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## Central Valley Regional Water Quality Control Board

20 April 2018

Gary Duncan  
Duncan's Pumping Service  
Star Route 2, Box 10  
Avenal, CA 93204

**CERTIFIED MAIL**  
**7017 3040 0000 4339 1187**

### **NOTICE OF APPLICABILITY (NOA), CENTRAL VALLEY REGIONAL WATER QUALITY CONTROL BOARD, ORDER NUMBER R5-2017-0036, GENERAL ORDER THREE, WASTE DISCHARGE REQUIREMENTS FOR OIL FIELD DISCHARGES TO LAND, DUNCAN'S PUMPING SERVICE, ORCHARD-SHANNON LEASE, PYRAMID HILLS OIL FIELD, KINGS COUNTY**

Duncan's Pumping Service (Duncan) operates the Orchard-Shannon Lease in the Pyramid Hills Oil Field, west of Highway 33 (Facility). The Facility utilizes four surface impoundments (ponds) for the disposal of produced wastewater (discharge). The ponds are on the northwest quarter of Section 33 of T24S, R18E MDB&M.

On 14 August 2017, Central Valley Regional Water Quality Control Board (Central Valley Water Board) staff received a Notice of Intent (NOI), with cover letter dated 9 June 2017, for coverage under Waste Discharge Requirements General Order for Oil Field Discharges to Land, General Order Number Three, Order Number R5-2017-0036 (General Order Three, or General Order). Based on the information provided by Duncan, the first encountered fluid under the ponds is petroleum. Three of the four ponds (Ponds No. 1, No. 2, and No. 4) at the Facility are constructed in the McLure Shale formation. Available data indicates that the bulk of the produced wastewater evaporates and the discharge will not migrate into waters that have beneficial uses as identified in the Water Quality Control Plan for the Tulare Lake Basin, Second Edition, Revised January 2015 (Basin Plan). Therefore, the discharges into Ponds No. 1, No. 2, and No. 4 are eligible for coverage under General Order Three.

This NOA serves as a notice that General Order Three is applicable to Ponds No. 1, No. 2, and No. 4 on the Facility (see the FACILITY SPECIFIC REQUIREMENTS, below). The Facility is hereby assigned General Order Number **R5-2017-0036-003**. Duncan should become familiar with all of the requirements, time schedules, prohibitions, discharge specifications, and provisions of General Order Three, and Monitoring and Reporting Program R5-2017-0036 (MRP).

This NOA does not provide coverage for discharges into Pond No. 3. Information available indicates that Pond No. 3 is constructed in weathered shale and/or in soil that overlies the McLure Shale, and is within a drainage feature that conveys surface runoff to the Sunflower Valley, where alluvial sediments containing groundwater are present. The FACILITY SPECIFIC REQUIREMENTS below contains a requirement for Duncan to submit either, a closure plan for Pond No. 3, or a work plan to provide the information needed to demonstrate that discharges to

Pond No. 3 can be covered under the General Order. Ongoing discharges into Pond No. 3 will be considered violations of Water Code section 13264 and Cleanup and Abatement Order R5-2015-0726.

As stated in Water Code section 13263, the discharge of waste into waters of the state is a privilege, not a right. General Order Three does not create a vested right for Duncan to continue the discharge of waste. Failure to prevent conditions that create or threaten to create pollution or nuisance or cause degradation will be sufficient reason to modify or revoke coverage under General Order Three, or otherwise enforce provisions of General Order Three, as well as prohibit further discharge.

In 2006, the Central Valley Water Board, the State Water Resources Control Board (State Water Board), and regional stakeholders began a joint effort to address salinity and nitrate problems in the region and adopt long-term solutions that will lead to enhanced water quality and economic sustainability. Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) is a collaborative basin planning effort aimed at developing and implementing a comprehensive salinity and nitrate management program. The CV-SALTS effort might effect changes to the Basin Plan that would necessitate the re-opening of General Order Three.

## **FACILITY SPECIFIC REQUIREMENTS**

Duncan must comply with all of the requirements of General order Three, including but not limited to the following:

1. Duncan shall maintain exclusive control of the discharge and shall comply with all of the requirements and timelines of General Order Three, and the MRP.
2. Duncan shall submit, **by 20 June 2018**, a water balance and capacity analysis, as described in General Order Three, Attachment B, Items A.7.(a - g) and B.4. Failure to do so may result in the rescission of this NOA or other enforcement action. Information that needs to be included in the water balance capacity analysis is discussed in the "WATER BALANCE AND POND CAPACITY ANALYSIS REQUIREMENTS" section of the enclosed memorandum. The water balance and capacity analysis shall establish and report the allowable maximum monthly flow volumes to the ponds. The allowable maximum monthly flow shall conform to the following:
  - a. A minimum of two feet of freeboard must be maintained, within each of the ponds, at all times, unless a California-registered civil engineer certifies that less freeboard is adequate, and
  - b. The allowable maximum monthly flow shall not exceed: 273 barrels (bbls) or 19,698 gallons (gal) to the Orchard-Shannon Lease ponds. This is the maximum reported monthly flow of produced wastewater to ponds between 26 November 2004 and 26 November 2014. Any increase beyond this reported maximum monthly flow volume constitutes a facility expansion requiring an evaluation under the California Environmental Quality Act (CEQA).

3. **By 20 June 2018** Duncan shall submit either: a closure plan for Pond No. 3, or a work plan to provide information needed to determine that discharges to Pond No. 3 can be covered under the General Order.
4. **By 22 May 2018** Duncan shall inform the Central Valley Water Board, in writing, as to whether the ponds accept produced wastewater discharge from any wells that have undergone a "well stimulation treatment," as defined by California Code of Regulations (CCR), title 14, section 1761 (including hydraulic fracturing, acid fracturing, and acid matrix stimulation). If it is determined that the ponds do accept wastewater from wells that accept produced wastewater discharge from any wells that have undergone a "well stimulation treatment," then Duncan shall comply with the compliance schedule in General Order Three, Provision E.8. and, **by 19 July 2018**, submit either: 1) a work plan to conduct studies necessary to demonstrate that the discharges of produced wastewater from wells that have been stimulated do not contain well stimulation treatment fluids in concentrations that could adversely affect beneficial uses of waters; or, 2) a work plan for an alternate disposal method for wastewater discharges from wells with a history of, or are planned to receive a "well stimulation treatment."
5. Duncan shall operate and maintain all ponds sufficiently to protect the integrity of containment and berms and prevent overtopping and/or structural failure. Discharges not authorized by the General Order and not described in the NOI should be reported to our office. Discharge of wastes other than those described in the NOI is prohibited. If the method of waste disposal changes, Duncan must submit a Report of Waste Discharge (Form 200).
6. The required annual fee specified in the annual billing from the State Water Board shall be paid until coverage under General Order Three is officially terminated. Duncan must notify the Central Valley Water Board in writing to request termination.
7. Within **90 days** of receipt of this letter, Duncan shall also submit written certification that acceptable flow meters have been installed at a location or locations to ensure the accurate measurement of all discharge flows. This is required by Provision E.3 of General Order Three. The certification shall be accompanied by: (1) a description of the flow metering devices installed, (2) a diagram showing their locations at the Facility, and (3) evidence demonstrating that the devices were properly calibrated. An engineered alternative may be used if approved in writing by the Central Valley Water Board's Executive Officer.

According to information provided with the NOI, the discharges are contained within the ponds. A storm water permit does not appear to be required for the Facility. Order Number 2014-0057-DWQ (NPDES General Permit CAS000001) specifies waste discharge requirements for discharges of storm water associated with industrial activities. If the conditions or regulatory policies change, the Facility may need coverage under NPDES General Permit CAS000001. The Facility does not require coverage under NPDES General Permit CAS000001 at this time.

The MRP requires extensive monitoring of the Facility and the discharge. Failure to comply with the requirements in General Order Three and the MRP could result in an enforcement action as authorized by provisions of the California Water Code. A copy of General Order Three and the MRP is included with the enclosures to this notice. A copy can also be found online at: [http://www.waterboards.ca.gov/centralvalley/board\\_decisions/adopted\\_orders/general\\_orders/r5-2017-0036.pdf](http://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/general_orders/r5-2017-0036.pdf).

The MRP includes monitoring and reporting of chemicals and additives. Duncan should become familiar with those requirements. The Central Valley Water Board will review the MRP periodically and revise the requirements when necessary. The MRP can be modified if Duncan provides sufficient data to support the proposed changes. If monitoring consistently shows no significant variation in magnitude of a constituent concentration or parameter after a statistically significant number of sampling events, Duncan may request the MRP be revised by the Executive Officer to reduce monitoring frequency or minimize the list of constituents. The proposal must include adequate technical justification for reduction in monitoring frequency.

Duncan must comply with the Central Valley Water Board's Standard Provisions and Reporting Requirements for Waste Discharge Requirements, dated 1 March 1991 (Standard Provisions). A copy of the Standard Provisions is included with the enclosures to this notice. A copy can also be found online at: [http://www.waterboards.ca.gov/centralvalley/board\\_decisions/adopted\\_orders/std\\_provisions/w\\_dr-mar1991.pdf](http://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/std_provisions/w_dr-mar1991.pdf).

Any person aggrieved by this action of the Central Valley Water Board may petition the State Water Board to review this action in accordance with Water Code section 13320 and CCR, title 23, division 3, chapter 6, section 2050 and those that follow. The State Water Board must receive the petition by 5:00 p.m., 30 days after the date of this NOA, except that if the thirtieth day following the date falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day.

## **SUBMISSIONS**

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://www.waterboards.ca.gov/ust/electronic\\_submittal/index.shtml](http://www.waterboards.ca.gov/ust/electronic_submittal/index.shtml). A frequently asked question document for GeoTracker can be found at [http://www.waterboards.ca.gov/ust/electronic\\_submittal/docs/faq.pdf](http://www.waterboards.ca.gov/ust/electronic_submittal/docs/faq.pdf). 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. The Geotracker site Global I.D. number that is associated with this NOA is T10000006739.

In addition documents that are less than 50 MB shall be sent via electronic mail to: [centralvalleyfresno@waterboards.ca.gov](mailto:centralvalleyfresno@waterboards.ca.gov). Documents that are 50 MB or larger shall be

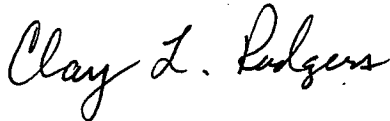
Duncan's Pumping Service  
Notice of Applicability for General Order Three  
Orchard-Shannon Lease  
Pyramid Hills Oil Field  
Kings County

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transferred to a disk and mailed to the Central Valley Water Board office at 1685 E Street, Fresno, CA 93706.

Please review the attached memorandum for more information. If you have any questions regarding this matter, please contact Zachary Jarvie of this office at (559) 445-5455 or at [zachary.jarvie@waterboards.ca.gov](mailto:zachary.jarvie@waterboards.ca.gov).



*for* Pamela Creedon  
Executive Officer

Enclosures: 20 April 2018 Memorandum  
1 March 1991 Standard Provisions  
General Order Three

cc: Gary Brierley, Professional Geologist, EnviroTech Consultants, Inc., Bakersfield  
Keith Nakatani, Oil and Gas Program Manager, Clean Water Action (NOA only, Via Email)

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**Central Valley Regional Water Quality Control Board**

**TO:** Clay Rodgers  
Assistant Executive Officer

W. Dale Harvey  
Supervising Engineer  
RCE No. 55628

**FROM:** Michael L. Pfister *MLP*  
Senior Engineering Geologist  
PG No. 5946

Zachary J. Jarvie *ZJJ*  
Engineering Geologist

**DATE:** 20 April 2018

**SUBJECT:** NOTICE OF APPLICABILITY (NOA), CENTRAL VALLEY REGIONAL WATER QUALITY CONTROL BOARD, ORDER NUMBER R5-2017-0036, GENERAL ORDER THREE, WASTE DISCHARGE REQUIREMENTS FOR OIL FIELD DISCHARGES TO LAND, DUNCAN'S PUMPING SERVICE, ORCHARD-SHANNON LEASE, PYRAMID HILLS OIL FIELD, KINGS COUNTY

Duncan's Pumping Service (Duncan) operates the Orchard-Shannon Lease (Lease) in the Pyramid Hills Oil Field West of Highway 33. The Lease utilizes four surface impoundments (ponds) for the disposal of oil field produced wastewater (discharge). The ponds are in the northeast corner of Section 33, T24S, R18E, MDB&M. On 14 August 2017, Central Valley Regional Water Quality Control Board (Central Valley Water Board) staff received a Notice of Intent (NOI), with cover letter dated 9 June 2017, for coverage under Waste Discharge Requirements General Order for Oil Field Discharges to Land, General Order Number Three, Order Number R5-2017-0036 (General Order Three). The NOI requested that the Central Valley Water Board consider information previously submitted for the Lease. This memorandum provides a summary of the information provided for the Lease and identifies the ponds to be covered under General Order Three.

### BACKGROUND INFORMATION

Presently a total of four ponds are utilized for the disposal of oil field produced wastewater. Oil and produced water from oil wells at the Lease are conveyed to a wash tank, which is used to separate oil and water. The produced wastewater from the wash tank is pumped, uphill, to the ponds, which are approximately 2,000 feet (ft.) northeast of the wash tank. General Order Three regulates oil field produced wastewater discharges where first encountered groundwater does not support beneficial uses as identified in the Water Quality Control Plan for the Tulare Lake Basin, Second Edition, Revised January 2015 (Basin Plan), or where there is no first encountered groundwater.

### **Submitted Information and Recent Regulatory History**

On 4 February 2015, Central Valley Water Board staff conducted an inspection of the Lease. As a result of this inspection, a Notice of Violation (NOV) was issued by Central Valley Water Board staff on 24 March 2015, for unregulated discharges on the Orchard Shannon Lease.

On 1 April 2015, Central Valley Water Board staff issued "*California Water Code Directive Pursuant to Section 13267*" (13267 Order), which required that Duncan "*Collect representative samples of wastewater within each of the ponds.*" In response, Duncan provided a report dated 12 June 2015 that contained analytical results from samples collected on 14 April 2015.

On 27 August 2015, Central Valley Water Board staff issued Cleanup and Abatement Order R5-2015-0726 (CAO) to Duncan.

In response to the CAO, EnviroTech Consultants, Inc. (EnviroTech) prepared a work plan (Work Plan), titled "*Duncan's Pumping Service, Work Plan, CAO R5-2015-0726, GeoTracker Site Global ID: T10000006739, Orchard-Shannon Lease, ...*" and dated 30 October 2015. The Work Plan reported that the McLure Shale is "*...underlain by an unconformity that separates overlying McClure from the lower Miocene and Oligocene vertically dipping beds. Oil is trapped within sands that are truncated by the basal McLure unconformity, indicating that the lower McLure shale is impermeable and forms a hydrocarbon trap.*"

On 17 May 2016, the Central Valley Water Board staff received a report from EnviroTech containing additional information for the Lease (Report). The Report is dated 12 May 2016, and titled "*Duncan's Pumping Service, Orchard-Shannon Lease, GeoTracker Site Global ID: T10000006739, Response to Central Valley Regional Water Quality Control Board, CAO R5-2015-0726, Issued on August 27, 2015, Additional Information Report, Pyramid Hills Oil Field ...*".

On 19 October 2017, Central Valley Water Board staff received an e-mail from EnviroTech containing monthly discharge volumes from January 2004 through December 2014 for the Orchard-Shannon Lease.

## POND CHARACTERISTICS

The dimensions and coordinate locations for the ponds are summarized in **Table 1**, below.

**Table 1 POND Information for the Orchard-Shannon Lease.**

Lease	Pond I.D.(s)	Dimensions (ft.)			Coordinates Latitude, Longitude	Underlying Material
		Length	Width	Depth		
Orchard-Shannon	Pond No. 1	138	12	6	35.80211, -120.02710	shale
	Pond No. 2	156	15	6	35.80204, -120.02732	shale
	Pond No. 3 *	54	12	8	35.80219, -120.02766	soils and shale
	Pond No. 4	90	12	8	35.80180, -120.02765	shale

\* Pond 3 is constructed within weathered shale and/or soils that have accumulated within a surface drainage feature. The produced wastewater discharged into this pond has the potential to percolate into the nearby alluvium in an area known as Sunflower Valley. Coverage for Pond No. 3 under General Order Three does not appear appropriate based on data provided to date.

## DISCHARGE CHARACTERISTICS

### Flow Volumes

The ten year average monthly volume of discharge to the ponds are reported by Duncan and EnviroTech as being 149 bbls.

Under Discharge Specifications, Item B.2., General Order Three states *“The discharge flow shall not exceed actual maximum monthly average produced wastewater flow to pond between 26 November 2004 and 26 November 2014. The discharge flow also shall not exceed the maximum design flow of the Facility’s limiting unit as described by the technical data in the NOI.”* During this time frame, the maximum monthly volume of produced wastewater and discharge reported for the Orchard-Shannon Lease is 273 bbls in January 2005.

Produced wastewater must not over top and flow outside of the ponds. General Order Three requires that a minimum of two feet of freeboard must be maintained at all times. The monthly discharges, up to and including the above noted maximum monthly volumes cannot be used to justify a violation of the General Order’s requirements. The General Order also prohibits all wastewater discharges outside of the ponds. Wastewater is not used or permitted for dust control on the Leases.

### Waste Constituents

The disposal methods for accumulated solids are not reported. Discharge Specifications, Item B.16., of General Order Three requires that the Discharger monitor the accumulation of solids within the ponds and as necessary remove them to maintain adequate treatment storage and capacity. General Order Three’s Section D., titled *“Solids Disposal Specifications”* includes handling and storage requirements for solids removed.



Produced wastewater samples were collected by Duncan on 14 April 2015. The sample results are summarized in **Table 2**, below. Units of measurement are milligrams per liter (mg/L), micro-grams per liter ( $\mu\text{g/L}$ ), and picocuries per liter (pCi/L).

**Table 2 Data from produced wastewater sample collected on April 2015.**

Sample Source	Orchard-Shannon Lease Wastewater Storage Tank	
Lab Sample ID	1504156-01	
<b>Constituents of Salinity</b>		<b>Units</b>
Total Dissolved Solids (TDS)	7,800	mg/L
Chloride	1,900	mg/L
Boron	10	mg/L
<b>Benzene and selected PAH</b>		
Benzene	<5.0	$\mu\text{g/L}$
Naphthalene	<10.0	$\mu\text{g/L}$
Phenanthrene	21.5	$\mu\text{g/L}$
Pyrene	<10.0	$\mu\text{g/L}$
Chrysene	7.2	$\mu\text{g/L}$
<b>Radioactivity</b>		
Gross Alpha	20.1	pCi/L

## REGIONAL CHARACTERISTICS

Ponds No. 1, No. 2, and No. 4 are constructed in the surface exposure of the McLure Shale on the western flank of the Pyramid Hills Anticline. Duncan has not identified the thickness of the McLure Shale beneath the Orchard-Shannon ponds. Information available indicates that Pond No. 3 is constructed in weathered shale and/or in soil that overlies the McLure Shale, and is within a drainage feature that conveys surface runoff to the Sunflower Valley. Central Valley Water Board staff has reviewed the geologic data available on the DOGGR Well Finder website for the limited number of oil and gas wells in the vicinity of the ponds. These wells have American Petroleum Institute (API) numbers 03100088, 03100128, 03100159, and 03120194. Based on the geologic boring logs for these wells, Central Valley Water Board staff estimates that the thickness of the McLure Shale, beneath the Orchard-Shannon ponds is between 300 and 600 ft. Duncan reports that first encountered fluids beneath the ponds are immediately below the McLure shale, within the oil field production zone. The McLure Shale is described by Duncan as having low permeability.

Sunflower Valley is west of the Pyramid Hills and down slope from the ponds and is within the boundaries of Detailed Analysis Unit 245 of the Basin Plan. The Basin Plan designated

beneficial uses for groundwater within Detailed Analysis Unit 245 are: Municipal and Domestic Supply; Agricultural Supply; and Industrial Service Supply.

Aerial photos, as well as pictures taken during the 4 February 2015 inspection, indicate that produced wastewater discharges into Pond No. 3 have the potential to percolate into soils and into nearby Sunflower Valley alluvium. The available information indicates that Pond No. 3 needs to be closed and a closure plan needs to be submitted to the Central Valley Water Board. The closure plan needs to include plans for investigating the vertical and lateral extent of constituents of concern within soils. The closure plan will need to indicate that the investigation will be completed prior to closure. Alternatively a work plan for collecting data to demonstrate that produced wastewater is contained within Pond No. 3 needs to be provided.

For Ponds No. 1, No. 2, and No. 4 Duncan has, in its previous submittals, demonstrated compliance with Provision 4.a of General Order Three. Provision 4.a requires where applicable that the Discharger *“Provide by (60 days of issuance of the NOA), as directed in the NOA issued for coverage under this General Order, the results of a hydrogeological investigation demonstrating that there is no groundwater beneath the Facility discharge areas and that produced wastewater and constituents associated with other approved wastes discharged at the Facility will not migrate into areas that there is groundwater with designated beneficial uses.”*

## **WATER BALANCE AND POND CAPACITY ANALYSIS REQUIREMENTS**

Duncan has not submitted an adequate water balance and capacity analysis for its total on site water storage capacity. The information described in General Order Three, Attachment B, Items A.7.a. through A.7.g., and Item B.4. is needed to confirm the pond holding capacities are sufficient for containing the reported maximum monthly average produced wastewater flow.

Information provided by Duncan indicates that evaporation is the primary mode of wastewater loss. When submitting the water balance capacity analysis (Item A.7.g., referenced above), all tables need to be provided in a spreadsheet format (such as Microsoft Excel). Additionally, a narrative explanation of all assumptions, variables, and calculations needs to be provided. In addition to the related items described in General Order Three Attachment B (A.7), the water balance and pond capacity analysis specifically needs to include the following:

1. The total volumetric capacity for wastewater storage at each Lease, including:
  - a. the volume of available tank space for storage of produced wastewater, and
  - b. the calculated volumetric capacity of each pond, at two feet of freeboard, taking into account any significantly sloped side walls;
2. All fluid inflows into each pond, including
  - a. monthly wastewater production volumes,
  - b. expected monthly precipitation volumes, both for an average rainfall year and the “100-year return period total annual precipitation,” and

- c. any other fluid source to the ponds;
3. All fluid outflows for each pond,
  - a. expected monthly evaporation volumes for each pond,
  - b. established percolation amounts, even if negligible, and;
  - c. any other process by which fluid is lost or removed from the ponds;
4. A factor that reasonably accounts for the slower evaporating rate of waters with elevated salt contents and oil residues;
5. Any remaining fluid volume which is not lost at the end of each month needs to be included in the fluid inputs for the following month.

The water balance capacity analysis must be signed and stamped by a California registered professional with expertise in water balance capacity analyses.

## **SUMMARY**

General Order Three applies to operators of existing oil and gas production facilities where the first encountered groundwater is of poor quality or where there is no first encountered groundwater. First encountered fluids beneath the ponds are encountered in the oil bearing formations beneath the McLure Shale. The McLure Shale in which Ponds No. 1, No. 2, and No. 4 are constructed has a low permeability. The Information available indicates that the bulk of the produced wastewater is contained within the ponds and lost via evaporation. Coverage under General Order Three is appropriate for Ponds No. 1, No. 2, and No. 4.

Available information indicates that a closure plan for Pond No. 3 needs to be prepared and submitted to the Central Valley Water Board. Alternatively a work Plan for collecting data to demonstrate that produced wastewater is contained within Pond No. 3 needs to be provided.

Based on these conditions, as per Title 23, California Code of Regulations, section 2200, the discharge shall be given a TTWQ (threat to water quality) and CPLX (complexity rating) of 3C. Duncan is responsible for annual fees associated with this rating unless conditions or regulatory policies change.