October 30, 2015

Meeting Notes Summary – Workgroup for Global Air Permit Policy Development for Temporary Oil and Gas Drill Rigs

Date of Meeting Friday Oct. 30, 2015

Time of Meeting: 12:30 – 16:30

Location of Meeting: DEC Main Conf. Rm, 555 Cordova Ave., Anchorage, AK 99501

Workgroup Global Air Permit Policy Development for Temporary Oil and Gas Drill Rigs (Workgroup) Members: Denise Koch, Director, Alaska Department of Environmental Conservation / Division of Air Quality (ADEC/AQ); Corri Feige, Director, Alaska Department of Natural Resources/ Division of Oil and Gas (ADNR/DOG); John Kuterbach, ADEC/AQ; Gordon Brower, Deputy Director, North Slope Borough (NSB) Planning Department; Joshua Kindred, Alaska Oil and Gas Alliance (AOGA); Alison Cooke and Robin Glover, BP Exploration Alaska (BPXA) (alternates for Josh Kindred); Brad Thomas, ConocoPhillips (CPAI) and Alaska Support Industry Alliance (ASIA); Mike Munger, (by phone) Executive Director, Cook Inlet Regional Citizen's Advisory Council (CIRCAC); Randall Kanady, CPAI (alternate for Mr. Thomas); Alice Edwards, Deputy Commissioner, Alaska Department of Environmental Conservation

Meeting Chair: Denise Koch

Facilitator: Tom Turner, ADEC/AQ

Transcriptionist provided by ADEC/AQ

Public/Agency members present in person: Wally Evans and Julianna Orczewska, Hilcorp Energy (Hilcorp); Mike Peters, Doyon Drilling (Doyon); Ann Mason, SLR Consulting (SLR); Barbara Trost and Deanna Huff, ADEC

Public/Agency members present by telephone: Tom Damiana and Tiffany Samuelson, AECOM; Alan Schuler and Rebecca Smith, ADEC.

Tom Turner provided all Workgroup members and alternates with an insert for the notebook (binder) of PowerPoint presentations for today's meeting.

1) Introductions

Denise Koch welcomed all the participants, introduced herself as the new Director of Air Quality (replacing Alice Edwards) and the new member of the Workgroup. She then asked for introductions, first from the Workgroup members, then from the participants present in the meeting, and finally from the participants joining the meeting by telephone.

2) Agenda Check and Update of Meeting Summary

Ms. Koch confirmed that the meeting would follow the same format in the past. She acknowledged the length of time since the previous Work Group meeting that allowed for the Technical Subgroup to complete the technical work. Ms. Koch made special mention of the tremendous hard work and high level of professional expertise of the Technical Subgroup and thanked them for their efforts.

Ms. Koch called for an agenda check and explained that there were would be presentation on the history of the Drill Rig Workgroup, a presentation on the work of the Technical Subgroup, and then a discussion of the findings and next steps for the Drill Rig Workgroup. Ms. Koch ask for any comments from the Workgroup. Gordon Brower requested to look at the original intent of the Drill Rig Workgroup and recap of the history. Ms. Koch agreed, and stated that is why Tom Turner was asked to prepare a history presentation. She suggested/requested that we proceed with Mr. Turner's presentation and if the presentation did not sufficiently answer his questions, then further discussion could occur. Mr. Brower agreed. No one had any further comments, additions, or corrections to the agenda to report. Ms. Koch then request that Mr. Turner review general logistic of the meeting. He then provide a safety briefing, telephonic communication guidelines, and other meeting logistics.

3) Presentation on the History of the Drill Rig Workgroup

The history presentation was presented by Mr. Turner with PowerPoint slides. (Please reference the DEC website); the following is the summary of the presentation.

Slides 1-6: The presentation is the "30,000 ft. level" overview. The workgroup was formed in 2013 based on an industry-requested review of the current regulatory process for drill rigs. The Workgroup was formed to bring a broad scope of interested parties together to look at issues related to drill rig air permits and how drill rigs operate. The Workgroup members were industry representatives from the Alaska Oil and Gas Alliance (AOGA) and Alaska Support Industry Alliance (ASIA); public interest representatives from areas where drill rigs operate, Cook Inlet Regional Citizen's Advisory Council (CIRCAC) and North Slope Borough (NSB); and regulatory agencies, Alaska Department of Environmental Conservation/Division of Air Quality (ADEC/AQ) and Alaska Department of Natural Resources/Division of Oil and Gas (ADNR/DOG).

The drill rig operators were having difficulty of demonstrating compliance with one hour standards, particularly for Title V Permit applications, and they requested flexibility for drill rig operations due to the large level of logistics and drill rig movement on pads.

The Workgroup agreed that protection of air quality was required. The state regulations are required to comply with the Clean Air Act (CAA) and the State Implementation Plan (SIP). Whatever options the Workgroup decides upon must take into consideration the requirements of the SIP, and any changes to the SIP will ultimately require approval by EPA. The other factor that must be considered is that drill rigs come on and off Title V authorized permit sites. John Kuterbach provided additional technical

clarification on ambient air quality analysis (modeling), how it is done in the SIP, and that there is the ability to look at other ways of doing air quality analysis other than modeling. Ms. Koch asked if the changes would be a SIP change versus a Title V change. Mr. Kuterbach confirmed it is ultimately a SIP change. Ms. Koch asked "and approved by EPA?" Mr. Kuterbach confirmed with "Yes."

Mr. Turner stated the goal of the Workgroup was "To develop informed recommendations to improve the air regulatory process for temporary drill rigs with a particular focus on predictability, operational flexibility, and compliance with air quality standards."

Slide 7-9: Overview of Workgroup activities. There have been 8 Workgroup meetings, beginning June 4, 2013, and continuing through May 2014. There was extensive research and presentation involved in each meeting. The first issue was to review the existing drill rig permitting process and the air quality standards. The second was to research/review other states' regulations that protect air quality standards related to drill rigs, and the third was to consider regulations based on monitoring centered demonstrations. The Workgroup also reviewed the technical aspects of drill rig operations.

Slides 10- 15: The Workgroup decided to form two subgroups: 1) the Technical Subgroup to look the technical/scientific aspects related to monitoring, modeling, and air quality protection; and 2) the Options Subgroup to look at alternatives and options for regulations. The Workgroup then determined that the Technical Subgroup needed more time to complete their work. The Workgroup has not met since May 2014 to allow the Technical Subgroup time to complete their analyses.

The SIP must ensure compliance with air quality standards for any operational scenario, which is the key, and the existing rules remain federally enforceable until the change is approved by EPA. Any changes will require time to incorporate into the regulations.

Mr. Turner to Mr. Brower, "So that is the 30,000 ft. level, was that sufficient? " Mr. Brower, "Yeah, I think that really brings us back."

Presentation from the Technical Subgroup

Ms. Koch introduced Dr. Deanna Huff with ADEC. Due to the highly technical issues, Ms. Koch recommended that questions be asked after each slide.

The presentation was presented by Dr. Huff, with PowerPoint slides. (Please reference the DEC website); the following is the summary of the presentation.

Dr. Huff acknowledge the work and expertise of the Technical Subgroup and Alan Schuler (ADEC). Dr. Huff emphasized the collaborative process they went through using the assumptions for modeling analysis; monitoring data; and work with industry, consultants and agencies.

Dr. Huff presented a timeline slide. Mr. Kuterbach asked about the green and blue lines. Dr. Huff

explained that green was anything ADEC was doing and the blue was anything AECOM and industry were presenting.

Data slides: Dr. Huff explained that first they looked at monitoring data. Dr. Huff provided an overview of the data considered: number of rigs, rig hours of operation, rig power source, off or on grids, one hour NO_2 concentrations, maximum fuel use, gallons per day, wind speed and direction, confirmed ambient data, confirmed emissions, and concentrations.

The data concluded that North Slope Drill rigs, operated under similar conditions, would not cause a violation; however, ADEC could not conclude that NAAQS would be protected under any scenario and would not threaten the one hour NO_2 standard.

Ms. Koch asked for pause and any questions. Mr. Brower restated the conclusion and asked "you could not make that determination?" Dr. Huff answered, "Right", and she further explained that the monitoring data and higher fuel use could or will have a violation. Barbara Trost further explained that the data was checked to show no future violations and did not have sufficient data. Mr. Brower ask for further clarification. Mr. Kuterbach explained that monitoring data represented certain operations and certain conditions, but under other conditions, that monitoring data could not predict if other operation would comply. Current operations comply but if operations change, that could not predict compliance.

Alice Edwards requested confirmation of the level of the one hour NO_2 standard. Ms. Trost stated, "a hundred PPB." There was discussion on the concentration levels. Mr. Kuterbach: "there are scenarios were it does demonstrate compliance, the monitoring data, but it doesn't demonstrate compliance under all possible scenarios."

Dr. Huff continued her presentations. She explained that the Technical Subgroup agreed that modeling was the best option to fill data gaps and provide guardrails for air protection and would cover all possible situations for drilling. Modeling is used for compliance demonstration for Minor General and Title V permits; however, continuous year round operations did not demonstrate compliance with one hour NAAQS.

Dr. Huff explained the modeling and statistical approach for the one hour NO_2 demonstration. They used model run with AERMOD and decided to use a Monte Carlo statistical approach. Mr. Turner asked if Monte Carlo was EPA approved. Dr. Huff confirm no, and she will explain that drill rigs run on and off and not continuously every day, so a statistical approach is best. There was an exchange with Randall Kanady, Dr. Huff, and Mr. Thomas to explain that AERMOD is the base model with a TRANSVAP approach.

Next slides: Dr. Huff explained that the model was the North Slope, and four drill rig categories were agreed upon by the Technical Subgroup: 1) routine drilling on isolated pad, 2) routine drilling on

collocated pad, 3) developmental drilling on isolated pad, and 4) developmental drilling on collocated pad. Josh Kindred asked a question on the categories and Mr. Thomas explained the difference and basis of the categories and that they could potentially be applied to off-shore drilling. Dr. Huff continued to explain graphs and tables on the slides that demonstrated the various on-off operations of the categories of drill rigs. There were 10,000 scenarios changing from five different wellheads. During the past year, the model was run using various assumptions. The Technical Subgroup reviewed EPA guidance, datasets, changes in rig characterizations, modeling assumptions, and reviewed the TRANSVAP runs. "So, a lot of work looking at the details…The goal was reviewing these modeling results and working together to make sure all the assumptions were agreeable to all—everyone came to same conclusion and goal."

Next slides: Dr. Huff gave details on other data into models such as stack height, buildings, and locations.
Mr. Kuterbach clarification that it was a typical drill rig and not a specific drill rig. Dr. Huff stated, "Right." Dr. Huff continued with data on 22 different drill rigs.

Dr. Huff stated the important aspects of the modeling analysis: assume vertical uncapped stacks, two different fuels and fuel consumption is constant, and fuel allocation varied by season. There was a change in the current AERMOD version; the current version is 15181, and it was used for the one hour NO_2 and PM-2.5. Ms. Koch asked if the PM-2.5 sensitivity run was to show the results for NO_2 did not change. Mr. Schuler confirmed, "That's right."

Next slides: Dr. Huff explained that they used Plume Volume Molar Ratio Method (PVMRM) to estimate NO_2. This is an alternative modeling technique, requiring EPA approval, and ADEC has been granted approval in similar requests.

Slide 17: Dr. Huff provided details on nominal fuel consumption of gallons per day. She explained how the nominal fuel values were run with the 4 drill rig categories as presented above. The most restrictive limit for NO_2 is 14,700 gallons per day. The other restrictive limits are 11,400 for collocated routine drilling, 14,700 for developmental drilling isolated pad, and 10,700 for developmental drilling collocated pad. Dr. Huff for all the scenarios the smallest limit is one hour NO_2 for developmental drilling at 10,700 gallons per day.

Slide 18: Comparisons; Slide 19: We modeled nominal fuel use limit to be conservative and that represented transient operations on drill pads. We later modeled excursions. Next slides, we modeled excursions with a 25% increase in fuel consumptions to randomly occur 20% of the time. Dr. Huff explained the random data over 10,000 models. The data was from pad A. There was discussion on the summary of the data. Ms. Koch confirmed that "for the proposed excursion limit, it is allowed 25% higher fuel, 20% of the time."

There were slides presented on ADEC comments on the excursion data. Dr. Huff confirmed that "this

modeling analysis needs to require vertical, uncapped stacks during drill rig activities."

Dr. Huff, "So the technical conclusion is that drill rigs fuel limits are for the North Slope drill rigs represented by the model drill rig. And it may not represent operations that include additional significant sources that we had not though about because that would – may lead to increase impacts." There was discussion with Mr. Kindred, Dr. Huff, and Mr. Kuterbach about the use of language and explanations on the number of rigs and data requirements. Mr. Schuler explained that looking at non-drill rig scenarios, such as fracking, would have different configurations.

Ms. Koch: "I just wanted to clarify, for the technical conclusion, these are the conclusion that there was consensus on. Right?" Dr. Huff concurred. Ms. Koch confirm that "if there were additional significant sources, it would just have to be evaluated and you have not evaluated in this context." Dr. Huff concurred.

There was discussion that the Monte Carlo approach itself has not been approved by EPA, but Region 10 is open to the concept and has not raised any red flags. The Technical Subgroup did document the modeling process. Mr. Brower asked if there was discussion on the meteorology for the North Slope. Ms. Trost confirm that the modeling was for North Slope operations, not Cook Inlet.

Presentation from Mr. Thomas: There was break, and Mr. Thomas presented via PowerPoint: "The modeling was conducted to establish guardrails of daily fuel volumes. It is robust, conservative, and can be broadly applied." We still need to do Cook Inlet and add some details for the North Slope. The goal was to cover diesel fired rigs that use engines for power, heaters, and boilers for heat. Mr. Thomas explain the pads used for the study and the use of AERMOD. The engines were non-tiered engines which means the NO_X emission rates were modeled higher. There was discussion with Mr. Thomas and Corri Feige on the collocated pads and data used to confirm sources that were accounted for in the background. Mr. Thomas discussed how the pollutants, including ozone, were appropriated for the North Slope. Mr. Kuterbach asked and Mr. Thomas confirmed that models included fuel usage higher than PTE, which a rig may actually do. Mr. Thomas explained background data used in the modeling.

Slides were presented with operation emissions. Mr. Kuterbach asked: "so the potential to emit is all the sources operating full out, that's the maximum emissions they could have?" Mr. Thomas confirmed "yes" for the record. There was discussion of the PTE of one rig and the number of rigs on a pad. Mr. Kuterbach said, "So it is greater than at the PTE of one rig…but not greater than the PTE of the rigs that might be at a site?" Mr. Thomas, "Correct. " There was further discussion on whether the modeling was conservative for a single pad, but not multiple rigs. Mr. Thomas discussed the use of nominal fuel limits that would apply per pad. There was further discussion to clarify that the fuel limits would be for the pad in operations.

Discussion on Straw Man Draft Regulations: Mr. Thomas presented a straw man draft of possible language for 18 AAC 50.502. The explanation was for including the Technical Subgroup's work on fuel limits and stack consideration into the regulations. There was discussion on how the regulations would include exceedances and how that would be applied to compliance. Mr. Turner asked and Mr. Thomas confirmed there could be 73 per year. There was further discussion on how that relates to days per year, how it would be applied, and how it could affect rig operations, in the context of the straw man draft regulations.

There was general discussion that existing drill rigs are permitted. Mr. Brower discussed the need for registration and mandatory reporting of compliance records. Ms. Koch agreed.

Options: Mr. Kuterbach discussed that these are options for drill rigs and that what Mr. Thomas presented is similar to the permit by rule. Mr. Kuterbach discussion the pros/cons of permit by rule or Minor General permit and that that the requirement to get a permit is in the SIP, but that ADEC has the flexibility of approving or not approving permits. The permit by rule would need to get adopted in the SIP, and EPA would be able to approve or disapprove the permit by rule. The general permit is already part of the SIP and the contents of the General Permit would not necessary come under additional EPA scrutiny.

Policy Discussion: Ms. Koch recommended that the discussion shift to policy discussion. Ms. Koch confirmed with workgroup members that they were satisfied and had sufficient technical information to proceed to policy discussion. There was some additional discussion on various technical issues. The Workgroup then concurred there was sufficient work on technical issues. Mr. Kuterbach encouraged an EPA representation be part of any policy discussion. Mr. Thomas and Mr. Kuterbach discussed the SIP and EPA approval and whether an amendment to the SIP should be developed first or with EPA input. Mr. Kuterbach stressed the need to have EPA participation as a resource for the SIP. Ms. Koch then asked each Workgroup member for their thoughts. Ms. Feige summarized the various technical outliers and thought they provided the bulk of the elements of the general permit. Mr. Munger discussed how the Technical Subgroup provided data and that the group has the ability to go back to the Technical Subgroup and pose the question if the regulatory agency had sufficient information. Ms. Koch confirm that there was sufficient information for the next step on policy. Ms. Koch then outlined for the Options Subgroup the permit by rule and general permit options. Ms. Koch then discussed who is on the Options Subgroup and the direction of the Options Subgroup. Mr. Kuterbach asked what the purpose is including "fleshing" out the details, answering certain questions, and understanding the characterization and concepts for the options. Mr. Thomas discussed that the Options Subgroup would present the pros and cons. Ms. Koch discussed the need for a smaller group, not the whole Workgroup, for the Options Subgroup. Mr. Gordon asked about other states. Mr. Turner provided the discussion of the other states' framework from previous Workgroup meetings. Mr. Kuterbach suggested the Options Subgroup can look at other states in the context of Alaska and protecting air quality. Mr. Thomas and Mr. Kuterbach discussed other states' approached and how Alaska uses permitting to protect air quality. Ms. Koch and Ms. Smith discussed who was previous identified for the

Options Subgroup. There was further discussion on what would be the most suitable size of the Options Subgroup. Mr. Kuterbach discussed whether the Options Subgroup could ask questions and do general permit review. Ms. Koch then led a discussion with the Workgroup, and they agreed the Options Subgroup should be 4-5 members. Mr. Turner proposed that the Options Subgroup will look at Mr. Thomas's proposal and permit by rule. There was discussion of the Options Subgroup, and Mr. Kuterbach discussed the need to come up with the concepts and then review which options would work. Ms. Feige said the big question is will EPA accept the Monte Carlo solution. There was discussion that Dave Bray of EPA has seen the Monte Carlo and there are no red flags.

Ms. Koch recommend the Options Subgroup be Mr. Thomas, Mr. Turner, Mr. Kindred, and Mr. Kuterbach; all agreed to be on the committee. The Options Subgroup will look at the pros and cons of whatever conceptual approach; and they look at regulatory, operational, cost, and timelines for the process. Ms. Koch confirmed with each Workgroup member on the size and scope. All concurred. Mr. Brower asked for timeline. There was a discussion by all parties for setting the next meeting on January 19th, by teleconference. There was follow-up discussion that the Technical Subgroup used North Slope data and that Cook Inlet data will be required. There was further discussion with Mr. Munger and the Technical Subgroup on what data and information would be used or required for Cook Inlet. There was further discussion on the use of PVMRM and EPA approval.

Action Items:

Options Subgroup to meet and present findings to the Workgroup Meeting scheduled for January. Please note this was later moved to Feb. 4, 2016.