QUESTIONS AND ANSWERS ON IODOMETHANE

1. What is iodomethane?

In 2007, the United States Environmental Protection Agency (US EPA) approved iodomethane as a new active ingredient for pre-plant soil fumigation to control insects, weeds, nematodes and plant pathogens in agricultural crops. Iodomethane is a liquid that readily evaporates following application. Iodomethane has long been used in laboratories as a methylating agent and for microscopy. Iodomethane is naturally produced by some plants and marine algae. As such, small amounts of iodomethane can be present in the air, seawater and the human diet.

2. What iodomethane products are used in Florida?

In July 2008, Florida registered technical iodomethane for use in the production of fumigation products. Florida also registered two agricultural products containing iodomethane which are restricted use pesticides (RUP). These products are made by Arysta LifeScience North America, LLC. One product is Midas 98:2, which contains 98% iodomethane and 2% chloropicrin. The other is Midas 50:50, a mixture of 50% iodomethane and 50% chloropicrin. Chloropicrin is included in many fumigant products as a warning agent, but in higher amounts, chloropicrin is used as a pesticide with iodomethane for greater overall effectiveness.

3. Why is iodomethane needed for Florida agriculture?

Broad-spectrum agricultural fumigants like iodomethane are needed in Florida because of the high pest pressure in the state, where non-chemical alternatives are not always possible or practical for all crops. One highly effective agricultural fumigant that has been relied upon by growers for many decades is methyl bromide. This fumigant is being phased out of use as a result of an international agreement called the Montreal Protocol. Scientists concluded that methyl bromide may damage the ozone layer in our atmosphere, which helps to protect us from cancer-causing rays of the sun. Studies indicate that the ozone-depleting potential of iodomethane is 22 times lower than that of methyl bromide. Iodomethane is being marketed as an alternative soil fumigant to methyl bromide.

4. Where, when and how is iodomethane applied?

Iodomethane is injected beneath the soil surface with specialized application equipment prior to planting. Once the iodomethane has been injected into the soil, the treated area is immediately covered with a plastic tarp to help retain the fumigant in the soil. Iodomethane fumigant products are registered for pre-plant use in Florida on tomato, strawberry, pepper, stone fruits, tree nuts, vines, nurseries, turf and field-grown ornamentals.

5. Does iodomethane get into our food?

Since iodomethane can damage a crop through soil fumigation, planting must be delayed to allow iodomethane in the soil to be reduced through soil metabolism, degradation, and degassing to levels that are safe for crop growth. Therefore, the amount of iodomethane taken up by the crop is negligible. Any iodine-containing compounds that may remain in the soil would likely be at low levels and would be part of a normal diet.

6. Is iodomethane likely to get into our ground water?
The EPA and the Florida Department of Agriculture and Consumer Services (FDACS) have independently assessed the potential for iodomethane to contaminate groundwater. Using computer modeling and assuming reasonable worst-case Florida environmental conditions, both agencies have concluded that iodomethane is unlikely to adversely affect the quality of groundwater or surface water. Furthermore, Arysta (the company that has registered iodomethane) is actively conducting groundwater monitoring in two Florida test sites to address any groundwater concern. The Florida studies are testing for both iodomethane and iodide (a breakdown product).

7. How can iodomethane affect human health?
All agricultural fumigants are somewhat toxic because they are intended to control a wide range of pests. By most measures, the toxicity of iodomethane is similar to that of methyl bromide. The EPA has concluded that people will not be exposed to harmful levels when iodomethane products are used according to the stringent requirements of their product labels. Many of the toxic effects of iodomethane are the same as those of iodide, which is a form of iodine. The reason for this is that iodomethane forms iodide when it is broken down in the body. Iodine deficiency in pregnant women is reported to be the leading cause of mental retardation worldwide, and for this and many other reasons, the proper amount of iodine in the body is needed for good health. However, too much iodine intake can also be harmful. Breathing high levels of iodomethane can cause excessive amounts of iodide to form in the body. This can lead to disruption of thyroid hormones, which can potentially affect pregnancy and cause other health problems. Thyroid cancer was found in some animals that inhaled high amounts of iodomethane over many months; this happened only when animals breathed iodomethane at levels and for durations that were much higher than people would likely breathe when they work with iodomethane products. Inhaling very high concentrations of iodomethane may affect the central nervous system. Breathing iodomethane at lower levels can irritate the respiratory tract and lungs. Prolonged contact with the skin may cause severe irritation and splashes into the eye may cause permanent eye damage. Workers are required to wear a significant amount of personal protective equipment to prevent harmful exposures. People outside of the application area, where the residue levels in air are much lower, also should not be affected.

8. Is iodomethane likely to affect wildlife and the environment?
Since iodomethane is injected beneath the soil surface and immediately covered with a tarp, high concentrations are unlikely to come into contact with wildlife. The tarp significantly slows the movement of iodomethane to the atmosphere. Once in the atmosphere, iodomethane is rapidly degraded by sunlight. Within a few days after being applied, iodomethane breaks down into forms of iodine that are found naturally in the environment. Iodine is an essential nutrient in the diets of both animals and humans. Toxicity and environmental fate studies show that iodomethane should not reach levels that would harm wild animals in the environment.

9. What has the EPA done to ensure the safe use of iodomethane in the U.S.?
The EPA has stated that its iodomethane risk assessment was among the most thorough in the Agency's history. The EPA required numerous scientific studies on iodomethane for registration. These studies quantified the relative toxicity of iodomethane to people and animals and characterized its fate in soil, water, and air. The EPA has required several new safety requirements for iodomethane that will be extended to the other agricultural fumigants. One new

requirement is the use of a "buffer zone," an area surrounding the treated field in which bystanders and unprotected workers must not enter until at least 48 hours after application. The size of the buffer zone depends on the area being fumigated, the amount of iodomethane being applied per acre and other factors. No single application, however, may exceed 40 acres. The EPA has also required agricultural workers using iodomethane to wear appropriate protective equipment. Iodomethane is a restricted use pesticide that can be used only under the direct supervision of certified applicators that have undergone extensive training on requirements that apply prior to, during, and following soil treatment. All iodomethane applicators must be state-certified and must complete an Arysta training/stewardship program that has been designed with input from the EPA and FDACS. All applicators must pass a test before they can apply iodomethane fumigant products.

10. What has the Florida Department of Agriculture and Consumer Services done to ensure the safe use of iodomethane in Florida?

Over a period of nine months, FDACS conducted a comprehensive new active ingredient review, examining a wide array of studies provided by the registrant and from the open scientific literature. The Department also reviewed the EPA's risk assessment and risk mitigation measures for iodomethane. FDACS engaged in numerous discussions on iodomethane with a number of diverse groups, including the iodomethane registrant, the EPA, the Florida Department of Health, the Florida Department of Environmental Protection, the Florida Fish and Wildlife Conservation Commission, Florida growers, the University of Florida, Florida farm worker advocates, and the California Department of Pesticide Regulation. Since this review process resulted in numerous changes in the existing Federal label for iodomethane products, FDACS required stand-alone iodomethane product labels for use only in Florida. These legally-binding Florida labels require additional safety measures and enhance clarity and enforceability beyond the extensive provisions already required by the EPA in the federal labels. In addition, Florida's review process has resulted in the registrant's commitment to carry out a robust product stewardship program in Florida, assisting applicators in the proper use of the product and working with applicators and FDACS to address any issues that may arise with the use of the product. Moreover, Arysta has agreed to conduct a small-scale monitoring study to assess the environmental fate of iodomethane in ground water and in air in Florida.

11. Where can I find additional information about iodomethane?

Further information on iodomethane can be found at these internet websites:
http://www.epa.gov/pesticides/factsheets/iodomethane_fs.htm
http://www.regulations.gov/search/index.jsp (Type "iodomethane" in the search box).
http://toxnet.nlm.nih.gov/cgi-bin/sis/search/f?./temp/~9ZVoF6:1
http://monographs.iarc.fr/ENG/Monographs/vol41/volume41.pdf
http://www.cdpr.ca.gov/docs/risk/toxsums/pdfs/5783.pdf
http://www.cdc.gov/niosh/pel88/74-88.html
http://www.cdc.gov/niosh/pdfs/0420.pdf
http://www.cdc.gov/niosh/idlh/74884.html

If you have additional questions, please contact the Bureau of Pesticides at (850) 617-7917.