CALIFORNIA
Water Boards

EDMUND G. BROWN JR.
GOVERNOR

MATTHEW RODRIQUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

Central Valley Regional Water Quality Control Board

28 January 2016

Thomas Cruise
LINN Operating, Inc.
5201 Truxtun Ave. Suite 100
Bakersfield, CA 93309

CERTIFIED MAIL
7015 1730 0000 9937 2783

CLEANUP AND ABATEMENT ORDER NO. R5-2016-0706, LINN OPERATING INC., BERRY AND EWING LEASE, MIDWAY-SUNSET OIL FIELD, KERN COUNTY

Enclosed is Cleanup and Abatement Order No. R5-2016-0706 (CAO), and Monitoring and Reporting Program No. R5-2016-0706 (MRP), for the disposal ponds in the Berry and Ewing Lease in the Midway-Sunset Oil Field.

The CAO requires LINN Operating, Inc., to submit, **by 29 March 2016**, a Work Plan and time schedule to determine whether the discharge can comply with applicable laws, policies, and regulations that would allow the issuance of waste discharge requirements.

Please submit your Work Plan to the attention of:

Rebecca T. Asami
Central Valley Water Board
1685 E Street
Fresno, CA 93706
rebecca.asami@waterboards.ca.gov

The CAO and MRP require LINN Operating, Inc., to perform specific tasks by specific dates. Failure to comply with the CAO and MRP will subject LINN Operating, Inc., to further enforcement actions including the potential assessment of civil liability.

If you have any questions regarding this matter, please contact Rebecca T. Asami of this office at (559) 445-5548 or at the above e-mail address.

RONALD E. HOLCOMB
Senior Engineering Geologist
CEG No. 2390

cc: Julia Macedo, Office of Enforcement, State Water Resources Control Board
Patrick Pulupa, Office of Chief Counsel, State Water Resources Control Board
John Borkovich, Division of Water Quality, State Water Resources Control Board

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

CLEANUP AND ABATEMENT ORDER NO. R5-2016-0706
FOR LINN OPERATING, INC.
BERRY AND EWING LEASE
MIDWAY-SUNSET OIL FIELD
KERN COUNTY

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

1. LINN Operating Inc., (hereinafter Discharger) operates a facility that utilizes ponds for the storage of petroleum production fluids at its Berry and Ewing Lease in the Midway-Sunset Oil Field (hereinafter Facility). The Berry and Ewing Lease is approximately two and one-half miles south of Taft and located in section 31, T31S, R24E, MDB&M.

2. The Berry and Ewing Lease contains two concrete lined surface impoundments (ponds) which flow in series. The ponds (Pond #1 and Pond #2) are used for the storage of oil field production fluids. The ponds reportedly receive discharges from vacuum truck washouts and tank drains. Crude oil is skimmed out and wastewater is eventually pumped to water treatment systems. Both ponds are approximately 30 feet in length by 10 feet in width, and 6 feet in depth.

3. The Berry and Ewing Lease is not regulated by Waste Discharge Requirements (WDRs) for the discharge of petroleum production wastewaters.

4. This Order contains a time schedule to achieve compliance with the California Water Code (Water Code) and the *Water Quality Control Plan for the Tulare Lake Basin Second Edition, Revised January 2004* (Basin Plan), and requires that by 31 December 2016, the Discharger demonstrate that the discharge to these ponds can comply with the applicable laws, policies, and regulations or the discharge will have to cease by that date.

5. The Basin Plan designates beneficial uses, establishes water quality objectives, and contains implementation plans and policies for all waters of the Basin.

6. Surface drainage is toward east in the Taft Hydrologic Area (557.20). The hydrologic area is part of the South Valley Floor Hydrologic Unit, of the Tulare Lake Basin. The designated beneficial uses of Valley Floor Waters, as specified in the Basin Plan, include agricultural supply; municipal and domestic supply; industrial service and process supply; water contact and non-contact water recreation; warm fresh water habitat; wildlife habitat; preservation of rare, threatened and endangered species; and groundwater recharge.

7. The Berry and Ewing Lease is in the Kern County Basin Hydrologic Unit, Detailed Analysis Unit (DAU) 260. The designated beneficial uses of the groundwater, as specified in the Basin Plan for DAU 260 are municipal and domestic water supply and

industrial service supply.

8. The Basin Plan sets forth the following specific waste constituent limits for discharges of oil field wastewater to unlined ponds overlying groundwater with existing and future probable beneficial uses:

Constituent	Limitation	Units
Electrical Conductivity (EC):	1000	micromhos per centimeter (µmhos/cm)
Chloride:	200	milligrams per liter (mg/L)
Boron:	1	mg/L

9. The Basin Plan allows discharges of oil field wastewater that exceed the above maximum salinity limits to unlined ponds, stream channels, or surface waters if the Discharger successfully demonstrates to the Central Valley Water Board in a public hearing that the proposed discharge will not substantially affect water quality nor cause a violation of water quality objectives.

10. On 1 April 2015, the Central Valley Water Board issued a California Water Code Directive Pursuant to Section 13267 to the Discharger. It required the Discharger to submit a technical report that includes lease information, wastewater disposal practices, and wastewater discharge analytical data by 15 June 2015. The technical report was submitted to the Central Valley Water Board by EnviroTech Consultants, Inc. (EnviroTech) on behalf of the Discharger.

A wastewater sample was collected from Pond #2 on the Berry and Ewing Lease by EnviroTech on 14 April 2015. The analytical results follow:

Constituent	Concentration	Units
Total Dissolved Solids (TDS):	10,000	mg/L
EC:	Not reported	µmhos/cm
Chloride:	4,200	mg/L
Boron:	97	mg/L

11. This Cleanup and Abatement Order is based upon: 1) Chapter 5, Enforcement and Implementation commencing with section 13300, of the Porter-Cologne Water Quality Control Act (Water Code Division 7, commencing with section 13000); 2) Water Code section 13267[1], Investigations; inspections, Chapter 4, Regional Water Quality Control;

[1] Water Code section 13267, subdivision (b)(1) states: "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 quality of 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 report and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written

3) all applicable provisions of the Basin Plan including beneficial uses, water quality objectives, and implementation plans; 4) California State Water Resources Control Board (State Water Board) Resolution No. 68-16 (*Statement of Policy with Respect to Maintaining High Quality of Waters in California*); 5) State Water Board Resolution No. 92-49 (*Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code section 13304*); and 6) all other applicable legal authority.

12. Certain regulations in the California Code of Regulations (CCR), title 14 concerning well stimulation treatment went into effect on 1 July 2015.

13. CCR title 14, section 1761(a) defines well stimulation treatment as treatment of a well designed to enhance oil and gas production or recovery by increasing the permeability of the formation. Examples of well stimulation treatments include hydraulic fracturing, acid fracturing, and acid matrix stimulation. Well stimulation treatment does not include routine well cleanout work; routine well maintenance; routine treatment for the purpose of removal of formation damage due to drilling; bottom hole pressure surveys; routine activities that do not affect the integrity of the well or the formation; the removal of scale or precipitate from the perforations, casing, or tubing; a gravel pack treatment that does not exceed the formation fracture gradient; or a treatment that involves emplacing acid in a well and that uses a volume of fluid that is less than the Acid Volume Threshold for the operation and is below the formation fracture gradient.

14. CCR, title 14, section 1786(a) states that operators shall not store well stimulation treatment fluids, including produced water from a well that has undergone well stimulation treatment, in sumps or pits.

15. Pursuant to Senate Bill 4 (Pavley 2013), the California Natural Resources Agency commissioned the California Council on Science and Technology (CCST) to conduct an independent scientific assessment of well stimulation treatments, including hydraulic fracturing, in California. CCST's assessment concluded that produced water from stimulated wells will contain well stimulation chemicals or their reaction by-products and that reuse of produced water for irrigation of crops could be a mechanism for release of well stimulation chemicals to the environment.

16. Pressurized placement of sand or gravel filter packs using pressurized high viscosity fluids (commonly called frac-packing) is a practice that may not meet the strict definition of well stimulation under CCR, title 14, but that employs similar chemicals or their reaction byproducts as those associated with well stimulation activities. Thus discharge of produced water from frac-packed wells may also provide a mechanism for release of those chemicals to the environment. The CCR amendments are independent prohibitions on certain oil production waste disposal practices, in addition to the Water Code authority.

17. Section 13304(a) of the Water Code provides that:

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explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports."

> *Any person who has discharged or discharges waste into the waters of this state in violation of any waste discharge requirement or other order or prohibition issued by a regional board or the state board, or who has caused or permitted, causes or permits, or threatens to cause or permit any waste to be discharged or deposited where it is, or probably will be, discharged into the waters of the state and creates, or threatens to create, a condition of pollution or nuisance, shall upon order of the regional board, clean up the waste or abate the effects of the waste, or, in the case of threatened pollution or nuisance, take other necessary remedial action, including, but not limited to, overseeing cleanup and abatement efforts. A cleanup and abatement order issued by the state board or a regional board may require the provision of, or payment for, uninterrupted replacement water service, which may include wellhead treatment, to each affected public water supplier or private well owner. Upon failure of any person to comply with the cleanup or abatement order, the Attorney General, at the request of the board, shall petition the superior court for that county for the issuance of an injunction requiring the person to comply with the order. In the suit, the court shall have jurisdiction to grant a prohibitory or mandatory injunction, either preliminary or permanent, as the facts may warrant.*

18. Oil field produced water can contain elevated concentrations of general minerals (especially total dissolved solids and chloride), metals (i.e., arsenic), trace elements (i.e., boron, strontium, thallium, lithium, etc.), petroleum hydrocarbons, polynuclear aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs, i.e., benzene, toluene, ethylbenzene, and xylenes [BTEX]), and radionuclides. The unauthorized discharge of waste containing oil field waste constituents to ground and/or groundwater creates, or threatens to create, a condition of pollution in groundwater, and may result in the degradation of water quality.

19. Land approximately four and one-half miles to the east of the Berry and Ewing Lease is being used for agricultural production. Many of the crops may be irrigated with groundwater from local supply wells in conjunction with canal water. Based on Water Quality for Agriculture by Ayers and Westcott (1985), irrigation water with a chloride concentration above 350 mg/L can cause severe crop problems. Boron toxicity can occur on sensitive crops at concentrations greater than 0.5 mg/L in irrigation water.

20. Underlying groundwater may be degraded if mixed with oil field wastewater. Oil field wastewater constituents could impair the groundwater for municipal and domestic supply and agricultural supply uses.

21. An investigation is necessary to determine whether the discharge of wastewater has caused or threatens to cause a condition of pollution in groundwater or the development of nuisance conditions.

22. The following actions will determine the threat and/or impacts to groundwater as a result of the discharges at the Berry and Ewing Lease are in violation of the Water Code:

a. Development of a work plan to conduct a hydrogeological site characterization and assess potential groundwater degradation by discharges from this facility;

b. Documentation of the average monthly volume of wastewater discharged to the ponds during the previous year will be submitted, and continued discharge during the investigation will not exceed the average monthly discharge rate calculated for the prior year; and

c. This Order requires that if degradation of groundwater due to discharge from any of the ponds is documented, then a work plan to delineate the nature and extent of the release and a plan to remediate the effects of the release must be submitted.

23. The deliverables ordered herein (work plans, signing up for WDRs, investigations, etc. as necessary) are needed to provide information to the Central Valley Water Board regarding (a) the nature and extent of the discharge, (b) the nature and extent of pollution conditions in State waters created by the discharge, (c) the threat to public health posed by the discharge, and (d) appropriate cleanup and abatement measures. The deliverables will enable the Discharger, with concurrence from the Central Valley Water Board, to determine the vertical and lateral extent of the discharge, ascertain whether the condition of pollution poses a threat to human health in the vicinity of the Berry and Ewing Lease and provide technical information to determine the cleanup and abatement measures necessary to bring the Sites into compliance with applicable water quality standards. Based on the nature and possible consequences of the discharges, including impacts to groundwater supply, the burden of providing the required information, including costs, bears a reasonable relationship to the need for the required reports, and the benefits to be obtained from the reports. The deadlines set forth herein are reasonable given the need to investigate the potential threat to groundwater quality.

24. In accordance with Water Code section 13267(b), these findings provide the Discharger with a written explanation with regard to the need for remedial action and reports, and identify the evidence that supports the requirement to implement investigative activities, to implement cleanup and abatement activities if needed, and to submit the reports. The Discharger operates Berry and Ewing Lease which are subject to this Cleanup and Abatement Order. The technical and monitoring reports required by this Order are necessary to determine compliance with this Cleanup and Abatement Order.

25. Issuance of this Cleanup and Abatement Order is being taken for the protection of the environment and as such is exempt from provisions of the California Environmental Quality Act (CEQA) (Public Resources Code section 21000 et seq.) in accordance with California Code of Regulations, title 14, sections 15061(b)(3), 15306, 15307, 15308, and 15321. This Cleanup and Abatement Order generally requires the Discharger to submit plans for approval prior to implementation of investigative and, if necessary, cleanup activities at the Berry and Ewing Lease. Mere submission of plans is exempt from CEQA as submission will not cause a direct or indirect physical change in the environment and/or is an activity that cannot possibly have a significant effect on the environment. CEQA review at this time would be premature and speculative, as there is not enough information concerning the Discharger's proposed remedial activities and

possible associated environmental impacts. If the Central Valley Water Board determines that implementation of any plan required by this Cleanup and Abatement Order will have a significant effect on the environment, the Central Valley Water Board will conduct the necessary and appropriate environmental review prior to the Executive Officer's approval of the applicable plan.

26. The Discharger will bear the costs, including the Central Valley Water Board's costs, of determining whether implementation of any plan required by this Cleanup and Abatement Order will have a significant effect on the environment and, if so, in preparing and handling any documents necessary for environmental review. If necessary, the Discharger and a consultant acceptable to the Central Valley Water Board shall enter into a memorandum of understanding with the Central Valley Water Board regarding such costs prior to undertaking any environmental review.

IT IS HEREBY ORDERED that, pursuant to section 13304 and section 13267 of Division 7 of the California Water Code, LINN Operating Inc., shall cease the discharge of wastewater in violation of applicable laws, policies, and regulations, and clean up and abate the condition of unauthorized discharge in accordance with the schedule below:

1. By **29 March 2016**, the Discharger shall prepare and submit to the Central Valley Water Board a Work Plan with a time schedule proposed by the Discharger and approved by the Assistant Executive Officer. The schedule shall provide the ability to determine whether the discharge can comply with applicable laws, policies, and regulations that would allow the issuance of waste discharge requirements by 31 October 2016. If issuance of waste discharge requirements is not obtained by 31 December 2016, the discharge shall cease. The Work Plan shall include, but is not limited to, the following tasks:

    a. Identify all owners of the surface rights and the mineral rights of the Berry and Ewing Lease.

    b. Conduct a hydrogeological site characterization to assess the effects of the discharge of oil field wastes on underlying groundwater. The characterization shall be conducted in a manner to utilize acquired information to further assess the impacts of the wastewater discharge on groundwater. If the Discharger demonstrates that the wastes discharged to the ponds cannot affect the quality of underlying groundwater, the Assistant Executive Officer may rescind by signed letter all or part of the requirements to complete the groundwater investigation and groundwater monitoring portions of this Order.

    c. The hydrogeological characterization, and a determination whether there has been a release of waste constituents to groundwater, shall be consistent with the detection monitoring requirements of Title 27, CCR, section 20005 et seq. (Title 27). This includes the development of a Sample Collection and Analysis Plan (SCAP); the location and installation of groundwater monitoring wells; soil sampling locations (if necessary); and the sampling and analysis methods for groundwater and soil samples, in accordance with Monitoring and Reporting

Program No. R5-2016-0706 (MRP), which is attached hereto and made part of this Order;

d. Monitoring wells installed for the hydrogeological characterization shall be installed at appropriate depths that will allow the collection of representative groundwater samples. Existing groundwater wells documented to be in appropriate locations, where well depth and construction details can be provided, may be proposed as sampling points;

e. Collect and submit representative groundwater and soil samples for laboratory analysis for waste constituents in Monitoring and Reporting Program No. R5-2016-0706 in accordance with a SCAP approved by the Assistant Executive Officer;

f. The methods of analysis and the method detection limits (MDLs) used must be appropriate for the expected concentrations. The laboratory reporting limits (RLs) for all reported monitoring data shall be set no greater than the practical quantitation limit (PQL). MDLs, PQLs and RLs shall be derived by the laboratory for each analytical procedure, according to State of California laboratory accreditation procedures. Analysis with an MDL greater than the most stringent drinking water standard that results in non-detection needs to be reanalyzed with the MDL set lower than the drinking water standard or at the lowest level achievable by the laboratory;

g. Conduct a well survey to identify all water supply wells within one-mile of the ponds. The Discharger shall sample the identified domestic water supply wells and analyze the samples for the waste constituents listed in Table I of Monitoring and Reporting Program No. R5-2016-0706. If access to private property is needed, requested and denied, a demonstration of that is required;

h. If the investigation determines that a release of wastewater to groundwater or soils has occurred, the hydrogeological characterization shall include a characterization of the nature and extent of the release consistent with the evaluation monitoring program requirements contained in section 20425 of Title 27;

i. If the investigation determines that a release of wastewater to groundwater or soils has occurred, then following the characterization of the nature and extent of the release, a groundwater remediation program shall be submitted for Assistant Executive Officer review and approval that is consistent with the corrective action program requirements contained in section 20430 of Title 27. This will entail the preparation of an engineering feasibility study followed by a proposed corrective action program;

j. Based on information acquired during the hydrogeological site characterization, submit a report of waste discharge (RWD) for preparation of waste discharge requirements, if appropriate, consistent with current regulations and policies. It is anticipated that general WDRs for discharges to unlined ponds will be presented

to the Central Valley Water Board for adoption by August 2016. Submittal of a Notice of Intent to come under a general WDR, with the additional technical information, will meet the requirement of a RWD.

k. Include in the report a table that provides the total monthly discharge in barrels and gallons to the pond(s) subject to this Order from 1 January 2013 to the end of the month immediately preceding the date of the report. The table shall include a description of the sources and volume of each individual waste stream going to each pond.

l. Include in the report a calculation of the average monthly discharge of wastes to the ponds from 1 June 2014 through 1 June 2015.

2. Beginning **28 April 2016**, or a date approved by the Assistant Executive Officer, and quarterly thereafter until all Work Plan activities are complete, the Discharger shall submit technical reports that provide information to document the Work Plan activities completed to date and to ultimately document that all elements of the Work Plan have been completed. Corrective actions shall be proposed and included in these technical reports when Work Plan activities fail to satisfy any interim or final success criteria.

3. The Discharger shall comply with the MRP, which is part of this Order, and any revisions thereto as ordered by the Assistant Executive Officer. The submission dates of self-monitoring reports shall be no later than the submission date specified in the MRP.

4. The Discharger shall comply with the following Discharge Prohibitions:

a. The average monthly discharge volume of oil field wastewater to the ponds shall not exceed the average monthly discharge volume calculated in Order 1.l. above.

b. The Discharger shall not discharge produced fluids to any location on the Berry and Ewing Lease other than a permitted injection well, a permitted pond or disposal facility, or the ponds which are the subject of this Order.

c. The discharge to land of fluids from wells that have undergone "well stimulation treatment," as defined by California Code of Regulations, title 14, section 1761 (including hydraulic fracturing, acid fracturing, and acid matrix stimulation) is prohibited, unless the Discharger meets the requirements of Order Requirement No. 5, below.

d. The discharge of any fluid associated with the frac-packing process (i.e., emplacement of a filter pack into the well annulus using a pressurized high-viscosity fluid that is not a drilling mud and that does not meet the standard of well stimulation) to land is prohibited. The discharge of produced water from wells that have been frac-packed is prohibited, unless the Discharger meets the requirements of Order Requirement No. 5, below.

e. Discharge of waste classified as 'hazardous', as defined in the California Code of Regulations, title 23, section 2510 et seq., is prohibited.

5. The discharge of any produced water from wells that have undergone a "well stimulation treatment" as defined in California Code of Regulations, title 14, section 1761 (including hydraulic fracturing, acid fracking, and acid matrix stimulation) or have undergone a frac-packing may only be authorized in writing by the Executive Officer following a demonstration by the Discharger that the well stimulation or frac-packing fluids are not present in the oil field produced water from the specific well or wells that have been stimulated and/or frac-packed.

6. The ponds shall either be free of oil or effectively screened and maintained to preclude entry of birds or animals.

7. Ponds adjacent to natural drainage courses shall be protected from inundation or washout, or properly closed.

8. **All activities in the Work Plan shall be completed** in accordance with time frames included in the Work Plan as approved by the Assistant Executive Officer.

9. With each report and work plan required by this Cleanup and Abatement Order, the Discharger shall provide under penalty of perjury under the laws of California a "Certification" statement to the Central Valley Water Board. The "Certification" shall include the following signed statement:

   I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. Pursuant to Water Code section 13350, any person who intentionally or negligently violates a cleanup and abatement order may be liable civilly in an amount which shall not exceed five thousand dollars ($5,000), but shall not be less than five hundred dollars ($500), for each day in which the cleanup and abatement order is violated.

10. If it is determined that discharges from the Berry and Ewing Lease has impacted the beneficial uses of water, the Discharger can be further required upon notification by the Assistant Executive Officer to provide a replacement water supply or treat the water to allow continued use by any affected party.

NOTIFICATIONS

1. **Applicability**. Requirements established pursuant to Water Code sections 13304 and 13267(b) are enforceable when signed by the Assistant Executive Officer of the Central Valley Water Board.

2. **Enforcement Actions.** The Central Valley Water Board reserves its right to take any enforcement action authorized by law for violations, including but not limited to, violations of the terms and conditions of this Cleanup and Abatement Order.

3. **Inspection and Entry.** The Discharger shall allow the Central Valley Water Board or State Water Board, and/or their authorized representatives (including an authorized contractor acting as their representative), upon the presentation of credentials and other documents, as may be required by law, to at reasonable times do the following:

   a. Enter upon the Facility properties;
   b. Access and copy any records related to this Cleanup and Abatement Order;
   c. Inspect and photograph any facilities, equipment, practices, or operations regulated or required by this Cleanup and Abatement Order; and
   d. Sample or monitor any substances or parameters on-site for the purposes of assuring Cleanup and Abatement Order compliance or as otherwise authorized by the Porter-Cologne Water Quality Control Act.

4. **Potential Liability.** Pursuant to Water Code section 13350, any person who intentionally or negligently violates a cleanup and abatement order may be liable civilly in an amount which shall not exceed five thousand dollars ($5,000), but shall not be less than five hundred dollars ($500), for each day in which the cleanup and abatement order is violated. Pursuant to Water Code section 13268, any person failing or refusing to furnish technical or monitoring program reports as required by section 13267, or falsifying any information provided therein, is guilty of a misdemeanor, and may be liable civilly in an amount which shall not exceed one thousand dollars ($1,000) for each day in which the violation occurs.

5. **Cost Reimbursement.** Pursuant to Water Code section 13304, the Central Valley Water Board is entitled to, and may seek reimbursement for, all reasonable costs it actually incurs to investigate unauthorized discharges of waste and to oversee cleanup of such waste, abatement of the effects thereof, or other remedial action, required by this Cleanup and Abatement Order. The Discharger shall reimburse the State of California for all reasonable costs actually incurred by the Central Valley Water Board to investigate unauthorized discharges of waste and to oversee cleanup of such waste, abatement of the effects thereof, or other remedial action, required by this Cleanup and Abatement Order, according to billing statements prepared from time to time by the State Water Board.

6. **Waste Management.** The Discharger shall properly manage, store, treat, and dispose of contaminated soils and groundwater which are extracted or disturbed during the investigation in accordance with applicable federal, state, and local laws and regulations. The storage, handling, treatment, or disposal of soil containing waste constituents and

polluted groundwater shall not create conditions of pollution, contamination or nuisance as defined in Water Code section 13050(m). The Discharger shall obtain or apply for coverage under waste discharge requirements or a conditional waiver of waste discharge requirements for any discharge of the waste to (a) land for treatment, storage, or disposal or (b) waters of the State.

7. **Requesting Administrative Review by the State Water Board.** Any person aggrieved by an action of the Central Valley Water Board that is subject to review as set forth in Water Code section 13320(a), may petition the State Water Board to review the action. Any petition must be made in accordance with Water Code section 13320 and California Code of Regulations, title 23, section 2050 and following. The State Water Board must receive the petition within thirty (30) days of the date the action was taken, except that if the thirtieth day following the date the action was taken falls on a Saturday, Sunday, or state holiday, then the State Water Board must receive the petition by 5:00 p.m. on the next business day. Copies of the laws and regulations applicable to filing petitions may be provided upon request or found on the internet at: http://www.waterboards.ca.gov/public_notices/petitions/water_quality/index.shtml

8. **Modifications.** Any modification to this Cleanup and Abatement Order shall be in writing and approved by the Assistant Executive Officer, including any extensions. Any written extension request by the Discharger shall include justification for the delay.

9. **No Limitation of Water Board Authority**. This Cleanup and Abatement Order in no way limits the authority or ability of the Central Valley Water Board to institute additional enforcement actions or to require additional investigation and any necessary cleanup of the property consistent with the Water Code. This Cleanup and Abatement Order may be revised as additional information becomes available.

REPORTING REQUIREMENTS

1. **Duty to Use Qualified Professionals.** The Discharger shall provide documentation that plans and reports required under this Cleanup and Abatement Order are prepared under the direction of appropriately qualified professionals. Business and Professions Code sections 6735, 7835, and 7835.1 require that engineering and geologic evaluations and judgments be performed by or under the direction of licensed professionals. The Discharger shall include a statement of qualifications and license numbers, if applicable, of the responsible lead professionals in all plans and reports required under this Cleanup and Abatement Order. The lead professional shall sign and affix their license stamp, as applicable, to the report, plan, or document.

2. **Electronic and Paper Media Reporting Requirements.**
The Discharger shall comply with the following reporting requirements for all reports and plans (and amendments thereto) required by this Cleanup and Abatement Order:

   a. The Discharger shall submit one paper and one electronic, searchable Portable Document Format (PDF) copy of all technical reports, monitoring reports, progress reports, and plans required by this Cleanup and Abatement Order. The

PDF copy of all the reports shall also be uploaded into the GeoTracker database, as required by Reporting Requirement 2.(d)(iv) below.

b. Larger documents shall be divided into separate files at logical places in the report to keep file sizes under 150 megabytes.

c. All paper correspondence and documents submitted to the Central Valley Water Board must include the GeoTracker Site Global ID.

d. Electronic Data Submittals to the Central Valley Water Board in compliance with the Cleanup and Abatement Order are required to be submitted electronically via the Internet into the GeoTracker database http://GeoTracker.waterboards.ca.gov/ (GeoTracker Global ID: **T10000007297** for the Berry and Ewing Lease).

The electronic data shall be uploaded on or prior to the regulatory due dates set forth in the Cleanup and Abatement Order or addenda thereto. To comply with these requirements, The Discharger shall upload to the GeoTracker database the following minimum information:

i. Laboratory Analytical Data: Analytical data (including geochemical data) for all waste, soil, and water samples shall be submitted in Electronic Deliverable Format (EDF), which facilitates the transfer of data from the laboratory to the end user. Waste, soil, and water include analytical results of samples collected from the following locations and devices: surface samples, equipment, monitoring wells, boreholes, gas and vapor wells or other collection devices, groundwater, piezometers, and stockpiles.

ii. Locational Data: All permanent monitoring locations (monitoring wells, sediment sampling locations, etc.) shall be surveyed with latitude and longitude coordinates in a decimal degree format basin on the North American Datum 1983 ellipsoid, and accurate to within one meter (3 feet).

iii. Site Map: Site map or maps which display discharge locations, streets bordering the facility, and sampling locations for all waste, soil, and water samples. The site map is a stand-alone document that may be submitted in various electronic formats. A site map must also be uploaded to show the maximum extent of any soil impact and water pollution. An update to the site map may be uploaded at any time.

iv. Electronic Report: A complete copy (in character searchable PDF) of all work plans, work plan modifications, assessment, cleanup, and monitoring reports including the signed transmittal letters, professional certifications, and all data presented in the reports.

3. **Oversight Reimbursement.** The Discharger may be required to reimburse the Central Valley Water Board for reasonable costs associated with oversight of the investigation and remediation of the Site, as provided in Water Code section 13304(c) (1).

By 29 February 2016, provide the name and address where the invoices shall be sent. Failure to provide a name and address for invoices and/or failure to reimburse the Central Valley Water Board's reasonable oversight costs shall be considered a violation of this Cleanup and Abatement Order.

4. **Signatory Requirements.** All reports and work plans required under this Cleanup and Abatement Order shall be signed and certified, in accordance with Order Item 9 above, by the Discharger or by a duly authorized representative and submitted to the Central Valley Water Board. A person is a duly authorized representative only if: 1) The authorization is made in writing by The Discharger; and 2) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.)

5. All monitoring and technical reports required under this Cleanup and Abatement Order shall be submitted to:

   California Regional Water Quality Control Board
   Central Valley Region
   1685 E Street, Suite 200
   Fresno, CA 93706
   Attn: Rebecca T. Asami

   GeoTracker Site Global ID: **T10000007297** for the Berry and Ewing Lease

FAILURE TO COMPLY WITH THE PROVISIONS OF THIS CLEANUP AND ABATEMENT ORDER MAY SUBJECT YOU TO FURTHER ENFORCEMENT ACTION, INCLUDING BUT NOT LIMITED TO, ASSESSMENT OF CIVIL LIABILITY UNDER SECTIONS 13268 AND 13350 OF THE WATER CODE AND REFERRAL TO THE DISTRICT ATTORNEY OR ATTORNEY GENERAL FOR INJUNCTIVE RELIEF AND CIVIL OR CRIMINAL LIABILITY.

W. Dale Harris
-for-

Ordered by: _____
CLAY L. RODGERS, Assistant Executive Officer

11/28/2016
(Date)

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM R5-2016-0706
FOR
LINN OPERATING, INC.
BERRY AND EWING LEASE
MIDWAY-SUNSET OIL FIELD
KERN COUNTY

Compliance with this Monitoring and Reporting Program (MRP) is required pursuant to Water Code section 13267 as ordered by Cleanup and Abatement Order R5-2016-0706 (the "CAO"). Failure to comply with this program constitutes noncompliance with the CAO and the Water Code, which can result in the imposition of civil liability. All sampling and analyses shall be by United States Environmental Protection Agency (USEPA) approved methods. The test methods chosen for detection of the constituents of concern shall be subject to review and concurrence by the California Regional Water Quality Control Board, Central Valley Region ("Central Valley Water Board").

A complete list of substances which are tested for and reported on by the testing laboratory shall be provided to the Central Valley Water Board. All peaks must be reported. In addition, both the method detection limit (MDL) and the practical quantification limit shall be reported. Detection limits shall equal or be more precise than USEPA methodologies. Analysis with an MDL greater than the most stringent drinking water standard that results in non-detection needs to be reanalyzed with the MDL set lower than the drinking water standard or at the lowest level achievable by the laboratory. Water samples must be analyzed within allowable holding time limits as specified in 40 CFR Part 136. All quality assurance/quality control (QA/QC) samples must be run on the same dates when samples were actually analyzed. Proper chain of custody procedures must be followed and a copy of the completed chain of custody form shall be submitted with the report. All analyses must be performed by a State Water Resources Control Board Division of Drinking Water Program certified laboratory.

The Discharger shall maintain all sampling and analytical results: date, exact place, and time of sampling; dates analyses were performed; analyst's name; analytical techniques used; and results of all analyses. Such records shall be retained for a minimum of three years. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge, or when requested by the Central Valley Water Board.

The Discharger shall provide a list of all chemicals and additives used in the production and processing of oil and the treatment of oil field produced water. This list shall include all chemicals and additives used in any stage of production including, but not limited to, substances injected into production and enhanced oil recovery wells and distribution and collection lines, substances added or applied to produced fluids either prior to or after treatment, and substances added or applied to produced fluids prior to or after being discharged to ponds or the ground surface. The Discharger shall add this list to Table 1 of this MRP under the heading of **Oil Production and Process Chemicals and Additives**. The Discharger shall sample and monitor for these chemicals and additives when conducting the groundwater and wastewater effluent monitoring programs of this MRP.

GROUNDWATER MONITORING

The Discharger shall operate and maintain a groundwater monitoring system that complies with the requirements of the CAO and is consistent with the detection monitoring requirements of section 20420 of Title 27, CCR, section 20005 et seq. (Title 27). The monitoring system shall be certified by a California-licensed professional civil engineer or geologist as being consistent with the detection monitoring requirements of Title 27. The Discharger shall revise the groundwater monitoring system (after review and approval by Central Valley Water Board staff) as needed to characterize the groundwater and to delineate the nature and extent of any release of waste constituents due to the operation of the surface impoundments (ponds) that are the subject of the CAO.

Groundwater samples shall be collected quarterly from groundwater monitoring wells and other sampling points established in accordance with the hydrogeological characterization required by the CAO. The collected samples shall be analyzed for the parameters and constituents listed in Table I in accordance with the specified methods and frequencies. The Discharger shall collect, preserve, and transport groundwater samples in accordance with the Sample Collection and Analysis Plan approved by the Assistant Executive Officer.

WASTEWATER MONITORING

Produced water samples shall be collected quarterly at a point in the system before discharge to the ponds. Time of collection of the sample shall be recorded. The collected produced water samples shall be analyzed for the parameters and constituents listed in Table I in accordance with the specified methods and frequencies. The Discharger shall collect, preserve, and transport produced water samples in accordance with the approved Sample Collection and Analysis Plan.

The Discharger shall record the volume of wastewater discharged to the ponds monthly. The wastewater volumes shall be reported in the quarterly monitoring reports.

FACILITY MONITORING

Permanent markers shall be in place with calibrations indicating the water level at design capacity and available operational freeboard. The freeboard shall be monitored on all ponds to the nearest tenth of a foot **monthly**.

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 repair and maintenance needed for: drainage control systems; slope failure; groundwater monitoring wells, or any change in site conditions that could impair the integrity of the waste management unit or precipitation and drainage control structures; and shall assess preparedness for winter conditions including, but not limited to, erosion and sedimentation control. The Discharger shall take photos of any problems areas before and after repairs. Any necessary construction, maintenance, or repairs shall be

completed by 31 October. Annual facility inspection reporting shall be **submitted by 30 November**.

The Discharger shall inspect all precipitation, diversion, and drainage facilities for damage **within 7 days** following major storm events (e.g., a storm that causes continual runoff for at least one hour) capable of causing flooding, damage, or significant erosion. The Discharger shall take photos of any problem areas before and after repairs. Necessary repairs shall be completed **within 30 days** of the inspection. Notification and reporting requirements for major storm events shall be conducted as required in Reporting Requirements 2. of this MRP.

The Discharger shall monitor and record on-site rainfall data using an automated rainfall gauge. Data shall be used in establishing the severity of storm events and wet seasons for comparison with design parameters used for waste management unit design and conveyance and drainage design. Daily data and on-site observation shall be used for establishing the need for inspection and repairs after major storm events. Rainfall data shall be reported in the quarterly monitoring reports, as required by this MRP.

REPORTING REQUIREMENTS

1. The Discharger shall report all monitoring data and information as specified herein. Reports that do not comply with the required format will be **REJECTED** and the Discharger shall be deemed to be in noncompliance with this Monitoring and Reporting Program.

2. Quarterly groundwater and wastewater monitoring and remediation system reports shall be submitted to the Central Valley Water Board according to the schedule below.

Monitoring Period	Report Due
January – March	April 30
April – June	July 31
July – September	October 31
October – December	January 31

Each quarterly report shall include the following minimum information:

(a) a description and discussion of the sampling event and results, including trends in the concentrations of waste constituents and groundwater elevations in the wells. If there are any deficiencies during the sampling event or if impacts to groundwater extend beyond recent historical boundaries, the report shall include an explanation and/or evaluation and propose options for addressing or correcting the deficiencies;

(b) field logs that contain, at a minimum, water quality parameters measured before, during, and after purging, method of purging, depth of water, volume of water purged, etc.;

(c) groundwater contour maps for all groundwater zones, if applicable;

(d) waste constituent isoconcentration maps for all groundwater zones, if applicable;

(e) a table showing well construction details that shall include, at a minimum, well number, groundwater zone being monitored, measuring point elevation, depth to top and bottom of screen, water level elevation, and depth to water;

(f) cumulative data tables containing all historical water quality analytical results and depth to groundwater;

(g) a copy of all laboratory analytical data reports;

(h) results of any monitoring done more frequently than required at the locations specified in this Monitoring and Reporting Program or at other locations at the site shall be reported to the Central Valley Water Board;

(i) a summary of any spills/releases that occurred during the quarter and tasks undertaken in response to the spills/releases;

(j) an update and status on each of the outstanding tasks required by the CAO or Assistant Executive Officer;

(k) a map showing all wells on the facility and the location of wastewater sampling;

3. 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 to demonstrate compliance with the requirements. All data shall be submitted in an electronic form acceptable to the Assistant Executive Officer.

4. Each quarterly monitoring report shall be submitted as a single document and contain all monitoring data collected at the site including all information cited in the above sections. A hard copy of all required reports or responses shall be submitted by the due date unless otherwise arranged with Central Valley Water Board staff.

5. The Discharger shall submit an **annual report by 31 January** of each year for the preceding year. The report can be combined with the Discharger's fourth quarter monitoring report. The report shall contain:

(a) Both tabular and graphical summaries of all data obtained during the year;

(b) An in-depth evaluation of groundwater conditions at the site including short and long-term trends of the constituents of concern in each area of the site;

(c) An evaluation of the effectiveness of the groundwater monitoring network in delineating the lateral and vertical extent of impacts to groundwater in all affected areas of the site. This needs to include an identification of any data gaps and potential deficiencies in the monitoring system or reporting program. The report shall include recommendations to address any deficiencies in the monitoring and report program;

(d) An evaluation of the effectiveness of each of the remediation systems. The evaluation shall include the effectiveness of the systems in remediating impacted groundwater and each of the source areas or suspected source areas. The report shall include recommendations for improving or expanding the systems, if necessary;

(e) A summary of the performance of each remediation system including the amount and percentage of operating and downtime, and the amount of petroleum hydrocarbons removed, if applicable; and

(f) A summary of all spills/releases, if any, that occurred during the year, tasks undertaken in response to the spills, the results of the tasks undertaken.

6. The Discharger may request that the Assistant Executive Officer change the monitoring frequency or constituents of concern after the first year of monitoring. The request needs to include a demonstration that adequate data has been collected to determine background groundwater conditions and a justification for the change.

7. The Discharger shall maintain a data base containing historical and current monitoring data in an electronic form acceptable to the Assistant Executive Officer. The data base shall be updated quarterly and provided to the Central Valley Water Board in electronic format.

8. The Discharger shall submit electronic copies of all work plans, reports, analytical results, and groundwater elevation data over the Internet to the State Water Board Geographic Environmental Information Management System database (GeoTracker) at *http://GeoTracker.swrcb.ca.gov*. Electronic submittals shall comply with GeoTracker standards and procedures, as specified on the State Water Board's web site. Uploads to GeoTracker shall be completed on or prior to the due date. In addition, a hardcopy of each document shall be submitted to:

California Regional Water Quality Control Board
Central Valley Region
1685 E Street, Suite 200
Fresno, CA 93706
Attn: Ron Holcomb

9. A transmittal letter explaining the essential points shall accompany each report. At a minimum, the transmittal letter shall identify any violations found since the last report was submitted, and if the violations were corrected. If no violations have occurred since the last submittal, this shall be stated in the transmittal letter. The transmittal letter shall also state that a discussion of any violations found since the last report was submitted, and a description of the actions taken or planned for correcting those violations, including any references to previously submitted time schedules, is contained in the accompanying report. The transmittal letter shall contain a statement identical to that required by the CAO by the Discharger, or the Discharger's authorized agent, under penalty of perjury, that to the best of the signer's knowledge the report is true, accurate, and complete.

The Discharger shall implement the above monitoring program on the effective date of this Program.

GeoTracker Site Global ID: T10000007297 for the Berry and Ewing Lease

Ordered by: W Dal Harrison - for -
CLAY L. RODGERS, Assistant Executive Officer

1/28/2016
Date

Table 1 – Wastewater and Groundwater Monitoring

Parameters	Units	Monitoring Frequency	US EPA or other Method	Reporting Frequency
Groundwater Elevation	feet & hundredths, MSL[1]	Quarterly		Quarterly
Field Parameters				
Temperature	°F[2]	Quarterly		Quarterly
Electrical Conductivity	µmhos/cm[3]	Quarterly		Quarterly
pH	pH units	Quarterly		Quarterly
Monitoring Parameters				
Total Dissolved Solids (TDS)	mg/L[4]	Quarterly	160.1	Quarterly
Electrical Conductivity	µmhos/cm	Quarterly	120.1	Quarterly
Boron, dissolved	mg/L	Quarterly	6010B	Quarterly
Oil Production and Process Chemicals and Additives[5]	µg/L	Quarterly	As Appropriate[6]	Quarterly
Standard Minerals				
Alkalinity as CaCO3	mg/L	Quarterly	310.1	Quarterly
Bicarbonate Alkalinity as CaCO3	mg/L	Quarterly	310.1	Quarterly
Carbonate Alkalinity as CaCO3	mg/L	Quarterly	310.1	Quarterly
Hydroxide Alkalinity as CaCO3	mg/L	Quarterly	310.1	Quarterly
Sulfate , dissolved	mg/L	Quarterly	300.0	Quarterly
Nitrate-N, dissolved	mg/L	Quarterly	300.0	Quarterly
Calcium, dissolved	mg/L	Quarterly	6010B	Quarterly
Magnesium, dissolved	mg/L	Quarterly	6010B	Quarterly
Sodium, dissolved	mg/L	Quarterly	6010B	Quarterly
Potassium	mg/L	Quarterly	6010B	Quarterly
Chloride	mg/L	Quarterly	300.0	Quarterly
PAHs[7]	µg/L[8]	Quarterly	8270	Quarterly
Total Petroleum Hydrocarbons (TPH)	µg/L	Quarterly	418.1	Quarterly
Volatile Organic Compounds Full Scan	µg/L	Quarterly	8260B	Quarterly

Table 1 – Wastewater and Groundwater Monitoring

Parameters	Units	Monitoring Frequency	US EPA or other Method	Reporting Frequency
Stable Isotopes				
Oxygen (^{18}O)	pCi/L[9]	Quarterly	900.0	Quarterly
Deuterium (Hydrogen 2, ^{2}H, or D)	pCi/L	Quarterly	900.0	Quarterly
Radionuclides				
Radium-226	pCi/L	Quarterly	SM[10] 7500-Ra	Quarterly
Radium-228	pCi/L	Quarterly	SM 7500-Ra	Quarterly
Gross Alpha particle (excluding radon and uranium)	pCi/L	Quarterly	SM 7110	Quarterly
Uranium	pCi/L	Quarterly	200.8	Quarterly
Constituents of Concern				
Lithium	mg/L	Quarterly	200.7	Quarterly
Strontium	mg/L	Quarterly	200.7	Quarterly
Iron	mg/L	Quarterly	200.8	Quarterly
Manganese	mg/L	Quarterly	200.8	Quarterly
Antimony	mg/L	Quarterly	200.8	Quarterly
Arsenic	mg/L	Quarterly	200.8	Quarterly
Barium	mg/L	Quarterly	200.8	Quarterly
Beryllium	mg/L	Quarterly	200.8	Quarterly
Cadmium	mg/L	Quarterly	200.8	Quarterly
Chromium (total)	mg/L	Quarterly	200.8	Quarterly
Chromium (hexavalent)	mg/L	Quarterly	7196A	Quarterly
Cobalt	mg/L	Quarterly	200.8	Quarterly
Copper	mg/L	Quarterly	200.8	Quarterly
Lead	mg/L	Quarterly	200.8	Quarterly
Mercury	mg/L	Quarterly	7470A	Quarterly

Table 1 – Wastewater and Groundwater Monitoring

Parameters	Units	Monitoring Frequency	US EPA or other Method	
Molybdenum	mg/L	Quarterly	200.8	Quarterly
Nickel	mg/L	Quarterly	200.8	Quarterly
Selenium	mg/L	Quarterly	200.8	Quarterly
Silver	mg/L	Quarterly	200.8	Quarterly
Thallium	mg/L	Quarterly	200.8	Quarterly
Vanadium	mg/L	Quarterly	200.8	Quarterly
Zinc	mg/L	Quarterly	200.8	Quarterly

[1] Mean Sea Level

[2] Degrees Fahrenheit

[3] Micromhos per centimeter

[4] Milligrams per liter

[5] A list of all chemicals and or additives used in the production and or processing of all oil and wastewater discharged into ponds or on to the ground surface

[6] Appropriate analytical methods may be proposed by the Discharger but are subject to the approval of the Assistant Executive Officer.

[7] Polycyclic aromatic hydrocarbons

[8] Micrograms per liter

[9] Picocuries per liter

[10] Standard Methods