

Safety and Health Effects of Trona



Summary

Trona is primarily made up of two chemicals that are common food additives which are generally recognized as safe (GRAS) by the FDA. Trona has been safely mined in Wyoming for over fifty years. Minimally refined trona ore is commonly used in cattle feed as a rumen buffer. It is also used to reduce air pollution by treating acid gas emissions from industrial stacks. Trona has been known to cause some irritation after repeated exposures to high dust concentrations in work environments.

Discussion

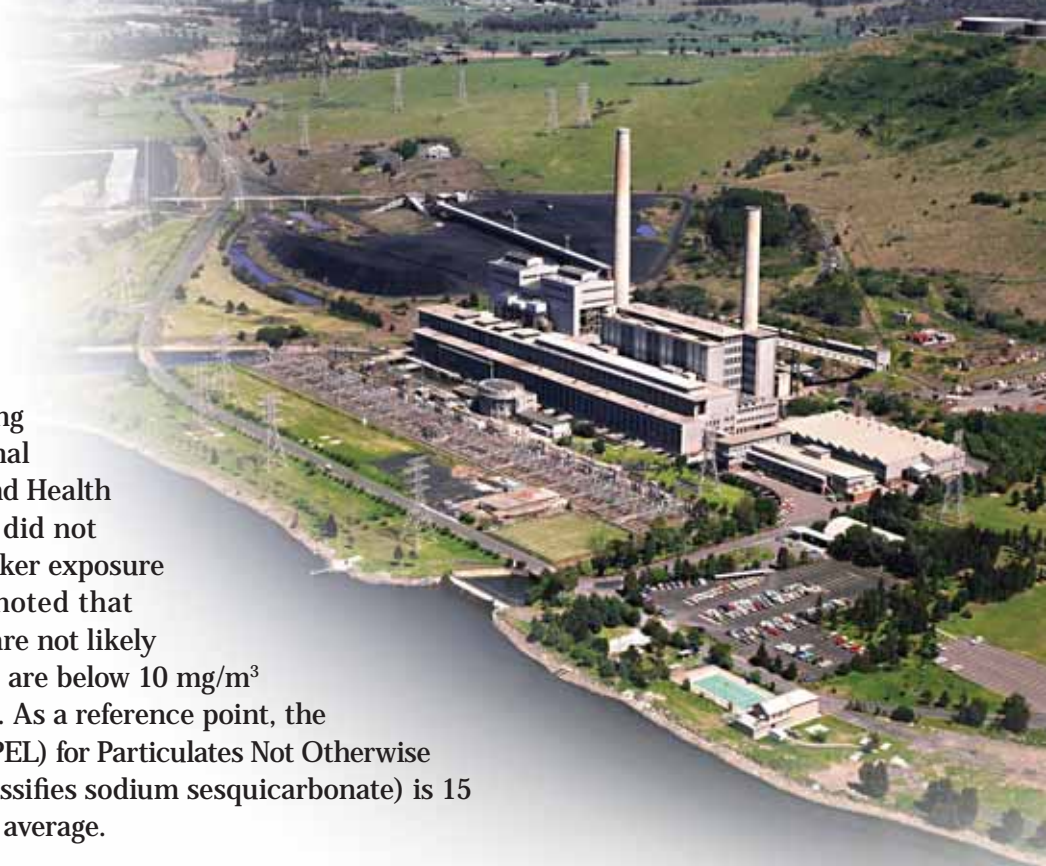
Trona is a naturally occurring mineral, mined for decades in Wyoming as a raw material used to manufacture sodium carbonate. In a minimally refined state, trona is used as a food additive (rumen buffer) in cattle feed. For over twenty years, it has also been used to reduce acid gas stack emissions in industries ranging from the electric power generating industry to cement manufacture and glass production.

About 97% of the content of trona products used to treat stack emissions is sodium sesquicarbonate ($\text{Na}_2\text{CO}_3 \cdot \text{NaHCO}_3 \cdot 2\text{H}_2\text{O}$). Sodium sesquicarbonate is made up of two chemicals, sodium bicarbonate (baking soda) and sodium carbonate. Both sodium bicarbonate and sodium carbonate are food additives that are generally recognized as safe (GRAS) by the United States Food and Drug Administration (FDA). Sodium sesquicarbonate has been tested in animals and found to be safe. It is not a sensitizer, does not cause skin irritation in standard animal tests, is not acutely toxic and, unlike the acid gases that it is used to treat, sodium sesquicarbonate does not cause bronchial-constriction in the lungs.

Mineral trona has been safely mined in Wyoming for 50 years. At the very high airborne dust concentrations sometimes found in mines or areas where trona is refined, trona can cause eye and nose irritation or a skin rash. However, in more common low level exposure situations irritation of any type is not normally the case. In fact, an extensive epidemiological

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study conducted in 2000 at all four Wyoming trona mines by a nationally recognized health consulting company showed no exposure-related signs of visible irritation to the eyes or nose, or of impairment to the lungs during the course of a work shift. A National Institute of Occupational Safety and Health (NIOSH) study (Rom et al, 1983) did not identify long term effects from worker exposure to trona. The NIOSH study also noted that trona-related irritative symptoms are not likely to occur when dust concentrations are below 10 mg/m³ averaged over an 8 hour work shift. As a reference point, the OSHA permissible exposure limit (PEL) for Particulates Not Otherwise Regulated (which is how OSHA classifies sodium sesquicarbonate) is 15 mg/m³ as an 8 hour time-weighted average.

While no reports have associated trona with long term health effects other than irritation, including cancer, trona does have small amounts of silica quartz (generally less than 2%). Particles of silica quartz (the common component of beach sand) are found in most naturally occurring ores. It has been known for a long time that workers inhaling respirable particles of silica quartz at relatively high concentrations, generally over a period of many years, have been at risk of developing silicosis, a progressive lung disease. Relatively recently, crystalline silica quartz has been linked to cancer by the International Agency on Research for Cancer (IARC) and the National Toxicology Program (NTP). Other groups, however, have maintained that there is not enough evidence to prove that silica is a potential human carcinogen. OSHA and the American Conference of Governmental Industrial Hygienists (ACGIH) have occupational exposure limits assigned to respirable silica in the workplace.

Solvay Chemicals recommends that any persons wishing to work with trona consult a Material Safety Data Sheet (MSDS) beforehand. Please consult our web site (www.solvaychemicals.us) for the latest version of any Solvay Chemicals MSDS.

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