tank failures in the community of Lake Hughes. The Regional Board has responded to this problem by adopting a septic tank prohibition for the affected area. We conclude that the desirability and need for a hydrologic basin study of the Lake Hughes/Elizabeth Lake basin and the priority to be assigned such a study are determinations which should be left to the Los Angeles Regional Board.

III. CONCLUSIONS

After review of the record and consideration of the contentions of the petitioner, and for the reasons discussed above, we conclude as follows:

1. There is a potential for nitrate contamination of groundwater in the Lake Hughes area as a result of the RV Park expansion project;
2. Additional monitoring should be instituted at the site in order to provide early detection of any possible groundwater contamination.
3. The decision whether a hydrologic study of the Lake Hughes/Elizabeth Lake basin is needed should be left to the Los Angeles Regional Board.
4. There is not substantial evidence in the record to support a discharge prohibition.

IV. ORDER

IT IS HEREBY ORDERED that the Executive Officer of the Los Angeles Regional Board shall amend Monitoring and Reporting Program No. CI 6676 for Order No. 84-32 to include the additional monitoring specified in this Order.

IT IS FURTHER ORDERED that the petition in this matter is otherwise denied.

V. CERTIFICATION

The undersigned, Executive Director of the State Water Resources Control Board, does hereby certify that the foregoing is a full, true, and correct copy of an order duly and regularly adopted at a meeting of the State Water Resources Control Board held on February 21, 1985.

Aye: Carole A. Onorato
Warren D. Noteware
Kenneth W. Willis
Edwin H. "Ted" Finster

No:

Absent: Darlene E. Ruiz

Abstain:



Michael A. Campos
Executive Director