United States Environmental Protection Agency | Pesticides And Toxic Substances (7508W) | 738-F-91-103 September 1991

R.E.D. FACTS

Inorganic Nitrate/Nitrite (Sodium and Potassium Nitrates)

Pesticide Reregistration

All pesticides sold or used in the United States must be registered by EPA, based on scientific studies showing that they can be used without posing unreasonable risks to people or the environment. Because of advances in scientific knowledge, the law requires that pesticides which were first registered years ago be reregistered to ensure that they meet today's more stringent standards.

In evaluating pesticides for reregistration, EPA obtains and reviews a complete set of studies from pesticide producers, showing the human health and environmental effects of each pesticide. The Agency imposes any regulatory controls that are needed to effectively manage each pesticide's risks. EPA then reregisters pesticides that can be used without posing undue hazards to human health or the environment.

When a pesticide is eligible for reregistration, EPA announces this and explains why in a Reregistration Eligibility Document, or RED. This fact sheet summarizes the information in the RED for inorganic nitrate/nitrite, or sodium and potassium nitrates.

Use Profile

Sodium and potassium nitrates are pyrotechnic fumigants used as rodenticides, predacides and insecticides. Each compound is combined with other pesticide active ingredients (sulfur and carbon) and loaded into fumigant gas cartridges, which are designed to be ignited and placed in pest burrows. The ignited cartridge bombs produce toxic gases which are lethal to target rodents, skunks, coyotes and ground-nesting wasps.

Both sodium and potassium nitrates are naturally occurring, common chemical compounds. While they have limited pesticidal uses, both have other industrial uses. Potassium nitrate is used in the production of fireworks, blasting powders and gunpowder. Sodium nitrate is used in producing other chemicals, glass, fertilizer and fireworks.

Regulatory History

The first of the six currently registered sodium and potassium nitrate pyrotechnic cartridge products was registered in 1948. A high rate of accidents, attributed to poor labeling and improper manufacture, prompted EPA to issue a Notice of Intent to Cancel these products, in 1982. In response, the registrants improved product labeling and provided adequate data on fuse and cartridge burn times.

Human Health Assessment

Few studies were needed by EPA to assess the potential health hazards, exposures and risks of sodium and potassium nitrates. Both are common chemical compounds with very limited uses as pesticides, and both are marketed in cartridges which prevent accidental exposure to the chemicals themselves.

Both sodium and potassium nitrates control target pests through an unconventional mode of action. Rather than directly poisoning rodents, they support the combustion of charcoal in gas cartridges, thus aiding in the production of toxic gases, which, when released, overtake the target pest. Therefore, EPA is concerned less about the risk of direct human exposure to sodium or potassium nitrates, than about accidents associated with use of the gas cartridge bombs--typically involving skin burns or inhalation of toxic gases. (Please see the Applicator Exposure section below.)

Toxicity

EPA has sufficient information on the toxicology of sodium and potassium nitrates to support their eligibility for reregistration.

Available acute toxicity studies indicate that sodium nitrate may cause eye irritation (Toxicity Category II effect level, with Category I indicating the greatest toxicity and Category IV the least). However, both sodium and potassium nitrates pose a relatively low acute oral toxicity hazard (Toxicity Category III). Sodium nitrate also produces some low level acute dermal effects (Toxicity Category III), and slight dermal irritation (Toxicity Category IV).

Available chronic toxicity studies indicate some effects on the blood, as well as equivocal evidence of carcinogenicity. However, these studies are not considered relevant because people are not chronically exposed to these chemicals used as pesticides.

Dietary Exposure

Although pesticide products containing potassium nitrate are registered for use in agricultural areas, they are used in a manner that does not bring them into contact with crops. Therefore, residues are not expected to remain in or on food or feed crops, and tolerances (legal residue limits) need not be established.

Applicator Exposure

The only people potentially exposed to sodium and potassium nitrates

should be applicators, and they should be exposed only minimally. These chemicals are completely encased in cartridges, similar to flares. Unlike many other pesticides, they do not splash, spill or create dust or spray particles. Further, once ignited, these products produce noxious gases inside the pest burrow, which is sealed or covered. Therefore, the applicator's dermal and inhalation exposure to these pesticides and the gases they produce should be negligible.

In the past, EPA received reports of incidents involving dermal burns, caused by improper handling of ignited cartridges or by defective cartridges. One fatality occurred as a result of gross misuse. In 1982, the Agency issued a Notice of Intent to Cancel sodium and potassium nitrate products, which elicited some improvements in labeling and manufacturing processes. However, since then, EPA has received four more reports of injuries to applicators, due mainly to defective cartridges. The Agency is issuing a Data Call-In Notice in conjunction with this RED, to address the issue of defective cartridges and further improve the safety of these products.

Human Risk Assessment

EPA believes that sodium and potassium nitrates, as currently registered for use as pesticides, do not present any unreasonable adverse effects to humans. As long as applicators use the gas cartridge products properly, in accordance with approved labeling, they should be exposed to virtually none of the chemicals themselves, and to only negligible amounts of the gases produced. EPA is requiring that registrants develop acute toxicity data on the gases, and will make final product reregistration decisions after reviewing these data.

Environmental Assessment

All environmental fate and ecological effects data requirements for sodium and potassium nitrates have been waived, as explained below.

Environmental Fate

Sodium and potassium nitrates are naturally occurring substances whose physical properties are well understood. The pyrolysis of these products results in simple organic and inorganic compounds, mostly in the form of gases, which diffuse through burrow openings or into the soil. Exposure of the environment is limited and localized, however, and environmental fate studies are not required.

Ecological Effects

The pesticide products containing these active ingredients are intended to kill certain vertebrates and wasp pest species inhabiting burrows. Since these pesticides are applied below the surface of the ground, avian and

aquatic species are not exposed. However, any organism in a properly treated burrow is likely to be killed. EPA is concerned about potential impacts to non-target and endangered species.

Several types of non-target organisms, including burrowing owls, may inhabit the burrows of target pests. EPA is developing more extensive and explicit labeling to modify the timing of applications, and to caution applicators to observe signs indicating the presence of target pests and the absence of non-target organisms.

Endangered species that inhabit burrows also are at potential risk. As a result of several earlier consultations with the Fish and Wildlife Service, EPA already requires endangered species labeling to protect the six species identified as being at risk. Another ongoing consultation may cause EPA to require further label revisions in 1992.

Additional Data Required

While EPA has all the generic studies needed to support the reregistration of sodium nitrate, the Agency still needs information regarding potassium nitrate's composition, recovering and refining process, and impurities. In addition, product-specific data, including accident reports and information on manufacturing processes and fuse burn times, still are needed for products containing both active ingredients. EPA is issuing a Data Call-In Notice in conjunction with this RED, to obtain this generic and product-specific information.

Product Labeling Changes Required

The labels of end-use products containing sodium or potassium nitrate must comply with EPA's current pesticide labeling requirements. In addition, the Agency soon will issue detailed guidance on labeling for gas cartridge products, which will address concerns regarding applicator safety and protection of non-target and endangered organisms.

Regulatory Conclusion

- Registered pesticide products containing sodium and potassium nitrates can be used without causing unreasonable adverse effects in people or the environment. Therefore, they are eligible for reregistration.
- The four end-use products containing sodium nitrate will be reregistered once product-specific data and revised labeling are received and accepted by EPA, and once any data and labeling needed for the other active ingredients in these products (sulfur and carbon) also are received and accepted.
- The two end-use products containing potassium nitrate will be reregistered once generic and product-specific data and revised labeling are received and accepted by EPA, and once any data and labeling needed for the other active ingredients in these products (sulfur and carbon) also are received and accepted.

For More Information

EPA is requesting public comments on the Reregistration Eligibility Document for sodium and potassium nitrates during a 60-day time period, as announced in a Notice of Availability published in the Federal Register. To obtain a copy of the RED or to submit written comments, please contact the Public Response and Program Resources Branch, Field Operations Division (7506C), Office of Pesticide Programs (OPP), US EPA, Washington, DC 20460, telephone 703-557-2805.

In the future, the RED will be available from the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161, telephone 703-487-4650.

For more information about sodium and potassium nitrates or about EPA's pesticide reregistration program, please contact the Special Review and Reregistration Division (7508W), OPP, US EPA, Washington, DC 20460, telephone 703-308-8000. For information about reregistration of individual nitrate products, please contact the Registration Division (7505C), OPP, US EPA, Washington, DC 20460, telephone 703-557-5447.

For information about the health effects of pesticides, or for assistance in recognizing and managing pesticide poisoning symptoms, please contact the National Pesticides Telecommunications Network (NPTN). Call toll-free 1-800-858-7378, 24 hours a day, seven days a week, or Fax your inquiry to 806-743-3094.