



Winston H. Hickox
Secretary for
Environmental
Protection

Department of Pesticide Regulation

830 K Street • Sacramento, California 95814-3510 • www.cdpr.ca.gov



Gray Davis
Governor

MEMORANDUM

TO: Jean-Mari Peltier Paul H. Gosselin
Acting Director Assistant Director

FROM: Lyn Hawkins
Senior Environmental Research Scientist
Environmental Monitoring and
Pest Management Branch

DATE: March 11, 1999

SUBJECT: FINDINGS ON NORFLURAZON BY THE GROUND WATER
SUBCOMMITTEE OF THE PESTICIDE REGISTRATION AND
EVALUATION COMMITTEE

Attached are the Norflurazon findings and recommendations of the Subcommittee of the Pesticide Registration and Evaluation Committee. These findings were unanimously agreed upon by the subcommittee members (Dr. Syed Ali, Dr. Anna Fan, and Lyn Hawkins) on January 28, 1999.

If you have any questions, please contact Lyn Hawkins, Chair of the subcommittee, at (916-324-4254).

Attachments

cc: Dr. Syed Ali, State Water Resources Control Board
Dr. Anna Fan, Office of Environmental Health Hazard Assessment

SUBCOMMITTEE OF THE
PESTICIDE REGISTRATION AND EVALUATION COMMITTEE

IMPLEMENTATION OF THE
PESTICIDE CONTAMINATION PREVENTION ACT

NORFLURAZON: FINDINGS AND RECOMMENDATIONS

March 9, 1999

Norflurazon has been found in ground water in Fresno County.

Pursuant to California Notice 86-12, Notice of Norflurazon Finds in California Ground Water, and the Notice of Hearing Pertaining to Norflurazon (July 28, 1998), the subcommittee held a hearing on November 5, 1998 to review registrant reports, public comment, and other appropriate information regarding the presence of norflurazon in ground water in California. After reviewing this information and visiting contaminated sites in Fresno County, the subcommittee offers the following findings and recommendations to the Director. These findings were unanimously agreed upon by the subcommittee on January 28, 1999.

FINDINGS

Finding One

The subcommittee finds that a pollution level for norflurazon cannot be identified due to lack of complete monitoring data and the possibility of norflurazon in ground water reach higher levels. Because a pollution level has not been established, it is not possible to determine that norflurazon has not polluted the ground waters of the state. Further, a decision regarding the threat to pollute cannot be made because of the lack of a pollution level, minimal sampling data, and possibility of other detections in ground water (such as findings in Tulare County). Therefore, the subcommittee cannot make Finding One in the Food and Agricultural Code, Section 13150(c)(1).

Finding Two

Although a pollution level has not been established, the subcommittee finds that the agricultural use of norflurazon can be modified to protect against further residues in ground water. The subcommittee concludes that this can only be ensured if the recommended monitoring of soil, ground water and surface water and accompanying specified actions are followed. Under these conditions, the subcommittee makes Finding Two in the Food and Agricultural Code, Section 13150 (c)(2).

Finding Three

The subcommittee cannot determine whether modified use of norflurazon would cause severe economic hardship on the agricultural industry of the state because available information presented at the hearing is not conclusive. The subcommittee further cannot recommend a level of norflurazon that does not significantly diminish the margin of safety not to cause adverse health effects. Therefore, the subcommittee cannot make Finding Three in the Food and Agricultural Code, Section 13150(c)(3).

Chronic Toxicity Determination

The chronic toxicity of norflurazon is determined from a study in dogs. Beagle dogs (4/dose/sex) were exposed to doses of 0, 1.5, 6.3, or 23 mg/kg-day in their diet for a period of 12 months. At a dose of 6.3 mg/kg-day, absolute and relative liver weights were increased in males and no histopathological changes were observed. At the same dose, body weights were decreased and serum cholesterol was increased in the females. A no-observable effect level of 1.5 mg/kg-day was determined from the study. Norflurazon has not been shown to be mutagenic or genotoxic in a limited number of assays. The chemical has not been shown to be toxic to the developing fetus at doses lower than those showing maternal toxicity. The U.S. EPA has classified norflurazon as a Group C, or unquantifiable, possible human carcinogen. This latter designation was based on an increased incidence of hepatomas in male mice at the highest dietary dose (218.8 mg/kg-day).

RECOMMENDATIONS

The subcommittee recommends that the Director should do either of the following to minimize norflurazon movement to ground water:

- A. Require that all products containing norflurazon be listed a restricted material requiring a permit with mitigation measures, OR
- B. Require the registrant to amend product labels containing norflurazon with mitigation measures to protect ground water.

MITIGATION MEASURES

The mitigation measures for either case, restricted material or label amendment, are as follows:

- Require norflurazon users to protect their wellheads, including working wells, abandoned wells, and dry or drainage wells, by not allowing irrigation and rainfall runoff water that may contain residues of the herbicide to enter wells or contact well-head areas.
- Require norflurazon users to protect surface water, which may enter ground water, by not permitting treatment of canal and ditch banks sides which slope towards surface water.
- In coarse soil areas where leaching is the principal mechanism by which norflurazon residues move to ground water, require norflurazon users to:
 - Not apply large irrigations (4' or more of water applied between October 1 and March 1) within 90 days after norflurazon application, and
 - manage normal irrigations so that the amount of irrigation water applied does not exceed 125 percent of the estimated evapotranspiration since the last irrigation.

(These modifications of use need not be required if norflurazon is

applied to areas that do not come in contact with downward moving irrigation water, such as if norflurazon is applied to a berm that is not contacted by irrigation water)

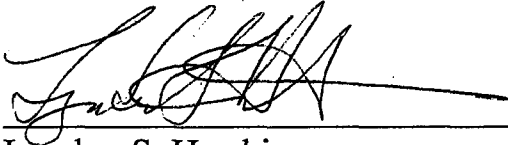
- In areas where runoff is the principal mechanism by which norflurazon residues move to ground water, require norflurazon users to do any one of the following:
 - disturb the soil (for example, by discing or harrowing) after the most recent rain or irrigation event prior to norflurazon application.
 - incorporate the norflurazon after application by mechanical means, or by low-volume or sprinkler irrigation applied at a rate that does not cause runoff from the treated area.
 - ensure that rainfall and irrigation runoff water remains on the treated site.
- Prohibit use of norflurazon in areas managed to recharge ground water.
- Prohibit use of norflurazon on the inward slope of drainage canals.

The Director should require soil, ground water, and surface water monitoring to demonstrate whether the above modifications of use prevent the movement of norflurazon to ground water. This monitoring program should be established in cooperation with the Office of Environmental Health Hazard Assessment, the State Water Resources Control Board, County Agricultural Commissioners, registrants, and users of norflurazon. If monitoring results indicate that modifications of use do not protect against further residues, the Director should further modify or consider banning the use of norflurazon.

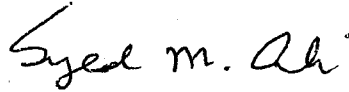
The Director should consider adding norflurazon to sampling screens in the ground water monitoring program. Additionally, the Director should outline procedures for protecting water consistent with the February, 1997 California Pesticide Management Plan for Water Quality. Some of these procedures should include a public outreach and education program and cooperatively developing a product stewardship effort.

ACKNOWLEDGMENTS

The subcommittee thanks those who provided information about norflurazon, including facts about toxicology, use, and potential relationships to ground water contamination. We also thank the Fresno County Agricultural Department and University of California who took time to discuss with us the agricultural practices in areas where norflurazon occurs in ground water.



Lyndon S. Hawkins
Chair of the Subcommittee
Senior Environmental Research
Scientist
Department of Pesticide Regulation



Syed M. Ali, Ph. D.
Staff Toxicologist
State Water Resources Control Board



Anna M. Fan, Ph. D.
Supervising Toxicologist
Office of Environmental Health
Hazard Assessment