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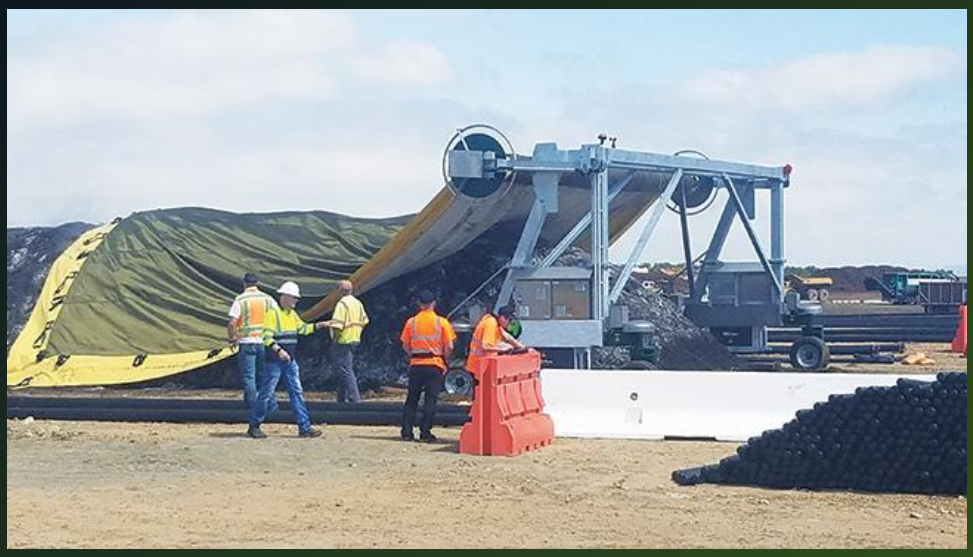

News ▸ Compost/Organic Recycling

Meeting Evolving Air Quality Regulations and Permit Requirements for Composting Facilities

September 29, 2023

As you begin planning for a future new or modified compost facility, it is important to get an update on the status of air quality permitting and regulatory requirements and to vet options in testing, monitoring, and emissions control technologies.

By Patrick Sullivan, BCES, CPP, REPA

As governments, industry, and citizens prioritize reducing greenhouse gas emissions, the mandates for more organic material diversion from landfills increase due to the potential to reduce methane emissions from landfills. With this decarbonization strategy, more states and municipalities are turning to composting as an alternative destination for green and food waste. They recognize the potential for composting to extend landfill lives, tackle climate change, and reuse valuable resources. But now, air quality regulatory agencies are looking closer

at associated emissions from composting, particularly volatile organic compounds (VOCs), ammonia, and toxic air contaminants. As compost operators develop new facilities or expand their existing footprint, they will face more regulations around these and other air emissions.

This article discusses air compliance and permitting requirements specific to composting in certain states and air districts, some of which are taking the lead in regulating composting. It covers questions to ask these regulatory agencies to proactively prepare a facility operator to obtain the necessary permits and meet the likely regulatory requirements under air quality programs. We will explore jurisdictions that already have robust air quality requirements for compost facilities and how to prepare for similar vigorous standards that, inevitably, are coming.

As part of that, we will look into monitoring and testing options and engineered emissions control systems. These tools will become increasingly essential for gathering information and ensuring compliance at a time when regulators, with limited formal data on compost emissions, are taking a conservative stance and overestimating potential releases into the air.

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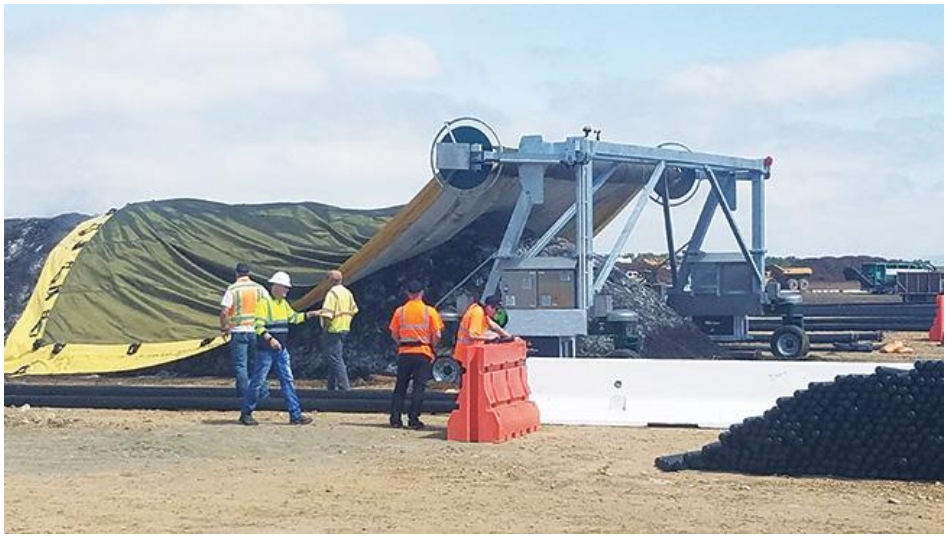


Large scale composting. Photos courtesy of SCS Engineers.

Evolving Permit Requirements and Rules

Like several other environmental programs, California is leading the way in regulating compost facilities. California requires a reduction in organic waste disposal by 75 percent by 2025 (SB1383), which has created an urgent need for new and expanded compost facilities to manage this material. At the same time, some local air management districts in the state have established rigorous permitting requirements and are even writing stringent air quality rules specific to compost operations. Washington and Minnesota have followed suit regarding more stringent composting regulations under their air permitting programs.

California's San Joaquin Valley Air Pollution Control District (SJVAPCD) and the South Coast Air Quality Management District (SCAQMD) are the first jurisdictions to establish source-specific rules for composting, which mandate certain management practices, control systems, and testing requirements for regulated facilities. The Bay Area AQMD (BAAQMD), which has a very stringent air permitting process for compost facilities, is developing similar regulations, while others are incorporating some level of air quality standards into their permitting process. For example, the San Diego APCD, Sacramento Metropolitan, Yolo-Solano AQMD, Feather River AQMD, and several other smaller air districts require some level of air permitting for compost facilities.

As composting expands in other states and more agencies become aware of the potential emissions, the California air district policies will likely serve as templates for other districts and states. In time, this movement may spark the EPA policy, such as developing a federal New Source Performance Standards (NSPS) rule, similar to how EPA promulgated an NSPS specific to landfilling, requiring operators to reduce VOC and methane emissions.

However, where these evolving standards exist, they are still maturing, changing quickly, and are quite different from one geographic area to another. Requirements vary by state, district, and even by which emission sources are considered in permitting (e.g., active piles, curing piles, stockpiles) as well as what pollutants are regulated (e.g., VOCs from composting, ammonia from composting, toxic pollutants from composting, fine particulate matter from grinding and other processes).
For instance, Maryland is among the states with requirements concerning emissions from equipment that compost facilities operate. Kansas regulates compost air emissions around odors, as do some other jurisdictions. Washington, Illinois, and Minnesota require full-scale permitting of compost facilities under their air programs. Ohio, North Carolina, Texas, South Carolina, Missouri, and Utah have permitted equipment associated with composting operations (such as the diesel engines used for grinding), but not for the compost piles. However, no other jurisdictions outside of California have source-specific rules for composting.

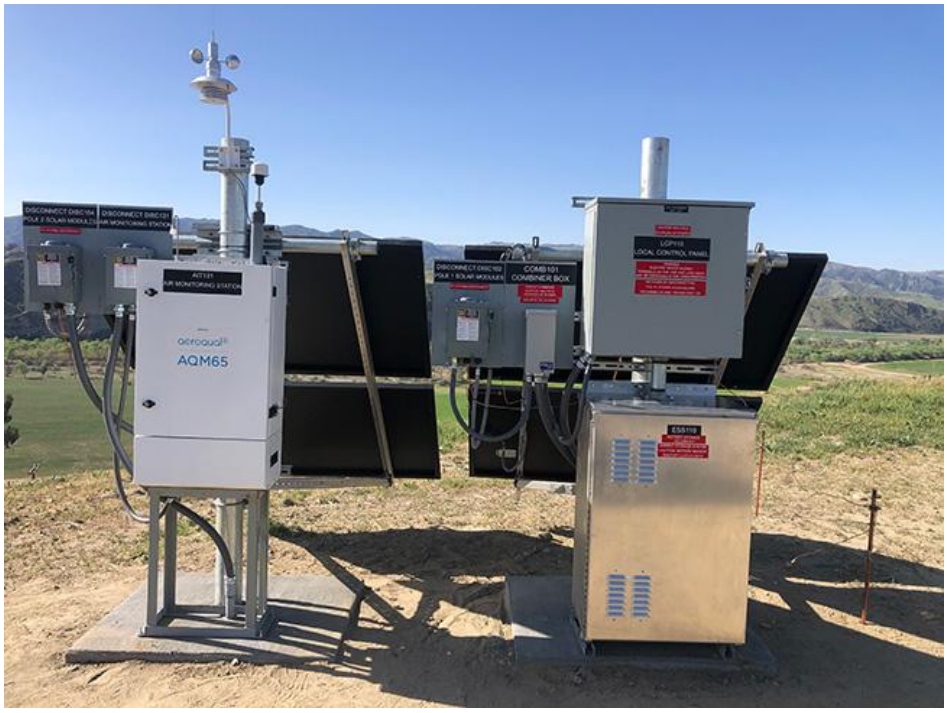
For now, most states and local agencies defer to the EPA's Clean Air Act (CAA), which has no mandates specific to composting. However,

VOCs and some other organic constituents. The stipulations give the EPA or a state the authority to regulate composting if they so choose. State/local air quality agencies also can adapt and expand upon federal regulations, so those agencies can go beyond what EPA has done, as other states have already implemented rules. In the absence of any federal regulation, the regulatory framework for compost facilities is highly variable by jurisdiction, and there is no cut-and-dry set of criteria for agencies to use in regulating or permitting compost operations.

Adding complexity, the CAA incorporates several programs with different emissions thresholds and requirements, depending on multiple factors. Remaining versed in varied and shifting policies takes diligence and is essential to designing systems for success, streamlining the permitting process, and sometimes saving money.

At the federal level, three different permit programs with varied emissions thresholds and rules depend on factors such as nonattainment status (nonattainment areas have emissions above EPA standards). For example, EPA's Title V program has a 100-ton-per-year (TPY) threshold for criteria pollutants. But the threshold drops if operators are in nonattainment areas.

EPA's Prevention of Significant Deterioration (PSD) applies in jurisdictions that attain federal standards. It sets a limit of 250 TPY of pollutants, but imposes additional requirements. The New Source Review (NSR) program applies only in nonattainment areas and has different thresholds. Like PSD, if operators trigger NSR, they must meet more stringent requirements.



Air monitoring powered by renewable energy.

Jurisdictions Setting Compost-Specific Rules

Some states go further, setting lower air emissions thresholds than designated in the federal permit programs and they impose other stipulations on top of any federal thresholds. The BAAQMD in California implements the most stringent permitting requirements for composting. The agency limits and regulates multiple individual emissions sources: stockpiles, active composting, curing piles, and road dust from vehicles, among others. And BAAQMD counts all emissions for all sources, even if considered fugitive. If facilities exceed 35 TPY of VOCs, operators must buy expensive offsets. Best available control technology (BACT) requirements trigger at 10 lb./day of VOCs, which requires the installation of robust engineered emissions controls. The BAAQMD defines BACT as a covered aerated static pile (CASP) system with a biofilter or biocover. CASP technology pulls or pushes air through perforated pipes connected to a blower; the biofilter or biocover treats the contaminated air. Most facilities in BAAQMD will trigger both BACT and offsets, which can significantly increase the cost of composting. The BAAQMD permits contain

emission limits and mandatory testing to demonstrate compliance. There are also operational requirements on the compost facilities, such that they are operating in a manner to reduce emissions and odors.

What Operators Need to know

As you look to build or expand a facility, your initial questions should be, are the jurisdictions where I plan to operate requiring permits for compost facilities, and if so, what are they permitting and at what level of complexity?

You will also want to know the specific permitting requirements and nonattainment status to determine if your facility's emissions would trigger a federal, state, or local permit. The state or local air quality district can provide a clear understanding of the provisions and how they would apply to a proposed facility. Recognize that an existing facility may be grandfathered to older requirements, but the agency can impose new requirements once it is modified or expanded.

Odors have long been on regulators' radar; expect attention to odorous releases to heighten, especially as organic diversion policies drive more food waste to compost piles. Most jurisdictions have at least a basic nuisance rule, which may not be specific to compost facilities, but would still apply to such operations. Operators should ask if there are specific compost permit provisions around odors. Again, be aware that VOCs, ammonia, and toxic chemical emissions are all vital considerations in addition to the odorous emissions.

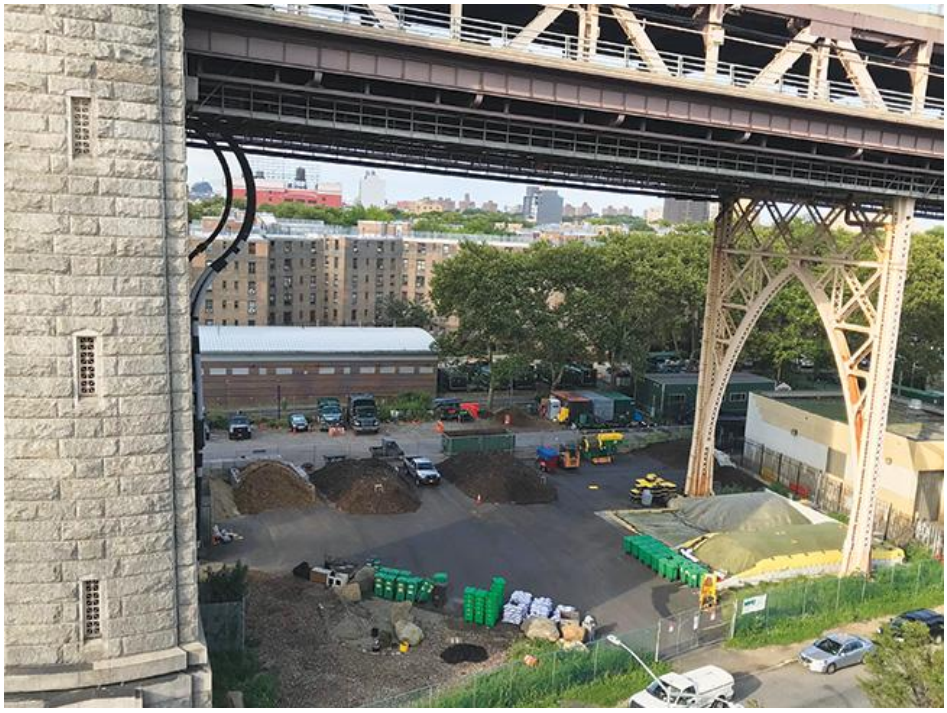
Know which pollutants agencies consider regulated for the purpose of the air permit and be aware that each one can have different requirements calling for different measures, potentially including risk assessments or specific emissions control technologies.

Understanding expectations for managing these potential pain points upfront will help inform an effective facility design and operational protocols.

Agencies requiring air permits may require compost operators to estimate emissions. Be prepared to research to determine emissions factors (values that relate the quantity of a pollutant to a process associated with the release of that pollutant—which are the most representative of the type of compost technology you plan to use as well as to the feedstock.

Solid, current data is a fundamental component for your toolbox, as regulators tend to make assumptions about emissions factors based on open windrow composting, which can be very conservative. Since most new facilities are designed as controlled compost facilities with aeration and other advanced features, emissions factors must reflect this advanced technology. Our research shows these technologies generate less emissions than open windrow composting.

To make an informed estimate, study data from states like California. Look at their emissions control technologies. Learn about the type of testing, individual emissions sources that they test, and the type of facility and technology deployed. You can leverage this information to develop the best-match emissions factor for your facility. Vendors that design and supply composting equipment may also provide data derived from their testing.



Urban operations.

What Do I Monitor or Test? And What About Emissions Controls?
Operators should learn if the agency requires them to monitor or test emissions. If it does, they should ask what emitting sources they must evaluate, at what level, and if they must employ specific methodologies. Requirements could vary. Where permits are needed, at minimum, operators must monitor VOCs coming off piles with handheld devices. Very occasionally, the standard is comprehensive, including expensive testing with flux chambers placed on top of piles to test for VOCs, ammonia, and toxic emissions.

Are Operational Requirements Written into Air Permits? Do they Stipulate Best Management Practices Around Moisture, Temperature, Oxygen Levels, and Other Parameters?
A progressing trend we expect to see more of is requirements to install control technologies if facilities surpass established emissions thresholds. When BACT is triggered (the emissions limitation based on maximum achievable control), CASP systems will likely be the standard for achieving required reductions. At this time, CASP is the baseline for control effectiveness, and our analyses show it to be the

most cost-effective technology to mitigate VOCs compared to other options (such as totally enclosed compost operations).

When pursuing a permit, expect to perform evaluations to determine which control systems are most efficient and cost-effective. Technologies range from ASP without controls, to CASPs, to in-vessel tunnel composting with enhanced thermal controls, to compost facilities fully enclosed in buildings with controls.

A Case Study on BACT

A BAAQMD analysis examining multiple systems found that CASP with a biofilter or biocover, at $8,800/ton of VOC reduced per year, would yield the most control for the cost. In-vessel tunnel composting is the most expensive at $188,000/ton, while an ASP in a fully enclosed structure was at $93,100/ton—both considered financially impractical.

The Districts' BACT calculation methodologies and standards vary so results will differ in every scenario. However, technology effectiveness rankings are likely comparable. As policies take shape, operators should ask: Does this jurisdiction have emissions control requirements? Will I trigger BACT? If I do, what technology must I deploy? Learn the costs and if there is more than one option.

When Offsets are Required

High VOC emissions and other regulated pollutants may trigger offset requirements, obligating facility operators to purchase emissions reduction credits. Today, offsets are a provision in a few jurisdictions that are nonattainment areas for ozone or in jurisdictions that go above and beyond federal regulations in establishing thresholds.

Offsets are expensive and, where required, can be triggered at low thresholds depending on the jurisdiction. In BAAQMD, they cost between $8,500 and $11,000/ton and are mandatory above 35 TPY of facility-wide emissions. In this scenario, as little as 100 tons per day (tpd) of throughput could push a facility past the threshold. As an example, in the BAAQMD, a large 750 TPD compost facility, even with BACT controls, had to pay more than $1 million for VOC offsets. In the SJVAPCD, offsets run as high as $200,000/ton and are required when facility-wide emissions exceed 10 TPY.

Prices for these credits are up from a few years ago, and we expect them to continue climbing. So, we advise operators to explore the feasibility of a recourse: installing the emissions-lowering controls mentioned earlier, even if not required as BACT. These engineered systems may be a way to reduce or avoid offsets altogether or at least reduce the amount and cost. You will want to determine which of these two investments—credits or technology—makes the most sense.

Begin by learning the offset requirements in your jurisdiction and the trigger levels. Check market prices and do a cost assessment. Then, compare the price of additional emissions controls. Converting from an open windrow to a more controlled system will likely enable you to avoid or minimize offsets and cost less in the long run.

Measures such as offsets, BACT, and highly sophisticated testing (flux chamber performance testing) are in very few jurisdictions today. Eventually, you will see more air quality control agencies requiring some or all of them.

Fugitive Emissions Regulations Differ

Are some compost emissions considered fugitive? If so, do agencies expect you to manage them, and how? These are more questions to ask. Know they may not be regulated the same way as other emissions. Some air districts regulate them like other emissions, while others exempt them, considering them not reasonably collectible and thus fugitive.

But now we are collecting and controlling compost emissions, so, in time, there may be more expectations that compost emissions are non-fugitive, just as landfill methane/VOC emissions were once considered fugitive. Today, landfills are collecting gas and showing they can control these releases into the air, which has caused these emissions to no longer be considered fugitive.

After you find out if agencies require permits in given jurisdictions and learn the expectations if they do, ask if they grandfather existing operations, negating the need to go through the entire permitting process. If such a clause exists, what are the allowances?

Some California districts will grandfather existing facilities. For example, SJVAPCD allows grandfathering existing facilities up to current processing levels. Only new or modified operations require a permit, offsets, and installation of controls based on emissions status.

Get Prepared

The call to manage tremendous volumes of organic waste means more opportunity, but it also means meeting greater (and evolving) regulatory demands and permit requirements around air quality. This demand will only accelerate with the push for organics management programs, especially as food waste adds to the mix. Today, eight states

—California, Connecticut, Massachusetts, Rhode Island, New York, New Jersey, Maryland, and Vermont—have laws to keep food out of landfills and more are looking at similar policies (e.g., New Hampshire).

It is important to know your jurisdiction's composting air quality requirements and recognize that they are in flux as these new standards and rules evolve. Even if your jurisdiction does not currently have air permitting requirements, it is likely they eventually will, at some level. Therefore, as you begin planning for a future new or modified compost facility, it is important to get an update on the status of air quality permitting and regulatory requirements and to vet options in testing, monitoring, and emissions control technologies to prepare for the future. | WA

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