

# Historic Oil & Gas Operations of British American Oil Producing Company & Gulf Oil Company

**BAYOU CHOCTAW FIELD  
(WEST BATON ROUGE PARISH, LOUISIANA)**

**FEBRUARY 6, 2025**

**Prepared for:**

**Chevron USA Inc.**

**Northstar Exploration Company**

A Registered Professional Engineering Company  
P.O. Box 5-A Lafayette, Louisiana 70505  
(337) 233-0830 Fax (337) 233-9772

Prepared By:

*Richard Kennedy*

Richard K. Kennedy, P.E.  
Petroleum Engineer



## Table of Contents

1.0 Introduction.....	4
2.0 Bayou Choctaw Oil and Gas Field.....	4
3.0 Industrial Development of Bayou Choctaw Salt Dome.....	5
4.0 Description of the Property.....	6
5.0 Oil Gas & Mineral Leasing on the Property.....	6
6.0 Oil and Gas Operations on the Property.....	7
6.1 Louis J. Roussel Oil Company.....	7
6.2 Operations on the Property Under the 1950 Lease.....	7
6.3 Other Oil and Gas Operations on the Property.....	11
6.4 Operators of the Levert B #1 SWD Well.....	12
6.5 Operators Off the Property With Potential Impacts.....	13
7.0 Site Inspection.....	14
7.1 Remaining Wells and Equipment on the Property.....	14
8.0 Review of Aerial Images.....	15
8.1 1941.....	15
8.2 1952.....	15
8.3 1959.....	15
8.4 1962.....	16
8.5 1968.....	16
8.6 1973.....	16
8.7 1975.....	16
8.8 1978.....	16
8.9 1983.....	16
8.10 1989.....	17
9.0 Pits.....	17
9.1 Reserve Pits.....	17
9.2 Production Pits.....	17
10.0 Water Production and Disposition.....	18
11.0 Inspections and Compliance.....	19
11.1 Inspections and Compliance – BAOP.....	19
11.2 Inspections and Compliance – Gulf, Precise and Brock.....	20
11.3 Inspections and Compliance – Other Operators.....	20
12.0 Louisiana Stream Control Commission.....	20
13.0 Louisiana Department of Environmental Quality.....	20
14.0 Environmental Site Assessment.....	20
15.0 Regulations Affecting Louisiana Oil and Gas Exploration and Production.....	21

15.1 Louisiana Conservation Commission .....	21
15.2 Louisiana Department of Conservation .....	22
15.3 Oil and Gas Statewide Orders .....	24
15.4 Louisiana Department of Natural Resources .....	25
15.5 Louisiana Stream Control Commission .....	27
15.6 Federal Environmental Regulations .....	28
15.7 State Environmental Regulations .....	29
16.0 General Historical Industry SWD Review .....	29
17.0 Plaintiff's Expert Report Comments .....	33
17.1 Charles Norman .....	33
17.2 ICON Environmental Services.....	40
18.0 Summary Opinions and Conclusions .....	41
19.0 Closing Remarks .....	42

## 1.0 Introduction

The following report concerns certain aspects of the matter **Paul M. Levert et al versus Union Texas International Corporation et al**. In particular, this report deals with oil and gas operations conducted on the Levert property (“the Property”). The Property is within the Bayou Choctaw Oil and Gas field. Oil and gas operations began on the Property in 1949. I have been retained by Chevron U.S.A.

The Property is in southwestern West Baton Rouge Parish approximately 9 ½ miles southwest of Port Allen, Louisiana and is described in the plaintiff’s petition as:

*“That certain tract of land situated in the Parish of West Baton Rouge, State of Louisiana, and being the Southeast Quarter (SE/4) of Section 28, Township Eight South (T8S), Range Eleven East (R11E), containing 160 acres.”*

ICON Environmental Services (“ICON”) has identified areas on the Property that it alleges have soil and groundwater contamination. The following plaintiff expert reports have been reviewed for which comments are included: ICON dated July 19, 2024 and Charles Norman dated August 9, 2024.

The information and data that has been provided to date is listed on Attachment “A” of this report. The following comments are based on the information and data reviewed to date, and my education, training and experience.

## 2.0 Bayou Choctaw Oil and Gas Field

The Bayou Choctaw shallow piercement salt dome was discovered in 1926 with seismic. The salt dome is located in northern Iberville Parish near the parish line with West Baton Rouge Parish. Hydrocarbons were discovered in 1931 by Standard Oil Company of Louisiana with the drilling of the Gay #1. Subsequent drilling found oil and gas deposits in faulted reservoirs around the flanks of the salt dome. The oil and gas deposits were trapped in steeply dipping Miocene and Oligocene sands.

Oil and gas operators in the Bayou Choctaw field included Gulf Oil Corporation, The Texas Company, Carter Oil Company, Freeport Oil Company and Temple Hargrove as well as numerous small companies. Temple Hargrove held various oil, gas and mineral leases and discovered oil and gas in the Bayou Choctaw field in 1951 and 1952. The properties were the E.B. Schwing property located on the west flank of the salt dome; the Morley Cypress property located on the north flank; and the Levert property located on the northeast flank. British American Oil Producing Company bought the properties of Temple Hargrove in 1957. The properties included leases, wells and equipment located in the Bayou Choctaw field. Gulf Oil Corporation bought British American Oil Producing Company and became the operator of the wells on the Property on August 1, 1966.

Louisiana Department of Natural Resources – Office of Conservation (“LDNR-OC”) information shows that over 400 serial numbers have been issued for the Bayou Choctaw field and the field has produced 31.2 million barrels of oil and condensate and 32.1 billion cubic feet of natural gas.

### **3.0 Industrial Development of Bayou Choctaw Salt Dome**

The crest of the Bayou Choctaw salt dome covers approximately 200 acres in Sections 52 and 53, T9S, R11E in Iberville Parish. The caprock of the salt dome is 400’ to 450’ of the below ground surface with salt found at approximately 600’ to 700’ below ground surface. Beginning in 1937, Solvay Process Company (“Solvay”) began drilling brine wells into the Bayou Choctaw salt dome. The brine was used as feedstock for nearby chemical plants. Solvay, whose United States division was later absorbed into Allied Chemical Corporation, obtained the brine by leaching caverns in the salt. Solvay’s Cavern Well #7 collapsed in 1954 and created a 12 acre lake (“Cavern Lake”) which is located approximately 2,500’ west-southwest of the Property. Allied Chemical Corporation bought Union Texas Natural Gas in 1962 which later became Union Texas Petroleum (“Union Texas”). Union Texas began ethylene gas storage in the salt caverns in 1967. When needed, the ethylene is withdrawn from storage caverns by displacing with higher-density brine. Boardwalk Louisiana Midstream, LLC is the current operator of the gas storage caverns. The ethylene storage site is located less than ½ mile south of the Property and one of its brine disposal wells is located on the Property.

In 1976, the Department of Energy (“DOE”) purchased 11 salt caverns from Union Texas for oil storage. The DOE converted the caverns to oil storage for its Strategic Petroleum Reserve (“SPR”) program. The Bayou Choctaw SPR has the capacity to store approximately 100 million barrels of oil and is currently active. The Bayou Choctaw SPR site is located approximately ½ mile south of the Property.

Sid Richardson Carbon constructed a carbon black plant in 1970 at a site located approximately one mile east of the Property. The plant uses hydrocarbons as feedstock that is processed in carbon black. The carbon black plant is currently owned and operated by Tokai Carbon.

Multiple pipelines exist throughout the Bayou Choctaw field. The pipelines transport various hydrocarbons, hydrocarbon products and brine. Pipelines through the Property include an ExxonMobil hydrocarbon liquids line and a brine disposal pipeline operated by Boardwalk Louisiana Midstream.

The Port Allen Canal, an extension of the Intracoastal Waterway, is less than a quarter mile to the west of the Bayou Choctaw field. Tributaries to the Port Allen Canal include Choctaw Bayou, Bull Bay, Bayou Bourbeaux, and manmade canals constructed in the field.

#### 4.0 Description of the Property

The Levert property in this matter consist of approximately 160 acres located in the southeast quarter of Section 28 T8S R11E. The Property was historically part of the St. Delphine Plantation. The Property is described by ICON as mostly backswamp deposits and is on the eastern margin of the Atchafalaya Basin. Topographic maps show that the Property's elevation decreases to the west. Bayou Bourbeaux is located approximately ¼ mile to the west and flows into manmade canals and the Intracoastal Waterway.

#### 5.0 Oil Gas & Mineral Leasing on the Property

The 160-acre Property was subject to an oil, gas and mineral lease dated November 18, 1950 ("1950 lease"). The lessors of the 1950 lease were multiple Levert heirs of the 160-acre tract and the lessee was Temple Hargrove. The 1950 lease granted the lessee rights *"for the purposes of investigating, exploring, prospecting, drilling and mining for and producing oil, gas and all other minerals, laying pipe lines, building tanks, power stations, telephone lines, and other structures thereon to produce, save, take care of, treat, transport and own said products and for dredging and maintaining canals, constructing roads and bridges, and building houses for its employees, and, in general, for all appliances, structures, equipment, servitudes and privileges which may be necessary, useful or convenient to or in connection with any such operations conducted by lessee thereon, or on any adjacent lands"* The 1950 lease did not contain a damage or restoration clause. The rights, title and interest of Temple Hargrove and other assignees were eventually assigned to British American Oil Producing Company ("BAOP"). By January 1958, BAOP held a 100% interest in the 1950 lease in the 40-acre tract comprising the southwest quarter of the Property and a 75% interest in the remaining 120 acres of the Property. The remaining 25% interest in the 120-acre tract was held by Ashland Oil & Refining Company. BAOP assigned all its rights, title and interest in the 1950 lease to Gulf Oil Corporation ("Gulf") effective July 1, 1966. Gulf released 80 acres in November 1967. The remainder of Gulf's interest was assigned to Precise Exploration Corporation on November 1, 1972. Subsequent assignees included Brock Exploration Corporation, Meenan Oil Company, James H. Bible, et al, and Liberty Oil and Gas Corporation ("Liberty"). Liberty released the remainder of the 1950 lease on June 23, 1984.

On February 11, 1981, Liberty assigned the right, title and interest in and to the Levert Heirs B #1 to Union Texas. The assignment was for the well bore only.

## **6.0 Oil and Gas Operations on the Property**

Oil and gas operations began on the Property in 1949. Initial oil and gas production began in 1952. LDNR-OC information shows that the last reported production on the Property was in December 1977. A total of twelve LDNR-OC serial numbers have been issued for the 160-acre area that encompasses the Property. The twelve serial numbers include four producing wells of which two were completed as dual producers. One of the wells was converted to a brine water injection well and is currently active on the Property.

In addition to the twelve serial numbers issued on the Property, four serial numbers were issued immediately north of the Property. Three wells were drilled as dry holes and one well was drilled and completed as a producer that was later converted to a brine water injection well. The wells located north of the Property utilized roads through the Property and the producing/injection well likely utilized flowlines on the Property.

### **6.1 Louis J. Roussel Oil Company**

Louis J. Roussel Oil Company (“Roussel”) drilled the first well on the Property in 1949. The well was the Levert Land Company #1, serial number (SN) 37734 and was permitted at a location 230’ north and 1,640’ west of the southeast corner of Section 28. Roussel built a well pad approximately 200’ by 200’ using adjacent soil that created borrow pits. A short road (approximately 30’) allowed access to the site from State Route 1148.

Roussel’s well was spudded on March 28, 1949 and drilled to a total depth (TD) of 8,485’. The well was tested at unknown rates but ultimately determined to be noncommercial and plugged and abandoned on September 22, 1949

### **6.2 Operations on the Property Under the 1950 Lease**

Temple Hargrove obtained the 1950 oil gas and mineral lease on the 160-acre Property after the Roussel – Levert Land Company #1 was drilled and plugged.

#### **6.2.1 Temple Hargrove et al**

Temple Hargrove drilled the Levert Heirs #1 (SN 44428) on the Property in 1951. The well’s surface location was 330’ north and 330’ east of the of the southwest corner of the southeast quarter of Section 28. An elevated well pad and road were built to the site with a reserve pit east of the well pad. The well was spudded on November 16, 1951 and drilled to a TD of 8,508’. The well was constructed with 16”, 55 pound per foot (ppf) conductor casing run to 96’ and cemented with 113 sacks; 10-3/4”, 40.5 ppf surface casing cemented at 1,589’ with 500 sacks; and 7”, 23 and 26 ppf production casing

cemented at 8,082' with 500 sacks. Temple Hargrove perforated the well from 7,937' to 7,954' and tested it at a rate of 228 barrels oil per day ("BO/day"), 205 thousand cubic feet gas per day ("Mcf/day"), and 0.1% basic sediment and water ("BS&W"). Temple Hargrove built a tank battery south of the well and near State Route 1148. Between January 1952 and March 1956, the completion made 204,910 BO.

In March 1956, Temple Hargrove recompleted the well by cementing off the completion and perforating from 7,885' to 7,891'. The recompletion had an initial test of 106 BO/day, 58.5 Mcf/day and 0.1% BS&W. Between March 1956 and April 1959, the completion made 73,947 BO.

## **6.2.2 British American Oil Producing Company**

British American Oil Producing Company became the assignee of the 1950 lease on the Property and the operator of Temple Hargrove's Levert Heirs #1 on May 16, 1957. BAOP drilled an additional three wells on the Property. Two of the wells were productive and one well was a dry hole. The two productive wells were completed as dual wells. BAOP operated three tank batteries on the Property.

### **6.2.2.1 Levert Heirs B #1 and #1D**

BAOP spudded its first well on the Property on October 15, 1957 at a location 1,300' north and 2,200' west of the southeast corner of Section 28 or approximately 1,000' north of the Temple Hargrove drilled Levert Heirs #1. BAOP extended the road from the Levert Heirs #1 north and built a well pad for the new well which was designated the Levert Heirs B #1 (SN 68122). The well was drilled to a TD of 9,777'. BAOP constructed the well with 20", 53.9 ppf conductor casing run to 124.48' and cemented with 250 sacks; 13-3/8", 54.5 ppf surface casing run to 2,137.78' and cemented with 2,000 sacks; and 9-5/8", 47 and 53.5 ppf production casing run to 9,484.27' and cemented with 1,000 sacks. The well was initially completed at perforations from 9,414' to 9,418' and tested at 129 BO/day, 300 Mcf/day and no water. BAOP constructed a tank battery for the Levert Heirs B #1.

In August 1959, BAOP worked on the Levert Heirs B #1 and created a dual completion. A zone at perforation 9,372' to 9,383' was completed and tested at a rate of 100 BO/day, 630 Mcf/day and 0.1% BS&W. The LDNR-OC designated the perforations at 9,372' to 9,383' as the Levert Heirs B #1D and assigned it serial number 76522.

### **6.2.2.2 Levert Heirs C #1 and #1D**

BAOP drilled the Levert Heirs C #1 (SN 69635) in April 1958 at a location of 840' north and 1,410' west of the southeast corner of Section 28 or approximately 900' southeast of the Levert Heirs B

#1. BAOP constructed a road from near the Levert Heirs B #1 to the “C” well location. The Levert Heirs C #1 was drilled to a TD of 9,904’ and constructed with a 16”, 42.8 ppf conductor casing run to 115’ and cemented with 200 sacks; 10-3/4”, 40.5 ppf surface casing run to 1991’ and cemented with 1,770 sacks; and 7”, 26 and 29 ppf production casing run to 9,616’ and cemented with 500 sacks. The well was completed as a dual. The Levert Heirs C #1 completion was from perforations 9,524’ to 9,550’ and tested at 125 BO/day, 71 Mcf/day and 0.1% BS&W. The C #1 retained the original well serial number. The Levert Heirs C #1D completion was from perforations 9,476’ to 9,495’ and was tested at a rate of 98 BO/day, 60.27 Mcf/day and no water. The C #1D completion was assigned the serial number 70947. BAOP constructed a tank battery for the well approximately 400’ west of the well.

#### **6.2.2.3 Levert Heirs D #1**

BAOP spudded the Levert Heirs D #1 (SN 73467) on January 28, 1959 at a location 330’ north and 1,095’ west of the southeast corner of Section 28. The well pad was accessed by a road from State Route 1148. The well was drilled to a TD of 9,508’ and was determined to be a dry hole. The Levert Heirs D #1 was constructed with a 16”, 40.8 ppf conductor run to 119’ and cemented with 175 sacks and a 10-3/4”, 40.5 ppf surface casing run to 2,020’ and cemented with 1,770 sacks. The well was plugged and abandoned on March 5, 1959 with a 100 sack cement plug from 1,919’ to 2,119’ and a 25 sack cement plug from 40’ to 90’. A 10.9 pound per gallon drilling mud was left in the well.

#### **6.2.2.4 Levert Heirs #1**

During April 1959, the Levert Heirs #1 wellbore (SN 44428) was junked during a workover operation. BAOP began sidetracking the well in May 1959, however, the drill pipe became stuck causing a second sidetrack. The sidetrack hole was drilled to 8,200’ and a 5”, 18 ppf casing liner was cemented in place at 8,186’ with 150 sacks. The new well bore was perforated from 8,119’ to 8,123’ and tested at a rate of 600 Mcf/day, no oil and 0.1% BS&W. After producing 593,000 Mcf and 2,790 BO from the completion, BAOP recompleted the well to perforations from 7,971’ to 7,979’ in September 1961. The new completion had an initial test rate of 113 BO/day, no measured gas and 0.1% BS&W. In August 1964, BAOP worked over the well and attempted a gravel pack. The workover failed and the well was temporarily shut in. The zone at 7,971’ had produced 69,130 BO by that time. A workover began in February 1965 and the well was eventually restored to production in May 1965 at perforations from 7,556’ to 7,564’ at an initial test rate of 81 BO/day, no measured gas and 0.1% BS&W. The completion at 7,556’ only produced 5,600 BO. LDNR-OC information shows that the Levert Heirs #1 last produced in December 1965. BAOP plugged and abandoned the Levert Heirs #1

on June 2, 1966. BAOP pulled 1,560' of 7" casing and then set cement plugs from 7,000' to 7,100'; 1,485' to 1,635'; and surface to 25'. A 9.2 ppg fluid was left in the wellbore and the casings were cut 3' below ground level with a steel plate welded on top.

### **6.2.3 Gulf Oil Corporation**

Gulf Oil Corporation became the operator of BAOP's wells on the Property on August 1, 1966. At that time the Levert Heirs B #1 was shut in and the B #1D was producing approximately 100 BO/day. The Levert Heirs C #1 was not producing when Gulf became the operator but the C #1D was producing approximately 10 BO/day. A workover was performed on the Levert Heirs C #1/1D during October 1966 and production was restored on the C #1. The C #1 was temporarily abandoned by February 1967 and the well was recompleted in May 1967 with only the C #1D producing. The C #1D was shut in by January 1971 and Gulf temporarily abandoned the well bore.

### **6.2.4 Precise Exploration Corp.**

Precise Exploration Corporation ("Precise") became the operator of the Gulf wells on the Property on December 8, 1972. At that time the only well producing was the Levert Heirs B #1D (SN 76522). The Levert Heirs B #1 (SN 68122) and the Levert Heirs C #s 1/1D (SNs 69635/70947) were temporarily abandoned and did not produce during the time Precise operated on the Property.

### **6.2.5 Brock Exploration Company**

Brock Exploration Corporation ("Brock") became operator of the Precise wells on October 9, 1973. The wells taken over by Brock were the Levert Heirs B #s 1/1D and the Levert Heirs C #s 1/1D. The Levert Heirs B #1D was the only producing well on the Property at that time. Brock plugged and abandoned the Levert Heirs C #1/1D on July 11, 1974.

Brock spudded a new well, its Levert Heirs #2 (SN 144260), on April 18, 1974 at a location on the Property 735' east and 330' north of the southwest corner of the southeast quarter of Section 28. Brock accessed the well location by building a 600'± elevated road south from the existing road originally built for the Levert Heirs C #1. The well pad for Brock's Levert Heirs #2 was also elevated and measured approximately 300' by 150'. Brock's Levert Heirs #2 was drilled to a TD of 9,215' and completed as a producer. The well's initial test was 12 BO/day, 99 Mcf/day and 88% BS&W. LDNR-OC documents show that Brock shut-in both the Levert Heirs B #1D and the Levert Heirs #2 in December 1977.

### **6.2.6 J.H. Bible and G.M Goldman**

J.H. Bible and G.M Goldman (“Bible”) became the operator of Brock’s Levert Heirs B #1 well bore and Levert Heirs #2 on August 1, 1978. Neither well was produced during the time Bible operated on the Property.

### **6.2.7 Memaca Petroleum Corporation**

Memaca Petroleum Corporation (“Memaca”) became the operator of Bible’s Levert Heirs B #1 and Levert Heirs #2 on December 1, 1979. Memaca reported the wells’ status as productive (LDNR-OC status code 10), however, neither well has any reported production volumes.

### **6.2.8 B&G Producers, Inc.**

B&G Producers, Inc. (“B&G”) became the operator of Memaca’s Levert Heirs B #1 and Levert Heirs #2 on September 1, 1980. B&G also reported the wells’ status as productive (LDNR-OC status code 10), however, neither well has any reported production volumes.

### **6.2.9 Liberty Oil and Gas Corp.**

Liberty Oil and Gas Corp. (“Liberty”) became the owner of B&G’s interest in September 1980. In February 1981, Liberty sold the Levert Heirs B #1 well bore to Union Texas Petroleum Corp. to be used as a salt water disposal well. Liberty plugged and abandoned the Levert Heirs #2 on April 19, 1984.

## **6.3 Other Oil and Gas Operations on the Property**

Besides Louis J. Roussel’s well drilled in 1949, additional oil and gas operations were performed that were not subject to the 1950 lease. The additional oil and gas operations consist of wells that were drilled and resulted in dry holes.

### **6.3.1 Penton-Sohio-Southwest Gas**

Penton-Sohio-Southwest Gas spudded the Levert, et al #1 (SN 124657) on June 12, 1968. The well’s location was 1,820’ north and 330’ west of the southeast corner of Section 28 and on the Property. The well was drilled to a TD of 9,917’ and plugged and abandoned as a dry hole.

### **6.3.2 Quality Petroleum Corp.**

Quality Petroleum Corp. (“Quality”) obtained a LDNR-OC permit on June 29, 1987 to re-enter the plugged and abandoned Levert Heirs C #1. The re-entry well retained its original name, Levert

Heirs C #1, but was assigned a new serial number by the LDNR-OC, 206248. Quality began work on the re-entry during September 1987. LDNR-OC information shows that work was suspended by October 9, 1987 at a depth of 9,441'. The LDNR-OC inspected the well site on October 23, 1989 and documented the inspection with a lease facility inspection report (LFIR). The 1989 inspection showed that a tree was on the well and a tank was on the location but the well was not producing. The tree was not connected to a flowline. A later inspection performed on September 17, 1991 showed that nothing had changed at the well site. Both LDNR-OC inspections showed no signs of discharge of oilfield waste and no existent pit. The well was later placed in the state's orphan well program and has not been plugged and abandoned at this time. Orphan oilfield site inspections performed on March 4, 2009; March 8, 2013; December 8, 2014; January 29, 2015; October 5, 2016; January 23, 2017; March 5, 2021; and October 20, 2021 did not find any signs of oilfield waste discharge or record any existent pit.

### **6.3.3 Quest Exploration, LLC**

Quest Exploration, LLC ("Quest") drilled its Levert #1 (SN 234756) at a location 1,868' north and 2,447' west of the southeast corner of Section 28. Quest built the well pad approximately 500' north of the Levert Heirs B #1 and extended the road north. The well was spudded on April 13, 2007 and drilled to 9,105'. The well was a dry hole and plugged and abandoned.

### **6.4 Operators of the Levert B #1 SWD Well**

On January 23, 1981, Union Texas Petroleum Corp. ("UTPC") entered into a lease agreement with Levert property owners. The lease allowed UTPC access to the lessor's surface and subsurface of the east half of Section 28. UTPC became the operator of the Levert Heirs B #1 and 1D (SNs 68122 and 76522) on February 1, 1981. By then, the well bore had reverted to a single completion. UTPC converted the well bore to a salt water disposal (SWD) well in April 1981 and it was used in conjunction with UTPC's petroleum products storage caverns which were located off the Property. UTPC's SWD well retained the serial number 76522 and was eventually renamed Levert Heirs B Brine Disposal #1. LDNR-OC information shows subsequent operators as: Union Texas Products Corp. from May 1, 1987 to May 1, 1997; Union Texas Petrochem Corp. from May 1, 1997 to September 1, 1999; Williams Olefins, LLC from September 1, 1999 to November 1, 2004; Petrologistics Olefins, LLC from November 1, 2004 to December 16, 2008; PL Olefins, LLC from December 16, 2008 to May 2, 2011; PL Midstream, LLC from May 2, 2011 to October 16, 2012; and Boardwalk Louisiana Midstream, LLC. ("Boardwalk") beginning October 16, 2012. Boardwalk is the current operator of record.

After its conversion to a SWD well, the LDNR-OC classified UTPC's Levert Heirs B #1 as Class II 5 (disposal well for produced salt water). On November 1, 2004 the classification was changed to Class II 5-SC (SWD for salt cavern). The SWD well is currently shown by LDNR-OC as active.

## **6.5 Operators Off the Property With Potential Impacts**

### **6.5.1 Ladd Petroleum Corporation**

Ladd Petroleum Corporation (Ladd) drilled its Howell Levert #1 (SN 156730) during November 1977. The well was located approximately 3,200' north of the Property. Access to Ladd's well site was through an extension of an existing road through the Property. The Howell Levert #1 was a dry hole and plugged and abandoned.

### **6.5.2 Brock Exploration Company**

Brock spudded the Gassie #1 (SN 165353) on December 5, 1979 at a surface location approximately 900' north of the Property and 350' west of the east boundary of Section 28. The well's surface location was not on the Property. However, access to the Gassie #1 is via a road through the Property and it is likely its flowlines went through the Property. The well was drilled to a TD 12,073' and completed as a producer. Pend Oreille became the operator of the producing well in August 1982. The Gassie #1 became operated by UTPC in February 1984 and UTPC converted it to a brine disposal well. The Gassie #1 is now named the Gassie Brine Disposal #1 and is an active brine disposal well currently operated by Boardwalk Louisiana Midstream.

### **6.5.3 Pend Oreille Oil and Gas Company**

Pend Oreille Oil and Gas Company ("Pend Oreille") drilled its Levert #1 (SN 179513) at a location 2,717' north and 613' west of the southeast corner of Section 28. The permitted location does not appear to be on the Property as stated in the Plaintiff's petition, however, Pend Oreille extended a road north through the Property that was originally built for the Penton well. Pend Oreille spudded the Levert #1 on February 5, 1982. Pend Oreille drilled the well to 10,978' and plugged and abandoned the well on March 19, 1982.

Pend Oreille also operated the Gassie #1 until February 1984. The Gassie #1 produced hydrocarbons through November 1982.

### **6.5.4 Lavino Oil and Gas Company**

Lavino Oil and Gas Company (Lavino) spudded its August J. Levert et al #1 (SN 192472) on July 11, 1984 at a location approximately 1,000' north of the Property. The well's drill site is located

approximately 300' east of the road built for the Ladd – Howell Levert #1. The August Levert #1 was a dry hole and was plugged and abandoned by Lavino.

## **7.0 Site Inspection**

I inspected the Property on December 12, 2024. The Property is currently being used for hunting. My inspection focused on sites constructed and/or operated by BAOP and Gulf. The well sites and their access roads are surrounded by swamp. With the exception of the Boardwalk site, the sites have been abandoned. Minor amounts of oilfield debris were seen. I found no obvious damage to vegetation that could be the result of salt water discharge.

The first well site inspected was the Boardwalk – Levert Heirs B Brine Disposal #1 (former Levert Heirs B #1/1D). The well bore and well site are now being used by Boardwalk for its brine injection. I found no remains of production equipment at the site. A former production pit is approximately 180' northeast of the well. The pit is approximately 100' by 100'. The pit levees have been cut to allow drainage, but the pit still holds some water.

The former well site and tank battery site of the Levert Heirs C #1/1D was inspected. The wellhead and tree of Quality's orphan well, Levert C #1 (SN 206248) remained at the site. The 100'± by 100'± production pit that is seen on aerial images between 1959 and 1962 has been filled and closed. The smaller 40'± by 40'± pit that is first seen on a 1968 aerial remains, however the levees are degraded. The tank battery site located northeast of the well was also inspected. No oilfield tanks or equipment were noted at the sites. Minor amounts of oilfield debris were found.

The former well site and tank battery of the Levert Heirs #1 was inspected. The well has been plugged and abandoned and there is no recognizable well pad. The tank battery site is also abandoned. The reserve and production pit have been abandoned and degraded.

Culverts were noted under the north-south part of the elevated road. One culvert is near the Levert Heirs #1 location and one is near the Levert Heirs B #1 location. Borrow ditches were also noted along the elevated roads. The original drilling location for the Levert Heirs #1 on the west side of the road has been mostly removed.

### **7.1 Remaining Wells and Equipment on the Property**

All the wells drilled on the Property have been plugged and abandoned with the exception of two. The Levert Heirs B #1 (SN 76522) is currently operated by Boardwalk Louisiana Midstream, LLC as a brine disposal well.

The Levert Heirs C #1 (SN 206248) is a shut-in well operated by Quality Petroleum Corp. and is an orphan well. No tanks, separators or pieces of equipment are remaining.

## **8.0 Review of Aerial Images**

Several historical aerial photographs of the Property have been made available in this matter. The images show the historical use of the Property including roads, well sites, equipment, pipelines and pits.

### **8.1 1941**

A January 27, 1941 aerial image shows the Property prior to any drilling operations. A pipeline right-of-way crosses the Property, which has been identified as belonging to Humble Pipeline Company.

### **8.2 1952**

An April 2, 1952 aerial image of the Property shows the remains of the Louis J. Roussell well's well pad, reserve pit and borrow pits. The 1952 image also shows the well site of the Temple Hargrove – Levert Heirs #1 which was drilled in November 1951. The drilling location is approximately 450' by 350'. The well's rectangular reserve pit is on the east side of the drilling location and is approximately 250' by 120'. A tank battery is approximately 200' south of the well.

### **8.3 1959**

A March 23, 1959 aerial image of the Property shows that the reserve pit at the Levert Heirs #1 well has been degraded and abandoned. A production pit has been constructed immediately south of the old reserve pit and north of the tank battery. The production pit is approximately 150' by 75'. A ditch has been constructed between the well pad and the abandoned reserve pit that appears to route produced water northward from the production pit and then through the culvert under the road to the west side of the road for discharge into the borrow ditch.

The elevated road has been extended north from the Levert Heirs #1 to the well site of the Levert Heirs B #1. The Levert Heirs B #1 reserve pit has been closed and a tank battery has been constructed on the west side of the road. A production pit has been constructed north of the reserve pit. The production pit is approximately 100' by 100'. A smaller production pit is west of the pit and is approximately 30' by 20'. A drainage ditch can be seen on the east side of the well site.

The 1959 aerial also shows a road built eastward to the BAOP – Levert Heirs C #1 well site. A tank battery can be seen approximately 300' northwest of the well. A production pit approximately 100' by 100' in size has been constructed south of the well. Borrow ditches along the elevated roads and well pads are seen in the 1959 aerial image.

The 1959 aerial also shows the well site for the BAOP drilled Levert Heirs D #1. The well was drilled approximately 300' north of State Route 1148 with access from the highway. The well was a dry hole and at the time of the photograph, the location was being abandoned and restored.

The 1959 aerial also shows the BAOP field office which was constructed on the abandoned well site of the Roussell – Levert Land Company #1 approximately 100' north of State Route 1148.

#### **8.4 1962**

The production pit at the Levert Heirs #1 in the February 11, 1962 aerial image shows that the pit contains little or no water. The production pit at the Levert Heirs B #s 1/1D also appears to contain minor volumes of water. The production pit at the Levert Heirs C #s 1/1D appears to contain water.

#### **8.5 1968**

The March 7, 1968 aerial photograph shows that the pit at the Levert Heirs #1 is holding a minor amount of water which is likely rainwater since the well has not produced since 1965. The pit at Levert Heirs B #s1/1D appears to be inactive. The pit at Levert Heirs C #s 1/1D has been closed and backfilled. In its place a small pit approximately 50' by 50' has been constructed which is likely an emergency pit.

#### **8.6 1973**

The September 19, 1973 aerial photograph is similar to the 1968 aerial but has less definition.

#### **8.7 1975**

The January 20, 1975 aerial photograph shows the addition of the Brock – Levert Heirs #2 location and road. At the time the photograph was made, the well had been drilled, completed and tested. The image also shows the reserve pit and borrow pits.

#### **8.8 1978**

The March 1, 1978 aerial photograph is similar to the 1975 but shows better resolution.

#### **8.9 1983**

The October 28, 1983 aerial shows that the operator of the Levert B #1 brine disposal well has constructed an earthen pit on the east side of the well pad. The pit appears to be approximately 120' by 120' and is later identified by number 61P040. It appears that there are no oil and gas production operations on the Property by that time.

### **8.10 1989**

The April 6, 1989 aerial is similar to the previous aerial images. However, pit number 61P040 near the Levert Heirs B #1 disposal well has been closed by the operator.

## **9.0 Pits**

The use of earthen pits in Louisiana for oil and gas exploration and production activities was routine, customary, and legally allowed by pertinent state and federal regulatory agencies during the time BAOP and Gulf operated on the Property.

### **9.1 Reserve Pits**

Reserve pits, or their equivalent, were required by the State of Louisiana during the time oil and gas operations were conducted on the Property. The LDOC required the use of slush pits during drilling operations as early as 1918. Reserve pits are temporary pits used to store materials used or generated in well drilling, completing and workover operations. Contents of reserve pits primarily included barite (barium sulfate, an inert material), bentonite clay, and to a lesser degree drilling fluid additives. In addition, the reserve pits would contain sand and shale drill cuttings generated in the drilling process. Reserve pits were generally closed in place after drilling operations ceased but occasionally portions were utilized as emergency or blowdown pits for wells that were ultimately produced. For wells drilled after 1986 reserve pits were required to be registered with the LDNR-OC.

All of the wells drilled on the Property prior to 1986 would likely have utilized an earthen reserve pit. The reserve pit levees for the Levert Heirs #1 well can be seen in many of the aerial images discussed earlier. However, an inspection of the site shows that the levee on its west side has been leveled and the levee on the east side has degraded. The reserve pits for the Levert Heirs B #1 and C #1 have been closed. The reserve pit for the Brock – Levert Heirs #2 can be seen on the aerials but is also degraded.

### **9.2 Production Pits**

Like reserve pits, production pits were allowed by the LDOC. On January 20, 1986, the LDNR-OC required operators to register all existing pits and close them within 36 months unless the pit was to remain in use. At that time, the LDNR-OC categorized production pits as burn pits, compressor station pits, natural gas processing plant pits, produced water pits, washout pits, well test pits and emergency pits.

Documents show that BAOP use produced water pits on the Property until June 1966 when it converted an offset well to a SWD well. During the time that BAOP and Gulf operated on the Property,

they would likely have utilized pits as emergency pits. This type of pit was used to receive well fluids temporarily during an emergency situation, to release pressure on well equipment as necessary, or to burn waste oil or gas when necessary. Prior to January 1986, LDNR-OC's statewide order 29B recognized the use of a pit for "cleaning up" a well prior to production testing. Likewise, Louisiana regulators required the use of burn pits to be used for the disposition of oily waste. Well contents placed in these types of pits would have been burned or removed to a disposal facility upon cessation of the emergency, blow down or well test.

Liberty released the 1950 lease in 1984, two years before LDNR-OC's 1986 pit amendments. The last oil and gas operation under the 1950 lease was December 1977, or eight years before the 1986 amendments. None of the operators under the 1950 lease were operating wells on the Property or in the Bayou Choctaw field in 1986. The 1986 amendments did not require operators to seek out pits from past operations.

The operator of the Levert Heirs B Brine Disposal #1 created a pit near its well pad sometime prior to October 1983. Union Texas Products Corporation registered the pit on July 17, 1986 as per the January 20, 1986 SOW 29B amendments. However, the operator did not register the older pit located nearby. Union Texas Products Corporation described the registered pit as a nitrogen lift blow out pit measuring 130' by 100' and 6' deep. The pit was closed by April 1989 and shown to be in compliance with SWO 29B when inspected by LDNR-OC on December 11, 1989.

## **10.0 Water Production and Disposition**

A January 15, 1959 internal report of BAOP's properties in the Bayou Choctaw field at that time stated, "*Present salt water disposal facilities lack sufficient capacity to handle adequately the present volume of produced formation water. Any major increase in water production will result in overflows into local streams and bayous. Plans for revision of the system with consideration of underground disposal is needed.*" The January 1959 report shows that BAOP had a water disposal system in place at the time designed to keep water out of local streams and bayous. The March 23, 1959 aerial image shows that the water disposal system on the Property consisted of the pits at the well sites and a series of ditches. The ditches consisted of areas along the elevated roads that were initially created as borrow ditches and smaller ditches created to conduct water from the individual pits to the larger ditches. An inspection of the Property confirmed that the borrow ditches, although degraded, and culverts are still in place. The smaller ditches do not remain due to work at the individual well sites.

An April 11 and 12, 1966 LDNR-OC inspection of the BAOP operations in the Bayou Choctaw field gives information concerning BAOP's produced water disposal at that time. At the time of the 1966 inspection, the Levert Heirs #1 had not produced since December 1965. The 1966 description of

water discharge is consistent with aerial images and shows that the produced water was directed to drainage ditches along the elevated roads.

At the time of the 1966 LDNR-OC inspection, there were no LDNR-OC or LSCC restrictions concerning salt water discharge from the Levert property. An LDNR-OC inspection on March 9, 1964 would have made the LDNR-OC aware of the manner in which BAOP discharged its water.

BAOP ceased using the series of ditches for its water discharge in June 1966. At that time BAOP received approval from LDNR-OC to convert its Schwing-State Lease 2249 B #3 (SN 48687) to an SWD well. Documents show that the well conversion was performed in June 1966. A system of water flowlines was installed to accumulate all of BAOP's produced water from its Bayou Choctaw field wells and transport it to the new SWD well.

## **11.0 Inspections and Compliance**

The LDNR-OC, through its Inspection & Enforcement (“I&E”) Division, inspects the operations of oil and gas operators. An operator subject to an I&E inspection prior to the mid-1980s would typically receive a letter stating LDNR-OC concerns or that the operator was in compliance with the rules and regulations. The LDNR-OC began issuing Lease Facility Inspection Reports (“LFIR”) in the mid-1980s. An LFIR is a documentation of an LDNR-OC Conservation Enforcement Agent’s (“CEA”) inspection of a well and tank battery. In some instances, CEAs wrote Narrative Reports to better explain some field situations. If for any reason the LFIR fails, the LDNR-OC will require compliance in one of three forms: a Compliance Notice, a Compliance Order, or a management letter. A Notice is typically sent to operators for clerical deficiencies or minor operational issues. An Order can be for minor or major issues. CEAs also inspected pit sites and former pit sites and wrote Production Pit Inspection Reports (“PPIR”)s.

### **11.1 Inspections and Compliance – BAOP**

On March 9, 1964, LDNR-OC representatives inspected BAOP's Bayou Choctaw operations. The inspection included BAOP Levert wells on the Property. The resultant inspection letter stated that BAOP's operations, “comply in every respect with regulations set forth by Statewide Orders of the Department of Conservation, and we wish to take this opportunity to commend you for good operating practices.” The March 1964 inspection meant that the LDNR-OC was aware of BAOP's pit usage and water discharge practices.

On April 11 and 12, 1966 inspectors from the LDNR-OC inspected the operations of BAOP in the Bayou Choctaw field. Produced water along with waste oil and paraffin had escaped from natural drainage ditches due to flooding from recent rains. The LDNR-OC noted a release of oil and paraffin at

Levert well sites and cited Louisiana statewide order 29B: Section VIII, Paragraph E. Section VIII is titled “Fire Hazards” and says nothing about water discharge. The LDNR-OC requested that BAOP consider underground disposal. BAOP responded to the LDNR-OC by letter dated May 19, 1966 that it would convert a well to a SWD well and install a fieldwide water gathering system.

### **11.2 Inspections and Compliance – Gulf, Precise and Brock**

I have found no inspection and compliance letters or reports for the operations of Gulf, Precise or Brock on the Property.

### **11.3 Inspections and Compliance – Other Operators**

Quality Petroleum Corp. received two LDNR-OC inspections in 1989 and 1991 which were documented in LFIRs. Both inspections reported that the well was off production, no discharges of oilfield waste and no pits. After the well was placed in the state’s orphan program, eight inspections were made between 2009 and 2021.

The Levert Heirs B Brine Disposal #1 well had multiple inspections since it was converted to a disposal well. The inspections included LFIRs. None of the LFIRs noted discharge of E&P waste or the existence of pits.

### **12.0 Louisiana Stream Control Commission**

Only one Louisiana Stream Control Commission (“LSCC”) letter to an operator on the Property has been found. The letter dated May 12, 1966 noted that LSCC had been notified of the LDNR-OC inspection in April and requested information concerning remedial measures. No LSCC inspections, issues or notifications were found.

### **13.0 Louisiana Department of Environmental Quality**

I have found no Louisiana Department of Environmental Quality (“LDEQ”) documents issued to BAOP or Gulf for their operations on the Property.

### **14.0 Environmental Site Assessment**

On October 27, 2000 a Phase I environmental site assessment (“ESA”) was conducted by Shintaux Environmental Services for the August J. Levert Family LLC on a tract of land that included the Property in this lawsuit. A transmittal letter dated November 16, 2000 included a list of environmental conditions which any new purchaser should be aware of. The items included recommendations to collect soil samples from impacted areas and pit areas at abandoned well locations;

collect ground water sample on western property boundary; and remediate a saltwater pipeline leak on Formosa Pipeline right-of-way near Louisiana Highway 1148. It is unknown what actions the landowner took.

## **15.0 Regulations Affecting Louisiana Oil and Gas Exploration and Production**

The oil and gas industry in Louisiana has been under state regulation since the early 20<sup>th</sup> century. Certain aspects of oil and gas operations have also been under federal regulation for many years. Over the years, knowledge in the oil and gas industry about the proper handling of drilling and production materials and by-products has changed. Likewise, the technology available to deal with those materials and the ability to detect materials at increasingly miniscule amounts has changed. State and federal regulations have reflected the changes in knowledge and technology. The regulations that govern the oil and gas industry in Louisiana have been revised on numerous occasions since regulation of the oil industry began in the early 20<sup>th</sup> Century.

### **15.1 Louisiana Conservation Commission**

Louisiana initially formed the Louisiana Commission for the Conservation of Natural Resources (“LCCNR”) in 1908 by Act 144 of the State Legislature. The LCCNR was formed in concert with a national call by President Theodore Roosevelt to conserve, and not waste nor needlessly consume, the nation’s natural resources. It appears the initial role of the LCCNR was largely to report on the status of the state’s various natural resources and to make recommendations to the Governor for the management and conservation of the State’s natural resources. By 1910 the name had been shortened to the Louisiana Conservation Commission (“LCC”).

Louisiana recognized very early the need to control wells. Prior to the formation of the LCC, Louisiana passed Act 71 in 1906 that was directed against those who set wells on fire or let wells go wild. It also required gas wells be plugged and abandoned. This was followed by Act 190 in 1910 that required oil and gas be properly confined in pipes and proper receptacles within 2 days after a well has been brought in.

Louisiana recognized early on the need to control the handling of waste oil and water produced in association with oil and gas production into the fresh waters of the state and to protect the fresh waters of the state. Water is often found underground in connection with oil and gas deposits. The water is typically saline (but can be fresh) and can contain other trace elements. As the oil and gas is produced associated water can also be produced. Typically, during the early stages of production, the oil and gas are produced water free. As the production life of a field continues it is common for the

amount of water being produced to increase. However, the volume of water produced from a field can vary greatly and will change as wells are produced, recompleted or abandoned.

Louisiana passed Act 183 to protect the rice planters and owners of canals used for irrigation purposes against pollution from salt water, oil and other substances and to protect the fish in 1910. It prohibited releasing oil, salt water or other noxious or poisonous gas into irrigation water sources between March 1 and September 1 of each year. It allowed for the release of oil field waters into said sources between September 1 and March 1.

Containment or storage in earthen pits or earthen tanks was used to impound produced waters in certain areas of the state. Earthen tankage was often used given the volumes and rates being produced and the availability of such tankage. Some produced water pits were referred to at times as evaporation pits. However, in the author's experience, the term was a term of art as at certain times substantial evaporation may occur. At times of high rain fall any evaporation would be offset by rain volume and dilution. Recognizing the effect of rain fall and surface water volumes to facilitate dilution, Louisiana allowed producers to discharge the produced waters out of the impoundment areas at certain times.

In 1912 Louisiana passed Act 127 which established the LCC as a Department of the State, with control over the natural resources of the State. The LCC was given the authority to make regulations to protect the state's natural resources. Some of the regulations established through Act 127 required drilling permits, maps of well locations, use of surface casing and cement and also required that abandoned wells be plugged. The Commissioner of Conservation headed up the LCC.

## **15.2 Louisiana Department of Conservation**

In 1916 Louisiana passed Act 66 which created the Louisiana Department of Conservation ("LDOC"), which replaced the LCC. This was followed by Act 105 in 1918 concerning the creation of the LDOC. The LDOC's continued purpose was to address the conservation of minerals and other natural resources of the state. Act 250 in 1920 also dealt with the LDOC's authority to make rules and regulations to protect state resources.

The LDOC required the use of slush pits during drilling operations by 1918. A 1925 compilation of the Conservation laws pertaining to oil and gas list the slush pit rule as Rule 10. The LDNR still allows the use of drilling reserve pits as approved by the state.

Over time the idea of impounding and discharging produced water at certain times of the year for certain areas of the state was replaced with the discharging being done based on Louisiana state regulatory agency approval only, for all areas of the state. However, no formal permitting process that generates an issued permit, as is in effect currently, has been noted to date concerning impounding and release. Louisiana passed Act 133 in 1924 that essentially mirrored Act 183 of 1910 except that it was

not limited to rice growing areas of the state but simply dealt with natural streams of the state and allowed for the release of impounded water as scheduled by the LDOC instead of fixing a set time table for impounding and releasing.

Louisiana also passed Act 252 (natural gas) and Act 253 (oil) in 1924 which prohibited allowing saltwater to flow over the surface of the land. Act 253 was amended in 1926 as Act 126 which retained the saltwater prohibition. These acts applied to landowners as well as contractors and operators. Louisiana also passed Act 68 of 1932 which again restricted discharges that resulted in fish kills or that made the receiving waters unfit for the normal maintenance of fish life or adversely affected the interest of the state.

The oil and gas industry began investigating the underground injection of produced waters utilizing SWD wells in certain areas of the country in the mid to late 1920s and 1930s. The LDOC raised the possibility of injecting produced water into salt dome cap rock or into depleted producing formations as early as 1927 but continued to use the impound and release method as the approved produced water disposal method. During that time frame, some in the industry believed that salt water injection wells would not be as good a solution as impounding and releasing the produced waters during periods of high rainfall due to the potential to contaminate fresh water sands penetrated by the SWD wellbores or the potential to damage productive zones.

The initial SWD well in Louisiana came on line about 1933 and over time SWD wells became the primary method for disposal of produced waters. However, as with any new technology, neither the industry nor the regulators changed completely from one method to the other quickly. Earthen containment pits continued to be used as temporary holding areas for produced water until it could be disposed of through a salt water injection well or released as approved by the State in certain areas. The LDOC published a "Recommended Specification and Design for Earthen Oil-Water Separating Pits" in December 1940 to be used to construct earthen pits for the purpose of removing oil from produced water before the produced water was either discharged to streams or to a SWD well. Over time earthen pits/tanks without liners (either natural or synthetic) were phased out as produced water storage areas, with steel storage tanks replacing them. The change over time for the various methods of handling produced water and other waste varied depending on several factors to include geographic area, soil types and conductivities, water sources and conditions, environmental conditions and the potential for contamination and/or risk of harm. The State of Louisiana continued to allow the storage of produced water in earthen pits/tanks for many years based on certain criteria, in various areas and under certain conditions.

### 15.3 Oil and Gas Statewide Orders

The first general Statewide Order (“SWO”), Rule A-1, concerning the drilling, production and operations of oil and gas wells in the state was promulgated in the summer of 1939. Rule A-1 was the forerunner of the modern SWO 29B. Rule A-1 was quickly supplemented in the fall of 1939 with Rule A-2. Louisiana passed Act 157 in 1940, which effectively created the modern LDOC and was the forerunner of Title 30, “Minerals, Oil and Gas”, which was adopted as part of the Revised Statutes of 1950. Several SWOs were promulgated under Act 157 during the 1940s to cover oil and gas operations in the state. These SWOs included SWO 29 which was promulgated in July 1941 by the then recently created Louisiana Department of Minerals (“LDM”). The LDM was created and severed from the LDOC during this time to focus only on the conservation of the minerals of the state. Shortly after the introduction of SWO 29 it was determined and ruled by the Supreme Court of Louisiana that the LDM had been unconstitutionally severed from the LDOC. Once the state’s minerals were placed back under the LDOC as the Minerals Division of the LDOC, the Minerals Division of the LDOC adopted SWO 29A in May 1942. SWO 29A followed the framework of SWO 29 with some changes and adaptations to certain regulatory requirements. Shortly after SWO 29A was adopted in May 1942, the LDOC’s Minerals Division’s SWO 29A was revised, superseded and replaced by SWO 29B in August 1943. SWO 29B has been revised on multiple occasions but the designation SWO 29B has remained. The current version of SWO 29B is one of the primary oil and gas SWOs and governs the drilling, production and operations of oil and gas wells in the state.

Starting in the mid-1930s the published regulations concerning the LDOC included a section on water pollution, Section VI. Once SWO 29 was adopted by the LDM in 1941, salt water was dealt with in Section XIII. When SWO 29A was adopted by the LDOC’s Minerals Division to replace the unconstitutional LDM’s SWO 29, salt water production and disposal was covered in Section XV. When the LDOC’s Mineral Division adopted SWO 29B to supersede and replace SWO 29A salt water production and disposal was kept under Section XV. During this time, DM1R forms were created to report the testing of wells; which includes the reporting of basic sediment and water. It was the first official reporting of saltwater production in the state.

Louisiana adopted Title 30, “Minerals, Oil and Gas”, as part of the Louisiana Revised Statutes of 1950. Oil and gas Acts and SWOs that predated the Louisiana Revised Statutes of 1950 were part of the rules and regulations that were repealed. The Louisiana Revised Statutes of 1950 reauthorized the LDOC, which then re-adopted certain of its rules and regulations. SWO 29B was re-adopted as the SWO governing the drilling for and producing of oil and gas in the state after the adoption of Title 30. Multiple amendments to SWO 29B have occurred since the adoption of Title 30. Several of the amendments to SWO 29B have dealt with the handling of produced water, oil field waste, pits and other

environmental issues. The first such amendment to Section XV of SWO 29B was in May 1961, which was an amendment that dealt with the approval process for disposing salt water in SWD wells. The Louisiana Geological Survey (“LGS”) became involved in the permitting of SWD wells. LGS had the responsibility of determining if the SWD well’s surface casing was set deep enough to protect fresh water zones, among other responsibilities.

The next amendment to section XV was in October 1967, which renamed Section XV from “Production and Disposal of Salt Water” to “Pollution Control”. The 1967 amendment also addressed the discharge of produced water. Produced water discharge was no longer allowed by the State into usable fresh water bodies but it did allow for discharge into tidally affected waters, brackish waters or any other waters unsuitable for human consumption or agricultural purposes. Also, at this time, the State began requiring reporting of water injection volumes. Injected volumes were reported to the LDOC annually on a LGS card. The LSCC also began monitoring injection volumes and required reporting on their form SWDR1. These forms were in place until the Underground Injection Control (“UIC”) division of LDNR was formed in 1982 and the UIC 10 Form became the form for the reporting of injected volumes. The October 1967 amendment was also the first time the State addressed annular injection. Annular injection was allowed for periods of 1 year, with yearly extensions allowed. The permitting for annular injection followed the same permitting process as for any other subsurface SWD injection permit.

In the 1970s several federal environmental laws were passed that affected environmental issues. These included the formation of the US EPA; the Clean Air Act; the Clean Water Act and the Safe Drinking Water Act among others. Some of the new federal laws and regulations imposed new legal requirements relating to handling of hazardous material. However, non-hazardous oilfield waste (“NOW”) was, and is, exempted from federal hazardous materials regulations. NOW wastes are exploration and production (“E&P”) wastes and includes several types of drilling and production wastes to include drilling, completion and workover fluids and produced waters. NOW wastes are managed by Louisiana under SWO 29B.

A complete SWO 29B was published in 1974 that incorporated all of the amendments up to that time.

#### **15.4 Louisiana Department of Natural Resources**

In 1976, the Louisiana Department of Natural Resources (“LDNR”) was created. The Office of Conservation (“OOC”) was one of the divisions under the LDNR. Act 449 of 1979 created the Office of Environmental Affairs (“OEA”) which was placed in the LDNR. The LSCC and various other entities were incorporated into the OEA. In 1983 Louisiana passed legislation that created the Louisiana

Department of Environmental Quality (“LDEQ”). The LDEQ formally began operation in February 1984.

In the 1980s several significant amendments to Section XV of SWO 29B were made. In July 1980 Section XV was amended to add Paragraph 13 which provided coverage for offsite disposal of drilling and completion fluids and produced waters. Act 804 was passed by the legislature in August 1980 which specified the requirements for commercial disposal facilities. Section XV of SWO 29B was amended again in January 1982 implementing underground injection control of SWD wells, enhanced recovery wells and liquid hydrocarbon storage wells. It also increased the data required as part of the permitting process. For example, the January 1982 amendment was the first to require operators to run a RTS and provide an interpretation to the LDNR for annular injection approval. Paragraph 13 of Section XV was amended in 1983 and again in 1984. In 1985 Section XV was amended concerning injection during secondary recovery projects. The amendment to Section XV of SWO 29B on January 20, 1986 greatly restricted the use of earthen pits and covered non-hazardous oil field waste (NOW). The January 20, 1986 Amendment covers the closure standards for “all existing” produced water pits, natural gas plant pits, compressor station pits and washout pits being used if they did not comply with the liner requirements of the order or were not exempted under specific provisions of the order.

Section XV of SWO 29B was incorporated into the Louisiana Administrative Code (LAC) format as LAC Title 43: Part XIX, Section 129. Further refinement of SWO 29B continued. In October 1990 Section 129 was amended concerning certain aspects of NOW testing, passive pit closure and pit closure for coastal areas of the state. Section 129 was amended again in 1991 concerning the onsite storage, treatment and disposal of NOW generated during drilling and production of oil and gas wells.

Reorganization of LAC 43:XIX.129 into Chapters 3, 4 and 5 under SWO 29B occurred effective December 20, 2000. The reorganized SWO 29B consisted of: Chapter 1. General Provisions, Section 129. (Reserved); Chapter 3. Pollution Control – Onsite Storage, Treatment and Disposal of NOW Generated from the Drilling and Production of Oil and Gas Wells (Oilfield Pit Regulations); Chapter 4 Pollution Control – (Class II Injection/Disposal Well Regulations); and Chapter 5 Off-site Storage, Treatment and /or Disposal of NOW Generated from Drilling and Production of Oil and Gas Wells – (Commercial Facility Regulations).

In November 2001 LAC 43:XIX.433 (Chapter 4) was changed to cover a new topic the disposal of E&P wastes by Slurry Fracture Injection. Also in November 2001 and again in June 2003, LAC 43:XIX.501 (Chapter 5) was amended. In December 2003, LAC 43:XIX was edited and compiled effective that date. In February 2004 LAC 43:XIX.303 which deals with produced waters was amended. LAC 43:XIX was last amended in November 2005 and compiled in December 2005.

### **15.5 Louisiana Stream Control Commission**

In 1940 Louisiana created the Louisiana Stream Control Commission (“LSCC”). The LSCC was initially comprised of the Commissioner of Conservation, the President of the State Board of Health and the Attorney General of the State. Rules governing the disposal of oil field waste were adopted by the LSCC in April 1941 and were revised in April 1943. There were 8 rules promulgated and adopted by the LSCC dealing with the disposal of oilfield waste, some of which included the handling of produced water. In these rules, the LSCC indicated its preference for subsurface injection of produced water but continued to allow the surface discharge of produced water based on certain criteria. Rule 8 specifically stated: “Wherever possible, disposition of oil field brine shall be accomplished by discharge through disposal wells to underground horizons below the fresh water level, such wells to be so drilled, cased, cemented, equipped, and operated that no fresh water horizon shall be polluted; provided that this rule shall not apply in fields or areas where it is determined by the Stream Control Commission that disposition of the brine is or may be accomplished by discharge into water bodies normally or seasonably sufficiently saline to preclude any actual or potential pollution hazard due to such discharge”. Oil and gas producers were allowed to discharge produced water under the LSCC rules and restrictions with no formal permit like what is seen with later agencies like the EPA and LDEQ.

The LSCC issued an order in 1942 that went into effect in January 1944 which prohibited the release of impounded produced water in rice growing areas after January 15<sup>th</sup> until a time approved by the LSCC, estimated to be after October 1, each year. However, the LSCC still allowed for the surface discharge of produced waters as approved by the LSCC and the order only affected the rice growing areas. The order was known as the Rice Order.

The LSCC and its rules and regulations were also among the items Louisiana repealed and re-adopted under the La Revised Statutes of 1950. The LSCC re-adopted its 8 rules governing disposal of waste oil, oil field brine and all other materials resulting from the drilling for, production of, or transportation of oil, gas or sulfur in January 1953. The rules concerning the disposal of produced water appeared to be unchanged from the original rules adopted and revised by the LSCC in the 1940’s. The LSCC oil field rules adopted in January 1953 are currently found under LAC Title 33, Part IX, Subpart 1, Chapter 17. In July 1968, the LSCC adopted additional rules which allowed produced salt water to be discharged into normally saline waters, tidally affected waters, brackish waters or other waters unsuitable for human consumption or agricultural purposes. The 1968 LSCC oil field rules also acknowledged the rules and regulations of the LDOC and the other existing rules of the LSCC concerning oil and gas operations. Furthermore the 1968 rules track the wording found in the 1967 revision to LDOC SWO 29 B concerning the discharge of produced water. The 1968 LSCC oil field rules are currently found under LAC Title 33, Part IX, Subpart 1, Chapter 19.

The LSCC was effectively incorporated into the LDNR's OEA. Once the LDEQ was authorized by the Louisiana legislature in 1983 and was operational in 1984 the LSCC was incorporated into the LDEQ's Water Quality Division, which currently has oversight for water quality in the state.

The State of Louisiana continued to allow the discharge of produced waters at the surface for many years, based on certain criteria, in various areas and under certain conditions based on prior approval by the state.

## **15.6 Federal Environmental Regulations**

As part of the Clean Water Act ("CWA"), the Environmental Protection Agency ("EPA") was given permit authority for point-source discharges in 1972. The term "point source" was defined as any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged. The permit program (Section 402 of the CWA) was named the National Pollutant Discharge Elimination System ("NPDES") and required discharge permits to follow EPA guidelines. The primary elements of a NPDES permit are (1) effluent limitations, (2) schedules of compliance, and (3) monitoring requirements.

Louisiana received authorization to implement the federal NPDES permits on August 27, 1996. As part of the implementation process, NPDES permits became LPDES permits.

The EPA proposed additional rules on July 19, 1973. The new rules were intended to help prevent discharges of oil into the navigable waters of the United States and to contain such discharges if they occur. The proposed regulations endeavored to prevent such spills by establishing procedures, methods and equipment requirements of owners or operators of facilities engaged in drilling, producing, gathering, storing, processing, refining, transferring, distributing, or consuming oil. The regulations would apply to non-transportation-related onshore and offshore facilities which, due to their location could reasonably be expected to discharge oil into or upon the navigable waters of the US or adjoining shorelines. The regulations required owners or operators of these facilities to create and maintain a Spill Prevention, Control and Countermeasure ("SPCC") Plan. At that time, the regulations did not apply to non-transportation-related onshore and offshore facilities, which, due to their location, could not reasonably be expected to discharge oil into or upon the navigable waters of the US or adjoining shorelines.

Full implementation of SPCC plans for some onshore oil facilities was delayed during several years of litigation over the definition of "navigable waters". During 1986 and 1988 the EPA and USACE expanded its definition of navigable waters to include geomorphic features such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie

potholes, wet meadows, playa lakes, or natural ponds. SPCC plans were required to be updated every three years and incorporate any new field-proven technology. The regulations have been amended several times and certain language is still being litigated.

### **15.7 State Environmental Regulations**

Act 449 of 1979 went into effect on January 1, 1980 and consolidated many of the State's environmental regulatory authorities and placed the agencies into the LDNR. Act 449 abolished the LSCC and established the Environmental Control Commission. However, the regulations previously adopted by the LSCC remained in effect. The LDNR's OEA became the primary agency charged with the responsibility of regulating water, air, hazardous waste and radiation control. LDNR's Water Quality Division ("WQD") was the agency that was responsible for drilling and production discharge at that time. Once the LDEQ was formed as a separate state agency, the WQD was transferred from the LDNR to the newly formed LDEQ.

The Louisiana legislature passed Act 97 in 1983 which established the LDEQ. Act 97 of 1983 gave the LDEQ's Office of Water Resources (OWR) most of the responsibilities formerly assigned to LDNR's OEA. In November 1985, the LDEQ promulgated regulations that required permits under the Louisiana Water Discharge Permit System (LWDPS) for a broad range of industrial discharges. Under the 1985 regulations, the LDEQ required LWDPS permits for discharges previously allowed by the LSCC.

The November 1985 LDEQ regulations established requirements for contingency planning and implementation of operating procedures to prevent and control the discharge of pollutants resulting from oil spill events. The Spill Prevention and Control (SPC) plan was similar to the EPA's SPCC. The LDEQ regulations allowed companies to utilize the SPCC plan.

Louisiana received authorization to implement the federal NPDES permits on August 27, 1996. As part of the implementation process, NPDES permits became LPDES permits.

### **16.0 General Historical Industry SWD Review**

The issue of handling produced water has been a topic of significant discussion within the oil and gas industry. The industry has been concerned with the protection of the environment and the proper handling of produced water for many decades. Louisiana was active from a regulatory standpoint protecting its sources of freshwater almost from the inception of the oil and gas industry in Louisiana. Discussions were also occurring in other areas of the country early in the life of the oil and gas industry, with the recognition that conditions and criteria were different depending on the area and would affect the manner in which produced water was handled.

The oil industry initially used earthen pits for the capture and storage of oil in the early life of the industry. Beginning in the early 1900s operators designed and built pits to minimize or eliminate losses and sought out areas with clay soils. As the oil and gas industry grew in the United States during the early 1900s, more water was produced from oil and gas wells and pits were inevitably used to store, process and treat produced water prior to releasing it for surface or subsurface disposal. The quantity of produced oil and associated water grew significantly during the 1920s through the 1950s in many areas of the United States. These areas often had different conditions available for handling produced water and the protection of fresh water. The practice of impounding water and releasing it into streams and rivers was widely practiced and accepted by industry and regulatory authorities. Over time, operators became aware that the construction of pits should include sufficient clay to control the seepage of pits while water was impounded.

Several papers dealing with produced water handling and pits are routinely discussed in Louisiana oil and gas environmental matters. These papers, when viewed in their entirety, are generally consistent with industry experience and the above regulatory discussion. Many of the articles presented deal primarily with other sections of the United States which have different conditions from those found in Louisiana related to the handling and disposal of produced water. Some of the articles presented do discuss Louisiana, with most discussing produced water in the context of what was being done generally on a state by state basis from a regulatory standpoint. However, none of the early articles discussed the operational history for produced waters in Louisiana in detail or discussed, compared and contrasted the various methods for handling produced water being employed in Louisiana over time. Papers concerning the operational use of earthen pits in Louisiana typically postdate Louisiana's regulatory restrictions on the use of such pits. These articles generally tie in with the timeline that evolved for dealing with the handling of produced water in the various areas of the country.

Selected parts of various articles are often cited in these matters for discussion. By way of example, a paper given by V.L. Martin in 1932 in Pampa, Texas concerning disposal of production waste is often cited. The quotes used normally concern the use of earthen pits as evaporation pits. However, the use of earthen evaporation pits was not a method that was routinely used as a disposal end point in Louisiana. Earthen pits were routinely used in Louisiana for many years as an impounding and treating step to process the produced water and remove any oil before the produced water went on to a disposal end point that could include either surface or subsurface disposal. This was a produced water treating process that Mr. Martin approved of in the 1932 paper. In the 1932 paper Mr. Martin discussed concerns dealing with SWD injection wells and expressed approval of impounding and releasing produced water in the appropriate environment. Anyone reading the entirety of the Martin paper would

understand that SWD by subsurface injection was not the industry preferred method at that time, even for the mid-continent area of the United States.

Mr. Martin classified waste into four groups: 1) waste oil; 2) saline waters; 3) drilling mud; and 4) gases and vapors. As part of the discussion Mr. Martin comments on the issue of the increasing water production from maturing fields and the various disposal techniques available. The methods of water disposal in general practice in the Mid-Continent area of the United States at that time were: 1) unrestricted flow to natural drainage; 2) impounding in earthen storage for either dumping during flood stage or evaporation and seepage; 3) conducting to polluted waters; and 4) return to subsurface formations. Mr. Martin stated: "probably the safest of these methods, where the volume is not too great and the rainfall sufficiently frequent is that of impounding and dumping at the proper time, however, great care must be exercised." Mr. Martin realized the impracticality of evaporation and storing produced water in evaporation pits as a disposal endpoint. Mr. Martin stated that "The only successful disposal systems are those which conduct oil free waste water to coastal waters, polluted streams, or streams of sufficient volume that resulting mixture will have a harmless concentration." When discussing subsurface reinjection Mr. Martin stated "There have been numerous attempts to return waste water to subsurface formations, but, almost without exception, these have been proven impractical except for a short period of time. It can probably be stated as a general rule that, unless such water can be returned by gravity, it will not be successful." Mr. Martin considered subsurface reinjection impractical due to the possibility of migration and contamination of fresh water zones at that time. He concluded that "No successful method, of general application, has been devised for the disposal of salt water".

Prior to the Martin paper in 1932, produced water disposal was being reviewed by others. In 1929 Schmidt and Devine discussed the water disposal situation in their report for the U.S. Bureau of Mines titled "The Disposal of Oil Field Brines". Schmidt and Devine surveyed 31 oil properties, all in Osage County Oklahoma, (none in Louisiana) and commented on water handling techniques including pits, surface disposal and subsurface injection. The paper discusses an experiment in which a sample of a type of clay from an Oklahoma pit was used to test the relative effects on hydraulic conductivity (seepage) of different water compositions. The results of the experiment indicated that certain salts slightly increased the seepage through the clay as opposed to distilled water. Magnesium, potassium and calcium cations caused a higher seepage rate than sodium. It was noted that when the vessel containing distilled water was drained and refilled with oil field brine that the seepage was only slightly greater than with the distilled water. The authors also discussed the effects of salt water on livestock, fish, plants and surface water. The paper concludes that it was feasible to divert produced water to selected streams.

A 1938 Bureau of Mines Report by Schmidt and Wilhelm titled “Disposal of Petroleum Wastes on Oil-Producing Properties” discussed the use of pits and water discharge and their effects on biology and soil. The authors stated, “...oil-field brines frequently can be disposed of most economically by allowing them to accumulate in ponds or settling basins, from which they are permitted to escape during periods of heavy rainfall into streams flowing at flood stage.”

Other examples of citations from papers include certain 1940s era American Petroleum Institute (“API”) documents on salt water disposal which again appears to be for the mid-continent area of the United States. The papers indicate that while SWD injection is generally preferable, it is not applicable for all fields. A review of the fields cited in those API documents shows that the focus was for areas other than Louisiana as no Louisiana fields or production operations were listed as being reviewed. The change over time for the various methods of handling produced water and other waste varied depending on several factors that include geographic area, soil types and conductivities, water sources and conditions, environmental conditions and the potential for contamination and/or risk of harm.

The 1940 API “Drilling and Production Practice” publication recognized four methods of salt water disposal. The four methods were: 1) storage in open pits; 2) periodic release into streams at flood stage; 3) evaporation and; 4) underground injection.

An API “Drilling and Production Practice” dated 1966 again recognizes discharge as a possible means of disposal.

During the 1960s various articles appeared in certain industry periodicals that discussed produced water handling issues. The articles reviewed dealt with the issue either from a regulatory perspective or as viewed by state regulators such as certain Texas Railroad commissioners from the mid-continent area of Texas.

The API Recommended Practice (RP) 51 titled “API Recommended Onshore Production Operating Practices” issued in 1974 and reissued in 1982 recognized the use of pits and made recommendations for the proper utilization of pits associated with production practices.

An assessment by the LDNR titled “Surface Impoundments Assessment Final Report for Louisiana” was presented to the U. S. Environmental Protection Agency in May 1980. The survey examines water quality in aquifers below surface impoundments. The report results show that the aquifers’ water quality below most surface impoundments was found to be excellent. Coastal swamps and marshes where the ground water is locally saline due to natural causes were noted to be an exception.

In October 1982, the API sponsored an independent study to provide data on the effects of oil and gas field waste management and disposal activities. The study concluded that any contamination was localized and unlikely to constitute a significant environmental or health hazard.

Contemporaneously with the published papers, Louisiana agencies published rules and guidelines that reflected the current technology of the time. The LDOC published its “Recommended Specifications and Design for Earthen Oil-water Separating Pits” in December 1940. In addition, the LSCC published its “Rules Governing Disposal of Oil Field Wastes” in April 1943. The general provisions allowed for the use of pits combined with either proper surface or subsurface disposal. The rules were re-issued in 1953 and amended in 1968. Both the LSCC 1953 rules and the 1968 amendment can be found in the current LDEQ regulations. As noted above, on January 20, 1986 Louisiana adopted requirements for the construction, continued use or closure of certain types of pits. Prior to that date reasonable operators conducted operations in Louisiana that properly utilized earthen pits as an internal stage of their SWD systems.

## **17.0 Plaintiff’s Expert Report Comments**

The Plaintiff in this matter has submitted two expert reports. Mr. Charles Norman provided a report dated August 9, 2024. In addition, ICON Environmental Services submitted a report dated July 19, 2024.

### **17.1 Charles Norman**

Mr. Norman opines about engineering and oil and gas operations conducted on the Property. Mr. Norman also opines on industry standards and regulations. Mr. Norman does not distinguish the accepted historic operational standards and engineering practices with current standards and practices. Nor does he acknowledge changing regulatory requirements. Mr. Norman implies that historic operations were not performed to appropriate industry standards or kept in compliance with regulatory requirements.

#### **17.1.1 Regulatory**

Mr. Norman states, “The Louisiana Office of Conservation 1940, LA29 [sic] regulations and subsequent regulations applied to operations on the Levert property.” At the time operations began on the Property, the LDOC effective statewide order (SWO) was 29B. SWO 29 which was promulgated in 1941 was revised with SWO 29A which was promulgated in 1942 and states in its heading that it is a revision of SWO 29. SWO 29B was promulgated in 1943 and states in its heading that it is a revision of the previous SWOs. Neither SWO 29 nor SWO 29A would apply to any of the operations on the Property.

### 17.1.2 Prudent Operator

Mr. Norman states, “the operators of the wells and facilities on the plaintiffs’ properties [sic] did so in an imprudent, unreasonable and excessive manner, which has resulted in damage to the properties [sic].” There is no evidence to support that BAOP or Gulf performed the way he alleges. LDNR-OC inspections indicate the opposite. The March 1964 inspection of the Property showed that BAOP was in compliance with LDNR-OC regulations. When a subsequent 1966 inspection cited discharge issues in the field, BAOP converted a well to a SWD well within a few days. There were no other issues cited by any state inspectors. Although no documents were found that support Mr. Norman’s allegations, a letter from a landowner representative in 1958 indicated that they were pleased with the operations of BAOP.<sup>1</sup> BAOP and Gulf operated on the Property in a manner that was in line with the then-existing Louisiana rules and regulations that guided its operations and general customs and practices for the time. BAOP and Gulf also operated in compliance to applicable state regulatory agencies who periodically inspected the wells and facilities.

Mr. Norman says that all the residual impacts allegedly found were not a result of normal wear and tear. Nothing reviewed indicates that BAOP and Gulf operated in a manner that was inconsistent with normal wear and tear. There is no evidence to support that BAOP and Gulf acted in a manner that was contrary to state regulations, industry practice for the time, or the 1950 lease.

Mr. Norman says that the alleged contamination is “...the result of excessive use and abuse of the Levert property and shows little or no regard by the operators for prudent engineering design, maintenance and operating methodology.” In my opinion, the operations conducted by BAOP and Gulf on the Property were conducted in a reasonable and customary manner that was consistent with industry practices and governmental regulations for the time-periods when they were conducted. I have seen no evidence that shows BAOP or Gulf violated any engineering design, ignored maintenance or used an unacceptable operating methodology. Nothing reviewed indicates BAOP or Gulf did, or failed to do, anything that violated any applicable regulatory requirements or industry standards during the times they operated on the Property.

Mr. Norman opines, “operators’ acts and omissions constitute wanton and reckless disregard for public safety and health in the treatment, transportation and handling of toxic or hazardous oilfield produced saltwater and waste substances.” I have seen no evidence that shows BAOP or Gulf operated in a manner that Mr. Norman suggests. I have seen no evidence that indicates BAOP or Gulf mishandled any oilfield fluids. Furthermore, the “produced saltwater” and oily waste he mentions has

---

<sup>1</sup> Levert-Norman SDT 000620

been classified by state and federal regulations as Non-Hazardous Oilfield Waste (NOW) for many years.

### **17.1.3 Leases/Restoration**

Mr. Norman says that his report addresses, "...the various oil and gas mineral leases, surface leases, right of way agreements, etc. pertaining to the oil and gas activities by Defendants on the Levert property." He goes on to say that based on his experience that, "...restoration of abandoned sites to their original state, after drilling and production operations, is standard operating procedure in the oilfield..." Mr. Norman then states, "Defendants have abandoned the property and have failed to clean up the property to satisfy the LA DNR 29 B regulations and the lease obligations to restore the land to its original condition". The 1950 lease granted the lessee broad rights to perform multiple operations for the mutual benefit of the lessee, assignees and mineral owners. There is no language in the lease that requires restoration. Restoration to original condition was not then, and is not now, a common industry practice or regulatory requirement. At the time the leases were agreed on, there was no expectation that restoration was to original "state" (condition). Some level of impact from oil and gas operations was expected. Oil and gas operations will have unavoidable impacts. Any current impact that the laws and regulations define that creates a real and unacceptable threat to humans, wildlife or plants should be addressed in accordance with current regulations and standards. I am unaware of any historic or current customs and practices, operational standards or regulations that utilize background standards.

### **17.1.4 Water Volumes**

Mr. Norman provides a table in his report [Norman Table 3] which shows his attempt to quantify the amount of water produced from wells on the Property between 1952 and 1977. Mr. Norman provides no explanation concerning the manner in which he calculated produced water volumes or if the volumes were obtained through other sources. The 1.6 million barrels Mr. Norman shows in his Table 3 is unreliable. I have calculated the volume of water produced from the Property from inception of production through June 1966 which is the start of SWD well injection. The calculated volume of water is approximately 498,699 barrels as compared with Mr. Norman's 593,536 barrels for the same period.

### **17.1.5 Salt Water Handling System**

Mr. Norman states, "Over 1.6 million barrels of saltwater were produced on the Levert property from 1952 until 1977. All of which was handled in saltwater production pits." He goes on to state,

“Offsite SWD wells were never used to dispose of saltwater production from the Levert property.” Mr. Norman has not seen or misunderstands available documents that make his statement inaccurate. BAOP converted a well in June 1966, not located on the Property, to use as their fieldwide SWD well. Therefore, only approximately 500,000 barrels of water were discharged via pits. As described earlier in this report, BAOP’s water production between October 1957 and June 1966 went to pits where any waste oil was removed, and then into a series of ditches for discharge into nearby water bodies. By July 1966, produced water was sent to a SWD well located off the Property.

Mr. Norman continues making erroneous statements when he says, “at no time did any of the Defendants install a saltwater disposal well for the purpose of disposing of produced water from the Levert property.” LDOC information shows that water from the Levert property was disposed in a SWD well located off the Property and converted in June 1966.

#### **17.1.6 Hazardous Substances**

Mr. Norman alleges, “...that hazardous substances and chemicals, such as heavy metals, chemical additives and friction reducers are among the highly toxic materials used in the operations and failed open unlined earthen pits.” However, Mr. Norman does not cite any specific incident, document or relationship between any substance and any test results on the Property. I have not seen any documents that show that BAOP or Gulf mishandled any alleged hazardous chemicals on the Property.

Mr. Norman then describes produced water as “toxic or hazardous”. The LDOC, LDEQ and EPA have classified oil, produced water and their waste as Nonhazardous Oilfield Waste (NOW).

#### **17.1.7 Casing Cement**

Mr. Norman states, “...the surface casing cement analysis indicates that the USDW was not protected.” I have reviewed the casing and cement utilized for the wells drilled or operated by BAOP and Gulf on the Property and find that they met or exceeded SWO 29B requirements. The casing and cement on the wells created effective barriers that did not allow the movement of oil, gas or water into the USDW and there is no evidence of fluid movement. Based on the information and data available it appears that the LDNR-OC was satisfied with the construction and operation of the wells including the casing and cementing program. Mr. Norman has not identified any flow path from any specific well that relates to any aquifer sampling on the Property. In addition, he has not performed any flow calculations that show how fluids can move vertically outside the well’s casings.

Mr. Norman attempts to support his theory of inadequate casing cement with questionable calculations (Norman Table 8). However, he uses faulty and unreliable assumptions. First, Mr. Norman uses a cement yield of 1.18 cubic feet per sack. The cement yield is the amount of cement measured in

cubic feet that a sack of cement will yield when mixed with a certain amount of water and other additives. A sack of common cement (Class A) mixed with 5.2 gallons of water and no other additives will yield a volume of 1.18 cubic feet and weigh 15.6 pounds per gallon (ppg). However, information shows that BAOP used a lightweight cement for its surface casings which was, and still is, a standard industry practice when cementing certain casing strings. A lightweight cement is used so that the cement can be better circulated up the casing-hole annulus and not lost to the formations. Lightweight cements have a cement yield that is higher than the 1.18 cubic feet per sack ( $\text{ft}^3/\text{sk}$ ) used by Mr. Norman. A standard industry practice is to create a lightweight cement by adding additional water volumes to a cement slurry mixture thus making the weight of a gallon of cement less. To facilitate adding more water to the cement, operators and cementing companies add bentonite gel to the cement-water mix. For example, if one needs a 13.1 ppg cement then 10.4 gallons of water and 8% gel is added to a sack of cement. This produces a cement yield of 1.92  $\text{ft}^3/\text{sk}$ . The use of water and gel additives have been a standard practice of operators and cementing companies since at least the 1930s.

Documents show that BAOP used at least a 4% gel in its casing cements which resulted in higher cement yields than those assumed by Mr. Norman. The higher cement yields based on the documents show that Mr. Norman's calculated top of cement should be shallower. In other words, Mr. Norman used incorrect cement volumes that do not conform with the facts.

In addition, Mr. Norman uses washout factors of 1.75 (75%) in his Table 8. A washout factor quantifies how a drilled hole's theoretical volume has enlarged. For example, a washout factor of 1.75 which means that the hole is 75% larger than the volume of a hole based on the diameter of the drill bit. Hole washout is highly influenced by the amount of time that the hole is open before casing is run. Surface holes are normally drilled quickly with most drilled in just one day. Therefore, hole washout is not as large as in deeper parts of the well subject to longer drilling times. For surface casings, the LDNR-OC requires a minimum volume of cement: 500 sacks for wells deeper than 2,500' or cement to be circulated to surface. The LDNR-OC defines "circulated to the surface" as "the calculated amount of cement necessary to fill the theoretical annular space plus 10 percent." Therefore, LDNR recognizes a washout factor of 1.1 (10%) which is more reasonable for surface holes.

Mr. Norman also alleges that the cement did not provide zonal isolation of the productive intervals. I have also reviewed the production casing cement and it is evident that the production zones in the Temple Hargrove and BAOP drilled wells were adequately isolated. There are no documents that indicate otherwise. Mr. Norman's cement volume calculations for the conductor and surface casing strings are incorrect and unreliable. However, even with Mr. Norman's unreliable assumptions, his calculations show that the BAOP and Gulf operated wells had sufficient cement to protect the underground source of drinking water ("USDW"). In addition, Mr. Norman's cement top calculations

for the production casings show that the cement covered the productive intervals in the BAOP and Gulf operated wells and created zonal isolation.

The surface casings of the BAOP wells were run, cemented and tested many years before the concept of the USDW was promulgated.<sup>2</sup> There have been no LDNR-OC complaints or compliance issues concerning the BAOP's well's casing or cementing. There is no evidence that the USDW has been impacted. There is no evidence that the wells on the Property pose any threat to the USDW.

#### 17.1.8 Pits

Mr. Norman comments on the use of earthen pits by oil and gas operators. He states, "...earthen pits were known by the oil and gas industry to leak and seep". Earthen pits in Louisiana were routinely constructed in a manner that was compatible with the surface geology and soil conditions. The predominance of clays in south Louisiana soils has provided excellent conditions for oil and gas production and reserve pits. Not until the 1980s were some natural clay-lined pits in Louisiana examined as potentially being subject to subsurface seepage. The use of earthen pits in Louisiana in oil and gas exploration and production activities was routine, customary, and legally allowed by pertinent regulatory agencies during the time BAOP and Gulf operated on the Property. Pits were an understood and very visible means of dealing with produced fluids. State inspectors and other persons familiar with oil and gas operations would have understood the use of earthen pits.

Mr. Norman cites his service in 1968 on an API committee as evidence of pit knowledge. However, Mr. Norman has supplied no written report or minutes from the 1968 committee. I have found no API documents from that time period that addresses earthen pits in the manner which he describes. However, API Recommended Practice (RP) 51 titled "*API Recommended Onshore Production Operating Practices For Protection Of The Environment*" does address pits. API RP 51 was issued in 1974, reissued in 1982, and recognized the use of pits. API RP 51 made recommendations for the proper utilization of pits associated with production practices and is consistent with pit usage on the Property. The API RP 51 document contradicts Mr. Norman's assessment of the 1968 committee views.

Mr. Norman discusses pit seepage calculations in his report for a hypothetical 100' by 50' by 4' pit. Mr. Norman assumes a hydraulic conductivity of between 0.01 and 0.05 ft/day over the life of the pit. Based on this data, Mr. Norman calculates a rate of 70 barrels per day for various pits. It should be noted that this seepage rate is for the entire cross-sectional area of his hypothetical pit and would be depth specific. The deeper the depth below the pit the slower the rate, until fluid migration would halt

---

<sup>2</sup> USDW was part of Safe Drinking Water Act of 1974

for the indicated conditions. Furthermore, Mr. Norman's use of an assumed hydraulic conductivity of between 0.01 and 0.05 ft/day would not be consistent with clay but would be more representative of a higher hydraulic conductivity or higher permeability soil. In addition, Mr. Norman does not account for the operational effects of pits having added solids to the pit bottoms. The solids include fines (primarily clay particles), vegetation and residual sludge that would settle to the pit bottoms and greatly reduce the native hydraulic conductivity.

Mr. Norman then says that only one pit on the Property was registered under the 1986 amendments to SWO 29B. The Levert Heirs #1 and Levert Heirs C #1/1D were plugged and abandoned prior to 1986. The Levert Heirs B #1/1D was sold to Union Texas prior to 1986. The BAOP Levert Heir D #1 and the Brock – Levert Heirs #2 were dry holes and plugged and abandoned before 1986. Neither BAOP nor Gulf were the operator of the wells on the Property when the amendments to SWO 29B were made in 1986. In addition, the 1950 lease had expired by then and neither BAOP nor Gulf had rights to access the Property.

#### **17.1.9 Standards**

Mr. Norman states, "Defendants also had industry knowledge of standards including API, ASME Section VIII, Division 1, ASTM, ANSI, NACE and parametrics on soils." I have found no information that indicates that any standards were ignored or misapplied by BAOP or Gulf on the Property. Mr. Norman's general statement does not cite any item of equipment or operating practice. ASME standards Mr. Norman cites are for pressure vessels. I have seen no pressure vessel inspection made by any of the plaintiff's experts in this matter. In fact, the production equipment used has long since been removed and are not available for testing or inspection. It is highly unlikely that BAOP or Gulf would employ under-designed equipment for use on the Property and I have seen no document to indicate that happened. I have found no evidence that BAOP or Gulf employed any under-designed equipment on the Property.

He then states, "Each of the operators did not properly design, operate and maintain the oil field equipment and facilities." However, he does not discuss any specific piece of equipment or any design, operation or maintenance. The equipment used by BAOP and Gulf on the Property has been removed. None of the available documents indicate that BAOP or Gulf equipment was improperly operated or maintained.

#### **17.1.10 Root Cause Analysis**

Mr. Norman says that he has used the principles of root cause analysis to develop his opinions. Mr. Norman cites as his root cause, "...inadequate engineering and imprudent operations..." Mr.

Norman does not disclose a formal root cause analysis that one would expect from his comments. Mr. Norman's root cause analysis is simply a circular argument that since impact was found, improper action had to be the root cause of that impact. I have seen no information that supports Mr. Norman's allegations.

## **17.2 ICON Environmental Services**

ICON provided a report that discusses alleged contamination and remediation of parts of the Property to either background or regulatory standards. Background level restoration is not required by the 1950 oil gas and mineral lease or LDNR-OC's SWO 29B. ERM has been retained in this matter and is addressing the alleged contamination of soil and groundwater.

Part of the ICON purposed restoration plan includes the handling of recovered alleged impacted shallow groundwater (15' to 25' below ground surface). I have found no technical reasons that would preclude the onsite reinjection of any recovered impacted waters if remediation is deemed to be required. Subsurface injection of the total recovered impacted waters would eliminate the need for reverse osmosis or transportation and offsite disposal of the recovered fluids.

Only one SWD well would be necessary to inject all the recovered fluid. A current SWD well or available wellbore could also be used. ICON estimates that 186,767,306 gallons (4,446,840 barrels) of shallow groundwater would be recovered over 17.7 years for remediation based on regulatory standards. This averages approximately 688 barrels per day. This injection rate is easily accomplished with a single SWD well. In 2009 alone, the Levert Heirs B Brine Disposal #1 well injected 5,137,663 barrels, an average daily injection rate of approximately 14,000 barrels per day.

ICON estimates the cost of two SWD wells at \$6,100,000. Therefore, ICON's single well cost is approximately \$3,000,000. Neither ICON nor Mr. Norman provide information showing how ICON came up with its SWD well cost. Information shows that a SWD well can be drilled, completed and operated for much less costs. A 4,500' SWD well can be drilled and completed for approximately \$1,200,000. This cost is based on publicly available information found in LDNR-UIC well files. The SWD well is the Midstates Petroleum Company (MPC) – SWD #1 (SN 973763). The information shows that a 4,500' SWD well was based on a turnkey bid for \$369,750. The bid included casing, cement, tubing, packer and a well head. Since the bid was made in 2009, I have applied the Producer Price Index (for drilling oil and gas wells) to estimate a current cost estimate of approximately \$473,000. The addition of tanks, injection pump, piping, labor, contingencies, P&A, restoration, etc. would increase the overall cost to approximately \$1,200,000. Therefore, a cost to provide underground water disposal if shallow groundwater remediation is performed would be approximately \$1,200,000 – not \$6,100,000 as ICON suggest. [Table 2]

## 18.0 Summary Opinions and Conclusions

BAOP and Gulf operated three well bores on the Property between 1957 through 1972. The 1950 oil, gas and mineral lease BAOP and Gulf operated under expired and was released in 1984.

The 1950 lease allowed BAOP and Gulf to maintain facilities, equipment, flowlines, and conduct operations on the Property. There is no evidence that the landowners had any unresolved issues with the operations of BAOP or Gulf.

A LDNR-OC inspection of BAOP's Bayou Choctaw operations was performed on March 9, 1964. A letter sent to BAOP from the LDNR-OC stated, "Our Enforcement Agents report that your installations at Levert Heirs "C" Lease, Levert Heirs Lease and Schwing St. "B" Lease comply in every respect with the regulations set forth by Statewide Orders of the Department of Conservation, and we wish to take this opportunity to commend you for good operating practices."

Prior to October 1967, produced water discharge was allowed for upland areas in Louisiana, subject to any limitations by the LDNR-OC or LSCC. When LDNR-OC inspected BAOP's field operations in May 1966 and subsequently asked them to consider possible underground injection, BAOP promptly converted a well to a SWD well for its Bayou Choctaw field operations.

The oil and gas operations conducted by BAOP and Gulf were in a manner that was consistent with the normal and customary way oil and gas operations were conducted in rural, land operations in the region, and for the time period the operations were conducted. The operations, which included the use of earthen pits, were normal routine and necessary operations for the development and production of the oil and gas reserves on the Property. The operations were reasonable and in keeping with applicable industry standards and governmental regulations.

Neither BAOP nor Gulf were operators on the Property in January 1986 when the LDNR-OC required pit registration. Any remaining pit would be the responsibility of the current or last operator and should be closed using SWO 29B parameters.

Oil and gas operations will have unavoidable impacts. Any impact that potentially poses a real threat to humans, wildlife or plants should be addressed and be compatible with current regulations and standards. Any areas of the Property impacted by oil and gas operations that are noted to be above current applicable regulatory standards may need to be remediated in a reasonable and practical manner by the party responsible for such exceedances, if required by the applicable regulatory agency to satisfy current existing regulatory standards. Any regulatory agency requirement to remediate property to existing regulatory standards does not itself mean that the oil and gas operations at issue were improper, unreasonable or excessive. The existence of any alleged pollution or contamination of the Property will be determined by other experts in this matter.

## **19.0 Closing Remarks**

My comments, opinions and conclusions are based on the information furnished to date and my education, training, knowledge, and experience in the oil and gas industry.

I am a Registered Professional Petroleum Engineer with a degree in Petroleum Engineering. Over the course of the past 47 years, I have worked in many aspects of the oil and gas industry including drilling, production, operations, reservoir engineering, and management. I have held positions in oil and gas companies which required the management of producing properties, drilling operations, field operations, land, and geology.

A copy of my curriculum vitae is attached (Attachment "B") and made a part of this report. If called to testify at trial, I would expect to testify as to the operations, equipment, and operating customs, practices, guidelines, and regulations. Possible trial exhibits may include the information furnished and reviewed to date. This is an initial report based on the work performed to date. As additional information is received and/or reviewed, I will, if necessary, adjust my opinions.

**Table 1**  
*Top of Cement Calculations*

Well [Original Operator]	Serial Number(s)		Casing Diameter (inches)	Hole Diameter (inches)	Casing Depth (feet)	Sacks of Cement	% Gel	Yield* [ft <sup>3</sup> /sack]	29B LDNR Excess [washout]	TOC Result
Lever Heirs #1 [Temple Hargrove]	44428	Conductor	16.00	20.000	96	113	4.0	1.55	10.0	Surface
		Surface	10.75	15.000	1,589	800	4.0	1.55	10.0	Surface
Lever Heirs B #1 [BAOP]	68122/76522	Conductor	20.00	26.000	125	250	4.0	1.55	10.0	Surface
		Surface	13.375	17.500	2,137	2,000	4.0	1.55	10.0	Surface
Lever Heirs C #1 [BAOP]	69635/70947	Conductor	16.000	20.000	115	200	4.0	1.55	10.0	Surface
		Surface	10.75	14.750	1,991	1,770	4.0	1.55	10.0	Surface
Lever Heirs D #1 [BAOP]	73467	Conductor	16.00	20.000	115	200	4.0	1.55	10.0	Surface
		Surface	10.75	15.000	1,993	1,770	4.0	1.55	10.0	Surface

\* See Halliburton Cementing Tables

**Table 2**  
*SWD Well Cost*

SWD Well Cost Estimate							
<b>Well:</b>	Water Disposal			<b>Depth- feet:</b>	4500' MD		
<b>Field:</b>	Vertical Well			<b>Zones:</b>	Miocene Sands		
<b>Parish:</b>	West Baton Rouge						
<b>State:</b>	Louisiana						
<b>INTANGIBLE DRILLING COSTS:</b>							
				<b>Dry Hole</b>	<b>Completed</b>	<b>P&amp;A</b>	<b>TOTAL</b>
Permitting/Surveying/Fees				5,000	2,000		7,000
Location, Roads				15,000	10,000	10,000	35,000
Surface Restoration					20,000	15,000	35,000
Rig	\$10,000.0	per day	4 days			40,000	
Drilling Turnkey [see SN 973763]				473,000			473,000
Turnkey Contingencies				20,000			20,000
Mud and Chemicals						6,400	
Materials & Supplies				5,000	20,000		25,000
Fluid Disposal				10,000	5,000	5,000	20,000
Cuttings Disposal				10,000			10,000
BOP & Wellhead Rental					10,000		10,000
Drill/Work String Rental							
Fuel				-	2,500	10,000	12,500
Cement & Cementing						26,000	
Squeeze Cementing (if required)					15,000		15,000
Transportation - Trucking				1,000	10,000	10,000	21,000
Consultants:							
Engineering	\$3,000.0	per day	20 days	60,000	-		60,000
Drilling Supervision	\$2,000.0	per day	days	-	8,000	8,000	16,000
Compl Supervision	\$2,000.0	per day	12 days		24,000		24,000
Geology	\$1,800.0	per day	5 days	9,000			9,000
Roustabout and contract labor				2,500	15,000	5,000	22,500
Wellhead Installation/Welding				-	1,000		1,000
Well Control Insurance				10,000	5,000	6,000	21,000
Contingencies (15%)				93,075	22,125	21,210	136,410
<b>TOTAL IDC</b>				<b>\$ 713,575</b>	<b>\$ 169,625</b>	<b>\$ 162,610</b>	<b>\$1,045,810</b>
<b>TANGIBLE COST:</b>					<b>Dry hole</b>	<b>Completed</b>	<b>TOTAL</b>
Casing:	<i>Turnkey</i>						-
Tubing	<i>Turnkey</i>						-
Packer	<i>Turnkey</i>						-
Wellhead Equipment/Tree	<i>Turnkey</i>						-
Flowlines, Valves, Guages					10,000		10,000
Pump/Motor					100,000		100,000
Tanks					25,000		25,000
Other Tangible Equipment					10,000		10,000
State and Parish Taxes (9%)					13,050		13,050
Contingencies (15%)					21,750		21,750
<b>TOTAL TANGIBLE</b>				<b>\$ -</b>	<b>\$ 179,800</b>	<b>\$ -</b>	<b>\$ 179,800</b>
<b>TOTAL WELL COSTS</b>				<b>\$713,575</b>	<b>\$349,425</b>	<b>\$162,610</b>	<b>\$1,225,610</b>

**Attachment A**

1. LDNR-OC documents available on Strategic Online Natural Resources Information System (SONRIS) including:
  - a. Well files,
  - b. Production Audit Cards,
  - c. Pit files,
  - d. LDNR correspondence,
  - e. Lease Facility Inspection Reports,
  - f. DNR Compliance Orders and Notices.
2. LDNR-OC documents available from Baton Rouge Office:
  - a. P Levert-DNR Rcds-1 – 1050,
  - b. Inspection and Enforcement documents.
3. Produced documents:
  - a. A2191572-000001 – 6807,
  - b. ERM Figures 1 – 32,
  - c. Mark A. O’Neal & Associates,
  - d. BC\_CampM\_0001 – 335,
  - e. BC\_JamesS\_00001 – 28,
  - f. BC\_JohnS\_00001 – 38,
  - g. BC\_MarkL\_00001 – 88,
  - h. BC\_RonL\_00001 – 569 & 577 – 1409,
  - i. ERDI documents (including Levert\_ERDI\_000001 – 85)
4. Expert Reports with attachments:
  - a. ICON report dated July 19, 2024,
  - b. ICON SDT documents,
  - c. Charles Norman report dated August 9, 2024,
  - d. Charles Norman SDT documents,
  - e. William Rogers report dated August 7, 2024,
  - f. William Rogers SDT documents.
5. Petitions with attachments:
  - a. Original,
  - b. First amended,
  - c. Second amended.
6. Google Earth images.
7. Halliburton Cementing Tables.

**Attachment B**  
CV of Richard K. Kennedy

**Richard K. Kennedy, P.E.**

CONTACT INFORMATION: 503 Montrose Avenue  
Lafayette, LA 70503  
Cell: 337.298.4570  
Email: richard.kennedy@att.net

CURRENT POSITION: Petroleum Consultant - Richard K. Kennedy, P.E.

EDUCATION,  
QUALIFICATIONS AND  
MEMBERSHIPS: B.S. Petroleum Engineering  
Louisiana Tech University, 1977  
Post Graduate Courses in Petroleum Engineering  
Louisiana Registered Professional Engineer since 1983 (# 20523)  
Pi Epsilon Tau (Petroleum Engineering Honor Society)  
Numerous Industry Training Schools  
Society of Petroleum Engineers

EMPLOYMENT HISTORY:

1/2000 – Current	Consultant Engineer
9/2005 – 11/2011	Miller Energy LLC Lafayette, LA President
1989 – 1999	XCL, LTD Lafayette, LA Vice President of Engineering
1987 – 1989	BASF Wintershall Corporation Lafayette, LA Manager of Field Operations
1981 – 1986	Borden Energy Resources Lafayette, LA Operations Manager (1984 – 1986) Petroleum Engineer (1981 – 1986)
1979 – 1981	Marathon Oil Company Lafayette, LA

Drilling Engineer (1980 – 1981)  
Reservoir Engineer (1979 – 1980)

1978 – 1979                      Shell Oil Company  
Houston, TX  
Reservoir Engineer

1977 – 1978                      Shell Oil Company  
Midland, TX  
Petroleum Engineer

6/1976-8/1976                      Mobil Oil Corporation: Engineering assistant (Lake Charles, LA)  
6/1975-8/1975                      Marathon Oil Company: Roustabout (Haynesville, LA)  
6/1974-8/1974                      Marathon Oil Company: Roustabout (Haynesville, LA)  
6/1972-8/1972                      Marathon Oil Company: Roustabout (Haynesville, LA)

#### Consulting Experience

- Determination of economic damages related to lost and deferred production due to production interruption incidents.
- Review of historical operations for environmental lawsuits.
- Facilities and well review for hurricane damage.
- Multiple drilling, operation and reservoir projects throughout Gulf Coast, both onshore and offshore.
- Engineering studies and field testing of unconventional resources; coal bed methane and oil/gas shales.
- Review of mineral/lease disputes.
- Field studies.
- Reserve reporting.
- Expert witness.

#### Industry Experience

- Drilling, production and reservoir engineering.
- Drilling and production operations.
- Management of oil and gas companies.
- Acquisition and divestiture of oil and gas properties.
- SEC reserve reports.