

Cannabis growers overcome the powerful scent



SLIDE 1 OF 4

Cannabis cultivation and extraction requires industrial venting and air-processing, with dehumidifiers, filters and fans.

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Cannabis stinks, its opponents claim, comparing the scent of buds at harvest to skunks.

Read more about North Coast cannabis commerce: nbbj.news/cannabis

But beyond its fragrant nose, cannabis enterprise carries an aroma welcome even to many who shun pot: the smell of money.

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a year in California, with Santa Rosa’s CannaCom Valley at the heart of North Bay cannabis commerce. But cannabis operators must reckon with the reek, which makes some neighbors smoking mad.

At public hearings on cannabis policy held by Sonoma County’s board of supervisors, residents who live near cultivation complained to the board about its pungent smell — especially at harvest. Supervisors responded by banning cultivation in rural-residential zones.

In public comments to Santa Rosa officials about proposed cannabis cultivation sites, neighbors objected to the odor.

SMELL TRAVELS 1,500 YARDS

“I object to the proposed commercial growth of marijuana adjacent to my home,” said Richard Cooper, an attorney who lives near proposed Giffen Avenue cannabis-cultivation sites, all indoors, the largest in Santa Rosa. “My primary objection is against the odor-smell that the plants create. The smell is skunk-like or sewer-like,” Cooper said in his March 17 letter, noting that “the offensive smell travels long distances — 1,500 yards or more. I don’t want to have this smell Do city officials realize the loss of value my property suffers because of this odor?”

Agricultural commerce brings unwelcome odors. Cow manure annoys folks near dairies. Gilroy reeks of garlic grown nearby. Vineyard managers in Sonoma and Napa counties spray elemental sulfur on wine grapes to ward off powdery mildew. Sulfur can smell like rotting eggs. Cannabis, too, has a distinctive aroma.

Santa Rosa’s planning staff sums up how cannabis cultivators at 2835 Duke Court will need to mitigate odor:

“Air within the facility will be ventilated through high-efficiency particulate arrestance filters,” the report said. “Cannabis cultivation and processing rooms include several layers of carbon filtration and fan systems, including scrubbers.”

Duke Court Capital Partners, headed by Steve Monahan of San Rafael, submitted descriptions of carbon-based can filters “designed for the control of VOCs, odors and other gaseous contaminants.”

VOCs are volatile organic compounds such as paint fumes, hydrocarbons.

FRUITY AROMAS

For industrial engineers, olfactory challenges have a scientific basis in essential oils, according to Jay Takacs, principal at 15000 Inc., a mechanical engineering company in Santa Rosa. Fatty acids occur naturally in cannabis and other plants,

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and can produce fruity aroma like that of berries, banana or apple cider.

Terpenes — fragrant essential-oil compounds of hydrogen and carbon — in cannabis account for sweet, floral, citrusy or piney scents. The typical smell of cannabis comes from roughly 140 different terpenes, according to “Chemistry and Analysis of

Phytocannabinoids,” written in 2007 by Rudolf Brenneisen, professor of phytochemistry at University of Bern, Switzerland. He studied cannabis for 20 years.

Terpenes can have beneficial as well as olfactory effects — antiseptic, anti-inflammatory or antiviral. Myrcene, noted for sedative, analgesic (pain relief) and anti-inflammatory effects, occurs in many cannabis strains as well as in hops, mangoes, thyme, lemongrass and basil. Linalool, a terpene found in cannabis and lavender, is prized for its stress-reduction effects. Pinene in cannabis and coniferous oil such as pine and spruce is strongly antiseptic. Limonene, occurring in citrus fruits as well as cannabis, is powerfully antiviral.

SCIENCE BEHIND THE SKUNK ODOR

Some cannabis critics describe its smell as skunky during flowering. The odoriferous secretion of skunks is primarily volatile thiols: ϵ -2-butene-1 thiol (about 40 percent) and 3-methyl-1-butanethiol (about 22 percent). Cannabis contains alpha-linolenic acid, which may break down under the ultraviolet rays of sunlight into methyl and butyl thiols, according to one scientist’s theory.

Whether it’s skunky or not, the smell of cannabis becomes a business challenge for which local engineers sniff out solutions.

Extraction involves isolating and concentrating substances in cannabis that have medicinal or psychoactive effects.

Extraction facilities use ethanol and carbon dioxide in processing, which must be managed in ventilation systems. Butane, more volatile, is not allowed in Santa Rosa’s CannaCom Valley.

The engineering company also works with cannabis distribution centers.

“Plant matter is broken down,” said Matthew Torre, a mechanical engineer at 15000 Inc. “It is taken out of large bins and repackaged, sent out to dispensaries.”

Smell is “much more prevalent in the trimming process,” Torre said. “You are breaking plants open. That’s where a lot of odors are emitted.”

The potency of smell depends on strain and plant size.

“Indica or sativa plants grow in different styles,” Torre said. “Some of them (cultivators) top the plants early so they have a very quick growing cycle.”

Other cultivators allow cannabis plants to grow some 15 feet tall, Torre said. Smell depends on “what stage and cycle plants are in terms of how much odor is emitted,” he said. “Sativas and indicas (different strains) have different odors.”

He doesn’t mind the strong smell.

“It would be like objecting to the hop smell in beer” or to rosemary, Torre said.

People in the cannabis industry are “conscious of what they’re doing and very good at what they’re doing,” Torre said. “They’re really conscientious. We take all measures to take care of odors. You can walk by the buildings and it’s not going to smell.”

One of Torre’s clients is the proposed cultivation facility by Middle Relief Partners at 1805 Empire Industrial Court in Santa Rosa. The project, as presented to the city, will have about 4,000 square feet of canopy in a building with some 9,700 square feet.

“We would ultimately like to have a dispensary,” said David Page, chief operating officer and managing general partner of Middle Relief. The group’s three partners paid \$1.7 million for the building in cash. Cultivation will be overseen by Scott Toland, who worked for Good Chemistry in Denver.

PLUME DISCHARGE AT 34 MPH

Managing cannabis reek is not just about filtration. “It’s how you terminate it,” Torre said. “We take an industrial-ventilation approach. We try to get a high plume coming off the exhaust fan. We discharge the air high into the atmosphere. Wind

current will take it away without anybody on the ground ever noticing.”

A roof duct rises to a nozzle, which increases the velocity of escaping gases. “We shoot that up into the atmosphere,” Torre said. “Plume heights we try to get between 10 and 20 feet above the nozzle.” Escaping air at the nozzle moves at about 3,000 feet per minute — nearly 34 miles per hour. “It’s a multiple approach to controlling odor, not just filtering particulate,” Torre said.

The cost for tenant improvements for cannabis operators runs nearly double that of most industrial businesses, Takacs said. “It’s not like doing an office building” at about \$25 a square foot. Because growing plants generate humidity, cannabis cultivation rooms require dehumidification” on top of plume discharge and filtration, for a total cost of about \$50 a square foot.

Filtration takes out most particles that smell. A high-efficiency particulate air filter with activated carbon achieves 99.996 percent removal of particulates. Resulting air still could smell faintly of cannabis at the emission nozzle, but not at ground level. Capturing 100 percent of particulates kills air flow, Takacs said, creating unhealthy indoor air.

“We do recirculation systems and bolster typical HVAC systems,” Torre said. “Beyond air terminals and defusers, oscillating fans ensure proper mixing of air.” Indoor air quality is as important as the smell of escaping air.

“This technology has existed for years,” Takacs said. “This is a year-round operation” similar to growing tomatoes indoors. “Each room has to be on its own zone,” he said, with numerous air-intake points.

DEHUMIDIFIERS FIGHT MOLD

“Mold is an enormous deal. We need to

take care of the mold” with dehumidification. “It’s all critical,” Takacs said. Every plant transpires — draws water from roots and evaporates it from pores on leaves.

Small plants transpire less than big ones, so the system must respond variably to differing zones. Sensors in the cultivation rooms send information to the HVAC system.

Some cannabis-growing techniques create hazards. Cultivators boost plant growth by injecting carbon dioxide into the room, which can jeopardize worker safety. “It’s the same as in a winery,” Takacs said. “A fermentation room is kicking off a lot of CO₂. We would exhaust CO₂ low because it is heavier than air,” keeping indoor carbon-dioxide levels less than 600 parts per million.

Cannabis processors use ethanol for cannabinoid extraction. “It’s heavier than air,” Takacs said. He uses slotted hoods with low intakes to entrain (draw in) the ethanol. “Then we take it out. You get the odor. We filter and treat it.”

ADAPTING EXISTING BUILDINGS

“Santa Rosa has done a phenomenal job at setting regulations” for cannabis, Takacs said. “The county is a bit further behind. The city is not taking it lightly.”

Some buildings planned for cannabis cultivation or processing don’t have roofs built to handle loads such as bigger air-filtration units, Torre said, so modifications must be made. “We just did an extraction facility on Piner Place,” he said. “The roof structure itself would not allow for a 500-pound exhaust fan to go up there.” Instead of mounting the unit on the roof, he located it inside.

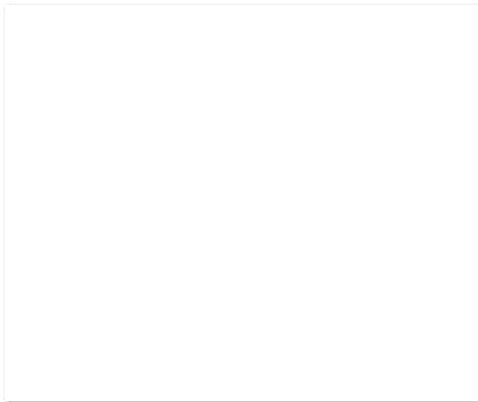
“We ran the duct up through the roof.”

Torre has completed several cannabis building designs, about evenly split between cultivation and extraction.

Though much of the cannabis industry runs on cash, the engineering firm is not being paid in currency. “They are real businesses,” Takacs said. “If they want to pay us in cash, we’ll take it.”

“They want to be as legitimate as the beer industry, the wine industry,” Torre said, “nothing taboo. We are seeing them operate as standard businesses.”

In Santa Rosa’s CannaCom Valley, businesses want buildings retrofitted fast. “Right



now, the boom is on. The biggest challenge is schedule," Takacs said. "Everybody wants it now. The quicker you open your doors, the quicker you are making money."

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