S.W.A.P.

Water Quality Control Division
Colorado Department of Public Health & Environment

May 2000

SWAP Website Address:
http://www.cdphe.state.co.us/wq/sw/swaphom.html

State of Colorado
Source Water Assessment and Protection (SWAP) Program Plan

(*Final*)

May 2000

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Ref:8EPR-EP

Ms. Jane Norton
Executive Director
Colorado Department of Public Health and Environment
4300 Cherry Creek Drive South
Denver, Colorado 80246-1530

Dear Ms. Norton:

It is my pleasure to approve the Colorado Source Water Assessment and Protection Program submitted by the Colorado Department of Public Health and Environment on February 8, 1999, pursuant to Section 1453 of the Safe Drinking Water Act Amendments of 1996. The program is designed to assess and to address existing and potential threats to the quality of sources of public drinking water supplies. We feel that the new program meets the requirements of the statute and provisions of the national guidance.

Building on the voluntary Colorado Wellhead Protection Program, the Colorado Source Water Assessment and Protection Program includes requirements for assessments of both ground and surface water sources of drinking water for all public water systems. These assessments may then be used by a public water system as a basis for voluntarily developing a Source Water Protection or Wellhead Protection Program.

Key elements of the program that meet or exceed our criteria include the delineation of aquifer areas and parts of watersheds that may contribute pollution to a water supply, identification of significant potential sources of contamination within those areas, determination of the water supply's susceptibility to contamination from those sources, and making this information readily available to the public. Communities and public water systems, working in cooperation with local, State, and Federal agencies, may use this assessment information to create locally-based source water protection programs to address current problems and prevent future threats to their drinking water supplies.

The Colorado Source Water Assessment and Protection Program will significantly enhance ongoing efforts to protect waters used as sources of drinking water through better intra- and inter-agency coordination, sound science, and the innovative use of the latest technical tools for information collection, management and sharing. The use of Global Positioning System (GPS), Geographic Information System (GIS), and Internet access technologies will allow valuable information about a public water supply's location, protection area, susceptibility, and potential sources of contamination to be both more accurate and more readily available to all stakeholders in drinking water source protection, including the general public, than ever before.

We greatly appreciate the efforts of the individuals in your agency who have worked to develop and refine the Colorado Source Water Assessment and Protection Program. We especially want to thank and call attention to the outstanding contributions of Kathleen Reilly from the Water Quality Control Division. Her overall vision for the program, skillful coordination with others at the local, State, and Federal level through the Colorado SWAP Design Team, and expertise within the Wellhead Protection Program was invaluable. Also, Gary Karst, who was recently hired via contract to be the Colorado Source Water Assessment and Protection Program Coordinator, did a timely and excellent job in addressing EPA issues and comments raised on the State submittal.

We hope to continue to work closely with the Colorado Department of Public Health and Environment as the Source Water Assessment and Protection Program is being implemented. We look forward to hearing about your continued efforts to inform the public and other interested parties about the program. We stand ready to act as partners in this effort to protect our precious drinking water resources, and so protect public health.

Because the Source Water Assessment and Protection Program is a dynamic document, we expect it may require changes during implementation. Please notify our Ecosystems Protection Program if changes are needed.

Congratulations on the approval of the Colorado Source Water Assessment and Protection Program. If you have any questions, please contact Carol Campbell, Director of the Ecosystems Protection Program at (303) 312-6340, or Marcella Hutchinson of the Source Water/ Ground Water Team at (303) 312-6753.

Sincerely,

William P. Yellowtail,
Regional Administrator

cc: J. David Holm, CDPHE
Carl Norbeck, CDPHE
Kathleen Reilly, CDPHE
Gary Karst, CDPHE

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SOURCE WATER ASSESSMENT AND PROTECTION PROGRAM

EXECUTIVE SUMMARY

AUTHORITY AND FUNDING:

Source Water Assessment and Protection (SWAP) is a preventative program designed to protect public drinking water supplies from potential contamination. SWAP emerged in the 1996 amendments to the federal Safe Drinking Water Act (Section 1453) and was designed to complement traditional drinking water treatment approaches. The amendments require each state to develop a source water assessment program that defines how it will implement the four steps contained in the law. Within a framework of guidance developed by the U.S. Environmental Protection Agency (EPA), each state has a fair amount of flexibility to develop and implement their SWAP program. The amendments also placed educating the public about the program and involving them in the process as a very high priority.

Each state received an allotment from the 1997 Drinking Water State Revolving Fund (DWSRF) Capitalization Grant to be used to implement the 1996 Safe Drinking Water Act amendments. Colorado's share of the 1997 DWSRF Capitalization Grant was $16.8 million. These funds are traditionally used for improvements to publicly owned water treatment facilities. The amendments provided for a one-time set aside from this allotment to support programs like SWAP. Colorado sought and received approval to set aside ten percent (10%), or approximately $1.68 million, to conduct the source water assessments for all 2200+ public water systems in the state. These funds were made available to support assessment activities once Colorado's work plan for spending the set aside is approved by the EPA.

In addition to the one-time SWAP set aside, Colorado has elected to utilize annual set aside funds from the Wellhead Protection (WHP) program to aid in conducting SWAP assessments and developing protection plans for ground water-based public water supplies. This annual set aside fund also comes from the annual DWSRF Capitalization Grants. Historically, the WHP set aside for Colorado has averaged approximately $500,000 annually. These funds were made available to support assessment activities once Colorado's work plan for spending the set aside is approved by the EPA.

PROGRAM REQUIREMENTS:

According to the EPA guidance on State Source Water Assessment and Protection Programs (EPA816-R-97-009, August 1997), a state program plan submittal needs to contain the following four descriptions:

1) The measures used to involve the public in the design of the SWAP;
2) The state's assessment approaches including the goals for the program;

3) How the state will make the results of assessments available to the public; and
4) How the state will implement its chosen approaches to SWAP.

Colorado submitted their draft program plan to EPA for approval in February 1999. In response to EPA's comments to the program plan, Colorado revised the program plan and submitted it for final approval in January 2000, and EPA approved the revisions in February 2000. Several minor changes to the approved program plan subsequently have been incorporated by addendum. Colorado had two years from approval to complete the assessments and, like most states, Colorado has requested an allowable 18-month extension to this deadline. As a result, Colorado must complete the assessments by August 2003.

Each state SWAP program must describe the state's approach to conducting assessments of public water supplies (PWSs). The Safe Drinking Water Act amendments require each state SWAP program to include, at a minimum, the following key elements:

1) Public participation
2) Delineation of source water assessment areas (SWAAs)
3) Inventory of the potential sources of contamination (PSOC)
4) Analysis of the susceptibility of the public water supplies to the PSOCs.

Public Participation:

SWAP is founded on the concept that informed citizens, equipped with fundamental knowledge about their drinking water sources, will be the most effective advocates for protecting it. The goal of SWAP, therefore, is to build awareness of the source(s) of their drinking water, what can threaten it, and how to protect it. Opportunities for citizens to become involved in the Colorado SWAP program are available from the planning and design phases through implementation.

The State of Colorado (the State) has spent considerable time and effort on "getting the word out" to people. Education efforts have included the design and distribution of a wide variety of descriptive materials on SWAP; presentations to many different groups throughout the design phase; participation in workshops and seminars on SWAP; and the development of a SWAP web site.

Public involvement in the design of SWAP was realized through the appointment of three (3) citizen advisory teams that advised Water Quality Control Division (Division) staff on the development of the state strategy for SWAP. Membership on the teams reflected geographic as well as specific interest and expertise. The 15-member Design Team was convened in January 1998 and generally met monthly for about a year to develop approaches for SWAP that would be appropriate for Colorado. The team was comprised of representative from the public and private sector selected from across the state and who had varying technical expertise and stakeholder interest. The mission of the Design Team was to craft a workable plan for Colorado that met the letter and spirit of the law.

The Citizen's Advisory Team (CAT) was appointed to represent special populations whose interests in drinking water were not present on the other teams. The members were selected to represent vulnerable and special needs populations, businesses with an interest in safe drinking water, and people whose livelihoods will be affected by the implementation of SWAP. The mission of the CAT is to help ensure that the assessment techniques developed by the other two teams meet the needs of these groups, are practical, easily understood and can be readily implemented at the local level.

The Technical Advisory Team (TAT) was selected to advise the Division on assembling and integrating the various data bases needed for SWAP, and to provide technical support on implementing the approaches proposed. The TAT is comprised of representatives from the public and private sectors with access to and management responsibilities for the data needed for SWAP. The technical aspects of determining the susceptibility of a PWS to various contaminant sources and applying consistent criteria to the susceptibility analysis are examples of the tasks undertaken by the TAT.

Colorado sought and received grant funds to work with neighboring and downstream states on the exchange of data for SWAP, and to develop cooperative agreements on the approaches proposed. A series of meetings are scheduled to explore data exchanges with states in the Platte, Arkansas, and Rio Grande River Basins. Colorado is participating in a similar effort on the Colorado River Basin, where Arizona has assumed the lead.

SWAP requires that the assessment results be made available to the public. The aim of the notification requirement is to make people aware of the potential impacts to their raw water source(s). They can then decide what, if any, actions to take to remove or resolve the potential impacts. In order for this to result in meaningful understanding and action, the announcements must be preceded by a well-designed public education effort on the potential impacts and what can be done about them. The State recognizes this need and is preparing to modify a citizen's guidebook on protecting ground water sources of drinking water to include surface water sources as well.

The need to devise methods of sustaining pubic interest has become increasingly apparent during the design phase. The State is prepared to assist local water providers with outreach and education as the program moves from design to implementation. A concerted effort is underway to garner PWS support for implementation, as it will be voluntary, and to build citizen interest in SWAP.

Delineation of Source Water Assessment Areas:

Delineation of source water assessment areas (SWAAs) will be performed primarily by the State and its contractor(s). Delineation of SWAAs also may be undertaken by the PWSs or a consortium of stakeholders that may include the PWSs. The delineated area must follow the guidelines outlined in the SWAP, and must conservatively include the area that provides water to the public intake or well. Any departures from the guidance will be evaluated on a case by case basis. The delineated areas will be entered into a Geographical Information System (GIS) and

indicated on a topographic map. Where the State undertakes the delineation, the PWS will be furnished copies of the delineated areas and given an opportunity to review and comment prior to finalization.

The delineation of the SWAA defines the area where water and/or pollutants can move prior to reaching the intake or well of a PWS. For surface water systems, the EPA guidance defines this area as that portion of the entire watershed area upstream of the PWS's intake structure that actually drains to the intake structure. This region will extend up to the headwater boundary of the watershed but not beyond state borders. The watershed approach that Colorado proposes to use for SWAP fosters adherence to the EPA advice to use the U.S. Geological Survey (USGS) hydrologic units as the basis from which to define the SWAAs for surface water systems.

Colorado has a number of large municipal water systems that divert surface water from the western slopes of the Rocky Mountains for consumption along the Front Range. Where surface water is diverted from one basin to another, the area above the diversion structure will be included as part of the source water assessment area using the principles described above.

The State's wellhead protection approach, defined in the "Colorado Wellhead Protection Program" document will be used to delineate source water areas for public ground water systems. For ground water systems, the SWAA is that region around a well, defined in accordance with the methods recommended in the wellhead protection program. The recommended approaches to defining the areas of influence around public water wells are influenced by the type of aquifer in which the well is located, and how vulnerable it is to contamination from the surface.

Given the short timeframe within which the delineations must be completed, SWAAs located in areas with few PSOCs of concern (i.e., those in wilderness or headwaters areas with high water quality use classifications) will be nested and evaluated in the aggregate.

The locations of the intakes and wells within a single SWAA help determine opportunities for partnering among the systems to protect the SWAAs. Partnering among PWSs located in the same source water protection area will be strongly encouraged by the State.

Inventory of Potential Sources of Contamination:

The State is required to undertake an inventory of the potential sources of contamination (PSOCs) within the delineated source water assessment area. The purpose of the inventory is to identify the most significant PSOCs that could potentially pollute the source water. The State recognizes that the level and detail of the information about the potential sources of contamination is limited, and as a result, Colorado will use an iterative, two step process for the contaminant inventory.

In the first step of the contaminant inventory, the State will identify, assess and assemble information relevant to SWAP that is contained in regulatory data bases maintained by various state and federal agencies. Examples of PSOCs that might be identified include Superfund sites, underground storage tanks, hazardous materials storage and disposal sites, surface water

discharges, intensive agricultural activity, etc. Locations of key sources will be entered into the GIS and mapped within the SWAAs. The maps and lists of the PSOCs will be sent to the PWS for review and verification.

The second step of the contaminant inventory allows for addition of information gathered at the local and county levels from records, surveys and face to face interviews with local citizens and business owners. The collection and analysis of this information provides an excellent opportunity to involve community residents and volunteers in the SWAP effort. The State is prepared to provide guidance to the PWS and/or stakeholder groups in collecting and evaluating this information for inclusion in the inventory.

To assist with the collection and assessment of information from local governments and water providers, the State will be preparing a guidance document by modifying a citizens' guidebook on protecting ground water sources of drinking water to include surface water sources as well. The State also has developed a list of the most significant activities with a potential to contaminate a water supply. This information, along with the map of the SWAA, will be provided to the PWS or to community groups interested in canvassing the area to identify PSOCs. The local level data that indicate the presence of significant PSOCs will be added to the map of the SWAA. Where there is no local interest in assisting with the contaminant inventory for community water systems, the inventory will default to the information identified in step one.

Whenever possible, the PWS or local watershed groups taking the lead on the inventory will be encouraged to involve local residents and business owners. All information that emerges from the contaminant inventory will be recorded and the most serious PSOCs will be recommended for inclusion on the SWAA map. The lists and maps will be distributed to the public once they have been reviewed by the PWS. The most significant PSOCs will be ranked by severity, the next step in the SWAP process. The PWS is encouraged to involve citizens in reviewing the ranking of the PSOCs and in deciding what actions to take to correct or manage the most serious problems.

Susceptibility Analysis:

The susceptibility analysis evaluates the PSOCs identified in the contaminant inventory and ranks them by the severity of the threat, risk and vulnerability to the water source. For the first iteration, only the most serious PSOCs, for which uniform data are available statewide, will be included in the susceptibility analysis. The Division and the Design Team have developed a qualitative non-numerical technique that allows citizens and professionals alike to evaluate and rank the factors that contribute to determining how susceptible a public water supply is to contamination.

The technique assigns specific rankings or ratings to various threat and risk factors important to the analysis. The factors and their ratings are combined in a series of matrix tables and the potential scenarios are assigned pre-determined ratings or outcomes to assess the relative threat, risk and vulnerability posed by the PSOCs.

Factors considered in determining the potential threat include the potential hazard or impact the contaminant has on human health and whether there is likelihood that these contaminants could be released to the water supply. The potential contaminant hazard is categorized into three classes, A, B, or C; with the most serious contaminants assigned to Class A. The likelihood of release will be determined by evaluating the compliance record of the potential source and/or the protective/preventative measures or best management practices that are in place, if possible.

Factors considered in determining the potential risk include evaluating the structural integrity of the water system and the setting sensitivity. System integrity refers to the structural soundness of the surface water intake and conveyance structures, or the ground water well, and includes factors such as age, construction, and maintenance. Setting sensitivity includes evaluating the proximity of the PSOC to the intake or well, and the presence of natural or man-made barriers that could enhance or impede the movement of the contaminant.

The vulnerability of the PWS to these sources are determined by combining the potential threat and risk outcomes in a matrix table and assigning pre-determined rankings to the potential scenarios. These outcomes will be summarized by contaminant class and/or contaminant source. The susceptibility analysis is then summarized in narrative format.

While the State expects to take the lead in conducting he susceptibility analysis, the PWS or a consortium of stakeholders, including the PWS could also conduct the analysis. The approach proposed allows the State or the PWS to use the information currently available to analyze susceptibility, and to ensure that with the use of the matrices, the susceptibility analysis results will be relatively uniform across the state. The results will be made available to the public as part of the assessment. The involvement of citizens in reviewing the susceptibility analysis results will be strongly encouraged. It is anticipated that the results will be used to prioritize local concerns and address them in the protection phase of SWAP.