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Catherine H. Reheis-Boyd
President

February 11, 2016

Sara Nichols
Air Pollution Specialist
California Air Resources Control Board
1001 I Street
Sacramento, CA 95814

Re: WSPA comments on Thermal White Paper

Dear Ms. Nichols,

WSPA appreciates the opportunity to respond to the questions raised in the Air Resources Board (ARB) "Preliminary Assessment of the Need for Clarification for the Reporting of Covered Product Data for Petroleum and Natural Gas" (herein referred to as "the White Paper"), dated December 11, 2015.

The White Paper notes that variability exists in the reporting and metering methods used for thermal enhanced oil recovery (EOR) and non-thermal EOR covered product data under its Mandatory Reporting Regulation (MRR). ARB also presented certain alternative methods for quantifying thermal and non-thermal EOR (as presented in Section 3 - Hypothetical Examples of Reporting of Thermal EOR and Non-Thermal EOR Covered Product Data and Associated Monitoring Methods of the White Paper). Although the methods presented in the White Paper are generally correct, WSPA believes that the White Paper oversimplifies thermal enhanced oil recovery principles. The scenarios presented by ARB do not fully capture the basic tenets of heat transfer for thermal EOR, depicting only that of heat convection and not the recognized additional GHG emissions reducing benefit of heat transfer by conduction between producing zones.

Oil and gas production operations vary in intricacy due to size, geology, historical reservoir development approaches, the complexity of operations, and company practices. It is common to see such variations even among a single operator's various operating fields. As such, variability in reporting and metering methods is to be expected. WSPA believes that an operator may appropriately use any one or more of the methods described in the White paper to reflect scenarios that occur in their unique, facility-level operations and be in compliance with ARB's MRR program.

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Summary of WSPA Recommendations:

- WSPA supports the current definitions of thermal and non-thermal EOR and does not believe that ARB needs to modify the definitions.
- Reporting thermal/non-thermal EOR product is complex due to the many variations that exist among operations. The reporting method(s) used by a company reflect that company's operations. Mandating specific reporting methods could lead to inaccurate reporting of thermal and non-thermal EOR.
- For this reason, WSPA recommends that ARB provide guidance on acceptable reporting methods rather than mandate a single method for all reporting entities that may not be reflective of most companies' operations.

Thank you for your consideration of WSPA's comments. If you have any questions, please contact me at this office, or Jenifer Pitcher of my staff at (661)321-0884 or email: jpitcher@wspa.org.

Sincerely,



WSPA Comments

ARB Preliminary Assessment of the Need for Clarification for the Reporting of Covered Product Data for Petroleum and Natural Gas

Section 4, Question 1 - Definition of “thermal enhanced oil recovery” or “thermal EOR”

ARB is looking for the best way to clarify the definition of “thermal EOR.” What is an appropriate way to clarify what is meant by “thermal EOR” as it pertains to covered product data? What additional and/or more specific information should ARB provide regarding the definition?

WSPA believes that the current definition of thermal EOR is, and has been sufficiently clear in both the MRR and Cap & Trade regulations and requires no further clarification. The definition focuses on the “use of the process of steam injection” (regardless of the methods of steam injection) as a qualifier for thermal EOR classification. It allows companies to utilize existing and emerging methods of steam injection to enhance oil recovery.

WSPA supports the current definition and recommends that ARB not change the definition of thermal EOR.

Section 4, Question 2 - Hypothetical Examples and Other Considerations

In Section 3 above, staff presents hypothetical examples of the variation that might exist among entities that report thermal EOR and non-thermal EOR covered product data and the associated metering methods. Staff is seeking input on the following questions related to the reporting of upstream oil and associated gas covered product data:

- a. How does your facility define and quantify thermal EOR and non-thermal EOR production? What criteria are used, and what assumptions are made? If applicable, use the examples presented in Section 3 (above) to assist you in describing definitions and quantification.*

WSPA members define thermal and non-thermal EOR using one or more methods described in the White Paper. Use of more than one method is a common practice. WSPA believes that variations in methods utilized are an appropriate reflection of variations in operations existing between operators and between fields.

Although there might be additional criteria specific to an individual facility, WSPA member companies generally utilize the following criteria to define thermal EOR:

- Was the process of steam injection used (per the definition of thermal EOR)?
- Where was the steam injected? Entire field/lease or a certain portion of the field/lease?

- Which producing wells were targeted by the injected steam (i.e. was it intended for only for certain portions of a field/lease)?

The following examples depict increasing complexity of operations and why/how a facility operator may use multiple methods for defining thermal EOR, depending on the unique geographic, geologic and reservoir development scenario that they may have for a particular field/lease.

- **Example 1:** All operating fields owned by an operator in Basin A are mature and have been using steam for multiple years across all areas of the field/reservoir. This operator may use the field method and report all product as thermal EOR.
- **Example 2:** Some operating fields owned by the operator in Basin B are mature and have been using steam for multiple years across all areas of those fields/reservoirs. The operator also owns some operating fields in Basin B where the process of steaming was never used. This operator may use “field” method, identifying the fields as being thermal EOR or non-thermal EOR accordingly.
- **Example 3:** The operator has some mixed fields in Basin C where some leases within a mixed field are mature and have been using steam for multiple years. For this scenario, the operator may supplement the “field” method (Basins A and B), with “lease” method in Basin C, designating the steamed leases as thermal EOR and the other leases as non-thermal EOR.
- **Example 4:** The operator has some mixed leases in Basin D where only a portion of the lease is steamed. For this scenario, the operator may supplement the “field” (Basins A and B) method and “lease” method (Basins C), with the “well” method for the mixed leases in Basin D.
- **Example 5:** All the above scenarios can exist in Basin A for one operator. Each surface location could be associated with more than one reservoir and that these reservoirs may not use the same methods of steaming. This operator may use field/lease/well/reservoir methods based on the scenario that exists at each of its operating fields and/or leases in Basin A.
- **Example 6:** An operator begins steaming a discrete targeted area of a large lease/field/reservoir in Basin A. The operator may utilize the “well” method to identify only those wells producing from that discrete, targeted area as being thermal EOR.

As exemplified above, any one specific method of classifying fields/leases/wells may not accurately represent the true thermal EOR production for a particular operator's basin operations. WSPA believes that mandating the application of a specific or universal method(s) could lead to an inaccurate accounting of thermal and non-thermal product. This potential inaccuracy could create both inter- and intra-sector inequities, inadvertently over-allocating or under-allocating allowances to some operators.

Methods used to quantify thermal and non-thermal EOR are the same methods in place to quantify product for financial transactions between operators, customers, and royalty owners. These methods are in place to quantify and value hydrocarbon production related to specific financial agreements for customer obligations and royalty payments. As such, these methods meet the requirements of financial transactions as described in Section 95103(k)(7) of the MRR. Below is a short description of each method:

- **Lease Automated Custody Transfer (LACT) meters.** LACT meters exist to quantify product for financial transactions between operators and owners or customers. In most cases, the operators have LACT meters that measure either thermal or non-thermal product.
- **Allocation meters.** In a few cases where LACT meters measure mixed product (i.e. commingled thermal and non-thermal EOR), the existing allocation meters upstream of the LACT meters may be used to differentiate thermal and non-thermal product. Allocation meters are in place to quantify and value hydrocarbon production related to specific financial agreements for the purpose of royalty payments/obligations, such as from a unique lease or production zone
- **Allocated production by well.** In unique cases where individual well production data are needed to quantify thermal EOR production, the existing industry-recognized standard practices and guidelines established by the American Petroleum Institute (API) are used. This methodology is described in the API Manual of Petroleum Measurement Standards and utilizes several parameters to determine the amount of production allocated to a well. Allocated production by well derived by these methods is used to meet specific financial agreements for royalty payments.

b. Does your facility define and report covered product data at the reservoir, field, lease, or well-head level? If applicable, use the examples presented in Section 3 (above) to assist you in this description.

As described in the answer to Question 2a above, the method(s) used by an operator is dependent on the level of complexity specific to their field operations, resource ownership, facility configuration(s) and financial relationships. However, regardless of the operator, the most common method of reporting is at the lease level which reflects the fact that LACT/allocation meters usually separately measure either thermal or non-thermal production. Lease level data is then consolidated and reported

at the field level (aligns with Reporter C methodology in the White Paper's Section 3 - Hypothetical Examples of Reporting of Thermal EOR and Non-Thermal EOR Covered Product Data and Associated Metering Methods). In the few cases where mixed product is measured by LACT/allocation meters, operator(s) may use allocated well-level data to report covered product.

The "reservoir" method is not normally used by operators for several reasons which are further discussed on the WSPA answer to Question 2c.

c. If ARB were to define thermal EOR as the production of oil from a reservoir that has had steam injected into it, would that cause any issues in the reporting of covered product data at your facility?

Yes. Using the reservoir method by itself would generally be an inaccurate method of quantifying thermal EOR production. The "reservoir" method is not typically used by facility operators for the following reasons:

- For small reservoirs with one operator where the entire reservoir is steamed, the reservoir method can accurately depict thermal EOR. However, this scenario is not very common. A more common scenario is a large reservoir with multiple operators where only a portion/pocket of a reservoir is steamed. In such cases, the "reservoir" method will significantly overestimate the amount of thermal EOR production for some operators.
- The "reservoir" method requires an in-depth understanding of sub-surface geology, reservoir and petroleum engineering, historical field development, and the current and past heat management program(s) of one or more specific companies. From a verification standpoint, the verifiability of this method might be limited without the verifiers having petroleum geologists and petroleum engineers on their teams. ARB's stated intention is to provide clarification and improvement of the verification process. Paradoxically, application of the "reservoir" method to mixed fields would likely increase the costs and administrative burdens for operators, verifiers, and ARB, without improving the accuracy of reported thermal EOR production.
- The "reservoir" method requires an in-depth understanding of the sub-surface management of mixed fields that varies from company to company (variation will still exist). Sub-surface information is considered a company's trade secret and is confidential. WSPA is opposed to divulging confidential trade secrets including reservoir and sub-surface information to verifiers, when other less complicated and non-confidential methods are available to accurately define thermal EOR production.

- The “reservoir” method has not been the sole method used by operators for any past ARB requested data collection since it does not accurately represent every operating scenario.

d. What subsurface monitoring and surface metering technologies does your facility have in place and how do they relate to the quantification of covered product data?

Oil and gas companies have subsurface monitoring technologies in place for various operational reasons. However, WSPA members do not currently use this data to directly quantify covered product data. Individual operators may use such data as supporting information for a specific scenario as described below in response to Question 2e. All direct covered product quantification methods including surface metering technologies are described above in response to Question 2a (i.e. LACT and allocation meters).

e. What evidence does your facility provide to verifiers to demonstrate conformance to the MRR definitions of thermal EOR and non-thermal EOR covered product data?

Upon request, facility operators may provide the following data/documentation to verifiers to demonstrate conformance to MRR definitions of covered product data:

- Production data submitted to DOGGR.
- Steam injection data including source of steam injected, barrels of steam injected, location of steam injection, duration of steam injection, and list of producing wells associated with zone of steam injection. Additional records might include steam purchase records.
- LACT tickets and allocation meter data.
- Additional data and documentation supporting a specific scenario as determined by the individual operators.

f. What additional guidance should ARB provide to verifiers when verifying the reporting of covered product data for the sector?

WSPA believes that verifiers would benefit from guidance or training regarding typical production processes in order to determine if an approach used by an operator for defining thermal and non-thermal EOR production is representative of their operations. WSPA members are willing to discuss this further in order to provide accurate guidance to the verifiers.

g. Do you use calibrated meters to determine the split between thermal EOR and non-thermal EOR covered product data, if applicable? If not, what methods do you use? If applicable, please refer to the hypothetical metering scenarios presented in Section 3 (above) for Reporters C and D.

As described in response to Question 2a, LACT meters/allocation meters/allocated well production methods that are in place for financial transactions and royalty payments are used to determine the split between thermal EOR and non-thermal EOR covered product data. These methods meet the requirements of financial transactions as described in Section 95103(k)(7) of the MRR.

h. Did you report voluntary survey data as part of the most recent oil and gas benchmarking data collection process? Emails containing the survey spreadsheets and instructions were sent to existing covered entities on December 21, 2012. If you did report benchmark survey data, are you currently using the same approach for MRR reporting as you did for the benchmark survey data? If not, please explain any differences in reporting methods.

WSPA member companies who reported data to the voluntary survey are using the same approach for MRR as was used for the survey.