Engine Component Swap-Out Query

I am seeking advice or guidance how other state or local agencies deal with the practice of reciprocating engine and turbine component replacements vs. federal emission standard applicability. 3rd party vendors offer a swap-out program by which the owner/operator removes an existing device & replace it w/ an overhauled unit from a vendor. This saves the owner/operator down-time necessary to overhaul a unit damaged or overdue a major overhaul. Owners, operators and the Permitting Agency responsible for federal source compliance need to know whether an engine or turbine swap-out triggers

Applicability Challenges for the agency:

- Incorrect or incomplete client assessments will challenge the agency from making correct determinations & follow-up.
- NSPS and MACT provisions determine applicable requirements based on manufacture date for RICE or the "commence construction" date for turbines. A replacement engine or turbine would bring with it a different manufacture date or construction date, possibly subject to differing NSPS or MACT standards than the replaced unit.
- Unknown 3rd party replacement block/engine pedigree will prevent clients from properly classifying applicable requirements. A replacement engine may be repurposed from other use to stationary source usage.
- To us, RICE engine manufacture date would follow the engine block as the elemental component of the engine.
- For combustion turbines it is not clear. Which turbine component constitutes engine replacement? Gas generator? Power turbine?
- The date of manufacture is retriggered if a block is reconstructed using entirely new parts (see 40 CFR 60.4219), so it appears we should treat such remanufactured engines as new. However, the replacement engine rebuild may also use some re-machined existing parts.
- Configuration changes between the replaced and replacement units or components may constitute a physical change or change in the method of operation that increases emissions (modification under NSPS).
- For turbines and engines, this practice appears prevalent in the oil and gas industry. However, each swap would have unique component capital costs to compare with capital costs to replace the entire "facility," under the NSPS "reconstruction" definition 40 CFR 60.15. Does another agency have a presumptive reconstruction cost determination that this engine swap-out practice does not constitute reconstruction?.

NACAA Survey Responses
Engine Component Swap-Out Query

	Agency	Point of Contact	Phone	E-mail	Response Hyperlink	Turbine Response	RICE Response	NSR	MACT
Clark County, NV	Department of Air Quality	Richard Beckstead	(702)455-1669	beckstead@ClarkCountyNV.gov	Nevada Response	X			
St. Paul, MN	Minnesota Pollution Control Agency	Carolina Espejel-Schutt	(651)757-2706	carolina.schutt@state.mn.us	Minnesota Response	X		X	
Connecticut	Dept. of Energy and Environmental Protection Bureau of Air Management	James Grillo	(860)424-3570	james.grillo@ct.gov	Connecticut Response	X		X	
Denver, CO	Dept. of Public Health and Environmen	Matt Burgett	(303)692-3183	matt.burgett@state.co.us	Colorado Response	X	X	X	X
Charleston, WV	Dept. of Environmental Protection	Robert Keatley	(304)926-0499 ext. 1695	robert.l.keatley@wv.gov	West Virgina Response	X		X	
Little Rock, AR	Department of Environmental Quality	Thomas Rheaume	(501)682-0762	rheaume@adeq.state.ar.us	Arkanasas Response			X	
Michigan	Department of Environmental Quality	Melissa Byrnes	(517)284-6790	byrnesm@michigan.gov	Michigan Response	X	X		X

Response:

I don’t know if it helps, but I think I asked this question before to EPA. See attached

I got nowhere

Thomas Rheaume
Permit Branch Manager
Arkansas Department of Environmental Quality
Air Division
5301 Northshore Drive
North Little Rock, AR 72118-5317
501 682 0762 Phone
501 682 0880 Fax

Attachment:

EPA Replacement Response

Response:

Hello James,

Attachments:

2011 Reconstruction Guidance
Reconstruction JJJJ engine

The State of Michigan has also been experiencing the same applicability challenges. We have developed a stakeholders group which consists of the Landfill Gas to Energy Industry, engine manufacturers, consultants, MDEQ permitting staff, and MDEQ district compliance staff. We started with the Landfill industry first, since recently we have seen more regulatory issues with the landfill gas fueled engines.

We would appreciate it tremendously if you would be willing to share any information you receive regarding your inquiry. We believe it could be a great benefit to Michigan, if we knew what other permitting agencies are doing, also.

Please feel free to contact me, if you have any questions

Thank you,

Melissa Byrnes
Senior Environmental Engineer
Michigan Dept. of Environmental Quality
Air Quality Division - Permit Section
(517) 284-6790
byrnesm@michigan.gov

Melissa,

Thanks for following up with Alaska.
Just wanted to pass along an interesting document I found from a group called the Gas Compressor Association. They published a guidance document in 2011 regarding reconstruction of spark ignition engines for natural gas compressor units (although could be applied to any RICE). The document (attached) provides a methodology for calculating reconstruction costs and also speaks to the "in-frame" and "swap" engine maintenance that we have been discussing. I've also attached a powerpoint that they did that is a little

Check it out. I would be interested to get your feedback prior to our January meeting. It might also be helpful to point this out to

Dave
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Air Quality Division
350 Ottawa NW Unit 10
Grand Rapids, MI 49503
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www.michigan.gov/deqair

Response:

Jim,

In Clark County, Nevada, we have several natural gas power plants and natural gas compressor stations that use what is typically called mini-turbines. These units are swapped out without triggering an analysis for different NSPS or MACT standards because they are part of a turbine pool. Our example involves Solar and Pratt & Whitney turbines with ratings from 44 to 58 MW. The vendor sets up a pool of turbines that cannot be added to. Exchanges are made using like-in-kind units, same make and model. As a unit reaches a point where it cannot be repaired, it is removed from the pool. As the pool becomes depleted, the end-user must update to a newer turbine that meets the current standards. My discussions with EPA Region 9, and the vendors, led me to understand that this is allowed because the pool has a definite life span. If new units were added to the pool at any time, EPA would not allow the exchanges without undergoing NSR. EPA Region 9 checked with headquarters and were told that they were allowing this to continue without comment. In other words, they are not sure they like it, but, have not taken any steps to challenge it as long as the vendor's program doesn't include enough units to challenge the concept of a reasonable for the emission unit.

We had to change the way we described the emission unit to address the turbine package instead of just the turbine. That way, the exchange could be allowed as routine repare and maintenance.

Richard Beckstead
Permitting Manager
Clark County Department of Air Quality
(702) 455-1669
beckstead@ClarkCountyNV.gov

Response:

We have two examples we hope are useful to you:

Attachments:

Turbine Relocations and Impacts on NSPS Applicability
Gas Turbine Definition and Modification Issues
Turbine Requirements

1. We are currently drafting a Title V permit reissuance for Northern Natural Gas Co. in Farmington, MN. Northern has requested permit conditions to allow them to implement a turbine exchange program. We expect to have this permit on public notice and available for view on our website sometime in February. Ben Carlson-Stehlin of our staff is the assigned permit engineer. Here are Ben's notes regarding this draft permit:

Northern Natural Gas Co. in Farmington is major for both NSR and Part 70. The following is an explanation of the replacement under the different programs. The potential emissions from the turbine are lower than the PSD significant thresholds so the replacement does not trigger NSR in any way unless the permittee chooses to increase the capacity of the turbine. Attached is the Permit Language itself explaining the rules that would apply if the replacement was considered a modification. There are also many applicability determinations which were helpful in the process.

New Source Performance Standards (NSPS)

The stationary gas turbine (EU007) is subject to NSPS subp. GG, Standards of Performance for Stationary Gas Turbines. If the cost of gas turbine component replacement meets the definition of reconstruction under 40 CFR § 60.15, 40 CFR pt. 60, subp. KKKK would apply instead of pt. 60, subp. GG.

National Emission Standards for Hazardous Air Pollutants (NESHAP)

EU 007 is an existing stationary combustion turbine. Under 40 CFR § 63.6090(b)(4), "Existing stationary combustion turbines in all subcategories do not have to meet the requirements of this subpart and of subpart A of this part. No initial notification is necessary for any existing stationary combustion turbine, even if a new or reconstructed turbine in the same category would require an initial notification." Therefore, the facility has no requirement to comply with NESHAP subp. YYYY for Stationary Combustion Turbines. If the turbine is reconstructed, the unit will be subject to this standard.

Title I Condition: To avoid classification as major modification under 40 CFR § 52.21 & Minn. R. 7007.3000

Provision for replacement of combustion turbine components. The restrictions of the authorization allow the change to avoid being a major modification under NSR. The potential to emit for each pollutant emitted by this unit is less than the major modification threshold, so the NSR emissions increase analysis for component replacement will be less than the major modification thresholds.

It is possible that component replacement would be considered reconstruction and the unit would then be subject to 40 CFR pt. 63, subp. YYYY as a reconstructed unit at a major HAP source. The permit states that the Permittee must apply for a permit amendment to incorporate the NESHAP into the permit if this occurs. In addition, as of permit issuance, the limits that would apply to the turbine are *stayed* under the rules (see 40 CFR § 63.6095(d)) until EPA takes final action and revises the rule. This may change at some point, so it is better to leave any specific requirements out of the rule and just require the facility to obtain the appropriate permit amendment.

40 CFR pt. 60, subp. GG; Minn. R. 7011.2350 National emission standards of performance for stationary gas turbines.

The unit is subject to NOX and fuel sulfur/SO2 limits and has a previously approved fuel sulfur content monitoring program.

40 CFR pt. 60, subp. KKKK Standards of Performance for Stationary Combustion Turbines.

The permit allows EU 007 component replacement, therefore it is possible that the cost of replacements could reach the point of reconstruction under NSPS. If this is the case, the unit would be subject to 40 CFR pt. 60, subp. KKKK. NSPS provisions cannot currently be incorporated into a permit via an administrative amendment under Minnesota rules, so these are included in this permit.

Language was added to the permit to authorize periodic replacement of the EU 007 turbine engine, any of the turbine engine components (compressor, combustor, and high pressure turbine), and/or the power turbine with similar components. The authorization does not allow any change that would increase the hourly emission rate of a regulated pollutant, trigger new applicable requirements, or result in noncompliance with existing permit conditions. When a replacement occurs the Permittee is required to submit a written notification stating the manufacturer, model number, and serial number of the new turbine engine/component/power turbine as well as justification that modification or reconstruction has not occurred under PSD or NSPS. If the change is a replacement or routine maintenance and repair, the Permittee shall include the serial number in the notification in order to update the EU 007 data in the MPCA permitting database.

2. Temporary replacement of boilers and emergency generators.

We issued a Title V reissuance permit to Xcel Energy – Allen S. King Generating Plant authorizing temporary replacement of industrial boilers and emergency engines. The King Plant is a major source under Titles I, II and V. The restrictions on temporary auxiliary boilers and emergency engines were expanded to ensure these are sufficient, enforceable and effectively avoid triggering a major modification under PSD. Other restrictions are added to define the applicable requirements and conditions are added to ensure compliance with these requirements. These are consistent with MPCA guidance on flexible permit terms. The issued permit No. **16300005-012** can be viewed at:

http://www.pca.state.mn.us/index.php/air/air-permits-and-rules/air-permits-and-forms/air-permits-issued-in-minnesota/air-permits-issued-in-minnesota-for-facilities-t-z.html

We hope this is helpful to you. Please let us know if you have further questions or comments.

Regards,

Carolina Espejel-Schutt, P.E.
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Air Quality Permits Section
Industrial Division
Minnesota Pollution Control Agency
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Phone: ((651) 757-2706.
Fax: (651) 296-8717

Response:
Hello,

Attachment:
INGAA Turbine Overhaul Paper

What did you guys decide? We are working on something similar in WV. I have attached some information that was given to us.

Thanks

Robert Keatley, PE
Senior Engineer
Supervisor, Compliance and Enforcement
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west virginia department of environmental protection
"Promoting a healthy environment"

Response:

From: Baumgartner, James R (DEC) [jim.baumgartner@alaska.gov]
Sent: Monday, December 16, 2013 11:50 AM
To: Grillo, James
Cc: Baumgartner, James R (DEC)
Subject: RE: Replacement engines and turbine components vs. federal stationary source standards

Jim,

Thanks. Connecticut's present approach sounds consistent w/ our current practices. Case-by-case evaluation. We are hoping some respondents have a more streamlined, rational approach to reduce time & effort.

Jim Baumgartner

-----Original Message-----
From: Grillo, James [mailto:James.Grillo@ct.gov]
Sent: Saturday, December 14, 2013 3:01 PM
To: Baumgartner, James R (DEC)
Subject: RE: Replacement engines and turbine components vs. federal stationary source standards

I would say that each time this happens we will look at it on a case-by-case basis. For an example we recently had a turbine sustain a significant failure and we made them look at reconstruction even though they wanted to claim that they were just going to exchange the "core" since they were about to hit their major overhaul anyway. I'm not sure what the final decision on that unit was because it was not one of my cases and I'm not sure it has been decided officially yet.

Just to be clear, We do not have a policy in place right now but I think that we will be looking as we have permitted a fair amount of co-gens in the last 4-5 yrs.

A core replacement could be considered maintenance but it would be up to the source to make that case.

Jim

_____
From: Baumgartner, James R (DEC) [jim.baumgartner@alaska.gov]
Sent: Friday, December 13, 2013 1:54 PM
To: Grillo, James
Cc: Baumgartner, James R (DEC)
Subject: RE: Replacement engines and turbine components vs. federal stationary source standards

Jim,

Thank you. In short, your agency considers the turbine core replacement/overhaul to be a maintenance activity, but this project had an emission rate increase, which triggered Subpart KKKK. I've received several responses so far. We plan to use the responses to formulate guidance for our

Jim Baumgartner

-----Original Message-----
From: Grillo, James [mailto:James.Grillo@ct.gov]
Sent: Thursday, December 12, 2013 9:54 AM
To: Baumgartner, James R (DEC)
Subject: Replacement engines and turbine components vs. federal stationary source standards

James,

I am responding to your question through NACAA concerning engine replacements. I cannot say that we have a defined policy on this topic but we did look at a co-gen turbine a few years ago when the 30,000 hour major maintenance overhaul was done to the unit. Keep in mind that this is a minor NSR permit.

The original NSR permit for the 14 MW turbine included the requirements for Subpart GG and when the permittee informed us that the major overhaul was also going to include an up-rate to the maximum fuel firing rate we decided to look closer at the project to determine if this was indeed a maintenance activity, a modification or reconstruction.

We determined that, while it is common practice for this size turbine to have a "core replacement" after extended operating hours, we would consider the fuel firing up-rate as a modification under NSPS and our minor NSR program because there was going to be a potential pound/hr increase for SOx. Most of the pollutants had either the same or lower short-term emission rates but the SOx did not have an enforceable limit so there was going to be an increase.

As a matter of BACT we reduced the maximum sulfur content of the distillate fuel from 500 ppm to 15 ppm and adjusted the other pollutants accordingly. Since we also determined that a modification under the NSPS would occur, Subpart KKKK would now apply to the whole facility.

We have been talking about this topic internally but there has not been any policy developed. I know that our Enforcement section was discussing your request and we probably will be talking about it more in the next few weeks.

If you have any questions please let me know

Jim

James A. Grillo
Air Pollution Control Engineer
CT Dept. of Energy and Environmental Protection Bureau Of Air Management
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Website: http://www.ct.gov/deep

Response:

Jim,

I'm not an expert on these issues, but Colorado does have engine and turbine alternative operating scenario provisions that we include in many permits. We had to address these issues since we have a large oil & gas industry in our state that often require quick replacement of units to continue operating. These types of actions are getting more and more complicated due to the requirements of the federal rules that you mention. You can take a look at the following guidance documents on the website link below:

98-07
98-06

http://www.colorado.gov/cs/Satellite/CDPHE-AP/CBON/1251597387439

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