



## Report of Independent Accountants

### To the Board of Directors and Management of Chevron Corporation

We have examined the accompanying Schedule of Scope 1 and Scope 2 Greenhouse Gas Emissions for the year ended December 31, 2015 on an equity basis for Chevron Corporation's ("Chevron" or the "Company") subsidiary operated entities in Africa and the United States (except California) (the "Schedule") in accordance with Chevron's GHG Reporting Protocol, Version 2.0, January 2014 (the "Criteria"). Chevron's management is responsible for the preparation of the Schedule. Our responsibility is to express an opinion on the Schedule based on our examination.

Our examination was conducted in accordance with attestation standards established by the American Institute of Certified Public Accountants and, accordingly, included examining, on a test basis, evidence supporting the Schedule and performing such other procedures as we considered necessary in the circumstances. We believe that our examination provides a reasonable basis for our opinion.

As described in footnote 1 to the Schedule, GHG emissions data is subject to measurement uncertainties resulting from limitations inherent in the nature and the methods used for determining such data. The selection of different but acceptable measurement techniques can result in materially different measurements. The precision of different measurement techniques may also vary.

In our opinion, the Schedule referred to above presents, in all material respects, Scope 1 and Scope 2 Greenhouse Gas Emissions on an equity basis for Chevron's subsidiary operated entities in Africa and the United States (except California) for the year ended December 31, 2015 based on Chevron's GHG Reporting Protocol, Version 2.0, January 2014.

*Ernst + Young LLP*

December 13, 2016  
San Jose, California

**Chevron Corporation**  
**Schedule of Scope 1 and Scope 2 Greenhouse Gas Emissions**  
**for the year ended December 31, 2015 on an equity basis for Chevron Corporation's subsidiary**  
**operated entities in Africa and the United States (except California)**

<u>Year ended</u>	<u>Amounts in million metric tonnes CO2e</u>
December 31, 2015	19.0

**Footnote 1 Basis of Presentation:**

The above amount represents Scope 1 and Scope 2 greenhouse gas emissions (in million metric tonnes CO2e) for the year ended December 31, 2015 on an equity basis for the Company's subsidiary operated entities in Africa and the United States (except California). Non-operated entities are not included in these figures. These amounts have been prepared in conformity with the criteria disclosed within Chevron's GHG Reporting Protocol, Version 2.0, January 2014, attached to this report. The selection of different but acceptable measurement techniques can result in materially different measurements. The precision of different measurement techniques may also vary.

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# Chevron's GHG Reporting Protocol

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Corporate HES

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Version 2.0  
January 2014

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# 1 INTRODUCTION TO THE CHEVRON GHG REPORTING PROTOCOL

## 1.1 Purpose of the Chevron GHG Reporting Protocol

The Chevron GHG Reporting Protocol is consistent with the following industry best standards for GHG accounting and reporting: ISO 14064-1 (2006) "Greenhouse gases – Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals" and WBCSD/WRI (2006) "The greenhouse gas protocol – A corporate accounting and reporting standard". Together with Chevron's GHG and Energy Reporting System (CGERS), and in the future for most business units the air module of Essential Suite<sup>®1</sup>, the purpose of this Protocol is to ensure that Chevron's enterprise-wide GHG inventory aligns with industry best practice, and to assist Chevron's business units in complying with any local, regional and/or national mandatory GHG reporting regulations that exist in the regions where they operate.

## 1.2 Structure of the Chevron GHG Reporting Protocol

A summary of Chevron's Corporate GHG reporting requirements and an overview of the GHG reporting roles and responsibilities within Chevron are given in Sections 2 and 3 of this Protocol, respectively. The principles with which Chevron must adhere in accounting for and reporting its GHG emissions are outlined in Section 4, while Section 5 provides details on how Chevron accounts for its GHG emissions on both an equity share and operational control approach and what GHGs and emissions source types are included in Chevron's total GHG emissions estimates.

To enable Chevron to compare the GHG emissions performance of its business units within the same organization, as well as to benchmark its GHG emissions performance with its competitors, Section 6 specifies the production measures to be used to determine the normalized energy and GHG figures for each facility/field. Section 7 then provides the basis for Chevron's selection of 2010 as its base year and specifies when and how base year emissions need to be recalculated in future years to enable a meaningful and consistent comparison of GHG emissions over time, while Section 8 describes Chevron's policy for making revisions to the non-base year (post 2010) GHG inventories.

Section 9 provides guidance to the business units on how to identify and calculate the GHG emissions from their operations and products, where applicable, respectively. Section 10 details Chevron's GHG data quality management guidelines, with specific reference to requirements with regards to the development and maintenance of Standard Operating Procedures (SOPs), and the tracking and accounting for changes in GHG emissions over time. Guidance to the business units on how to prepare for internal and third-party verifications is provided in Section 11.

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<sup>1</sup> At time of publication of this document, only a few business units were beginning to use Essential Suite<sup>®</sup> for GHG reporting, with a larger rollout expected later in 2014 and 2015. Business units are expected to meet the same requirements in this document regardless if they are using CGERS or Essential Suite<sup>®</sup>.

1.3 Version Control of the Chevron GHG Reporting Protocol

Version	Release Date	Principal Amendments	Owner
0	8 Dec 2004	Establishing the Emissions Inventory for ChevronTexaco	A. Lee
1.0	1 Dec 2009	Developed to be consistent with ISO 14064-1 (2006) and WBCSD/WRI's (2006) "The Greenhouse Gas Protocol", and to take into account the findings of DNV's 2007 assessment of Chevron's original GHG Protocol (first released in 2002 and last updated in 2004).	G. Heddle
2.0	31 Jan 2014	<p>Modified training requirements for data reporters from needing to attend in-person training every two years and data managers attend every three years to "All Facilities shall have at least one active GHG data reporter who has attended a training course in person, although all data reporters and data managers are encouraged to attend" (Section 3</p> <p>Included an option to exclude construction and commissioning activities as long as the facility's data reporters do not consider them significant when compared to full facility operations" (Section 4),</p> <p>Clarified how production sharing agreements can be used to calculate equity share, based on industry standard guidance (Section 5),</p> <p>Added an option to exclude NOJVs where Chevron has less than 16% equity (Section 5),</p> <p>Updated to the production section, to reflect the requirement beginning January 2013 to report production metrics used for the new energy metric (Section 6),</p> <p>Added an allowance to use standard operating procedures (SOP) or equivalent documents mandated by host governments to fulfill the corporate SOP requirement (Section 10), and</p> <p>Included guidance to business units and ETC to address material findings from Chevron's corporate third-party verifiers (Section 10).</p>	D. Shen

## 2 CHEVRON'S REPORTING POLICY

### 2.1 Policy on GHG Emissions Reporting

#### 2.1.1 GHG Reporting to Corporate

All Chevron business units are required to report monthly accounts of GHG emissions to Corporate HES on a quarterly basis. Business units are required to submit data that meets the minimum standards described in this Protocol, or the appropriate legal requirements in place in that location, whichever is more rigorous.

The period of reporting will be consistent across Chevron, and reports will be submitted quarterly for each calendar year period beginning January 1<sup>st</sup>. Reporting entities will enter data one month in arrears, consistent with their internal financial accounting practices.

Emissions inventory reports are due by the 15<sup>th</sup> of the month following the end of each quarter:

- April 15<sup>th</sup> for 1<sup>st</sup> quarter;
- July 15<sup>th</sup> for 2<sup>nd</sup> quarter;
- October 15<sup>th</sup> for 3<sup>rd</sup> quarter; and
- January 15<sup>th</sup> for 4<sup>th</sup> quarter.

In the case that activity data (e.g., fuel consumption figures) for the quarter are not available prior to the reporting deadline, then the Facility-level GHG Data Reporter is required to submit a 'draft' GHG emissions report for the quarter by the deadline using an estimate based on the best available information (e.g., the previous quarter's activity data if there have been no major changes). As soon as the 'actual' activity data become available, a 'final' GHG emissions report for the quarter is then required to be submitted.

#### 2.1.2 Participation in Voluntary GHG Reporting Programs

Chevron business units may participate in voluntary GHG reporting programs that support business objectives. Prior to participation, however, approval must be obtained from both Corporate HES and PGPA.

#### 2.1.3 Compliance with Mandatory GHG Reporting Programs

Chevron entities will comply with all mandatory GHG reporting programs, as required by law or regulation.

Each business unit is responsible for all compliance requirements in the regions in which it operates. This includes, but is not limited to, reporting of emissions to regulatory agencies, organizing for emissions to be verified by a third party, and being responsible for verification and compliance costs.

Chevron business units are required to identify and implement processes and equipment to meet any regulatory requirements that exceed the requirements of this Protocol. Costs will be borne by the operating company or business unit. Assistance in interpreting regulations can be requested from Corporate HES.

### 2.2 Policy on Criteria Pollutant Emissions Reporting

Criteria pollutant (i.e., SO<sub>x</sub>, NO<sub>x</sub>, VOC, CO and particulate matter) emissions are to be reported in a manner consistent with local regulations. If no regulations exist, estimates are to be provided in accordance with separate Criteria Pollutant emissions reporting guidance provided by Corporate HES (refer to the Operational Excellence Data Reporting Standard). At the time of publication of this revision, a project is underway to migrate GHG reporting from

CGERS to Essential Suite<sup>®</sup>, which many business units are already using to report criteria air and other environmental pollutants.

### 2.3 Policy on GHG Target Setting

Chevron sets an annual GHG emissions target, typically one year ahead, based on projected emissions for that year. There is no target set relative to a base year. The target is published in Chevron's Corporate Responsibility Report.

## 3 GHG REPORTING ROLES AND RESPONSIBILITIES

### 3.1 Roles and Responsibilities

The roles described in this Section can be combined with other job responsibilities. Therefore, while the roles will remain consistent across the corporation, actual job titles will vary based on business needs. In all cases, GHG reporting responsibilities should be included in the Performance Management Plan (PMP) of the person assuming the roles listed below.

#### 3.1.1 Corporate HES

Corporate HES is responsible for the following:

- Providing guidance to business units on compliance with GHG regulations, as appropriate;
- Specifying the GHG metrics to be reported by the business units to Corporate;
- Managing energy and GHG emissions inventory system upgrades, and revisions to the GHG Reporting Protocol;
- Overseeing the inventory-related activities of the ETC GHG Team;
- Reviewing and signing off on the enterprise-wide GHG emissions estimates;
- Conducting the evaluation and interpretation of GHG emissions data;
- Assisting the ETC GHG Team with the training of Facility-level GHG Data Reporters and Managers on energy and GHG emissions reporting, and in using the inventory software application (CGERS); and,
- Managing 3<sup>rd</sup>-party verifications of the enterprise-wide GHG inventory system.

#### 3.1.2 ETC GHG Team

The ETC GHG Team is responsible for the following:

- Ensuring the continued integrity and functioning of the enterprise-wide GHG inventory system;
- Overseeing the quality assurance/quality control of the enterprise-wide GHG emissions estimates;
- Enabling the timely submission of data by each of the reporting entities;
- Assisting Facility-level GHG Data Reporters with reporting, as needed;
- Planning and facilitating training to Facility-level GHG Data Reporters and Managers on energy and GHG emissions reporting, and in using the inventory software application (CGERS), ensuring that the training requirements in section 3.2 are met; and,
- Generating custom GHG emissions reports requested by the business units and Corporate.
- Review material third-party findings and coordinate with business units to address them

#### 3.1.3 Operating Company GHG Coordinator

The Operating Company GHG Manager provides a coordinating role across the business units through:

- Working with the Facility-level GHG Data Reporters and Managers to ensure timely and consistent data;

- Ensuring that all sources of emissions for the operating company, particularly in cases of an acquisition/divestiture, are covered by their business units' quarterly GHG reports; and,
- Reporting the GHG performance of their business units to others within the operating company.

The role of Operating Company GHG Coordinator may be omitted, depending on the size, complexity, or business needs of an operating company.

#### 3.1.4 Business Unit

The business unit (e.g., San Joaquin Valley, Chevron North Sea) is responsible for complying with local, regional, and/or national GHG regulations. This includes, but is not limited to, reporting of emissions to regulatory agencies, organizing for emissions to be verified by a third party, and being responsible for verification and compliance costs. Further, the business unit is responsible for developing and implementing procedures to ensure compliance.

#### 3.1.5 Facility-level GHG Data Manager

The Facility-level GHG Data Manager is responsible for:

- Reviewing and approving the quarterly GHG emissions report for the facility, prior to its submission to the ETC GHG Team and Corporate HES, to ensure that it meets the requirements of this Protocol; and,
- Ensuring that the Facility-level GHG Data Reporter(s) receive the requisite training on GHG reporting and the use of the inventory software application (CGERS).

The position title of the designated GHG Data Manager may vary by reporting entity but, preferably, the role should be assigned to a HES Manager/Senior HES Specialist for the facility or a member of the facility's leadership team.

#### 3.1.6 Facility-level GHG Data Reporter

The Facility-level GHG Data Reporter is responsible for:

- Ensuring that their quarterly GHG reports to Corporate HES adhere to the GHG reporting principles of 'relevance', 'completeness', 'consistency', 'transparency' and 'accuracy';
- Assessing their facility/ies to determine all sources of emissions that fall within the organizational and operational boundaries defined in this Protocol;
- Determining the appropriate approaches/methodologies for measuring or calculating the GHG emissions from all emissions sources to meet the requirements of this Protocol, or local regulation;
- Using CGERS to report their activity data for, and to calculate and report their GHG emissions from, all emissions sources;
- Tracking changes in ownership (i.e., equity percentage) and operational control for each emissions source in CGERS to enable GHG emissions to be calculated and reported on an equity share and operated basis (where all activity and production data is entered on a 100% basis);
- In those regions where GHG emissions are required to be reported to a local regulator, reporting to the Corporate HES through CGERS any activity data required by this Protocol that is not required by local requirements;
- Tracking the addition and decommissioning of equipment at the facility level relevant to the calculation of GHG emissions, and making the appropriate updates to the configuration of their facility within CGERS;
- Providing production data through CGERS using the production measure and units specified for each 'facility type' (e.g., production field) for purposes of enabling the calculation of GHG emissions intensities;
- Recalculating the 2010 base year GHG inventory and post-2010 GHG emissions for the reporting entity through CGERS to account for emissions calculation methodology changes and/or discovery of errors that result in significant changes, at the facility level, to the historical GHG inventory;

- Preparing the quarterly GHG emissions report for the facility for submission to the ETC GHG Team and Corporate HES; and,
- Developing and maintaining documented Standard Operating Procedure(s) (SOPs) to cover their facility. Details on how to write a SOP can be found in Section 10.

The GHG Data Reporter must have a comprehensive understanding of the reporting entity operations and available data, and, preferably, a background in engineering or environmental science.

### 3.1.7 Facility-level GHG Data Collector

The Facility-level GHG Data Collector is responsible for the following:

- Providing the activity and/or production data for the facility to the Facility-level GHG Data Reporter, the latter of whom is responsible for entering this data into CGERS; and,
- Assisting the GHG Data Reporter with the compilation/tracking of any other data (e.g., CVX's equity share in emissions sources) required for submission of the quarterly GHG report for the facility.

The role of Facility-level GHG Data Collector may be omitted, depending on the size, complexity, or business needs of a reporting entity. It is important to note that the GHG Data Collector/s will not be provided access to CGERS.

## 3.2 Training Requirements

Training in the requirements of the GHG Reporting Protocol and the use of CGERS will be held at least twice a year. Equivalent training for Essential Suite<sup>®</sup> will be held at time of migration. All Facilities shall have at least one active GHG data reporter who has attended a training course in person, although all data reporters and data managers are encouraged to attend. Data reporters should also attend refresher training every three years. In the case of unavoidable conflicts, alternative arrangements can be made for one-on-one training with a member of the ETC GHG Team or a Carbon Management Advisor with Corporate HES.

In addition, in the case of a change in personnel in the role of Facility-level GHG Data Reporter, the new GHG Data Reporter should be trained in the requirements of this Protocol and the use of CGERS from their predecessor. Further, wherever possible, the new GHG Data Reporter should work with their predecessor to jointly prepare and submit at least one quarterly GHG Report.

The costs of the GHG training workshops are covered by Corporate HES, while all travel and time expenses for the Facility-level GHG Data Reporters and Managers associated with the training are borne by the business unit. In the case of training outside these workshops, the business unit is responsible for both training and travel costs.

## 4 GHG REPORTING PRINCIPLES

### 4.1 Introduction to Principles

Chevron requires that GHG accounting and reporting be carried out in accordance with the principles detailed below. Adherence to these principles will ensure that Chevron's GHG inventory constitutes a true and fair representation of the GHG emissions of the company, and is aligned with industry best practice.

### 4.2 Relevance

*Chevron's GHG inventory should properly reflect the GHG emissions of the company, and serve the decision-making needs of those receiving the data, whether internal or external to the company.*

This principle requires the following:

- In selecting the boundary of their facility for the purposes of the GHG inventory, the Facility-level GHG Data Reporter needs to ensure that all of the combustion devices, process units and/or other emissions sources that are integral to the facility's operations are included in the boundary.
- In preparing GHG data reports for both those internal and external to the company, Corporate HES, the ETC GHG Team, Facility-level GHG Data Reporters/Managers and others need to ensure that the report content serves the decision-making needs of the end user.

#### 4.3 Completeness

***Chevron's GHG inventory should account for the GHG emissions from all sources and activities that fall within scope and within the company's organizational boundary (defined here as those facilities which Chevron wholly/partially owns or operates, or which are 'captive' to Chevron's operations).***

This principle requires the following:

- The Facility-level GHG Data Reporter needs to make an initial estimate of the GHG emissions from all sources and activities at their facility. It is then the decision of the Facility-level GHG Data Reporter/Manager as to whether or not to exclude from their facility's inventory those GHG emissions sources whose contribution to GHG emissions is 'not material.' That is, emission sources that are in aggregate less than 3 percent of the facility's total emissions for all non-material emissions), and whose quantification on a quarterly basis would not be technically feasible or cost effective. Further, the Facility-level GHG Data Reporter must disclose and justify these exclusions, and check at least every two years that they still qualify as 'not material'. Finally, significant emissions from one-time or non-routine activities should be assessed for inclusion in the inventory. In general, construction and commissioning activities may be excluded as long as the facility's data reporters do not consider them significant when compared to full facility operations.
- Another important aspect of completeness is for the ETC GHG Team/Facility-level GHG Data Reporter to ensure the inventory accounts for acquisitions and divestitures, as well as the adding of new, and retiring of existing, equipment. Emissions sources should be included in or excluded from the inventory as of the effective date of their acquisition/addition or divestiture/retirement.
- In the case of non-operated facilities/fields, the ETC GHG Team should approach the operator and request that it use CGERS (Chevron's GHG and Energy Reporting System) in conjunction with the Chevron GHG Reporting Protocol to estimate its GHG emissions. If the operator chooses not to use CGERS, the ETC GHG Team shall request that the operator calculate its emissions in accordance with this Protocol, and provide emissions data to Chevron for each gas (e.g., CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O), each emissions type (e.g., direct, indirect) and each emissions source (e.g., combustion, flaring, venting, fugitive); this emissions data shall in turn be entered into CGERS by the ETC GHG Team.

#### 4.4 Consistency

***Chevron's GHG inventory should allow for meaningful comparisons of GHG emissions, whether at the facility, strategic business unit, organizational or enterprise level, over time (e.g., year-to-year).***

This principle requires the following:

- All facilities that are wholly owned and/or operated by Chevron are required to use CGERS to calculate and report their GHG emissions, while those facilities that are partially owned are strongly encouraged to use the tool.
- The Facility-level GHG Data Reporter should, to the extent possible, be consistent with regards their facility's inventory boundary and the calculation methodologies applied to emissions sources. In the case

that there are changes to the facility's boundary or to the calculation methodologies used over time, the Facility-level GHG Data Reporter needs to transparently document and justify these changes.

- The ETC GHG Team is responsible for compiling the GHG information from all of the facilities across the enterprise in a manner that ensures that the aggregate information is internally consistent and comparable over time.

#### 4.5 Transparency

*Chevron's GHG inventory should be capable of replication by a third party through provision of sufficient information and a clear audit trail.*

This principle requires the following:

- The Facility-level GHG Data Reporter needs to clearly document the chosen inventory boundary for the facility, all data sources, the calculation methodologies used, any specific exclusions and justification for excluding them, any relevant assumptions made, and changes in any of these over time.

#### 4.6 Accuracy

*Chevron's GHG inventory should be sufficiently accurate to enable intended users, whether internal or external to the company, to make decisions with reasonable assurance that the reported information is credible.*

This principle requires the following:

- The Facility-level GHG Data Reporter needs to ensure that the estimate of GHG emissions for their facility is systematically neither over nor under actual emissions, as far as can be judged, and that uncertainties are reduced as far as practicable.
- Wherever feasible from a technical and cost perspective, the Facility-level GHG Data Reporter should use the most accurate calculation methodology to estimate their GHG emissions for each emissions point source at their facility. For instance, instead of using general emission factors, measure the composition of the fuel combusted or use a continuous emissions monitor.

## 5 REPORTING BOUNDARIES

### 5.1 Organizational Boundaries

Chevron accounts for and reports its GHG emissions on both an equity share and operational control basis. Using information required to be provided by each Facility-level GHG Data Reporter on Chevron's economic interest in and operational control over their facility/ies, CGERS will compute facility-level (as well as enterprise-wide) GHG emissions according to both the equity share and operational control approach.

#### 5.1.1 Equity Share Approach

For the purpose of the equity share approach, Chevron accounts for GHG emissions from its operations according to its share of equity in the business. According to the WRI/WBCSD, "the equity share reflects economic interest, which is the extent of rights a company has to the risks and rewards flowing from an operation. Typically, the share of economic risks and rewards in an operation is aligned with the company's percentage ownership of that operation, and equity share will normally be the same as ownership percentage. Where this is not the case, the economic

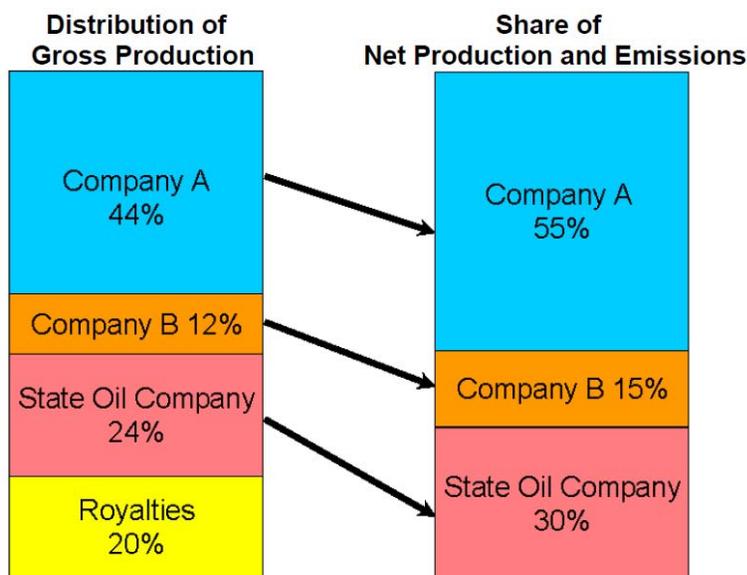
substance of the relationship the company has with the operation always overrides the legal ownership form to ensure that equity share reflects the percentage of economic interest.”<sup>2</sup>

In practice, this means that Chevron’s equity share should in general be determined in a manner consistent with financial accounting approaches. This general rule is, however, not to be applied in cases where there are specific contractual arrangements that either set out how GHG emissions are to be allocated to the partners, or alter the normal practice of allocating costs and benefits in proportion to the equity interest.

One type of arrangement that alters the normal practice of allocating benefits in proportion to equity is the Production Sharing Agreement (PSA), which is commonly used in upstream petroleum operations. A PSA is an agreement between one or more oil companies and a government entity or state company in which the participating oil companies provide financing and bear the risk of exploration and production activities in exchange for a share of the production remaining after royalties<sup>3</sup> are paid to the government. Chevron’s share of this remaining production – commonly referred to as the company’s entitlement share of net production – should be used as the basis for allocating emissions.

As shown in Figure 1, all of the parties receiving a share of net production, whether they be state-owned or private companies, receive a proportionate share of emissions, and all of the emissions from the asset are accounted for among the companies. No emissions are allocated to the royalties.

The net share of production used for allocating emissions from PSAs is the production reported in financial accounts or statements prepared according to the requirements of UK Generally Accepted Accounting Principles (GAAP), US GAAP, and the US Securities Exchange Commission (SEC). The relevant net production volumes and the company share can be obtained directly from company financial departments.



Note: Royalties include taxes and other levies paid in kind (with oil rather than money).

**Figure 1.** Allocation of emissions from PSAs for equity share accounting.

<sup>2</sup> World Resources Institute (WRI)/World Business Council for Sustainable Development (WBCSD), 2004: “The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard,” Revised Edition, Available at: <http://www.ghgprotocol.org/standards/corporate-standard>

<sup>3</sup> Including taxes and other levies paid in kind (with oil rather than money).

Another arrangement that requires special attention for the purposes of GHG accounting is a 3<sup>rd</sup> party-owned and operated unit that is 'captive' to our operations because the owner/operator does not sell the unit's product or activities to anyone else besides Chevron. Examples include hydrogen or electricity generation plants that exclusively sell to Chevron facilities, time-chartered shipping vessels, significant well drilling and well testing activities, and remediation work. In such cases, despite the fact that the unit is not owned by Chevron, the Facility-level GHG Data Reporter should account for the GHG emissions from the unit as though it is wholly-owned (i.e., take the equity share as 100%) for purposes of Chevron's GHG inventory.

An exception to the requirement for GHG emissions to be reported by facilities in which Chevron has an equity share exists for those operations within Global Marketing that are company owned but operated by others. Those Global Marketing facilities that are specifically excluded from GHG reporting include: Company Owned and Retail Operated (COROs) gas stations; Company Owned and Franchise Operated (COFOs) gas stations; and other Commercial and Industrial operations that may not be company operated. In addition, any non-operated joint venture facilities where Chevron has 16 percent or less equity share can be exempt from reporting.

The table below provides guidance on how to determine Chevron's equity share of emissions for different types of facilities/investments.

Type of facility/investment	Chevron's equity share of emissions
Wholly-owned facility/subsidiary	100%
Non-wholly owned (as in a joint venture between several oil companies), operated facility, in which Chevron has a 40% interest	40%
Non-wholly owned (as in a joint venture between several oil companies), non-operated facility, in which Chevron has a 40% interest	40%
Non-wholly owned (as in a joint venture between several oil companies), non-operated facility, in which Chevron has 16% or less equity share	Can be exempt from reporting
Joint venture among a state-owned oil company and several foreign oil companies, as part of a production sharing agreement/contract (PSA/PSC)	Entitlement share of net production
Operated facility, in which Chevron has a 0% interest	0%
Non-owned/non-operated unit that is 'captive' to Chevron's operations (i.e., owner/operator of unit does not sell product to anyone else besides Chevron)	100%
Stock ownership in a publicly traded corporation, over which Chevron has significant influence (typically defined as greater than 20% interest)	Ownership share in the corporation
Stock ownership in a publicly traded corporation, over which Chevron has limited influence (typically defined as less than 20% interest)	0%

### 5.1.2 Operational Control Approach

Under the operational control approach, Chevron accounts for 100 percent of the GHG emissions from operations over which it has control in operational terms. It does not account for GHG emissions from operations in which it owns an interest but has no operational control.

According to the WRI/WBCSD, "a company has operational control over an operation if the former or one of its subsidiaries has full authority to introduce and implement its operating policies at the operation. This criterion is consistent with the current accounting and reporting practice of many companies that report on emissions from facilities, which they operate (i.e., for which they hold the operating license). It is expected that except in very rare circumstances, if the company or one of its subsidiaries is the operator of a facility, it will have full authority to introduce and implement its operating policies and thus has operational control."<sup>4</sup>

<sup>4</sup> See WRI/WBCSD, Note 1.

For the purpose of this protocol, the test to be used by the Facility-level GHG Data Reporter in determining whether Chevron has operational control over their facility is whether or not Chevron has the authority to introduce and implement its operational and Health, Environment and Safety (HES) policies at the facility. This test should also be applied to third party-owned and operated units (e.g., hydrogen plants, cogeneration plants) that are 'captive' to our operations because the owner/operator does not sell the unit's product (e.g., hydrogen, electricity) to anyone else besides Chevron, as well as to third party-owned and operated services (e.g. well drilling and well testing activities and remediation work) that are 'captive' to our operations because the work is conducted solely for Chevron.

Type of facility/investment	Percent of emissions to report under operational control approach
Wholly-owned facility/subsidiary	100%
Non-wholly owned (as in a joint venture between several oil companies), operated facility, in which Chevron has a 40% interest	100%
Non-wholly owned (as in a joint venture between several oil companies), non-operated facility, in which Chevron has a 40% interest	0%
Operated facility, in which Chevron has a 0% interest	100%
Non-owned/non-operated unit that is 'captive' to Chevron's operations (i.e., owner/operator of unit does not sell product to anyone else besides Chevron)	100%
Stock ownership in a publicly traded corporation, over which Chevron has significant influence (typically defined as greater than 20% interest)	0%
Stock ownership in a publicly traded corporation, over which Chevron has limited influence (typically defined as less than 20% interest)	0%

## 5.2 Operational Boundaries

Chevron accounts for and reports its emissions of all 6 Kyoto GHGs (i.e., carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), sulfur hexafluoride (SF<sub>6</sub>), perfluorocarbons (PFCs) and hydrofluorocarbons (HFCs)) from all direct sources of emissions. The company also accounts for and reports its indirect emissions of CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O from the import/purchase of electricity and steam, while also tracking for internal GHG performance management purposes the emissions of these gases associated with the export/sale of electricity and steam. In addition to direct and indirect emissions, the company estimates and reports the CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O emissions that would result from the combustion of the solid, liquid and gas products leaving its facilities for sale on the market.

### 5.2.1 Direct (Scope 1) Emissions

Chevron quantifies the emissions of all 6 Kyoto GHGs from all direct emissions sources at facilities that fall within its organizational boundaries (i.e., those facilities which are wholly or partially owned by Chevron, operated by Chevron, or 'captive' to Chevron's operations). A facility's direct emissions can be considered as those from sources that fall within the 'fence line' of the facility (i.e., are under the operational control of the operator of the facility, regardless of whether or not Chevron is the operator). Direct emissions, also referred to as scope 1 emissions, may include emissions from stationary combustion, mobile combustion, process unit and fugitive sources. Section 9 of the Protocol provides detailed guidance on how to identify and calculate a facility's direct emissions.

It is important to note that the emissions associated with exported/sold electricity and steam should not be deducted from a facility's direct/scope 1 emissions. Emissions associated with the export/sale of electricity and steam are, however, tracked by Chevron for internal GHG performance management purposes by CGERS.

### 5.2.2 Indirect (Scope 2) Emissions

In accordance with the requirements of ISO 14064-1 and the WRI/WBCSD GHG Standard, Chevron accounts for and reports its GHG emissions associated with the generation of imported/purchased electricity and steam, also

known as scope 2 emissions. Further, in addition to quantifying its scope 2 emissions, the company also separately tracks its GHG emissions associated with exported/sold electricity and steam as a type of indirect emission. Emissions of CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O are estimated for both types of indirect emission. Section 9 of the Protocol provides detailed guidance on how to identify and calculate a facility's indirect emissions. Chevron no longer takes any "grid credits" in accounting for emissions exported that are produced with less emissions than the electricity on the local grid.

The grounds for Chevron tracking its GHG emissions from exported/sold, in addition to imported/purchased, electricity and steam is that it enables the company to better internally measure its GHG performance. Specifically, it enables Chevron facilities that export/sell electricity and steam to receive full credit internally for improving their energy efficiency (e.g., through cogeneration) for, and/or reducing their GHG emissions (e.g., through cogeneration, low-carbon energy technologies such as geothermal) from, onsite electricity and steam generation.

### 5.2.3 Product (Scope 3) Emissions

In addition to direct and indirect emissions, Chevron estimates and reports the GHG emissions that would result from the combustion of its solid, liquid and gaseous products. These product emissions are another type of indirect GHG emission, also referred to as a scope 3 emission. Specifically, Chevron quantifies the CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O emissions that would result from the combustion of solid, liquid and gaseous products leaving its facilities for sale on the market including, but not limited to: (1) the gasoline, jet fuel, gas oils and kerosene, and residual fuel oil leaving its refineries; (2) the natural gas/NGLs leaving its natural gas/upstream processing facilities; and, (3) the coal leaving its mines. Section 9 of the Protocol provides guidance on how to calculate the emissions from a facility's solid, liquid and/or gaseous products.

## 6 PRODUCTION DATA REPORTING

### 6.1 Introduction to Production Data Reporting

All Chevron business units are required to report their production in order that the energy intensity of their operations may be calculated, as per the efficiency section of the Operational Excellence Data Reporting Standard.

### 6.2 Chevron's Requirements for Production Data Reporting

Chevron business units are required to submit monthly accounts of their production on a quarterly basis through CGERS. Further, it is required that the business units provide their production figures in accordance with the production measures/definitions specified by Section 10 of the Operational Excellence Data Reporting Standard.

## 7 BASE YEAR SELECTION AND RE-CALCULATION

### 7.1 Chevron's Base Year Selection

Chevron's selection of base year for the purpose of its enterprise-wide GHG emissions inventory is 2010. The basis for the choice of 2010 as the enterprise-wide base year is that it is the first year for which a complete set of GHG emissions inventory data for the enterprise will be collected through CGERS, and for which the GHG emissions will be able to be recalculated in later years, as required by ISO 14064-1, to enable a meaningful and consistent comparison of GHG emissions over time. While it is to be noted that Chevron has been reporting its GHG emissions since 2002 and managing its GHG emissions since implementation of its Action Plan on Climate Change in 2001, the 2010 base year will be used to quantitatively track its post-2010 performance in enterprise-wide GHG emissions management.

## 7.2 Chevron's Policy on Re-Calculating Base Year Emissions

To enable a meaningful and consistent comparison of later years' GHG emissions against those of 2010, Chevron requires that the 2010 base year GHG inventory be recalculated in later years, as needed, to account for the following: (1) any structural changes to the organization, where these include mergers, acquisitions and divestments, and the outsourcing and insourcing of GHG-emitting activities; (2) changes in GHG emissions calculation methodology that would result in a significant change to (i.e., equal to or greater than 10 percent increase or decrease in) the reporting entity's base year GHG emissions figure; and, (3) discovery of an error, or a number of cumulative errors, that would have a significant impact on (i.e., equal to or greater than 10 percent increase or decrease in) the reporting entity's base year GHG inventory.

It is important to note that the 2010 base year GHG inventory is not recalculated for organic growth or decline. According to the WRI/WBCSD, "organic growth/decline refers to increases or decreases in production output, changes in product mix, and closures and openings of operating units that are owned or controlled by the company."<sup>5</sup> The rationale for not recalculating the base year for organic growth or decline is that it results in a change of emissions to the atmosphere (as opposed to a mere transfer of emissions from one company's inventory to another in the case of a change in organization structure) and therefore needs to be counted as an increase or decrease in the company's emissions profile over time.

### 7.2.1 Changes in Organization Structure

Chevron requires that the 2010 base year GHG inventory be recalculated in later years to take into account structural changes to the organization (e.g., acquisition of a new refinery, divestment of an upstream field). The grounds for this requirement is that Chevron's GHG emissions performance relative to 2010 can only be accurately determined if the 2010 base year GHG inventory covers the same set of assets as the most recent year for which Chevron is tracking its GHG emissions performance.

In the case that a significant structural change occurs during the middle of the year, the base year should be adjusted accordingly. For example if a new business unit is acquired in June, its emissions for the rest of the year should be reflected in the base year. At the end of the following year, the new acquisition's full 2010 emissions should be used to update the base year.

It is to be noted that the 2010 base year GHG inventory is not to be recalculated where Chevron makes an acquisition or divestment of (or insources) operations that did not exist in the base year (2010).

### 7.2.2 Changes in Calculation Methodology

In the case where a change in GHG emissions calculation methodology, that is implemented in the current year (for an emissions source/s that also existed in the base year), would have a significant impact on a reporting entity's 2010 base year GHG inventory, Chevron requires that the entity recalculate its base year emissions. For the purpose of determining whether a methodology change triggers a base year GHG inventory recalculation, significant is defined here by Chevron as a change that would result in an equal to or greater than 10 percent increase or decrease in the entity's base year emissions. If the data required to make the more accurate emissions calculation for the emissions source for the base year is not available, then the Facility-level GHG Data Reporter should try to backcast the improved emissions estimate or, if this is not possible, the data reporter may acknowledge the change in data source without recalculation.

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<sup>5</sup> World Resources Institute (WRI)/World Business Council for Sustainable Development (WBCSD), 2004: "The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard," Revised Edition, Available at: <http://www.ghgprotocol.org/standards/corporate-standard>

For those changes in GHG emissions calculation methodology (e.g., emissions factor) that reflect real changes in emissions (e.g., due to fuel changes or changes in technology), the 2010 base year GHG inventory is not recalculated.

### 7.2.3 Discovery of Significant Errors

Chevron requires that the 2010 base year GHG inventory be recalculated in the case of the discovery of an error, or a number of cumulative errors, in the current year (for an emissions source/s that also existed in the base year) that would result in a significant change to a reporting entity's base year GHG inventory. For the purpose of determining whether the discovery of an error/s triggers a base year GHG inventory recalculation, significant is defined here by Chevron (as for a change in calculation methodology) as a change that would result in an equal to or greater than 10 percent increase or decrease in the entity's base year emissions.

### 7.3 Guidance on How to Re-Calculate Base Year Emissions

Chevron's ETC GHG Team has responsibility for recalculating the 2010 base year GHG inventory to account for structural changes to the organization, while the Facility-level GHG Data Reporters have responsibility for ensuring that their reporting entity's base year GHG emissions are recalculated (where the significance threshold is met) for emissions calculation methodology changes and/or if errors are discovered.

CGERS must be used to recalculate, and submit changes to, the 2010 base year GHG inventory. In recalculating the base year emissions, the ETC GHG Team and Facility-level GHG Data Reporters will be required to record the data source/s and provide the reason/s for making the change to base year inventory.

## 8 REVISION OF NON-BASE YEAR EMISSIONS

### 8.1 Chevron's Policy on Revising Non-Base Year Emissions

For purposes of retaining an accurate representation of the company's historical GHG emissions, Chevron requires that its historical (post 2010), non-base year enterprise-wide GHG emissions inventories be revised, as needed, to account for the following: (1) changes in GHG emissions calculation methodology that would result in a very significant change to (i.e., equal to or greater than 20 percent increase or decrease in) the reporting entity's historical (post 2010) year GHG emissions figure; and, (2) discovery of an error, or a number of cumulative errors, that would have a very significant impact on (i.e., equal to or greater than 20 percent increase or decrease in) the reporting entity's historical (post 2010) year GHG inventory. However, if business units have local reporting regulations that require them to revise their GHG emissions numbers at more stringent thresholds (e.g., *all* errors must be corrected for in the US EPA Mandatory Reporting Rule), business units should defer to the regulations.

It is important to note that Chevron's policy with regards to revising historical (post 2010) GHG inventories differs from its requirements for recalculating the 2010 base year GHG inventory in two respects: (1) revisions based on structural changes to the organization are not required; and, (2) the threshold to trigger revisions based on emissions calculation methodology changes and the discovery of errors is higher.

Revisions to historical (non-base year) GHG inventories for purposes of accounting for emissions calculation methodology changes and discovery of errors should be undertaken in accordance with Sections 7.2.2 and 7.2.3 respectively, being careful to take into account the difference in revision thresholds.

It is important to note that Chevron does not require revisions to GHG emissions for any years prior to 2010.

## 8.2 Guidance on How to Revise Non-Base Year Emissions

Facility-level GHG Data Reporters have responsibility for ensuring that their reporting entity's historical (post 2010) GHG emissions are recalculated (where the significance threshold is met) for emissions calculation methodology changes and/or if errors are discovered.

CGERS must be used to recalculate, and submit changes to, historical (post 2010) GHG emissions. In revising historical emissions, Facility-level GHG Data Reporters will be required to record the data source/s and provide the reason/s for making the change to the historical inventory.

## 9 GHG EMISSIONS QUANTIFICATION

### 9.1 Chevron's Requirements for GHG Emissions Quantification

All Chevron business units are required to submit monthly accounts of their GHG emissions from all emissions sources on a quarterly basis through CGERS. Further, it is required that the business units use CGERS to report their activity data, and calculate their GHG emissions using the appropriate methods detailed in this Section of the Protocol. Only in the case of non-operated reporting entities, or where prior agreement has been reached with Corporate HES and the ETC GHG Team, may pre-calculated, aggregate GHG emissions figures be reported through CGERS.

For those reporting entities submitting their GHG emissions to a local regulator, then the same set of GHG figures for the set of emissions sources covered by the regulation should be submitted to Corporate HES for purposes of the enterprise-wide GHG inventory; a scenario where two sets of 'books' exist for the same emissions sources should be avoided. These reporting entities are also required to report GHG emissions data for all sources of emission regardless of local regulatory thresholds or permit levels, as well as any activity data required by this Protocol that is not required by local requirements.

### 9.2 GHG Emissions Calculation Methods Built into CGERS

CGERS incorporates the GHG emission factors and calculation methodologies detailed within the American Petroleum Institute (2009) "Compendium of Greenhouse Gas Methodologies for the Oil and Natural Gas Industry" (referred to as the "API Compendium"). For emissions sources not covered by the API Compendium, CGERS includes the GHG emissions calculation methodology for these sources from The Climate Registry (2008) "General Reporting Protocol" and the Western Climate Initiative (2009) "Final Essential Requirements of Mandatory Reporting". Also incorporated within CGERS are the GHG emission factors and calculation methodologies required to be used for compliance with the following: California's mandatory GHG reporting regulation<sup>6</sup>; the EU's regulation for monitoring and reporting GHG emissions under the EU Emissions Trading Scheme (ETS)<sup>7</sup>; and, Australia's National Greenhouse and Energy Reporting (NGER) Act<sup>8</sup>. For each emissions source, this Section of the Protocol

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<sup>6</sup> California Air Resources Board (CARB), 2007: "Regulation for the Mandatory Reporting of Greenhouse Gas Emissions," Title 17, California Code of Regulations, Sections 95100 et seq., Available at:

<http://www.arb.ca.gov/cc/reporting/ghg-rep/ghg-rep.htm>

<sup>7</sup> European Commission (EC), 2007: "Commission Decision of 18 July 2007 establishing Guidelines for the Monitoring and Reporting of Greenhouse Gas Emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council", 2007/589/EC, Available at:

[http://ec.europa.eu/environment/climat/emission/mrg\\_en.htm](http://ec.europa.eu/environment/climat/emission/mrg_en.htm)

<sup>8</sup> Wong, P., 2008: "National Greenhouse and Energy Reporting (Measurement) Determination 2008," Available at:

<http://www.frl.gov.au/ComLaw/Legislation/LegislativeInstrument1.nsf/0/43052517D07F8902CA25747400001E7A?OpenDocument>

sets out the preferred (i.e., more accurate) API Compendium method/s, together with alternate and/or other less accurate API Compendium methods, and the relevant regulatory methods.

To assist the Facility-level GHG Data Reporter in determining potential GHG emissions sources, Table 1 provides an illustrative list for the upstream production and refining sectors of operations and devices that would need to be assessed for their GHG emissions, and also includes an indication of whether each source is likely to emit CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, SF<sub>6</sub>, HFCs and/or PFCs.

**Table 1 – Potential Sources of GHG Emissions**

Emissions Type	Emissions Source Category	Operations and Devices with Potential to Emit GHGs	Upstream Production	Refining
DIRECT	Combustion – Stationary Sources	Boilers/Steam Generators	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O
		Process Heaters/Treaters	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O
		IC Engine Generators	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O
		Fire Pumps	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O
		Compressors	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O
		Turbine Electric Generators	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O
		Flares	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O
		Catalyst and Thermal Oxidizers	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O
	Combustion – Mobile Sources	Company Vehicles	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O
		Planes/Helicopters	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O	n/a
		Supply Boats/Barges	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O	n/a
	Venting – Process Vents	Glycol Dehydrators	CO <sub>2</sub> <sup>*</sup> , CH <sub>4</sub>	n/a
		Acid Gas Removal	CO <sub>2</sub> , CH <sub>4</sub>	CO <sub>2</sub> , CH <sub>4</sub>
		Catalytic Cracking	n/a	CO <sub>2</sub>
		Catalytic Reforming	n/a	CO <sub>2</sub>
		Catalyst Regeneration	n/a	CO <sub>2</sub>
		Hydrogen Plants	n/a	CO <sub>2</sub>
		Asphalt Blowing	n/a	CO <sub>2</sub> <sup>*</sup> , CH <sub>4</sub>
		Venting – Other Vents	Storage Tanks	CO <sub>2</sub> <sup>*</sup> , CH <sub>4</sub>
	Water Tanks		CO <sub>2</sub> <sup>*</sup> , CH <sub>4</sub>	n/a
	Pneumatic Devices		CO <sub>2</sub> <sup>*</sup> , CH <sub>4</sub>	CO <sub>2</sub> <sup>*</sup> , CH <sub>4</sub>
	Chemical Injection Pumps		CO <sub>2</sub> <sup>*</sup> , CH <sub>4</sub>	CO <sub>2</sub> <sup>*</sup> , CH <sub>4</sub>
	Venting – Maintenance/ Turnarounds	Casing Gas Vents	CO <sub>2</sub> <sup>*</sup> , CH <sub>4</sub>	n/a
		Mud Degassing	CO <sub>2</sub> <sup>*</sup> , CH <sub>4</sub>	n/a
		Well Unloading	CO <sub>2</sub> <sup>*</sup> , CH <sub>4</sub>	n/a
		Well Workovers	CO <sub>2</sub> <sup>*</sup> , CH <sub>4</sub>	n/a
		Well Completions	CO <sub>2</sub> <sup>*</sup> , CH <sub>4</sub>	n/a
		Compressor Starts	CO <sub>2</sub> <sup>*</sup> , CH <sub>4</sub>	CO <sub>2</sub> <sup>*</sup> , CH <sub>4</sub>
		Equipment/Process Blowdowns	CO <sub>2</sub> <sup>*</sup> , CH <sub>4</sub>	CO <sub>2</sub> <sup>*</sup> , CH <sub>4</sub>
	Venting – Non-routine Activities	Pressure Relief Valves	CO <sub>2</sub> <sup>*</sup> , CH <sub>4</sub>	CO <sub>2</sub> <sup>*</sup> , CH <sub>4</sub>
		Well Blowouts	CO <sub>2</sub> <sup>*</sup> , CH <sub>4</sub>	n/a
		Fire Suppression	HFCs, PFCs	HFCs, PFCs
	Fugitive	Equipment Component Leaks	CO <sub>2</sub> <sup>*</sup> , CH <sub>4</sub>	CO <sub>2</sub> <sup>*</sup> , CH <sub>4</sub>
Wastewater Treatment		CO <sub>2</sub> , CH <sub>4</sub>	CO <sub>2</sub> , CH <sub>4</sub>	
Refrigeration		HFCs, PFCs	HFCs, PFCs	
Electrical Insulation		n/a	SF <sub>6</sub>	
INDIRECT	Imported Energy	Purchased Electricity	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O
		Purchased Steam	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O
	Exported Energy	Exported Electricity	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O
		Exported Steam	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O
	Cogeneration	Exported Cogen Electricity	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O
		Exported Cogen Steam	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O
PRODUCT	Combustion	Natural Gas Liquids	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O	n/a
		Refined Products	n/a	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O

\* A potentially minor emissions source

## 10 QUALITY INFORMATION MANAGEMENT GUIDANCE

### 10.1 Facility-level GHG Data Quality Management Guidelines

The quality of facility-level data can best be managed by developing and abiding by a standard operating procedure (SOP), and by accounting for changes in facility-level emissions each quarter. Section 10.1.1 lists the requirements for developing a facility-level SOP. The factors that can lead to changes in facility-level emissions and the steps that must be taken to report these changes are outlined in Section 10.1.2. Documents required by host governments of Chevron that are similar in scope may be used to satisfy this requirement.

#### 10.1.1 Facility-level Standard Operating Procedures

The reporting entity shall have a Standard Operating Procedure (SOP) for GHG quality information management. The SOP should align with the OE process and should contain the following sections:

- Purpose, Scope and Objectives
- Procedures
- Resources, Roles and Responsibilities
- Measurement and Verification
- Continual Improvement

#### Purpose, Scope and Objectives

The GHG data management and reporting process is designed to help ensure that Chevron's GHG inventory is accurate and verifiable. The process requires that roles and responsibilities, as well as the procedures for maintaining data quality be documented.

The reporting entity shall identify the scope of GHG reporting. Information will include:

- Organizational and operational boundaries;
- Identification of GHG emission sources and sinks; and,
- Identification of de minimis sources and justification for exclusion.

#### Procedures

Information and procedures pertaining to the following shall be defined in the SOP:

- a. Data gathering, input and handling activities;
- b. Emissions calculation methods;
- c. Data quality assurance;
- d. Change management; and,
- e. Data documentation.

#### a. Data Gathering, Input and Handling Activities

The reporting entity shall have a procedure that describes the data gathering process from data source to GHG report submission. The procedure should include:

- Information on data sources (e.g., SAP, Energy Component) for each emissions source;
- Information on contact person/position in charge of providing data for each emissions source;
- Information on how and where data is stored (e.g., in hard or electronic format);
- Information on change management;
- Information on GHG Data Manager review and signoff process; and,
- Schedule for CGERS and internal data reporting.

b. Emissions Calculations Methods

The reporting entity shall document how emissions are calculated for each emission source. Information shall include:

- Emissions calculation methodology;
- Selection criteria for emissions calculation methodology;
- Data requirement for calculation; and,
- Data measurement requirement with information on measurement technique, sampling frequency, analysis method and calibration program, where all sampling, measurement and analysis methods shall conform to recognized international standards.

c. Data Quality Assurance

The reporting entity shall document reporting boundary, map reporting processes from source to data submission, identify potential risk points in data reporting system, and implement appropriate controls to minimise the risks of erroneous data.

The reporting entity shall have a procedure for routine and consistent checks to ensure accuracy and completeness of the GHG inventory. The procedure shall include the following:

- Peer review of data for accuracy checks, omissions and errors;
- Data check and comparison with previous reporting periods;
- Documentation of data variation;
- GHG Data Manager review and signoff process involving site leadership; and,
- Annual internal audits and technical review.

The reporting entity shall periodically review:

- GHG inventory reporting parameters such as organizational and operational boundaries, GHG emission sources and sinks, emissions calculation methodologies, and de minimis sources to ensure completeness of reported data; and
- opportunities for improvement within the information management process.

d. Change Management

Each facility should have a change management program in place so that changes in equipment, processes and ownership can be systematically identified and appropriately documented in the GHG inventory.

Each facility shall document a procedure for:

- Training, and transferring knowledge to, new GHG Data Reporters;
- Identifying the changes in the scope of reporting (e.g., have emissions sources or sinks been added or removed from the facility's reporting boundary?); and,
- Identifying and reporting changes in facility-level emissions (see Section 10.1.2 for more details).

e. Data Documentation

The reporting entity shall maintain procedures for documentation retention and record keeping. The reporting entity shall maintain documentation that supports the data reported. It should include:

- An inventory of all emissions sources;
- A list of emissions sources not included within the scope of reporting and justification for exclusion;

- The methods used for calculating emissions, references for emissions factors and/or fuel properties used, and any changes to methodologies;
- Organizational changes such as facility name change, change in entity share, and change in operator status;
- Internal audit results and corrective actions taken as follow up to an audit;
- Quarterly CGERS submissions with information relating to significant data changes when compared with previous quarters; and,
- Annual CGERS submissions with information relating to significant data changes when compared with previous years.

The reporting entity shall retain documentation (in hard or electronic format) for a period of at least seven years, or as required by local regulation, whichever is longer.

### Resources, Roles and Responsibilities

The reporting entity shall include the following information:

- Describe the roles and responsibilities of staff gathering data from the field, GHG Data Reporters, GHG Data Managers, and other personnel involved in the GHG reporting and data management process;
- Outline technical competency requirements for GHG Data Reporters; and,
- Outline training requirements for the GHG Data Reporters and GHG Data Managers.

New users of CGERS should receive formal training and turnover from previous users. Ideally, the existing user should work with the new user to jointly prepare and submit at least one or two quarters of data.

### Measurement and Verification

Measurement and verification indicators shall be used to measure performance.

Measurements indicators can include:

- Completion for each submission of peer review of data for accuracy;
- Percent of on-time data submission by data providers/collectors to GHG Data Reporters per year;
- Percent of on-time CGERS submissions per year;
- Percent of quarterly CGERS submissions not requiring re-submission due to inadequate information or data omissions;
- Percent of quarterly CGERS submissions that have been approved by GHG Data Manager before due date per year; and,
- Percent of GHG Data Reporters who have received training.

Internal audits are conducted to verify how complete and accurate the GHG inventory is, and how well the GHG data reporting procedures are followed. Verification indicators will include the number of internal audits conducted.

### Continual Improvement

The SOP shall be reviewed on an annual basis to identify areas for improvement and submitted to the reporting entity's ETC GHG mentor. The review report shall include:

- Review and analysis of the measurement and verification performance; and,
- Evaluation of results of the review and recommendations for areas of improvement.

The results shall be reviewed with all affected parties and appropriate action for improvement shall be taken by responsible parties. The SOP sponsor shall ensure appropriate revisions are made, and any changes communicated to all affected parties.

#### 10.1.2 Accounting for Changes in Facility-level Emissions

A critical step in GHG reporting is to assess the changes in GHG emissions from a facility over time and to document the causes of the changes. It is important to determine the reasons for the changes because it allows Chevron to make a fair comparison of its GHG emissions from one reporting period to the next and to realize if, and where, real sustainable GHG reductions have been made.

As a means of facilitating a fair comparison and checking a facility's data for accuracy, the reporter from each facility must account for the changes by location. The reporter should compare the CO<sub>2</sub>e emissions from the current quarter to the same quarter of the previous year, as well as the current year-to-date (YTD) emissions with the previous year's emissions for the same period.

If a greater than 10% increase or decrease in GHG emissions (in metric tons CO<sub>2</sub> equivalent) has occurred, then the reporter must first determine if the change has resulted from an error or omission. If the reporter determines that an error or omission has occurred, then the issue must be addressed before the GHG Data Reporter completes the quarterly data submission action item in CGERS. In the case that the change in emissions is not due to an error or omission, then an explanation for the change needs to be recorded and communicated to the ETC GHG Team and Corporate HES. The factors that can result in changes to facility emission estimates are detailed below.

##### Changes due to Acquisition/Divestment/Merger

Facilities are often acquired or divested and these transactions must be clearly communicated to the ETC GHG Team and Corporate HES so that the GHG emissions from these entities may be properly accounted for in the inventory. In each case, the date on which ownership of the facility changed hands must be documented together with the percent interest that was acquired or divested.

##### Changes due to Revision of Estimation Methodology

It is expected, and encouraged, that improvements to a reporting entity's emissions calculations will be made over time. Examples of improvements include the use of a more accurate emission factor or the addition to the inventory of emissions sources that had previously been considered insignificant. When such improvements are made, the reason for the resulting change in emissions must be documented and communicated to the ETC GHG Team and Corporate HES. Documentation should include details of the new emissions calculation methods used and/or new emissions sources added, any assumptions made, and those parties involved in the decision to make the change.

Changes to emissions calculation methodologies for the current reporting period must also be made to the 2010 base year and post-2010 historical inventories where the change results in a significant change in emissions, in accordance with Sections 7 and 8 of this Protocol respectively.

##### Changes due to Change in Production Level

GHG emissions are dependent upon production. Thus, changes in production levels from one reporting period to the next can significantly affect GHG emissions estimates. When a change in production leads to a greater than 10% increase or decrease in GHG emissions (in metric tons CO<sub>2</sub> equivalent), then this change should be documented and communicated to the ETC GHG Team and Corporate HES. It should also be noted as to whether the change in production is expected to be temporary or permanent.

## Changes due to Real Sustainable Reduction

Facilities may make changes to their operations that reduce energy use and/or GHG emissions. Examples of such energy use and/or GHG emissions reduction measures include the switch to cleaner fuels, reductions in flaring/venting, adoption of carbon capture and storage (CCS), and installation of cogeneration and/or more efficient hydrogen plants. These measures to reduce energy use and/or GHG emissions are highly encouraged, and should be documented and communicated to the ETC GHG Team and Corporate HES.

## Changes due to Other Causes

“Other” causes for changes in GHG emissions are often changes to operations and are not due to changes in production, and may include: new or more intensive processing at refineries to produce cleaner fuels; facility shutdowns; increased use of gas/water injection for production; pollution abatement controls; and, fuel switching.

Some “other” changes are caused by non-operational differences from one quarter to another such as a change in the weather (i.e., more or less heating oil required for heating buildings), a change in the percent equity or the operator status, the addition of new locations within an entity. Furthermore, the amount of electricity or steam purchased or sold could change. The utilities that were outsourced could become insourced, or vice versa. All these changes should be documented and communicated to the ETC GHG Team and Corporate HES.

## 10.2 ETC GHG Data Quality Management Guidelines

Chevron's ETC GHG Team can best manage data quality by developing and abiding by a standard operating procedure (SOP) and by accounting for changes in corporate-level GHG emissions each quarter. Section 10.2.1 provides guidance for developing an SOP for ETC, while Section 10.2.2 outlines the steps the ETC GHG Team shall take to identify significant changes in corporate-level emissions and report these changes to Corporate HES.

### *10.2.1 ETC Standard Operating Procedures*

The ETC GHG Team shall have a SOP for GHG quality information management. The SOP shall contain the following information:

- Roles and Responsibilities
- Supporting Documentation
- Change Management
- Record Retention

The remainder of this section describes the information that must be included in ETC's SOP as well as procedural requirements for maintaining data quality.

### Roles and Responsibilities

The following should be described in ETC's SOP:

- The roles of the ETC GHG Team staff who aggregate and quality control the Corporate GHG inventory data;
- The responsibility of the ETC GHG Team staff to plan and facilitate training for the GHG Data Reporters and GHG Data Managers in the use of the CGERS application;
- The responsibility of the ETC GHG Team staff to maintain a portal for use by Chevron employees which contains past and present information on Chevron's GHG Inventory system and GHG emissions; and,
- The roles and responsibilities of the IT staff who manage the servers where the GHG data is stored.

## Supporting Documentation

The following pieces of documentation, which support the GHG Inventory system, should be maintained by the ETC GHG Team:

- List of reporting entities - Develop/Update documentation to include acquisition and divestitures, and to clearly identify Chevron reporting entities included in scope of the GHG Inventory for each relevant year; and,
- List of reporting contacts – Develop/Update a list of the staff responsible at each facility for the completion of the GHG emission estimates.

ETC's SOP should outline guidance on the frequency with which these documents should be reviewed and revised.

## Change Management

The ETC GHG Team should have a change management program in place so that Chevron's GHG emissions may be collected and reported each year in a consistent manner, and so that changes in enterprise-wide emissions may be rigorously tracked.

The ETC GHG Team shall document a procedure for:

- Training, and transferring knowledge to, new GHG data analysts within the ETC GHG Team;
- Identifying the changes in the scope of reporting (e.g., have acquisitions or divestitures occurred during the course of the year); and,
- Identifying and reporting changes in corporate-level emissions (see Section 10.2.2 for more details).

## Record Retention

The ETC GHG Team shall develop and follow procedures for documentation retention and record keeping. These procedures shall require the ETC GHG Team to retain all of the annual GHG emission estimates for the corporation as well as the final documentation that explains any anomalies in the data in a given year indefinitely, while retaining all supporting documentation (in hard or electronic format) for a period of at least seven years.

### *10.2.2 Accounting for Changes in Corporate-level Emissions*

Each quarter the ETC GHG Team shall review the GHG data submitted by each reporting facility and undertake the following quality assurance and quality control activities:

- Check completeness of the GHG inventory (i.e., has data been received from each of the reporting entities?) and address any omissions;
- Compare the emissions for the current quarter against those for the same quarter of the previous year, as well as the current year-to-date (YTD) emissions against those for the same period of the previous year; and,
- Aggregate explanations provided by facilities for a greater than 10% increase or decrease in emissions.

When completing the annual GHG emission report, the ETC GHG Team shall:

- Check completeness of the GHG inventory (i.e., has data been received from each of the reporting facilities?) and address any omissions;
- Compare the emissions for the current quarter against those for the same quarter of the previous year, as well as the current year's emissions against those of the previous year;
- Provide a summary to Corporate HES of the leading cause/s for any increase or decrease in the Corporate GHG emissions estimate for the current year as compared to previous years; and,
- Assess the need for, and if necessary undertake, the re-statement of previous years' Corporate GHG emissions estimates.

The ETC GHG Team shall also document the reasons for any changes to the GHG emissions calculation methods and/or default emission factors. Further, the ETC GHG Team shall also periodically review opportunities to improve the information management process.

## 11 EMISSIONS VERIFICATION PLANNING GUIDANCE

### 11.1 Third-Party Verifications of Chevron's GHG Inventory

Chevron plans to have annual audits of at least 33 percent of the corporation's inventory. The primary purposes of Chevron's voluntary, independent verifications include:

- Identifying opportunities to improve Chevron's GHG inventory process;
- Preparing for anticipated future mandatory GHG inventory reviews; and,
- Obtaining independent opinion statements, suitable for public disclosure, regarding the quality of Chevron's GHG inventory.

In general, these GHG verifications consist of the following seven steps:

- 1) Preparation – The independent verifier reviews the GHG inventory (e.g., the CGERS model) for the reporting entity. The verifier, Corporate HES, and the Facility-level GHG Data Reporter then discuss the objectives of the verification and agree on a schedule. The GHG Data Reporter assures that other key individuals are available to meet with the verifier.
- 2) Opening meeting – At the beginning of the verification visit, there is an opening meeting with facility management and/or other interested parties. The objective is to assure that the objectives of the verification are clearly communicated to all stakeholders.
- 3) Review of processes in place – The verifier checks the existence and sufficiency of the facility-level Standard Operating Procedures (SOP) for the GHG inventory process.
- 4) Review of emission sources and data flow – The Facility-level GHG Data Reporter describes the GHG emission sources at the facility, and the data paths from raw data, such as fuel usage meter readings, through any intermediate spreadsheets or files, to CGERS inputs. The verifier assures that, assuming no transcription errors, meter inaccuracies etc., the data paths will correctly take the data from the original sources to the CGERS model. The verifier also checks for missing sources and the double counting of emissions.
- 5) Actual data checking – The verifier checks the accuracy of data for significant sources. Starting with a sample of the monthly CGERS inputs, the verifier traces data from the CGERS model back to original meter reading, checking the accuracy of data transfers, calculations, etc. along all intermediate spreadsheets or other data records. For example, this activity typically includes the following steps for any given entry in the CGERS model:
  - a. Ask the Facility-level GHG Data Reporter who provided him/her with the number;
  - b. Speak with the source and check that the CGERS™ entry matches the data in the source's records; and,
  - c. Ask the source where he/she got the number, and repeat all the way back to the original meter reading.

- 6) Recommendations - The verifier develops conclusions/ recommendations.
- 7) Communication of results - The verifier communicates those conclusions/recommendations through a closing meeting and a follow-up written report. The report summarizes all the findings and defines their degree of materiality such that appropriate actions can be taken.

## 11.2 Preparing for a Third-Party Verification

During a verification visit, the GHG verifier will review:

- The processes in place to assure that the GHG inventory is accurate;
- The standard operating procedure of the facility (see Section 10 for details); and,
- The GHG inventory itself.

The verifier will also review the actual GHG data, using the following key criteria:

- Completeness – Are all data sources within the defined boundary included in the final data set?
- Consistency – Have the data been collected and reported in a consistent way that allows comparison between business units and from one year to the next?
- Accuracy – Have the data been calculated correctly in accordance with the defined protocol?
- Transparency – Is documentation available to clearly demonstrate that the inventory accurately reflects the actual emissions from the facility?

As described above, the GHG verifier will want to trace the CGERS data entries back through any intermediate databases to the original meter readings. Prior to the verification, the Facility-level GHG Data Reporter should do this at least for the major GHG sources, and should make sure that the data transfers, calculations, etc. are correct. The data reporter should also be prepared to describe the data pathways which flow into CGERS. For example, if there is a line entry in the combustion module for “heaters–south,” the data reporter should be prepared to describe which heaters are included, which meters are used to record fuel usage, how the meter readings are taken (e.g., manually vs. electronically, continuously vs. hourly vs. daily), where the data is initially recorded, and how the data get from the initial recordings to the CGERS model (including any intermediate databases). It would be very helpful to develop a flow diagram, showing all the emission sources and how the data get from those sources to CGERS.

The Facility-level GHG Data Reporter should also review the Chevron GHG Reporting Protocol to assure that it and the reporting entity’s approach are consistent, and should assure that records related to GHG emissions are available. In addition, the reporter should inform key field personnel who are responsible for GHG-related data about the verification, and make sure that they will be available to meet with the verifier if requested.

## 11.3 Follow-up to Findings of a Third-Party Verification

The GHG verifier will document findings and recommendations in a final report. Some of the recommendations may be simple changes that can be implemented quickly to correct errors. These changes should be made by the Facility-level GHG Data Reporter.

Other recommendations may be more costly or time-consuming to implement, or may deal with issues that are common to the Chevron GHG inventory process in general. The verifier may also identify issues that materially impact the corporate inventory. In these cases, Corporate HES will work with the Facility-level GHG Data Reporters to determine the most appropriate path forward. When faced with an issue that has material impact, facilities should address it as soon as possible in order to preserve the corporation’s GHG data quality.

## REFERENCES

American Petroleum Institute (API), 2009: "Compendium of Greenhouse Gas Methodologies for the Oil and Natural Gas Industry", Available at:

<http://ghg.api.org/nupdates.asp>

International Organization for Standardization (ISO), 2006: "14064-1 Greenhouse gases – Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals".

The Climate Registry (TCR), 2008: "General Reporting Protocol", Version 1.1., Available at:

<http://www.theclimateregistry.org/resources/protocols/general-reporting-protocol/>

Western Climate Initiative (WCI), 2009: "Final Essential Requirements of Mandatory Reporting", Available at:

<http://www.westernclimateinitiative.org/component/registry/func-startdown/118/>

World Resources Institute (WRI)/World Business Council for Sustainable Development (WBCSD), 2004: "The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard," Revised Edition, Available at:

<http://www.ghgprotocol.org/standards/corporate-standard>