TSCA GROUND-WATER PROTECTION STRATEGY

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I. INTRODUCTION

Since the late 1970's, ground-water protection has emerged as a major environmental concern. Incidents such as the toxic contamination of ground water in Montgomery County, Pennsylvania in 1979 and Miami, Florida in 1984 underscored the potential health effects of toxic substances contaminating ground-water supplies used for drinking water.

This paper outlines a plan for using the Toxic Substances Control Act (TSCA) to address selected problems of toxic substance contamination of ground water. The Toxic Substances Control Act was enacted in 1976 to address concerns related to production, distribution, and use of toxic chemicals. At the time TSCA was introduced, however, ground-water problems involving toxic chemicals were just beginning to become nationally known. As more episodes of contamination have been discovered in the last few years, concern for the nation's ground-water resources, and concern for the health implications of ground-water use, has grown significantly. This has also raised concern for possible health effects for contaminated ground water used as drinking water.

In response, EPA issued its Ground-Water Protection Strategy in August, 1984, and the Agency is now focusing more attention and resources on the problems involving ground-water contamination. Two of the primary objectives of the Agency's Ground-Water Protection Strategy are to identify actual and potential ground-water problems and to provide a policy framework for addressing them. Part of the EPA Strategy is to use TSCA as an effective means to deal with certain problems related to toxic chemicals in ground water.

TSCA is the EPA statute that provides the broadest range of authority in protecting human health and the environment from harmful exposure to toxic chemicals. As a result, it is an integrative tool which can be used to:

1. Collect and assess data on health and environmental effects of toxic substances in ground water [Sections 4, 5, and 8];

2. Provide information needed by other EPA programs to fully assess existing and potential problems related to toxic substances in ground water [Sections 4, 8, and 9]; and

3. Control the production, transport, storage, disposal, and use of toxic substances [Sections 5 and 6] for those problems involving ground-water contamination from toxic substances which are only partially addressed, or remain unaddressed, in other EPA statutes.

The Office of Toxic Substances (OTS) will use TSCA authority and expertise to help assess the extent of toxic contamination of the nation's ground water, to collect information on health effects of those contaminants, and to examine several specific problems which are thought to be related to pollutants frequently detected in drinking water. The EPA Ground-Water Protection Strategy includes a three-tiered classification system* for ground-water sources based on use, value, and vulnerability to contamination. Information gathered under TSCA authorities will be used to help determine management strategies for different ground water classes. Three specific problems that TSCA's information gathering authorities can be used to address are trichloroethylene (TCE) and other volatile organic chemicals (VOCs), the chemical constituents of fertilizers, and additives to septic systems. These represent three different problems where contamination of ground water has been widespread.

The overall goal of the TSCA Strategy is to enhance the Agency's ability to detect, assess, correct, and prevent ground-water quality problems caused by toxic substances.

II. EXTENT OF GROUND-WATER CONTAMINATION FROM TOXIC SUBSTANCES

Over fifty percent of the U.S. population draw upon ground water for drinking water use. As a result, toxic substance contamination of ground water could result in widespread and serious adverse effects on human health. At present, however, not enough is known about either the extent of contamination or the potential health effects which may result. But sufficient information exists to raise concerns that a widespread problem of ground-water contamination from toxic substances may exist.

Anecdotal information and a few surveys (such as EPA's Ground Water Supply Survey) form the essence of information known to date on the extent of contamination, but these have only begun to describe the potential problem. Nearly every State in the U.S. has detected toxic contamination in ground water. There is enough information to emphasize the need for future programs to focus on preventative actions to protect the resource, while

*Class I includes special waters highly vulnerable to contamination and either irreplaceable for substantial populations or ecologically vital. Class II includes all other current and potential sources of drinking water and other beneficial uses. Class III includes ground waters not considered potential drinking water sources and of limited beneficial use.

efforts to detect and deal with serious contamination resulting from past actions continue. The information we now have indicates the potential for health and environmental problems which, if not prevented, could reap serious social and economic impacts on a scale heretofore unknown. Cleaning up contaminated ground water is difficult, expensive, and often unsuccessful.

Indication of potential exposure includes:

1. Nearly 8,000 private, public, and industrial wells have been closed or otherwise affected by toxic substances and other forms of contaminated ground water;

2. Volatile organic chemicals are found at detectable levels in 20% of public drinking water supplies and 30% of supplies serving over 10,000 people;

3. Concentrations of toxic compounds in ground water are often much higher than in surface water; and

4. Of 38 inorganic substances being surveyed by EPA, 26 have already been detected in ground-water supplied community water systems. Although this is not in itself a measure of concern, the levels at which many of these chemicals are being detected raise questions of possible health concerns.

On the health effects side, EPA's Office of Drinking Water (ODW) is currently developing drinking water standards and health advisories for some of the toxic substances most commonly found in ground water. More information is needed to fully assess health related problems on additional chemicals, so drinking water standards or health advisories can be developed for important chemicals not among the most commonly found. Previous monitoring efforts have generally looked for a limited number of chemical pollutants, so there is little information on the range of pollutants that might be found in ground water. A more systematic look at identifying previously unidentified pollutants is needed, and the health effects of these pollutants assessed.

A number of ground-water monitoring efforts have been undertaken to assess the problems resulting from toxic contamination, but they have not resulted in a systematic picture of the extent of ground-water contamination. Systematic methods must be developed to ensure that the worst problems are discovered early enough to clean up, or that potentially vulnerable areas are identified for preventive measures. The present ground-water contamination problems are expected to appear more severe as additional information is collected, since many currently unrecognized sources are undoubtedly contributing to the problems. It is necessary that future studies indicate the relative significance of various sources to the contamination of ground water and provide information concerning the fate of contaminants and their potential impact on human health and the environment.

Sources where ground-water contamination from toxic substances has been found include: industrial and municipal landfills; aboveground and underground storage tanks; pesticide and fertilizer applications; irrigation practices; oil and gas wells; mining and mine drainage; waste piles and tailings; pipelines; materials transport and transfer operations; de-icing salt applications; urban runoff; animal feedlots; radioactive disposal sites; underground injection activities; open dumps; and septic systems.

In reviewing what is currently known, it is clear that little systematic information exists today on either the extent or the potential health impacts of toxic contamination of ground water. Furthermore, in those areas where problems have been detected, it has often been difficult to determine the source(s) of the contamination. Finally, little has been done to date to try and identify and prevent future contamination problems. The TSCA Strategy will focus, in the short term, on using the information-gathering authorities under TSCA to provide appropriate data necessary to address these areas. In the long term, the TSCA Strategy will concentrate on controlling contamination from toxic substances.

III. TSCA STRATEGY FOR GROUND-WATER PROTECTION

The overall goal of the TSCA Ground-Water Protection Strategy is to use TSCA authority and expertise to enhance the Agency's ability to detect, assess, correct, and prevent ground-water quality problems caused by toxic substances. Four objectives have been identified as key elements in achieving that goal:

1. To develop information needed to identify current ground-water contamination problems and to determine the potential for future ground-water contamination from toxic substances;

2. To develop information needed to determine the health effects resulting from specific chemicals contaminating ground water;

3. To improve ground-water assessment methods and to incorporate those methods into risk assessments for new and existing chemicals; and

4. To adopt appropriate controls to prevent or reduce the introduction of toxic substances and fertilizer components to ground waters.

The following paragraphs discuss the needs under each of these objectives, the current activities relevant to those needs, and the actions EPA plans to take in both the short term (FY86-87) and long term (FY88 and beyond).

A. Development of information to identify problems.

1. Information collection plan.

No comprehensive or systematic data base exists which summarizes the extent of ground-water contamination, although there are many sources of information that provide limited data. As a practical matter, the lack of information on the extent of ground-water contamination and the sources of that contamination must be addressed before any meaningful steps can be taken to either clean up existing problems or prevent future problems. The Office of Toxic Substances (OTS), in working with the Office of Ground-Water Protection (OGWP), has prepared a plan for developing information for both existing problems and identifying possible future problems.

The plan has six components: (a) developing a system for identifying geographic areas of highest priority to study for potential ground-water contamination problems, and applying this priority-setting system to a number of projects; (b) developing a system for determining sources of ground-water contamination for a given geographical area; (c) collecting or developing information on TCE and other VOC contamination of ground water, and using the systems developed above to help identify likely sources in high priority areas; (d) collecting or developing information concerning the components of fertilizers that may be contaminating ground water; (e) collecting or developing information concerning ground-water contamination by toxic substances as a result of septic systems; and (f) performing a broad-scan analysis of ground-water samples in certain priority areas to identify contaminants not previously identified using past analytical procedures.

Each of these components is discussed below.

2. Priority setting system for future work.

a. Discussion. Sampling and analysis for ground-water contaminants can be time-consuming and expensive. Given the current lack of systematic data on the extent of ground-water contamination by toxic chemicals, a nationwide survey would be prohibitively expensive. On the other hand, field data need to be developed to allow a clearer picture of the extent of the potential problems which may emerge. OTS needs to develop a system to identify geographical areas where limited field work (or other information collection) might take place to better define specific problems, such as the VOCs, fertilizers, and septic system projects described below.

Current Activities. There are several activities in other organizations related to identification of contamination problems. EPA's Office of Pesticide Programs (OPP) and Office of Drinking Water (ODW) are planning a monitoring survey beginning in FY86 to determine the extent of pesticide contamination in ground water. OTS will participate in work group efforts related to this survey and coordinate the OTS efforts in the fertilizer area with the OPP/ODW survey.

The Office of Solid Waste, under RCRA authority, has a limited amount of monitoring data on ground water beneath hazardous waste facilities, as well as information on pits, ponds, and lagoons located at manufacturers' plants.

EPA's Office of Research and Development has conducted a ground-water research program for almost 20 years to improve the capability to predict the movement and transformation of organic chemicals in the subsurface environment, improve monitoring methods, and more recently, to determine the cost and effectiveness of aquifer restoration methods. The EPA Ground Water Protection Strategy as well as this TSCA Strategy will depend on maintenance of a strong continuing research program to accomplish their goals.

Under the Superfund Program, ground-water criteria are a major (although not the sole) consideration in feasibility studies for remedial action. The sites where data are developed may or may not be sites with the worst ground-water problems, but useful monitoring data for some sites may be available.

The U.S. Geological Survey (USGS) is a primary source of hydrogeological data on the overall state of the nation's ground-water resources. USGS has undertaken cooperative efforts with States to appraise ground-water resources and develop information on land use related to hydrologic systems. Fourteen studies have been conducted on the fate and movement of contaminants in ground water, and USGS is expanding this effort, called the National Program of Toxic Wastes in Ground-Water Contamination. The outcome of this effort will be a better understanding of the processes which control the movement of contaminants in ground waters. This work will facilitate the efforts at EPA to develop information leading to greater protection of ground water related to the actual or potential contamination from toxic substances.

EPA and the Department of the Interior signed a Memorandum of Understanding June 21, 1985, which will promote exchange of information and cooperation between EPA and USGS.

c. Plans. In FY86, OTS plans to develop a system for prioritizing areas to study for a variety of possible projects. The system will focus on inherent hydrogeologic vulnerability as well as existing and potential ground-water use. A report describing the system will discuss the merits and disadvantages of various ranking tools (DRASTIC Index, exposure models, etc.), information needed to do the ranking, and compatibility with supporting the EPA ground-water classification system. The report will also discuss the merits, disadvantages, costs, appropriateness, and potential effectiveness of various ways to get the information needed to do the ranking (Section 8 rules, consumer surveys, field work, etc.). This system will later be used in specific cases to determine areas for investigation in the septic systems, fertilizers, and VOCs projects.

3. Development of a system for identifying sources of ground-water contamination.

a. Discussion. One of the more difficult problems facing the Agency is the tracing of sources of contamination once chemicals are detected in ground water. A good example of this problem is illustrated by trichloroethylene (TCE), which is found in many ground-water sources at low concentration levels. Due to the many uses of TCE and its diverse distribution in commerce, it presents a particularly complex challenge if the Agency needs to control the sources. A systematic method of approaching the problem of source identification is needed.

b. Current Activities. Although many studies of ground-water contamination have identified sources, a general systematic approach to the problem of identifying sources has not been developed.

c. Plans. OTS plans to use its expertise in exposure assessment to develop a system for determining sources of ground-water contamination for chemicals in a given area. The system would employ a decision-tree approach to predicting sources, then look at various mechanisms for collecting needed data to verify sources. The mechanisms discussed will include Section 8 rules, letter writing, consumer surveys, hydrogeological/geochemical investigations, etc., and discuss the relative merits, disadvantages, costs, appropriateness, and potential effectiveness of each mechanism. A report on the general system for identifying sources will be done in the short term, then the system would be applied later in the three specific projects (VOCs, fertilizers, septic systems).

4. Determining sources of VOCs in ground water.

a. Discussion. VOCs have been detected in numerous public water systems across the country. Although contamination is typically at low levels (less than one part per billion), higher levels have been found in some systems. Although VOCs are frequently detected contaminants around hazardous waste sites, it is unclear that the increasing amounts of VOCs being detected in ground water are due to hazardous waste sites. It is also unclear what other sources of contamination may exist.

The presence of VOCs raises considerable concern, because several have been identified as suspected carcinogens, mutagens, and/or teratogens. Numerous other chronic and acute toxic effects are attributed to many of the VOCs. Estimates have been made of as high as 6.4% of the nation's ground-water supplies having detectable levels of tricholoroethylene (TCE), one of the VOCs. VOCs are also a major class of chemicals frequently found in RCRA and Superfund sites.

b. Current Activities. The uses and monitoring data for several of the VOCs, including TCE, have been the focus of information collection within EPA for several years. Agency-wide work groups have been formed on several of the VOCs to share information and discuss possible risks associated with these chemicals. To date, however, no systematic effort to identify specific sources of ground-water contamination has been undertaken.

c. Plans. In the short term, EPA plans to use the methods developed under #2 above to select high priority areas for study of these contaminants. Much is known about the production and use of TCE, for example, and this information could be used to set up hypotheses as to the sources of TCE in these areas. These hypotheses can be checked during any subsequent field work in the areas by incorporating the appropriate sampling into the field study design. In the long term (FY88), EPA plans to apply the system developed for identification of sources to the VOC problem. The results of this effort may lead to information collection rules or control rules for various sources.

5. Determination of possible ground-water contamination from fertilizer use.

a. Discussion. The monitoring of select aquifers indicates that nitrate levels in the ground water of shallow aquifers underlying agricultural lands have increased substantially in the past 20 to 30 years. The use of chemical fertilizers in the United States has increased from 20 to 40 million tons per year from 1950 to 1970. Recent figures (1982-83) indicate a leveling off at 42 million tons after reaching a peak of 54 million tons in 1980-81. In addition the average percentage of nitrogen in all fertilizers has increased from 6.1 to 20.4 percent.

Agricultural use of fertilizers is believed to constitute a major source for nitrate contamination of shallow aquifers. Nitrate levels in ground water of the Big Springs area of Northeastern Iowa have increased from a background level of 10 ppm in 1955 to a current background level of 40 ppm. Similar increases have been documented in the ground water underlying the Platte River Valley of Nebraska.

Nitrate in drinking water was first associated with infant methemoglobinemia in 1945. Since then a total of 2000 cases have been reported in the United States and Europe, but since the disease is not "reportable" in the U.S., there may have been substantially more cases. Nitrate in ground water has been "suggested" as a possible factor in other health related problems, to include: cancer, nervous system impairments, and birth defects.

Metals (Cd, Se, Mo, U) present in trace amounts in the phosphate rock used to produce the superphosphate component of a mixed fertilizer constitute another potential source of ground-water contamination.

b. Current Activities. Other than product performance standards, transportation safety, and point source effluent guidelines, there is little Federal regulation of fertilizers. Other than a 10mg/L drinking water standard for nitrate(N), which is now under reevaluation, there is no current regulatory effort dealing with potential human and environmental harm resulting from fertilizer use. EPA's Office of Water, however, is considering the effects of fertilizer use as a non-point source.

U.S. Geological Survey has been collecting and analyzing data on nitrate levels in ground water using their computerized data base WATSTORE for over 25 years. In 1984, USGS used this information to summarize occurrence and distribution of elevated concentration levels on a national scale. This is the first attempt of any federal agency to characterize nitrate occurrences nationwide. The report cited chiefly two areas where research is needed, namely, further evaluation of health risks and fate and transport studies of nitrogen fertilizers.

The U.S. Department of Agriculture (USDA) has focused efforts on the impact of agricultural activities on ground-water quality and the fate and transport of pesticides. Over the past 15 years, the Extension Service and Soil Conservation Service has advised split application of fertilizers, but possible health effects of long-term fertilizer use have not been determined. Several programs, for instance in Long Island, have developed some data on lawn-use of fertilizers, but such studies are sporadic.

c. Plans. In the short term, OTS plans to gain a better understanding of fertilizer constituents, including contaminants, and the suspected linkage between fertilizer usage and nitrate contamination of groundwater. Because little is currently known about the potential for ground-water contamination from either nitrate or other toxic substances, information collection is the first priority. To get some idea of the magnitude of possible contamination, consideration will be given to the opportunity to sample ground water in agricultural areas in conjunction with the Office of Pesticide Programs/Office of Drinking Water's ground-water monitoring program mentioned earlier. After these data are obtained, existing information on fertilizer use, land management practices, and fertilizer content can then be compared with monitoring data to look for correlations.

In the long term, OTS may do limited field work in areas ranked as high priority for potential fertilizer contamination. In any field work done in the high priority areas, information on the use of fertilizers by homeowners would be important so the non-farm use of fertilizers can be addressed. It may be necessary to use section 8 of TSCA to supplement published information.

A better understanding of the leaching dynamics of fertilizer-related pollutants is also needed to develop predictive models. Section 4 of TSCA can be used to require fate testing for those components suspected of causing ground-water contamination. Data gaps also exist in the areas of human and environmental effects which may occur as a result of nitrate contamination of water supplies. Section 4 of TSCA can also be used to require these tests.

In the long term, following the establishment of a sufficient data base to clearly define the problem and to indicate practicable regulatory approaches, a number of remedial approaches are possible under TSCA including labeling (e.g., application restrictions, geographic restrictions) and use of chemical advisories. It is clear that any regulatory approach selected, however, would need to balance the large benefits from fertilizer use against any health or environmental effects. Consideration should be given to cooperative public education and information programs in conjunction with the USDA to encourage efficacious use of management practices that could reduce usage without severe economic impact and control use in areas where fertilizer is likely to leach or runoff into water supplies.

6. Development of information concerning toxic substance contamination from septic systems.

a. Discussion. One trillion gallons of liquid waste are discharged from septic tanks each year and household septic tanks are the largest single discharge source of wastewater. Contamination of ground water from septic tanks results from both normal and improper use of these systems. Properly functioning septic systems continuously deliver nitrate, metals, VOCs, and other organics to shallow ground water. In urban areas the nitrate loading from septic systems is comparable to that from the use of lawn fertilizers. The use of cleaners containing chlorinated solvents to clear clogged drainfields can cause serious contamination of underlying aquifers. Additionally, high levels of organic contaminants have been found in ground water near commercial and light industrial facilities that use septic systems. For example, in Lakewood, WA, EPA confirmed that municipal drinking water wells were contaminated with 1,2-dichloroethylene (200-600 ug/L) and tetrachloroethylene (600-1300 ug/L). The source was identified as a septic tank drain field at a laundry and dry cleaners. In Florida a statewide small waste generator survey uncovered a variety of light industrial establishments such as plating shops and automotive repair shops operating in areas zoned for warehouses and discharging their wastes to septic ststems. A similar survey on Long Island identified commerciall dry cleaners as a source of ground-water contamination. Soil type, hydrogeological characteristics of the area, and the density of individual units are important factors in assessing vulnerability of ground water to septic system contaminants.

b. Current Activities. The permitting of septic tank installation or the regulation of their use is almost always done on a local or state level and it is not anticipated that this TSCA Strategy would affect this process. Within the last five years OTS has expended a low level of effort to gather information on septic tank additives. EPA's Office of Water and Office of Research and Development have conducted numerous studies on design and management of septic systems. OGWP is currently preparing a Technical Information Document on septic system control programs.

c. Plans. In the short term, OTS plans an investigation to clarify which geological situations are likely to favor contamination of ground water by solvents or other septic tank additives. For areas with these characteristic, surveys can be conducted to determine what introduced products are likely to cause contamination problems and to clearly establish that the appearance of these products in ground water is due to leakage from septic tanks and not the result of contamination from waste sites. For commerical or industrial septic systems, methods similar to #3 above can be utilized to determine the types of business and mumber of facilities needed to support a specified population size. Combined with data on chemicals used and

disposed of by these facilities, an estimate of contaminant loading to ground water could be made and then verified for vulnerable areas by monitoring in limited field studies. In the long term, the incorporation of the EPA Ground-Water Protection Class I, II, and III source classification system should be a prime consideration in devising and refining an advisory or regulatory program for additives of septic systems. More stringent criteria for siting of septic tanks over Class I sources would be a possible recommendation to local authorities, perhaps through a non-regulatory approach (Chemical Advisories) providing the results of EPA's information gathering efforts to local authorities. Finally, because septic tanks, like fertilizers, are a source of nitrate contamination, the investigation of nitrate contamination from fertilizers and septic tanks should be closely coordinated.

7. Broad-scan analysis of ground-water samples for previously unidentified contaminants.

a. Discussion. Most monitoring efforts focus on a list of contaminants selected a priori, and during analysis of samples, only these chemicals are quantified, regardless of what additional chemicals may be present. This procedure allows a substantial savings in cost for the analytical work. Because of this practice, however, the full extent of pollutants in ground water may not be known. An effort is needed to determine which pollutants other than the VOCs, metals, and pesticides currently being measured are important in terms of health effects.

b. Current Activities. OTS currently collects human exposure data on a nationwide basis, taking samples of human tissues and fluids from the general population and subjecting them to broad chemical analyses. Experience from this program indicates that humans are being exposed to a number of chemicals not normally measured in current analytical schemes. This may also be the case for exposure through drinking water using ground-water sources.

ODW is proposing monitoring for 52 unregulated VOCs as part of its Revised Primary Drinking Water Regulations.

c. Plans. In the short term, the broad chemical analyses from the human monitoring program will yield data on toxic chemicals to which humans are exposed. Analysis of these data in wide geographical areas ranked as high priorities in a screening step for vulnerable areas may result in a list of toxic chemicals with known human exposure in those areas. Chemicals suspected of contributing to exposure through the drinking water route should be among those looked for in any ground-water monitoring done in these areas.

In the long term, design and implementation of limited field studies to statistically survey the high priority areas for chemical contamination would then result in a defensible answer to the question of extent of contamination for those high priority areas. The mechanism for performing these field studies could be either a special OTS field study or a cooperative effort with another organization such as USGS or OPP; the most efficient and effective mechanism needs to be determined.

B. Development of information needed to determine health effects.

1. Discussion. EPA's Office of Drinking Water is currently developing drinking water standards for some of the most commonly found toxic substances in public water supplies. Health advisories are also issued to inform the public of the contamination level which, if exceeded, could lead to adverse health effects at different periods of exposure. As a result of efforts to better characterize the extent of contamination (discussed above), EPA expects to identify chemicals that either have previously been unreported in drinking water, or that have a more widespread occurrence than is currently known. For these chemicals, it is likely that health advisories or drinking water standards may need to be established, but complete data defining health effects may not exist.

2. Current Activities. The Office of Drinking Water has the principal role in the Agency for developing standards and guidelines (Health Advisories) for drinking water contaminants. As part of this effort, ODW has developed, for example, acute as well as chronic data for nitrates, a primary substance in fertilizers, but subchronic data (i.e., 90-day studies) are needed to more fully determine health effects. ODW has currently issued drinking water standards for 10 inorganic and 10 organic substances, as well as for several additional radionuclides and microbial contaminants. They are currently in the process of setting standards for an additional 35 organic chemicals and reexamining the standards for inorganic, radionuclide, and microbial contaminants. In addition, they have issued health advisories for 22 chemicals and are currently preparing health advisories for an additional 25 chemicals.

3. Plans. For TSCA-related toxic substances with demonstrated widespread exposure, such as the chemicals found in ground water used for drinking water, TSCA has the authority under section 4 to require manufacturers of these chemicals to provide health effects data where data gaps exist. In the short term, OTS will work with ODW (advised, where appropriate, by OGWP) to determine the health effects data needs for those toxic substances currently under consideration for health advisories or drinking water standards. This coordinated effort may result in one or more section 4 test rules. In the long term, information from the broad-scan analysis described above may identify

chemicals where previously unrecoginzed widespread exposure is demonstrated, but little toxicity information exists. EPA plans to evaluate the potential impact of these chemicals by looking at exposure levels and known toxicity, setting priorities based on this screening evaluation, and investigating the use of section 4 or section 8(d) to acquire data for eventual consideration of health advisories or drinking water standards.

C. Improve ground-water assessment methods for new chemical and existing chemical risk assessment.

1. Discussion. TSCA provides a unique opportunity to prevent future ground-water contamination, because new chemicals must be assessed for potential risk. Under section 5 of TSCA manufacturers or importers of new chemicals must file a premanufacture notice (PMN) with EPA before commercial manufacture or import commences. OTS then assesses the chemical's potential risk, and if it may be an unreasonable risk, testing requirements, exposure control requirements, or a ban may be imposed. Potential ground-water contamination from new chemicals has been routinely assessed in the PMN program using state-of-the-art techniques. Similar techniques, along with existing monitoring data, have been employed in OTS' existing chemicals program in the evaluation of ground-water problems posed by existing chemicals.

As more is becoming known about ground-water contamination, more sophistication is needed in the state-of-the-art assessment techniques to adequately address the problem. Little is known, for example, about the relative frequency of various events leading to contaminated ground water (leaching through relatively homogeneous soil, for example, vs. contamination aided by soil heterogeneities such as cracks, root tubes, etc.). Existing models tend to treat soil layers in a given area as homogeneous, limiting the assessments done to date. In addition to the limitation of current models and ground-water contamination data, more focus is needed on the unique problems in assessing impacts of contamination of ground water for both drinking water and other beneficial uses.

2. Current Activities. Ground-water models, including both saturated zone and unsaturated zone models, have been under development in EPA (and elsewhere) for a number of years. OTS has a close working relationship with EPA's Office of Research and Development (ORD), and both are working actively to improve the state-of-the-art in this area. ORD work done in FY84-85 for OTS, for example, investigated ways of validating unsaturated-zone models and laboratory tested several models (developed by OTS and ORD-OPP) in controlled settings. In FY85, OTS sponsored a task to begin examining the question of frequency of events leading to ground-water contamination that might not be predicted using the current modeling state-of-the-art.

3. Plans. OTS plans a substantial effort in FY86 to strengthen the assessment techniques for both the PMN program and the existing chemicals program. By the end of FY86, OTS plans to develop guidance for use in exposure assessment for both programs. This guidance will be for use of OTS assessors in focusing on the unique problems and complications presented by ground-water exposure assessment. In the long term, OTS plans to continue working with ORD and other organizations both inside and outside EPA to assure state-of-the-art techniques will be used by OTS assessors, and to encourage improvements to those techniques where needed.

D. Controls to prevent or reduce the introduction of toxic substances to ground waters.

1. Discussion. With increasing concern over ground-water issues in the past few years, and with the planned information collection activities described above, EPA anticipates that TSCA regulatory authority may be necessary to deal with some problems related to toxic substances in groundwater. Certainly section 5 authority will be used to deal with new chemicals. The three specific projects noted above (VOCs, fertilizers, septic systems), after information collection efforts designed to define the scope of the problems, may result in actions ranging from TSCA Chemical Advisories (non-regulatory information dissemination) to restrictions under section 6 of TSCA. Although information-collection rules (e.g., section 4 or 8 rules) may be forthcoming under this Strategy in the next two years, it is unlikely that section 6 controls will result during that period. What is needed in the short term, however, is an examination of risk management alternatives for the unique problems presented by toxic substance ground-water contamination. The EPA Ground-Water Protection Strategy stresses the necessity for coordination and consistency among EPA's ground-water protection efforts. In keeping with the EPA Strategy, the TSCA control action strategy must fit, along with programs from other organizations, as a part of a larger, fully coordinated effort.

2. Current Activities. The Office of Ground-Water Protection is actively working with a number of organizations both inside and outside of EPA concerning their current actions and plans. As part of this effort, OGWP has been chairing various workgroups to coordinate and promote activities in the ground-water area. OTS has been working with OGWP and other offices in one such work group since January, 1985. This strategy is the result of that work group's efforts.

3. Plans. In the short term, OTS plans to use the regulatory authority of section 5 of TSCA to reduce potential ground-water threat for those new chemicals where an unreasonable risk will occur. The OTS-OGWP work group will be expanded and will immediately begin examination of the relative usefulness, cost, and appropriateness of the many risk management alternatives available under TSCA for dealing with existing ground-water contamination problems. During the next two years, this work group will actively work toward a control strategy integrated with other offices' efforts. In the long term, control actions, if necessary under TSCA, can be designed to be effective and coordinated responses to a very complex problem.

IV. SUMMMARY

TSCA can significantly help the EPA ground-water protection effort, both by collecting information needed by the Agency and by addressing certain problems not addressed by other offices. This TSCA Ground-Water Protection Strategy describes an aggressive program to deal with an important and complicated problem. The effort will begin immediately and will be coordinated with other organizations through the OTS-OGWP work group, which will be expanded to include other offices, Regional, and State participation. An early goal of the work group will be to develop an implementation plan which discusses in greater detail the concepts and projects presented in this Strategy. The following paragraphs outline the short-term and long-term programs.

Short-term efforts (FY86-87) will start on information collection and methods development in FY86. The information and methods will quickly be put to use starting in FY87 with the investigation of three specific problems where toxic chemicals are known to be contaminating drinking water, namely VOCs, components of fertilizers, and additives to septic systems. Short-term efforts will also result in guidelines for better OTS ground-water exposure assessment and a better focus for future research needs.

The long-term (FY88+) program will emphasize integrated problem solving (i.e., use of the best control, whether TSCA or another method) in dealing with protection of ground-water contamination from toxic substances. Long-term research needs will focus on more sophisticated assessment techniques commensurate with the level of complexity of control decisions. Long-term information collection activities will be oriented toward obtaining data for both OTS and other program office use.

Finally, this Strategy will be updated before the long-term program begins, to reflect the results of information collected in the short term.