REGIONAL POLLUTION PREVENTION PROJECT TO DEVELOP AN EARLY WARNING SYSTEM TO PREVENT IRRETRIEVABLE LOSS OF AQUIFER RESOURCES

PHASE I
PROJECT SUMMARY REPORT

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SECTION I
PROJECT SUMMARY

PROJECT NARRATIVE

The EPA Region 10 Pollution Prevention Project is intended to result in the development of a conceptual analytical tool to assist in early identification of ground water contamination problems. Such an early warning mechanism should facilitate prompt and effective responses to minimize or limit pollution before potentially catastrophic impacts occur to large portions or all of an aquifer system.

The project was prompted by the significant number of costly ground water contamination incidents that have occurred within Region 10 during the past two decades; problems that may have limited in their severity had early action been taken in response to initial warnings. Among these incidents are the following:

- Coeur d'Alene Wellfield (Idaho),
- Garden City (Idaho),
- Lakewood/Ponders Corner (Washington),
- Milwaukie (Oregon),
- Portland South Shore (Oregon),
- Tacoma Landfill (Washington),
- Tacoma Well 12A (Washington),
- Tumwater Wellfield (Washington), and
- Vancouver Wellfield (Washington).

The project is divided into two phases. Phase I is primarily oriented towards an assessment of existing mechanisms for ground water data evaluation and response; while Phase II will involve the actual development of the conceptual analytical tool and validation of the tool by applying it to data from an historic case study and to a set of current ground water quality data.

EPA Region 10 determined that the project would focus on the State of Oregon. Oregon was selected from among the four states in Region 10 in recognition of its ongoing efforts to develop a Comprehensive State Ground Water Protection Program

and because of the expressed willingness of state agency personnel to participate in and contribute to this project.

The Pollution Prevention Project will attempt to provide a conceptual analytical tool and decision making framework that will assist the State of Oregon in the implementation of its Comprehensive State Ground Water Protection Program. The conceptual analytical tool will be developed within the context of the institutional system for ground water resource protection and management in the State of Oregon. However, the tool will be designed in a manner that will allow adaptation to institutional systems in the other Region 10 states.

In Phase I, the project team conducted workshops and interviews with EPA Region 10 staff, State of Oregon agency personnel, and representatives of public water utilities within the State of Oregon in order to gain insight into existing protocols for evaluations of ground water data and selection of response actions linked to those evaluations.

The workshops and interviews were intended to obtain information that will be vital to the design of the conceptual analytical tool including:

- The nature of available ground water quality data;
- The manner in which ground water data are collected, analyzed, and shared;
- The specific criteria that trigger response actions to further investigate or remediate identified problems; and
- The range of possible response actions.

The workshops and interviews also provided an opportunity for identification of actual ground water contamination incidents, case studies, where resource damages could have been substantially limited had early action been taken.

The first workshop was held in Portland, Oregon, on November 18, 1993. It was attended by representatives of the Oregon Department of Environmental Quality, Oregon Health Division, Oregon Water Resources Department, Oregon Department of Agriculture, Oregon Department of Parks and Recreation, Oregon Association of Water Utilities, City of Boardman, City of Portland, and the City of Springfield.

The second workshop was held at EPA Region 10 Headquarters in Seattle, Washington, on November 30, 1993. In attendance were representatives of the Drinking Water, Ground Water, and Air and Toxics Programs as well as the Environmental Services Division.

In addition to participation in the workshops, attendees were asked to complete a questionnaire designed to elicit specific information regarding the role of their agency or program in ground water protection and management. Of the 28 total attendees at the two workshops, 17 completed and returned questionnaires. Summaries of the workshops and questionnaires are contained in Section II of this document.

Follow-up interviews were conducted with eight EPA Region 10 representatives, nine Oregon agency personnel, and three public water system managers. Summaries of these interviews are contained in Section III of the document.

Results of the interviews and workshops have led to the development of specific findings and recommendations provided below. These findings and recommendations served as the basis for development of guiding principles for project and the design of the Phase II effort.

FINDINGS AND RECOMMENDATIONS

Based on the workshops and interviews conducted as part of the Phase I effort, the following findings and recommendations are offered by the project team. The findings summarize the most significant information obtained from the interviews and workshops conducted as part of the project, as well as from review of the *Profile of Ground Water Protection Programs 1993, State of Oregon* (Keenan and Helferty, 1993).

Assistance of interviewees and workshop attendees was sought in characterizing the day-to-day, operational processes of the agencies involved in ground water protection in the State of Oregon. Information concerning data evaluation procedures, data transfer mechanisms, and response activities is critical to identifying the niche for the analytical tool and decision making framework envisioned by this project.

The findings are not intended as criticisms of State of Oregon agencies or programs, but rather to serve as indicators of how the analytical tool and decision making framework could provide tangible benefit to the existing institutional system. Financial resource constraints and agency coordination difficulties discussed below are ubiquitous, not only within Region 10, but across the nation as a whole. Further, it is recognized that many of the institutional limitations discussed below are being addressed by the State of Oregon and EPA Region 10 through the Comprehensive State Ground Water Protection Program planning effort.

1) Financial Resource Limitations. State of Oregon agency personnel interviewed as part of this project are dedicated individuals who are attempting to operate ground water protection programs without adequate levels of financial resources. Unfortunately, it appears that there is little prospect for any increase in resource levels in the foreseeable future. Financial resource limitations have severely restricted the ability of state health,

environmental, and resource agencies in the State of Oregon to operate a comprehensive, forward-looking resource protection program. Important cornerstones of an effective, comprehensive resource protection program, such as vulnerability mapping, statewide ambient monitoring, coordinated data management and analysis, and contaminant source control, have not been advanced to a desired level due to funding restrictions. In general, state agencies are in a mode of primarily reacting to emergent problems rather than engaging in proactive planning and management.

RECOMMENDATION: Phase II of the project should be designed to provide tools to help maximize efficient use of existing personnel by improving the ability to identify potentially serious ground water contamination problems at an incipient stage. The conceptual analytical tool and communication and response protocols developed for the project must be compatible with the current operations of the departments and divisions involved with their implementation. Should they be viewed as adding additional burdens to those departments and divisions without providing tangible short term benefits, the tool and protocols will likely be rejected as impractical.

However, while recognizing that financial limitations will greatly influence the design of the conceptual analytical tool and institutional protocols, Phase II should also highlight the differences in approach that might be taken if the conceptual analytical tool was not constrained financially and was wholly oriented towards long-term resource protection.

2) Confusion Over Role of Project in Pollution Prevention. The project's standing within EPA's pollution prevention program initially created confusion among some of the State of Oregon agency representatives. That confusion stemmed from questions as to whether pollution minimization, which is the principal thrust of this project, fits the definition of pollution prevention, or whether pollution prevention is confined to source reduction activities. This semantic issue appears to have initially created some problem with acceptance of the project's concepts.

RECOMMENDATION: Phase II should attempt to further clarify this semantic issue. This project seeks to achieve pollution prevention within the broader context of that term; however, it is concerned with a very specific role in pollution prevention. While it is recognized that pollution prevention typically focuses on source reduction, pollution minimization should also be considered an important element as well.

3) Drinking Water VOC Data as Early Warning Indicator. Personnel of both the Department of Environmental Quality and the Oregon Health Division expressed concern over the use of drinking water volatile organic compound (VOC) data as the primary data bases for use with the conceptual analytical tool to provide early warning of ground water contamination problems. Some are concerned that once VOC contamination has reached a public water supply well, it may be too late for early intervention; a problem already exists. Additionally, public water supply wells are usually

not designed, constructed, or sampled in a manner that provides data which are representative of specific conditions in an aquifer system.

Further, the practice of some public water utilities of removing wells from service at the first indication of a problem, either a contaminant hit or unpleasant taste and odor, has created "dead ends" in the drinking water data base. While the Oregon Health Division is aware of this problem and is taking steps to rectify it, the practice may have cost the state opportunities to identify and respond to emerging problems before broader resource damages occurred.

RECOMMENDATION: It was evident from the interview process that considerable misunderstanding resulted from the decision by EPA Region 10 to select the Oregon drinking water VOC data as the primary data source for the limited purposes of this project. That data set will be used strictly to test and illustrate the conceptual analytical tool developed as part of this project. However, at a point in the future when the analytical tool and early warning system are fully developed as a result of subsequent EPA and/or state sponsored efforts, it is recognized that a much broader data base would need to be incorporated and utilized.

The broader data base would include information from monitoring programs at solid waste landfills, RCRA sites, and hazardous waste cleanup sites; pesticide data; and ground water vulnerability assessments. In addition, a comprehensive data base for a fully developed early warning system would need to consider drinking water monitoring parameters other than VOCs. Parameters such as bacteria, nitrate, and metals could be used in conjunction with the aforementioned data as potential triggers for the processes of priority setting and determination of response actions.

While such a comprehensive data base is under development by the State of Oregon, it will not be available for use within the time frame of this project.

4) Data Base Coordination Issues. Many data bases related to ground water quality exist within the departments and divisions of state government; however, the organization of those data bases has not been well coordinated. Many of these data bases lack common formats and locators and are not configured in a manner that would facilitate access by potential users in other departments and divisions.

Data management tools are available (ARC/INFO and ARC/VIEW) to create a comprehensive, relational data base management system; however, financial resources to provide for programming, data entry, and data analysis are lacking.

RECOMMENDATION: Efforts by the state's health, environment, and water resource agencies to develop a comprehensive ground water data base management system that will allow free flow of information between departments and divisions should be expedited. This will ultimately result in the development of multiple, interactive linkages

that will facilitate early identification of and coordinated response to emerging ground water quality problems.

Progress towards completion of a comprehensive data management system has been hindered by financial resource limitations. Such a system is not likely to be brought on-line within the time frame of this project. Thus, interim mechanisms for interagency data coordination will need to be developed in Phase II as part of the decision making framework if the conceptual analytical tool is to be useful. The interim mechanism may be a modification of the Oregon Health Division's drinking water data "alerts" system.

5) Protocols for Data Transfers and Response Actions. There is agreement among many of those interviewed that a "process" or "protocol" is needed to help determine when and with whom data should be shared. There is currently no formal system for data transfers, and there are no mutually agreed upon criteria to trigger transfer of data or response actions.

RECOMMENDATION: Phase II of the project should provide assistance to departments and divisions in improving intra- and interagency communication and coordination. In development of the conceptual analytical tool, it should be recognized that data analysis and response generally is a two tier process. Typically, an initial threshold determination is made as to whether a piece or a group of data is significant enough to warrant notification of others and collection of additional information. After additional data have been collected and analyzed, a second, response action oriented determination is made. In concert with the health, environmental, and resource agencies, a framework for decision making should be developed which links specific analytical outputs to commensurate response actions.

Because of differences in the goals and missions of health, environmental, and resource management agencies, it may be necessary to develop more than one system for assigning priority to identified contamination incidents and for selecting appropriate responses actions.

6) Wellhead Protection Program Interface. There is a potential interrelationship between this project and the Wellhead Protection (WHP) Program. Contaminant source inventories conducted by public water utilities as part of their WHP Programs will correlate individual wells to specific data sources, improving the ability of health, environmental, and resource agencies to assess the significance of monitoring data from water supply wells.

The state WHP program should also provide impetus for centralizing management of contaminant source data. In order to complete contaminant source inventories for their WHP Areas, public water utilities will be requesting data from the Department of Environmental Quality concerning underground storage tanks, leaking underground storage tanks, RCRA facilities, solid waste landfills, and facilities included in the state's

Pollution Prevention Program. These data are not currently contained within a single data base, but are held separately in various divisions of the department.

The Department of Environmental Quality intends to either combine these data bases or to facilitate coordination of and access to the various data bases. This will ultimately assist in streamlining the analysis of ground water quality data.

RECOMMENDATION: The Phase II effort should explore the potential role of WHP Programs in providing linkage between wells and contaminant sources as well as in facilitating contaminant source data transactions. However, it is premature to speculate concerning the degree to which this project might benefit from WHP Program related activities. There is significant political pressure to make the WHP Program voluntary. Whether it will be entirely or partially voluntary depends on a number of factors to be decided by state agencies, Oregon's legislature, and EPA.

Other special management programs such as pesticide monitoring and management plan development efforts may be of greater utility in certain portions of the state where few major public water systems exist.

7) Definition of Agency and Utility Roles. The roles of agencies in ground water protection appear to be fairly well understood by some individuals at the state level; however, when the horizon is expanded to include local governments and public water utilities, the distinction in roles become somewhat unclear. The roles or potential roles of local governments and public water systems in ground water protection are recognized by state agencies, but are not fully developed as an adjunct to state water resources programs.

RECOMMENDATION: When defining the function of the conceptual analytical tool within the existing institutional system for ground water protection, the role of local governments and public water utilities in an expanded partnership with state agencies for protection of ground water resources should be addressed. This should include establishing mechanisms for accessing data that may be collected and managed at a local level.

GUIDING PRINCIPLES

EPA Region 10 directed the project team to identify the principals which will guide the Phase II effort. Those guiding principles are as follows:

1) An effective, comprehensive ground water resource protection program should be based on proactive planning and management involving state-wide monitoring, accurate assessments of vulnerability, coordinated data management, and pollution prevention.

The concept of pollution minimization, as advocated by this project, is an important element of pollution prevention.

2) A wide-variety of land use and water quality data should considered in data evaluations, priority setting, and selection of response actions. A single piece of data may not individually provide an indication of a problem, but, when evaluated in the context of other available data, may signal the need for response actions.

3) Effective management of and interagency access to data is essential. Investment in the development of mechanisms for interagency data transfers should have significant pay offs.

4) To be most effective, ground water data management efforts should facilitate easy access to more data and provide relatively simple analytical tools to evaluate that data.

5) Interagency "processes" or "protocols" to help determine when and with whom data should be shared make significant contributions to effective resource management, particularly when they include formal mechanisms for data transfers and mutually agreed upon criteria to trigger transfers of data or response actions.

6) Analysis of ground water contamination incidents should include some form of ranking based upon frequency (number of wells affected), magnitude (what percent of the MCL), proximity to uses, flow directions, and time trends.

7) A framework for decision making should link specific analytical outputs to commensurate levels of response.

PROPOSED PHASE II SCOPE OF WORK

Based on the information compiled in Phase I of the ground water protection project, the following Phase II are proposed:

TASK 1: INSTITUTIONAL ISSUES

A number of related institutional issues affecting the realization of the early warning system ground water protection model were identified in Phase I. Those institutional issues will be enumerated and discussed; protocols for addressing those issues will then be developed to support adoption of improved ground water protection practices. The developed protocols will focus on practical, achievable steps within the existing ground water protection activities of appropriate agencies.

The roles and responsibilities of the agencies/programs will be addressed, with consideration of local/state/federal agency interactions and issues related to "handoffs"

of ground water problems from one agency/program to another. Protocol development will focus on data collection (types, frequencies, and formats); database management and data quality issues; communications and data transfers among the agencies; coordination in integrating relevant data sets (e.g., chemistry and source inventory data); and similar issues. A list of key contacts in each of the agencies/programs will be provided identifying areas of responsibility, addresses, and phone numbers.

TASK 2: DEVELOPMENT OF ILLUSTRATIVE ANALYTICAL TOOL FOR PRIORITIZATION

The Phase I interviews confirmed that ground water monitoring data sets have more detected chemical concentrations than can be effectively dealt with by the agencies within the constraints of their current level of resources. Therefore, a short-term need exists to establish some priorities and resource allocation decisions to address potential ground water contamination issues. An analytical tool to achieve useful prioritization among ground water "hits" will be developed. That analytical tool may need to consider the different roles and responsibilities of various agencies (i.e., different prioritization objectives), yet maintain an overall focus on protection of ground water resources. Ground water chemistry results and other data types may be included in this analytical tool. The resulting rankings or priority classifications of potential ground water problems will likely be used not only for intra-program decisions on allocations of staff resources, but also for coordinating interagency communications and data transfers.

TASK 3: DEVELOPMENT OF ILLUSTRATIVE ANALYTICAL TOOL TO SUPPORT SELECTION OF APPROPRIATE RESPONSE ACTIONS

Once a potential ground water contamination problem has been given a priority ranking, the second problem is the selection of appropriate actions in response to a "hit" in ground water monitoring data. An analytical tool, consisting of specific evaluations or displays of chemical and other types of data, will be developed to support informed decisions on the selection of response actions. The practical limitations in available data will be considered in designing this analytical tool. To the extent feasible, coordination of the effort under this task with other ongoing work (e.g., development of Wellhead Protection Programs or State Management Plans for pesticides) will be pursued. The data requirements, data characterization, and data display outputs for the analytical tool will be identified.

TASK 4: DRAFT OUTLINES OF INSTITUTIONAL PROTOCOLS AND ANALYTICAL TOOLS

The protocols and analytical tools developed in this project need to be both practical and useful within the existing agency ground water programs. Based on the products of Tasks 1, 2, and 3 of this scope of work, and prior to testing the developed tools on case studies and illustrative data sets or preparing project report materials, an outline of

protocols and analytical tools will be prepared for review by EPA and state agency staff. A working meeting to discuss review comments and possible revisions may be convened at EPA's discretion based on the extent of comments and identified issues. Following any necessary revisions, the subsequent "proof of concept" and report preparation tasks will be completed.

TASK 5: ILLUSTRATIVE DATA EVALUATIONS USING ANALYTICAL TOOL

SUBTASK 5A - ILLUSTRATIVE DATA ANALYSIS USING CASE STUDIES

The potential benefits of this project's conceptual approach to early warning of ground water contamination problems and appropriate early actions to prevent loss of ground water resources will be examined in one or more (retrospective) case studies. While many sites were mentioned during Phase I interviews as possibilities for case studies, most appeared to have limitations for full case study application. The most promising options appear to include the Shoshone-Bannock reservation site in Idaho; the Tacoma Landfill site in Washington; and LaPine, Oregon.

Data for one or more case study sites will be obtained and evaluated retrospectively, using the analytical tools developed in Tasks 2 and 3 of this scope of work to illustrate the benefits of an early detection/early response scenario. A narrative discussion of the results will be prepared and briefly compared with the actual site histories.

If none of the candidate case study sites effectively illustrate the overall benefits of the early warning system framework for aquifer protection, a "constructed case study" approach will be used. Actual site histories and information may still be useful under this approach to provide specific, real-world examples of particular benefits (such as protection of human health through early provision of alternate water supplies, or additional ground water monitoring requirements).

SUBTASK 5B - ILLUSTRATIVE DATA ANALYSIS USING CURRENT GROUND WATER MONITORING DATA

A selected set of current ground water monitoring data will be used to illustrate applications of the analytical tools developed in Tasks 2 and 3 of this scope of work. The presumptive ground water chemistry data set for this task will be a subset of the Oregon VOC data from drinking water supply wells. The analytical tools may use other types of data in addition to ground water chemistry data; such additional data will be included in the illustrative analyses to the extent they are readily available. The main purpose of this task will be to provide clear examples to potential users of the application and usefulness of the analytical tools. Various data characterization products (analytical tool outputs) will be provided.

TASK 6: FINAL REPORT

A Draft Report will be prepared to document the objectives, approach, and results of the ground water protection project. The report will describe how the conceptual framework for this project relates to pollution prevention, including case study summaries. The protocols developed for addressing institutional issues, as well as the analytical tools developed for prioritization and response action selection, will be described and illustrated.

The preliminary draft outline reviewed with EPA in December, 1993, will be used as a starting point for report organization. Modifications in that outline, based on Phase II work, will be discussed with EPA prior to preparing the draft report.

A Final Report will be prepared with revisions based on review comments from EPA and other designated reviewers. The project report should not exceed 50 pages in length.

TASK 7: RECOMMENDATIONS.

Recommendations for further development, adaptation, and application of the concept will be provided to EPA Region 10 in a memo separate from the final report.

REGIONAL POLLUTION PREVENTION PROJECT TO DEVELOP AN EARLY WARNING SYSTEM TO PREVENT IRRETRIEVABLE LOSS OF AQUIFER RESOURCES

PHASE I AND PHASE II FINAL REPORT OUTLINE

1. BACKGROUND

   A. PROBLEM STATEMENT

   B. PROJECT OBJECTIVE

      The objective of the framework is to document the conceptual structure and guiding principles for the use of water monitoring data in pollution prevention.

      The objective of the analytical tool is to provide risk-based information which characterizes the data in ways useful for identifying priorities and approaches compatible with existing state and federal programs for reducing or preventing pollution at the source.

      The objective of the recommendations is to utilize the findings of the case study and interviews to identify ways in which local, state, and/or federal program staff can work together to promote early awareness of water contamination and early initiation of pollution prevention activities.

   C. PROJECT APPROACH

      Development of early warning concept with EPA
      Interviews
          Oregon
          EPA
      Selection of data for review
      Case study
      Conceptual development of analytical tool and framework
      Evaluation of institutional issues

2. SUMMARY OF CURRENT SITUATION

A. EXISTING INSTITUTIONAL SYSTEMS

EPA
Oregon
Regional
Short-term objectives for early warning system (ranking)
Long-term objectives for early warning system (source detection and appropriate actions)

B. EXISTING IMPEDIMENTS TO EFFECTIVE EARLY DETECTION AND ACTION

Extent of current knowledge/understanding
Lack of communication
Lack of coordination
Absence of systems
Inadequate resources
Expanding need

3. ANALYTICAL TOOL

A. PURPOSE

B. IDENTIFICATION OF USEFUL DATA CHARACTERIZATION PRODUCTS

Short-term (ranking)
Long-term (source detection)

C. INPUT/OUTPUT MODEL FOR ANALYTICAL TOOL

D. TYPES OF DATA INPUTS/SOURCES OF DATA

E. DEVELOPMENT OF ANALYTICAL TOOL

F. ILLUSTRATIVE APPLICATIONS

Selected Oregon VOC data

4. APPLICATION OF TOOL WITHIN INSTITUTIONAL SETTING

   A. ROLES AND RESPONSIBILITIES

   B. RESOURCE DECISIONS (PRIORITIZATION)

   C. SOURCE IDENTIFICATION

   D. HIERARCHY OF RESPONSE ACTIONS/SELECTION

5. SELECTION AND REVIEW OF CASE STUDY

   A. DESIRABLE CHARACTERISTICS FOR CASE STUDY

   B. CANDIDATE CASES

   C. CONSTRUCTED CASE SCENARIOS

   D. SELECTION OF CASE STUDY(S)

   E. DESCRIPTION OF CASE(s)

   F. RETROSPECTIVE DATA EVALUATIONS

   G. ILLUSTRATION OF OPPORTUNITIES FOR EARLY DETECTION

6. SUMMARY, CONCLUSIONS, AND GUIDING PRINCIPLES

7. REFERENCES

SECTION II
WORKSHOP AND QUESTIONNAIRE SUMMARIES

The following are summaries of the two workshops conducted as part of the Regional Pollution Prevention Project. The first workshop was conducted on November 18, 1993, in Portland, Oregon, with representatives of the State of Oregon; the second was held on November 30, 1993, in Seattle, Washington, with staff of EPA Region 10. Individuals who were invited to attend the workshops were also requested to complete a questionnaire that was developed by the project team. Questionnaire responses are also summarized below. Some workshop findings were expanded upon by incorporating information obtained from the questionnaires. Information so incorporated is generally not repeated under the summary of the questionnaires. The questionnaire form is included as an attachment to this section of the Phase I Project Report.

STATE OF OREGON

WORKSHOP FINDINGS - NOVEMBER 18, 1993

GENERAL CONSIDERATIONS

• The lack of adequate financial resources severely impairs data collection, management, transfer, and analysis efforts by Oregon resource management and public health agencies and limits early response capability.

• The selection of terminology for the project is important in clearly defining its objectives. For instance, the term "source reduction" has specific meaning to those in the pollution prevention field; it is not synonymous with limiting the migration of pollutants once they are in ground water.

I. DATA COLLECTION AND MANAGEMENT

• Sources of ground water data include: OHD public water system compliance data, DEQ Oregon Water Quality Data Base, individual well certification testing, the free NO_3-N sampling program, the Fire Marshal's hazardous substances surveys, ODA and DEQ pesticide surveys, USGS, RCRA and CERCLA/SARA enforcement programs, Environmental Impact Statements for major projects potentially affecting ground water, and possibly ODOT, BLM, and COE. Other data are potentially available in the private sector (e.g., data generated through site assessments for property transfers); however, they are frequently not shared with government agencies due to fear of regulatory consequences.

• The utility of some data sets are limited due to differences in testing objectives. Consideration of objectives may influence testing methods, well construction practices,

and selection of detection limits. For example, public water system compliance monitoring may involve different parameters and detection limits than testing done as part of a site assessment.

- There are many undocumented wells for which data is either never generated or never provided to public agencies. In addition, there are many public water supply wells within Oregon that have been removed from service but not properly abandoned. Resource management agencies sometimes do not know the motivation behind removal of these wells from service (e.g., were wells taken out of service due to contamination problems that were never reported?).

II. DATA TRANSACTIONS

- The current system for interdepartmental exchange of data is informal; although, a more formal process is currently under development by an interagency committee. The interagency committee is also addressing problems in linking data bases such as the lack of a common location designator (e.g., latitude/longitude; state plane coordinates; and Township, Range, and Section).

- The Oregon Ground Water Protection Act of 1989 addressed the issue of multiple agency access to data and the creation of a data repository; however, implementation has not been adequately funded.

- OWRD is developing an on-line data base (water levels, well logs, etc.) with well identifier numbers. This system is not yet fully operational.

- Problems noted with the current system for transferring data include:

    - Some data sets consist of paper files which are difficult to handle, transfer, and analyze;

    - Data transfers have typically not been considered early enough in various planning efforts to facilitate effective resource protection;

    - Data from "special studies" are often not distributed to other agencies;

    - Data are not always readily available to those that want to use it (e.g., the City of Springfield experience); and

    - Some local jurisdictions do not properly utilize available data in making land use decisions (e.g., allowing construction of a subdivision and a community well over an abandoned landfill).

• The current system for informing other agencies of "detects" or "hits" is human dependent. Creation of a system that automates the notification system or reduces the dependence on subjective human judgement would be helpful.

III. DATA ANALYSIS

• Currently, OHD conducts an analysis of data when a VOC hit is detected. In conducting the analysis, OHD considers the type and quantity of the contaminant, the presence of potential sources, land use information, and the location of other wells that might be affected.

A general form is used in the evaluation that addresses the following:

- Latitude/longitude of well,
- Number of samples,
- Facilities, (air quality permits, water quality permits, stormwater quality permits), and
- Fire Marshal MSDS information.

• Concern was expressed over the notion of centralizing responsibility for data analysis within a single department or division. Making one agency (or person) responsible for data analysis might preclude valuable insight that may be provided by those not participating in the analysis. Additionally, departments differ with respect to their legal mandates, priorities, and objectives. Thus, some redundancy in the analysis of data is is probably desirable.

• "Triggers" are obviously needed in data analysis, but the trigger should not be the MCL for a compound. Possible triggers mentioned include: multiple hits versus single hits, occurrence in residential areas versus industrial areas, relative contaminant levels such as half the MCL, and the number of potential sources in the area of concern. (See also discussion of yellow light/red light system in section IV.)

• Concerns were expressed over the reliability of data, QA/QC, and well identifiers when comparing historical data to current data.

• Maps of Wellhead Protection Areas may be helpful in alerting agencies and department as to when outreach to other agencies, especially potentially affected public water systems, may be appropriate.

IV. ACTIONS IN RESPONSE TO DATA ANALYSIS

• Any detection of VOCs in a drinking water well signifies a problem that needs to be evaluated and resolved.

• Factors that need to be considered in determining appropriate actions include: number of hits, confirmation, concentration, spatial frequency, and exposure (population affected).

• Responses at cleanup sites should be coordinated with public water system Wellhead Protection Program activities.

• There are a number of hits that have already been discovered; however, state agencies lack the necessary resources to effectively deal with them. Finding hits is relatively easy; unfortunately, finding the source of those hits is time consuming and expensive. Resource limitations have forced departments to make judgements as to when action is justified. For example, a hit in an industrial area may not be a high priority; whereas, the same hit in a residential area may raise a red flag.

• There is, in practice, a yellow light/red light system for response to identified inorganic contaminants in ground water. Under this system, if levels of a contaminant, such as nitrate, remain static within a geographic region, no action is taken. If levels begin increasing, the yellow light threshold is reached and the region may be designated an Area of Concern. If levels reach 1/2 the MCL, the red light threshold is reached and a Ground Water Management Area should be formed. There are 37 areas in the state that could be designated Ground Water Management Areas; however, there isn't enough staff in DEQ and OHD to pursue official designation in all areas.

• State government agencies, particularly DEQ, lack the ability to institute meaningful controls at an incipient stage due to lack of jurisdictional authority and the lack of adequate resources.

• Local governments could be more prudent in land use planning decisions concerning industrial uses. Cities are anxious to attract new industries to expand their tax base. Some tools are available to minimize impacts of industrial development such as Business Toxic Use Reduction Plans and Stormwater Containment Plans; however, in areas where ground water is highly susceptible, industrial zoning may simply be incompatible with the goal of protecting underlying ground water. Many cities are unwilling to even conduct inventories of potential contaminant sources.

• GIS appears to represent a potentially valuable tool for prioritizing special studies and enforcement actions through identification of areas with vulnerable ground water.

V. CASE STUDIES

- Potential case studies identified in the November 1993 interview include:
    - Montezuma (Medford) (PCE problem in domestic wells),
    - East Multnomah County,
    - Springfield,
    - Lakewood, and
    - Milwaukie.

ADDITIONAL INFORMATION FROM QUESTIONNAIRES: OREGON RESPONDENTS

- Information was provided concerning the mission and the legal jurisdiction of the following departments: Oregon Water Resources Department, Oregon Department of Environmental Quality, Oregon State Parks and Recreation Department, Oregon Health Division, and Oregon Department of Agriculture.

- In reviewing individual responses concerning data bases and data transfers, there does not appear to be a sense of a need for a common data base.

- Current processes for data sharing are not fully developed. Some data is shared on a "by request" basis only.

- Respondents were about equally split concerning whether or not agency roles are currently well defined.

- Impediments to prompt response to early warnings include:

    - Lack of response agency resources,

    - Crisis driven mode of operation, and

    - Lack of jurisdiction to deal with potential problems before an MCL is violated.

- Responses to "let your mind wander question" include:

    - Establish a system for regular notification of other agencies,

    - Use GIS mapping to identify populations at risk,

    - Notify businesses in the area of potential violation that a release appears to be occurring,

    - Halt further ground water development and conduct a detailed hydrogeologic study, and

    - Initiate enhanced monitoring and surveillance of potential sources within the possible zone of contribution to the affected well(s).

EPA REGION 10

WORKSHOP FINDINGS - NOVEMBER 30, 1993

GENERAL CONSIDERATIONS

- Other states in Region 10 may be worse off than Oregon in the implementation of a coordinated system for collection, transfer, and analysis of data.

- There are many efforts in progress to manage, transfer, and analyze data. EPA needs to get a handle on all of these efforts.

- Regardless of the nature of the analytical tool developed as part of this project, we must focus on a manageable data base such as drinking water data.

- The desire to protect ground water resources in general, irrespective of beneficial use, must be reconciled with the expediency, and arguably the congressional mandate, to focus on protection of specific water supply wells.

- The lack of adequate resources prevents EPA from doing everything it should do in terms of data transaction, data analysis, and undertaking actions to protect ground water.

I. DATA COLLECTION AND MANAGEMENT

- Data sources that might be useful in conducting this project include: Oregon Vulnerability Map (GIS), Oregon Ground Water Data Base, and the mass nitrate testing data base.

- Concern was expressed that, although EPA Region 10 provides funding to DEQ for a number of data collection and management projects, it does not have access to the Oregon Ground Water Data Base.

- While there are extensive site investigation data (RCRA, LUST, CERCLA/SARA), there is a general lack of ambient ground water monitoring of aquifers within Region 10.

- Typically, a crisis needs to arise before the EPA or the states recognize the need for data management.

- There are a number of emerging technologies that may significantly improve future data collection and management efforts, for instance, use of the Global Positioning System to pinpoint locations of wellheads.

II. DATA TRANSACTIONS

- EPA does not collect or is unable to obtain all ground water data:

    - USGS collects a great deal of ground water data (e.g., monitors 1,000 wells per year in Idaho) that are not routinely shared with EPA; and

    - Proprietary data, for example pesticide registration information, are commonly not available.

- Data formats used by the states are typically different than those used by EPA creating difficulties in data transactions.

- EPA data bases are not routinely or globally shared. Transfers of data are generally viewed as a low priority activity within the agency. There is a need for the upper management of EPA to promote such activities.

- There is some question as to how useful the STORET data base is in facilitating ground water protection efforts. The principal concerns revolve around the completeness and accessibility of the data base (See page II-10 for further discussion of STORET).

- EPA is in the process of developing a "roadmap" for ground water data sources within the agency. This document is intended to facilitate exchange of information between sections within the agency.

III. DATA ANALYSIS

- Analysis of ground water contamination incidents should include some form of ranking based on frequency (number of wells affected), magnitude (what % of the MCL), proximity to uses, flow direction, and time trends.

IV. ACTIONS IN RESPONSE TO DATA ANALYSIS

- Generally, actions to protect ground water quality are left to the states. Federal laws are not sufficient to protect ground water through preventative action. The implementation of the WHP Program will help, but its effectiveness is dependent upon implementation of successful state programs and enactment of state and local enabling legislation. Assisting in the development of state capability represents the greatest need.

Sole Source Aquifer designation represents another federal tool; however, it is of limited effectiveness in resource protection because:

- Designation requires petition from an agency or citizen group outside of EPA,

- The designation criteria are not oriented towards aquifers that demonstrate susceptibility or vulnerability, and

- The enabling federal legislation (SWDA) provides authority to address only federally financially assisted activities.

The UIC section of the SDWA allows EPA to abate any underground injection well that represents an immediate threat to an underground source of drinking water.

- The states within Region 10 are in the process of developing Comprehensive State Ground Water Protection Programs under guidance developed by EPA. Under these programs, goals will be defined, priorities identified, responsibilities assigned, and implementation actions specified. Such programs represent a vehicle for improvement of data collection, transfer, and analysis processes.

- The determination of what constitutes an "appropriate" response may necessarily differ from state to state because the underlying tenets of water law vary. For example, a state with water laws based on a non-degradation policy may view ground water contamination differently than a state with laws based on an antidegradation policy.

- Some local governments are acting unilaterally to investigate and/or address incipient problems and are not necessarily informing EPA or the states as to what they are doing or sharing relevant data.

ADDITIONAL INFORMATION FROM QUESTIONNAIRES - EPA RESPONDENTS

- EPA Assists the states in preparation of State Management Plans for pesticides. EPA identifies those chemicals for which SMPs must be developed and determines if the SMPs prepared by a state are adequate to protect ground water. If they are not, EPA can eliminate the sale and use of the specific pesticide(s) that is the object of the SMP. A risk/benefit analysis is a required portion of the SMP. (FIFRA 3(d)(1)(c)(ii))

- The STORET data base is the most significant EPA data base concerning ground water. A portion, but by no means all, of the state data is incorporated into STORET. Apparently, not enough is done with the STORET data in terms of either data analysis or transfer of data to other entities.

- Impediments to prompt response to early warnings include:

    - Laws in some states allow contamination up to the MCL, and

    - There is no ambient monitoring system for early detection.

- Responses to "let your mind wander question" include:

    - Place ambient monitoring wells in appropriate locations,

    - Obtain historical water quality data and look for time trends, and

    - Properly utilize the data that is already available.

DEVELOPMENT OF AN EARLY WARNING SYSTEM TO PREVENT IRRETRIEVABLE LOSS OF AQUIFERS

WORKSHOP
November 18, 1993
USEPA Region 10
Portland, Oregon

ATTENDEES

Ranei Nomura	Wastewater Control, WQ, DEQ	229-5256
Rick Kepler	Groundwater, DEQ	229-6804
Jan Koehler	OR Water Resources Dept.	378-8455
Barbara Priest	DEQ Standards & Assessment	229-5943
Ron Polvi	OR Parks & Rec	378-6821 x263
David Priebe	OR Dept. of Agriculture	378-3776
Cathy Neumann	OR Health Division	731-4015
Dennis Nelson	OR Health Division	731-4010
Barry C Beyeler	City of Boardman	481-9252
Chuck Davis	Springfield Utility Board	726-2396
Sheree Stewart	Waste Mgmnt & Clnup, DEQ	229-5413
Dan DeMoss	OAWLL/Program Manager	364-8269
Jeff Jenkins	OSU Dept. of Ag Chemistry	737-5993
Heather Schijf	Site Assessment Prgm, DEQ	229-5657
Curt Ireland	Portland Water Bureau	823-7598
Marianne Fitzgerald	Cross-Media Project, DEQ	229-5946
Mary Alvey	Oregon Health Division	731-4387

EPA Project Managers:

Rene Fuentes	Region 10 EPA, Seattle	(206) 553-1599
Roseanne Lorenzana	Region 10 EPA, Seattle	(206) 553-8002

Consultants:

Adolfson Associates, Inc.	Derek Sandison	(206) 789-9658
Littler Environmental Consulting	John Littler	(206) 486-3861
Environmental Consultant	Greg Glass	(206) 523-1858

DEVELOPMENT OF AN EARLY WARNING SYSTEM TO PREVENT IRRETRIEVABLE LOSS OF AQUIFERS

WORKSHOP
November 30, 1993
USEPA Region 10
Seattle, Washington

ATTENDEES

Matt Gubitosa	ESD/Data Management	553-4059
Scott Downey	WD/Ground Water Section	553-0682
Garrett Wright	PTSB/Pesticides Section	553-1495
David Frank	ESD/Risk Evaluation Branch	553-4019
Maryann Helferty	WD/Ground Water Section	553-1901
Rene Fuentes	ESD/Risk Evaluation Branch	553-1599
Jerry Opatz	Drinking Water Section	553-4039
Ray Peterson	ESD/Data Management	553-1682
Martha Sabol	Ground Water Section	553-1593
Consultants:		
Derek Sandison	Adolfson Associates, Inc.	789-9658
John Littler	Littler Environmental Consulting	486-3861
Greg Glass	Environmental Consultant	523-1858

QUESTIONNAIRE RESPONDENTS

ENVIRONMENTAL PROTECTION AGENCY

Maryann Helferty - Oregon Liaison

Martha Sabol - Water Division

Garrett Wright - Air and Toxics

Matt Gubitosa - Environmental Services

Ray Peterson - Environmental Services

OREGON HEALTH DIVISION

Mary Alvey -Drinking Water

Dennis Nelson - Drinking Water

Cathy Neumann - Toxicology

DEPARTMENT OF ENVIRONMENTAL QUALITY

Rick Kepler - Groundwater

Ranei Nomura - Wastewater Control

Sheree Stewart - Waste Management and Cleanup

Barbara Priest - Standards and Assessment

OTHER STATE AGENCIES

Jan Koehler - Water Resources

Ron Polvi - Parks and Recreation

David Priebe - Dept. of Agriculture

PUBLIC WATER UTILITIES

Barry Beyeler - City of Boardman

Chuck Davis - City of Springfield

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10

REGIONAL POLLUTION PREVENTION PROJECT

DEVELOPMENT OF AN EARLY WARNING SYSTEM TO PREVENT IRRETRIEVABLE LOSS OF AQUIFER RESOURCES

QUESTIONNAIRE

NAME:_____

TITLE/POSITION:_____

DIVISION:_____

DEPARTMENT/AGENCY:_____

PHONE NUMBER:_____

Please complete the following questionnaire prior to the upcoming workshop, and bring it with you to the workshop.

Respond "not applicable" or "N/A" where appropriate.

A. ABOUT YOURSELF AND YOUR AGENCY

1. Describe your individual role and also your agency's involvement with the use or protection of water resources.

B. EXISTING GROUND WATER DATA COLLECTION EFFORTS

1. What specific ground water data sets do you collect and manage (including water chemistry data, hydrogeologic data, aquifer resource data, contaminant source data, and land use data)?

For water quality data sets, estimate the number of sampling locations. What are the frequencies of monitoring?

2. Are data maintained in computer (electronic) files or as hard copy (paper) records?

If kept in computer files, please specify hardware and software.

3. What types of ground water monitoring information are kept (what are the fields in the data records)?

What are the data formats?

4. Where are the data stored?

Are the data readily accessible? Who has access? What portion of data is archived?

NOTE: Please provide examples of data records (demonstrating format and fields) that you maintain.

C. DATA TRANSFER MECHANISMS

1. Do you share ground water data with other divisions of your own agency or other agencies?

With who?

As a regular procedure, or only upon specific request?

2. How frequently is data shared?

How long after initial data collection?

3. For what purposes are data shared with other divisions or agencies?

4. What criteria are used to determine who gets data and how often?

5. In what manner and in what format are data transferred?

How are data compatibility issues addressed?

6. After data is shared, is there any feedback from the agency receiving the data concerning how the data was used?

7. Does everyone receive ground water data that should?

If not, why?

D. DATA EVALUATION

1. What types and/methods of data evaluation do you perform?

2. Who within your department or agency performs the evaluations?

3. How are data evaluations documented (e.g., tables, figures, written memoranda or reports, or computer files)?

4. For what purpose are data evaluations performed?

5. What criteria is used for evaluation?

6. Who receives the results of the data evaluations?

7. If evaluating water chemistry data, what other data, in addition to the chemical data, are incorporated into the evaluation?

8. In what way is data quality/reliability considered in performing evaluations?

E. LINKING DATA EVALUATIONS TO RESOURCE PROTECTION ACTIONS

1. What types of ground water protection actions are currently available to your department or agency?

2. What are the thresholds used by your department or agency in deciding whether to undertake a response action (e.g., violation of an MCL)?

3. Under what existing legal authority is your department or agency able to or required to undertake actions to protect ground water resources? Please cite specific laws, regulations, or policies.

Are there limitations in the scope or applicability of that authority?

4. Are the roles of departments and agencies which are responsible for ground water protection clearly defined?

5. Why have ground water quality problems historically been addressed "later" rather than "sooner"?

6. What are the greatest impediments to early and effective action to protect ground water resources?

7. Let your mind wander....If data were available to convince you that an aquifer (or portion of) was threatened, what steps could happen to prevent the loss? What kind of data would it be? What would you do with the data?

SECTION III - INTERVIEW SUMMARIES

TASK 2 - EXPANDED INTERVIEWS
LIST OF INTERVIEWEES

ENVIRONMENTAL PROTECTION AGENCY

Maryann Helferty, Oregon Liaison - Field interviews March 29th and May 12th

Scott Downey, Washington Liaison - Field interview March 29th

Grover Partee, Alaska Liaison - Field interview May 12th

Craig Paulson - Tribal Liaison - Field interview May 4th and May 12th

Matt Gubitosa, GIS - Field Interview April 28th

Garrett Wright, Pesticides - Field interview May 4th

Bill Mullen, Office of Groundwater - Field interview May 13th

OREGON STAFF

Mary Alvey, Drinking Water, OHD - Phone interview pending

Dennis Nelson, Drinking Water, OHD - Field interview May 4th

Cathy Neumann, Toxicology, OHD - Phone interview May 19th

Rick Kepler, Groundwater, DEQ - Field interview May 4th

Sheree Stewart - Waste Management and Cleanup, DEQ - Field Interview May 4th

Marianne Fitzgerald - Cross Media Project, DEQ - Phone interview pending

Barbara Priest - Standards and Assessment, DEQ - Field interview May 3rd

Sandy Gurkewitz - Toxics Use Reduction, DEQ - Field Interview May 3rd

Jeff Jenkins - OSU Department of Ag Chemistry - Phone interview May 16th

PUBLIC WATER SYSTEM OPERATORS

Chuck Davis, Springfield Utility - Field interview May 14th, Phone interview May 16th

Denny Klingbile, Damascus Water District - Field interview May 14th

John Thomas, Mt. Scott Water District - Field Interview May 14th

REGION 10 POLLUTION PREVENTION PROJECT

INTERVIEWEE: Matt Gubitosa
AFFILIATION: U.S. Environmental Protection Agency, Region 10
INTERVIEWER: Greg Glass
DATE: April 28, 1994

Matt attended the November 1993 workshop in Seattle. He manages EPA Region 10's ground water database and GIS software project.

The original idea behind EPA's regional ground water database project was to compile data across programs (e.g., RCRA and Superfund) so that site managers could easily access information relevant to a given site vicinity. (Prior to this project, it was difficult and time consuming for individual EPA site managers to track down data from other nearby sites or other EPA programs). While Matt is in contact with state database coordinators and periodically gets some data files from them, he readily acknowledges that he does not have "all the ground water data". Additional data sets are worked into the EPA database system as time and resources allow.

A standard ground water data submittal format was established in 1989. (Pre-1989 data from EPA files are being added to the database over time, a process now largely completed). It is being used, for example, as an attachment to EPA orders or consent decrees at Superfund sites (e.g., where PRPs or their contractors will be producing the data). EPA can be somewhat flexible about details of data formats for submittals, as long as entry into the database system can be assured. (There are a lot of options for the software platform that can be used to submit data). EPA project managers provide data submittals to Matt, with about 2/3 of the data coming from Superfund and about 1/3 from RCRA programs. No data from the underground injection control program have been incorporated yet; UIC is more prevalent in Alaska and Idaho, according to Matt. In a few cases, NPDES program sites may also produce ground water data.

Matt provided a written copy of EPA Region 10's ground water data submittal requirements, as well as files on disk with standard formats. Specific data elements are identified and described. A review of these specific database fields may be useful in thinking about the types of data evaluations that could be included within the analytical tool. It may also be useful to compare state database formats against EPA Region 10's format to identify common and disparate elements.

Matt discussed data sets that he knew existed but that were not included in his regional database. None of the normal monitoring data for drinking water supply wells are being compiled in his project. Research studies are likewise not included. Pesticides data are also largely omitted from the database so far (a lot of the pesticides data exist at the state level). Matt noted that USGS is doing a substantial amount of ground water monitoring work, often in cooperation with the states (e.g., Yakima area, Whidbey Island). USGS maintains its own databases and submits data to the STORET system, which Matt characterized as "antiquated" (having been developed before the PC revolution). Matt can access STORET,

or the local PC-based version of STORET used for local data, on request by EPA project managers, but he does not regularly review or incorporate STORET data.

Matt noted that there were about 8,000 ground water well locations in the 4 state region. (That obviously does not count small domestic drinking water wells). The states have begun projects to develop statewide databases; they are reportedly being designed to be compatible with the EPA database. Some state agencies are doing the database development themselves; others (e.g., Idaho) are using contractors.

Matt compiles and uses both chemical data and descriptor data (e.g., well location, well construction) in his ground water program. For creating GIS maps, he uses a large number of other spatially-based data files to create GIS layers. Most of the effort in the project so far has gone into assembling the database, and not data analysis. Matt thought there was about another year of heavy effort on database compilation.

Matt described his current work as focused on "data displays" rather than "data evaluations". He does not, for example, do any significant statistical data evaluations (correlations, time trends, etc.). He said he thought ground water data would typically be exported from his database to another platform for statistical evaluations. The hydrogeologists and risk assessors at EPA are more likely to do data evaluations, including statistical evaluations. Matt noted that kriging was available within ARCINFO, as well as some very limited statistical capabilities. For one WA site they tried to do the risk analysis within ARCINFO, but decided that was not a very useful approach.

The EPA GIS group appears to have a broad capability for data mapping. Matt showed me a number of products from previous or ongoing EPA projects.

I asked Matt if he could identify good candidates for case studies to illustrate missed opportunities for early detection/response to ground water problems. He mentioned the Tacoma Landfill site, where there were about 10 years of data. He thought the city of Fircrest wells were just starting to show impacts last year, even though a ground water extraction system was in place. (We may have to determine if this reflects a prompt but ineffective response to ground water contamination, or a deferral of appropriate actions).

Matt mentioned that the Manchester lab maintains a separate laboratory database with ground water data. There is poor coordination of the lab database with his database. He sometimes gets data files from Manchester, but there is no systematic program for such transfers of data.

With respect to Matt doing any GIS work as part of our Phase 2 effort, we would route requests to him through our EPA project leads and he would then review them along with other requests to see if he had time and resources to respond. If we needed to add new information for GIS evaluations for our project, that would be easy for him to accommodate (working out details of formats with him).

REGION 10 POLLUTION PREVENTION PROJECT

INTERVIEWEE Garrett Wright
AFFILIATION: U.S. Environmental Protection Agency, Region 10
INTERVIEWER: Greg Glass
DATE May 4, 1994

Garrett has worked in EPA's pesticides program since 1987, and was with the cooperative extension service before that. He attended the November 1993 workshop in Seattle.

A primary motivation for this interview was to explore how information from the initial surveys of pesticides in ground water was evaluated, and what actions followed from the detection of pesticide contamination. There was an initial perception that responses in the case of pesticide contamination of ground water have been more direct and have progressed further than has been the case for other types of ground water contamination.

Garrett reviewed the development of EPA's ground water program for pesticides. He also provided a large number of supporting documents after the interview. (All documents received are being maintained in the project file). Review of those documents was very helpful in understanding the development of a strategy for addressing pesticide contamination in ground water, involving cooperative actions by both EPA and the states. In some ways, pesticides do offer a useful policy "case study" for some of the ideas that have motivated the current EPA Region 10 project. It also appears that the more advanced strategy and program for addressing pesticides in ground water is in large part attributable to existing legislation (FIFRA), large and identifiable affected groups (pesticide manufacturers and users), EPA's use of the pesticides problem as a first illustration for development of its overall ground water protection strategy, and other coincidental factors.

From the perspective of agency staff working on pesticide contamination problems, progress is very slow. There have been reports of substantial pesticide problems in selected locations (sensitive/vulnerable ground water resources) dating back to at least the early 1980's. Nevertheless, current activities within the overall strategy for pesticides in ground water do provide an illustration of actions taken in response to detection of ground water contamination, even if many of those actions focus on prevention of ground water contamination in the first place rather than early response to avoid further losses of ground water resources.

I asked Garrett if he could identify any good "case studies" where opportunities for early responses to ground water contamination were missed. Garrett immediately noted a pesticide and nitrate contamination problem on the Shoshone-Bannock tribal lands near Pocatello, Idaho. He identified the key EPA Region 10 contact as Craig Paulsen; I met with Craig after completing the interview with Garrett (a separate summary is provided for discussions with Craig regarding the Shoshone-Bannock problem). Although retrospective compilation of ground water monitoring data for the tribal lands showed that pesticide and nitrate contamination had been detected earlier, the true problem (especially regarding safe drinking water supplies to several thousand people served by ground water wells) was not

recognized until late 1993. Substantial actions by several agencies, including an emergency order by EPA under the Safe Drinking Water Act, followed soon after confirmation of the scope of the problem. The site is currently the focus of a great deal of attention and continuing agency actions. Garrett commented that the main pesticide problem in ground water (but not the only one) related to EDB (ethylene dibromide). Since EPA had already cancelled the registration for EDB use as a pesticide several years ago, there was nothing more that the pesticides program could do. This illustrates the importance of appropriate "handoffs" among programs and agencies if appropriate early response actions are to be identified and implemented.

EPA actions on pesticide registrations occur under FIFRA, a statute that specifically requires consideration of costs and benefits of EPA actions (i.e., the context is larger than just environmental issues). When ground water contamination by agricultural chemicals began to be recognized in the late 1970's, for example in studies in New York and California, EPA did take some early actions. Pesticide registrations for certain chemicals shown to have affected ground water quality were suspended or revoked. Manufacturers also took voluntary actions, such as agreements not to sell specific chemicals in certain areas of demonstrated vulnerability, or to withdraw from labeled uses applications to specific crops. EPA development of an overall strategy for pesticides in ground water has evolved over more than a decade.

Under FIFRA, pesticide-specific rules are the real focus for EPA actions. Once EPA identifies a specific pesticide for evaluation (e.g., based on perceptions of possible problems with its use) and rulemaking, states have to develop State Management Plans for that pesticide, for review and approval by EPA. That pesticide can then be used only in states whose management plans have been approved. This process of listing specific pesticides and approving State Management Plans takes several years for each individual chemical, and is just starting. This framework is really dictated by the nature of the underlying legislation (FIFRA). However, EPA has recognized the larger ground water protection issues involved and has found ways to enhance state capabilities on a broader front, providing supporting grants for state development of more general programs.

EPA released an overall ground water protection strategy in 1991. A final Pesticides and Ground Water Strategy was also released in 1991 and is in many ways the test bed for the overall strategy, focusing on a federal-state cooperative approach and on preventing ground water contamination rather than remediating already contaminated ground water. EPA is encouraging, and supporting with grants, the development of State Management Plans for pesticides; it is the intent that these will form part of larger State Ground Water Protection Programs. EPA has issued guidance for these State Management Plans for pesticides (1993). Notably, while under FIFRA plans to manage specific pesticides are required, the guidance encourages states to develop generic management plans that can address issues such as philosophy and goals; roles and responsibilities of state agencies; monitoring; prevention actions; and response to detections of pesticides. (See EPA 735-B-93-005a, Guidance for Pesticides and Ground Water State Management Plans, Office of Prevention, Pesticides, and Toxic Substances). Various funding mechanisms under multiple laws and programs are being used to support these activities at the state level. Garrett commented

that EPA hopes for a "spillover effect" from the state planning for pesticides (e.g., in establishing interagency communications and coordination).

The development of the national strategy for pesticides and ground water has taken place against a 5-year national survey (statistically designed) of pesticides in drinking water wells (completed in about 1990) and numerous state-level surveys. Garrett provided information on both Washington and Oregon state surveys and results. Overall, a relatively large number of agricultural chemicals have been detected in ground water, at times at levels above health-based reference levels, advisories, or drinking water standards. Garrett noted the primary role of the states in addressing such detected pesticide problems in ground water. He felt in many ways they can move faster than EPA due to the limitations inherent in FIFRA (although resources continue to be a significant problem for the states). Garrett provided a number of reports and summaries of activities under cooperative agreements between EPA and Oregon to illustrate how specific components of state responses to the recognition of ground water pesticide problems are being developed.

REGION 10 POLLUTION PREVENTION PROJECT

INTERVIEWEE: Craig Paulsen
AFFILIATION: U.S. Environmental Protection Agency, Region 10
INTERVIEWER: Greg Glass
DATE May 4, 1994

Craig works in the EPA ground water program and has specific responsibility for tribal lands in the region. Based on Garrett Wright's suggestion that the Shoshone-Bannock site might be a good case study, I met with Craig to get additional information on the ground water issues and data there. (Note: Craig later participated in a group interview at EPA on May 12th, summarized separately).

Craig identified a key contact at the Shoshone-Bannock site: Charlie Bidondo, telephone 208-238-3733 (FAX 208-237-0797). He is coordinating the tribal response to ground water contamination, and was described by Craig as being a good communicator. Craig noted that when the problem was recognized, an attempt was made to pull together all of the relevant (historical) site data; that report should be available through Charlie Bidondo. Craig thought that ground water monitoring has been conducted since at least the 1970's.

Craig provided copies of two internal memoranda he wrote in March 1994 that succinctly described the problem. He also referred to a large map as we talked, showing a lot of the site ground water information. There is a great deal of current activity related to ground water problems and response actions at the site, something to which we will need to be sensitive if we decide to pursue this site. There are also jurisdictional issues among the tribe and various local, state, and federal agencies.

According to Craig, a Boise consulting firm has been working with the tribe on ground water studies. A Draft Ground Water Investigation Report has apparently been prepared already.

Tribal lands are located north of Pocatello. Ground water contamination reflects agricultural land use (pesticide use) and the sensitivity of ground water resources (sandy soils, shallow uppermost aquifer). EDB and nitrates are among the detected contaminants of concern. Craig thought the last EDB applications were in 1986 (after EDB registration had been pulled). General application practices are reported to have been appropriate (at about one-half the label application rate); the problems seem to relate more to the sensitivity of local ground water. There is anecdotal evidence of some drum or dump sites related to pesticide use. Studies to date have shown fluctuating EDB concentrations over time in some wells, and no general spatial pattern in contamination that can be related to specific sources.

Current concerns over ground water contamination date to November 1993, when routine supply system monitoring conducted the previous September under the Safe Drinking Water Act reported EDB. Two rounds of repeated sampling through December 1993 did not confirm EDB presence. However, there were some issues related to lab capabilities and performance. Moreover, EPA looked for historic ground water monitoring data in the area

and discovered numerous reports of detected pesticides and agricultural-related chemicals in ground water. One sample in a private water supply well from June 1990 had actually been reported to contain 4,000 times the drinking water standard for EDB. EPA decided that it needed to conduct its own confirmatory sampling; when the results were obtained in February 1994, EDB contamination at up to 300 times the MCL was found. Nitrates also exceeded the MCL. Those findings precipitated many actions, including an EPA Emergency Order under Section 1431 of the Safe Drinking Water Act, intensive sampling of water supply wells throughout tribal lands, an emergency declaration from the Governor of Idaho, and steps to provide alternate water supplies.

EDB has been detected in ground water to a depth of 300 feet according to Craig, with generally decreasing concentrations with greater depths. Ground water flows toward Pocatello. Ground water flows at a high velocity of about 70 feet per day in the porous materials of the aquifer, with very large flow volumes. This may mitigate the vulnerability of Pocatello water supplies; any interception or containment of the contaminated ground water appears impractical. Shallower ground water resources are used for irrigation throughout the valley. There is some thought that irrigation withdrawals may partially provide "treatment" for the contamination problem.

After detection of the contamination problem, EPA provided large amounts of clean drinking water at central distribution points within tribal lands until alternate water supplies could be provided. Residents in outlying areas with contaminated private supply wells had to pick up and haul their own water. Consideration is being given to interconnecting with other available water supply systems and to developing a new tribal water supply upgradient from the contaminated areas. Granular activated carbon systems are meanwhile in place and being operated for the contaminated water supply systems. There is also a program to case existing wells (deeper supplies) to isolate them from contaminated ground water.

Health agencies may be conducting several studies of community health (e.g., blue baby syndrome from nitrates, anecdotal elevated cancer rates). Health advisories and public education are also required under the EPA Emergency Order, as are development of Best Management Practices for pesticide use and a comprehensive ground water monitoring program.

This situation appears to present a case where early ground water monitoring produced a record of detected contamination, with no effective actions taken until years later when "regulatory" (required) monitoring results led to recognition of a problem. In this case, drinking water supplies for several thousand persons were ultimately found to be affected.

REGION 10 POLLUTION PREVENTION PROJECT

INTERVIEWEE: Grover Partee, Craig Paulsen, Maryann Helferty
AFFILIATION: U.S. Environmental Protection Agency, Region 10
INTERVIEWERS: Greg Glass and Derek Sandison
DATE: May 12, 1994

(Note: see also the interview summary by Derek Sandison, Adolfson Associates)

Maryann Helferty, coordinator for Oregon ground water programs, had previously attended the Seattle workshop in November 1993, as well as an additional project meeting. Grover Partee and Craig Paulsen are the ground water coordinators for Alaska and tribal lands in Region 10, respectively. Craig had previously met with Greg Glass on May 4th regarding the Shoshone-Bannock tribe situation (see separate summary).

Discussions in this group interview largely confirmed that institutional framework problems were generalizable from Oregon to other parts of Region 10. Data transfer and agency coordination problems were noted with respect to effective early responses to ground water problems. Grover commented that in Alaska the culture of the agencies was to deal primarily with their individual responsibilities; they did not see much need to interact. Craig noted similar issues for the tribes. He thought they showed a lot of variability in their interactions with the states, but with a dominant theme of preserving tribal sovereignty. (Jurisdictional issues can be complicated by non-tribal members living on tribal lands). Most of the tribes were described as significantly behind the states in their attempts to deal with ground water contamination problems.

Resource issues were highlighted as a continuing problem. The states and tribes were characterized as having few available resources to do development of analytical tools or protocols for data transfers or evaluations. A ready-to-use standard protocol was felt to have a greater potential for application within the region. Maryann suggested the possibility of building a standard approach into wellhead protection programs. At the same time, it was noted that some resistance to having to adapt to a new standard protocol could be expected from the states.

Effective communication and sharing of information on ground water monitoring results was also thought to be very important to meet the objectives of early recognition and appropriate response to ground water contamination. Database development was noted as underway, using EPA grant money, with some beginning work to assess data formats and data transfer requirements. Existing systems are not effective or sufficiently flexible. Past problems in EPA changing database requirements over time, after state investments to develop tools under prior formats, were noted by Craig ("EPA pulling the rug out from under the states"). Maryann noted that even though grant money was available to fund a GIS position in Oregon, the state had trouble finding an experienced person willing to take a short-term position with only temporary funding. She also wondered if there was a possibility of earmarking some money from collected penalties to fund work on data transfer problems (as a "Supplemental Environmental Project").

Grover thought any effective data transfer system among the agencies should have the following characteristics: 1) "translator" functions to achieve standard formats for database entry should be transparent to the individual users wherever possible (e.g., among various well location descriptors); 2) acceptance by various users would be increased if they perceived added benefits of the new system; and 3) backwards compatibility is necessary (no loss of records).

The general consensus was that all data should be shared among the agencies. It was recognized that there were privacy concerns or legal restrictions that could limit the release of certain data. Data quality issues were noted as important. The precision and accuracy of various data sets are important facts to preserve; blind mixing of data of different quality should be avoided. Grover commented that in Alaska there is a great deal of basic information lacking on ground water quality.

Craig commented that beyond the issue of sharing ground water data, there was a question of knowing what to do with data once they are shared. He thought in the case of the Shoshone-Bannock tribe pesticide contamination problem, early data had in fact been reported but in a way that did not make it clear what the potential problems were. As a result, no actions were taken for several years. Maryann Helferty thought there were similar problems with monitoring related to injection wells (e.g., food processing wastewaters).

Some criteria that could be used to set priorities for detected ground water contamination are comparisons to criteria (e.g., percent of MCL); population served by ground water; toxicity of detected contaminants; and ground water vulnerability. Information would have to be available and readily extracted from existing data sets to be useful for ranking problems.

REGION 10 POLLUTION PREVENTION PROJECT

INTERVIEWEE: Jeff Jenkins
AFFILIATION: Oregon State University
INTERVIEWER: Greg Glass (telephone)
DATE: May 16, 1994

Jeff attended the November 1993 Oregon workshop. He is in the Extension Environmental Chemistry and Toxicology Program at OSU, working mainly in the area of pesticides. Jeff has worked with a lot of the user groups in agriculture, forestry, nurserymen, and similar occupations using agricultural chemicals. He has worked under numerous grants and agency-funded projects on database development, vulnerability assessments, risk assessments, and related ground water contamination issues.

Jeff maintains very close contact in all of his activities with the person responsible for the State Management Plan for pesticides. The federal process for dealing with pesticide problems in ground water (listing individual chemicals and requiring management plans for each one) is very slow. More general activities for addressing pesticide problems are being pursued under the framework of the State Management Plan for Oregon, allowing progress to be made outside of the EPA pesticide-by-pesticide approach.

ODEQ has a "detects" database for ground water data. Jeff said a fellow professor, now retired, has a contract with ODEQ to improve the database. Jeff characterized it as a slow process and said the database is not really that useful in its current form. The current database does not really support screening or summary characterizations such as the frequencies of detection for various contaminants.

Using EPA grant money, Jeff has been developing databases on pesticide properties (e.g., solubility, fate and mobility) and soil properties (sensitivity measures for ground water contamination). He is also working in combining various types of information in ground water vulnerability assessments for Oregon.

Jeff is applying for additional grant money under the wellhead protection program (ODEQ "319" funds) to focus on exposure assessment issues, especially how pesticides get into ground water. He commented that toxicity information would then be useful to prioritize chemicals with potential exposures based on their risks, as part of a broader evaluation.

Ground water monitoring was identified as an important part of the strategy for minimizing pesticide problems in ground water (early detection/early response). Jeff expressed the opinion that the agencies know what an effective monitoring approach would be, given more resources. With limited resources, the ground water monitoring strategy should be based on a rationale of looking at locations and for chemicals that are most likely to be found (i.e., a biased monitoring strategy, looking for "indicators"). Criteria could include, for example, the amount of pesticide use, specific pesticide properties (e.g., fate and mobility), soil properties, ground water vulnerability (depth), and so on. This is the approach he has been taking in his work, to develop and apply such information.

An individual working for Jeff has been doing pesticide use surveys for the past 12 years. The details of survey practices have varied over the years. Data are compiled for all major crop groupings, for all counties, and for all pesticides. The spatial resolution may not support detailed GIS-type analyses or vulnerability evaluations, but are nonetheless useful. Jeff said there was a significant effort underway to improve use reporting for pesticides, which was running into some privacy concern constraints.

I asked Jeff about factors that should be used to set priorities for further assessment/action among ground water detects. He commented that the basic state approach is "percent of MCL". Other criteria could include amount of chemical use (indicator of extent of problem?), toxicity measures (included in setting MCLs), the properties of chemicals (sensitivity issues), or the degree of ground water use. Jeff noted that something simple like nitrate testing (required in Oregon for real estate transactions) could provide good information on sensitivity of ground water to contamination.

One area where Jeff thought a lot could be accomplished was in education on irrigation practices. Irrigation and not precipitation may be the biggest factor affecting pesticide leaching to ground water in Oregon. Jeff works a lot with user groups on education to prevent or minimize contamination problems. His general opinion seemed to be that there was concern over a few "bad actors" causing problems for the larger user groups, but that most individuals were interested in "doing it right". There is no real incentive to overuse/misapply pesticides (in fact, an economic disincentive). Jeff noted that special measures are appropriate to protect certain sensitive areas (hence his research focus); in many areas, pesticides can be used properly without much risk to ground water. (The problems of vulnerability are site-specific). The kinds of information users need to have more of is fundamental knowledge about the properties of the chemicals they use and the soil/ground water sensitivity.

I asked Jeff what evaluations he thought should be done to decide what actions to take in cases of ground water contamination. He is currently working under a USDA grant on a three-tiered process to evaluate ground water data. The level of detail and sophistication increases from one tier to the next; the evaluation would proceed only as far as needed to make a decision. The nature of the problem and the difficulty or consequences of various possible actions affect the depth of analysis needed (decision theory framework). Thus, the availability, cost, and effectiveness (greater crop loss?) of alternative pesticides may determine whether a simple, conservative analysis or a detailed modeling approach is required. Jeff is preparing a manuscript on this tool for an American Chemical Society Symposium; he will send me a copy when available (with information on specific types of information and evaluations used). At the simplest level, conservative assessments of basic soil and pesticide properties could give "yes/no/maybe" answers that may be adequate for simple decisions. At the next tier, screening-level fate and transport models may be used together with regional data to construct scenarios for evaluation. The most detailed analyses would constitute site-specific evaluations that might be comparable to Superfund site RI/FS studies.

REGION 10 POLLUTION PREVENTION PROJECT

INTERVIEWEE: Cathy Neumann
AFFILIATION: Oregon Health Department
INTERVIEWER: Greg Glass (telephone)
DATE: May 19, 1994

Cathy attended the November 1993 Oregon workshop. She remembered the purpose of the project; our discussions therefore focused on more specific followup questions.

Cathy does not do regular reviews of ground water databases. She becomes involved when a specific program, e.g. ODEQ or the DW program, brings her in based on detected contaminants in ground water (on-call role). She has been in her position for about 15 months.

She has been involved in about 6 sites in the last 15 months. Those sites involved diverse contaminants (PCP, PCE, BTEX, asbestos) with no one type dominating. She has not had pesticide or agricultural chemical cases, not is she much involved in bacteriological problems. Considering those types of problems, the frequency would be somewhat more than the 6 per year she noted.

We talked about case studies. She could not recall seeing cases where early recognition and early action opportunities had been missed; her experience has been that agency evaluations have been pretty fast after first detection in ground water data. The biggest timing concern has been whether to issue notification or advisories before data validation is complete (i.e., based on preliminary, non QA'd data).

Cathy commented that she wishes we were doing this project for fish/shellfish contamination. She said she thinks Oregon needs to be issuing additional health advisories for fish consumption, based on the available data she has reviewed. I found this comment quite interesting; it may indicate that the problem we are addressing re: ground water data (early and appropriately protective responses to monitoring data) is in fact generalizable to other areas.

Cathy prepares Fact Sheets or advisories, and works with the agencies on risk communication, for problem sites. The manner in which she participates depends on which program has the lead role on the project (e.g., ODEQ or OHD). She identified the main issues as being problem characterization/source identification; health effects evaluations; and steps for mitigation. ODEQ typically works on characterization/source issues and engineering questions (filtering, alternate water supplies); she focuses on health effects issues.

I asked Cathy to describe how she evaluates the ground water data. She said the process was "best judgment" (i.e., not formally defined), with SDWA MCLs (or advisories) as the obvious screening criteria. Cathy said the general policy was to "notify if detected", and then to assess specific additional recommendations based on concentrations in comparison to

MCLs. Recommendations could include broader or continued sampling; she noted a case where initial data showed x2 MCLs, but further sampling showed x20 (Monmouth, OR asbestos problem from corrosivity and pipe deterioration). I asked whether the whole focus was on addressing drinking water concerns (i.e., whether the issue of aquifer degradation was also considered); I understood Cathy to say that working with the other agencies (e.g., ODEQ) the broader context of source identification and aquifer protection could be considered, but I am not sure to what extent there is real followup. In any event, it is a question that really moves beyond Cathy's direct role at ground water contamination sites.

I asked Cathy whether in her experience supply wells were being turned off after detection of contamination, with loss of information. She said she did not think that was common. Often there are capacity problems, or few readily available alternatives that do not have degraded quality (e.g., naturally high Fe or Mn). She commented, however, that she probably would not be the person to ask about this issue. Cathy also said that in some cases the concern was over losing a low cost (private) water supply and having to use a higher cost (public) water supply, so there was a bias against turning off the well.

I asked Cathy what she thought the agencies needed re: evaluating ground water data, or what she would want at her desk to help assess a problem. She replied that a chemical database that was integrated across agencies and readily updated, as well as GIS mapping capabilities, would be high on her list. We only started to identify the kinds of GIS layers she would want (vulnerability/sensitivity, map of sampling data, public well system locations and use, demographic information, irrigation water use, source information/chemical use, soil types...).

Cathy commented that the existing monitoring programs might be missing some problems, and it might make sense to do more testing in some areas (e.g. private wells in agricultural/high chemical use areas).

Toxicity data are very important given Cathy's role on ground water problems. She uses a number of available toxicity databases to obtain information, from standard EPA sources (IRIS, HEAST) to RTECS to specialized agricultural chemicals databases. Cathy did not feel missing toxicity information had been a significant problem at her sites.

In response to her public notifications and Fact Sheets, Cathy sometimes gets requests for biomonitoring or health assessment studies. She works out risk issues with affected parties on a case by case basis.

REGION 10 POLLUTION PREVENTION PROJECT

INTERVIEWEE: Barbara Priest and Sandy Gurkewitz
AFFILIATION: Department of Environmental Quality
INTERVIEWER: Derek Sandison
DATE: May 3, 1994

Oregon DEQ has adopted a broader view of Pollution Prevention that would encompass the pollution minimization approach of the EPA project. Front end reduction is still emphasized; however, mitigation, particularly at existing facilities, is also an accepted approach. The "trigger" for imposing mitigation requirement is the business license review process.

Thirty-two areas within Oregon could qualify as Ground Water Management Areas; however, resources are not available to pursue more than the current two GWMAs.

Regarding OHD data:

- Health data difficult to obtain;

- OHD doesn't track wells that aren't in current production, some public water system wells haven't been tested since the 1930's;

- Often, wells that test positive for VOCs are removed from service and not further tested creating dead ends in the data base; and

- Private drinking water wells aren't being tested, except wells tested under the property transfer program.

Regarding other data sources:

- Various sections within DEQ maintain data concerning spills, UST, LUST, etc. that isn't routinely circulated to other divisions or departments;

- Landfill monitoring data would be helpful; however, enforcement of monitoring requirements is lacking;

- Hazardous waste reduction plans for businesses may be a source of information concerning potential contaminant sources;

- An effort should be made to link hazardous waste generator and other DEQ data with specific well sites (an argument for WHP tie-in);

- There is a Pollution Prevention Plan Requirement for permitted subsurface stormwater disposal systems; however, only about 1,000 of the 17,000 potentially regulated systems are currently under NPDES permit; and

- Bacteriological test results may be early indicators of vulnerability; however, great significance is generally not attached to such data

Public Water Utilities need to gain a better understanding of ground and surface water interaction (used Springfield as an example of a community that has an appropriate understanding.)

REGION 10 POLLUTION PREVENTION PROJECT

INTERVIEWEE: Dennis Nelson
AFFILIATION: Oregon Health Division - Drinking Water
INTERVIEWER: Derek Sandison (Also interviewed by John Littler)
DATE: May 4, 1994

Once you are seeing detects in PWS wells, you are past the point of early warning; it is a pretty strong indication that there is a significant problem. Also, for most public supply wells, only a single test for organic compounds has been conducted; thus, insufficient information is available for time trends and other analyses. Whatever analytical tool is developed, it must be capable of working with single sample data.

A large amount of data is collected by the various state agencies, but that data is generally not pooled or shared.

There is no current "framework" for automatic data transfers. There are no mutually accepted "triggers" for data transfers. Currently, the determination of what thresholds will trigger data transfers or response is made on a case by case basis by individuals within DEQ and OHD. There is a need for common evaluation criteria and a system or process for determining who needs to know and when (mentioned the DEM notification sheet as an example). That system or process should be designed to be compatible with and implementatable within all agencies. In a time of budgetary and personnel resource limitations, a mechanism for effectively prioritizing agency activities would be helpful.

The driving force in the decision making process is what is the contaminant (e.g., chemical v. microbial) and what is the concentration.

Suggested that hits could be automatically flagged by the computer in a manner similar to the daily "alerts" system OHD currently utilizes, but noted that the evaluation of alerts data is still subject to subjective opinion. Additionally, the alerts are not routinely shared with DEQ because DEQ does not want to see all data, and there is no set criteria for determining what data they might want to see. Alerts are sent to the appropriate OHD regional offices and local health departments (those with drinking water programs).

At present, OHD is able to respond to MCL violations of organic contaminants; however, this is not true of bacteria and nitrates. OHD knows where major problems are, but lacks adequate staff for proper follow-through. There is a reluctance on the divison's part to expand any programs. "Everyone is beaten down."

The primary function of OHD (drinking water) is implementation of the Safe Drinking Water Act. This brings up the issue of differing agency goals in terms of ground water protection. OHD is primarily responsible for protecting health, specifically, ensuring public water supplies do not exceed the MCL; while DEQ is responsible for enforcing

the antidegradation policy, that is, preventing any significant deterioration of the quality of ground water regardless of beneficial use.

Feels that DEQ see's a lot more ground water quality data than OHD.

Interaction with local health departments and utilities is important. At some point, he wants to see direct access by local health departments to the OHD computer. Probably all county governments would respond to a problem should one arise (help in sampling and contacting people).

OHD is currently assisting DEQ in the promotion of the Wellhead Protection (WHP) Program. WHP involves making land use management decisions that are appropriately local decisions. Local decision makers should be involved in WHP Program from day one. One of the first steps should be public involvement including local and state agencies; this should help give everyone a sense of ownership in the program. A guideline document for management strategies is being developed by DEQ and OHD.

Currently, WHP is expected to be a voluntary program. A "club" for inducing PWSs to prepare WHP programs does not appear to be on the horizon. Potentially, an incentive program could be developed.

The problem with wells being abandoned after VOC or SOC hits is being rectified, the well will continue to be carried in the data base and all previous data on the well will remain accessible. Common scenario: public water system wells are being shut down two to three times a week for chemical detects, taste and odor, chloride, hydrogen sulfide, etc. OHD will see a hit, perhaps another hit, then no new data.

Suggested La Pine as a case study (included problems with nitrate, BTEX, and pesticides).

On a daily basis, OHD processes data from 30 chemical analyses and 100 bacteriological analyses. They are six to eight months behind processing.

REGION 10 POLLUTION PREVENTION PROJECT

INTERVIEWEE: Rick Kepler
AFFILIATION: Department of Environmental Quality
INTERVIEWER: Derek Sandison (Also interviewed by John Littler)
DATE: May 4, 1994

Doesn't consider this project pollution prevention. DEQ is never going to be able to respond effectively after contamination has reached a public water supply well.

A single sample may give you an indication that something is occurring, but it doesn't tell you much.

Excited about formalizing the process of sharing data and communication between departments. Need to establish lines of communication, coordinating mechanisms, perhaps a decision tree, and/or a "roadmap." Currently have problems with system and file structure compatibility. Location designators are a particularly significant problem. Also there are no common identifiers for wells.

Where you have existing problems is where the system (for cooperation and sharing) is working well. Cooperation seems to evolve with any formal prioritization effort.

Currently, on a day-to-day basis, Rick and Dennis Nelson have an informal communication process.

Eventually will have ARC Info/ARC View capability. A data manager to develop a ground water data system will be hired in June.

Sees WHP Program as stimulus for coordinating existing data systems (ECD Cleanup Sites, RCRA facilities, solid waste landfills, UST, and pollution prevention. The new DEQ data system is envisioned as a one stop point of contact for PWSs to collect CSI data.

ECD is being (has been) decentralized which may hinder information exchange.

Believes that local health departments have a strong role in ground water protection; they know where the PWS wells are and can identify many of the contaminant sources.

Believes that 75% of PWS wells are withdrawing ground water under the influence of surface water, making ground water quality management more problematic.

The vulnerability mapping project will not result in a map with site specific application. Oregon State University has developed an soil type/crop cover/pesticide overlay. Project is currently stalled since the staff position for developing the map was cut.

DEQ hasn't gone far in pursuing arrangement with WRD concerning collecting water quality data from the water level monitoring well network.

Statewide ambient monitoring program is not being initiated due to lack of funding.

Questioned the adequacy of siting criteria for new wells in areas where contamination sources might be present.

REGION 10 POLLUTION PREVENTION PROJECT

INTERVIEWEE: Grover Partee, Craig Paulson, Maryann Helferty
AFFILIATION: EPA Region 10
INTERVIEWER: Derek Sandison (Also interviewed by Greg Glass)
DATE: May 11, 1994

Suggested that the first time a state goes through the process of crunching data that they develop a set of conventions for locators, field names, data collection, etc. Additional data base development efforts in the state could use those conventions or develop translation software to bridge between data systems.

Funds could potentially be diverted from Supplemental Environmental Projects or from cleanup activities to support data base development. It is also possible that EPA could make funds available to states to convert existing data into compatible formats. EPA may have supported a similar effort in the State of California.

EPA has "burned a number of bridges" with the states in giving conflicting instructions in terms of the desired structure for data bases. EPA would tell states to organize their structures in some manner; the states would comply, then EPA would alter its position and ask the states to make further changes.

Water quality in Alaska is generally good in deep aquifers; however, the shallow aquifer is a different matter. Underground injection of hazardous waste is permitted in a number of areas. Financial resources for water quality agencies in Alaska have not historically represented a problem, but with oil money "drying up", state agencies are starting to feel the pinch.

Ranking/prioritization of incipient problems should be based on vulnerability, ground water use, population served or at risk, single or multiple hit, toxicity and concentration of contaminants.

Recommendation for Case Study: Shoshone/Bannock EDB contamination problem. This case is illustrative of problems that are allowed to progressively worsen because of the lack of an adequate early response protocol.

REGION 10 POLLUTION PREVENTION PROJECT

INTERVIEWEE: Dennis Nelson
AFFILIATION: Oregon State Health Division - Water Supply Program
INTERVIEWERS: Derek Sandison and John Littler
DATE: May 4th 1994

The following summary presents the most significant points resulting from the subject interview:

- Regarding semantics there is a need to clarify that it may be too late to "protect groundwater" or provide early warning, from a contaminated source perspective once a bad sample is collected. This or similar points have been raised by others. Pollution prevention also has some problems in this regard. When we do the final write ups we will need to be sensitive to this point.

- Whereas data collection is relatively routine, sharing is not. A tool would be very helpful in the context of defining a framework for defining: who, when, how, what data is shared and what the triggers are.

- No systematic priority setting or system exists for defining when to act or how to respond. The exceptions are the DEQ HRS system and the PWS compliance responses.

- If a framework or procedure is developed as an automatic, like an emergency notification system, as a checklist or template, this could help in priority setting and decision making.

- The current situation is not satisfactory to Dennis.

- There is potential to use or build on to the current ALERTS system to raise the red flags.

- Response to observed hits is variable, depending on resources and perceptions. The original policy required a confirmation sampling and investigation, but this is not always possible. In general they seem to be able to keep up with MCL violations for organics, but don't have time to worry much about inorganics.

- Good understandings exist with respect to most of the NO3 problem areas.

- Politically it is a very bad time for agencies to be perceived as expanding programs. Other forums are being tried to broaden the understanding of the problems.(i.e. WHP). Politically the agencies are in a low profile mode.

- It is understood that the cheapest methods to address these problems are the most proactive and politically untimely.

- Our project tool could: facilitate identification of problem areas, clarify roles and responsibilities, risk assessment and perception. At this time DEQ has to wait to hear from Dennis and Vice Versa.

- The basic agency missions are different: DOH looks at public health, but DEQ looks at the entire resource and all the beneficial uses theoretically.

- Based on his knowledge of DEQ, it is his feeling that both agencies are overwhelmed with the workload and inadequate resources.

- LHDs are a potentially important player in several areas of the state in the drinking water program, and statewide when it comes to protection programs.

- It would be appropriate to include the counties in the framework.

- Wellhead Protection will be a big related interest in this set of issues. Potentially this could be used as a spring board in some way. This will probably be a voluntary program in Oregon.

- Previous comments on writing off areas were discussed. This is not thought to mean writing them off per se, but recognizing they are a lower priority until new resources are available.

- A common problem from a data management perspective was that many systems once they had a hit would turn off the well. This would result in the well disappearing from the data base. This has now been fixed so that the data is not lost for review.

- Raw water samples are recommended but not required, so it is not always clear what the data represent.

- A case study does not jump out with along enough history to help this project. There are plenty of problem water supplies but the data generally only goes back 4 years maximum (i.e. LaPine, Lakewood and Portland).

- No trends analysis of problem sample results is done except on an occasional basis.

- Dennis feels that DOH has the responsibility to share the data, and feels this is not happening routinely except with the ALERT notifications. There is a concern about sharing the data before knowing what it means.

REGION 10 POLLUTION PREVENTION PROJECT

INTERVIEWEE: Rick Keppler
AFFILIATION: Oregon Department of Environmental Quality - Water Quality Program
INTERVIEWERS: Derek Sandison and John Littler
DATE: May 4th 1994

The following summary presents the most significant points resulting from the subject interview:

- Rick feels this is not a pollution prevention project in its pure sense. His concern is you cannot respond to something after detection. Dennis had a similar comment in the morning session. This again highlights the sensitivity of how this is discussed in our documentation because nobody disagrees with the basic thrust of this effort.

- He is concerned about the analytical emphasis up front, based on the lack of quality data on which to base an analysis. A vulnerability type analysis however is something both he and Dennis seem to feel more at ease with, due to the ability to look at issues impacting water quality and apply a proactive logic path..

- He is excited about formalizing the process and developing a framework of understanding and problem resolution. This would define who/ what /how /when.

- There is currently no good understanding of roles and responsibilities or the associated communication needs. This needs to be resolved.

- There is a difference in the roles of the agencies.

- It is important for local health departments to be a part of the process. They have information others are not privy to.

- Communication is sporadic and not well defined, but Dennis and Rick work well together and coordinate on a policy level more than a project or site level. This is falling apart in practice due to the workload and resource pressures.

- ArcInfo and Oracle are currently available and he is in the process of hiring a full time data person. Access will allow them to relate different data bases.

- GIS is needed for PWS data.

- There are close ties between this project and WHP, which he agrees will probably be a voluntary program.

- In reality there is some good data sharing in GWMAs, but no real prioritization. When there is, it is not consistent and is based on the individual investigators experience/interest/ and perceptions. It should be OK to say no when a good priority setting mechanism is used.

- Some community outreach is being done using grants.

- The focus on groundwater is still very much from the state level, and overall things are still focused on surface water. Awareness of issues like hydraulic continuity is limited.

- There is no good definition of the triggers appropriate for defining when he would like to see the data.

- He is concerned that ECD may be writing off areas and there is no authority under state law to do that. Sheree Stewart later clarified that is not the case in a formal sense - (see interview summary for Sheree Stewart).

- For case studies one of the best places to look in terms of historical data is landfill sites.

- One problem identified with respect to database is the absence of a common identifier for wells.

- The vulnerability mapping project is stalled and is not the best tool for addressing site specific problems.

- Regarding case studies and the absence of data, if a bigger picture approach is taken important issues are: land use, known contaminated sites, agricultural use of chemicals, population, water use, industry and sewage disposal, and others ?

- Looking at the factors identified above in a prospective manner could shift the project into more of a pollution prevention mode in his mind. Rick liked this approach as a risk based approach to pollution prevention.

REGION 10 POLLUTION PREVENTION PROJECT

INTERVIEWEE: Sheree Stewart
AFFILIATION: Oregon State Department of Environmental Quality - Environmental Cleanup Program
INTERVIEWER: John Littler
DATE: May 4th 1994

The following summary presents the most significant points resulting from the subject interview:

- There needs to be increased communication between the agencies.

- The roles and responsibilities of the various agencies need to be clarified.

- There is a fairly clear distinction between pollution prevention and early warning systems.

- Sheree feels very strongly that public education and involvement is a critical part of the solution to these problems. She and other professional staff spend a lot of time educating the public. Hand out materials etc. would be very helpful to them. This is one of her highest priorities with respect to this project.

- Similar comments to the above interviews regarding priority setting, resource constraints and trigger questions.

- Writing off of Aquifer resources is not a formal thing and is more in the context of deferred action or lower priority of actions based on the perception that an aquifer is unusable, outside the normal priority mechanisms or beyond help. For example in Lake Oswego a PWS well was taken off line and even though contamination is there and not addressed, it is not a priority at this time. The probable source has been found through the PA program.

- When an up gradient problem is known to exist in a water supply aquifer aquifer it is automatically be bumped into a higher priority for action.

- Dennis and Rick are perceived to be a focal point for whatever communication and recommendations for action are happening.

- The Site Assessment program could also be a focal point for information flow regarding early detection of contamination. Heather Schigf is the contact person at 229-5657.

- Wellhead Protection has some good elements but would potentially be of limited benefit due to scope and it being voluntary.

- Database development needs to focus on being more interactive, the contact person for ECD is Jean Sloper 229-6490.

- The cleanup program has not addressed the cost benefit of their expenditures. for example spending a little at a lot of sites on source control could produce great benefit, but spending a lot at a few sites has not always done so. This is probably politically motivated to some extent. More emphasis should be given to source control, which again could tie back directly to pollution prevention.

- In phase 2 of this project more direct involvement from the programs will be necessary.

REGION 10 POLLUTION PREVENTION PROJECT

INTERVIEWEE: Chuck Davis
AFFILIATION: City of Springfield
INTERVIEWER: John Littler
DATE: May 13th 1994

Chuck basically reinforced a great deal of the input previously received from Dennis Nelson and Rich Keppler. In addition, he emphasized that he felt there is a lot more data available in the utilities and private sector that could be usefully applied if it could be accessed. He also agreed with the approach that Rick described of using a vulnerability type analysis to prioritize rather than a detailed analytical tool. He also felt that it would be very helpful to have documented case studies to use as demonstrative examples in communicating with policy makers and the public.

REGION 10 POLLUTION PREVENTION PROJECT

INTERVIEWEE: Denny Klingbile and John Thomas
AFFILIATION: Damascus Water District and Mt. Scott Water District
INTERVIEWER: John Littler
DATE: May 12th 1994

This was a brief discussion which took place during the AWWA convention but described the project in general with a very positive response in terms of desire to have a tool like ours available. There was some considerable concern at the prospect of problems going unaddressed as utilities abandon contaminated sources without addressing the root of the problem, which in turn could impact downgradient wells.

APPENDIX A - RELEVANT DOCUMENTS

1) *Final Comprehensive State Ground Water Protection Program Guidance*, EPA Office of the Administrator, EPA 100-R-93-001, 161 pp., December 1992.

(Describes process for developing state programs under EPA objectives:

A) Prevention of contamination whenever possible;

B) Prevention of contamination based on the relative vulnerability of the resource and, where necessary, the ground water's use and value;

C) Remediation based on relative use and value of ground water.)

2) *Final Report of the Volunteer Well Water Nitrate Testing Program*, Clean Water Act Section 319 Grant to the Oregon Department of Environmental Quality, Barbara Brahmani, Program Coordinator, ODEQ, 10 pp. plus attachments, November 1993.

(Indications of significant nitrate problems in a number of areas of the state.)

3) Ground Water Protection Act Implementation Task Force: Recommendations to the Strategic Water Management Group, 6 pp., February 16, 1993.

4) *Guidance for Pesticides and Ground Water State Management Plans*, EPA Office of Prevention, Pesticides, and Toxic Substances, EPA 735-B-93-0, 42 pp., December 1993.

(Implementation document for the EPA Pesticides and Ground Water Strategy)

5) Interpretation of Federal Antidegradation Regulatory Requirement, Memo from Tudor Davis, Director OST, to Water Management Division Directors, Regions I - X, 6 pp., February 22, 1994.

6) Oregon DEQ Work Program for Clean Water Act Section 319 Grants: Project Level Proposal for Fiscal Year 1994 Funding, Project Number OR-94-21-319, Prepared and Submitted by ODEQ, Undated.

(Project Name: Utilization of GIS Technology to Map Ground Water Vulnerability)

7) *Profile of Ground Water Protection Programs 1993, State of Oregon*, (Draft Document), Prepared by Dru Keenan and Maryann Helferty, EPA Region 10, Ground Water Section, EPA 910/R-93-019, 77 pp. plus appendices, September 1993.

8) *Pesticides in Ground Water Database*, EPA Pesticides and Toxic Substances, H750C, 126 pp. plus appendices listed as follows, November 1991.

Appendix A - Describes data fields for data base in D-Base III plus.

Appendix B - Positive entries sorted by chemical (state identified but geographic location not further defined).

Appendix C - Positive entries sorted by state.

Appendix D - Summary assessment sorted by chemical (shows numbers of states with positives, range of values, etc.

Appendix E - Bibliography.

Appendix F - Miscellaneous memos, etc.

(National summary and analysis of all data that Office of Pesticide Programs has available, both in computerized and hard copy form, regarding pesticides in ground water.)

9) *Pesticides in Ground Water Database: Region X*, EPA Pesticides and Toxic Substances, H750C, 38 pp., November 1991.

(Regional Supplement to the national summary and analysis described above.)

10) *Pesticides in Ground Water Data Base 1988 Interim Report*, EPA Office of Pesticide Programs, 32 pp., December 1988.

(Preliminary document related to the above referenced pesticide surveys.)

11) Uncovering the Legacy of Pesticide Use: What We Know About Ground Water Contamination in the Northwest, Neva Hassanein, Northwest Coalition for Alternatives to Pesticides, P.O. Box 1393, Eugene, OR 97440, 36 pp., August 1992.

(Summarizes EPA and ODEQ pesticide findings.)

12) Summary of the January 10, 1994 Quarterly Groundwater Protection Advisory Committee (GPAC) Meeting, Memo from Ivan Camacho, ODEQ Groundwater Section, to GPAC issues interested persons, 9 pp., March 8, 1994.

MAPS

1) "Sampling Locations and Average Nitrate Concentrations", Data from Oregon DEQ Volunteer Nitrate Testing Program and Health Division's Real Estate Transaction Testing Program, Scale 1:3,000,000, November, 1989 to June, 1993, by ODEQ, OHD, and State GIS Program.

2) "Ground Water Vulnerability", Vulnerability = susceptibility plus pollutant load, no credits, scale not indicated, undated.

(Ranked low, medium, high, and very high.)