MAINTENANCE START-UP AND SHUTDOWN (MSS): WHO? WHAT? WHEN? WHERE? WHY? AND HOW TO DEAL WITH IT

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Maintenance, start-up and shutdown (MSS) is an issue that every facility in the oil and gas industry must address at one time or another. This paper seeks to examine MSS and help ensure that facilities are properly planning for MSS and the associated regulatory burdens.

EPA has long held the belief that startup and shutdown of process equipment is part of the normal operations of a facility and that excess emissions during these periods can be prevented through careful planning so that permitted emission violations do not occur. However, state enforcement and implementation was inconsistent at best. Several states had provisions in their State Implementation Plans (SIPs) that specifically exempted emission limits during startup, shutdown or malfunction that EPA had approved in the past.

Sierra Club filed a petition for rulemaking requesting that several changes be made to how SIPs address MSS. This paper won't cover all the requests in the petition, but will focus on the changes that EPA proposed and the subsequent ramifications on the oil and gas industry. On February 13, 2013, EPA proposed a rule that would ensure that states have plans in place that require industrial facilities to follow air pollution rules during times when the facility is starting up or shutting down, or when a malfunction occurs. This rule maintains the option of the state to provide "affirmative defenses" in SIPs. An affirmative defense is allowable when well-managed facilities experience malfunctions due to circumstances beyond their control and would shield a facility from monetary penalties, but not from the responsibility to take action to limit future problems. Thus, affirmative defenses can no longer be claimed for excess emissions that occur when a facility is operating in a planned startup or shutdown mode.

Additionally, EPA has called on 36 states to correct specific provisions related to MSS in their SIPs to become consistent with the Clean Air Act. If EPA finds that a SIP is "inadequate" in meeting the Clean Air Act with regards to MSS, then the state has 18-months to correct and submit their state plans to the EPA. Thus, this lawsuit and subsequent rulemaking got a lot of states to look at their MSS rules and make sure that they were in line with the new requirements that planned MSS had to meet the emission limits of the Clean Air Act.

Now that the need to re-examine MSS has been established, it is necessary to define what is considered to be a maintenance, startup and shutdown activity. There are two types of MSS, planned and unplanned. Planned MSS is sometimes referred to as Scheduled MSS, or SMSS. These are events that can be planned for in advance. Routine maintenance falls into this category whether it is on a daily, weekly, monthly, annual or less frequent schedule. Facilities likely have forms or checklists for planned MSS activities to ensure that they are performed in compliance with a schedule.

Examples of planned MSS activities include reciprocating compressor blowdowns due to the rod packing requirements in NSPS Subpart OOOO since it is known that it needs to be replaced every 36 months. Compressor blowdowns due to routine oil changes or maintenance would also need to be permitted. If the facility has floating roof tanks, then annual tank landing may need to be permitted. If tank painting and blasting occur on a regularly scheduled basis, then the emissions from those operations would need to be permitted as well.

Any routine occurrence that is a foreseeable event during the operation of the facility needs to be permitted. The question arises on foreseeable events that are unusual in nature. For example, when the temperature drops below 32° F, certain facilities within your plant stop working. If this happens on average 12 times per year, does this qualify as planned MSS? More likely than not, the DEQ is going to say that this event falls under uncontrollable "Act of God" and is not subject to permitting. However, it would be advised to consult the applicable Department of Environmental Quality (DEQ) in instances where there is a question on whether the MSS should be included in permitting.

Unplanned MSS is also commonly referred to as malfunction, upset emissions or emissions events (EE). These are unpredictable events. Acts of God, equipment failure, power outages, plugged equipment, etc. fall into this category. These emissions cannot be permitted in most states. New Mexico does have a new General Construction Permit (GCP) that has the option of reducing excess emissions by allowing the applicant to choose an option on the application for a<10 tpy VOC "malfunction emission limit". These emissions may or may not have to be accounted for or reported. Specifics on accounting and reporting MSS emissions will be examined later in the paper.

Examples of unplanned MSS emissions are emissions resulting from a lightning storm knocking out the power so electric-powered equipment goes offline or lightning strikes a facility setting it on fire. It could also include mechanical failure of a facility like a hole in a heater-treater. While these events could be brainstormed as possible scenarios on what could cause unplanned emissions from a facility, they are not considered part of normal operations. Something unexpected occurs to cause the emissions.

The Texas Commission on Environmental Quality (TCEQ) has also begun stressing the importance of determining Alternate Operating Scenarios (AOS) when evaluating MSS during permitting. Alternate Operating Scenarios are different ways that your plant might operate under different circumstances. Historically, one may think of a situation where a plant may permit the option to be able to run electric engines as one scenario or an alternate scenario where the engines are gas-operated. The reason for the alternate scenario, be it economic or logistic, is irrelevant for permitting. These are pretty cut and dry situations where it is easily seen that there are two different modes of operating the facility.

This past fall, TCEQ had an interesting presentation on AOS at the Advanced Permitting Seminar. The agency said that AOS has been around for years in permitting, but they felt the need to provide some clarification on the matter in light of the recent changes in permitting involving MSS. The easiest way to examine this issue is through a few examples.

For the first example, the facility has a Vapor Recovery Unit (VRU). Routine maintenance is planned on the unit, so that has to be permitted. Traditionally, the emissions from the routine maintenance, blowdown emissions and emissions from whatever is happening to the stream normally directed through the VRU during that time would be considered MSS emissions. TCEQ now maintains that this case is actually MSS and an AOS. Blowing down the VRU for maintenance is MSS and the emissions must be accounted for in that way. However, what happens to the stream normally directed through the VRU at the time of MSS may be considered an AOS. It is a different way that the facility operates during a certain period.

There are a couple of options about what might happen to that stream during the MSS event. The first option is that the stream is shut-in so that it is not emitting. This may or may not mean that production can continue, depending on the process, but no emissions are occurring other than the blowdown from the VRU, which we have determined are MSS. This would NOT be considered an AOS. Only MSS is occurring during this scenario with normal operations either continuing or ceasing temporarily. The second option is that the stream that normally comes through the VRU is routed to a flare, other control device, or vented while the MSS is occurring. This creates an AOS during an MSS event. The stream that would normally be directed to the VRU is instead directed to the flare or control device and thus the facility is operating differently under certain conditions.

Next is an example involving three compressors. The facility has 2 compressors that operate 24/7/365. The other compressor is a back-up compressor. During blowdown of one compressor, the gas is routed through the back-up compressor. Is this MSS, MSS and AOS or AOS only? The answer is, it depends on what compressors the facility has. If all 3 are the same compressors, then it is irrelevant which 2 are running and then there is only MSS on the blowndown compressor with normal operations occurring for the rest of the facility. If the 3 compressors are not the same, then there is an AOS scenario with MSS emissions from the blowdown.

The next example is in regards to floating roof tanks. Floating roof tanks have certain requirements that may or may not require annual maintenance requirements. As such, it may need to be considered for MSS/AOS status. This is a more complicated issue, because TCEQ came out with a memo in 2006 that unless you can prove that the roof remained floating, then your emissions were likely underestimated and therefore unauthorized. This is a matter where you it would be EXTREMELY important to consult a third party with knowledge in this area or to contact TCEQ directly on this matter. With that being said, during periods of maintenance, the emissions would be considered MSS, but during periods when the roof tank was not floating and was landed, the emissions may be an AOS.

Tank painting and blasting, which is also listed on the planned MSS list, does not normally affect operations. Normal operations can continue during this time. MSS emissions will occur and if they are scheduled, then they should be accounted for or permitted. If the tank painting or blasting causes an interruption in the normal operations, then an AOS would need to be considered, but this is not normally the case.

The last planned MSS activity that was listed is routine occurrences. This was explained to cover a broad range of activities that was unusual, but foreseeable. For example, one facility experienced instances where the gas gatherer would shut-in their sales line and stop accepting gas due to scheduled maintenance or excess volume on average a couple of times a year. They needed to be able to flare the gas to continue producing oil. This couldn't legitimately be called upset emissions, because they would get a couple of days' notice before it would happen and could bring a flare out. Thus, they should legally plan for these instances, even though it was not due to actions on their part. It also could not be called MSS emissions, since there was no maintenance occurring during this period. Thus it was considered an AOS. So no MSS activities occur when the sales gas is required to be flared due to the gas gatherer shutting in the sales line on a scheduled basis.

Now that MSS has been defined, it is necessary to know who is subject to these regulations and the compliance dates for the facility. Since the MSS requirements originate from federal regulations, all facilities in every state are subject to the regulations, unless the facility is specifically exempted from permitting. Yet each state DEQ has some flexibility in applying the rules and thus specific regulations will differ amongst each state. This paper will provide information for Oklahoma, New Mexico, and Texas with regards to specific rule information.

Oklahoma and New Mexico were among the 36 states that were deemed to have "inadequate" provisions in place to ensure compliance with the Clean Air Act with regards to MSS. EPA approval of the Oklahoma and New Mexico SIP provisions regarding MSS is still pending approval as of March 10, 2014. EPA is expected to take final action on the proposals in May 2014. At that time, affected states will be given 18-months to determine how they will comply and implement the new provisions. Texas had a deadline of January 5, 2014 to permit MSS emissions for existing facilities.

Now that it has been determined who is subject, what MSS is, when a facility is subject to the rules, and why these changes came about, the question is how does a facility deal with permitting MSS. Facilities in Oklahoma and New Mexico (or other states with pending SIP approvals) cannot simply choose to ignore the issue until the fate of the SIP is determined. Since these are federal regulations, they still must be followed by the facilities. As such, compliance in states with the pending SIP approvals becomes more difficult. It is advised that foreseeable scenarios

of MSS be developed and permitted to avoid compliance issues. Consultation with the specific DEQ is advised if MSS matters are not straightforward.

The first step to dealing with the MSS emissions is to calculate them. There are several ways to approach the situation, but for the oil and gas industry one of the easiest is to use a tool developed by the TCEQ, the "Oil and Gas Emission Calculation Spreadsheet" that is available at www.texasoilandgashelp.org . This spreadsheet is programmed in with accepted federal and state emission factors. (Unfortunately, the formulae cannot be edited for other emission factors if they differ from the state of Texas.) Other state DEQs (Oklahoma, New Mexico and Arkansas) have found the TCEQ spreadsheet to be acceptable in submissions for permits. This is especially true in states whose oil and gas programs are not as developed as Texas' (which is true for most states other than California).

The next step is to determine the permitting vehicle necessary to authorize the emissions. Again, for Oklahoma and New Mexico it may be harder to include these emissions in their current permitting structure. Oklahoma has a new oil and gas permit that does not specifically address MSS emissions, but limits VOC emissions to less than 25 tpy. Calculating the potential MSS emissions and ensuring that they are below the threshold with normal operational emissions should be an acceptable option for permitting. New Mexico has several various General Construction Permits (GCPs) that authorize specific units at a facility. New Mexico's new GCP-6 specifically deals with OOOO regulations for tanks. It includes an option to permit malfunction VOC emissions of up to 10 tpy. It also states that MSS emissions are considered part of the allowable annual VOC limit for tanks in the GCP-6 permit and other federal regulations that have been revised recently. If it is unclear whether MSS emissions can be authorized via a specific vehicle, then third party advice should be sought or consultation with the DEQ.

Texas has several ways to authorize MSS emissions. If the TCEQ spreadsheet is used, then emissions can be generated in the spreadsheet and authorized via the 106.352 PBR or a Standard Permit. However if the facility does not need a revision to their current authorization, Texas implemented a new PBR 106.359. This PBR authorizes planned MSS emissions as long as site-wide emissions continue to meet the general PBR limits of <25 tpy VOC, <10 tpy HAPs, etc. This is a great option for many facilities, as there is no registration with TCEQ required. There is a record-keeping requirement and normal reporting guidelines apply.

The last topic that needs to be covered with regards to MSS emissions is when they need to be reported. Each state has their own specific reporting requirements for MSS and excess emissions. This paper will only examine the excess emissions reporting requirements for Oklahoma, New Mexico, and Texas.

In Oklahoma, all facilities that require a permit are required to file an emissions inventory, which includes all emissions, including excess emissions, from the facility for the calendar year. Excess emissions require notification prior to 4:30 pm the following working day by phone, email or web if it is in excess of a limit of a hazardous air pollutant or a toxic air contaminant or in excess of a limit of a criteria pollutant or ozone precursor emitted from a source located in a nonattainment area for the relevant criteria pollutant. Immediate notification is not required for excess emissions associated with the primary cause of a startup or shutdown, excess emissions that do not exceed 10% opacity above the applicable opacity standard; or excess emissions that do not exceed 10% opacity above the applicable opacity standard and are <200 lb of the relevant regulated pollutant during any 24-hour period. A report is required on all excess emissions within 30 days after the start of any event.

In New Mexico, notification is required no later than the end of the next regular business day on state-provided forms. A final report is due in 10 days after the start of the event.

In Texas, notification is required for emission events that exceed Reportable Quantities (RQ) as listed in 40 CFR 302, Table 302.4, column labeled "final RQ"; 40 CFR 355, Appendix A, column "Reportable Quantity"; the amount listed for specific chemicals in 30 TAC 101.1 (88) (A) (i) (III) or mixtures of air contaminant compounds as listed in

30 TAC 101.1 (88) (B); for opacity from boilers and combustion turbines that ≥15% above the applicable limit, averaged over a 6-minute period; for facilities using Continuous Emissions Monitoring Systems (CEMS), the amount determined by the applicable limits in 30 TAC 101.1 (88) (D) and a screening model. Records must be kept of non-reportable events and reported on the Emissions Inventory (EI) for Title V facilities or those facilities that are required to file a Special Inventory.

Maintenance, start-up and shutdown is an issue that arises at every facility in the oil and gas industry. Determining what is planned versus unplanned MSS ensures that the facility can be properly permitted. Proper notification and recordkeeping is vital to maintaining compliance with applicable regulations for facilities.