I. INTRODUCTION

I have been retained by counsel for defendant Chevron U.S.A. Inc. in the matter of Hero Lands Company, L.L.C. versus Chevron U.S.A. Inc., et al. (25th Judicial District Court for the Parish of Plaquemines, State of Louisiana [Docket No. 64-320; Division “A”]), to assess the radiological conditions of a specific parcel of land in the Stella Oil and Gas Field in Plaquemines Parish, Louisiana. Specifically, I have been asked to determine whether there is naturally occurring radioactive material (NORM) due to oil and gas operations of the property. I have also been asked to review the reports by Plaintiff’s experts Gregory W. Miller, Jason S. Sills, Charles R. Norman, William J. Rogers, Paul H. Templet, and Walker B. Wilson in this matter and provide opinions with respect to those reports. I submitted my expert report in this matter on May 8, 2020. I visited the subject property on August 20, 2020. Also following submission of my May 8, 2020 report, I received additional laboratory reports of analysis for eleven (11) samples of groundwater and 11 split groundwater samples from the subject property. I am submitting this report to include the additional groundwater data and to update my May 8, 2020 report.

II. OPINIONS

I have reached the following conclusions with a reasonable degree of scientific certainty:

1. My opinions given in my May 8, 2020 report in this case are unchanged.

2. Laboratory reports of analyses received since May 8, 2020 include NORM measurement results for 11 groundwater samples and 11 split groundwater
samples from the subject property that show no additional locations that have
NORM concentrations that are consistent with the presence of oilfield NORM
in old produced water from oil production activities, other than the
approximately six wells discussed in my May 8, 2020 report.

III. QUALIFICATIONS

My qualifications are detailed in Attachment A of my May 8, 2020 report in this case and
are unchanged since that report.

IV. BASIS OF OPINIONS

During preparation of my opinions presented in this report I reviewed documents related
to the subject property and natural radiological conditions in the vicinity of the subject property
and throughout the State of Louisiana. Specific documents that I reviewed in preparation of this
report are listed in Attachment A. This list of documents replaces the list in Attachment B of my
May 8, 2020 report.

My discussion basic concepts of NORM and natural background radiation and
radioactive materials in Louisiana given in Section IV-A through D of my May 8, 2020 report
are unchanged.

A. Description of the Subject Property

The property that is the subject of my radiological assessment is a parcel of land located
in the Stella Oil and Gas Field in Plaquemines Parish, Louisiana. Descriptions of the location and
history of oil production operations on the subject property are given in reports listed in
Attachment A.

B. Collection and Analysis of Additional Groundwater Samples

In my May 8, 2020 report, I described the collection, analysis and measurement results of
forty-two (42) groundwater samples that were collected from wells on the subject property by
ICON personnel on behalf of Plaintiff from August 28, 2018 to April 9, 2019 (Miller 2019).
Following submission of my May 8, 2020 report, I received reports of laboratory analysis of
eleven (11) additional samples of groundwater collected from the subject property during
January 21-24, 2020 and July 15-16, 2020, by ICON (Pace 2020a; Pace 2020b). I also received
reports of laboratory analysis of 11 split samples of groundwater collected from the subject
property during January 21-24, 2020 and July 15-16, 2020, by ERM Environmental Resources
Management, in Metairie, Louisiana (ERM) (Eberline 2020a; Eberline 2020b). As with the
groundwater samples described in my May 8, 2020 report, each sample was sealed in a sample
container, marked with a unique identification code, and shipped under chain of custody to the respective laboratories for analysis (Pace laboratory for ICON’s samples and Eberline laboratory for ERM’s samples). Both laboratories measured the concentrations of Ra-226 and Ra-228 in each of the 11 samples they received. Eberline also measured the total dissolved solids (TDS) in each of the 11 samples they received. Results of Eberline’s laboratory analysis of the 11 samples (and two laboratory duplicate samples) were reported in two reports of analysis (Eberline 2020a; Eberline 2020b). The two laboratory reports of analysis by Eberline are included as Attachments B1 and B2. The results of the measurements by Eberline are summarized in Table 1.

<table>
<thead>
<tr>
<th>Sample ID</th>
<th>Result (pCi/g)</th>
<th>CU (pCi/g)</th>
<th>CSU (pCi/g)</th>
<th>MDC (pCi/g)</th>
<th>Result (pCi/g)</th>
<th>CU (pCi/g)</th>
<th>CSU (pCi/g)</th>
<th>MDC (pCi/g)</th>
<th>TDS (mg/L)</th>
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<tbody>
<tr>
<td>MW 1A LAB DUP</td>
<td>2.00</td>
<td>0.60</td>
<td>0.74</td>
<td>0.37</td>
<td>1.34</td>
<td>0.46</td>
<td>0.55</td>
<td>0.83</td>
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<td>MW 8B</td>
<td>0.37</td>
<td>0.31</td>
<td>0.32</td>
<td>0.42</td>
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<td>0.50</td>
<td>0.58</td>
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<td>0.35</td>
<td>0.39</td>
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<td>MW 1B</td>
<td>17.53</td>
<td>3.50</td>
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<td>0.48</td>
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<td>1.99</td>
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<td>4.69</td>
<td>0.64</td>
<td>1.24</td>
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<tr>
<td>MW-2B LAB DUP</td>
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<td>0.19</td>
<td>0.19</td>
<td>0.40</td>
<td>0.50</td>
<td>0.44</td>
<td>0.46</td>
<td>0.89</td>
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<td>MW-3A</td>
<td>147.*</td>
<td>14.8</td>
<td>34.5</td>
<td>2.88</td>
<td>27.0</td>
<td>2.09</td>
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<td>MW-4A</td>
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<td>MW-7A</td>
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<td>0.34</td>
<td>0.56</td>
<td>0.57</td>
<td>1.17</td>
<td>2,550</td>
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</table>


* Laboratory results for Ra-226 in sample MW-3A show significant interference for the measurement method (EPA Method 903.1). The reported result is an outlier and not confirmed by Pace analysis of the split of this sample.

**C. Assessment of the Analytical Results for Groundwater Samples**

The measurement results for the 11 additional samples analyzed by Pace combined with the results reported by Pace for the 42 groundwater samples (discussed in my May 8, 2020 report) total 53 groundwater samples analyzed by Pace from the subject property. My evaluation of the results and their associated CSU suggest there are possibly six wells (BC-2A, BC-3A, BC-
7A, BC-8A, BC 23, and BC 26) that have concentrations of Ra-226 and Ra-228 that are consistent with aged produced water. Results for the remaining wells are consistent with only natural background concentrations of Ra-226 and Ra-228 in solids (i.e., TDS) in groundwater samples.

The measurement results for the 11 additional split samples analyzed by Eberline combined with the results reported by Eberline for the 42 groundwater samples (discussed in my May 8, 2020 report) total 53 groundwater samples analyzed by Eberline from the subject property. My evaluation of the results and their associated CSU suggest there are possibly six wells (BC-2A, BC 10, BC 13, BC 16, BC 23, and BC 26) that have concentrations of Ra-226 and Ra-228 that are consistent with aged produced water. Results for the remaining wells are consistent with only natural background concentrations of Ra-226 and Ra-228 in TDS in groundwater samples.

These conclusions follow from observation that the natural concentration of Ra-226 is approximately equal to the natural concentration of Ra-228 in groundwater samples (taking into account the overall uncertainty of the laboratory measurements) having the respective TDS concentrations (IAEA 1990; IAEA 2014; USGS 1988; Kraemer 1984).

The national secondary standard for TDS in drinking water is 500 milligrams per liter (mg/L). Samples of groundwater from the subject property exhibit a wide range of TDS concentrations and all the samples have TDS concentrations greater than 500 mg/L. The lowest concentration of TDS in the 53 samples analyzed by Eberline was nearly twice the secondary standard of 500 mg/L. The measured TDS concentrations in the groundwater samples from the subject property bring into question whether the groundwater is potable (USGS 2020; LDNR 2020).

The observations, conclusions, and opinions noted in this report are based on my personal knowledge and experience and are consistent with accepted practice in the field of health physics. I reserve the right to amend this report should additional data or other information become available to me in the future.

V. RATE OF COMPENSATION

I am being compensated at a rate of $250 per hour for my time to work on this project, including sworn testimony at deposition and trial.
VI. PRIOR TESTIMONY

A list of cases in which I have given sworn testimony at deposition or at trial since submission of my May 8, 2020 report is included in Attachment C.

Prepared and submitted by:

John R. Frazier, Ph.D., CHP

Date: September 5, 2020
ATTACHMENT A

LIST OF DOCUMENTS REVIEWED
ATTACHMENT A


Supplemental Report of John R. Frazier, Ph.D., CHP


ATTACHMENT B1: EBERLINE WORK ORDER #20-01124-OR
ATTACHMENT B2: EBERLINE WORK ORDER #20-07104-OR

(in separate electronic files)
ATTACHMENT C

LITIGATION IN WHICH DR. JOHN R. FRAZIER HAS PROVIDED SWORN TESTIMONY SINCE MAY 8, 2020
### LITIGATION IN WHICH DR. JOHN R. FRAZIER HAS PROVIDED SWORN TESTIMONY SINCE MAY 8, 2020

<table>
<thead>
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<th>LAW FIRM</th>
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