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Memorandum

To	Angela Levert
From	Jane Whitsett
Date	04 August 2022
Reference	0526033
Subject	Data Review 2019 – 2022 Site Investigation Soil Samples: Element Materials Technology Lafayette Henning Management, LLC vs Chevron USA, Inc, et al. Docket No 73318: 31st JDC: Division C Hayes Oil and Gas Field, Calcasieu and Jefferson Davis Parish, Louisiana

1. PROJECT OVERVIEW AND SUMMARY

ERM completed a Quality Assurance/Quality Control (QA/QC) data validation and usability review of chemical analytical data from the property that is the subject of a lawsuit titled the Henning Management, L.L.C. v. Chevron U.S.A. Inc., et al. (Henning property). The purpose of the validation and review is to ensure that the data are technically valid and also appropriate and reliable for use in quantitative risk assessment, including under Louisiana's Risk Evaluation/Corrective Action Program (RECAP). The data includes soil samples collected by ERM as split samples during ICON's investigation (from October 2019 to August 2021) and soil samples collected by ERM as primary samples during ERM's investigation (from November 2021 to January 2022). Samples were analyzed for arsenic, barium, cadmium, chromium, lead, selenium, silver, strontium, and zinc by EPA SW-846 Method 6010B (Method 6010B) following Method 3050B preparatory digestion. Testing was performed by Element Materials Technology Lafayette in Lafayette, LA (Element). Element conducted several other tests on these samples; however, this report specifically addresses QA/QC data validation and usability for the parameters listed above. The data validation included Element lab reports that contain samples from the Chevron limited admission areas with Method 6010B metals analysis. Some of the lab reports contain samples collected from other areas of the Henning property. These samples were also included in the data validation. A complete list of the samples and the tests performed on each is shown in Table 1 (Sample Summary).

The following summarizes the results of the validation and usability review:

1.1. Analytical Methodology

The laboratory used EPA SW-846 Method 6010B for LDNR Method 29B metals preceded by 3050B digestion. The laboratory holds the applicable LELAP Certification No.: 01997. The method is appropriate for the intended use of risk assessment per the Louisiana Department of Environmental Quality (LDEQ) and provides definitive (i.e., analyte-specific with confirmation of identity and concentration) and usable data.

1.2. Sample Reporting Limits

The analytical results are in mg/kg and include a Practical Limit of Quantitation (PQL) and the Method Detection Limit (MDL) for each measurement. The MDL is a value that is statistically determined and represents what can be identified above the "noise" level (i.e., baseline electrical signal) of an instrument as being present but not necessarily accurate. The PQL is a laboratory determined value at 2 to 5 times above the MDL and can be reproduced in a manner that results in a 99% confidence level that the result is both accurate and precise. Both are adjusted for sample-specific actions such as dilution or use of a smaller aliquot size. Results for the samples are reported on a wet-weight (as-received) basis in accordance with LDNR policy (LDNR, 2007[1]). The nominal (i.e., unadjusted) PQLs and MDLs are at or below the applicable limiting RECAP screening standards (i.e., the lower of the Soilssni and Soilssgw) for all listed analytes, and thus all analytical methodologies can achieve a quantitation limit that is below the limiting standard.

1.3. Blank Sample Results

The laboratory prepared and analyzed one method blank for each metals batch (maximum 20 samples). No field QC blanks were collected with the samples. All method blank results were not detected for metals of interest.

1.4. QC Outcomes and Data Qualifiers

The laboratory prepared and analyzed a laboratory control sample (LCS) and a laboratory control sample duplicate (LCSD) for every analytical batch using a spike solution containing all the target analytes. LCS/LCSD provide an assessment of laboratory performance. The laboratory also prepared and analyzed a matrix spike and matrix spike duplicate (MS/MSD) for each analytical batch and reported results for MS/MSD prepared using a sample from the Henning property or from a non-Henning project. MS/MSD provide an indication of how the sample matrix affects method performance. The validator evaluated each of these QC samples along with sample holding times and preservation, and any analytical or calibration issues noted in the laboratory narratives. Ten samples were selected for full data validation from the raw instrument data and bench sheets (selected samples are identified in Table 1). The samples were selected to be representative of method performance and disparity recognized in laboratory-reported results for split samples (reported separately by ICON Environmental Services, Inc.). Review of the raw data included evaluation of instrument calibrations, independent calibration verifications (ICV), initial calibration blanks (ICB), continuing calibration verification (CCV) standards and continuing calibration blanks (CCB).

There are 653 results in the data set and 40 results are qualified. The only metal requiring qualification based on the data validation was barium. The qualifiers indicate the results are estimated with a high bias for 30 samples (JH) and a low bias for ten (10) samples. Qualified results

[1] File Memorandum from Gary Snellgrove, November 20, 2007. Laboratory Procedures for the Analysis of Exploration & Production Waste, Revision May 2005 (Lab Manual), Acid Digestion of Sludges Procedure, Calculations 7.7.1.

are associated with MS/MSD accuracy. All qualified results are shown in Table 2 (Qualified Sample Results). Data usability is discussed in Section 4.0.

2. PROCEDURES

Data review and validation was completed by examining the data packages produced by the laboratory. The validation included QC checks covering data comparability, accuracy, precision, representativeness, completeness, and sensitivity. The laboratory packages include analysis results and laboratory QC reports (Level 2) plus detailed case narratives. Full data validation (Level 4) was done for ten (10) samples using the laboratory's raw instrument data and bench sheets. Data for all the samples were examined to determine if the analyses meet the QC requirements for Level 2 review:

- Data Completeness,
- Chain-of-Custody,
- Reporting Limits,
- Sample Preservation and Holding Time,
- Blanks (Laboratory),
- Laboratory Control Samples (LCS/LCSD),
- Matrix Spike Samples (MS/MSD),
- Matrix Duplicates (MD).

Additionally, data for ten (10) samples were examined to determine if the analyses meet the QC requirements for Level 4 review:

- Instrument Calibration,
- ICVs, ICBs, CCVs and CCBs,
- Interference Check Samples,
- Sample Quantitation.

The examination used the following data quality criteria based on requirements in the analytical method and to provide a consistent approach, which allows the user to easily assess data quality:

Laboratory Spikes and Matrix Spikes: 75 to 125% spike recovery and 20% RPD for LCS/LCSD and MS/MSD. For MS/MSD, the spike recovery is considered inconclusive per data validation guidelines if the unspiked sample concentration is greater than four times the amount of spike added.

Initial Calibration Curve: A correlation coefficient of 0.9950 or above is an acceptable calibration curve per data validation guidelines for Method 6010B metals.

Initial and Continuing Calibration Verification: 80 to 120% R for ICV and CCV are acceptable per validation guidelines for Method 6010B metals.

Interference Check Sample: 80 to 120% R are acceptable per validation guidelines for Method 6010B metals.

After completing the examination, the validator applied qualifying flags to any data associated with a QC deviation. The Data Validation Qualifiers (DVQs) are defined in Table 2 and were applied in accordance with the following reference documents:

- Contract Laboratory Program (CLP) procedure (ICP Metals) and
- USEPA's National Functional Guidelines for Inorganic Superfund Methods Data Review, January 2017

3. DATA VALIDATION RESULTS

The data set includes 145 soil samples from different locations/depths submitted for metals analysis by Method 6010B as shown in Table 1 (Sample Summary). All samples/tests in the table were included in the validation giving a total of 653 sample results that were validated. The outcomes are discussed below. Samples collected from the Chevron limited admission areas (100 of the 145 total samples) are identified in Table 1.

3.1. Comparability

Comparability expresses the confidence with which one data set can be compared to another and can be related to accuracy and precision because these quantities are a measure of data reliability. Samples were analyzed using standard EPA protocols or other rigorous methods, and the results have been validated with acceptable levels of accuracy and precision based on appropriate data quality criteria or the data have been qualified. Results are considered comparable to other results similarly generated and validated. When comparing results, it should be noted that analytical results for this sample set are reported in mg/kg. Results are reported on a wet-weight (as-received) basis.

3.2. Accuracy

Accuracy is defined as the degree of agreement of a measurement to an accepted reference or true value and is measured as percent recovery (%R) of an analyte in a reference standard or spiked sample. The analytical accuracy of the sample results was evaluated using the %R for the LCS/LCSD, MS/MSD, ICV, CCV and interference check samples. LCS/LCSDs are prepared using a clean sample matrix (reagent water or sand) that is spiked with the analytes of interest before preparation and analysis. They provide an indication of the accuracy of the preparation and analysis technique on a sample free of matrix effects. MS/MSD are prepared using a field sample that is spiked with the analytes of interest before preparation and analysis. They provide an indication of the accuracy of the preparation and analysis technique on the given sample matrix. The calibration of

the instrument and presence of interferences are checked with the ICV, CCV and interference check samples.

3.2.1. Laboratory Control Sample (LCS) Accuracy

The laboratory prepared and analyzed an LCS and LCSD with every applicable analytical batch (maximum 20 samples) as required. For this sample set, there are 22 LCS/LCSD, each with recoveries reported for all the target analytes. The LCS/LCSD recoveries are within the data quality criteria. Associated samples did not require any qualification.

3.2.2. Matrix Spike (MS) Accuracy

The laboratory prepared and analyzed an MS and MSD with every applicable analytical batch (maximum 20 samples) and reported results for MS/MSD prepared using a sample from the Henning property or from a non-Henning project. For this data set, there are 23 MS/MSDs each with recoveries reported for all the target analytes. There were 8 MS/MSDs prepared using a sample from the Henning property and 15 MS/MSD that were prepared from sites other than the Henning property. Applicable method requirements were met for these samples using a laboratory-selected solid matrix sample. The MS/MSD recoveries are within the data quality criteria for 7 of the 8 Henning samples that were spiked. The MS/MSD recoveries for 15 non-Henning samples were not considered for this evaluation of accuracy since they are not project-specific matrices. For the Henning MS/MSD samples, there are three (3) sets in which the test is considered inconclusive since the amount of spike added compared to the unspiked sample concentration is less than four times the concentration of the unspiked sample as shown in Table 2. For the remaining Henning MS/MSD, four pairs had recoveries outside the acceptable criteria (i.e., 75-125%) for barium. The associated samples (i.e., those in the same batch as the MS/MSD and of similar matrix) were qualified as indicated in Table 2. Recoveries for the other metals included in the analysis are within the data quality criteria and did not require qualification.

3.3. Precision

Precision is defined as the agreement between a set of replicate measurements without assumption or knowledge of the true value and is measured as relative percent difference (RPD) between two results. The analytical precision of the sample results was evaluated using the RPD for the LCS/LCSD and MS/MSD. LCSD are prepared using a clean sample matrix (reagent water or sand) that is spiked with the analytes of interest before preparation and analysis. They provide an indication of the precision of the preparation and analysis technique on a sample free of matrix effects. MSD are prepared using a field sample that is spiked with the analytes of interest before preparation and analysis. They provide an indication of the precision of the preparation and analysis technique on the given sample matrix.

3.3.1. Laboratory Control Sample Duplicate (LCSD) Precision

The laboratory prepared and analyzed an LCSD with every analytical batch (maximum 20 samples). For this data set, there are 22 LCSD each with RPDs reported for all the target analytes. The LCSD RPDs are within the data quality criteria.

3.3.2. Matrix Spike Duplicate (MSD) Precision

The laboratory prepared and analyzed an MSD with every analytical batch (maximum 20 samples) and reported results for MSDs on 8 samples from the Henning property. Applicable method requirements were met for these analytes using a laboratory-selected solid matrix sample. The MSD RPDs are within the data quality criteria except in two cases as shown in Table 2 (Table of Qualified Results). The associated samples (i.e., those in the same batch as the MSD of similar matrix) were qualified as indicated in the table. For the site-specific MSD samples, there are three (3) sets in which the test is considered inconclusive since the amount of spike added compared to the unspiked sample concentration is less than four times the concentration of the unspiked sample as shown in Table 2.

3.4. Representativeness

Representativeness is the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Analytical representativeness of the sample results was verified by evaluating the data completeness, examining the custody procedures, calculating holding times, examining blanks for evidence of contamination, and comparing the actual analytical procedures to those described in the analysis methods.

3.4.1. Data Completeness

The data packages contain all necessary information.

3.4.2. Chain of Custody

All samples were hand-delivered or delivered under seal by a commercial overnight carrier with properly executed Chain-of-Custody records, which ensures sample integrity was maintained.

3.4.3. Sample Preservation and Holding Time

All samples were properly preserved and analyzed within the holding times listed in the analytical methodology.

3.4.4. Blank Results

The laboratory analyzed a method blank for every analytical batch (maximum 20 samples). There are 22 laboratory blanks for this data set. All method blank results were not detected for metals of interest.

3.4.5. Results Assessment

As part of the data comparability review for this project, the validator was asked to identify specific differences in the metals analysis performed by the same laboratory on split soil samples submitted separately by another consultant, ICON. The laboratory preparation of the soil samples submitted by ICON for metals analysis included a drying and grinding step prior to implementing the EPA SW-846 Method 3050B digestion procedure followed by Method 6010B metals analysis.

3.4.6. Completeness

There were no data qualified as rejected and a completeness (number of acceptable results divided by the total number of results) of 100 percent has been achieved.

4. DATA USABILITY

Data usability was evaluated by considering the appropriateness of the analytical methods used by the laboratory, the reporting limits stated by the laboratory, and the qualifiers applied by the validator.

4.1. Methodology

The Method 6010B for metals employed by the laboratory on the samples submitted by ERM was appropriate for the intended use of risk assessment, including the LDEQ's RECAP, and provides definitive data per RECAP.

4.2. Sensitivity (Reporting Limits)

Sensitivity is the degree to which an analytical instrument responds to a change in target analyte concentration, particularly at low concentrations, and is reflected in the reporting limit stated by the laboratory for results that are non-detect. For this data set, the analytical results are reported with a PQL and MDL. The MDL is a detection limit statistically determined by the laboratory and thus corresponds to the lowest concentration at which a target analyte can be positively identified but not necessarily accurately measured. The PQL are quantitation limits based on instrument calibration curves and thus reflect the lowest concentration at which a target analyte can be both positively identified and accurately measured. Each are adjusted for sample-specific actions such as dilution or use of a smaller aliquot size. As such, the PQL and MDL are equivalent to the sample quantitation limit (SQL) as defined by RECAP. Nondetected results are reported as 'ND' and should be considered not present at or above the PQL or MRL per RECAP format.

Per RECAP, the sample quantitation limit should be less than the limiting screening standard. The nominal (i.e., unadjusted) PQLs and MDLs are at or below the applicable RECAP screening standards (i.e., the lower of the Soilssni and Soilssgw) for all listed analytes, and thus all analytical methodologies can achieve a quantitation limit that is below the limiting standard.

4.3. QC Performance

All soil data are considered technically valid and acceptable for risk assessment purposes. As shown in Table 2 (Qualified Sample Results), the reviewer qualified some detected results as estimated biased low (JL) or biased high (JH). These results are reliable for determining the absence or presence of the analyte, and the reported estimated value is usable in quantitative risk assessment in accord with USEPA and RECAP guidance. There were thirty (30) barium results qualified as estimates with a high bias (JH) and ten (10) barium results qualified as estimates with a low bias (JL) due to MS and MSD recoveries outside of acceptance limits. This is due to matrix interferences for the site-specific samples. No other metals required qualification based on data validation.

Table 1

ERM Soil Sample Summary for Data Validation - Metals by SW-846 Method 6010B

Henning Management, L.L.C. v. Chevron U.S.A. Inc., et al.

Hayes Oil and Gas Field

Calcasieu and Jefferson Davis Parishes, Louisiana

Laboratory	Laboratory Report (a)	Laboratory ID (b)	Field Sample ID (b)	Area of Site (c)	Matrix	Date Collected	Date Analyzed	Investi-gation (d)	Sampled by	Sample Type (e)	Metals by EPA SW-846 Method 6010B (f)								
											As	Ba	Cd	Cr	Pb	Se	Ag	Sr	Zn
Element	19101487	19101487-001A	H-1 6-8	Chevron	Soil	10/29/2019	11/22/2019	ICON	ERM	Split	1	1	1	1	1	1	1		1
Element	19101487	19101487-002A	H-1 10-12	Chevron	Soil	10/29/2019	11/6/2019	ICON	ERM	Split	1	1	1	1	1	1	1		1
Element	19101487	19101487-005A	H-2 10-12	Chevron	Soil	10/30/2019	11/6/2019	ICON	ERM	Split	1	1	1	1	1	1	1		1
Element	19110451	19110451-001A	H-3 10-12	Non-Chevron	Soil	10/31/2019	11/19/2019	ICON	ERM	Split	1	1	1	1	1			1	1
Element	19110451	19110451-004A	H-4 4-6	Chevron	Soil	11/4/2019	11/19/2019	ICON	ERM	Split	1	1	1	1	1			1	1
Element	19110451	19110451-006A	H-5 4-6	Non-Chevron	Soil	11/4/2019	11/19/2019	ICON	ERM	Split	1	1	1	1	1			1	1
Element	19110451	19110451-007A	H-5 10-12	Non-Chevron	Soil	11/4/2019	11/19/2019	ICON	ERM	Split	1	1	1	1	1			1	1
Element	19110451	19110451-009A	H-6 6-8	Non-Chevron	Soil	11/5/2019	11/19/2019	ICON	ERM	Split	1	1	1	1	1			1	1
Element	19110451	19110451-010A	H-6 10-12	Non-Chevron	Soil	11/5/2019	11/19/2019	ICON	ERM	Split	1	1	1	1	1			1	1
Element	19110451	19110451-012A	H-7 6-8	Chevron	Soil	11/5/2019	11/19/2019	ICON	ERM	Split	1	1	1	1	1			1	1
Element	19110451	19110451-013A	H-7 10-12	Chevron	Soil	11/5/2019	11/19/2019	ICON	ERM	Split	1	1	1	1	1			1	1
Element	19110451	19110451-015A	H-8 4-6	Chevron	Soil	11/5/2019	11/19/2019	ICON	ERM	Split	1	1	1	1	1			1	1
Element	19110451	19110451-016A	H-8 6-8	Chevron	Soil	11/5/2019	11/19/2019	ICON	ERM	Split	1	1	1	1	1			1	1
Element	19110451	19110451-017A	H-8 10-12	Chevron	Soil	11/5/2019	11/19/2019	ICON	ERM	Split	1	1	1	1	1			1	1
Element	19110451	19110451-019A	H-9 4-6	Chevron	Soil	11/5/2019	11/22/2019	ICON	ERM	Split	1	1	1	1	1			1	1
Element	19110451	19110451-020A	H-9 8-10	Chevron	Soil	11/5/2019	11/22/2019	ICON	ERM	Split	1	1	1	1	1			1	1
Element	19110451	19110451-021A	H-9 10-12	Chevron	Soil	11/5/2019	11/22/2019	ICON	ERM	Split	1	1	1	1	1			1	1
Element	19110451	**19110451-022A**	**H-10 4-6**	Chevron	Soil	11/6/2019	11/22/2019	ICON	ERM	Split	1	1	1	1	1			1	1
Element	19110451	19110451-023A	H-10 8-10	Chevron	Soil	11/6/2019	12/4/2019	ICON	ERM	Split	1	1	1	1	1			1	1
Element	19110648	19110648-001A	H-13 0-2	Non-Chevron	Soil	11/14/2019	11/22/2019	ICON	ERM	Split	1	1	1	1	1	1	1		1
Element	19110648	19110648-002A	H-13 4-6	Non-Chevron	Soil	11/14/2019	11/22/2019	ICON	ERM	Split	1	1	1	1	1	1	1		1
Element	19110648	19110648-003A	H-13 8-10	Non-Chevron	Soil	11/14/2019	11/22/2019	ICON	ERM	Split	1	1	1	1	1	1	1		1
Element	19110648	19110648-006A	H-11 4-6	Chevron	Soil	11/12/2019	11/22/2019	ICON	ERM	Split	1	1	1	1	1	1	1		1
Element	19110648	19110648-007A	H-11 8-10	Chevron	Soil	11/12/2019	11/22/2019	ICON	ERM	Split	1	1	1	1	1	1	1		1
Element	19110648	**19110648-010A**	**H-12 4-6**	Chevron	Soil	11/13/2019	11/22/2019	ICON	ERM	Split	1	1	1	1	1	1	1		1
Element	19110648	19110648-011A	H-12 8-10	Chevron	Soil	11/13/2019	11/26/2019	ICON	ERM	Split	1	1	1	1	1	1	1		1
Element	19110959	19110959-001A	H-14 8-10	Non-Chevron	Soil	11/18/2019	12/4/2019	ICON	ERM	Split	1	1	1	1	1			1	1
Element	19110959	19110959-004A	H-15 4-6	Chevron	Soil	11/19/2019	12/4/2019	ICON	ERM	Split	1	1	1	1	1			1	1
Element	19110959	19110959-005A	H-15 6-8	Chevron	Soil	11/19/2019	12/4/2019	ICON	ERM	Split	1	1	1	1	1			1	1
Element	19110959	19110959-006A	H-15 8-10	Chevron	Soil	11/19/2019	12/4/2019	ICON	ERM	Split	1	1	1	1	1			1	1
Element	19110959	19110959-007A	H-15 10-12	Chevron	Soil	11/19/2019	12/4/2019	ICON	ERM	Split	1	1	1	1	1			1	1
Element	19110959	**19110959-010A**	**H-16 0-2**	Chevron	Soil	11/20/2019	12/4/2019	ICON	ERM	Split	1	1	1	1	1			1	1
Element	19110959	19110959-011A	H-16 4-6	Chevron	Soil	11/20/2019	12/4/2019	ICON	ERM	Split	1	1	1	1	1			1	1
Element	19110959	19110959-012A	H-16 10-12	Chevron	Soil	11/20/2019	12/4/2019	ICON	ERM	Split	1	1	1	1	1			1	1
Element	19110959	19110959-017A	H-17 4-6	Chevron	Soil	11/20/2019	12/4/2019	ICON	ERM	Split	1	1	1	1	1			1	1
Element	19110959	19110959-018A	H-17 6-8	Chevron	Soil	11/20/2019	12/4/2019	ICON	ERM	Split	1	1	1	1	1			1	1
Element	19110959	19110959-019A	H-17 8-10	Chevron	Soil	11/20/2019	12/4/2019	ICON	ERM	Split	1	1	1	1	1			1	1
Element	19110959	19110959-020A	H-17 10-12	Chevron	Soil	11/20/2019	12/4/2019	ICON	ERM	Split	1	1	1	1	1			1	1
Element	19110959	19110959-024A	H-18 4-6	Chevron	Soil	11/21/2019	12/4/2019	ICON	ERM	Split	1	1	1	1	1			1	1

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ERM Soil Sample Summary for Data Validation - Metals by SW-846 Method 6010B

Henning Management, L.L.C. v. Chevron U.S.A. Inc., et al.
Hayes Oil and Gas Field
Calcasieu and Jefferson Davis Parishes, Louisiana

Laboratory	Laboratory Report (a)	Laboratory ID (b)	Field Sample ID (b)	Area of Site (c)	Matrix	Date Collected	Date Analyzed	Investi-gation (d)	Sampled by	Sample Type (e)	Metals by EPA SW-846 Method 6010B (f)								
											As	Ba	Cd	Cr	Pb	Se	Ag	Sr	Zn
Element	19110959	19110959-025A	H-18 8-10	Chevron	Soil	11/21/2019	12/4/2019	ICON	ERM	Split	1	1	1	1	1			1	1
Element	19110959	19110959-029A	H-19 4-6	Chevron	Soil	11/22/2019	12/4/2019	ICON	ERM	Split	1	1	1	1	1			1	1
Element	19110959	19110959-030A	H-19 8-10	Chevron	Soil	11/22/2019	12/4/2019	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040438	21040438-001A	H-20 4-6	Non-Chevron	Soil	3/29/2021	4/21/2022	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040438	21040438-002A	H-20 8-10	Non-Chevron	Soil	3/29/2021	4/21/2022	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040438	21040438-006A	H-21 0-2	Chevron	Soil	3/30/2021	4/21/2021	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040438	21040438-007A	H-21 8-10	Chevron	Soil	3/30/2021	4/21/2021	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040438	21040438-008A	H-21 10-12	Chevron	Soil	3/30/2021	4/21/2021	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040438	21040438-010A	H-22 0-2	Chevron	Soil	4/1/2021	4/21/2021	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040438	21040438-011A	H-22 4-6	Chevron	Soil	4/1/2021	4/21/2021	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040438	21040438-012A	H-22 8-10	Chevron	Soil	4/1/2021	4/21/2021	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040438	21040438-016A	H-23 0-2	Non-Chevron	Soil	4/5/2021	4/21/2022	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040438	21040438-017A	H-23 4-6	Non-Chevron	Soil	4/5/2021	4/21/2022	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040438	21040438-018A	H-23 10-12	Non-Chevron	Soil	4/5/2021	4/21/2022	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040438	**21040438-022A**	**H-24 0-2**	Chevron	Soil	4/6/2021	4/21/2021	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040438	21040438-023A	H-24 4-6	Chevron	Soil	4/6/2021	4/21/2021	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040438	21040438-024A	H-24 8-10	Chevron	Soil	4/6/2021	4/21/2021	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040438	21040438-028A	H-25 0-2	Non-Chevron	Soil	4/7/2021	4/21/2021	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040438	21040438-029A	H-25 4-6	Non-Chevron	Soil	4/7/2021	4/22/2021	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040438	21040438-030A	H-25 6-8	Non-Chevron	Soil	4/7/2021	4/22/2021	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040438	21040438-031A	H-25 8-10	Non-Chevron	Soil	4/7/2021	4/22/2021	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040438	21040438-032A	H-25 10-12	Non-Chevron	Soil	4/7/2021	4/22/2021	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040438	21040438-035A	H-26 0-2	Non-Chevron	Soil	4/8/2021	4/22/2021	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040438	21040438-036A	H-26 4-6	Non-Chevron	Soil	4/8/2021	4/22/2021	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040438	21040438-037A	H-26 6-8	Non-Chevron	Soil	4/8/2021	4/22/2021	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040438	21040438-038A	H-26 8-10	Non-Chevron	Soil	4/8/2021	4/22/2021	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040438	21040438-039A	H-26 10-12	Non-Chevron	Soil	4/8/2021	4/22/2021	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040438	21040438-043A	H-27 0-2	Non-Chevron	Soil	4/9/2021	4/22/2021	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040438	21040438-044A	H-27 4-6	Non-Chevron	Soil	4/9/2021	4/22/2021	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040438	21040438-045A	H-27 6-8	Non-Chevron	Soil	4/9/2021	4/22/2021	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040438	21040438-046A	H-27 8-10	Non-Chevron	Soil	4/9/2021	4/22/2021	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040481	21040481-001A	H-28 0-2	Chevron	Soil	4/12/2021	4/22/2021	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040481	21040481-002A	H-28 4-6	Chevron	Soil	4/12/2021	4/22/2021	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040481	**21040481-003A**	**H-28 6-8**	Chevron	Soil	4/12/2021	4/22/2021	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040481	21040481-005A	H-29 0-2	Non-Chevron	Soil	4/12/2021	4/22/2021	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040481	21040481-006A	H-29 4-6	Non-Chevron	Soil	4/12/2021	4/22/2021	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040481	21040481-007A	H-29 8-10	Non-Chevron	Soil	4/12/2021	4/22/2021	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040481	21040481-008A	H-29 10-12	Non-Chevron	Soil	4/12/2021	4/22/2021	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040481	21040481-009A	H-30 0-2	Non-Chevron	Soil	4/12/2021	4/22/2021	ICON	ERM	Split	1	1	1	1	1			1	1

Table 1

ERM Soil Sample Summary for Data Validation - Metals by SW-846 Method 6010B

Henning Management, L.L.C. v. Chevron U.S.A. Inc., et al.
Hayes Oil and Gas Field
Calcasieu and Jefferson Davis Parishes, Louisiana

Laboratory	Laboratory Report (a)	Laboratory ID (b)	Field Sample ID (b)	Area of Site (c)	Matrix	Date Collected	Date Analyzed	Investi-gation (d)	Sampled by	Sample Type (e)	Metals by EPA SW-846 Method 6010B (f)								
											As	Ba	Cd	Cr	Pb	Se	Ag	Sr	Zn
Element	21040481	21040481-010A	H-30 4-6	Non-Chevron	Soil	4/12/2021	4/22/2021	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040481	21040481-011A	H-30 8-10	Non-Chevron	Soil	4/12/2021	4/22/2021	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040481	21040481-012A	H-30 10-12	Non-Chevron	Soil	4/12/2021	4/22/2021	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040481	21040481-013A	H-31 8-10	Non-Chevron	Soil	4/12/2021	4/22/2021	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21040481	21040481-014A	H-31 10-12	Non-Chevron	Soil	4/12/2021	4/22/2021	ICON	ERM	Split	1	1	1	1	1			1	1
Element	21110790	21110790-001A	H-22W 0-2	Chevron	Soil	11/11/2021	11/16/2021	ERM	ERM	Primary		1							
Element	21110790	21110790-003A	H-22S 0-2	Chevron	Soil	11/11/2021	11/16/2021	ERM	ERM	Primary		1							
Element	21110790	21110790-004A	H-22N 0-2	Chevron	Soil	11/11/2021	11/16/2021	ERM	ERM	Primary		1							
Element	21110790	21110790-005A	H-22E 0-2	Chevron	Soil	11/11/2021	11/16/2021	ERM	ERM	Primary		1							
Element	21110790	21110790-007A	H-8E 0-2	Chevron	Soil	11/11/2021	11/16/2021	ERM	ERM	Primary		1							
Element	21110790	**21110790-008A**	**H-8W 0-2**	Chevron	Soil	11/11/2021	11/19/2021	ERM	ERM	Primary		1							
Element	21110790	21110790-009A	H-8S 0-2	Chevron	Soil	11/11/2021	11/19/2021	ERM	ERM	Primary		1							
Element	21110790	21110790-010A	H-8N 0-2	Chevron	Soil	11/11/2021	11/19/2021	ERM	ERM	Primary		1							
Element	21110790	21110790-011A	H-16N 0-2	Chevron	Soil	11/11/2021	11/19/2021	ERM	ERM	Primary		1							
Element	21110790	**21110790-012A**	**H-16W 0-2**	Chevron	Soil	11/11/2021	11/19/2021	ERM	ERM	Primary		1							
Element	21110790	21110790-013A	H-16E 0-2	Chevron	Soil	11/11/2021	11/19/2021	ERM	ERM	Primary		1							
Element	21110790	21110790-014A	H-16S 0-2	Chevron	Soil	11/11/2021	11/19/2021	ERM	ERM	Primary		1							
Element	21110790	21110790-015A	H-24S 0-2	Chevron	Soil	11/11/2021	11/19/2021	ERM	ERM	Primary		1							
Element	21110790	21110790-016A	H-28W 0-2	Chevron	Soil	11/11/2021	11/19/2021	ERM	ERM	Primary		1							
Element	21110790	21110790-018A	H-28S 0-2	Chevron	Soil	11/11/2021	11/19/2021	ERM	ERM	Primary		1							
Element	21110790	21110790-019A	H-28E 0-2	Chevron	Soil	11/11/2021	11/19/2021	ERM	ERM	Primary		1							
Element	21110790	21110790-020A	H-28N 0-2	Chevron	Soil	11/12/2021	11/19/2021	ERM	ERM	Primary		1							
Element	21110790	21110790-021A	H-24N 0-2	Chevron	Soil	11/12/2021	11/19/2021	ERM	ERM	Primary		1							
Element	21110790	21110790-022A	H-24E 0-2	Chevron	Soil	11/12/2021	11/19/2021	ERM	ERM	Primary		1							
Element	21110790	21110790-023A	H-24W 0-2	Chevron	Soil	11/12/2021	11/19/2021	ERM	ERM	Primary		1							
Element	21110790	21110790-026A	H-4N 0-2	Chevron	Soil	11/12/2021	11/19/2021	ERM	ERM	Primary		1							
Element	21110790	21110790-027A	H-4E 0-2	Chevron	Soil	11/12/2021	11/19/2021	ERM	ERM	Primary		1							
Element	21110790	21110790-028A	H-4S 0-2	Chevron	Soil	11/12/2021	11/19/2021	ERM	ERM	Primary		1							
Element	21110790	21110790-029A	H-4W 0-2	Chevron	Soil	11/12/2021	11/19/2021	ERM	ERM	Primary		1							
Element	21111085	**21111085-001A**	**H-16R 0-2**	Chevron	Soil	11/15/2021	12/7/2021	ERM	ERM	Primary		1							
Element	21111085	21111085-022A	H-15N 0-2	Chevron	Soil	11/18/2021	12/7/2021	ERM	ERM	Primary		1							
Element	21111085	21111085-023A	H-15W 0-2	Chevron	Soil	11/18/2021	12/7/2021	ERM	ERM	Primary		1							
Element	21111085	21111085-025A	H-15E 0-2	Chevron	Soil	11/19/2021	12/7/2021	ERM	ERM	Primary		1							
Element	21111085	21111085-026A	H-15S 0-2	Chevron	Soil	11/19/2021	12/7/2021	ERM	ERM	Primary		1							
Element	21111085	21111085-027A	H-11S 0-2	Chevron	Soil	11/19/2021	12/7/2021	ERM	ERM	Primary		1							
Element	21111085	21111085-028A	H-11E 0-2	Chevron	Soil	11/19/2021	12/7/2021	ERM	ERM	Primary		1							
Element	21111085	21111085-030A	H-11N 0-2	Chevron	Soil	11/19/2021	12/7/2021	ERM	ERM	Primary		1							
Element	21120179	21120179-001A	MW-7 4-6	Chevron	Soil	11/29/2021	12/17/2021	ERM	ERM	Primary		1							
Element	21120179	21120179-008A	MW-1 0-2	Chevron	Soil	12/1/2021	12/17/2021	ERM	ERM	Primary		1							

Table 1

ERM Soil Sample Summary for Data Validation - Metals by SW-846 Method 6010B

Henning Management, L.L.C. v. Chevron U.S.A. Inc., et al.
Hayes Oil and Gas Field
Calcasieu and Jefferson Davis Parishes, Louisiana

Laboratory	Laboratory Report (a)	Laboratory ID (b)	Field Sample ID (b)	Area of Site (c)	Matrix	Date Collected	Date Analyzed	Investi-gation (d)	Sampled by	Sample Type (e)	Metals by EPA SW-846 Method 6010B (f)								
											As	Ba	Cd	Cr	Pb	Se	Ag	Sr	Zn
Element	21120179	21120179-009A	MW-1 4-6	Chevron	Soil	12/1/2021	12/17/2021	ERM	ERM	Primary		1							
Element	21120179	21120179-014A	MW-9 0-2	Non-Chevron	Soil	12/2/2021	12/17/2021	ERM	ERM	Primary		1							
Element	21120179	21120179-015A	MW-9 4-6	Non-Chevron	Soil	12/2/2021	12/17/2021	ERM	ERM	Primary		1							
Element	21120179	21120179-026A	H-18NW 0-2	Chevron	Soil	12/3/2021	12/21/2021	ERM	ERM	Primary		1							
Element	21120560	21120560-001A	MW-11 0-2	Non-Chevron	Soil	12/7/2021	12/21/2021	ERM	ERM	Primary		1							
Element	21120560	21120560-009A	MW-4 0-2	Chevron	Soil	12/8/2021	12/21/2021	ERM	ERM	Primary		1							
Element	21120560	21120560-010A	MW-4 4-6	Chevron	Soil	12/8/2021	12/21/2021	ERM	ERM	Primary		1							
Element	21120560	21120560-015A	MW-3 0-2	Chevron	Soil	12/8/2021	12/21/2021	ERM	ERM	Primary		1							
Element	21120560	**21120560-021A**	**MW-2 0-2**	Chevron	Soil	12/9/2021	12/21/2021	ERM	ERM	Primary		1							
Element	21120834	21120834-001A	MW-10 0-2	Chevron	Soil	12/13/2021	12/21/2021	ERM	ERM	Primary		1							
Element	21120834	21120834-002A	MW-10 4-6	Chevron	Soil	12/13/2021	1/5/2022	ERM	ERM	Primary		1							
Element	21120834	21120834-007A	H-1SE 0-2	Non-Chevron	Soil	12/13/2021	1/5/2022	ERM	ERM	Primary		1							
Element	21120834	21120834-008A	H-1SE 4-6	Non-Chevron	Soil	12/13/2021	1/5/2022	ERM	ERM	Primary		1							
Element	21120834	21120834-012A	H-1E 0-2	Non-Chevron	Soil	12/13/2021	1/5/2022	ERM	ERM	Primary		1							
Element	21120834	21120834-013A	MW-8 0-2	Chevron	Soil	12/14/2021	1/5/2022	ERM	ERM	Primary		1							
Element	21120834	21120834-018A	H-19NE 0-2	Chevron	Soil	12/14/2021	1/5/2022	ERM	ERM	Primary		1							
Element	21120834	21120834-020A	H-19SW 0-2	Chevron	Soil	12/14/2021	1/5/2022	ERM	ERM	Primary		1							
Element	21120834	**21120834-021A**	**H-18SW 0-2**	Chevron	Soil	12/14/2021	1/10/2022	ERM	ERM	Primary		1							
Element	22010535	22010535-001A	H-4E2 0-2	Chevron	Soil	1/10/2022	1/28/2022	ERM	ERM	Primary		1							
Element	22010535	22010535-002A	H-4N2 0-2	Chevron	Soil	1/10/2022	1/28/2022	ERM	ERM	Primary		1							
Element	22010535	22010535-003A	H-4W2 0-2	Chevron	Soil	1/10/2022	2/3/2022	ERM	ERM	Primary		1							
Element	22010535	22010535-004A	H-8N2 0-2	Chevron	Soil	1/11/2022	2/3/2022	ERM	ERM	Primary		1							
Element	22010535	22010535-005A	H-8S2 0-2	Chevron	Soil	1/11/2022	1/31/2022	ERM	ERM	Primary		1							
Element	22010535	22010535-006A	H-22S2 0-2	Chevron	Soil	1/11/2022	1/31/2022	ERM	ERM	Primary		1							
Element	22010535	22010535-007A	H-24NW 0-2	Chevron	Soil	1/11/2022	2/3/2022	ERM	ERM	Primary		1							
Element	22010535	22010535-008A	H-24NE 0-2	Chevron	Soil	1/11/2022	1/28/2022	ERM	ERM	Primary		1							
Element	22010535	22010535-009A	H-28SE 0-2	Non-Chevron	Soil	1/11/2022	1/31/2022	ERM	ERM	Primary		1							
Element	22010535	22010535-010A	H-24SW 0-2	Chevron	Soil	1/11/2022	2/3/2022	ERM	ERM	Primary		1							

Notes:

Sample ID: Samples selected for full (Level IV) data validation.

(a) The data validation included Element Materials Technology Lafayette (Element) laboratory reports that contain samples from the Chevron limited admission areas that were analyzed for metals by Method 6010B.

(b) Samples include those with Method 6010B metals analysis in the respective laboratory reports. Laboratory sample IDs and field sample IDs are provided.

(c) Samples collected from Chevron limited admission areas are the focus of the data validation; however, samples collected from other areas of the site with 6010B analysis in the respective laboratory reports were also included in the data validation.

(d) Investigations were led by ICON (from October 2019 to August 2021) and by ERM (from November 2021 to January 2022).

(e) ERM collected split samples during ICON investigations and primary samples during ERM investigations.

(f) Metals analyzed by Method 6010B and included in the data validation include arsenic (As), barium (Ba), cadmium (Cd), chromium (Cr), lead (Pb), selenium (Se), silver (Ag), strontium (Sr), and zinc (Zn). Metals analyzed for each sample are identified with a "1" in the column for the respective metal.

Table 2

Qualified ERM Soil Sample Results - Metals by SW-846 Method 6010B

Henning Management, L.L.C. v. Chevron U.S.A. Inc., et al.
Hayes Oil and Gas Field
Calcasieu and Jefferson Davis Parishes, Louisiana

Lab Report	MS/MSD Lab Sample ID	Associated Sample Field Sample ID	Parameter	Lab Batch	MS %R	MSD %R	Limit (%)	MS RPD	RPD Limit	Result (mg/kg)	ERM Qualifier
19110959	19110959-001A MS/MSD	H-14 8-10 *	Barium	32425	139	139	75-125	0.728	20	24.1	JH
		H-15 4-6								286	JH
		H-15 6-8								224	JH
		H-15 8-10								92	JH
		H-15 10-12								64.4	JH
		H-16 0-2								186	JH
		H-16 4-6								339	JH
		H-16 10-12								57.7	JH
		H-17 4-6								140	JH
		H-17 6-8								69.4	JH
		H-17 8-10								131	JH
		H-17 10-12								304	JH
		H-18 4-6								51	JH
		H-18 8-10								25.4	JH
		H-19 4-6								28.8	JH
		H-19 8-10								46	JH
21040438	21040438-029A MS/MSD	H-25 4-6 *	Barium	39307	193	192	75-125	0.173	20	25.7	JH
		H-25 6-8 *								17.9	JH
		H-25 8-10 *								16.9	JH
		H-25 10-12 *								36.2	JH
		H-26 0-2 *								125	JH
		H-26 4-6 *								10.4	JH
		H-26 6-8 *								30.4	JH
		H-26 8-10 *								43.9	JH
		H-26 10-12 *								37.7	JH
		H-27 0-2 *								39.9	JH
		H-27 4-6 *								133	JH
		H-27 6-8 *								6.51	JH
		H-27 8-10 *								200	JH

Table 2

Qualified ERM Soil Sample Results - Metals by SW-846 Method 6010B

Henning Management, L.L.C. v. Chevron U.S.A. Inc., et al.
Hayes Oil and Gas Field
Calcasieu and Jefferson Davis Parishes, Louisiana

Lab Report	MS/MSD Lab Sample ID	Associated Sample Field Sample ID	Parameter	Lab Batch	MS %R	MSD %R	Limit (%)	MS RPD	RPD Limit	Result (mg/kg)	ERM Qualifier
19110451	19110451-019A MS/MSD	H-9 4-6	Barium	32314	47.2	49.4	75-125	0.969	20	59.7	JL
		H-9 8-10								58	JL
		H-9 10-12								30.1	JL
		H-10 4-6								27.2	JL
		H-10 8-10								392	JL
		H-13 0-2 *								52	JL
		H-13 4-6 *								155	JL
		H-13 8-10 *								60.5	JL
		H-11 4-6								192	JL
		H-11 8-10								27.6	JL
21120834	21120834-021 MS/MSD	H-18SW 0-2	Barium	42232	370	363	75-125	5.33	20	40.9	JH
21110790	21120834-008 MS/MSD	H-8W 0-2	Barium	41663	2620	295	75-125	**65.3**	20	519	--
21120179	21120179-026A MS/MSD	H-18NW 0-2	Barium	42001	-1430	-1290	75-125	5.75	20	591	--
22010535	22010535-005A MS/MSD	H-8S2 0-2	Barium	42382	494	-3080	75-125	**58.9**	20	1903	--

Notes:

* Sample collected from Henning property, but not located in a Chevron limited admission area.
JH - Sample result is an estimate with a high bias (J+)
JL - Sample result is an estimate with a low bias (J-)
MS - matrix spike
MSD - matrix spike duplicate
mg/kg - milligrams per Kilogram
% - percent
RPD - relative percent difference
-- Inconclusive since the unspiked sample is >4 times the concentration of the sample amount.
Bold RPDs do not meet acceptance criteria.