SITE INVESTIGATION REPORT AND PROPOSED REMEDIATION PLAN

Danny Paul Gastal and Ignatius Hoffpauir v. Petrodome Operating, LLC, et al.
15th Judicial District Court; Docket No. 202210495-A
Section 32, Township 10 South, Range 01 West
Morse Oil and Gas Field
Morse, Acadia Parish, Louisiana
C&E Legacy Project No. 015-106
October 03, 2025

Prepared for

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Hydro-Environmental Technology, Inc. (HET) is submitting this Site Investigation Report and Proposed Remediation Plan (Plan), on behalf of Petrodome Operating, LLC and Ichor Energy (LA), LLC (collectively referred to for the purposes of this report as Petrodome), to the Louisiana Department of Conservation and Energy (C&E) and to the 15th Judicial District Court for the Parish of Acadia, State of Louisiana (Court) pursuant to a Limited Admission filed on behalf of Petrodome on September 04, 2025 (Attachment 1). The purpose of the Limited Admission is, in accordance with La. R.S. 30:29 ("Act 312"), to establish the Most Feasible Plan for the evaluation, or if necessary, remediation of environmental damage, if any, as defined by Act 312 within the scope of the Limited Admission Area as defined in the Limited Admission in accordance with Act 312 and applicable regulations. The Plan was prepared to evaluate whether environmental damage as defined by Act 312 exists and if necessary, remediate the contamination that resulted in the environmental damage, if any, within the Limited Admission Area defined herein in accordance with the requirements of the applicable rules and regulations of the C&E and/or the Louisiana Department of Environmental Quality (LDEQ) as applicable through the C&E. Where applicable or relied upon, rules and regulations of the LDEQ as part of the overall framework of C&E's Statewide Order 29-B are cited in the Plan. This Plan was prepared in adherence to HET's strict quality assurance/quality control procedures to ensure that the Plan meets the highest standards in terms of the methods used to obtain the information presented.

The Plan is based on field data collected and information received from the client, other parties associated with the client and other third parties during the period of January 01, 2023 to October 03, 2025. All conclusions and recommendations are based on available information cited herein and should be reviewed within this context. Should conditions at the site in question change, or additional information become available, especially with regard to prior site conditions, it may be necessary to modify these conclusions and recommendations accordingly in the future. The contents of this Plan are proprietary, and text, illustrations, and/or any other parts of this Plan may not be reproduced without the express written permission of HET.

A reasonable effort was made by Petrodome's counsel to obtain a complete list of parties. A list of all parties to whom the Plan is being provided, their addresses, and other contact information is attached as Attachment 2. A commissioner's conference has not been held. Should you have any questions or need further information, please feel free to contact us.

Sincerely,

HYDRO-ENVIRONMENTAL TECHNOLOGY, INC.
Project #1705.A37

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EXECUTIVE SUMMARY

Site Status

This Plan is being submitted in connection with a Limited Admission made on behalf of Petrodome Operating, LLC and Ichor Energy (LA) LLC. (collectively referred to for the purposes of this report as Petrodome) in the matter styled *Danny Paul Gastal and Ignatius Hoffpauir v. Petrodome Operating, LLC, et al., 15th Judicial District Court, Docket No. 202210495-A, Parish of Acadia, State of Louisiana*. The case is currently set for trial in May 2026. The Limited Admission pertains to environmental damage, if any, to environmental media arising from a leak in a produced water flowline that ran from the MIOGYP RA SUA; Gastal No. 1 well (C&E Serial No. 195102) to an off-site disposal well as depicted in Figure 4 and further defined below. The Danny Paul Gastal property (the "Property") was observed during the course of the investigation as agricultural fields, grassland, and densely vegetated acreage, as well as an area of active oilfield operations.

History

The Property has been subject to oilfield exploration and production associated with MIOGYP RA SUA; Gastal No. 1 (C&E Serial No. 195102) and the Gastal Production Facility, as well as a former flowline that transferred produced water to the off-site Foreman Estate SWD No. 001 (C&E Serial No. 200132) for disposal that has since been re-routed. The petition states that defendants owned and/or operated the Gastal Production Facility, which consisted of natural gas, crude oil, and saltwater collection and separation facilities, including production from, but not limited to, the MIOGYP RA SUA; Gastal No. 1 (C&E Serial No. 195102) well.

On December 26, 2021, an unintended release of produced water was self-reported by Petrodome personnel, who determined that the source of the release was the flowline that transferred produced water from the Gastal Production Facility to the off-site Foreman Estate SWD No. 1 well (C&E Serial No. 200132) for disposal. Petrodome temporarily shut in the well and discontinued use of the flowline after discovery of the release. A new flowline was installed, and the well was placed back in service. However, the agricultural ponds near the release have remained fallow as of the date of this report. The Plaintiff filed suit in 2022 against Petrodome and others alleging environmental damage on the Property and sought restoration costs based on data collected by their consultants, including RBB Consulting, LLC (RBBC) and Southland Environmental, LLC (Southland). Hydro-Environmental Technology, Inc. (HET) subsequently conducted an additional delineation investigation.

On September 04, 2025, Petrodome entered a limited admission of responsibility to evaluate whether environmental damage (as defined by Act 312) exists and, if necessary, remediate environmental damage, if any, resulting from the produced water release within the Limited Admission Area (LAA) as illustrated on Figure 4 and further defined below. Pursuant to the Order entered by the Court on September 10, 2025, HET, on behalf of Petrodome, is submitting this Plan for (1) the evaluation of constituents in the environmental media resulting from the release within the LAA and (2) the presentation of evaluation and remedial options for constituents in the environmental media within the LAA that meet applicable regulatory standards and that serve the best interest of the intended utilization, functionality, and aesthetics of the Property. The Plan is being submitted in accordance with the requirements of the applicable rules and regulations of the C&E.

Reason for Assessment

Southland, on behalf of the landowners, conducted an investigation of the property between May and September of 2023 and presented the results in the joint Expert Report dated April 21, 2025, and authored by Duane Piranio with Southland and Brent Bray with RBBC. HET conducted further assessment of the site between January and June of 2025 to accurately determine the environmental conditions and conduct further evaluation and delineation to establish the appropriate regulatory status of the Property. The purpose of the Limited Admission and this Plan is to assist the C&E with its function of assessing the existence or not of environmental damage related to a historical produced water release within the LAA; to acknowledge regulatory responsibility for the evaluation and/or remediation of such environmental damage, if it is found to exist; and thereby, to assist the C&E to ensure that the health, safety, and welfare of the people of the State of Louisiana are protected as established in La. R.S. 30:29.

Site Characteristics

The Property is located in the village of Morse in a rural portion of Acadia Parish and is used primarily for agricultural purposes in the form of rice/crawfish fields. The Property is surrounded by agricultural land to the north and east, residential properties and agricultural land to the south, and a Dollar General store along Louisiana Highway 91 to the west, with additional residential houses and agricultural land across the highway. The Property has also been subject to oilfield exploration and production associated with MIOGYP RA SUA; Gastal No. 1 (C&E Serial No. 195102) and the Gastal Production Facility, as well as a former flowline that transferred produced water to the off-site Foreman Estate SWD No. 001 (C&E Serial No. 200132) for disposal; this line has now been re-routed. No areas of stained surfaces or areas of distressed vegetation were observed during the course of the investigation, with the exception of the immediate vicinity of the flowline release. The remaining portions of the Property were observed as healthy agricultural fields, grassland, and dense vegetation.

From information obtained from the Environmental Regulatory Code (LAC 33.IX.1123), the Property is located within the Bayou Queue de Tortue subsegment from headwaters to Mermentau River (Subsegment 050501), within the Mermentau River Management Basin. Surface water bodies, including the tributaries and drainage canals, within this subsegment are not utilized as sources of drinking water. Background salinity values for these surface water bodies for this subsegment are listed as ninety (90) milligrams per liter (mg/L) for chlorides, thirty (30) mg/L for sulfates, and 260 mg/L for total dissolved solids (TDS).

Release Source

The LAA is identified in Figure 4 and pertains to environmental media in and adjacent to the area associated with a historical release in the produced water flowline that ran from the MIOGYP RA SUA; Gastal No. 1 well (C&E Serial No. 195102) to an off-site disposal well. The source of constituents associated with the LAA appears to be the unintended release of produced water which was discovered by Petrodome on December 26, 2021. Data demonstrate that the source soils (i.e., constituent concentrations) have been vertically and horizontally delineated to Statewide Order 29-B, Chapter 3 and RECAP screening standards; are confined to the surficial confining unit at depths less than sixty (60) feet BLS; and neither extend to the Chicot aquifer, nor stand to affect it in the future. No ongoing sources have been identified.

Soil Type

According to the United States Department of Agriculture (USDA) Soil Survey of Acadia Parish (March 2006 and updated via the online database), soil types for the Property consist of the Crowley-Midland complex (CwA) and the Mowata silt loam (MtA). These soil types are gently sloping to level, poorly to somewhat poorly drained, and found on stream terraces, either on low convex ridges and in flats between the ridges, or on low depressional areas. The USDA database also identifies natural pH values for soils on the Property ranging between 4.5 and 8.4 Standard Units (SU). In addition, USDA data indicates that the natural salinity (i.e., EC) values for soil types on the Property range upward of two (2) millimhos per centimeter (mmhos/cm), contrary to RBBC and Southland's calculated background EC concentration of 1.2 mmhos/cm.

Maximum Concentrations (Soil)

Surface concentrations of EC, SAR, and/or ESP were evaluated within the root zone as established by on-site work and research performed by HET. Subsurface concentrations of EC were evaluated for reference purposes in accordance with LAC 43:XIX.313D to assess whether the chloride parameters at depth might affect the overall conditions of the Property, while considering the protection of the shallow water bearing zones.

Laboratory analytical results for surface concentrations of electrical conductivity (EC) from the HET and Southland investigations within and in the vicinity of the LAA reported that all concentrations are below the regulatory/agronomic standards, with the exception of limited concentrations reported in surface samples collected from soil borings SE-SB02, SE-SB06, SE-SB08, SE-SB13, SE-SB14, B-1, and B-5. Additionally, limited concentrations of ESP and SAR were reported above the respective Statewide Order 29-B standards, with a maximum surface concentration of ESP at 61.6 percent in soil boring SE-SB-06 and of SAR at 112 in soil boring SE-SB-06, both at a depth between land surface and two (2) feet BLS. Note that ESP and SAR concentrations are typically only evaluated within the effective root zone and concentrations of SAR above the Statewide 29-B, Chapter 3 standard have been determined to be within natural tolerances.

Laboratory analytical results reported subsurface concentrations of EC above the Statewide Order 29-B upland standard of four (4) mmhos/cm at depths upward of sixty (60) feet BLS. The maximum EC concentration was reported as 35.9 mmhos/cm at a depth of twelve (12) to fourteen (14) feet BLS in Southland boring SE-SB06. Elevated values have been vertically and horizontally defined and are limited to the south-central portion of the Property, in the vicinity of the produced water release. However, the depths of the EC concentrations significantly decrease within a short lateral distance from the release. Furthermore, the reported EC concentrations are confined to the surficial confining unit and do not extend to the Chicot aquifer. Finally, SPLP results demonstrate that the reported EC concentrations are below the threshold to result in cross-media transfer.

With regard to metals, all reported concentrations were determined to be below the Statewide Order 29-B, Chapter 3 standards, with the exception of arsenic concentrations in select soil samples at depths collected during installation of Southland soil boring SE-SB06. A maximum arsenic concentration of 12.7 mg/Kg was reported in the six (6) to eight (8) foot sample interval. Note that the elevated arsenic concentrations in Southland soil boring SE-SB06 were not confirmed in the split sample analyses and were unable to be reproduced in the collocated HET soil boring SE-SB-06R, with an average concentration of 4.06 mg/Kg as the AOIC for comparison purposes to the RECAP standard. Additionally, arsenic has been demonstrated to be naturally occurring in soils throughout Louisiana according to a study performed by Ori, et al. (1993).

With regard to hydrocarbons, all concentrations of hydrocarbons were reported below the respective RECAP screening standards for the total petroleum hydrocarbons as well as the aliphatic and aromatic hydrocarbon fractions. All concentrations of the indicator compounds of PAH were also reported well below the respective RECAP screening standards.

Based on the tiered approach that considers concentrations in order from Statewide Order 29-B, Chapter 3, and RECAP, all constituent concentrations in the soil have been demonstrated to meet applicable screening standards in accordance with Statewide Order 29-B, Chapter 3 and RECAP considering further analyses and/or SPLP results. The concentrations of EC reported in the surface soils were within the effective root zone as determined by HET; however, further evaluation suggests that the EC levels in the effective root zone do support the intended agricultural use of the Property.

Maximum Concentrations (Groundwater)

As part of its investigation on behalf of the Plaintiffs, Southland installed cluster monitor wells [MW-1 (6-16') and MW-1 (22-32')] near Southland soil boring SE-SB-01. Southland was unable to obtain groundwater samples from the monitor wells over the course of several attempted gauging events, as the wells were consistently observed as dry.

Free Product Conditions

No phase separated hydrocarbons were identified during the investigations conducted by HET and Southland.

Potential Receptors

In Acadia Parish, the Chicot aquifer system and the deeper Evangeline aquifer system are utilized as sources of groundwater regionally. The thickness of the surficial confining zone in this portion of Acadia Parish has been mapped by the USGS as between eighty (80) and 120 feet BLS (Sargent, 2004). Furthermore, lithologic descriptions from soil cores collected on the Property demonstrate that the thickness of the surficial confining zone is greater than sixty-eight (68) feet BLS, which is the deepest boring logged. Finally, review of the C&E well registration data files determined that shallow water bearing zones within the surficial confining unit were not utilized as a source of drinking water and that potable water was obtained from the upper sand unit of the Chicot aquifer at depths greater than 140 feet in this portion of Acadia Parish.

Problem Evaluation

The data demonstrates that soil remediation of surface soils via targeted soil excavation, together with off-site disposal of scarred surfaces, combined with the application of soil amendments to portions of the agricultural ponds near the release, as proposed by HET, is warranted. Additional remediation activities may include, but are not limited to, slurrying, contouring, and leveling of the three (3) fallow ponds. The cost to conduct the soil remediation activities within the LAA is estimated to be $286,673. The Plan submitted by Petrodome complies with all of the provisions of Statewide Order 29-B and is fully protective of human health, the environment, and any reasonably intended use of this Property without limitations or encumbrances. As such, Petrodome proposes that the C&E adopt a Most Feasible Plan (MFP) to remediate shallow soils as proposed by HET.

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1.0: INTRODUCTION

Hydro-Environmental Technology, Inc. (HET) conducted a hydrogeologic and environmental assessment of the Danny Paul Gastal property (the "Property") and requests that the Louisiana Department of Conservation and Energy (C&E) adopt this Plan as the Most Feasible Plan (MFP) for the evaluation and, if necessary, remediation of the constituents in environmental media associated with the Limited Admission Area (LAA) in compliance with the rules of the C&E. The Plan was prepared in connection with a Limited Admission made by Petrodome Operating, LLC and Ichor Energy (LA) LLC. (collectively referred to for the purposes of this report as Petrodome) in the case entitled *Danny Paul Gastal and Ignatius Hoffpauir v. Petrodome Operating, LLC, et al, (15th Judicial District Court, Parish of Acadia, State of Louisiana, Docket No. 202210495-A)*. The Plan includes an evaluation of all data generated during separate assessments conducted by multiple consultants, including HET, on behalf of Petrodome and RBB Consulting, LLC (RBBC) and Southland Environmental, LLC (Southland), as representatives of the Plaintiff.

This Plan includes information provided by the following experts: 1) Stewart "Smokey" L. Stover, Jr., Director with HET, 2) Brent T. Pooler, Principal Risk Analyst/Hydrogeologist with HET, 3) Craig E. Cormier, Principal Environmental Scientist with HET, 4) Matthew L. Greene, Environmental Scientist with HET, and 5) Dr. Jay V. Huner, Ph.D. with Louisiana Ecrevisse. More detailed information on the qualifications of these experts is outlined in Section 1.3 below, with the résumés included in Appendix A.

The work conducted by HET to date has included oversight of field activities performed by consultants on behalf of the Plaintiffs and the completion of independent assessments of portions of the Property to further evaluate and confirm constituent concentrations to make an independent determination as to the environmental conditions of the area of investigation (AOI). In addition, HET reviewed and included here within relevant environmental assessment data, as appropriate, from nearby properties, addressed in the *Shirlene Britt, et al., v. Riceland Petroleum Company, et al. (31st Judicial District Court for the Parish of Jefferson Davis, Docket No. C-397-14*, C&E Order Nos. 031-012-001 and 031-012-002) ("Britt Properties"), *Velma Humble Hebert, et al. v. Atlantic Richfield Company, et al., 15th Judicial District Court for the Parish of Vermilion, Docket No. 84111* (C&E Order No. 015-067-001); and *Daniel Hardee, III, et al. v. Atlantic Richfield Company, et al., 14th Judicial District Court for the Parish of Calcasieu, Docket No. 2004-2319, Division "B"* (C&E No. 014-002) properties as described in more detail below.

The investigation conducted by HET was performed in accordance with applicable and appropriate standards and regulations, including Statewide Order 29-B per the C&E regulations (LAC 43:XIX) and the Risk Evaluation/Corrective Action Program (RECAP), as promulgated by the Louisiana Department of Environmental Quality (LDEQ) under the most recent guidance document dated October 20, 2003 (LAC 33:1 Chapter 13). The application of RECAP standards was done after comparison of constituent concentrations to the Statewide Order 29-B, Chapter 3 pit closure standards (LAC 43:XIX.313.C) as part of the overall regulatory framework established by the C&E for the evaluation of sites pursuant to Statewide Order 29-B under LAC 43:XIX.313.D and 43:XIX.319, the second amended memorandum of understanding between the C&E and the LDEQ dated February 23, 2023, and the provisions of Act 312 which include the use of all appropriate regulations. Furthermore, data presented in this Plan, as well as information from other consultants, have been submitted to the C&E Legacy Project No. 015-106 per the requirements outlined in Act 312 for the evaluation of oilfield sites pursuant to Statewide Order 29-B in the State of Louisiana.

The Plan presented below is protective of human health and the environment under a non-industrial exposure scenario. Upon completion of the proposed work, remnant constituent concentrations, if any, will not pose limitations or encumbrances on any reasonably intended use of the property. The incorporation of regulatory standards was part of the overall assessment conducted to ensure that the Property could be used for its intended purposes.

1.1: Site Description

The Property subject to litigation consists of approximately eighty-three (83) acres, according to the petition, and is situated along Louisiana Highway 91 in Morse, Louisiana. The Property is geographically located in Section 32, Township 10 South, Range 01 West in Acadia Parish, Louisiana. Figure 1 contains a location map of the Property boundary according to the Acadia Parish Tax Assessor's office. Figure 2 contains a 1985 historical topographic location map of the Property.

The Property is located in the village of Morse in a rural portion of Acadia Parish and is used primarily for agricultural purposes in the form of rice/crawfish fields. The Property is surrounded by agricultural land to the north and east, residential properties and agricultural land to the south, and a Dollar General store along Louisiana Highway 91 to the west, with additional residential houses and agricultural

land across the highway. The Property has also been subject to oilfield exploration and production associated with MIOGYP RA SUA; Gastal No. 1 (C&E Serial No. 195102) and the Gastal Production Facility, as well as a former flowline that transferred produced water to the off-site Foreman Estate SWD No. 001 (C&E Serial No. 200132) for disposal. The flowline has since been re-routed.

No areas of stained surfaces or areas of distressed vegetation were observed during the course of the investigation, with the exception of the immediate vicinity of the flowline release. The remaining portions of the Property were observed as healthy agricultural fields, grassland, and dense vegetation. Figure 3 contains a 2024 aerial photograph of the Property. Appendix G contains photographs of the site as obtained from aerial drone photography. Appendix H contains historical aerial photographs of the Property and the LAA.

1.2: Litigation Status and Limited Admission Area

This Plan is being submitted in connection with a Limited Admission made on behalf of Petrodome on September 04, 2025. The case is currently set for a jury trial set to commence in May 2026. Petrodome's Limited Admission applies to the area associated with a leak in the produced water flowline that ran from the MIOGYP RA SUA; Gastal No. 1 well (C&E Serial No. 195102) to a disposal well, as illustrated on Figure 4 and further defined below.

This Plan presents the results of the investigations performed on the Property to date, with a focus on the results within and adjacent to the LAA. The samples collected and evaluated to date associated with the produced water release and the LAA are illustrated in Figure 5.

1.3: Qualifications of Experts

The group of experts that jointly prepared this Plan has had numerous plans and reports submitted and approved by regulatory agencies, including the C&E and LDEQ. Copies of the résumés of the key personnel involved in preparation of this plan are included in Appendix A.

Stewart "Smokey" L. Stover, Jr. with HET holds both Bachelor of Science and Master of Science degrees in Geology and has thirty-five (35) years of experience as a Hydrogeologist. Mr. Stover has been an expert witness in litigation involved in, but not limited to, environmental site assessment, remediation, landfill assessment and design, hazardous waste, surface water impacts, and groundwater supplies and

currently conducts project oversight for HET in the states of Louisiana, Mississippi, Alabama, Texas, Wyoming, and Colorado. He also holds several professional licenses in the field of Geology in the states of Alabama, Arkansas, Mississippi, Tennessee, Texas, and Louisiana.

Brent T. Pooler with HET holds a Bachelor of Science in Geology, with a concentration in environmental geology from Louisiana State University (LSU) and has nearly twenty-nine (29) years of experience in conducting hydrogeologic investigations and implementation of soil and groundwater restoration plans. Additionally, Mr. Pooler has over twenty-seven (27) years of experience in conducting risk assessments in the states of Louisiana and Texas and has been qualified as an expert in the fields of geology, hydrogeology, remediation, and implementation of RECAP and risk assessments. Mr. Pooler holds professional licenses in the field of Geology in both Louisiana and Texas.

Mr. Craig E. Cormier with HET holds a Bachelor of Science in Environmental Science, with a minor in Chemistry from McNeese State University (McNeese) and has over twenty-eight (28) years of experience in the design, implementation, and management of numerous remediation projects and oilfield pit closures under Statewide Order 29-B and RECAP, including soil remediation, surface soil restoration, and decommissioning. Mr. Cormier's experience also includes environmental assessment; remediation; decommissioning; soil, groundwater, and surface water sampling; and/or Naturally Occurring Radioactive Materials (NORM) surveying as part of numerous environmental evaluations/assessments of oilfields in Louisiana, Texas, Colorado, Utah, Wyoming, and North Dakota. He has also owned and operated a rice and crawfish farm of eighty (80) acres in size for fifteen (15) years.

Matthew L. Greene with HET holds a Bachelor of Science in Environmental Science, with a concentration in soil and water conservation from the University of Louisiana at Lafayette (ULL) and has over seven (7) years of experience in conducting root zone investigations at HET, which have been approved by the C&E as part of overall site assessment work conducted by HET. In addition, Mr. Greene previously worked with Mr. Arville Touchet for over two (2) years doing much of the same before joining HET. Mr. Greene holds a national professional license in the field of Soil Science.

Dr. Jay Huner has studied crawfish biology and culture since 1972 at Louisiana State University beginning as a Master of Sciences candidate and then transferring directly to a doctoral program in Marine Sciences there. Dr. Huner received his doctorate in August 1975. He held professorial appointments at Southern University in Baton Rouge in the College of Sciences and Agriculture and Home Economics there

from 1975 to 1988. His research and outreach work at Southern University involved aquaculture centered on crawfish farming and crawfish biology. From 1988 until his retirement in 2005 from the University of Louisiana at Lafayette (formerly the University of Southwestern Louisiana), he was Director of the Crawfish Research Center and Adjunct Professor of Aquaculture in the Department of Renewable Resources. He was associated with the University of Kuopio in Kuopio, Finland from 1982 until 2005 and held the position of Docent (Adjunct) of Applied Zoology in the Department of Applied Zoology. His work in Finland was centered on the study of crawfish biology and aquacultural methods. In June 2000, he received an Honorary Doctorate in Natural Sciences from the University of Kuopio. He has authored or co-authored several hundred technical or semi-technical publications on various aspects of fisheries science, aquaculture, aquatic biology, and wildlife management. Many of the publications deal with crawfish topics. He has held all elected offices in the International Association of Astacology, the international crawfish organization. He also managed the organization's permanent home office for a number of years. He has traveled to the following countries as a consequence of his crawfish work: Australia, Canada, Costa Rica, Finland, France, Germany, Great Britian, Holland, Italy, Norway, The People's Republic of China, Russia, Sweden, and Switzerland. Dr. Huner has also served as an expert in at least a dozen cases involving claims of damage related to crawfish, for both plaintiffs and defendants.

1.4: Operational History

According to the C&E database, seven (7) wells were drilled between 1984 and 2011 as part of the overall exploration of the Morse Oil and Gas Field. The petition states that defendants owned and/or operated the Gastal Production Facility, which consisted of natural gas, crude oil, and saltwater collection and separation facilities, including production from, but not limited to, the MIOGYP RA SUA; Gastal No. 1 (C&E Serial No. 195102) and the off-site Foreman Estate SWD No. 001 (C&E Serial No. 200132) wells. The MIOGYP RA SUA; Gastal No. 1 (C&E Serial No. 195102) was drilled on October 13, 1984, and is currently an active, oil-producing well. The off-site Foreman Estate SWD No. 001 (C&E Serial No. 200132) was drilled on July 06, 1985, and is currently an active injection well. Note that the Foreman Estate SWD No. 001 is not located on the Property but on the south-adjacent property owned by Matthew Taylor, et al. according to the Acadia Parish Tax Assessor's office. Figure 6 contains a 2010 aerial photograph illustrating the approximate locations of these two (2) wells, as well as the former path of the now re-rerouted flowline.

Separately, HET has reviewed files associated with a produced water release. On December 26, 2021, an unintended release of produced water was self-reported by Petrodome personnel. The source of the release was determined to be the flowline that transferred produced water from the Gastal Production Facility to the off-site Foreman Estate SWD No. 1 well (C&E Serial No. 200132) for disposal. Petrodome temporarily shut in the well and discontinued use of the flowline after discovery of the release. A new flowline was installed, and the well was placed back in service. However, the agricultural ponds near the release have remained fallow as of the date of this report.

As a result of the release, the LDEQ assigned Agency Interest No. 171651 to the release site (the "Site") as part of the initial emergency actions. According to LDEQ records, an unknown amount of produced water was released and contained within three (3) leveed ponds utilized for rice and crawfish production on the Property. Beginning in January of 2022, Petrodome personnel began the process of dewatering the ponds via submersible pump and disposing of the water by injection into the off-site Foreman Estate SWD No. 001 (C&E Serial No. 200132). Additionally, the source of the release was located and repaired by early February. Over the course of the spring and summer, Petrodome continued pumping water from the ponds; however, several rainfall events diluted the remaining water and by the end of August 2022, chloride levels tested below the acceptable level of 500 parts per million (ppm) to allow for surface water discharge. Therefore, Petrodome commenced surface discharge of the ponds into receiving ditches on August 26, 2022. On September 12, 2022, New Tech Global Environmental, LLC (NTG) collected a series of composite soil samples from seventeen (17) areas within the three (3) ponds. The samples were analyzed for EC and chlorides, with all concentrations reporting below the Statewide Order 29-B standard of four (4) mmhos/cm for EC and the LDEQ RECAP standard of 5,000 mg/Kg for chlorides. As of September 14, 2022, all water had been discharged from the three (3) ponds. The LDEQ performed an inspection to confirm conditions in October of 2022, during which the LDEQ inspector noted extremely dry conditions, with mud cracks present, along with patchy grass and small vegetation in the fields. The inspector also noted that there were sections of soil that had been recently plowed. The LDEQ later transferred jurisdiction of the Site to the C&E in a letter dated July 31, 2023. The C&E accepted jurisdiction in a letter dated August 09, 2023, under C&E Legacy Project No. 015-106.

1.5: Review of Previous Investigations

The LAA is a portion of the Property, which comprises approximately eighty-three (83) acres. Environmental media in the form of soil on the Property have been sampled in a series of efforts by Southland and HET. The following discussion provides an overview of sampling across the Property, including the LAA. Copies of the reports prepared by other parties not included here within may be provided separately by counsel or at the request of the C&E.

Southland performed an investigation of portions of the Property on behalf of the Plaintiffs as part of the captioned litigation and presented its conclusions in the joint Expert Report dated April 21, 2025, and authored by Duane Piranio with Southland and Brent Bray with RBBC. Between May 02, 2023 and September 06, 2023, Southland installed a total of twenty-one (21) soil borings (SE-SB1 to SE-SB21) in the vicinity of a release from the former flowline. Additionally, Southland installed cluster monitor wells [MW-1 (6-16') and MW-1 (22-32')] near Southland soil boring SE-SB-01, as well as a series of conductivity probes on the Property. Note that Southland was unable to obtain groundwater samples from the monitor wells over the course of several attempted gauging events as the wells were consistently observed as dry. HET conducted oversight and collected split samples as volume allowed during Southland's investigation. HET has reviewed all available data to determine the environmental conditions, regulatory status, and natural tolerances of the site, including sample results from split samples collected by HET. A review of the data is presented below in Section 5.0. Appendix J contains HET's field notes generated during all investigations of the Property to date.

Figure 7 depicts the locations of all borings and monitor wells installed by Southland as part of its assessment of the Property. Tables 1 and 2 contain analytical summaries of soil samples analyzed for Statewide Order 29-B and/or RECAP parameters, respectively, in the LAA, as well as delineation borings. Each of the above referenced tables in Appendix C summarizes data from all parties, including split sample results. Appendix D contains a copy of the boring logs. Appendix E contains a copy of the laboratory analytical reports from samples collected by Southland and HET.

1.5.1: Review of Plaintiff's Investigation

Based on a review of the Southland report (Appendix I), HET offers the following limited comments on the evaluation and conclusions made by Southland as they pertain to the LAA and HET's further evaluation below.

- The Plaintiffs' remediation plan is based on soil remediation to either purported background standards or regulatory standards, neither of which have been done in accordance with applicable regulatory guidance and requirements. First, RBBC and Southland fail to account for natural tolerances of EC as determined by the USDA as upward of two (2) mmhos/cm for the soil types encountered on the Property and similar background tolerances identified by RBBC and Southland in Attachment I of the report. Furthermore, it is unclear as to the method employed by RBBC and Southland in selection of the background data as several boring locations are designated as both background and subject to soil remediation.
- RBBC and Southland identified several locations as background in Attachment I of the report that are also subject to remediation. This is done based on a statistical average; however, RBBC and Southland identified EC values upward of 2.34 mmhos/cm as background in Southland boring SE-SB15 at a depth of two (2) to four (4) feet BLS. Similar EC values are not included in the calculations, and all values below the statistical average are included as part of soil remediation areas despite being within natural tolerances. Interestingly, RBBC and Southland identified several EC values as background but target the same sample depth for remediation based on subsurface concentrations of ESP and/or SAR above the respective Statewide Order 29-B standards (i.e., SE-SB-03 and SE-SB-15, for example). This inconsistent application demonstrates RBBC and Southland's failure to establish background ranges for ESP and SAR and the fact that these constituents are typically evaluated in the effective root zone only.
- Southland failed to conduct the necessary evaluation to determine the regulatory status of the Site or whether a threat to human health or the environment exists in its regulatory restoration option. Southland failed to include appropriate analytical testing to confirm and fully evaluate constituent concentrations, such as TPH, that include non-target analytes and natural compounds. This includes the omission of necessary analyses, including

hydrocarbon fractions in accordance with RECAP, Appendix D, Table D-1 or Synthetic Precipitation Leachate Procedure (SPLP) in accordance with RECAP and the provisions of US EPA Soil Screening Guidance Technical Background Document (EPA 1996). The additional testing is necessary to establish the environmental and regulatory status of the subsurface soils, which have been demonstrated by HET to be vertically and horizontally delineated, confined to the surficial confining unit, and below the threshold to result in cross-media transfer.

- RBBC and Southland fail to conduct the necessary testing and evaluation to support the proposed soil remediation via soil flushing for soils encountered at depths greater than thirty (30) feet BLS. First, the monitor wells installed by Southland at depths upward of thirty-two (32) feet BLS have consistently been observed on multiple occasions as dry. Second, RBBC and Southland failed to conduct any testing below forty (40) feet BLS, let alone any aquifer testing, geotechnical analyses, or otherwise necessary to support a soil flushing plan. Furthermore, the proposed soil flushing calculations presented by RBBC and Southland in Appendix J of the report appear to assume removal of one (1) volume of pore space for each of the regulatory or background remediation plans. The calculations do not adhere to the EPA pore flushing model, mainly by failing to consider the constituent concentrations in determining the amount of flushing necessary. As a result, RBBC and Southland do not present the appropriate information necessary to support the proposed soil remediation plan for subsurface soils, which HET has determined to meet applicable standards.

As such, the RBBC/Southland plan for soil remediation 1) is unfeasible and exaggerated in nature and extent as large areas within the proposed remediation areas have either not been sampled or have been demonstrated to meet standards as discussed further below; 2) fails to conduct any testing (i.e., geotechnical parameters, aquifer tests, etc.) or appropriate evaluation (i.e., pore flushing calculations) necessary to support the proposed soil flushing plan; and 3) does not adhere to the C&E's regulatory framework on analytical methods employed, regulatory standards applied, or evaluation of the depth of remediation necessary. In addition, RBBC/Southland failed to appropriately determine natural tolerances in the soil, particularly regarding EC based on the USDA database and its own background tolerances

identified in Attachment I of the report. As a result, the foundation of the Plaintiffs' remediation plan does not justify the need for the proposed soil remediation. Finally, the Plaintiffs' plan, as proposed, would render large portions of the Property unusable for extended periods of time, would fundamentally alter the conditions of the Property, and fails to address whether the plan provides any meaningful benefit to achieve the stated goals.

1.6: Defense Investigations

Between January 28, 2025 and June 06, 2025, HET conducted an independent investigation of the Property on behalf of the Defendants. The investigation conducted by HET included the installation of a series of confirmatory and/or delineation soil borings on the Property. In addition, HET performed a determination of the effective root zone on the Property, as discussed below in Section 4.0. HET also accompanied Jay Huner on an inspection of the Property on May 15, 2025, to observe and take surface and drone photographs. HET has reviewed Mr. Huner's report dated June 12, 2025. Lastly, HET reviewed plans and cost estimates submitted on behalf of the Plaintiffs pertaining to remediation and separately prepared estimates for those remediation areas proposed by HET, as discussed further below and presented in Appendix O. Figure 8 illustrates the locations of borings installed by HET. Appendix D contains a copy of the boring logs for borings installed by HET.

The results of the investigation conducted by HET, as well as data generated during the course of the investigation conducted by Southland, are incorporated into the overall evaluation of the Property conditions as described in more detail below. Southland, as representatives of the Plaintiffs, observed all field work conducted by HET and collected split samples for select analyses as volume allowed. All data were reviewed by HET in its evaluation of the regulatory status.

Tables 1 and 2 contain analytical summaries of soil samples analyzed for Statewide Order 29-B and/or RECAP parameters, respectively, in the LAA, as well as delineation borings. Each of the above referenced tables in Appendix C summarizes data from all parties, including split sample results. Appendix D contains a copy of the boring logs. Appendix E contains a copy of the laboratory analytical reports from samples collected by Southland and HET.

1.7: Review of Regional Investigations

As part of the evaluation of the Property, HET reviewed the investigations conducted in connection with legacy matters on the nearby Velma Humble Hebert (*Velma Humble Hebert, et al. v. Atlantic Richfield Company, et al., 15th Judicial District Court for the Parish of Vermilion, Docket No. 84111*), Hardee (*Daniel Hardee, III, et al. v. Atlantic Richfield Company, et al., 14th Judicial District Court for the Parish of Calcasieu, Docket No. 2004-2319, Division "B"*), and Britt, Doherty, former Walker, Morgan, Hollier, Theriot, and Miller (collectively referred to as "Britt") properties (*Shirlene Britt, et al., v. Riceland Petroleum Company, et al., 31st Judicial District Court, Parish of Jefferson Davis, Docket No. C-397-14*). Given the proximity of the properties to each other, the methods of assessment and/or remediation (i.e., pit closure), as well as the applicable regulatory standards, including groundwater classification as GW_3, as established on the Velma Humble Hebert (Hebert), Hardee, and Britt properties, were evaluated as they pertain to the assessment conducted on the Property. These are a few examples of numerous projects in which the C&E has applied regulatory standards as part of the overall evaluation of environmental conditions and the need, if any, for soil and/or groundwater remediation. Figure 9 illustrates the location of the Hebert, Hardee, and Britt properties in relation to the Property.

The Hebert property has been subject to separate investigations conducted by ICON Environmental Services, Inc. (ICON), on behalf of the Hebert Plaintiffs and HET, on behalf of the Hebert Defendants, in the now-settled above-captioned lawsuit. HET conducted assessment and decommissioning activities on portions of the Hebert property based on established regulatory standards as part of the overall response to C&E Order No. ENV 015-067-001. Results of the assessment and decommissioning activities conducted by ICON and HET were summarized and submitted by HET in a series of reports, including, but not limited to, the following: 1) Site Assessment Report dated June 12, 2019; 2) Supplemental Radiological Data Package dated February 10, 2020; and 3) Monitor Well Plugging and Abandonment and Decommissioning Report dated March 23, 2022. The C&E approved HET's overall assessment of soil and groundwater conditions and granted closure status [No Further Action At This Time (NFA-ATT)] considering the application of Statewide Order 29-B and/or RECAP standards in a letter dated October 07, 2022.

The Hardee property has been subject to separate investigations conducted by ICON, on behalf of the Hardee Plaintiffs and HET, on behalf of the Hardee Defendants, in the now-settled above-captioned

lawsuit. HET conducted assessment activities on portions of Hardee property based on established regulatory standards as part of litigation activities. Results of the assessment activities conducted by ICON and HET were summarized and submitted by HET in a series of reports, including, but not limited to, the following: 1) Site Investigation Report dated August 30, 2011; 2) Site Investigation Report Addendum dated October 12, 2011; and 3) Site Investigation Report dated February 28, 2012. The C&E approved HET's overall assessment of soil and groundwater conditions and granted closure status [No Further Action At This Time (NFA-ATT)] considering the application of Statewide Order 29-B and/or RECAP standards in a letter dated March 29, 2012.

The Britt properties have been subject to separate investigations conducted by ICON Environmental Services, Inc. (ICON), on behalf of the Britt Plaintiffs and HET, on behalf of the Britt Defendants, in the now-settled above-captioned lawsuit. HET conducted assessment and remedial activities on portions of Britt properties based on established regulatory standards as part of the overall response to C&E Order Nos. ENV 031-012-001 and 031-012-002. Results of the assessment activities conducted by ICON and HET, along with a description of the remedial activities conducted by HET, were summarized and submitted by HET in a series of reports, including, but not limited to, the following: 1) Site Assessment Report dated November 15, 2017; 2) Groundwater Monitoring and Delineation Assessment Report dated October 01, 2020; 3) Groundwater Monitoring and Pit Closure Report dated July 11, 2022; 4) Petition for Site Closure and Semi-Annual Groundwater Monitoring Report dated March 06, 2023; and 5) Petition for Site Closure Monitor Well Plugging and Abandonment Report dated February 28, 2024. The C&E approved HET's overall assessment of soil and groundwater conditions and granted closure status [No Further Action At This Time (NFA-ATT)] considering the application of Statewide Order 29-B and/or RECAP standards in a letter dated January 17, 2025.

1.8: Introduction to the Plan

As discussed and defined below, this Plan presents a comprehensive review of all data associated with the LAA to establish the MFP to protect the health, safety, and welfare of the people of the State of Louisiana as established in La. R.S. 30:29. The Plan serves in the best interest of the utilization, functionality, and aesthetics of the Property, consistent in function with native and undisturbed areas of the Property and surrounding areas. The data discussed below demonstrates that all source areas in the LAA have been appropriately characterized and the site is in declining conditions (i.e., the constituent mass is

not increasing, the source of the release has been mitigated, and the area of constituent concentrations above the screening standard is not expanding).

As to the LAA, Petrodome proposes to conduct soil remediation of surface soils via targeted soil excavation and off-site disposal of scarred surfaces combined with the application of soil amendments to portions of the agricultural ponds near the release. Additional remediation activities may include, but are not limited to, slurrying, contouring, and leveling of the three (3) fallow ponds.

Statewide Order 29-B, Chapter 6 (Section 611.F.1) provides for the submission of a plan that complies with all of the provisions of Statewide Order 29-B, Chapter 3, exclusive of Sections 313.D and 319. Petrodome's proposal with regard to subsurface soils contemplates MNA, which Petrodome submits is fully compliant with Statewide Order 29-B, Chapters 3 and 6. Should the department wish to evaluate an alternative soil remediation plan, Appendix O contains a hypothetical soil excavation plan to address concentrations of EC below the root zone to a depth upward of sixteen (16) feet below land surface (BLS) with soils beneath sixteen (16) feet BLS subject to MNA. The alternate plan to address soil remediation plan is not endorsed by the authors, or suggested to be the most feasible plan, or warranted, or necessary based on the evaluation of data below and the protection of human health, the environment, and the uses of the Property. Such a plan is not necessary based on the nature and extent of conditions at the LAA, would result in more harm than good for the property, and would render the property unusable during implementation.

2.0: GEOLOGICAL SETTING

The Property is located within the Morse Oil and Gas Field, approximately nine (9) miles southwest of Crowley and within the Village of Morse in a rural portion of Acadia Parish, Louisiana. The depositional environment of the Property was influenced by Pleistocene fluvial deltaic processes and resulting deposits associated with the Paleo Red River. The property consists of prairie pastures which are mainly utilized for agricultural purposes. Additionally, the property is 2.5 miles north of Bayou Queue de Tortue, which serves as the boundary between Acadia and Vermilion Parishes.

The Geologic Map of Louisiana, Crowley Quadrangle Map (2012) indicates that the near surface in the vicinity of the Property is mapped as the Beaumont Alloformation (Figure 10). This formation is comprised of Coastal Plain deposits of late to middle Pleistocene. The Beaumont Alloformation (Beaumont) is associated with deposits of the Paleo-Red River Deltaic Plain. The Beaumont deposits consist of light gray to light brown clays, sandy clays, silts, sands, and some gravel along alluvial valleys. The fine grained units (clays) form a surficial confining layer for this portion of Acadia Parish that tends to retard downward vertical migration of substances toward the underground sources of drinking water which is obtained from the coarser grained deposits (sands) of the Chicot aquifer in Southwest Louisiana.

2.1: Topography and Drainage

Based on the United States Geological Survey (USGS) topographic map of the Morse Oil and Gas Field, surface elevations range from ten (10) to fourteen (14) feet above sea level. Figure 11 contains a LIDAR map of the property illustrating the changes in elevation across the investigation Property.

The Soil Survey of Acadia Parish (March 2006 and updated via the online database) published by the United States Department of Agriculture (USDA) designates the surface soils within the boundaries of the Property as the Crowley-Midland complex and the Mowata silt loam, as further described below:

> **Crowley-Midland complex (CwA):** These level to gently sloping, somewhat poorly and poorly drained soils are located on stream terraces. The Crowley soil is located on low convex ridges with the Midland soil located on flats between the ridges. Very slow permeability rates.
>
> **Mowata silt loam (MtA):** These level and nearly level, poorly drained soils are located on low depressional areas on stream terraces. Very slow permeability rates.

The USDA also tabulated natural conditions of several soil parameters, including pH and EC, based on mapping conducted of soils in the State and within Acadia Parish itself. The USDA database identifies natural pH values for those soils encountered on the Property ranging between 4.5 and 8.4 standard units (SU). In addition, USDA data indicates that the natural salinity (i.e., EC) values for soil types on the Property range upward of two (2) mmhos/cm, contrary to RBBC and Southland's calculated background EC concentration of 1.2 mmhos/cm. Figure 12 illustrates the soil types on the Property as defined by the USDA.

From information obtained from the Environmental Regulatory Code (LAC 33.IX.1123), the Property is located within the Bayou Queue de Tortue subsegment from headwaters to Mermentau River (Subsegment 050501), within the Mermentau River Management Basin. Surface water bodies, including the tributaries and drainage canals, within this subsegment are not utilized as sources of drinking water. Salinity values for these surface water bodies for this subsegment are listed as ninety (90) milligrams per liter (mg/L) for chlorides, thirty (30) mg/L for sulfates, and 260 mg/L for total dissolved solids (TDS). Figure 13 illustrates the extent of the regional subsegments, including subsegment 050501, in which the Property is situated.

2.2: Depositional Environment

Depositional environments of Quaternary sediments control the geologic framework of near surface and subsurface deposits underlying this portion of Acadia Parish. These deltaic and fluvial depositional patterns produce a variety of lithologies deposited as the result of stream energy in various environments. The energy of the Paleo-Red River distributary system and the energy of the associated deltaic plain were the main controlling factors influencing the depositional environment and drainage patterns (Fisk, 1952; Jones, et. al., 1956; Saucier, 1977; Saucier, 1994). Varying relict depositional sequences of channel courses, ranging from natural levees to backswamps, occur within these meander belts across the area. Surface and near surface faulting in the vicinity of the Property will also control the extent and distribution of sediments (Milner and Fisher, 2009).

2.3: Regional Hydrogeology

According to the LDEQ Aquifer Recharge Potential Map (1988), the Property is located in an area that is considered as having no recharge potential for major Louisiana freshwater aquifers. A confining clay unit occurs at the surface and forms the surficial confining unit of the Chicot aquifer beneath the Property and this portion of Acadia Parish. The Geologic Map of Louisiana (1984) shows the Property as the Quaternary Prairie Terrace Formation, consisting of light gray to light brown clay, sandy clay, silt, sand, and some gravel.

Two (2) major aquifer systems capable of supplying usable, sufficient quantities of groundwater underlie the Property and the surrounding areas within Southwest Louisiana, including Acadia Parish. These aquifers are known as the Chicot aquifer system and the deeper Evangeline aquifer system. The Chicot aquifer system in the majority of Acadia Parish is divided into two (2) units, the upper sand and the lower sand units, which are separated by a confining clay found between 400 and 450 feet BLS in the southern portions of the Parish.

The Chicot aquifer system, typically encountered at depths ranging from eighty (80) to 120 feet BLS in this portion of Acadia Parish, is composed of clay, silt, coarse sand, and gravel deposited during the Pleistocene epoch (Sargent, 2004). This unit is composed of several confined and subdivided sand units named for the depth in which the layer is encountered separated by laterally discontinuous clay confining units. Localized water bearing units within the overall confining zone of the Chicot aquifer system are classified as the shallow sands, if encountered, which are often not in communication with the upper sands of the Chicot. Recharge for this aquifer typically occurs from infiltration of precipitation in the northern portions of the aquifer in parts of Beauregard, Allen, Evangeline, Rapides, and Vernon Parishes, as well as from vertical leakage and lateral flow from other aquifers. Overall groundwater flow directions are toward the south in areas not influenced by agricultural, municipal, and industrial pumping activities, and regional directions are to the north and toward the pumping centers in southern Evangeline and northern Acadia Parishes.

The Evangeline aquifer system, typically encountered at a depth of greater than 1,000 feet BLS in this region of Acadia Parish, is moderately well to well sorted and consists of fine sand near the upper portion of the aquifer grading to coarse sand and gravel in the lower portions. This unit is generally discontinuous and confined by silt and clay layers of Pliocene age. Recharge of this aquifer occurs in the

northern portion of the aquifer in Vernon, Rapides, and Avoyelles Parishes. The aerial extent of fresh water within the Evangeline aquifer extends to the northern portions of Calcasieu, Jefferson Davis, and Acadia Parishes and the western portion of St. Landry Parish, noting that no freshwater is present within the Evangeline aquifer at the Property and surrounding portions of Acadia Parish.

2.3.1: Aquifer Utilization

A review of the C&E well registration data files indicated that a total of forty (40) water wells have been installed within a one (1) mile radius of the Property. Of the wells that have been installed, two (2) are listed as plugged and abandoned. The uses of active registered water wells include commercial public supply, domestic, institution public supply, irrigation, monitor, municipal public supply, oil/gas well rig supply, reworked industrial, and test hole. Additionally, one (1) well installed to a depth of 180 feet BLS has no listed use and no listed aquifer name. Figure 14 depicts the locations of registered water wells within a one (1) mile radius of the Property.

The active monitor wells were installed at depths ranging between fifteen (15) and thirty-two (32) feet BLS within the surficial confining unit of the Chicot aquifer system. The remaining active wells, including commercial public supply, domestic, industrial, irrigation, livestock, and oil/gas well rig supply, were all installed in the upper sand unit of the Chicot aquifer at depths ranging from 145 to 283 feet BLS, with the exception of three (3) active wells with a listed depth of “0”, being Water Wells 001-178, 001-228, and 001-244. Water well 001-178 was installed approximately 0.15 of a mile southwest of the Property as an irrigation well. Water well 001-228 was installed approximately 0.6 of a mile north-northwest of the Property, with a listed use description of “unknown”. Finally, water well 001-244 was installed approximately 0.2 of a mile southwest of the Property as an institution public supply well for Morse Elementary. A review of the database determined that shallow water bearing zones within the surficial confining unit are not utilized as a source of drinking water and that potable water was obtained from the upper sand unit of the Chicot aquifer at depths greater than 140 feet in this portion of Acadia Parish. Appendix F contains a list of wells registered within a one (1) mile radius of the site.

2.3.2: USGS Regional Water Quality Information

Regional water quality information from the USGS was reviewed with regard to the Property and surrounding areas. Laboratory data obtained from the USGS water quality sample results reported chloride concentrations ranging from sixteen (16) mg/L to 141 mg/L within the Chicot aquifer system in Jefferson Davis and Acadia Parishes. Figure 15 illustrates the locations of regional water wells and the associated sample results. Appendix F contains a copy of the USGS sample results.

2.3.3: Drinking Water Supply

Information obtained indicated that municipal water supplies for the area are obtained from the upper sand unit of the Chicot aquifer at depths greater than 230 feet BLS. Laboratory data obtained from the most recent published drinking water quality sample results in April of 2024 for Water Wells #1 (001-330) and #2 (001-331) from the Village of Morse Water System reported chloride concentrations ranging from fifty-two (52) to fifty-four (54) mg/L. Appendix F contains a copy of the Louisiana Department of Health & Hospitals Village of Morse Water System sample results.

2.4: Surficial Confining Unit Water Bearing Zones

The surficial confining unit is composed of deposits that contain mostly clays and silty clays that form an aquitard over the Chicot aquifer system. Selective silts containing some fine-grained sand deposits occur locally to form water bearing zones, which are discontinuous in nature and occur at various depths within this overall confining unit. Regional depositional patterns will control the extent, thickness, and distribution of these water bearing units. The thickness of the surficial confining zone in this portion of Acadia parish has been mapped by the USGS as between eighty (80) and 120 feet BLS (Sargent, 2004). Furthermore, lithologic descriptions from soil cores collected on the Property demonstrate that the thickness of the surficial confining zone is greater than sixty-eight (68) feet BLS, which is the deepest boring logged.

2.5: Site Hydrogeology

The near surface hydrogeologic and depositional environment were determined from borings installed at the Property by HET and Southland to a maximum depth of sixty-eight (68) feet BLS. Observations and lithologic interpretation from borings installed indicate that the hydrogeology is dominated by low energy deposits that are predominantly clay and silt. This surficial confining unit contains some discontinuous silt and sand content with varying thicknesses. Cross sections indicate that these permeable zones are underlain by confining clays. Figure 16 contains lithologic cross section A-A' that illustrates the near surface hydrogeology on the Property. Appendix D contains a copy of geologic boring logs.

Underlying the confining unit is the upper sand unit of the Chicot aquifer, which was not encountered in Southland's or HET's investigation. The top of the Chicot aquifer Upper Sand Unit (112CHCTU) at the Property occurs at depths greater than 100 feet below land surface (BLS) based on a review of site specific and regional driller's log and geophysical log data. Plate 4 of Milner and Fisher (2009) illustrates the property on the 100 foot contour line for the stratigraphic top of the Chicot aquifer, with a benchmark on the property of fourteen (14) feet elevation (USGS Topographic Map). Lithologic data from driller's logs within a one (1) mile radius of the Property predominantly show the top of the sand at depths greater than eighty (80) feet BLS. Review of regional geophysical subsurface logs, which are a more reliable source of data, consistently place the top of the Chicot aquifer at depths greater than 100 feet BLS. Water wells 001-451 located 2.6 miles east of the site and 001-8750Z located 2.6 miles north of the site show the top of the Upper Sand at depths of 120 feet BLS and 152 feet BLS, respectively. Furthermore, screened intervals of the water wells within a mile radius of the Property are set at depths of 140 feet BLS and greater. Therefore, minor silts and fine-grained sands located at depths shallower than 100 feet are part of the Chicot aquifer Surficial Confining Unit (112CHCTC) and are not in hydraulic communication with the top of the Upper Sand Unit, which is being utilized at depths of 140 feet or greater in the vicinity of the Property.

3.0: INVESTIGATION DESCRIPTION

Between January 28 and June 05, 2025, HET conducted a hydrogeologic and environmental assessment of the Property. The investigation performed by HET included the installation of a series of borings for the collection of soil samples. Southland, as representatives of the Plaintiffs, observed all field work and collected split samples for select analyses as volume allowed during HET's investigation of the Property.

All drilling conducted by HET and its contractors was done in accordance with the C&E regulations pertaining to drilling practices, including the Guidance Manual for Environmental Boreholes and Monitoring Systems dated November 2021. HET (C&E WWC-416), Walker-Hill Environmental, Inc. (WHE) (C&E WWC-574), and Savage Excavation, LLC (C&E WWC-892) are licensed water well contractors in the State of Louisiana. All samples submitted for laboratory analyses were analyzed in accordance with applicable regulatory requirements, including, where applicable, the latest revision of C&E laboratory procedures manual titled "Laboratory Procedures for Analysis of Exploration and Production Waste." All laboratory analyses were performed by a DEQ LELAP-accredited laboratory holding current accreditation for each parameter analyzed and test method used. Copies of the laboratory accreditations are identified in the accompanying reports and are available for review upon request. Appendix E contains a copy of the laboratory analytical reports.

3.1: Boring Installation

HET installed twelve (12) soil borings (B-1 to B-11, SE-SB-06R) as part of the overall evaluation of the Property, one (1) of which was installed as a reproduction boring for further evaluation and/or confirmation sampling (SE-SB-06R) of a previously installed Southland location. Additionally, HET boring locations B-2 and B-9 were installed as co-located borings to Southland's SE-SB-13/13R and SE-SB-10/10R borings, respectively. Figure 8 illustrates the locations of borings installed by HET.

The borings and monitor wells were installed to evaluate conditions of the Property with respect to historical oilfield exploration and production related activities, based on a review of previous assessments, historical aerial photography, and regulatory research to assess areas of potential concern, to further evaluate/confirm the information presented by RBBC and Southland during their investigation of the Property, to obtain accurate lithologic descriptions of the soils, to horizontally and/or vertically delineate the

constituents of concern, to determine the applicable standards to be applied, and/or to determine the need for remediation, as necessary and appropriate. During each boring installation, appropriate field screening, lithologic descriptions of the geological setting, and the collection of soil and/or sediment samples for subcontracted laboratory analyses were conducted, as appropriate. The complete geologic logs with photoionization detector (PID) and EC meter readings for soil borings are contained in Appendix D.

The borings were installed by direct push technology utilizing either a 2.25- or 3.25-inch outer diameter dual core with interior sample core barrel with dedicated acetate liner for each sample interval, with access to each location provided by track mounted Geoprobe drill rig. Upon completion of boring installation, the borehole annulus was grouted to land surface utilizing a cement/bentonite slurry. All core barrels, bits, and sampling equipment utilized in the boring installation were properly decontaminated and cleaned prior to each drilling activity. In addition, new, disposable nitrile gloves were utilized during sample collection.

3.2: Soil Sample Collection

Continuous soil samples were obtained from a direct push core during the installation of borings via direct push core barrel with dedicated, interior liners for each interval sampled. A representative sample was obtained from the soil core on one (1) foot (i.e., surface samples only) and two (2) foot intervals for lithologic description and screened in the field by head space analysis using an Ion Science® PID. In addition, each interval was screened in the field for chloride concentrations by a field EC meter. The complete geologic boring logs with PID and EC readings for borings and monitor wells installed or observed by HET are contained in Appendix D.

Soil samples were retained for laboratory analyses on one (1) foot (i.e., surface samples only) and two (2) foot intervals at the total depth (TD) of the boring, at the depth of the soil/water interface, if encountered, and/or at a depth in which field observations indicated the potential presence of constituents of concern from land surface to fifteen (15) feet BLS and from fifteen (15) feet BLS to the total depth of the borehole. All soil samples were properly containerized, labeled, chilled, and transported under chain-of-custody records to Waypoint Analytical, Inc. in Marrero, Louisiana, for the select analyses of the parameters listed below. Appropriate detection limits were obtained by laboratory personnel on all parameters for application to C&E Statewide Order 29-B or RECAP, as appropriate.

1. C&E Statewide Order 29-B parameters (EC/SAR/ESP/CEC, oil and grease, True Total Barium, and pH)

2. total chlorides and sulfates by EPA SW-846 Method 9056 and 29-B (Saturated Paste)

3. synthetic precipitation leachate procedure (SPLP) by Extraction Method 1312

4. metals by EPA SW-846 Method 6010D/7471A

5. alkalinity by 29-B (Saturated Paste)

6. percent moisture by Method 2540G

7. hydrocarbon fractions (volatile petroleum or extractable petroleum hydrocarbon ranges) in accordance with RECAP, Appendix D, Table D-1 by either the Massachusetts or TX 1006 Method

8. polycyclic aromatic hydrocarbons (PAH) by EPA SW-846 Method 8270D

Tables 1 and 2 contain analytical summaries of soil samples analyzed for Statewide Order 29-B and/or RECAP parameters, respectively, in the LAA, as well as delineation borings. Each of the above referenced tables summarizes data from all parties, including split sample results. Appendix D contains a copy of geologic boring logs for boreholes during this investigation.

4.0: ROOT ZONE INVESTIGATION

On January 28, 2025, HET performed a root zone investigation on portions of the Property. The investigation consisted of a visual site inspection; identification of site-specific plant species; characterization of soil types across portions of the Property; exposure of roots of select plant species by way of shovel; and evaluation of rooting depths. The investigation was conducted to determine the effective root zone depth of the representative agricultural and herbaceous vegetation to support assessment activities conducted on the Property.

During the investigation, traverses were made across portions of the Property to note vegetative transitions within the areas investigated. Upon documentation of the agricultural and herbaceous vegetation, five (5) rice stands, four (4) herbaceous stands, and one (1) shrub were analyzed during the investigation by excavating nine (9) core profiles and one (1) inspection trench via shovel to expose soil horizons and rooting depths in areas with minimal amount of historic disturbance to obtain an undisturbed result. An evaluation of near surface soils, vegetation, and root mass abundance was conducted for the core profiles, inspection trench, and hand augers to determine the site-specific effective root zone. Figure 17 depicts the root zone investigation locations.

4.1: Soil Classification

The soil at each investigation location was evaluated to determine specific soil properties relative to the soil classification system. Specific soil properties evaluated included, but were not limited to, the depth of each horizon, horizon classification, matrix color, and redoximorphic concentration or depletions (if applicable) with associated abundances and color contrasts, texture, concretions, and structure. In addition to these soil properties, the N-value, a measure of the soil firmness of each horizon, was determined by the “Squeeze Test” method, as necessary. Other soil properties that would impede root elongation or deter plant growth were also documented, including hydric soil, non-hydric soil, restrictive layers, disturbed soil horizons, buried horizons, etc. Upon review of all soil properties, the soil at each inspection location was classified under the USDA soil taxonomy system and correlated to the correct soil series name.

Based on soil properties and mapping data, the area investigated consisted of three (3) soil types, including the Crowley silt loam, the Crowley-Midland silt loam, and the Mowata silt loam. The Crowley series is classified as fine, smectitic, thermic Typic Albaqualfs; the Midland series is classified as fine, smectitic, thermic Chromic Vertic Epiaqualfs; and the Mowata series is classified as fine, smectitic, thermic Typic Glossaqualfs by the USDA. These soils, along with elevation, management practices, and hydrology, are directly related to the current plant species growing throughout the area investigated.

4.2: Vegetation Identification

The vegetation throughout portions of the Property was documented on HET Field Note Sheets, as well as HET Root Zone Data Forms, as applicable, using the species' common name at the time of the investigation. Scientific nomenclature and species-specific information for the vegetation observed was obtained upon completion of all field activities. Portions of the agricultural areas were utilized for rice (*Oryza sativa*) production (rice stubble present), with other portions left fallow (set-aside) containing herbaceous vegetation, including, but not limited to, Bermuda grass (*Cynodon dactylon*), Rush species (*Juncus sp.*), Common Panic Grass (*Panicum capillare*), Mexican-Devilweed (*Chloracantha spinosa*), Broom Sedge (*Carex tribuloides*), Green Flat Sedge (*Cyperus virens*), and Rattlebox (*Sesbania drummondii*). These areas also consisted of an immature, potentially invasive, woody species, including, but not limited to, Groundseltree (*Baccharis halimifolia*). The purpose of this investigation was to establish the site-specific effective root zone for the dominant species within the area investigated as possible restoration activities would target these select species.

4.3: Root Zone Interpretation

Rooting depths of different vegetative species vary due to several factors (soil type, hydrology, prior land usage, etc.); therefore, a site-specific root zone investigation is needed to determine the species' effective root zone. The effective root zone of a plant is the area within the soil that is essential for plant growth and maturation process. This area is not representative of the plant's deepest roots, rather, it is the location where the vast majority, approximately eighty (80) percent, of the roots reside. The effective root zone is imperative for the completion of the plant's life cycle as it is the area within the soil where the majority of the water from the soil water solution is extracted by the plant and the area where the most

available nutrients reside. The maximum root depth of a plant may be below the effective root zone. However, the maximum depth is not the area in which the plant takes up the vast majority of its nutrients, as noted above. The intent of this evaluation is to describe the root zone that is essential for plant growth, completion of the life cycle, and maturation process (i.e., effective root zone) as remedial and/or restoration activities typically target this distinct zone, if deemed appropriate.

Herbaceous and shrub root zones are described by noting and distinguishing the root mass abundances. The zones can be broken down into several different categories (abundant, many, common, sparse, very sparse, etc.), depending on the site location, vegetative species, and soil type. In areas where the root densities across the soil profile were high with thick root mat, the root mass abundance was considered "abundant." Areas where the root densities begin to decrease, yet still contain a considerable number of roots, were considered "many." When densities decreased with a dotted distribution of roots across the soil profile, the root mass abundance was considered "common." When the root densities across the soil profile were low and/or very low, the area was considered "sparse" and/or "very sparse." The effective root zone of a plant species takes into account areas that are documented as "abundant", "many", and "common" root mass abundances. This area is essential for the completion of a plant's life cycle. Site-specific root zones are described in the Root Zone Results section of this report.

4.4: Root Zone Results

The results of this investigation are concluded based on current site conditions. Rice location 1 (R-01) consisted of Cultivated Rice (*Oryza sativa*) that is located on the northeast portion of the Property. The soil profile at location R-01 was made up of Crowley silt loam. As shown in the photographs, the root distribution was abundant from zero (0) to one (1) inch, many from one (1) to three (3) inches, and common from three (3) to six (6) inches BLS. Below six (6) inches, the root distribution decreases with sparse from six (6) to nine (9) inches and very sparse to none from nine (9) to twenty (20) inches BLS. Based on field documented data obtained, the effective root zone for R-01 was determined to be approximately zero (0) to six (6) inches BLS.

Rice location 2 (R-02) consisted of Cultivated Rice (*Oryza sativa*) that is located on the northeast portion of the Property. The soil profile at location R-02 was made up of Crowley-Midland silt loam. As shown in the photographs, the root distribution was abundant from zero (0) to one (1) inch, many from one

(1) to three (3) inches, and common from three (3) to six (6) inches BLS. Below six (6) inches, the root distribution decreases with sparse from six (6) to nine (9) inches and very sparse to none from nine (9) to nineteen (19) inches BLS. Based on field documented data obtained, the effective root zone for R-02 was determined to be approximately zero (0) to six (6) inches BLS.

Rice location 3 (R-03) consisted of Cultivated Rice (*Oryza sativa*) that is located on the eastern portion of the Property. The soil profile at location R-03 was made up of Mowata silt loam. As shown in the photographs, the root distribution was abundant from zero (0) to 1.5 inches, many from 1.5 to 3.5 inches, and common from 3.5 to seven (7) inches BLS. Below seven (7) inches, the root distribution decreases with sparse from seven (7) to nine (9) inches and very sparse to none from nine (9) to sixteen (16) inches BLS. Based on field documented data obtained, the effective root zone for R-03 was determined to be approximately zero (0) to seven (7) inches BLS.

Rice location 4 (R-04) consisted of Cultivated Rice (*Oryza sativa*) that is located on the east-southeast portion of the Property. The soil profile at location R-04 was made up of Mowata silt loam. As shown in the photographs, the root distribution was abundant from zero (0) to one (1) inch, many from one (1) to three (3) inches, and common from three (3) to six (6) inches BLS. Below six (6) inches, the root distribution decreases with sparse from six (6) to eight (8) inches and very sparse to none from eight (8) to eighteen (18) inches BLS. Based on field documented data obtained, the effective root zone for R-04 was determined to be approximately zero (0) to six (6) inches BLS.

Rice location 5 (R-05) consisted of Cultivated Rice (*Oryza sativa*) that is located on the southeast portion of the Property. The soil profile at location R-05 was made up of Mowata silt loam. As shown in the photographs, the root distribution was abundant from zero (0) to 1.5 inches, many from 1.5 to 3.5 inches, and common from 3.5 to six (6) inches BLS. Below six (6) inches, the root distribution decreases with sparse from six (6) to nine (9) inches and very sparse to none from nine (9) to nineteen (19) inches BLS. Based on field documented data obtained, the effective root zone for R-05 was determined to be approximately zero (0) to six (6) inches BLS.

Herbaceous location 1 (H-01) consisted of a Rush species (*Juncus sp.*) that is located on the southeast portion of the Property. The soil profile at location H-01 was made up of Mowata silt loam. As shown in the photographs, the root distribution was abundant from zero (0) to two (2) inches, many from two (2) to four (4) inches, and common from four (4) to nine (9) inches BLS. Below nine (9) inches, the root

distribution decreases with sparse from nine (9) to fourteen (14) inches and very sparse to none from fourteen (14) to twenty-four (24) inches BLS. Based on field documented data obtained, the effective root zone for H-01 was determined to be approximately zero (0) to nine (9) inches BLS.

Herbaceous location 2 (H-02) consisted of Common Panic Grass (*Panicum capillare*) that is located on the southeast portion of the Property. The soil profile at location H-02 was made up of Mowata silt loam. As shown in the photographs, the root distribution was abundant from zero (0) to two (2) inches, many from two (2) to four (4) inches, and common from four (4) to eight (8) inches BLS. Below eight (8) inches, the root distribution decreases with sparse from eight (8) to eleven (11) inches and very sparse to none from eleven (11) to twenty-four (24) inches BLS. Based on field documented data obtained, the effective root zone for H-02 was determined to be approximately zero (0) to eight (8) inches BLS.

Herbaceous location 3 (H-03) consisted of Bermuda Grass (*Cynodon dactylon*) that is located on the southeast portion of the Property. The soil profile at location H-03 was made up of Mowata silt loam. As shown in the photographs, the root distribution was abundant from zero (0) to two (2) inches, many from two (2) to five (5) inches, and common from five (5) to nine (9) inches BLS. Below nine (9) inches, the root distribution decreases with sparse from nine (9) to twelve (12) inches and very sparse to none from twelve (12) to twenty-two (22) inches BLS. Based on field documented data obtained, the effective root zone for H-03 was determined to be approximately zero (0) to nine (9) inches BLS.

Herbaceous location 4 (H-04) consisted of Bermuda Grass (*Cynodon dactylon*) that is located on the southwest portion of the Property. The soil profile at location H-04 was made up of Crowley silt loam. As shown in the photographs, the root distribution was abundant from zero (0) to 1.5 inches, many from 1.5 to five (5) inches, and common from five (5) to nine (9) inches BLS. Below nine (9) inches, the root distribution decreases with sparse from nine (9) to thirteen (13) inches and very sparse to none from thirteen (13) to twenty-two (22) inches BLS. Based on field documented data obtained, the effective root zone for H-04 was determined to be approximately zero (0) to nine (9) inches BLS.

Shrub location 1 (S-01) consisted of a Groundseltree (*Baccharis halimifolia*) with Mexican-Devilweed (*Chloracantha spinosa*) that is located on the southeast portion of the Property. The soil profile at location S-01 was made up of Mowata silt loam. As shown in the photographs, the root distribution was abundant from zero (0) to two (2) inches, many from two (2) to four (4) inches, and common from four (4) to ten (10) inches BLS. Below ten (10) inches, the root distribution decreases with sparse from ten (10) to

thirteen (13) inches and very sparse to none from thirteen (13) to twenty-eight (28) inches BLS. Based on field documented data obtained, the effective root zone for S-01 was determined to be approximately zero (0) to ten (10) inches BLS.

Findings during the root zone investigation within the dominant vegetative communities exhibited shallow distributions of roots as summarized in Text Table 1 below. Effective root zones for the rice stands investigated ranged from zero (0) to seven (7) inches BLS, herbaceous stands ranged from zero (0) to nine (9) inches BLS, and the shrub ranged from zero (0) to ten (10) inches BLS. The vast majority of the roots found during the investigation were above six (6) inches below land surface. The vegetation observed on the Property appeared to be in very good condition, with excellent growth and reproduction observed, with the exception of the immediate vicinity of the flowline release. The effective root zones noted above should be taken into account during potential remedial and/or restoration planning, if any.

Text Table 1
Effective Root Zone (ERZ) of Select Species

Location ID	Common Name	Effective Root Zone (Inches)
R-01	Rice	0-6
R-02	Rice	0-6
R-03	Rice	0-7
R-04	Rice	0-6
R-05	Rice	0-6
H-01	Rush Species	0-9
H-02	Common Panic Grass	0-8
H-03	Bermuda Grass	0-9
H-04	Bermuda Grass	0-9
S-01	Groundseltree and Mexican-Devilweed	0-10

5.0: RESULTS OF THE INVESTIGATIONS

Based on a review of data generated during the investigations performed to date, the following results of the investigations are presented. All information obtained to date was considered in the evaluation of the data, including split sample results from the various consultants, as well as the overall geological settings of the Property. If additional data is collected, the following evaluation of data is subject to change. For reference purposes in the evaluation of data, Figure 5 illustrates the locations of all borings and monitor wells installed by HET and/or Southland. Tables 1 and 2 contain analytical summaries of soil samples analyzed for Statewide Order 29-B and/or RECAP parameters, respectively, in the LAA, as well as delineation borings. Figure N-1 in Appendix N contains a soil concentration map that depicts an initial screening of concentrations relative to Statewide Order 29-B and RECAP based on the data tabulated in the above referenced summary tables with regard to samples collected as part of Southland's investigation. Figure N-2 in Appendix N contains a soil concentration map that depicts an initial screening of concentrations relative to Statewide Order 29-B and RECAP based on the data tabulated in the above referenced summary tables with regard to samples collected as part of HET's delineation investigation.

This report presents the results of data collected within or in the immediate proximity of the LAA, as defined above in Section 1.2. Figure 5 illustrates the locations of all borings and monitor wells installed by all parties, including HET and Southland, during the litigation assessments conducted within the LAA to date.

5.1: Regulatory Framework Under Statewide Order 29-B

As mentioned above, the investigation conducted by HET was performed in accordance with applicable and appropriate regulations under the framework established under Statewide Order 29-B per the C&E regulations (LAC 43:XIX) which incorporate the Risk Evaluation/Corrective Action Program (RECAP), as promulgated by the LDEQ under the most recent guidance document dated October 20, 2003 (LAC 33:1 Chapter 13). The incorporation of regulatory standards was part of the overall assessment conducted to review natural tolerances and ensure that the Property could be used for its reasonably intended purposes, consistent with accepted standards of environmental site assessment and corrective action evaluation. Data were initially evaluated by comparison with Section 313 of Statewide Order 29-B

as a conservative reference and as per C&E policy. This information is provided for agency reference, with the following considerations upon review of the data set as a whole:

1. Surface concentrations of EC, SAR, and/or ESP considering upland criteria for the areas investigated were evaluated in accordance with Statewide Order 29-B, with SAR and ESP typically applied within the effective root zone only in support of vegetative growth, as established by the work performed by HET. Subsurface concentrations of EC were also evaluated in accordance with LAC 43:XIX.313 to demonstrate that chloride parameters assessed do not affect the overall conditions of the Property and are protective of subsurface water bearing zones as discussed further below.

2. Metal concentrations, with the exception of True Total Barium, were evaluated on a wet weight basis in accordance with the C&E memorandum dated November 20, 2007, and in accordance with the October 20, 2003, RECAP guidance document. Any metal results that were reported on a dry weight basis were converted to a wet weight basis as part of the HET's analysis for comparison to the regulatory standards.

3. Oil and grease concentrations as per the method in Statewide Order 29-B, as well as TPH by EPA SW-846 Method 8015B, may include non-target analytes, including a broad range of oils and minerals found in plant matter and other substances that do not pose a risk to human health. Additional analyses of the hydrocarbon fractions are more indicative of potential impact, noting that RECAP, Appendix D, requires the use of the hydrocarbon fraction analysis and further states that the hydrocarbon fraction analyses supersede the results of the total analyses, especially when the data differ.

4. Finally, concentrations of pH less than the Statewide Order 29-B standard of six (6) standard units were consistent with natural tolerances for soil types determined by the USDA.

5.2: Regulatory Framework Under RECAP

The utilization and application of RECAP standards were done after comparison of constituent concentrations to the Statewide Order 29-B, Chapter 3 pit closure standards (LAC 43:XIX.313.C) as part of the overall regulatory framework established by the C&E for the evaluation of sites under Statewide Order 29-B pursuant to LAC 43:XIX.313.D and 43:XIX.319, the second amended memorandum of understanding between the C&E and the LDEQ dated February 2023, and the provisions of Act 312 which incorporate the use of all appropriate regulations. The LDEQ RECAP document, under the most recently promulgated guidance document dated October 20, 2003, defines preliminary acceptable levels of compounds (screening standards) and site-specific standards to aid in determining more site-specific levels (management options), as appropriate, for potential constituents of concern (COC) in soil and groundwater in Louisiana. Each of the three (3) higher tiers of RECAP under Management Options 1 (MO-1), 2, (MO-2), and 3 (MO-3) requires additional and more rigorous assessment data than the previous tier to establish more site-specific standards and includes conservative assumptions to ensure that the goal of protection of human health and the environment is met. RECAP evaluates sites either under a non-industrial (residential) or industrial (commercial) exposure scenario, depending on the use of the Property.

Application of the industrial standards, if met, requires the filing of a conveyance notification to limit the use of the Property for commercial/industrial purposes only.

The LDEQ promulgated RECAP to develop conservative risk-based standards to establish clear and consistent guidelines across media-based program lines, properly evaluate risk to human health and the environment, and to determine whether remediation is warranted. The first tier is the Screening Option, which establishes screening standards to quickly and effectively determine whether additional assessment would be warranted as an overly conservative assessment. An exceedance of a screening standard does not mean that a threat to human health or the environment necessarily exists, and the screening standards are not intended to serve as the target remedial goals. The screening standard is determined by selecting the lowest of two (2) general exposure criteria, those being the protection of human health (Soil_SSni or Soil_SSi, depending on the use of the Property) and the protection of groundwater (Soil_SSgw). The screening option (SO) takes into consideration overly conservative certain assumptions and exposure criteria that are not met at the Property. First, the screening standards assume protection of a drinking water aquifer defined by RECAP in Section 2.10 as GW_1. Secondly, the screening standards assume a Hazard Index of 0.1 to account for potential additive health effects, when, in fact, the protection of a Hazard Index of 1.0 is appropriate under the higher tiers of RECAP. This basically equates to the assumption of ten (10) COCs targeting each organ which is not realized on the Property.

Furthermore, RECAP evaluates the non-traditional parameter of chlorides under Appendix D with the following considerations: 1) applicable or relevant and appropriate requirements, 2) protection of resource aesthetics, 3) environmental fate and transport pathways, 4) protection of vegetation, and 5) background conditions. Additional guidance published by LDEQ and approved on other sites by both agencies established methods to consider chloride concentrations in a typical risk assessment methodology as sodium chloride concentrations do not pose a threat to human health. Both sets of regulations, as promulgated by the C&E and LDEQ, as well as natural conditions, are taken into consideration by HET to evaluate site conditions.

The agriculturally derived standards of EC, SAR, and ESP are typically evaluated within the root zone for the ability to support vegetation growth, and restoration/analyses of ESP and SAR concentrations below the root zone are not appropriate. Additional evaluation of the root zone and the effect of chloride related parameters on vegetation was conducted by HET as documented in Section 4.0 above.

Subsurface concentrations of chloride are evaluated for protection of the Point of Exposure (POE), as defined by RECAP, either being the protection of groundwater or the nearest surface water body capable of receiving discharge after consideration of the additional risk assessment methodology promulgated under RECAP. Samples collected beneath the effective root zone during the course of the investigations were analyzed for total chlorides and electrical conductivity (EC), as well as SPLP analyses, to evaluate the potential for cross media transfer (soil to groundwater). Chloride, EC, and sodium concentrations are evaluated for the protection of the shallow water bearing zones by comparing constituent concentrations to the standard determined by conservatively multiplying the EPA secondary drinking water standard of 250 milligrams per liter (mg/L) for chlorides and sixty (60) mg/L for sodium by a default DAF of twenty (20) in accordance with RECAP. As a result, the concentrations of chloride-related parameters in the soil demonstrate that the subsurface concentrations of chloride and sodium are below the threshold considered to result in cross media transfer (soil to groundwater), particularly since the source has been mitigated and the concentrations are in declining conditions as defined by RECAP. Note that the SPLP analysis is considered the preferred method to evaluate the potential for cross media transfer by the regulatory agencies, including C&E and LDEQ, as compared to the Leachate Chloride parameter per the Statewide Order 29-B analysis.

5.3: Review of Soil Data Associated with the Limited Admission Area

Based on the regulatory framework established above by the C&E under Statewide Order 29-B, HET has evaluated all data obtained collected by HET and Southland. The following is a tiered evaluation under Statewide Order 29-B, Chapter 3 and then RECAP as a screening tool to determine the need for further evaluation under a higher tier of RECAP as part of the overall framework established by the C&E. Laboratory analytical results and field observations made during boring installation demonstrate that constituent concentrations have been vertically and horizontally delineated and meet the applicable standards in accordance with Statewide Order 29-B, Chapter 3 pit closure standards and/or RECAP standards as discussed below.

With regard to surface concentrations of EC, limited concentrations were reported in surface samples collected from soil borings SE-SB02, SE-SB06, SE-SB08, SE-SB13, SE-SB14, B-1, and B-5. All surface concentrations of EC have been horizontally delineated. Additionally, limited concentrations of ESP

and SAR were reported above the respective Statewide Order 29-B standards, with maximum surface concentrations of ESP at 61.6 percent (%) in soil boring SE-SB-06 and of SAR at 112 in soil boring SE-SB-06, both at a depth between land surface and two (2) feet BLS. Note that ESP and SAR concentrations are typically only evaluated within the effective root zone.

Furthermore, laboratory analytical results reported subsurface concentrations of EC above the Statewide Order 29-B upland standard of four (4) millimhos per centimeter (mmhos/cm) at approximate depths upward of sixty (60) feet below land surface (BLS). The maximum EC concentration was reported as 35.9 mmhos/cm at a depth of twelve (12) to fourteen (14) feet BLS in Southland boring SE-SB06. Elevated values have been vertically and horizontally defined and are limited to the south-central portion of the Property, in the vicinity of the produced water release. However, the depth of the EC concentrations significantly decreases within a short lateral distance from the release. As previously noted, the concentrations of EC have been vertically and horizontally delineated. Furthermore, the reported EC concentrations are confined to the surficial confining unit and do not extend to the Chicot aquifer. Finally, SPLP results demonstrate that the reported EC concentrations are below the threshold to result in cross-media transfer.

As an initial evaluation, all reported metal concentrations were determined to be below the Statewide Order 29-B, Chapter 3 standards, with the exception of arsenic concentrations in select soil samples at depth collected during installation of Southland soil boring SE-SB06. A maximum arsenic concentration of 12.7 mg/Kg was reported in the six (6) to eight (8) foot sample interval. Note that the elevated arsenic concentrations in Southland soil boring SE-SB06 were not confirmed in the split sample analyses and were unable to be reproduced in the collocated HET soil boring SE-SB-06R. Additionally, arsenic has been demonstrated to be naturally occurring in soils throughout Louisiana according to a study performed by Ori, et al. (1993). Total arsenic concentrations for soils of the coastal prairies at depths from zero (0) to seventy-two (72) centimeters (cm) below surface ranged from 4.5 to 46.5 mg/Kg, with a mean arsenic concentration of 18.3 mg/Kg. Therefore, HET elected to perform an evaluation of arsenic concentrations at the site based on the arithmetic average of reported arsenic concentrations to determine the area of investigation concentration (AOIC) in accordance with LDEQ guidance. Based on the average calculation, an arsenic concentration of 4.06 mg/Kg serves as the AOIC for comparison purposes to the RECAP standard. Note that HET utilized all arsenic data collected to date to calculate the AOIC as a

conservative method, including the split sample and reproduction boring results. Based on a review of the data collected to date and in consideration of the reproduction data, HET has determined that current constituent concentrations of arsenic do not correlate with other constituents typically associated with oilfield activities, are within natural tolerances, and meet the applicable regulatory standard under RECAP.

With regard to hydrocarbons, all concentrations of hydrocarbons were reported below the respective RECAP screening standards for the aliphatic and aromatic hydrocarbon fractions. All concentrations of the indicator compounds of PAH were also reported well below the respective RECAP screening standards.

Based on the tiered approach that considers concentrations in order from Statewide Order 29-B, Chapter 3, and RECAP, all constituent concentrations in the soil have been demonstrated to meet applicable standards in accordance with Statewide Order 29-B, Chapter 3 and RECAP considering further analyses and/or SPLP results. The concentrations of EC in the surface soils within the HET determined effective root zone support the intended agricultural use of the Property, with the exception of isolated areas subject to the proposed remediation. As a result, HET has developed a surface remediation plan that includes targeted surface excavation at the source of the release and application of amendments in surrounding areas to support the intended agricultural use of the release area. Figure 18 illustrates the extent of targeted soil excavation and/or surface amendments. Appendix O presents the associated costs for the proposed soil remediation by HET.

6.0: SUMMARY OF FINDINGS TO BE ADDRESSED BY A PLAN

The investigations performed to date have appropriately characterized the environmental conditions of the Property and definitively determined the horizontal and vertical extents of constituent concentrations above the Statewide Order 29-B and RECAP standards. The data generated to date are more than sufficient to determine the most feasible plan for evaluation and remediation of the LAA. Furthermore, the evaluations of all data generated to date by HET have confirmed that all constituent concentrations meet appropriate human health and ecological risk assessment standards.

The following sections of this document reflect the consideration of the necessity of remediation, or lack thereof, proposed for the release area within the LAA. This document then presents and considers potential remedial options and recommends the most feasible plan for remediation, if necessary. Appendix P contains references in support of the conclusions and findings of this report.

7.0: MOST FEASIBLE PLAN

Before deciding whether remedial options should be considered, Louisiana Revised Statute 30:29 provides for creation, when necessary, of the most feasible plan for evaluation to determine the necessity and scope of remediation. As documented in the foregoing discussion, constituent concentrations have been fully evaluated within and adjacent to the LAA. As a result, the extent of salt and metal-related exceedances of Statewide Order 29-B parameters has been appropriately characterized, and the horizontal and vertical extents have been delineated to the applicable standards presented in Section 6.0 above in support of the risk assessment. Additional details and costs are presented in Appendix O.

With respect to the soil associated with the LAA, HET proposes to conduct soil remediation of surface soils via targeted soil excavation and off-site disposal of scarred surfaces combined with the application of soil amendments to portions of the agricultural ponds near the release. Additional remediation activities may include, but are not limited to, slurrying, contouring, and leveling of the three (3) fallow ponds. The options listed below were considered in the process of determination of the most feasible plan.

7.1: Option 1: Excavation of Soil

Excavation of soil was considered in part or as a whole to address constituent concentrations identified during the course of the investigations. HET considered excavation as the first option to determine the most feasible course of action for the site. Evaluation of the constituent concentrations does not demonstrate a need for large scale removal of environmental media as (a) subsurface constituent concentrations meet the appropriate and applicable standards, (b) there are no limitations to the potential uses of the Property, and (c) constituent concentrations are not a threat to human health or the environment upon completion of implementation of the MFP.

Excavation as the remediation option is typically a last resort by the EPA as it causes the most disruption on-site, requires the use of landfill space, and results in damage to another property, which would be used as a source of backfill material. This option is not recommended due to its large, wasteful, and invasive scope and costs, in addition to the fact that the concentrations detected in the subsurface soil do not affect the overall use of the Property and concentrations meet applicable risk assessment standards.

However, targeted source removal via excavation of scarred surface soils in the immediate vicinity of the line leak is feasible in combination of soil mixing and blending and the application of chemical amendments as described below to reduce overall remediation time frames.

7.2: Option 2: Remediation of Surface Soils

As part of this Limited Admission, remediation of surface soils via targeted soil excavation and off-site disposal of limited scarred surfaces, combined with soil mixing and blending and the application of soil amendments to portions of the agricultural ponds near the release, is considered the most feasible plan to address constituent concentrations within the LAA identified during the investigations. The soil mixing and blending option is often enhanced by the use of off-site inert backfill and the application of soil amendments to achieve compliance with regulatory standards.

This option would allow for the consideration of all appropriate regulatory standards as part of the overall framework of Statewide Order 29-B and allow for the scarred surfaces within the LAA to be used as farmland. The soil subject to remediation would be limited to elevated ESP and SAR concentrations in the LAA within the effective root zone as described above in Section 4.0. The cost for soil remediation would be approximately $286,673.

7.3: Option 3: No Further Action

As part of this Limited Admission, no further action is not considered a viable alternative for soil remediation as this process does not consider potential reduction in rice crop yields in select areas of the line leak area. Note that a vast majority of the Property showed no areas of stained surfaces or areas of distressed vegetation during the course of the investigation, with the exception of the immediate vicinity of the flowline release.

7.4: Soil Remedy Selection

Based on the alternatives considered above, targeted soil excavation and off-site disposal of surface scarred areas, combined with soil mixing and blending and the application of surface amendments, is the most efficient and feasible plan for the site. This option supports the conclusion that subsurface concentrations meet applicable risk assessment standards and support the current uses for the Property

as farmland. Furthermore, the results are in declining conditions, all subsurface concentrations meet applicable comparative standards that allow for protection of groundwater, and the risk assessment confirms that constituent concentrations are not a threat to human health or the environment.

8.0: FINAL RECOMMENDATION, TIMEFRAME, AND ESTIMATED COSTS

The most feasible plan to address environmental media for compliance with applicable regulatory standards at the Property is soil remediation of surface soils based on the fact that all constituent concentrations meet the applicable risk assessment standards, and concentrations are not affecting the surface vegetation, with the exception of the immediate vicinity of the flowline release. This plan does not change the conclusions of the risk assessment as concentrations have been demonstrated to be in declining conditions in accordance with RECAP.

HET estimates that it can begin implementing the work called for in this Plan within ninety (90) days of adoption of the Most Feasible Plan. A written report will be formulated and submitted to the C&E within ninety (90) days of completing the soil remediation activities. The report will include complete documentation of the remediation activities and current site conditions. The report will be structured to include a summary of all field activities and will include all documentation necessary to petition the C&E for site closure as appropriate based on a review of the data. Text Table 2 on the following page contains a list of itemized costs associated with surface soil remediation activities. Appendix O contains a copy of the estimates prepared/obtained by HET.

Text Table 2
Costs for Surface Soil Remediation
Danny Paul Gastal Property
Morse Oil and Gas Field

Proposed Remediation Option	Proposed Cost Estimates
Remedial Activities: Excavation	$57,758.00
Remedial Activities: Soil Amendments	$199,220.80
HET Safety Management, Project Management, and Reporting Requirements	$29,695.00
Total Estimated Cost	$286,673.80

ATTORNEY CERTIFICATION

I, Douglas Longman, have reviewed the information submitted herewith and hereby attest that to the best of my knowledge, information, and belief it is true and correct and is based on scientific data that has been obtained in a manner compliant with all applicable regulations.

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