

This is the requested report on the murdering of the termites living in the building. I examined the advantage and disadvantages of the two existing methods: (a) fumigation, which generally is saturation of the structure with the gas sulfuryl fluoride, which is a nerve gas, and (b) localized treatment, which consists of spreading termite insecticide on the places where the termites are living. I will, from now on, refer to these two methods by their popular names: fumigation and local treatment. This report is divided into the following sections:

- (1) effectiveness,
- (2) warranty,
- (3) side effects,
- (4) cost

Introduction: ref R2, page 6, third paragraph, item 5: Sulfuryl fluoride is a toxic gas that targets the central nervous system [14,15]. It is rapidly absorbed when inhaled and breaks down into several components that travel through the bloodstream, reaching the lungs, kidney, spleen, nasal tissues, and brain [14,15]."

(1) effectiveness of each method.

(a) Fumigation.

It is generally believed among the American population that fumigation will "kill everything", an expression that I heard from several Americans around. The scientific literature denies the truth of this belief - though it is held by all Americans - see Ref R1, page 284: "Egg Mortality. Eggs were by far less susceptible than adults or nymphs. Mortality of eggs did not exceed 99% for any of the concentrations tested, ...". The results of experiments by professors and other researchers at state and federal facilities is that sulfuryl fluoride does kill the adult insect, also kills the larvae, though less efficiently so, and leaves a large number of viable eggs behind, even at sulfuryl concentrations 10 times higher than the concentrations used to murder the adult insects. At the concentrations used for home fumigation, which is limited, mostly by the cost, and a little by the high danger to human life around, the eggs of the termites will not be killed, so they will hatch and go on with the blood line.

Data from what Americans know as "peer reviewed literature", a.k.a. "scholarly articles" is clear in that the dosage used for home/buildings fumigation, most likely will indeed kill all adult termites, so fumigation is the same as local treatment on the killing of adults only, but will not kill even most of the larvae (their babies, so to say), and certainly WILL NOT KILL any of the eggs. The eggs require 7 to 30 times more exposure to the damm nerve gas (sulfuryl fluoride) than the used amount for fumigation, which means that IT IS GUARANTEED THAT IN TWO YEARS THEY ARE ALL BACK! (Ref R1).

(b) local treatment.

I need to look in more depth on the effectiveness of the local treatment, but my initial readings of what is popularly known as "scholarly articles" is that local treatment is effective, killing all the insects, larvae and eggs - where it is applied. This is true both at the spot where the treatment is applied and also for termites that take a walk around, just to check the neighborhood, and happen to stroll by the treated area.

conclusion: on the issue of effectiveness local treatment is more effective on the long run.

(2) warranty,

Most companies offer the same 2 years of warranty for both fumigation and local treatment. This is a measure of the advantage of fumigation over local treatment, because, fumigation being twice more expensive than local treatment, it seems to me that the company would offer longer warranty if possible at all - but they do not offer longer warranty. Take note of the effectiveness item above. (note * below if you want more detailed information on warranties)

It is here worth to point out that if fumigation really made the building safe for a long-long time, the fumigators would offer longer warranties, and conversely, if the warranty period is the same for both, it is safe to conclude

that both are equally effective on the long run.

(*) Some companies specialize in one or the other, some companies do both, and some companies offer warranties of more than 2 years for fumigation, but the longer-than-2 comes with many caveats. I think that it is safe to consider that any company that the building hires will offer a honest-to-god 2 years warranty perhaps with a useless warranty beyond the 2 years.

(3) side effects:

(a) Fumigation.

In a short time I found scientific articles reporting the DEATH OF TEN PERSONS due to sulfuryl fluoride inhalation. Three of these deaths were of people that for sure entered the building only AFTER the building was cleared for use, the other 7 deaths, I do not know the details. Of the three cases of death occurring as a consequence of gas exposure after the building was cleared for use, one of the cases is the death of both husband-and-wife - yes they both went down, the other "just" one person. I also found a report of a PERMANENT BRAIN DAMAGE in a child due to inhalation of sulfuryl fluoride AFTER his home was declared safe for humans. Also children and pets are clearly found to be more affected by Sulfuryl fluoride than adults, a result that is believed to be due to their closer proximity to the floor, where the gas concentrates due to its higher mass when compared with the other air molecules. Older persons have also been found to be more affected, a result that is believed to be due to their decreased lung capabilities. I am now 79 years old, and will be 80 years old in 5 months, when a fumigation occurs; am in good health but I am not wishing to die. I will not cooperate with this fumigation, other than to follow what the law requires me to do. I will follow the law, not more.

I quote from Ref R2, page 4, end of first paragraph: "In 7 of 59 incidents (12%), or 7 of 86 individuals (8%), the exposure resulted in a fatality. Over half of the incidents, but none of the fatalities, involved persons who were exposed after the structure had been cleared [11]." and same ref R2, page 6, first paragraph: "Symptoms generally appear to resolve quickly in non-fatal cases. But, health consequences of acute sulfuryl fluoride exposure may be long lasting, such as a Florida 2015 case, in which a 9-year-old boy suffered permanent brain damage from sulfuryl fluoride exposure after his family's home was fumigated [12]." again same ref R2, page 6, second paragraph: "A query of the Poison Control database identified a total of 1291 calls concerning sulfuryl fluoride/chloropicrin between 2010 and 2016 (not including animal exposures or information-only queries)"

It is worth to close the side effects report with the number for fatality (that is, death, going under). The abode will be considered safe for habitation with a measured sulfuryl fluoride concentration of 1 ppm (part per million), while "The 10 minute AEGL-3 concentration (lethal) is 81 ppm" ref R2, page 7, first paragraph. Let us pause here: at only 81 times higher concentration than what causes the abode to be cleared for entrance, a short exposure of 10 minutes is enough to bump the person off! This can easily occur from outgassing from trapping sources as mattresses, drawers left closed during the degassing period, or to gases trapped inside and behind the electrical switches, etc. Then the following should cause pause for using sulfuryl fluoride: Ref R1, page 7 last paragraph: "In 2017, the CDPR proposed acute (1 day), short-term (1–2 weeks), and chronic RfCs for residential bystander exposures to sulfuryl fluoride, at 0.41, 0.015, and 0.015 ppm, respectively (short term and chronic have the same level) [20]. The proposed RfCs are below the 1 ppm clearance level deemed safe for reentry and below the range of detection of direct reading instruments used for clearance testing. This would suggest that the clearance standards for residential fumigations treatments allow higher concentrations of sulfuryl fluoride than would be considered protective against noncancer health effects for the general public." This last assertion, coming from a conservative but a reliable source, should give pause to anyone that plan to return to the building, even after one month after fumigation, let alone one day after fumigation and clearance for inhabitation at 1 ppm (part per million).

see ref R2, page 8, 2nd paragraph "Information provided to homeowners and businesses planning to have a structure fumigated indicates that sulfuryl fluoride dissipates quickly [22]. However, multiple cases have occurred where symptoms and odors are reported after a building was aerated for the required time period

[11,23].

Another side effect of fumigation is that the gas sulfuryl fluoride is 4,800 times worse than CO₂ as a greenhouse gas - yes four thousand eight hundred time worse than CO₂ as a greenhouse gas. As a comparison, this is the equivalent to tent all the structures from here to Barrington to the east, and from here to Montana (to the north), saturating this with CO₂ then releasing it into the atmosphere. And the CO₂ at least does not kill people! (math: if you want to do the math it is simple: sulfuryl fluoride being 4,800 times worse than CO₂, one building saturated with it is equivalent to 4,800 buildings saturated with CO₂. I assume 10 buildings per side on each block, so 40 buildings per block, dividing 4,800 buildings by 40 is the number of blocks, which is 120 blocks, which in turn is 11 streets on each direction, which carries to Barrington and Montana)

(4) cost

Fumigation typically costs twice as much as local treatment, and really three times as much than local treatment when the extra cost of hotel, food out, etc. are included in the cost of fumigation. Cost is no big deal, given that the cost per unit will be either \$400 (local treatment) or \$1,200 (fumigation plus hotel)

Conclusion:

- (1) Local treatment is more effective than fumigation,
- (2) Local treatment will give the same 2 years warranty as fumigation,
- (3) local treatment does not pose a threat to health and life of the residents, and local treatment does not add to the greenhouse problem.

Regarding the health danger to residents, I am now 79 years old, and will be 80 years old in 5 months, when any fumigation may occur, therefore I am more in danger than younger persons. At my age it is not advisable for me to be exposed to this nerve gas, the sulfuryl fluoride. It happens that local treatment is also less expensive. If the HOA decides for fumigation, I recommend that the renters be warned of its dangers to their health, so as they can make their choice of how best to protect their health. The homeowners are now receiving the scientific information that opposes the believes widely held by Americans that "fumigation is safe because California is over-regulated as it is" - yes, I did heard this statement, so the renters should receive the same information. Once we know the dangers, it would be unconscious to allow the renters to walk into danger without warning. Nobody will go to jail for promoting fumigation with sulfuryl fluoride, because of the law is the way it is, but I want to have a clear conscience that I did what is in my power to alert the persons involved to themselves and to their infant children. One should not forget that just because "more doctors smoke camels than any other brand" it did not mean that tobacco smoking was safe and good, nor does it matters that there are 4 or 5 "scientists" that work for Exxon and deny climate catastrophe - not counting Donald Trump and Barak Obama.

- (4) local treatment is less expensive than fumigation - though I personally consider this secondary and am not giving it weight on my decision.

Based on the above, it is my conclusion that the preferred solution to murder the termites is local treatment, and I vote for local treatment, while strongly warning against fumigation because of the danger to humans.

References in attachment

Note: I used all the below references for my conclusions, but, knowing that it is unlikely that you will read even the two I explicitly cited in my text, or even a single one, I add the other 6 just because I read them and they are pertinent, but in my text above I only mention R1 and R2:

Ref R1: (note that this is for other insects, not for termites) "Efficacy of Sulfuryl Fluoride Against Four Beetle

Pests of Museums (Coleoptera: Dermestidae, Anobiidae)", Nan-Yao Su, Rudolf H. Scheffrahn, *J. Econ. Ent.*, Volume 83, Issue 3, Pages 879–882, 1 June 1990,

Ref R2: "Sulfuryl Fluoride Poisonings in Structural Fumigation, a Highly Regulated Industry—Potential Causes and Solutions" Tracy Barreau 1 , Sumi Hoshiko 1, * , Rick Kreutzer 2 , Svetlana Smorodinsky 2 and John Talarico 1, *Int. J. Environ. Res. Public Health* V 16, (2019)

Ref R3: "Effectiveness of Sulfuryl Fluoride for Control of Different Life Stages of Stored-Product Psocids (Psocoptera)" CHRISTOS G. ATHANASSIOU, 1,2 THOMAS W. PHILLIPS, 3 M. JAMIE AIKINS, 3 M. MAHBUB HASAN, 3,4 AND JAMES E. THRONE 2, *J. Econ. Entomol.* 105(1): 282–287 (2012).

Ref R4: "Epidemiologic Notes and Reports Fatalities Resulting From Sulfuryl Fluoride Exposure After Home Fumigation -- Virginia" <https://www.cdc.gov/mmwr/preview/mmwrhtml/00051658.htm>

Ref R5: "Illnesses Associated With Chloropicrin Use in California Agriculture" Michel Oriol 1 , Susan Edmiston, Sheryl Beauvais, Terrell Barry, Michael O'Malley, *Review Rev Environ Contam Toxicol.* 2009;200:1-31. doi: 10.1007/978-1-4419-0028-9_1

Ref R6: "Efficacy of Sulfuryl Fluoride Against Four Beetle Pests of Museums (Coleoptera: Dermestidae, Anobiidae)", Nan-Yao Su, Rudolf H. Scheffrahn, *J. of Econ. Ent.*, Volume 83, Issue 3, 1 June 1990, Pages 879–882

Ref R7: "Health Effects Associated With Sulfuryl Fluoride and Methyl Bromide Exposure Among Structural Fumigation Workers" Geoffrey M. Calvert, MD, MPH, Charles A. Mueller, MS, John M. Fajen, MS, David W. Chrislip, John Russo, PhD, Thomas Briggie, PhD, Lora E. Fleming, MD, PhD, Anthony J. Suruda, MD, MPH, and Kyle Steenland, PhD, *Amer J. Publ. Health*, V 88 n. 12, p. 1774, (Dec 1998)

Ref R8: "Systemic fluoride poisoning and death from inhalational exposure to sulfuryl fluoride" AARON SCHNEIR, M.D. 1 , RICHARD F. CLARK 2 , MAMTA KENE 3 , and DAVID BETTEN 4, *Clin. Toxic.* V 46, P 850–854 (2008)