

WALKING ON A SLIPPERY SLOPE: DESPERATE FARMERS TURN TO OIL WASTEWATER TO IRRIGATE DROUGHT STRICKEN CROPS

I. INTRODUCTION

As a result of the longstanding drought in California, farmers have turned to the oil wastewater byproduct created by oil fields in Kern County to irrigate their crops.¹ The drought conditions have produced record low precipitation levels while simultaneously reaching record high temperatures.² With the enduring heat wave and overall lack of precipitation to replenish natural underground aquifers, surface and groundwater supplies are now at record low levels.³ The snowpack, which typically supplies a significant amount of the water used by cities and farmers, has also been negatively affected by the drought and is similarly at historically low levels.⁴ The drought conditions have instilled a sense of desperation in local farmers because their success in producing crops hinges on their ability to irrigate crops, which has now been threatened.⁵

Home to one of the most prolific stretches of agricultural land in the world, and providing over six billion dollars in crop revenue per year, Kern County also boasts some of the richest oil fields in the United States.⁶ With billions of dollars in revenue on the line, desperate farmers have turned to the use of oil wastewater, an oily and salty byproduct of the oil drilling and extraction processes.⁷ In an effort to combat California's crushing drought conditions, some local farmers have struck a deal to purchase the oil wastewater as a means of agricultural irrigation.⁸ While this may seem like a potential solution to the

¹ Zoë Schlanger, *In California, Farmers Rely on Oil Wastewater to Weather Drought*, NEWSWEEK (April 6, 2015), <http://www.newsweek.com/california-farmers-rely-oil-wastewater-weather-drought.html>.

² California Water Science Center, *California Drought* (March, 2016).

³ *Id.*

⁴ *Id.*

⁵ *See generally* DROUGHT IN CALIFORNIA AND THE EFFECT ON LOCAL FARMERS

⁶ Schlanger, *supra* note 1.

⁷ *Id.*

⁸ Daniel Ross, *Has Our Food Been Contaminated by Chevron's Wastewater?* (June 19, 2015),

challenges farmers have been facing with the drought, past testing results reveal the presence of organic heavy metals, methyl chloride, chromium, selenium, and arsenic in oil wastewater.⁹ These elements have all been known to cause various forms of cancer, cardiovascular disease, respiratory disease, skin lesions, damage to multiple organs, and in extreme cases, death.¹⁰ The potential for such substantial health risks begs the question of whether irrigation that employs the use of oil wastewater is safe for the soil, the crops, and ultimately, the consumers who eat those crops.¹¹ The enactment of more stringent testing guidelines and regulations is vital to protect these interests.

This Comment will assess current conditions affecting the irrigation of crops by local farmers, analyze whether the State Water Resources Control Board (“SWRCB”) is doing enough to ensure that the oil wastewater is safe for such use, and lastly explore more modern water treatment methods and techniques. Part II will discuss the longstanding drought in California and its effects on farmers as well as surface and groundwater supplies. Part III will provide a detailed background of oil wastewater: where it comes from, how much is produced, the cost of purchasing such water, the amount produced per day, and storage and treatment procedures. Part III will also discuss the potentially harmful effects of using oil wastewater as a means of irrigating soil and crops, including the possibility that crops grown with wastewater may absorb certain toxic chemicals, which are in turn ingested by consumers. Part IV will introduce the SWRCB and its role in ensuring the safety and quality of water, and most importantly it’s responsibility to regulate oil wastewater testing. Part V will assess the California Water Code testing regulations that are currently in place and whether they are sufficient to ensure the quality and safety of oil wastewater. Part VI will recommend more stringent guidelines for the testing and treatment of oil wastewater to allow for safer irrigation of crops. Finally, Part VII will conclude that oil wastewater is not a safe alternative for crop irrigation by farmers under the current testing and treatment procedures, and that improvements must be made if farmers are to continue utilizing such a method.

<http://www.truth-out.org/news/item/31470-has-our-food-been-contaminated-by-chevron-s-wastewater>.

⁹ Ross, *supra* note 8; Schlanger, *supra* note 1.

¹⁰ Heavy Metal Toxicity and the Environment, <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4144270/> (Last visited August 26, 2914).

¹¹ Ross, *supra* note 8.

II. THE HISTORIC CALIFORNIA DROUGHT AND ITS DELETERIOUS EFFECT ON AGRICULTURE

A. Climate Change

There are several natural conditions, which have led farmers to turn to the use of oil wastewater as a means of crop irrigation.¹² Paleoclimate data suggest that we are now in one of the driest periods in the history of our state and the most staggering studies suggest that the driest period in the past 1,200 years was between the years of 2011 and 2014.¹³ The year 2013 proved to be the driest year since 1895 and 2014 was the hottest year ever to be recorded.¹⁴ California has historically experienced prolonged periods of drought, and some scientists believe that the current conditions are still only the start of an extended period of insufficient water supply.¹⁵

California has also experienced an overall climate change during the course of the drought as a result of various historical weather patterns taking place in the state.¹⁶ There is now less snow in the mountains and the snowpack is sitting at levels that are approximately five to six percent of its normal water content.¹⁷ In fact, five of the lowest ten snowpack's on record occurred within the last ten years.¹⁸ Snowpack is simply the amount or measurement of thickness of snow that accumulates on the ground over a period of time.¹⁹ Over the last seventy-four years, the average depth of the snowpack levels was about 66.5 inches; however, there is now a fraction of that amount currently on the ground.²⁰ The snowpack is vital because it replenishes surface

¹² See generally, California Water Science Center, *California Drought* (March, 2016); Paleoclimatology Data, <https://www.ncdc.noaa.gov/data-access/paleoclimatology-data> (defining paleoclimate data as the study of past climates).

¹³ See California Water Science Center, *California Drought* (March, 2016).

¹⁴ See *id.*

¹⁵ See R. Muse, *Drought Stricken California Farmers Buy Recycled Oil Wastewater for Irrigation* (May 6, 2015), <http://www.politicususa.com/2015/05/06/drought-stricken-california-farmers-buy-recycled-oil-wastewater-irrigation.html>.

¹⁶ See California Water Science Center, *California Drought* (March, 2016).

¹⁷ *Id.*

¹⁸ *Id.*

¹⁹ Environmental Protection Agency: Climate Change Indicators in the United States, <http://www.epa.gov/climatechange/science/indicators/snow-ice/snowpack.html>.

²⁰ Department of Water Resources: Snow Water Equivalents, <http://cdec.water.ca.gov/cdecapp/snowapp/sweq.action>.

water streams and lakes, and also supplies nearly one-third of the water used by California during the summer and fall seasons.²¹

There has also been a decrease in fog from past years, which scientists have attributed to the overall rise in climate temperatures, especially during the nighttime.²² Fog is important in combatting drought conditions as it carries and deposits moisture onto plants, which then falls onto the soil and becomes available for the plant to use.²³ The presence of fog and cloud cover allow plants to retain more water by shielding them from the sun and also allow for the regulation of surface level temperatures.²⁴ Scientists and farmers have gone as far as attributing a decrease in fruit and nut crop yields to the lack of fog.²⁵ These very scientists conclude that the moisture brought about by fog maintains the “chill,” which aids in bud and flower formation.²⁶

While a significant reduction in precipitation levels has played a role in the drought, scientists believe that man-made global warming has increased the severity of the drought by fifteen to twenty percent.²⁷ It is also anticipated that the overall increase in the earth’s temperature will worsen drought conditions in the future.²⁸ Global warming alone affects the baseline amount of available water simply from the increase in the earth’s temperature, which is compounded by the “greenhouse effect” created by humans.²⁹ The greenhouse effect is caused when heat is trapped within the atmosphere by carbon dioxide and the increased emissions of carbon dioxide by humans have exacerbated this condition.³⁰ The drought conditions are worsened by these warmer temperatures, which cause evaporation from rivers, soil and

²¹ *Id.*

²² Fimrite, Peter, *As Central Valley Fog Disappears, Fruit, Nut Crops Decline*, SF GATE NEWSPAPER, May 22, 2014, available at <http://www.sfgate.com/science/article/As-Central-Valley-fog-disappears-fruit-nut-5496710.php>.

²³ *Id.*

²⁴ *Id.*

²⁵ California Department of Food and Agriculture: Climate Change Consortium for Specialty Crops, impacts and Strategies for Resilience, <https://www.cdfa.ca.gov/environmentalstewardship/pdfs/ccr-report.pdf>.

²⁶ *Id.*

²⁷ Henry Fountain, *California Drought Worsened by Global Warming, Scientists Say*, N.Y. TIMES, Apr. 5, 2015, at A1, available at <http://www.nytimes.com/2015/04/02/science/california-drought-is-worsened-by-global-warming-scientists-say.html>.

²⁸ *Id.*

²⁹ *Id.*

³⁰ See WHAT IS GREENHOUSE EFFECT, <http://nasa.gov/greenhouse-effect/>.

reservoirs.³¹ The increase in overall atmospheric temperatures as a result of the global warming has led scientists to conclude that California and the Western United states are likely to continue to face severe droughts in the future.³²

Some point to El Niño as a means of overcoming or reversing the drought conditions this winter; however, state climatologists are really unable to confirm whether El Niño would provide an increase in precipitation according to historical weather data.³³ El Niño is a term used to describe the Pacific trade winds blowing from east to west, while pushing the warm Pacific Ocean water west in the process.³⁴ As the trade winds die down, the waters of the Pacific begin to warm back up, which results in increased precipitation levels in areas near the California coastline.³⁵ Scientists speculate that, even if the winter season does bring substantially more rain, it would not be sufficient to reverse the already critical drought conditions.³⁶ There have been seven different time periods since 1950 where similar El Niño patterns have occurred, and there was a wide range of results in terms of precipitation levels fluctuating from very wet to dry.³⁷ In essence, it would not be wise to rely solely on El Niño weather patterns as a means of reversing drought conditions.³⁸ Instead, farmers will have to place reliance elsewhere, as they have already begun to do with oil wastewater. In addition to extreme weather conditions and fluctuations, farmers must also compete against the steadily increasing population of California residents who also rely on water to accomplish day-to-day living.³⁹

³¹ Fountain, *supra* note 27.

³² *Id.*

³³ Paul Rogers, *Four Ways that El Niño Could Fail to End California's Drought*, SAN JOSE MERCURY NEWS, Aug. 14, 2015, available at http://www.mercurynews.com/drought/ci_california-drought-el-nino-keeps-growing-new-report.

³⁴ David Herring, *What is El Niño?*, NASA, Apr. 27, 1999, http://earthobservatory.nasa.gov/Features/ElNino/el_nino.php.

³⁵ *Id.*

³⁶ *Id.*

³⁷ *Id.*

³⁸ *Id.*

³⁹ Adam Nagourney, Jack Healy, and Nelson Schwartz, *California Drought Tests History of Endless Growth*, N.Y. TIMES, at A1, Apr. 4, 2015, <http://www.nytimes.com/2015/04/05/us/california-drought-tests-history-of-endless-growth.html>.

B. Population Growth and Drought

The number of residents living in California has nearly tripled in size over the past fifty years, which has further tightened the grip on available water sources.⁴⁰ From the sprawling agricultural lands of Kern County to the high rise buildings and bustling streets of Los Angeles and San Francisco, California is home to more than thirty nine million people.⁴¹ As a result, state officials and Governor Brown declared a state of emergency and ordered the SWRCB to impose a twenty-five percent reduction in urban water use by the state's 400 water agencies.⁴² The cutbacks were ordered across the board, which has had an impact on homeowners, farmers, and various businesses such as golf courses.⁴³ California is in a state of emergency and statistics show that the California population is on an upward trend, which will continue to restrict the amount of water available to farmers for crop irrigation.⁴⁴ The extreme drought conditions, in addition to a steadily growing population, have taken a toll on the water reserves, and Governor Brown has indicated in his Executive Order that the drought may continue through 2016 and beyond.⁴⁵ California boasts one of the largest economies in the world, which is driven by the multi-billion dollar agricultural industry in Kern County.⁴⁶ In addition to population growth, if the expectations of prolonged drought are realized, the possibility of more severe water restrictions will put additional pressure on farmers to locate sustainable irrigation sources.⁴⁷ As the amount of people living in California continues to rise, farmers may have no choice

⁴⁰ Historical Census Populations of Counties and Incorporated Cities in California, http://www.dof.ca.gov/research/demographic/state_census_data_center/historical_census_1850-2010/view.php. (Census data obtained from the Excel spreadsheet found on the page).

⁴¹ United States Census, <https://www.census.gov/quickfacts/table/PST045215/06>

⁴² California Water Boards: Emergency Conservation Regulation, http://www.waterboards.ca.gov/water_issues/programs/conservation_portal/docs/factsheet/implementing_25percent.pdf (July 7, 2015).

⁴³ Nagourney, *supra* note 39.

⁴⁴ Exec. Order No. B-29-15, California Government Code sections 8567 and 8571, (2014), *available at* https://www.gov.ca.gov/docs/4.1.15_Executive_Order.pdf; Historical Census Populations of Counties and Incorporated Cities in California, http://www.dof.ca.gov/research/demographic/state_census_data_center/historical_census_1850-2010/view.php (Last visited March 2013).

⁴⁵ Exec. Order No. B-29-15, California Government Code sections 8567 and 8571, (2014), *available at* https://www.gov.ca.gov/docs/4.1.15_Executive_Order.pdf.

⁴⁶ Schlanger, *supra* note 1.

⁴⁷ Exec. Order No. B-29-15, California Government Code sections 8567 and 8571, (2014), *available at* https://www.gov.ca.gov/docs/4.1.15_Executive_Order.pdf.

but to turn to the oil wastewater as a means to irrigate their crops.⁴⁸ The steady dwindling of water supplies as a result of population growth and historical climate changes is not the only devastating effect as increased groundwater pumping has also resulted in a significant impact on the fertile land itself.⁴⁹

C. The Impact of Drought Conditions in California

As California moves forward in the fifth year of drought, surface water levels and stream flows have also reached all-time record lows.⁵⁰ This can have a devastating effect in both the long and short terms not only for agriculture, but also for hydropower production, navigation, recreation, and the habitats of various naturally growing trees, shrubs, and grasses.⁵¹ The snowpack, which supplies many of our water needs, will also continue to be affected until there is a shift in the climate.⁵² As of March 2015, National Aeronautics and Space Administration (“NASA”) scientists believe California is in serious trouble due to the lack of snowpack and has estimated that California would require eleven trillion gallons of water to replenish the water losses caused by the drought.⁵³ Even in the event California receives substantial rainfall, the staggering amount required to overcome the water shortage caused by drought is troubling in its own right.⁵⁴ The lack of water runoff caused by the melting snowpack, which is essential to recharging groundwater sources, has left San Joaquin River basins, rivers, reservoirs, and surface and ground water at levels that are substantially below the average.⁵⁵ All surface water sources such as streams, lakes, and wetlands have an indirect relationship with groundwater, and shortages in surface and runoff water from snowpack often causes the ground to absorb more

⁴⁸ See Historical Census Populations of Counties and Incorporated Cities in California, *supra* note 40.

⁴⁹ See California Water Science Center, *California Drought* (March, 2016); Historical Census Populations of Counties and Incorporated Cities in California, *supra* note 40.

⁵⁰ See California Water Science Center, *California Drought* (March, 2016).

⁵¹ California Water Science Center, *Drought Impacts*, <http://ca.water.usgs.gov/data/drought/drought-impact.html> (Last visited March 24, 2016).

⁵² See *id.*

⁵³ NASA Analysis: *11 Trillion Gallons to Replenish California Drought Losses*, NASA, (Dec. 14, 2014), URL, <https://www.nasa.gov/press/2014/december/nasa-analysis-11-trillion-gallons-to-replenish-california-drought-losses>.

⁵⁴ See generally *id.*

⁵⁵ See generally *id.*

sunlight and lose moisture in the soil, which ultimately reduces the availability to residents and farmers.⁵⁶

Excessive groundwater pumping also results in land subsidence and aquifer depletion.⁵⁷ Aquifers are underground water cavities that store ample amounts of water and are one of the most vital sources of water used by farmers.⁵⁸ Increased underground water pumping causes the underlying land beneath the surface to erode and give way, resulting in damage to adjacent aquifers as a result.⁵⁹ In turn, this can result in the permanent loss of ground water storage in aquifers as well as infrastructure damage.⁶⁰ Substantial groundwater pumping also reduces quality as saltwater from the ocean is moved upward and inward, leading to saltwater contamination of water supplies.⁶¹ This devastating consequence has already been demonstrated in the fertile San Joaquin Valley at the Delta-Mendota Canal.⁶² The canal is several miles long and is utilized for the irrigation of land and crops in the western San Joaquin Valley and also serves as a replacement to water stored at Friant Dam.⁶³ There, excessive groundwater pumping in response to drought conditions has resulted in a decrease in the elevation of the land by as much as eight meters in some areas.⁶⁴ A separate drought study conducted by NASA found a subsidence of the land at the Delta-Mendota Canal by nearly two inches every month in some locations as a result of increased groundwater pumping.⁶⁵ If oil wastewater continues to be used as an alternative to groundwater, the focus should

⁵⁶ See generally *id.*

⁵⁷ United States Geological Survey: Drought and Overpumping and Groundwater Decline, <http://water.usgs.gov/edu/droughtandgw.html> (last visited Nov. 6, 2015).

⁵⁸ United States Geological Survey: Aquifers and Groundwater, <http://water.usgs.gov/edu/earthgwaquifer.html> (last visited Dec. 2, 2015).

⁵⁹ United States Geological Survey: Land Subsidence, <http://water.usgs.gov/edu/earthgwlandsubside.html>, (last visited Aug. 20, 2015).

⁶⁰ *Id.*

⁶¹ United States Geological Survey: Groundwater Depletion, <http://water.usgs.gov/edu/gwdepletion.html> (last visited Dec. 9, 2015).

⁶² See United States Geological Survey: Ground Water Availability of the Central Valley Aquifer, California (2009), http://pubs.usgs.gov/pp/1766/PP_1766.pdf.

⁶³ *Id.*

⁶⁴ See United States Geological Survey: Delta Mendota – Evaluation of Groundwater Conditions and Land Subsidence, <http://ca.water.usgs.gov/projects/central-valley/delta-mendota-canal.html> (last visited Aug. 20, 2015).

⁶⁵ *California Drought Causing Valley Land to Sink*, NASA, URL <http://www.water.ca.gov/news/newsreleases/2015/081915.pdf> (2015); See United States Geological Survey: Ground Water Availability of the Central Valley Aquifer, *supra* note 62.

be shifted to oil wastewater testing and treatment methods that will allow such water to be recycled and safely used in the irrigation of crops.

III. OIL WASTEWATER: THE BYPRODUCT OF OIL DRILLING

A. How Oil Wastewater is Produced

Chevron Corporation is the largest oil producer in California and has deep roots in the state dating back to 1876 when it first struck oil and founded the company.⁶⁶ In the time following its incorporation over 100 years ago, Chevron has extracted more oil in California than any other company, pumping more than 50,000 barrels of oil per day.⁶⁷ For every 42 gallon barrel of oil extracted, ten barrels, or 420 gallons, of salty, oily wastewater is also extracted as a byproduct.⁶⁸ During the process known as hydraulic fracturing or “fracking,” thousands and in some cases millions of gallons of water are mixed with hazardous chemicals and injected into underground wells at high pressure.⁶⁹ This causes fracturing of the underground rock formation, forcing oil and gas to rise to the surface.⁷⁰ During this extraction process, fracking produces substantial amounts of oil wastewater as a byproduct.⁷¹ On a typical day, Chevron produces up to 50,000 barrels of oil and over 500,000 barrels of wastewater.⁷² There have been longstanding issues with determining the proper way to store and dispose of oil wastewater from drilling.⁷³ Scientists, environmentalists, and farmers continue to seek injunctive relief and aid from the government, claiming that the untreated oil wastewater byproduct that is being stored in underground injection wells is seeping out and contaminating the surrounding

⁶⁶ Chevron Corporation in California, <http://www.chevron.com/documents/pdf/ChevronInCalifornia.pdf> (last visited Jun. 2010).

⁶⁷ Chevron Corporation in California, *supra* note 66; Schlanger, *supra* note 1.

⁶⁸ Chevron Corporation in California, *supra* note 66.

⁶⁹ Chris Jordan-Bloch, *Extreme Energy: Out of Control Out West*, EARTH JUSTICE, <http://earthjustice.org> (click on fracking link at the top of the page).

⁷⁰ *Id.*

⁷¹ *Id.*

⁷² Schlanger, *supra* note 1.

⁷³ Environmental Protection Agency: The Hydraulic Fracturing Water Cycle, <http://www.epa.gov/hfstudy/hydraulic-fracturing-water-cycle> (last visited Jun. 1, 2015); Abrahm Lustgarten, *Injection Wells: The Poison Beneath Us* (June 21, 2012), <https://www.propublica.org/article/injection-wells-the-poison-beneath-us>.

underground water supply⁷⁴ Farmers' mounting desperation as a result of drought conditions has afforded Chevron a partial solution to its issues with oil wastewater storage.⁷⁵ Farmers are now able to purchase the oil wastewater from Chevron at a cost of about thirty-three dollars per acre-foot.⁷⁶ Compared to a cost of about \$1,500 per acre-foot for fresh water, oil wastewater is not only a potential solution to the drought conditions, but also an economical alternative.⁷⁷ Chevron is thus profitable on two fronts due to its ability to make money on the wastewater byproduct while simultaneously dealing with storage and disposal issues.⁷⁸

The Cawelo Water District delivers water to farmers within a several thousand-acre stretch of Kern County.⁷⁹ Oil wastewater is pumped into skimmers where it remains for a brief period of time before it is pumped into filters containing walnuts, which help remove oil residue.⁸⁰ The water then passes through water-softening tanks, which help remove ions such as magnesium and calcium.⁸¹ The oil wastewater subsequently moves through a hydrocarbon tank that scans for various carbon compound contaminants, such as benzene, which are toxic to humans.⁸² The process continues by pumping the treated oil wastewater into polishing ponds where it is mixed with fresh water in an attempt to further dilute the high salinity levels.⁸³ Lastly, the wastewater travels down cement-lined canals and is eventually purchased and pumped into

⁷⁴ See generally Complaint for Declaratory and Injunctive Relief and Verified Petition for Writ of Mandate at 13-17, *Center for Diversity and Sierra Club v. Dept. of Conservation*, No. RG15769302. (Superior Court of Alameda County, May 7, 2015) (case brought on behalf of local farmers, environmentalist, and scientists who allege damages and request injunctive relief in connection with improper well injection techniques).

⁷⁵ Schlanger, *supra* note 1.

⁷⁶ Veronique Dupont, *Pact with the Devil? California Farmers Use Oil Firms' Water*, (July 3, 2015), <http://news.yahoo.com/pact-devil-california-farmers-oil-firms-water-075541481.html>.

⁷⁷ *Id.*

⁷⁸ *Id.*

⁷⁹ California Regional Water Quality Control Board: Water Discharge Requirements for Chevron USA, Inc., and Cawelo Water District Produced Water Reclamation Project, http://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/kern/r5-2012-0058.pdf (2012).

⁸⁰ *Id.*

⁸¹ *Id.*

⁸² *Id.*

⁸³ *Id.*

one of the many available ponds in the Cawelo Water District for irrigation use.⁸⁴

Even with the seemingly adequate filtering process, it is contended that one can smell the petrochemicals even after treatment to the point of developing a headache.⁸⁵ Farmers such as Tom Frantz have visited the Cawelo Water District ponds on many occasions.⁸⁶ He has refused to use the oil wastewater on his crops, and asserts that farmers who are using the wastewater would discontinue using it if they actually visited and smelled the ponds.⁸⁷ The nauseating smells reminiscent of freshly laid asphalt and the murky colored water is an indication that the oil wastewater remains contaminated with toxic chemicals and high levels of the salt, which would ultimately be highly detrimental to the crops, soil, and most importantly, the consumers⁸⁸

B. Toxic Chemicals and High Salinity Levels

Water Defense is a non-profit organization established in 2014 with a goal to use technology and public awareness to keep waterways and fresh water free from contamination and industrial pollution.⁸⁹ Scientists from Water Defense have served as consultants to the Environmental Protection Agency (“EPA”) and other governmental offices on at least fifty different oil spills and have spent several years studying the various wastewater processing and testing methods.⁹⁰ Over the past two years, scientists and activists from Water Defense have collected samples from the Cawelo Water District and detected compounds within the wastewater that are known to be toxic to humans.⁹¹ Such compounds include: acetone, methylene chloride, benzene, selenium, chromium, and oil, which are caustic and known to be highly dangerous to humans.⁹² Several of these compounds such as

⁸⁴ *Id.*

⁸⁵ Ross, *Supra* note 8.

⁸⁶ *Id.*

⁸⁷ *See id.*

⁸⁸ Water Defense, <https://waterdefense.org/content/about-us>.

⁸⁹ *Id.*

⁹⁰ Julie Cart, *Central Valley's Growing Concern: Crops Raised with Oil Field Water*, L.A. TIMES, at Local section, (May 2, 2015), available at <http://www.latimes.com/local/california/la-me-drought-oil-water-20150503-story.html>.

⁹¹ Water Defense Reveals Oil Waste Used to Irrigate Crops, <https://waterdefense.org/blog/water-defense-reveals-oil-waste-used-irrigate-crops> (May 4, 2015).

⁹² *Id.*

selenium and chromium are known to cause cancer, while other organic heavy metals are also known for their chronic toxicity as they often become entrenched in bone and tissue, slowly poisoning the host.⁹³ The EPA has estimated that dozens of chemicals are used during the fracking process, many of which are not tested for or disclosed by big oil companies such as Chevron.⁹⁴ Water Defense's aim is to provide awareness about water quality and safety, thus the reason for their involvement in testing the oil wastewater of the Cawelo Water District.⁹⁵ Following the signing of Senate Bill 4, the SWRCB was required to establish a Regional Monitoring System that allows for the efficient testing and monitoring of any potential water that can be of beneficial use, which includes oil wastewater.⁹⁶ As it stands now, the SWRCB conducts testing that is area specific and businesses such as Chevron are only required to test for certain chemicals that the SWRCB believes is appropriate.⁹⁷ However, the SWRCB would likely amend the current regulations in the face of the findings by Water Defense.

Methylene chloride, or dichloromethane, is a volatile and colorless industrial solvent that is utilized in a wide variety of processes, such as paint remover manufacturing, metal cleansing and degreasing, and as a way to soften crude oil during oil extraction.⁹⁸ Methylene chloride is a compound that the SWRCB likely does not require to be tested even though this toxic solvent has been closely linked with various forms of cancer and respiratory and mental disorders.⁹⁹ Methylene chloride is a caustic chemical and should be included as part of the testing regimen that is currently being put in place by the Senate 4 Bill signing as its exclusion would be dangerous to human health.¹⁰⁰ The results from the samples collected by Water Defense found methylene chloride at levels

⁹³ *Id.*

⁹⁴ See Environmental Protection Agency: Analysis of Hydraulic Fracturing Fluid Data from the "FracFocus" Chemical Disclosure Registry 1.0 (March 2015), http://www.epa.gov/sites/production/files/2015-03/documents/fracfocust_analysis_report_and_appendices_final_032015_508_0.pdf.

⁹⁵ Water Defense, <https://waterdefense.org/content/about-us>.

⁹⁶ Model Criteria for Groundwater Monitoring in Areas of Oil and Gas Well Stimulation, http://www.waterboards.ca.gov/water_issues/programs/groundwater/sb4/docs/model_criteria_final_070715.pdf (2015).

⁹⁷ *Id.*

⁹⁸ Occupational Safety and Health Administration: Methylene Chloride (2003), <https://www.osha.gov/Publications/osha3144.html>.

⁹⁹ *Id.*; Schlanger, *supra* note 1.

¹⁰⁰ See Model Criteria for Groundwater Monitoring in Areas of Oil and Gas Well Stimulation, *supra* note 96.

as high as fifty six parts per billion, four times the levels detected during the Exxon Mobile oil spill at the Arkansas River.¹⁰¹ It is highly likely that any reasonable person would be in objection to the irrigation of their food with water that contains more methylene chloride than an oil spill.¹⁰²

Although the treatment process sends oil wastewater through a hydrocarbon analyzer to help detect contamination, a highly toxic hydrocarbon called benzene was detected during prior testing conducted by Chevron.¹⁰³ Benzene is a dangerous carcinogen that is one of the most prevalently used petrochemical solvents in all fuel industries, including: coal, gas, and oil.¹⁰⁴ Benzene is extremely toxic and is closely linked with causing leukemia as well as breast and urinary tract cancers.¹⁰⁵ Benzene should also be included in the amended model criteria in light of its toxicity to humans.¹⁰⁶

In addition to the variety of toxic chemicals, oil wastewater contains extremely high concentrations of salt, which are estimated to be several times the normal levels of fresh water.¹⁰⁷ Such salinity is devastating to not only to the soil, but the crops in them as they ultimately grow at a slower rate.¹⁰⁸ The SWRCB is also responsible for monitoring and maintaining the salinity levels found in wastewater due to the high salinity content.¹⁰⁹ Destruction of the soil by way of high salt levels can be just as harmful as the toxic chemicals found in oil wastewater.¹¹⁰ Many herbaceous vegetable species, such as lettuce, cabbage, carrots, sweet potatoes, turnips, asparagus, and celery that have been grown in soil with high salinity levels develop what is known as “salt burn,” which causes yellowed leaves and low production yields.¹¹¹ All of these

¹⁰¹ Cart, *supra* note 90.

¹⁰² *Id.*

¹⁰³ Ross, *supra* note 8.

¹⁰⁴ Don Lieber, *10 Most Toxic Ingredients Used in Coal, Oil, and Gas Production*, ECOWATCH (Dec. 9, 2013), <http://ecowatch.com/2013/12/09/10-toxic-ingredients-used-in-coal-oil-gas-production/>.

¹⁰⁵ *Id.*

¹⁰⁶ *See id.*

¹⁰⁷ Schlanger, *supra* note 1.

¹⁰⁸ Dean Ravenscroft, Ph.D., *Plant Biology: Salt Tolerance in Plants*, <http://www.plant-biology.com/Salt-Tolerance.php>, (last visited 2015).

¹⁰⁹ *See* United States v. State Water Resources Control Board, 182 Cal.App.3d 82, 139-40.

¹¹⁰ C.M. Grieve, M.C. Shannon *Department of Agriculture: Tolerance of Vegetable Crops to Salinity*, SCIENTIA HORTICULTURAE, at 5-38, (1999), available at, http://www.ars.usda.gov/SP2UserFiles/Place/20360500/pdf_pubs/P1567.pdf.

¹¹¹ *Id.*

crops are grown in Kern County in addition to deciduous crops such as apples, olives, pears, plums, walnuts, and grapes.¹¹²

High salt concentration levels in soil are normally prevented by rainwater, which naturally flushes the soil.¹¹³ However, with significantly reduced precipitation levels in California, there is not a sufficient amount of rainwater available to cleanse the soil as is necessary to produce quality crops.¹¹⁴ Thus, the lack of rainwater in combination with the growing use of oil wastewater for irrigation is increasing the risks of damage to crops and farmlands from the high concentration levels of salt in the soil.¹¹⁵ Soil exposed to high levels of salt over extended periods of time eventually becomes barren and unable to sustain crop production.¹¹⁶ In addition, a significant amount of salt at the root surface prevents the uptake of other vital chemicals such as potassium, which results in slower growth and potentially reduced crop yields.¹¹⁷ With no end to the drought in sight, farmers using oil wastewater are walking an extremely dangerous line by introducing large amounts of salt, which in turn could have a drastic effect on the soil and farmlands.¹¹⁸

Bioaccumulation is the process by which chemicals are absorbed by organisms, such as plants or crops, directly from exposure to contamination like oil wastewater.¹¹⁹ Bioaccumulation can also occur by consuming food, which contains the contaminant.¹²⁰ Thus, great risks arise with respect to human health as a result of the use of oil wastewater to irrigate crops, due to the bioaccumulation process.¹²¹ According to research conducted on bioaccumulation of toxic compounds in food crops, scientists irrigated crops with wastewater that

¹¹² Kern County Crop Statistics, <http://www.kernag.com/dept/stats/crop-stats.asp> (last visited Apr. 17, 2015).

¹¹³ M.C. Shannon, C.M. Grieve, *Department of Agriculture: Tolerance of Vegetable Crops to Salinity*, SCIENTIA HORTICULTURAE, at 5-38, (1999), available at, http://www.ars.usda.gov/SP2UserFiles/Place/20360500/pdf_pubs/P1567.pdf.

¹¹⁴ *Id.*

¹¹⁵ Ravenscroft, Ph.D., *supra* note 108.

¹¹⁶ *Id.*

¹¹⁷ *Id.*

¹¹⁸ *Id.*

¹¹⁹ United States Geological Survey: Bioaccumulation, <http://toxics.usgs.gov/definitions/bioaccumulation.html> (last visited Aug. 4, 2015).

¹²⁰ *Id.*

¹²¹ Beth Mole, *Crops Take Up Drugs from Recycled Water*, SCIENCE NEWS, (Sep. 19, 2014), available at <https://www.sciencenews.org/article/crops-take-drugs-recycled-water>.

contained nineteen different chemicals.¹²² Of those nineteen chemicals, eight of them were found in the edible portions of the crops.¹²³ Many crops are highly sensitive to compounds found in wastewater such as boron and chloride, which cause leaf damage in grapes and berries, reducing yields and overall production.¹²⁴

Leaching is the process of applying more water to an irrigation field than the soil is capable of retaining in the root-zone.¹²⁵ This causes the water to drain below the root system, washing the salts and other chemicals away with it.¹²⁶ In wetter weather conditions, farmlands would be leached naturally by rainfall; however salinity and chemical levels have continued to increase due to the historically low precipitation levels.¹²⁷ With no end in sight to the historic drought gripping California, the debate continues as to whether oil wastewater is indeed a beneficial commodity that should be utilized in this time of need.

C. The Debate Over Whether the Use of Oil Wastewater is Beneficial

In response to the historical drought conditions, fresh water prices continue to surge, costing as much as \$1,500 per acre-foot.¹²⁸ In contrast, Chevron is providing a less expensive alternative to farmers in dire need of a solution to the drought.¹²⁹ Treated oil wastewater is being sold at a fraction of the cost of fresh water, averaging thirty to thirty-three dollars per acre-foot, allowing farmers to irrigate their crops without also worrying about becoming bankrupt.¹³⁰

Proponents of oil wastewater use for irrigation argue that Chevron is providing a solution to farmers desperately in need of a way to irrigate their crops.¹³¹ As the provider of the wastewater, Chevron insists that it makes every effort to comply with current testing requirements outlined

¹²² *Id.*

¹²³ *Id.*

¹²⁴ Stephen Grattan, *Irrigation Water Salinity and Crop Production*, U.C. Davis Agriculture and Natural Resources Publication 8066 at 1-9, (2002), available at <http://vric.ucdavis.edu/pdf/Irrigation/IrrigationWaterSalinityandCropProduction.pdf>.

¹²⁵ *Id.*

¹²⁶ *Id.*

¹²⁷ CENTRAL VALLEY REGIONAL WATER QUALITY CONTROL BOARD, <http://www.waterboards.ca.gov/centralvalley/>.

¹²⁸ Dupont, *supra* note 76.

¹²⁹ *Id.*

¹³⁰ *Id.*

¹³¹ Cart, *supra* note 90.

by the SWRCB, and that its water has met the required expectations.¹³² Those in favor of wastewater use also assert that the chemicals and compounds normally found in the water are filtered out through the soil, either by microorganisms or rainwater, and thus present no problems in terms of absorption by crops grown with the wastewater.¹³³ However, at the present time, the soil is not being effectively filtered of the high salinity levels as a result of the lack of rainfall.¹³⁴

Oil wastewater has been a nuisance for companies such as Chevron due to the issues associated with its disposal.¹³⁵ By treating the water and selling the recycled product back to farmers as an inexpensive resource, Chevron is able to alleviate two longstanding issues at once. Chevron and the SWRCB continue to assert that the wastewater is safe for use, pointing to the test results to substantiate these claims.¹³⁶ With 500,000 barrels of wastewater being produced everyday by Chevron, farmers are presented with a partial solution to their continuing problems associated with the drought.¹³⁷

Chevron may be meeting the required standard for water safety testing, but the methods currently in place are outdated and fail to detect the chemicals used in modern oil drilling operations.¹³⁸ Senate Bill 4 mandated the SWRCB to establish model-testing criteria for any water that is of beneficial use to California residents.¹³⁹ In addition to the requirements of the bill, the SWRCB currently has the authority to bolster current testing measures to keep pace with the caustic chemicals used in modern oil drilling.¹⁴⁰ Such authority must be utilized in order to prevent toxic and hazardous chemicals from making their way into the food purchased by consumers.

¹³² *Id.*

¹³³ *Id.*

¹³⁴ *Id.*

¹³⁵ *Id.*

¹³⁶ Technical Reports: Reclaimed Water Impoundments Sampling, http://www.waterboards.ca.gov/centralvalley/water_issues/oil_fields/information/disposal_ponds/chevron/2015_0615_com_chevron_cawello.pdf (2015).

¹³⁷ California Farmers Turn to Big Oil's Wastewater to Grow Crops, business.financialpost.com/news/energy/california-farms-turn-to-big-oils-drilling-wastewater-to-grow-crops?__lsa=b5fe-57b3.

¹³⁸ Cart, *supra* note 90.

¹³⁹ See Model Criteria for Groundwater Monitoring in Areas of Oil and Gas Well Stimulation, *supra* note 96.

¹⁴⁰ CAL. WATER CODE §13241(a) (2015).

IV. THE WATER RESOURCES CONTROL BOARD AND ITS DUTY TO ENSURE ADEQUATE WATER QUALITY

A. Historical Background of the Water Resources Control Board

The SWRCB was created nearly fifty years ago in 1967 and consists of a five-member panel.¹⁴¹ The SWRCB was actually a merger of the State Water Quality Control Board and former State Water Rights Board in response to industrial and population growth.¹⁴² The SWRCB consists of members who were appointed by Governor Jerry Brown based on their varying levels of experience in agriculture, environment, and regulatory policy-making.¹⁴³ While the current board has members appointed by Governor Brown, the governor in office generally appoints members.¹⁴⁴ The SWRCB was given broad authority and responsibility to balance competing demands, allocate water rights, adjudicate water rights disputes, develop statewide water protection plans, and establish water quality standards.¹⁴⁵ The beneficial uses of water of the state, which may be guarded against degradation, are those used for municipal, domestic, industrial, agricultural, power generation, enjoyment, navigation, and preservation and enhancement of fish, wildlife, and other aquatic resources.¹⁴⁶

The SWRCB is responsible for overseeing these regional water boards.¹⁴⁷ The Dickey Water Pollution Act was enacted in 1949 and established nine regional water boards in each of the major California watersheds.¹⁴⁸ The regional water boards serve as the frontline for state and federal water pollution control efforts and they are given the responsibility of managing and enforcing the state's pollution programs

¹⁴¹ State Water Resources Control Board: *History of the Boards*, http://www.swrcb.ca.gov/about_us/water_boards_structure/history.html (2012).

¹⁴² *Id.*

¹⁴³ State Water Resources Control Board: *Meet the Members*, http://www.waterboards.ca.gov/about_us/board_members/, (2015) (members of the Water Board are generally appointed by the current Governor in office).

¹⁴⁴ *Id.*

¹⁴⁵ See State Water Resources Control Board: *History of the Boards*, *supra* note 140.

¹⁴⁶ See *United States v. State Water Resources Control Board*, 182 Cal.App.3d 82, 110.

¹⁴⁷ See State Water Resources Control Board: *History of the Boards*, *supra* note 140.

¹⁴⁸ *Id.*, Defining a watershed as the area of land where all of the water that falls in it and drains off of it goes to a common outlet, <http://water.usgs.gov/edu/watershed.html>.

based on the needs of their respective regions.¹⁴⁹ The Central Coast, Los Angeles, and Central Valley Regional Water Quality Control Boards all share control over portions of Kern County, which is home to the Cawelo Water District oil wastewater ponds.¹⁵⁰ The ultimate goal in the formation of the regional water boards was to consider all of the significant factors and conditions that affect water quality.¹⁵¹ Thus, the three regional boards overseeing the Cawelo Water District have the ability to coordinate with the SWRCB in staying current with testing regulations that account for the modern drilling techniques and chemicals used in today's fossil fuel extraction processes.¹⁵²

B. The Porter-Cologne Act

The Porter-Cologne Act was enacted in 1969 as a revision of the anti-pollution legislation in place at that time.¹⁵³ The enactment was considered the cornerstone of water protection and anti-pollution efforts in California and it extended the reach of the SWRCB by granting it ultimate authority to oversee water rights and quality.¹⁵⁴ The authority created by the Porter-Cologne Act was recognized as one of the strongest pieces of legislation in combatting pollution.¹⁵⁵ It gave the SWRCB the power to enforce additional pollution control measures and also allowed the SWRCB to establish requirements for nearly any source of waste discharge, including oil wastewater.¹⁵⁶

The Porter-Cologne Act and the efforts by the legislature to control and regulate water quality law is said to have paved the way for the 1972 amendments to the Federal Water Pollution Control Act.¹⁵⁷ Also known as the Clean Water Act (CWA), it is the primary federal law governing water pollution.¹⁵⁸ The CWA required state and federal agencies to set guidelines and standards mandating sewage treatment, ensuring surface

¹⁴⁹ State Water Resources Control Board: State and Regional Water Boards, http://www.waterboards.ca.gov/publications_forms/publications/factsheets/docs/region_brds.pdf (2013).

¹⁵⁰ *Id.*

¹⁵¹ *Id.*

¹⁵² *Id.*

¹⁵³ State Water Resources Control Board: Porter Cologne Water Quality Control Act, http://www.swrcb.ca.gov/laws_regulations/docs/portercologne.pdf (last amended 2016).

¹⁵⁴ *Id.*

¹⁵⁵ *Id.*

¹⁵⁶ *Id.*

¹⁵⁷ *Id.*

¹⁵⁸ *Id.*

water quality, and regulating wastewater discharges into surface water supplies.¹⁵⁹ More specifically, the CWA gives the SWRCB the discretion to decide whether or not to grant water discharge permits to companies such as Chevron.¹⁶⁰ As the historical California drought continues on to its fifth year, the Porter-Cologne and CWA have bestowed upon the SWRCB the power to enforce or modify the current regulations in place to ensure the quality and safety of the oil wastewater.¹⁶¹ And while the SWRCB works in conjunction with the regional water boards to enforce policy within various regions, it has the sole responsibility to create statewide policy in regard to water quality control.¹⁶² However, the SWRCB may not be doing enough with its broad power in regulating the testing measures currently in place to ensure that the oil wastewater is indeed safe.

V. THE POWER ALLOCATED TO THE WATER RESOURCES CONTROL BOARD IS NOT BEING ADEQUATELY UTILIZED TO ENSURE THE SAFETY OF WASTEWATER IRRIGATION

A. The Water Code

1. Testing Regulations Currently in Effect

Prior testing of the oil wastewater by scientists from Water Defense in 2014 and early 2015 revealed traces of oil, carcinogenic compounds, organic heavy metals, methylene chloride, and even radioactive material in some instances.¹⁶³ This has led the opponents of oil wastewater to question the current regulations and testing that have allowed the irrigational use of oil wastewater to continue.¹⁶⁴ California Water Code section 13267(a) allows the SWRCB to investigate the quality of any state waters within their region.¹⁶⁵ Section 13267(b)(1) also requires that:

[In] conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region, or any citizen or domiciliary, or political agency or

¹⁵⁹ *Id.*

¹⁶⁰ *Id.*

¹⁶¹ *Id.*

¹⁶² *United States v. State Water Resources Control Board*, 182 Cal.App.3d 82, 110.

¹⁶³ *Cart*, *supra* note 90.

¹⁶⁴ CAL. WATER CODE §13267 (2015).

¹⁶⁵ *Id.* §13267(a).

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.¹⁶⁶

In compliance with the requirements of section 13267, recent testing completed by Chevron revealed no traces of methylene chloride or acetone, which were found in previous testing.¹⁶⁷ The SWRCB currently only requires testing for certain contaminants.¹⁶⁸ Chevron is not required to test for other possible contaminants such as heavy metals, arsenic, radioactive materials and chemicals that are normally used during the modern day drilling processes.¹⁶⁹ The scientists of Water Defense allege that the “standard tests” implemented by the SWRCB are not conclusive because they failed to test at different depths and over a period of time.¹⁷⁰ It is the contention of Water Defense and various local farmers that more in-depth testing, although more costly, would likely reveal more accurate data regarding the safety of the wastewater.¹⁷¹ The Water Defense scientists have shared video footage of the oil wastewater treatment canals in the Cawelo Water District.¹⁷² Throughout the videos, the scientists note a continuous and nauseating smell resembling freshly laid asphalt.¹⁷³ The water is dark and discolored, which tends to refute Chevron’s reported findings that the water is completely free of contaminants.¹⁷⁴ The smell and the unnatural coloration of the water bolsters the argument of Water Defense that more in-depth testing of the water would reveal the very compounds that Chevron alleges are not present within the oil wastewater being sold to farmers.¹⁷⁵ Further, the characteristics of this water show that oil wastewater can come within the required regulations and still be inherently unsafe.¹⁷⁶ The outdated techniques being used to test the oil

¹⁶⁶ *Id.* §13267(b)(1).

¹⁶⁷ *Cart*, *supra* note 90.

¹⁶⁸ *Id.*

¹⁶⁹ *Id.*

¹⁷⁰ *Id.*

¹⁷¹ Water Defense, <https://waterdefense.org/content/about-us>.

¹⁷² Water Defense Reveals Oil Waste Used to Irrigate Crops, <http://www.foodandwaterwatch.org/news/exclusive-water-defense-video-shows-tar-balls-oil-slicks-near-kern-county-irrigation-site> (2015).

¹⁷³ *Id.*

¹⁷⁴ *Id.*

¹⁷⁵ *Id.*

¹⁷⁶ *Id.*

wastewater are not sufficient.¹⁷⁷ Thus, it is imperative that the SWRCB uses its broad legislative power to revise the current codes to require more stringent testing of the oil wastewater in an effort to obtain more definitive findings.¹⁷⁸

2. Why has the Water Board Failed to Enact Stricter Testing Regulations?

The ultimate goal of the SWRCB is to establish a model code to enforce and monitor any oil wastewater that is or may be used for beneficial use.¹⁷⁹ Based on Water Code Section 10783(h)(1) and the Senate Bill 4 signed and enacted into law by the Governor in September 2013, the SWRCB has been mandated to implement an effective Regional Monitoring Program to protect any and all water designated for any beneficial use, including water used for agricultural irrigation.¹⁸⁰ In addition, the SWRCB has also been given the responsibility of collaborating with various stakeholder groups like Chevron to develop measures, which allows for efficient evaluation and comparison to the model criteria.¹⁸¹ The substantial amount of time and resources required to develop and establish a monitoring system that complies with today's modern oil drilling operations may be the main reason behind the SWRCB's inactivity in terms of strengthening the current testing regulations or requiring companies to test for certain chemicals.¹⁸² With the amount at stake, both financially and economically, it makes the sense for the SWRCB to take a reasonable amount of time in reviewing and analyzing collection data to determine the most appropriate water testing measures.¹⁸³ The SWRCB was given wide-ranging authority and flexibility to make necessary changes to stay current with the modern day oil drilling processes.¹⁸⁴ However, years have passed since the signing of Senate Bill 4, and there is a question as to whether the SWRCB is making appropriate use of their time and authority.¹⁸⁵

¹⁷⁷ *Id.*

¹⁷⁸ CAL. WATER CODE §13267(b)(1) (2015).

¹⁷⁹ *See* Model Criteria for Groundwater Monitoring in Areas of Oil and Gas Well Stimulation, *supra* note 96.

¹⁸⁰ *Id.*

¹⁸¹ *Id.*

¹⁸² *Id.*

¹⁸³ *Id.*

¹⁸⁴ CAL. WATER CODE §13241(a) (2015).

¹⁸⁵ *See* Model Criteria for Groundwater Monitoring in Areas of Oil and Gas Well Stimulation, *supra* note 96.

Currently, there is sufficient legislation, which affords the SWRCB the authority to make changes in order to expedite the process of establishing and implementing an appropriate Regional Monitoring Program.¹⁸⁶

2. The Water Code Allows the Water Board to Make More Demanding Regulations

Water Code Section 13263(a) states:

[The] Water Board shall prescribe and be allowed to revise requirements and implement any relevant water quality control plans as to the nature of any proposed discharge or existing discharge of wastewater or any other toxic wastes into the water system while taking into consideration the beneficial uses to be protected and the water quality objectives reasonably required.¹⁸⁷

The SWRCB was established to protect the quality and integrity of surface and ground water within the state of California.¹⁸⁸ The SWRCB has full discretion to require large businesses such as Chevron to comply with testing requirements and may revise and amend current regulations to do so.¹⁸⁹ Consequences resulting from the severe drought conditions may continue to give rise to more water quality issues.¹⁹⁰ Testing standards and regulations must be amended to adequately address those concerns.¹⁹¹ At the time the SWRCB and its regional boards were created, it is reasonable to infer that the use of oil wastewater as crop irrigation was not foreseeable.¹⁹² Thus, the regulations as they stand now are inadequate to address the potential risks associated with the use of such water.¹⁹³ The SWRCB was created to help keep water quality and anti-pollution standards current, but the longstanding drought and the subsequent use of oil wastewater have created the need for additional revisions in the current testing measures.¹⁹⁴ The current testing standards are outdated and failed to fully detect the wide range of compounds and chemicals known to be associated with modern oil

¹⁸⁶ CAL. WATER CODE §13263(a) (2015).

¹⁸⁷ *Id.*

¹⁸⁸ See State Water Resources Control Board: *History of the Boards*, *supra* note 141.

¹⁸⁹ *Id.*

¹⁹⁰ See Model Criteria for Groundwater Monitoring in Areas of Oil and Gas Well Stimulation, *supra* note 96.

¹⁹¹ CAL. WATER CODE §13263(a) (2015).

¹⁹² See State Water Resources Control Board: *History of the Boards*, *supra* note 141.

¹⁹³ *Id.*

¹⁹⁴ *Id.*

drilling operations.¹⁹⁵ The Senate Bill 4 mandated the SWRCB to establish a statewide monitoring program model to aid in effectively monitoring any water that has potential for beneficial use, which includes municipal, industrial, commercial, and agricultural sectors.¹⁹⁶ Water Code Section 13263(a) will allow the SWRCB to adequately monitor the recycled oil wastewater within the parameters of the Water Code, while also moving forward in achieving the ultimate goal of establishing a model-monitoring program.¹⁹⁷

With the current regulations, Chevron is only required to satisfy relatively low standards in terms of treatment of the oil wastewater.¹⁹⁸ Then, by selling the oil wastewater to desperate farmers, Chevron is able to renounce responsibility for any future ramifications resulting from the use of such water. The SWRCB is not only given broad authority to regulate testing regulation, but they also have the power to adjust and amend current regulations to ensure that the use of oil wastewater is not compounding the negative effects caused by the current drought conditions.¹⁹⁹ Water Code Section 13241 “allows the SWRCB to establish water quality objectives in water quality conditions that could reasonably be achieved through the coordinated control of all factors, which affect water quality in the area.”²⁰⁰

As Chevron continues to drill and pump oil from the ground in Kern County, the problems related to the disposal and use of oil wastewater to irrigate crops create new regulatory objectives and issues in regard to the quality of water.²⁰¹ Drilling has always taken place in this area, but the modernization of the drilling process through time has incorporated the use of hazardous chemicals in today’s “fracking” process. These modern day processes can result in several potential impacts to the environment such as stressing surface and ground water supplies, contamination of groundwater supplies, and air pollution from the

¹⁹⁵ Cart, *supra* note 90.

¹⁹⁶ See Model Criteria for Groundwater Monitoring in Areas of Oil and Gas Well Stimulation, *supra* note 96.

¹⁹⁷ *Id.*

¹⁹⁸ See generally State Water Resources Control Board: *Water Quality in Areas of Oil and Gas Production*, http://www.waterboards.ca.gov/water_issues/programs/groundwater/sb4/index.shtml (last visited February 10, 2016).

¹⁹⁹ CAL. WATER CODE §13263(a) (2015).

²⁰⁰ *Id.* §13241(a).

²⁰¹ *Hydraulic Fracturing*, EPA, <http://www2.epa.gov/hydraulicfracturing>, (last visited February 1, 2016).

release of organic compounds and gases.²⁰² Water Code Section 13241 allows the SWRCB the authority to adjust and establish appropriate regulations to remain current with safety standards.²⁰³ Because enacting new legislation is not a quick fix for the problems arising from wastewater use, the amount of oil wastewater being used by local farmers should also be regulated until the current testing requirements and guidelines are revised.

VI. RECOMMENDATIONS FOR ENSURING THE QUALITY AND SAFETY OF OIL WASTEWATER FOR USE IN CROP IRRIGATION

A. More Stringent Testing Regulations Must Be Enacted

The SWRCB does not require testing for many hazardous and carcinogenic compounds like heavy metals, arsenic, radioactive materials, and chemicals that might be used in the drilling process.²⁰⁴ More invasive testing in addition to the standard testing measures are very costly and requires a considerable amount of time to collect the data.²⁰⁵ This is obviously a deterrent to local farmers who are usually unwilling or unable to incur such costs.²⁰⁶ Chevron should be required to pay any bills or costs related to testing, even if such testing goes beyond what is normally required. Water Code section 13267(b)(1) states:

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 explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports.²⁰⁷

Thus, the costs of more sophisticated testing and reporting would be the responsibility of Chevron, pursuant to the Water Code, because the need to monitor for the presence of hazardous and carcinogenic metals and solvents in comparison to the increased costs are equal.²⁰⁸ The EPA

²⁰² *Id.*

²⁰³ CAL. WATER CODE §13241(a) (2015).

²⁰⁴ Schlanger, *supra* note 1

²⁰⁵ *Id.*; see Model Criteria for Groundwater Monitoring in Areas of Oil and Gas Well Stimulation, *supra* note 96.

²⁰⁶ Schlanger, *supra* note 1.

²⁰⁷ CAL. WATER CODE §13267(b)(1) (2015).

²⁰⁸ *Id.*

notes the modern oil drilling and hydraulic “fracking” processes result in wastewater byproduct that contains many of the aforementioned contaminants in addition to radioactive compounds.²⁰⁹ This certainly bolsters the need to implement more stringent testing guidelines, regardless of costs.²¹⁰ Many of these hazardous materials are not a part of the current testing agenda and are likely slipping by undetected.²¹¹ The fact that consumers are potentially ingesting various chemicals that are not part of the testing regulations is important considering six billion dollars worth of crops are produced within this region annually and are shipped to various portions of the world.²¹² While the SWRCB may be acting within the scope of the regulations, it is arguable that they are doing the bare minimum in terms of testing this dangerous wastewater, when they could be using their broad authority to make the necessary changes.²¹³

In addition to enacting more stringent testing measures, the SWRCB and farmers may also look to different wastewater treatment methods to help ensure the quality and safety of the water used to irrigate farmlands.²¹⁴

B. Alternative Wastewater Treatment Methods

Consideration should be given to alternative wastewater treatment methods, which in turn may require less-costly testing methods and procedures.²¹⁵ Origin Clear, Inc. is a waste treatment company that uses Electro Water Separation (EWS) to separate free-floating oil, organic chemicals, bacteria, and suspended solids from wastewater.²¹⁶ The EWS method is able to eliminate over 98% of the impurities and contaminants found in the wastewater.²¹⁷ Utilizing such a method with regard to oil wastewater would ensure its quality and safety instead of relying on less efficient testing and treatment methods.²¹⁸

²⁰⁹ See Hydraulic Fracturing, *supra* note 201.

²¹⁰ *Id.*

²¹¹ Water Defense Reveals Oil Waste Used to Irrigate Crops, <https://waterdefense.org/blog/water-defense-reveals-oil-waste-used-irrigate-crops> (May 4, 2015).

²¹² Schlanger, *supra* note 1.

²¹³ Cart, *supra* note 90.

²¹⁴ See generally, Origin Clear, originclear.com (last visited 2016).

²¹⁵ *Id.*

²¹⁶ *Id.*

²¹⁷ *Id.*

²¹⁸ *Id.*

In May 2015, the SWRCB authorized an amendment to the Water Quality Control Plan for the Ocean Waters of California (“Ocean Plan”), which allowed for the construction and operation of desalination facilities while protecting marine wildlife and water quality.²¹⁹ The amendment runs statewide and the desalinated ocean water provides an additional alternative to battle the drought.²²⁰ The desalination process removes salt, minerals, microorganisms, and any other impurities for use by homeowners, businesses, and farmers alike.²²¹ The byproduct of the desalinization process is called brine and poses a risk, as it is denser than the ocean.²²² Without the administration of proper disposal methods, the brine could settle at the ocean floor and cause harm to the ocean and marine life.²²³ However, the recent amendment was signed and put in place to maintain the integrity as well as prevent the destruction of marine habitats and wildlife.²²⁴ Therefore, the Ocean Plan provides another potential solution to the drought conditions while also maintaining the integrity of our ocean.²²⁵

C. Chevron Should Bear the Cost of Developing More Advanced Testing Measures

Companies such as Chevron, with net profits of over half a billion dollars, would be able to foot the bill for EWS water treatment at likely the same cost as standard testing.²²⁶ This is in light of the responsibility of the Chevron to provide a safe commodity in addition to the need for such testing in relation to the costs as established in Water Code section 13267(b)(1).²²⁷ The need to ensure the most technologically feasible water treatment methods for the irrigation of crops far outweighs the limited costs to a multi-billion dollar oil company.²²⁸ This would bring

²¹⁹ See generally State Water Resources Control Board: Desalination Facilities and Brine Disposal, http://www.waterboards.ca.gov/water_issues/programs/ocean/desalination/ (last visited February 1, 2016).

²²⁰ *Id.*

²²¹ *Id.*

²²² *Id.*

²²³ *Id.*

²²⁴ *Id.*

²²⁵ *Id.*

²²⁶ See Heather Long, *Exxon and Chevron Profits are Down Over 50%*, CNN (July 31, 2015), <http://money.cnn.com/2015/07/31/investing/exxon-mobil-chevron-profits-tank/>.

²²⁷ CAL. WATER CODE §13267(b)(1) (2015).

²²⁸ *Id.*

clarity to the results and testing measure regarding the quality of water and continue to allow farmers to use the oil wastewater byproduct without the risks of oil and other particulate contamination.

When considering the current uses of wastewater along with the associated safety concerns, more weight must be given to determine whether the option is viable and innocuous for irrigating crops.²²⁹ The responsibility bestowed upon the SWRCB requires more than the bare minimum act of testing the oil wastewater.²³⁰ More thorough testing can be accomplished by modifying current regulations to ensure the safety and quality of the wastewater regardless of cost.²³¹ Even with sales down, Chevron netted \$571 million in 2014.²³² With such vast resources and profits, Chevron should help bear the costs associated with maintaining and ensuring the safety and quality of the oil wastewater it is selling.²³³

VII. CONCLUSION

The use of oil wastewater for crop irrigation has taken root in Kern County and some argue that this practice has been going on for many years unregulated.²³⁴ As California enters the fifth year of unrelenting drought, there appears to be no definite end to the detrimental weather conditions in sight.²³⁵ Historical climate changes has scorched the once fertile soils and drastic measures must be taken in order to protect the fertile land that supplies billions of dollars worth of produce every year.²³⁶

The modern oil drilling and extraction processes have become more sophisticated.²³⁷ The legislative intent allowing the SWRCB to regulate water quality control standards and amend current regulations was to allow the SWRCB the ability to stay current with modern processing practices, which could have a harmful effect on the quality of irrigation water.²³⁸ The California Water Code specifically calls for the person or company creating the oil wastewater byproduct to bear the costs

²²⁹ See State Water Resources Control Board: *History of the Boards*, *supra* note 140.

²³⁰ CAL. WATER CODE §13263(a) (2015).

²³¹ *Id.*

²³² Long, *supra* note 226.

²³³ *Id.*

²³⁴ Schlanger, *supra* note 1.

²³⁵ See California Water Science Center, *California Drought* (March, 2016).

²³⁶ Schlanger, *supra* note 1; R. Muse, *supra* note 15.

²³⁷ *Id.*

²³⁸ CAL. WATER CODE §13267(b)(1) (2015).

associated with the appropriate testing measures to ensure its use in irrigation is safe for not only the soil and crops, but for the millions of people who eat these crops.²³⁹ An improved and more sophisticated water treatment technique, such as EWS or establishing desalination facilities, are inexpensive and environmentally conscious alternatives to ensure water quality and safety.²⁴⁰ This Comment has demonstrated that a multi-prong approach involving more stringent testing methods, regulation of the use of oil wastewater by local farms, and improved water treatment techniques is the most efficient way to ensure the quality of the oil wastewater being used for irrigation purposes in Kern County.

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²³⁹ Schlanger, *supra* note 1; CAL. WATER CODE §13267(b)(1) (2015).

²⁴⁰ *See* Origin Clear, *supra* note 214.

²⁴¹ I would like to take the time to thank my beloved family and friends for their unwavering support and encouragement throughout this process. Thank you to Ashley (and our dog Toochie) for your incredible patience, tolerance, and support during these past several months. Thank you to my mother Brenda for being my biggest fan and always believing in me. I wish to extend a special thank you to Professor Denise Kerner for all your help in editing my comment; I truly appreciate all your help. I would also like to thank Paul Rodriguez, Esq. for being so understanding during the many hours spent away from the office. Last but certainly not least, I would also like to thank Jennifer Oleksa-Vanzant for all the help and support throughout this process. Thank you.