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Supporting Documentation and Cost Effectiveness

Issue 1: Lack of Supporting Documentation for the Proposed Regulation

As previously expressed multiple times by WSPA, ARB presented only the results (not the basis) of a state-wide cost-effectiveness analysis at their February 4th, 2016 workshop. Furthermore, ARB provided less than 3 weeks for comment before proposing to move into the 45-day comment period without providing the supporting documentation for emissions estimates, costs, assumptions made to determine benefits, and technical basis for the proposed regulation.

The proposed requirements are complicated and require careful review to fully understand the actual impact on operations. How should operators provide meaningful comments without understanding the rationale behind the proposed regulation and the associated impacts? WSPA is curious as to why the ARB did not provide the supporting documentation before the regulatory proposal was made on February 1st, 2016? If such documentation remains unavailable at this time, why is ARB moving into the 45-day comment period with the regulatory proposal without conducting a comprehensive, adequate, and transparent impact assessment?

In order for operators to respond properly, ARB needs to provide all supporting documentation on the emissions estimates, costs, assumptions made to determine benefits, and the technical basis for the proposed regulation. ARB also needs to provide operators with a reasonable timeline for providing comments on the supporting documentation before the 45-day comment period. Additionally, ARB needs to provide responses to each concern raised by stakeholders and describe how the concerns are addressed in the regulatory language.

Recommendation 1: WSPA requests that ARB provide a comprehensive, adequate, and transparent impact assessment as well as the rationale for the proposed regulation as soon as possible. WSPA also urges that ARB provide stakeholders reasonable time and opportunity to comment on the supporting documentation. WSPA stresses the need for ARB to provide written responses to comments and concerns raised by stakeholders prior to moving into 45-day comment period. WSPA also recommends that ARB postpone the 45-day comment period to July 1, 2016 or until after ARB has provided written responses to comments from stakeholders.

Issue 2: Lack of Standardized and Transparent Cost-Effectiveness Threshold for the Proposed Regulation

The current cost-effectiveness data provided by ARB during the February 4th workshop does not include details on impacts for each producer, cost-effectiveness thresholds, or the assumptions made to determine benefits. Significant variations can exist among operations and/or fields and understanding these variations is important before mandating the proposed requirements on all operations. The same requirement at one location may be cost-effective while another location might be significantly impacted. Therefore, it is critical that ARB adopt a standard and transparent cost-effectiveness threshold for methane emissions and allow exemptions to small producers where compliance costs can lead to shutdown of operations. ARB should minimize regulatory burdens for operators where the proposed requirements are clearly not cost-effective and could lead to a significant economic burden for the operator(s).

Recommendation 2: WSPA recommends that ARB adopt the current market value of carbon as the standard and transparent cost-effectiveness threshold ($13 to $14/MT CO_2e at GWP of CH_4 = 21). WSPA also recommends that ARB add exemptions for small producers as follows (San Joaquin APCD Rule 1020) –

(53) "Small Producer" means an owner or operator who produces an average of less than 6,000 barrels per day of crude oil or condensate from all operations in the state of California, and does not engage in refining, transporting or marketing of refined petroleum products.

WSPA's recommendation for regulatory language is also included in Attachment 1.

Separator and Tank Systems

Issue 3: Definition of Separator and Tank System Includes "sump"

ARB's definition of separator and tank systems, to include "sump" as follows –

(50) "Separator and tank system" means a separator and any tank or sump connected directly to the separator. For the purpose of this article, in crude oil production, a pressure vessel used to separate crude oil and produced water is also considered a separator; in dry natural gas production, a pressure vessel used to separate gas from water is also considered a separator.

San Joaquin Air Pollution Control District (SJVAPCD) Rule 4402 (CRUDE OIL PRODUCTION SUMPS) already prohibits the use of first stage production sumps and requires that second stage sumps be covered. WSPA is concerned that ARB is requiring additional controls that cannot be safely achieved. Sumps can introduce oxygen into closed loop vapor recovery systems leading to fire and explosion risks.

Recommendation 3: WSPA requests that ARB remove the term "sump" from the definition of "separator and tank system." As already stated in the previous letter, WSPA recommends the following definition for "separator and tank system" –

(52) "Separator and tank system" means ~~a~~ the first separator receiving production directly from a well and any tank ~~or sump~~ connected directly to the first separator. ~~For the purpose of this article, in crude oil, production, a pressure vessel used to separate crude oil and produced water is also considered a separator; in dry or natural gas production, a pressure vessel used to separate gas from water is also considered a separator.~~

WSPA's recommendation for regulatory language is also included in Attachment 1.

Issue 4: Overlapping Definitions of Terms "Sump" and "Pond"

"Pond" means an excavation or impoundment for the storage and disposal of produced water and is not used for crude oil separation or processing.

"Sump" means a lined or unlined surface impoundment or depression in the ground that, during normal operations, is used to separate, store, or hold emulsion, crude oil, condensate, or produced water.

ARB's definitions in Section § 95667 suggest that "Ponds" are subsets of "Sumps" (based on ARB's proposed definitions both could be an impoundment that store produced water, see yellow highlighted text above). However, the control requirements of § 95668(a)(5) and record-keeping requirements of § 95671(a)(1)(A) and (B) and Appendix A Table A1 apply to sumps and ponds differently. How will an operator differentiate between a sump and a pond?

Recommendation 4: WSPA recommends that ARB clarify the definition of the term "Pond" by using existing and industry-understood definition of Pond in SJVAPCD Rule 4402 as follows –

~~(39)~~(41) "Pond" means any very large excavation that is used for the storage and or disposal of clean produced water (as defined in San Joaquin Air Pollution Control

District Rule 4402), is not used for the separation of oil and water, and has no more than five percent visible oil-covered surface area~~.an excavation or impoundment for the storage and disposal of produced water and is not used for crude oil separation or processing~~.

WSPA's recommendation for regulatory language is included in Attachment 1.

Issue 5: Inaccurate Definition of the Term "Pressure Vessel"

"Pressure vessel" means any hollow container used to hold gas or liquid and rated, as indicated by an ASME pressure rating stamp, and operated to contain normal working pressures of at least 15 psig without vapor loss to the atmosphere and may be used for the separation of crude oil, condensate, produced water, or natural gas.

Based on ARB's definition in Section § 95667, pressure vessels cannot have vapor loss to the atmosphere. This is not true since all pressure vessels have pressure relief valves for safety purposes. In emergency or upset conditions, pressure relief valves allow the release of vapors to balance pressure within the system.

Recommendation 5: WSPA recommends that ARB correct the definition of the term "Pressure Vessel" as follows –

~~(43)~~(45) "Pressure vessel" means any hollow container used to hold gas or liquid and rated, as indicated by an ASME pressure rating stamp, and operated to contain normal working pressures of at least 15 psig without continuous vapor loss to the atmosphere and may be used for the separation of crude oil, condensate, produced water, or natural gas.

WSPA's recommendation for regulatory language is included in Attachment 1.

Issue 6: Unnecessary Flash Testing where the maximum potential emissions would always be less than the applicability threshold

Small separator and tank systems can have low enough throughput such that even a high Gas to Oil Ratio (GOR) or Gas to Water Ratio (GWR) will not lead to 10 MT CH_4 per year. Such operators would have to conduct unnecessary testing for three consecutive testing periods before they are allowed to conduct testing once every five years.

Costs associated with flash testing can range between $500 and $1,500 per test. Depending on the number of small separator and tank systems an operator might have,

the costs of unnecessary flash testing can become significant without any benefit to the operator or the ARB.

Recommendation 6: WSPA recommends that ARB use the initial test (§95688(a)(3)(A)) to determine the frequency of subsequent testing. For example, if the annual emission rate resulting from the initial test is less than or equal to half the threshold, operators should not have to conduct any further testing unless any significant (20% or higher) changes occur. WSPA's recommendation for regulatory language is included in Attachment 1 (see proposed §95688(a)(6)).

Issue 7: Technical Feasibility Issues with Flash Liberation Test Procedure

WSPA has expressed concerns about the technical feasibility issues with conducting flash tests at low-volume separator and tank systems previously, without response from ARB to date. The flash test procedure requires a minimum amount of produced fluid sample for proper flash simulation resulting in reasonably accurate test data. In addition, a certain amount of produced fluid is necessary to purge the lines to ensure impurities do not enter the sample. According to the laboratories, the minimum volume of flash gas required for a proper analysis is 10 ml while the corresponding fluid volume could range between 300 – 500 ml depending on the API gravity.

WSPA members have experienced these issues while conducting flash testing- certain dry gas wells that do not produce sufficient volumes of fluid to conduct sampling needed for flash liberation testing. ARB has not addressed such technical infeasibility scenarios in the regulation. Operators are being required to comply with a testing requirement that is in some instances impossible to achieve.

Recommendation 7: WSPA recommends that ARB allow field-wide representative sampling to determine the annual methane emissions of separator and tank systems located within the same field. In cases where none of the wells have sufficient volumes of produced fluids to conduct flash testing, engineering estimates must be allowed. WSPA's recommendation for regulatory language is included in Attachment 1 [(see proposed §95688(a)(3)(A)].

Issue 8: Inconsistent use of terms "separator", "pressure vessel", "separator and tank systems", "sumps"

Sections 95668(a)(1) and (2) have several confusing provisions that, as written, are not clear due to inconsistent use of the terms "separator," "pressure vessel," "separator and tank systems," and "sumps." ARB needs to use the terms consistently in order to avoid confusion and interpretation issues.

Recommendation 8: WSPA recommends that ARB clarify the requirements in Section 95668(a)(1) and (2) as follows:

(a) Crude Oil, Condensate, and Produced Water Separation and Storage

(1) Except as provided in section 95668(a)(2), the requirements in sections 95668(a)(3) though (9) apply to ~~pressure vessels, separators, tanks, and sumps~~separator and tank systems located at facilities listed in section 95666~~:~~.

(2) The requirements of this subsection do not apply to the following:

(A) ~~Pressure vessels, separators, tanks, and sumps~~Separator and tank systems that have not contained crude oil, condensate, or produced water for at least 30 calendar days.

(B) Separator and ~~T~~tank systems used for temporarily separating, storing, or holding emulsion, crude oil, condensate, or produced water from any newly constructed well for up to 30 calendar days following initial production from that well but only if the tank is not used to circulate liquids from a well that has been subject to a well stimulation treatment.

WSPA's recommendation for regulatory language is included in Attachment 1.

Issue 9: Duplicative LDAR Requirements on Pressure Vessels

Sections 95668(a)(3) requires LDAR on pressure vessels that are not already subject to Air District regulations. This requirement is redundant to the requirements of Section 95669. The requirements seem to be duplicative and lead to confusion on the number of times leak detection needs to be conducted on the same pieces of equipment/components to comply with redundant requirements of both 95668(a)(3) and 95669. ARB needs to eliminate requirements that are duplicative.

Recommendation 9: To eliminate duplicative requirements, WSPA recommends that ARB remove Section 95668(a)(3) from the proposed regulation.

WSPA's recommendation for regulatory language is included in Attachment 1.

Issue 10: No Benefit Associated with Proposed Multiple and Redundant Flash Liberation Tests

ARB's proposed Section 95668(a)(5) would require operators to conduct multiple and redundant flash liberation tests without technical basis. Each flash liberation test can cost between $500 and $1,500. All of the proposed causes shown below can lead to requiring multiple tests by an operator with no significant benefit:

Requirement	Technical Background	Issues with Proposed Requirement
An operator needs to conduct flash liberation testing of each separator and tank system	• Separator and tank systems located within the same producing field have similar Gas to Oil (GOR) and Gas to Water Ratios (GOR) that a flash liberation test will provide. • The differences in annual methane emissions rates between separator and tank systems located within the same field are due to throughput (not GOR or GWR). • Conducting multiple flash liberation tests within the same field is not likely to provide significantly different GOR or GWR.	• Operators have to conduct redundant flash testing of every separator and tank system located within the same field even though the expected GOR and GWR will be similar for all separator and tank systems located within the same field.
An operator needs to conduct flash liberation testing annually	• Each separator and tank system will have similar GOR and GWR year after year. GOR or GWR will likely decrease due to gradual decline in production over time. • The differences in annual methane emission rates between separator and tank systems year after year are due to throughput (not GOR or GWR). • Conducting multiple flash liberation tests annually is not likely to provide significantly different GOR or GWR.	• Operators have to conduct redundant flash testing of every separator and tank system annually even though the expected GOR and GWR will be similar year after year.
An operator needs to conduct flash liberation testing when a new well is added	• Each separator or tank system is designed to receive product from wells that produce fluids of similar API gravity for several reasons – financial requirements, process and safety requirements. For e.g. Light oil and heavy oil systems are maintained separately. • As such, adding a new heavy oil well to a heavy oil system will not change GOR and GWR. • The differences in annual methane emission rates between separator and tank systems are due to throughput (not GOR or GWR). • Conducting multiple flash liberation tests every time a well is added is not likely to provide significantly different GOR or GWR.	• Operators have to conduct redundant flash testing of a separator and tank system every time a new well is added even though the expected GOR and GWR will be similar.
An operator needs to conduct flash liberation testing when throughput increases by 10%	• The differences in annual methane emissions rates between separator and tank systems located within the same field are due to throughput (not GOR or GWR). • Conducting multiple flash liberation tests every time there is an increase in throughput by 10% is not likely to provide significantly different GOR or GWR.	• Operators have to conduct redundant flash testing of a separator and tank system every time throughput increases by 10% even though the expected GOR and GWR will be similar.

Recommendation 10: WSPA recommends that ARB remove redundancy of flash testing requirements that are not likely to provide any significant benefit in determining annual emission rates. WSPA's recommendation for regulatory language is included in Attachment 1.

Issue 11: Unnecessary Demonstration of Appropriateness of Flash Tests

§ 95668(a)(4)(D) requires that an operator "demonstrate" a flash test is representative when the test was conducted on the system in question. Furthermore, this section implies that ARB may mandate additional testing if it is determined that the tests "do not reflect representative results of similar systems." WSPA disagrees that ARB is given the authority to discount testing results at their discretion, especially for a test that will be performed by a third party laboratory. This authority would essentially allow ARB to ignore validated and properly determined flash testing data at its sole discretion with no given triggers or explanation for when it may discount such data. ARB has provided no indication of how it would determine that a test result is not representative of similar systems or what this terminology means. The authority to discount testing results at will allows ARB to be the final arbiter of technical information which it has had no part in preparing or testing and allows for discretion to enter an area which should be governed solely by technical information.

Recommendation 11: WSPA requests that ARB remove this language. WSPA's recommendation for regulatory language is included in Attachment 1.

Issue 12: Single Flash Tests to Determine if a Vapor Control System Needs to Be Installed

WSPA disagrees that ***one*** flash test result would be used to determine that installation of the vapor recovery system if the test result shows that the threshold has been exceeded during a particular year.

Recommendation 12: WSPA requests that ARB allow an engineering evaluation based on operations data to determine the annual emission rate prior to the requirement of vapor recovery system installation. WSPA's recommendation for regulatory language is included in Attachment 1.

Issue 13: Lack of Maintenance/Emergency/Upset Provisions

WSPA is concerned that maintenance/emergency/upset provisions are not included in the proposed storage tank control requirements. For example, when a separator/tank is

taken offline for maintenance, the separator/tank is bypassed in the separation process. In such cases, the next inline tank (without a required vapor recovery system) could be used temporarily. Operators may follow similar process during an emergency or upset condition.

Recommendation 13: WSPA believes that ARB must build in a provision to allow for routine system and facility maintenance, similar to temporary maintenance variances as currently allowed under local air district rules (e.g. San Joaquin Valley APCD Rule 4623).

WSPA requests that ARB adopt regulatory language similar to San Joaquin Valley APCD Rule 4623:

(5) A separator or a tank is not required to be served by a vapor control system during maintenance/repairs/upset conditions for up to 600 hours per rolling 12 calendar month period. During temporary periods of maintenance/repair/upsets, operator shall use best work practices to minimize emissions.

WSPA's recommendation for regulatory language is included in Attachment 1 [see §95668(c)(5)].

Issue 14: Clarity Needed in All Requirements Associated with Separator and Tank Systems

As currently written, the requirements associated with separator and tank systems lack clarity with regard to current and future applicability and compliance timelines. This section requires corrections, significant improvements for clarity, and provisions for emergency and upset conditions.

Recommendation 14: Along with other suggested recommendations in this comment letter and previously submitted in Comment Letter 1 (dated 2/18/16), WSPA requests that ARB clarify Section 95668(a). WSPA's recommendation for regulatory language is included in Attachment 1.

Issue 15: Definitions Needed for the terms "existing sales gas system," "existing fuel gas system," and "existing underground injection well"

Section 95668(c)(2) states that vapor recovery systems should direct vapors from storage tanks to an existing sales gas system, or an existing fuel gas system, or an existing underground injection well that is not currently under review by Division of Oil and Gas and Geothermal Resources (DOGGR). There are several issues associated with this requirement:

- An oil and gas production facility can consist of multiple contiguous properties encompassing several hundred square miles. With no definition of the terms "existing sales gas system," "existing fuel gas system," and "existing underground injection well," it is unclear what area within a facility is considered "existing." For example, if an existing sales system is located 200 miles from the separator and tank system, would that be considered "existing"? In that case, did ARB include the costs for constructing hundreds of miles of "pipeline" in their cost-effectiveness analysis? Has ARB conducted an environmental impact analysis of construction of several pipelines that operators would be required to build to comply with the proposed requirements?

- There is no consideration given to the compatibility of the recovered gas quality the "existing" system. If the vapors cannot be safely directed to an existing system, it is not clear what operators are required to do.

Recommendation 15: WSPA recommends that ARB provide clarity in requirements for vapor recovery systems by providing definitions of the terms "existing sales gas system," "existing fuel gas system," and "existing underground injection well" describing clearly the area of proximity that an operator should consider when assessing compliance requirements. ARB should also include costs and additional criteria pollutant emissions associated with the construction of pipelines that cover the area of proximity in their cost-effectiveness and environmental impact analysis. Additionally, WSPA strongly recommends ARB allow operator safety provisions in cases where the vapors are incompatible with existing systems.

WSPA's recommendation for regulatory language is included in Attachment 1.

Circulation Tanks

Issue 16: Incorrect Definition of Circulation Tank

Section 95667(a)(6) defines circulation tanks as follows:

"Circulation tank" means a tank or portable tank used to circulate, store, or hold liquids or solids from a crude oil or natural gas well during or following a well stimulation treatment.

It is our understanding that ARB is proposing control requirements for circulation tanks such as SandX tanks. However, the definition proposed for circulation tanks does not reflect this intent and is incorrect. Circulation tanks do not circulate produced liquids or solids from oil or gas wells. These tanks are used to circulate water in order to clean out the sand from the well-bore during or after the well stimulation treatment.

Recommendation 16: WSPA recommends the following definition to reflect ARB's intent accurately:

(6) "Circulation tank" means a tank or portable tank used to circulate~~, store, or hold liquids~~ water ~~or solids from~~ during a crude oil or natural gas well-bore sand cleanout process during or following a well stimulation treatment.

WSPA's recommendation for regulatory language is included in Attachment 1.

Issue 17: ARB's Estimated Emissions from Circulation Tanks Are Very Small

WSPA has summarized the emissions and costs associated with circulation tanks presented by ARB during the February 4th, 2016 workshop:

Parameter	Statewide	Per Event[1]
MT CO_2e (GWP = 72)[2]	4,900	8.36
MT CH_4	68.1	0.12
ARB Proposed Costs	$186,000	$317.4
ARB Proposed Benefits	$17,000	$29.01
ARB Proposed Cost Effectiveness ($/MT CO_2e)	$34	$34

- **<u>Emissions from Circulation Tanks are Extremely Small</u>**

[1] Based on Kern County Environmental Impact Assessment Report, approximately 1,025 well stimulation events were conducted over a period of 21 months (1/1/2014 and 9/30/2015). This means approximately 586 well stimulation events are conducted annually within the state of California.

Table 25: Number of Well Stimulation Treatments by Stimulation Type and Oil Field

Oil Field	Acid Fracture	Acid Matrix	Hydraulic Fracture	Totals by Oil Field
Belridge, North			149	**149**
Belridge, South	1		704	**705**
Elk Hills		18	44	**62**
Kettleman Middle Dome		2		**2**
Lost Hills			88	**88**
North Coles Levee			2	**2**
Rose			12	**12**
Stockdale			1	**1**
Ventura			3	**3**
No Associated Field			1	**1**
Totals by Stimulation Type	**1**	**20**	**1004**	**1025**

Counties/Districts not listed did not contain occurrences of well stimulation treatment.
Source: Interim Well Stimulation Database, WST Disclosures Index, operator disclosures

[2] ARB Presentation February 4, 2016

Based on the emission estimates presented by ARB, the circulation tank source category represents **0.4%**[3] of the total statewide emissions that ARB plans to control with the proposed regulation. As seen above, per ARB, this represents 0.12 MT or 264.5 lbs CH_4 per event. WSPA does not agree with these emissions since the 2015 WSPA circulation tank test results demonstrate even fewer emissions with an average of approximately 0.012 or 26 lbs CH_4[4] per event (ten times smaller than estimated emissions). Although, it is very clear to all parties that circulation tanks are an insignificant source of emissions, ARB has not provided the technical basis for proposing a regulation to control emissions from such a small source category.

- **Zero Benefit/Market-Value of Gas**

  WSPA disagrees with ARB's valuation ($17,000) of the gas captured from circulation tanks. These vapors contain very little hydrocarbons and have an average higher heating value (HHV) of 7 Btu/scf[5]. The estimated average heat content is 1.6 MMBTU for an entire event. There is no market-value for this gas.

  When compared to pipeline quality gas (900 – 1,150 Btu/scf) or field/waste gas (200 – 900 Btu/scf), the vapors (7 Btu/scf) are extremely low quality and non-combustible without the addition of supplemental higher heating value fuel. There is zero financial benefit in capturing this gas. ARB's proposed benefits of $17,000 are completely hypothetical with no sound technical basis.

WSPA is concerned that a significant amount of effort will be required by ARB and Air Districts to implement and manage the program for minute methane emissions reductions (easily outweighed by emissions from additional criteria pollutants; See Issue#19) and virtually no associated benefit. Additionally, operators would have to comply with the proposed unsafe and exceedingly burdensome requirements outlined below:

[3] Per ARB's estimates presented on February 4, 2016, emissions from Circulation tanks are 4,900 MT CO_2e out of a total proposed control of 1.2 million MT CO_2e

[4] Per 2015 WSPA Circulation Tank Test Results, the methane emissions ranged from 0.24 lb CH_4 to 132 lb CH_4 with an average of 26 lb CH_4.

[5] Per 2015 WSPA Circulation Tank Test Results, the calculated HHV ranged from 0.003 Btu/scf to 57 Btu/scf with an average of 7 Btu/scf.

	Needed Equipment/ Infrastructure	Concerns	Letter Reference
1. REQUIRED CAPTURE			
Installation of Vapor Collection System	~125 kW Diesel powered generator for the vapor recovery compressor	GHG and criteria emissions from diesel combustion	See Issue 19
2. REQUIRED CONTROL			
Option 1: Direct vapors to existing sales gas system/existing fuel system/underground injection well	Existing sales gas system/existing fuel system/underground injection well	Safety and explosion risk (introduction of air/oxygen into existing systems)	See Issue 18
Option 2: Direct vapors to a Vapor Control Device	Installation of Flare (15 ppmv NOx @3% O_2)	Increased GHG and criteria pollutant emissions from supplemental fuel for flaring	See Issue 19

Recommendation 17: WSPA does not believe there is a justifiable reason for ARB to propose control requirements for this source category as no benefit can be gained from the potential capture of an insignificant amount of low quality vapors from circulation tanks. Additionally, WSPA believes that the control of this source category cannot be achieved safely (Issue 18) or without additional criteria pollutants (Issue 19). WSPA is recommending that ARB allow the use of best management practices to achieve emissions reductions as discussed in Issue 20.

WSPA's recommendation for regulatory language is included in Attachment 1.

Issue 18: Unsafe Control Measures Proposed for Circulation Tank Emissions Control

ARB has proposed unsafe mandatory control measures that require operators to install a vapor collection system (Section 95668(b)) on circulation tanks and connect the system to either an existing sales, existing fuel line or inject the vapors underground. Vapors collected from the circulation tanks contain insignificant and varying concentrations of hydrocarbons (C1 – C6+) ranging from 0 to 5%[6] with high amounts of introduced air from the circulation process (95-100%). Connecting oxygen-rich vapors to an existing sales or fuel line containing hydrocarbons will create an explosive environment.

[6] Per 2015 WSPA Circulation Tank Test Results, total hydrocarbons (C1 to C6+) ranged from 0 to 5% by volume.

WSPA has been re-iterating this concern to ARB without response. ARB has not included any safety provisions in the regulation. While it appears that ARB is proposing several options, the fact is that the safety concerns eliminate almost all options leaving flaring as the only method of control for this source category, if allowed by Air Districts. In the absence of Air District approval, operators would have to shut down operations (§95668(c)(5)).

Recommendation 18: WSPA recommends that ARB remove unsafe mandatory control measures from the proposed regulation. At a minimum, WSPA urges that ARB incorporate alternative control methods that maintain safe practices.

WSPA's recommendation for regulatory language is included in Attachment 1 [see §95668(b)(1)(C)].

Issue 19: Multiple of Issues with Flaring of Vapors from Circulation Tanks

As discussed above, flaring is the only option available for an operator in the absence of safe alternatives for emissions control from circulation tanks. There are significant issues with the flaring option as discussed below:

Restrictions on Flare Use

- ***Permitting:*** ARB is assuming that operators will be allowed to install new flares or use existing flares. However, it is extremely difficult, if not impossible, to obtain permits from local Air Districts for new or increased flaring, especially in regions classified as non-attainment, such as the San Joaquin Valley Air Pollution Control District.

- ***Flare use (Emergency only):*** Operators may have existing stationary emergency flares on site. However, these flares can only be used in emergency or upset conditions. Emergency flares are not allowed to be used for flaring of vapors during normal operation of circulation tanks.

- ***Location of Existing Process Flares:*** There are few stationary process flares currently permitted in the state for oil and gas operations and most are not located within the vicinity of field operations where well stimulation occurs. If any are located near the fields, the flares are larger and sized for field gas streams with higher flow rates and heat content. These larger flares are not able to adequately combust the extremely low heating value and low volume vapors from circulation tanks unless large amounts of supplemental fuel is also combusted to meet all regulatory and stoichiometric requirements.

- ***Portable Flares*****:** Small portable flares (rented or leased), as described above, are the only option for operators but can only be used at accessible, remote locations where safety and risk are not an overriding issue. In most cases where

well stimulation events occur (e.g. - Belridge Field), oil fields are congested and portable flares can pose safety issues due to fire risk.

Control Measures Will Result in Higher Emissions

Proposed Control measures will result in additional GHG and criteria pollutant emissions from both capture and control of vapors from circulation tanks. WSPA has quantified the additional emissions below:

- ***Emissions from Capture of Vapors from Circulation Tanks:*** Operators are required to capture vapors from circulation tanks by installing a vapor recovery compressor. The compressor would most likely be powered by a portable diesel generator. Additional criteria pollutant emissions are expected from the diesel generators and the estimates are provided in the table below.

Pollutant	Additional Emissions from 125 kW Diesel Generator[7] (per event)	Additional Emissions from 125 kW Diesel Generator (statewide[8])
CH_4 (lbs)	0.06	33
N_2O (lbs)	0.01	7
CO_2 (lbs)	1,399	819,986
NOx (lbs)	38	22,298
SOx (lbs)	2.5	1,475
VOC (lbs)	3.1	1,808
CO (lbs)	8.2	4,805
PM_{10} (lbs)	2.7	1,582

  As seen above, capture of vapors from circulation tanks using a vapor recovery system alone produces approximately 38 lbs of additional NOx per event mostly within the jurisdiction of SJVAPCD[9].

- ***Emissions from Flaring of Vapors from Circulation Tanks:*** As stated above, the vapors from circulation tanks contain very little hydrocarbons making combustion of the vapors inefficient (i.e. inconsistent burning, low destruction efficiency, and the potential for smoke) without the addition of supplemental fuel. The average higher heating value (HHV) of the vent gas from circulation tanks is expected to be approximately 7 Btu/scf[10] at an average flow rate of 527 scfm with

[7] Emission Factors from AP-42 Section 3.3-1 (https://www3.epa.gov/ttn/chief/ap42/ch03/final/c03s03.pdf)

[8] Based on Kern County Environmental Impact Assessment Report, approximately 1,025 well stimulation events were conducted over a period of 21 months (1/1/2014 and 9/30/2015). This means approximately 586 well stimulation events are conducted annually within the state of California.

[9] Based on Kern County Environmental Impact Assessment Report, 99.7% percent of well stimulation events occur in Kern and Kings Counties, which are under the jurisdiction of San Joaquin Valley Air Pollution Control District.

[10] Per 2015 WSPA Circulation Tank Test Report, the calculated HHV ranged from 0.003 Btu/scf to 57 Btu/scf with an average of 7 Btu/scf.

inconsistent and varying concentrations of methane during the circulation process.

Per 40 CFR 60.18, flares[11] are required to maintain an HHV of at least 300 Btu/scf. In order to combust vapors from circulation tanks and meet the requirements of 40 CFR 60.18, operators would be required to add supplemental fuel. The amount of supplemental fuel required would depend on the quality of the vapors collected from circulation tanks and the size of the flare (minimum flow for the available flare).

The following table shows methane emissions from control of vapors from circulation tanks with natural gas (HHV = 1,020 Btu/scf[12]) as supplemental fuel using a low NOx flare as specified in Section 95668(c)(4)(B)(2):

Pollutant	Additional Emissions from Flaring of Vapors from Circulation Tanks[13] (per event)	Additional Emissions from Flaring of Vapors from Circulation Tanks (statewide[14])
CH4 (lbs)	180.40	105,716
N2O (lbs)	0.02	12
CO2 (lbs)	11,754.34	6,888,044
NOx (lbs)	1.79	1,047
SOx (lbs)	0.06	35
VOC (lbs)	13.74	8,053
CO (lbs)	36.33	21,288
PM10 (lbs)	0.75	437

[11] For steam-assisted or air-assisted flares required to meet Best Available Control Technology (BACT).
[12] PUC natural gas heating value
[13] https://www3.epa.gov/ttnchie1/ap42/

Emission Factors:			
NO_X:	0.0182	lb/MMBtu	(Proposed regulation limit of 15 ppmv @ 3% O_2 converted to lb/MMBtu based on natural gas)
CO:	0.37	lb/MMBtu	(AP-42, “Industrial Flares”, Table 13.5-1)
PM_{10}:	7.6	lb/MMscf	(AP-42, “Natural Gas Combustion”, Table 1.4-2)
SO_X (as SO_2):	0.0006	lb/MMBtu	(AP-42, “Natural Gas Combustion”, Table 1.4-2)
VOC:	0.1372	lb/MMBtu	Section 13.5 of AP-42, Table 13.5-1 lists a THC emission factor of 0.14 lbs/MMBtu. The flare VOC emission factor for non-methane, non-ethane hydrocarbons is determined using an average of 2% Methane and 0% Ethane estimated from vent samples.

[14] Based on Kern County Environmental Impact Assessment Report, approximately 1,025 well stimulation events were conducted over a period of 21 months (1/1/2014 and 9/30/2015). This means approximately 586 well stimulation events are conducted annually within the state of California.

As seen above, flaring of vapors from circulation tanks produces approximately 1.8 lbs of additional NOx per event.

- ***Total Emissions from Capture and Control of Vapors from Circulation Tanks:***

  The following table shows methane emissions from circulation tank vapors (Emissions with No Control) and emissions from capture (diesel generator) and control (Low NOx flare) of vapors from circulation tanks as specified in Section 95668(c)(4)(B)(2):

Pollutant	AVERAGE PER EVENT		AVERAGE STATEWIDE	
	Vapor Emissions from Circulation Tanks with No Control	Additional Emissions from 125 kW Diesel Generator + 95% Control with Flare	Vapor Emissions from Circulation Tanks with No Control	Additional Emissions from 125 kW Diesel Generator + 95% Control with Flare
CH_4 (lbs)	26	180	15,053	105,749
N_2O (lbs)	-	0	-	19
CO_2 (lbs)	-	13,154	-	7,708,030
NOx (lbs)	-	40	-	23,345
SOx (lbs)	-	3	-	1,509
VOC (lbs)	-	17	-	9,861
CO (lbs)	-	45	-	26,093
PM_{10} (lbs)	-	3	-	2,020

As seen above, flaring of vapors from circulation tanks produces approximately 40 lbs of additional NOx per event.

The increase in SJVAPCD-wide criteria pollutant emissions inventory due to additional flaring is shown below:

Pollutant	Existing SJVAPCD Flare Emissions Inventory[15]	% Increase with 95% Control of Circulation Tank Vapors with Flare
NOx (lbs)	205,780	11%
SOx (lbs)	116,920	1%
VOC (lbs)	120,120	8%
CO (lbs)	120,120	22%
PM_{10} (lbs)	49,800	4%

The additional and significant amounts of criteria pollutant emissions *drastically* outweigh the effectiveness of proposed reductions on extremely small amounts

[15] Based on 2014 emissions inventory data from existing permitted flares in San Joaquin Air Pollution Control District.

of methane emissions (0.4% of the state-wide methane emissions) from circulation tanks. WSPA does not believe the proposed controls are justifiable in any way.

High Costs of Vapor Control Device

- The costs provided by ARB drastically underestimate the costs of control ($317 per event or $186,000 statewide). Based on our estimates, equipment (not including piping) rental alone would cost an operator between $3,600 and $7,700 per event or $2.1M and $4.5M statewide.

- It is very clear that ARB has not included costs of permitting, engineering and safety analysis, equipment rental (such as compressor, flare, piping, and other necessary instrumentation such as meters), costs associated with labor to configure and dismantle the control equipment, training, and other costs.

Proposal is Not Cost-Effective

- Although the details of the cost-effectiveness are currently unavailable for review by stakeholders, WSPA believes that the proposed cost-effectiveness does not represent the reality of this control measure.

ARB has not addressed any of these issues. As discussed in Issue 17, WSPA is concerned that ARB is proposing a significant amount of effort (and costs) to control a very small amount of emissions. WSPA believes that the requirements are ineffective in terms of controlling emissions and not at all cost-effective.

Recommendation 19: WSPA recommends that ARB review the issues described above and re-evaluate the effectiveness of flaring as a control measure proposed for circulation tanks.

WSPA's recommendation for regulatory language is included in Attachment 1.

Issue 20: Alternative Methods of Control of Emissions from Circulation Tanks

WSPA has expressed our concerns with the proposed requirements associated with circulation tanks. Currently the proposed requirements are either unsafe or ineffective in controlling overall emissions that are negligible to begin with.

WSPA has been urging that ARB allow alternative methods of control for this source category. WSPA recommended a Best Practices Management Plan (BMP) with best practices such as the following as alternative methods of control –

Best Practice Options	Technical Basis for Emissions Reductions	Expected Methane Reductions Achievable
Use of SandX or similar tanks instead of shaker pits	The open surface area of a SandX or similar tank is approximately half the open surface area of a shaker pit. As such, we can assume using a SandX or similar tank will reduce the amount of vapors released into the atmosphere by approximately 50%. Additionally, unlike shaker pits, SandX tanks do not include agitation of circulated water. Therefore, SandX tanks have lower emissions than shaker pits over unit surface area. WSPA estimates that additional emissions reductions can be achieved with use of SandX tanks in place of shaker pits.	~50%
Minimize the duration of circulation of water with visual monitoring	The amount of vapors from the circulation process is directly proportional to the duration of circulation. Operators, who optimize the water circulation rate and circulate water only when necessary, will reduce the amount of vapors potentially released into the atmosphere. The optimization of circulation rates can be achieved by visually monitoring the opacity of water until desirable clarity is achieved followed by prompt response. WSPA estimates that with this option, operators will be able to reduce an average of 1 hr of circulation per event (average 8-10 hrs per event).	~10%
Influx Control Plan (Recordkeeping)	During circulation, the well is balanced or over-balanced with the weight of circulated water/fluid. This prevents the reservoir fluids from entering the well-bore (existing requirement of Department of Oil and Gas and Geothermal Resources, DOGGR). Operators can develop and implement an Influx Control Plan that explains the methods used to maintain control – • Amount of water utilized; • Expected and actual circulation rates; • Visual monitoring frequency and results; • Expected and actual durations of circulation; and • Work flow actions undertaken	0%
	Total Estimated Emissions Reductions	~60%

Recommendation 20: WSPA recommends that ARB allow Best Management Plans that provide safe emissions reductions from circulation tanks.

WSPA's recommendation for regulatory language is included in Attachment 1.

Issue 21: Conducting LDAR inspections on Circulation Tanks

Sections 95668(b)(1)(A) and (B) require that an operator comply with the LDAR provisions of §95669 for circulation tanks. WSPA has demonstrated that the methane emissions from the circulation tanks are extremely small (average 26 lbs/event). As a result, leak concentrations of fugitive emissions from the circulation process are expected to be extremely small. Additionally, the entire circulation process typically only lasts for 4-12 hours – operators remove equipment from service well below the repair durations of §95669. WSPA does not believe that ARB should require operators to unnecessarily conduct LDAR on a process with a short life span and negligible emissions. This requirement is burdensome as there are virtually no emissions before or after the circulation, nor during circulation.

Recommendation 21: WSPA recommends that ARB eliminate LDAR requirements on circulation tanks.

Leak Detection and Repair

Issue 22: Catastrophic Leaks

The Draft Proposed Regulation Order states that "Staff is considering a leak emission reduction requirement for large or catastrophic leaks at any oil and gas facility covered by this regulation." ARB's presentation at the February 4, 2016 workshop stated that options for implementing such a requirement would include specific emission reduction projects or development of an emission reduction plan. WSPA does not believe that a leak emission reduction requirement is necessary or proper.

First, such a requirement is not necessary given existing laws and regulations. Regulated facilities already report significant leaks to DOGGR, and most equipment is subject to leak inspection and integrity testing. Production facilities are required to be maintained in good condition and in a manner to prevent leaks. [*See*, *e.g.*, 14 CCR §§1722(i), 1773.2, 1773.3, 1774(c), 1774.1(a), 1777(a), 1777.1(a)]. Local Air Districts in California have substantial leak detection and repair (LDAR) programs, and all facilities subject to the proposed regulation are either covered by these provisions or would be covered by proposed § 95669. Also, EPA has a new source performance standard in place for new crude oil and natural gas production, transmission and distribution facilities, already requiring such facilities to identify and address methane leaks. (*See*

40 CFR Part 60, Subpart OOOO). In addition, as noted in ARB's presentation, DOGGR is in the process of adopting regulations to address early detection and emission reductions for large methane leaks. Regulations that aim to prevent leaks and address them when they are discovered are more appropriate than an after-the-fact offset requirement for an emergency or upset condition, which only operates as a penalty and would do little to prevent such occurrences in the future.

Second, ARB has failed to explain how a leak emission reduction requirement would be a necessary or cost-effective way to achieve the statewide GHG reductions required by AB 32. Regulations adopted pursuant to AB 32 must be cost-effective and designed to implement AB 32 reduction goals. [*See* Cal. Health & Safety Code §§ 38501(h); 38562(a)]. Thus, before it may adopt any leak emission reduction requirement, ARB must first explain how a leak emission reduction requirement for "large or catastrophic leaks" is both necessary to meet the AB 32 goals and would achieve those goals in a cost-effective manner. Indeed, such a requirement would contradict ARB's decision to exclude most vented and fugitive emissions from the AB 32 cap-and-trade program. [*See* 17 CCR §§ 95852.2(b)(3), (b)(5), (b)(6), (b)(10); *see also* California Cap-and-Trade Program, ARB Final Statement of Reasons, October 2011, p. 425 (stating that fugitive and vented emissions cannot reliably be quantified or accounted for under the cap)]. Having already devised a cap-and-trade program to meet AB 32 goals while excluding vented and fugitive methane emissions, it would be illogical for ARB to now argue that ***eliminating*** that exclusion is somehow necessary to meet those goals.

Issue 23: Unrealistic and High Emissions Factors Used for LDAR Emissions Estimates

As noted in our Comment Letter 1, ARB has increased the methane emissions estimates from component leaks from 48 MT CH_4 to 3,056 MT CH_4 (increase by 6,266%) without providing any technical basis. WSPA has already provided real data associated with the estimated number of components, expected leak rates, and expected emissions estimates.

Although the technical basis for the emissions estimates is currently unavailable, it appears that ARB has adopted significantly higher leak rates and/or emission factors to estimate emissions from fugitive leaks. The high emission factors make emissions and benefits appear larger than they actually are leading to skewed cost-effectiveness.

It is critical for ARB to provide the technical basis for the emissions and cost estimates.

Recommendation 23: WSPA recommends that ARB provide the technical basis for the emissions and cost estimates as soon as possible. Furthermore, WSPA recommends that ARB consider emission factors outlined in the CAPCOA document "*California*

Implementation Guidelines for Estimating Mass Emissions of Fugitive Hydrocarbon Leaks at Petroleum Facilities"[16] as a guide to estimate overall emissions.

Issue 24: Unclear Interaction between Proposed ARB Requirements and Air District Programs

Section § 95669(a) states that components at facilities covered under an existing leak detection and repair (LDAR) program are exempt from the leak detection and repair requirement of the proposed regulation. WPSA appreciates ARB's recognition of the many mature LDAR programs implemented by California's Air Districts and other local agencies. WSPA is concerned, however, that the proposed regulation is unclear in the interaction between existing programs and the requirements outlined in the proposed regulatory language, and in fact, will result in duplicative monitoring requirements for operators. The proposed revisions, as written, fail to ensure that operators will not end up having to conduct duplicative monitoring.

Recommendation 24: WSPA believes that ARB should align the proposed regulatory text with air districts wherever practicable. WSPA's recommendation for regulatory language is included in Attachment 1.

Issue 25: No definition for the term "Commercial Quality Natural Gas"

Although ARB has included requirements for "commercial quality natural gas" in Section 95669, no definition has been provided in the proposed regulation. Lack of a definition will cause confusion and issues with alignment with local Air Districts who have clear definition of the term (SJVAPCD Rule 4409).

Recommendation 25: In order to avoid confusion and align with local Air District regulations, WSPA recommends that ARB add the following definition to Section 95667 –

~~(6)~~(7) "Commercial quality natural gas" means a mixture of gaseous hydrocarbons with at least 80 percent methane by volume (≥ 80 vol%) and less than ten percent by weight (<10 wt%) VOC and meets the criteria specified in Public Utilities Commission (PUC) General Order 58-A.

WSPA's recommendation for regulatory language is included in Attachment 1.

[16] http://www.arb.ca.gov/fugitive/impl_doc.pdf

Issue 26: Need clarification in the definition of the term "Component"

ARB has provided the following definition of "component" in Section 95667 –

"Component" means a valve, fitting, flange, threaded-connection, process drain, stuffing box, pressure-vacuum valve, pipe, seal fluid system, diaphragm, hatch, sight-glass, meter, open-ended line, pneumatic device, pneumatic pump, centrifugal compressor wet seal, or reciprocating compressor rod packing or seal.

This definition seems to include components in compressed air service or in service of potable water. ARB needs to clarify the definition of the term to include components in natural gas service and exclude components in service of compressed air.

Recommendation 26: In order to avoid confusion, WSPA recommends that ARB clarify the definition of the term "component" in Section 95667 as follows:

~~(10)~~(11) "Component" means a valve, fitting, flange, threaded-connection, process drain, stuffing box, pressure-vacuum valve, pipe, seal fluid system, diaphragm, hatch, sight-glass, meter, open-ended line, natural gas-driven pneumatic device, natural gas-driven pneumatic pump, centrifugal natural gas compressor wet seal, or reciprocating natural gas compressor rod packing or seal in methane service.

Issue 27: Overlapping definitions of terms of "Minimize" and "Successful Repair"

ARB has provided the following definitions for terms "minimize" and "successful repair" in Section 95667 –

"Minimize" means tightening, adjusting, or replacing components or equipment for the purpose of stopping or reducing leaks below the lowest leak threshold specified in this subarticle.

"Successful repair" means tightening or adjusting or replacing equipment or a component for the purpose of stopping or reducing fugitive leaks below the lowest leak threshold specified in this subarticle.

The definition of "minimize" is exactly same as "successful repair." However, the durations applicable to "minimizing" a leak specified in 95669(h) are different from "repair" durations specified in Section 95669(l) Table 1 and Section 95669(m) Table 2 as shown below:

(h) Owners or operators shall minimize leaks immediately, but not later than one (1) calendar day after initial leak detection.

Table 1
Repair Time Periods January 1, 2017 through December 31, 2018

Leak Threshold	Repair Time Period
10,000-49,999 ppmv	14 calendar days
50,000 ppmv or greater	5 calendar days
Critical Components	Next shutdown or within 180 calendar days

Table 2
Repair Time Periods On or After January 1, 2019

Leak Threshold	Repair Time Period
1,000-9,999 ppmv	14 calendar days
10,000-49,999 ppmv	5 calendar days
50,000 ppmv or greater	2 calendar days
Critical Components	Next shutdown or within 180 calendar days

The same definitions of "minimize" and "successful repair" make Section 95669(h) essentially a repair requirement, leading to operators being required to repair leaks immediately within 1 day of initial leak detection.

WSPA believes that ARB's intent is not reflected in the current definition of "minimize." In order to clarify the requirements, ARB needs to revise the definition of the term "minimize."

Recommendation 27: In order to avoid confusion, WSPA recommends that ARB revise the definition of the term "minimize" in Section 95667 by including an existing and widely understood definition of the term "Leak Minimization" form SJVAPCD Rule 4409 as follows:

~~(25)~~(27) "Minimize" means ~~tightening, adjusting, or replacing components or equipment for the purpose of stopping or reducing leaks below the lowest leak threshold specified in this subarticle.~~ reducing a leak to the lowest achievable level without damaging the component using best modern practices which include, but are not limited to, adding sealing material to the component, tightening the component, or adjusting the component without shutdown of the process that the component serves and that can be safely accommodated.

Issue 28: Redundant and Unnecessary Audio-Visual Inspection Proposed

The proposed regulation requires daily or weekly audio-visual inspections of facilities in addition to quarterly leak detection pursuant to Sections § 95669(b) and (c).

This is an impracticable requirement requiring operators to hire and retain full time staff and vehicles just to conduct audio-visual inspections. In addition to the costs associated with conducting quarterly inspections, operators would have to incur additional costs for additional Full-Time Employees (FTEs). The existing annual inspections (DOGGR, SPCC) usually requires 2-3 contract personnel per a medium-sized field at an average cost of over $400,000 annually to walk the hundreds of miles of pipelines. If this same inspection needs to be performed every day, the expected cost for a field would be over $14 million per year. Furthermore, the inclusion of this practice in the regulation introduces costs associated with unnecessary reporting and record keeping burden on all facilities. These costs have clearly not been incorporated by ARB in the cost-effectiveness analysis.

Additionally, some remote facilities would also result in additional mobile combustion emissions associated with driving up to hundreds of miles per week to visit all unmanned facilities. WSPA believes these additional emissions estimates have not been considered by ARB in the cost-effectiveness and benefits analysis.

Recommendation 28: WSPA requests that ARB eliminate redundant audio-visual inspection requirements and remove the language of § 95669(b) and (c) from the regulatory text. WSPA's recommendation for regulatory language is included in Attachment 1.

Issue 29: Unclear LDAR requirements for buried well-casings

Section 95669(e)(3) provides exemptions for the following:

(3) Components that are buried below ground. Well casing that extends to the surface is not considered a buried component.

Well casings extend hundreds of feet underground. It is unclear if ARB is expecting daily audio/visual inspections and quarterly Method 21 inspections on buried casings, which would require excavations. WSPA assumes that ARB's intent is to require inspections on the aboveground visible portion of well-casings.

Recommendation 29: WSPA recommends that ARB clarify the requirements on well casings as follows:

(3) Components that are buried below ground. The portion of w~~W~~ell casing that is visible aboveground ~~extends to the surface~~ is not considered a buried component.

WSPA's recommendation for regulatory language is also included in Attachment 1.

Issue 30: No exemptions for components handling non-hydrocarbon streams

No exemptions have been proposed for components that are handling non-hydrocarbon streams such as compressed air or potable water.

Recommendation 30: WSPA recommends that ARB exempt components that exclusively handle non-hydrocarbon streams. WSPA recommends that ARB add the following exemption to Section 95669(e):

> *Components exclusively handling non-hydrocarbon streams.*

WSPA's recommendation for regulatory language is also included in Attachment 1.

Issue 31: Unnecessary LDAR Requirements on Components Handling Low Methane Streams with No Emissions Benefit

As explained in our previous comment letters, operators can have streams with very low concentrations of Methane (e.g. some produced water streams). Conducting leak detection on these streams will never lead to identification of any leaks above the leak thresholds proposed in the regulation. The costs associated with developing an LDAR program for such low-methane components could be onerous for operators with no associated emissions benefit.

Recommendation 31: WSPA recommends that ARB exempt components that are expected to never exceed the proposed leak thresholds due to very low methane concentrations. WSPA recommends that ARB add the following exemption to Section 95669(e) –

> *Components exclusively handling streams which have methane concentration less than 10 percent by weight (<10 wt%).*

WSPA's recommendation for regulatory language is also included in Attachment 1.

Issue 32: Method 21 is Incompatible with Pipeline Inspections

As discussed in our Comment Letter 1 dated 2/18/16, the definition of "component" includes pipes which are subject to the leak detection and repair requirements using Method 21.

Method 21 is not compatible with pipes/pipelines. All existing pipeline inspection requirements recognize this and require annual visual inspections of pipes [SJVAPCD Rules 4401 and 4409; Department of Oil, Gas, and Geothermal Resources (DOGGR) pursuant to California Code of Regulation Title 14, Division 2, Subchapter 2, Section 1774 (Oilfield Facilities and Equipment Maintenance); Spill Prevention Control and

Countermeasure Plan (SPCC) pursuant to 40 Code of Federal Regulation Part 112 (Oil Prevention and Response: Non-Transportation-Related Onshore and Offshore Facilities)].

Recommendation 32: WPSA recommends that ARB recognize that Method 21 is incompatible with pipes and add the following regulatory language for pipeline inspections:

On an annual basis, operators shall visually inspect pipes that are not already subject to an existing Local Air District or DOGGR or SPCC visual inspection program. If a leak is detected during a visual inspection, Method 21 follow-up will be performed to determine the leak concentration.

WSPA's recommendation for regulatory language is also included in Attachment 1.

Issue 33: Beginning with Quarterly Inspections is Onerous for Operators

As ARB noted in their February 4 workshop and explained in WSPA's Comment Letter 1, the majority of facilities are already in a mature LDAR program run by a local air district. With several years of data, these facilities show very low leak rates. Minimal additional methane reduction will be gained by starting with quarterly inspections for operators already in LDAR programs, while costs will quadruple. Beginning with quarterly inspections to demonstrate lower leak rates is extremely onerous without benefit. Operators who can demonstrate a leak rate below the proposed leak rates in the regulation within the first quarter of the first year of compliance should be allowed to continue with annual inspections. This will also encourage operators to proactively comply with the leak detection requirements.

Recommendation 33: WSPA recommends that ARB allow operators to demonstrate lower leak rates than proposed in the regulation during the first quarter of the first year of compliance. Such operators should be allowed to continue with annual inspections unless the operator exceeds the thresholds in subsequent inspections at which time quarterly inspections would be required. WSPA recommends the following changes to the Section 95669(f):

> *~~(f)~~(d) Beginning January 1, 201~~7~~8, components (not including pipes) shall be inspected at least once each calendar ~~quarter~~ year for leaks of total hydrocarbons in units of parts per million volume (ppmv) calibrated as methane in accordance with EPA Reference Method 21 excluding the use of PID instruments. Operators shall conduct an annual visual inspection of pipes that are not already subject to an existing Local Air District or DOGGR or SPCC visual inspection program.*
>
> *(A) If a leak is found to be above the thresholds specified in Tables 3 or 4, the*

leak shall be repaired as soon as practicable but not later than the time frame specified in Table 1 or 2 of this rule.

(B) The annual inspection frequency will be increased to quarterly if components have been measured above the number of allowable leaks for each leak threshold during the calendar year specified in Table 4.

~~(A)~~(C) A quarterly inspection frequency may be reduced back to annual provided that both of the following conditions are met: All components have been measured below the number of allowable leaks for each leak threshold specified in Table 4 for five (5) consecutive calendar quarters.

~~(B) The change in inspection frequency is substantiated by documentation and approved by the ARB Executive Officer.~~

~~(2) The inspection frequency shall revert to quarterly at any time the number of allowable leaks specified in Table 4 is exceeded during any inspection period.~~

WSPA's recommendation for regulatory language is also included in Attachment 1.

Issue 34: Unreasonably Short Repair Time for Critical Components

Sections 95669(l), (m), and (n) require that repair of critical components be completed by the end of the next process shutdown or within 180 days from the date of initial leak detection, whichever is sooner. WSPA is concerned that ARB is allowing only 180 days for repair of critical components when it is very common for critical equipment to have longer turn around durations. Currently San Joaquin Valley Air District regulations accommodate these longer process shutdown times in their leak detection rules (SJV Rule 4401 and 4409).

Recommendation 34: WSPA recommends that ARB incorporate one year as the repair time for critical components similar to SJV Rules 4401 and 4409. WSPA recommends the following changes to Section 95669(l), (m), and (n):

~~(l)~~(j) From January 1, 201~~7~~8 and through December 31, 201~~8~~9, any component with a leak concentration measured above the following standards shall be repaired within the time period specified:

(1) Leaks with measured total hydrocarbons greater than or equal to 10,000 ppmv but not greater than 49,999 ppmv shall be successfully repaired or removed from service within 14 calendar days of initial leak detection.

(2) Leaks with measured total hydrocarbons greater than or equal to

50,000 ppmv shall be successfully repaired or removed from service within five (5) calendar days of initial leak detection.

(3) Components measured above the standards specified and which have been ~~approved by the ARB Executive Officer~~ identified as a critical component as specified in section 95670, shall be repaired to minimize the leak to the maximum extent possible within one (1) calendar day of initial leak detection and the final repair shall be completed by the end of the next process shutdown or within ~~180 days~~ 1 year from the date of initial leak detection, whichever is sooner.

Table 1
Repair Time Periods January 1, 201~~7~~8 through December 31, 201~~8~~9

Leak Threshold	***Repair Time Period***
10,000-49,999 ppmv	*14 calendar days*
50,000 ppmv or greater	*5 calendar days*
Critical Components	*Next shutdown or within ~~180 days~~ 1 year*

~~(m)~~(k) By January 1, 202~~019~~, any component with a leak concentration measured above the following standards shall be repaired within the time period specified:

(1) Leaks with measured total hydrocarbons greater than or equal to 1,000 ppmv but not greater than 9,999 ppmv shall be successfully repaired or removed from service within 14 calendar days of initial leak detection.

(2) Leaks with measured total hydrocarbons greater than or equal to 10,000 ppmv but not greater than 49,999 ppmv shall be successfully repaired or removed from service within five (5) calendar days of initial leak detection.

(3) Leaks with measured total hydrocarbons greater than or equal to 50,000 ppmv shall be successfully repaired or removed from service within two (2) calendar days of initial leak detection.

Table 2
Repair Time Periods On or After January 1, 202~~019~~

Leak Threshold	***Repair Time Period***
1,000-9,999 ppmv	*14 calendar days*
10,000-49,999 ppmv	*5 calendar days*
50,000 ppmv or greater	*2 calendar days*

Critical Components	*Next shutdown or within ~~180 days~~ 1 year*

~~(n)~~(l) Upon detection of a component with a leak concentration measured above the standards specified, the owner or operator shall affix to that component a weatherproof readily visible tag that identifies the date and time of leak detection measurement and the measured leak concentration. The tag shall remain affixed to the component until all of the following conditions are met:

(1) The leaking component has been repaired or replaced; and,

(2) The component has been re-inspected and measured below the lowest standard specified for the inspection year when measured in accordance with EPA Reference Method 21, excluding the use of PID instruments.

(3) Components measured above the standards specified and which have been ~~approved by the ARB Executive Officer~~ identified as a critical component as specified in section 95670, shall be repaired to minimize the leak to the maximum extent possible within one (1) calendar day of initial leak detection and the final repair shall be completed by the end of the next process shutdown or within ~~180 days~~ 1 year from the date of initial leak detection, whichever is sooner.

WSPA's recommendation for regulatory language is also included in Attachment 1.

Issue 35: Very Low Leak Rates Proposed

Section 95669(o)(4) and Table 4 allow very low leak rates with no leaks greater than or equal to 50,000 ppmv allowed after the first two years of the LDAR program. As written, just one leak of 50,000 ppmv or greater would require operators to conduct quarterly LDAR.

WSPA disagrees that an operator, who has an otherwise very effective LDAR program, should be penalized for one 50,000 ppmv leak. Statistically, it is impossible to have zero leaks that are 50,000 ppmv or greater and this requirement would lead to operators never being able to reduce the inspections to annual. A mature LDAR program will ultimately reduce such leaks. However, a field with 250,000 components will conduct 1,000,000 component inspections each year. The sheer number of components suggests that there is a statistically significant potential for leaks greater than 50,000 ppm. However, as the program matures, the potential for such leaks will decrease. Providing unrealistic regulatory mandates does nothing to drive the program especially when other aspects of the regulation address this issue.

Recommendation 35: WSPA recommends that ARB allow reasonable leak rates for operators after the first two-years of the LDAR program. WSPA recommends the following changes to Section 95669(o):

~~(o)~~(m) Compliance with Leak Detection and Repair Requirements:

(1) The failure of an owner or operator to meet any of the requirements specified shall constitute a violation of this subarticle.

(2) Between January 1, 201~~7~~8 and December 31, 201~~8~~9, no facility shall exceed the number of allowable leaks specified in Table 3 during any inspection period as determined by the ARB Executive Officer or by the facility owner or operator in accordance with Method 21, excluding the use of PID instruments.

(3) By January 1, 20~~20~~19, no facility shall exceed the number of allowable leaks specified in Table 4 during any inspection period as determined by the ARB Executive Officer or by the facility owner or operator in accordance with Method 21, excluding the use of PID instruments.

~~(4) By January 1, 2019, no component shall exceed a leak of total hydrocarbons greater than or equal to 50,000 ppmv as determined by the ARB Executive Officer or by the facility owner or operator in accordance with Method 21, excluding the use of PID instruments.~~

Table 3 - Allowable Leaks Per Number of Components Inspected January 1, 201~~7~~8 through December 31, 201~~8~~9

Leak Threshold	***200 or Less Components***	***More than 200 Components***
10,000-49,999 ppmv	*5*	*2% of total inspected*
50,000 ppmv or greater	*~~2~~3*	*1% of total inspected*

Table 4 - Allowable Leaks Per Number of Components Inspected On or After January 1, 202~~019~~

Leak Threshold	***200 or Less Components***	***More than 200 Components***
1,000-9,999 ppmv	*5*	*2% of total inspected*
10,000-49,999 ppmv	*~~2~~3*	*1% of total inspected*
50,000 ppmv or greater	*~~0~~2*	*0.5% of total inspected*

WSPA's recommendation for regulatory language is also included in Attachment 1.

Issue 36: Critical Component Identification – Process Issues

As explained in WSPA's Comment Letter 1 submitted on 2/18/16, WSPA requests that ARB clarify the process of identifying a component as critical as discussed in Section § 95670 of the proposed regulation. WSPA is concerned that the current regulatory language puts regulatory agencies (ARB or local air districts) in the position of the decision-maker regarding which components are critical to process operations. There will be tremendous effort and costs associated with providing each critical component data to ARB for their understanding of the process and approval. WSPA believes that facility engineers and inspectors and their superior process knowledge should be deferred to in this decision of component criticality, especially in the face of safety concerns.

Recommendation 36: WSPA recommends that ARB allow knowledgeable operators to identify and designate the critical components without needing approval from ARB. WSPA recommends the following changes to the proposed requirements in Section 95670:

> *(a) Beginning January 1, 201~~7~~8, critical components used in conjunction with a critical process unit at facilities listed in section 95666 must be ~~pre-approved by the ARB Executive Officer~~identified ~~if~~ by owners or operators who wish to claim any critical component exemptions available under this subarticle.*
>
> *(b) Each critical component shall be identified as shown in Appendix A, Table A3 and submitted to ARB for approval by no later than June 30, 201~~7~~8 or within 180 days from the installation of a new critical component.*
>
> *(c) Owners or operators must provide sufficient documentation showing that a critical component is required as part of a critical process unit and that shutting down the critical component would result in emissions greater than the emissions measured from the component.*

~~*(d) Approval of a critical component may be granted only if owners or operators fully comply with this section. The ARB Executive Officer retains discretion to deny any application for approval.*~~

WSPA's recommendation for regulatory language is also included in Attachment 1.

Pneumatic Devices

Issue 37: High Costs of Duplicative Testing of Pneumatic Devices

Sections 95668(f)(2)(C) requires operators to conduct testing of pneumatic devices in addition to the LDAR requirements on components (includes pneumatic devices and pumps) covered under Section 95669. WSPA is concerned about the duplicative requirements especially considering the costs of testing using high volume sampling, calibrated bags, or calibrated flow measurement.

Each test would require at least 2 technicians and test equipment rental. Additionally, the devices could be dispersed across a large geographical area requiring technician travel time. The estimated number of tests that can be completed can range from 6 – 15 devices per day. The estimated cost for one team is expected to be approximately $2,500 per day. In order to meet the quarterly testing requirements of Section 95668(f)(C), an operator may have to deploy multiple teams leading to annual costs of approximately $100,000 per 100 devices. These costs are in addition to the proposed LDAR requirements of Section 95669.

WSPA does not believe this duplicative testing is necessary especially since LDAR requirements with low leak thresholds (10,000 ppmv) are also being proposed. There are no benefits to conducting duplicative testing in addition to LDAR. ARB needs to remove redundancy and duplicative requirements from the proposed regulation.

Recommendation 37: To eliminate redundant and duplicative requirements, WSPA recommends that ARB change Section 95668(f)(2) as follows:

(2) A natural gas powered pneumatic device installed prior to January 1, 2018~~5~~ may be used provided it meets all of the following requirements:

(A) The device does not vent natural gas at a rate greater than 6 standard cubic feet per hour (scfh); and,

(B) The device is clearly marked with a permanent tag that identifies the vent rate as less than or equal to 6 scfh; and,

(C) The device is tested during each inspection period as specified in section 95669 by using a direct measurement method (high volume sampling, bagging, calibrated flow measuring instrument); and,

~~(D)~~ A device with a measured emissions flow rate greater than 6 scfh shall be repaired or replaced within 14 calendar days from the date of the initial emission flow rate measurement; or

(D) The device is tested during each inspection period as specified in section 95669 by using Method 21 not including PID and,

A device with a measured emissions flow rate greater than leak thresholds specified in section 95669 shall be repaired or replaced within 14 calendar days from the date of the initial emission flow rate measurement.

WSPA's recommendation for regulatory language is also included in Attachment 1.

Reciprocating and Centrifugal Compressors

Issue 38: Duplicative LDAR Requirements for Reciprocating and Centrifugal Compressors

Sections 95668(d)(1) and (e)(2) require LDAR on reciprocating compressors located at oil and gas production facilities and centrifugal compressors. The requirements seem to be duplicative to the requirements of Section 95669 and lead to confusion on the number of times leak detection needs to be conducted on the same pieces of equipment/components to comply with redundant requirements of 95668(d)(1), (e)(2) and 95669. ARB needs to eliminate requirements that are duplicative.

Recommendation 38: To eliminate redundant and duplicative requirements, WSPA recommends that ARB remove Sections 95668(d)(1) and (e)(2) from the proposed regulation.

WSPA's recommendation for regulatory language is also included in Attachment 1.

Issue 39: Redundancy of Annual Testing Requirements for Reciprocating Compressors with GHG Mandatory Reporting Regulation (MRR)

Sections 95668(d)(2) and (e)(5) require annual testing of rod packing vents from reciprocating natural gas compressors and west seal vents from centrifugal compressors. ARB's GHG MRR already requires annual testing and measurement of rod packing vents and wet seal vents. This requirement has been in place since 2012. Operators subject to requirements of both regulations have to conduct duplicate tests to comply with both Section 95668(d)(2) and (e)(5) of the proposed regulation and GHG MRR leading to doubling of costs with no added emissions benefit.

Recommendation 39: WSPA recommends that ARB allow operators to use results from the annual testing conducted per the requirements of MRR. WSPA recommends the changes to Section 95668(d)(2)(D) and (e)(5) as follows:

(D) The rod packing or seal emissions flow rate shall be measured annually by direct measurement (high volume sampling, bagging, calibrated flow measuring instrument) while the compressor is running at normal operating temperature. Flow rates measured annually as per the methods described in Greenhouse Gas Mandatory Reporting Regulation Section 95153(n) are acceptable.

…

(5) The wet seal emissions flow rate shall be measured annually by direct measurement (high volume sampling, bagging, calibrated flow measuring instrument) while the compressor is running at normal operating temperature. Flow rates measured annually as per the methods described in Greenhouse Gas Mandatory Reporting Regulation Section 95153(m) are acceptable.

WSPA's recommendation for regulatory language is also included in Attachment 1.

Issue 40: Unsafe Low Access Points Proposed for Rod Packing Vents from Reciprocating Compressors and Wet Seal Vents from Centrifugal Compressors

Sections 95668(d)(2)(C) and (e)(4) require operators to install an access port in the rod packing or wet seal vent stacks at a height of no more than 6 feet above ground level for measurement of rod packing or seal emission flow rates. Typically, the rod packing and wet seal vents are installed at a higher elevation than 6 feet above ground level for safety reasons – if gas is released in emergency or upset conditions, it stays above the operators' breathing space.

In most cases, it is unsafe to install access ports within the breathing space of operators. ARB needs to consider and allow safe methods for conducting annual measurements.

Recommendation 40: WSPA recommends that ARB incorporate safe measurement practices and change Section 95668(d)(2)(C) and (e)(4) as follows:

(C) The compressor shall be equipped with a clearly identified access port installed in the rod packing or seal vent stack at a height of no more than six (6) feet above ground level or a permanent support surface for making individual or combined rod packing or seal emission flow rate measurements; and,

…

(4) The compressor shall be equipped with a clearly identified access port installed in the wet seal vent stack at a height of no more than six (6) feet above ground level or a permanent support surface for making wet seal emission flow rate measurements; and,

WSPA's recommendation for regulatory language is also included in Attachment 1.

Recordkeeping Requirements

Issue 41: Redundant and Inefficient Recordkeeping Requirements – GHG Mandatory Reporting Regulation (MRR)

The proposed recordkeeping requirements (Section 95671(a)) are redundant to recordkeeping requirements for flash testing and liquids unloading that already exist under ARB's GHG MRR Section 95105 for operators that have to comply with both regulations.

Recommendation 41: To avoid redundant recordkeeping, WSPA recommends that ARB incorporate the following to Section 95671(a):

(a) The requirements of this section do not apply to operators who are subject to the recordkeeping requirements of Greenhouse Gas Mandatory Reporting Regulation for the parameters described below. Beginning January 1, 201~~7~~8, owners or operators of facilities listed in section 95666 subject to requirements specified in sections 95668 and 95669 shall maintain, and make available upon request by ARB a copy of the following records

WSPA's recommendation for regulatory language is also included in Attachment 1.

Reporting Requirements

Issue 42: Redundant and Inefficient Reporting Requirements – GHG MRR

The proposed recordkeeping requirements (Section 95672(a)) are redundant to annual reporting requirements for liquids unloading that already exist under ARB's GHG MRR for operators that have to comply with both regulations.

Recommendation 42: To avoid redundant and inefficient reporting, WSPA recommends that ARB incorporate the following to Section 95671(a):

(a) The requirements of this section do not apply to operators who are subject to the reporting requirements of Greenhouse Gas Mandatory Reporting Regulation for the parameters described below. Beginning January 1, 201~~8~~9, owners or operators of facilities listed in section 95666 subject to requirements specified in sections 95668 and 95669 shall report the following information to ARB or implementing Air Districts within the timeframes specified

WSPA's recommendation for regulatory language is also included in Attachment 1.

Issue 43: Unclear Reporting Requirements under Air District Implementation

Section 95672 requires operators to report to ARB various test results, emissions and leak data and information at various frequencies. In cases where Air Districts implement the proposed regulation, it is unclear how ARB intends the reporting to work. Based on Section 95673(a)(2), it is our understanding that ARB may enter into an agreement with Air Districts for information sharing. The regulation fails to prevent redundant reporting where Air Districts will implement the regulations.

Recommendation 43: To avoid redundant reporting, WSPA recommends that report submittals to air districts that implement the proposed regulation be considered as submittal to ARB as well. WSPA recommends the following change to Section 95672:

(a) The requirements of this section do not apply to operators who are subject to the reporting requirements of Greenhouse Gas Mandatory Reporting Regulation for the parameters described below. Beginning January 1, 201~~8~~9, owners or operators of facilities listed in section 95666 subject to requirements specified in sections 95668 and 95669 shall report the following information to ARB or implementing Air Districts within the timeframes specified

WSPA's recommendation for regulatory language is also included in Attachment 1.

Implementation and Enforcement

Issue 44: Issues with Duplicative Implementation and Enforcement

Section 95673(a)(4) states the following:

(4) Implementation and enforcement of the requirements of this subarticle by a local air district, including inclusion or exclusion of any of its terms within any local air district permit, or within a local air district rule, or registration of a facility with a local air district or ARB, does not in any way waive or limit ARB's authority to implement and enforce upon the requirements of this subarticle. A facility's permitting or registration status also in no way limits the ability of a local air district to enforce the requirements of this subarticle.

ARB is proposing to implement and enforce the program regardless of Air District efforts. At the same time, several Air Districts (such as the SJVAPCD) are likely to incorporate the proposed regulation by either amending their rules or adopting a separate program. WSPA is very concerned about the duplicative implementation and enforcement of the proposed regulation.

Per Section 95673(a)(3):

(3) Implementation and enforcement of the requirements of this subarticle by a local air district may in no instance result in a standard, requirement, or prohibition less stringent than provided for by this subarticle, as determined by the Executive Officer. The terms of any local air district permit or rule relating to this subarticle do not alter the terms of this subarticle, which remain as separate requirements for all sources subject to this subarticle.

In cases where Air Districts are planning to implement the rule and are required to develop standards, requirements or prohibition that are no less stringent than provided by ARB's proposed regulation, it is unclear why ARB is proposing duplicative implementation and enforcement. Implementation of two separate programs by both ARB and the Air Districts will lead to doubling of administrative costs for the same emissions control. Additionally, operators will also need to implement two separate programs that will not only lead to confusing compliance requirements but also a doubling of their compliance costs. WSPA strongly believes that this is inefficient both in terms of costs and effectiveness of regulation. Where an Air District is implementing and

enforcing the requirements of the proposed regulation, there is no need for duplicative ARB implementation and enforcement of the same requirements.

Recommendation 44: WSPA strongly urges that ARB remove the duplicative implementation and enforcement requirements from the proposed regulation in Section 95673(a)(3) & (4) as follows:

(3) Implementation and enforcement of the requirements of this subarticle by a local air district may in no instance result in a standard, requirement, or prohibition less stringent than provided for by this subarticle, as determined by the Executive Officer. The terms of any local air district permit or rule relating to this subarticle do not alter the terms of this subarticle~~, which remain as separate requirements for all sources subject to this subarticle~~.

(4) ~~Implementation and enforcement of the requirements of this subarticle by a local air district, including inclusion or exclusion of any of its terms within any local air district permit, or within a local air district rule, or registration of a facility with a local air district or ARB, does not in any way waive or limit ARB's authority to implement and enforce upon the requirements of this subarticle.~~ A facility's permitting or registration status also in no way limits the ability of a local air district to enforce the requirements of this subarticle.

WSPA's recommendation for regulatory language is also included in Attachment 1.

Issue 45: Issues with Enforcement Details

Section 95674(f) states the following:

(f) Falsifying any information or record required to be submitted or retained by this subarticle, or submitting or producing inaccurate information, shall be a violation of this subarticle.

As written, this section fails to differentiate between unintentional mistakes and "falsifying" of data. ARB needs to separate the enforcement sections for the two scenarios for clarity and transparency.

Recommendation 45: WSPA recommends that ARB separate the two scenarios as follows:

(f) Submitting or producing inaccurate information required by this subarticle shall be a violation of this subarticle.

~~(f)~~(g) Falsifying any information or record required to be submitted or retained by this subarticle~~, or submitting or producing inaccurate information,~~ shall be a violation of this subarticle.

WSPA's recommendation for regulatory language is also included in Attachment 1.