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

OFFICE OF WATER

NATIONAL SURVEY OF PESTICIDES IN GROUND WATER SUPPLIES AN OVERVIEW, September 13, 1985

Office of Drinking Water
Office of Pesticide Programs

The National Survey of Pesticides in Ground Water Supplies (NPS) is a joint effort of EPA's Office of Drinking Water (ODW) and Office of Pesticide Programs (OPP). As of September 1985, the survey design is partially complete. A significant amount of technical planning has been done, and the following overview will likely be a fairly accurate summary of the final design.

I. FOCUS

- Pesticides in well water as a result of agricultural practice.
- Approximately 4 dozen pesticides, plus a large number of transformation products.
- Private and public drinking water wells.

II. GOALS

- Characterize the occurrence of selected pesticides in well water.
- Determine the relationship between uses of pesticides, pesticide characteristics and field conditions (e.g., soil types) to ground and drinking water contamination.
- Estimate human exposure to these chemicals via drinking water contaminated by normal use.

III. SURVEY DESIGN

- Stages: A three stage design; select counties (first stage), select county segments (second stage), identify and select wells (third stage). At some point, possibly in the first stage, the survey will be bifurcated into public well and private well components.
- Stratification: In the first and second stages, and possibly in the third stage, sampling units will be stratified according to their estimated pesticide usage and their estimated ground water vulnerability. Pesticide usage will be estimated by using Doane Marketing data and county level crop acreage data from the Department of Commerce Census of Agriculture. Ground water vulnerability will be estimated in the first and second stages using the National Water Well Association's DRASTIC ranking scheme. Thus, in stages one and two, a matrix will be constructed of high, medium, and low ground water vulnerability versus

high, medium, low, and uncommon pesticide usage. In the first stage, all counties in the U.S. would then be allocated into one of the matrix cells and weighted selections of counties from each of the cells will be made. This is likely to result in the selection of 100-150 counties for the study. In the second stage, the selected counties will be similarly ranked, but in more detail. Intra-county areas will then be allocated to a matrix similar to the stage one matrix, and selections of intra-county areas will be made. Stage three selection of private wells is less clearly defined at this point. Public well selections may be made after stages one or two using the EPA inventory of public water supplies for the areas of interest. There are three reasons for this stratification: (1) to help ensure that potential hotspots are located; (2) to increase overall precision of estimates of results from the survey; and (3) to enhance our ability to make correlations and predictions.

° Statistics: Each design stage will involve random sampling within strata. Precision constraints will be applied so that areas with a high potential for contamination may be oversampled without sacrificing the statistical validity of the survey. Overall precision (coefficient of variation) for national estimates may be between 20%-30%.

° The final selection of pesticide analytes will be selected based principally on leaching potential. Proven ground-water occurrence is also an important consideration. Qualitative considerations for toxicity will be used when making decisions on whether to include pesticides which are particularly troublesome and/or expensive to analyze.

IV. Survey Conduct

° Approximately 1500 existing wells will be sampled. A significant effort will be made to gather data on and make educated guesses about well construction.

° Multiresidue methods will be used whenever possible.

° Roughly 6-8 separate analyses will be needed per well sampled.

° All positives will be confirmed by at least three analyses using different analytical conditions. In some cases a second analysis by GC-MS will be considered adequate confirmation.

° All samples will be analyzed for all pesticides.

° Health guidance will be in place before sampling commences. This guidance will be in the form of Action Guidance Levels for the National Pesticide Survey, a modified version of a typical ODW Health Advisory.

V. Survey Management

° The survey is being designed and managed by ODW and OPP.

° An ODW/OPP survey work group was formed April 30, 1984. Due to complexity of designing this survey, ODW and OPP established 13 task groups made up of experienced staff. Included are task groups on hydrogeology, pesticide use, analytical methods, quality assurance, health guidance, statistical design, etc.

° Major concepts and many technical details are handled in-house. Significant contractor support is required. All primary analyses will be done under a contract managed by ODW, and QC work will be done by ODW labs in Cincinnati and OPP labs in Bay St. Louis. The ground water vulnerability assessment will done by a contractor. The statistical plan for the survey design and the statistical design will be done by a contractor.

VI. Schedule

° County stratification and selection tentatively scheduled to be complete by late 1985. TX?

° Sampling and analysis tentatively scheduled to begin summer or fall, 1986.

° Sampling and analysis tentatively scheduled to end mid 1988.

VII. Cost

° Estimated to be 5-6 million dollars, total.

° Very significant amounts of EPA HQ staff and lab staff time required.

VIII. Communications

° Periodic monitoring reports, possibly monthly, to state lead agencies.

° Levels exceeding health guidance reported immediately to state lead agencies.

° Updated information regarding the Survey may be obtained from the EPA Office of Public Affairs, the National Agricultural Chemical Association, OPP or ODW state liason groups or from OPP or ODW in Washington, D.C.