WHPA DELINEATION REPORTS
RECOMMENDED MEETINGS, SUBMITTAL OF REPORTS AND WHPA DELINEATION REPORT CONTENTS

The purpose of this document is to provide recommendations for meetings, establish a procedure for the submittal of wellhead protection area (WHPA) delineation reports and to identify items in the report which the state deems necessary to the review process. Scheduling the appropriate meetings, submitting the delineation report and addressing the items as noted will expedite the review process and allow the agency to respond in a timely fashion.

RECOMMENDED MEETINGS

Two meetings are being strongly recommended which will serve to address how the WHPA delineation will be conducted. A representative of the community or public water supply system shall be present at one or both of the meetings. The meetings are identified as follows:

1) **Workplan Meeting:** The purpose of this meeting will be to provide approval of the workplan for delineation of the WHPA. The meeting shall consist of a review of the available information on the wells, well field(s) and surrounding area. Approval of the workplan will be based upon the adequacy of the available information in meeting the requirements for WHPA delineation including confirmation of flow direction, evidence of hydraulic characteristics and the ability to adequately characterize and model the study area.

2) **Model Conceptualization Meeting:** The purpose of this meeting will be to reach agreement on the site hydrogeologic conceptualization prior to the modeling effort. This meeting shall be held upon completion of the field activities and compilation of data by the consultant. The consultant should be prepared to present their conceptualization of the site hydrogeology and provide the necessary supporting documentation. As a minimum, supporting documentation should include geologic cross-sections, area well logs and a contour map of the piezometric surface for the hydrogeologic system.

PROCEDURE FOR SUBMITTAL

The WHPA delineation report should be submitted in **duplicate** to:

For Lower Peninsula Water Supplies	For Upper Peninsula Water Supplies
Mr. Brant O. Fisher, Environmental Engineer Drinking Water and Environmental Health Division Michigan Department of Environment, Great Lakes, and Energy 525 West Allegan Street PO Box 30817 Lansing, Michigan 48909-8311	Mr. Chuck Thomas, Environmental Manager KI Sawyer International Airport and Business Center 420 Fifth Street Gwinn, Michigan 49841-3004

The review process will consist of evaluating the delineation to determine its consistency with the State of Michigan, Wellhead Protection Program. The agency, upon completion of the review process, will identify areas which are inconsistent with the state program or approve the wellhead protection area delineation. The anticipated time for providing a response is four (4) weeks.

RECOMMENDATIONS FOR WHPA DELINEATION REPORT

Written Report Content

To expedite the review process, it is recommended the written report address the following items.

1) **Purpose and Scope:** Clearly state the purpose and scope of the project.

2) **Sources of Information:** Provide a discussion on the sources of information used in completion of the project.

3) **Description of Area:** Include a general description of the study area. The description might include the local topography, local and regional hydrogeology, and the location(s) of the municipal wells. Location descriptions should include county, township, range, and section information.

4) **Aquifer Test:** Where applicable, describe the aquifer test. Discuss the methods of analysis and the hydraulic characteristics of the aquifer as they relate to the model conceptualization.

5) **Model Conceptualization:** Describe the models' purpose, assumptions and limitations. How is the model appropriate to the area of study? Relate the similarities in the model conceptualization to the physical characteristics identified in the ground water system. How were these physical characteristics represented in the model (i.e., description of flow system, bottom/top elevations, hydraulic conductivities, boundary conditions, effective porosity, recharge)?

6) **Results and Interpretation:** Discuss the results of the modeling effort. Do the results from the model make sense relative to the conceptualized hydrogeological setting? Where applicable, compare observed heads to modeled heads and discharges to streams with known discharges. Is the flow direction and gradient reasonable? The discussion should include areas of the modeling effort which lack a "high degree" of certainty. What effect might this lack of certainty have on the delineated area?

7) **Conclusions:** Provide a "best estimate" of what the delineated area should encompass based upon the results and interpretation.

Maps and Figures

The delineation report should also contain maps and figures to support the delineation. The following maps and figures are suggested:

1) **Municipal Well Locations:** This map should identify the municipal well locations on an appropriate base map. It need not be of the same scale as the maps identified in #2 of this section.

2) **Study Area, GW Contours, Delineated Area:** These maps should be constructed from an appropriate base map and provided in the same scale.

   Study Area – Provide a map of the study area and include all pertinent boundaries and features of the hydrogeologic system. Features such as political boundaries, townships

and sections, lakes, streams or rivers, roads, and sites referenced in the written report should be identified on the map.

Contour Map – Include a contour map of the piezometric surface of the hydrogeologic system being modeled. The map should include the locations and measurements of static water levels used to "calibrate" the model.

Delineated Area – The delineated WHPA should be depicted on the base map.

3) **Geologic Cross Sections:** Provide geologic cross sections, as a minimum, both axial and perpendicular to the direction of ground water flow. The locations of the cross sections should be identified on a base map as in #2 of this section.

Contents of Appendix

As supporting documentation for reference, the appendix should include the following items:

1) **Municipal Well Logs:** Provide well logs for the municipal wells.

2) **Residential Well Logs:** Include a representative selection of well logs indicative of the local geology. As a minimum, provide the well logs which were used to generate the geologic cross sections.

3) **Aquifer Test Data:** Where an aquifer test was conducted as part of the study, the appendix should include a copy of the aquifer test data and any plots used in the analysis and interpretation of the data.

4) **Model Input and Output:** A copy of the input and output used to generate the WHPA delineation (preferably in hard copy and on computer disk).

5) **Miscellaneous:** Include other information pertinent to the review process.