RESERVES AND RESOURCES CONSIDERATIONS FOR LNG PROJECTS IN ACCORDANCE WITH SPE-PRMS AND SEC DEFINITIONS

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Executive Summary

Increasingly companies are interested in building or already have in place an integrated global natural gas business that includes equity positions in natural gas fields, interstate natural gas pipelines, liquefaction plants and export terminals, and marketing for liquefied natural gas (LNG) sales to worldwide markets. The purpose of this paper is to explore the reserves and resources considerations related to the implementation of such integrated LNG businesses. Tellurian Inc. (Tellurian) is a public company in the process of building such an integrated global natural gas business and has been taken as a case study to illustrate the implications explored within this paper.

Introduction

Reserves and Resources Definitional Frameworks

The two most common definitional frameworks in use within the United States are: (1) The Society of Petroleum Engineers – Petroleum Resources Management System (SPE-PRMS or PRMS) and (2) the United States Securities and Exchange Commission (SEC) definitions and regulations. The SPE-PRMS is a widely used industry standard for estimating oil and gas reserves and resources, while the SEC definitions and regulations are most commonly used by SEC registrants engaged in oil and gas producing activities for regulatory disclosure purposes.

While many of the SEC definitions are designed to be consistent with PRMS[1], the SEC rules are stricter, and therefore generally result in more conservative reserves estimates. This divergence is mostly due to the discrepancy between the goals of PRMS and the SEC definitions. While PRMS reflects an attempt by petroleum professionals to create a consistent and comprehensive classification framework for understanding the value of individual projects, the SEC is primarily concerned with consumer protection. The SEC rules are not designed to estimate the fair value of a project, but rather to provide useful information to enable investors to compare the business prospects of different companies. As outlined below, this difference in goals has created several key distinctions between the PRMS and SEC frameworks.

Disclosure of Resources – The SEC rules do not allow for disclosure of contingent or prospective resources as defined by PRMS.[2] Prior to the amendments to Regulation S-X Rule 4-10, which went into effect on January 1, 2010, only disclosure of proved reserves were allowed under SEC rules; the amendments allowed for the disclosure of probable and possible reserves at the discretion of the individual filer.[3]

Five Year Rule – Whereas PRMS requires that a development plan be in place to initiate development of the project within a reasonable time frame, the SEC requires that undeveloped reserves be scheduled to be converted to developed status within five years from initial disclosure, unless the specific circumstances justify a longer time.[4]

First-Day-of-the-Month Pricing – While PRMS allows an entity to use its forecasted product price schedules, the SEC rules require the use of the average price during the 12-month period prior to the ending date of the period covered by the report, unless prices are defined by contractual arrangements.[5]

Existing Economic Conditions – Under the PRMS standards, economic producibility is determined using the entity's view of future conditions, while the SEC rules require the use of existing economic conditions.[6]

Projects Must Have a Final Investment Decision to Move to the Reserves Class – While PRMS only requires that an entity demonstrate a firm intention to proceed with development in order to book reserves of any category, the SEC rules require that a company commit to a final investment decision in the development project.[7] KRC has interpreted the PRMS decision gate for the Approved for Development project maturity sub-class to be consistent with the recognition of reserves in accordance with a final investment decision under SEC rules.

Revenues Derived From Non-Hydrocarbon Sales Must be Excluded From Economic Evaluation – Whereas PRMS allows revenues from non-hydrocarbon sources to be included in the determination of economic producibility for a given project, the SEC only allows consideration of revenues associated with saleable hydrocarbons associated with oil and gas producing activities in its estimation of economic producibility.[8]

Important Considerations for LNG Projects

The following subjects comprise the key considerations under both definitional systems that apply specifically to LNG projects. A brief summary is provided here with full development and discussion to follow in the succeeding sections.

Development Project– Under both classification systems, appropriate development project definition is a critical step in the determination of whether associated volumes may be classified as reserves. PRMS is a project-based classification system under which a project may involve the development of a single petroleum

[1] Final Rule, 74 FR 2160
[2] Instruction to Item 1202 of Regulation S-K
[3] Final Rule, 74 FR 2167
[4] Regulation S-X Rule 4-10(a)(31)(ii)
[5] Regulation S-X Rule 4-10(a)(22)(v)
[6] Regulation S-X, Rule 4-10(a)(22)
[7] CD&I Question 131.04
[8] Rule 4-10(a)(16)(ii)(C) of Regulation S-X

accumulation, or a group of accumulations, or there may be more than one project implemented on a single accumulation.[9] The SEC rules also imply a project-based classification system similar to PRMS and define a development project as the means by which petroleum resources are brought to the status of economically producible[10]. It is typically a single engineering activity that has a distinct beginning and end, which, when completed, results in the production, processing, or transportation of oil or gas.[11]

Reference Point/ Terminal Point – Under both PRMS and SEC, the appropriate definition of the reference point(s)/ terminal point(s) through the contractual framework of the integrated development project is essential to the recognition of reserves. Under PRMS, the reference point is a defined location within a petroleum extraction and processing operation where the produced quantities are measured or assessed, which is typically the point of sale to third parties or where custody is transferred to the entity's midstream or downstream operations.[12] The PRMS reference point corresponds with the terminal point under SEC definitions, which is defined as the outlet valve on the lease or field storage tank in traditional extraction scenarios. However, if unusual physical or operational circumstances exist, as with an integrated LNG project, the terminal point may be regarded as the first point at which the hydrocarbon is delivered to a main pipeline, a common carrier, a refinery, or a marine terminal.[13]

Entitlement/ Legal Right to Produce – In order to recognize reserves under both definitional frameworks, contracts must be structured to ensure that partners are entitled to an economic interest in production revenue. According to PRMS, any entity intending to claim reserves must have an entitlement to a share of future production through an economic interest or a right to proceeds from sales in order to recognize resources or reserves.[14] Similarly, in order to report reserves under the SEC definitions, there must exist, or there must be a reasonable expectation that there will exist, the legal right to produce or a revenue interest in the production.[15]

Sales Market/ Market Existence – Under both PRMS and SEC, evidence of the existence of an established sales market is necessary in order to report the associated quantities of petroleum as reserves. Under PRMS, one of the criteria necessary to achieve commerciality, and thus attain reserves status, is a reasonable expectation that there will be a market for forecast sales quantities of the production required to justify development.[16] The SEC definitions likewise require that there be a market for the saleable hydrocarbons and a means of delivering such quantities to that market, or a reasonable expectation thereof, in order to be claim reserves.[17]

Regulatory Approval and Financing/ Permits and Financing – Both PRMS and SEC require that the necessary financing, permits, and external approvals be obtained or are likely to be obtained in order for an entity to report reserves. Under PRMS, a commerciality determination requires evidence of financial appropriations either being in place or having a high likelihood of being secured, and evidence that legal, contractual, environmental, regulatory, and government approvals are in place or will be forthcoming, together with resolving any social and economic concerns.[18] In the same vein, the SEC definitions require that all permits and financing required to implement the project exist, or that there is a reasonable expectation that they will exist.[19]

Firm Intention to Proceed with Development/ Final Investment Decision – Both classification frameworks require a level of internal management commitment to a project in order to claim reserves from that project. Under PRMS, the entity claiming commerciality must demonstrate a firm intention to proceed with development, which means that the entity has satisfied the internal decision criteria (typically rate of return at or above the weighted average cost-of-capital or the hurdle rate).[20] The SEC rules necessitate a higher level of commitment than PRMS, requiring the entity to adopt a development plan, which means that the entity must commit to a final investment decision in the project.[21]

Reasonable Time-Frame/ Five Year Rule – Both PRMS and SEC establish time frames in which an entity must develop its undeveloped projects in order to report associated reserves. Under PRMS, for a project to be included in the reserves class, there must be evidence to support a reasonable time-frame for the initiation of development.[22] What constitutes a reasonable time frame depends on the specific circumstances and varies according to the scope of the project.[23] The SEC definitions, on the other hand, only allow undrilled locations to be classified as having undeveloped reserves if a development plan has been adopted indicating that they are scheduled to be drilled within five years, unless the specific circumstances, justify a longer time.[24]

Economic Producibility – Under both the PRMS and SEC definitions, oil and gas must be economically producible in order for the associated project to attain reserves status. Under PRMS, production from a project is economic when the revenue attributable to the entity interest from production exceeds the cost of operation.[25] Similarly, under the SEC rules, it must be estimated with reasonable certainty that the resource will generate revenue that exceeds, or is reasonably expected to exceed, the costs of the operation.[26]

Purpose and Methodology

The purpose of this paper is to explore the reserves and resources considerations related to the implementation of an integrated LNG business. Tellurian has been chosen as a case study for discussion because its business model is largely unprecedented and combines key elements of typical natural gas resource play development in the United States, as well as elements of substantial, integrated LNG developments executed mostly on the international stage. Therefore, it was considered advantageous to provide a review of reserves and resources definitions with a view to this unique type of development, particularly with respect to SEC definitions and regulations.

[9] Guidelines for Application of PRMS, par. 2.2, p. 10
[10] Rule 4-10(a)(8) of Regulation S-X
[11] C&DIs, Question 108.01
[12] PRMS, Ver. 1.01, par. 3.2.1.1
[13] Instruction 1 to Rule 4-10(16)(i) of Regulation S-X
[14] PRMS, Ver. 1.01, par. 3.3.0.3
[15] Rule 4-10(a)(26) of Regulation S-X
[16] PRMS, Ver. 1.01, par. 2.1.2.1.E
[17] CD&I Question 126.02
[18] PRMS, Ver. 1.01, par. 2.1.2.1
[19] Rule 4-10(a)(26) of Regulation S-X
[20] PRMS, Ver. 1.01, par. 2.1.2.1
[21] C&DIs, Question 131.04
[22] PRMS, Ver. 1.01, par. 2.1.2.C
[23] PRMS, Ver. 1.01, par. 2.1.2.3
[24] Rule 4-10(a)(31)(ii) of Regulation S-X
[25] PRMS, Ver. 1.01, par. 3.1.1.1
[26] Rule 4-10(a)(10) of Regulation S-X

Tellurian is a public company in the process of building an integrated global natural gas business that is planned to include equity positions in United States natural gas fields, interstate natural gas pipelines, a liquefaction plant and export terminal, and marketing for liquefied natural gas (LNG) sales to worldwide markets. Upon completion, the Driftwood LNG plant will be capable of exports up to 27.6 million tonnes of LNG per year out of a proposed site near Lake Charles, Louisiana. Currently, Tellurian holds more than 10,000 net acres and operates approximately 20 wells in the Haynesville Shale, an unconventional natural gas resource play located in Texas and Louisiana and intends to acquire additional assets to supply low-cost natural gas to the Driftwood LNG plant. Tellurian has proposed to construct, own, and operate the Haynesville Global Access Pipeline in order to transport natural gas from its Haynesville asset. Additionally, Tellurian has proposed the Permian Global Access Pipeline and the Driftwood Pipeline to further its transportation network in pursuit of its integrated LNG business. Collectively, these existing and planned natural gas assets are referred to as the Driftwood Project.[27]

This paper may serve as an in-depth guide for organizations to use in their business development activities and decision-making processes with regard to reporting of reserves and resources. This paper will identify the issues and key criteria required for reporting reserves in accordance with the two most common definitional frameworks: (1) The Society of Petroleum Engineers – Petroleum Resources Management System (SPE-PRMS or PRMS) and (2) the United States Securities and Exchange Commission (SEC) definitions and regulations. The SPE-PRMS is a widely used industry standard for estimating oil and gas reserves and resources, while the SEC definitions and regulations are most commonly used by SEC registrants engaged in oil and gas producing activities for regulatory disclosure purposes.

The first half of this paper will address reserves and resources definitions in accordance with SPE-PRMS. A brief introduction will be provided, along with an overview of key documents. Basic principles of SPE-PRMS will be reviewed, followed by key issues under SPE-PRMS definitions. Each key issue will be introduced with a definition, followed by an explanation of the relevant definitions, guidelines, and/or industry standards. Finally a discussion of the interpretations and opinions related to those rules, particularly with regard to reserves and resources considerations for LNG projects, will be provided. All opinions and interpretations are solely those of KR Consulting LLC (KRC).

The second half of this paper will address reserves and resources definitions in accordance with SEC rules and regulations for public disclosure by registrants. The same structural format will be followed as for SPE-PRMS definitions, with the addition of a discussion of key differences between SPE-PRMS and SEC definitions.

Finally, conclusions will be provided at the end of this report summarizing the key reserves and resources considerations under both definitional standards.

Introduction to SPE-PRMS Definitions

The Society of Petroleum Engineers – Petroleum Resources Management System (SPE-PRMS) is a widely used industry standard for estimating oil and gas reserves and resources. SPE-PRMS was prepared by the Oil and Gas Reserves Committee of the Society of Petroleum Engineers (SPE). The document was reviewed and jointly sponsored by the World Petroleum Council (WPC), the American Association of Petroleum Geologists (AAPG), the Society of Petroleum Evaluation Engineers (SPEE), the Society of Exploration Geophysicists (SEG), the Society of Petrophysicists and Well Log Analysts (SPWLA), and the European Association of Geoscientists and Engineers (EAGE). These definitions and the related classification system provide a measure of comparability, reduce the subjective nature of petroleum resources estimation, and improve clarity in global communications regarding petroleum reserves.

There are three key documents related to SPE-PRMS:

(1) Petroleum Resources Management System
The Petroleum Resources Management System (PRMS) is the controlling document defining the fundamental principles for the evaluation and classification of petroleum reserves and resources. It was approved by the SPE Board of Directors in March 2007 and revised in June 2018. PRMS provides a consistent approach to estimating petroleum quantities, evaluating projects, and presenting results within a comprehensive classification framework.

(2) Guidelines for Application of the Petroleum Resources Management System
The Guidelines for Application of the Petroleum Resources Management System (the Guidelines) were published in 2001 and revised in 2011. The Guidelines serve as a useful reference for petroleum professionals engaged in the evaluation and estimation of petroleum reserves and resources. It is anticipated that the Guidelines will be updated in the future to align with changes made to PRMS under the June 2018 revision, but until then care must be exercised in the application of the Guidelines in any area that may conflict with the revised version of PRMS.

(3) Standards Pertaining to the Estimating and Auditing of Oil and Gas Reserves Information
The Standards Pertaining to the Estimating and Auditing of Oil and Gas Reserves Information (the Standards) were adopted by SPE in 1977 and were most recently revised in June 2019. The purpose of the Standards is to enable users of reserves information to have a general understanding of the methods of, and limitations on, estimating and auditing reserves information. Additionally, the Standards enumerate the requirements and obligations of professional geoscientists and engineers to ensure that reserves information is estimated and audited consistently and by well-trained, competent professionals.

Basic Principles under SPE-PRMS Definitions

The goal of PRMS is to provide "a common language for communicating both the confidence of a project's resources maturation status and the range of potential outcomes to the various entities."[28] Accordingly, the definitions and guidelines were designed to allow flexibility for entities, governments, and regulatory

[27] Tellurian 10-K as of December 31, 2018, p. 1

[28] PRMS, Ver. 1.01, par.1.0.0.1

agencies to tailor application for their particular needs.[29]

Classification Framework

PRMS defines **resources** as all quantities of petroleum existing within the Earth's crust plus those quantities already produced.[30] The PRMS classification framework distinguishes between recoverable and unrecoverable resources, as well as between discovered and undiscovered resources, which correspond to the chance of commerciality represented by the vertical axis. The PRMS classification system also divides recoverable resources into four classes, based on the development projects applied.[31]

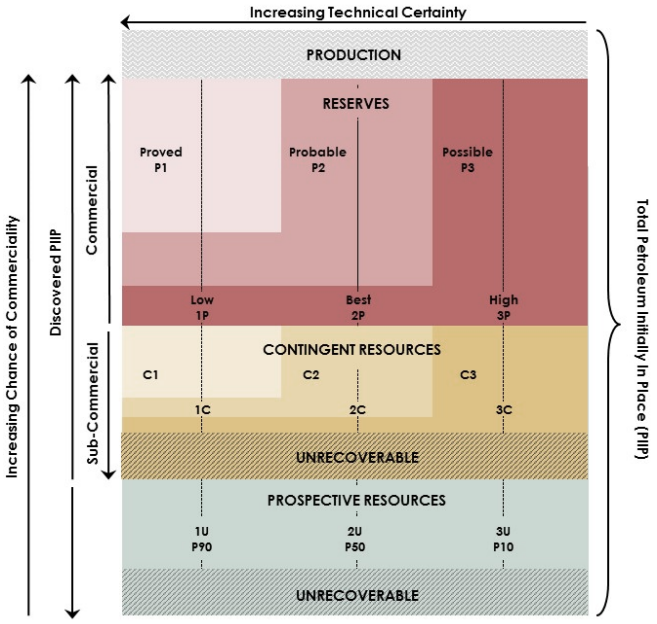

Figure 1 SPE-PRMS Resources Classification Framework

Production is the cumulative quantities of petroleum that have been recovered at a given date.[32]

Reserves are those quantities of petroleum anticipated to be commercially recoverable by application of development projects to known accumulations from a given date forward under defined conditions.[33]

Contingent Resources are those quantities of petroleum estimated, as of a given date, to be potentially recoverable from known accumulations, by the application of development project(s) not currently considered to be commercial due to one or more contingencies.[34]

Prospective Resources are those quantities of petroleum estimated, as of a given date, to be potentially recoverable from undiscovered accumulations by application of future development projects.[35]

In the PRMS classification framework, the horizontal axis specifies the range of uncertainty for the estimated quantities of recoverable petroleum associated with a development project. For the reserves class, the three incremental categories based on the level of technical certainty are (1) **Proved**, (2) **Probable**, and (3) **Possible**.[36] These incremental categories also translate to the cumulative categories of 1P (proved), 2P (proved plus probable), and 3P (proved plus probable plus possible). Similarly, incremental and cumulative categories representing the range of uncertainty for contingent resources and prospective resources are defined under the PRMS classification framework, as shown in Figure 1.

Each reserves category can be further sub-divided, reflecting the funding and operational status of wells and associated facilities within the development plan, according to the following divisions: (1) **Developed Reserves**, which are expected to be recovered from existing wells and facilities, and (2) **Undeveloped Reserves**, which are expected to be recovered through future significant investments.[37]

Project-Based Classification System

PRMS is a project-based classification system. The project is the primary element considered in the resources classification, and each project should have a range of estimated recoverable resources. A project may be defined as the development of a well, a single reservoir, or a small field; an incremental development in a producing field; or the integrated development of a field or several fields together with associated facilities.[38] A project should represent a defined activity or set of activities to develop the petroleum accumulation(s).[39]

A project can further be classified by the level of an entity's commitment to proceeding with the development project.[40]

Within the reserves class, there are three sub-classes of project maturity, listed below in increasing order of commitment.

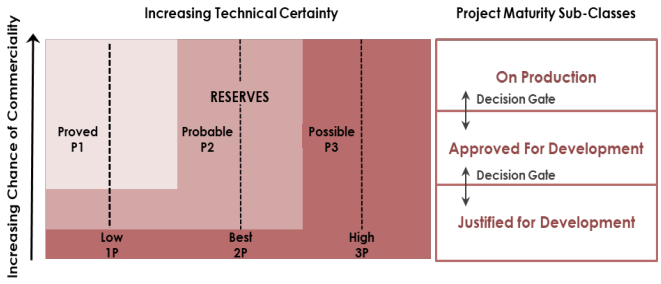

Figure 2 SPE-PRMS Reserves Subclasses Based on Project Maturity

Justified for Development means that implementation of the development project is justified on the basis of reasonable forecast commercial conditions at the time of reporting, and there are

[29] PRMS, Ver. 1.01, Preamble
[30] PRMS, Ver. 1.01, par. 1,1.0.2
[31] PRMS, Ver. 1.01, par. 1.1.0.3
[32] PRMS, Ver. 1.01, par. 1.1.0.5.C
[33] PRMS, Ver. 1.01, par. 1.1.0.6.A.1
[34] PRMS, Ver. 1.01, par. 1.1.0.6.B
[35] PRMS, Ver. 1.01, par. 1.1.0.6.D
[36] PRMS, Ver. 1.01, par. 2.2.2.8
[37] PRMS, Ver. 1.01, par. 2.1.3.6
[38] PRMS, Ver. 1.01, par. 1.2.0.4
[39] PRMS, Ver. 1.01, Appendix A, "Project"
[40] PRMS, Ver. 1.01, par. 2.1.3.5.1

reasonable expectations that all necessary approvals/contracts will be obtained.[41]

To move to this level of project maturity and have reserves associated with it:

- The project must be commercially viable;
- The project must be agreed to by all participating entities, and there must be a firm intention to proceed with development within a reasonable time-frame; and
- The project must have no known contingencies that could preclude the development from proceeding.[42]

Approved for Development means that all necessary approvals have been obtained, capital funds have been committed, and implementation of the development project is ready to begin or is under way.[43]

Reserves may only be sub-classified as Approved for Development after a final investment decision has been made.[44]

On Production means the development project is currently producing or capable of producing and selling petroleum to market. The key criterion is that the project is receiving income from sales, rather than that the approved development project is necessarily complete.[45]

Key Issues under SPE-PRMS Definitions

KEY ELEMENTS FOR RESERVES RECOGNITION

Definition

Reserves are those quantities of petroleum anticipated to be commercially recoverable by application of development projects to known accumulations from a given date forward under defined conditions. Reserves must satisfy four criteria: discovered, recoverable, commercial, and remaining (as of the evaluation's effective date) based on the development project(s) applied.[46]

PRMS defines reserves as remaining petroleum quantities, as of a given date, which can be produced via a development project, with a defined reference point.

Under PRMS, an entity may recognize reserves and resources in accordance with the entity's entitlement share of future production legally accruing under the terms of the applicable contract. This will involve (1) a right to proceeds from sales, (2) exposure to market and technical risk, and (3) exposure to reward through development activities.

Reserves are further required to be commercial, which includes, but is not limited to, economic producibility, such that the revenue attributable to the entity interest from production exceeds the cost of operation, including all abandonment liabilities. Commerciality also requires a firm intention to proceed with development and evidence to support a reasonable expectation for each of the following:

- A market for sales quantities
- Production and transportation facilities
- Social and regulatory approvals
- Financing
- A reasonable time-frame for development
- A technically mature, feasible development plan

Each of these topics, along with related significant terms used by PRMS, will be discussed in further detail herein. Each topic will be introduced with a definition, followed by an explanation of the relevant SPE-PRMS definitions and guidelines. Finally, a discussion of KRC's interpretations and opinions related to those definitions and guidelines, particularly with regard to reserves and resources considerations for LNG projects, will be provided.

KRC discusses the Key Elements for Reserves Recognition under SEC definitions in the second half of this paper.

DEVELOPMENT PROJECT

Definition

A defined activity or set of activities that provides the link between the petroleum accumulation's resources sub-class and the decision-making process, including budget allocation. A project may, for example, constitute the development of a single reservoir or field, an incremental development in a larger producing field, or the integrated development of a group of several fields and associated facilities (e.g. compression) with a common ownership.[47]

A project may involve the development of a single petroleum accumulation, or a group of accumulations, or there may be more than one project implemented on a single accumulation.[48] PRMS recognizes projects at varying stages of maturity, ranging from "Play," as in prospective resources, to "On Production."[49] As the project moves to a higher level of commercial maturity, the chance that the accumulation will be commercially developed increases.[50] However, to be recognized as reserves, a project must be sufficiently defined so as to establish its technical and commercial viability.[51]

DISCUSSION

PRMS a project-based classification system, under which the definition of the development project is a critical step in the determination of whether associated volumes may be classified as reserves. Proper definition of the development project allows for the identification of (1) the reference point of the project, (2) the type and associated quantities of saleable petroleum at the reference point, (3) the applicable expenses prior to the reference point, and (4) the relevant hydrocarbon sales price at the reference point. This information is necessary for the determination of commerciality, which is required for classification of reserves.

Additionally, proper definition of the development project is crucial

[41] PRMS, Ver. 1.01, Table 1
[42] PRMS, Ver. 1.01, par. 2.1.3.5.4
[43] PRMS, Ver. 1.01, Table 1
[44] PRMS, Ver. 1.01, par. 2.1.3.5.5
[45] PRMS, Ver. 1.01, Table 1
[46] PRMS, Ver. 1.01, par. 1.1.0.6.A.1
[47] PRMS, Ver. 1.01, Appendix A, "Project"
[48] Guidelines for Application of PRMS, par. 2.2, p. 10
[49] PRMS, Ver. 1.01, par. 2.1.3.5.1
[50] PRMS, Ver. 1.01, par. 2.1.3.2
[51] PRMS, Ver. 1.01, par. 2.1.2.3

when substantiating a "firm intention to proceed with development" and justifying initiation of development within a reasonable time-frame, each of which are key requirements for commerciality, as will be discussed further herein.

It is expected that Tellurian will define its development project, or a series of development projects, as an integrated LNG development, beginning with production in the field and terminating at the loading of the LNG cargo, or ex-ship at the final delivery destination. Under SPE-PRMS definitions, this should be relatively simple provided that the project is clearly defined to include all relevant portions of the integrated development project, and provided that the reference point can be substantiated by a contractual framework which maintains the legal entitlement of Tellurian and its partners up until the desired reference point.

KRC discusses the Development Project under SEC definitions in the second half of this paper.

Reference Point

Definition

> *Reference point is a defined location within a petroleum extraction and processing operation where the produced quantities are measured or assessed. A reference point is typically the point of sale to third parties or where custody is transferred to the entity's midstream or downstream operations. Sales production and estimated Reserves are normally measured and reported in terms of quantities crossing this point over the period of interest.*[52]

Ideally, the same reference point should be used for the measurement of reported sales quantities and accounting treatment of sales revenues.[53] Sales quantities are defined as raw production minus non-sales quantities that are produced at the wellhead but not available for sales at the reference point, including petroleum consumed as lease fuel, flared, or lost in processing, and non-hydrocarbons that must be removed before sale, including water. Each of these may be allocated using separate reference points, but, when combined with sales, should sum to the wellhead values.[54]

The reported sales quantities should reflect the specifications of the petroleum product at the point of sale. Therefore, when gas is sold as wet gas, the wet gas quantity sold should be reported as sales, but any hydrocarbon liquids extracted and sold downstream of the reference point would not be reported.[55] Applying the same principle, when the hydrocarbon liquids are extracted before sale and the gas is sold in dry condition, the dry gas quantity and the extracted liquid quantities should be separately reported as sales at their respective reference points.[56]

When non-hydrocarbon components are associated with production, the non-hydrocarbon components may be included in reserves where they are part of a sales product but should be disclosed if they are material. When it is required to remove all or a portion of the non-hydrocarbons upstream of the reference point, the reserves and production values should reflect only the marketable product at the reference point.[57] Even if the non-hydrocarbon component removed before the reference point is subsequently marketed, it cannot be reported as reserves. However, the revenue generated by the sale of non-hydrocarbon products may be included in the project's economic evaluation.[58]

Reserves are recommended to be sales quantities, but lease fuel may be included as reserves or resources if the quantities are reported separately from sales.[59] Lease fuel quantities cannot be directly included in the economic assessment of the project, since there is neither a cost incurred nor a revenue stream to recognize a sales quantity. However, lease fuel indirectly influences the project economics by replacing the need to purchase fuel from third parties, resulting in lower operating costs.[60]

Discussion

KRC has interpreted the SPE-PRMS definitions to indicate that the petroleum extraction and processing operation ends at the first point of sale or custody transfer (i.e. reference point) by the entity entitled to such saleable volumes. This interpretation allows for reserves to be reported for an integrated LNG development project, so long as the reference point can be reasonably defined at the outlet of the LNG facility or at the delivery point to a regasification facility.

It is important to consider the intended meaning of "a petroleum extraction and processing operation," as opposed to "midstream and downstream operations," as specified in the definition of reference point. The SPE-PRMS definitions clearly allow for unconventional resources, including the production of synthetic oil and gas, which requires a chemical composition change in order to arrive at the final sales products.[61] Though not specifically addressed in PRMS, KRC has concluded that the production of LNG, which requires only a phase change, easily meets the definition for a petroleum extraction and processing operation under an integrated development project and for the recognition of reserves. Additionally, the SPE-PRMS definitions clearly indicate that NGLs, which also require only a phase change, may be classified as reserves, along with associated natural gas, according to the sales product at each reference point.[62]

Furthermore, The Guidelines clearly indicate that the production of LNG is a petroleum extraction and processing operation, as opposed to a purely midstream or downstream operation, which may constitute a development project and have associated quantities classified as reserves. Furthermore, it is clear that the reference point may be defined, at minimum, at the outlet of the plant:

> In the case of LNG plants, while significant purification and associated fuel-use shrinkage is involved, there is no intent to chemically alter the gas but only to change its physical state for transportation. Inert gases and contaminants that must be removed during processing are part of shrinkage. If condensate or NGLs are extracted during processing and reported, the gas

[52] PRMS, Ver. 1.01, par. 3.2.1.1
[53] PRMS, Ver. 1.01, par. 3.2.1.2
[54] PRMS, Ver. 1.01, par. 3.2.1.3
[55] PRMS, Ver. 1.01, par. 3.2.3.1
[56] PRMS, Ver. 1.01, par. 3.2.3.2
[57] PRMS, Ver. 1.01, par. 3.2.4.1
[58] PRMS, Ver. 1.01, par. 3.2.4.2
[59] PRMS, Ver. 1.01, par. 3.2.2.2
[60] PRMS, Ver. 1.01, par. 3.2.2.3
[61] PRMS, Ver. 1.01, par. 2.4.0.1.B
[62] PRMS, Ver. 1.01, par. 3.2.4

> volume should be adjusted accordingly. Volumes must be adjusted downward for plant fuel consumption. **While output is measured in tons of LNG, associated reservoir estimates are stated in terms of equivalent purified/shrunk volume of gas.**[63]

Based on the foregoing, KRC has concluded that for the purposes of LNG reserves recognition, the distinction between upstream, midstream, and downstream activities is less important than the appropriate definition of the development project and recognition of the reference point.

According to PRMS, a project may be defined as "the integrated development of a group of several fields and associated facilities with a common ownership." Accordingly, common ownership and sales point form the key basis for determination of the reference point at which point reserves may be recognized. Additionally, the SPE-PRMS definitions specifically allow for separate reference points defined for each marketable hydrocarbon product under an integrated project.[64]

The contractual framework of the integrated development project is critical to the appropriate definition of the reference point(s) and the recognition and classification of reserves. The first delivery of saleable volumes becomes the reference point at which the reserves are recognized. Therefore, the contractual framework should be structured to preclude the interpretation of title transfer prior to the intended reference point for the recognition of reserves, e.g. ex-ship at the delivery destination.

The Reference Point corresponds with the Terminal Point under SEC definitions.

ENTITLEMENT

Definition

> *An entity's net recoverable resources are the entitlement share of future production legally accruing under the terms of the development and production contract or license.*[65]

The allocation of sales quantities, costs, and revenues is governed by the applicable contracts between the mineral lease owners and contractors and is generally referred to as entitlement.[66] The sum of the recoverable resources entitlements from all participating entities must equal the total recoverable resources.[67]

The ability for an entity to recognize reserves and resources is subject to satisfying certain key elements. These key elements include:

- Possessing an economic interest through the mineral lease or concession agreement (i.e., right to proceeds from sales);
- Exposure to market and technical risk; and
- Opportunity for reward through participation in exploration, appraisal, and development activities.

Given the complexities of some agreements, there may be additional elements that must be considered in determining entitlement and the recognition of reserves and resources.[68]
An economic interest is possessed when an entity acquires a license or an interest in the minerals in-place, and secures, by any form of legal relationship, revenue derived from the extraction of the mineral to which the entity must look for a return.[69] Risk and reward refer primarily to the variation in revenues caused by technical and economic risks. Technical risk involves the ability to physically extract and recover hydrocarbons and is typically dependent on a number of technical factors. Economic risk is dependent on cost, price, and political or other economic factors. [70]

DISCUSSION

Any entity intending to claim reserves must have an entitlement to a share of future production through an economic interest or a right to proceeds from sales in order to recognize resources or reserves. Accordingly, the contractual framework between Tellurian and partners should be designed to ensure that partners are entitled to an economic interest in production revenues and to preclude such title transfer prior to the reference point recognized by Tellurian, such that partners can recognize reserves for the full value chain of the integrated development project.

Based on disclosures provided in Tellurian's 10-K filing as of December 31, 2018, there exist potential issues related to partner revenue interest entitlement and the corresponding recognition of reserves. Per Tellurian's fling:

> In connection with the implementation of our Business, we are offering partnership interests in a subsidiary, Driftwood Holdings LLC ("Driftwood Holdings"), which will own the Driftwood Project. Partners will contribute cash in exchange for equity in Driftwood Holdings and **will receive LNG volumes at the cost of production, including the cost of debt, for the life of the Driftwood terminal.**[71]

This statement reads as a possible supply agreement that represents the right to purchase production volumes rather than an economic interest in those volumes and may present obstacles to partner reserves and resources recognition depending on the precise nature of Driftwood Holdings. Individual agreements should be reviewed to ensure compliance with the SPE-PRMS standard of an entitlement or an economic interest in production for the classification of hydrocarbon volumes as resources or reserves.

This structure may also raise potential issues regarding risk and reward. Although partners would be assuming some risk through this arrangement, for example, the technical risk that insufficient gas volumes would be extracted for them to purchase their allotted LNG at the tailgate of the plant, it is KRC's opinion that this small level of risk is insufficient to allow for the recognition of reserves or resources. It is KRC's interpretation that the level of reward realization in this arrangement, such as the ability to purchase the LNG volumes at a lower cost when the cost of production is lowered, is likewise inadequate to allow partners to claim reserves or resources.

[63] 2011 PRMS Guidelines, p. 149
[64] PRMS, Ver. 1.01, par. 3.2.0.1
[65] PRMS, Ver. 1.01, par. 1.2.0.6
[66] PRMS, Ver. 1.01, par. 3.3.0.1
[67] PRMS, Ver. 1.01, par. 3.3.0.2
[68] PRMS, Ver. 1.01, par. 3.3.0.3
[69] PRMS, Ver. 1.01, Appendix A, "Economic Interest"
[70] PRMS, Ver. 1.01, Appendix A, "Risk and Reward"
[71] Tellurian 10-K as of December 31, 2018

Entitlement corresponds with the Legal Right to Produce under SEC definitions.

Sales Market

Definition

> *Commerciality is achieved with… a reasonable expectation that there will be a market for forecast sales quantities of the production required to justify development.*[72]

As discussed in the Key Elements for Reserves Recognition section, above, one of the criteria necessary to achieve commerciality is "[a] reasonable expectation that there will be a market for forecast sales quantities of the production required to justify development."[73] Furthermore, evidence that the necessary production and transportation facilities are available, or can be made available, should also exist.[74] A "reasonable expectation" indicates that there is a high degree of confidence and low risk of failure that the referenced event will occur.[75] If there are no viable markets for the petroleum product, volumes may be classified as contingent resources, but may not be classified as reserves.[76]

Discussion

For LNG volumes to be sold through long-term GSAs, a signed GSA not only demonstrates that there will be a market for the contract sales quantities, but also provides a clear basis for what price to use for calculating economic producibility. Therefore, it is commonly accepted that reserves can be booked for future LNG sales through an existing GSA up to the expiration of the contract and using the price specified under the contract. It is KRC's opinion that reserves may also be classified beyond the expiration of an existing GSA, with the documented assumption that a reasonable expectation of the extension or assignment of a similar contract exists. Furthermore, KRC considers that reserves may be booked in compliance with SPE-PRMS definitions even before a GSA is signed, so long as there is a reasonable expectation that the entity will secure a GSA.

The question of an existence of a market for planned spot sales, however, is not as clearly defined. The global LNG market has historically been subject to different market pressures than its counterpart in traditional spot sales of natural gas. However, the LNG market has shifted dramatically over the past two decades, with both increasing global trade and the emergence of a variety of trading strategies. LNG cargoes are no longer sold nearly exclusively under long-term GSAs, but rather the market share of non-long-term trade transactions has increased from less than 10% in 2004 to over 30% as of 2018.[77] Moreover, the S&P Global Platts Japan Korea Marker (JKM) has been gaining popularity as a benchmark price assessment for spot physical cargoes, and represents the spot market value of cargoes delivered ex-ship into Japan, South Korea, China, and Taiwan, which deliveries equate to the majority of global LNG demand. However, the liquidity of JKM remains dramatically below other traded futures contracts such as Henry Hub, indicating its relative immaturity as a benchmark price.[78]

As LNG spot sales have become relatively common, it is KRC's opinion that there is sufficient evidence of a reasonable expectation that there will be a market for spot sales to satisfy this requirement under SPE-PRMS definitions. As there continues to be large disparities in global LNG prices delivered into different markets, KRC suggests defining specific market destinations and pricing as a part of the development project. Additionally, where possible, future plans may be substantiated with a historical, demonstrated track record.

The Sales Market corresponds with Market Existence under SEC definitions.

Regulatory Approval and Financing

Definition

> *Commerciality is achieved with… evidence of financial appropriations either being in place or having a high likelihood of being secured to implement the project… [and] evidence that legal, contractual, environmental, regulatory, and government approvals are in place or will be forthcoming, together with resolving any social and economic concerns.*[79]

Two additional criteria necessary to establish commerciality are regulatory approval and financing. The entity must have evidence that all of the necessary legal, contractual, environmental, regulatory, and government approvals are currently in place or that there is a reasonable expectation that such approvals will be forthcoming in order for a project to reach commercial status.[80] There must also be evidence that the financial appropriations necessary to implement the project have either been secured, or that there is a high likelihood that they will be secured.[81]
While PRMS requires evidence of financial appropriations, it does not require that financing be confirmed in order to classify a project as reserves. Rather, there only needs to be a reasonable expectation that financing or other forms of commitment, such as farm-outs, can be arranged, and will be in place at the time of the final investment decision[82]

Discussion

As disclosed in Tellurian's 10-K filing as of December 31, 2018, the operation of Tellurian's anticipated integrated LNG project will have extensive permitting and approval requirements. According to Tellurian's fling:

> Additionally, **numerous other governmental and regulatory permits and approvals will be required to build and operate our Business**, including, with respect to the construction and operation of the Driftwood Project, consultations and approvals by the Advisory Council on Historic Preservation, USACE, U.S. Department of Commerce, National Marine Fisheries Services, U.S. Department of the Interior, U.S. Fish and Wildlife Service, and U.S. Department of Homeland Security.[83]

While final environmental, regulatory, and government approvals and final funding decisions are not required, there must be a

[72] PRMS, Ver. 1.01, par. 2.1.2.1.E
[73] PRMS, Ver. 1.01, par. 2.1.2.1.E
[74] PRMS, Ver. 1.01, par.2.1.2.1.F
[75] PRMS, Ver. 1.01, Appendix A, "Reasonable Expectation"
[76] PRMS, Ver. 1.01, par. 1.1.0.6.
[77] IGU World LNG Report, 2019 Edition
[78] Petroleum Economist, JKM comes of age
[79] PRMS, Ver. 1.01, par. 2.1.2.1
[80] PRMS, Ver. 1.01, par. 2.1.2.1.G
[81] PRMS, Ver. 1.01, par. 2.1.2.1.B
[82] PRMS, Ver. 1.01, par 2.1.2.4
[83] Tellurian 10-K as of December 31, 2018

reasonable expectation, which means a high degree of confidence and low risk of failure, that the approvals will be forthcoming. KRC interprets that this expectation may be proven through evidence such as an established track record of receiving similar approvals or financing, or an indication from the approving body or financer that the approvals will be granted or the financing confirmed. Evidence that a request for approval or funding has been submitted, without more, is insufficient to establish this element of commerciality.

Regulatory Approval and Financing correspond with Permits and Financing under SEC definitions.

Firm Intention to Proceed with Development

Definition

Discovered recoverable quantities (Contingent Resources) may be considered commercially mature, and thus attain Reserves classification, if the entity claiming commerciality has demonstrated a firm intention to proceed with development. This means the entity has satisfied the internal decision criteria (typically rate of return at or above the weighted average cost-of-capital or the hurdle rate).[84]

In order to establish commerciality, the entity must demonstrate at least a "firm intention to proceed with development." This intent is demonstrated through financial plans, but does not require a final investment decision[85], which is defined as the project approval stage in which the participating entities have firmly agreed to the project and the required capital funding. Rather, it simply requires that all participating entities have agreed that the project is commercially viable and decided to proceed with development on the basis of an agreed development plan.[86]

In the classification framework, this corresponds with the Justified for Development project maturity sub-class. This sub-class represents the decision by the entity and its partners that the project has reached a level of technical and commercial maturity sufficient to justify proceeding with development.[87] Projects should not remain in the Justified for Development sub-class for an extended period of time without positive indications that all required approvals are expected to be obtained without undue delay. Once the final investment decision has been made, the reserves will be reclassified as Approved for Development.[88]

Discussion

The interpretation of the phrase "firm intention to proceed with development" is critical to the classification of recoverable quantities as reserves under PRMS. It is clear from the definitions that a "firm intention to proceed with development" is not equivalent to a final investment decision but is a state of entity commitment that exists just prior to a final investment decision. A review of the contingent resources project maturity sub-class Development Pending can aid in the interpretation of "firm intention to proceed with development." Development Pending, the contingent resources sub-class directly preceding classification as reserves as Justified for Development, indicates that:

> The project is seen to have reasonable potential for eventual commercial development, to the extent that **further data acquisition (e.g. drilling, seismic data) and/or evaluations are currently ongoing** with a view to confirming that the project is commercially viable and **providing the basis for selection of an appropriate development plan.** The critical contingencies have been identified and are reasonably expected to be resolved within a reasonable time-frame. Note that disappointing appraisal/evaluation results could lead to a reclassification of the project to On Hold or Not Viable status.[89]

Development Pending and Justified for Development are often confused by resources evaluators. KRC considers the key distinction between the two sub-classes to be the existence of ongoing evaluations providing the basis for selection of an appropriate development plan, as described in the definition of Development Pending. Recall that one of the commerciality criteria for classification of reserves is, "evidence of a technically mature, feasible development plan."[90] In order for an entity to demonstrate a "firm intention to proceed with development," such development must be sufficiently defined and mature in order to firmly agree to proceed with it. When entities have difficulty enumerating the development project or when partners are in disagreement over the generalities of a development project, it is an indication that there is no "firm intention to proceed." While a project is still undergoing further data acquisition to select an appropriate development plan, it should be classified as contingent resources, rather than reserves. When an entity or entities have agreed to a technically mature, feasible development plan and are progressing towards a final investment decision, the project may be classified as reserves and sub-classified as Justified for Development.

The SPE-PRMS definitions provide guidance for what constitutes firm intention to proceed with development but allow judgment to be used in the application of the term to individual projects of varying scope and size. Projects with significant capital expenditures (e.g. integrated LNG development projects, deep-water projects, significant international projects, etc.) are likely to progress through a prescribed sanctioning process within a corporation that would require a formal agreement that the project is commercially viable and that development should proceed. However, for projects that are more limited in scope, or where an individual well or a group of wells may constitute a project, particularly in onshore drilling of unconventional shale plays, there may be no formal process. In this case, it is KRC's experience that companies will rely on their established track record of continued development and capital budgets, rather than on an official agreement for a specific well to be drilled. Nevertheless, there must still be a firm intention to proceed with the planned wells, but exact locations or release of funds may be lacking due to practical limitations.

Additionally, it is important to distinguish between a single, integrated development and a phased development when defining a development project and substantiating a final investment decision. Under a single, integrated development project, the firm intention to proceed with development is taken for the entire project. Conversely, a phased development project will require a separate firm intention under each discrete stage of the project, and only those estimated volumes for which there is a firm

[84] PRMS, Ver. 1.01, par. 2.1.2.1
[85] PRMS, Ver. 1.01, Appendix A, "Committed Project"
[86] PRMS, Ver. 1.01, par. 2.1.3.5.4
[87] PRMS, Ver. 1.01, Table 1
[88] PRMS, Ver. 1.01, par. 2.1.3.5.5
[89] PRMS, Ver. 1.01, Table 1, "Development Pending"
[90] PRMS, Ver. 1.01, 2.1.2.1.A

intention to proceed may be considered commercial. Each incremental investment decision may be contingent upon the results of the prior phase or may depend on future conditions which are uncertain. The following are examples of phased development projects:

- Development of fields or reservoirs where reservoir limits and/or quality is poorly defined
- Development of unconventional resource plays where individual wells or small programs of wells may constitute separate development projects
- Development projects where there is a risk of obtaining regulatory approvals for future phases
- Development projects with future phases which are dependent on market conditions (e.g. tertiary floods, secondary target development, etc.)

The Firm Intention to Proceed with Development corresponds with the Final Investment Decision under SEC definitions.

Reasonable Time-Frame

Definition

A reasonable time-frame for the initiation of development depends on the specific circumstances and varies according to the scope of the project. While five years is recommended as a benchmark, a longer time-frame could be applied where justifiable.[91]

For a project to be considered commercial, and therefore be included in the reserves class, there must be evidence to support a "reasonable time-frame" for the initiation of development.[92] What constitutes a reasonable time frame depends on the specific circumstances and varies according to the scope of the project.[93] Although the PRMS standards recommend five years from the initial classification date as a benchmark[94], they allow for the application of a longer time-frame where justifiable, and list "development of economic projects that take longer than five years to be developed or are deferred to meet contractual or strategic objectives" as examples of appropriate justifications. These justifications should be clearly documented.[95]

Additionally, when reserves remain undeveloped beyond a reasonable time-frame or have remained undeveloped because of postponements, reasons for the delay in initiating development should be carefully reviewed and documented in order to justify keeping the quantities in the reserves class.[96]

Discussion

A plain reading of the reasonable time-frame component of commerciality suggests that it applies to the initiation of the development project, not the completion. However, there is some ambiguity in the PRMS definitions, as they concurrently refer to a "reasonable time-frame for the **initiation of development**" and list "economic projects that take longer than five years **to be developed**" as an example of a situation where a time-frame longer than five years would be reasonable.[97] The reference to a project that takes more than five years to be developed was added to the PRMS standards when they were updated in 2018.

The previous version of the definition reads:

> While 5 years is recommended as a benchmark, a longer time frame could be applied where, for example, **development of economic projects are deferred at the option of the producer for, among other things, market-related reasons**, or to meet contractual or strategic objectives.[98]

It is unclear what the update committee's intent in adding this new example was, and whether the use of "to be developed" rather than "for development to be initiated" was intentional or simply a confusing word choice. Since the change was recently implemented in 2018, there has not been enough time for an industry standard on how this requirement is applied to be established.

Additionally, apparent conflict exists in paragraph 2.1.3.6.4, which states:

> Where Reserves **remain Undeveloped beyond a reasonable time-frame**… evaluations should be critically reviewed to document reasons for the delay in **initiating development** and to justify retaining these quantities within the Reserves class. While there are specific circumstances where a longer delay… is justified, **a reasonable time-frame to commence the project** is generally considered to be less than five years from the initial classification date.[99]

Again, it is unclear in this section whether a reasonable time-frame is required for the initiation of development or the conversion to developed status. However, it is KRC's opinion that this requirement is most likely meant to apply to the initiation of development. The reasonable time-frame criterion must be read concurrently with the other elements of commerciality, all of which center around the entity's decision-making process and level of commitment to proceeding with the project. It is KRC's interpretation that the reasonable time-frame requirement is satisfied as long as the project is initiated and being actively developed within five years, or longer, with appropriate justification.

Nonetheless, KRC recommends that any PRMS evaluation includes justification of the extended time frame for any development plan longer than five years in scope. Tellurian's integrated LNG project, which combines elements of a standard domestic natural gas play with an international LNG development, necessitates the staged development of gas wells over a period of time in order to produce the gas needed for LNG gas sales contracts. Additionally, the project would likely not be economically producible if wells scheduled to be developed outside of five years were not considered. For these reasons, it is KRC's opinion that, if the reasonable time-frame requirement does refer to the completion of the development, a development time frame that is longer than five-years can be justified as reasonable under the appropriate

[91] PRMS, Ver. 1.01, par. 2.1.2.3
[92] PRMS, Ver. 1.01, par. 2.1.2.C
[93] PRMS, Ver. 1.01, par. 2.1.2.3
[94] PRMS, Ver. 1.01, par. 2.1.3.6.4
[95] PRMS, Ver. 1.01, par. 2.1.2.3
[96] PRMS, Ver. 1.01, par. 2.1.3.6.4
[97] PRMS, Ver. 1.01, par. 2.1.2.3
[98] 2007 PRMS, par. 2.1.2
[99] PRMS 2007, par. 2.1.2

definition of an integrated LNG development project.

It should also be noted that the reasonable time-frame requirement applies to all categories of reserves, not just proved. Prior to the 2018 PRMS update, the industry standard practice was to only apply the standard to proved reserves, and to report probable and possible reserves for projects that did not have a planned reasonable time-frame for development. However, the update committee has specifically clarified that the "'5-year rule' applies to the Reserves class and not solely to the Proved Reserves category."[100] KRC's interpretation is that the entirety of the reasonable time-frame requirement applies to proved, probable, and possible reserves, not just the five year rule. Development within a reasonable-time frame is a one of the commerciality criteria required for estimated recoverable quantities to move into the reserves class and, logically, should apply to all quantities of reserves.

Reasonable Time-Frame corresponds with the Five Year Rule under SEC definitions.

Economic Producibility

Definition

Economic determination of a project is tested assuming a zero percent discount rate (i.e., undiscounted). A project with a positive undiscounted cumulative net cash flow is considered economic. Production from the project is economic when the revenue attributable to the entity interest from production exceeds the cost of operation.[101]

In order to satisfy commerciality criteria under PRMS and, thus, attain reserves classification, a development project must, at minimum, have a positive undiscounted cumulative net cash flow evaluated under defined conditions, along with each of the other commerciality criteria. It is important to remember that, under PRMS, commerciality encompasses many criteria beyond positive economics.

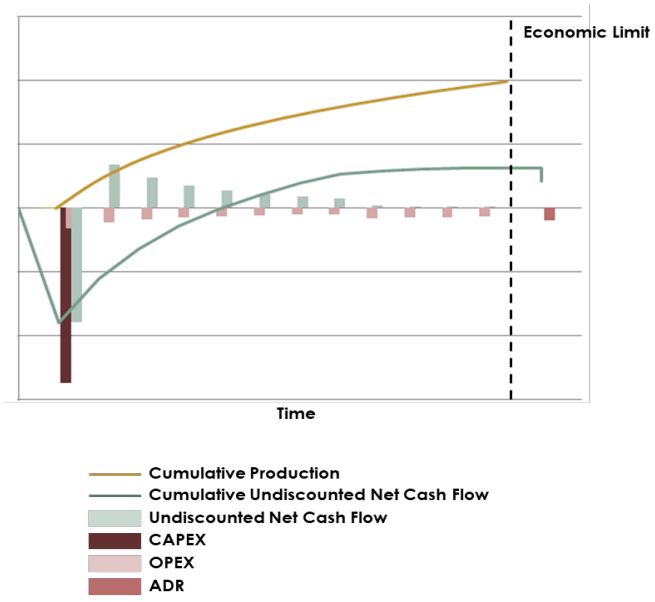

Figure 3 Undeveloped Project Economic Forecast

The calculation of net cash-flows is based on the reference point, and should reflect the following:

- The forecast production quantities over identified time periods;
- The estimated costs and schedule associated with the project to develop, recover, and produce the quantities to the reference point, including abandonment, decommissioning, and restoration (ADR) costs, based on the entity's view of the expected future costs;
- The estimated revenues from the quantities of production based on the evaluator's view of the prices expected to apply to the respective commodities in future periods;
- Future projected production- and revenue-related taxes and royalties expected to be paid by the entity;
- A project life that is limited to the period of economic interest or a reasonably certain estimate of the life expectancy of the project, which is typically truncated by the earliest occurrence of either technical, license, or economic limit; and
- The application of an appropriate discount rate applicable to the entity at the time of the evaluation.

Reserves and resources evaluations are based on a set of defined conditions that are used to classify and categorize a project's expected recoverable quantities. The defined conditions include the factors that impact commerciality, such as decision hurdle rates; commodity prices; operating and capital costs; technical subsurface parameters; marketing, sales route(s); environmental, governmental, legal, and social factors; and timing issues. These factors are forecast for the project over time, and evaluators must clearly identify and document the assumptions used in the evaluation because these assumptions can directly impact the project quantities eligible for classification as Reserves or Resources.[102]

Forecasts based solely on current economic conditions are estimated using an average of those conditions, including historical prices and costs, during a specified period. The default time period for averaging prices and costs is one year, but if a step change occurred within the previous 12-month period, the use of a shorter period reflecting the step change must be justified.[103]

Forecasts based on an entity's forecasted economic scenario conditions, including costs and product price schedules, inflation indexes, and market factors, should reflect and document reasonable assumptions, as assessed by the entity, to exist throughout the life of the project. Inflation, deflation, or market adjustments may be made to forecast costs and revenues.[104]

Economic determination of a project is tested assuming a zero percent discount rate. An economic project is one that has a positive undiscounted cumulative net cash flow. Production from the project is considered economic when the revenue attributable

[100] Key Changes from the PRMS 2007 to PRMS 2018
[101] PRMS, Ver. 1.01, par. 3.1.1.1
[102] PRMS, Ver. 1.01, par. 3.0.0.2
[103] PRMS, Ver. 1.01, par. 3.1.2.3
[104] PRMS, Ver. 1.01, par. 3.1.2.2

to the entity's interest in production exceeds the cost of operation. A project's production is economically producible when the net revenue from an ongoing producing project exceeds the net expenses attributable to a certain entity's interest. The ADR costs are excluded from the determination as to whether developed reserves are economically producible, since such costs are representative of sunk costs which were committed to at the time the project was brought to developed status.[105]

The economic limit of a project is defined as the production rate at the time when the maximum cumulative net cash flow occurs for a project.[106] In determining the economic limit, operating costs should include only those cash costs that will actually be eliminated if project production ceases, which should include fixed property-specific overhead charges if these are actual incremental costs attributable to the project and any production and property taxes. However, for purposes of calculating the economic limit, depreciation, ADR costs, and income tax should not be included as operating costs, nor should any overhead that is not required to operate the subject property.[107]

DISCUSSION

The economic determination required to classify reserves under the SPE-PRMS definitions allows for significant flexibility in the defined conditions used in the net cash flow evaluation and determination of economic producibility. The only requirement is that the entity assesses the underlying assumptions as "reasonable to exist throughout the life of the project."[108] Therefore, it is commonly accepted that reserves can be booked for future LNG sales through an existing Gas Sales Agreement (GSA) up to the expiration of the contract and using the price specified under the contract, as discussed previously.

It is KRC's interpretation that the contract price may also be used to calculate economic producibility beyond the expiration of the GSA, with the documented assumption that a reasonable expectation of the extension or assignment of a similar contract exists. Furthermore, KRC considers that reserves may be booked in compliance with SPE-PRMS definitions even before a GSA is signed, so long as there is a reasonable expectation that the entity will secure a GSA. In this case, the price used in the determination of the economic viability of the development project should be that price which the entity reasonably assesses will exist under the terms of such contract.

In the case of spot sales of LNG, it is KRC's opinion that recoverable quantities may be classified as reserves under SPE-PRMS definitions. As there continues to be large disparities in global LNG prices delivered into different markets, KRC suggests defining specific market destinations and pricing as a part of the development project. Additionally, where possible, future plans may be substantiated with a historical, demonstrated track record. In all cases, the price used must be that which the entity reasonably assesses will exist throughout the life of the project.

KRC will discuss Economic Producibility under SEC definitions in the second half of this paper.

Introduction to SEC Definitions

The mission of the United States Securities and Exchange Commission (SEC) is to protect investors, maintain fair, orderly, and efficient markets, and facilitate capital formation. It is the responsibility of the SEC to:

- Interpret and enforce federal securities laws
- Issue new rules and amend existing rules
- Oversee securities firms, brokers, investment advisers, and ratings agencies
- Oversee private regulatory organizations in the securities, accounting, and auditing fields
- Coordinate United States securities regulation with federal, state, and foreign authorities

One of the SEC's primary concerns is that all investors, whether large institutions or private individuals, have access to certain basic facts about an investment prior to buying it, and so long as they hold it. Accordingly, the SEC requires that publicly-traded companies disclose certain information, including their oil and gas reserves. These disclosures and the statutory provisions that govern them are intended to create a uniform system of calculating reserves in order to allow investors to compare the relative value of oil and gas companies.

There are several key resources that are relevant to the SEC definitions:

(1) Regulation S-X Rule 4-10 (17 CFR Part 210)
Regulation S-X Rule 4-10 contains the financial accounting and reporting standards for registrants with the SEC engaged in oil and gas producing activities.

(2) Regulation S-K, Subpart 1200 (17 CFR 229.1200)
Regulation S-K, Subpart 1200 details the information that registrants with the SEC engaged in oil and gas producing activities are required to disclose.

(3) Modernization of Oil and Gas Reporting; Final Rule (74 FR 2158)
The Final Rule is the publication in the Federal Register announcing and explaining the most recent amendments to Regulation S-X Rule 4-10 and Regulation S-K, Subpart 1200, which went into effect on January 1, 2010.

(4) Financial Accounting Standards Board (FASB) Accounting Standards Update, Topic 932
Accounting Standards Update, Topic 932 explains the most recent updates to the FASB Accounting Standards Codification for Oil and Gas Reserve Estimation and Disclosures. These updates were enacted in an attempt to conform to the requirements of the Final Rule.

(5) Compliance and Disclosure Interpretations (C&DIs)
The C&DIs contain some of the SEC's interpretations of the Oil and Gas Rules in Regulation S-X and Regulation S-K and are shown in question and answer format. The C&DIs were most

[105] PRMS, Ver. 1.01, par. 3.1.2.1
[106] PRMS, Ver. 1.01, par. 3.1.3.1
[107] PRMS, Ver. 1.01, par. 3.1.3.2
[108] PRMS, Ver. 1.01, par. 3.1.2.2

recently updated in May 2013.

(6) SEC Comment Letters
SEC Comment Letters comprise of correspondence between SEC staff and SEC filers in connection with the SEC's review of disclosure filings. The SEC publicly releases this correspondence, and, although comment letters are not binding formal opinions, they can provide valuable insight into the way that the rules are actually being applied.

(7) Other Avenues of SEC Guidance
Other avenues of SEC guidance are available, though may not publicly released. These avenues include presentations made by SEC staff and private correspondence between SEC filers, consultants, and SEC staff. This type of guidance is also not binding formal opinion but can provide similar information as comment letters.

Key Differences from SPE-PRMS

While many of the SEC definitions are designed to be consistent with PRMS[109], the SEC rules are stricter, and therefore generally result in more conservative reserves estimates. This divergence is mostly due to the discrepancy between the goals of PRMS and the SEC definitions. While PRMS reflects an attempt by petroleum professionals to create a consistent and comprehensive classification framework for understanding the value of individual projects, the SEC is primarily concerned with consumer protection. The SEC rules are not designed to estimate the fair value of a project, but rather to provide useful information to enable investors to compare the business prospects of different companies. As outlined below, this difference in goals has created several key distinctions between PRMS and SEC frameworks.

Disclosure of Resources

The SEC rules do not allow for disclosure of contingent or prospective resources as defined by PRMS.[110] Prior to the amendments to Regulation S-X Rule 4-10, which went into effect on January 1, 2010, only disclosure of proved reserves were allowed under SEC rules; the amendments allowed for the disclosure of probable and possible reserves at the discretion of the individual filer.[111] The SEC has issued comment letters to registrants requesting that they remove references to resources which are not compliant with the Instruction to Item 1202 of Regulation S-K which generally prohibits disclosure of the estimates and/or values of resources other than reserves.[112]

Five Year Rule

Whereas PRMS requires that a development plan be in place to initiate development of the project within a reasonable time frame, the SEC requires that undeveloped reserves be scheduled to be converted to developed status within five years from initial disclosure, unless the specific circumstances justify a longer time.[113]

First-Day-of-the-Month pricing

While PRMS allows an entity to use its forecasted product price schedules, the SEC rules require the use of the average price during the 12-month period prior to the ending date of the period covered by the report, unless prices are defined by contractual arrangements.[114]

Existing economic conditions

Under the PRMS standards, economic producibility is determined using the entity's view of future conditions, while the SEC rules require the use of existing economic conditions.[115]

Projects must have a Final Investment Decision to move to the Reserves class

While PRMS only requires that an entity demonstrate a firm intention to proceed with development in order to book reserves of any category, the SEC rules require that a company commit to a final investment decision in the development project.[116] KRC has interpreted the PRMS decision gate for the Approved for Development project maturity sub-class to be consistent with the recognition of reserves in accordance with a final investment decision under SEC rules.

Revenues derived from non-hydrocarbon sales must be excluded from economic evaluation

Whereas PRMS allows revenues from non-hydrocarbon sources to be included in the determination of economic producibility for a given project, the SEC only allows consideration of revenues associated with saleable hydrocarbons associated with oil and gas producing activities in its estimation of economic producibility.[117]

Key Issues under SEC Definitions

Key Elements for Reserves Recognition

Definition

Reserves are estimated remaining quantities of oil and gas and related substances anticipated to be economically producible, as of a given date, by application of development projects to known accumulations. In addition, there must exist, or there must be a reasonable expectation that there will exist, the legal right to produce or a revenue interest in the production, installed means of delivering oil and gas or related substances to market, and all permits and financing required to implement the project.[118]

The SEC defines reserves as remaining hydrocarbon volumes, as of a given date, which can be produced via a development project, with a defined terminal point.

In order for hydrocarbon volumes to be classified as reserves under the SEC rules, there must exist, or be a reasonable expectation that there will exist: (1) a legal right to produce the volumes, (2) a market and a means of delivery to that market, and (3) all necessary permits and financing required to implement the development project.

[109] Final Rule, 74 FR 2160
[110] Instruction to Item 1202 of Regulation S-K
[111] Final Rule, 74 FR 2167
[112] SEC Comment Letter to Kosmos Energy, Ltd., September 10, 2018, p. 1
[113] Regulation S-X Rule 4-10(a)(31)(ii)
[114] Regulation S-X Rule 4-10(a)(22)(v)
[115] Regulation S-X, Rule 4-10(a)(22)
[116] CD&I Question 131.04
[117] Rule 4-10(a)(16)(ii)(C) of Regulation S-X
[118] Rule 4-10(a)(26) of Regulation S-X

Undeveloped reserves of any category must be a part of an adopted development plan that has received a final investment decision, and such reserves should be scheduled to be converted to developed status within five years of initial disclosure, unless specific circumstances justify a longer time.

Reserves are further required to be economically producible such that the development project generates revenues that exceed the costs of the operation, including all abandonment liabilities.

Each of these topics, along with related significant terms used by the SEC, will be discussed in further detail herein. Each topic will be introduced with a definition, followed by an explanation of the relevant SEC rules and a discussion of KRC's interpretations and opinions related to those rules, particularly with regard to reserves and resources considerations for LNG projects.

KRC discusses the Key Elements for Reserves Recognition under SPE-PRMS definitions in the first half of this paper.

Development Project

Definition

A development project is the means by which petroleum resources are brought to the status of economically producible. As examples, the development of a single reservoir or field, an incremental development in a producing field, or the integrated development of a group of several fields and associated facilities with a common ownership may constitute a development project.[119]

The integrated development of a group of fields and associated facilities may be considered a single development project when there is common ownership. A development project is typically a single engineering activity that has a distinct beginning and end, which, when completed, results in the production, processing, or transportation of oil or gas. The following factors are indicative of a development project:

- Has a definite cost estimate, time schedule and investment decision;
- Is approved for funding by management;
- May include all classifications of reserves;
- Will be fully operational after the completion of the initial construction or development; and
- If a project were terminated before completion, a significant portion of the invested capital would be lost.[120]

Discussion

The SEC rules imply a project-based classification system similar to PRMS, under which the definition of the development project is a critical step in the determination of whether associated volumes may be classified and disclosed as reserves. Proper definition of the development project allows for the identification of (1) the terminal point of the project, (2) the type and associated quantities of saleable hydrocarbons at the terminal point, (3) the applicable expenses prior to the terminal point, and (4) the relevant hydrocarbon sales price at the terminal point. This information is necessary for the determination of economic producibility, which is required for classification and disclosure of reserves.

Additionally, proper definition of the development project is crucial when substantiating a final investment decision and justifying exceptions to the five year rule, as will be discussed further herein.

It is expected that Tellurian will define its development project, or a series of development projects, as an integrated LNG development, beginning with production in the field and terminating at the loading of the LNG cargo, or ex-ship at the final delivery destination. Further, it is important to avoid a possible interpretation of the development project by the SEC as merely the development of various fields where each well is considered to be a separate development project, as is the case for many companies developing resource plays in the United States.

KRC discusses the Development Project under SPE-PRMS definitions in the first half of this paper.

Terminal Point

Definition

The oil and gas production function shall be regarded as ending at a "terminal point", which is the outlet valve on the lease or field storage tank. If unusual physical or operational circumstances exist, it may be appropriate to regard the terminal point for the production function as: (a) the first point at which oil, gas, or gas liquids, natural or synthetic, are delivered to a main pipeline, a common carrier, a refinery, or a marine terminal; and (b) In the case of natural resources that are intended to be upgraded into synthetic oil or gas, if those natural resources are delivered to a purchaser prior to upgrading, the first point at which the natural resources are delivered to a main pipeline, a common carrier, a refinery, a marine terminal, or a facility which upgrades such natural resources into synthetic oil or gas.[121]

When determining economic producibility, the value of the products that generate revenue is determined at the terminal point of oil and gas producing activities, as associated with the defined development project.[122] While in traditional extraction scenarios the terminal point is the outlet valve on the lease or field storage tank, if unusual physical or operational circumstances exist, as with an integrated LNG project, the terminal point may be regarded as the first point at which the hydrocarbon is delivered to a main pipeline, a common carrier, a refinery, or a marine terminal.[123]
Oil and gas producing activities include:

- The search for crude oil or natural gas in their natural states and original locations;
- The acquisition of property rights or properties for the purpose of further exploration or for the purpose of removing the oil or gas from such properties;
- The construction, drilling, and production activities necessary to retrieve oil and gas from their natural reservoirs; and

[119] Rule 4-10(a)(8) of Regulation S-X
[120] C&DIs, Question 108.01
[121] Instruction 1 to Rule 4-10(16)(i) of Regulation S-X
[122] Rule 4-10(a)(10) of Regulation S-X
[123] Instruction 1 to Rule 4-10(16)(i) of Regulation S-X

- Extraction of saleable hydrocarbons and activities undertaken with a view to such extraction.[124]

Notably, oil and gas producing activities do not include processing hydrocarbon resources by a registrant that does not have the legal right to produce or a revenue interest in such production, nor does it include production of natural resources other than hydrocarbon resources such as helium, sulfur, or geothermal steam.[125]

Discussion

KRC has interpreted the SEC rules to indicate that the production function terminates at the first delivery of saleable hydrocarbons (i.e. terminal point of oil and gas producing activities) by the entity engaged in oil and gas producing activities and with a legal right to produce or a net revenue interest in such saleable hydrocarbons. KRC considers references to "delivery" under SEC rules to be equivalent to sales point or transfer of ownership.[126] This interpretation allows for reserves to be reported for an integrated LNG development project, so long as the terminal point can be reasonably defined at the outlet of the LNG facility or at the delivery point to a regasification facility.

Oil and gas producing activities have been informally defined by the industry at the transition between upstream and downstream operations. Though this definition may have been reasonable and clearly interpreted for decades in the oil and gas industry, the modern landscape of the industry has continued to blur the boundaries between upstream and downstream. The SEC considered this under the amendments made to Regulation S-X Rule 4-10, particularly in the amendment to the definition of "oil and gas producing activities," which now includes extraction and upgrading of non-traditional hydrocarbon sources such as bitumen from oil sands. The definitions were amended to allow for disclosure of reserves according to final sales products from such activities, in this case bitumen or synthetic oil and gas.[127]

The production of synthetic oil and gas requires a chemical composition change in order to arrive at the final sales products. Since the SEC has revised its disclosure rules to include this type of activity as an oil and gas producing activity, KRC has concluded that the production of LNG, which requires only a phase change, easily meets the definition for an oil and gas producing activity under an integrated development project and for the recognition of reserves. Additionally, the SEC has clearly indicated that NGLs, which also require only a phase change, may be disclosed as reserves, along with associated natural gas, on an "as sold" basis.[128]

Based on the foregoing, KRC has concluded that for the purposes of LNG reserves recognition, the distinction between upstream and downstream activities is less important than the appropriate definition of the development project and recognition of the terminal point of oil and gas producing activities. According to Regulation S-X Rule 4-10(a)(8) a development project may be defined as "the integrated development of a group of several fields and associated facilities with a common ownership." Accordingly, common ownership and sales point form the key basis for determination of the terminal point for the production function at which point reserves may be disclosed. Furthermore, Instruction 2 to Item 1204 of Regulation S-K states that for the purposes of reporting production, volumes will include "dry, residue, or wet gas, depending on whether liquids have been extracted before the registrant transfers title." Instruction 3 to Item 1204 further states, "if any product, such as bitumen, is sold or custody is transferred prior to conversion to synthetic oil or gas, the product's production, transfer prices, and production costs should be disclosed separately from all other products." It follows that there may be separate terminal points defined for each saleable product under an integrated project.

Instruction 4 to Item 1204 of Regulation S-K indicates that transfer prices should be determined in accordance with FASB ASC paragraph 932-235-50-24, which states, "revenues shall include sales to unaffiliated entities and sales or transfers to the entity's other operations (for example, refineries or chemical plants)." This statement indicates that terminal points can exist not just between the reporting entity and another unaffiliated entity, but also between the reporting entity's sub-entities. However, KRC has interpreted "other operations" to mean operations other than oil and gas producing activities. Therefore, so long as the sub-entities participate in the integrated development project with a common ownership, which clearly constitutes oil and gas producing activities, no issues related to sales or transfers between sub-entities should arise.

The contractual framework of the integrated development project is critical to the appropriate definition of the terminal point(s) and the recognition of reserves. The first delivery of saleable hydrocarbons becomes the terminal point at which the reserves are recognized. Therefore, the contractual framework should be structured to preclude the interpretation of title transfer prior to the intended terminal point for the recognition of reserves, e.g. ex-ship at the delivery destination.

The Terminal Point corresponds with the Reference Point under SPE-PRMS definitions.

Legal Right to Produce

Definition

> *There must exist, or there must be a reasonable expectation that there will exist, the legal right to produce or a revenue interest in the production.*[129]

In order to recognize reserves, a company must have a legal right or revenue interest to the production of oil or gas. Reserves may only be recognized up to the point at which contracts providing the right to operate expire, unless evidence indicates that renewal is reasonably certain.[130] Entities that gain a legal interest in the hydrocarbons after the completion of oil and gas producing activities and participate in processing, transporting, refining, and marketing activities do not have the ability to claim reserves.[131] The revenue interest is based on hydrocarbon volumes accruing to the company via mineral interests in properties, as defined in FASB ASC Topic 932, for fee ownership, lease, concession, or other interests representing the right to extract oil or gas subject to such terms that may be imposed by the conveyance of that interest. This includes both operated and non-operated working interests, owned

[124] Rule 4-10(a)(16)(i) of Regulation S-X
[125] Rule 4-10(a)(16)(ii) of Regulation S-X
[126] Instruction 2 to Rule 4-10(a)(16)(i) of Regulation S-X
[127] Final Rule, 74 FR 2163
[128] Instruction 2 to Item 1204 of Regulation S-K
[129] Rule 4-10(a)(26) of Regulation S-X
[130] Rule 4-10(a)(22) of Regulation S-X
[131] Rule 4-10(a)(16)(ii) of Regulation S-X

overriding royalty interests, and certain in-kind production payments. This does not include other supply agreements or contracts that represent the right to purchase, rather than extract, hydrocarbon volumes.[132]

Discussion

Any entity intending to claim reserves must have a legal right to produce or a revenue interest in the production in order to disclose reserves. Accordingly, the contractual framework between Tellurian and partners should be designed to ensure that partners are entitled to a revenue interest in production and to preclude such title transfer prior to the terminal point recognized by Tellurian, such that partners can recognize reserves for the full value chain of the integrated development project.

Based on disclosures provided in Tellurian's 10-K filing as of December 31, 2018, there exist potential issues related to partner revenue interest entitlement and the corresponding recognition of reserves. Per Tellurian's fling:

> In connection with the implementation of our Business, we are offering partnership interests in a subsidiary, Driftwood Holdings LLC ("Driftwood Holdings"), which will own the Driftwood Project. Partners will contribute cash in exchange for equity in Driftwood Holdings and **will receive LNG volumes at the cost of production, including the cost of debt, for the life of the Driftwood terminal.**[133]

This statement reads as a possible supply agreement that represents the right to purchase, rather than extract, hydrocarbon volumes and may present obstacles to partner reserves recognition depending on the precise nature of Driftwood Holdings. Individual agreements should be reviewed to ensure compliance with the SEC standard of a legal right to produce or a revenue interest in production for the classification of hydrocarbon volumes as reserves.

The Legal Right to Produce corresponds with Entitlement under SPE-PRMS definitions.

Market Existence

Definition

> *There must exist, or there must be a reasonable expectation that there will exist… installed means of delivering oil and gas or related substances to market.*[134]

In addition to a legal right or revenue interest to the production of oil or gas, there must also be a market for the saleable hydrocarbons and a means of delivering such quantities to that market, or a reasonable expectation thereof.[135] If there is no market, or no way of transporting production to market, then the volumes cannot be classified as reserves.[136]

Discussion

The global LNG market has historically been subject to different market pressures than its counterpart in traditional spot sales of natural gas, and accordingly has been a subject of scrutiny by the SEC with regard to reserves classification. Notably, the major write-down of reserves by Shell, which occurred in 2004 and spurred the regulatory changes which would come to fruition under the Final Rule, included reserves associated with the Gorgon Project in Australia, which the SEC considered to have been inappropriately classified as reserves at the time partially due to a lack of secured commitments under long-term GSAs, indicating inadequate certainty of an existing market.[137] In fact, a signed GSA not only indicates the existence of a market, but also pre-empts the question of what price to apply to sales of LNG under the SEC requirement of existing economic conditions at the terminal point.

However, the LNG market has shifted dramatically over the past two decades, with both increasing global trade and the emergence of a variety of trading strategies. LNG cargoes are no longer sold nearly exclusively under long-term GSAs, but rather the market share of non-long-term trade transactions has increased from less than 10% in 2004, when the SEC issued its opinion on Shell's Gorgon Project, to over 30% as of 2018.[138] Moreover, the S&P Global Platts Japan Korea Marker (JKM) has been gaining popularity as a benchmark price assessment for spot physical cargoes, and represents the spot market value of cargoes delivered ex-ship into Japan, South Korea, China, and Taiwan, which deliveries equate to the majority of global LNG demand. However, the liquidity of JKM remains dramatically below other traded futures contracts such as Henry Hub, indicating its relative immaturity as a benchmark price.[139]

Whether or not the SEC would be amenable to the argument for the existence of a market, and thus the classification of reserves, without signed GSAs remains unclear, and KRC is unaware of any direct guidance or action by the SEC with regard to this issue. Therefore, KRC does not recommend booking reserves for spot sales of LNG at this time and believes that there is a risk that the SEC staff will take issue with classifying such volumes as reserves.

In the event that Tellurian chooses to disclose reserves associated with spot sales of LNG, KRC considers that it is crucial to underpin such disclosure with a well-reasoned argument for (1) the existence of a market, (2) availability of transportation to said market, and (3) the applicable price for said market. As there continues to be large disparities in global LNG prices delivered into different markets, KRC considers that it is important to define specific market destinations and pricing as a part of the development project. Additionally, where possible, future plans should be substantiated with a historical, demonstrated track record.

Market Existence corresponds with the Sales Market under SPE-PRMS definitions.

Permits and Financing

Definition

> *There must exist, or there must be a reasonable expectation that there will exist… all permits and financing required to implement the project.*[140]

[132] FASB Topic 932, p. 31
[133] Tellurian 10-K as of December 31, 2018
[134] Rule 4-10(a)(26) of Regulation S-X
[135] CD&I Question 126.02
[136] SEC Comment Letter to Marathon Oil Company, September 15, 2016
[137] SEC v. Royal Dutch Petroleum Co., et. al., pp. 6-7, 10-11
[138] IGU World LNG Report, 2019 Edition
[139] Petroleum Economist, JKM comes of age
[140] Rule 4-10(a)(26) of Regulation S-X

All permits necessary to implement the project must be in place, or there must exist a reasonable expectation that they will be in place, for implementation of the development project and classification of associated reserves. Where necessary approvals are subject to likely contingencies, such as environmentally sensitive areas or under combative regulatory regimes, caution should be exercised in the justification of reasonable expectation. Moreover, where mineral interests are owned by the government and development projects are subject to government approval, volumes should not be classified as reserves prior to government approval.[141]

Finally, financing required to implement the project must be available, or there must exist a reasonable expectation that financing can be obtained. As discussed in further detail below, a frequent subject of recent comment letters from the SEC staff to registrants is whether there is evidence of a company's ability to secure financing for their undeveloped reserves, particularly with the steep decline in commodity prices in 2015.

Discussion

As disclosed in Tellurian's 10-K filing as of December 31, 2018, the operation of Tellurian's anticipated integrated LNG project will have extensive permitting and approval requirements. According to Tellurian's fling:

> Additionally, **numerous other governmental and regulatory permits and approvals will be required to build and operate our Business**, including, with respect to the construction and operation of the Driftwood Project, consultations and approvals by the Advisory Council on Historic Preservation, USACE, U.S. Department of Commerce, National Marine Fisheries Services, U.S. Department of the Interior, U.S. Fish and Wildlife Service, and U.S. Department of Homeland Security.[142]

Where permits or regulatory approvals are required but not yet received, KRC recommends a conservative approach to reporting reserves based on a reasonable expectation of obtaining authorization, especially without an established track record of receiving such approvals. Whenever a filer books reserves based on a reasonable expectation of receiving future approvals, KRC recommends having clearly documented evidence in support of said reasonable expectation.

Additionally, due to the recent increase in SEC scrutiny of the ability to finance development projects, KRC recommends that filers have a clearly-documented and specific plan for funding the entirety of their development plan for any reported undeveloped reserves.

A review of recent SEC comment letters shows that the SEC staff has been highly cognizant of the impact of the current economic environment on filers' ability to finance development projects to convert undeveloped reserves to developed status. For example, staff may request detailed information regarding plans to finance expected future development costs shown in cash flows[143], including specific sources of capital.[144] The SEC may also compare development costs incurred during the previous year with the future capital expenditures reported, and request further information regarding the expected sources of funding for future expenses when the previous year's costs are lower than would be expected based on the total amount.[145] Comment letters have also shown that the SEC may question, in light of any disclosure about the financial status of the company, whether related to development costs or not, if the filer has sufficient evidence of a reasonable expectation that financing will exist.[146]

Permits and Financing correspond with Regulatory Approval and Financing under SPE-PRMS definitions.

Final Investment Decision

Definition

> *The definition of "undeveloped oil and gas reserves" requires that the company have adopted a development plan with respect to the reserves.*[147]

In order for an undrilled location to be classified as reserves, the company must have adopted a development plan.[148] The mere intent to develop an area does not, on its own, constitute the adoption of a development plan. Rather, in order for the petroleum to be considered part of the reserves class, the company must commit to a final investment decision in the project.[149]

The SEC requires that a final investment decision be made for the entire development project in order to classify each portion of the development project as reserves. If there is a decision to only develop a portion or phase of the project, then only the portion for which the final investment decision has been made may be classified as reserves.[150]

Discussion

The SEC staff has clearly indicated in the CD&Is that a final investment decision is required to demonstrate adoption of a development plan; however, the term "final investment decision" is not clearly defined in the SEC rules, nor are specific examples provided. Of course, individual companies will have different corporate approval schemes under which the term "final investment decision" may not appear verbatim. Therefore, filers must identify what stage of approval under their own corporate approval scheme is equivalent to the term "final investment decision," with limited formal guidance from the SEC.

KRC has interpreted final investment decision under SEC rules to be consistent with the PRMS decision gate for the Approved for Development project maturity sub-class, which is more rigorously defined and also includes a requirement for a final investment decision.[151] For a project sub-classified as Approved for Development, "all necessary approvals have been obtained, capital funds have been committed, and implementation of the development project is ready to begin or is under way."

[141] CD&I Question 126.01
[142] Tellurian 10-K as of December 31, 2018
[143] SEC Comment Letter to Indonesia Energy Corp Ltd, July 9, 2019
[144] SEC Comment Letter to Indonesia Energy Corp Ltd, August 6, 2019
[145] SEC Comment Letter to Epsilon Energy Ltd., April 30, 2018; SEC Comment Letter to New Concept Energy, Inc., December 5, 2017
[146] SEC Comment Letter to Viking Energy Group, Inc., November 14. 2018; SEC Comment Letter to Vanguard Natural Resources, LLC, April 12, 2016.
[147] Rule 4-10(a)(31)(ii) of Regulation S-X; C&DIs, Question 131.04
[148] Rule 4-10(a)(31)(ii) of Regulation S-X
[149] C&DIs, Question 131.04
[150] C&DIs, Question 108.01
[151] PRMS 2.1.3.5.5, p. 9

Furthermore, PRMS states that "at this point, it must be certain that the project is going ahead."[152] These definitions provide guidance for what constitutes a final investment decision but allow judgment to be used in the application of the term to individual projects of varying scope and size. These items are closely aligned with the SEC definition of reserves and the key elements for reserves recognition.[153]

Projects with significant capital expenditures (e.g. integrated LNG development projects, deep-water projects, significant international projects, etc.) are likely to progress through a prescribed sanctioning process within a corporation resulting in a formal declaration of a final investment decision. However, for projects that are more limited in scope, or where an individual well or a group of wells may constitute a project, particularly in onshore drilling of unconventional shale plays, there may be no formal declaration of a final investment decision. In this case, it is KRC's experience that companies will rely on their established track record of continued development and capital budgets, rather than on an actual authorization for expenditure for a specific well to be drilled. Nevertheless, the planned wells must still have a final investment decision, but exact locations or release of funds may be lacking due to practical limitations.

In many areas of disclosure, the SEC has placed considerable emphasis on evidence of future performance based on historical results. This emphasis is also evident with regard to final investment decision where, under the Final Rule, the SEC states:

> Rather than requiring forward-looking information about a company's plans to develop reserves that may lead to exaggeration of a company's capability to actually convert such reserves, **we believe that disclosure of a company's verifiable, established track record of converting such reserves, including its ability to obtain financing for such activities, would be a better indication** of the likelihood of that company's success in developing reserves in the future.[154]

KRC suggests that filers carefully document their capital budgets, internal approval scheme, historical track record of development, and any other contributing factors to substantiate claims of a final investment decision, as opposed to the mere intent to develop. Ultimately, each filer is responsible for justifying its claim of a final investment decision to the SEC staff if questions arise regarding the company's commitment to a particular development project. The following are examples of substantiating documentation:

- Established track record for developing reserves of a similar nature
- Inclusion in short- and/or mid-term budget plans
- Evidence of financing or ability to readily obtain financing
- Meeting minutes for appropriate approval bodies
- Request for proposals to build facilities
- Signed acceptance of bids for proposals
- Approved authorization for expenditures to build facilities or infrastructure
- Orders for long lead items
- Initiation of construction of facilities
- Approved environmental and/or regulatory permits
- Records of firm plans and timetables for development
- Signed sales contracts for products
- Memos of understanding between appropriate organizations and/or governments
- Submitted and approved development plan to government organization[155]

Additionally, it is important to distinguish between a single, integrated development and a phased development when defining a development project and substantiating a final investment decision. Under a single, integrated development project, the final investment decision is taken for the entire project and substantial changes or non-adherence to the development plan may lead to significant loss of capital. Conversely, a phased development project will require a separate final investment decision under each discrete stage of the project, and only those estimated volumes which have received a final investment decision should be disclosed as reserves. Each incremental investment decision may be contingent upon the results of the prior phase or may depend on future conditions which are uncertain. The following are examples of phased development projects:

- Development of fields or reservoirs where reservoir limits and/or quality is poorly defined
- Development of unconventional resource plays where individual wells or small programs of wells may constitute separate development projects
- Development projects where there is a risk of obtaining regulatory approvals for future phases
- Development projects with future phases which are dependent on market conditions (e.g. tertiary floods, secondary target development, etc.)

The Final Investment Decision corresponds with the Firm Intention to Proceed with Development under SPE-PRMS definitions.

Five Year Rule

Definition

> *Undrilled locations can be classified as having undeveloped reserves only if a development plan has been adopted indicating that they are scheduled to be drilled within five years, unless the specific circumstances, justify a longer time.*[156]

Rule 4-10(a)(31)(ii) of Regulation S-X, commonly referred to as the "Five Year Rule", allows undrilled locations to be classified as undeveloped reserves only if a development plan has been adopted indicating that they are scheduled to be drilled within five years, unless the specific circumstances justify a longer time frame. SEC comment letters have shown that current SEC staff interprets this rule to require that reserves from undrilled wells be fully converted to

[152] PRMS, Table 1, p. 31
[153] Regulation S-X, Rule 4-10(a)(26)
[154] Final Rule, p. 2177
[155] See also Division of Corporation Finance: Current Accounting and Disclosure Issues, June 30, 2000
[156] Rule 4-10(a)(31)(ii) of Regulation S-X

developed status and not simply drilled[157], and that the conversion must occur within five years from the time they were initially disclosed, not from the date of the filing.[158]

Whether a longer time period for development is justified must be determined on a case-by-case basis under the particular facts and circumstances of the situation and clarified that "any extension beyond five years should be the exception, and not the rule." The SEC identified the following factors for determining whether an exception to the Five Year Rule would be appropriate:

- The company's level of ongoing significant development activities in the area to be developed (for example, drilling only the minimum number of wells necessary to maintain the lease generally would not constitute significant development activities);
- The company's historical record at completing development of comparable long-term projects;
- The amount of time in which the company has maintained the leases, or booked the reserves, without significant development activities;
- The extent to which the company has followed a previously adopted development plan (for example, if a company has changed its development plan several times without taking significant steps to implement any of those plans, recognizing proved undeveloped reserves typically would not be appropriate); and
- The extent to which delays in development are caused by external factors related to the physical operating environment (for example, restrictions on development on Federal lands, but not obtaining government permits), rather than by internal factors (for example, shifting resources to develop properties with higher priority).[159]

Note that, while it is not required at initial disclosure of undeveloped reserves to indicate if any undrilled locations are scheduled to be drilled beyond the five year time frame, annual disclosure of PUD conversion rates is required, and registrants must also explain why "material amounts of proved undeveloped reserves in individual fields or countries remain undeveloped for five years or more after disclosure as proved undeveloped reserves."[160]

Discussion

The SEC does not allow many exceptions to the Five Year Rule, particularly in North American resource plays. Nonetheless, the SEC has allowed PUDs to be booked beyond five years in similar scenarios involving integrated development projects with facilities capacity constraints. As Tellurian is considering an unprecedented combination of the typical domestic model with an international LNG model, KRC is not aware of any SEC guidance directly on point. However, it is KRC's opinion that Tellurian should qualify for an exception to the Five Year Rule because the project would require the long-term development of gas wells to provide the gas required to satisfy LNG gas sales contracts and to justify the economic producibility of the project. This should allow Tellurian to schedule wells for development and completion beyond five years in order to fill capacity of the LNG plant. However, there are several important factors that Tellurian should consider.

Recent comment letter trends demonstrate that the SEC has been particularly interested in PUDs, PUD conversion rates, and changes in development plans for PUDs. Therefore, KRC recommends that any registrant keep clear and well-organized documentation of their business decisions in anticipation of SEC scrutiny.

It is also essential that the project is clearly documented as a single, integrated development project. In denying exceptions to the Five Year Rule for regular domestic unconventional development, the SEC has refused to recognize the planned development of large fields as a single, integrated project. Instead, it has interpreted the development plans as "drilling programs" that were "composed of individual wells, each comprising a separate project that should be initiated within 5 years of booking to claim PUD reserves."[161] Therefore, if Tellurian opts to book reserves for wells scheduled to be developed outside of the 5-year window, the SEC must agree that the development plan involves one integrated project tied to the LNG plant.

KRC also recommends that Tellurian document the "specific circumstances" that would justify the booking of any PUDs scheduled for development beyond five years. The SEC has specified that slowly developing a field in order to extend its economic life does not justify recognizing proved undeveloped reserves beyond five years.[162]

However, the SEC has allowed exceptions to the Five Year Rule for integrated steam-assisted gravity drainage (SAGD) oil sands projects in which the registrants scheduled pad development over the life of the project. For example, the SEC allowed a development plan that scheduled PUDs to be completed 15 years from the date of initial disclosure when the development schedule was "primarily controlled by the need to keep the processing plants at their full capacity."[163] The SEC also allowed a development plan that involved maintaining a material portion of the reported PUDs as undeveloped for more than five years when the registrant argued it qualified for an exception because the processing facility had a substantially longer life than each of the SAGD well pairs, and it would be neither economically nor environmentally viable to construct central facilities capable of developing the entire field within five years.[164]

Therefore, it is KRC's opinion that Tellurian would be most likely to receive an exception to the Five Year Rule if the delayed development is tied to facilities capacity constraints and the economic and environmental feasibility of the project.

It should also be noted that, when considering the factors for whether an extension of time beyond five years is warranted, it may be concerning to the SEC that Tellurian has no established track record of completing development projects on this scale.

The Five Year Rule corresponds with Reasonable Time Frame under PRMS definitions.

[157] SEC Comment Letter to Cabot Oil & Gas Corporation, January 11, 2017
[158] SEC Comment Letter to Apache Corporation, June 29, 2015, p.1
[159] C&DIs, Question 131.03
[160] Regulation S-K, Item 1203
[161] SEC Comment Letter, BP p.l.c., September 24, 2010, p. 4
[162] C&DIs, Question 131.05
[163] SEC Comment Letter to Devon Energy Corporation, April 14, 2010, p.5
[164] SEC Comment Letter to ConocoPhillips, April 15, 2010, p. 9-10; SEC Comment Letter, ConocoPhillips, June 11, 2010, p. 9-11

Economic Producibility

Definition

Proved oil and gas reserves are those quantities of oil and gas, which, by analysis of geoscience and engineering data, can be estimated with reasonable certainty to be economically producible.[165]

In order to be classified as reserves, a resource must be able to be estimated with reasonable certainty to be economically producible. In order to be economically producible, the resource must generate revenue that "exceeds, or is reasonably expected to exceed, the costs of the operation."[166] Furthermore, economic producibility must be determined using existing economic conditions, operating methods, and government regulations.[167]

The SEC requires the use of the average price during the 12-month period prior to the ending date of the period covered by the report determined as an unweighted arithmetic average of the first-day-of-the-month price for each month within such period, unless the price is otherwise determined by contractual arrangements. The price cannot include escalations based upon future conditions.[168] This pricing scheme was updated with the Final Rule in order to provide companies with the ability to efficiently prepare disclosures that are "more consistent with the objective of comparability."[169]

In adopting the "economically producible" standard, the SEC specifically rejected the PRMS "commerciality" standard because it would introduce a subjective aspect to the price by factoring in the rate of return required by the company in order to move forward with the project. As this rate of return would vary among companies, the SEC believed this would reduce the comparability of disclosures.[170]

Discussion

The economic producibility required to recognize reserves under the SEC rules must be calculated using existing economic conditions, including price. The price must be either the average first-day-of-the-month price for the 12-month period prior to the ending date of the period covered by the report, or a price that is defined by a contractual arrangement.[171] Therefore, it is commonly accepted that reserves can be booked for future LNG sales through an existing Gas Sales Agreement (GSA) up to the expiration of the contract and using the price specified under the contract.

It is KRC's interpretation that the contract price may also be used to calculate economic producibility beyond the expiration of the GSA because the contract price is part of the existing economic conditions. However, even if the SEC rejected the argument that the contract price may be used beyond the expiration of the GSA as an existing economic condition, it could allow for the continued use of the contract price if evidence that renewal of the GSA is reasonably certain. While the SEC rules do not specifically address this issue, they do allow for the recognition of reserves beyond the time at which contracts that provide the right to operate expire if evidence indicating that renewal is "reasonably certain" is provided.[172] The SEC also looks to an entity's track record and historical results as indications of the likelihood of a future event, such as with the development of undeveloped reserves.[173] Therefore, based on the entity's history of securing GSAs or other factors, the SEC may accept the continued use of a contract price beyond the expiration of a GSA. However, KRC is unaware of any direct SEC guidance on this issue.

As previously discussed, KRC does not recommend booking reserves for spot sales of LNG at this time. Due to the absence of a historical track record and the lack of an established and recognized price index for LNG spot sales, and, in consideration of the potential issues regarding market existence, KRC believes that there is a risk that the SEC staff would not be amenable to classifying such volumes as reserves. As the SEC typically looks for historical data to support assumptions, KRC believes that the safest approach is to not recognize anticipated LNG spot sales as reserves at this time. Further, KRC is not aware of any entities that book SEC reserves for LNG spot sales and is not aware of any SEC guidance on this issue.

KRC discusses Economic Producibility under the SPE-PRMS definitions in the first half of this paper.

Conclusions and Recommendations

Tellurian is a public company in the process of building an integrated global natural gas business that is planned to include equity positions in United States natural gas fields, interstate natural gas pipelines, a liquefaction plant and export terminal, and marketing for LNG sales to worldwide markets. In pursuit of its key goals, Tellurian must understand and effectively apply the reserves and resources definitions to achieve the most favorable outcome for reserves recognition and entitlement. The following is a summary of the important considerations for LNG projects, along with the KRC recommendation for each.

Development Project – Under both classification systems, appropriate development project definition is a critical step in the determination of whether associated volumes may be classified as reserves. It is expected that Tellurian will define its development project, or a series of development projects, as an integrated LNG development, beginning with production in the field and terminating at the loading of the LNG cargo, or ex-ship at the final delivery destination. Under SPE-PRMS definitions, this should be relatively simple provided that the project is clearly defined to include all relevant portions of the integrated development project, and provided that the reference point can be substantiated by a contractual framework which maintains the legal entitlement of Tellurian and its partners up until the desired reference point. Further under SEC definitions, it is important to avoid a possible interpretation of the development project by the SEC as merely the development of various fields where each well is considered to be a separate development project, as is the case for many companies developing resource plays in the United States.

Reference Point/ Terminal Point – Under both PRMS and SEC, the appropriate definition of the reference point(s)/ terminal point(s) through the contractual framework of the integrated development project is essential to the recognition of reserves. Under PRMS, the

[165] Rule 4-10(a)(22) of Regulation S-X
[166] Rule 4-10(a)(10) of Regulation S-X
[167] Rule 4-10(a)(22) of Regulation S-X
[168] Rule 4-10(a)(22)(v) of Regulation S-X
[169] Final Rule, 74 FR 2161
[170] Final Rule, 74 FR 2167
[171] Rule 4-10(a)(22)(v) of Regulation S-X
[172] Rule 4-10(a)(22) of Regulation S-X
[173] Final Rule, 74 FR 2177; C&DIs Question 131.03

reference point is a defined location within a petroleum extraction and processing operation where the produced quantities are measured or assessed, which is typically the point of sale to third parties or where custody is transferred to the entity's midstream or downstream operations. The PRMS reference point corresponds with the terminal point under SEC definitions, which is defined as the outlet valve on the lease or field storage tank in traditional extraction scenarios. However, if unusual physical or operational circumstances exist, as with an integrated LNG project, the terminal point may be regarded as the first point at which the hydrocarbon is delivered to a main pipeline, a common carrier, a refinery, or a marine terminal. Therefore, under either definitional system, the contractual framework should be structured to preclude the interpretation of title transfer prior to the intended terminal point for the recognition of reserves, e.g. ex-ship at the delivery destination.

Entitlement/ Legal Right to Produce – In order to recognize reserves under both definitional frameworks, contracts must be structured to ensure that partners are entitled to an economic interest in production revenue. According to PRMS, any entity intending to claim reserves must have an entitlement to a share of future production through an economic interest or a right to proceeds from sales in order to recognize resources or reserves. Similarly, in order to report reserves under the SEC definitions, there must exist, or there must be a reasonable expectation that there will exist, the legal right to produce or a revenue interest in the production. Individual contracts should be reviewed to ensure compliance with the relevant definitional framework in terms of entitlement.

Sales Market/ Market Existence – Under both PRMS and SEC, evidence of the existence of an established sales market is necessary in order to report the associated quantities of petroleum as reserves. Under PRMS, one of the criteria necessary to achieve commerciality, and thus attain reserves status, is "[a] reasonable expectation that there will be a market for forecast sales quantities of the production required to justify development." The SEC definitions likewise require that there be a market for the saleable hydrocarbons and a means of delivering such quantities to that market, or a reasonable expectation thereof, in order to be claim reserves.

It is commonly accepted that reserves can be booked for future LNG sales through an existing GSA up to the expiration of the contract and using the price specified under the contract, under both PRMS and SEC definitions. It is KRC's opinion that reserves may also be classified beyond the expiration of an existing GSA, with the documented assumption that a reasonable expectation of the extension or assignment of a similar contract exists.

Furthermore, KRC considers that reserves may be booked in compliance with SPE-PRMS definitions even before a GSA is signed, so long as there is a reasonable expectation that the entity will secure a GSA. As LNG spot sales have become relatively common, it is KRC's opinion that there is sufficient evidence of a reasonable expectation that there will be a market for spot sales to satisfy this requirement under SPE-PRMS definitions. As there continues to be large disparities in global LNG prices delivered into different markets, KRC suggests defining specific market destinations and pricing as a part of the development project. Additionally, where possible, future plans may be substantiated with a historical, demonstrated track record.

Whether or not the SEC would be amenable to the argument for the existence of a market, and thus the classification of reserves, without signed GSAs remains unclear, and KRC is unaware of any direct guidance or action by the SEC with regard to this issue. Therefore, KRC does not recommend booking reserves for spot sales of LNG at this time and believes that there is a risk that the SEC staff will take issue with classifying such volumes as reserves.

Regulatory Approval and Financing/ Permits and Financing – Both PRMS and SEC require that the necessary financing, permits, and external approvals be obtained or are likely to be obtained in order for an entity to report reserves. Under PRMS, a commerciality determination requires evidence of financial appropriations either being in place or having a high likelihood of being secured, and evidence that legal, contractual, environmental, regulatory, and government approvals are in place or will be forthcoming, together with resolving any social and economic concerns. In the same vein, the SEC definitions require that all permits and financing required to implement the project exist, or that there is a reasonable expectation that they will exist. KRC interprets that this reasonable expectation under both PRMS and SEC definitions may be proven through evidence such as an established track record of receiving similar approvals or financing, or an indication from the approving body or financer that the approvals will be granted or the financing confirmed. Evidence that a request for approval or funding has been submitted, without more, is insufficient to establish this element of commerciality. Additionally, due to the recent increase in SEC scrutiny of the ability to finance development projects, KRC recommends that filers have a clearly-documented and specific plan for funding the entirety of their development plan for any reported undeveloped reserves.

Firm Intention to Proceed with Development/ Final Investment Decision – Both classification frameworks require a level of internal management commitment to a project in order to claim reserves from that project. Under PRMS, the entity claiming commerciality must demonstrate a firm intention to proceed with development, which means that the entity has satisfied the internal decision criteria (typically rate of return at or above the weighted average cost-of-capital or the hurdle rate). The SEC rules necessitate a higher level of commitment than PRMS, requiring the entity to adopt a development plan, which means that the entity must commit to a final investment decision in the project. KRC suggests that SEC-filers carefully document their capital budgets, internal approval scheme, historical track record of development, and any other contributing factors to substantiate claims of a final investment decision, as opposed to the mere intent to develop.

Reasonable Time-Frame/ Five Year Rule – Both PRMS and SEC establish time frames in which an entity must develop its undeveloped projects in order to report associated reserves. Under PRMS, for a project to be included in the reserves class, there must be evidence to support a reasonable time-frame for the initiation of development. What constitutes a reasonable time frame depends on the specific circumstances and varies according to the scope of the project. The SEC definitions, on the other hand, only allow undrilled locations to be classified as having undeveloped reserves if a development plan has been adopted indicating that they are scheduled to be drilled within five years, unless the specific circumstances, justify a longer time. It is KRC's opinion that Tellurian would be most likely to receive an exception to the Five Year Rule if the delayed development is tied to facilities capacity constraints and the economic and environmental feasibility of the project, but KRC also recommends that Tellurian document the "specific circumstances" that would justify the booking of any PUDs scheduled for development beyond five years. The SEC has

specified that slowly developing a field in order to extend its economic life does not justify recognizing proved undeveloped reserves beyond five years.[174]

Economic Producibility – Under both the PRMS and SEC definitions, oil and gas must be economically producible in order for the associated project to attain reserves status. Under PRMS, production from a project is economic when the revenue attributable to the entity interest from production exceeds the cost of operation. Similarly, under the SEC rules, it must be estimated with reasonable certainty that the resource will generate revenue that exceeds, or is reasonably expected to exceed, the costs of the operation. In the case of spot sales of LNG, it is KRC's opinion that recoverable quantities may be classified as reserves under SPE-PRMS definitions. As there continues to be large disparities in global LNG prices delivered into different markets, KRC suggests defining specific market destinations and pricing as a part of the development project. Additionally, where possible, future plans may be substantiated with a historical, demonstrated track record. In all cases, the price used must be that which the entity reasonably assesses will exist throughout the life of the project.

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[174] C&DIs, Question 131.05