

Memorandum

HSM-94005

To: Thomas T. Thongsinthusak, Staff Toxicologist
Worker Health and Safety Branch

Date: May 12, 1994

Place: Sacramento

Phone: 445-4207

From: **Department of Pesticide Regulation** -Research Scientist
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Worker Health and Safety Branch

Subject: Metam Sodium-Methods of Application and Annual Number of Occupational Exposure Days

The major agricultural uses (million lbs a.i.) of metam sodium during the 1991 growing season were: carrots (1.40), tomatoes (0.78), potatoes (0.67), lettuce (0.30), and cotton (0.20). Products that contain metam sodium permit applications to be made with ground rigs and through chemigation. One of the problems with applications of metam sodium is the potential for off-site drift of the odorous metabolites: hydrogen sulfide and carbon disulfide. A technical bulletin is included with the agricultural use products that includes measures to mitigate the potential for off-site drift.

The majority of the metam sodium applications on carrots take place in Imperial and Kern Counties. In Kern County, sprinkler irrigation is the predominate method for applying metam sodium (Kennedy, 1994) with an estimated 19% of the carrot acreage treated in 1992. Treatments are usually made to control nematodes with an average application rate of 127 lbs a.i. per acre. Applications are typically made during 12 hour irrigation sets with an average of 20 acres treated per set. The number of acres treated per set is limited by the capacity of the pump. Initially, water only is applied to bring the soil moisture up to 50-80% of field capacity. Then the metam sodium is applied for a few hours, followed by a couple hours of water only to flush out the lines and provide the water seal. During the application, the irrigator must be present at all times to monitor the application equipment for breakdowns and to check for off-site drift. For 12 hours after the application is completed, the treatment site must be monitored, periodically, for off-site drift. An agricultural inspector for Kern County (Kennedy, 1994) estimates the average ranch size for carrots grown in Kern County range from 80-200 acres. If one irrigator made all the metam sodium applications for one ranch, the number of annual exposure days would range from 4-10 days. Potatoes are treated in a similar manner with 7% of the Kern County acreage treated with metam sodium in 1992 with an average of 149 lbs of a.i. per acre (Kennedy, 1994), (Pesticide Use Report, 1992). If a grower had both carrots and potatoes treated with metam sodium, the exposure days for the irrigator could range from 6-15 days per year. The use season is late May through August and January-February.

In Imperial County, metam sodium applications to carrots are made with flood irrigation or mechanically applied with shank injection or deep plowing (Mayberry, 1994). Applications



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averaged 152 lbs of a.i. per acre with an estimated 65% of the acreage treated in 1992 for nematode control (Pesticide Use Report, 19923; Imperial County Agricultural Commissioner Annual Report, 1992). In preparation for a flood irrigation treatment, the field is leveled and then partitioned with checks (raised earth about one foot in height) about 20-30 feet apart to guide the water to the opposite end of the field. The metam sodium is then metered directly into the concrete delivery ditch that applies water to several checks at one time. When the water reaches the end of the check, the ditch out-let is closed and water is then released into another series of checks. This process is repeated until the whole field has been irrigated. Irrigators generally work 12 hour shifts and it can take 1-2 days to treat a 34 acre field. The maximum carrot acreage a grower may have is 200-300 acres which could be handled by 1-2 irrigators (Mayberry, 1994). If one metam sodium application is made per season and 65 % of the grower's carrot acreage is treated, then an irrigator could be exposed approximately 2-11 days per year. Mechanical applications of metam sodium can be made to flat fields as a broadcast application or to the top of the raised bed. The material is applied with a spray blade or with several shanks with modified tillage equipment. Growers or custom applicators can make the applications.

Tomatoes is the second crop most commonly treated with metam sodium with the majority of the acreage located in the Westlands area of Fresno County and the southern Sacramento Valley. Metam sodium applications are usually applied mechanically by the growers using modified tillage equipment. Most of the applications are banded treatments to control weeds, predominately nightshade, in the plant row (Miao, 1994). The material is applied 3-4 inches deep to pre-formed tomato beds with two shanks or a "duck-foot" sweep per plant line and then followed with a cultivator or roller on the same tool bar to re-seal the bed (Miao, 1994). One worker will perform the work tasks of mixing/loading and application. Most applications are made in the late fall or early spring when the soil has adequate moisture and soil temperatures are 60° F or warmer. Application rates average 19 lbs of a.i. per plant row treated (19-38 lbs of a.i./acre) with the average rate of 28.7 lbs a.i./acre for Yolo County and 37.5 lbs a.i./acre in Fresno County (Pesticide Use Data, 1992). Since the applications entail the use of considerable tillage equipment (three beds treated at a time), the tractor speeds are slow with 40-50 acres treated in an average day (Miller, 1994; Miao, 1994). The average acreage for a processing tomato grower in California is approximately 500 hundred acres (Miao, 1994). If one tractor driver treated all the acreage for the average sized ranch, it would entail approximately 10-13 exposure days per year.

Some applications of metam sodium are made to Brussels sprouts, carrots, lettuce and other vegetable crops grown along the central coast of California. In the Santa Maria growing district of Santa Barbara County, applications of metam sodium are made by pest control operators using custom application equipment. Tractors equipped with shanks, apply the

metam sodium, sometimes with liquid fertilizer, on top of the pre-formed beds. Sprinklers are also used to make medium sodium applications, particularly when higher rates are used to control nematodes. Applications are made as described for treatments made in Kern County. However, off-site drift problems have occurred in this area because many ranches are close to residential areas. Fields within 1/2 mile of these "sensitive areas" must file a "Notice of Intent" with the Agricultural Commissioner 24 hours before an application is made. This potential for off-site drift from sprinkler applications is causing more growers to rely on custom applicators to make their metam sodium applications. One large pest control operator dominates the custom application business in Santa Maria. This company employs nine tractor drivers to do side-dress work and each driver can treat an average of 41 acres per day with fertilizer (Haskell, 1994). Assuming this company makes all the metam sodium applications (3,208 acres except for treatments to lemons, oranges and potatoes) during the growing season for 1992 in Santa Barbara County, each driver would experience an average of nine exposure days per year (Pesticide Use Report, 1992). The average application rate to vegetable crops for the 1992 season was 149 lbs a.i./acre.

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