

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. R5-2002-0141

WASTE DISCHARGE REQUIREMENTS
FOR
FULTON RECLAMATION FACILITY, INC.
GLENN COUNTY

The California Regional Water Quality Control Board, Central Valley Region (hereafter Regional Board), finds that:

1. Fulton Reclamation Facility, Inc., owned and operated by Charles and Carol Fulton (hereafter Discharger), is a drilling mud recycling/soil amendment operation. The Discharger submitted a Report of Waste Discharge dated 22 January 2001 to increase the loading of drilling mud on its land and to add 42 acres to its operation. The Discharger subsequently provided additional information to complete the Report of Waste Discharge.
2. The site has operated under Waste Discharge Requirements Order No. 95-124, adopted by the Regional Board on 26 May 1995, which prescribed requirements for the operation of a drilling mud disposal facility. The Discharger was previously regulated by Order No. 88-182, which was adopted 28 October 1988, until the adoption of Order No. 95-124. Order No. 95-124 allowed an increase in the drilling mud loading rate from eight percent to twelve percent. The percent loading is based on a ratio of the dry weight per cubic foot drilling mud to the weight of a cubic foot of soil predominant in the area of the discharge (a Cortina Very Gravelly Sandy Loam).
3. Order No. 95-124 is no longer adequate due to a proposed increase in the drilling mud loading rate from twelve to sixteen percent, and the proposed addition of the 42-acre area for drilling mud application. The total application area, including the test plots located along the eastern boundary of the property, will increase from 190 to 232 acres as a result of the expansion.
4. The total area of the Fulton property is 315 acres (Assessor's Parcel No. 024-100-018-0) and is located in Section 15, T21N, R3W, MDB&M, as shown in Attachment A, which is attached hereto and part of this Order by reference. The total area includes a reserve site where drilling mud will not be applied, a truck washout area and other facilities, and a residence.
5. Prior to the adoption of Order No. 88-182, discharge of drilling mud took place in elevated ponds on approximately 80-acres of the site. Drilling mud was discharged to five ponds at various times until discharge ceased in 1987 in accordance with the California Code of Regulations (CCR), Title 23, Division 3, Chapter 15 (hereafter Chapter 15) standards. The pond closure plan was approved on 22 June 1989 and the ponds were considered officially closed on 20 November 1991.
6. Beginning in 1985, drilling mud was also discharged directly to land, allowed to dry, and disced into the ground in an experimental land spreading operation. The area affected by this operation is designated as Field A in Attachment B and comprises approximately 18 acres. The amount of drilling mud added to the soil at that time amounted to approximately ½ percent by dry weight.

7. The Discharger receives spent drilling mud and dried "clean-up" drilling mud from gas exploration operations and water supply well drilling. This drilling mud is landspread on selected portions of the site as a soil amendment to the native soils. The admixture is agriculturally more productive as a result of the addition of the drilling mud. The area of landspreading will be rotated through the life of the project.
8. The Discharger has been utilizing test plots with varying concentrations of drilling mud applications. The test plots are located on the east boundary of the facility along County Road M. Drilling mud has been applied at rates of 8, 12, 16 and 24 percent on these test plots. Crop yields over the last seven years from these test plots indicate that an increase of drilling mud loading to 16 percent generates an increase in crop yield from the current application rate of twelve percent or the former application rate of eight percent. A loading rate of 24 percent resulted in a decrease in crop yield.
9. The Discharger requested an increase of the drilling mud loading rate to 16 percent in 1995, but staff determined that it would be preferable to incrementally increase the drilling mud loading rate to 12 percent before allowing a rate increase to twice the 8 percent that was allowed at that time. Staff also indicated that when sufficient data was gathered at the 12 percent loading rate showing no negative effects to ground water quality, that the Regional Board may consider allowing the loading rate to increase to 16 percent.
10. The Discharger has installed three new background monitoring wells, MW-10, 11 and 12, which act in addition to the existing background monitoring well MW-5, as shown in Attachment B, to assess background water quality. The Dischargers facility is located immediately downgradient of a feedlot.

SITE DESCRIPTION AND CHARACTERISTICS

11. Topographically, the site slopes gently south at a grade of approximately 0.5 percent and lies at an average elevation of about 200 feet. It is on the Stony Creek Alluvial Fan, a deposit of geologically young (Pleistocene-Holocene) alluvium.
12. Prior to its use as a disposal facility, the site was allowed to lie fallow or was utilized for marginal, non-irrigated agricultural operations.
13. Land within 1,000 feet of the site is used for agriculture. Gravel mining has been conducted within 1,000 feet of the site's west side, but no gravel removal is currently occurring.
14. The soils underlying the site belong predominantly to the Cortina Very Gravelly Sandy Loam classification. This soil supports sparse grasses and forbs. A small portion of the northeast corner of parcel 0-024-10-0-005-0 is underlain by the Tehama Gravelly Loam soil. Approximately 20 percent of the site's total area, on the west side, is underlain by Tehama Silt Loam soil. Both of the Tehama soils are agriculturally productive.

15. The Cortina Very Gravelly Sandy Loam soils are moderately to highly permeable and have poor moisture holding capacity. The Storie Index for these soils, which is a measure of agricultural value, ranges from 32 to 37.
16. The Discharger currently performs soil amendment operations on those portions of the site which are underlain by the Cortina soils. Soil amendment operations are not proposed at this time for those portions underlain by the Tehama soils.
17. Benefits to be accrued from the soil amendment procedures include improvement of the soils' water holding capacity, augmentation of nutrient deficiencies in the natural soil, improvement of soil texture, and tilth.
18. First ground water at the site is approximately 26 feet below the ground surface. This is a shallow aquifer consisting of alluvial fan deposits extending to a depth of less than 60 feet. Ground water flow at the site is in a southeasterly direction, as indicated by on-site water level measurements. While this aquifer is not used locally for domestic water supply, it is of drinking water quality.
19. The regional aquifer, which is used for water supply, is the Tehama Formation. Wells near the site are completed at approximately 200 feet below ground surface, but the Report of Technical Information (May 1986) submitted by the Discharger, indicates that potential exists for water production from depths as great as 700 feet. This is a confined aquifer with a piezometric surface at a depth of 20 to 30 feet. Recharge to this aquifer occurs primarily from Stony Creek, which lies seven miles north of the site, and from the Coast Range foothills, approximately 20 miles away. This water is of good quality and meets drinking water standards.
20. The average annual rainfall at the site is 18 inches.
21. The mean evaporation for a dry-land site near Black Butte Lake, which is 200 feet higher in elevation than the subject site, is reported as 85 inches in the Supplemental Report of Technical Information.
22. The 100-year, 24-hour precipitation event for the site is 4.6 inches.
23. The site is not within a 100-year flood plain.
24. The effective percolation rate is 3.2 inches per hour for existing soils, according to information submitted by the Discharger.

DRILLING MUD DESCRIPTION AND CLASSIFICATION

25. The Discharger has been discharging drilling mud in its landspreading operation under regulation by the Regional Board since 1988. This waste has been classified as a "designated waste" by the Regional Board, as defined by the California Water Code (CWC) Chapter 3 Article 4 §13173(b),

on the basis of the concentration of Total Dissolved Solids (TDS) in fluid derived in a Waste Extraction Test performed on dried drilling mud crusts.

26. The basic components of drilling mud are water and bentonite clay. It is used in well drilling operations, most specifically in natural gas well drilling rigs. The primary purpose of the mud is to provide temporary stabilization and sealing of the well sidewalls until the well can be completely constructed. The Discharger discharges this spent drilling mud directly to land as a soil amendment.
27. Drilling mud may also contain additives, such as diesel fuel, which would degrade and threaten groundwater quality by introducing petroleum hydrocarbons, if discharged to land and allowed to travel to the aquifer. Diesel fuel may enhance the drilling process. The Discharger accepts only loads from producers who certify that the drilling mud is non-hazardous. This Order contains new requirements for a periodic spot-checking program for Total Petroleum Hydrocarbons (TPHs) by the Discharger.
28. The process of deep gas exploration by drilling can result in the transport of high TDS groundwaters from deep aquifers back to the surface as the drilling mud is retrieved. In addition, the bentonite component adds an alkaline balance to the drilling mud formula. The resulting spent drilling mud therefore contains pollutants that can alter the quality and beneficial uses of underlying groundwater if applied to the ground surface.
29. Data submitted by the Discharger indicates that this drilling mud, if discharged under uncontrolled conditions, could constitute a threat of excessive salt loading to soil and ground waters. The data gathered from the monitoring well network indicate there is no apparent negative impact to groundwater quality with regards to TDS, pH, and electrical conductivity, based on the management, practice, and monitoring of the Discharger's operation thus far. However, it is known that the loading of salts from deep formation drilling mud deposition increases the concentration of salts within the soil horizon. These salts can impact water quality and hence beneficial use of the groundwater. The clay content, mineralogy, and organic matter content dictate the soils ability to remove or exchange salts. This Order establishes an extended monitoring and reporting program, which includes an unsaturated-zone (i.e. vadose zone) monitoring program designed to study and ascertain the behavior of the salts within the soil horizon.
30. The Discharger's data, based on information gathered from the experimental test plots, confirm that the addition of the drilling mud increases soil productivity potential for certain crops, and that, if application rates are controlled, degradation of ground water will not occur.

SITE OPERATIONS

31. The original landspreading discharge rate under Order No. 88-182 was 208 tons per acre (at eight percent dry weight of drilling mud to weight of equivalent volume of soil) to a depth of one foot.

The current landspreading operation discharge rate is 312 tons per acre, which is based on an application rate of twelve percent drilling mud.

32. The Discharger has landspread drilling mud over the entire area indicated by Areas A through K in Attachment B since the adoption of Order No. 88-182. This area comprises approximately 161 acres and is now been completed to the currently permitted twelve percent drilling mud capacity.
33. Approximately 28.8 acres, as shown in Attachment B, are currently used as test areas. The Discharger intends to continue experimentation with the drilling mud in these test areas to the extent that the allowable drilling mud loading (i.e. 8, 12, 16, and 24 percent by dry weight is not exceeded) by varying both native soil ratio and the depth to which the drilling mud will be incorporated into the native soils. Oat crop yield on these test plots over the past seven years indicate increased drilling mud loading up to 16 percent is agriculturally beneficial.
34. The Discharger receives spent drilling mud from gas exploration wells and water supply wells in northern California. The drilling mud is transported to the site in either 100-barrel capacity vacuum trucks, or 14 cubic yard capacity dump trucks. The loads are generally originated from well drilling operations within Glenn County and other local counties. Drivers are EPA-registered haulers.
35. The site accepts only drilling mud that is certified by the producer and/or driller as nonhazardous and as containing only those additives that are listed in the California Department of Health Services Nonhazardous Drilling mud Additive List (May 1982).
36. The Discharger submitted a Load Checking Program in the Report of Disposal Site Information, dated April 1989. The Load Checking Program consists of sampling all trucks entering the facility from the top and bottom of the tanker and analyzing for pH, EC, and TDS. The load checking program also includes visual inspection for petroleum. Based on these analyses the load is either accepted or rejected.
37. Incoming trucks are directed to the landspreading area currently in use. The discharge of the drilling mud fluid is accomplished by opening the rear discharge valve(s) on the truck and depositing the contents into a leveed area of approximately 60 feet by 100 feet. Each load of drilling mud is recorded on daily load sheets as to its area of disposal. Each leveed disposal area can receive 10 to 20 truck loads.
38. After discharge of its contents, the trucks can then proceed to a washout area where residual drilling mud and settled solids are washed out with a high-pressure hydrant. The washout water is collected in a sloped concrete lined basin and channeled to portable tanks, which are emptied as necessary. Contents of the portable washout tanks are spread at 0.25 gallons per square foot over a zone that has been previously treated with dried drilling mud.
39. Non-drilling mud trash, including bentonite sacks and drilling mud additive sacks, gloves, paper trash, and other miscellaneous refuse are collected on-site in a trash container adjacent to the

washout area. This trash is removed to an appropriate Class III waste management unit as necessary.

40. Drilling mud discharged to the landspreading areas dries by evaporation. When dried, the levees and drilling mud are smoothed and spread to accommodate farming operations.
41. The dried drilling mud is spread and then tilled into the native soils to a maximum depth of one foot to develop new treated zones. Tilling is accomplished by a three-phase process consisting of: (1) breaking up the soil with a chisel plow, (2) tilling with a disc, and (3) mixing with a bottom plow. These zones are then planted in the fall months with grain seed. The matured grain is harvested by others and utilized as fodder.
42. It is expected that drilling mud application will occur on all site areas underlain by the Cortina soils. This amounts to approximately 190 acres including the test areas. With the Dischargers proposal to add 42 acres to its land reclamation operation, the total reclaimed area will be increased to 232 acres.
43. Until January 2002, the Discharger had not conducted vadose zone sampling as required under the previous Orders Nos. 88-182 and 95-124 and accordingly not provided vadose zone monitoring results to the Regional Board. The vadose zone monitoring data is critical in the Regional Board's determination whether any immediate impacts to soils or water quality may be evident from the discharge of the drilling mud. The recent vadose zone monitoring has not produced results because the dry soils have not yielded sufficient water volume for sampling.
44. In January 2002, the Discharger installed ceramic cup soil pore moisture measuring devices (suction type lysimeters) at 30 inches below ground surface in its existing application areas (Fields A – K). According to the Discharger's recent self-monitoring reports, lack of precipitation has prevented the lysimeters from yielding sufficient water for sampling, as the vadose zone is relatively dry. The water volume needed to conduct the required testing for electrical conductivity, chemical oxygen demand, and standard minerals and trace metals, is 473 milliliters.
45. The Discharger is required pursuant to this Order to install suction cup lysimeters, and also pan type lysimeters, or other effective devices in the proposed application area. The lysimeters in the new discharge area can provide both background data and ongoing data as the drilling mud soil amendment operation proceeds. The results of the lysimeter sampling program should yield sufficient information to determine immediate impacts within the soil horizons directly beneath the discharge areas.
46. The location of the landspreading areas will be changed over the life of the operation, as new areas are reclaimed.
47. When reclamation is completed, drilling mud will no longer be taken at the site, and the site will be utilized exclusively for agriculture.

48. The crops on which nutrient supply and plant growth experiments were conducted were non-irrigated grain crops used for hay. Additional or alternative crops may be tried, subject to conditions of water demand (irrigation method) and water quality.
49. The site is fenced in and access is through a locked gate. Access to the site is on a 24-hour basis to accommodate the round-the-clock schedule of drillers.

ANTI-DEGRADATION

50. The discharge to land of drilling mud may result in a higher pH, and an increase in concentration of total dissolved solids and specific conductivity in groundwater. State Water Resources Control Board (State Board) Resolution No. 68-16 allows degradation of waters of the state if the change in quality is consistent with the maximum benefit to the people of the state, will not unreasonably affect present and anticipated beneficial uses of such water, and will not exceed applicable water quality objectives. In addition, the discharge must meet requirements that result in “best practicable treatment or control of the discharge” to assure that pollution or nuisance will not occur. To remain consistent with State Board Resolution 68-16, the discharge shall not degrade groundwater at levels greater than specified in this Order within the point of compliance and shall not unreasonably affect beneficial uses or cause nuisance. If monitoring of groundwater indicates that the discharge has caused an increase in constituent concentrations, when compared with background, the Discharger will be required to conduct a study of the extent of groundwater degradation. In this event, the Discharger may be required to cease the discharge, reduce the drilling mud application rate on the disposal areas, and/or take other necessary action as deemed appropriate and reasonable by the Regional Board.
51. The Regional Board has considered anti-degradation pursuant to State Board Resolution No. 68-16 and finds that the discharge of drilling mud waste specified herein, and conducted in accordance with the specifications, provisions, and limitations, of this Order, should not degrade surface water or groundwater quality. The drilling mud will be applied to land at the appropriate agronomic rate to enable maximized crop production, within the loading rate specified herein. This Order establishes effluent limitations that are protective of all beneficial uses of the underlying groundwater, and accordingly requires quarterly waste (drilling mud) monitoring for electrical conductivity, pH, total dissolved solids, standard mineral and trace metals monitoring, vadose zone monitoring, and agronomic testing.

SACRAMENTO AND SAN JOAQUIN RIVER BASIN PLAN

52. The Regional Board adopted a Water Quality Control Plan, Fourth Edition, for the Sacramento and San Joaquin River Basins (hereafter Basin Plan), which designates beneficial uses, establishes narrative and numerical water quality objectives, and contains implementation plans and policies for protecting all waters of the Basin. The Basin Plan includes plans and policies of the State Water Resources Control Board incorporated by reference, including the Antidegradation Policy, Resolution 68-16. Pursuant to the California Water Code (CWC), §13263(a), waste discharge requirements must implement the Basin Plan.

53. CWC §13241 requires the Regional Board to consider various factors, including economic considerations, when adopting water quality objectives into its Basin Plan. CWC §13263 requires the Regional Board to address the factors in §13241 in adopting waste discharge requirements. The State Board, however, has held that a Regional Board need not specifically address the §13241 factors when implementing existing water quality objectives in waste discharge requirements because the factors were already considered in adopting water quality objectives. These waste discharge requirements implement adopted water quality objectives. Therefore, no additional analysis of §13241 factors is required.
54. The beneficial uses of underlying groundwater are municipal and domestic water supply, agricultural supply, industrial service supply, and industrial process supply.
55. Surface water drainage is to ephemeral streams, which are tributary to the Colusa Basin Drain and thence to the Sacramento River.
56. The beneficial uses of the Colusa Basin Drain are agricultural supply; recreation; esthetic enjoyment; ground water recharge; and preservation and enhancement of fish, wildlife, and other aquatic resources.
57. Basin Plan water quality objectives to protect the above beneficial uses include numeric objectives and narrative objectives for chemical constituents in groundwater, as well as toxicity and tastes and odors of groundwater. The toxicity objective requires that groundwater be maintained free of toxic substances in concentrations that produce detrimental physiological responses in humans, plants, or animals. The chemical constituent objective states groundwater shall not contain chemical constituents in concentrations that adversely affect any beneficial use, including any exceedance of MCLs specified in Title 22, CCR, as necessary for domestic supply. The Basin Plan requires application of the most stringent objective for each constituent as necessary to ensure that waters do not contain a chemical constituent, toxic substance, radionuclide, pesticide, or taste-producing or odor-producing substances in concentrations that adversely affects a domestic drinking water or agricultural supply, or any other of the above-identified beneficial uses.
58. The Basin Plan procedure for applying water quality objectives as terms of discharge in waste discharge requirements requires maintenance of the existing quality of groundwater except where the Regional Board determines an adverse change is consistent with Resolution 68-16. Resolution 68-16 requires the Regional Board to regulate waste discharges in a manner that maintains high quality waters of the State. Any change in quality can only occur after full application of best practicable treatment and control (BPTC) of the waste and must be consistent with maximum benefit to the people of the State, not unreasonably affect a beneficial use, and not result in water that exceeds a water quality objective.

LAND TREATMENT

59. The Discharger does not employ the minimum technology-based treatment specified in the Basin Plan, but uses alternative methods that rely on effective land treatment.
60. Successful treatment and control by applying waste constituents to land is an inexact science highly dependent upon the constituent, soils, climate, other practices that affect the property, and sound waste management and control. The process depends upon attenuation (decomposition, immobilization, and transformation) in the soil profile and consumption from the root zone by crops to remove waste constituents. Excessive application rates for waste constituents can result in anaerobic waste or soil conditions that can create nuisance odor and vector conditions. Excessive application rates can also overload the shallow soil profile and root zone to impair crops, crop waste constituent consumption, and the waste attenuation process itself, and lead to leaching of waste constituents out of the treatment zone. Excessive application can also result in dissolution of soil minerals such as calcium and magnesium. Excessive hydraulic applications, even if from use of supplemental fresh water, can flush waste constituents, decomposition by-products, and dissolved minerals out of the treatment zone. Absent sufficient sustained reliable attenuation of residual waste constituents in the remaining soil profile, the constituents will eventually discharge into groundwater. Temporal storage of residual waste constituents within the soil column can misrepresent the effectiveness of the process.

TREATMENT AND CONTROL REQUIREMENTS

61. This discharge is nonhazardous, but exhibits characteristics of “designated waste,” as defined by CWC §13173(b), as the concentrations of some waste constituents when applied to land have potential for causing exceedances of water quality objectives or affecting beneficial uses. The discharge contains inorganic dissolved solids in concentrations orders of magnitude greater than water quality objectives. This discharge is appropriately categorized as designated waste because of these constituents and is subject to the full containment provisions of Title 27. The waste need not be contained if the waste constituents of concern can be demonstrated to be effectively removed by controlled land treatment or, if not removed, subjected to BPTC and reduced sufficiently thereby to satisfy criteria of Resolution 68-16. Regardless, given the applicability of Title 27, some of its definitions and terms are used herein.
62. Regulations for the land treatment of designated waste are contained in Title 27. Title 27 §20210, allows designated waste constituents that are decomposable to be discharged to a Class I or Class II Land Treatment Unit (LTU). Title 27, §20164, defines LTU as a “waste management unit (Unit) at which liquid and solid waste is discharged to, or incorporated into, soil for degradation, transformation, or immobilization within the treatment zone.” It defines treatment zone as “a soil area of the unsaturated zone of a land treatment unit within which constituents of concern are degraded, transformed, or immobilized.” The Discharger’s method of waste constituent treatment and control, specifically the discharge of drilling mud to the land application area, is an LTU subject to the performance standards of Title 27. Hereafter, the land application area will also be referred to as the LTU.

63. Performance standards of Title 27 applicable to this LTU require that:
- a. The Discharger demonstrate prior to discharge that the LTU can completely degrade, transform, or immobilize designated waste constituents in the treatment zone (§20250(b));
 - b. The Discharger establish prior to discharge the appropriate design depth of the treatment zone for each designated waste constituent, not to exceed five feet below the initial ground surface (§20250(b));
 - c. The Discharger establish prior to discharge to the LTU a site-specific Water Quality Protection Standard (§20390) for each designated waste constituent (under §20395), the concentration limits (under §20405), and the Point of Compliance and all Monitoring Points (under §20405).
 - d. The Regional Board prescribe specific standards by which to monitor water quality (§20420), including a detection monitoring program (§20420), an evaluation monitoring program (§20425), and an unsaturated zone monitoring program for the LTU (§20435).
64. The Discharger has not made the required BPTC and Title 27 demonstration for any waste constituent. The LTU has been in operation for years but may not be necessarily operating and can not necessarily be assumed to have been operating under steady-state conditions. Data and information regarding past operation contain evidence of groundwater degradation. A vadose zone monitoring program which could provide the information necessary to evaluate possible impacts to the groundwater environment and ascertain whether steady state conditions have been achieved has not been implemented. Further, certain waste constituents discharged to the LTU, such as inorganic dissolved solids will not be degraded, transformed, or immobilized in the treatment zone. Evidence of groundwater degradation includes several inorganic constituents. Given the nature of the waste constituents contained in the discharge, the Regional Board is unable now but may be likely in the future to determine the discharge complies with Title 27 standards for a LTU after sufficient data has been gathered from the vadose zone monitoring program. The Regional Board may be able to assure protection of high quality groundwater and exempt the discharge from Title 27 requirements for full containment of the waste. Pursuant to §20090(b), an exemption requires that:
- a. The Regional Board issue waste discharge requirements,
 - b. The waste discharge requirements implement the Basin Plan and allow discharge only in accordance with the Basin Plan,
 - c. The wastewater be nonhazardous waste and without need to be managed according to Title 22, CCR, Division 4.5, Chapter 11, as a hazardous waste.
65. While the Regional Board can find now that conditions 64.a and 64.c are met, technical documentation is insufficient at this juncture to identify final and specific conditions of discharge that assure consistency with 64.b. Determinations of BPTC for each waste constituent, at least

comparable to the minimum performance standard set forth by the Basin Plan (and Resolution 68-16) and Title 27, are necessary first. A reasonable schedule of tasks to generate all necessary documentation for a final Regional Board determination on this matter is essential, and the benefit to be derived from such documentation more than justifies the burden of preparation. In the interim, and because of the schedule of tasks, the Regional Board conditionally finds this Order consistent with Resolution 68-16 and the Basin Plan, and therefore 64.b, and temporarily exempts the discharge from Title 27.

66. As stated in CWC §13263(g), discharge is a privilege, not a right, and this conditional authorization to discharge while obtaining technical documentation for a future decision does not in any way create a vested right to continue the discharge. Failure to provide the level of management required preclude conditions that threaten pollution or nuisance will be sufficient reason to modify, revoke, or enforce this Order, as well as prohibit further discharge.
67. The Discharger must complete a comprehensive evaluation of the LTU. The evaluation must identify which waste constituents in the discharge will be consistently and completely degraded, transformed, or immobilized in a treatment zone of less than five feet from the initial soil surface (ground surface) per CWC Title 27, §20250(b)(5) and identify the practices and controls to assure this. It must also evaluate which waste constituents will be consistently removed by crop uptake, and the practices and controls that assure this occurs within the root depth of crops grown on the LTU. If removal, containment, or uptake of a waste constituent cannot be guaranteed by the Discharger to occur within the treatment and root zones, the Discharger must complete a BPTC evaluation for the waste constituent, and identify the concentration and mass of the constituent that will be released to groundwater and its consequent impact on concentrations of the constituent in groundwater.
68. This Order requires optimal performance of an LTU and specifies minimum conditions of LTU performance to ensure the discharge does not degrade groundwater quality. Discretionary decisions of the Discharger regarding budget, personnel, equipment, energy, and day-to-day activities can adversely affect these. Technical and monitoring reports on operation, maintenance, and performance relate directly to the Regional Board's need to know in a timely manner whether the Discharger is effectively operating and maintaining the LTU. Soil, soil-pore liquid, and groundwater monitoring is necessary to measure whether effective operation, and reliance on constituent treatment in the soil profile, mitigates the impact on groundwater quality as described in environmental documents, and complies with discharge specifications and groundwater limitations. This necessitates a comparison of constituent concentrations in samples from a network of wells, LTU and background soils, and from an unsaturated zone monitoring system. The burden, including costs, of regularly obtaining information about its potential impacts on water quality and submitting the required reports is reasonable given the costs of remediation in event of failure.
69. The conditions of discharge in this Order were developed based on currently available technical information and applicable water quality laws, regulations, policies, and plans, and are intended to assure conformance with them. However, information is presently insufficient to develop final effluent and groundwater limitations, so the proposed Order sets limitations for the interim while

site-specific, constituent-specific limits are developed in conjunction with a BPTC evaluation, including source control and pretreatment. Additional information must be developed and documented by the Discharger as required by schedules set forth in the proposed Order. As this additional information is obtained, decisions will be made concerning the best means of assuring the highest water quality possible that could involve substantial cost. It may be appropriate to reopen the Order if applicable laws and regulations change, but the mere possibility that such laws and regulations may change is not sufficient basis for reopening the Order. The CWC requires that Waste Discharge Requirements implement all applicable requirements.

70. CWC §13267(b) provides that: "In conducting an investigation specified in subdivision (a), the Regional Board may require that any person who has discharged, discharges, or is suspected of discharging, or who proposes to discharge within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of discharging, or who proposes to discharge waste outside of its region that could affect the quality of the waters of the state within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the board requires. The burden, including costs of these reports, shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports."
71. Pursuant to CWC §13263(g), discharge is a privilege, not a right, and issuance of this Order does not create a vested right to continue the discharge. Failure to provide the level of management required to assure best practicable treatment and control, preclude conditions that threaten pollution or nuisance, and protect groundwater quality will be sufficient reason to enforce this Order, modify it, or revoke it and prohibit further discharge. This Order prescribes limits for TDS loading, EC, mass drilling mud application rates, and pH, but it remains the responsibility of the Discharger to assure that its waste loading practices do not degrade groundwater or create a condition of pollution or nuisance. Acceptable loading rates established in this Order are subject to change if conditions are such that the discharge of wastewater causes, or threatens to cause, pollution or nuisance.

CALIFORNIA ENVIRONMENTAL QUALITY ACT CONSIDERATIONS

72. The County of Glenn has issued a Mitigated Negative Declaration for this project, which finds that the project "will have no adverse impacts on the environment because monitoring is an integral part of the project and is included in the mitigation measures."(Glenn County Conditional Use Permit #84-09 and Reclamation Plan, June 1984). The Mitigated Negative Declaration addressed the inclusion of the 42-acre expansion in its overall assessment of environmental impacts. The County further required that the Discharger must apply for and receive all State of California required permits. The Conditional Use Permit was re-issued in August 2000.
73. The Regional Board has reviewed the Mitigated Negative Declaration and concurs that there is no substantive evidence for impact on water quality if the Discharger adheres to conditions of the Conditional Use Permit and these waste discharge requirements.

PUBLIC NOTICE

74. The Regional Board has notified the Discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for this discharge, and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.
75. The Regional Board, in a public meeting, heard and considered all comments pertaining to this discharge.

OTHER CONSIDERATIONS

76. All local agencies with jurisdiction to regulate land use, solid waste disposal, air pollution, and to protect public health have approved the use of this site for the discharge of the specific waste to land described herein.
77. Compliance with this Order may not relieve the Discharger of its obligations under Health and Safety Code §§25249.5 through 25249.13, the Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65).
78. The Regional Board finds that, as a soil reclamation project, this operation is exempt from Chapter 15.

IT IS HEREBY ORDERED that Order No. 95-124 is rescinded and Fulton Reclamation Facility, Inc., its agents, successors, and assigns, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, shall comply with the following:

[Note: Other prohibitions, conditions, definitions, and some methods of determining compliance are contained in the attached "Standard Provisions and Reporting Requirements for Waste Discharge Requirements" dated 1 March 1991.]

A. Discharge Prohibitions:

1. The discharge of "hazardous waste" at this site is prohibited. The discharge of "designated waste", other than used drilling mud from gas exploration wells and water supply wells, is prohibited. For the purposes of this Order, the terms "hazardous waste" and "designated waste" are as defined in Chapter 15, and CWC §13173.
2. The discharge of solid or liquid waste or drilling mud to surface waters, surface water drainage courses or to ground water is prohibited.
3. Runoff from treated areas shall not be permitted to leave the site or to enter the gravel pit.

4. The discharge of waste within 100 feet of surface waters is prohibited.
5. The discharge of liquid drilling mud or liquids from the storage tank directly to untreated land (land which has not had any addition of dried drilling mud) is prohibited.
6. Storage in ponds or tanks of liquid drilling mud or other waste liquids, other than the washout fluids, is prohibited.
7. The discharge of brines (i.e., drilling mud with an electrical conductivity (EC) greater than 7000 $\mu\text{mhos/cm}$ and/or TDS greater than 4200 mg/l) from any source is prohibited.
8. The discharge of wastes other than that described in the Findings contained in this Order and/or as described throughout this Order as allowable, is prohibited.
9. The discharge of liquids, drilling mud, or brines to the gravel pit is prohibited.
10. The discharge of waste containing any carcinogen or reproductive toxin listed by the Governor pursuant to Health and Safety Code §§25249.5 through 25249.13, the Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65), where such chemical passes or probably will pass into any source of drinking water, is prohibited.
11. Discharge from the LTU of waste classified as “hazardous”, as defined in §2521(a), CCR, §Section 2510, et seq., or “designated”, as defined in CWC §13173, is prohibited.
12. The discharge of waste constituents in amounts that exceed the agronomic uptake of crops is prohibited.

B. Discharge Specifications:

1. Drilling mud application under this Order shall be confined to the previously unused 42-acre Reserve Area and any previously treated zone or test plot as shown in Attachment B. Loading of the previously treated zones (A – K) or test plot areas shall not be completed to more than to their respective limits as specified in this Order. The Regional Board shall be notified before the Discharger moves treatment to a new area, as described in the Operations and Maintenance Plan.
2. The Discharger shall file a written report within 90 days after the total quantity of wastes discharged at the site equals 75 percent of the site's calculated capacity, based on a drilling mud application rate of 12 percent by weight, or at the final application rate approved by the Regional Board. The report shall contain a schedule for studies, design and/or other steps needed to justify and provide additional capacity. Unless the Regional Board approves additional loading, the total quantity of drilling mud discharged shall be limited to the calculated capacity, as described elsewhere in this Order, based on the application rate of 12 percent.

3. The Report of Technical Information and the Report of Operations shall be updated every two years or whenever a change in amount, method, or location of drilling mud application is proposed. These reports shall also be updated if or when the Discharger proposes to begin to crop or leave fallow a previously amended area.
4. A specific proposal for cropping areas that have been amended shall be prepared as operations change. This proposal shall state the conditions, frequency, and manner of applying irrigation water to the soil. It shall demonstrate by calculations and by monitoring that addition of irrigation water, if the drilling mud application area is irrigated, will not produce excessive leaching of salt from the soils. This proposal shall be submitted 60 days before irrigation is initiated.
5. The Discharger shall install an unsaturated zone (vadose zone) monitoring system in the new 42-acre Reserve Area. The system shall include soil monitoring with soil-pore-liquid monitoring devices such as lysimeters which are capable of acquiring soil-pore liquid samples. At least two ceramic cup type lysimeters shall be placed in every 20-acre section. In addition, the new 42-acre area that has never been used shall have both the ceramic cup type lysimeters in each 20-acre section, and also either a pan type or other type capable of acquiring samples of adequate volume so as to provide the data described in and required by this Order. These devices shall be placed by a registered hydrogeologist or other registered professional in this field.

The unsaturated zone monitoring system shall consist of a sufficient number of sampling points at appropriate locations and depths to yield results which will allow analysis of the adequacy of treatment within the vadose zone immediately below the land application area (i.e., within the unsaturated zone between eighteen inches to five feet below ground surface). The Discharger shall provide a technical report on the workplan for placing these devices that includes the rationale for the type of devices used consistent with the soil types and textures in order to obtain the best result possible. The rooting zone is estimated to be twelve to eighteen inches below ground surface. This should represent the quality of soil-pore liquid and chemical makeup under the following conditions:

- a. Background (i.e., soil that has not been affected by the discharge of drilling mud);
 - b. During the period of land application under this Order (i.e., soil that had been previously fallow but which receives drilling mud);
 - c. During this concurrent period of seasonal precipitation; and
 - d. During the cycling of seasonal crop planting and harvesting.
6. The Discharger shall annually collect soil samples at 12 inches, 24 inches, and 36 inches from at least one location in each existing application field (A-K), and one location per 10-acre area in fields L and M (there will therefore be four sampling locations in the new application area) that is receiving drilling mud for the purpose of evaluating the distribution gradient of standard minerals and trace metals. Such information will be used by the

Discharger in assessing the profiles in the old fields and new field for the purpose of determining the attenuation capability and exchange capacity of the soil horizon for salts and other standard minerals, trace metals, and clay content. The information contained in these reports should be presented so that it can be clearly interpreted (i.e., tabulated data, charts, and/or graphical representations should clearly show the attenuation of salt over time, for example).

7. The Discharger shall conduct agronomic testing as described in the monitoring and reporting program.
8. The Discharger shall not add drilling mud to soils at a rate greater than 12 percent by weight, without specific approval by the Regional Board.
9. The discharge shall not cause a degradation of any water supply.
10. The vehicle washout area shall be protected by a concrete slab, and any other means necessary to prevent uncontrolled runoff or leakage to the ground.
11. All construction plans and specifications shall be certified and supervised by an independent registered civil engineer or engineering geologist. Written approval of operation and construction plans and specifications shall be obtained from the Board prior to implementation.
12. Water used for site maintenance shall be limited to the minimum amount necessary for dust control and normal irrigation of crops, as described in the Operations and Maintenance Plan.
13. The Discharger shall remove and relocate any wastes discharged at this site, which have been discharged in violation of this Order.
14. All containment structures shall be designed and constructed under the direct supervision of a California registered civil engineer or a certified engineering geologist.
15. The concentrations of indicator parameters or waste constituents in waters passing through the points of compliance shall not exceed the "water quality protection standards" established pursuant to Monitoring and Reporting Program No. 5-2002-0141, which is attached to and made part of this Order.
16. Surface drainage from tributary areas and internal site drainage from surface or subsurface sources shall not be permitted to drain off-site or into areas not being treated and monitored.
17. Annually, prior to the anticipated rainy season, any necessary erosion control measures shall be implemented, and any necessary construction, maintenance, or repairs of

precipitation and drainage control facilities shall be completed to prevent erosion or flooding of the site and to prevent surface drainage from spreading onto treating areas.

18. The disposal area shall be protected from any washout or erosion of wastes or treated or amended soils, and from inundation, which could occur as a result of a 100-year, 24-hour precipitation event.

C. Groundwater Limitations:

The discharge, in combination with other sources, shall not cause underlying groundwater to contain waste constituents in concentrations statistically greater than background water quality. The following limitations are established based on the information presented in the Discharger's Report of Waste Discharge:

<u>Constituent</u>	<u>Units</u>	<u>Limitations</u>
EC (field)	µmhos/cm	background
pH (field)	Hydrogen ion units	background
Temperature (field)	°C or °F	
TDS	mg/l	background
COD	mg/l	background

D. Provisions:

1. The Discharger shall comply with the MRP No. R5-2002-0141, which is incorporated into and made part of this Order, and any revisions thereto as ordered by the Executive Officer. This compliance includes, but is not limited to, maintenance of vadose zone and groundwater monitoring systems, and, reporting of waste monitoring, organic, and nutritive loading in accordance with the procedures detailed in the MRP.
2. The Discharger shall comply with all applicable portions of the *Standard Provisions and Reporting Requirements for Waste Discharge Requirements*, dated 1 March 1991, which are attached hereto and by reference a part of this Order. This attachment and its individual paragraphs are commonly referenced as *Standard Provision(s)*.
3. A violation of any of the applicable portions of the *Standard Provisions* or the MRP is a violation of these Waste Discharge Requirements.
4. All technical reports required herein that involve planning, investigation, evaluation, or design, or other work requiring interpretation and proper application of engineering or geologic sciences, shall be prepared by or under the direction of persons registered to practice in California pursuant to California Business and Professions Code, §§6735, 7835, and 7835.1. To demonstrate compliance with Title 16, CCR, §§415 and 3065, all technical reports must contain a statement of the qualifications of the responsible registered

professional(s). As required by these laws, completed technical reports must bear the signature(s) and seal(s) of the registered professional(s) in a manner such that all work can be clearly attributed to the professional responsible for the work.

5. Pursuant to CWC §13267, **by 1 July 2003**, the Discharger shall submit a technical report describing the waste assimilative capacity of the drilling mud application area/LTU specifically in terms of salt(s) assimilation capability. This report should also address the effectiveness of the lysimeter monitoring system in producing samples for lab analysis. The report shall evaluate the salt distribution within the soil column and the mass balance of salt applied to the soil and then attenuated within the soil treatment zone. The report shall provide an analysis of the contents of typical drilling mud disposed at the Discharger's facility (i.e., among other things, the report shall identify drilling mud water content, clay content, salt content, and other organic and inorganic content on a mass per cubic foot basis, for example, or other basis that the technical preparer may see fit). The technical report shall be prepared in accordance with Provision D.4, and is subject to Executive Officer written approval.
6. Pursuant to CWC §13267, **by 1 July 2003 and 1 November of each year thereafter**, a Cropping Plan shall be submitted to the Regional Board prepared by an agronomist and shall identify the crops to be grown, present nitrogen and TDS removal calculations, and crop cutting/harvesting procedures. The report shall evaluate the effect of applying irrigation water to the drilling mud application area. The report shall evaluate the Discharger's application rate and shall include a description of the application schedule, potential vegetation/crop problems, water usage of recommended crops, evapotranspiration rates, infiltration rates, planting/harvesting schedules and the long term impact to soil and quality of the wastewater application. The report shall also address the loading rates of TDS and sodium chloride to the land application area. Salt accumulation in soil and potential groundwater impacts must be addressed. The plan shall be updated and shall address the previous processing season.
7. The Discharger shall submit a technical report describing the installation of a vadose zone monitoring program in accordance with Discharge Specification B.5. The Discharger shall comply with the following compliance schedule in implementing work required by this Provision:

<u>Task</u>	<u>Compliance Date</u>
a. Submit technical report on the vadose zone monitoring program work plan. Refer to Discharge Specification B.5:	180 days following Order adoption
b. Implement vadose zone monitoring work plan:	60 days following completion of task a

<u>Task</u>	<u>Compliance Date</u>
c. Complete vadose zone monitoring system installation and commence monitoring of soil and of soil-pore liquid:	60 days following completion of task b
d. Submit technical report on the vadose zone monitoring system installation report of results:	30 days following completion of task d
e. Report on sampling procedures as described in the MRP:	1st day of the second month following the first sampling event
f. Submit technical report on Water Quality Protection Standards for vadose zone monitoring:	365 days following completion of task e

Technical reports submitted pursuant to this Provision shall be prepared in accordance with Provision D.4, and are subject to Executive Officer approval.

8. Compliance with this Order's groundwater limitation will be evaluated, in part, on data collected from the existing background groundwater monitoring well system and from data collected from the vadose zone monitoring system following completion of Provision D.7.f. Should the Discharger fail to comply with the schedule to characterize natural background groundwater quality at approved monitoring zones by the date specified in Provision D.7.f, the Regional Board shall not consider the lack of natural background characterization as sufficient defense to enforcement for violations of this Order's groundwater limitation.
9. **Within 90 days following receipt of written notification by the Regional Board that the Discharger is in violation of this Order's groundwater limitations,** the Discharger shall submit an amended report of waste discharge to make any appropriate changes to the character of the discharge and/or the design and operation of the land application area as necessary to comply with this Order.
10. Pursuant to CWC §13267, **by 1 February of each year** the Discharger shall submit a thorough Groundwater Assessment Report. This report must be prepared pursuant to Provision D.4. by a registered professional with experience in groundwater quality monitoring and assessment. The technical report shall include the following:
 - A narrative discussion of the existing groundwater monitoring well network, disposal site hydrogeology, including subsurface stratigraphy, soil infiltration characteristics, depth to groundwater, groundwater gradient, and seasonal gradient variations over the previous monitoring year.

- Groundwater elevation contour maps for each of the preceding four quarters of monitoring.
 - Historical summary data tables for all monitored constituents.
 - Concentration vs. time graphs for electrical conductivity and total dissolved solids. Each graph shall represent the results for a single constituent, and multiple wells may be plotted on a single graph.
 - Definition of site-specific background concentration for each of the constituents as listed in the MRP.
 - A narrative analysis of spatial and temporal trends for each of the constituents listed above with respect to established background concentrations.
 - An evaluation of monitoring data from background and compliance monitoring wells in an appropriate data analysis method as described in Title 27, §20415(e)(7-9). If any water quality protection standard has been exceeded, a specific plan for source control and a corrective action program and time schedule to assure compliance with the Discharge Specifications and Groundwater Limitations of this Order shall be submitted to the Regional Board in this Groundwater Assessment Report.
11. The Discharger shall maintain a current Operation and Maintenance Plan (O&M Plan). The O&M Plan shall be kept at the facility for reference by operating personnel. Operating personnel shall be familiar with its contents. The O&M Plan shall discuss all aspects of managing the discharge operation to comply with the terms and conditions of this Order and how to make field adjustments as necessary to preclude nuisance conditions. The O&M Plan shall also include the current cropping plan for each processing season.
12. A copy of this Order shall be kept at the discharge facility for reference by operating personnel. Key operating personnel shall be familiar with its contents.
13. The Discharger is ultimately responsible for the effectiveness of its treatment and control measures in assuring compliance with groundwater limitations, and is liable for remediation of any impact on groundwater not authorized herein. Failure to properly operate and maintain best practicable treatment and control, or failure of such measures to perform effectively, shall be grounds to rescind this Order, reclassify the designated waste, and require compliance with Title 27 prescribed waste containment standards or initiate enforcement, as appropriate.
14. If the Discharger or the Regional Board finds that there is a statistically significant increase in indicator parameters or waste constituents over the water quality protection standards (established pursuant to Monitoring and Reporting Program No. R5-2002-0141 at the Points of Compliance, the Discharger shall notify the Regional Board or acknowledge the Regional Board's finding in writing within seven days. Within 90 days, the Discharger shall submit to the Regional Board an amended Report of Waste Discharge for

establishment of a verification monitoring program, which is designed to verify that water quality protection standards have been exceeded and to determine the horizontal and vertical extent of pollution.

15. If the Discharger, through a verification monitoring program, or the Regional Board verifies that water quality protection standards have been exceeded at or beyond the Points of Compliance, the Discharger shall notify the Regional Board or acknowledge the Regional Board's finding in writing within seven days. Within 90 days, the Discharger shall submit to the Regional Board an amended Report of Waste Discharge for establishment of a corrective action program that is designed to achieve compliance with the water quality protection standards.
16. The Discharger shall use the best practicable cost-effective control technique(s) currently available to comply with discharge limits specified in this Order.
17. The Discharger shall immediately notify the Regional Board of any flooding, equipment failure, or other change in site conditions that could impair the integrity of drilling mud or wash water containment facilities or precipitation and drainage control structures.
18. The Discharger shall maintain precipitation and drainage controls as long as the potential exists for runoff to occur.
19. The Discharger shall maintain legible records of the volume and type of each waste discharged at each treatment area. Such records shall be maintained at the site. These records shall be available for review by representatives of the Regional Board and of the State Water Resources Control Board at any time during normal business hours. At the beginning of the post-closure maintenance period, copies of these records shall be sent to the Regional Board.
20. The Discharger shall report promptly to the Regional Board any material change or proposed change in character, location, or volume of discharge.
21. The Discharger shall submit to the Regional Board on or before each compliance report due date, the specified document or, if appropriate, a written report detailing compliance or noncompliance with the specific schedule date and task. If noncompliance is being reported, then the Discharger shall state the reasons for such noncompliance and provide an estimate of the date when the Discharger will be in compliance. The Discharger shall notify the Regional Board in writing when it returns to compliance with the time schedule.
22. The Discharger shall comply with all conditions of this Order, including timely submittal of technical and monitoring reports as directed by the Executive Officer. Violations may result in enforcement action, including Regional Board Orders or court orders requiring corrective action or imposing civil monetary liability, or in revision or rescission of this Order.

23. The Discharger shall have the continuing responsibility to assure protection of usable waters during the active life of the treated area, and during subsequent use of the property for other purposes.
24. In the event of any change in control or ownership of the land or the waste discharge facilities described herein, the Discharger shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be immediately forwarded to this office.
25. Pursuant to CWC §13267, the Discharger may be required to submit technical reports as directed by the Regional Board.
26. Changes in drilling mud application rates to greater than 12 percent by weight or mixing depth deeper than one foot must be approved by the Regional Board through the adoption of new waste discharge requirements pursuant to a complete revised Report of Waste Discharge. The revised Report of Waste Discharge must be supported by experimental and analytical data that show continued benefit to the soil will accrue and that no degradation of ground water will occur.
27. The Regional Board will review this Order periodically and will revise requirements when necessary.
28. The Regional Board shall approve any changes in the operation program prior to implementation of any changes.

I, THOMAS R. PINKOS, Acting Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 19 July 2002.

THOMAS R. PINKOS, Acting Executive Officer

H:/djl/Fulton.WDRs;7/19/02

AMENDED

INFORMATION SHEET

WASTE DISCHARGE REQUIREMENTS ORDER NO. R5-2002-0141
FULTON RECLAMATION FACILITY, INC.
GLENN COUNTY

The Fulton Reclamation Facility, Inc., is owned and operated by Charles and Carol Fulton (hereafter Discharger). The Discharger's facility is located in Glenn County, approximately five miles south of the City of Orland. The facility is a family owned and operated drilling mud recycling/soil amendment operation. The Discharger's reside on site. The Discharger submitted a Report of Waste Discharge dated 22 January 2001, which requested that the Regional Board allow increased loading of drilling mud in its land reclamation area, and also allow the annexation of a 42-acre reserve area to expand its operation. The spent drilling mud, originating from northern California gas and oil exploration sites, is delivered by truck, and is applied to the soil in bermed areas in a soil amendment land reclamation operation. The Discharger subsequently provided additional information for the Report of Waste Discharge package.

BACKGROUND

The Discharger has been operating its facility under Waste Discharge Requirements (WDRs) Order No. 95-124. The facility was in operation without WDRs from the mid-1970s through August 1987, when Regional Board staff requested that discharge of wastes cease until submittal of a Report of Waste Discharge and issuance of tentative WDRs. Regional Board Order No. 88-182 was subsequently adopted 28 October 1988. Prior to the adoption of Order No. 88-182, the discharge of drilling mud took place in elevated ponds on approximately 80-acres of the site. Drilling mud was disposed of into five ponds at various times until the discharge ceased in 1987 in accordance with the California Code of Regulations (CCR), Title 23, Division 3, Chapter 15 (hereafter Chapter 15) standards. The pond closure plan was approved on 22 June 1989 and the ponds were considered officially closed on 20 November 1991. Beginning in 1985, drilling mud was also discharged directly to land, allowed to dry, and disced into the ground in an experimental land spreading operation. The area affected by this operation is designated as Field A in Attachment B and comprises approximately 18 acres. The amount of drilling mud added to the soil at that time amounted to approximately ½ percent by dry weight.

Order No. 88-182 allowed the drilling mud loading to the application area of eight percent by dry weight, or 208 tons per acre dry weight of drilling mud. The dry weight of drilling mud is computed as the dry weight in one cubic foot to the weight of a cubic foot volume of the predominant Cortina Very Gravelly Sandy Loam Soil where it is applied as an amendment. Waste Discharge Requirements Order No. 95-124, adopted by the Regional Board on 26 May 1995, allowed an increase to twelve percent loading (312 dry tons per acre) in addition to prescribing requirements for the operation of a soil reclamation facility using drilling mud as a soil amendment. Part of both Orders was a monitoring and reporting program which required extensive soils and vadose zone testing by gathering soil horizon data, agronomic data, and vadose zone information utilizing lysimeters, in addition to groundwater and waste load testing and monitoring.

Order No. 95-124 is no longer adequate due to a proposed addition of the 42-acre area for drilling mud application. The total application area, including the test plots located along the eastern boundary of the property, will increase from 190 to 232 acres as a result of the proposed expansion.

The total area of the Fulton property is 315 acres (Assessor's Parcel No. 024-100-018-0) and it is located in Section 15, T21N, R3W, MDB&M, as shown in Attachment A, which is attached hereto and part of this Order by reference. Other facilities located at the site include a truck washout area, equipment storage, and a residence.

The Discharger requested an increase of the drilling mud loading rate to 16 percent in 1995, but Regional Board staff determined that it would be preferable to incrementally increase the drilling mud loading rate to 12 percent before allowing a rate increase to twice the 8 percent that was allowed at that time. Regional Board staff also indicated that when sufficient data was gathered at the 12 percent loading rate showing no negative impacts to ground water quality, an increase in the loading rate to 16 percent would then be considered.

In August 2001, the Discharger installed three new background monitoring wells, MW-10, 11 and 12, which act in addition to the existing background monitoring well MW-5, as shown in Attachment B, to assess background water quality. The Discharger's facility is located immediately downgradient of a dairy feedlot and the additional monitoring wells are needed to determine the new background water quality. The feedlot operation has the potential to contribute significant nitrate and salt loadings to groundwaters. Before the Discharger's site was used for drilling mud disposal, the land was allowed to lie fallow or was utilized for marginal, non-irrigated agricultural operations. Land within 1,000 feet of the site is used for agriculture. Gravel mining has been conducted within 1,000 feet of the site's west side, but no gravel removal is currently occurring.

SITE OPERATIONS

The Discharger has conducted land application of drilling mud over the entire area indicated by Areas A through K in Attachment B since the adoption of Order No. 88-182. This area comprises approximately 161 acres and is now been completed to the currently permitted twelve percent drilling mud capacity.

Approximately 29 acres, as shown in Attachment B, are currently used as test areas for application of varying concentrations of drilling mud. The Discharger intends to continue experimentation with the drilling mud in these test areas to the extent that the allowable drilling mud loading (i.e. 8, 12, 16, and 24 percent by dry weight is not exceeded) by varying both native soil ratio and the depth to which the drilling mud will be incorporated into the native soils. The crops on which nutrient supply and plant growth experiments were conducted were non-irrigated grain crops used for hay. Additional or alternative crops may be tried, subject to conditions of water demand (irrigation method) and water quality. Application of drilling mud at the 16 percent loading rate has been demonstrated to be agriculturally beneficial based on the oat crop yield on these test plots over the past seven years.

The Discharger receives spent drilling mud from gas exploration wells and water supply wells in northern California. Access is available 24-hours a day. The site is fenced in and access is through a locked gate. The drilling mud is transported to the site in either 100-barrel capacity vacuum trucks, or 14 cubic yard capacity dump trucks. The loads are generally originated from well drilling operations within Glenn County and other local counties. Drivers are EPA-registered haulers. The Discharger accepts only drilling mud that is certified by the producer and/or driller as nonhazardous. The

Discharger implements a Load Checking Program, from which information is provided monthly to the Regional Board in the self-monitoring reports. The Load Checking Program consists of sampling all trucks loads entering the facility at the top and bottom of the tanker visually checking for the presence of petroleum and analyzing for pH, EC, and TDS. Based on these analyses the load is either accepted or rejected.

The incoming trucks are then directed to the application area currently in use. The discharge is accomplished by opening the rear discharge valve(s) on the trucks. The drilling mud fluid is discharged into a leveed area of approximately 60 feet by 100 feet. Each incoming load of drilling mud is recorded on daily load sheets as to its area of disposal. Each leveed disposal area can receive 10 to 20 truck loads. After discharge of its contents, the trucks can then proceed to a washout area where residual drilling mud and settled solids are washed out with a high-pressure hydrant. The washout water is collected in a sloped concrete lined basin and channeled to portable tanks. The contents of the portable washout tanks are spread at 0.25 gallons per square foot over a zone that has been previously treated with dried drilling mud.

Non-drilling mud trash, including bentonite sacks and drilling mud additive sacks, gloves, paper trash, and other miscellaneous refuse are collected on-site in a trash container adjacent to the washout area. This trash is removed to an appropriate Class III waste management unit as necessary.

The drilling mud discharged to the landspreading areas dries by evaporation, and infiltration and percolation of the water content. When dried, the levees and drilling mud are smoothed and spread to accommodate farming operations. The dried mud and levees are tilled into the native soils to a maximum depth of one foot to develop the soil. Tilling is accomplished in a three-phase process consisting of: (1) breaking up the soil with a chisel plow, (2) tilling with a disc, and (3) mixing with a bottom plow. These zones are then planted in the fall months with grain seed. The matured grain is harvested by others and utilized as fodder. Eventually, all the Cortina classified soils will be reclaimed. This will amount to approximately 232 acres including the test areas. When the soil reclamation project is completed, drilling mud will no longer be taken at the site, and the site will be utilized exclusively for agriculture.

SOILS TESTING AND MONITORING, AND GROUNDWATER MONITORING

A vadose (unsaturated) zone monitoring program is required pursuant to this Order. The Discharger has not conducted vadose zone sampling as required under the previous Orders Nos. 88-182 and 95-124 and consequently not provided vadose zone monitoring results to the Regional Board. The vadose zone monitoring data is critical in the Regional Board's determination whether any immediate impacts to soils or water quality may be evident from the discharge of the drilling mud.

In order to begin implementation of vadose zone monitoring in the existing permitted application areas, the Discharger, in January 2002, installed ceramic cup soil pore moisture measuring devices (suction cup type lysimeters) at 30 inches below ground surface. According to the Discharger's recent self-monitoring reports, lack of precipitation has prevented the lysimeters from yielding sufficient water for sampling, as the vadose zone at this depth is relatively dry. The water volume needed to conduct the

required testing for electrical conductivity, chemical oxygen demand, and standard minerals and trace metals, is 473 milliliters.

In addition to these lysimeters, the Discharger is required pursuant to this Order to install additional suction cup lysimeters, and either pan type lysimeters or tensiometers, or other unsaturated zone moisture-sampling device as deemed appropriate by a professional hydrogeologist, in the proposed 42-acre application area. The Discharger and its hydrogeologist should consider the soils types in the area and appropriate depths for these devices which would yield sufficient water for testing for the constituents required pursuant to the WDRs and MRPs. The objective of this monitoring is to examine the behavior of the salts in the soil media in the application area, and ultimately determine whether there are any impacts to water quality and the beneficial uses of waters of the State. The lysimeters and moisture sampling devices in the new discharge area can provide both background data and ongoing data as the drilling mud soil amendment operation proceeds. The results of the lysimeter sampling program should yield sufficient information to determine immediate impacts within the soil horizons directly beneath the discharge areas.

SITE TOPOGRAPHY, GEOLOGY, AND HYDROGEOLOGY AND SOIL CHARACTERISTICS

Site topography is gently sloping south at a grade of approximately 0.5 percent. The average elevation is about 200 feet. The site lies on the Stony Creek Alluvial Fan, a deposit of geologically young (Pleistocene-Holocene) alluvium.

The soils underlying the site belong predominantly to the Cortina Very Gravelly Sandy Loam classification. This soil supports sparse grasses and forbs. A small portion of the northeast corner of parcel 0-024-10-0-005-0 is underlain by the Tehama Gravelly Loam soil. Approximately 20 percent of the site's total area, on the west side, is underlain by Tehama Silt Loam soil. Both of the Tehama soils are agriculturally productive.

The Cortina soil is moderately to highly permeable and has poor moisture holding capacity. The Storie Index for these soils, which is a measure of agricultural value, ranges from 32 to 37. Soil amendment of the Cortina soils with drilling mud results in improved water holding capacity, augmentation of nutrient deficiencies in the natural soil, and soil texture.

First ground water at the site is approximately 26 feet below the ground surface. This is a shallow aquifer consisting of alluvial fan deposits extending to a depth of less than 60 feet. Ground water flow at the site is in a southeasterly direction, as indicated by on-site water level measurements. This aquifer is of drinking water quality although it is not used locally for domestic water supply.

The regional aquifer, which is used for water supply, is the Tehama Formation. Wells near the site are completed at approximately 200 feet below ground surface, but studies indicate that potential exists for water production from depths as great as 700 feet. This is a confined aquifer with a piezometric surface at a depth of 20 to 30 feet. Recharge to this aquifer occurs primarily from Stony Creek, which lies seven

miles north of the site, and from the Coast Range foothills, approximately 20 miles away. This water is of good quality and meets drinking water standards.

The average annual rainfall at the site is 18 inches. The mean evaporation for a dry-land site near Black Butte Lake, which is 200 feet higher in elevation than the subject site, is reported as 85 inches in the Supplemental Report of Technical Information. The 100-year, 24-hour precipitation event for the site is 4.6 inches. The site is not within a 100-year flood plain. The effective percolation rate is 3.2 inches per hour for existing soils, according to information submitted by the Discharger.

BASIN PLAN, BENEFICIAL USES, AND REGULATORY CONSIDERATIONS

Surface water drainage at the site is to ephemeral streams, which are tributary to the Colusa Basin Drain and thence to the Sacramento River. The beneficial uses of the Colusa Basin Drain are agricultural supply; recreation; aesthetic enjoyment; ground water recharge; and preservation and enhancement of fish, wildlife, and other aquatic resources.

The *Water Quality Control Plan for the California Regional Water Quality Control Board Central Valley Region, Fourth Edition* (Basin Plan), designates beneficial uses, establishes water quality objectives, and contains implementation plans and policies for all waters of the Basin. Beneficial uses often determine the water quality objectives that apply to a water body. For example, waters designated as municipal and domestic supply must meet the maximum contaminant levels (MCLs) for drinking waters. The Basin Plan sets forth the applicable beneficial uses (industrial, agricultural, and domestic supply in this instance) of groundwater, procedure for application of water quality objectives, and the process for and factors to consider in allocating waste assimilation capacity.

ANTIDegradation

The antidegradation directives of CWC §13000 require that waters of the State that are better in quality than established water quality objectives be maintained “consistent with the maximum benefit to the people of the State.” Waters can be of high quality for some constituents or beneficial uses and not others. Policies and procedures for complying with this directive are set forth in the Basin Plan (including by reference State Water Board Resolution No. 68-16, “Statement of Policy With Respect to Maintaining High Quality Waters in California,” or “Antidegradation” Policy).

Resolution 68-16 is applied on a case-by-case, constituent-by-constituent basis in determining whether a certain degree of degradation can be justified. It is incumbent upon the Discharger to provide technical information for the Regional Board to evaluate that fully characterizes:

- All waste constituents to be discharged;
- The background quality of the uppermost layer of the uppermost aquifer;
- The background quality of other waters that may be affected;
- The underlying hydrogeologic conditions;

- Waste treatment and control measures;
- How treatment and control measures are justified as best practicable treatment and control;
- The extent the discharge will impact the quality of each aquifer; and
- The expected degradation to water quality objectives.

In allowing a discharge, the Regional Board must comply with CWC §13263 in setting appropriate conditions. The Regional Board is required, relative to the groundwater that may be affected by the discharge, to implement the Basin Plan and consider the beneficial uses to be protected along with the water quality objectives essential for that purpose. The Regional Board need not authorize the full utilization of the waste assimilation capacity of the groundwater (CWC §13263(b)) and must consider other waste discharges and factors that affect that capacity.

This discharge has been occurring for years. Certain waste constituents in municipal wastewater are not fully amenable to waste treatment and control and it is reasonable to expect some impact on groundwater. Some degradation for certain constituents is consistent with maximum benefit to the people of California because the technology, energy, water recycling, and waste management advantages of municipal utility service to the State far outweigh the environmental impact damage of a community that would otherwise be reliant on numerous concentrated individual wastewater systems. Economic prosperity of local communities is of maximum benefit to the people of California, and therefore sufficient reason to accommodate increases in wastewater discharge provided terms of reasonable degradation are defined and met. The proposed Order authorizes some degradation consistent with the maximum benefit to the people of the State.

Groundwater monitoring at the site to date has not been sufficient to establish the most appropriate groundwater limits. In addition, certain aspects of waste monitoring practices have not been and are unlikely to be justified as representative of best practicable treatment and control (BPTC). Reasonable time is necessary to gather specific information about the WWTF and the site to make informed, appropriate, long-term decisions. This proposed Order, therefore, establishes groundwater limitations, and a monitoring and reporting program to assure protection of the beneficial uses of groundwater of the State pending the completion of certain tasks, and provides time schedules to complete specified tasks. The Discharger is expected to identify, implement, and adhere to BPTC as individual practices are reviewed and upgraded in this process. During this period, degradation may occur from certain constituents, but can never exceed water quality objectives (or background water quality should it exceed objectives), or cause a nuisance.

LAND TREATMENT AND CONTROL

Successful treatment and control by applying waste constituents to land is an inexact science highly dependent upon the constituent, soils, climate, other practices that affect the property, and sound waste management and control. The process depends upon attenuation (decomposition, immobilization, and transformation) in the soil profile and consumption from the root zone by crops to remove waste constituents. Depending on the type of waste discharged, excessive application rates for waste constituents can result in adverse groundwater conditions that may impair beneficial uses. Excessive

application rates can also overload the shallow soil profile and root zone to impair crops, crop waste constituent consumption, and the waste attenuation process itself, and lead to leaching of waste constituents out of the treatment zone. Excessive application can also result in dissolution of soil minerals such as calcium and magnesium. Excessive hydraulic applications, even if from use of supplemental fresh water, can flush waste constituents, decomposition by-products, and dissolved minerals out of the treatment zone. Absent sufficient sustained reliable attenuation of residual waste constituents in the remaining soil profile, the constituents will eventually discharge into groundwater. Temporal storage of residual waste constituents within the soil column can misrepresent the effectiveness of the process.

This discharge is nonhazardous, but exhibits characteristics of “designated waste,” as defined by CWC §13173(b), given that the concentrations of some of the waste constituents contained in the drilling mud which is applied to the land have the potential for causing exceedances of water quality objectives or, affecting beneficial uses. The discharge contains inorganic dissolved solids in concentrations orders of magnitude greater than water quality objectives. The discharge is appropriately categorized as designated waste because of these constituents and is subject to the full containment provisions of Title 27. The waste need not be contained if the waste constituents of concern can be demonstrated to be effectively removed by controlled land treatment or, if not removed, subjected to best practicable treatment and control (BPTC) and reduced sufficiently thereby to satisfy criteria of the Antidegradation Policy, Resolution 68-16.

Regulations for the land treatment of designated waste are contained in Title 27. Title 27, §20210, allows designated waste constituents that are decomposable to be discharged to a Class I or Class II Land Treatment Unit (LTU). Title 27, §20164, defines LTU as a, “waste management unit (Unit) at which liquid and solid waste is discharged to, or incorporated into, soil for degradation, transformation, or immobilization within the treatment zone.” It defines treatment zone as, “a soil area of the unsaturated zone of a land treatment unit within which constituents of concern are degraded, transformed, or immobilized.” The Discharger’s method of waste constituent treatment and control, specifically the discharge to the soil amendment area, is an LTU subject to the performance standards of Title 27. Hereafter, the land application (soil amendment area) will also be referred to as the LTU.

The Regional Board’s acceptance of a discharger’s control methods for specific waste constituents as BPTC, requires a discharger to demonstrate first that it has comprehensively evaluated and compared, then chosen and implemented, the most effective technology and control methods to sustain the highest possible water quality. The demonstration must consider existing proven technologies, performance data from treatability studies, and methods currently and successfully used by similarly situated dischargers. Basin Plan technology-based and Title 27 performance standards must be considered in this process. The Discharger does not employ the minimum technology-based treatment specified in the Basin Plan, as it is not applicable in this case, but uses alternative methods that rely on effective land treatment.

The Discharger has not made the specific required BPTC and Title 27 demonstration for the total dissolved solids (TDS) constituent of the drilling mud. The LTU has been in operation for years and cannot be assumed to have been operating under steady-state conditions at all times. Data and information regarding past operation contain instances and evidence of groundwater degradation when

drilling mud was disposed in unlined ponds. Further, certain waste constituents discharged to the LTU, such as inorganic dissolved solids, are conservative and will not be degraded, transformed, or immobilized in the treatment zone. Evidence of groundwater degradation includes several inorganic constituents. Given the nature of the waste constituents, the Regional Board is unable now and unlikely in the future to determine the discharge complies with Title 27 standards for a LTU. However, if source control is sufficient, and the vadose zone monitoring program, and other monitoring, is satisfactorily implemented per the requirements of the WDRs and the MRPs, the Regional Board should be able to assure protection of high quality groundwater and exempt the discharge from Title 27 requirements for full containment of the waste.

This Order contains a compliance schedule to resolve issues surrounding groundwater protection and provides a reasonable schedule of tasks to generate all necessary documentation to complete a comprehensive evaluation of the LTU. The evaluation must identify which waste constituents in the discharge will be consistently and completely degraded, transformed, or immobilized in a treatment zone of less than five feet from the initial soil surface (ground surface) per Title 27 §20250(b)(5), and identify the practices and controls, and any necessary pretreatment, to assure the ultimate protection of the beneficial uses of the waters of the state. It must also evaluate which waste constituents will be consistently removed by crop uptake, and the practices and controls and any necessary pretreatment that assure this occurs within the root depth of crops grown on the LTU. If removal, containment, or uptake of a waste constituent cannot be guaranteed by the Discharger to occur within the treatment and root zones, the Discharger must complete a BPTC evaluation for the waste constituent, and identify the concentration and mass of the constituent that will be released to groundwater and its consequent impact on concentrations of the constituent in groundwater. If the Discharger wishes the Regional Board to consider authorizing continued discharge with the characterized impact, it shall also submit all available documentation as to why the Regional Board should find the degradation of maximum public benefit.

This Order requires optimal performance of an LTU and specifies minimum conditions of LTU performance to ensure the discharge does not degrade groundwater quality. Discretionary decisions of the Discharger regarding budget, personnel, equipment, energy, and day-to-day activities can adversely affect the optimal performance of an LTU and the minimum specifications of LTU performance required to ensure water quality protection. Technical and monitoring reports on operation, maintenance, and performance, relate directly to the Regional Board's need to know in a timely manner whether the Discharger is effectively operating and maintaining the LTU. Soil, soil-pore liquid, and groundwater monitoring is necessary to measure whether effective operation, and reliance on constituent treatment in the soil profile, mitigates the impact on groundwater quality as described in environmental documents, and complies with discharge specifications and groundwater limitations. This necessitates a comparison of constituent concentrations in samples from a network of wells, LTU and background soils, and from an unsaturated zone monitoring system. The unsaturated zone monitoring program proposed in this Order, in conjunction with the updated load checking program, agronomic/soils testing, and groundwater monitoring, and other Discharge Specifications and Provisions regarding the Discharger's operation, should provide the controls needed to identify any impacts which may occur at the earliest possible stage. In the event of evidence of a potential impact, this program should enable the Discharger, in conjunction with the Regional Board, to mitigate the impact.

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2002-0141
FOR
FULTON RECLAMATION FACILITY, INC.
GLENN COUNTY

The Discharger shall comply with the following Monitoring and Reporting Program (MRP), which outlines the requirements for waste monitoring of drilling mud, groundwater monitoring, agronomic and soils testing, and, vadose zone monitoring. This MRP is issued pursuant to California Water Code (CWC) §13267. The Discharger shall not implement any changes to this MRP unless and until a revised MRP is issued by the Executive Officer or by the Regional Board.

All samples should be representative of the volume and nature of the discharge or matrix of material sampled. The time, date, and location of each grab sample shall be recorded on sample chain of custody forms. The results of analyses performed in accordance with specified test procedures, taken more frequently than required at locations specified in this program, shall be reported to the Regional Board and used in determining compliance.

WASTE MONITORING

The Discharger shall monitor each load of drilling mud discharged at this site and report to the Regional Board as follows:

<u>Parameter</u>	<u>Reporting Units</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>
Quantity discharged	Gal/Barrels/CY	Per load	Quarterly
Type of materials	Description	Per load	Quarterly
Number of truck or tankerloads	Measured	Per load	Quarterly
Source(s) of drilling mud discharged (by shipper and place of origin)	Description	Per load	Quarterly
pH	Hydrogen ion units	Per load	Quarterly
EC	µmhos/cm	Per load	Quarterly
TDS	mg/l	Per load	Quarterly
Total Petroleum Hydrocarbons (TPHs) – Diesel ¹	µg/l	Weekly	Quarterly
Petroleum	Visual	Per Load	Quarterly

¹ EPA Test Method 8015M. After six months, the Discharger may reduce the sampling frequency for TPHs to monthly, if none are detected. The Discharger shall then monitor monthly for twelve months. If no TPHs are detected for 12 months, the Discharger may further reduce the sampling frequency for TPHs to quarterly.

Each tanker load shall be visually inspected. A bailer or similar collecting devices shall be used to collect a representative sample, on which measurements of the above parameters shall be made. Loads consisting of brines or containing waste oil shall be rejected.

GROUND WATER MONITORING

Groundwater samples shall be collected from a Regional Board staff approved network of groundwater monitoring wells installed at the disposal area. The workplans and well development plans, and specifications for construction of any additional monitoring wells, if any wells are needed, shall be submitted to Regional Board staff for review and approval. Prior to collecting samples and after measuring the water level, each monitoring well shall be adequately purged to remove water that has been standing within the well screen and casing that may not be chemically representative of formation water. Depending on the hydraulic conductivity of the geologic setting, the volume removed during purging is typically from 3 to 5 volumes of the standing water within the well casing and screen, or additionally the filter pack pore volume.

The following groundwater monitoring program shall be implemented at the facility. Downgradient wells (Nos. 1, 2, 3, 4, 6, 7, 8 and 9) and upgradient wells (Nos. 5, 10, 11 and 12) shall constitute the points of compliance. At least quarterly and concurrently with groundwater quality sampling, the Discharger shall measure the water level in each well as groundwater depth (in feet and hundredths) and as groundwater surface elevation (in feet and hundredths above mean sea level). The upgradient wells' monitoring shall establish background water quality, and the downgradient wells shall monitor any water quality impacts. Samples from all wells shall be collected and analyzed at the indicated frequencies for the parameters and constituents listed below:

<u>Constituent/Parameter</u>	<u>Units</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>
Ground Water Elevation	feet (0.01ft) (USGS datum)	Quarterly	Quarterly
Gradient and Direction	ft/ft, degrees	Quarterly	Quarterly
pH (field)	hydrogen ion units	Quarterly	Quarterly
Temperature (field)	°C or °F	Quarterly	Quarterly
EC (field)	µmhos/cm	Quarterly	Quarterly
COD	mg/l	Quarterly	Quarterly
TDS	mg/l	Quarterly	Quarterly

<u>Constituent</u>	<u>Units</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>
Standard Minerals:			
Calcium	mg/l	Annually	Annually
Sodium	mg/l	Annually	Annually
Potassium	mg/l	Annually	Annually
Magnesium	mg/l	Annually	Annually
Iron	mg/l	Annually	Annually
Chloride (Cl)	mg/l	Annually	Annually
Fluoride (F)	mg/l	Annually	Annually
Nitrate (NO ₃)	mg/l	Annually	Annually
Sulfate (SO ₄)	mg/l	Annually	Annually
Carbonate (CO ₃)	mg/l	Annually	Annually
Bicarbonate (HCO ₃)	mg/l	Annually	Annually

Trace Metals:

Arsenic ¹	mg/l	Annually	Annually
Barium ²	mg/l	Annually	Annually
Boron ²	mg/l	Annually	Annually
Copper	mg/l	Annually	Annually
Total Chromium ²	mg/l	Annually	Annually
Lead ²	mg/l	Annually	Annually
Manganese ²	mg/l	Annually	Annually
Zinc ²	mg/l	Annually	Annually
Selenium ¹	mg/l	Annually	Annually
Vanadium ²	mg/l	Annually	Annually

¹ By Atomic Absorption Spectroscopy (AA)

² By Inductively Coupled Argon Plasma (ICAP) Scan

Three new monitoring wells (MW-10, 11, and 12) were installed in August 2001 in order to monitor the new 42-acre reclamation area as denoted on Attachment B. Regional Board staff approved the locations and design of these wells prior to installation. Each of these new wells shall constitute a point of compliance. The groundwater elevation data shall be used by the Discharger to determine gradient and direction of ground water flow on a quarterly basis. The Discharger shall continue to monitor groundwater for a period to be determined based on the information provided by the Discharger through this MRP, but not less than three years after discharge of drilling mud has ceased and growth of irrigated crops has begun.

VADOSE ZONE MONITORING

The Discharger shall install, in currently untreated areas of Cortina soil (the 42-acre Reserve Area where the new discharge is proposed), at least four background ceramic soil pore moisture sampling devices (lysimeters) placed at a depth of 30 inches below the ground surface, or placed in strata at a depth where an adequate sample size can be obtained for testing. At least two additional lysimeters shall be located in areas that will never be treated. In addition, the Discharger shall install at least four vadose zone soil pore-moisture measuring and sampling devices such as pan type lysimeters or other unsaturated-zone moisture measuring devices capable of acquiring the information required in this Order and also capable of confirming the data gathered from the ceramic cup lysimeters, near the locations of the ceramic cup lysimeters in the Reserve Area (fields L and M).

Tensiometers, or other devices as appropriate, may be used to measure soil pore moisture pressure near the locations of the lysimeters. A registered professional in the field of hydrogeology, or other equivalent experience, in accordance with WDR Provision D.4, shall determine the appropriate devices to be used and their locations, which will yield the results required in this Order for this particular application. In determining the device to be used, foremost consideration shall be given to the soil type and texture where the device is placed and its ability to yield sufficient water for sampling. Regional Board staff shall approve the location, type, and mode of installation of these devices beforehand.

In January 2002, the Discharger installed ceramic cup suction type lysimeters in its existing drilling mud application fields (A – K). At least three lysimeters of this type, at a depth of 30 inches below the land surface in each 20-acre reclamation unit, are required. Regional Board staff shall approve the location and mode of installation of these devices beforehand. The data gathered in the vadose zone monitoring program described herein shall be utilized, in part, to ascertain the migration of salts within the soil media. This information shall be used to determine the attenuation of salts within the horizon and any potential groundwater impacts due to the addition of the drilling mud. At each reclamation unit, and the new Reserve Area, the Discharger shall implement a program of vadose zone monitoring as follows:

1. On a quarterly basis, EC and pH of soils shall be measured from at least four locations in each treated area that is receiving drilling mud liquids. At the same time, background EC and pH shall be measured in untreated native soil. The test areas shall also be monitored on the same schedule.
 - a. EC shall be measured quarterly on samples collected from all the lysimeters using a Solu Bridge portable meter or similar device.
 - b. On a quarterly basis, samples from the lysimeters shall be subject to laboratory analysis for standard minerals, as specified in the Ground Water Monitoring section.

- c. On an annual basis, in March, samples from the lysimeters shall be subject to analysis for trace metals, as specified in the Ground Water Monitoring program above.
2. Annually, soil samples collected at controlled depths of 12 inches, 24 inches and 36 inches from at least one location in each treated area that is receiving drilling mud, shall be subjected to the following laboratory analyses:
 - a. Standard minerals, as listed under Ground Water Monitoring above.
 - b. Trace metals, as listed under Ground Water Monitoring, above, by ICAP scan and/or AA, as specified.
 - c. A sieve analysis to determine how much clay was added. The test method should be ASTM D1140.
3. Agronomic testing of the soils is necessary and soil samples should be collected each Fall for testing prior to seeding of the fields. Samples shall be collected in each treated field that is receiving drilling mud. Ten core samples should be taken from each field at a depth of one foot and then composited into one representative sample. The following analyses, or better or equivalent, shall be performed by an approved agricultural lab on the soil samples:

<u>Constituent</u>	<u>Test Method</u>
pH	EPA 150.1
Electrical Conductivity	EPA 2510
TDS	EPA 2540C
Cation Exchange Capacity	Ion Scan and Balance
Total Organic Carbon	EPA 5310C
Nitrate (NO ₃)	EPA 300
Sulfate (SO ₄)	EPA 300
Phosphorous	EPA 6010B
Potassium	EPA 6010B
Calcium	EPA 6010B
Magnesium	EPA 6010B
Sodium	EPA 6010B
Total Alkalinity	EPA 2310B
Zinc	EPA 6010B
Copper	EPA 6010B
Manganese	EPA 6010B
Iron	EPA 6010B
Boron	EPA 6010B

Use of test methods other than those designated above will require prior approval from Board staff.

4. The Discharger shall continue to monitor the vadose zone in reclaimed and test areas for a period of three years after drilling mud discharge has ceased and growth of crops has begun.

WATER QUALITY PROTECTION STANDARDS

Quarterly samples shall be taken from background monitoring wells and analyzed for each of the parameters and constituents listed below. The sampling results from the quarterly groundwater program described above under "Groundwater Monitoring" section may provide this information in a quarterly report:

<u>Constituent</u>	<u>Units</u>
Ground Water Elevation	Feet to the nearest hundredth of a foot
Gradient and Direction	ft/ft, degrees
EC (field)	µmhos/cm
pH (field)	Hydrogen ion units
Temperature (field)	°C or °F
TDS	mg/l
COD	mg/l
Standard Minerals ¹	

¹ As listed under Ground Water Monitoring, above.

Reports shall account for errors in sampling and analysis. The Discharger shall use the data collected pursuant to this Order in determining Water Quality Protection Standards for groundwater at the site. The Discharger shall submit an annual Groundwater Assessment Report in accordance with Provision D.10 by **1st February**. The purpose of this technical report is to establish whether the Water Quality Protection Standards are being met.

If subsequent sampling of "background" monitoring wells indicates significant water quality changes due to seasonal fluctuation or to other reasons unrelated to waste management activities at the site, the Discharger may request modification of these Water Quality Protection Standards.

REPORTING

The Discharger shall report monitoring data and information as required in this Monitoring and Reporting Program and as required in the Standard Provisions and Reporting Requirements. Certification of the monitoring reports shall be as specified in General Reporting Requirements B.3 of the *STANDARD PROVISIONS AND REPORTING REQUIREMENTS FOR WASTE*

DISCHARGE REQUIREMENTS, dated 1 March 1991, which is commonly referenced as the *Standard Provisions*.

In reporting the monitoring data, the Discharger shall arrange the data in tabular form so that the date, the constituents, and the concentrations are readily discernible. The data shall be summarized in a manner that clearly illustrates whether the discharge complies with waste discharge requirements. If the Discharger monitors any pollutant at the locations designated herein more frequently than is required by this Order, the results of such monitoring shall be included in the calculation and reporting of the values required in the discharge monitoring report form. Such increased frequency shall be indicated on the discharge monitoring report form.

As required by the California Business and Professions Code Sections 6735, 7835, and 7835.1, all Groundwater Monitoring Reports shall be prepared under the direct supervision of a Registered Engineer or Geologist and signed by the registered professional.

A. Quarterly Monitoring Reports

The Discharger shall establish a quarterly sampling schedule for groundwater monitoring such that samples are collected and analyzed approximately every three months. Quarterly monitoring reports shall be submitted to the Board by the **1st day of the second month** after the quarter (e.g. the January through March report is due May 1st) each year. At a minimum, the report shall contain:

1. A narrative description of all preparatory, monitoring, sampling, and analytical testing activities. The narrative shall be sufficiently detailed to verify compliance with the WDRs, this MRP, and the Standard Provisions and Reporting Requirements. The narrative shall be supported by field logs for each well documenting depth to groundwater; parameters measured before, during, and after purging; method of purging; calculation of the casing volume; and total volume of water purged.
2. Calculation of groundwater elevations, an assessment of the groundwater flow direction and gradient on the date of measurement, comparison to previous flow direction and gradient data and discussion of seasonal trends, if any.
3. A comparison of monitoring data to the discharge specifications, groundwater limitations, and surface water limitations, and explanation of any violation of those requirements.
4. Summary data tables of historical and current water table elevations and analytical results.
5. A scaled map showing relevant structures and features of the facility, the locations of monitoring wells and other sampling stations, and groundwater elevation contours referenced to mean sea level datum.
6. Copies of laboratory analytical report(s).

7. A calibration log verifying weekly calibration of any field monitoring instruments (e.g. DO, pH and EC meters) used to obtain data.

B. Annual Report

An Annual Report shall be submitted to the Regional Board by **1 February** of each year. The Annual Report may also include the contents of the 4th Quarter Monitoring Report as described above. The Annual Report shall present a summary of all monitoring data obtained during the previous calendar year and shall include the following:

1. Tabular and graphical summaries of all monitoring analytical data obtained during the previous four quarterly reporting periods, presented in tabular form, as well as on 3.5" computer diskettes (or submitted separately via e-mail), either in MS-DOS / ASCII format or in another file format acceptable to the Executive Officer (e.g., Microsoft Excel)
2. Tabular and graphical summaries of historical monthly total loading rates for fertilizer (in pounds and pounds per acre).
3. A narrative description of the annual soil sampling program and a map of sampling locations.
4. Tabular and graphical summaries of historical soil analytical results for all monitored constituents and parameters.
5. An evaluation of the performance of the disposal site and estimated loadings for next calendar year.
6. A mass balance relative to constituents of concern and mass loading along with supporting data and calculations. The report shall describe the types of vegetation/crops planted, dates of planting and harvest for each crop.
7. A comprehensive evaluation of the effectiveness of the past year's wastewater application operation in terms of odor control and groundwater protection, including consideration of application management practices (e.g. waste constituent and hydraulic loadings, application cycles, drying times, and cropping practices), soil profile monitoring data and groundwater monitoring data.
8. An evaluation of the groundwater quality at the facility.
9. A comprehensive discussion of the compliance record, and the result of any corrective actions taken or planned that may be needed to bring the Discharger into full compliance with the waste discharge requirements.
10. A discussion of any data gaps and potential deficiencies/redundancies in the monitoring system or reporting program.
11. The names and telephone numbers of persons to contact regarding the Plant's land discharge for emergency and routine situations.

12. A certified statement of when the monitoring instruments (e.g., hand held pH and EC meters) and/or other devices were last calibrated.
13. A summary of vadose zone monitoring data in a format (both printed and electronic) selected in concurrence with Regional Board staff.
14. A summary of groundwater monitoring in a format (both printed and electronic) selected in concurrence with Regional Board staff, including
 - a. Hydrographs showing the groundwater elevation in each approved well for at least the previous five years or to the extent that such data are available, whichever is fewer. The hydrographs should show groundwater elevation with respect to the elevations of the top and bottom of the screened interval and be presented at a scale of values appropriate to show trends or variations in groundwater elevation. The scale for the background plots shall be the same as that used to plot downgradient elevation data;
 - b. Graphs of the laboratory analytical data for all samples taken from each approved well within at least the previous five calendar years (as data become available). Each such graph shall plot the concentration of one or more waste constituents specified below over time for a given monitoring well, at a scale appropriate to show trends or variations in water quality. The graphs shall plot each datum, rather than plotting mean values. For any given constituent, the scale for the background plots shall be the same as that used to plot downgradient data. Separate graphs shall show hydrologic equipotential gradients and equal concentration gradients for constituents specified below.

Groundwater Constituents to Evaluate

EC	Carbonate (CO ₃)
COD	Bicarbonate (HCO ₃)
TDS	Arsenic
Calcium	Barium
Sodium	Boron
Potassium	Copper
Magnesium	Total Chromium
Iron	Lead
Chloride (Cl)	Manganese
Fluoride (F)	Zinc
Nitrate (NO ₃)	Selenium
Sulfate (SO ₄)	Vanadium

A letter transmitting the self-monitoring reports shall accompany each report. Such a letter shall include a discussion of requirement violations found during the reporting period, and actions

taken or planned for correcting noted violations, such as operation or facility modifications. If the Discharger has previously submitted a report describing corrective actions and/or a time schedule for implementing the corrective actions, reference to the previous correspondence will be satisfactory. Pursuant to Standard Provisions, General Reporting requirements B.3, the transmittal letter shall contain the following statement by the Discharger, or the Discharger's authorized agent:

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of the those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations."

All Discharger reports specified above shall be submitted pursuant to Section 13267 of the California Water Code. Technical reports submitted by or for the Discharger shall be prepared and stamped by the appropriate registered professional required by the California Business and Professions Code. As required by the California Business and Professions Code Sections 6735, 7835, and 7835.1, all groundwater monitoring reports shall be prepared under the direct supervision of a registered professional engineer or geologist and signed by the registered professional.

Based on results of the monitoring program after a minimum of two years, the Discharger may request a reduction in the constituents monitored and/or sample frequency. If such reductions are warranted, this MRP may be revised by the Executive Officer.

The Discharger shall implement the above monitoring program as of the date of this Order.

Ordered by: _____
THOMAS R. PINKOS, Acting Executive Officer

19 July 2002
(date)

H:/djl/Fulton.MRPs
7/19/02

AMENDED