Water Re-Use in Alberta

Potential Public Health Regulatory and Policy Implications

Cross-Ministry Water Re-Use Committee

- AHW is a partner in development of provincial policy for water re-use
- Ultimate goal of ‘the policy’ is protection of public health
- As with many other health issues, other agencies have an important role in health protection ie Municipal Affairs and the ABC
- Updates to Alberta Health Services through DC9

- Include AHS on consultation on policies and proposed regulation/standards
- Water conservation entails a range of options ie water metering, efficient appliances, water re-use
- Is it worth the risk? How can that risk be managed and who will manage the risk?
- Flushing with re-use water saves approx. 126m^3 per year in a household – saving about $200

Water Re-Use Policy

- Potentially, the provincial policy will outline:
  - Where water re-use may occur ie households vs subdivision developments
  - What water standards must be met
  - What management systems must be in place
  - What legislation/regulations will be amended

Water Re-Use Scenarios

- Centralized systems – well designed; well funded; well operated and maintained; large population at risk
- Clusters or smaller communities – vary in design and operation; mid-size population at risk
- Onsite/individual: unapproved technologies, owner operated/maintained; small population at risk; owner changes

Alberta

- Interest from private homeowners and small businesses to introduce in house systems “BRAC” filtration and disinfection
- Developers in southern AB who are sharing water licenses and stretching their water allocation
  - Irrigation of landscaping/golf courses
  - Fire suppression
  - Roughed in purple pipe
- Large municipalities:
  - Treatment of wastewater for industry
  - Conservation campaign
  - Rainwater harvesting

Health Risk Assessment

- Early in 2003, Health Canada began work on the national “ Canadian Guidelines for Household Reclaimed Water for Use in Toilet and Urinal Flushing”
- Dr. Karina Thomas from AHW was on that working committee.
- Their work addressed the health risks associated with use of reclaimed water for toilet and urinal flushing.

- Potential risks range from pathogens, heavy metals, organic chemicals such as endocrine disrupters, pharmaceuticals
- Microbiological hazards have been indentified as the greatest source of risk to human health from the use of reclaimed water so much more research has been done in this area.

Microbial Risk Assessment

What to Consider

- What are the microbiological contaminants in the untreated wastewater – bacteria, viruses, protozoa
  - Eg using greywater vs black water for flushing toilets
- Difficult to predict the microbial loading in greywater and black water.
- For example: the fecal loading varies with the number of bowel movements, size of the stools, gastrointestinal illness
- Treatment system needs to be able to deal with the increased pathogen loading

Indicator Bacteria in Untreated Wastewater

(taken from draft Canadian Guidelines for Domestic Reclaimed Water May 2008)

Source of Greywater	Total Coliforms (CFU/100ml)	E. coli	Entero Viruses
Hand Basins	$2.4x10^2$ to 10^6	0 – 2.4×10^6	
Bath/shower	$2.5x10^2$ to $1.8 x10^8$	10 – 10^8	
Laundry, kitchen sink	$7x10^5$	n/a	
Feces (per grams)	10^7 – 10^8		10^3 - 10^7
Raw Sewage (per litre)		10^5 – 10^{10}	10^2 - 10^6

Routes of Exposure

- Inhalation and ingestion of aerosols from water used in the home for showering or flushing
- Ingestion through hand to mouth from droplets on surfaces
- Accidental ingestion should cross-connection occur
- Ingestion from plants irrigated with reclaimed water

Populations at Risk

- Housing for the general public
  - Age ranging from 0 to 100 years
  - Varying health status: good health to immuno-compromised
  - Changing vulnerability in the household

Other Provinces

- Held a teleconference with Sask/BC/Man/ in June 2009
  - Saskatchewan:
    - Ministry of Health responsible for private sewage, plumbing; public health
    - Proposed regulation to allow water re-use for flushing toilets in owner-occupied buildings and other buildings (ie university) No care facilities.
    - No verification standard yet for the technology so require a consulting engineer to conduct an evaluation
    - For in-home re-use, require a plumbing permit to “establish, construct, extend, renovate, alter or repair a plumbing system” and an initial inspection; conform to B128 plumbing standards

- British Columbia
  - Living Water Smart strategy that mandates purple pipe by 2010 for new construction.
  - Consultation on 3 options:
    1. mandating use of greywater or rainwater for toilet and urinal flushing in new construction. feedback – not best option at this point.
    2. mandating use of rainwater for toilet & urinal flushing, cold water laundry, irrigation. For areas where there is sufficient rainfall.
    3. mandate purple pipes for centralized reclaimed water systems.
  - All options code based

- Manitoba
  - reclaimed water not allowed except on a case by case situation through the office of the Fire Commissioner or City of Winnipeg.

  Common Issues:
  - Definition of greywater, wastewater, rainwater, stormwater
  - Lack of technology verification standard for greywater and rainwater for certain uses.
  - training, cost-benefit, inspection, water pricing.
  - Homeowner maintenance – problematic
  - Cross connection issues
  - Emergency, surplus, alternate disposal, alternate treatment trains
  - Various government agencies

Speculation: How will it work in Alberta?

- Policies will be developed and adopted in phases:

Centralized systems

- Most likely to begin with small centralized developments which will have good technical design and oversight
- Alberta Environment already has standards for use of wastewater and so it could fit there
  - Landscape irrigation
  - Fire suppression
  - Cooling water ??
- AHW/AHS to provide advice on health risks in developing the policy
- AHS would review subdivision applications and consider the overall site specific health risks

On-site

- Adopt the national guidelines for toilet and urinal flushing
- Reference the new CSA technology standards
- As with private sewage and plumbing, falls under Municipal Affairs – Plumbing Code?
- AHW/ AHS would be involved in providing expertise on health risks,
- AHS would provide response to complaints and nuisance abatement, support public education?