

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION
ORDER NO. R5-2004-0160
WASTE DISCHARGE REQUIREMENTS
FOR
CONTIGROUP COMPANIES, INCORPORATED
FRENCH CAMP GRAIN ELEVATOR
ENHANCED REMEDIATION PILOT STUDY
SAN JOAQUIN COUNTY

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

1. ContiGroup Companies, Inc. submitted a Report of Waste Discharge on 28 June 2004 and supplemental information on 3, 9, and 14 July 2004 for a zero valent iron injection pilot study. The Discharger formerly owned the active grain storage and transfer facility at 9504 South Harlan Road in French Camp, Assessor's Parcel Number 193-21-003 at Township 1S, Range 6E, Section 2, MDBoM (hereafter referred to as Site). The current owner is French Camp Grain Elevator LLC. The general location of the facility is shown on Attachment A, which is attached hereto and made part of these Waste Discharge Requirements (WDRs), hereafter referred to as Order, by reference.
2. French Camp Grain Elevator LLC is the current owner of the property. ContiGroup Companies, Inc. is hereafter referred to as the Discharger, and both French Camp Grain Elevator LLC and ContiGroup Companies, Inc. are responsible for compliance with this Order. However, since French Camp Grain Elevator LLC is the property owner and ContiGroup Companies, Inc. will be operating the groundwater treatment system and discharging treated groundwater, ContiGroup Companies, Inc. is primarily required to comply with this Order. If ContiGroup Companies, Inc. does not comply, then within 60 days of notification by the Executive Officer, French Camp Grain Elevator LLC will be required to comply.

BACKGROUND

3. Historically, liquid fumigants containing carbon tetrachloride were stored on the Site in five-gallon buckets. Carbon tetrachloride was found in groundwater in 1999. The Discharger has performed several investigations to delineate the extent of carbon tetrachloride and its breakdown product, chloroform. Three water bearing zones are identified at the Site and are monitored by 14 groundwater monitoring wells as required by Monitoring and Reporting Program (MRP) No. 5-00-858. The Site has two private supply wells that were previously used for irrigation. This Order rescinds Order No. R5-2003-0166.
4. On 17 October 2003, the Regional Board issued WDRs Order No. R5-2003-0166 for a Hydrogen Releasing Compound (HRC®) injection pilot study. Upon further review of the technology and groundwater limitations set by the WDRs, the Discharger determined HRC® injections was not the ideal remedial technology for the Site.
5. Most of the mass of carbon tetrachloride and chloroform pollution is in the B water bearing zone, which is from about 60 to 80 feet below ground surface (bgs) and varies from about 5 to 15 feet in thickness across the Site. Groundwater contains up to 1,300 micrograms per liter ($\mu\text{g/l}$) of carbon tetrachloride and up to 190 $\mu\text{g/l}$ of chloroform.

PROPOSED REMEDIATION PROJECT

6. Based on review of other remedial technologies and case studies, the Discharger proposes a granular zero valent iron (GZVI) injection pilot study to reduce carbon tetrachloride and chloroform concentrations. This technology is well suited for slow moving groundwater plumes, such as is observed at the Site. The pilot study will evaluate the efficacy of the amount and spacing of the GZVI injections. The effectiveness of the pilot study will be determined by measuring the concentrations of carbon tetrachloride, chloroform, and breakdown products in perimeter monitoring wells. Groundwater monitoring of amendments, breakdown products, and byproducts will continue until concentrations return to baseline levels, which will conclude the pilot study.
7. GZVI is a strong reducing agent. Electrons released during GZVI oxidation reduce the chlorinated compounds whereby the chlorine atoms are replaced by hydrogen atoms. During the reductive dechlorination process, the carbon tetrachloride and chloroform act as electron acceptors. The hydrogen ion, which will affect pH, and chlorine are produced from the reductive dechlorination process. Case studies show that 70 percent of the carbon tetrachloride is expected to degrade to non-chlorinated end products (such as carbon dioxide) and 30 percent is expected to degrade to chloroform. The GZVI will further promote degradation of chloroform with about 60 percent expected to degrade to methylene chloride and about 40 percent expected to degrade to non-chlorinated end-products. The biological half-life of methylene chloride is about 10 days, so a buildup is not expected. The ultimate end products are carbon dioxide and chloride.
8. The Discharger will drill three borings, as shown on Attachment B, which is attached hereto and made part of this Order by reference, to about 85 feet bgs. The locations of the borings were determined based on groundwater flow direction and area with the highest concentrations of pollutants in the B water bearing zone. The pilot study is focusing on the B water bearing zone because the horizontal permeability is much greater than the vertical permeability so there should not be an influence on the C water bearing zone during the pilot study. Depths of injection will be about 77.5 feet bgs, 72.5 feet bgs, 67.5 feet bgs, and 62.5 feet bgs to create four iron fractures per boring. About 4 cubic meters of GZVI slurry will be injected into each fracture for a total of about 16 cubic meters per boring. The GZVI slurry consists of guar gum, which makes the slurry viscous and allows the GZVI to be suspended and pumped into the boring, cross-linker to make the slurry more viscous, and an enzyme breaker to reduce viscosity once the fracture is emplaced in the subsurface. Guar gum is a carbohydrate made up of carbon, hydrogen, and oxygen. The cross-linker, BX-1L, is made up of boric acid sodium salt and ethylene glycol. The enzyme breaker, LEB-H, is made up of sodium chloride. The mixture of slurry is 400 kilograms of iron, eight kilograms of guar gum, three quarters to two liters of cross-linker, and 0.02 liters of enzyme breaker per cubic meter of slurry. The amount injected may be less, but not exceed 4 cubic meters per fracture because the mass of GZVI injected is controlled by the amount that can be hydraulically fractured into the subsurface.

9. Hydraulic fracturing is a process whereby a fluid is pumped into a boring at a rate and pressure high enough to overcome the in-situ confining stress and the material strength of a formation (i.e. soil or rock) resulting in the formation of a fracture. The slurry mixture is pumped under pressure into the subsurface soils to create a fracture. During pumping, downhole pressures and flow rates are monitored against time via logging computers. After pumping, the GZVI holds the fracture open while the enzyme breaks down the viscous fluid. The fluid subsequently drains out of the fractures, leaving multiple, overlying fractures radiating from the borehole.
10. The Discharger will use the FRAC RITE™ process, which was developed in 1995 specifically for geo-environmental applications in unconsolidated, low permeability sediments for the hydraulic fracturing. Fracturing is conducted using proprietary down hole fracturing equipment designed for various soil types at shallow depths and low operating pressures. The pollutants are treated as a result of moving into the fractures.
11. After injections are completed, the Discharger will abandon the borings by grouting. The expected lateral extent of the GZVI is about 33 feet following the fractures created, which the Discharger will verify by fracture mapping on each boring. The mapping will be done by using tiltmeters, which are instruments that measure the minute ground surface deformations created during the fracturing process and can determine direction and magnitude of the ground surface deformation. The Discharger will set out about 12 to 20 tiltmeters in a grid or concentric configuration to measure the ground surface deformations. After the first boring is completed, the remaining two boring locations may be adjusted based on the results of the fracture mapping from the first boring.
12. Within two days of completing the three borings with GZVI injections, the Discharger will install two groundwater monitoring wells screened from 60 to 80 feet bgs in the B water bearing zone (MW-9B and MW-10B). MW-9B and MW-10B are being installed after the GZVI injections to prevent possible damage from the fracturing activities and so that the lateral extent of GZVI can be determined, allowing the wells to be installed in the appropriate locations. MW-9B will be installed at the downgradient edge of the furthest reach of the GZVI from the second boring but also outside the upgradient lateral extent of GZVI from the third boring. MW-10B will be installed at the downgradient edge of the furthest extent of the GZVI from the third boring. Based on this proposed spacing of the monitoring wells, the Discharger anticipates seeing effects of the GZVI injections in MW-9B and MW-10B within the first month after the injections.
13. The Discharger will monitor MW-3B, MW-9B, and MW-10B to evaluate the effectiveness of the GZVI injections. The Discharger will monitor MW-4B to determine whether increases in pollutants, byproducts, and breakdown products occur downgradient of the treatment area. The treatment area is the area of the GZVI injected into the three borings and 10 feet downgradient of the furthest reach of the GZVI, since the average groundwater flow at the Site is about 10 feet per year.
14. The Discharger has conducted two sampling events for baseline parameters and will collect additional baseline groundwater samples from MW-3B and MW-4B a minimum of four weeks prior to the injection of GZVI. The list of analytes required for the baseline sampling is listed in

the attached MRP No. R5-2004-0160. Regional Board staff must provide concurrence with the proposed baseline concentrations prior to injecting the GZVI. The Discharger will collect groundwater samples from MW-9B and MW-10B immediately following well development. Well development of MW-9B and MW-10B will occur no sooner than 24 hours after installation and no later than 48 hours after installation. MW-3B, MW-4B, MW-9B, and MW-10B will be sampled at 2, 4, 8, 12, 16, 20, and 24 weeks after the completion of the GZVI injections in accordance with MRP No. R5-2004-0160, and then quarterly thereafter until concentrations return to baseline.

15. Bench-scale testing was not performed because this technology has been shown to be successful at reducing carbon tetrachloride and chloroform concentrations at several other sites, include the E.I. du Pont de Nemours and Company site in Oakley, California.
16. Byproducts from the injection of GZVI may include reduced forms of iron, which depending on pH and electrical conductivity may include ferrous hydroxide or ferrous chloride. Breakdown products of carbon tetrachloride and chloroform from the injection may include methylene chloride, chloromethane, carbon dioxide, methane, and chloride ion. With the exception of chloride ion, the breakdown products of carbon tetrachloride are expected to be intermediate compounds. The Discharger will monitor for these byproducts in accordance with the attached MRP No. R5-2004-0160.
17. In the event that carbon tetrachloride, chloroform, methylene chloride, chloromethane, metals, total dissolved solids, chloride, carbon dioxide, methane, boron, ethylene glycol, byproducts, and/or breakdown products are detected in downgradient well MW-4B more than 20 percent above the approved baseline concentrations, the Discharger will collect a confirmation sample within 7 days of receiving the analytical results. If the exceedence is confirmed, the Discharger will install two extraction wells screened in the B water bearing zone downgradient of the three GZVI injection areas and upgradient of MW-4B within three months of the receiving the exceedence confirmation sample. The Discharger will receive Regional Board staff concurrence on extraction well schematics and placement prior to installation. Within two months of the installation of the two extraction wells, the Discharger will begin extracting from both extractions wells, treat the recovered water with granular activated carbon and/or air stripping and transport the extracted water to the Stockton Regional Wastewater Control Facility. The Discharger may also submit a Report of Waste Discharge to reinject the treated water if initial results show that groundwater extraction may be a long-term corrective measure.

REGULATORY CONSIDERATIONS

18. The injection of chemicals into waters of the State is subject to regulation under the California Water Code. This Order authorizes the Discharger to inject GZVI into groundwater subject to specific discharge requirements.
19. The *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition* (hereafter Basin Plan) designates beneficial uses, establishes water quality objectives (WQOs), contains implementation plans and policies for protecting waters of the basin, and incorporates by reference plans and policies adopted by the State Water Resources Control Board

(State Board). Pursuant to Section 13263(a) of the California Water Code, waste discharge requirements must implement the Basin Plan.

20. Surface water drainage is into the San Joaquin River within the legal boundaries of the Sacramento - San Joaquin Delta. The designated beneficial uses of the Sacramento - San Joaquin Delta are municipal and domestic supply; agricultural supply; process and service industrial supply; water contact recreation; noncontact water recreation; warm and cold freshwater habitat, migration of warm and cold freshwater species, spawning of warm freshwater species, wildlife habitat, and navigation.
21. The designated beneficial uses of underlying groundwater are municipal and domestic supply, agricultural supply, and industrial process and service supply.
22. Surrounding land uses are commercial and industrial.
23. State Board Resolution No. 92-49 requires the Regional Board to require actions for cleanup and abatement of discharges that cause or threaten to cause pollution or nuisance to conform to the provisions of State Board Resolution No. 68-16 (hereafter Resolution 68-16) and the Basin Plan. Pursuant to Resolution No. 92-49, the Regional Board shall ensure that dischargers are required to cleanup and abate the effects of discharges in a manner that promotes attainment of either background water quality, or if background levels of water quality cannot be restored, the best water quality which is reasonable and which complies with the Basin Plan including applicable WQOs.
24. Resolution No. 68-16 requires the Regional Board in regulating discharges of waste to maintain the 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 present and potential beneficial uses, and will not result in water quality less than that described in plans and policies (e.g., quality that exceeds any WQO). Temporal degradation of groundwater at this Site due to the GZVI injections may occur. The temporary degradation allowed by this Order is consistent with Resolution 68-16 since (1) the purpose is to accelerate and enhance remediation of groundwater pollution and such remediation will benefit the people of the State; (2) the discharge facilitates a pilot project to evaluate the effectiveness of cleanup technology in accordance with Resolution No. 92-49; (3) the degradation is limited in scope and duration; (4) best practicable treatment and control, including adequate monitoring and contingency plans to assure protection of water quality, are required; and (5) the discharge will not cause WQOs to be exceeded beyond the project duration or treatment area, as defined in Finding Nos. 5 and 12.
25. Section 13267(b) of California Water Code 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 having discharged or 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 having discharged or 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. In requiring those 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.

The technical reports required by this Order and the attached MRP No. R5-2004-0160 are necessary to assure compliance with these WDRs. The Discharger formerly operated the facility that discharged the waste subject to this Order.

26. The California Department of Water Resources sets standards for the construction and destruction of groundwater wells, as described in *California Well Standards Bulletin 74-90* (June 1991) and *Water Well Standards: State of California Bulletin 74-81* (December 1981). These standards, and any more stringent standards adopted by the State or County pursuant to California Water Code Section 13801, apply to all monitoring wells.
27. Issuance of this Order is an action to assure the restoration of the environment and is, therefore, exempt from the provisions of the California Environmental Quality Act (Public Resources Code, Section 21000, et seq.), in accordance with Section 15308 and 15330, Title 14, California Code of Regulations (CCR).
28. This discharge is exempt from the requirements of *Consolidated Regulations for Treatment, Storage, Processing, or Disposal of Solid Waste*, as set forth in Title 27, CCR, Section 20005, et seq., (hereafter Title 27). Section 20090(d) allows exemption for a project to clean up a condition of pollution that resulted from an unauthorized release of waste based on the following:
 - a. The cleanup and abatement action is under the direction of a public agency;
 - b. Wastes removed from the immediate place of release will be discharged according to the Title 27 regulations; and
 - c. The remedial actions intended to contain wastes at the place of release shall implement the Title 27 regulations to the extent feasible.
29. Pursuant to California Water Code Section 13263(g), discharge is a privilege, not a right, and adoption of this Order does not create a vested right to continue the discharge.
30. All the above and the supplemental data and information and details in the attached Information Sheet, which is incorporated by reference herein, were considered in establishing the following conditions of discharge.
31. The Discharger and interested agencies and persons were notified of intent to prescribe WDRs for this discharge and provided with an opportunity for a public hearing and an opportunity to submit written views and recommendations.
32. In a public meeting, all comments pertaining to the discharger were heard and considered.

IT IS HEREBY ORDERED that pursuant to Sections 13263 and 13267 of the California Water Code, Order No. R5-2003-0166 is rescinded and ContiGroup Companies, 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 while conducting the above-described pilot study:

[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, incorporated herein.]

A. Discharge Prohibitions

1. Discharge of wastes to surface waters or surface water drainage courses is prohibited.
2. Discharge of other than GZVI, cross-linker, guar gum, and enzyme breaker into groundwater is prohibited.
3. Discharge of waste classified as 'hazardous' under Section 2521 of Title 23, CCR, or as 'designated' under Section 13173 of California Water Code is prohibited.
4. Discharge of GZVI, cross-linker, guar gum, and enzyme breaker at locations or in a manner different from that described in Finding Nos. 7, 8, and 9 is prohibited.

B. Discharge Specifications

1. No waste constituent shall be released or discharged, or placed where it will be released or discharged, in a concentration or in a mass that causes violation of the Groundwater Limitations.

C. Groundwater Limitations

1. During the pilot study, the Discharger shall not cause an increase of carbon tetrachloride, chloroform, methylene chloride, chloromethane, metals, total dissolved solids, chloride, carbon dioxide, methane, boron, ethylene glycol, byproducts, and/or breakdown products more than 20 percent above the approved baseline concentrations in MW-4B.
2. When the pilot study is completed, the pollutants, byproducts, and breakdown products shall not exceed baseline levels.

D. Provisions

1. The Discharger shall notify Regional Board staff a minimum of one week prior to the injection of GZVI.

2. The Discharger shall comply with the attached MRP No. R5-2004-0160, which is part of this Order, and any revisions thereto as ordered by the Executive Officer.
3. The Discharger shall comply with 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).”
4. All of the following reports shall be submitted pursuant to Section 13267 of the California Water Code. 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 sections 6735, 7835, and 7835.1. To demonstrate compliance with sections 415 and 3065 of Title 16, CCR, 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.
 - a. The Discharger shall submit a Baseline Summary Report due no later than **30 days** after the collection of the baseline samples from MW-3B and MW-4B to propose baseline values for carbon tetrachloride, chloroform, methylene chloride, chloromethane, metals, total dissolved solids, carbon dioxide, methane, chloride, boron, ethylene glycol, byproducts, and/or breakdown products. The Baseline Summary Report shall provide a table of proposed baseline concentrations developed using an EPA-approved statistical method, including the rationale used to develop the concentrations. The Discharger shall not begin injections until receiving written approval of baseline concentrations.
 - b. The Discharger shall submit a Pilot Study Implementation Report due no later than **60 days** after completing the GZVI injections that shall include a description of field activities, well installations, injection of GZVI, fracture mapping, results of the first month of monitoring, and baseline concentrations for newly installed monitoring wells MW-9B and MW-10B. The Discharger shall propose baseline concentrations for MW-9B and MW-10B for carbon tetrachloride, chloroform, methylene chloride, chloromethane, metals, total dissolved solids, chloride, carbon dioxide, methane, boron, ethylene glycol, byproducts, and/or breakdown products.
 - c. The Discharger shall submit a Pilot Study Evaluation Report no later than **12 months** after the injection of GZVI that shall include a summary of analytical results and an evaluation of the effectiveness of the GZVI injections.
5. In the event that carbon tetrachloride, chloroform, methylene chloride, chloromethane, metals, total dissolved solids, chloride, carbon dioxide, methane, boron, ethylene glycol, byproducts, and/or breakdown products are detected in downgradient well MW-4B more than 20 percent above the approved baseline concentrations, the Discharger shall immediately notify Regional Board staff of the exceedence(s) and obtain a confirmation

sample within **7 days** of receiving the results. Within **48 hours** of receiving the confirmation sample results, the Discharger shall notify Regional Board staff of the results followed by written notification within **7 days**.

6. **Within 90 days** of confirming an exceedence as described in Provision D.5, the Discharger shall implement the contingency plan as described in Finding 16 and submit a Contingency Plan Implementation Report **60 days** after groundwater extraction activities have started.
7. 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 or court order requiring corrective action or imposing civil monetary liability, or in revision or rescission of this Order.
8. The Discharger shall maintain records of all monitoring information including all calibration and maintenance records, copies of all reports required by this Order, and records of all data used to complete the application for this Order. Records shall be maintained for a minimum of three years from the date of the sample, measurement, or report. This period may be extended during the course of any unresolved litigation regarding this discharge or when requested by the Executive Officer.
9. The Discharger shall at all times properly operate and maintain all facilities and systems of treatment and control that are installed or used by the Discharger to achieve compliance with this Order. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems, which are to be installed by the Discharger only when necessary to achieve compliance with the conditions of this Order.
10. The Discharger shall report any non-compliance, and/or accidental spill or release of liquid or material verbally to the Regional Board within 24 hours of the spill or release, and follow-up the verbal notification with written documentation of the spill or release within 14 calendar days of the incident.
11. 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.
12. As described in the Standard Provisions, the Discharger shall report promptly to the Regional Board any material change or proposed change in the character, location, or volume of the discharge.
13. While this Order is in effect, and prior to any change in ownership of the Site or management of this operation, the Discharger shall transmit a copy of this Order to the succeeding Owner/Operator, and forward a copy of the transmittal letter and proof of transmittal to the Regional Board. Transfer of privileges granted under this Order are subject to the discretion of the Executive Officer.

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

I, THOMAS R. PINKOS, 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 15 October 2004.

_____ original signed by _____
THOMAS R. PINKOS, Executive Officer

Attachments

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2004-0160
FOR
CONTIGROUP COMPANIES, INCORPORATED
FRENCH CAMP GRAIN ELEVATOR
ENHANCED REMEDIATION PILOT STUDY
SAN JOAQUIN COUNTY

This Monitoring and Reporting Program (MRP) incorporates requirements for monitoring the progress of the enhanced remediation pilot study. This MRP is issued pursuant to California Water Code Section 13267. ContiGroup Companies, Inc. (Discharger) is required to comply with this MRP. The Discharger shall not implement any changes to this MRP unless and until a revised MRP is issued by the Executive Officer. Groundwater sampling and reporting outlined in MRP No. 5-00-858 is still required.

All samples shall be representative of the volume and the nature of the discharge and matrix of the sampled medium. The time, date, and location of each grab sample shall be recorded on the sample chain of custody form.

ENHANCED REMEDIATION PILOT STUDY MONITORING

As shown on Attachment B, there are 14 monitoring wells, two proposed monitoring wells, and two private supply wells. The private wells are no longer in use. Monitoring of the enhanced remediation pilot study will consist of groundwater samples collected from four monitoring wells: MW-3B, MW-4B, and newly installed monitoring wells (MW-9B and MW-10B). Monitoring shall follow the schedule below. These analyses shall be completed by a State certified laboratory and shall follow standard EPA protocol.

Constituents	EPA Method	Maximum Quantitation Limit ¹	Sampling Frequency
Volatile Organic Compounds	8260	0.5 ug/l	Schedule A
Alkalinity	310.1, 310.2	1.0 mg/l	Schedule A
Carbon dioxide (dissolved)	SM4500 or ASTM D1945	0.01 mg/l	Schedule A
Chloride	300	0.2 mg/l	Schedule A
Nitrate as N	300, 352.1	0.4 mg/l	Schedule A
Sulfate	300, 375	0.5 mg/l	Schedule A
Total Dissolved Solids	160.1	10 mg/l	Schedule A
Total Organic Carbon	415	0.3 mg/l	Schedule A
Iron, total & dissolved	200.7	0.1 mg/l	Schedule A
Ferrous and Ferric Iron	200, 6020, or SM 3000	0.1 mg/l	Schedule A
Ethylene glycol	1666, 1671	200 mg/l	Schedule B
Boron	200.7 or 6010B	0.1 mg/l	Schedule B
Phosphorous	200.7, 365	1.0 mg/l	Schedule B
Methane	SM4500 or ASTM D1945	0.01 mg/l	Schedule B
Metals ²	200.7, 200.8	Various	Schedule B

1 For nondetectable results

2 Metals analysis includes: barium, cadmium, calcium, total chromium, copper, lead, magnesium, manganese, mercury, molybdenum, nickel, silica, and sodium.

ug/l Micrograms per liter

mg/l Milligrams per liter

Schedule A Baseline, 2, 4, 8, 12, 16, 20, and 24 weeks after GZVI injections are completed, and quarterly thereafter.

Schedule B Baseline, 2, 4, and 8 weeks after GZVI injections are completed. Any metal, boron, phosphorous, methane or ethylene glycol detected in MW-3B, MW-4B, MW-9B, or MW-10B at 10 percent above baseline concentrations shall also be monitored at 12, 16, 20, 24 weeks, and quarterly thereafter in the well in which it was detected.

Note: Baseline samples are collected from monitoring wells MW-3B and MW-4B a minimum of four weeks prior to the

injection of GZVI.

Field measured parameters shall follow the schedule below:

Parameters	Units	Type of Sample	Sampling Frequency
Groundwater Elevation	Feet, Mean Sea Level	Grab	Every time MW-3B, MW-4B, MW-9B, and MW-10B are sampled
Oxidation-Reduction Potential	Millivolt	Grab	
Electrical Conductivity	uhmos	Grab	
Dissolved Oxygen	mg/l	Grab	
pH	0.1 units	Grab	

Field testing instruments (such as those used to test oxidation-reduction potential and dissolved oxygen) may be used provided that:

1. The operator is trained in proper use and maintenance of the instruments;
2. The instruments are field calibrated prior to each monitoring event;
3. Instruments are serviced and/or calibrated by the manufacturer at the recommended frequency; and
4. Field calibration reports are provided with the appropriate monitoring report.

REPORTING

In reporting monitoring data, the Discharger shall arrange the data in tabular form so that the date, sample type, and reported analytical result for each sample are readily discernible. The data shall be summarized in such a manner to clearly illustrate compliance with waste discharge requirements and spatial or temporal trends, as applicable. The results of any monitoring done more frequently than required at the locations specified in the MRP shall also be reported to the Regional Board.

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.

Quarterly reports shall be submitted to the Board by the **1st day of the second month following the end of each calendar quarter (i.e., by 1 February, 1 May, 1 August, and 1 November)**. The reports shall be submitted separately from the quarterly monitoring reports required by MRP No. 5-00-858. At a minimum, the reports shall include:

1. Results of monitoring, including a narrative description of all preparatory, monitoring, sampling, and analytical testing activities for the groundwater monitoring. The narrative shall be sufficiently detailed to verify compliance with the WDR, 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; calculation of casing volume; total volume of water purged, etc.;
2. Copies of all laboratory analytical report(s);
3. Cumulative data tables containing the water quality analytical results and depth to groundwater;

4. An evaluation of the performance of the remediation pilot study including an analysis of its effectiveness in destroying the pollutants, and a discussion of the potential for field scale application;
5. A discussion of compliance and the corrective action taken, if any, as well as any planned or proposed actions needed to bring the discharge into full compliance with the waste discharge requirements; and
6. A discussion of any data gaps, potential deficiencies/redundancies in the monitoring system or reporting program and the anticipated date for an effectiveness evaluation of the pilot study.

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. The transmittal letter shall contain the penalty of perjury statement by the Discharger, or the Discharger's authorized agent, as described in the Standard Provisions General Reporting Requirements Section B.3.

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

Ordered by: _____ original signed by _____
THOMAS R. PINKOS, Executive Officer

(Date)

DLL

INFORMATION SHEET

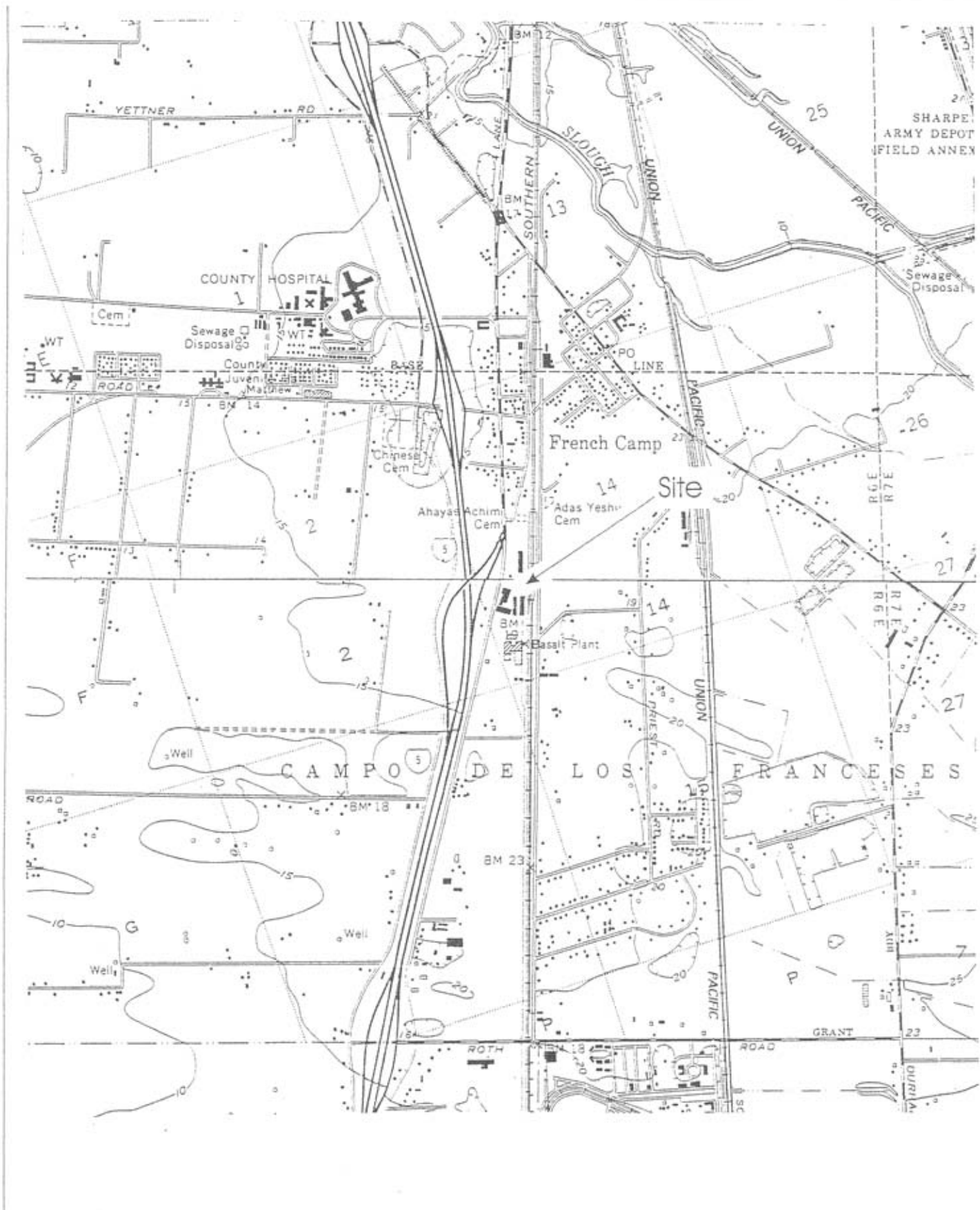
WASTE DISCHARGE REQUIREMENTS ORDER NO. R5-2004-0160
CONTIGROUP COMPANIES, INC.
FRENCH CAMP GRAIN ELEVATOR
ENHANCED REMEDIATION PILOT STUDY
SAN JOAQUIN COUNTY

ContiGroup Companies, Inc. (Discharger) formerly owned the active grain storage and transfer facility at 9504 South Harlan Road in French Camp (Site). Historically, liquid fumigants containing carbon tetrachloride were stored on site in five-gallon buckets. Carbon tetrachloride was found in groundwater in 1999. Several investigations have been conducted to delineate the extent of carbon tetrachloride and its breakdown product, chloroform. Three water bearing zones are identified at the Site with most of the mass of pollution in the B water bearing zone. The B water bearing zone is about 60 to 80 feet below ground surface (bgs) and varies from about 5 to 15 feet thick across the Site.

The Discharger proposes a nine-month granular zero valent iron (GZVI) injection pilot study to reduce carbon tetrachloride and chloroform concentrations. GZVI is a strong reducing agent. Electrons released during GZVI oxidation reduce the chlorinated compound whereby the chlorine atoms are replaced by hydrogen atoms. During the reductive dechlorination process, the carbon tetrachloride and chloroform act as electron acceptors. The purpose of the pilot study is to reduce pollutant concentrations and evaluate GZVI as a remedial alternative. Under reductive dechlorination, carbon tetrachloride and its breakdown product chloroform are reduced to methylene chloride. As the groundwater moves out of the area of the GZVI into aerobic conditions, the methylene chloride breaks down with the ultimate end products of carbon dioxide and chloride.

The Discharger will drill three borings to about 85 feet bgs. Points of injection will be spaced at about 77.5 feet bgs, 72.5 feet bgs, 67.5 feet bgs, and 62.5 feet bgs to create four iron layers per boring. About 4 cubic meters of GZVI slurry will be injected into each layer for a total of about 16 cubic meters per boring. The GZVI slurry consists of guar gum, which makes the slurry viscous and allows the GZVI to be suspended and pumped in to the boring, cross-linker to make the slurry more viscous, and an enzyme breaker to reduce viscosity once the layer is emplaced in the subsurface. The mixture of slurry is 400 kilograms of iron, eight kilograms of guar gum, three quarters to two liters of cross-linker, and 0.02 liters of enzyme breaker per cubic meter of slurry. The amount injected may be less, but not more than 4 cubic meters per layer because the mass of GZVI injected is controlled by the amount that can be hydraulically fractured into the subsurface. The WDRs require extensive monitoring to evaluate the effects of the proposed injections. When the pilot study is completed, the amendments and byproducts shall not exceed baseline levels.

DLL 9/14/04

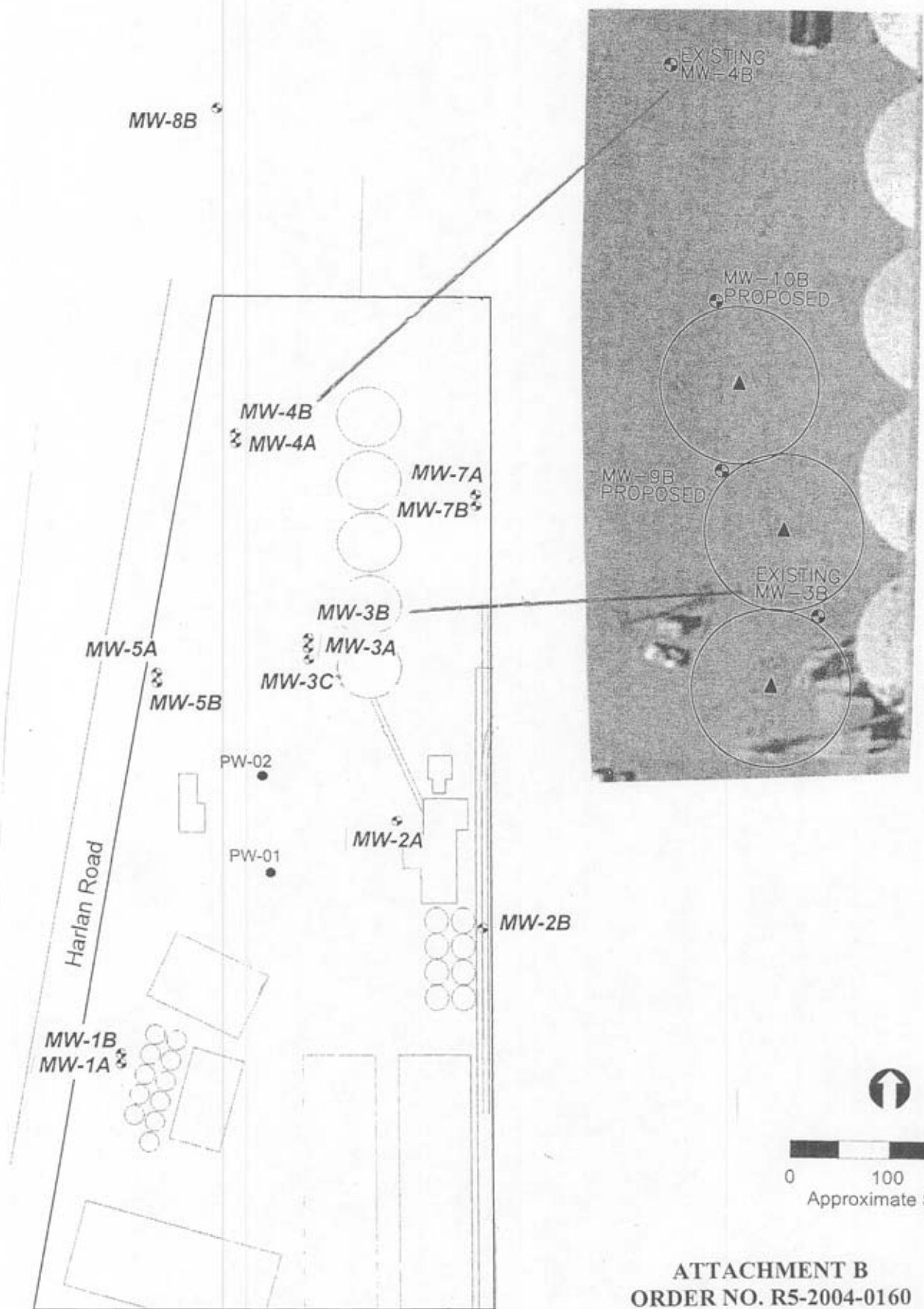


SHARPE
ARMY DEPOT
FIELD ANNEX



Scale in Feet (1" = 2000 feet)

ATTACHMENT A
ORDER NO. R5-2004-0160
CONTIGROUP COMPANIES
FRENCH CAMP GRAIN ELEVATOR
ZERO VALENT IRON INJECTION PILOT STUDY
SAN JOAQUIN COUNTY



ATTACHMENT B
ORDER NO. R5-2004-0160
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