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Office of Pesticides
and Toxic Substances
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Pesticides and Toxic Substances



***Agricultural Chemicals in Ground Water: Summary
Minutes from the 1987 Pesticide Strategy Workshop***



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES


To The Coolfont Workshop Participants:

On behalf of EPA, let me express how much we appreciate the time that so many of you have contributed in helping us sort through the complicated issues associated with the agricultural chemicals in ground water concern. In developing an Agency strategy for addressing this concern, we will continue to deal with the difficult questions as openly and as fully as possible.

This document contains a summary of the discussions that occurred this summer at the public workshop held in Coolfont, West Virginia. These discussions not only heightened our awareness of the difficult public health, environmental, and economic issues involved in the agricultural chemicals in ground water concern, but have further underscored the great need to strengthen the relationships among federal, state, and local governments in dealing effectively with the problem.

In the months ahead, EPA intends to broaden the public review of the draft Agricultural Chemicals in Ground Water Strategy that was presented at the Coolfont workshop. Our plans are to develop a final strategy early next year and begin to address some of the key implementation issues raised at the workshop. I feel certain that with the continued support of people like yourself, we will be able to meet our goal of protecting the ground-water resource.

Sincerely,


John A. Moore
Assistant Administrator
for Pesticides
and Toxic Substances

AGRICULTURAL CHEMICALS IN GROUND WATER:
SUMMARY MINUTES FROM THE
1987 PESTICIDE STRATEGY WORKSHOP

JULY 23 and 24, 1987

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

Introduction

This document is a summary of the minutes from the EPA Office of Pesticides and Toxic Substances (OPTS) 1987 Agricultural Chemicals in Ground Water Workshop. Workshop participants were asked to comment on the Agency's proposed pesticide strategy and a number of associated implementation issues.

The July 1987 workshop was the second of two public workshops held by OPTS to solicit input from a wide range of ground-water experts, including Federal and state managers and staff, scientists, agricultural specialists, environmental groups and industry representatives. Input from the first workshop, held in June 1986, formed the basis for the proposed strategy reviewed at the 1987 workshop. Participants at the 1986 workshop were asked to review an assessment of the problem and recommend key issues to be addressed in the plan. Minutes from the first meeting were prepared and distributed to participants and other interested parties.

Following the format of the pesticides strategy, the minutes are divided into three chapters: 1) the Agency's environmental goal; 2) the proposed prevention program; and 3) the proposed response program.

EPA is considering the viewpoints and recommendations expressed at the workshops. These, along with the comment received from formal public review of the proposed strategy, will be taken into account as the Agency develops its final strategy.

Goal

A number of environmentalists and some state officials preferred a ground-water goal of non-degradation. Although these participants generally recognized that there was little likelihood of attaining such a goal, they believed it should nevertheless be the target. A number of state officials suggested a goal that would tolerate some contamination, but not to the extent

that it would impair ground-water use. Under this goal, efforts would focus on preventing pesticide contamination of ground water that is a current or potential drinking water source from reaching drinking water standards or health advisories. Finally, a number of farm interests wanted a goal that would explicitly recognize agricultural productivity and take into account the benefits of pesticide use; a "practicable goal that would be within FIFRA's mandate of weighting the benefits and risks of pesticide use".

Many of the participants thought that health-based reference points should be used to help determine what levels of ground-water contamination is unacceptable. There was disagreement on what these reference points should be and how they should be used. Suggestions for proper reference points ranged from negligible risk to Maximum Contaminant Levels (MCLs), which are defined under the Safe Drinking Water Act. Some wanted these reference points to be considered absolute limits to acceptable ground-water contamination. Others thought the reference point should only serve as a benchmark that would help define the risk side of pesticide use, but the benefits of a pesticide's use would also have to be considered before any regulatory control action was taken.

There was also extensive discussion on the definition of ground water and the use of classification schemes to differentially protect ground water based on its use and value. Some participants felt that all ground water should be protected and that the water in the unsaturated zone should be included in the definition of ground water. Other participants thought that each body of ground water should be protected based on its current or potential use and value. Of particular concern to some of these participants was differentiating potential drinking water sources from ground water that, for a number of practical reasons, would not be used as a drinking water source. There were a number of participants who suggested that continued agricultural productivity in some farming areas may be much more valuable than underlying ground water and that pesticide contamination of such water may have to be tolerated.

Prevention Policy and Program

Most participants felt that the strategy struck a proper balance between national consistency and local flexibility. In general, state participants wanted EPA to define unacceptable ground-water contamination and establish minimum environmental protection requirements that all state pesticide management programs must strive to meet. At the same time, these participants wanted the states to have the flexibility to tailor the management of pesticide use to specific local conditions. Environmental representatives generally thought that the strategy appropriately stressed the need for shared responsibility, but were concerned that there could be too much flexibility given to states in defining what ground waters will be protected and what management measures will be employed.

While most participants thought that there would still be the need for certain EPA prevention measures that would be uniformly required across all areas of the country, there was disagreement on the feasibility of EPA establishing prevention measures that would be geographically differentiated. There were particular labelling and compliance questions raised concerning EPA's proposed establishment of county- or state-wide prevention measures. Some participants felt EPA should not attempt to "go below" the state level in establishing differential measures. Other participants thought that the problems with a differential approach are surmountable and that these measures would be needed as an alternative if there is no state management plan; in fact, the threat of these alternative measures would be a motivating factor for parties on each side of the issue to support the development of a state management plan.

Some participants questioned EPA's authority to require a state to develop a management plan. Others thought that the state management plan should be considered as an opportunity that EPA would provide to the states. These latter participants noted that in the absence of an adequate state plan, EPA may have to cancel or radically change the registration of important pesticides within a state. A number of state representatives believed that the development and implementation of state pesticide management plans would take substantial time and resources. Some suggested that registrants should

help support the development of such plans. Others suggested that the concept of state plans should be phased-in over a number of years and certain interim pesticide management measures be established. Environmental participants, however, thought that stringent control measures were needed immediately to address obvious threats to ground water posed by certain pesticide uses and that these measures should not be delayed in anticipation of the development of state plans. Furthermore, environmentalists felt that to be effective, these measures would have to specify the exact locations (i.e. state, county, or other area) where a pesticide cannot be used.

There was considerable discussion on the possible elements of a state plan and the need for EPA to develop criteria. Also discussed was the extent these criteria should be considered guidelines or requirements and whether state plans should be established for specific pesticides or developed as a generic management approach for all pesticides. Some participants felt that state plans should be evaluated in terms of environmental results, i.e. prevention of ground-water contamination. Others were concerned that the "lag-time" in ground-water contamination and detection would make it difficult to judge the environmental success of prevention measures on a "real-time basis". These latter participants suggested the use of administrative criteria to evaluate state plans (e.g., legislative authority, sufficient resources, etc.).

A number of participants believed that coordination of a number of programs at both the federal and state level would be a major difficulty in the successful implementation of the concept of the state management plan. Some suggested that EPA request each governor's office to establish the lead state agency and that EPA take a number of measures to help ensure coordination both at the federal and state levels. Another stumbling block identified by several participants was the extensive labelling needed to support the state management approach. Others suggested that the actual product label could be a simple, but Federally-required, referral to supplemental labelling materials provided under a state plan, such as bulletins or a user manual.

Most all participants agreed on the critical role of the user and the need to better support his decision-making in the field. Some thought that agricultural extension agents could be the critical link to users. Others were concerned about the possible liability risk this could pose for extension agents. Some suggested that extension agents could still have a critical role, but one that was limited in such a way to avoid liability or the perception of being "enforcers".

Participants identified three basic purposes for monitoring in support of the proposed strategy: (1) monitoring to support registration; (2) monitoring to establish trends and identify emerging problems; and (3) site-specific monitoring to characterize a specific contamination problem. Monitoring to support pesticide registration was generally considered the responsibility of registrants. Some suggested that such monitoring should be designed to look at the most sensitive areas or worst case situations and have definite limits. Others thought that some small percentage of samples should be randomly selected from sites not considered worst case as a precaution against faulty predictions. Others wanted certain measures taken to assure the quality of registrant monitoring efforts.

Monitoring to assess general trends and to identify emerging problems was generally seen by the participants as an EPA or other federal agency responsibility, when done at the national level, and a state function, when done within a state's own boundaries. A number of participants thought registrants should also help support such efforts. Some suggested that EPA or a state could "piggyback" onto the monitoring efforts of a registrant or onto each others' efforts. There was discussion among the participants on how such monitoring should be focused and how to avoid unnecessary duplication.

The third purpose of monitoring was site-specific assessments, which participants thought could be initiated as a result of findings by either registrant monitoring or monitoring conducted by EPA or a state to identify general trends. Some participants thought that more intensive monitoring at a specific site should be conducted when there has been "one-hit" or detection of ground-water contamination at or above the MCL. Others suggested that there be an initial assessment of the site before additional monitoring is

considered. Some participants wanted additional monitoring conducted at a specific site when there is any detection. Others suggested the establishment of an "action level" which, if found, would trigger additional monitoring and site-specific control measures. Most agreed that a state should have the lead in addressing a specific site concern, but EPA and/or a registrant may also have to have roles depending on the situation.

Workshop participants suggested a number of activities EPA should undertake in the near future to help implement the proposed strategy. Much of the suggestions centered on furthering the development of the state pesticide management plan concept.

Response Policy and Program

There was major disagreement on what EPA should do if there is no adequate state plan to respond to ground-water contamination at specific sites. Some wanted EPA to ban the use of pesticides at specific sites. Others thought EPA should ban the use of a pesticide in an entire county or state where a pesticide is detected in ground water at or above an MCL or other unacceptable level and the state does not take adequate action to prevent further contamination from occurring.

There was also major disagreement on who should be liable for ground-water contamination resulting from pesticide use. Some thought that the user should be responsible for contamination resulting from normal, registered use of a pesticide as well as any misuse or accidental spill by the user. Others thought that the registrant is in a better position to understand the inherent risks of pesticide use and the uncertainties of predicting contamination and, therefore, should be held liable when the normal use of his product results in ground-water contamination. Still others took the position that our society has accepted that the benefits of pesticide use carry some risks and, thus, the public should bear the burden of correcting unforeseen contamination. One mechanism for public support of response actions included direct expenditures by owners or users of wells contaminated by pesticides. Other participants thought that public support should be broader and suggested either a tax on pesticide products or the use of general tax revenue at either the state or federal level.

SUMMARY MINUTES

INTRODUCTION

The Office of Pesticides and Toxic Substances (OPTS) has developed a proposed long-term strategic plan for protecting ground water from contamination by pesticides. As part of this effort, OPTS has held two public workshops to solicit input from a wide range of ground-water experts, including federal and state managers and staff, scientists, agricultural specialists, environmental groups and industry representatives. Last year, on June 26 and 27, 1986, the workshop participants were asked to review an assessment of the problem and provide recommendations on key issues for addressing the agricultural chemicals in ground water concern. Summary minutes from this workshop were developed and mailed to participants and other interested parties.

This year, on July 25 and 26, 1987, workshop participants were asked to comment on the Agency's proposed pesticide strategy and a number of implementation issues associated with the strategy. The purpose of this document is to provide a summary of the minutes from this second agricultural chemicals in ground water workshop. Following the format of the pesticides strategy, the summary minutes are divided into three chapters: 1) the Agency's environmental goal, 2) the proposed prevention program, and 3) the proposed response program. For each of these chapters, the document presents EPA's proposed strategy, the workshop discussion questions, and a summary of the discussion. In addition, a list of all workshop participants is included in the Appendix at the end of the document.

The viewpoints and recommendations expressed at the workshops, along with any comments received from formal public review of the proposed strategy, will be taken into account as the Agency develops its final strategy. Such input will also prove valuable in EPA's development of an implementation plan for the strategy and the establishment of guidelines for state pesticide management plans; both of these efforts are to be initiated in 1988.

CHAPTER 1: ENVIRONMENTAL GOAL

EPA Draft Proposal

EPA's goal will be to manage the use of pesticides to protect the ground-water resource. The Agency will give specific attention to preventing unacceptable contamination of ground water that is a current or potential drinking water source or of ecological importance. Additional preventative measures may be taken to ensure protection of "high-priority ground waters".

For ground water that is a current or potential drinking water source, EPA will use the Maximum Contaminant Level (MCL) as its general benchmark or "reference point" for helping to determine what contamination levels are unacceptable. If an MCL is not available, EPA will establish an interim reference point equivalent to a Maximum Contaminant Level Goal (MCLG) for a noncarcinogen and a negligible risk level for a carcinogen.

Discussion Questions:

1. Is EPA's proposed goal appropriate? Is it appropriate for the Agency to focus on preventing unacceptable contamination?
2. How should EPA use health-based reference points? Under what conditions should contamination below a reference point be considered unacceptable? Conversely, under what conditions should contamination above a reference point be considered acceptable?
3. Is the MCL the appropriate general reference point?
4. Is differential protection of ground water based on its use and value appropriate? How should "high-priority ground water" be defined? Should there be more than one class for ground water that is a potential drinking water source and should these classes be differentially protected? What

should be the roles and responsibilities of the EPA and the States in implementing a differential protection scheme?

Discussion:

1. Appropriateness of the Goal and EPA's Focus on Preventing Unacceptable Contamination

NON-DEGRADATION
AS A GOAL

There was considerable discussion about what EPA's goal should be. A number of environmentalists and some state representatives took issue with EPA's focus on preventing unacceptable contamination because it implies that some level of contamination is acceptable. These participants wanted a goal of nondegradation, i.e., no contamination of ground water. They believed that the strategic goal should be a broad, long-term target that is "reached for, even if it perhaps can never be attained".

AGRICULTURAL
PRODUCTION
AND
NON-DEGRADATION
AS A COMBINED
GOAL

Other participants agreed that a long-term goal of non-degradation had appeal, but only if combined with a goal of protecting farmland resources and continued agricultural production. One participant noted that food as well as water is essential to life and that pesticides are currently vital to food production in this country. In response to this statement, another participant argued that a combined goal of non-degradation of ground water and continued agricultural production was possible, but should be based on "appropriate" agricultural productivity and essential uses of pesticides. It was further suggested that while some pesticides are currently essential to food production, pesticide residues in ground water represent inefficiencies and indirect costs to growers; eliminating ground-water contamination could, therefore, improve agricultural productivity.

STEPS TO
ACHIEVE A
COMBINED
GOAL

There were discussions as to how and when a combined goal of non-degradation and continued farm productivity could be attained. Some participants noted that this goal would require major changes in basic farm policies, including paying farmers to take cropland out of production in areas with vulnerable ground water and possibly moving toward a bushel-based compensation system. It was also mentioned that a combined goal would require extensive research into alternative pest control practices including integrated pest management as well as the development of new pesticides that are more highly selective and less toxic and mobile.

OPPOSITION
TO NON-
DEGRADATION
GOAL

Other state participants, along with most industry and agricultural representatives, did not support non-degradation as a goal and thought that the Agency should establish a goal that is attainable within the context of EPA's legislative mandates. A number of these participants stated that a non-degradation goal would be outside EPA's EPA's authorities. Such a goal would require extensive policy changes and massive, long-term efforts by numerous agencies at each level of government, as well as efforts that could only be initiated by the private sector. Furthermore, to move toward a non-degradation goal would require changes in social values (e.g., landowner rights) and personal preferences (e.g., "defect-free" and "insect-free" grains, fruits and vegetables). Finally, these participants believed that radical changes in basic agricultural practices and major dislocations of farming would have to occur to meet a goal of non-degradation. These participants concluded that the costs to society of a non-degradation goal would be too high without justifiable increases in public health or environmental protection. They argued that a goal of non-degradation could not be

attained and that it would be misleading to the public to suggest otherwise.

NEED FOR A
PRACTICABLE
GOAL WITHIN
EPA AUTHORITY

Many of the participants were concerned about pesticide contamination of ground water that is occurring now or in the near future, and what EPA, specifically, will do about it under the Agency's existing legal authorities and programs. One of these participants stated that while a combined target of non-degradation and continued farm productivity is "a nice thing to talk about", it does not reflect the practical world as it exists for the foreseeable future and ignored the fact that difficult trade-offs between these two objectives will often be unavoidable. It was further argued that these trade-offs are considered for other pesticide concerns and are the basis of the basic pesticide law, FIFRA.

NET RISK
REDUCTION AS
A GOAL

Some of the above participants were also concerned that the risks of ground-water contamination must be considered in the context of the potential risks that may result from substituted pesticides particularly through other exposure routes (e.g., dietary). These participants suggested that the goal should be "net pesticide risk reduction", i.e., the Agency should attempt to reduce pesticides risks from a perspective that includes all possible exposure routes including drinking water, dietary, applicator and farm worker exposures.

SOME
CONTAMINATION
ACCEPTABLE

A number of participants felt that some level of ground-water contamination by pesticides would have to be tolerated or accepted in order to continue agricultural production in this country. These participants felt that the risks of ground-water contamination by pesticides would have to be weighed against the benefits of their use; in some cases, the risk would be considered reasonable given the benefits of pesticide use. The level of a

pesticide in ground water that poses a reasonable risk should be considered acceptable contamination, while contamination above such a level would pose unreasonable risks and thus, would be unacceptable.

DETERMINATION
OF
UNACCEPTABLE
CONTAMINATION

A few participants suggested that unacceptable contamination would have to be determined for each individual pesticide and for each site where it is used. These participants explained that the risks and benefits would differ for each pesticide at each usage site. The risk that a pesticide poses depends on its toxicity, which differs with each chemical, and the extent of potential exposure, which would differ with each usage site.

GENERIC
APPROACH

- USE OF
REFERENCE
POINTS

Most other participants thought that a site-specific approach was infeasible and that a more generic approach was needed. Some suggested that unacceptable contamination should be established by using a health-based standard or other "reference point" such as a drinking water standard or health advisory level. These reference points would be used to define unacceptable contamination for ground water classified as a current or potential drinking water source. Ecological criteria or reference points would be used for ground water classified as having significant ecological value. [Note - A summary of the discussions on the issues of ground-water classification is presented later].

ALLOWS FOR
CONSISTENCY

A number of participants stressed that the above generic approach for determining unacceptable contamination would allow for consistency between FIFRA decisions and other EPA statutes addressing ground-water concerns. Some participants suggested that this approach would also provide national consistency if used as a minimum standard, i.e., states could establish a more stringent definition of

unacceptable contamination, but could not establish a less stringent definition.

2. Use of Health-Based Reference Points to Determine Unacceptable Contamination

REFERENCE POINT - ACCEPTABLE TO EXCEED

There was considerable debate among the participants on how a reference point should be used. Some of the participants suggested that there may be cases where the benefits of a pesticide use are minimal and contamination of ground water by such a pesticide below a reference point would be unacceptable. Conversely, others felt that there may be cases where a pesticide with critical and significant benefits should be allowed at levels above a reference point. While the former statement was generally accepted as a possibility, there was general disagreement on the latter statement, particularly if the reference point is the Maximum Contaminant Level (MCL).

- OUTER LIMIT TO REASONABLE RISK

Some participants felt that the reference point should always be considered as an "outer limit to reasonable risk". In other words, once it was shown that the use of a pesticide has the potential to contaminate ground water at or above the level of a reference point, control measures would have to be imposed to reduce contamination below that level regardless of the implications for the benefits derived from the pesticide's use. Other participants disagreed and argued that the economic benefits of a pesticide's use could be so significant that they would outweigh the costs of alternative measures such as treating the contaminated water before it is used or providing new sources of water. Furthermore, there may be areas where ground-water contamination is quickly diluted by natural processes and levels above a reference point could be temporarily tolerated. These participants thought that the

strategy should allow for the possibility of acceptable contamination above a reference point including the MCL.

"LICENSE TO
POLLUTE"

A number of other participants were concerned that EPA might not take action until a reference point was reached or exceeded; they felt that the Agency may be establishing a "tolerance level" or a "license to pollute" up to the reference point. For a goal of prevention, it was suggested that ground-water contamination below a reference point should trigger action to prevent contamination from ever reaching unacceptable levels. These participants recommended that a number of trigger levels be established from the level-of-detection up to the reference point and that increasingly more stringent preventative measures be established for each higher trigger level. Some participants also felt that the root zone or the unsaturated zone should be monitored for pesticide residues, and triggers should be established for these zones as part of a prevention approach.

TRIGGERS/
MENU OF
PREVENTION
MEASURES

Participants talked of the menu of control measures that could be established for each trigger level. Some measures, such as requiring monitoring studies by the registrant, could be taken based only on a pesticide's chemical/physical properties and its intended uses. Other control measures, such as changes in the rate, timing or method of application, should be considered if ground-water contamination is detected even at fairly low trigger levels. Moratoriums on the use of pesticides in an area should be considered when contamination levels begin to show the potential to reach the actual reference point.

3. The MCL as the General Reference Point

MCLG MORE
APPROPRIATE

There was considerable discussion about what the general reference point should be. A number of participants felt that the MCL, as a reference point for unacceptable contamination, would be inappropriate because it is not solely health-based. This group was concerned that an MCL could be set significantly higher than an MCLG or negligible risk level because the Safe Drinking Water Act (SDWA) requires that the EPA establish an MCL only after considering the technological limits of public water utilities to treat such contamination; a factor that should not be considered when determining needed prevention measures. These participants felt that an MCLG would be a more appropriate goal. They argued that because neither the MCLG nor the MCL takes into account the possibility of the presence of several drinking water contaminants and their possible combined effects, the more conservative of the two levels should be the reference point.

MCL IS
APPROPRIATE

A number of participants disagreed with the arguments for using the MCLG and instead, supported the MCL as the general reference point for determining unacceptable contamination. These participants noted that, in most cases, MCLs have been set at, or are very near to, the MCLGs. When there is a difference, it is usually a result of limits to practical analytical capability, i.e., an MCLG is below the level of detection and thus, the MCL was set at the level of detection. These participants felt that since MCLGs are based on highly-conservative risk estimates, derived MCLs will also be very protective regardless of the other considerations taken into account. Furthermore, the MCL has been used to establish the adequacy of drinking water for millions of Americans relying on public water systems, and a more stringent level for ground water would be confusing to the public.

NEGLECTIBLE
RISK AS
REFERENCE
POINT

A few participants felt that the reference point should be the level that poses a "negligible" risk, and that any level that poses a risk considered greater than negligible would be unacceptable. Other participants claimed that this would limit the utility of the reference point because FIFRA recognizes that some 'non-negligible' risks may be reasonable given the benefits of pesticide use.

HEALTH
ADVISORIES
ARE KEY FOR
THE NEAR TERM

A number of participants suggested that in most cases, the MCLs for pesticides would be set at the MCLG for noncarcinogens and a negligible risk level for carcinogens or, if necessary, at the limit of detection. Furthermore, the Agency's proposed strategy is to use these criteria to develop interim reference points when no MCL is available, which may be the case for some time. Thus, the interim reference points, currently being developed as Health Advisories, would likely drive prevention efforts for some time to come.

ECOLOGICAL
REFERENCE
POINTS

There was also a discussion on the development of reference point levels for ecological impacts resulting from pesticide contamination of ground water. A number of participants mentioned that some ecosystems or species can be more sensitive than humans to toxic substances and that the MCL or other human health-based criteria may not always be ecologically protective. There was general agreement among participants that ecological reference points should be developed, but many felt that it would be very difficult to determine which would be applicable to specific situations. It was mentioned that ecosystems vary too greatly in their sensitivity to toxic chemicals for national reference points to be useful. Some suggested that ecological concerns could be addressed under the Clean Water Act in which EPA would continue to establish ecological criteria and the states would develop specific water quality standards. In this situation, the states

would determine the applicability of ecological standards to any given ground-water resource.

4. Differential Protection of Ground Water

THE ROLE OF GROUND-WATER CLASSIFICATION IN DETERMINING UNACCEPTABLE CONTAMINATION

As mentioned above, participants discussed a possible generic approach to establishing unacceptable contamination. Such an approach would use a standardized reference point, such as the MCL, to designate unacceptable contamination levels for certain classes of ground water. Classifications would be based on whether a ground-water resource is or could be used as a drinking water source or on its ecological value. Use of such a classification scheme would provide a surrogate for exposure and thus, coupled with a health-based reference level, a measure of the potential risk resulting from pesticide contamination of ground water. This approach would avoid having to determine potential exposures for each local ground-water/pesticide use setting --- a task that was considered infeasible by many participants.

DEFINITION OF GROUND WATER

The workshop participants discussed a number of issues involving this approach including: the definition of ground water, the appropriateness of differentiating ground water for protection purposes and the appropriate classification scheme. Some participants mentioned that the Strategy did not define ground water or provide options for its definition. One possible option would be to define ground water as the water in the saturated zone. A second option would be to define ground water as the the water from the root zone on down. Some participants replied that the Strategy uses the same definition of ground water that is found in EPA's general Ground-Water Protection Strategy (1984), which focuses EPA's protection efforts on ground water in the saturated zone.

PROTECTION OF
UNSATURATED
ZONE

Some participants felt that it would be more consistent with a prevention goal to include the water in the root zone or the unsaturated zone in the definition of ground water. They argued that the saturated zone is the "destination" of water of concern and the root zone is the "transport system" for the water of concern. Other participants thought that the goal should be protection of the water in the saturated zone, but preventative management actions could be based on monitoring of pesticide residues in the unsaturated zone. One participant suggested that either approach would have the added benefit of helping to protect surface water as well as ground water.

NO DIFFER-
ENTIATION

There was considerable discussion on whether and how ground water should be differentiated. A number of participants felt that you could not differentiate ground water; that all ground water needed protection because we do not know enough about the interconnection of ground waters and could not accurately predict what waters may be used in the future for drinking water.

DIFFERENTIA-
TION BASED
ON VULNER-
ABILITY

Other participants thought that ground water could be differentiated by relative vulnerability and that in highly vulnerable areas, little or no pesticide use of any kind should be allowed. Some participants stated that differentiation of ground water by vulnerability was generally accepted and that ground-water differentiation based on its use for human consumption or ecological value was the real issue.

ZONES OF
ATTENUATION

In one work group, the concept of "zones of attenuation" was suggested as a possible approach for a differential protection scheme. Such an approach would allow for a lesser degree of protection as one goes further away from

the point where the water is actually withdrawn by a drinking water well or recharges an area of ecological importance.

AGRICULTURAL

It was mentioned that some crops require saturated soil conditions. Also, large agricultural areas may overlie areas of "useless" shallow ground water. Continued agricultural production could be more valuable in some of these areas than protecting ground water that has little likelihood of being used as drinking water and little economic or environmental value. These participants suggested that certain areas be classified as agricultural zones where ground-water protection would be reduced or deemed unnecessary. In some of these areas, the agricultural activities may be so intense that ground-water contamination above a reference point, including an MCL, may have to be tolerated.

PROTECTION FOR ALL GROUND WATER

Others suggested that the essentiality of a pesticide to continued agricultural production should be clearly shown before contamination of any ground water is considered acceptable even if the risks are negligible. Some of these participants thought that there may be areas where ground water should not receive full protection, but some baseline protection should be attempted for all ground water.

LESS PROTECTION ONLY FOR CLASS III

Some participants argued that less protection should only be considered for those waters that would fit EPA's Class III designation, i.e., high salinity, low yield, etc. Others, however, believed that little, if any, agricultural areas would be found to overlie just Class III ground water, and that exemptions or additional differentiation of areas with EPA Class II-type of ground waters was needed.

DIFFERENTIATION
OF POTENTIAL
DRINKING WATER
SOURCES

Many of the workshop participants felt that there should be some differentiation within EPA's Class II definition of potential drinking water. In other words, there should be differentiation between what is a real potential drinking water source and what is, for all practical purposes, not a source for the foreseeable future even though it does not fall within EPA's Class III definition.

SHALLOW
GROUND WATER

Some participants thought that shallow ground water could be less protected if deeper aquifers were used as a drinking water source. Others, however, disagreed and mentioned that in some areas of the country, shallow ground water is the preferred source of drinking water. Moreover, shallow water is also more likely to be associated with surface water systems that may need protection for either human health or ecological reasons.

LOCAL
ZONING

A few of the work groups discussed how local zoning ordinances could be used to identify agricultural zones and to prevent any future use of ground water in these areas as drinking water sources. Some participants thought that local ordinances could be established in certain agricultural areas that would require any future drinking water wells to draw water from below a specified depth. This approach would allow for contamination of shallower ground waters while protecting deeper, more valuable waters.

FUTURE USE TOO
UNCERTAIN TO
ALLOW
CONTAMINATION

Others felt that local zoning and other land use controls could not assure that ground water in specified areas would not eventually be used for drinking water or that contamination at a shallow depth would not eventually migrate to deeper drinking water supplies. Therefore, because of the uncertainty in determining future ground-water use, all ground water should receive baseline protection with perhaps additional measures taken in areas where ground water is currently being used as drinking water.

NO "UP-FRONT"
EXEMPTIONS

Some participants noted that there had been several attempts to more narrowly define underground sources of drinking water, but each attempt had failed. A number of participants felt EPA should not make "up-front" exemptions for ground-water protection. Rather, the issue could be approached from one of setting priorities for protection efforts. Such priorities, it was argued, should only be made by a state or local government, but EPA could develop the general criteria or approach for establishing priorities.

A STATE
RESPONSIBILITY

Some participants felt that the states should have the authority to establish their own classification systems, if they can generally meet EPA's goal of protecting ground water. Others felt very uncomfortable with not having federal consistency and believed that ground-water protection would become a local political issue. Some participants suggested that the states should use EPA's classification scheme and not "reinvent the wheel".

EXTRA-
PROTECTION FOR
"HIGH-PRIORITY
GROUND WATER"

A number of participants believed that some baseline level of protection should be provided for all ground water that is a current or potential drinking water source, but that additional prevention measures should be taken to assure protection of "high-priority ground waters". Other participants were concerned that identifying ground waters for "extra protection" would result in "underprotection" for other ground waters. More specifically, these participants felt that such an approach would result in protection for large community wells at the expense of protection for private wells, particularly in rural areas.

POSSIBLE
"HIGH-PRIORITY
GROUND WATER"

Several participants suggested that high-priority ground waters should be those waters supplying public drinking wells that are included in a state's wellhead protection area program. Another suggestion was that water supplying private wells should also be included as high-priority ground water and that well setbacks be established for areas where pesticides could be stored, mixed or used. It was mentioned that a national minimum well setback could be established for all wells with additional setbacks for areas with more vulnerable or valuable ground waters. Some participants disagreed with this idea and thought that owners of private wells should be targeted for education efforts concerning the vulnerability of well areas rather than specific regulatory measures.

A LOCAL
DECISION

A final suggestion was to include areas with ground waters that are likely to supply future public water systems. Other participants thought that this was a good idea, but the designation of such areas would have to be done by local governments. These participants noted that some states had tried and failed at designating such areas; now these states are developing criteria and guidelines for local governments to do such designations. In the future, farming communities may have to decide whether to "trade-off" current agricultural production in return for protecting future drinking water supplies.

CHAPTER 2: PREVENTION

EPA Proposal:

EPA prevention strategy will combine three basic pesticide management approaches:

- EPA-directed prevention measures that will be required in all areas of the country (i.e., "uniform nationwide measures")
- EPA-directed, differential prevention measures that will be required on a county-by-county basis or applicable to entire individual states (i.e., "area-specified measures").
- State-directed measures that will be considered by the Agency as possible alternatives to the above, EPA-directed measures and the basis for EPA registration decisions. These state-directed measures will be described in a "State Pesticide Management Plan". A State may establish "uniform statewide measures" or use "area-specified measures" to tailor prevention to local ground-water protection needs.

All three of the above management approaches can include additional protective measures for sites where certain special conditions exist (e.g., high recharge areas, shallow ground water, "high-priority ground water", etc.). The pesticide's label would specify what special conditions would warrant these additional "site-conditional measures". The determination of the presence of special conditions at a particular site and the applicability of "site-conditional measures" would be the responsibility of the pesticide user.

EPA's prevention strategy recognizes the pivotal role of the pesticide user in protecting the ground-water resource; his decision-making in the field must be better supported. The strategy also calls for increased responsibilities by registrants in preventing ground-water contamination that

includes: a greater role in supporting proper decision-making by the user in the field; expanded ground-water monitoring efforts; and the development of safer alternative pesticides.

Under this prevention strategy, monitoring of ground water for pesticides will be of increased importance for identifying emerging problems and for evaluating the environmental effectiveness of management efforts.

Discussion Questions:

1. Does the strategy strike an appropriate balance between national consistency and local flexibility in managing pesticides to protect the ground-water resource? What aspects of the strategy should be flexible (e.g., alternative state management measures, definitions of ground-water classes/subclasses)? What aspects should be consistent (e.g., no exceedance of EPA-designated, unacceptable contamination levels)?
2. What types of prevention measures should EPA impose uniformly to all areas of the country? Is an EPA-directed differential approach at the county- or state- level feasible? How should EPA decide what counties or states need what types of differential protection measures? What are the implications of EPA differential measures for labelling and enforcement? Should EPA-directed measures always be developed for each pesticide as the basis for evaluating the adequacy of alternative measures proposed by a State Pesticide Management Plan?
3. What should be the elements of a State Pesticide Management Plan? What guidance, criteria or standards should EPA develop for state plans? What should EPA review when deciding on the adequacy of a state's plan? What are the labelling and enforcement problems of the state plan approach? What are the other barriers to establishing a state plan and program? What can EPA do to facilitate the development of adequate state plans? How much time and resources will be required to develop and implement state plans?

4. How can the federal and state governments increase the knowledge of users, and introduce this strategic approach in a way that would encourage users to comply voluntarily? What information needs to be provided to pesticide users? What are the best mechanisms for getting such information to the user?
5. Who should be responsible for conducting ground-water monitoring that is intended for identifying potential contamination trends or emerging problems? What frequency and level of ground-water contamination should be considered as an indication that preventative management actions are needed? Who should conduct site-specific monitoring when a pesticide contamination problem has been found? How can EPA or a state better respond to contamination reports?
6. What are the next steps in launching this strategy?

Discussion:

1. Balance Between National Consistency and Local Flexibility

CONSISTENT
GOAL/
FLEXIBLE
MANAGEMENT

Most participants felt that at the conceptual level the strategy strikes a proper balance between national consistency and local flexibility. Several state participants emphasized that there needs to be national consistency in regard to the minimum standard for acceptable ground-water contamination; a state would have the option of being more stringent. However, many state representatives wanted maximum flexibility in applying pesticide management measures for achieving such protection and for determining what ground waters should receive protection. They recognized that there may be inconsistencies between states in their management approach, but most agreed that more than one approach could be successful.

EPA'S
ALTERNATIVE -
"GORILLA-IN-
THE-CLOSET"

A number of states also liked the idea of EPA having an alternative management approach that would tend to be less precise than a state management effort. Such an approach could provide "the gorilla-in-the-closet" threat that would "make things happen in a state". In other words, a less precise EPA-directed management measures could pose difficulties from both an agricultural and environmental perspective and thus motivate political support for alternative state-directed measures.

CONCERN FOR
TOO MUCH
FLEXIBILITY

Most environmentalists thought that the strategy appropriately stressed the need for a shared responsibility, especially between EPA and the states. However, some environmental representatives expressed reservations that the strategy could provide too much flexibility for the states, particularly in regard to what ground waters should be protected. Many of these participants felt that

EPA should provide specific criteria for the definition of what types of ground waters are to be protected.

NEED SPECIFIC
REQUIREMENTS

A few environmentalists also had reservations about allowing the states to develop their own pesticide management measures. They felt that national criteria should be developed for identifying areas vulnerable to ground-water contamination by specific pesticides and that prevention measures for these areas should be dictated by EPA. The role of the states would be limited to assessing pesticide usage areas using EPA's vulnerability criteria and enforcing the EPA-required measures for each type of area identified.

2. EPA-Directed Measures

NATIONAL
UNIFORM
MEASURES

Most participants agreed that there are certain agricultural practices that should be managed uniformly across the country. Such practices would include those that could result in contamination of ground water regardless of local hydrogeological conditions. The best example of this practice is contamination from chemigation tanks that can result from accidental backsiphoning of pesticide mixtures into a water supply well. EPA has established a nationwide requirement that anti-backsiphoning devices be installed on all chemigation systems.

NATIONAL
REQUIRED
WELL SET-BACKS

Another possible national, uniform regulation may be a minimum well setback for mixing and loading operations; the intent being to prevent "run-in" of highly contaminated waters from leaks or spills. Still other participants thought that a minimum well setback for all pesticide activities including field applications should be established as a minimum national requirement. However, some participants disagreed with this proposal, stating that the degree to which well setbacks are actually needed

requirements would vary too much from area to area and a uniform, national requirement could be either too stringent or provide a false sense of security. Other participants mentioned that certain measures, including use cancellations, could be uniformly required for all Wellhead Protection Areas. It was noted, however, that in many states wellhead protection was in its infancy and that imposing federal regulations at this time for those areas could impede their development.

NATIONAL
RESTRICTED-
USE REQUIREMENT

Another possible national measure could be restricting pesticides that pose a ground-water threat to certified applicators. It was argued that if restrictions were differentiated by area, it would result in confusion and noncompliance. Also, the certification process could be used as a primary vehicle for educating users on the ground-water concern and the more complicated differential prevention measures required by either EPA or a state.

NEED FOR
NATIONAL
CANCELLATIONS

There was some disagreement on whether or not national cancellations of pesticides, based on ground-water concerns, would be appropriate once adequate state plans are in place. Some participants felt that there will always be areas where a pesticide can be used without impacting ground water and if a state can identify these areas, the use should be allowed. Other participants thought that EPA should not expend resources to oversee a state plan that would support the registration of a nationally-banned pesticide for a small number of sites.

EPA DIFFER-
ENTIAL MEASURES
- NOT FEASIBLE

Most of the workgroups expressed considerable differences in opinion on the strategy's proposal for EPA-directed differential measures at the county- or state- levels. Some participants noted that the variability of ground-water vulnerability and agricultural practices at the county or state-level of

resolution was too great in some areas to serve as a basis for differential measures. Still others suggested that national pesticide labels could not carry the amount of information necessary to support such an approach. Finally, a number of participants felt that a county-by-county approach could not be enforced in some states.

EPA
DIFFERENTIAL
MEASURES
FEASIBLE AND
NEEDED FOR
MOTIVATION

Some participants felt that an EPA-directed differential approach at the state- or county-level was possible and in fact was the key tactic of the proposed strategy. The crudeness of a state- or county-level approach would be a motivating factor for a state to develop the preferred approach of a state management plan. It would also motivate industry, user and environmental groups to support the development of a state plan.

- MOTIVATION
FOR
INDUSTRY
SUPPORT OF
STATE PLAN

Under an EPA-directed approach, it was noted that EPA's countywide or statewide measures would tend to be based on worst case assumptions. For example, the Agency would have to establish ground-water protection measures for an entire county based on the assumption that all of the water was a drinking water source. The use of worst case assumptions would result in pressure on the states by industry to develop alternative, more refined management approaches. The EPA-directed approach would also likely result in areas within a county that may actually be more vulnerable than the overall county designation. As a result, EPA would need to include additional label directions that would require a user to assess the local vulnerability of his usage site and take additional protective measures if applicable. These "site-conditional" measures were not liked by either the user or environmental groups. It was clear at the work- shop that users do not want to be responsible for determining local vulnerability, while environmentalists are concerned about users' interpretation

- USER AND

ENVIRONMENTALIST of the measures and compliance and enforcement
SUPPORT OF difficulties. These considerations would lead to political
STATE PLAN pressure from users and environmentalists for a state to
develop an alternative, more refined approach.

- LABELLING
IS FEASIBLE

These participants also suggested that the labelling problem could be surmounted. Bulletins and other informational vehicles could be used. Requirements made available through these other "labelling" mechanisms could be made enforceable by having a simple and short statement on the actual product label directing the user to follow those instructions.

- COMPLIANCE
IS FEASIBLE
BUT EDUCATION
IS CRITICAL

Finally, these participants thought that a state that could not demonstrate its ability to enforce a county-by-county approach should lose the registration of the pesticide in the entire state. Some other participants countered that enforcement should not be expected to assure complete compliance. User willingness to comply must be considered and label instructions that would take a pesticide's use away from him, but not his neighbors in the next county, would likely lead to noncompliance, especially if other crop uses were allowed in his own fields. A number of farm representatives took issue with this viewpoint. They suggested that the farmer is very interested in protecting his and his neighbors' drinking water. If you can show the farmer that a pesticide will contaminate his family's drinking water, he will not use the product regardless of what his neighbor is doing. A number of participants agreed that the key to differential measures is education. Some participants pointed out that if differential management measures are not possible, the alternative would be a nationwide approach that would result in greater measures, including cancellations.

STATE - VS
COUNTY- LEVEL

Major disagreement still occurred on whether EPA should ever attempt differential measures below the state level. Most environmental representatives and a number of state representatives thought that EPA should cancel all uses of a pesticide that pose a ground-water threat in any state that does not develop an adequate state plan. A number of other states and most agricultural interests protested that such an approach would be unfair if EPA's own data shows that there are agricultural areas in a state where a pesticide could be used without impacting ground water. These participants noted that there may be counties within a state that are vulnerable to ground-water contamination, but of little agricultural importance. Within that same state, there may be counties where the farming areas are not vulnerable and their agricultural production could be of national if not worldwide significance. They asked how it could possibly be appropriate to ban the use of pesticides in that entire state based on ground-water concerns, particularly if a state could enforce EPA's county-by-county prevention measures.

3. State Management Plans

OPPORTUNITY
FOR A STATE

There was general agreement among the participants that the concept of state management plans was appropriate, but some questioned EPA's authority to provide federal funds for this activity. In response to these concerns, EPA participants noted that if a state refuses to develop a management plan, EPA may have to cancel or radically change the registration of the pesticide within that state. These participants suggested that the state management plan should be viewed as an "opportunity" for the state to develop alternatives to EPA's measures, and that the state can better tailor prevention measures to specific local needs. However, it was noted that if a state is unwilling

to develop a management plan, the Agency will have to take action under its FIFRA responsibilities.

COMPETITIVE
ADVANTAGE

Some participants expressed concern that development of a state plan would place them at a disadvantage over those states that do not take an active role. However, it was pointed-out by other participants that states that take the initiative to develop a management plan may, in fact, have a competitive advantage over states that do not take an active role. A state that takes an active role may find that its management plan will allow for the use of pesticides that would otherwise be cancelled by EPA within parts or all of the state.

"NOT PREMATURE"

Several state participants noted that they and a number of other states were already addressing the pesticides in ground water concern and, regardless of EPA actions, additional states would soon have to do the same as a result of public concern. These participants stated that in regard to state pesticide management plans, it was "not premature for EPA to require them". For some states, it will only be a matter of "repackaging" their plans into a format appropriate for submission to EPA.

REQUIRES
TIME/MONEY

A number of other state representatives felt that the development and implementation of a state management plan will be a substantial undertaking requiring from 3 to 5 years to develop and even longer to implement. Significant resources will be needed for their establishment, and EPA must provide the major share, at least in the early stages. Some participants estimated that the cost of developing a plan could range from 250 to 500 thousand dollars a year. Other participants estimated that detailed mapping of ground-water resources and vulnerability could cost up to 2 million dollars a year for several years in moderate size states. A number of participants suggested

that some state legislatures may not provide the resources necessary to support a management plan until EPA threatens to cancel the use of pesticides important to a state's agricultural productivity. It was further noted that certain aspects of a management plan could only be developed by state or local governments.

ASSISTANCE
FROM
REGISTRANTS

Pesticide registrants were mentioned as another possible source of funding as well as technical assistance for the development of state management plans. Some state representatives expressed concern that industry would not generally support the development of management measures. Industry representatives countered this by citing a number of cases of joint cooperation between registrants and states in addressing potential ground-water problems. These latter participants suggested that registrants are, in fact, expecting to shoulder some of the responsibility for helping states develop plans, except in areas where a pesticide's use may be marginally profitable.

PHASE-IN
MEASURES

Some participants thought that a five-year period was needed to phase-in state management plans. During this phase-in period, EPA should develop site-conditional label requirements for the states to implement. For example, EPA could require a pesticide's label to read: "do not apply this pesticide in areas with high ground-water recharge". Each state would then decide to what extent it would assist pesticide users in complying with the EPA label. During the phase-in period, EPA should also support a number of pilot state efforts. Support should be given to both states that already have fairly-advanced programs and states that are just beginning to address the problem. The intent of these pilots would be to develop the criteria and guidelines or perhaps a model for state plans.

PILOT STATE
PLANS

NO DELAY
FOR NEEDED
CONTROLS

Environmental representatives felt that EPA should not delay measures to address pesticides that have clearly been shown to pose ground-water threats. Furthermore, these participants doubted that site-conditional measures could adequately protect ground water. Instead, they preferred that pesticide uses be specifically cancelled by EPA in certain counties or states based upon ground-water concerns.

ALTERNATIVE
INTERIM
MEASURE

As an alternative to the above approaches, some participants suggested that the states be allowed to issue permits or waivers to farmers for limited use of pesticides in counties where EPA has cancelled a pesticide's use. These participants thought that this could also be the eventual approach taken by a state plan. Other participants suggested that such an approach could work only in those states where the demand for permits would be low.

NEED
GUIDELINES

In developing guidelines for state plans, it was suggested that EPA review a number of state programs. Some of these participants suggested that EPA's strategy should include a detailed description of the criteria for an adequate state management plan.

ELEMENTS
OF
STATE PLANS

There was considerable discussion on what should be the basic criteria or elements of a state management plan and which aspects should be viewed as specific requirements and which should be thought of as flexible guidelines. A number of participants had recommendations on the basic elements of a state plan. These included:

- Description of a state's general ground-water policies and intent of its management plan

- Description of a state's legal authorities that will support the plan
- Roles/responsibilities of the various state agencies including the lead agency and mechanisms for coordination
- Description of the state's definitions and approaches for classifying areas in regard to ground-water use and value and vulnerability to contamination by pesticides
- Maps of agricultural areas that would support determination of ground-water protection needs
- Description of a state's proposed pesticide management measures
- Strategy for labelling and other communication/education mechanisms
- State's plan for public participation
- Enforcement strategy
- Monitoring strategy
- QA/QC program

ENVIRONMENTAL PERFORMANCE

Some participants thought that a State should develop a generic plan that would be applicable to all pesticides and EPA should only establish environmental performance requirements, i.e., a state's plan should provide confidence that it will prevent ground-water contamination from reaching unacceptable levels as defined by EPA. Other participants disagreed with having only environmental

ADMINISTRATIVE
PERFORMANCE

performance standards, noting that there may be significant "lag times" between when a management plan is implemented and when it can be clearly shown to have succeeded or failed in measurable reductions in contamination. These participants suggested that EPA should establish certain administrative requirements to assess the general capability of a state plan and program, i.e., sufficient resources, expertise, legislative authority, etc. It was further suggested that EPA assess the adequacy of a state's plan on an annual basis.

DETAILED EPA
REQUIREMENTS

Some participants wanted EPA to prescribe exact criteria for nearly all aspects of a state plan and to identify the specific manner in which individual pesticides would be managed. Others thought that there would have to be combinations of flexible guidelines and exact criteria for different elements of a state plan. These latter participants also suggested that only initially would state plans need to identify management measures for specific pesticides; eventually, this need would diminish as experience is gained by both EPA and a state in implementing this management concept.

COORDINATION

Coordination of efforts by different agencies at both the federal and state level was a key topic. It was noted at the state level that a number of agencies would have to be involved in the development of a state plan, including those responsible for agriculture, water or natural resources, pollution control, public health, etc. A number of state representatives indicated that the water agency would likely be responsible for identifying ground-water contamination problems, but the agricultural agencies would be responsible for pesticide management to control the problem. Furthermore, the state's pesticide management plan would have to be coordinated with other relevant state planning efforts, such as any wellhead protection plan, nonpoint source plan, ground-water plan, or pesticide user

certification and training plan. Who should have the lead in developing a state's management plan was an issue that each state would have to decide. In this regard, EPA should work with each state to determine the appropriate point of accountability.

GOVERNOR
DESIGNATION

Most state participants suggested that EPA request the governor of a state to designate a lead agency that would have the responsibility of assuring adequate coordination among all relevant state agencies. A number of these representatives noted that it was important for EPA to set the proper example by coordinating its own efforts with those of other relevant Federal agencies, such as USDA and USDI.

LABELLING
TO INCLUDE
STATE MEASURES

The potential problems associated with labelling were also discussed. Some participants noted that only instructions on the label are enforceable, but that it would not be possible for EPA's national label to carry the prevention requirements of 50 states. Other participants recommended that the national label direct the user, as a federal requirement, to follow the instructions of a state, which the state would provide in bulletins or other supplemental labelling. Some industry representatives described a project that is exploring the possibility of a general pesticide user's manual that would provide detailed usage instructions and requirements. Such a manual could include the ground-water protection requirements of individual states.

TECHNICAL
ASSISTANCE

Another key topic discussed was how the federal government could provide technical assistance to the states. It was pointed out that the states need to know of technologies for identifying and mapping their potential problem areas, such as ground-water modeling and geographic information system (GIS) technologies developed by EPA or

USGS. States also need information on what management measures are effective in preventing pesticide contamination. In this regard, the states felt that both EPA and USDA needed stronger research and development efforts. Some state representatives suggested that a national information clearinghouse should also be established for states as well as federal agencies to exchange information on emerging problems and potential solutions.

4. Increasing User Knowledge

KEY TO PREVENTION

As noted earlier, there was general agreement that a pesticide user's understanding of the ground-water concern and his compliance with management measures are both crucial to achieving the goal of the strategy. The key to protecting the ground-water resource is getting understandable information to the pesticide user. The pesticide label is both an enforceable requirement and the principal vehicle for delivering information on the proper use of pesticides. However, as noted above, there are limitations to its capability as an informational vehicle. Some participants suggested that additional labelling materials such as bulletins would be needed. These materials could be distributed at the point-of-sale by pesticide dealers.

ROLE OF EXTENSION SERVICE

A number of participants suggested that with its tradition of helping the farmer, the extension service was in the best position of getting the proper information to the user. However, others were concerned about the extension agents' liability in instructing users on proper use of pesticides to avoid ground-water contamination. These participants noted that extension agents are rarely hydrogeologists and many do not understand the ground-water problem. Finally, these participants did not want extension agents to be viewed as enforcers.

LIMIT ROLE

Some participants suggested that the extension agent could have a limited but very useful role of just getting the proper bulletin or other labelling material into the hands of the user who needs it. Perhaps the agent could also have a "checkoff list" of the things a user would have to consider or do before applying certain pesticides that pose ground-water concerns.

5. Role of Monitoring

PURPOSE OF MONITORING/ RESPONSIBILITIES

Several participants recommended that the proposed strategy clarify who would conduct monitoring studies and the purposes of the studies. It was noted that there are a number of purposes that monitoring information can fulfill. The purpose for collecting monitoring information would determine who should conduct a study and the type of information needed. These participants proposed three general purposes for monitoring:

- Monitoring to support the registration or continued registration of a pesticide
- Monitoring to assess general trends and to identify emerging contamination problems; such monitoring should also be used to evaluate the environmental effectiveness of EPA or state pesticide management efforts
- Monitoring to further characterize site-specific problems

REGISTRANT MONITORING

Participants thought that a registrant should clearly be responsible for conducting the monitoring studies necessary to support the registration of his product. Such monitoring would include relatively small, controlled field

studies, but also may include large-scale, regional or national surveys that sample ground water in areas where the pesticide is being used. With respect to registrant monitoring, several industry representatives expressed concern about being subject to unlimited and infinite monitoring requirements, particularly for large-scale surveys. They argued that there must be some consideration of costs and the possible competitive disadvantage that monitoring requirements could entail. These participants thought that registrant monitoring efforts could be designed to look at areas that are representative of "worst case" situations (i.e., most sensitive or vulnerable areas) and that such monitoring should be a one time effort unless data from the study or another study indicates a problem.

- LIMITED/
WORST CASE

Other participants thought that registrant monitoring should be statistically representative of the areas where a pesticide is used, perhaps with a known bias toward over-sampling of areas considered "worst case". These participants felt that at least 10% of the areas sampled should be from locations not considered "worst case" as a precaution against underestimating the extent of a problem. If a pesticide is detected in areas considered less sensitive, then monitoring efforts would need to be expanded. Other participants warned that the designer of a monitoring survey must be sure that the pesticide has or is actually being used in areas designated as representative of the "worst case" situation.

- STATISTICALLY
REPRESENTATIVE

Other concerns raised in regard to registrant monitoring included the quality of such monitoring and the need for specific EPA requirements and protocols. Some state representatives felt that registrant monitoring should always be done with the knowledge of the state in which it is conducted. Some thought that the registrant should split samples with either EPA or a state or that the

- QUALITY

registrant should have an independent third party conduct the effort at "arms length". Industry representatives noted that nearly all information on a pesticide's characteristics, toxicology and fate in the environment are generated by the registrants and that EPA and industry have worked out mechanisms to assure quality. These participants also noted that in most cases where registrants have conducted extensive ground-water studies, there has been good cooperation between them and state agencies.

MONITORING
TO ASSESS
TRENDS

A second purpose given for monitoring was to assess trends and identify emerging problems. While some participants thought that ambient monitoring of ground water was impracticable, others thought that statistically designed surveys could be used to meet this purpose.

- EPA AND
STATE ROLE

Generally, participants thought that EPA or some other Federal agency should conduct monitoring to provide national assessments; the Agency's Pesticides in Well Water Survey was cited as a prime example of such efforts. These participants also thought that a state should conduct such general assessments within its own borders. EPA should "piggyback" onto these efforts as well as registrant studies to do national assessments.

- AVOID
DUPLICATION

Some participants noted that a lot of monitoring data is not being captured and made generally available, leading to duplication of efforts or less focused monitoring efforts. Development of a clearinghouse of monitoring information was suggested as a way to better communicate and coordinate efforts.

- FOCUS WITH
MODELING &
OTHER INFO.

A number of participants advocated using modeling and other predictive tools to the greatest extent possible to help focus and design monitoring efforts. The need for and scale of monitoring efforts should be based on vulnerability of usage areas, relative leachability of pesticides used, previous findings of pesticides in similar areas, and pesticide sales information. On this latter point, some participants noted that sales data may not truly reflect where pesticides are being used.

- PUBLIC WELL
NETWORKS

Some participants suggested that a monitoring network, composed of public water systems, could be established to track pesticide contamination trends. These participants noted that there will be increased monitoring requirements placed on public water systems as a result of new regulations under the 1986 Amendments to the Safe Drinking Water Act. Others thought that such an approach would be limited as the basis for early warnings because public wells are probably less vulnerable to contamination than private wells. Furthermore, these latter participants noted that those public wells that may be more vulnerable because of their location in rural areas often cannot afford to conduct pesticide residue monitoring studies.

- ROLE OF
REGISTRANTS

A few participants thought that the registrant should be responsible for monitoring to assess trends and identify problems. Others thought that monitoring by a registrant should be limited to what is needed to support his registration. At best, EPA may be able to "piggyback" onto a registrant's efforts to look for other pesticide residues. One participant noted that a registrant may also want to look for pesticides of his competitors in order to dilute his responsibility. Some participants suggested that EPA or a state could support ground-water monitoring efforts by establishing fees on the registration of pesticide that pose potential ground-water threats. Such

an approach would have the added advantage of encouraging the registration of pesticides that do not pose a ground-water contamination threat.

- ROLE OF USER
 - A few participants suggested that the user be responsible for monitoring pesticides with ground-water concerns or that monitoring be supported by a local tax or fee on those using pesticides that pose a potential ground-water threat. Other participants noted that very few individual farmers could ever come close to affording ground-water monitoring.

- USE TO EVALUATE STATE EFFORTS
 - There was some discussion of using trend data as a tool for evaluating the effectiveness of state management plans. Some thought that such monitoring provides the ultimate criteria for evaluating pesticide management efforts. Others thought that such monitoring information was important, but that there can be considerable "lagtime" between when a pesticide is applied or when a management measure is imposed and the resulting change in pesticide levels in ground water can be noted.

- SITE-SPECIFIC MONITORING
 - The third purpose of monitoring suggested by workshop participants concerned site-specific investigations. There was considerable discussion on what should trigger site-specific monitoring and who should be responsible for conducting it. Most participants agreed that such site-specific efforts could be triggered by findings from either registrant monitoring or monitoring conducted by EPA or a state to assess trends.

- TRIGGERS
 - There was some disagreement on what frequency and levels of contamination should trigger site-specific monitoring. In this regard, participants proposed four different approaches, listed in order of increasing stringency: 1) "one-hit" or one incident of contamination

at or above the MCL (or some other unacceptable level) would trigger some limited investigation before additional monitoring would be considered; 2) "one-hit" at or above the MCL would always trigger additional monitoring; 3) "one-hit" at or above an "action level", established as a percentage below the MCL, would trigger additional monitoring; and 4) "one-hit" at any detection level would trigger additional monitoring. Some participants felt that the type of well where contamination is found should be considered in site-specific decisions, e.g., if the well is used for drinking water instead of just irrigation, then action should be taken at the first indication of a problem.

STATE HAS
PRIMARY
ROLE

Most participants felt that a state should be the first to respond to a site-specific concern. A state should have the responsibility to make the initial determination of the seriousness of a contamination situation and the circumstances that led to its occurrence. A registrant may want to work cooperatively with the state at that time. Later, a state may require a registrant to conduct more monitoring of the site or request EPA to make such a requirement of the registrant. In general, a state will have the lead for a specific site but some participants suggested that if the scope of the problem becomes too large, EPA may have to conduct the monitoring.

OTHER
MONITORING
ISSUES

There was general agreement among participants that an adequate state management plan needed to include a monitoring strategy which specified the purposes and various roles and responsibilities of all parties in conducting various types of monitoring studies. There was also agreement that EPA and other key federal agencies needed to take a number of steps to assure that useful monitoring efforts will occur. These included establishment of registrant requirements, analytical

standards, monitoring protocols, information exchange mechanisms between federal and state efforts and between states, priorities for monitoring, and enforcement mechanisms.

6. Next Steps

A number of participants outlined what EPA should do in the next few months. These activities included the following:

NEXT FEW MONTHS

- Address resource question regarding development of state plans
- Determine coordination schemes
- Develop state plan task force
- Develop first draft of state plan guidelines
- Initiate pilot projects to develop plans
- Require environmental fate data and usage data for potential leachers
- Continue the National Well Water Survey
- Develop Health Advisories for potential leachers
- Review Geographic Information System (GIS) techniques for applicability
- Develop criteria for restricting pesticides
- Work with USDA on development of ground-water policies

CHAPTER 3: RESPONSE

EPA Proposal:

The Agency's proposed strategy for responding to pesticide contamination of ground water emphasizes greater Federal/State coordination and statutory enforcement activities. Specifically, EPA's policy would include the following:

- Where a pesticide has reached unacceptable levels in ground water, strong actions will be taken to stop further contamination possibly including enforcement measures, registration amendments, or geographic cancellations.
- EPA will encourage a strong state role in responding to contamination. A state's pesticide management plan should consider the development of a valid corrective response scheme.
- EPA will continue to develop and emphasize enforcement of MCLs to protect users of public drinking water systems.
- EPA and the states will place greater emphasis on coordinating FIFRA, SDWA and CERCLA enforcement activities to identify parties responsible for ground-water contamination as a result of the misuse of pesticides, including illegal disposal or leaks and spills.
- On a case-by-case basis, EPA may assist states by undertaking CERCLA Fund-financed "removal actions" to provide temporary alternative drinking water supplies where there is an imminent human health threat.
- The question of who should pay for corrective actions at sites contaminated by the approved use of a pesticide is a federal or state legislative question.

Discussion Questions:

1. What registration actions should EPA take when there is reported well contamination and a state does not have a management plan that will adequately respond to the problem? Should EPA consider not registering pesticides that pose ground-water concerns in states that contamination?
2. Where does responsibility lie when contamination of ground water results from normal registered use of a pesticide?

Discussion:

1. EPA Registration Response Actions

WHEN NO
STATE
PLAN
EXISTS

There was major disagreement as to what EPA should do if there is no state plan or activity to respond to ground-water contamination. Some participants suggested that EPA impose a specific site ban on further use of a pesticide in areas where ground-water contamination has reached or exceeded unacceptable levels, unless it can be shown that it was a result of misuse. Other participants thought such an approach would be administratively impracticable for EPA and essentially unenforceable. Some suggested that EPA should ban the use of a pesticide in the entire county or perhaps in a state where contamination above an unacceptable level is found and the state does not take appropriate action. A number of agricultural interests felt that such an approach would be grossly unfair.

(NOTE: The reader is referred to the earlier Prevention chapter of this document which contains a discussion of site-specific actions in regard to monitoring that are relevant to this topic.)

2. Liability

STATUTORY
AUTHORITIES

There was considerable discussion among the workshop participants on the issue of who should be held liable for pesticide contamination of ground water. Several participants noted that contamination from disposal leaks or spills were generally covered under other environmental statutes, particularly RCRA or CERCLA (i.e. Superfund), and that the real issue is how to deal with contamination that results from normal, registered use of a pesticide. Others suggested that the leaks, spills and

disposal problems found on a farm were currently being ignored by regulators.

USER LIABLE
FOR MISUSE

Most participants agreed that any contamination resulting from misuse of a pesticide should be the responsibility of the user. A number of participants, however, suggested that in many cases it would be very difficult to prove that misuse had occurred and what the relative impact of misuse had been if the pesticide had also been extensively used in the area in accordance with the label.

FOUR PARTIES
WHO COULD BE
LIABLE

Most participants agreed that EPA's proposed strategy should take a more definitive position on who should be liable for contamination resulting from approved use. However, there was little agreement among the participants on what position EPA should take. It was suggested that each of the following four parties could be held, in some way, responsible for ground-water contamination that resulted from normal, registered use of a pesticide:

- Pesticide user
- Pesticide registrant
- The taxpayer - through a federal or state agency program
- Well-owner or water users

There was some limited agreement that because all four of these parties are involved, liability should be limited to provisions of alternative water or treatment.

USER SHOULD
NOT BE LIABLE

A number of participants felt that the user should never be liable for contamination that results from his use of a pesticide in accordance with the label. These participants felt that if the user has followed the label, he has not been negligent. Furthermore, it would be unfair to hold a user responsible when he has the least amount of knowledge of the potential for ground-water problems.

USER SHOULD
BE LIABLE
FOR REGISTERED
USE

Some environmental participants disagreed that a user should always be excluded from liability when contamination results from normal, approved use. These participants thought that the question of liability should be determined in the courts. Some also suggested that a label advisory statement on possible ground-water risks posed by a product would make a user liable for any resulting contamination. Others felt that these advisory statements were not informative enough to allow the farmer to make the proper decision and, therefore, it would be unfair to hold him responsible.

One participant laid out a five step approach that would motivate users not to risk ground-water contamination from pesticide use, either registered use or misuse:

- STEPS TO
MOTIVATE
USER

1. User assumes liability if he uses the product;
2. Citizens given explicit right to sue when water is contaminated;
3. Pesticide users are educated on the danger and uncertainties;
4. Users are tested on competency before being certified to use pesticides of ground-water concern; and

5. EPA establishes an enforcement approach that includes random audits to check misuse of pesticides.

Another participant thought that a sixth step of paying farmers to put land into ground-water conservation reserves would give users an option of not using pesticides.

- EDUCATION OF
USERS

Some thought that if the farmer is educated on ground-water risks and the uncertainties involved, he should be held responsible for unforeseen contamination resulting from registered use. While not agreeing that education should make the user responsible, a number of participants thought that user training was lacking. These participants suggested that state certification and training programs (C&T) should include information on drinking water standards and advisories and information on the availability of non-chemical alternatives for pest control (several participants thought that EPA and USDA need a greater commitment to non-chemical alternatives). Finally, these participants suggested that users be tested for competency.

- FARMERS SHOULD
NOT BE LIABLE

Representatives of agriculture thought that holding the farmer responsible would bankrupt him without producing enough funds to address a contamination problem. They noted that farming is already operating under severe economic conditions, and that farmers are not given enough information about the risks to ground water associated with the use of pesticides. They also mentioned the difficulties in proving that the contamination resulted from a particular farmer's use of the pesticide, e.g., an unknown spill, leak, disposal or misuse in the area by another party, even several years earlier, could be the actual source of contamination.

- COOPERATIVE
FARMS ARE
DIFFERENT

Other participants thought that arguments excluding farmers from liability did not hold for large cooperative farms which are financially large and stable. Also any on-site ground-water contamination by pesticides would obviously have resulted from activities on these large farms whether it was registered use, misuse or an accident.

REGISTRANT
LIABILITY

A number of participants thought that the registrant of a pesticide should bear all or part of the liability for responding to ground-water contamination that results from the registered use of his products. These participants suggested that such liability should be considered as a cost of doing business that can be passed on to customers in the form of more costly products; more costly products would also have the added benefit of encouraging non-chemical alternatives. Furthermore, these participants noted that registrants would be subject to the most lawsuits anyway because they are perceived as having the "deep pockets", i.e. the most financial resources. Finally, these participants thought that the registrant would have the most knowledge of his product and the risks and uncertainties in predicting ground-water contamination of potential pesticide uses.

- REGISTRANT
RESPONSIBILITIES

Some participants suggested that registrants post "performance bonds" as a condition of registration. These bonds would be used to finance the response to unforeseen ground-water contamination that threatens human health. It was also suggested that the registrant should develop methods for ground-water clean-up as a condition of registration.

Other participants disagreed that the registrant should be held responsible for addressing ground-water contamination that results from the registered use of a product. If the registrant had submitted all necessary data required

- PROBLEMS WITH
HOLDING
REGISTRANT
LIABLE

by EPA for registration, then, it was argued, they should not be liable for ground-water contamination problems. This type of "open-ended liability" can result in an unstable business environment. They also suggested that it would be difficult to decide which registrant should be liable when a pesticide having more than one registrant has created a ground-water problem. Furthermore, they noted that a number of registrants are already paying into "Superfund" which should be used to address the problem.

PUBLIC
LIABILITY

- WELL OWNERS
AND USERS

A number of participants suggested that the public should bear all or part of the cost of having to provide alternative water or treatment when pesticides contaminate drinking water supplies. However, there were differences in opinion on what "public" should bear the cost and the mechanism to use. Some thought that the well owner should bear some or all of the cost. If a public well should be contaminated, the cost should be passed onto the system's customers through increased water rates. The well owner or water user should realize that they are in an agricultural area which carries certain risks and, therefore, they should accept at least some responsibility for being exposed to agricultural chemicals. These participants noted that this approach is already occurring in a number of areas, if only by default.

- TAX ON
PESTICIDES

Others thought that the public should bear the costs by taxing the use of either all pesticides or those that are thought to pose ground-water contamination risks to establish response funds either at the national or state level. These participants suggested that the tax would be hidden in the price of the products and passed onto the farmer who would then pass the cost onto the general public through increased food costs. Some participants noted that the farmer would often not be able to pass the cost on to

the consumer because of a variety of competitive constraints.

- GENERAL
TAXPAYERS
LIABLE

Finally, some participants thought that the general taxpayer should pay for alternative drinking water or treatment of contaminated water. This could be done either at the federal, state or local level.

APPENDIX A

Appendix A

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