

Where is it Coming From?

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Over the years I have seen many systems lose wells to contamination, and the first question the water operator and system owners usually ask is “Where did it come from?”. This is not always an easy question to answer, and the answer almost always depends on what the contaminant is. For some contaminants the answer is that it has always been there. Usually if this is the case, the loss of the well can often be attributed to the fact that the water quality standards have changed regarding that particular contaminant. This has been the case for many systems finding themselves out of compliance for arsenic and radioactivity. The elements have been there since the well was drilled, but recent changes in the Maximum Contaminant Levels (MCLs) for these contaminants have resulted in many wells now being categorized as out of compliance.

For many other contaminants, however, this is not the case. Sometimes a well that has been providing good quality water for many years will suddenly have a “detect” for a contaminant that has never showed up in the past. Another concern for many systems is a rising nitrate concentration in the well water. Generally speaking, when new contaminants are detected in a water supply or the concentration of the chemical starts to increase, it is most likely that the contaminant is not naturally occurring, but is being introduced into the water supply by man or some other occurrence. Over fertilization can result in increasing nitrate levels, but incorrect land management can have the same result. Construction or excavation practices can also open a direct path to the groundwater. For instance, a gravel quarry or mine that is not protected from runoff can result in fertilizer or animal wastes being admitted into the groundwater where the nitrates can then start migrating toward nearby wells. Leaking fuel storage tanks, pesticide and herbicide storage tanks, or improper disposal of outdated or damaged chemicals can also encroach on the aquifer and result in impaired water quality.

Knowing ahead of time that these possibilities exist, it is a good idea for water systems to be proactive in determining what, if any, contaminants are threatening the system’s drinking water supply. The best way to do this is to complete a contaminant source inventory for the system to determine what possible contaminants are within the “sphere of influence” for the water supply. For practical purposes, the “sphere of influence” should be considered to be that area that is contained within the well’s wellhead protection area. All public water supply systems within the state have had a source water assessment completed for the wells that were in existence prior to 2002. This assessment included a map of the wellhead protection area for each system well, which includes the area around the well where the water pumped for the next twenty (20) years will come from. This map is a good place to start gathering information regarding the possible sources of contamination that may threaten the quality of the water coming from your system well. New wells need to have maps drawn of their wellhead protection area. These maps are currently being drawn by the Nebraska Department of Environmental Quality (NDEQ), and are based on the size of the well, the formation of the aquifer and the amount of water the well is expected to produce.

Once the maps for all of the system’s wells have been gathered, the contaminant source inventory (CSI) can begin. This process consists of carefully examining the area within the wellhead protection boundaries to determine what, if any, possible sources of contamination

might exist in the area. Surveyors should be looking for fuel storage tanks, fertilizer and pesticide storage tanks, abandoned wells, septic systems, grain storage, feedlots, businesses that traditionally use hazardous chemicals, etc. A complete list of things to look for, as well as a sample CSI input form can be obtained from our office. It is often helpful to have local groups, such as Future Farmers of America (FFA) chapters; high school earth science classes or other civic groups assist in completing the contaminant source inventory. I would suggest that you call the survey a Source Water Protection Area survey or a Groundwater Protection area survey rather than a contaminant source inventory, as they sound less threatening. NeRWA has GPS units that can be utilized during this process, and when the CSI is completed, the information can be used to produce a map of the Groundwater Protection area with the possible contaminant sources marked on it.

Completing the CSI and having a map of the possible contaminant sources can help in answering the question “Where did it come from?” in the future. It can also assist the system in completing a contingency plan to identify possible courses of action that they might need to pursue in the case that the current sources of drinking water become contaminated in the future. It is always much easier to make these plans and consider the options before the problem requires immediate action.