Water Reuse in Idaho

Summer 2015

This is the third edition of the Idaho Department of Environmental Quality (DEQ) Water Reuse newsletter. We hope you will find it useful, and we welcome your input and comments for future editions. Contact your regional office if you have any questions.

Electronic versions of all reuse newsletters are available under "DEQ Resources" at *deq.idaho.gov/permitting/water-quality-permitting/wastewater-reuse.aspx*. The e-version provides access to the hot links included in the newsletter.

Water Reuse News

2015 Idaho Reuse Conference!

The 11th annual Water Reuse Conference was held May 27–28, 2015, at the Riverside Hotel in Boise. Approximately 400 water and wastewater operators, engineers, public works directors, elected officials, consultants, developers, attorneys, environmental advocates, and other professionals attended the conference.

Once again, the conference provided a great opportunity for the reuse community to continue their education, network, and discuss key issues related to water reuse in Idaho and the West.

The agenda included the growing scarcity of water, the state of the science for constituents of emerging concern, direct potable reuse, and several water reuse case studies…even the possibility of brewing beer with recycled water!

The conference included an optional tour of the Simplot Company's water reuse facility in Caldwell. Started up in 2014, this reuse facility treats potato processing wastewater to a level where a portion of the water can be returned to the processing facility and reused in the production process. The remainder is used to irrigate over 2,000 acres of reuse fields. Thanks to Simplot for providing this opportunity.

Water Rights

Several presentations at the conference expanded on the issue of water rights related to water reuse. Water reuse is affected differently in various states due to differing water rights. For instance, Mark Holmes, Water Resources Manager for the city of Goodyear, discussed water rights in Arizona and how recycled water has become a vital resource for the state. He described the city's indirect potable reuse system, which uses recycled water for aquifer recharge and underground storage. He also touched on the potential cost savings from using an aquifer as a conduit instead of building purple pipe.

Andy Waldera, Sawtooth Law Offices, discussed the legal considerations for water reuse in Idaho. He provided an overview of where Idaho water rights laws intersect with water reuse. Concurrently, the Idaho Statesman contained an article stating "All of Idaho is now in a drought or heading into a drought, scientists say."

We learned many unknowns still exist regarding water reuse and water rights, and in Idaho, we are entering into new territory on this important topic.

Water Conservation

Potential irrigation water shortages throughout the United States are impacting growers and their cropping plans. With input from Howard Niebling, an irrigation specialist with the University of Idaho Extension, the following article offers ideas to conserve and reduce irrigation water volume:

http://www.capitalpress.com/Idaho/20150515/expert-offers-idaho-well-irrigators-tips-to-meet-water-cut

Most reuse permits have an irrigation efficiency that is used for calculating irrigation water requirements. If you install more efficient irrigation equipment, contact your regional office to inform them of the changes as it affects the amount of water (recycled and supplemental irrigation water) necessary for the crops you are growing.

At the 2015 reuse conference, Idaho Power presented their program promoting energy efficiency for irrigation systems. The program provides ***cash*** incentives for upgrading or installing efficient equipment. Other power utilities provide similar programs, and DEQ encourages water reuse facilities to take advantage of these programs.

Direct Potable Reuse

Drought conditions in some parts of Texas provided the impetus for two direct potable reuse (DPR) projects. The following article discusses these two projects:

http://www.wateronline.com/doc/texas-leads-the-way-with-first-direct-potable-reuse-facilities-in-u-s-0001

Posted: 3:02 AM, Jul 23, 2014, Updated: 7:35 AM, Jul 23, 2014
Daniel Nix, utilities operations manager, drinks a glass of water at the Cypress Water Treatment plant Monday afternoon. Wichita Falls activated its Direct Potable Reuse program last week after

final approval from the Texas Commission on Environmental Quality. Adding the treated effluent water to the water system means the city will use about 5 million gallons less from our reservoirs each day.

The following video describes the Wichita Falls DPR project in more detail:

https://www.youtube.com/watch?v=0JWTVpVN3p0&feature=player_embedded

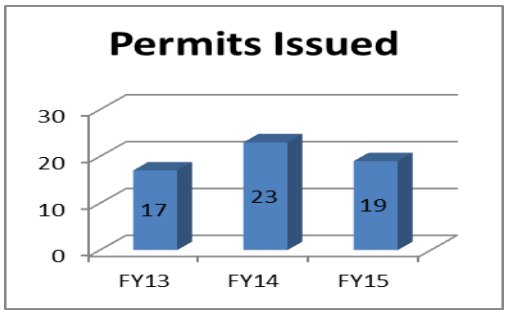
As drought conditions affect more areas in the United States, more projects of this nature will be proposed. In Idaho, the "Recycled Water Rules" have provisions for recharging ground water with municipal Class A recycled water.

What's New at DEQ

- DEQ director, Curt Fransen, retired in May. The new director is John Tippets. Welcome aboard.
- John Tindall, engineering manager at the Coeur d'Alene regional office retired in May (congratulations!). Matt Plaisted is the new manager.
- Aaron Scheff was appointed the Boise Regional Office administrator in May. Aaron has extensive experience within DEQ as the Boise Regional Office Ground Water and Remediation program manager and previously as the Brownfields program manager in the State Office.

Idaho Reuse Highlights

- Reuse permits issued from fiscal year 2013 to 2015:



A Little History Lesson

- Over the years, the terminology used in our program has evolved.
  - The original program was the "Wastewater Land Application Program."
  - The original rules, issued in 1988, were the "Wastewater-Land Application Permit Rules"
  - To reflect the treatment of wastewater before land application/reuse, the titles of the rules have changed:
    - "Rules for the Reclamation and Reuse of Municipal and Industrial Wastewater" (2006)
    - "Recycled Water Rules" (2011)

  Certain DEQ program documents still refer to old terminology, and the Idaho Bureau of Licensing (IBOL) rules for wastewater and reuse operators (not under DEQ authorities) still use the old terminology.

  Therefore, in the IBOL rules, operator certification documents, and reuse operator training manuals, you will still see reference to the old terminology such as "wastewater land application permits" and "wastewater land application operators."

  In addition, the DEQ reuse guidance, *Guidance for Reclamation and Reuse of Municipal and Industrial Wastewater* (2007), still uses old terminology in certain areas. Over time, we will update the terminology to match the current DEQ rules.

Soil Salinity and Reuse Permits

Read about reuse permits and soil salinity in the attached fact sheet.

Regional Office Reuse Permit Coordinators

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Water Reuse Permits in Idaho

Permit search tool:
deq.idaho.gov/permitting/issued-permits.aspx?records=10&type=Wastewater+Reuse&sort=effectiveDescending

Information on municipal wastewater collection and treatment system classification can be found at *deq.idaho.gov/water-quality/wastewater/pwws-classification-licensure/system-classifications.aspx*

Reuse Permits: Soil Salinity

Soil Salinity

Soil salinity problems are caused from the accumulation of soluble salts, such as chlorides, sulfates, carbonates, and sometimes nitrates of calcium, magnesium, sodium, and potassium in the root zone. The excess salts can reduce plant growth and vigor by reducing a plant's ability take up water and causing ion-specific toxicities or imbalances.

The following fact sheet provides information for managing saline soils: *http://www.ext.colostate.edu/pubs/crops/00503.html*. Saline soils cannot be reclaimed by chemical amendments, conditioners, or fertilizers. Saline soils are often reclaimed by leaching salts past the root zone by applying irrigation water volumes above a crop's agronomic requirements.

Soil salinity is often measured by passing an electrical current through a solution extracted from a soil sample. The ability of the solution to carry a current is called electrical conductivity (EC)—the higher the EC, the higher the soil salinity.

Crop Tolerance to Soil Salinity

Excessive soil salinity reduces the yield of certain crops. This ranges from a slight crop loss to complete crop failure, depending on the type of crop and the severity of the salinity problem. Yields of most crops are not significantly affected where soil EC is 0 to 2 millimhos per centimeter (mmhos/cm). Generally, a level of 2 to 4 mmhos/cm affects some crops. Levels of 4 to 5 mmhos/cm affects many crops and above 8 mmhos/cm affects all but the very salt tolerant crops such as barley and some forage grasses.

For example, alfalfa yield is reduced ~10% at a salinity of 3.4 mmhos/cm and reduced ~25% at 5.4 mmhos/cm.

Conventional Agriculture—Leaching Requirement to Reduce Soil Salinity

For *conventional* agriculture, most surface irrigation systems (furrow and flood), irrigation inefficiency is generally adequate to satisfy the leaching requirement. However, poor irrigation uniformity can result in salt accumulation in parts of a field, and additional irrigation water may be necessary to "flush" excess salts through the soil profile. However, adding more water to satisfy a leaching requirement further reduces irrigation efficiency and *may result in the loss of nutrients or pesticides* from the soil profile. For high efficiency irrigation systems such as low pressure center pivots, salts may accumulate as little to no irrigation water may pass through the root zone to remove excess salts.

Leaching can be accomplished on a limited basis at key times during the growing season, particularly when a grower may have high quality water available. Surface water in most areas of the state tends to have low salinity. Ground water, in some areas, may also have a lower salinity than either shallow ground water or surface water. In situations where a grower has multiple water sources of varying quality, consider planned leaching events with high quality water (low salt) at low stress periods for a given crop.

Most crops are sensitive to salinity stress in the germination and seedling stages. Once the crop grows past these stages, it can often tolerate and grow well in higher salinity conditions. Planned leaching events should only occur once fertilizers, pesticides, and herbicides levels in the soil are reduced. Soil testing for these materials is appropriate to reduce the risk of contaminating ground water. Leaching might include post-harvest irrigation to push salts below the root zone to prepare the soil for the following spring. Fall is the best time for a planned leaching event because soil nutrient levels have generally been drawn down.

Leaching Requirement at Reuse Sites

For *reuse* sites, leaching requirements are not generally recommended because of the potential to degrade ground water quality. The "Ground Water Quality Rule" (IDAPA 58.01.11.400), Ground Water Contamination, allows DEQ to approve a leaching requirement event on a case-by-case basis taking the following into account:

- Existing soil salinity and impacts to growing a viable crop to treat the recycled water
- Soil nutrient levels
- Quality of water to be used for the leaching event
- Downgradient ground water users
- Beneficial uses of ground water

Operators at reuse sites should monitor the soil EC. If salinity becomes a crop health issue, the facility should contact DEQ and discuss possible options.

If a leaching requirement is approved by DEQ, the leaching fraction (or percent of additional water needed above crop requirements) can be calculated using various equations. These are presented in the *Guidance for Reclamation and Reuse of Municipal and Industrial Wastewater*, section 4.4.7.

Avoid the Need for a Leaching Requirement

Design your reuse system to prevent or manage salt buildup in the soil:

- Remove/reduce major salt contributors to the recycled water stream.
- Select crops that remove higher levels of salt. For example, alfalfa and silage corn remove more salt than grain crops such as wheat and barley.
- Select crops that are more tolerant of soil salinity (see reuse guidance Table 4-10 and the Colorado State University fact sheet).
- Manage recycled water application based on soil salinity (reduce volume on fields where soil salinity is building up to levels that impact crop production).
- For fields with problem soil salinity levels, increase the ratio of supplemental irrigation water to recycled water to meet the crop irrigation water requirement. Generally, surface water has low total dissolved solids (salinity) values.
- Have spare reuse area capacity for reducing the overall salt loading rates.