

## **Appendix O Hypothetical 29-B Plan**

ERM's proposed most feasible plan (MFP) for the Hero Lands property is located in the main body of this document and complies with the Louisiana Department of Environmental Quality's Risk Evaluation/Corrective Action Program (RECAP), the State's risk-based protocol for environmental evaluation and remediation, and Statewide Order 29-B utilizing recognized exceptions approved and accepted by the Louisiana Department of Natural Resources in developing remediation plans for exploration and production (E&P) sites.

As required by LAC 43:XIX.611.F.1, this Appendix presents a hypothetical remediation plan for both soil and groundwater that complies with all the provisions of Statewide Order 29-B, exclusive of Subchapter 319, and is submitted solely in fulfillment of that requirement. Unlike its soil standards, 29-B contains no groundwater standards. Therefore, this Hypothetical Plan includes a theoretical cost estimate if RECAP was ignored and groundwater remediation was attempted in the A and B Zones underlying the Hero Lands property to "background levels" only to comply with the technical requirements of LAC 43:XIX.611.F.1 and ERM does not support or endorse such remediation as an alternative approach to RECAP. The cost estimate associated with this appendix represents the worst case maximum cost and does not consider the use of McGowan's existing water disposal system. Actual costs would be truncated if this approach was attempted because any attempt to operate a shallow groundwater pumping system would be expected to fail.

Because the California Company and/or Chevron did not operate on the northwestern tract, and Chevron did not include that tract in its limited admission, this Hypothetical Plan does not address the area beneath the northwestern tract (ICON's A zone remediation Area 1 and the majority of ICON's B zone remediation area).

Statewide Order 29-B's standards apply to soil and do not apply to groundwater; RECAP instead contains the recognized and accepted treatment protocol. The application of 29-B to groundwater as set forth in this Hypothetical Plan would be excessive, wasteful, unnecessary, technically impracticable, infeasible, potentially harmful, economically unsound, unreasonable, and would result in significantly more damage than benefit. Furthermore, this Hypothetical Plan would be impractical or impossible to implement. Therefore, ERM does not support or endorse the adoption of this plan as the most feasible plan for this site for the below reasons:

- 1) It is unnecessary given the current condition of the Property, which meets RECAP and USEPA human health and ecological standards and continues to be used for its highest and best use;
- 2) It is technically impracticable and would result in significantly more damage than benefit to the environment and public health;
- 3) It would result in the disruption of current and future oil and gas operations on the Property;
- 4) It would ignore LDNR's approval of the use of risk-based standards in the 2011 LDNR/LDEQ Memorandum of Understanding (MOU) and in multiple MFPs including 29-B exceptions issued to reviewing courts based on evidence presented at Act 312 hearings (see attached LDNR memorandum); and,
- 5) It is not the most feasible plan to protect the health, safety and welfare of the people of Louisiana.

ERM's MFP includes the application of appropriate and recognized exceptions allowed under Section 319 of the 29-B regulations and the 2011 MOU to support the application of RECAP. ERM requests that the RECAP-based plan be adopted as the most feasible plan for this Property. The use of RECAP to determine whether and to what extent groundwater should be remediated has consistently been recognized by LDNR as an appropriate exception to 29-B. Indeed, Plaintiff's expert, ICON Environmental Services, Inc., utilized RECAP to prepare its proposed groundwater remediation plan in this case. In addition to general guidance from both LDNR and LDEQ on the application of RECAP to groundwater, previous and current regulation by LDEQ of groundwater underlying adjacent properties clearly support the use of RECAP. Therefore, the application of RECAP to the groundwater in this case is appropriate for the following reasons:

- The 2003 RECAP document provides the comprehensive risk-based program necessary and appropriate for fully evaluating this complex, multi-media site. The U.S. EPA, the State of Louisiana and other states have developed and refined risk-based standards subsequent to the promulgation of Statewide Order 29-B pit closure standards in January 1986; therefore, these regulations provide standards that appropriately supplement 29-B standards;
- The February 2011 MOU between LDNR and LDEQ recognizes the application of RECAP, a risk-based approach to assessing the need for remediation, as compared to the rigid 1986 Statewide Order 29-B pit closure standards, which do not include numerical groundwater standards. The MOU also brings other knowledgeable state regulators into the process, as it requires that all site evaluation or remediation plans or final results submitted pursuant to RECAP Management Option 3 (MO-3) assessments, or those addressing air, surface water, water bottoms (sediments) or non-Statewide Order No. 29-B parameters, shall be forwarded to LDEQ for review and comment;
- The extensive, site-specific Human Health and Ecological Risk Assessments performed by Chevron's experts in this case demonstrate that the site poses no unacceptable risk to human health and the environment. As outlined in the LDEQ RECAP preamble, risk to human health and the environment is the primary consideration when remedial decisions are made. The full RECAP Risk Assessment and Ecological Assessment findings fully support an MFP with exceptions to Statewide Order 29-B (i.e., use of the more rigorous and widely-accepted RECAP standards);
- LDEQ has been involved in regulating soil and groundwater conditions beneath the Chevron Oronite Plant and adjacent storm water impoundment for almost 40 years, recognizes the naturally poor water quality underlying the area, and has not required active groundwater remediation. It is reasonable to assume that the LDNR and LDEQ would evaluate and regulate groundwater beneath the Hero Lands property in the same manner as groundwater beneath the Oronite plant, since portions of the property are located immediately adjacent to the plant, the plaintiffs' property is zoned for heavy industrial and/or commercial uses, and groundwater conditions do not change at the property boundaries.

In addition, any attempt to remediate groundwater underlying the Hero Lands property would be destructive to the Plaintiff's property, the Plaintiff's intended future use of its property, and in portions of the property, a wetland ecosystem. It would also likely be impossible. As identified in

the U.S. National Contingency Plan (NCP), the ultimate selection of a remedy by the agency is dependent upon five primary balancing criteria, which are: 1) long-term effectiveness and permanence; 2) reduction of toxicity, mobility, or volume through treatment; 3) short-term effectiveness; 4) implementability; and 5) cost. Rigid application of Statewide Order 29-B (i.e., implementation of this Hypothetical Plan), is not consistent with these criteria. If two remedies are equally feasible, reliable, and provide the same level of protection, the less expensive remedy should be selected. Both the capital and long-term operational and maintenance costs for the remedial period must be considered. The most expensive remedy is not always the most feasible or best approach.

This Hypothetical Plan is not appropriate for the Hero Lands property and should be rejected for the following reasons:

- Approximately 80 years of E&P activities (from 1940 to present) consisting of drilling and production of many oil wells, drilling and operation of salt water disposal wells (SWDs), construction and use of pits, pipelines, tanks, etc., were authorized by the lessor to extract the maximum amount of oil and gas from the property at issue. Although these long-term industrial operations, as expected, have left an industrial footprint on the property (which remains an active oil and gas E&P site), that footprint has not affected the past, current or reasonably anticipated future highest and best use of the property and does not pose an unacceptable risk to human health or the environment;
- It is highly unlikely that the United States Army Corps of Engineers (USACE) would issue a permit for a massive groundwater pumping remedy near the Mississippi River levee system. The USACE has jurisdiction over activities in proximity to the Mississippi River levees and has strict requirements regarding any drilling within 1,500-feet of the levees. It should be noted that ERM's USACE permit precludes the installation of monitoring wells when the Mississippi River stage is greater than 11 feet above mean sea level (amsl), and that ERM was forced to suspend its investigations for approximately six months in 2020 due to elevated river stage levels.
- The hypothetical remediation areas include many features that would impede the installation of wells at the ground surface (Highway 23, existing oil and gas operations, the Mississippi River levee system, wetland areas, etc.). The limited available surface locations for recovery wells and other associated equipment would likely prevent the strategic positioning of wells and impede the ability to effectively target impacted areas;
- The uppermost water bearing zone (the A Zone) is a Class 3A aquifer based on aquifer tests (slug tests). This zone has a very low hydraulic conductivity (average of 0.00028 cm/s) and consequently a very low yield (234 gallons per day). The low hydraulic conductivity of this zone demonstrates not only that it is unsuited as a source of usable water, but also that it would be infeasible to remediate through a long-term, large scale pumping remedy;
- The A zone is highly variable laterally, which would further impede the ability to recover groundwater in some areas on the property. This is demonstrated by the very low yield in well MW-6A, which purged dry during well development;

- The B zone, is a Class 2 aquifer based upon aquifer tests (slug tests). Available information indicates that the groundwater within the B zone has never been used, is non-potable and is of naturally poor quality. The LDEQ and its predecessor agency have been involved with the regulation of the groundwater under the adjacent Oronite Plant and active storm water impoundment for almost 40 years and have never required active remediation of the groundwater in either the A or B zones. Thus, the groundwater in the B zone has effectively been managed as a Class 3 zone.
- The A zone and B zones exhibit naturally poor water quality, with arsenic, iron, manganese, and TDS concentrations exceeding the EPA Maximum Contaminant Level (MCL) and Secondary Maximum Contaminant Level (SMCLs) standards at locations unaffected by E&P activities. An attempt to reduce constituents to background levels will likely not achieve any benefit. Furthermore, the remedy would not make the water potable because arsenic, iron, manganese, and TDS would naturally remain above MCLs and SMCLs;
- A remedy of the magnitude required to attempt to technically comply with Statewide Order 29-B's standards as opposed to using accepted RECAP standards for groundwater is technically impracticable and would not be able to achieve end goals in a reasonable time frame;
- Implementation of a Hypothetical Plan would destroy portions of a thriving ecosystem in the effort to attain groundwater concentrations that would provide no environmental benefit;
- The implementation of a Hypothetical Plan would do nothing to change the current or reasonably anticipated future use of the property and would, in fact, impede the use of the property for the duration of the remedy;
- The risks posed by implementation of a massive, Hypothetical Plan are significant and must be considered. They include destruction of healthy wetland areas as a result of installation and operation of a groundwater remediation system and the potential for subsidence due to the extraction of large volumes of shallow groundwater;
- Pits closed prior to January 20, 1986, are not considered existing pits subject to Statewide Order 29-B standards. Thus, implementation of a Hypothetical Plan is not appropriate.

The Hypothetical Plan is based on the following scope and general assumptions:

- ERM's proposed soil remediation plan includes removal and replacement of soils that exceed 29-B limits for metals and hydrocarbons (oil & grease) and with highly elevated levels of salt within the effective root zone, and treatment with surface amendments and mixing and blending of less salt-affected soils within the effective root zone. LDNR has approved the application of salt standards to soils within the root zone at other E&P sites (see the attached correspondence related to the MAR Services site). The proposed soil remediation plan does not include exceptions to 29-B and would not be modified for this Hypothetical Plan. Therefore, the soil remediation plan is not further discussed herein;

- 29-B does not include groundwater standards, so the groundwater evaluation includes remediation to address groundwater where concentrations indicate any increase over background concentrations. This is based on the assumption that Statewide Order 29-B requires that groundwater be remediated to background conditions, regardless of risk or lack of risk posed by the conditions, which is contrary to modern EPA and state risk-based regulations and guidance;
- Target groundwater chloride concentrations are based on remediation targets of <250 mg/L chloride (EPA SMCL) for the A zone and 3,000 mg/L total dissolved solids (TDS) [for livestock water supply] for the B zone. Any attempt to pump the B zone will likely draw in saltier water from the west; therefore, we believe the 3,000 mg/L TDS concentration is a reasonable target. The extent of the remediation areas were assumed based on ICON's proposed remediation areas in the Hypothetical Plan; and,
- The Hypothetical Plan for groundwater relies on an estimated capture zone for each recovery well based on *U.S. EPA., 1987, Guidelines for delineation of wellhead protection area, EPA 440/6-87-010, Washington, D.C., Office of Groundwater Protection*, along with various other assumptions outlined in Tables O-1 through O-7. These assumptions would be further evaluated after the *Initial Remediation Well Installation, Pump Test, and Pilot Evaluation* component of the remedy. It is anticipated that this initial step in the remedy would demonstrate that the implementation of the Hypothetical 29-B remedy would be impractical or impossible to implement.

The following steps would be implemented as part of this Hypothetical Plan, though as noted throughout this Appendix, ERM does not support or believe the following is the appropriate remedy for groundwater:

- Submit a plan to LDNR Office of Conservation for remedial design activities;
- Apply for necessary permits (i.e., Coastal Use Permit, U.S. Army Corps of Engineers Permit, Levee Permit, etc.) for remediation activities;
- Complete the soil removal and replacement and soil treatment specified in Section 10 of the main body of this document;
- Perform *Initial Remediation Well Installation, Pump Test, and Pilot Evaluation* in each area to obtain data needed to design a groundwater pumping system, if practical and possible;
- Perform design activities for groundwater pumping, if feasible;
- Submit a detailed implementation plan to LDNR OOC for remediation activities;
- Revise, if necessary, the relevant permit applications;
- Install saltwater disposal well for on-site disposal of extracted groundwater;
- Install groundwater extraction wells; and,
- Install groundwater recovery system and operate for a period of up to 30 years.

It has been assumed that the groundwater pumping remedy will continue for a period of up to 30 years as a part of the Hypothetical Plan. Although estimates based on the currently available data suggest that the remedy may extend beyond 30 years for some areas, the time frame cannot be determined until pump tests and pilot testing is complete. The 30-year-time frame is consistent with EPA guidance on estimating the costs for groundwater pump and treat remedies where an active groundwater remedy is appropriate (which it is not here). Similarly, the number of recovery wells needed to implement a groundwater pumping remedy cannot be determined until pump

tests and pilot testing is completed. The cost estimates as a part of the Hypothetical Plan assume the number of recovery wells based on estimated capture zones calculated from EPA wellhead protection equations and the total estimated impacted area. In reality, the ability to implement groundwater pumping from numerous wells would likely be impeded by the limited ability to install and operate recovery wells in various locations within the remediation areas (Highway 23, existing oil and gas operations, the Mississippi River levee system, wetland areas, etc.), recovery wells pumping dry over time due to close spacing, and very low yield in some portions of the highly variable and discontinuous shallow water-bearing zones.

In addition, the groundwater remediation areas in the Hypothetical Plan include areas within the footprint of the current operator's active facilities. The remedy will likely cause the disruption or complete shutdown of oil and gas production on the site. Costs of this business interruption will be significant and have not been included in the estimate.

The details of this plan and estimated implementation cost for the Hypothetical Plan are included in Tables O-1 through O-7.

The hypothetical schedule for implementing this Hypothetical Plan would be generally as follows:

- Submit relevant permit applications – approximately 60 days after adoption of the Hypothetical Plan;
- Obtaining the permits would require at least 3 to 6 months, assuming it is even possible to obtain LDNR Office of Coastal Management and U.S. Army Corps of Engineers approval;
- Soil remediation activities would require approximately six months to complete (two months for targeted soil removal and replacement and four months for onsite soil treatment);
- Groundwater remedial design activities under the Hypothetical Plan would require approximately 6 months to complete;
- Groundwater treatment system design and installation under the Hypothetical Plan would require approximately 6 months to one year to complete; and,
- The groundwater extraction and disposal would be performed for up to 30 years.

**Table O-1**  
**Groundwater Remediation: A Zone Area 2 (Hypothetical 29-B Plan)**

*Hero Lands Company, L.L.C. vs. Chevron U.S.A. Inc. et al.*  
*Stella Oil and Gas Field*  
*Plaquemines Parish, Louisiana*

| <u>Volume Calculations</u>              | <u>Unit</u>          | <u>Value</u> | <u>Basis</u>   |
|---|----------------------|--------------|--|
| Impacted Thickness (b)                  | feet                 | 4.6          | Average A zone thickness in Area 2   |
| Porosity (n)                            | unitless             | 0.3          | Assumed  |
| Area of Plume (A)                       | square feet          | 430,503      | ICON area  |
| Pore Volume                             | cubic feet           | 597,969      | Calculated: Pore Volume = b * n * A  |
| Pore Volume                             | gal                  | 4,473,117    | Calculated: Unit conversion  |
| Retardation Factor (Rf)                 | unitless             | 1            | Constant value for chloride  |
| Target Concentration (C <sub>f</sub> )  | mg/L                 | 250          | EPA SMCL for Drinking Water  |
| Initial Concentration (C <sub>o</sub> ) | mg/L                 | 29423        | Average of ICON and ERM Splits for wells in A zone Area 2  |
| Number Pore Volumes                     | unitless             | 4.77         | Calculated: Number Pore Volumes = -Rf * ln(C <sub>f</sub> /C <sub>o</sub> )                      |
| Recovery Volume                         | gallons              | 21,328,188   | Calculated: Recovery Volume = Pore Volume * Number Pore Volumes                                  |
| <u>Recovery Well Calculations</u>       |                      |              |  |
| Aquifer Pumping Rate                    | gallons per minute   | 0.163        | Average well yield in the A zone based on slug test results                                      |
| Aquifer Pumping Rate (Q)                | ft <sup>3</sup> /day | 31.38        | Calculated: Unit conversion  |
| Time (t)                                | days                 | 3,650        | Assume 10 years  |
| Estimated Radius (r)                    | feet                 | 162          | Calculated: $r = \sqrt{\frac{Qt}{\pi bn}}$ (EPA, 1987)   |
| Estimated Capture Zone Area             | square feet          | 82,453       | Calculated   |
| Estimated Number of Recovery Wells      | unitless             | 6            | Calculated: Area of Plume / Estimated Capture Zone Area  |
| <u>Time Calculations</u>                |                      |              |  |
| Groundwater Recovery Rate               | gallons per day      | 1,408        | Calculated: Pumping Rate * Number of Wells   |
| Recovery System Operation Time          | years                | 30           | Assume 30 years based on EPA (calculated value [Recovery Volume / Recovery Rate] is ~44.5 years) |
| <u>Other Assumptions</u>                |                      |              |  |
| Well Depth                              | feet                 | 18           | Approximate average bottom of A zone in Area 2   |
| Well Diameter                           | inch                 | 4            | Assumed  |

Initial RW Installation, Pump Test, and Pilot Evaluation

|   | <u>Unit Cost</u> | <u>Units</u> | <u>Quantity</u> | <u>Cost</u>     | <u>Cost Basis</u>               |
|---|------------------|--------------|-----------------|-----------------|---------------------------------|
| Permit Applications (Coastal Zone, COE, Levee Permits)                    | \$10,000         | unit         | 1               | \$10,000        | ERM Estimate                    |
| Drill Rig Mobilization/Demobilization                                     | \$780            | unit         | 1               | \$780           | 08/26/2020 Walker Hill Estimate |
| Hollow Stem Auger Rig and Crew (one four-inch well and one two-inch well) | \$2,500          | day          | 2               | \$5,000         | 08/26/2020 Walker Hill Estimate |
| Four-inch PVC Well Materials  | \$18             | foot         | 18              | \$324           | 08/26/2020 Walker Hill Estimate |
| Two-inch PVC Well Materials   | \$15             | foot         | 18              | \$270           | 08/26/2020 Walker Hill Estimate |
| Drill Crew Per Diem   | \$375            | day          | 2               | \$750           | 08/26/2020 Walker Hill Estimate |
| Above-grade Surface Completions   | \$600            | unit         | 2               | \$1,200         | 08/26/2020 Walker Hill Estimate |
| 1/2 HP 5 GPM Well Pump, Motor, and Control Box                            | \$2,000          | unit         | 1               | \$2,000         | ERM Estimate                    |
| Temporary Electrical Hookup   | \$40             | feet         | 150             | \$6,000         | ERM Estimate                    |
| ERM Oversight, Development, and Equipment                                 | \$1,500          | day          | 2               | \$3,000         | ERM Estimate                    |
| ERM Labor for 24-Hour Pump Test   | \$3,750          | day          | 1               | \$3,750         | ERM Estimate                    |
| Data Loggers for Pump Test  | \$2,000          | unit         | 2               | \$4,000         | ERM Estimate                    |
| Frac Tank for Pump Test   | \$50             | day          | 30              | \$1,500         | ERM Estimate                    |
| Data Evaluation and Reporting   | \$7,500          | unit         | 1               | \$7,500         | ERM Estimate                    |
| <i>Initial RW Installation, Pump Test, and Pilot Evaluation Subtotal</i>  |                  |              |                 | <i>\$46,074</i> |                                 |

**Table O-1**  
**Groundwater Remediation: A Zone Area 2 (Hypothetical 29-B Plan)**

*Hero Lands Company, L.L.C. vs. Chevron U.S.A. Inc. et al.*  
*Stella Oil and Gas Field*  
*Plaquemines Parish, Louisiana*

| <u>Additional RW Installation</u>                              | <u>Unit Cost</u> | <u>Units</u> | <u>Quantity</u> |                            | <u>Cost</u>        | <u>Cost Basis</u>  |
|--|------------------|--------------|-----------------|----------------------------|--------------------|--|
| Drill Rig Mobilization/Demobilization                          | \$780            | unit         | 1               |                            | \$780              | 08/26/2020 Walker Hill Estimate  |
| Hollow Stem Auger Rig and Crew (five four-inch wells)          | \$2,500          | day          | 5               |                            | \$12,500           | 08/26/2020 Walker Hill Estimate  |
| Four-inch PVC Well Materials                                   | \$18             | foot         | 90              |                            | \$1,620            | 08/26/2020 Walker Hill Estimate  |
| Drill Crew Per Diem  | \$375            | day          | 5               |                            | \$1,875            | 08/26/2020 Walker Hill Estimate  |
| Above-grade Surface Completions                                | \$600            | unit         | 5               |                            | \$3,000            | 08/26/2020 Walker Hill Estimate  |
| 1/2 HP 5 GPM Well Pump, Motor, and Control Box                 | \$2,000          | unit         | 5               |                            | \$10,000           | ERM Estimate   |
| Electrical Hookup  | \$40             | feet         | 1,750           |                            | \$70,000           | ERM Estimate   |
| ERM Oversight, Development, and Equipment                      | \$1,500          | day          | 5               |                            | \$7,500            | ERM Estimate   |
| <i>Additional RW Installation Subtotal</i>                     |                  |              |                 |                            | <i>\$107,275</i>   |  |
| <br>   |                  |              |                 |                            |                    |  |
| <u>On-site Disposal Capital Costs</u>                          | <u>Unit Cost</u> | <u>Units</u> | <u>Quantity</u> |                            | <u>Cost</u>        | <u>Cost Basis</u>  |
| Three-inch Flowline to Connect Wells to Tanks and Tanks to SWD | \$30             | feet         | 4,350           |                            | \$130,500          | ERM Estimate, Peak Energy (assume 275' average distance from wells to tanks and 2,700' distance from tanks to SWD in Area 3) |
| Highway 23 Right-of-way Crossing for Distribution Lines        | \$10,000         | unit         | 0               |                            | \$0                | ERM Estimate - Assume highway crossing with Area 4 crossing  |
| Minor Right-of-way Crossing for Distribution Lines             | \$5,000          | unit         | 2               |                            | \$10,000           | ERM Estimate   |
| 10,000 Gallon Storage Tanks                                    | \$10,000         | unit         | 1               |                            | \$10,000           | ERM Estimate, Peak Energy  |
| Pumps, Piping, and Electrical                                  | \$25,000         | unit         | 1               |                            | \$25,000           | ERM Estimate, Peak Energy  |
| <i>On-site Disposal Capital Costs Subtotal</i>                 |                  |              |                 |                            | <i>\$175,500</i>   |  |
| <br>   |                  |              |                 |                            |                    |  |
| <u>Recovery Operation and Maintenance</u>                      | <u>Unit Cost</u> | <u>Units</u> | <u>Quantity</u> | <u>Quarterly or Annual</u> | <u>Cost</u>        | <u>Cost Basis</u>  |
| Energy Consumption (Recovery Pumps)                            | \$0.0775         | kWh          | 4,834           | 120                        | \$44,957           | <a href="https://www.electricitylocal.com/">https://www.electricitylocal.com/</a> - Gretna is closest city with data         |
| Personnel (O&M)  | \$75             | hr           | 26              | 120                        | \$234,000          | ERM Estimate - Assumes 2 hours per week  |
| Project Management   | \$120            | hr           | 3               | 120                        | \$43,200           | ERM Estimate - Assumes 3 hours per quarter   |
| Miscellaneous Equipment  | \$1,000          | year         | 1               | 30                         | \$30,000           | ERM Estimate   |
| Pump Replacement (every 5 years)                               | \$2,400          | year         | 1               | 30                         | \$72,000           | ERM Estimate   |
| Annual Sampling  | \$5,000          | year         | 1               | 30                         | \$150,000          | ERM Estimate   |
| <i>Recovery Operation and Maintenance Subtotal</i>             |                  |              |                 |                            | <i>\$574,157</i>   |  |
| <br>   |                  |              |                 |                            |                    |  |
| <u>Project Management and Reporting</u>                        | <u>Unit Cost</u> | <u>Units</u> | <u>Quantity</u> | <u>Years</u>               | <u>Cost</u>        | <u>Cost Basis</u>  |
| Project Management   | \$1,000          | year         | 1               | 30                         | \$30,000           | ERM Estimate   |
| Data Evaluation and Reporting                                  | \$3,000          | year         | 1               | 30                         | \$90,000           | ERM Estimate   |
| <i>Project Management and Reporting Subtotal</i>               |                  |              |                 |                            | <i>\$120,000</i>   |  |
| <br>   |                  |              |                 |                            |                    |  |
| <b>Total Cost - 30 Years of Operation</b>                      |                  |              |                 |                            | <b>\$1,023,006</b> |  |

**Table O-2**  
**Groundwater Remediation: A Zone Area 3 (Hypothetical 29-B Plan)**

*Hero Lands Company, L.L.C. vs. Chevron U.S.A. Inc. et al.*  
*Stella Oil and Gas Field*  
*Plaquemines Parish, Louisiana*

| <u>Volume Calculations</u>              | <u>Unit</u> | <u>Value</u> | <u>Basis</u>  |
|---|-------------|--------------|---|
| Impacted Thickness (b)                  | feet        | 12.4         | Average A zone thickness in Area 3  |
| Porosity (n)                            | unitless    | 0.3          | Assumed   |
| Area of Plume (A)                       | square feet | 2,682,894    | ICON area   |
| Pore Volume                             | cubic feet  | 9,972,317    | Calculated: Pore Volume = b * n * A   |
| Pore Volume                             | gal         | 74,598,117   | Calculated: Unit conversion   |
| Retardation Factor (Rf)                 | unitless    | 1            | Constant value for chloride   |
| Target Concentration (C <sub>f</sub> )  | mg/L        | 250          | EPA SMCL for Drinking Water   |
| Initial Concentration (C <sub>o</sub> ) | mg/L        | 11413        | Average of ICON and ERM Splits for wells in A zone Area 3                   |
| Number Pore Volumes                     | unitless    | 3.82         | Calculated: Number Pore Volumes = -Rf * ln(C <sub>f</sub> /C <sub>o</sub> ) |
| Recovery Volume                         | gallons     | 285,042,578  | Calculated: Recovery Volume = Pore Volume * Number Pore Volu                |

| <u>Recovery Well Calculations</u>  | <u>Unit</u>          | <u>Value</u> | <u>Basis</u>  |
|------------------------------------|----------------------|--------------|---|
| Aquifer Pumping Rate               | gallons per minute   | 0.163        | Average well yield in the A zone based on slug test results |
| Aquifer Pumping Rate (Q)           | ft <sup>3</sup> /day | 31.38        | Calculated: Unit conversion                                 |
| Time (t)                           | days                 | 3,650        | Assume 10 years   |
| Estimated Radius (r)               | feet                 | 99           | Calculated: $r = \sqrt{\frac{Qt}{\pi bn}}$ (EPA, 1987)      |
| Estimated Capture Zone Area        | square feet          | 30,812       | Calculated  |
| Estimated Number of Recovery Wells | unitless             | 88           | Calculated: Area of Plume / Estimated Capture Zone Area     |

| <u>Time Calculations</u>       | <u>Unit</u>     | <u>Value</u> | <u>Basis</u>   |
|--------------------------------|-----------------|--------------|--|
| Groundwater Recovery Rate      | gallons per day | 20,655       | Calculated: Pumping Rate * Number of Wells   |
| Recovery System Operation Time | years           | 30           | Assume 30 years based on EPA (calculated value [Recovery Volume / Recovery Rate] is ~38 years) |

| <u>Other Assumptions</u> | <u>Unit</u> | <u>Value</u> | <u>Basis</u>                                   |
|--------------------------|-------------|--------------|--|
| Well Depth               | feet        | 20           | Approximate average bottom of A zone in Area 3 |
| Well Diameter            | inch        | 4            | Assumed  |

| <u>Initial RW Installation, Pump Test, and Pilot Evaluation</u>           | <u>Unit Cost</u> | <u>Units</u> | <u>Quantity</u> | <u>Cost</u>     | <u>Cost Basis</u>                                      |
|---|------------------|--------------|-----------------|-----------------|--|
| Permit Applications (Coastal Zone, COE, Levee Permits)                    | \$10,000         | unit         | 0               | \$0             | ERM Estimate - Cost Included in A zone Area 2 Estimate |
| Drill Rig Mobilization/Demobilization                                     | \$780            | unit         | 1               | \$780           | 08/26/2020 Walker Hill Estimate                        |
| Hollow Stem Auger Rig and Crew (one four-inch well and one two-inch well) | \$2,500          | day          | 2               | \$5,000         | 08/26/2020 Walker Hill Estimate                        |
| Four-inch PVC Well Materials  | \$18             | foot         | 20              | \$360           | 08/26/2020 Walker Hill Estimate                        |
| Two-inch PVC Well Materials   | \$15             | foot         | 20              | \$300           | 08/26/2020 Walker Hill Estimate                        |
| Drill Crew Per Diem   | \$375            | day          | 2               | \$750           | 08/26/2020 Walker Hill Estimate                        |
| Above-grade Surface Completions   | \$600            | unit         | 2               | \$1,200         | 08/26/2020 Walker Hill Estimate                        |
| 1/2 HP 5 GPM Well Pump, Motor, and Control Box                            | \$2,000          | unit         | 1               | \$2,000         | ERM Estimate   |
| Temporary Electrical Hookup   | \$40             | feet         | 150             | \$6,000         | ERM Estimate   |
| ERM Oversight, Development, and Equipment                                 | \$1,500          | day          | 2               | \$3,000         | ERM Estimate   |
| ERM Labor for 24-Hour Pump Test   | \$3,750          | day          | 1               | \$3,750         | ERM Estimate   |
| Data Loggers for Pump Test  | \$2,000          | unit         | 2               | \$4,000         | ERM Estimate   |
| Frac Tank for Pump Test   | \$50             | day          | 30              | \$1,500         | ERM Estimate   |
| Data Evaluation and Reporting   | \$7,500          | unit         | 1               | \$7,500         | ERM Estimate   |
| <i>Initial RW Installation, Pump Test, and Pilot Evaluation Subtotal</i>  |                  |              |                 | <i>\$36,140</i> |  |

**Table O-2  
Groundwater Remediation: A Zone Area 3 (Hypothetical 29-B Plan)**

*Hero Lands Company, L.L.C. vs. Chevron U.S.A. Inc. et al.  
Stella Oil and Gas Field  
Plaquemines Parish, Louisiana*

| <u>Additional RW Installation</u>                              | <u>Unit Cost</u> | <u>Units</u> | <u>Quantity</u> |                            | <u>Cost</u>         | <u>Cost Basis</u>  |
|--|------------------|--------------|-----------------|----------------------------|---------------------|--|
| Drill Rig Mobilization/Demobilization                          | \$780            | unit         | 1               |                            | \$780               | 08/26/2020 Walker Hill Estimate  |
| Hollow Stem Auger Rig and Crew (87 four-inch wells)            | \$2,500          | day          | 50              |                            | \$125,000           | 08/26/2020 Walker Hill Estimate  |
| Four-inch PVC Well Materials                                   | \$18             | foot         | 1,740           |                            | \$31,320            | 08/26/2020 Walker Hill Estimate  |
| Drill Crew Per Diem  | \$375            | day          | 50              |                            | \$18,750            | 08/26/2020 Walker Hill Estimate  |
| Above-grade Surface Completions                                | \$600            | unit         | 87              |                            | \$52,200            | 08/26/2020 Walker Hill Estimate  |
| 1/2 HP 5 GPM Well Pump, Motor, and Control Box                 | \$2,000          | unit         | 87              |                            | \$174,000           | ERM Estimate   |
| Electrical Hookup  | \$40             | feet         | 18,000          |                            | \$720,000           | ERM Estimate   |
| ERM Oversight, Development, and Equipment                      | \$1,500          | day          | 50              |                            | \$75,000            | ERM Estimate   |
| <i>Additional RW Installation Subtotal</i>                     |                  |              |                 |                            | <i>\$1,197,050</i>  |  |
| <br>   |                  |              |                 |                            |                     |  |
| <u>On-site Disposal Capital Costs</u>                          | <u>Unit Cost</u> | <u>Units</u> | <u>Quantity</u> |                            | <u>Cost</u>         | <u>Cost Basis</u>  |
| Three-inch Flowline to Connect Wells to Tanks and Tanks to SWD | \$30             | feet         | 79,200          |                            | \$2,376,000         | ERM Estimate, Peak Energy (assume 900' average distance from wells to tanks and tanks located at SWD in Area 3)      |
| Highway 23 Right-of-way Crossing for Distribution Lines        | \$10,000         | unit         | 0               |                            | \$0                 | ERM Estimate   |
| Minor Right-of-way Crossing for Distribution Lines             | \$5,000          | unit         | 0               |                            | \$0                 | ERM Estimate   |
| 10,000 Gallon Storage Tanks                                    | \$10,000         | unit         | 2               |                            | \$20,000            | ERM Estimate, Peak Energy  |
| Pumps, Piping, and Electrical                                  | \$25,000         | unit         | 1               |                            | \$25,000            | ERM Estimate, Peak Energy  |
| <i>On-site Disposal Capital Costs Subtotal</i>                 |                  |              |                 |                            | <i>\$2,421,000</i>  |  |
| <br>   |                  |              |                 |                            |                     |  |
| <u>Recovery Operation and Maintenance</u>                      | <u>Unit Cost</u> | <u>Units</u> | <u>Quantity</u> | <u>Quarterly or Annual</u> | <u>Cost</u>         | <u>Cost Basis</u>  |
| Energy Consumption (Recovery Pumps)                            | \$0.0775         | kWh          | 70,900          | 120                        | \$659,369           | <a href="https://www.electricitylocal.com/">https://www.electricitylocal.com/</a> - Gretna is closest city with data |
| Personnel (O&M)  | \$75             | hr           | 260             | 120                        | \$2,340,000         | ERM Estimate - Assumes 20 hours per week   |
| Project Management   | \$120            | hr           | 24              | 120                        | \$345,600           | ERM Estimate - Assumes 24 hours per quarter  |
| Miscellaneous Equipment  | \$10,000         | year         | 1               | 30                         | \$300,000           | ERM Estimate   |
| Pump Replacement (every 5 years)                               | \$35,200         | year         | 1               | 30                         | \$1,056,000         | ERM Estimate   |
| Annual Sampling  | \$40,000         | year         | 1               | 30                         | \$1,200,000         | ERM Estimate   |
| <i>Recovery Operation and Maintenance Subtotal</i>             |                  |              |                 |                            | <i>\$5,900,969</i>  |  |
| <br>   |                  |              |                 |                            |                     |  |
| <u>Project Management and Reporting</u>                        | <u>Unit Cost</u> | <u>Units</u> | <u>Quantity</u> | <u>Years</u>               | <u>Cost</u>         | <u>Cost Basis</u>  |
| Project Management   | \$4,000          | year         | 1               | 30                         | \$120,000           | ERM Estimate   |
| Data Evaluation and Reporting                                  | \$12,000         | year         | 1               | 30                         | \$360,000           | ERM Estimate   |
| <i>Project Management and Reporting Subtotal</i>               |                  |              |                 |                            | <i>\$480,000</i>    |  |
| <br>   |                  |              |                 |                            |                     |  |
| <b>Total Cost - 30 Years of Operation</b>                      |                  |              |                 |                            | <b>\$10,035,159</b> |  |

**Table O-3  
Groundwater Remediation: A Zone Area 4 (Hypothetical 29-B Plan)**

*Hero Lands Company, L.L.C. vs. Chevron U.S.A. Inc. et al.  
Stella Oil and Gas Field  
Plaquemines Parish, Louisiana*

| <u>Volume Calculations</u>              | <u>Unit</u>          | <u>Value</u> | <u>Basis</u>   |
|---|----------------------|--------------|--|
| Impacted Thickness (b)                  | feet                 | 7.1          | Average A zone thickness in Area 4   |
| Porosity (n)                            | unitless             | 0.3          | Assumed  |
| Area of Plume (A)                       | square feet          | 2,172,964    | ICON area  |
| Pore Volume                             | cubic feet           | 4,641,451    | Calculated: Pore Volume = b * n * A  |
| Pore Volume                             | gal                  | 34,720,468   | Calculated: Unit conversion  |
| Retardation Factor (Rf)                 | unitless             | 1            | Constant value for chloride  |
| Target Concentration (C <sub>f</sub> )  | mg/L                 | 250          | EPA SMCL for Drinking Water  |
| Initial Concentration (C <sub>o</sub> ) | mg/L                 | 23,181       | Average of ICON and ERM Splits for wells in A zone Area 4  |
| Number Pore Volumes                     | unitless             | 4.53         | Calculated: Number Pore Volumes = -Rf * ln(C <sub>f</sub> /C <sub>o</sub> )                      |
| Recovery Volume                         | gallons              | 157,270,219  | Calculated: Recovery Volume = Pore Volume * Number Pore Volumes                                  |
| <u>Recovery Well Calculations</u>       |                      |              |  |
| Aquifer Pumping Rate                    | gallons per minute   | 0.163        | Average well yield in the A zone based on slug test results                                      |
| Aquifer Pumping Rate (Q)                | ft <sup>3</sup> /day | 31.38        | Calculated: Unit conversion  |
| Time (t)                                | days                 | 3,650        | Assume 10 years  |
| Estimated Radius (r)                    | feet                 | 131          | Calculated: $r = \sqrt{\frac{Qt}{\pi bn}}$ (EPA, 1987)   |
| Estimated Capture Zone Area             | square feet          | 53,618       | Calculated   |
| Estimated Number of Recovery Wells      | unitless             | 41           | Calculated: Area of Plume / Estimated Capture Zone Area  |
| <u>Time Calculations</u>                |                      |              |  |
| Groundwater Recovery Rate               | gallons per day      | 9,624        | Calculated: Pumping Rate * Number of Wells   |
| Recovery System Operation Time          | years                | 30           | Assume 30 years based on EPA (calculated value [Recovery Volume / Recovery Rate] is ~45.5 years) |
| <u>Other Assumptions</u>                |                      |              |  |
| Well Depth                              | feet                 | 16           | Approximate average bottom of A zone in Area 4   |
| Well Diameter                           | inch                 | 4            | Assumed  |

Initial RW Installation, Pump Test, and Pilot Evaluation

|   | <u>Unit Cost</u> | <u>Units</u> | <u>Quantity</u> | <u>Cost</u>     | <u>Cost Basis</u>                                      |
|---|------------------|--------------|-----------------|-----------------|--|
| Permit Applications (Coastal Zone, COE, Levee Permits)                    | \$10,000         | unit         | 0               | \$0             | ERM Estimate - Cost Included in A zone Area 2 Estimate |
| Drill Rig Mobilization/Demobilization                                     | \$780            | unit         | 1               | \$780           | 08/26/2020 Walker Hill Estimate                        |
| Hollow Stem Auger Rig and Crew (one four-inch well and one two-inch well) | \$2,500          | day          | 2               | \$5,000         | 08/26/2020 Walker Hill Estimate                        |
| Four-inch PVC Well Materials  | \$18             | foot         | 16              | \$288           | 08/26/2020 Walker Hill Estimate                        |
| Two-inch PVC Well Materials   | \$15             | foot         | 16              | \$240           | 08/26/2020 Walker Hill Estimate                        |
| Drill Crew Per Diem   | \$375            | day          | 2               | \$750           | 08/26/2020 Walker Hill Estimate                        |
| Above-grade Surface Completions   | \$600            | unit         | 2               | \$1,200         | 08/26/2020 Walker Hill Estimate                        |
| 1/2 HP 5 GPM Well Pump, Motor, and Control Box                            | \$2,000          | unit         | 1               | \$2,000         | ERM Estimate   |
| Temporary Electrical Hookup   | \$40             | feet         | 150             | \$6,000         | ERM Estimate   |
| ERM Oversight, Development, and Equipment                                 | \$1,500          | day          | 2               | \$3,000         | ERM Estimate   |
| ERM Labor for 24-Hour Pump Test   | \$3,750          | day          | 1               | \$3,750         | ERM Estimate   |
| Data Loggers for Pump Test  | \$2,000          | unit         | 2               | \$4,000         | ERM Estimate   |
| Frac Tank for Pump Test   | \$50             | day          | 30              | \$1,500         | ERM Estimate   |
| Data Evaluation and Reporting   | \$7,500          | unit         | 1               | \$7,500         | ERM Estimate   |
| <i>Initial RW Installation, Pump Test, and Pilot Evaluation Subtotal</i>  |                  |              |                 | <u>\$36,008</u> |  |

**Table O-3  
Groundwater Remediation: A Zone Area 4 (Hypothetical 29-B Plan)**

*Hero Lands Company, L.L.C. vs. Chevron U.S.A. Inc. et al.  
Stella Oil and Gas Field  
Plaquemines Parish, Louisiana*

| <u>Additional RW Installation</u>                              | <u>Unit Cost</u> | <u>Units</u> | <u>Quantity</u> |                            | <u>Cost</u>        | <u>Cost Basis</u>  |
|--|------------------|--------------|-----------------|----------------------------|--------------------|--|
| Drill Rig Mobilization/Demobilization                          | \$780            | unit         | 1               |                            | \$780              | 08/26/2020 Walker Hill Estimate  |
| Hollow Stem Auger Rig and Crew (40 four-inch wells)            | \$2,500          | day          | 25              |                            | \$62,500           | 08/26/2020 Walker Hill Estimate  |
| Four-inch PVC Well Materials                                   | \$18             | foot         | 640             |                            | \$11,520           | 08/26/2020 Walker Hill Estimate  |
| Drill Crew Per Diem  | \$375            | day          | 25              |                            | \$9,375            | 08/26/2020 Walker Hill Estimate  |
| Above-grade Surface Completions                                | \$600            | unit         | 40              |                            | \$24,000           | 08/26/2020 Walker Hill Estimate  |
| 1/2 HP 5 GPM Well Pump, Motor, and Control Box                 | \$2,000          | unit         | 40              |                            | \$80,000           | ERM Estimate   |
| Electrical Hookup  | \$40             | feet         | 10,500          |                            | \$420,000          | ERM Estimate   |
| ERM Oversight, Development, and Equipment                      | \$1,500          | day          | 25              |                            | \$37,500           | ERM Estimate   |
| <i>Additional RW Installation Subtotal</i>                     |                  |              |                 |                            | <i>\$645,675</i>   |  |
| <br>   |                  |              |                 |                            |                    |  |
| <u>On-site Disposal Capital Costs</u>                          | <u>Unit Cost</u> | <u>Units</u> | <u>Quantity</u> |                            | <u>Cost</u>        | <u>Cost Basis</u>  |
| Three-inch Flowline to Connect Wells to Tanks and Tanks to SWD | \$30             | feet         | 16,875          |                            | \$506,250          | ERM Estimate, Peak Energy (assume 375' average distance from wells to tanks and 1,500' distance from tanks to SWD in Area 3) |
| Highway 23 Right-of-way Crossing for Distribution Lines        | \$10,000         | unit         | 1               |                            | \$10,000           | ERM Estimate   |
| Minor Right-of-way Crossing for Distribution Lines             | \$5,000          | unit         | 0               |                            | \$0                | ERM Estimate   |
| 10,000 Gallon Storage Tanks                                    | \$10,000         | unit         | 1               |                            | \$10,000           | ERM Estimate, Peak Energy  |
| Pumps, Piping, and Electrical                                  | \$25,000         | unit         | 1               |                            | \$25,000           | ERM Estimate, Peak Energy  |
| <i>On-site Disposal Capital Costs Subtotal</i>                 |                  |              |                 |                            | <i>\$551,250</i>   |  |
| <br>   |                  |              |                 |                            |                    |  |
| <u>Recovery Operation and Maintenance</u>                      | <u>Unit Cost</u> | <u>Units</u> | <u>Quantity</u> | <u>Quarterly or Annual</u> | <u>Cost</u>        | <u>Cost Basis</u>  |
| Energy Consumption (Recovery Pumps)                            | \$0.0775         | kWh          | 33,033          | 120                        | \$307,206          | <a href="https://www.electricitylocal.com/">https://www.electricitylocal.com/</a> - Gretna is closest city with data         |
| Personnel (O&M)  | \$75             | hr           | 39              | 120                        | \$351,000          | ERM Estimate - Assumes 3 hours per week  |
| Project Management   | \$120            | hr           | 5               | 120                        | \$72,000           | ERM Estimate - Assumes 5 hours per quarter   |
| Miscellaneous Equipment  | \$4,000          | year         | 1               | 30                         | \$120,000          | ERM Estimate   |
| Pump Replacement (every 5 years)                               | \$16,400         | year         | 1               | 30                         | \$492,000          | ERM Estimate   |
| Annual Sampling  | \$20,000         | year         | 1               | 30                         | \$600,000          | ERM Estimate   |
| <i>Recovery Operation and Maintenance Subtotal</i>             |                  |              |                 |                            | <i>\$1,942,206</i> |  |
| <br>   |                  |              |                 |                            |                    |  |
| <u>Project Management and Reporting</u>                        | <u>Unit Cost</u> | <u>Units</u> | <u>Quantity</u> | <u>Years</u>               | <u>Cost</u>        | <u>Cost Basis</u>  |
| Project Management   | \$2,000          | year         | 1               | 30                         | \$60,000           | ERM Estimate   |
| Data Evaluation and Reporting                                  | \$6,000          | year         | 1               | 30                         | \$180,000          | ERM Estimate   |
| <i>Project Management and Reporting Subtotal</i>               |                  |              |                 |                            | <i>\$240,000</i>   |  |
| <br>   |                  |              |                 |                            |                    |  |
| <b>Total Cost - 30 Years of Operation</b>                      |                  |              |                 |                            | <b>\$3,415,139</b> |  |

**Table O-4  
Groundwater Remediation: B Zone Beneath Northeast Tract (Hypothetical 29-B Plan)**

*Hero Lands Company, L.L.C. vs. Chevron U.S.A. Inc. et al.  
Stella Oil and Gas Field  
Plaquemines Parish, Louisiana*

| <u>Volume Calculations</u>              | <u>Unit</u>          | <u>Value</u> | <u>Basis</u>   |
|---|----------------------|--------------|--|
| Impacted Thickness (b)                  | feet                 | 18.9         | Average B-Zone thickness in ICON Remediation Area Beneath Northeast Tract      |
| Porosity (n)                            | unitless             | 0.3          | Assumed  |
| Area of Plume (A)                       | square feet          | 259,397      | ICON area beneath Area 2   |
| Pore Volume                             | cubic feet           | 1,470,781    | Calculated: Pore Volume = b * n * A  |
| Pore Volume                             | gal                  | 11,002,207   | Calculated: Unit conversion  |
| Retardation Factor (Rf)                 | unitless             | 1            | Constant value for chloride  |
| Target Concentration (C <sub>f</sub> )  | mg/L                 | 3,000        | Target for Livestock Use   |
| Initial Concentration (C <sub>o</sub> ) | mg/L                 | 3,093        | Average TDS of ICON and ERM Splits for wells in B-Zone beneath Northeast Tract |
| Number Pore Volumes                     | unitless             | 0.03         | Calculated: Number Pore Volumes = -Rf * ln(C <sub>f</sub> /C <sub>o</sub> )    |
| Recovery Volume                         | gallons              | 335,889      | Calculated: Recovery Volume = Pore Volume * Number Pore Volumes                |
| <u>Recovery Well Calculations</u>       |                      |              |  |
| Aquifer Pumping Rate                    | gallons per minute   | 1.43         | Average well yield in the B-Zone based on slug test results                    |
| Aquifer Pumping Rate (Q)                | ft <sup>3</sup> /day | 275.28       | Calculated: Unit conversion  |
| Time (t)                                | days                 | 3,650        | Assume 10 years  |
| Estimated Radius (r)                    | feet                 | 237          | Calculated: $r = \sqrt{\frac{Qt}{\pi bn}}$ (EPA, 1987)                         |
| Estimated Capture Zone Area             | square feet          | 177,205      | Calculated   |
| Estimated Number of Recovery Wells      | unitless             | 2            | Calculated: Area of Plume / Estimated Capture Zone Area                        |
| <u>Time Calculations</u>                |                      |              |  |
| Groundwater Recovery Rate               | gallons per day      | 4,118        | Calculated: Pumping Rate * Number of Wells                                     |
| Recovery System Operation Time          | years                | 0.2          | Calculated: Recovery Volume / Recovery Rate                                    |
| <u>Other Assumptions</u>                |                      |              |  |
| Well Depth                              | feet                 | 44           | Approximate average bottom of B-Zone in ICON Remediation Area                  |
| Well Diameter                           | inch                 | 4            | Assumed  |

| <u>Initial RW Installation, Pump Test, and Pilot Evaluation</u>           | <u>Unit Cost</u> | <u>Units</u> | <u>Quantity</u> | <u>Cost</u>     | <u>Cost Basis</u>  |
|---|------------------|--------------|-----------------|-----------------|--|
| Permit Applications (Coastal Zone, COE, Levee Permits)                    | \$10,000         | unit         | 0               | \$0             | ERM Estimate - Cost Included in A-Zone Area 2 Estimate       |
| Drill Rig Mobilization/Demobilization                                     | \$780            | unit         | 1               | \$858           | 08/26/2020 Walker Hill Estimate                              |
| Hollow Stem Auger Rig and Crew (one four-inch well and one two-inch well) | \$2,500          | day          | 2               | \$5,500         | 08/26/2020 Walker Hill Estimate                              |
| Four-inch PVC Well Materials  | \$18             | foot         | 44              | \$871           | 08/26/2020 Walker Hill Estimate                              |
| Two-inch PVC Well Materials   | \$15             | foot         | 44              | \$726           | 08/26/2020 Walker Hill Estimate                              |
| Drill Crew Per Diem   | \$375            | day          | 2               | \$825           | 08/26/2020 Walker Hill Estimate                              |
| Above-grade Surface Completions   | \$600            | unit         | 2               | \$1,320         | 08/26/2020 Walker Hill Estimate                              |
| 1/2 HP 5 GPM Well Pump, Motor, and Control Box                            | \$2,000          | unit         | 1               | \$2,200         | ERM Estimate   |
| Temporary Electrical Hookup   | \$40             | feet         | 50              | \$2,200         | ERM Estimate - Assume B-Zone wells located near A-Zone wells |
| ERM Oversight, Development, and Equipment                                 | \$1,500          | day          | 2               | \$3,000         | ERM Estimate   |
| ERM Labor for 24-Hour Pump Test   | \$3,750          | day          | 1               | \$3,750         | ERM Estimate   |
| Data Loggers for Pump Test  | \$2,000          | unit         | 2               | \$4,400         | ERM Estimate   |
| Frac Tank for Pump Test   | \$50             | day          | 0               | \$0             | ERM Estimate - Assume same frac tank as A-Zone               |
| Data Evaluation and Reporting   | \$7,500          | unit         | 1               | \$7,500         | ERM Estimate   |
| <i>Initial RW Installation, Pump Test, and Pilot Evaluation Subtotal</i>  |                  |              |                 | <i>\$33,150</i> | Includes 10% markup on contracted items                      |

**Table O-4  
Groundwater Remediation: B Zone Beneath Northeast Tract (Hypothetical 29-B Plan)**

*Hero Lands Company, L.L.C. vs. Chevron U.S.A. Inc. et al.  
Stella Oil and Gas Field  
Plaquemines Parish, Louisiana*

| <u>Additional RW Installation</u>                              | <u>Unit Cost</u> | <u>Units</u> | <u>Quantity</u> |                            | <u>Cost</u>      | <u>Cost Basis</u>  |
|--|------------------|--------------|-----------------|----------------------------|------------------|--|
| Drill Rig Mobilization/Demobilization                          | \$780            | unit         | 1               |                            | \$858            | 08/26/2020 Walker Hill Estimate  |
| Hollow Stem Auger Rig and Crew (one four-inch well)            | \$2,500          | day          | 2               |                            | \$5,500          | 08/26/2020 Walker Hill Estimate  |
| Four-inch PVC Well Materials                                   | \$18             | foot         | 44              |                            | \$871            | 08/26/2020 Walker Hill Estimate  |
| Drill Crew Per Diem  | \$375            | day          | 2               |                            | \$825            | 08/26/2020 Walker Hill Estimate  |
| Above-grade Surface Completions                                | \$600            | unit         | 1               |                            | \$660            | 08/26/2020 Walker Hill Estimate  |
| 1/2 HP 5 GPM Well Pump, Motor, and Control Box                 | \$2,000          | unit         | 1               |                            | \$2,200          | ERM Estimate   |
| Electrical Hookup  | \$40             | feet         | 200             |                            | \$8,800          | ERM Estimate - Assume B-Zone wells located near A-Zone wells   |
| ERM Oversight, Development, and Equipment                      | \$1,500          | day          | 2               |                            | \$3,000          | ERM Estimate   |
| <i>Additional RW Installation Subtotal</i>                     |                  |              |                 |                            | <u>\$22,714</u>  | Includes 10% markup on contracted items  |
| <br>   |                  |              |                 |                            |                  |  |
| <u>On-site Disposal Capital Costs</u>                          | <u>Unit Cost</u> | <u>Units</u> | <u>Quantity</u> |                            | <u>Cost</u>      | <u>Cost Basis</u>  |
| Three-inch Flowline to Connect Wells to Tanks and Tanks to SWD | \$30             | feet         | 600             |                            | \$19,800         | ERM Estimate, Peak Energy (assume 2 wells 300' average distance to tank, use flowline from Area 2 to connect to SWD in Area 3) |
| Highway 23 Right-of-way Crossing for Distribution Lines        | \$10,000         | unit         | 0               |                            | \$0              | ERM Estimate   |
| Minor Right-of-way Crossing for Distribution Lines             | \$5,000          | unit         | 0               |                            | \$0              | ERM Estimate   |
| 10,000 Gallon Storage Tanks                                    | \$10,000         | unit         | 1               |                            | \$11,000         | ERM Estimate, Peak Energy  |
| Pumps, Piping, and Electrical                                  | \$25,000         | unit         | 1               |                            | \$27,500         | ERM Estimate, Peak Energy  |
| <i>On-site Disposal Capital Costs Subtotal</i>                 |                  |              |                 |                            | <u>\$58,300</u>  | Includes 10% markup on contracted items  |
| <br>   |                  |              |                 |                            |                  |  |
| <u>Recovery Operation and Maintenance</u>                      | <u>Unit Cost</u> | <u>Units</u> | <u>Quantity</u> | <u>Quarterly or Annual</u> | <u>Cost</u>      | <u>Cost Basis</u>  |
| Energy Consumption (Recovery Pumps)                            | \$0.0775         | kWh          | 1,611           | 1                          | \$137            | <a href="https://www.electricitylocal.com/">https://www.electricitylocal.com/</a> - Gretna is closest city with data           |
| Personnel (O&M)  | \$75             | hr           | 26              | 1                          | \$1,950          | ERM Estimate - Assumes 2 hours per week  |
| Project Management   | \$120            | hr           | 3               | 1                          | \$360            | ERM Estimate - Assumes 3 hours per quarter   |
| Miscellaneous Equipment  | \$1,000          | year         | 1               | 1                          | \$1,100          | ERM Estimate   |
| Pump Replacement (every 5 years)                               | \$800            | year         | 0               | 1                          | \$0              | ERM Estimate   |
| Annual Sampling  | \$5,000          | year         | 1               | 1                          | \$5,000          | ERM Estimate   |
| <i>Recovery Operation and Maintenance Subtotal</i>             |                  |              |                 |                            | <u>\$8,547</u>   | Includes 10% markup on contracted items  |
| <br>   |                  |              |                 |                            |                  |  |
| <u>Project Management and Reporting</u>                        | <u>Unit Cost</u> | <u>Units</u> | <u>Quantity</u> | <u>Years</u>               | <u>Cost</u>      | <u>Cost Basis</u>  |
| Project Management   | \$1,000          | year         | 1               | 1                          | \$1,000          | ERM Estimate   |
| Data Evaluation and Reporting                                  | \$3,000          | year         | 1               | 1                          | \$3,000          | ERM Estimate   |
| <i>Project Management and Reporting Subtotal</i>               |                  |              |                 |                            | <u>\$4,000</u>   |  |
| <br>   |                  |              |                 |                            |                  |  |
| <b>Total Cost - 1 Quarter of Operation</b>                     |                  |              |                 |                            | <b>\$126,712</b> |  |

**Table O-5  
Groundwater Remediation: Disposal Well Capital and O&M (Hypothetical 29-B Plan)**

*Hero Lands Company, L.L.C. vs. Chevron U.S.A. Inc. et al.  
Stella Oil and Gas Field  
Plaquemines Parish, Louisiana*

| <u>Volume Calculations</u>            | <u>Unit</u> | <u>Value</u> | <u>Basis</u>  |
|---------------------------------------|-------------|--------------|---|
| Disposal Volume                       | gpd         | 35,806       | Sum of Groundwater Recovery Rate for All Areas                  |
| Disposal Volume                       | bbl/day     | 853          | Unit Conversion   |
| Approximate Capacity of Disposal Well | bbl/day     | 2,783        | Reported Volume Injected in SN971481 in 2008 (1,015,680 bbl/yr) |
| Number of Disposal Wells Required     | unitless    | 1            | Calculated  |

| <u>On-site Disposal Capital Costs</u>          | <u>Unit Cost</u> | <u>Units</u> | <u>Quantity</u> | <u>Cost</u>        | <u>Cost Basis</u>         |
|--|------------------|--------------|-----------------|--------------------|---------------------------|
| Disposal Well                                  | \$1,000,000      | unit         | 1               | \$1,000,000        | ERM Estimate, Peak Energy |
| 10,000 Gallon Storage Tanks                    | \$10,000         | unit         | 6               | \$60,000           | ERM Estimate, Peak Energy |
| Pumps, Piping, and Electrical                  | \$100,000        | unit         | 1               | \$100,000          | ERM Estimate, Peak Energy |
| <i>On-site Disposal Capital Costs Subtotal</i> |                  |              |                 | <i>\$1,160,000</i> |                           |

| <u>On-site Disposal Operation and Maintenance (Annual)</u>          | <u>Unit Cost</u> | <u>Units</u> | <u>Quantity</u> | <u>Years</u> | <u>Cost</u>        | <u>Cost Basis</u>         |
|---|------------------|--------------|-----------------|--------------|--------------------|---------------------------|
| Chemical Treatment (Biocide)  | \$10,000         | year         | 1               | 30           | \$300,000          | ERM Estimate, Peak Energy |
| Acid Wash SWD (\$100,000 every two years)                           | \$50,000         | year         | 1               | 30           | \$1,500,000        | ERM Estimate, Peak Energy |
| <i>On-site Disposal Operation and Maintenance (Annual) Subtotal</i> |                  |              |                 |              | <i>\$1,800,000</i> |                           |

**Total Cost - 30 Years of Operation** **\$2,960,000**

**Table O-6**  
**Soil Remediation Cost Estimate (Hypothetical 29-B Plan)**

*Hero Lands Company, L.L.C. vs. Chevron U.S.A. Inc. et al.*  
*Stella Oil and Gas Field*  
*Plaquemines Parish, Louisiana*

| <u>Permitting</u>   | <u>Unit Cost</u> | <u>Units</u> | <u>Quantity</u> | <u>Cost</u>        | <u>Cost Basis</u>    |
|---|------------------|--------------|-----------------|--------------------|----------------------|
| Permit Applications (Coastal Zone, COE, Levee Permits)              | \$10,000         | unit         | 1               | \$10,000           | ERM Estimate         |
| <i>Permitting Subtotal</i>  |                  |              |                 | <i>\$10,000</i>    |                      |
| <br>  |                  |              |                 |                    |                      |
| <u>Offsite Disposal</u>   | <u>Unit Cost</u> | <u>Units</u> | <u>Quantity</u> | <u>Cost</u>        | <u>Cost Basis</u>    |
| Removal and Replacement of 8,600 in-place Cubic Yards of Soil       | \$1,207,657      | unit         | 1               | \$1,207,657        | Diversified Estimate |
| ERM Oversight (Labor and Expenses)                                  | \$1,500          | day          | 63              | \$94,500           | ERM Estimate         |
| Sampling  | \$10,000         | unit         | 1               | \$10,000           | ERM Estimate         |
| <i>Offsite Disposal Subtotal</i>                                    |                  |              |                 | <i>\$1,312,157</i> |                      |
| <br>  |                  |              |                 |                    |                      |
| <u>Onsite Blending</u>  | <u>Unit Cost</u> | <u>Units</u> | <u>Quantity</u> | <u>Cost</u>        | <u>Cost Basis</u>    |
| Treatment of 18 Acres to a Depth of 2 Feet                          | \$620,840        | unit         | 1               | \$620,840          | Diversified Estimate |
| ERM Oversight (Labor and Expenses)                                  | \$1,500          | unit         | 130             | \$195,000          | ERM Estimate         |
| Sampling  | \$25,000         | unit         | 1               | \$25,000           | ERM Estimate         |
| <i>On-site Disposal Capital Costs Subtotal</i>                      |                  |              |                 | <i>\$840,840</i>   |                      |
| <br>  |                  |              |                 |                    |                      |
| <u>Project Management and Reporting</u>                             | <u>Unit Cost</u> | <u>Units</u> | <u>Quantity</u> | <u>Cost</u>        | <u>Cost Basis</u>    |
| Project Management  | \$5,000          | unit         | 1               | \$5,000            | ERM Estimate         |
| Data Evaluation and Reporting                                       | \$10,000         | unit         | 1               | \$10,000           | ERM Estimate         |
| <i>On-site Disposal Operation and Maintenance (Annual) Subtotal</i> |                  |              |                 | <i>\$15,000</i>    |                      |
| <br>  |                  |              |                 |                    |                      |
| <b>Total Cost</b>   |                  |              |                 | <b>\$2,177,997</b> |                      |

**Table O-7**  
**Hypothetical 29-B Remediation**

*Hero Lands Company, L.L.C. vs. Chevron U.S.A. Inc. et al.*  
*Stella Oil and Gas Field*  
*Plaquemines Parish, Louisiana*

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| <u><i>Cost Estimate Component</i></u>   | <u><b>Estimated Cost</b></u> |
|---|------------------------------|
| Groundwater Remediation - A-Zone Area 2 | \$1,023,006                  |
| Groundwater Remediation - A-Zone Area 3 | \$10,035,159                 |
| Groundwater Remediation - A-Zone Area 4 | \$3,415,139                  |
| Groundwater Remediation - B Zone        | \$126,712                    |
| Disposal Well Capital and O&M           | \$2,960,000                  |
| Soil Remediation                        | \$2,177,997                  |
| <br><b><i>Total Cost</i></b>            | <br><b>\$19,738,012</b>      |



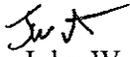
JOHN BEL EDWARDS  
GOVERNOR

State of Louisiana  
DEPARTMENT OF NATURAL RESOURCES  
OFFICE OF CONSERVATION

THOMAS F. HARRIS  
SECRETARY

RICHARD P. IEYOUB  
COMMISSIONER OF CONSERVATION

MEMORANDUM

TO: Richard P. Ieyoub, Commissioner of Conservation  
FROM:  John W. Adams, Attorney, LDNR/Office of Conservation  
DATE: December 12, 2018  
RE: Landowner Consent

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ISSUE

Should landowner consent be required for a Most Feasible Plan (MFP) including exceptions to LAC 43:XIX.Subpart 1 (Statewide Order 29-B) which is approved or developed by the Agency as a result of evidence at an Act 312 public hearing?

**THERE IS NO BASIS FOR REQUIRING LANDOWNER CONSENT FOR MFP ISSUED TO A REVIEWING COURT IN CONTEXT OF AN ACT 312 PUBLIC HEARING**

Landowner consent has not been required by Louisiana Department of Natural Resources, Office of Conservation (hereinafter "LDNR/OC" or "Agency") when a case goes through an Act 312 public hearing and a Most Feasible Plan including exceptions to LAC 43:XIX.Subpart 1 (29-B) is approved or developed as a result of evidence at an Act 312 public hearing. The reason is that the court is an active participant in that situation, as explained more fully below.

Act 312 took effect in 2006 when the Governor signed Senate Bill 655 of the 2006 Regular Session into law. La. Acts 2006, No. 312, eff. June 8, 2006, which is codified at La. R.S. 30:29. Act 312 set forth requirements for pursuing claims for environmental damages caused by oilfield operations. It was immediately challenged as unconstitutional by landowner, M.J. Farms, Ltd., which owned property in Catahoula Parish on which it claimed certain defendants had caused environmental damage from oil and gas operations. The constitutional basis for the landowner's challenge was that Act 312 violated La. Const. art. V, § 16 (divestiture of the district courts of original jurisdiction), the Fifth Amendment of the United States Constitution (the deprivation of a landowner of his property without due process), and La. Const. art. I, § 4 (divestiture of the landowner's right to acquire, own, control, use, enjoy, protect and dispose of private property). The first basis was a denial of "access to courts" argument. The Seventh Judicial District Court in Catahoula Parish entered a judgment declaring Act 312 unconstitutional. On appeal, the Louisiana Supreme Court concluded the district court erred in finding Act 312

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of 2006 unconstitutional. *M.J. Farms, Ltd. v. Exxon Mobil Corp.*, 2007-2371 (La. 7/1/08), 998 So.2d 16. On the “access to courts” argument, the Court said the following:

Although Act 312 changes the remedy available to M.J. Farms in its efforts to obtain surface restoration of its immovable property, we do not find this denies it access to the courts. To the contrary, under the provisions of Act 312 the district court remains an active participant in the entire restoration process. It is the filing of pleadings in the district court making demand for environmental damages that triggers implementation of Act 312. See La.Rev.Stat. § 30:29(B)(1). Furthermore, it is in the district court that it is determined whether environmental damages exists, who caused the damage, and it is the district court that orders the development of a restoration plan. La.Rev.Stat. § 30:29(C)(1). Finally, it is the district court who considers the various restoration plans, including any that the surface owner may choose to submit, determines which one is most feasible, and oversees the implementation of the restoration plan. La.Rev.Stat. § 30:29(C)(5). Accordingly, we find no merit to M.J. Farms' contrary assertion.

*Id.*, at 37-38. See also *State v. Louisiana Land & Exploration Co.*, 2012-0884 (La. 1/30/13, 110 So.3d 1038, 1057.

LDNR/OC has required landowner consent for cleanup plans which include exceptions to 29-B in regulatory actions, including those pursuant to Act 312, for site evaluation and/or remediation of oilfield sites in cases where no Act 312 contradictory public hearing is involved. Landowner consent is required even though this is not explicitly set forth as a requirement for a cleanup plan anywhere in the regulations. LDNR/OC has looked to the definition of “contamination” in Statewide Order No. 29-B, specifically in LAC 43:XIX.301, which is “the introduction of substances or contaminants into a groundwater aquifer, a USDW or soil in such quantities as to render them unusable for their intended purposes.” It is in reliance on this definition that LDNR/OC has required landowner consent as a matter of practice in cases where there is no contradictory hearing because, as it has said, “only a landowner or court of law can truly make a decision as to what a given property’s “intended purpose” is.” See *e.g.*, Letter of James H. Welsh, Commissioner of Conservation, to Louis E. Buatt, Esq., attorney for BP, dated 10/27/15.

But the Act 312 public hearing cases with an issued Most Feasible Plan with 29-B exceptions have been treated differently because the court is an active participant. There have been seven cases where a MFP with 29-B exceptions was issued to a reviewing court as a result of evidence at an Act 312 public hearing, which as described below, is a contradictory hearing. Landowner consent has not been required by the reviewing court in any of those cases. (See **Appendix A** at the end of this Memorandum). It is important to recognize that the Agency’s consistent application of the law and regulations in accepting or developing MFP’s with 29-B exceptions issued to reviewing courts specific to the issue of landowner consent has been, to date, accepted by the reviewing courts and participating parties.

There is a valid basis for making a distinction between the public hearing cases and the non-public hearing cases on the issue of whether landowner consent is required. Unlike the non-public hearing cases, in the public hearing cases the landowner has the opportunity to put forth a competing plan and/or comments to the responsible party’s plan. Also, during the public hearing, the landowner has the right and opportunity to put on evidence to protect and/or advance the landowner interest. The hearing is contradictory in nature and permits cross-examination of the responsible party’s witnesses by the landowner, and also permits cross-examination of the landowner’s witnesses by the responsible party. The LDNR/OC panelists also get to ask their own questions of witnesses about the competing plans. Since the landowner is present to defend and advance the landowner interest, LDNR/OC panelists can focus on the public interest as intended by Act 312. In addition to this contradictory hearing, the Act 312 process includes substantial opportunity for active court involvement after the MFP is structured by LDNR/OC (see steps 6 and 7 below). The process from start to finish includes:

1. Step 1 The plaintiff/landowner files suit, and the court holds a trial to determine that environmental damage exists and the party or parties who caused the damage.” La. R.S. 30:29(B) & (C)(1).
2. Step 2 The court orders the responsible party to develop and submit a remediation plan(s) to LDNR/OC for review and consideration. La. R.S. 30:29(C)(1).
3. Step 3 The plaintiff/landowner is given the opportunity to provide a landowner plan or provide comment or response to the other plan(s). La. R.S. 30:29(C)(1).
4. Step 4 LDNR/OC conducts a public hearing—a contradictory hearing—on the plan(s). La. R.S. 30:29(C)(2)(a).
5. Step 5 LDNR/OC accepts a plan submitted, or structures a plan, based on the evidence, which LDNR/OC determines to be the Most Feasible Plan to evaluate or remediate the environmental damage and protect the health, safety and welfare of the people. La. R.S. 30:29(C)(2)(a).
6. Step 6 The court adopts the LDNR/OC plan unless a party proves to the court by a preponderance of the evidence that another plan is a more feasible plan to adequately protect the environment and the public health, safety and welfare. La. R.S. 30:29(C)(5).
7. Step 7 The court issues such orders as necessary to ensure that funds are expended in a manner consistent with the adopted plan, retains oversight to ensure compliance with the plan, and retains continuing jurisdiction until such time as the evaluation or remediation is completed. La. R.S. 30:29(D) & (F).

Since 1) landowner consent is not explicit in the regulations, 2) the public hearing process is a contradictory process giving the landowner the opportunity to offer a competing plan and/or comments to the responsible party’s plan, of cross-examination the responsible party’s witnesses, and to put on evidence, and 3) the court has continuing oversight of the entire process after the structuring of the MFP in the public hearing, including conducting a preponderance hearing if necessary, ensuring funding of the plan, and ensuring compliance of the plan right up to the time remediation is completed, there is no basis for landowner consent as a requirement in Act 312 public hearing cases.

The overriding interest in Act 312 is the public interest. *See* La. R.S. 30: 29(A). Requiring landowner consent for a plan in all events, even if the evidence at the public hearing does not support a finding that such a plan (i.e., the plan requiring landowner consent) is the most feasible plan, would, or could, result in the structuring of a plan by LDNR/OC that is not the most feasible from the standpoint of the public interest (i.e., from the standpoint of protection of the environment, public health, safety and welfare).

Finally, should a party feel aggrieved by the Agency’s acceptance or development of an MFP and issuance to a reviewing court following court referral pursuant to the agency mandated Act 312 public hearing process, the aggrieved party’s legal recourse is and remains with the reviewing court.

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**APPENDIX A**

The seven LDNR/OC Act 312 public hearing cases with issued MFP to date are as follows:

1. **In Re: Tensas Poppadoc, et al v. Chevron (USA), Inc., et al, LDNR/OC Docket No. ENV 2008-L-01:**  
(Responsible Party—Chevron) (Act 312 public hearing February 9-13 and 16, 2009):

This was the first Act 312 public hearing case. It came shortly after Act 312 was held constitutional in 2008. Numerous defendants, including Chevron, were sued by Tensas Poppadoc in 2006 pursuant to La. R.S. 30:29 alleging soil and groundwater contamination on the Tensas Poppadoc property. The case was tried to a jury in Concordia Parish in 2008. Following the jury trial, the trial court signed an order which sent the matter to LDNR/OC for consideration of a remediation plan submitted by Chevron. The court's order stated that the trial court retained jurisdiction pending approval and completion of an approved remediation. An LDNR/OC three-person panel conducted an Act 312 hearing on February 9-13 and 16, 2009. The Most Feasible Plan adopted by LDNR/OC required further collection of site data before a final remedy could be approved. Plaintiff objected to the Most Feasible Plan and appealed to the trial court in Concordia Parish. The case settled in 2014. Following settlement, Chevron moved forward with implementation of the Most Feasible Plan. The Final Report on the last round of data is due to be submitted to LDNR/OC in January 2019.

2. **In Re: Clyde Reese, et al v. Carl Oil & Gas Co., et al, LDNR/OC Docket No. ENV-2012-L-001:**  
(Responsible Party—UNOCAL) (Act 312 public hearing March 21, 2012):

The landowners sued Union Oil Company of California (UNOCAL) and other operators in 2006 for alleged damage to approximately 692 acres in Sections 4 and 5, Township 12 South, Range 2 West, Vermilion Parish, West Gueydan Field, arising from oil and gas operations. UNOCAL and/or its predecessor, The Pure Oil Company, operated four wells on approximately 50 acres of the property at issue ("UNOCAL Operational Tract" or "UOT"). UNOCAL filed a limited admission of liability under Act 312, admitting that "environmental damage" existed on the UOT (that portion of the acreage at issue referred to by landowners as the "Benoit Tract"), and praying for an order accepting that admission, ordering UNOCAL to develop an evaluation/remediation plan, and otherwise ordering the post-admission actions required under Act 312. The court signed an order on September 12, 2011 accepting UNOCAL's admission and ordering submission of a plan to LDNR/OC. The UNOCAL plan was submitted to LDNR/OC on November 28, 2011. A public hearing was held before LDNR/OC on March 21, 2012. On May 17, 2012, LDNR/OC submitted the Most Feasible Plan to the trial court. On July 16, 2012, the court issued an order adopting the MFP. Work is ongoing on the Benoit Tract pursuant to the MFP. The underlying litigation is still pending.

3. **In Re: Hazel Richard Savoie, et al v. Alice T. Richard, et al, LDNR/OC Docket No. 2012-L-002**  
(Responsible Party—Shell) (Act 312 public hearing August 7-10 and 13, 2012):

Shell Oil Company was sued along with subsequent operators in a lawsuit by the landowners, Hazel R. Savoie and family, in state district court in Cameron Parish relating to historical operations in the Kings Bayou Field. After a 2011 jury trial and verdict finding the existence of environmental damage and Shell as a responsible party, a public hearing was held at LDNR/OC from August 7-10 and 13, 2012 to determine the most feasible plan for the site. During the hearing, the landowner presented the LDNR/OC panel with an affidavit attesting to their intended use of the property and refusal to consent to any exceptions to Statewide Order No. 29-B. Following the hearing, in consideration of the landowner's testimony presented during the public hearing, LDNR/OC made modifications to the Shell plan, which LDNR/OC then recommended to the court as the most feasible plan. The landowners filed a motion for a preponderance hearing in the trial court to challenge the plan but withdrew the

motion on the second day of the hearing. The court then adopted the LDNR/OC-recommended plan as the most feasible plan. Shell is currently implementing the plan and continues to work with LDNR/OC on the remediation. In 2015, Shell and the landowners settled ancillary issues, and LDNR/OC issued a letter of no objection.

4. **In Re: Agri-South, LLC, et al v. Exxon Mobil, et al, LDNR/OC Docket No. ENV-2013-L-02**  
(Responsible Party—Tensas Delta) (Act 312 public hearing August 5-9 and 13-16, 2013):

Tensas Delta Exploration Company and ExxonMobil Corporation were sued along with others in a legacy lawsuit by the landowners, Agri-South Group, LLC; Plug Road, LLC; and King Brothers Land Company, LLC., in state district court in Catahoula Parish. In connection with this litigation, Tensas Delta made a limited admission of responsibility and submitted its remediation plan pursuant to La. CCP art. 1563 and La. R.S. 30:29 on January 25, 2013. Plaintiffs/landowners submitted an alternative remediation plan for LDNR/OC's consideration. LDNR/OC held a public hearing August 5-9 and 13-16, 2013 for the purpose of approving or structuring a final plan. On October 3, 2013, LDNR/OC submitted its most feasible plan to the court as required by La. R.S. 30:29(C)(3)(b)(ii). Following submission of the most feasible plan, the litigation progressed until the parties reached a settlement agreement. A redacted form of the settlement between the parties was submitted to LDNR/OC. LDNR issued a letter of no objection to the proposed settlement dated December 16, 2014.

5. **In Re: Martha Zoe Moore, et al v. Denbury Onshore, LLC, LDNR/OC Docket No. ENV-2015-L-01:**  
(Responsible Party—Denbury) (Act 312 public hearing August 25-26, 2015):

The Moore family landowners filed suit against Denbury Onshore, LLC over a spill incident in March 2013. Denbury made a limited admission of responsibility pursuant to La. C.C.P. art. 1563 and La. R.S. 30:29 on January 25, 2013. On March 23, 2015, Magistrate Judge Karen Hayes of the federal Western District of Louisiana, Monroe Division, signed the requested order and referred the matter to the LDNR/OC for a public hearing. Remediation plans were submitted by both Denbury and the Moore family. A public hearing was held on August 25-26, 2015 and LDNR/OC issued its Most Feasible Plan which was filed with the federal court in Monroe, Louisiana on October 22, 2015. The *Moore* case settled on the eve of trial in 2016. Part of the settlement involved an agreed to scaling back of the scope of the Most Feasible Plan adopted by the LDNR/OC, and LDNR/OC agreed to the revised plan. The settlement was approved by the court. Denbury is still executing part of the revised plan that involves groundwater monitoring in one well, and a vegetative recovery assessment that will be conducted in mid-2019.

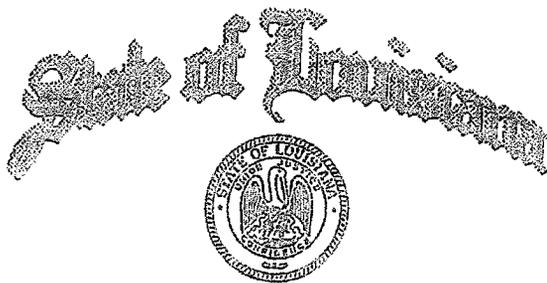
6. **In Re: State of Louisiana and the Vermilion Parish School Board v. The Louisiana Land and Exploration Co., Union Oil Company of California, Union Exploration Partners, Ltd., Carrollton Resources, L.L.C. and Phoenix Oil & Gas Corporation, LDNR/OC Docket No. ENV-L-2016-01**  
(Responsible Party—UNOCAL) (Act 312 public hearing March 2-4, 7-10, 2016):

This case was filed by the Vermilion Parish School Board against numerous defendants in 2004. In 2010, UNOCAL filed an admission of environmental damage under R.S.30:29. The case was tried to a jury in Vermilion Parish in 2015, with UNOCAL and Chevron as the only remaining defendants. Based upon UNOCAL's admission, the jury found environmental damage and found UNOCAL responsible. After a jury verdict with a remediation plan of \$3 million, the court referred the matter to LDNR/OC, where a public hearing was held on March 2-4 and 7-10, 2016 before a LDNR/OC panel. LDNR issued its Most Feasible Plan in July 2016. Plaintiff landowner objected to this plan in so far as it ordered UNOCAL, and not plaintiff, to implement the plan. The Most Feasible Plan was affirmed by the trial court and the court of appeal. UNOCAL is currently in the process of implementing the Most Feasible Plan. A final judgment has been entered in the trial court and various matters

are awaiting appeal, except plaintiff's motion for attorney's fees which is set for hearing beginning December 4, 2018.

7. **In Re: The Sweet Lake Land & Oil Company, LLC v. Oleum Operating Company, LLC, LDNR/OC Legacy Project No. 014-006-001** (Responsible Party—BP) (Act 312 public hearing April 25-28, 2016):

Sweet Lake Land & Oil Company, LLC, filed a petition on March 5, 2010, seeking damages caused by oil and gas operations from BP Products North America, Inc. and other defendants, to property Sweet Lake owned in Section 34, Township 10 South, Range 6 West, in Calcasieu Parish, in the East Bell City Oil and Gas Field. BP predecessors operated 10 wells, including two saltwater disposal wells on the property. By the time of trial, May 11, 2015 through May 27, 2015, the only remaining defendants were BP and Oleum/AKSM. The jury found that BP was responsible for "environmental damage" under Act 312 and estimated the remediation costs to be \$1,500,000.00. The trial court referred the matter to LDNR/OC for Act 312 public hearing proceedings. BP and Sweet Lake submitted proposed plans to LDNR/OC. A public hearing was held from April 25-28, 2016. On October 3, 2016 LDNR/OC issued its Most Feasible Plan, essentially agreeing with the soil remediation plan of BP's experts, including soil restoration where proposed, with additional requirements for sampling and delineation. The MFP rejected both parties' experts' groundwater plan and ordered BP to submit a comprehensive groundwater investigation and aquifer characterization work plan. The MFP adopted by LDNR/OC require soil remediation for 29-B salt exceedances to root zone depth and used RECAP to address constituents with no standards in Statewide Order No. 29-B. A hearing in the trial court was held February 15, 2017 on BP's motion to adopt the MFP. The court denied the motion and ordered LDNR/OC to "submit a final plan to the court that includes a remediation plan for all environmental damage to be remediated." The court ordered LDNR/OC to state remediation options based on different outcomes in the further evaluation of shallow groundwater. The court also ordered LDNR/OC to "specify the flowlines on the property and include a remediation plan for flowlines that must be removed." BP sought writs from this ruling, which were denied. On October 26, 2017, LDNR/OC issued a compliance order in response to the court's ruling, which stated that in order to obtain the necessary information pursuant to satisfying the court's directive for additional information pertaining to final remediation of the Sweet Lake property, specific aspects of LDNR/OC's Plan must be completed and reported to the Agency for consideration, all incumbent upon the responsible party, BP, of which the court and all parties were informed with no subsequent response provided to the Agency from any party in opposition or to the contrary. The Agency's application of the law and regulation on the matter of landowner consent and its MFP decision was not an apparent issue before the court. On October 5, 2018 LDNR/OC approved HET's (BP's expert's) January 19, 2018 evaluation plan and work under the plan commenced on November 2, 2018.



M.J. "MIKE" FOSTER, JR.  
GOVERNOR

DEPARTMENT OF NATURAL RESOURCES  
OFFICE OF CONSERVATION

JACK C. CALDWELL  
SECRETARY

PHILIP N. ASPRODITES  
COMMISSIONER OF CONSERVATION

July 19, 2000

Ian A. Webster  
Project Navigator, Ltd.  
2600 East Nutwood Avenue  
Suite 830  
Fullerton, California 92831

Re: MAR Services Site Remediation Project Slide Presentation (May 3, 2000)  
Phase II: Soils Management Proposed Remedy  
Mar Services, St. Landry Parish, Louisiana

Dear Mr. Webster:

The Office of Conservation, Injection and Mining Division (IMD) has reviewed the proposed Phase II soils remedy outline for the referenced site contained in the handouts submitted in your presentation on May 3, 2000. Based on the material presented during your presentation in addition to subsequent discussions regarding the same, IMD staff considers the items listed below to represent the most significant aspects of the proposal.

- All metal (barium, zinc) and hydrocarbon (oil & grease) impacted soils, regardless of depth, shall be treated on-site or excavated for off-site disposal for compliance with closure criteria as established in Statewide Order No. 29-B, Section 129.M.7.e.ii.
- All salt impacted areas shall be treated to a depth of three (3) feet to meet closure criteria of 29-B, Section 129.M.7.e.ii.
- All remediated areas shall be graded and vegetated for adequate surface water management.
- New up-gradient and down-gradient groundwater monitoring wells shall be installed.
- All new and existing groundwater monitoring wells shall be maintained and sampled (monitored).

IMD has no objection to this conceptual approach toward closure certification for the referenced site as relates to previous nonhazardous oilfield waste (NOW) commercial facility operations. However, salt impacted soils below three (3) feet and any groundwater concerns are considered to be associated with onsite production waste activities occurring prior to commercial facility operations. Future activities to address groundwater at the MAR site shall be referred to Office of Conservation's Engineering Division.

Ian A. Webster  
July 19, 2000

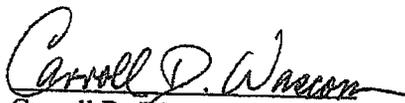
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Therefore, Office of Conservation authorization to conduct Phase II activities shall be contingent upon submission of a written plan for closure certification in accordance with Statewide Order No. 29-B, Section 129.M.7.e. Such plan must be submitted for review and approval before any Phase II soil remediation activities may be initiated. The plan must also address the question of salt wicking upon completion of Phase II activities.

You may contact Mr. Pierre H. Catrou or Mr. Gary Snellgrove at 225/342-5515, if you have any questions about this letter.

Yours truly,

Philip N. Asprodites  
Commissioner of Conservation

By:   
Carroll D. Wascom, Director  
Injection & Mining Division

DW:PHC:gs

CC: John Aldridge, Office of Conservation, Engineering Division  
Earl Moran, ExxonMobil  
Nick Longo, Unocal