STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD

In the Matter of the Petition of COUNTY OF MADERA, DEPARTMENT OF ENGINEERING, For Review of Waste Discharge Requirement Order No. 91-124 of the California Regional Water Quality Control Board, Central Valley Region. Our File No. A-749.	**ORDER NO. WQ 92-10**

BY THE BOARD:

On May 29, 1991, the California Regional Water Quality Control Board, Central Valley Region (Regional Water Board), adopted Order No. 91-124, containing waste discharge requirements for the expansion of an existing municipal landfill. The landfill is owned by the County of Madera (County) and operated by Madera Disposal Systems, Inc.

On June 28, 1991, the County of Madera, Department of Engineering (petitioner), filed a timely petition for review of Order No. 91-124 with the State Water Resources Control Board (State Water Board or Board).

I. BACKGROUND

The County owns a 48-acre Class III landfill[1], known as the Fairmead Solid Waste Disposal Site, located approximately

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1 The State Water Board's land disposal regulations, contained in Chapter 15, Division 3 of Title 23 of the California Code of Regulations, classify waste management units as Class I, II, or III, depending on the unit's ability to contain wastes. See 23 C.C.R. Sections 2530-2533. The least stringent requirements apply to Class III facilities, which receive only nonhazardous and inert wastes.

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one mile south of the community of Fairmead. The facility has been in operation since the 1950's. It consists of one waste management unit[2], which is unlined. The facility is the only landfill serving the County.

Refuse and cover material are placed to a maximum height of 60 feet above the native ground surface, or 240 feet above mean sea level (MSL), at the site. Wastes are deposited no more than 40 feet below ground level, at an elevation of 200 feet above MSL.

Approximately 220 tons of nonhazardous municipal refuse are discharged at the site per day. The landfill is projected to reach final disposal capacity in the near future.

On May 23, 1989, petitioner submitted a report of waste discharge and a technical report to the Regional Water Board for expansion of the landfill to 101.21 acres of land contiguous to the existing landfill. The application included an environmental impact report (EIR) certified by the County Planning Commission on February 7, 1989. The application was later supplemented with several additional technical reports.

The Fairmead expansion project would triple the size of the existing landfill. The County proposes to develop the site in 20-acre segments, each designed to hold 700,000 tons of waste. Actual waste disposal would occur on about 96 acres of the

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2 A "waste management unit" is an area of land at which waste is discharged. A "waste management facility" is the entire parcel of land at which waste discharge operations are conducted. A waste management facility may include one or more waste management units. 23 C.C.R. Section 2601.

expansion area. The entire waste management unit is projected to hold about three and one-half million tons of solid waste at final closure.

On May 29, 1991, the Regional Water Board conducted a public hearing to consider the adoption of waste discharge requirements for the expansion. Staff recommended the adoption of an order, which would have required petitioner to construct a composite liner, consisting of a one-foot thick clay liner overlain with a 40-mil synthetic liner, and a leachate collection and removal system (LCRS). At the conclusion of the hearing, the Regional Water Board adopted Order No. 91-124, containing a revised version of the waste discharge requirements proposed by staff. Order No. 91-124 retained the requirements for a clay liner and LCRS but deleted the requirement for a synthetic liner.

The Regional Water Board also considered adoption of a proposed cleanup and abatement order, requiring the County to conduct verification monitoring.[3] The genesis of the proposed enforcement order was the solid waste water quality assessment test (SWAT) program[4]. In 1987 a SWAT investigation was conducted for the existing Fairmead landfill. A SWAT report, dated June 25, 1987, and a revised report, dated April 20, 1988,

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3 The monitoring provisions of the Board's land disposal regulations were revised, effective July 1, 1991. Under the new regulations, "verification monitoring" is now "evaluation monitoring".

4 See Water Code Section 13273. Under the program, the operator of a solid waste disposal site which is ranked by the State Water Board must submit a SWAT report to the applicable Regional Water Board. The report must assess whether hazardous waste constituents have migrated from the site.

were submitted to the Regional Water Board. The SWAT reports indicated that volatile organic compounds, including tetrachloroethylene (PCE), trichlorofluoromethane (Freon 11), and dichloroethylene, and concentrations of iron and manganese in excess of secondary drinking water standards[5] were present in ground water underlying the site.

Beginning in October, 1989, and on three other occasions, the Regional Water Board requested that the County conduct verification monitoring in order to determine whether leachate or gas with volatile organic compounds was being released from the existing landfill. Petitioner failed to comply with these requests.

On May 29, 1991, the Regional Water Board decided to defer issuance of an enforcement order based upon the petitioner's representation that the required report would be voluntarily submitted. The Regional Water Board sent a follow-up letter, dated June 14, 1991, to petitioner, requesting submission of a report by August 31, 1991, containing an evaluation of the adequacy of the monitoring program at the existing landfill, a plan and time schedule for determining the horizontal and vertical extent of ground water degradation, and other pertinent information. In a letter dated August 23, 1991, petitioner responded that a verification monitoring program was unnecessary.

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5 Secondary maximum contaminant levels (SMCL) primarily address taste and odor. The SMCL for iron is 0.3 mg/l and for manganese, 0.05 mg/l. 22 C.C.R. Section 64473.

Subsequent to the adoption of Order No. 91-124, petitioner filed this petition for review. Petitioner primarily seeks relief from the requirement in Order No. 91-124 that petitioner construct a clay liner and a LCRS prior to waste disposal in the expansion area.

II. CONTENTIONS AND FINDINGS[6]

1. Contention:

Petitioner objects to Order No. 91-124 on the ground that the Regional Water Board misapplied Section 2533 of the State Water Board regulations (23 C.C.R.), governing the siting of Class III landfills, in determining that a liner was necessary for the landfill expansion. In a related vein, petitioner argues that the Regional Water Board lacked substantial evidence to require these construction features. Petitioner also contends that the Regional Water Board held petitioner to an inappropriate standard, i.e. full containment, rather than nonimpairment of beneficial uses of ground and surface waters.

Finding:

Section 2533 of this Board's land disposal regulations delineates the factors which a Regional Water Board must consider in assessing whether site characteristics for a Class III landfill are adequate, without additional construction features, to protect water quality. The section provides, in pertinent part:

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6 All other contentions raised in the petition which are not discussed in this order are dismissed for failure to raise substantial issues which are appropriate for review. See 23 C.C.R. Section 2052.

"(a) Class III landfills shall be located where site characteristics provide adequate separation between nonhazardous solid waste and waters of the state....

"(b) Geologic Setting

(1) New Class III...shall be sited where soil characteristics, distance from waste to ground water, and other factors will ensure no impairment of beneficial uses of surface water or of ground water beneath or adjacent to the landfill. Factors that shall be evaluated include:

(A) size of the waste management unit,
(B) permeability and transmissivity of underlying soils,
(C) depth to ground water and variations in depth to ground water,
(D) background quality of ground water,
(E) current and anticipated use of the ground water, and
(F) annual precipitation."

Where consideration of the factors listed above indicates that site characteristics alone will not ensure protection of ground and surface water quality, Section 2533 further states that "Class III landfills shall be required to have a single clay liner with permeability of 1 x 10-6 (centimeters per second) cm/sec or less".

Section 2533 establishes minimum standards for the siting of Class III landfills. See 23 C.C.R. Section 2510. A Regional Water Board may impose more stringent requirements to accomodate regional and site-specific conditions. Id.

Petitioner contends that the Regional Water Board only considered one factor, specifically soil characteristics, in assessing whether additional construction features were required for the expansion project. This contention is not supported by the record. Evidence in the record indicates that the Regional

Water Board properly considered all of the factors specified in Section 2533. Petitioner's real complaint is that the Regional Board gave undue weight to soil characteristics. Section 2533 does not, however, ascribe any particular weight to the factors which a Regional Water Board must consider in assessing the site characteristics. Nothing in the section precludes a Regional Water Board from assigning greater weight to the soil characteristics at a proposed landfill site than to other factors, such as, for example, the size of the waste management unit.

In addition, petitioner maintains that the Regional Water Board could not draw conclusions regarding the expansion site based upon evidence regarding the existing site. The expansion site is located immediately adjacent to the existing landfill. There is no evidence in the record to indicate that there are any significant differences in the geologic or hydrogeologic features of the two areas. Therefore, it was entirely proper for the Regional Water Board to consider evidence regarding the existing landfill in decision-making regarding the expansion project.

For the reasons which will be explained below, we conclude, based upon our review of the record, that the Regional Water Board properly applied Section 2533 in determining that a liner and LCRS, at a minimum, must be constructed at the expansion site. Consideration of the geologic and hydrogeologic features of the site, as well as evidence of pollutant releases

from the existing landfill, all point to the need for additional containment features at the expansion site. Further, we conclude that the Regional Water Board applied the appropriate standard in making its determination, that is, protection of beneficial uses of ground and surface waters, and that this determination is amply supported by evidence in the record.

(A) Regional Geology

The facility is located in the San Joaquin Valley of Central California. The soils at the site are classified as alluvial fan deposits of the Chowchilla River. The Chowchilla River alluvium is divided into a younger and older alluvium. In the immediate vicinity of the landfill, only the older alluvium exists. These deposits are generally characterized by unconsolidated to loosely consolidated, poorly-sorted gravel, sand, and silty clay. The older alluvium is highly permeable.

The landfill is located approximately five miles southeast of the outside edge of the E-Clay, or Corcoran Clay. The E-Clay is the principal groundwater-confining stratum in the region. Groundwater conditions are confined below the E-Clay and are unconfined above. East of the E-Clay, however, groundwater conditions are expected to be unconfined throughout the saturated profile.

(B) Ground Water

Wastes discharged at the Fairmead facility are placed roughly 50 feet above the highest anticipated elevation of the underlying ground water. Ground water elevations have declined

dramatically over the last 100 years due to the use of subsurface water for agricultural irrigation. In 1906 ground water was recorded at 205 feet above MSL, or 35 feet below the ground surface. The maximum depth to ground water at the landfill site was recorded in 1977 at 140 feet (100 feet above MSL). Since then, surface water imports have raised the water table about 40 feet. The highest depth in recent years, recorded in the spring of 1986, was 90 feet beneath the surface. Currently, ground water is encountered at about 115 feet below grade.

The ground water flow direction and gradient are variable in the vicinity of the landfill site. This variability has been attributed to seasonal pumping of ground water for irrigation purposes.

Ground water beneath the site is designated by the Regional Water Board in the water quality control plan (basin plan) for beneficial use as municipal and domestic, agricultural, and industrial supply. Ground water quality beneath the site is of very good quality, ranging in total dissolved solids (TDS) content from approximately 200 to 300 milligrams per liter (mg/l).

(C) Site Investigations

(1) Soils

In assessing the actual geologic conditions in the landfill expansion area, Regional Water Board staff evaluated well logs and soil boring data submitted by petitioner. In addition, staff conducted a field investigation and collected

five soil samples from expansion area cores used by petitioner's consultant. These data were consistent with the characterization of regional sedimentation patterns along the eastern portion of San Joaquin basin. The data indicated that the site consists of interbedded, and laterally discontinuous, layers of clays, silts, sands, and gravels. These alluvial deposits beneath the landfill site provide natural pathways for fluid migration to the underlying ground water.

Petitioner, in fact, concedes that no single stratum is continuous over the depth interval between the bottom of the existing landfill and expansion area and the upper ground water zone. Petitioner argues, however, that a continuous clay layer is unnecessary for a number of reasons. Petitioner analyzed data on the cumulative thickness of clay deposits at the existing site and the expansion area in a 50 foot zone underlying the base of the landfill. Based upon a statistical analysis of this data, petitioner contends that the permeability of soils below the expansion area provides protection equivalent to a one-foot thick clay liner.

Petitioner's data is not persuasive. It indicates only that vertical fluid migration in the 50 foot zone underlying the base of the expansion area may be impeded by low permeability material present in that zone. Vertical fluid migration is not the only mechanism of flow, however, beneath a landfill. Horizontal flow is also a major consideration. Fluids will tend to migrate vertically downward until they reach a barrier and

then travel horizontally until the permeability of the barrier has increased to the point where vertical migration can continue or until an artificial pathway, such as a well screen or pack, is encountered. In heterogenous materials, such as the alluvial deposits beneath the site, high permeability materials are typically interconnected at some point in the soil profile. Therefore, a continuous layer of low permeability material must be shown to exist, between the bottom of the landfill and the upper ground water zone, in order to demonstrate protection equivalent to a continuous one-foot clay liner.

(2) Ground Water

Petitioner, additionally, contends that a clay liner is unnecessary because the volatile organic compounds which have been detected in ground water beneath the existing landfill have only impacted the "perched" water table. Petitioner contends that this upper ground water zone is disappearing and does not warrant protection. Petitioner further contends that the upper zone is separated from the lower or regional aquifer by the equivalent of about 100 feet of impermeable material. The regional aquifer is adequately protected, according to petitioner, because of this intervening material and because any constituents which do migrate to the regional aquifer will receive adequate dilution.

The actual hydrogeologic conditions beneath the landfill site are uncertain. Petitioner asserts that the upper ground water zone is currently located at depths of between about

100 and 122 feet below ground surface and the lower zone at depths of between 210 and 240 feet. Monitoring wells at the site have been installed to approximate depths of 110, 150, and 270 feet. According to the petitioner, the 110 and 150 foot wells draw from the upper ground water zone. Only one well TW-3 (250) taps the lower zone.

As of May 1991, at least one well, TW-4 (110) was still producing water from the 110 foot depth. The water level in the 150 foot wells was about 115 feet below grade, while the water level in the 250 feet well was approximately 135 to 140 feet.

The existence of a perched zone has not been substantiated. State Water Board regulations define "perched ground water" as a body of unconfined ground water separated from the zone of saturation by a portion of the unsaturated zone". 23 C.C.R. Section 2601.

Petitioner's consultant testified before the Regional Water Board on May 29 that the existence of an unsaturated zone has not been demonstrated. Nevertheless, petitioner argues, based upon the results of a pump test, that the two ground water zones are not hydraulically connected. Petitioner conducted a single 48-hour pump test using TW-3 (250) as the pumping well and TW-3 (150) as the observation well. No declines in water levels in the observation well were observed even though it is located only ten feet laterally from TW-3 (250).

The results of the pump test do not provide a reliable indication of ground water conditions, in general, throughout the

landfill. The results indicate only that, given the discharge rate and duration of that particular test, the shallow ground water zone in the area immediately adjacent to the pumping well, was apparently unaffected by the hydraulic influence on the lower zone created during the test. The well logs for the two wells clearly show the presence, at least locally, of layers of fine-granted materials which restrict flow between the two ground water zones. The existence of these layers provides a good explanation of the test results.

The test fails to indicate the amount of long term flow of ground water which can pass through the confining strata. We note that, although fine-grained materials may severely restrict flow under saturated conditions, thousands of gallons of water can pass through these materials over a period of several years. Petitioner's consultant, in fact, testified at the Regional Water Board's May 29 hearing, that pollutants can migrate down to the lower ground water zone. The consultant argued, however, that the pollutants would be sufficiently diluted so as not to exceed applicable drinking water standards.

As discussed above, the alluvial deposits characterizing the landfill site provide naturally occurring pathways connecting the upper and lower ground water zones. In addition, numerous wells, which have been screened across both zones, are located in close proximity to the site. These wells provide an artificial connection between the two zones.

Whether or not the upper ground water zone is perched, it is clear that the upper zone is beneficially used. At least three domestic wells in the vicinity of the Fairmead landfill are screened to include the upper ground water zone. Petitioner's background well, well No. 14, is screened between 123 and 183 feet; well No. W-21, located about one-half mile northwest of the facility is perforated between 128 and 260 feet; and well No. 6, located approximately 300 feet west of the landfill, is perforated between the depths of 100 and 280 feet. In addition, 19 other supply wells located within one mile of the site are constructed with gravel packs that extend across both the upper and lower ground water zones.

Further evidence that the upper zone is beneficially used is provided by repeated references in the record to the drop in elevation of the ground water table. This decrease is attributed to a combination of the drought and increased use of the ground water for agricultural irrigation.

In sum, we conclude that the upper and lower ground water zones are connected through both natural and artificial means. In addition, we find that the upper zone is, in fact, beneficially used.

Petitioner contends that the upper ground water zone is drying up and, therefore, does not warrant protection. We cannot responsibly take this position. It is true that ground water elevations have been decreasing over the last several years. It is common knowledge that the State, and in particular the

San Joaquin Valley, has experienced several consecutive years of drought in recent times. The impacts of the drought have been exacerbated in the Fairmead area by the heavy dependence on ground water for agricultural supply in that location. Ground water elevations in the area, however, have risen in the past in response to the provision of new surface water supplies or periods of above normal precipitation. A return to normal or above normal precipitation conditions could again result in a rise in ground water elevations.

Further, this Board's "Sources of Drinking Water Policy", Resolution No. 88-63, established state policy that, unless excepted, all ground waters are considered suitable, or potentially suitable, for municipal or domestic supply. Exceptions may be granted only for: (1) aquifers with a TDS content exceeding 3,000 mg/l; (2) aquifers which are contaminated, either by natural processes or by human activity unrelated to a specific pollution incident; or (3) aquifers which do not provide sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day (gpd).

In its basin plan the Regional Water Board has designated ground water in the Fairmead area for use as domestic and municipal supply. No exception has been granted for the upper ground water zone. Nor would one be appropriate at this time. The TDS content of the upper ground water zone ranges from 200 to 300 mg/l, and there is no evidence that the zone is naturally contaminated or contaminated by human activity

unrelated to a pollution incident. The only possible issue is the potential discharge rate of the upper ground water zone, and empirical data on this is currently unavailable.

(3) Potential for Leachate Releases

Petitioner contends that the volatile organic compounds which have been detected in the upper ground water zone beneath the existing landfill are due to the release of gaseous constituents rather than leachate. Petitioner maintains that construction of a gas extraction system will obviate this problem in the expansion area. Additionally, petitioner contends that implementation of operational measures, such as load checking, belting operations, and recycling will prevent volatile organic compounds from being disposed at the expansion site.

Petitioner also attributes the high concentrations of iron and manganese to the release of gases. Petitioner theorizes that the gases could create a reducing environment beneath the existing landfill, resulting in the mobilization of iron and manganese naturally present in the soils in the vicinity of the landfill. In addition, petitioner contends that there is no evidence that concentrations of TDS and chloride, which, like iron and manganese, are indicator parameters of leachate migration, are elevated; therefore, the high levels of iron and manganese cannot be due to leachate.

As further evidence that leachate has not been discharged at the site, petitioner states that leachate has never been observed at the existing landfill. Finally, petitioner

cites the fact that volatile organic compounds have not been detected in monitoring well TW-3 (250).

Evidence in the record indicates that volatile organic compounds were first detected at the Fairmead landfill in 1986, when the SWAT investigation began. They have been continuously detected since then. Monitoring well TW-3 (110) produced four samples with concentrations of PCE exceeding the maximum contaminant level (MCL) of 5.0 parts per billion (ppb) for drinking water before the well went dry in 1989. On one occasion PCE was detected at a maximum concentration of 21 ppb. Well TW-2 (110) produced samples with detectable concentrations of PCE until it also went dry in 1989. Wells TW-1 (150), TW-2 (150), and TW-3 (150) have produced water samples with detectable concentrations of PCE since January 1990. During September 1991 well TW-3 (150) produced a water sample with a PCE concentration of 7.7 ppb. PCE has been detected in well TW-2 (150) and TW-3 (150) during each of seven sampling events between January 1990 and June 1991. PCE has been detected in well TW-4 (110) during every sampling event between September 1987 and June 1991, except one sampling event in September 1989 when the well was reported as dry.

Dichloroethene has been detected on several occasions in the 110 foot wells. Trichlorofluoromethane has been detected in both the 110 and 150 foot wells on a consistent basis. Iron and manganese have been detected in concentrations exceeding

secondary maximum contaminant levels. TDS and chloride concentrations appear to be slightly elevated above background.

The Regional Water Board concluded that the presence of volatile organic compounds and the elevated concentrations of iron and manganese beneath the existing landfill were attributable to the release of leachate, gases, or both. While it is undoubtedly clear that pollutants have been released from the existing landfill, it is unclear whether the releases are due to leachate. Petitioner's persistent failure to conduct verification monitoring at the site has made any valid assessment of this issue impossible.

The significantly elevated iron and manganese levels in conjunction with the slightly elevated TDS and chloride concentrations in the upper ground water zone monitoring wells seem to indicate leachate. However, the supply wells used for background monitoring data are not screened discretely in the same ground water zone as the site monitoring wells. Therefore, the background data may not be accurate.

Further, the sampling results from well TW-3 (250) cannot be considered reliable because the well is improperly constructed for use as a pollutant monitoring well due to its excessive screen length. Well TW-3 (250) is screened between the depths of 170 and 250 feet (80 feet). The well is not screened in the discrete interval corresponding to the depth of the lower ground water zone. In general, well screens of 10 to 15 feet in the saturated zone are considered appropriate for pollutant monitoring.

Petitioner's surface observations of the presence or absence of leachate at the existing landfill are meaningless. Leachate typically occurs in the subsurface where it cannot be seen. Either vadose zone monitoring or direct drilling into the existing landfill would be needed to determine whether or not leachate is present beneath the existing landfill.

We also concur with the Regional Water Board that petitioner is overly optimistic in its assertion that volatile organic compounds will not be disposed at the expansion site. The operational measures which petitioner will use will, hopefully, reduce the quantity of these constituents which find their way into the landfill. They will not eliminate such disposal, however.

Petitioner cites the high evaporation rate/rainfall ratio in support of its position that leachate will not be generated at the site. The facility receives an average of 11 inches of rain per year, and mean evaportion is about 65 inches per year. While this ratio is high, leachate will undoubtedly still be produced at the site. The evaporation rate/rainfall ratio is an annual average and may be reversed during the rainy season. The record indicates that, on several occasions, ponded water was observed by Regional Water Board staff at the existing landfill during routine site inspections. Additionally, there are numerous ways that leachate-generating liquids can enter the landfill, including rainfall, vegetation, food, and liquids from small household containers. Liquids can

be squeezed out of substances such as vegetation and food under the overburden of landfill wastes.

(D) Conclusions

Groundwater beneath the Fairmead expansion site is designated for beneficial use, and is, in fact used, as domestic supply. Natural hydrogeologic conditions at the site provide pathways for pollutant migration from the expansion area to underlying ground water. Additionally, numerous wells located in the area provide artificial conduits for the movement of pollutants. Pollutants have escaped from the existing landfill and have polluted the upper ground water zone, although it is unclear whether the releases are due to leachate migration or gaseous constituents. There are no significant differences in the geologic or hydrogeologic characteristics of the existing site and the expansion area. Additional containment features are, therefore, necessary at the expansion site in order to protect the beneficial uses of area ground waters.

2. Contention: Petitioner contends that the Regional Water Board did not consider costs in making its decision to require a liner and a LCRS at the expansion site.

Finding: This contention is not supported by the record. The Regional Water Board heard testimony on May 29 that a synthetic liner would cost approximately seven million dollars. Comments made by board members at the conclusion of the hearing indicate that their decision to forego a synethic liner was based, at least in part, upon cost considerations. In any

event, cost considerations are relative. Balanced against the cost of additional containment features at a landfill are the potential costs of ground water remediation if the containment measures are inadequate.

3. Contention: Petitioner additionally argues that the Regional Water Board erred in establishing the water quality protection standard for volatile organic compounds at the detection limit of the analytical method used (or nondetect). Discharge Spec. B. 15 of Order No. 91-124. Petitioner contends that the use of nondetect as the applicable standard is inconsistent with Water Code Section 13263.

Finding: Article 5 of Chapter 15 of this Board's land disposal regulations establishes monitoring and response programs for waste management units. There are three programs: detection monitoring, evaluation monitoring (formerly verification monitoring), and corrective action. See 23 C.C.R. Section 2550.1. The respective purposes of these programs may be generally stated as (1) determining whether a waste management unit has leaked, (2) determining what has leaked, where leakage has occurred, and how can the leakage be corrected, and (3) correcting the problem.

The Regional Water Boards are required to establish water quality protection standards for each of these programs. A water quality protection standard consists of several components, including a list of constituents of concern, concentration limits for these constituents, the point of compliance, and all

monitoring points. See id. Section 2550.2. The constituents of concern are the waste constituents, reaction products, and hazardous constituents which are reasonably expected to be in or derived from waste contained in the waste management unit. Id. Section 2550.3.

The concentration limits are values "not to exceed background" for each constituent of concern. Id. Section 2550.4. Only two exceptions to this rule are allowed. See id. Concentration limits greater than background are permitted in a corrective action program, or in a detection monitoring program after a corrective action program has been completed. Id. (h).

A discharger is required to institute evaluation monitoring whenever there is statistically significant evidence of a release from a waste management unit. Id. Section 2550.8(k). It is during evaluation monitoring that a discharger may propose concentration limits greater than background for constituents of concern. Id. Section 2550.9(d)(2). If approved by the Regional Water Board, the concentration limits greater than background apply during the subsequent corrective action program and, also, during detection monitoring following corrective action.

Petitioner contends that the use of nondetect as the concentration limit for volatile organic compounds is inconsistent with Water Code Section 13263. Section 13263 specifies certain factors which a Regional Water Board must consider in adopting waste discharge requirements. These include

the relevant water quality control plans, the beneficial uses to be protected, the water quality objectives reasonably required for that purpose, and other factors. Petitioner argues that the nondetect standard is unreasonable and does not reflect a balancing of the factors specified in Section 13263.

Petitioner's contention must be rejected for several reasons. First, as explained above, the Regional Water Board was required under this Board's regulations to establish concentration limits for volatile organic compounds at the Fairmead landfill at background. See id. Section 2550.4. Volatile organic compounds, unlike such waste constituents as chlorides or nitrates, are not naturally occurring. Therefore, the use of nondetect as the concentration limit was entirely consistent with our regulations.

Secondly, when this Board adopted the applicable regulation, Section 2550.4, setting concentration limits for waste constituents at background levels, we determined that the regulation was necessary in order to implement Section 13263. This specific determination was subsequently reviewed and approved by the Office of Administrative Law. See Gov. Code Section 11349.1.

Finally, as explained above, a discharger may propose concentration limits greater than background during evaluation monitoring. Petitioner, however, has repeatedly failed to conduct verification monitoring, now evaluation monitoring, as requested by the Regional Water Board. Under the circumstances,

petitioner is in a poor position to argue that concentration limits for volatile organic compounds should be greater than background.

Petitioner appears to have a fundamental misunderstanding of the purposes of Article 5 of the Chapter 15 Regulations. One of the most significant aims of Article 5 is to ensure an early and effective response to evidence of a release from a waste management unit. The use of background concentrations to trigger further investigation is necessary and appropriate in order to further this goal. The collective experience of this and other states is that failure to respond in this manner can increase ground water cleanup costs exponentially. We wish to emphasize, nevertheless, that the use of background as the concentration limit for a waste constituent does not necessarily mean that ground water which has been impacted by a release must be cleaned up to this level.

III. ADDITIONAL CONSIDERATIONS

As noted previously, the Regional Water Board has made five requests that petitioner conduct verification monitoring (now evaluation monitoring) at the Fairmead landfill. To date, petitioner has failed to comply with these requests. As a consequence, neither the Regional Water Board nor this Board can accurately determine whether the pollutants in the ground water underneath the existing Fairmead landfill are due to leachate migration, gaseous releases, or some combination of the two. Without this information, it is difficult to determine whether

the containment measures required by the Regional Water Board will adequately protect beneficial uses.

We note that the Regional Water Board, after finding that site characteristics alone do not ensure water quality protection, imposed the minimum construction standards specified in Chapter 15 for Class III landfills on the County. The Regional Water Board was authorized to impose more stringent requirements than the minimum standards if necessary to protect ground water quality in the vicinity of the Fairmead landfill.

We also take note that the federal Environmental Protection Agency (EPA) recently adopted regulations, implementing Subtitle D of the Resource Conservation and Recovery Act, 42 U.S.C. Section 6901 et seq. (RCRA), which establish minimum national standards for solid waste landfill facilities. See 56 Fed. Reg. 550978 (Oct. 9, 1991). These regulations, which are effective on October 9, 1993, establish a stringent minimum design standard for municipal landfills. The federal regulations require a composite liner system, consisting to two feet of compacted clay with a permeability of not less than 1 x 10-7 cm/sec and a flexible membrane liner over the clay layer.

One of the most important functions of landfill liners is to detect, collect and remove leachate. The EPA has defined leachate collection efficiency as the ratio of the volume of leachate collected to the total volume entering a LCRS. For clay liners with a permeability of 1 x 10-6 cm/sec, the EPA has found the leachate collection efficiency to be 0% (that is, no leachate

collected) for leachate flow rates up to 100 gpd onto the liner. In contrast, EPA has found the leachate collection efficiency of a composite liner to approach 100% for leachate flow rates of 10 gpd or greater. In addition to improving leachate collection efficiency, there are other advantages to a composite liner, the most important of which is the added structural integrity that such a liner system provides.

In this case a properly conducted evaluation monitoring program would have provided the Regional Water Board with information essential to a determination of whether the existing landfill was leaking and the likelihood of leachate development in the expansion area. This information would also be very relevant to a determination of whether a single one foot clay liner for the landfill expansion would be adequate to protect the beneficial uses of area ground waters.

The County has indicated that it is at capacity at the existing landfill, which is the only landfill serving the County. We have, therefore, determined that the County should be permitted to proceed with limited waste disposal at the expansion site. Waste disposal should be limited to 20 acres, the approximate acreage of Phase 1 of the expansion project, or less, as approved by the Regional Water Board. Waste disposal beyond this approved area should be prohibited, however, until the County conducts an evaluation monitoring program which meets the requirements of Chapter 15. The Regional Water Board shall consider the results of the evaluation monitoring program, prior

to authorizing waste disposal beyond this first area, in order to determine whether the minimum containment measures specified in Order No. 91-124 are adequate to protect the beneficial uses of areal ground waters or whether additional containment features are necessary.

IV. CONCLUSIONS

Based upon the above discussion, the Board concludes as follows:

1. The Regional Water Board properly applied Section 2533 of the Board's land disposal regulations in determining that a clay liner and a LCRS, at a minimum, are necessary for the Fairmead expansion project.

2. The Regional Water Board had substantial evidence to support adoption of Order No. 91-124.

3. The Regional Water Board held the County to an appropriate standard, that is, protection of beneficial uses of ground and surface waters, when it adopted Order No. 91-124.

4. The Regional Water Board took into account economic considerations in the adoption of Order No. 91-124.

5. The Regional Water Board acted properly in establishing the concentration limit for volatile organic compounds at the detection limit of the analytical method used.

6. The County should be prohibited from disposing waste beyond an area of 20 acres or less, of the expansion area, as approved by the Regional Water Board, until the County conducts an evaluation monitoring program in compliance with Chapter 15.

7. The Regional Water Board shall consider the results of the County's evaluation monitoring program, prior to authorizing waste disposal beyond the first approved area, in order to determine whether the containment measures contained in Order No. 91-124 are adequate or whether additional measures are necessary in order to protect the beneficial uses of area ground waters.

V. ORDER

IT IS HEREBY ORDERED that this matter is remanded back to the Regional Water Board for appropriate action consistent with the findings of this Order. In particular, the Regional Water Board shall revise Order No. 91-124 to prohibit waste disposal at the expansion site beyond an area of 20 acres or less, as approved by the Regional Water Board, until petitioner

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has conducted an evaluation monitoring program which complies with Chapter 15 and until the Regional Water Board has made the findings required in this Order.

IT IS FURTHER ORDERED that the petition is hereby denied.

CERTIFICATION

The undersigned, Administrative Assistant to the 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 September 17, 1992.

AYE: W. Don Maughan
Eliseo M. Samaniego
John Caffrey
Marc Del Piero
James M. Stubchaer

NO: None

ABSENT: None

ABSTAIN: None

Maureen Marché
Administrative Assistant to the Board