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Mr. Victor Gregoire
Mr. Alan Berteau
Attorneys at Law
Kean Miller
One American Place, 22nd Floor
Baton Rouge, Louisiana 70821

Dear Mr. Gregoire

Introduction:

The following supplemental report deals with certain aspects of the matter styled **State of Louisiana vs The Louisiana Land and Exploration Company, et al.** on the Vermilion Parish School Board property in the East White Lake Field. Further, it incorporates my original report dated June 13, 2010 and is to be viewed in conjunction with that report. This report addresses new information along with the supplemental report of Charles Norman, dated January 15, 2015 and the affidavit of Charles Norman dated October 27, 2014. The following comments are based on the information and data reviewed to date, and my education, training and experience.

Information and Data:

New 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.

Norman's Supplemental Report

The supplemental report of Mr. Norman discusses issues which he either did not develop or did not discuss in his initial report on the East White Lake Field to the extent discussed in his supplemental report. However, it appears that certain of the topics addressed in Mr. Norman's supplemental report deal with issues which were noted from the original information provided in this matter.

Mr. Norman cites certain documents that show the use of pits in the East White Lake (EWL) Field. As noted at the time of my original report pits were a part of the water processing mechanisms employed at the EWL field. Information and data available at the time of the original reports along with certain new documents support that fact. The materials provided show that the production pits were primarily used as emergency production pits after water injection was established in 1948. In fact the documents cited by Mr. Norman show that beginning in 1948, Unocal used a combination of SWD wells, pit/tank storage for processing, discharge and the shutting in of high water rate wells as part of its efforts to handle the produced water. All of these procedures would have been known and accepted methods for the handling of produced water at the time they were done.

During the time period covered by the documents cited, there was no prohibition to water storage in pits and discharge either into SWD wells or surface water bodies capable of handling such releases at the EWL Field. Earthen pits and surface discharge operations were open and observable to the various state inspectors with site responsibility, as well as others who would be onsite. Both were allowed by the applicable governmental agencies, which had oversight responsibility for oil and gas operations, for a significant portion of the time that oil and gas operations have been conducted in the EWL Field. The Louisiana Office of Conservation (La OOC) as well as the Louisiana Department of Wildlife and Fisheries (La WF) were in the EWL field at various times and would have been aware of any problems associated with water storage and discharge. The La WF personnel and La OOC personnel were responsible for reporting problems to their respective agencies and the Louisiana Stream Control Commission (La SCC). A review of La SCC documents available indicates that the La SCC was aware of Unocal's handling of produced water in the EWL Field as early as May 1943. Nothing reviewed indicates that the La SCC had any problems or issues with

Unocal as a result of the water discharge in the EWL Field. The pits associated with the VPSB A tank battery and the La Furs tank battery were closed by Unocal in 1988. The pit associated with the VPSB B tank battery was closed in 1985 when the tank battery was dismantled.

Mr. Norman references wording found in certain AFEs in his supplemental report. AFE wording is often strongly phrased in an attempt to motivate the recipient to provide authorization for the work being requested. While AFE language certainly should be considered, the issue it is discussing should be fully developed by reviewing any and all available materials on the topic. One example presented by Mr. Norman is a 1965 AFE associated with adding an addition SWD well which contains a statement that Unocal was in regulatory violation for dumping salt water into the canal at the EWL Field. The obvious aim is to get approval for the new SWD well. Nothing has been noted in the information reviewed that indicates any issues were noted at the time with the discharge or that any regulatory body had any issue with the discharge. There was no prohibition found on discharging produced water into the waters around EWL for the time frame involved, provided such release complied with existing regulations and did not result in oil and noxious gas exceedances or cause harm to the local environment.

Mr. Norman states that numerous AFEs show "problems with SWD wells that resulted in the use of production pits and overboard discharge." The AFEs cited reflect a history of an active SWD system in a large field which was used and underwent customary types of repairs and maintenance. These types of systems are mechanical by nature and do have mechanical failures related to issues of usage and wear and tear over the life of the system. It appears that Unocal utilized the components that were available to it under the existing regulatory scheme of the

time in the EWL Field, such as water injection and utilizing pits coupled with discharge as part of its SWD system as necessary.

Reference is made by Mr. Norman to documents that indicate produced water was being filtered into the marsh or leaked into the marsh from pits. To date the only document I noted on this issue was a La SCC document that did not use the term leakage but does indicate the state's knowledge about the manner of water released from the pit area in 1943. This time period was prior to the installation of the first SWD well. Again, as long as the method of discharge was consistent with the regulations of the day then no violations would have occurred.

Mr. Norman discusses the disposal of La Furs produced water into VPSB SWD wells. Between February 1948 and May 1965 (17 years) the La Furs A #4 was the only SWD in the field. At that time it disposed of both VPSB and La Furs produced water. In mid-1965 the VPSB A #12 was converted to a SWD well with water being disposed of on both the La Furs tract and the VPSB tract. The La Furs A #4 continued disposing produced water until mid-1976. After the abandonment of the La Furs A #4 well, produced water for the field was sent to VPSB SWD wells. As noted in my initial report, Unocal's operations for the EWL Field were conducted utilizing a centralized facilities concept. Utilizing a centralized facilities concept that shared SWD operations to develop the field, including the La Furs tract and the VPSB tract, minimized the impact felt by all parties in the development of the resources from the field. Utilizing a central facilities concept was routine for south Louisiana coastal operations.

As was also discussed in my initial report, the water that was being produced from the EWL Field was subsurface water that was common to the subsurface strata that underlaid the field and was not specific to any one surface tract. As such returning it to the subsurface strata below the field would simply be placing it

back into the environment from which it came regardless of the location of the injection point.

The documents provided include the 1994 Surface and Saltwater Injection agreement between VPSB and Unocal. The fee arrangement for 1994 was \$5000/year/well and \$2000/year/acre for the pad; with a limit of two SWD wells at any one time. The total amount give in the agreement was \$14,400. The agreement also provided for an escalation of the injection fee based on either 4% starting in 1995 or the NCPI for the time.

Mr. Norman claims there were mechanical integrity issues and provides five examples. One example utilized by Mr. Norman was a Unocal PIP dated September 16, 1991 that supplied information about pilot settings on flow lines. The usage of flow line pilots indicates the usage of a production safety system at EWL. API RP 14C covers offshore production facilities safety systems. It has been adopted by reference under the Federal regulations for many years and is mandated on Federal OCS production facilities. The state of Louisiana has not adopted compliance with API RP14C for onshore production facilities. The fact that Unocal was using an offshore production facilities safety system indicates that Unocal was operating at a level substantially above any regulatory requirements in the EWL Field.

A memo dated October 17, 1984 concerning the La Furs tank battery pit is cited by Mr. Norman as an example of failed mechanical integrity. However, this memo does not address any issue on the VPSB lease and does not conclude that the pit poses any environmental threat to either the La Furs or VPSB property. The La Furs tank battery was taken out of service 1986.

Mr. Norman cites documents that he alleges are evidence of over 70 spills experienced by Unocal between 1970 and 1995 (25 years). Some of the documents cited by Mr. Norman are not spills or leaks and some of the documents are not on the VPSB property. A review of Mr. Norman's cited documents indicates that

Unocal handled the leaks in a routine and customary manner. The leaks and spills that were noted appear to be relatively diverse and spread-out across the field. No one well or area was noted to have an unusually high concentration of incidences and in fact some wells and equipment never leaked. Furthermore, the majority of leaks were relatively small indicating quick detection. The leaks and spills appear consistent with aging infrastructure operations. The number and diversity of leaks and repairs would hardly be considered an excessive amount for a field as old, large and diverse as the EWL Field.

As noted by Mr. Norman some of the spills were of oil that required notification of the agencies with oversight of such matters. The information provided indicates that Unocal complied with the reporting requirements and paid any final assessed penalties. It appears the incidents involved limited quantities which indicates quick detection. The documents reviewed indicates that the penalties assessed, as required by regulation, were on the lower end of the sale possible for such events. As discussed in my initial report Unocal did have interaction with the state on some pit and spill issues.

Mr. Norman further opines that these leaks are evidence that many more leaks would have occurred during the earlier years but were simply undocumented. It should be noted that Unocal operated at the EWL Field, which was in a coastal environment, for 55 years. During the earlier years of the field, and as wells and facilities were added, the equipment and facilities would have been new and less likely to have mechanical issues. By 1970 operations would have been ongoing for 30 years with the infrastructure aging. The older the field and the more usage and wear and tear on the infrastructure the greater the likelihood of mechanical issues.

The documents review indicate Unocal had an equipment and flowline inspection protocol. Testimony by Unocal field personnel indicates that inspections were conducted daily, which included looking and listening for leaks. Repairs were

initiated timely once an issue was found. Many of the vessels and flowlines were refurbished or replaced as necessary. By way of example in March 1990 Unocal x-rayed, tested and inspected 62 vessels in the EWL Field. Furthermore Unocal also provided training on leak detection and prevention, with mock cleanup drills. Unocal had an established corrosion inhibition program designed to prevent corrosion that could lead to leaks. Unocal responded to spills by shutting in wells and repairing or replacing flow lines. Periodically Unocal would have airplane flyovers for the field to look for leaks or other problems. As noted above, Unocal also had practice drills that simulated spills that tested field personnel's responses to those mock spills.

Further, Mr. Norman asserts that Unocal did not follow good engineering design, maintenance and operating practices. The documents reviewed appear to indicate that Unocal installed, operated and maintained its facilities within the norms of accepted engineering and operational practices of the time. Mr. Norman does not distinguish the accepted and required operational, engineering and regulatory oil and gas practices of prior times with the more stringent practices and requirements of today. This erroneously implies that operations conducted in earlier times were not kept in compliance with industry standards and regulatory requirements.

Mr. Norman discusses violations of mechanical integrity and permit violations. Nothing was noted in the review that indicates Unocal's operations led to any mechanical integrity permit violations. The one example Mr. Norman uses of permit violations is the lack of adequate La DEQ discharge permits. The information reviewed indicates that Unocal had the necessary La DEQ discharge permits required for the time.

Mr. Norman also references "casing problems in specific wells". The new document cited by Mr. Norman with bates number 4074021-0014356 references

tubing to casing communication which would indicate a tubing issue. No problem with the casing was noted. A review of the documents did indicate that one well, the VPSB #16 SWD, had an issue with a shallow hole in the casing with water reaching the surface. The documents reviewed indicated that workover plans were initiated once the problem was detected. The casing issues that were noted in the materials appeared to be dealt with in a timely and appropriate manner.

Mr. Norman discusses photographs dealing with the manifold at the Unocal Tank Battery Facility in 1985. The photographs reviewed does show soil discoloration below the header system. The origin of this discoloration is unknown. It may be associated with marsh soil and be a combination of decayed vegetation and moisture or possibly could be stained soil from leakage of oil from repairs to the header system. Oil stained soil below a header complex would not be unusual for a large header system that had been in place for many years. This would be the type of wear and tear usage that could be expected for the time frame as the header system would not be decommissioned after each event but instead the area would be clean and the stained soil removed once the header was decommissioned at the end of the facility's life. Testimony of Unocal field personnel reviewed indicates that any spilled oil present would be removed timely. However, removal of the oil would still leave stained soil behind.

Mr. Norman cites documents that he indicates shows communication between one or more producing wells and the Unocal's camp potable water. While there is a discussion on methane being detected in the Unocal documents, there is no mention about a producing wellbore being the source of the methane or eliminating marsh gas as being a potential source of the methane. Unocal tested the potable water in 1994 and found that in its opinion the methane was not oil and gas related due to the lack of other associated hydrocarbon gases. The documents

reviewed indicate that the potable water system was repaired. No other references to a methane being in the potable water supply was note.

Mr. Norman indicates that land farming of pit solids occurred on the property. Land farming is one of the methods recognized by the State of Louisiana as a means for handling pit material. It appears that Unocal utilized a standard industry procedure of first injecting the slurred pit material down a well, then bring in fill and mixing the remaining material with the fill before spreading the mixture in the process known as land farming.

Mr. Norman discusses issues with mercury in the soil on the VPSB property and cites a document that he claims shows Unocal operated the gas metering and gas sales line from the EWL Field to Transco. However the document cited only deals with one well (the VPSB #35) drilled in 1980 and 500' of a 2-1/2" pipeline. Nevertheless, Unocal would have operated several gas meters including test meters, gas lift meters and check meter(s). Transco would have operated the gas sales meter at the gas custody transfer point. Any gas meter storage or repair may have caused mercury to be present in the limited specific areas around the meter being repaired. A Phase I and II Environmental Site Assessment (ESA) performed by Envico in early 1995 shows the presence of mercury in isolated areas of the field. Mr. Norman states in his report "that the Envico reports...show the presence of Mercury [sic] in canals and soils throughout the property." The results of the Envico Phase II showed levels of mercury exceeding 29-B limits near the meter building - not throughout the field. In September 1995, Envico remediated two areas that they had identified earlier in the area known as the base camp. An area around the glycol unit was remediated for BTEX and an area around the meter station was remediated for mercury. IES found one 29-B exceedance in 2010. It was located at the VPSB A facility. IES did not find any 29-B exceedances of mercury when they tested during 2014.

Mr. Norman discusses environmental reports done during the 1990s – the Envico report, the Titan report and the Newpark report. The Envico ESA was prepared in February 1995 – prior to Unocal selling the property to Resource Acquisition Corporation (RAC). The report states that “Only minor spills have ever occurred in the field and they have been reported and handled prudently and as per regulatory requirements.” As noted above, the Envico ESA resulted in the BTEx and mercury remediation performed by Unocal during September 1995.

Highlander Environmental Corporation (Highlander) prepared an ESA for Titan Resources in September 1997 covering multiple oil and gas properties including the EWL field. Unocal was not operating the EWL Field at the time of this ESA. The report stated that onsite personnel stated that Unocal had remediated the mercury and BTEx exceedances. The Highlander ESA noted minor issues but no major problems. A review of the attached photographs to the report indicate that the EWL field surface facilities had been well maintained.

Newpark Environmental Services (NES) performed an ESA in April 1999; some 5 years after Unocal sold the property. The ESA was performed based on two days of visual examination covering nine oil and gas properties. The ESA was prepared for Phoenix Oil and Gas for properties owned by Carrollton Resources. However the EWL Carrollton property was operated by RAC. For the EWL property, NES noted that “[t]he level of visible soil staining at the field production facility is minimal...” and commented on a “recent spill event”.

Mr. Norman quotes general statements in the Newpark report that may not be attributable to the EWL field such as glycol filters and accumulations of oil materials. NES stated that in the EWL field “...used oils are collected and recycled into the production process, and filters are drained and transported to shore for proper disposal.” The NES report does not identify any problems that relate to the time Unocal operated the field.

Mr. Norman refers to materials that he indicates shows Unocal level of knowledge concerning soil and ground water issues. The materials reviewed indicate that these materials are contemporaneous with or postdate the time period when Louisiana was moving toward or requiring the closure of earthen pits. Certainly, as environmental knowledge and detection capabilities increased Unocal's knowledge base increased as did other companies.

Based on all of the available information and documents reviewed, and as discussed in previous report, Unocal conducted its oil and gas operations on the subject property in a reasonably prudent manner, generally in keeping with applicable industry standards and government regulations. During normal drilling and production operations, leaks and other mechanical problems can and do occur. Often times such situations can allow releases of oil, gas, salt water and/or other fluids at well sites, production facilities and along flowline or pipeline right of ways. The simple fact that such incidents may or may not occur is not indicative of unreasonable or imprudent operations. The information previewed indicates that when such incidents occurred at the EWL Field Unocal responded timely, notifying the appropriate regulatory agencies and responding appropriately. When fines were levied as required by regulation they were noted to be on the lower end of the scale available and were paid by Unocal.

Additional Issues

Flow Line Removal

Additional information provided indicates that Peak Operating Company (Peak) removed old out-of-service flowlines that crossed waterways. These flowlines were removed as far out into the marsh as they could be pulled from the waterway. No attempt was made to enter the marsh with equipment to remove old abandoned flowlines so as to limit the impact on the marsh. In my experience, in such remote areas flowlines are generally left in place unless they are causing a direct problem

or their removal is required under the agreements in place. Typically, flowline removal, if performed, is part of the decommissioning of the field once operations have ended. However, if such removal is requested by the landowner prior to the end of operations, such request should be evaluated and executed if possible and practicable to do so. Certainly if removal of the abandoned flowlines is going to cause more damage to the environment than leaving them in place, the flowlines should be left in place.

Canals

A system of canals was used to explore and develop the EWL Field. Canal systems were routinely used to develop oil and gas fields in such marsh areas. As the field progressed additional canals and dredged well locations were needed to develop the field given the local conditions. The use of land based locations in areas away from canal locations, and the roads to support such locations, would have been expensive and impractical in my opinion. Using fill dirt from the area would require the dredging of a borrow canal along the roadway and a borrow pit at location area, which still would have created canals, borrow ditches and borrow pits in the field. A network of built up roads, built up site locations, borrow ditches or canals and pits would have been more intrusive to the marsh than just the canals.

SWD Injection

Injection records available at the time of my initial report showed that 0 Bbls of produced water were injected into the Unocal SWD wells between June of 1966 and October of 1967. The method of handling the produced water during this time frame was not noted in the documents available at the time the initial report was rendered. But the lack of injected volume data suggested the SWD wells were shut-in and that impoundment and surface discharge may have been utilized. As noted both in my initial report and this report, surface discharge was still a viable and accepted method of handling produced water in coastal Louisiana during that time

frame. However, documents produced since the time of my initial report indicate that produced water was injected into Unocal SWD well system in 1967 indicating that the well system was not shut-in but was operational; suggesting that the Injection Reports for the June 1966 to October 1967 time frame may have been in error.

Current Operations

Peak continues to actively operate the EWL Field. Since 2010, Peak has drilled 7 wells in the EWL Field. Five of those wells have been on the VPSB lease. La DNR data shows that there are currently 6 producing wells, 2 active SWD wells and 2 wells that are shut-in with future utility on the VPSB property. In addition Peak maintains a central facility, campsite and multiple flowlines on the VPSB property. Any canals deemed necessary to further current and future operations would need to be left open.

Given the fact that Peak currently operates a field SWD system, and the fact that a field SWD system has been in place since 1948, indicates the practicality of using such an onsite system in the event that a ground water related cleanup was deemed necessary.

Based on all of the available information and documents reviewed, and as discussed in previous report, Unocal conducted its oil and gas operations on the subject property in a reasonably prudent manner, generally in keeping with applicable industry standards and government regulations. During normal drilling and production operations, leaks and other mechanical problems can and do occur. Often times such situations can allow releases of oil, gas, salt water and/or other fluids at well sites, production facilities and along flowline or pipeline right of ways. The simple fact that such incidents may or may not occur is not indicative of unreasonable or imprudent operations. The information previewed indicates that when such incidents occurred at the EWL Field Unocal responded timely, notifying

the appropriate regulatory agencies and responding appropriately. When fines were levied as required by regulation they were noted to be on the lower end of the scale available and were paid by Unocal.

These remarks and conclusions are based on the information furnished to date and my education, training, knowledge and experience in the oil and gas industry. I am a Registered Professional Petroleum Engineer with two (2) degrees in Petroleum Engineering and 30 plus hours of graduate level environmental science course work. Over the course of the past +/- 45 years, I have worked in many aspects of the oil and gas industry, including time spent designing wells, drilling and completing wells, working over and maintaining wells; producing wells; operating properties, designing and installing facilities, negotiating leases, agreements and contracts, P&A'ing wells and restoring sites.

If you have any questions or if I can be of any further assistance please let me know. With kind regards, I remain

Sincerely,

A handwritten signature in cursive script that reads "Calvin Barnhill". The signature is written in dark ink and is positioned above the printed name.

Calvin Barnhill, P.E.

Attachment A

Supplemental Documents

- A. Unocal documents – Bates Numbers
 - 1. C4074021 0000001 – C4074021 0068541
- B. Pisani Documents
 - 1. KM EWL PISANI surface 1-325
- C. LLE Documents
 - 1. ROGERS 1-1577
 - 2. WILLIAMS 1-752
- D. Plaintiff's Documents received on 11/14/2014
- E. Depositions
 - 1. Steve Miller
 - 2. Julius Gregorie
 - 3. Dale Meche
- F. Supplemental Reports
 - 1. Charles Norman, with documents
 - 2. Icon, with exhibits
 - 3. Paul Templet
- G. Carrollton Environmental Report dated 4/1999