Source Water Assessment Program (SWAP) Report For Kushi Institute

What is SWAP?

The Source Water Assessment Program (SWAP), established under the federal Safe Drinking Water Act, requires every state to:

? Inventory land uses within the recharge areas of all public water supply sources;

? Assess the susceptibility of drinking water sources to contamination from these land uses; and

? Publicize the results to provide support for improved protection.

SWAP and Water Quality

Susceptibility of a drinking water source does *not* imply poor water quality. Actual water quality is best reflected by the results of regular water tests.

Water suppliers protect drinking water by monitoring for more than 100 chemicals, treating water supplies, and using source protection measures to ensure that safe water is delivered to the tap.

Prepared by the Massachusetts Department of Environmental Protection, Bureau of Resource Protection, Drinking Water Program

Date Prepared: December 4, 2001

Table 1: Public Water System (PWS) Information

PWS NAME	**Kushi Institute**
PWS Address	**308 Leland Rd.**
City/Town	**Becket, Massachusetts**
PWS ID Number	**1022027**
Local Contact	**Mariana Pina-Bergtold**
Phone Number	**413-623-5741**

Well Name	*Source ID#*	*Zone I (in feet)*	*IWPA (in feet)*	*Source Susceptibility*
West Well	01G	165	460	High
East Well	02G	135	438	High

Introduction

We are all concerned about the quality of the water we drink. Drinking water wells may be threatened by many potential sources of contamination, including septic systems, road salting, and improper disposal of hazardous materials. Citizens and local officials can work together to better protect these drinking water sources.

Purpose of this report:
This report is a planning tool to support local and state efforts to improve water supply protection. By identifying land uses within water supply protection areas that may be potential sources of contamination the assessment helps focus protection efforts on appropriate best management practices (BMPs) and drinking water source protection measures. Department of Environmental Protection (DEP) staff are available to provide information about funding and other resources that may be available to your community.

This report includes:
1. Description of the Water System
2. Discussion of Land Uses within Protection Areas
3. Recommendations for Protection
4. Attachments, including a Map of the Protection Areas
5. Appendix

1. Description of the Water System

The 2 wells for the facility are located near the driveway, northeast of the dormitory. West well has a Zone I of 165 feet and an Interim Wellhead Protection Area (IWPA) of 460 feet. East well has a Zone I of 135 feet and an IWPA of 438 feet. The two wells are within close proximity to one another, approximately 35 feet apart. The public water system for the facility also includes the Mountain Spring 1022027-03G, an emergency source that is currently disconnected from the system and not included in this report. The IWPAs provide an interim protection area for water supply wells when the actual recharge areas have not been delineated. The actual recharge areas to the wells may be significantly larger or smaller than the IWPAs.

What is a Protection Area?

A well's water supply protection area is the land around the well where protection activities should be focused. Each well has a Zone I protective radius and an Interim Wellhead Protection Area (IWPA).

- **The Zone I** is the area that should be owned or controlled by **the** water supplier and limited to water supply activities.
- **The IWPA** is the larger area that is likely to contribute water to the well.

In many instances the IWPA does not include the entire land area that could contribute water to the well. Therefore, the well may be susceptible to contamination from activities outside of the IWPA that are not identified in this report.

What is Susceptibility?

Susceptibility is a measure of a well's potential to become contaminated due to land uses and activities within the Zone I and Interim Wellhead Protection Area (IWPA).

USGS mapping shows the area as till over bedrock, with the structural geology mapped as complex folds and faults of gneissic formations. The wells are located in an aquifer with a high vulnerability to contamination due to the absence of hydrogeologic barriers that can prevent contaminant migration. Please refer to the attached map of the Zone Is and IWPAs. The well serving the facility has no treatment at this time. For current information on monitoring results and treatment, please contact the Public Water System contact person listed above in Table 1.

At the time this report was prepared, the well water for Kushi Institute does not require and does not have treatment. The DEP requires public water suppliers to monitor the quality of the water. For current monitoring results, please refer questions to the local contact identified in Table 1.

2. Discussion of Land Uses in the Protection Areas

There are a number of land uses and activities within the drinking water supply protection areas that are potential sources of contamination.

Key issues include:

1. **Nonconforming Activities in Zone Is;**
2. **Confirmed Hazardous Materials/Oil Release Sites;**
3. **Aboveground Storage Tanks (ASTs) With Heating Oil;**
4. **Floor drains in boiler rooms;**
5. **Septic system in IWPA; and**
6. **Improper storage of household hazardous materials.**

The overall ranking of susceptibility to contamination for the well is high, based on the presence of many moderate threat land uses or activities in the IWPA, as seen in Table 2.

1. Zone Is – Currently, the wells do not meet DEP's restrictions, which only allow water supply related activities in Zone Is. The West and East wells' Zone I contain a 22-room dormitory, driveways and waste transfer stations (dumpsters). Please note that systems not meeting DEP Zone I requirements must get DEP approval and address Zone I issues prior to increasing water use or modifying systems. Kushi reportedly has relocated the dumpsters further away from the wells.

Recommendations:

✓ Since Kushi Institute owns much of the land in the surrounding area. Consider installing a well in a location away from the facility.

Table 2: Table of Activities within the Water Supply Protection Areas

Potential Contaminant Sources	Zone I	IWPA	Threat	Comments
Fuel Storage - Above Ground	No	Both wells	High	Oil tanks should be at 110% containment
Waste Transfer Stations	Both wells	Both wells	Moderate	Relocate dumpsters outside of the Zone I
Confirmed hazardous materials/oil release sites (2) - (tank overfills)	No	Both wells	**	RTN 1-0012103 and 1-0012229, Tier 1B; See Appendix A
Floor Drains in boiler room	Both wells	Both wells	Moderate	Bring the floor drains into compliance with Department Regulations
Septic System	Both wells	Both wells	Moderate	See septic systems brochure in the appendix
Storage of household hazardous materials	No	Both wells	Moderate	Provide secondary containment; do not store in area of basement with dirt floor
Parking lot, driveways & private access roads	No	Both wells	Moderate	Limit road salt usage and provide drainage away from wells

*** -For more information on Contaminants of Concern associated with individual facility types and land uses please see the SWAP Draft Land Use / Associated Contaminants Matrix on DEP's website - www.state.ma.us/dep/brp/dws/. ** - See Appendix A.**

Glossary

Zone I: The area closest to a well; a 100 to 400 foot radius proportional to the well's pumping rate. To determine your Zone I radius, refer to the attached map.

IWPA: A 400-foot to ½ mile radius around a public water supply well proportional to its pumping rate; the area DEP recommends for protection in the absence of a defined Zone II. To determine IWPA radius, refer to the attached map.

Zone II: The primary recharge area defined by a hydrogeologic study.

Aquifer: An underground water-bearing layer of permeable material that will yield water in a usable quantity to a well.

Hydrogeologic Barrier: An underground layer of impermeable material that resists penetration by water.

Recharge Area: The surface area that contributes water to a well.

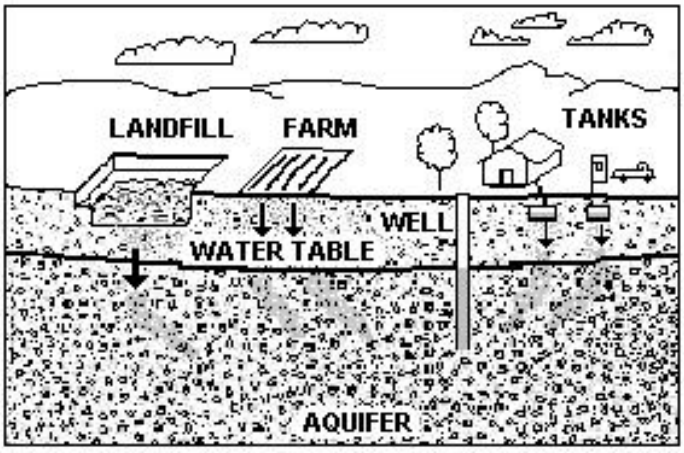

Figure 1: Example of how a well could become contaminated by different land uses and activities.

- ✓ Do not use or store pesticides, fertilizers, petroleum products (including equipment that use petroleum) or road salt within the Zone I.

2. Confirmed Oil Release Site - The IWPAs of both wells contain DEP Bureau of Waste Site Cleanup Tier 1B Classified Oil and/or Hazardous Material Release sites indicated on the map as Release Tracking Numbers 1-0012103 and 1-0012229. The releases of oil were discovered after the filling of ASTs in November 1997 and March 1998 respectively. Contaminated soil was removed from both sites. For further information on the status of both of these spills, please contact the DEP-Bureau of Waste Site Cleanup at 413-784-1100. For information regarding the location of the site refer to the attached map. Appendix A includes additional information regarding the Massachusetts Contingency Plan (MCP) and where additional information is available.

Recommendation:

- ✓ Comply with the requirements of the MCP process and continue monitoring as prescribed by DEP.

3. Aboveground Storage Tank (AST) – There are three ASTs located within the IWPAs containing heating oil. If managed improperly, Aboveground Storage Tanks can be a potential source of contamination due to leaks or spills of the chemicals they store. None of the tanks have containment.

Recommendations:

- ✓ Aboveground storage tanks in your IWPA should be located on an impermeable surface and contained in an area large enough to hold 110% of the liquid volume, should a spill occur.
- ✓ Upgrade all oil/hazardous material storage tanks to incorporate proper containment and safety practices. Any modifications to the AST must be accomplished in a manner consistent with Massachusetts's plumbing, building, and fire code requirements. Consult with the local fire department for any additional local code requirements regarding ASTs. Diligently monitor the delivery of oil.

4. Floor Drain in boiler room - Floor drains in an area that contains hazardous materials must be sealed or discharged to a tight tank or a sewer. It is not known whether the floor drain in the boiler room discharges to a dry well or the septic system. The floor drain must therefore either be sealed or connected to a tight tank since there is no sanitary sewer available.

Recommendations:

3 Bring the floor drains into compliance with Department Regulations (refer to Industrial Floor Drain Brochure attached).

  * Contact the UIC coordinator for the Western Region Office of the Department (Rick Larson 413-755-2207).
  * Interim Actions: cease using the floor drains.

- ✓ Install a containment structure around the ASTs to contain 110% of the tank volume near the boiler to protect from any potential oil leaks caused by overfill or tank failure.

5. Septic System in IWPAs – Within the IWPAs of both wells are three leach fields; two are in use and one is disconnected from the system. The most significant threats from a septic system are from lack of maintenance and improper disposal of non-sanitary waste.

Recommendations:

- ✓ Septic system components should be located, inspected, and maintained on a regular basis. Refer to the attachments for more information regarding septic systems.

For More Information:

Contact Catherine Skiba in DEP's Western Regional Office at (413) 755-2119 for more information and for assistance in improving current protection measures.

More information relating to drinking water and source protection is available on the Drinking Water Program web site at: www.state.ma.us/dep/brp/dws/

Additional Documents:

To help with source protection efforts, more information is available by request or online at www.state.ma.us/dep/brp/dws, including:

1. Water Supply Protection Guidance Materials such as model regulations, Best Management Practice information, and general water supply protection information.
2. MA DEP SWAP Strategy
3. Land Use Pollution Potential Matrix
4. Draft Land/Associated Contaminants Matrix

Copies of this assessment have been made available to the public water supplier, town boards, and the local media.

- ✓ Avoid septic tank cleaners, especially those with acids and solvents.

6. Improper storage of hazardous household materials – Paint, wood stains and varnishes, and used oil were found stored on open shelves in small basement room with a gravel and dirt floor.

Recommendations:
- ✓ Store in area with a sealed floor and within stable, enclosed cabinets.
- ✓ Provide secondary containment for storage of potentially hazardous items.

Other issues noted during the site visit were lawn maintenance equipment and gasoline being stored within the Zone I behind the dormitory. These should be contained and removed from the Zone I.

3. Protection Recommendations

Implementing protection measures and best management practices (BMPs) will reduce the wells' susceptibility to contamination. Kushi Institute should review and adopt the key recommendations above and the following:

Priority Recommendations:
- ✓ Consider well relocation if Zone I threats cannot be mitigated.
- ✓ Seal the floor drains in the boiler rooms or provide a tight tank. (See attachment)
- ✓ Provide proper storage and containment for ASTs and hazardous materials.

Zone I:
- ✓ Keep non-water supply activities out of the Zone I.
- ✓ Protect the well by using secure well caps and posting signs.
- ✓ Conduct regular inspections of the Zone I. Look for illegal dumping, evidence of vandalism; check any above ground tanks for leaks, etc.
- ✓ Redirect road and parking lot drainage in the Zone I away from well.
- ✓ Do not use or store pesticides, fertilizers or road salt within the Zone I.
- ✓ Consider upgrading to propane gas for an alternate fuel or back-up power source.

Training and Education:
- ✓ Train staff on proper hazardous material use, disposal, emergency response, and best management practices; include custodial staff, groundskeepers, certified operator, and food preparation staff. Post labels as appropriate on raw materials and hazardous waste.
- ✓ Post drinking water protection area signs at key visibility locations such as parking areas.

Facilities Management:
- ✓ Implement standard operating procedures regarding proper storage, use and disposal of hazardous materials. To learn more, refer to http://www.state.ma.us/dep/bwp/dhm/files/sqgsum.pdf.
- ✓ Eliminate non-sanitary wastewater discharges to on-site septic systems. Instead, in areas using hazardous materials, discharge drains to a tight tank or seal floor drains.
- ✓ Remove hazardous materials from rooms or store them in a contained area.
- ✓ Upgrade all oil/hazardous material storage tanks to incorporate proper containment and safety practices.
- ✓ Septic system components should be located, inspected, and maintained on a regular basis.
- ✓ Concrete or earthen collars around wellheads should slope away from well and the well casing should extend above ground.

Planning:
- ✓ Work with local officials in Becket to include the IWPAs of Kushi Institute in Aquifer Protection District Bylaws.
- ✓ Have a plan to address short-term water shortages and long-term water demands. Keep the phone number of a bottled water company readily available.

- ✓ Supplement the SWAP assessment with additional local information and incorporate it into water supply educational efforts. Use a land use inventory to assist in setting priorities, focusing inspections, and creating educational activities.

These recommendations are only part of your ongoing local drinking water source protection. Citizens and community officials should use this SWAP report to spur discussion of local drinking water protection measures.

4. Attachments

- Map of the Public Water Supply (PWS) Protection Area.
- Recommended Source Protection Measures Factsheet
- Your Septic System Brochure
- Pesticide Use Factsheet
- Source Protection Sign Order Form

5. Appendix

- Table of DEP Regulated Chapter 21E Hazardous Materials Release Sites

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