CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. R5-2008-0045

WASTE DISCHARGE REQUIREMENTS
FOR
CHARLES FULTON, CAROL FULTON, AND FULTON FAMILY TRUST
FOR OPERATION OF
FULTON RECLAMATION FACILITY, INC.
GLENN COUNTY

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

1. Waste Discharge Requirements (WDR) Order No. R5-2002-0141, adopted by the Regional Water Board on 19 July 2002, prescribes requirements for Fulton Reclamation Facility, Inc.

2. Fulton Family Trust owns 273.1 acres (Assessors Parcel Number 024-100-018 in Section 15, T21N, R3W, MDB&M, approximately five miles south of the City of Orland, Glenn County, as shown in Attachment A. Charles Fulton and Carol Fulton reside and operate a drilling mud recycling/soil amendment operation, Fulton Reclamation Facility Inc., a California corporation (hereafter Facility) on the Fulton Family Trust land. Charles Fulton, Carol Fulton, and Fulton Family Trust are hereafter referred to as Discharger.

3. On 9 August 2006, the Discharger submitted a Report of Waste Discharge requesting the Regional Water Board increase the Facility drilling mud application rate from 12 percent to 16 percent. In a 10 September 2007 letter, the Discharger requested the 12 percent application rate be increased to 24 percent, instead of 16 percent, and proposed changes to the monitoring and reporting program. Technical information to support the 24 percent application rate has not been submitted.

4. WDR Order No. R5-2002-0141 restricts drilling mud application to 12 percent (by dry weight). The purpose of this Order is to rescind WDR Order No. R5-2002-0141 and prescribe requirements for a drilling mud application rate of 16 percent (by dry weight).

HISTORIC OPERATIONS

5. Drilling muds have been discharged to a portion of the land since the mid 1970's. At that time, discharges of drilling mud to five ponds took place on approximately 80 acres. Beginning in 1985, drilling mud was discharged directly to land, allowed to dry, and disced into the ground in an experimental land speading operation. The area affected by this operation is designed as Field A, as shown 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 dry weight. The initial WDR (Order No. 88-182) specified a drilling mud application rate of 8 percent by dry weight, or 208 tons per acre, and required closure of the five ponds. On 22 June 1989,

Regional Water Board staff approved the pond closure plan. On 20 November 1991, the five ponds were officially considered closed.

6. WDR Order No. 95-124 rescinded Order No. 88-182 and specified an increase to 12 percent by dry weight, or 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. WDR Order No. R5-2002-0141 rescinded Order No. 95-124 and continued the 12 percent drilling mud application rate requirements previously prescribed.

DRILLING MUD CHARACTERISTICS

7. Drilling mud received at the Facility is generated from the natural gas, geothermal, and water well exploration activities in the Northern Sacramento Valley. Drilling fluids for natural gas and oil exploration follow the American Petroleum Institute specifications.

8. The basic components of drilling mud are water and bentonite clay. Drilling mud is used in well drilling operations, primarily to cool and lubricate the drill bit as well as provide temporary stabilization and sealing of the borehole sidewalls until the well is fully developed. The drilling fluid also carries rock and soil to the surface.

9. The process of deep gas exploration by drilling can result in the transport of total dissolved solids (TDS) back to the surface as drilling mud is retrieved. Bentonite is added to help control viscosity and fluid loss, and barite may be added to increase density. The bentonite component creates an alkaline formula.

10. The pH of drilling mud typically ranges from 8 to 9.5 units. Particles passing a number 200 mesh sieve range from 75 to 80 percent, and the percent solids in the drilling mud range from 10 to 56 percent with a mean of 30 percent. According to recent Discharger self-monitoring reports, the electrical conductivity (EC) of the mud is typically 2,000 to 3,000 µmhos/cm. TDS ranges from 1200 to 1800 mg/L. Compared to native soil at the Facility, samples of drilling mud are higher in TDS, alkalinity, bicarbonates, chloride, barium, boron, copper, sodium, vanadium, and zinc.

11. The drilling mud is classified as a ‘designated waste’ by the Regional Water Board, as defined by the California Water Code (CWC) Chapter 3 Article 4 Section 13173(b), due to the relatively high concentration of TDS in fluid derived in a Waste Extraction Test performed on dried drilling mud.

AGRONOMIC ANALYSIS

12. In September 2004, six test pits were dug six feet deep at various Facility drilling mud application areas. Laboratory analyses of the native soil and native soil mixed with drilling mud, at the 12 percent and 16 percent application areas, show that the addition

of drilling mud increases TDS, EC, alkalinity, bicarbonate, chloride, barium, boron, copper, sodium, vanadium, and zinc in soil.

13. On 1 November 2004, the Discharger submitted a Drilling Mud Assimilative Capacity Report, which included a Cropping Plan and Water Quality Protection Standards Report. The reports, required by WDR Order No. R5-2002-0141, evaluate the feasibility of increasing the mud waste application rate from 12 percent to 16 percent, and provides upper tolerance limits for water quality parameters. The report concludes that crop yield will likely increase by increasing the drilling mud loading rate; however, crop yields may decrease if loading rates are greater than 24 percent. Soil data and plant analyses indicate that although plant requirements for vanadium, barium, cadmium, and other heavy metal are minimal, these constituents are bound up in the root zone by various microbiological processes and migration is limited to 3 to 5 feet below ground surface.

14. The Discharger performs annual agronomic testing of the soil to determine the appropriate quantity and quality of fertilizer to apply to the crop fields. Soil samples are collected from one location within each test plot and in each area that is receiving drilling mud. The samples are analyzed for primary, secondary, and micronutrients, in addition to pH, salinity, sodium absorption ratio (SAR), and moisture content. The resulting concentrations of the tested parameters throughout the test plots (8 percent to 24 percent) and current application fields do not vary significantly.

15. The Facility Cropping Plan was developed to identify crops to be grown, analyze nitrogen and TDS removal rates, and to outline harvesting procedures. According to the Cropping Plan, Kanota Oats will be planted in the fall and harvested in May and June. Drilling mud is applied throughout the year to specific fields. In November, Kanota Oats and 200 pounds of ammonium sulfate per acre are flown over the 240 acres. An additional 150 pounds of ammonium sulfate per acre may be applied, if spring precipitation is adequate. According to the Cropping Plan, the calculated removal rate for nitrogen is approximately 40 percent and plant utilization of metals in drilling mud is limited.

EXISTING OPERATIONS

16. The Facility now receives non-hazardous drilling mud and uses the material as a soil amendment by discing the dried mud into the upper 1-foot of ground surface to improve soil texture, nutrient deficiencies, and water holding capacity. The mixture is agriculturally more productive, than the native soil. The total application area encompasses approximately 232 acres of the total 273.1 acres.

17. Currently the disposal facility is separated into 10 application areas, four test plots, and a reserve area. The Discharger has been utilizing the test plots to grow Kanota Oats and compare crop yields in fields where drilling mud is applied at varied rates. Drilling mud has been applied at rates of 8, 12, 16, and 24 percent on the test plots. Crop

yields over seven years of initial experimentation indicate that an application of drilling mud up to 16 percent provides the greatest crop yield. A loading rate of 24 percent resulted in a decrease in crop yield.

18. Drilling mud is delivered to the site by registered haulers in either 100-barrel capacity vacuum trucks or 14-cubic yard capacity dump trucks. The loads are checked for temperature, pH, EC, TDS, and visually inspected for petroleum hydrocarbons. If the mud is acceptable, it is then discharged directly to an unlined bermed area. Following discharge, the trucks proceed to a concrete lined washout area where they are cleaned with a high-pressure washer. Truck wash water is collected in a sloped concrete lined basin and channeled to portable tanks, then spread at a rate of 0.25 gallons per square foot over a zone previously treated with drilling mud.

    The bermed area can receive 10 to 20 truck loads. After the mud dries to a workable moisture content, the Discharger spreads and discs the mud into the application field soil up to 1-foot deep. The fields are seeded in early winter with a dryland hay crop such as Kanota Oats. The fields are not manually irrigated; therefore, winter precipitation is the only water source. The hay is harvested the following spring.

19. According to the Discharger's October 2007 self-monitoring report, Field D is now receiving drilling mud. Fields A, E, F, J, K, L, M, part of Field B, the test plots, and the reserve field had been disced and land-planed in preparation for seeding. The Facility received 264 truckloads of drilling mud in October 2007.

20. The Discharger has complied with all the conditions set forth in Waste Discharge Requirements Order No. R5-2002-0141. When the soil reclamation project is complete (i.e., the fields have attained the maximum loading/application rate allowable), drilling mud will no longer be taken to the site, and the Facility will only be used for dryland hay crops.

SITE DESCRIPTION

21. The Facility is approximately 210 feet above mean sea level (MSL) on the Stony Creek Alluvial Fan, a deposit of Pleistocene-Holocene alluvium. Surface topography is relatively flat, but slopes to the south at a grade of approximately 0.5 percent.

22. The soils underlying the Facility 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 Facility is underlain by the Tehama Gravelly Loam soil. Approximately 20 percent of the Facility's total area, on the west side, is underlain by Tehama Silt Loam soil. Both of the Tehama soils are agriculturally productive.

23. 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. The Storie Index scale ranges

from 0 to 100, where higher values indicate more favorable conditions for agricultural productivity.

24. Benefits from applying drilling mud include improvement of the soil's water holding capacity, augmentation of nutrient deficiencies in the natural soil, and improvement of soil texture.

25. According to information provided by the Discharger, the average percolation rate for the existing untreated soils is 3.2 inches per hour. However percolation rates have likely decreased with the addition of drilling mud.

26. Land use within 1,000 feet of the site is mainly agricultural. The Greenwood Dairy, located on the Discharger's northern and western property boundaries, operates two wastewater ponds adjacent to Field D. Greenwood Dairy is enrolled under State Water Resources Control Board Industrial Storm Water General Permit Order No. 97-03-DWQ (WDID #5R111019861) and Regional Water Board General WDR Order No. R5-2007-0035 for Existing Milk Cow Dairies (WDID #5S111015863).

    Gravel mining has also been conducted within 1,000 feet of the Facility's western boundary, but gravel is currently not being removed. Staff research found no historic or active Regional Water Board regulatory actions for the gravel mine.

27. There are three wells located within 2,000 feet of the Facility. William Reimers, Otto Reimers, and the Greenwood Dairy own the wells.

SURFACE AND GROUNDWATER CONDITIONS

28. The average annual rainfall at the Facility is 23 inches (National Weather Service, Orland Station). The 100-year, 24-hour precipitation event is 4.5 inches (NOAA).

29. The Facility is not within the 100-year flood plain as shown on FEMA Map No. 0600570375B.

30. The mean evaporation is approximately 85 inches as reported at a dry-land site near Black Butte Lake, which is 200 feet higher, in elevation (Supplemental Report of Technical Information). The Department of Water Resources estimates that annual evaporation averages 60 inches as reported in Bulletin 73-79.

31. First encountered groundwater at the Facility is approximately 26 feet below ground surface. This is a shallow aquifer consisting of alluvial fan deposits extending to a depth of less than 60 feet. Regional groundwater is approximately 170 feet mean sea level (MSL) or approximately 50 feet below ground surface, and fluctuates approximately 15 feet seasonally. Monitoring wells at the site are completed in the regional aquifer. The average groundwater flow direction is S 29° E, with a gradient of 0.0028 feet/foot. The range of groundwater seepage velocity is calculated to be

between 95.4 feet/year and 132.9 feet/year. Recharge of this aquifer may primarily occur from Stony Creek, which lies seven miles north of the site.

32. Vadose zone monitoring results may be used, in part, to determine the attenuation of salts through the unsaturated zone. The Discharger has installed several lysimeters to detect salt migration. One of the deep lysimeters (DL-M), located at the edge of Field M, historically shows greater concentrations of TDS and EC.

33. The Discharger has installed several wells to monitor groundwater. TDS and Nitrates as NO_3 show an increasing trend in monitoring well MW-10. Monitoring wells, downgradient of the Facility, do not show significantly increasing trends in TDS and Nitrate as NO_3. A comparison of the background groundwater quality, to compliance points in groundwater and the vadose zone, indicates that no significant impacts to groundwater have occurred from the Discharger's Facility and that constituents found in drilling mud have not migrated through the unsaturated zone.

34. Drinking water analysis reports from the California Department of Public Health (CDPH) Division of Drinking Water also show increased nitrates in water supply wells throughout Orland. Based on conversations with CDPH staff, increased nitrates may be a result of surrounding agricultural activities. Nitrate as N in Orland water supply wells typically range from 7 mg/L to 15 mg/L.

35. Manure from dairies contains high salts/TDS and nutrients including nitrogen, ammonia, phosphorus, and potassium compounds. As described in Finding 27, Greenwood Dairy is located hydraulically upgradient of the Facility. At this time, staff does not have sufficient information to determine if the increasing TDS and nitrate trends in MW-10 are occurring due to the Discharger's Facility or off-site agricultural activities.

BASIN PLAN

36. The *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition*, (Basin Plan) designates beneficial uses, establishes water quality objectives and contains implementation plans and policies adopted by the State Water Board. Pursuant to California Water Code Section 13263(a), waste discharge requirements must implement the Basin Plan.

37. Surface water drainage is to ephemeral streams, which are tributary to the Colusa Basin Drain and then to the Sacramento River. The Basin Plan designates the beneficial uses of the Colusa Basin Drain as agricultural supply; recreation; aesthetic enjoyment; groundwater recharge; warm water freshwater habitat; and wildlife habitat. The Basin Plan designates the beneficial uses of the Sacramento River as municipal and domestic supply; agricultural supply; industrial supply; hydropower generation; water contact recreation; non-contact water recreation; warm freshwater habitat; cold

freshwater habitat; spawning reproduction and/or early development; wildlife habitat; and navigation.

38. The Basin Plan designates the beneficial uses of the underlying groundwater as municipal and domestic supply, agricultural supply, industrial service supply, and industrial process supply.

CEQA AND OTHER CONSIDERATIONS

39. The action to revise waste discharge requirements for ongoing operations of the existing Facility is exempt from the provisions of the California Environmental Quality Act (Public Resources Code Section 21000, et seq.).

40. On 21 January 2005, Glenn County Planning Commission approved a seven-year extension for the Facility Conditional Use Permit (#88-04). Conditional Use Permit #88-04 is subject to this Order.

41. On 5 July 2005, Glenn County Health Services Agency in consultation with the California Integrated Waste Management Board, determined that the Discharger's Solids Waste Facility Permit (No.11-AA-0017) is no longer required.

ANTIDEGRADATION

42. State Water Resources Control Board Resolution No. 68-16 Statement of Policy with Respect to Maintaining High Quality of Waters of the State (Antidegradation Policy), requires the Regional Water Board in regulating the discharge of waste to maintain high quality waters of the state until it is demonstrated that any change in quality will be consistent with maximum benefit to the people of the State, will not unreasonably affect beneficial uses, and will not result in water quality less than that described in Regional Water Board policies. This Order requires vadose zone and groundwater monitoring to assure continued protection of beneficial uses of waters of the state.

43. A comparison of the background groundwater quality to compliance points indicates that no significant impacts to groundwater have occurred from the Facility, and that constituents found in drilling mud have not migrated through the unsaturated zone. The application of drilling mud has demonstrated an increase in crop yield and provides a regional economic resource, rather than consuming air space in Class II landfill.

PROCEDURAL REQUIREMENTS

44. The Monitoring and Reporting Program required by this Order is necessary to assure compliance with these waste discharge requirements.

45. California Water Code Section 13267 states, in part, 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 having discharged or discharging, or who proposes to discharge waste within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge, waste outside of its region that could affect the qualities of the waters within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the Regional 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. The Regional Board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports."

46. The Regional Water Board notified the Discharger and interested agencies and persons of its intent to prescribe revised waste discharge requirements for the discharges of waste to land, and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.

47. The Regional Water Board, in a public meeting, heard and considered all comments pertaining to the revision of Waste Discharge Requirements.

48. Any person adversely affected by this action of the Regional Water Board may petition the State Water Resources Control Board to review the action in accordance with Sections 2050 through 2068, Title 23, California Code of Regulations. The petition must be received by the State Board Office of Chief Council, P.O. Box 100, Sacramento, CA 95812-0100, within 30 days of the date the action was taken. Copies of the law and regulations applicable to the filing of a petition are available on the Internet at http://www.swrcb.ca.gov/water_laws/index.html and will be provided upon request.

IT IS HEREBY ORDERED, pursuant to Sections 13263 and 13267 of the California Water Code, that Order No. R5-2002-0141 is rescinded, and that Charles Fulton, Carol Fulton, and Fulton Family Trust, their agents, successors, and assigns, in order to meet the provisions of Division 7 of the California Water Code and the regulations adopted thereunder, shall comply with the following:

A. Discharge Prohibitions

1. The discharge of 'hazardous waste' at this Facility is prohibited. For the purpose of this Order, the terms, 'hazardous waste' and 'designated waste' are defined in Title 27, California Code of Regulations (CCR).

2. The discharge of drilling mud or other pollutants to groundwater, surface water, or surface water drainage courses is prohibited.

3. The discharge of drilling mud in amounts that exceed the agronomic uptake of crops is prohibited.

4. The discharge of drilling mud with an EC greater than 7000 µmhos/cm and/or TDS greater than 4200 mg/L from any source is prohibited.

5. Storage in ponds or tanks of liquid drilling mud or other waste liquids, other than washout fluids, is prohibited.

6. The discharge of wastes other than described in the Findings contained in this Order and/or described throughout this Order as allowable, is prohibited.

B. Discharge Specifications

1. Drilling mud application under this Order shall be confined to the reserve area, 8 percent test plot, 12 percent test plot, and Fields A though L, as shown on Attachment B. The total drilling mud application rate shall not exceed 16 percent dry weight (416 dry tons per acre) without specific approval from the Regional Water Board.

2. Neither the treatment nor the discharge of waste shall cause a nuisance or condition of pollution as defined by the California Water Code, Section 13050.

3. The discharge shall remain within the designated disposal area at all times.

4. The Discharger shall remove and relocate any wastes, which have been discharged in violation of this Order.

5. The treatment facilities shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods with a 100-year return frequency.

C. Groundwater Limitations

1. The discharge, in combination with other sources, shall not cause underlying groundwater to contain waste constituents in concentrations statistically greater than background water quality.

D. Provisions

1. The Discharger shall comply with Monitoring and Reporting Program No. R5-2008-0045, which is part of this Order, and any revisions thereto as ordered by the Executive Officer.

2. The Discharger shall comply with all the items of the "Standard Provisions and Reporting Requirements for Waste Discharge Requirements (Standard Provisions)," dated 1 March 1991, which are part of this Order.

3. In the event of any change in control or ownership of land or 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 the Regional Water Board.

4. The Discharger shall maintain legible records of the volume and type of waste discharged to each treatment area. Such records shall be maintained at the site.

5. A copy of this Order and its attachments shall be maintained at the Facility for reference by key operating personnel.

6. The Regional Water Board will review this Order periodically and revise requirements when necessary.

I, PAMELA C. CREEDON, 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 14 March 2008.

_____
PAMELA C. CREEDON, Executive Officer

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CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2008-0045
FOR
CHARLES FULTON, CAROL FULTON, AND FULTON FAMILY TRUST
FOR OPERATION OF
FULTON RECLAMATION FACILITY, INC.
GLENN COUNTY

Compliance with this Monitoring and Reporting Program, and with the companion Standard Provisions and Reporting Requirements, is ordered by Waste Discharge Requirements (WDR) Order No. R5-2008-0045. Failure to comply with this Program, or with the Standard Provisions and Reporting Requirements dated 1 March 1991, constitutes noncompliance with the WDRs and with the California Water Code, which can result in the imposition of civil monetary liability.

A. WASTE MONITORING

The Discharger shall visually inspect and, using a bailer or similar device, collect a representative samples of each drilling mud load for the parameters described in Table 1. Loads containing brines or petroleum hydrocarbons shall be rejected.

Table 1

Drilling Mud Inspection and Application Parameters

Parameter	Units	Sampling Frequency	Reporting Frequency
Quantity accepted	Gal/CubicYards/ Truck loads	Each Truckload	Semiannual
Description of material	Consistency, color, abnormalities, etc.	Each Truckload	Semiannual
Source(s) and/or place of origin	N/A	Each Truckload	Semiannual
Drilling mud applied / treatment area remaining	Dry tons / percent remaining	Per field treated	Semiannual
pH	hydrogen ion	Each Truckload	Semiannual
Electrical Conductivity (EC)	µmhos/cm	Each Truckload	Semiannual
Total Dissolved Solids (TDS)	µg/L	Each Truckload	Semiannual
Petroleum Hydrocarbons and Brines	Visual (presence or absence)	Each Truckload	Semiannual

B. VADOSE ZONE MONITORING

The Discharger has installed a vadose zone monitoring network consisting of thirty 2.5-feet deep suction lysimeters, three 5-feet deep suction lysimeters, and two gypsum block arrays with moisture blocks installed at 3-feet, 5-feet, and 10-feet below ground surface. Unsaturated zone samples shall be collected from fourteen lysimeters (DL-U, DL-M, L-M/Un, L-M/Us, L-Aw, L-Cw, L-Fe, L-Jw, L-Ks, L-Le, L-Lw, L-Ln, 24%n, and 8%s) and analyzed in accordance with the detection monitoring program described in Table 2. All monitoring parameters shall be graphed to show historical trends at each monitoring point.

Semi-annually, the Discharger shall evaluate the vadose zone monitoring network and to determine if additional lysimeters are necessary to detect the parameters described in Table 2. A report of the findings shall be submitted in accordance with the schedule described in Table 2. A work plan for additional lysimeters shall be submitted to the Regional Water Board for review and approval prior to construction. Approved lysimeters shall be sampled and analyzed in accordance with Table 2.

C. GROUNDWATER MONITORING

The Discharger has installed ten compliance groundwater monitoring wells (MW-1 through MW-10) and two background monitoring wells (MW-11 and MW-12). Groundwater samples shall be collected from MW-1 through MW-12 and analyzed in accordance with the detection monitoring program described in Table 2.

The Discharger shall collate all groundwater sample results obtained previous to this Order with results collected pursuant to this Order to update the Water Quality Protection Standards (WQPS) developed for the Facility. Annually, the Discharger shall submit a Groundwater Assessment Report to establish whether the WQPS are being met. If annual sampling of "background" monitoring wells indicates significant water quality changes due to seasonal fluctuation or other reasons unrelated to waste management activities at the Facility, the Discharger may request modification of the WQPS.

Semi-annually, the Discharger shall evaluate the groundwater monitoring network and to determine if additional monitoring wells are necessary to detect the parameters described in Table 2. A report of the findings shall be submitted in accordance with the schedule described in Table 2. A work plan for additional monitoring wells shall be submitted to the Regional Water Board for review and approval prior to construction. Approved wells shall be sampled and analyzed in accordance with Table 2.

Table 2

Detection monitoring program

Parameter	Units	Sampling Frequency	Reporting Frequency
Field			
Groundwater Elevation	feet MSL	Semiannual	Semiannual
Gradient and Direction	ft/ft, degrees	Semiannual	Semiannual
pH	hydrogen ion	Semiannual	Semiannual
Temperature	°C or °F	Semiannual	Semiannual
Electrical Conductivity	µmhos/cm	Semiannual	Semiannual
COD	mg/L	Semiannual	Semiannual
TDS	mg/L	Semiannual	Semiannual
Standard Minerals			
Calcium	mg/L	Annual	Annual
Sodium	mg/L	Annual	Annual
Potassium	mg/L	Annual	Annual
Magnesium	mg/L	Annual	Annual
Iron	mg/L	Annual	Annual
Chloride	mg/L	Annual	Annual
Fluoride	mg/L	Annual	Annual
Nitrate as NO_3	mg/L	Annual	Annual
Nitrate as N	mg/L	Annual	Annual
Sulfate	mg/L	Annual	Annual
Carbonate	mg/L	Annual	Annual
Bicarbonate	mg/L	Annual	Annual
Trace Metals			
Arsenic	mg/L	Annual	Annual
Barium	mg/L	Annual	Annual
Boron	mg/L	Annual	Annual
Copper	mg/L	Annual	Annual
Total Chromium	mg/L	Annual	Annual
Lead	mg/L	Annual	Annual
Manganese	mg/L	Annual	Annual
Zinc	mg/L	Annual	Annual
Selenium	mg/L	Annual	Annual
Vanadium	mg/L	Annual	Annual

Note: Semiannual sampling events shall occur in February and August. Annual sampling events shall occur in February

D. FACILITY MONITORING

Annually, prior to the anticipated rainy season, but no later than **30 September**, the Discharger shall conduct an inspection of the facility. The inspection shall assess any damage to the drainage control system, vadose zone monitoring network, and groundwater monitoring wells. Any necessary construction, maintenance, or repairs shall be reported to the Regional Water Board, by **31 October**, with a description of the inspection results, photographs, proposed repairs, and implementation time schedule.

The Discharger shall also inspect all precipitation, diversion, and drainage controls for damage within **7 days** following *major storm events*. Major storm events are defined as 1.5 inches of accumulated rainfall in 24 hours. The Discharger shall report any damage and subsequent repairs **within 45 days of completion** of the repairs and include photographs of the repairs.

E. REPORTING

The Discharger shall report monitoring data and information as required in this Monitoring and Reporting Program. The Discharger shall submit semiannual monitoring reports to the Regional Water Board by **30 September** and **30 March** of each year. Annual reports shall be submitted by **30 March** of each year.

In reporting the monitoring data required by this program, the Discharger shall arrange the data in tabular form so that the date, constituents, concentrations, and respective units are readily discernible. Method detection limits and practical quantitation limits shall be reported. All peaks shall be reported, including those, which cannot be quantified and/or specifically identified. The results of any monitoring done more frequently than required at the locations specified herein shall also be reported to the Regional Water Board.

The data shall be summarized in such a manner so as to illustrate clearly the compliance with WDRs or the lack thereof. All monitoring parameters shall be graphed to show historical trends at each monitoring point. Graphs for the same constituent shall be plotted at the same scale to facilitate visual comparison of monitoring data. A short discussion of the monitoring results, including notations of any water quality violations shall precede the tabular summaries. Data shall also be submitted in digital format annually.

Reports, which do not comply with the required format, will be **REJECTED** and the Discharger shall be deemed to be in noncompliance with the WDRs. The Discharger shall implement the above monitoring program on the effective date of this Order.

Ordered by:_____
PAMELA C. CREEDON, Executive Officer

_____14 March 2008_____
Date

KB: SAE

INFORMATION SHEET

WDR ORDER NO. R5-2008-0045
CHARLES FULTON, CAROL FULTON, AND FULTON FAMILY TRUST
FOR OPERATION OF FULTON RECLAMATION FACILITY, INC.
GLENN COUNTY

Fulton Family Trust owns 273.1 acres (Assessors Parcel Number No. 024-100-018) in Glenn County, approximately five miles south of the City of Orland. Charles Fulton and Carol Fulton reside and operate a drilling mud recycling/soil amendment operation, Fulton Reclamation Facility Inc., a California corporation (hereafter Facility), on the Fulton Family Trust land. Charles Fulton, Carol Fulton, and Fulton Family Trust are hereafter referred to as Discharger.

The initial Waste Discharge Requirements (WDRs), adopted by the Regional Water Board on 28 October 1988 (WDR Order No. 88-192), named Harry and Alvin Rehse, of the Rehse Drilling Mud Site and Soil Reclamation Facility, as Discharger. WDR Order No. 88-192 was revised on 26 May 1995 as WDR Order No. 95-124, naming Carole and Charles Fulton of Fulton Reclamation Inc. as Discharger.

WDR Order No. 88-182 specified a drilling mud application rate of 8 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. WDR Order No. 95-124 specified an increase to 12 percent (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. WDR Order No. R5-2002-0141 continued the 12 percent drilling mud application rate. Part of both Orders was a monitoring and reporting program requiring extensive soils and vadose zone testing by gathering soil horizon data, agronomic data, and vadose zone information using lysimeters, in addition to groundwater and waste load testing and monitoring.

On 9 August 2006, the Discharger submitted a Report of Waste Discharge and technical information requesting the Regional Water Board increase the Facility drilling mud application rate from 12 percent to 16 percent. In a 10 September 2007 letter, the Discharger requested the 12 percent application rate be increased to 24 percent, instead of 16 percent, and proposed changes to the monitoring and reporting program. Technical information to support the 24 percent increase has not been submitted.

HISTORIC AND EXISTING OPERATIONS

Drilling muds have been discharged to a portion of the land since the mid 1970's. At that time, discharges of drilling mud to five ponds occurred on approximately 80 acres. Beginning in 1985, drilling mud was discharged directly to land, allowed to dry, and disced into the ground in an experimental land spreading operation. The amount of drilling mud added to the soil was approximately ½ percent dry weight. A pond closure plan was approved on 22 June 1989 and the ponds were officially closed on 20 November 1991. The Facility now receives non-hazardous drilling mud and uses the material, as a soil amendment on 232 of the 273.1 acres, by discing the dried mud into the upper 1-foot of native soil to improve soil texture, nutrient levels, and water holding capacity, creating an agriculturally more productive soil.

Compared to the Facility's native soil, drilling mud generally contains elevated total dissolved solids (TDS), alkalinity, bicarbonates, chloride, barium, boron, copper, sodium, vanadium, and zinc. Drilling mud is delivered to the site by registered haulers in either 100-barrel capacity vacuum trucks or 14-cubic yard capacity dump trucks. Upon delivery, the Discharger samples and analyzes the drilling mud for Temperature, pH, Electrical Conductivity (EC), TDS, and visually inspects for oil and grease. If the mud is acceptable, it is then discharged directly to an unlined bermed area. Following discharge, the trucks proceed to a concrete lined washout area where they are cleaned with a high-pressure washer. Truck wash water is collected in a sloped concrete lined basin and channeled to portable tanks, then spread at a rate of 0.25 gallons per square foot over a zone previously treated with drilling mud.

Currently the Facility is separated into 10 application areas, four test plots, and a reserve area. The Discharger has been using the test plots to grow kanota oats and compare crop yields in fields where drilling mud is applied at 8, 12, 16, and 24 percent discharge rates. Crop yields, over seven years of initial experimentation, indicate that an application of drilling mud up to 16 percent provides the greatest crop yield. A loading rate of 24 percent results in a decrease in crop yield.

The Discharger performs agronomic soil testing annually to determine the appropriate quantity and quality of fertilizer to apply to the crop fields. Soil samples are collected from one location within each test plot and in each area that is receiving drilling mud. The samples are analyzed for primary, secondary, and micro nutrients, in addition to pH, salinity, sodium absorption ration (SAR), and moisture content. The resulting concentrations of the agronomic parameters throughout the test plots (8 percent to 24 percent), and current field application, do not vary significantly from field to field.

The Discharger developed a Facility Cropping Plan to identify crops to be grown, determine harvesting procedures, and present nitrogen and TDS removal rates. According to the Cropping Plan, Kanota Oats will be planted in the fall and harvested in May and June. Drilling mud is applied throughout the year to specific fields. In November, Kanota Oats and 200 pounds of ammonium sulfate per acre are aerially applied over 240 acres. An additional 150 pounds of ammonium sulfate per acre may be top dressed, if spring precipitation is adequate. The fields are not manually irrigated; therefore, winter precipitation is the only water source. According to the Cropping Plan, the calculated removal rate for nitrogen is approximately 40 percent and plant utilization of the drilling mud metals is limited.

DETECTION MONITORING SYSTEMS

VADOSE ZONE

The Discharger has installed a vadose zone monitoring network, which consists of thirty 2.5-feet deep suction lysimeters, three 5-feet deep suction lysimeters, and two gypsum block arrays with moisture blocks installed at 3-feet, 5-feet, and 10-feet below ground surface. Two 2.5-feet deep lysimeters are present in each field, except in Field L, which contains three 2.5-feet deep lysimeters, and the untreated area (southeast of area of property), which contains only one 2.5-feet deep lysimeter, L-U. Each lysimeter within a pair is located

approximately 20 feet apart and is identified by east/west or north/south markings (e.g. L-Le and L-Lw), with respect to their geographic location to one another.

The data obtained from the vadose zone monitoring network may be utilized, in part, to determine the attenuation of salts through the unsaturated zone, due to the addition of drilling mud. One of the deep lysimeters (DL-M), located at the edge of Field M, historically shows greater concentrations of TDS and EC; however, a comparison of the background groundwater quality to compliance points in the vadose zone and groundwater indicates that no significant impacts to groundwater have occurred from the Discharger's Facility and that constituents found in drilling mud have not migrated through the unsaturated zone.

According to recent quarterly groundwater monitoring reports, many of the lysimeters are damaged and/or non-functional and have not produced a sample for some time. However, based on historical records of vadose zone monitoring, the functional lysimeters may provide an adequate vadose zone monitoring network.

These WDRs require the Discharger to assess any damage to the vadose zone monitoring system and evaluate the vadose zone monitoring network to determine if additional lysimeters are necessary to detect the specified water quality parameters. Lysimeters that are currently functional are listed in Table 1.

Table 1

Functional Lysimeters

Lysimeter ID	**Depth (feet bgs)**
DL-U*	5
DL-M*	5
L-M/Un	2.5
L-M/Us	2.5
L-Aw	2.5
L-Cw	2.5
L-Fe	2.5
L-Jw	2.5
L-Ks*	2.5
L-Le*	2.5
L-Lw*	2.5
L-Ln	2.5
24%n	2.5
8%s*	2.5

* produced sufficient volume when last sampled on 1 March 2007

GROUNDWATER

First encountered groundwater at the Facility is approximately 26 feet below ground surface. This is a shallow aquifer consisting of alluvial fan deposits extending to a depth of less than 60 feet. Regional groundwater is approximately 170 feet mean sea level (MSL) or approximately 50 feet below ground surface, and fluctuates approximately 15 feet seasonally. Monitoring wells at the site are completed in the regional aquifer. The average groundwater flow direction is S 29° E, with a gradient of 0.0028 feet/foot. The range of groundwater seepage velocity is calculated to be between 95.4 feet/year and 132.9 feet/year. Recharge of this aquifer may primarily occur from Stony Creek, which lies seven miles north of the site.

The Discharger has installed ten compliance wells (MW-1 through MW-10) and two background monitoring wells (MW-11 and MW-12). The groundwater monitoring well construction details are described in Table 2.

Table 2

Groundwater Monitoring Well Construction Details

Monitoring Well ID	Type	Top of Casing (ft MSL)	Total Depth (ft below top of casing)	Screen Interval (ft below top of casing)
MW-1	compliance	205.26	49.74	29-49
MW-2	compliance	202.72	47.2	u/k
MW-3	compliance	207.84	47.17	30-47
MW-4	compliance	208.56	48.23	u/k
MW-5	compliance	209.85	50.43	u/k
MW-6	compliance	209.14	54.96	u/k
MW-7	compliance	208.83	62.55	u/k
MW-8	compliance	209.02	52.25	u/k
MW-9	compliance	205.99	60.26	u/k
MW-10	compliance	209.85	51.76	30-50
MW-11	background	217.42	51.3	u/k
MW-12	background	213.04	52.51	u/k

u/k = unknown

Drinking water analysis reports from the California Department of Public Health (CDPH) Division of Drinking Water also show increased nitrates in water supply wells throughout Orland. Based on conversations with CDPH staff, increased nitrates may be a result of surrounding agricultural activities. Nitrate as N in Orland water supply wells typically range from 7 mg/L to 15 mg/L.

Land use within 1,000 feet of the site is mainly agricultural. Current aerial photographs indicate a diary (Greenwood Dairy), hydraulically upgradient of the Discharger's Facility, is along the northern and western boundary, with two wastewater ponds located along the western boundary (see Attachment B). Aerial photographs, dated 21 August 1998, show that a dairy did not exist adjacent to the Facility at that time. Manure from dairies contains high salts/TDS and nutrients including nitrogen, ammonia, phosphorus, and potassium compounds. Greenwood Dairy, 6569 County Road 27, Orland, in Glenn County, is currently enrolled under State Water Resources Control Board Industrial Storm Water General Permit Order No. 97-03-DWQ (WDID #5R111019861) and Regional Water Board General WDR Order No. R5-2007-0035 for Existing Milk Cow Dairies (WDID #5S111015863).

Staff review of analytical data submitted by the Discharger, finds that one monitoring well (MW-10), appears to be increasing in TDS and nitrates as NO_3. Monitoring wells, downgradient of the Facility, do not show significantly increasing trends in TDS and Nitrate as NO_3. At this time, staff does not have sufficient information to determine if the increasing TDS and nitrate trends in MW-10 are occurring due to the Discharger's Facility or off-site agricultural operations.

On 1 November 2004, the Discharger developed a Water Quality Protection Standard (WQPS) using an intra-well statistical analysis described in the 1989 U.S. EPA guidance document entitled, *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities*. The standard deviation and mean for 23 sampling events (26 March 2003 to 30 June 2004) for monitoring wells MW-5, MW-10, MW-11, and MW-12 were computed and these numbers were used to calculate Upper Tolerance Limits (UTL) for each of the parameters tested.

Samples with constituents at concentrations reaching the UTL may indicate that groundwater has been impacted. However, since MW-5 and MW-10 are "compliance" wells, the UTL determined on 1 November 2004 does not represent "background" water quality. These WDRs require the Discharger to assess historic and annual sample results from "background" wells and submit an annual Groundwater Assessment Report to determine whether WQPS are being met.

The Discharger has complied with the requirements set forth in previous WDR Order No. R5-2002-0141.

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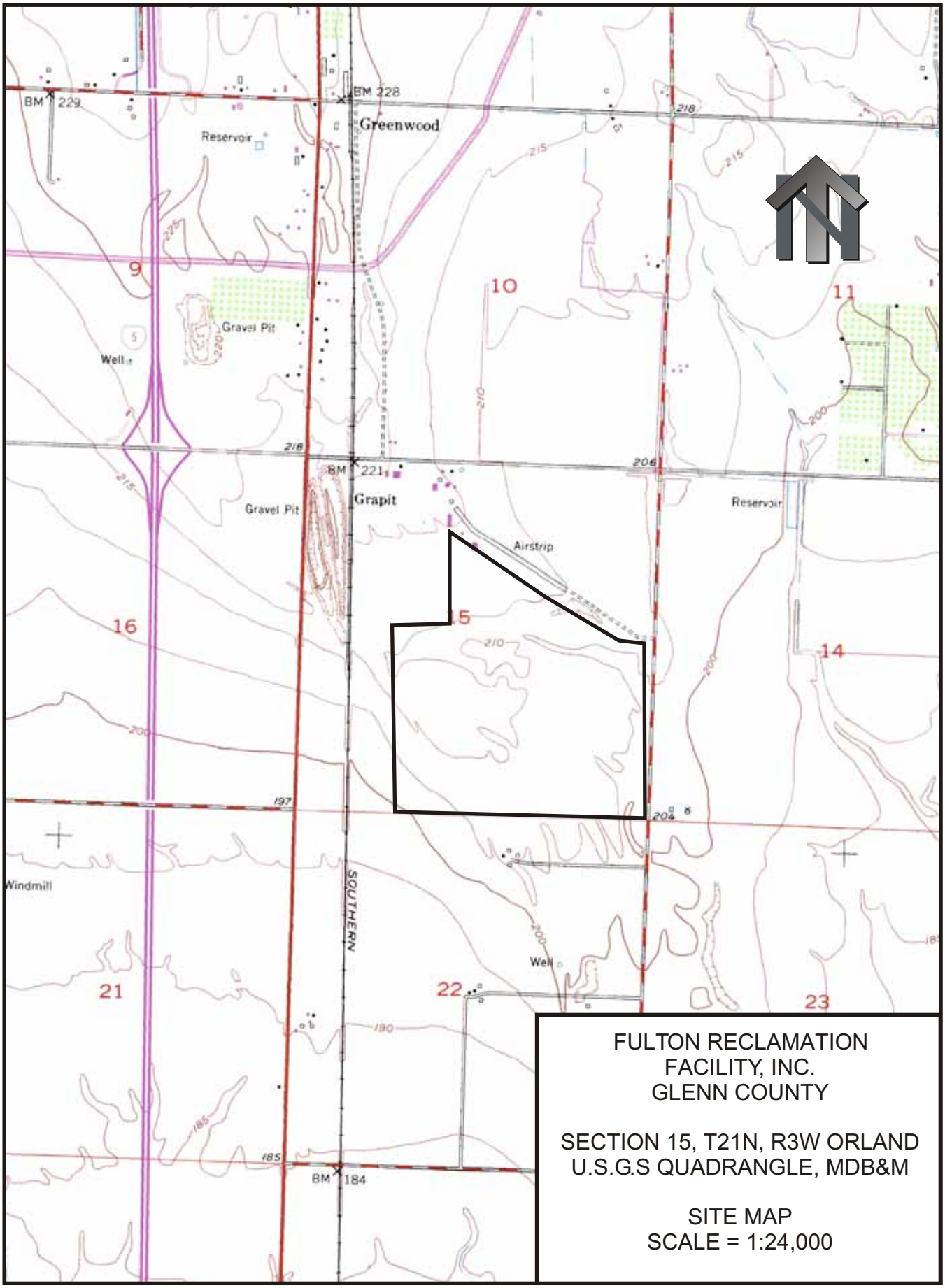
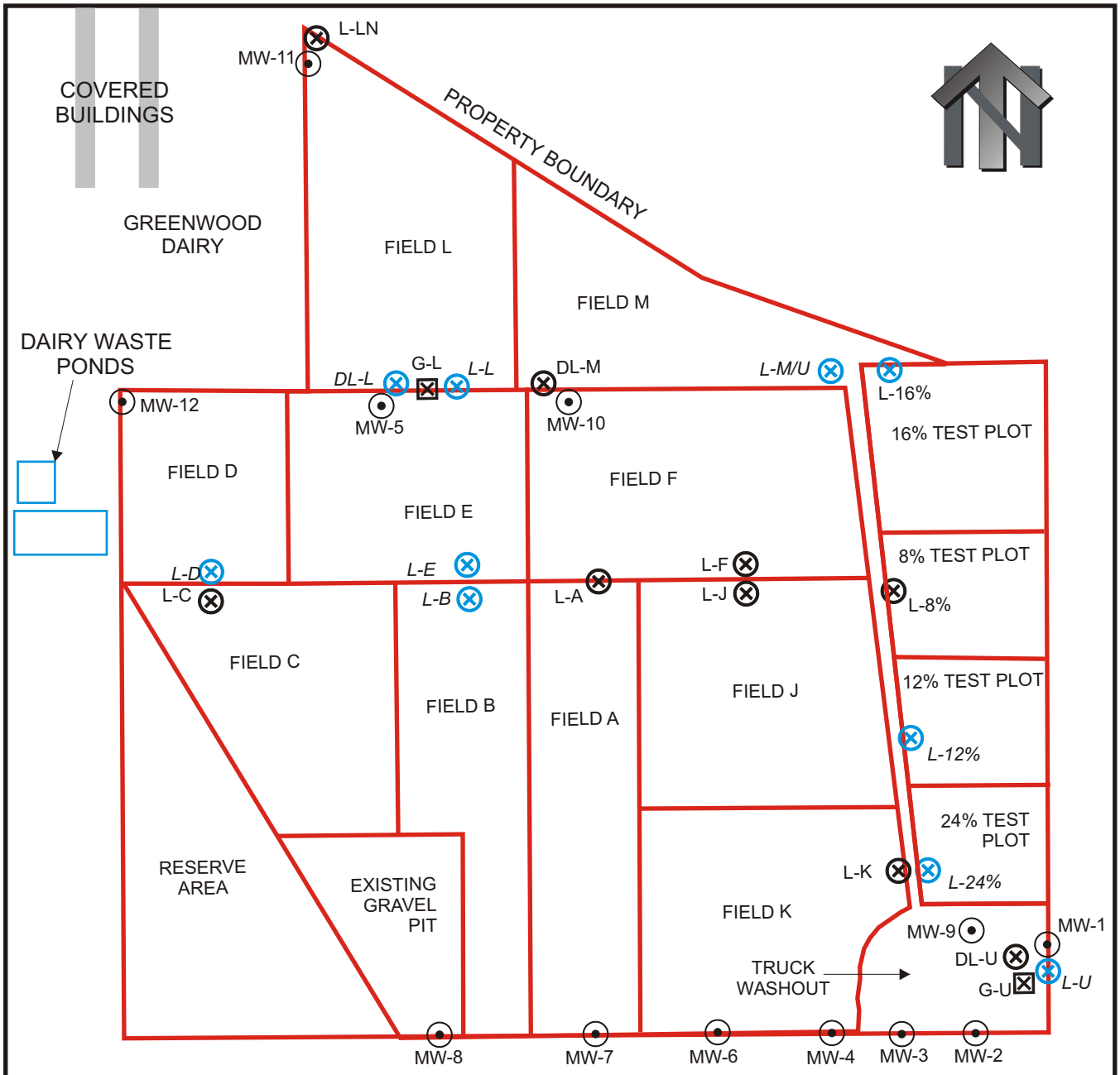

BM 229
BM 228
Greenwood
Reservoir
9
10
11
Gravel Pit
Well
Gravel Pit
Grapit
BM 221
Airstrip
Reservoir
16
15
14
Windmill
SOUTHERN
Well
21
22
23
BM 184
FULTON RECLAMATION
FACILITY, INC.
GLENN COUNTY
SECTION 15, T21N, R3W ORLAND
U.S.G.S QUADRANGLE, MDB&M
SITE MAP
SCALE = 1:24,000



LEGEND

- MONITORING WELL MW-1
- DEEP LYSIMETER DL-A
- SHALLOW LYSIMETER L-A
- *NON-FUNCTIONAL LYSIMETER L-U*
- GYPSUM MOISTURE BLOCK ARRAY G-L

FULTON RECLAMATION FACILITY INC.

GLENN COUNTY

FACILITY MAP

APPROX. SCALE
1 INCH = 600 FEET