AIRAH/NSW Lecture-17 Feb 2009

REUSE OF WASTE WATER FOR HVAC&R APPLICATIONS

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(1) MAIN OBJECTIVE :

For sustainability reasons, to help conserve the town or drinking quality water that is normally used in HVAC&R systems, by reusing, where considered to be feasible and economical in all respects, the waste water obtained from the associated or other systems and processed where necessary, to ensure it is continuously fit for the proposed purpose.
Town water can also be conserved by ensuring that all existing water usage systems at the site are water efficient.

(2) APPLICATION :

It is important that the relevant work of water conservation be carried out by those who are competent and experienced in the respective activity. The organization undertaking the work needs to have extensive field experience and have adequate research, scientific and technical services available as back-up support to the work carried out in the field.
The following applications subject to compliance with the requirements/recommendations of the relevant authorities (see separate document) , could be considered subject to economic viability, practical feasibility and suitability, as being fit for the intended purpose:-

(A) Make-up Water, etc. for Cooling Tower Water Systems

(1) Waste Water to be Reused as Make-up Water, etc. for Cooling Tower Water Systems
(Possibly not needing water treatment. Some of these waters may be stored in a common tank)

- Condensate from chilled water or refrigerated, air-cooling coils in an air-conditioning or refrigeration plant, then collected and stored onsite. The water to be collected prior to any chemical cleaning of the coils.
- Condensate from a humidification system in an air-conditioning plant. then collected and stored on site.
- Bleed-off or blow-down water and any overflow water collected from cooling towers and then stored on site.
- Water drained from a cooling tower water system prior to routine physical cleaning of the tower, then collected and stored on site
- Condensate from air-to-air heat exchangers and also from dehumidifiers or intercoolers for compressed air systems.
- Rainwater (roofwater), collected and stored on site.
- Stormwater (rainwater),eg. stormwater harvesting, collected or retained at ground level and stored on site.
- Water used during fire system testing, then collected and stored on site.
  (Ref. SAA HB 233)

- Other similar recycled waste water systems, then collected and stored on site

(2) Equipment Drain Water to be Reused as Make-up Water, etc. for Cooling Tower Water Systems

(Possibly needing treatment Some of these waters may be stored in a common tank)

- Water drained from a cooling tower during a routine cleaning procedure, then collected and stored on site
- Backwash water discharged from a side-stream or a by-pass style, particulate arrestance type water filter unit serving a cooling water system, then collected and stored on site
- Waste water discharged from an in-line (mainstream or full flow) type, centrifugal style, water filtrate (seperator) unit, serving a cooling water system, then collected and stored on site
- Waste water ultimately discharged from a washer extractor or a continuous type or batch style clothes washing machine in a commercial type laundry, then collected and stored on site. The waste water may have been already recycled or reused several times.
- Other similar recycled waste water system, then collected and stored on site.

(3) Alternative Supply of Water to be Used as Make-up Water, etc. for a Cooling Tower Water System

(Possibly needing treatment. Some of these waters may be stored in a common tank)

- Reclaimed water supplied from any off-site, municipal type, waste-water treatment plant. fed from either industrial; commercial and/or domestic sources, then collected and stored on site The effluent may have been already subject to primary, secondary or tertiary treatment. Examples of such supply being sewer mining and dual water systems.
- Reclaimed water supplied from any on-site, sewerage treatment plant, then collected and stored on site. The effluent may have been already subject to primary, secondary or tertiary treatment Examples of such supply being sewer mining and dual water systems.
- Recycled water supplied from a personal ablution facility on a commercial or industrial complex. then collected and stored on site. An example being greywater harvesting.
- Bore water collected and stored on site.
- Water from an inland lake or a river.
- Water from an ocean fed harbour, eg. via a desalination process..
- Selected process cooling water, collected and stored on site.
- Other alternative water supply systems. then collected and stored on site.

(B) Make-up Water, etc. for Evaporative Air-cooling Systems

(1) Water to be Reused as Make-up Water, etc. for Direct Type, Evaporative Air-cooling Systems
(Possibly not needing water treatment. Some of these waters may be stored in a common tank)

- Bleed-off water and any overflow water collected from a direct type, evaporative air-cooler and stored on site.
- Water drained from a direct type, evaporative air-cooler prior to routine cleaning of air-cooler, then collected and stored on site
- Rainwater (roofwater) collected and stored on site.
- Stormwater (rainwater) collected or retained at ground level and stored on site.An example being stormwater harvesting.
- Water used during fire system testing, then collected and stored on site.(Ref. SAA HB 233)
- Other similar recycled waste water system

(2) Alternative Supply of Water to be Used as Make-up Water, etc. for Direct Type, Evaporative Air-cooling Systems
(Possibly needing treatment. Some of these waters may be stored in a common tank)

- Water drained from direct type, evaporative air-coolers during routine cleaning of air-cooler, then collected and stored on site
- Bore water collected and stored on site.
- Water from an inland lake.
- Selected process cooling water, collected and stored on site.
- Other alternative water supply system then collected and stored on site.

(C) Some Other Applications

Some other applications for possible reuse of waste water for HVAC&R systems, include feedwater for steam; heating and hot water boilers, steam generators, humidifier systems, sprayed coil type, cooling water systems, indirect evaporative air coolers, backflushing or backwashing of by-pass type water filters, fire protection systems, etc.

It is proposed to have the above information submitted for incorporation in a future revision of the AIRAH Technical Handbook.

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