

CONSULTING SERVICE REPORT

| | | |
|---|---|-------------------------------|
| CUSTOMER: SERCO - NEW YORK UNIVERSITY, ABU DHABI | To: Mr. Ratheesh Muttath Operations Engineer | DATE: 10-11-2019 |
| CUSTOMER ID: 3003 | Copy: SERCO - NYUAD | LAST VISIT: 05-10-2019 |

CLOSED LOOP SOLAR SYSTEM ANALYSIS

| PARAMETER | CONTROL LIMITS | A1D1 | | | |
|--|----------------|------|--|--|--|
| pH | 9.0 - 10.5 | 9.84 | | | |
| Conductivity, $\mu\text{S}/\text{cm}$ | Max 3500 | 2690 | | | |
| TDS, ppm | -- | 1748 | | | |
| 'P' Alkalinity, ppm as CaCO_3 | -- | | | | |
| Total Hardness, ppm as CaCO_3 | -- | | | | |
| Calcium Hardness, ppm as CaCO_3 | -- | | | | |
| Chloride, ppm as Cl^- | -- | | | | |
| Iron, ppm as Fe | 0 - 2.0 | 0.34 | | | |

| Treatment Residuals | | | | | |
|------------------------------|------------------|-----|--|--|--|
| Nitrite, ppm | > 800 | 910 | | | |
| CaH Balance | | | | | |
| Dipslide | <10 ³ | ND | | | |
| Phosphate/Phosphonate | | | | | |
| Free Residual Chlorine as Cl | -- | -- | | | |
| Cynauric Acid | | | | | |

All test results expressed in parts per million (ppm) as CaCO_3 except pH and conductivity (μmhos).

| COMMENTS: | ACTION: |
|--|------------------------|
| The pH levels are satisfactory \Rightarrow | No action recommended. |
| Dissolved iron levels are found within control limits. \Rightarrow | No action recommended. |
| Corrosion Inhibitor levels found satisfactory \Rightarrow | No action recommended. |

| INVENTORY LEVELS | | | DOSAGE SCHEDULE | |
|--------------------------|---|-------------------|----------------------|----------------|
| Chemical | Quantity | Chemical | Present Dosage | Revised Dosage |
| Crystal 5547C | | | -- | |
| Crystal 9040 | | | -- | |
| | | | -- | |
| Service Engineer: | Murugaraaj | Client: | Mr. Ratheesh Muttath | |
| Signature: |  | Signature: | | |



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CLOSED LOOP SOLAR SYSTEM ANALYSIS

| PARAMETER | CONTROL LIMITS | A2A3 | | | |
|--|----------------|-------|--|--|--|
| pH | 9.0 - 10.5 | 10.24 | | | |
| Conductivity, $\mu\text{s}/\text{cm}$ | Max 3500 | 2830 | | | |
| TDS, ppm | -- | 1839 | | | |
| 'P' Alkalinity, ppm as CaCO_3 | -- | | | | |
| Total Hardness, ppm as CaCO_3 | -- | | | | |
| Calcium Hardness, ppm as CaCO_3 | -- | | | | |
| Chloride, ppm as Cl^- | -- | | | | |
| Iron, ppm as Fe | 0 - 2.0 | 0.31 | | | |

Treatment Residuals

| | | | | | |
|------------------------------|------------------|-----|--|--|--|
| Nitrite, ppm | ➤ 800 | 890 | | | |
| CaH Balance | | | | | |
| Dipslide | <10 ³ | ND | | | |
| Phosphate/Phosphonate | | | | | |
| Free Residual Chlorine as Cl | -- | -- | | | |
| Cynauric Acid | | | | | |

All test results expressed in parts per million (ppm) as CaCO_3 except pH and conductivity (μmhos).

COMMENTS:

ACTION:

| | |
|---|------------------------|
| The pH and Conductivity/TDS are found satisfactory. ⇨ | No action recommended. |
| Dissolved iron levels are within control limits. ⇨ | No action recommended. |
| Corrosion Inhibitor levels satisfactory ⇨ | No action recommended. |

INVENTORY LEVELS

DOSAGE SCHEDULE

| Chemical | Quantity | Chemical | Present Dosage | Revised Dosage |
|---------------|----------|----------|----------------|----------------|
| Crystal 5547C | | | -- | |
| Crystal 9040 | | | -- | |
| | | | -- | |

| | | | |
|-------------------|------------|------------|----------------------|
| Service Engineer: | Murugaraaj | Client: | Mr. Ratheesh Muttath |
| Signature: | P.M. | Signature: | |



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CLOSED LOOP SOLAR SYSTEM ANALYSIS

| PARAMETER | CONTROL LIMITS | A4A5 | | | |
|--|----------------|------|--|--|--|
| pH | 9.0 – 10.5 | 10.1 | | | |
| Conductivity, $\mu\text{s}/\text{cm}$ | Max 3500 | 2780 | | | |
| TDS, ppm | -- | 1807 | | | |
| 'P' Alkalinity, ppm as CaCO_3 | -- | | | | |
| Total Hardness, ppm as CaCO_3 | -- | | | | |
| Calcium Hardness, ppm as CaCO_3 | -- | | | | |
| Chloride, ppm as Cl^- | -- | | | | |
| Iron, ppm as Fe | 0 – 2.0 | 0.14 | | | |

Treatment Residuals

| | | | | | |
|------------------------------|------------------|------|--|--|--|
| Nitrite, ppm | > 800 | 1140 | | | |
| CaH Balance | | | | | |
| Dipslide | <10 ³ | ND | | | |
| Phosphate/Phosphonate | | | | | |
| Free Residual Chlorine as Cl | -- | -- | | | |
| Cynauric Acid | | | | | |

All test results expressed in parts per million (ppm) as CaCO_3 except pH and conductivity (μmhos).

COMMENTS:

ACTION:

| | |
|--|------------------------|
| The pH found are satisfactory \Rightarrow | No action recommended. |
| Dissolved iron levels are found within control limits. \Rightarrow | No action recommended. |
| Corrosion Inhibitor levels satisfactory \Rightarrow | No action recommended. |

INVENTORY LEVELS

DOSAGE SCHEDULE

| Chemical | Quantity | Chemical | Present Dosage | Revised Dosage |
|--------------------------|---|-------------------|----------------------|----------------|
| Crystal 5547C | | | -- | |
| Crystal 9040 | | | -- | |
| | | | -- | |
| Service Engineer: | Murugaraaj | Client: | Mr. Ratheesh Muttath | |
| Signature: |  | Signature: | | |



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CLOSED LOOP SOLAR SYSTEM ANALYSIS

| PARAMETER | CONTROL LIMITS | C1B1 | | | |
|--|----------------|-------|--|--|--|
| pH | 9.0 - 10.5 | 10.25 | | | |
| Conductivity, $\mu\text{s/cm}$ | Max 3500 | 3140 | | | |
| TDS, ppm | -- | 2041 | | | |
| 'P' Alkalinity, ppm as CaCO_3 | -- | | | | |
| Total Hardness, ppm as CaCO_3 | -- | | | | |
| Calcium Hardness, ppm as CaCO_3 | -- | | | | |
| Chloride, ppm as Cl^- | -- | | | | |
| Iron, ppm as Fe | 0 - 2.0 | 0.19 | | | |

Treatment Residuals

| | | | | | |
|------------------------------|------------------|------|--|--|--|
| Nitrite, ppm | > 800 | 1270 | | | |
| CaH Balance | | | | | |
| Dipslide | <10 ³ | ND | | | |
| Phosphate/Phosphonate | | | | | |
| Free Residual Chlorine as Cl | -- | -- | | | |

All test results expressed in parts per million (ppm) as CaCO_3 except pH and conductivity (μmhos).

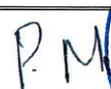
COMMENTS:

ACTION:

| | |
|--|------------------------|
| The pH and Conductivity/TDS levels are satisfactory ⇨ | No action recommended. |
| Dissolved iron levels are found within control limits. ⇨ | No action recommended. |
| Corrosion Inhibitor levels found are satisfactory ⇨ | No action recommended. |

INVENTORY LEVELS

DOSAGE SCHEDULE

| Chemical | Quantity | Chemical | Present Dosage | Revised Dosage |
|--------------------------|---|-------------------|-----------------------------|----------------|
| Crystal 5547C | | | -- | |
| Crystal 9040 | | | -- | |
| | | | -- | |
| Service Engineer: | Murugaraan | Client: | Mr. Ratheesh Muttath | |
| Signature: |  | Signature: | | |

