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Introduction:

The following report deals with certain aspects of the matter styled **Henning Management, LLC vs. Chevron USA, Inc., et al.** In particular, this report deals with oil and gas operations conducted on the Henning Management property (the Property) by various oil and gas operators. The Property is located within the Hayes Oil and Gas Field. Oil and gas operations began on the Property in 1938 and continue through the present time. The author of this report has been retained by Chevron USA.

ICON Environmental Services (ICON) has identified areas on the Property that it alleges have soil and groundwater contamination. The oil and gas operations on the Property have been reviewed and are discussed in this report. The following expert reports have been reviewed: ICON dated September 30, 2021; Charles Norman dated October 15, 2021; and Walker Wilson dated June 3, 2021.

The following comments are based on the information and data reviewed to date, and the author's education, training and experience.

Information and Data:

The information and data that has been provided to date is listed on Attachment “A”, which is attached to and made a part of this report.

General

The Property is located in eastern Calcasieu Parish and western Jefferson Davis Parish and purported to comprise approximately 1,246 acres. The Property is within parts of Sections (Secs) 16, 17, 18, 19, 20 and 21 of Township 11 South (T11S), Range 5 West (R5W) as well as approximately 20 acres in the northeast corner of Sec 24 T11S R6W. The Property is approximately 1.5 miles south of Hayes, Louisiana.

Hayes Oil and Gas Field

The Hayes Field was discovered in 1942 with the successful completion of the Gulf Refining Company (Gulf) – Calcasieu National Bank (CNB) #2, SN 26358. However, exploration drilling began in 1935. Production began in 1942 and continues to date. Multiple oil and gas companies have operated in the Hayes Field over the field’s lifetime. Shell spudded the initial exploratory well in the Hayes Field on September 25, 1935. The well was the Lacassine Company #1, SN 18137 located in the southwest quarter (SW/4) of Sec 20. The Lacassine Company #1 was drilled to a total depth (TD) of 9,844’ and plugged and abandoned (P&Ad) as a dry hole. The Louisiana Department of Natural Resources (LDNR) information shows +/-84 SNs have currently been issued for the Hayes Field of which +/-72 are wellbores and the remainder are either expired permits or dual completions. Twenty-eight of the SNs represent dry holes. LDNR information shows at least four wells have been either drilled or converted to salt water disposal (SWD) wells. None of the SWD wells are currently shown as active. At least four wells were permitted for annular disposal.

LDNR data show that the last well to be permitted and drilled in the Hayes Field was the Lacassine Company #1, SN 225690. The well was permitted by United World Energy Corporation on March 23, 2001. It was drilled to a TD of 13,455' and was a dry hole. It was P&A'd as of October 24, 2003.

Oil Gas & Mineral Leasing on the Property

Shell Petroleum Corporation (Shell) entered into an oil, gas and mineral (OG&M) lease with Calcasieu National Bank of Lake Charles on January 15, 1935. Calcasieu National Bank (CNB) of Lake Charles was the owner of the Property at that time. The 1,569.56 acre lease granted Shell the rights "...of exploring, drilling, mining, and operating for, producing, and owning oil, gas, sulphur and all other minerals and of laying pipe lines and of building tanks, telephone lines, power stations and other structures thereon to produce, save, treat and take care of said products, and housing its employees...". The lease addresses certain surface operations and damages by stating, "When requested by Lessor, Lessee shall bury its pipe lines below plow depth. No well shall be drilled nearer than 200 feet to the house or barn now on said premises, without the consent of the Lessor. Lessee shall pay for damages caused by all operations to growing crops on said land. Lessee shall have the right at any time to remove all machinery and fixtures placed on said premises, including the right to draw and remove casing." Paragraph 12 of the 1935 lease stated, "Lessee shall have the exclusive right to build, operate and maintain pits, reservoirs, pickup stations and plants for the purpose of picking up and conserving the waste oil that flows down the creeks, ravines and across the land embraced in the lease, whether said oil is produced from land covered by this lease or other lands and lessor shall be entitled to receive the royalty hereinbefore reserved on all such oil so saved." Shell drilled one well on the Property under the 1935 OG&M lease which was a dry hole. The 1935 lease expired in 1938.

On May 19, 1938 Shell obtained a new OG&M lease on the CNB property covering the same 1,569.56 acres. The 1938 lease had an identical granting clause, damage clause and Paragraph 12 as the 1935 lease. Shell subleased portions of the 1938 CNB OG&M lease to Gulf by instruments effective December 9, 1940 and August 9, 1943. For the 1943 sublease, Shell reserved the gas and liquid hydrocarbons from wells classified as oil wells by the Louisiana Department of Conservation (LDOC) or as defined in the sublease instrument. Gulf and other lessors and lessees created a 1,280 voluntary unit called the Hayes Unit 1. The unit initially contained two producing gas wells. The unit was created to conform with the LDOC and the federal Petroleum Administration for War (PAW) requirement for gas well spacing of 640 acres per well. The 1938 lease was amended on September 13, 1943 and December 7, 1946 to better define lessees' rights and obligations as a result of the voluntary unit. Shell and Gulf released part of the 1938 OG&M lease on December 30, 1947. The released area was acreage outside the established 1,280-acre unit.

Willard E. Walker and Calcasieu Real Estate & Oil Co. (Walker) became the owner of the Property in January 1946. H.L. Hawkins obtained a 670 acre OG&M lease on June 6, 1951. The 1951 Hawkins lease was partially assigned to Coastal States Gas Producing Company (Coastal). Hawkins heirs and Valero Energy Corporation, the successor to Coastal, released the 670 acres in 1981.

By 1977 the Property was owned by a partnership called Walker Louisiana Properties. Gulf leased 222.5 acres from Walker Louisiana Properties on February 21, 1983. The OG&M lease covered minerals on the Property located in Secs 16 and 17. No wells were drilled under the 1983 OG&M lease. Gulf merged with Chevron Corporation (Chevron) in 1985. Chevron released the acreage on June 18, 1986.

Gulf, followed by Chevron, farmed out acreage in the Hayes Field to Graham Drilling Partnerships 83A and 83B effective September 30, 1984 and

amended January 24, 1986. Chevron also farmed out acreage in the Hayes Field to Petrocana, Inc. (Petrocana) on November 21, 1986. Both farmouts included acreage on the Property. Chevron was not one of the oil and gas operators that operated on the Property.

Effective November 1, 1990 Chevron assigned all of its right, title and interest in and to the Hayes Field to Petrocana which included its interest in the 1938 OG&M lease. Petrocana sold its interest in the 1938 lease to United World Energy Corporation (UWEC) on August 13, 1993. UWEC and its partners individually transferred their interest in the 1938 lease to Louisiana Exploration & Acquisitions, Inc. beginning in 1997.

Operations on the Property

Shell

Shell spudded its second well, the first and only well on the Property, on January 14, 1938 at a location in the SE/4 of Sec 18. The well was Shell's Calcasieu Marine National Bank (CMNB) #1, SN 20853. The CMNB #1 was drilled to a total depth (TD) of 9,073' and was P&A'd as a dry hole.

Gulf

After obtaining a sublease from Shell of the 1938 CNB lease, Gulf spudded the CNB #1, SN 24340, on January 3, 1941. The CNB #1 was located on the Property in Sec 18 approximately 330' east of the western boundary and was designed as an exploratory test of zones deeper than zones drilled in the earlier Shell wells. Gulf ran a string of 13-3/8", 48 pound per foot (ppf) surface casing to 1,850' and cemented it with 1,000 sacks of cement. Gulf then drilled to 9,200' and cemented a 9-5/8", 43.5 ppf intermediate casing string with 1,000 sacks. The well was then drilled to a total depth (TD) of 10,534' encountering a high pressure gas sand from 10,472' to 10,523'. Gulf ran a 7" liner in the well but the primary cementing of the liner failed due to loss of circulation. After perforating the 7"

liner for additional cementing, the well pressured up (kicked) with the wireline in the well. The well was immediately shut-in with 2,800 pounds per square inch (psi) at the surface and no drill pipe in the hole. Mud was pumped in the well in an effort to lower the pressure prior to snubbing drill pipe. At 5,100 psi a 2" diameter high pressure nipple that was utilized for gas bleeding ruptured. The well then began blowing out through the 2" connection on or about July 21, 1941. Due to the well flowing sand, several blowout preventer valves were damaged allowing the flow to increase. The well flow then began burning. Gulf planned to kill the well by installing well control equipment on the wellhead and diverting the flow to surface separators and tanks. However, on July 30, the flow damaged the casings at the surface causing the well to create a crater. Gulf's initial plan to cap the well had to be changed and a relief well was spudded 800' east of the CNB #1. The planned relief well was the CNB #2 which was spudded on August 15, 1941. However, the CNB #1 bridged over and ceased flowing on August 13, 1941 ending the need for a relief well. The CNB #1 burned for 12 days before it bridged over.

The CNB #2, SN 26358, was planned as a relief well for the CNB #1. However, since the CNB #1 bridged over and ceased flowing before the CNB #2 was spudded, the CNB #2 was drilled vertically to a TD of 11,784' as a replacement well. The well was completed April 30, 1942 through perforations from 11,880' to 11,915' and had an initial reported test rate of 3,222 thousand cubic feet gas per day (Mcf/day), 60 barrels of condensate per day (BC/day), and 7% base sediment and water (BS&W) which was likely completion fluids and not formation water. Subsequent well test showed that the water decreased to 0%.

Gulf spudded its third well in the Hayes Field on May 28, 1942 approximately 2,900' northwest of the CNB #2. The well was the Amoskeag Savings #1, SN 27488, which was not on the Property. Gulf then established a 1,280 acre voluntary unit which adhered to the PAW requirements at that time and called for gas wells to be drilled and produced on 640 acre spacing. The unit

was called the Hayes Unit 1 and incorporated portions of the Property. The names of the Amoskeag Savings #1 and CNB #2 well were changed to Hayes Unit 1 (HU1) #1 and HU1 #2 respectively.

The two HU1 wells produced sporadically until September 1947 to provide fuel for drilling operations in the Hayes Field. In September 1947, United Gas Pipe Line Company finalized a pipe line to the field that allowed Hayes Field gas to be sold to a long term market.

Gulf spudded the CNB F #1, SN 31298, on January 16, 1946 at a location in the SE/4 of Sec 17 on the Property. The well was drilled to TD of 13,455' and P&A'd as a dry hole.

Between March 1952 and November 1976, Gulf drilled an additional seven wells within the 1,280 acre Hayes Unit. Three of the new HU1 wellbores were located on the Property. These were the HU1 #6, SN 103174; HU1 #7, SN 128241; and the HU1 #9, SN 153121. The HU1 #6 was completed as a dual producer with the dual called the HU1 #6D, SN 105169. The HU1 #9 was a dry hole.

Gulf ultimately drilled eight wells on the Property. Three of the wells were dry holes and were P&A'd by Gulf. The dry holes were the CNB #1, SN 25340; CNB F #1, SN 31298; and HU1 #9, SN 153121. Three of the Gulf wellbores on the Property were productive. These were the HU1 #2, SN 26358; the HU1 #6/6D, SNs 103174/105169, a dual completion; and the HU1 # 7, SN 128241. Two of the wells drilled by Gulf on the Property were SWD wells. The HU1 #6/6D was P&A'd by Gulf on May 12, 1980 and the HU1 # 7 was P&A'd by Gulf on December 28, 1983. The sole remaining Gulf well, the HU1 #2, was transferred to Great Southern Oil and Gas Company (Great Southern) on February 1, 1984. The two SWD wells were P&A'd by 1984.

Great Southern

Great Southern became the operator of the of Gulf's HU1 #2 on February 1, 1984. Great Southern perforated and unsuccessfully tested two zones in the well during March 1984. Great Southern P&A'd the HU1 #2 on June 4, 1984.

H.L. Hawkins

H.L. Hawkins (Hawkins) assembled leases immediately south and east of the Gulf operated 1,280-acre HU1. Hawkins then created a 1,280-acre voluntary unit that it called the Hawkins-Hayes Unit 1 (HHU1). The 670 acres that Hawkins had obtained with its June 6, 1951 Walker lease was part of the 1,280-acre unit.

Hawkins spudded its first well on October 11, 1951. The well was the HHU1 #1, SN 44135 located in the north part of Sec 20 and on the Property. Hawkins' #1 well was drilled to a TD of 11,864' and completed at perforations from 9,584' to 9,600'. The well was tested at a rate of 2,727 Mcf/day, 116 BO/day and no water.

Hawkins spudded its second well on its HHU1 on November 28, 1956. The well was the A. Atkinson #1, SN 63207 and was located near the center of Sec 19 but not on the Property. The well was drilled to a TD of 11,651' and completed with perforations from 11,246' to 11,250'. The well tested 4,322 Mcf/day, 40 BO/day, and no water. The well's name was changed to the HHU1 #2.

Coastal States Gas Production Company

Coastal States Gas Production Company (Coastal) became the operator of the two Hawkins wells in June 1963. One of the wells was on the Property, the HHU1 #1, SN 44135. Coastal drilled nine additional wells in the Hayes Field but no new wells on the Property. Coastal P&A'd its HHU1 #1 on March 29, 1971.

Ranger Oil Company

Ranger Oil Company spudded its first well on the Property on February 27, 1973. The well was the HHU1 #1, SN 142076. Ranger's HHU1 #1 well was

located in the NE/4 of Sec 20 and was drilled to a TD of 10,555'. The well was completed as a dual producer with the #1 perforations from 9,694' to 9,698' which tested at a rate of 1,598 Mcf/day, 8 BC/day and no water. The #1D, SN 142399 was perforated from 8,330' to 8,333' and tested at a rate of 1,758 Mcf/day, 12 BC/day and no water. The two completions depleted quickly and Ranger P&A'd them on October 31, 1973.

Graham Exploration

Graham Exploration spudded its HU1 #3, SN 195098, on October 11, 1984 at a location on the Property in the NW/4 of Sec 20. The well was drilled to a TD of 10,000' and completed at perforations from 8,920' to 8,926'. The well was tested at an initial rate of 1,307 Mcf/day, 6 BC/day and 3 BW/day. Graham permitted the HU1 #3 for annular disposal of produced water on September 1, 1991. Petrocana became the operator on February 1, 1992.

Flynn Energy Corporation

Flynn Energy Corporation (Flynn) spudded its Walker Properties #1, SN 206344 on the Property on July 15, 1987. The well was located in the NE/4 of Sec 19 and was drilled to a TD of 10,474'. The well was completed at perforations from 7,954' to 7,957' and tested at an initial rate of 800 Mcf/day, 13 BC/day and 1.67 BW/day. The well was recompleted on March 20, 1988 and the well's name was changed to HU1 #1.

Flynn spudded the Walker Properties #2, SN 207055 on October 31, 1987. The well was located in the SE/4 of Sec 18 on the Property and was drilled to a TD of 9,090'. The well was a dry hole and P&A'd.

Coda Energy, Inc.

Coda Energy, Inc. (Coda) became the operator of Flynn's HU1 #1 on August 1, 1990. LDNR information shows that Coda performed no recompletions or P&A work while operator of the well.

Petrocana, Inc.

Petrocana became the operator of Coda's HU1 #1 on April 1, 1991.

Petrocana became the operator of Graham's HU1 #3 on February 1, 1992.

Richmond Petroleum, Inc. (Richmond) permitted and re-entered the P&A'd dry hole: Walker Properties #2, SN 207055. The re-entry was given the new name Walker Properties #1 and new SN, 213760. Petrocana took over as the operator of the well shortly after the re-entry and unsuccessfully tested perforations from 4,167' to 4,173'. Petrocana then perforated from 3,979' to 3,985' and tested the well at 500 Mcf/day, no condensate or oil and no water. The well's name was changed to the HU1 #4 since it was in an established unit.

United World Energy Corporation

United World Energy Corporation (UWEC) became operator of four of Petrocana's Hayes Field wells on July 1, 1993. Three of those wells were on the Property. They were the HU1 #1, SN 206344; HU1 #3, SN 195098; and HU1 #4, SN 213760. UWEC P&A'd the HU1 #3 on July 3, 2020 and the HU1 #1 on July 9, 2020. Currently, the only remaining active well on the Property is the UWEC – HU1 #4 which is classified by the LDNR as status 33 (shut-in productive – future utility).

Saltwater Disposal

Due to the fact that during the early 1940s there was not a consistent market for natural gas and the HU1 unit was limited to two wells by the PAW, gas and condensate production was modest until 1948. As Gulf's wells were being drilled and produced, gas and condensate production gradually increased. As with most new wells, little or no water was produced. In some cases, water test volumes were described as being fresh water. The phenomenon for gas wells to produce fresh water under certain pressure and temperature conditions is

common. A Gulf reservoir analysis of the existing wells in mid-1956 stated that the wells had no water production and exhibited signs of a pressure depletion reservoir i.e. no signs of a water drive at that time.

SWD #1

During early 1957 the produced water rate increased. Based on well test data an estimate of produced water from the Gulf wells through March 1957 is 57,500 barrels. Gulf contacted the LDOC on March 5, 1957 requesting permission to drill a SWD well. The Louisiana Geologic Survey estimated the base of the fresh water at 600' at that time and approved of the drilling and well construction plan. LDOC permission was granted and Gulf spudded the HU1 SWD #1 (SWD #1) on March 14, 1957. The well was located in Sec 18 approximately 550' east-northeast of Gulf's HU1 #2 and near the facility for that well. The well was drilled to a TD of 1,585' and constructed with 13-3/8", 48 ppf, H-40 casing run to 112.54' and cemented in place with 75 sacks of cement; a 9-5/8", 32.3 ppf, H-40 casing run to 1,345.6' and cemented in place with 400 sacks; and a 7", 20 ppf, J-55 casing run to 1,500' and cemented with 75 sacks. The volumes of cement used on the 13-3/8" and 9-5/8" were sufficient to allow cement to the surface thus isolating any fresh water bearing zones behind the casing strings. A 200', 4-1/2", 9.5 ppf slotted liner was run to 1,582'. Documents indicate that the 7" inner casing string was utilized as the injection string with the injection zone behind the screened interval from 1,519' to 1,592'. SWD #1 was later given the serial number 970424.

A leak was later found in the 7" injection string at 15' and bad 7" casing was found at 1,232'. Gulf then ran a 2-3/8" tubing string on a packer to 1,209' that isolated the leak at 15' and prevented fluid circulation into the 7" by 9-5/8" casing annulus. Since the 9-5/8" casing was set at 1,345.6' and cemented to surface, the fresh water zones and external formations were protected. In addition, the outer 13-3/8" casing at 112.54' protected the shallow water zones. Nothing reviewed indicates water reached either the surface or any fresh water subsurface

formations. The SWD #1 was eventually taken out of service and replaced with the SWD #2. The SWD #1 was P&A'd on December 6, 1983.

SWD #2

Gulf spudded the HU1 SWD #2 (SWD #2) on October 31, 1977 at a location approximately 100' east of the SWD #1. The well was drilled to a TD of 2,000' and was constructed with 8-5/8" casing run to 120' and cemented to surface and 5-1/2" casing run to 1,990' and cemented with 400 sacks to surface. The well was perforated from 1,888' to 1,908' for injection and a 2-7/8" tubing string was run on a packer to 1,742'. The SWD #2 was given the SN 970427. The SWD #2 was utilized through 1983 and P&A'd on September 4, 1984.

Gulf obtained a surface lease from W.E. Walker on January 21, 1959. The surface lease covered 1.77 acres located in the SE/4 of Sec 18. The surface lease gave Gulf the right to use a SWD well on the lease for any of its wells' water production in the Hayes Field. The lease stated that the use of the surface was, "...for the purpose of constructing, installing and maintaining on said tract of land, roads, pipe lines and all other facilities and equipment necessary and useful in the operation of said well as a salt water disposal well in the disposal of salt water produced from any and all wells now owned or which in the future may be owned by Lessee or its assigns, in the above mentioned field." The surface lease allowed Gulf to transport and dispose water into the SWD well from other wells Gulf operated that were not on the lease or within the HU1.

R. Walker SWD #1

Gulf also operated the R. Walker SWD #1 in the Hayes Field. The well was not given a serial number by the LDOC which was customary for the time. The well was located in Sec 8, T11S R5W which was not on the Property.

Hayes SWD #1

Graham, Petrocana and UWEC utilized the Hayes SWD #1, SN 970423. The Hayes SWD #1 was originally drilled by Notomas North America in 1979. The well was located in the NW/4 of Sec 19 but not on the Property.

Annular Disposal

LDNR information also shows that Graham and later Petrocana received approval to utilize the HU1 #3, SN 195098, for annular water disposal. The HU1 #3 is on the Property. Flynn received LDNR approval to utilize its HU1 #1, SN 206344, for annular disposal. Approval was received in 1989 however by August 1990, Flynn had found an alternate SWD method. Gulf did not utilize annular disposal in the Hayes Field.

Aerial Photographs

Aerial photographs of the Property have been made available in this matter that cover the time period from 1940 through 2019. The aerial photographs show the progression of wells drilled on the Property along with facilities, tanks and pits utilized by all operators on the Property along with oil and gas operations that occurred adjacent to the Property.

The 1940 aerial image shows the Property prior to Gulf operations. The location of Shell's CMNB #1 is seen with various drilling pits visible.

The 1951 image shows the crater formed by the blowout of the Gulf CNB #1. The Gulf facility that has been constructed near its HU1 #2 can also be seen. A rectangular containment levee is noted to the northeast of the HU1 #2. Tankage is seen south of the east-west access road.

The 1952 aerial image appears to be very similar to the 1951 image as related to oil and gas operations on the Property. Gulf and Hawkins each had drilled a well on the Property between the dates of the 1951 and 1952 aerials. The

Gulf CNB F #1 was a dry hole and its drill site and reserve pit are seen in the images. The Hawkins HHU1 #1 well was drilled and its drill site is also seen.

The 1957 aerial image appears to be very similar to the 1952 image with no additional wells drilled on the Property. The 1957 image was dated February 28, 1957 which was approximately 2 weeks prior to the spudding of the SWD #1 well, SN 970424.

The only additional drilling activity that took place on the Property between the time of the 1957 aerial and the 1962 aerial was the drilling of the SWD #1. What appears to be the SWD #1 well site with an associated pit can be seen on the 1962 aerial. An emergency pit is seen on the northeast edge of the facility and a possible flair pit is seen south of the tanks.

The 1968 aerial image shows the well site of the HU1 #6/6D which Gulf drilled and completed on the Property in 1964. There appears to be a small blowdown pit associated with the well located to the west of the wellsite. The levees of the original reserve pit are seen but the reserve pit does not appear to be active or used for any purpose. The remainder of the Property appears similar to the 1962 aerial image.

The only significant change between the 1968 aerial image and the 1970 aerial image was the well site and possible associated drill pits for the HU1 #7 which Gulf drilled on the Property in the spring of 1969. An inactive reserve pit is seen near the well site.

No significant changes were noted on the property between the 1970 and 1971 images. Gulf drilled no wells during that time.

Several changes occurred between the time of the 1971 aerial images and the 1978 aerial images. Gulf drilled the HU1 #9 in the last half of 1976 which was a dry hole. The well's drill site and associated reserve pits can be seen on the 1978 aerial image. Gulf also installed the SWD #2 in the fall of 1977 which is seen in

the 1978 aerial image. Ranger also drilled its HHU1 #1/1D in 1973 and the well site is seen on the 1978 aerial image.

No significant changes were noted on the Property between the 1978 and 1981 aerial images. No wells were drilled on the Property during that time.

The only significant change between the 1981 aerial image and the 1985 aerial image is the addition of the Graham HU1 #3 well which was drilled and completed in 1984. Graham's wellsite and tank battery can be seen on the 1985 aerial image.

All of the aerial images from 1985 through 2019 reflect a time period when Gulf did not conduct any oil and gas operations on the Property. Gulf sold its last remaining oil and gas well to Great Southern in February 1984. Great Southern P&A'd this well in June 1984. Gulf P&A'd its last remaining well on the Property in September 1984 which was the SWD #2.

Any changes observed after September 1984 on any aerial image reflects the oil and gas operations conducted by operators other than Gulf or its successor Chevron. Two wellbores were drilled on the Property after 1984. The Flynn HU1 #1, SN 206344, was drilled and completed in 1987. The Flynn HU1 #1's well site, facilities and tank battery can be seen on the 1988 aerial image. The Flynn Walker Properties #2, SN 207055, was also drilled in 1987 and was a dry hole. The Walker Properties #2 well site can also be seen on the 1988 aerial image.

There are no active Gulf pits seen on the 1988 aerial image. All the facilities associated with Gulf's operations on the Property appear to have been removed by the time of the 1995 aerial photo.

Aerial images after 1995 reflect vegetation and/or agricultural changes that have occurred on the Property. The 2019 aerial image shows the well sites for the UWEC HU1 #3, SN 195098, and the UWEC HU1 #1, SN 206344. There are no open pits on the Property.

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 Gulf operated on the Property.

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 drilling fluid additives to a lesser degree. 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. There are no LDNR reserve pits registered to Gulf since it was not an operator in the Hayes Field after 1984. There are no LDNR reserve pits registered to Gulf's successor Chevron since it was not an operator on the Property. There are registered reserve pits on the Property for subsequent operators.

Production Pits

Like reserve pits, production pits were required by the Louisiana Department of Conservation (LDOC). On January 20, 1986, the LDNR required operators to register all existing pits and close them within 36 months unless the pit was to be used. At that time, the LDNR 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. During the time that Gulf

operated in the Hayes Field, 1941 – 1984, it would have utilized burn pits, well test pits or emergency pits. These types of pits, whether they began as a reserve pit or was a built-for-purpose pit, were used to receive well fluids temporarily during an emergency situation, to release pressure on well equipment as necessary, or to burn waste oil when necessary. Prior to 1986, LDNR's statewide order 29B recognized the use of pits as an option for "cleaning up" a well prior to production testing. Likewise, Louisiana regulators required the use of burn pits as a means for the disposition of oily waste. Generally, any well content 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.

LDNR information shows that there are no LDNR registered production pits on the Property associated with Gulf's operations between 1941 and 1984. Gulf's operations predated requirements to register pits of any type. Since Chevron was not an operator on the Property, there are no registered production pits associated with Chevron.

Incidents and Discharges

The blowout incident on the Property of the Gulf CNB #1 well was discussed at length in a prior section of the report. Based on the information reviewed, the author noted that several claims were filed by various landowners and others and all claims appeared to have been successfully resolved at the time.

A salt water disposal line experienced a leak near the HU1 #7 during June 1983. It is unknown how much water leaked however Gulf and Walker Louisiana Properties agreed to execute a damage release on June 29, 1983.

LDNR Lease Facility Inspections

The LDNR began issuing Lease Facility Inspection Reports (LFIR) in the mid-1980s. An LFIR is a documentation of an LDNR Conservation Enforcement

Agent's (CEA) inspection of a well and/or tank battery. In some instances, CEAs wrote Narrative Reports to better explain some field situations. A Compliance Order (CO) is issued if warranted based on the result of an LFIR. CEAs also inspected pit sites and former pit sites and wrote Production Pit Inspection Reports (PPIR)s.

Gulf was issued two LIFRs and one PPIR listing the SN 105169 as the associated well. The LFIRs and PPIR resulted from an LDNR operational complaint received from the EPA on August 15, 1988. It is not clear if the complaint was based on an EPA inspection or other means. The complaint does not mention Gulf or Chevron. The operational complaint was logged in as number 0066.

One of the above-referenced LIFRs was dated January 11, 1989 and the other LFIR and the PPIR were dated February 17, 1989. The associated well for all of these was SN 105169, the HU1 #6D. The HU1 #6D was P&A'd by Gulf in 1971 when the HU1 6/6D was converted to a single completion under the HU1 #6 SN 103174. The HU1 #6 was later P&A'd in February 1980 by Gulf. The P&A report for the HU1 #6 shows that after setting appropriate cement plugs in the well, Gulf cut the casing 4' below ground level and welded a ½" steel plate on the casing. Therefore, it is unknown why the LDNR associated the HU1 #6/6D or Gulf with the LFIRs and PPIR.

The January 1989 LIFR noted that the lease was in excellent condition except for missing signs. An added handwritten note references the EPA complaint, number "066", and notes a production pit that was operated by an offset operator etc. The original LFIR writer noted that there was no existing pit for the site.

The February 1989 LFIR indicates it was a periodic inspection and references the complaint number "0066". This LFIR lists multiple deficiencies. Given that the two LFIRs are for inspections that occurred only 37 days apart, it

seems unusual that so much would change in such a short time. The LFIR also notes that the site referenced by SN 105169 was a multi lease commingling facility. It is unknown from the documents if the two LIFRs are referencing the same site given the number of differences. LDNR CEAs reference the nearest well SN when inspecting facilities or pits. It has not been unusual when reviewing old fields to find the inspected site did not correspond to an appropriate well SN. LDNR correspondence concerning the matter did note that both the HU1 6/6D had been P&A'd well before the noted complaint. Based on the February 1989 LFIR writer's description of the equipment and well site it is more than likely the site is not a former Gulf site. The site described is more than likely the site of the Flynn – HU1 #1, SN 206344. Multiple LFIRs were issued to Flynn for this well and its associated tank battery citing several similar oil releases and equipment issues.

The PPIR indicated the pit was an inactive well test pit with dimensions of 25' wide by 50, long by 4' deep. The only issues noted was that the freeboard was not deep enough. There is not enough information on the PPIR to determine its location or past ownership.

The two LFIRs and one PPIR did not result in any COs issued to Gulf or Chevron. It appears that the LDNR and EPA were satisfied with Gulf and/or Chevron and the matter needed no further action.

There were at least 21 LIFRs issued for the inspection of the HU1 #1, later renamed the HU1 #3, SN 195098. This well was originally drilled and operated by Graham and subsequently operated by UWEC. UWEC P&A'd the well in 2020. At least 5 LIFR's were issued to Graham indicating the site was in good or very good condition, there was no pit and the water was being trucked to a commercial disposal facility. At least 16 LIFRs were issued to UWEC. All but one indicated the site was in compliance with no issues. The one exception was issued on January 14, 2002 which listed multiple deficiencies. A follow up LIFR issued on

March 27, 2002 shows that the site was in compliance and indicated that UWEC addressed all of the deficiencies.

There were at least 23 LIFRs issued for the inspection of the HU1 #1, SN 206344, that was drilled by Flynn and subsequently operated by Coda, Petrocana and UWEC. At least 5 LIFR's were issued to Flynn. The first two were dated June 27, 1988 and November 21, 1988. They indicated the site was in good condition, with no pit and the water was being hauled off to a commercial facility. The last three LIFRs indicated the site was not in compliance and had multiple deficiencies including possible oil spills. The first deficient LFIR was dated February 26, 1990 and the last was dated August 10, 1990. Flynn started addressing the deficiencies but had not completed addressing all of the issues prior to Coda becoming the operator of the well. The information provided contained two LIFRs that were issued to CODA. The first was on September 7, 2019 when Coda became the operator. Coda cleared all of the remaining issues and the LFIR issued to Coda on October 31, 1990 indicated the site was in good condition and was in compliance. At least two LIFRs were issued to Petrocana. One was dated October 31, 1991 based on a request of the landowner for an inspection; the site was found to be in compliance. The second was dated August 17, 1992 with the well undergoing a workover at the time. At least 14 LIFRs were issued to UWEC. All but two indicated the site was in compliance with no issues. The two exceptions were issued on July 2, 1998 which listed multiple deficiencies and August 25, 1998. The remaining 12 LIFRs indicated the site was in compliance through the time UWEC P&A'd the well in 2020.

There were at least 9 LIFRs issued for the inspection of the HU1 #4, SN 213760, that was reentered by Richmond/Petrocana. The well was subsequently operated by UWEC. All but one of the LFIRs issued to Petrocana and UWEC indicated the site was in good condition and/or was in compliance. The one LIFR that was not in compliance was dated on June 30, 2011 and found three relatively

minor deficiencies while UWEC was the operator. All of the deficiencies were cleared and the site was found to be back in compliance by the LIFR dated December 28, 2011. The final LIFRs reviewed was dated May 9, 2020 and noted that the site was in compliance and the well was shut in.

LDNR Compliance Orders/Notices

There were no Compliance Orders or Compliance Notices issued to Gulf. There would be none to Chevron as they were not an operator on the property, related to its operated wells or tank batteries on the Property. Compliance Orders and/or Compliance Notices were issued to UWEC, Flynn and CODA.

Louisiana Stream Control Commission

There were no LSCC notices of violations issued to Gulf. There are no LSCC documents expressing any concerns about Gulf's operations on the Property. Since it was not an operator on the Property, there are no LSCC documents concerning Chevron.

Louisiana Department of Environmental Quality

There are no Louisiana Department of Environmental Quality (LDEQ) documents issued to Gulf related to its operated wells or tank batteries on the Property. There would be no documents concerning Chevron since it was not an operator on the Property.

Site Inspection

The Property was inspected by the author on January 12, 2022. Parts of the Property appear to be used for farming. However, most of the Property is overgrown with grasses, brush and small trees. An overgrown drainage canal

runs east-west through the Property and terminates in the nearby Bayou Lacassine.

No production facilities or tanks were seen on the Property. One well tree was noted on the Property (SE/4 of Sec 18) that was identified as the United World Energy – Hayes U1 #4, SN 213760. The well had no associated tanks or production equipment and the well site was covered with native grass. Evidence of two recent well site locations were noted on the Property. One area located in the NE/4 of Sec 19 was identified as the site for the United World Energy – HU1 #1, SN 206344. No tanks, vessels or wells were at the site. However, the remnants of the limestone base location have not been removed. A small pile of piping and debris was noted north of the site. Another location was inspected in the NW/4 of Sec 20 which was identified as the well site of the United World Energy – Hayes U1 #3, SN 195098.

The historic Gulf operational areas were overgrown by vegetation except where intentionally mowed for environmental assessment. A pond remains at the site of the CNB #1 well that was created by the well's blowout. No apparent environmental damage was noted. The pond was surrounded by abundant vegetation and signs of wildlife. A meter shed and associated piping was noted in the SE/4 of Sec 18. The shed is identified as being owned by Gulf South and the piping does not appear to be in use. A gas transmission line goes through the Property and is evident with road crossing signs and a pigging/cleanout station located in the northeast corner of Sec 19. An old abandoned compressor and pipeline station were on the north side of the access road to the United World Energy – HU1 #1 location. The historic owners of the equipment are unknown at this time. No open pits were seen on the Property.

General Louisiana Oil and Gas Industry's Practices and Regulations

The oil and gas industry in Louisiana has been under state regulation since the early 20th 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. Generally, 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 20th Century.

LA CC

Louisiana initially formed the Louisiana Commission for the Conservation of Natural Resources (La CCNR) in 1908 by Act 144 of the State Legislature. The La CCNR 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 La CCNR 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 (LA CC).

Louisiana recognized very early the need to control wells. Prior to the formation of the La CC, 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 P&A'd. 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.

Likewise, early on Louisiana recognized 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. As the oil and gas is produced the water associated with the oil and gas reservoir 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, and does, vary greatly and will change as different productive zones, or wells, go into or out of production. The water produced with oil and gas production is typically saline (but can be fresh) and can contain trace elements other than just salts.

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 La CC as a Department of the State, with control over the natural resources of the State. The La CC 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 La CC.

LDOC

In 1916 Louisiana passed Act 66 which created the Louisiana Department of Conservation (LDOC), which replaced the La CC. 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 began requiring 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 La DOC 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 in +/- 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. Again, over time earthen pits/tanks without approved 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.

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 frame work 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 publicized Acts 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 base sediment and water (BS&W). It was the first official reporting of saltwater production in the state.

Louisiana adopted Title 30, "Minerals, Oil and Gas", as part of the La Revised Statutes of 1950. Oil and gas Acts and SWOs that predated the La Revised Statutes of 1950 were part of the rules and regulations that were repealed. The La 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.

LDNR

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 (UIC) 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 in to the Louisiana Administrative Code (LAC) format as LAC Title 43: Part XIX, Section 129. Further refinement of SWO 29B continued to occur through the 1990s and into the 21st Century. 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.

Louisiana remains active in the oversight and regulation of the oil and gas industry within its borders.

LSCC

In 1940 Louisiana created the 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". Again, no formal permitting process that generated an issued permit during that time-period, as is in effect currently, has been noted to date.

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 15th 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.

General Historical Industry SWD Review

The issue of handling produced water from a historical standpoint was a topic of significant discussion within the oil and gas industry. Industry personnel of good conscience were concerned with the protection of the environment and the proper handling of produced water early on. As noted above in the previous section, 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 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 where available. 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 US. 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 the issue of handling produced waters and pits are routinely presented for discussion in matters of this type. These papers, when viewed in full, are generally consistent with our experience and the above regulatory discussion. Many of the articles presented deal primarily with other sections of the United States which have different conditions and criteria 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 VL 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 expresses concerns dealing with SWD injection wells and expressed approval on impounding and releasing produced water in the appropriate environment. Anyone reading the Martin paper would not come away with an understanding that SWD by subsurface injection was the industry preferred method at that time, even for the mid-continent area of the USA.

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 US 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 papers in 1930 and 1932, work on produced water disposal was being done by others to include the US government. 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”. The authors 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 state “...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 cites 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 and also indicates 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. As stated in other sections of this report, 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 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

In December 1940, the Louisiana Department of Conservation (La DOC) published “Recommended Specifications and Design for Earthen Oil-water Separating Pits”.

In April 1943, the Louisiana Stream Control Commission (LSCC) published their “Rules Governing Disposal of Oil Field Wastes”. The general provisions allowed for the use of pits combined with either proper surface or subsurface disposal. These rules were re-issued in 1953. As discussed above amendments to the LSCC rules were added in 1968. Both the LSCC 1953 rules and the 1968 amendments can be found in the current LDEQ regulations.

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.

As noted above, on January 20, 1986 Louisiana adopted requirements for the construction, use and 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.

Report Comments

Charles Norman

Mr. Norman provided a report dated October 15, 2021. Mr. Norman opines about the engineering and operational aspects of the oil and gas operations conducted on the Property. Mr. Norman does not distinguish between the

accepted and required operational, engineering and regulatory oil and gas practices of prior times with the more stringent practices and requirements of today. He erroneously implies that operations conducted in earlier times were not kept in compliance with industry standards and regulatory requirements.

Mr. Norman states, “The Chevron et al lease(s) for the subject property did not allow for the operators or their working interest partners to pollute or contaminate the property.” The 1938 OG&M lease under which Gulf operated on the Property allowed the lessee broad rights to perform multiple operations for the mutual benefit of the operator, working interest owners and mineral owners. Oil and gas operations will have unavoidable impacts. Any impact that potentially poses a real threat to humans, wildlife or plants should be addressed. Any alleged pollution or contamination to the Property will be determined by toxicologists and agricultural experts in this matter, including ERM, Angela Levert, John Kind, John Frazier, and Luther Holloway/Patrick Ritchie.

Mr. Norman then states, “The subject wells on the Henning Management property were drilled under leases that included restoration clauses or common law that required the land to be restored to original condition less normal wear and tears.” There are no requirements in the Shell 1938 OG&M lease that require the lessor to restore the Property to original conditions. Nothing reviewed indicates that Gulf failed to meet the lease requirements, regulatory requirements and industry standards that were in effect for the time they operated on the Property. Chevron did not operate on the Property.

Mr. Norman discusses the wells on the Property, including the SWD wells, and concludes that the wells did not have adequate cement to protect the underground source of drinking water (USDW). The author has reviewed the cement utilized on the surface casing for the producing wells, dry holes and SWD wells drilled by Gulf on the Property and finds that adequate cement was utilized on all of the wells. Furthermore, the cement volumes used met or exceeded SWO

29B requirements. Casing and cement placement created effective barriers that will not allow the unwanted movement of oil, gas or water. Based on the information and data available to date it appears that the LDNR was satisfied with the construction and operations of the wells, to include the SWD wells drilled by Gulf. Mr. Norman has not identified a well that has experienced a flow problem on the Property nor has he found an actual flow path that has a potential to allow movement of fluid into a USDW.

Mr. Norman attempts to support his theory of inadequate cement by calculating the top of cement in certain wells either on or adjacent to the Property. However, he uses faulty and unrealistic 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 of a sack of cement will yield when mixed with a certain amount of water and other additives. A sack of cement 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, a standard industry practice when cementing shallow casing or surface casing is to use a cement that weighs less so that the cement can be circulated up and around the casing and not lost to the formations. Therefore, additional water is added to the cement thus making the volume greater but 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 cubic feet per sack. The use of water and gel additives have been a standard practice of operators and cementing companies since the 1930s.

In addition, Mr. Norman uses washout factors ranging from 1.6 to 2.0. A washout factor is the amount a drilled hole has enlarged during the time it is being drilled. For example, a washout factor of 2.0 means that the hole is double the volume of a hole that is the size of the drill bit's diameter. For the most part,

hole washout is a function of the amount of time that the hole is open (uncased) before casing is run. However, surface holes are often drilled quickly with most drilled in just one day. Therefore, hole washout is not as prevalent as in deeper holes. The LDNR requires a minimum volume of cement (500 sacks) or cement to be circulated to surface for surface casing strings. The LDNR defines "Circulate to the Surface" as "the calculated amount of cement necessary to fill the theoretical annular space plus 10 percent." Therefore, for regulatory purposes, the LDNR recognizes a washout factor of 1.1 (10%) which is more reasonable for surface holes.

Mr. Norman opines that the wells on the Property were not properly P&A'd and "...not consistent with DNR rules." The author has not found any wells on the Property that were not adequately P&A'd. In addition, the author has not found any information to indicate the LDNR had any issues with the wells that were P&A'd on the Property.

Mr. Norman discusses the SWD #1, SN 970424, which experienced a leak in its 7" casing string and states, "This is a potential source and pathway for bottom up contamination." Mr. Norman fails to mention that the 7" casing was an interior string that was run inside of a 9-5/8" casing string. The 9-5/8" casing was run to 1,346' and cemented to surface with 400 sacks of cement. In addition, another casing string outside of the two deeper casings was run. A 13-3/8" casing was run to 113' and cemented with 75 sacks of cement to surface. These cemented casing strings would mean that it is highly unlikely that any shallow chlorides found by ICON or ERM testing would have originated from the SWD #1. The author has not found any indication that Gulf's response to the SWD #1 leak was inappropriate or not keeping with the standards at that time. There is no evidence that any injected fluid into the SWD #1 migrated to USDW zones or any shallow zone.

Mr. Norman states that at the time opened unlined pits were used on the Property the industry knew that open unlined earthen production pits would leak and seep. While there was a realization that a potential could exist for pits to leak or seep, given all the factors to consider and the understanding at the time of the potential impact, using earthen pits was an accepted and viable solution. Earthen pits were routinely constructed in a manner that was compatible with the surface geology and soil conditions of Louisiana. As discussed above, during this time frame Louisiana was active in protecting its sources of fresh water and allowed the use of earthen pits. Using earthen pits was an understood and very visible means of dealing with fluids. State inspectors and other persons familiar with oil and gas operations would have understood the use of earthen pits.

Mr. Norman discusses pit seepage calculations for a hypothetical 100' by 150' pit. Mr. Norman assumes a hydraulic conductivity of between 0.01 and 0.1 ft/day over the life of the pit. Based on this data, Mr. Norman calculates a rate of 12 barrels per day for this exemplar pit. 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 for the indicated conditions. Furthermore, Mr. Norman's use of a hydraulic conductivity of 0.01 to 0.1 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 the pit having added solids to the pit bottoms. The solids include fines (primarily clay particles), vegetation and residual sludge that would settle to the pit bottom and greatly reduce the native hydraulic conductivity (permeability).

Mr. Norman concludes that any residual impacts allegedly found were not a result of normal wear and tear. The author disagrees with such a finding. Nothing reviewed indicates that Gulf operated in a manner that was inconsistent with normal wear and tear. There is no evidence to support that Gulf acted in a

manner that was contrary to state regulations or industry practice for the time or the existing OG&M leases, surface leases or ROWs. Chevron was not an operator on the Property.

Mr. Norman states that the operators on the Property "...performed unreasonably, excessively and inadequately..." The author has seen no evidence that Gulf acted in an imprudent manner. Gulf was subject to multiple agency inspections during the time it operated and there are no agency documents that support Mr. Norman's allegation. In addition, there were no landowner complaints during the time Gulf operated on the Property. Chevron was not an operator on the property.

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. However, Mr. Norman does not cite any specific incident or relationship between any substance and any test results on the Property. The author has not seen any documents that show that Gulf mishandled any alleged hazardous chemicals on the Property. Chevron was not an operator on the property.

Mr. Norman opines the operators, "...operated on the Henning Management property without regard for protecting the soil and groundwater to the extent that their operations were wanton and reckless." The author has not seen any documents that show that Gulf operated in a manner that Mr. Norman suggest and disagree that Gulf acted in a "wanton and reckless" manner. Chevron was not an operator on the property.

Mr. Norman says that the alleged contamination "...is the result of excessive use and abuse of the subject property and shows little or no regard by the operators for prudent engineering design, maintenance and operating methodology." In the author's opinion, the operations conducted by Gulf on the Property were conducted in a reasonable and customary manner that was

consistent with industry practices and governmental regulations for the time-period when they were conducted. There are no documents that show Gulf violated any engineering design, ignored maintenance or used an unacceptable operating methodology. Nothing reviewed indicates Gulf did, or failed to do, anything that violated any regulatory requirements or industry standard during the time it operated on the Property. Chevron was not an operator on the property.

Mr. Norman says that he has used the principles of root cause analysis (RCA) to develop his opinions. Mr. Norman cites as his root cause, "...imprudent and reckless operations and methods of controlling and handling drilling and production fluids during the drilling and operation of the wells on the Henning Management property." In particular, the improper designs of the wells, production facilities and production pits to handle produced brine and hydrocarbons is the source and pathway of contamination." However, this broad statement does not relate a specific incident to any alleged impact. Mr. Norman's RCA in this, and other matters, is simply a circular argument that since impact was found, improper action had to be the root cause of that impact.

Mr. Norman states, "It is more probable than not produced brine was discharged from the large production pits located near production facilities into natural drainage..." He goes on to list four agencies that he says Gulf needed discharge permits from: LSCC, Army Corp of Engineers, EPA and LDEQ. As detailed above, the early water produced from these gas distillate wells was fresh. When the wells began making salt water in late 1956, the SWD #1 was drilled. However, the author has found no evidence that produced water, fresh or salt, was discharged into natural drainage. If any water was discharged prior to the SWD #1, no permit was needed at that time in the Hayes Field from any of the agencies Mr. Norman list. It is highly unlikely that Gulf discharged water after it drilled the SWD wells.

Mr. Norman cites the 1986 SWO 29B amendment concerning pit closure. Gulf was not an operator in the field when the 1986 amendment became effective.

ICON Environmental Services

ICON provided a report that discusses remediation of parts of the Property due to soil sampling or shallow groundwater above certain regulatory standard or purported background level. However, ICON does not consider any environmental risk or harm. ERM has been retained and is addressing the issues alleged by ICON.

Part of the ICON purposed restoration plan includes the handling of recovered alleged impacted water. 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.

Summary Opinions and Conclusions

Gulf conducted oil and gas operations on the Property from 1941 until 1984. Gulf ultimately drilled eight wellbores on the Property which resulted in three productive wells, 2 SWD wells and three dry holes that were P&A'd by Gulf. The dry holes were the CNB #1, CNB F #1, and HU1 #9. The three Gulf wellbores on the Property that were productive were the HU1 #2; the HU1 #6/6D, a dual completion; and the HU1 #7. The two wells drilled by Gulf on the Property specifically as SWD wells were the SWD #1 and the SWD #2. The HU1 #6/6D was P&A'd by Gulf on May 12, 1980 and the HU1 # 7 was P&A'd by Gulf on December 28, 1983. The last remaining unplugged Gulf gas well, the HU1 #2, was transferred to Great Southern on February 1, 1984. Great Southern P&A'd the

HU1 #2 in June 1984. The SWD #1 was P&A'd by Gulf in December 1983 and the SWD #2 was P&A'd by Gulf in September 1984.

Gulf merged with Chevron in 1985. By then Gulf operated no wells on the Property. Chevron never conducted oil and gas operations on the Property. Chevron became the assignee of the sublease and a 1983 Gulf OG&M lease. No wells were drilled under the 1983 OG&M lease by either Gulf or Chevron and Chevron released the acreage on June 18, 1986.

Gulf, followed by Chevron, farmed out acreage in the Hayes Field to Graham Drilling Partnerships 83A and 83B effective September 30, 1984 and amended January 24, 1986. Chevron also farmed out acreage in the Hayes Field to Petrocana on November 21, 1986. Both farmouts included acreage on the Property. However as previously noted, Chevron never conducted oil and gas operations on the Property. As the party granting the farmout neither Gulf nor Chevron would have retained any operational authority as related to the oil and gas operations being conducted as a result of the farmout. The entity receiving the farmout, or its appointed operator, would have the operational authority concerning the oil and gas operations conducted relative to the farmout.

The CNB #1 was drilled in 1941. The well was drilled into high pressure gas which exist below +/-10,000' in the Gulf Coast area of Louisiana. At the time of drilling of the CNB #1 well, this transition from normal pressures to abnormal high pressures was not entirely understood by the industry. The well blew out at a depth below 10,000' while conducting 7" liner installation operations. Gulf's handling of the kick and subsequent blowout was appropriate and reasonable. Multiple landowner damage claims were filed at that time and all claims appeared to have been successfully resolved.

The blowout created a +/-15' deep crater that is still there. Sampling by ERM has found a modest increase in chlorides at around 60' below ground level in the area of the blowout crater. Given that the blowout fluid would consist of

drilling fluid and native fluid it is more than likely the increase in chlorides at 60' is the result of blowout fluids migrating downward from the crater. Available documents show that a high pressure nipple failed followed by a failure of the above ground casings due to sand cutting. This more than likely caused the flow to scour out the crater.

The oil and gas operations conducted by Gulf on the Property were conducted in a manner that was consistent with the normal and customary way oil and gas operations were conducted in rural, land based operations in the region, for the time period the operations were conducted. Gulf conducted its operations on the Property in a reasonable manner, in keeping with applicable industry standards and governmental regulations for the time they operated on the Property. In addition, the manner in which Gulf operated was consistent with landowner/lessor expectations as evidenced by the terms of the 1938 OG&M lease.

The OG&M lease and surface lease allowed Gulf to maintain facilities, equipment, flowlines, and conduct operations on the Property. The author has seen no information to suggest that the operations conducted by Gulf were not in accord with these leases. There is no evidence that the landowners at the time had any issues with the manner in which Gulf operated. Gulf paid landowners for damages caused by the blowout and a 1983 salt water line leak.

The oil and gas operations conducted by Gulf, 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. There is no evidence to indicate that Gulf violated any LDNR, LDOC, LSCC, LDEQ, EPA or U.S. Army Corp of Engineers regulations that were in place during the times Gulf operated on the Property.

The Gulf wells were gas-condensate wells and the water produced in association with its operations on the Property initially would have been

condensed water vapor which would yield fresh water. As the Gulf wells began to produce native salt water, Gulf installed SWD wells so that the produced water could be disposed of by subsurface injection. The native formation water would have been produced from the subsurface formations with the gas and condensate, and then separated with separation equipment before being returned to subsurface sands. Any surface retention of the produced water would be limited to the temporary surface retention in tanks. This type of temporary retention would be part of normal, routine and customary production operations and would be covered under normal OG&M lease agreements or other operational type agreements and existing governmental regulations. The information and data reviewed does not support a finding that large volumes of salt water or other substances were released onto the surface of the Property from any wells or pits operated by Gulf.

Oil and gas operations are subject to wear and tear and will leave some type of footprint or indication they were conducted. Oil and gas operations conducted on the Property by Gulf were conducted reasonably and in accordance with the regulatory and industry standards that existed at the time they operated. Any areas of the Property impacted by oil and gas operations that are noted to be above the 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 the current existing regulatory standards. However, any such work should not destroy an existing ecosystem or cause more damage or potential harm to simply satisfy a later adopted standard. 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 author understands that ERM has

been retained by Chevron to evaluate the need, if any, for remediation on the Property.

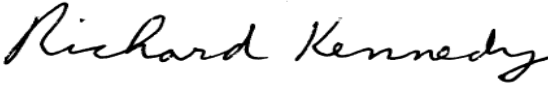
Remarks

I am a Registered Professional Petroleum Engineer with a degree in Petroleum Engineering. Over the course of the past 45 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 resume is attached as Attachment "B" and made a part of this report. If called to testify at trial, I would expect to testify as to the agreements and operations involved in this situation, the roles and responsibilities of the various personnel, the equipment involved and any applicable recommended practices, guidelines or regulations.

Please be advised this is an initial report based on the information and data available to date and the work performed to date. As additional information and data is received and reviewed I will, if necessary, adjust my findings and provide a supplemental report if required. Possible trial exhibits may include the information furnished and reviewed to date. If you have any questions or if I can be of any further assistance, please let me know.

Sincerely

A handwritten signature in cursive script that reads "Richard Kennedy".

Richard Kennedy, P.E.

Attachment "A"

- 1) LDNR Documents:
 - a) Well files,
 - b) LDNR files,
 - c) UIC files,
 - d) LDNR Sonris data,
 - e) Field Orders and exhibits,
 - f) DMR1s,
 - g) DT1s,
 - h) Production Audit Cards,
 - i) Pit files,
 - j) LFIRs,
 - k) Orphan well inspections,
 - l) LDNR correspondence,
 - m) Lease Facility Inspection Reports,
 - n) DNR Compliance Orders and Notices.

- 2) IHS Production Data

- 3) LDEQ Files.
 - a) AI 101835,
 - b) AI 166486.

- 4) Chevron Production 1 Part 1 A2183064-0000001-0003222.

- 5) Plaintiff Doc Production
 - a) Arabie Evaluation - 000001-000015,
 - b) Improvements - 000001-000008,
 - c) Insurance Docs - 000001-000127,
 - d) Landowner Maps - 000001-000042,
 - e) Lease and Title History - 000001-000301,
 - f) Non-O&G Leases - 000001-000053,
 - g) Purchase Related Docs - 000001-000067,
 - h) Rice Farming Docs - 000001-000040,
 - i) Tax Docs - 000001-000004
 - j) Plaintiff's Responses to Chevron's Discovery Requests.7.7.21.

- 6) ERM Documents
- 7) ERM aerial photographs
- 8) Pride Oil & Gas documents
- 9) Walker Louisiana Properties

- 10) Expert Reports with attachments and produced documents:
- a) ICON Environmental Services, Inc. dated 9/30/2021 ICON Report 000001-001001 and ICON SDT return,
 - b) Charles Norman report dated 10/15/2021 Henning – Norman Report 000001-000073, Henning – Norman SDT Return 000001-012661
 - c) CEI Report – 000001-003542,
 - d) DeWayne Corley dated 2/28/2022
 - e) Jerry Fontenot dated 2/28/2022,
 - f) Lance Fontenot dated 2/28/2022.

11) Petitions with attachments

Attachment B

Resume

Richard K. Kennedy, P.E.

503 Montrose Avenue - Lafayette, LA 70503

Email: richard.kennedy@att.net

Telephone: 337/298-4570

HOME ADDRESS: 503 Montrose Avenue
Lafayette, LA 70503

CURRENT POSITION: 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 Engineer

- 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.

Richard K. Kennedy, P.E.

Depositions and Trials - Last Four Years

<u>Case/Style</u>	<u>Case Number</u>	<u>Court</u>	<u>Trial/Deposition</u>	<u>Client</u>
New 90, LLC vs Grigsby Petroleum, Inc. et al	#130528	16th Judicial District: St. Mary Parish, LA	Deposition	Chevron
Hero Lands Company vs Chevron USA	#64-320	25th District Court; Plaquemines Parish, LA; Div "A"	Deposition and Trial	Chevron
Emerald Land Corporation vs Trimont Energy	6:17-CV-01655	US District Court; Western District; Lafayette, LA; Div "A"	Deposition	Chevron
Fernen L Andrepont vs Chevron U.S.A., Inc.	#2008-10045	15th Judicial District; Acadia Parish, LA; Div "A"	Deposition	Chevron
James Steven Broussard vs Mayne & Mertz	#2018-002721	14th Judicial District: Calcasieu Parish, LA	Deposition	Mayne & Mertz
Texaco Inc. vs Devillier, et al; Tomlinson Realty, Co. et al; Vermillion Parish School Board	#87 B 20142 & #87 B 20143	United States Bankruptcy Court; Southern District of New York	Deposition	Chevron
James J. Martin Family, LLC vs BP America Production Company, et al	#87912-B & #87428-C	16th Judicial District: St. Martin Parish, LA; Div "C"	Deposition	Chevron and Devon
Jack anthony Devillier, et al vs Chevron U.S.A., et al	#12-C-5530	27th Judicial District; St Landry Parish, LA; Div "C"	Deposition	BHP Billiton Petroleum
Litel Explorations, LLC vs Aegis Development Co. LLC	#C823-17	31st Judicial District Court, Jeferson Davis Parish, LA	Deposition	Pioneer Natural Resources
Furie Petroelum Co. et al vs SWEPI LP, Encana Oil & Gas (USA) et al	#70,733-A	42nd Judicial District Court, Desoto Parish, LA	Deposition	SWEPI and Encana
Jeanerette Lumber & Shingle, LLC vs ConocoPhillips, et al	#134307	16th Judicial District Court, New Iberia Parish, LA	Deposition	Chevron