PLANT HEALTH AND PROTECTION
WEEDS RESEARCH DIVISION
ROODEPLAAT

RE-COMMISSIONING OF THE WASTEWATER STERILISER/BOILER IN THE WEEDS QUARANTINE FACILITY

BACKGROUND:

The weeds research quarantine facility at ARC-PHP Roodeplaat is a fully operational post-entry arthropod containment facility. Wastewater generated in the high-level containment section needs to be heat sterilised before being discharged to ensure that no living biological material leaves the facility. A freestanding purpose built 18Kw wastewater sterilizer/boiler is presently installed in the facility but has proven problematic and unreliable (Fig. 1).

Fig 1. Freestanding 18KW wastewater steriliser.

WASTEWATER TREATMENT SYSTEM:

The high-level containment wastewater reticulation system incorporates a subterranean holding tank, centrifugal pump and 18Kw steriliser unit (Fig. 2). Wastewater from two laboratory basins, and from floor drains in the glasshouse, is gravity fed to a holding tank (~260 litres) located outside the facility. Water in the holding tank is maintained at a constant level by an automated float switch, which initiates excess water to be pumped back to the steriliser unit where it is heat treated/ decontaminated, allowed to cool, and then discharged into the facilities primary wastewater system.

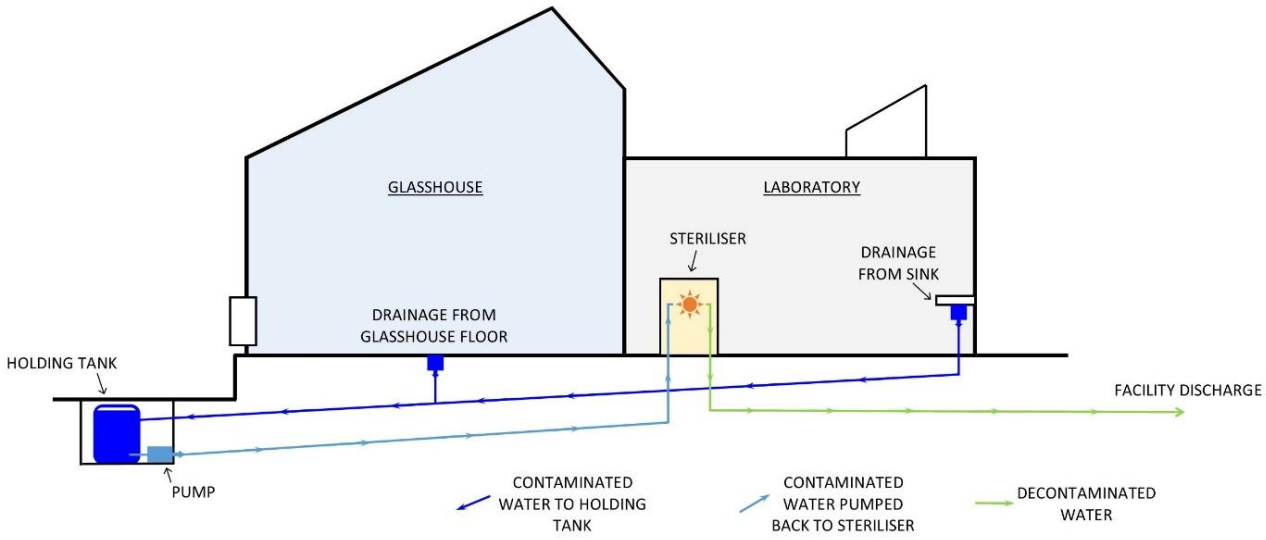

Fig 2. Wastewater reticulation system at present.

WORK REQUIRED:

1. **Holding tank, float switch and centrifugal pump:**
   - Verify proper functioning and appropriate capacity of the centrifugal pump, as well as continuity with the control system on the steriliser unit. Install new pump if necessary.
   - Construction of a proper floor and raised plinth within the holding tank well on which the centrifugal pump can be affixed and raised above any accumulating ground water.
   - Verify proper functioning of the float switch and continuity with control system on the steriliser unit. Install new switch if necessary.
   - Verify the integrity/suitability of the currently installed holding tank. Install and plumb new tank if necessary.
   - Hermetically seal the holding tank. To maintain equilibrium pressure in the holding tank when filling, or when water is pumped out, an appropriately sized airflow valve/vent needs to be installed. This valve/vent should incorporate filtration using a hydrophobic cartridge filter to prevent the escape of microorganisms (HEPA filtration).
   - Verify air/water tightness of all fixtures, junctions and piping within the holding tank well.

2. **18Kw wastewater steriliser:**
   - Verify proper functioning of the wastewater steriliser - boiler, electronics and control system. Repairs/modifications as necessary.
   - Verify wastewater sterilisation temperature and holding times (water to be heated to 121°C with a retention time of ≥ 20 minutes; or at 134°C with a retention time of ≥ 3 minutes.
   - Installation of a secondary holding tank and pre-filters to remove larger particles prior to water entering the steriliser (if necessary). These should be placed in the laboratory adjacent to the steriliser to enable filters to be changed and sterilised within the bounds of the quarantine facility.
   - Installation of a sensor to validate the desired temperature is reached and thus treatment efficacy.
   - Cooling of decontaminated water down to 40°C prior to discharge.

3. **Re-commission the system:**
   - Demonstrate/certify the entire reticulation system is operating as specified.
   - Daily decontamination capacity of system: approximately 40 litres per day.
   - Automated operation preferable but a manual system would still be acceptable.
   - Option to run system without heat treatment.

4. ***PLEASE PROVIDE A DETAILED QUOTE* - Quotes should contain a description of the work to be conducted as well as an itemised breakdown of all components so far as is possible. This should include new equipment to be purchased, major consumables, labour and full costing to allow fair and accurate comparison between service providers.**

5. **Improvements to the proposed design elements and equipment constituting the reticulation system are welcomed where those changes will increase durability, overall efficiency and/or reflect a cost saving. Please clearly indicate any changes and provide a brief description and motivation in your quote.**

6. **All work will be carried out within a fully operational quarantine facility and as such all standard operating procedures must be adhered to at all times - these will be communicated prior to the commencement of work. All penetrations, for example through walls, are to be sealed airtight where possible with an appropriate and permanent sealant.**

7. **12-month guarantee on all work done is desired.**

8. **Appropriate SANS 347 accreditation required.**

9. **Any alterations to walls or other surfaces necessitated by refitting pipes or attaching brackets shall be 'made good' upon completion of the project. This shall include the repair of any damage and repainting if necessary.**

10. The specifications listed above may contain errors or omissions. Potential service providers should arrange for a site visit to familiarize themselves with the scope of work required prior to quoting. Visits can be arranged with:

Anthony King
ARC-Plant Health and Protection
Office: 012 808 8213
Mobile: 082 480 5016
E-mail: KingA@arc.agric.za

LOCATION: Agricultural Research Council – Plant Health and Protection
KwaMhlanga/Moloto Road (R573)
Roodeplaat East
Pretoria, 0039
25°36’55.4”S 28°21’51.9”E