1.1 GENERAL

1.2 Coordination Requirements

.1 Coordinate with SFU Facilities.
.2 Coordinate with other design disciplines.

1.3 Description

.1 HVAC water treatment system procedures and design requirements.

2.1 MATERIALS AND DESIGN REQUIREMENTS

2.2 General Requirements

.1 The specification shall clearly state which systems are to be cleaned and subsequently treated with control agents.

.2 Requirements

.1 In new buildings the scope of work will cover all new systems.
.2 Heating, cooling and condenser water systems shall be chemically cleaned and treated as appropriate.
.3 In existing buildings where existing systems are to be modified or extended the mechanical consultant shall contact SFU Facilities to determine what sections should be cleaned and treated.
.4 In renovation projects, where existing systems are extended or modified, the Consultant shall review his original analysis of the pertinent water systems with the SFU Facilities for a decision on the extent of the cleaning and whether or not it should be carried out by the contractor.
.5 In energy conservation retrofit projects, the consultant shall review his original analysis of all the water systems with SFU Facilities for agreement on cleaning the systems.

.3 Technical Support

.1 The mechanical sub-contractor or, in the case of energy conservation retrofit projects, the controls-contractor, shall work with SFU Facilities to and supervise the sub-contractor/contractor in the cleaning and treatment of the listed. The company shall employ technicians fully trained in the cleaning and treatment of building piping systems.

.4 Characteristics of Control Chemicals

.1 Chemicals must be non-toxic when released to atmosphere, noncorrosive and non-staining if a leak occurs. Chemicals shall be compatible with all system components so that operation or life expectancy of the components is not affected by the application of the chemical treatment.

.5 Existing Metering Pumps and Pot Feeders

.1 The consultant shall ensure that existing metering pumps and pot feeders are in good operative condition or shall install new devices where none exist. Refer to this Guideline.
.2 All water treatment heating and cooling shall have chemical pot feeders, flow indicators, bypass filters and water meters.

.6 Cross Connection Control

.1 The consultant shall ensure that backflow prevention devices are incorporated to prevent control chemicals from migrating to potable water systems within the building or to the Campus Water Distribution System. Refer to Guideline Section 22 11 18 Backflow/Cross Connection Control for control devices and to AWWA requirements.

2.3 Pipe Cleaning Chemicals

.1 Dispersant/Purging compound as recommended by the Chemical Water Treatment Company. Compounds shall not cause odors.

.2 Corrosion Inhibitors

.1 For closed heating and cooling water systems use Calgon MCS PLUS or similar product manufactured by IPAC.

.2 For open condenser water systems use Calgon Phree Guard 2350 or similar product manufactured by IPAC.

.3 Control Agent for Algae, Bacteria and Fungi (Biocide) for cooling tower water use Sodium Hypochlorite.

.4 Acceptable Chemical Water Treatment Companies shall be IPAC.

2.4 Cleaning

.1 Under the supervision of SFU Facilities Representative, the Mechanical Sub-Contractor/Controls Contractor shall:

.1 Position all control valves and other in-line devices and remove all strainer gaskets so that all system components can be flushed.

.2 Drain system at all low points and flush with clean water to remove loose and suspended matter. Maintain flushing pressure and system venting to ensure that all circuits are flushed. System shall be drained and flushed a minimum of two times; continue until flushed water appears clean. Clean and replace baskets when flush complete.

.3 Supply and add a cleaning dispersant/purging compound to the system as recommended by the Chemical Water Treatment Company and circulate for 24 hours at the recommended temperature.

.4 Drain, flush, refill and repeat until water quality meets the acceptable level of 0.5 mm of suspended solids, including magnetite, as determined by the Chemical Water Treatment Company.

.5 Ensure that the system is filled and that all operational components are returned to their proper operational settings.

.6 Ensure that the system is tight. Correct any leakage in piping installed under this contract. If leakage occurs in an existing system, report to SFU Facilities.
### 2.5 Water Treatment

.1 Supply and add the chemical scale and corrosion inhibitor to the closed circuit heating or chilled water piping system under the direction of, and according to, the concentration recommended by the chemical water treatment company.

.2 Supply and add the chemical scale and corrosion inhibitor to the open circuit condenser water system under the direction of, and according to, the concentration recommended by the chemical water treatment company.

.3 Supply and add the algae, bacteria and fungi control agent to the cooling tower water under the direction of, and according to, the concentration recommended by the chemical water treatment company.

.4 Provide 50% additional quantity of each chemical for the owner.

.5 Obtain a receipt from the owner and give one copy to the consultant shall be sent to:

   Facilities Services Department  
   Simon Fraser University  
   8888 University Drive  
   Burnaby, BC  
   V5A 1S6  
   Attention: Project Representative

### 2.6 Testing

.1 Chemical water treatment company shall provide a laboratory test report as required.

   .1 Provide laboratory test reports confirming the correct chemical concentrations have been achieved.

### 2.7 Monitoring

.1 Provide laboratory test reports and treatment recommendations for treated water samples taken by the owner’s operating personnel.

.2 They will be sent to the chemical water treatment company monthly for the first three months, and once every three months thereafter for one year following the initial test.

.3 Each analysis shall provide concentrations of significant components of each water sample. At minimum, these shall be:

<table>
<thead>
<tr>
<th>Item</th>
<th>Reporting Units (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>total Suspended Solids</td>
<td>p.p.m.</td>
</tr>
<tr>
<td>Total Hardness</td>
<td>p.p.m.</td>
</tr>
<tr>
<td>Total Dissolved Solids</td>
<td>p.p.m. as calcium carbonate.</td>
</tr>
<tr>
<td>pH</td>
<td></td>
</tr>
<tr>
<td>Magnetite</td>
<td>p.p.m.</td>
</tr>
</tbody>
</table>

.4 The cost of the testing is to be borne by the Contractor.

.5 The Chemical Water Treatment Company shall send to the Owner on a scheduled basis, properly identified sample bottles for each of the systems to be tested as required.
.6 Test reports shall be sent as they occur to:

Facilities Services Department
Simon Fraser University
8888 University Drive
Burnaby, BC
V5A 1S6
Attention: Project Representative

2.8 Reports

.1 Test reports shall be sent as they occur shall be sent to:

Facilities Services Department
Simon Fraser University
8888 University Drive
Burnaby, BC
V5A 1S6
Attention: Project Representative

.2 A copy of reports shall be sent to the Consulting Engineer.

.3 Provide three (3) hard copies of written instructions for the chemical testing and treatment specific to this project for insertion into the operating and maintenance manuals as well as an electronic soft copy.

***END OF SECTION***