SULTAN AZLAN SHAH POWER STATION  
TNB JANAMANJUNG SDN BHD  
CHEMICAL SERVICES AND ENVIRONMENT SECTION

MONTHLY REPORT  
**December 2019**

1. **HR Issues**
2. En. Nayan b. Sulaiman, Senior Laboratory Technician on shift (TT11/12) was retired on 31 October 2018. En. Mohd Zairul Azuan bin Said Laboratory Technician (TT9/10) is covering En Nayan post.
3. En. Ismail Mohammad, Senior Laboratory Technician (TT11/12) was retired on 12 April 2019. En. Raja Mohd Yazid bin Samsudin Laboratory Technician (TT9/10) is covering En Ismail post. So, En. Raja Mohd Yazid bin Samsudin post filled up by new technician En Muhammad Alim Adha b. Makhtar on 2 May 2019.
4. **Machines**

**a) Boiler Drum Water Quality (Normal Operation)**

**Unit: M1 Drum**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter / Limit Unit 1 | Direct Cond / | Cation Cond / | pH / | Sodium/ | Chloride/ | Silica/ | Ammonia/ | Phosphate/ |
| 14.0 uS/cm | 20.0 uS/cm | 9.2 - 9.7 | 0.2-2.0 ppm | 110 ppb | 90 ppb | 1500 ppb | 0.2 - 2.0 ppm |
| Max | 12.5 | 7.5 | 9.9 | 1.11 | 63 | 330 | 1085 | 0.6 |
| Min | 7.5 | 0.0 | 9.4 | 0.28 | 11 | 15 | 471 | 0.03 |
| Ave | 9.7 | 2.1 | 9.6 | 0.50 | 43 | 88 | 735 | 0.35 |

**Notes :**

Unit 1 on forced outage from 21/11/2019 – 26/12/2019.

Silica was above maximum limit for 2 days after light up process.

**Blowdowns:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Date** | **Parameter** | **Reading,**  **ppb** | **Duration, hrs** | **Opening Percentage, %** | **Remarks** |
| 26/12/2019 | Silica | 330 | 24 hrs | 100% | Light up |
| 27/12/2019 | Silica | 96 | 4 hrs | 100% | Light up |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| **Total** | | | **28 hrs** |  |  |

**Unit: M2 Drum**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter / Limit Unit 2 | Direct Cond / | Cation Cond / | pH / | Sodium/ | Chloride/ | Silica/ | Ammonia/ | Phosphate/ |
| 14.0 uS/cm | 20.0 uS/cm | 9.2 - 9.7 | 0.2-2.0 ppm | 110 ppb | 90 ppb | 1500 ppb | 0.2 - 2.0 ppm |
| Max |  |  |  |  |  |  |  |  |
| Min |  |  |  |  |  |  |  |  |
| Ave |  |  |  |  |  |  |  |  |

**Notes :**

Unit 2 under had major overhaul started from 4/6/2019 to 25/8/2019, However, Unit 2 continues off under forced outage since 26/8/2019 onward due to turbine high vibration. Turbine repairing on going and target date job complete in Jan 2020.

**Blowdowns :**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Date | Parameter | Reading, ppb | Duration, hrs | Opening Percentage,% | | Remarks | |
| Nil |  |  |  |  | |  | |
|  |  |  |  |  | |  | |
| **Total** | | |  | |  | |  | |

**Unit: M3 Drum**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter / Limit Unit 3 | Direct Cond / | Cation Cond / | pH / | Sodium/ | Chloride/ | Silica/ | Ammonia/ | Phosphate/ |
| 14.0 uS/cm | 20.0 uS/cm | 9.2 - 9.7 | 0.2-2.0 ppm | 110 ppb | 90 ppb | 1500 ppb | 0.2 - 2.0 ppm |
| Max | 16.4 | 2.6 | 9.9 | 0.81 | 86 | 161 | 1530 | 0.88 |
| Min | 8.2 | 1.0 | 9.3 | 0.25 | 23 | 14 | 465 | 0.21 |
| Ave | 10.7 | 1.7 | 9.7 | 0.45 | 55 | 39 | 874 | 0.45 |

**Notes :**

Unit 3 under forced outage starting from 29/11/2019- 16/12/2019 and from 26/12/2019 – 30/12/2019.

Direct conductivity was above maximum limit for 1 days due to trisodium phosphate dosing during light up.

pH was above maximum limit for 5 days due to trisodium phosphate dosing.

Ammonia was slightly above limit for 1 day.

Silica was above maximum limit for 2 days due to light up process.

Trisodium phosphate was injected to control pH of the boiler water. However, due to the injection, sodium and direct conductivity slightly increases above the limit.

**Blowdowns:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Date** | **Parameter** | **Reading, ppb** | **Duration, hrs** | **Opening Percentage,%** | **Remarks** |
| 31/12/2019 | Silica | 161 | 6 hrs 15 min | 100 | Light up |
| 17/12/2019 | Silica | 112 | 16 hrs | 100 | Light up |
| **Total** |  |  | **22 hrs 15 min** |

**Unit: M4 (Before CPP)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter / Limit | Direct Cond /uS/cm | pH | DO2 | Sodium | Chloride | Silica |
| 4.3-11.0 | (9.0 – 9.6 AVT) | 5 ppb | 10 ppb | 10 ppb | 10 ppb |
| Max | 8.98 | 9.42 | 6.1 | 3.04 | 0.45 | 5 |
| Min | 8.98 | 9.42 | 6.1 | 3.04 | 0.45 | 5 |
| Ave | 8.98 | 9.42 | 6.1 | 3.04 | 0.45 | 5 |

**Note: M4 in AVT mode only for 1 day**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter / Limit | Direct Cond /uS/cm | pH | DO2 | Sodium | Chloride | Silica |
| (8.5 – 9.0 OT) | 5 ppb | 10 ppb | 10 ppb | 10 ppb |
| 0.7-2.80 |
| Max | 2.9 | 9.17 | 42.1 | 0.42 | 3.20 | 8 |
| Min | 2.43 | 8.91 | 3.5 | 0.42 | 0.12 | 3 |
| Ave | 2.60 | 9.04 | 6.1 | 0.42 | 0.86 | 4 |

**Unit: M4 (Economizer Inlet)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Direct Cond (uS/cm) | Acid conductivity  (uS/cm) | pH | DO2  ppb |
| Limit | 4.3-11 (AVT) | 0.2max (AVT) | 9.2-9.6 (AVT) | 10max (AVT) |
| Max | 9.05 | 0.07 | 9.48 | 4.2 |
| Min | 9.05 | 0.07 | 9.48 | 4.2 |
| Ave | 9.05 | 0.07 | 9.48 | 4.2 |

**Note: M4 in AVT mode only for 1 day**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Direct Cond (uS/cm) | Acid conductivity  (uS/cm) | pH | DO2  ppb |
| Limit | 0.7- 2.8 (OT) | 0.15max (OT) | 8.5-9.0 (OT) | 30-50 (OT) |
| Max | 2.91 | 0.13 | 9.13 | 63 |
| Min | 2.49 | 0.06 | 8.86 | 40 |
| Ave | 2.65 | 0.07 | 9.01 | 51 |

M4 in normal operation OT is preferable

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date from | Date to | Chemical treatment mode | Number of day | Remarks |
| 1/12/2019 | 2/12/2019 | SHUTDOWN | 2 | Due to Generator H2 Leakage |
| 3/12/2019 | 4/12/2019 | AVT | 1 | Light up process |
| 4/12/2019 | 31/12/2019 | OT | 28 |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  | **Total** |  |  |
| Total day in AVT mode |  |  | 1 |
| Total day in OT mode |  |  | 28 |

1. **Raw Water Consumption & Demin Water Production**
2. **Overall Raw Water Data:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | This Month (M3) | This Month (RM) | Total in this FY (M3) | Total in this FY (RM) | Percentage used |
| % |
| Station Raw Water Used (m3) | 263,572 | 424,344.72 | 4,272,451 | 6,878,571.71 |  |
|  |  |  |  |  |  |
| GF1 Raw Water Used (m3) | 172,643 | 277,949.03 | 2,873,193 | 4,625,766.33 | 66% |
| -GF1 raw water for  WTP | 50,273 | 80,939.53 | 1,288,518 | 2,074,513.98 | 45% |
| -GF1 raw water for  Other | 122,370 | 197,015.70 | 1,584,675 | 2,551,326.75 | 55% |
|  |  |  |  |  |  |
| GF2 Raw Water Used (m3) | 63,742 | 102,624.62 | 1,058,656 | 1,704,436.16 | 24% |
| -GF2 raw water for  WTP | 48,099 | 77,439.39 | 535,174 | 861,630.14 | 51% |
| -GF2 raw water for  Other | 15,643 | 25,185.23 | 523,482 | 842,806.02 | 49% |
|  |  |  |  |  |  |
| Other (M5) | 27,187 | 43,771.07 | 344,017 | 553,867.37 | 10% |

1. **Raw Water Reduction Program Monitoring:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Year | Month | Station Town Water consumption,m3 | Target per month, m3 | Varian,m3 | % achievement | Remarks |
| 2019 | Jan | 354,030 | 447675 | 93,645 | 21 |  |
|  | Feb | 524,268 | 447675 | -76,593 | -17 | M4 turbine safety drain valve leak |
|  | Mar | 550,098 | 447675 | -102,423 | -23 | -M1 RAH Rotary Air Heater Cleaning  -Minor passing on boiler drain MOV. M1 M3 soot blowing in progress |
|  | Apr | 384,511 | 447675 | 63,164 | 14 |  |
|  | May | 375,472 | 447675 | 72,203 | 16 |  |
|  | Jun | 369,610 | 447,675 | 78,065 | 17 |  |
|  | Jul | 378,042 | 447,675 | 69,633 | 16 |  |
|  | Aug | 355,366 | 447,675 | 92,309 | 21 | Unit 2 shutdown from 4/6/2019 to onwards in Jan 2020 |
|  | Sep | 274,873 | 447,675 | 172,802 | 39 |  |
|  | Oct | 259,795 | 447,675 | 187880 | 42 |  |
|  | Nov | 268,324 | 447,675 | 179,351 | 40 | Unit 1 shutdown from 1/11/2019 – 13/11/2019 and 21/11/2019 onwards.  Unit 3 shutdown 7/11/2019 – 8/11/2019 and from 29/11/2019 onwards |
|  | Dec | 263,572 | 447,675 | 184,103 | 41 | Unit 1 shutdown from 21/11/2019 – 26/12/2019.  Unit 3 shutdown 29/11/2019- 16/12/2019 and from 26/12/2019 – 30/12/2019. |
|  | **Total** | **5,372,100** | **4,272,451** | **1,099,649.00** | **20** |  |

1. **GF1 (M1, M2 & M3)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | This Month (M3) | This Month (RM) | Total in this FY (M3) | Total in this FY (RM) |
| Raw Water Used (M3) | 50,273 | 80,939.53 | 1,288,518 | 1,993,574.45 |
| Demin Water Produced For Boilers (m3) | 49,891 | 647,086.27 | 1,257,086 | 8,323,804.98 |
| Demin water production, % | 99% |  | 98% |  |
| Annual No of Resin Regeneration | This month | | Total in this FY | |
| (i) Anion/Cation | 16 | | 442 | |
| (ii) Mixed Bed | 2 | | 37 | |
| Chemical Consumption | This Month (kg) | This Month (RM) | Total in this FY (kg) | Total in this FY (RM) |
| (i) HCl | 20,584 | 10,703.68 | 551,040 | 286,540.80 |
| (ii) NaOH | 11,208 | 11,768.40 | 504,546 | 529,773.30 |

|  |  |
| --- | --- |
| GF1 Demin Water Cost, RM/Meter Cubic | RM 12.97 |

**WTP GF1 last resin, activated carbon and UF membrane replacement:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | QUANTITYPER VESSEL EACH STREAM | STREAM 1 | STREAM 2 | UF | SAND FILTER | PORTABLE WATER ACF |
| Activated carbon ACF | 9,800 KG | 9/1/2019 | 28/2/2019 | 8/7/2013 | - | - |
| Cation Resin Twin Bed | Amberjet 1200Na resin-6,480 LITER | 6/6/2010 | 10/6/2011 | - | - | - |
| Anion Resin Twin Bed | Amberjet 4200CL resin-13,000 LITER | 30/11/2015 | 10/11/2017 | - | - | - |
| Mixed Bed (anion & cation resin) | Amberjet 1200Na cation resin -3,000 LITER  Amberjet 4200CL anion resin - 3,000 LITER | 1/3/2013 | 25/2/2014 | - | - | - |

1. **GF2 (M4)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | This Month (M3) | This Month (RM) | Total in this FY (M3) | Total in this FY (RM) |
| Raw Water Used (M3) | 48,099 | 77,439.39 | 535,174 | 861,630.14 |
| Demin Water Produced For Boilers (M3) | 39,792 | 715,062.24 | 415,309 | 8,700,153.37 |
| Demin water production, % | 83% |  | 78% |  |
| Annual No of Resin Regeneration | **This month** | | **Total in this FY** | |
| (i) Anion/Cation | 0 | | 28 | |
| (ii) Mixed Bed | 0 | | 1 | |
| Chemical Consumption | **This Month (kg)** | **This Month (RM)** | **Total in this FY (kg)** | **Total in this FY (RM)** |
| (i) HCl | 0 | 0.00 | 87,724 | 45,616.48 |
| (ii) NaOH | 0 | 0.00 | 73,100 | 76,755.00 |

|  |  |
| --- | --- |
| M4 Demin Water Cost, RM/Meter Cubic | RM 17.97 |

**WTP & CPP GF2 last resin, activated carbon, RO and UF membrane replacement/Installed:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | STREAM 1  WTP | VOLUME PER VESSEL | CPP A | CPP B | CPP C | CPP D |
| CPP Boiler | - | Amberjet 1500H resin- 8,700 LITER  Ambersep 900SO4 resin- 3,620 LITER | 14/4/2015 | 14/4/2015 | 14/4/2015 | 14/4/2015 |
| CPP anion top up level | - | - | - | 6/6/2018 (Resin No. 2)  4x200 liter drum | 9/10/2018  (Resin No 3)  Due to anion & cation resin escaped due flange anion vessel leak during transfer for regeneration process  Anion-2275 liter | - |
| CPP cation top up level | - | - | - | - | 9/10/2018  (Resin No 3)  Cation-2600 liter | - |
| FILTER | 14/4/2015 |  | - | - | - | - |
| UF | 14/4/2015  29/11/2019 (STREAM 2) |  | - | - | - | - |
| RO  O-Ring size (diameter):  Small: 2.5 cm  Big: 19 cm | 14/4/2015 |  | - | - | - | - |
| Cation Resin Twin Bed | 6/7/2019  (Resin top up- 1100 liter) | Amberjet 1000Na resin- 8454 LITER | - | - | - | - |
| Anion Resin Twin Bed | 14/4/2015 | Amberjet 4200CL resin-17,650 LITRE | - | - | - | - |
| Working Mixed Bed (anion & cation resin) | 14/4/2015 | Dowex Monosphere 650C (H) resin- 1,570 LITER  Dowex Monosphere 550C (OH) -3,140 LITER | - | - | - | - |
| Polishing Mixed Bed (anion & cation resin) | 14/4/2015 | Dowex Monosphere 650C (H) resin- 1,570 LITER  Dowex Monosphere 550C (OH) -3,140 LITER | - | - | - | - |

1. Environment Performance Update

|  |  |  |
| --- | --- | --- |
| **Parameter** |  | **Status / Description** |
| Stack monitoring | Unit M1 | All readings were within DOE limit except as mentioned below:   * M1 under maintenance outage from 21 November 2019 – 26 December 2019. * Opacity maximum reading exceeded DOE limit for 6 days suspect due to ESP rapping and maintenance activities but daily average reading below the DOE limit. Opacity emission above 40% exceeded 5 min/hr for 1 day and exceeded 15 min/day for 1 day due to unit light up. |
| Unit M2 | * M2 under plant outage for whole month. |
| Unit M3 | All readings were within DOE limit except as mentioned below:   * M3 under maintenance outage from 29 November 2019 – 16 December 2019 and from 25 – 31 December 2019. * Dust maximum reading exceeded limit for 2 days but daily average reading below limit * Opacity maximum reading exceeded limit for 10 days suspect due to ESP rapping and maintenance activities but daily average reading below the DOE limit. Opacity emission above 40% exceeded 5 min/hr for 1 day and exceeded 15 min/day for 1 day due to unit light up. |
| Unit M4 | All readings were within DOE limit except as mentioned below:   * SO2 maximum readings exceeded limit for 9 days but daily average reading below the CAR 2014 DOE limit. * CO maximum reading exceeded limit for 7 days but daily average reading below the CAR 2014 DOE limit. * Dust maximum reading exceeded limit CAR 2014 for 29 days but daily average reading below limit except for 9 days. * Opacity maximum reading exceeded limit CAR 2014 for 29 days but daily average reading below limit except for 13 days. Opacity emission above 40% exceeded 5 min/hr for 6 days |
| Rain Water | AQM No. 1 | Average pH reading was 4.87 |
| AQM No. 2 | Average pH reading was 4.99 |
| AQM No. 3 | Average pH reading was 4.94 |
| Ambient Air | AQM No. 1 | All readings were within DOE limit. |
| AQM No. 2 | All readings were within DOE limit except as mention below:   * PM10 exceeded maximum limit for 3 days suspected from road dust and haze. * PM2.5 exceeded maximum limit for 12 days suspected from road dust and haze. |
| AQM No. 3 | All readings were within DOE limit except as mention below:   * PM2.5 exceeded maximum limit for 2 days suspected from road dust and haze. |
| Noise Level | NM1- North bank of island. | Day and night Leq dB readings within limit. |
| NM2- East bank of island | Day and night Leq dB readings within limit. |
| NM3- North bank of island (Middle) | Day and night Leq dB readings within limit. |
| NM4-West bank of island | Day and night Leq dB readings within limit. |
|  |
| GF 1  IWWTP Effluent |  | All parameters tested within DOE standard B limit |
| GF 2  IWWTP Effluent |  | All parameters tested within DOE standard B limit |
|  |
| GF1  CYWWTP Effluent |  | All parameters tested within DOE standard B limit |
| GF2  CYWWTP Effluent |  | All parameters tested within DOE standard B limit |
|  |
| GF1  Cooling water | Fore bay | All parameters tested within the DOE standard B limit |
| Outfall | All parameters tested within the DOE standard B limit |
| GF2  Cooling water | Fore bay | All parameters tested within the DOE standard B limit |
| Outfall | All parameters tested within the DOE standard B limit |
| GF1  Storm water | N/A | All parameters tested within the DOE standard B limit. |
| GF2  Storm water | N/A | All parameters tested within the DOE standard B limit. |
| Scheduled Wastes Disposed  (MT) | N/A | SW102 – 0.36  SW110 – 2.288  SW305 – 14.60  SW306 – 1.20  SW307 – 3.40  SW409 – 0.114  SW410 – 20.456 |

1. **Effluent (treated water) Discharged:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO.** | **PLANT** | **TOTAL DISCHARGED THIS MONTH**  **m3** | **TOTAL DISCHRAGED**  **IN THIS FY**  **m3** | **REMARKS** |
| 1 | GF1 IWWTP | 26,743 | 396,215 |  |
| 2 | GF1 CYWWTP | 38,961 | 181,804 |  |
| 3 | GF2 IWWTP | 30,254 | 313,347 |  |
| 4 | GF2 CYWWTP | - | - | RECYCLED |
| **TOTAL** | | **95,958** | **891,366** |  |

1. **List of activities related to environment in FY2019**

|  |  |
| --- | --- |
| **Date** | **Activities** |
| 9-11 Jan 2019 | ISO:HSE Legal Requirements and Internal Audit Course/training (ISO9001,14001 & 45001) |
| 25 Feb-1 Mar 2019 | Internal Audit |
| 1 Apr 2019 | Environmental Management Review Meeting |
| 7 – 10 May 2019 | ISO14001:2015 SIRIM Surveillance Audit |
| 25 June 2019 | EMC meeting No. 1 FY2019 |
| 26 September 2019 | EMC meeting No. 2 FY2019 |
| 11 December 2019 | EMC meeting No. 3 FY2019 |

1. Environmental achievement

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  | |
| **Description** | **ISEMS Score / Rating** | | |
| **FY 14/15** | | **FY 15/16** |
| ENVIRONMENTAL (EMS) AUDIT SCORE | 93.50% | | 95.40% |
|  |  |  | |

1. **Material / Service**

|  |  |  |
| --- | --- | --- |
| **a) Industrial Chemical Consumption** |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| GF1 |  |  |  |  |  |  |
| Item | Total quantity in this month | Total Cost this month (RM) | Total quantity in this FY | Total Cost this FY (RM) | Total quantity Last FY | Total Cost last FY (RM) |
| Sodium Hydroxide 48%, drum | 64 | 25,920.00 | 169 | 68,445.00 | 50 | 20,250.00 |
| Trisodium Phosphate (TSP), Box | 5 | 4,955.00 | 112 | 110,992.00 | 127 | 125,857.00 |
| Sodium Hypochloride 10% , Drum | 0 | 0.00 | 132 | 30,096.00 | 154 | 35,112.00 |
| Sodium Hypochloride 10% , IBC | 60 | 57,000.00 | 128.5 | 122,075.00 | 12 | 13680 |
| Ammonia 25%, Drum | 8 | 7,344.00 | 180 | 165,240.00 | 234 | 214,812.00 |
| Hydrochloric Acid 18%, drum | 4 | 713.80 | 44 | 7,138.00 | 22 | 3,925.90 |
| Ammonia 29%, Drum |  |  |  |  |  |  |
| Hydrochloric Acid 32%, kg | 20,584 | 10,703.68 | 551040 | 286,540.80 | 720376 | 374,595.32 |
| Caustic soda 48%, kg | 11,208 | 11,768.40 | 504546 | 529,773.30 | 750960 | 788,507.60 |
| GF2 |  |  |  |  |  |  |
| Item | Total quantity in this month | Total Cost this month (RM) | Total quantity in this FY | Total Cost this FY (RM) | Total quantity Last FY | Total Cost last FY (RM) |
| Trisodium Phosphate (TSP), kg | 11 | 436.04 | 83 | 3,290.12 | 52 | 2,061.28 |
| Sodium Hypochloride 10% , Drum | 0 | 0.00 | 48 | 10,944.00 | 396 | 90,288.00 |
| Sodium Hypochloride 10% , IBC | 12 | 11,400.00 | 92 | 86,925.00 | 19 | 21660 |
| Ammonia 29%, Drum | 0 | 0.00 | 36 | 39,168.00 | 152 | 165,376.00 |
| Hydrochloric Acid 18%, drum | 7 | 1,249.15 | 45 | 8,030.25 | 22 | 3,925.90 |
| Sodium Metabisulphite | 0 | 0.00 | 1 | 78.50 | 50 | 8,922.50 |
| Ammonia 25%, Drum | 8 | 7,344.00 | 108 | 99,144.00 | 4 | 3,672.00 |
| Hydrochloric Acid 32%, kg | 0 | 0.00 | 87,724 | 45,616.48 | 102,846 | 53,479.44 |
| Caustic soda 48%, kg | 0 | 0.00 | 73,100 | 76,755.00 | 83,300 | 87,465.50 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **b) Environmental Chemical Consumption** | | | | | |  |
| **GF1** |  |  |  |  |  |  |
| **Item** | **Total quantity in this month** | **Total Cost this month (RM)** | **Total quantity in this FY** | **Total Cost this FY (RM)** | **Total quantity Last FY** | **Total Cost last FY (RM)** |
| Polyaluminium Chloride (PAC), drum | 0 | 0 | 468 | 154,200 | 644 | 212,520 |
| Anionic Polyelectrolite,bag | 0 | 0 | 0 | 0 | 120 | 60,795.00 |
| Cationic Polyelectrolite,bag | 0 | 0 | 80 | 27,020 | 80 | 27,020.00 |
| Sodium Hydroxide 48%, drum | 9 | 5,259.38 | 79 | 46,165.63 | 32 | 18,700.00 |
| Polyaluminium Chloride (PAC), IBC | 38 | 33,946.60 | 103 | 92,013.20 | 22 | 19,653.35 |
|  |  |  |  |  |  |  |
| **GF2** |  |  |  |  |  |  |
| **Item** | **Total quantity in this month** | **Total Cost this month (RM)** | **Total quantity in this FY** | **Total Cost this FY (RM)** | **Total quantity Last FY** | **Total Cost last FY (RM)** |
| Polyaluminium Chloride (PAC), drum | 0 | 0 | 372 | 122,760 | 288 | 95,040.00 |
| Polyaluminium Chloride (PAC), IBC | 19 | 16,973.33 | 59 | 50,026.68 | 37 | 36,725.93 |
| Anionic Polyelectrolite,bag | 0 | 0 | 0 | 0 | 40 | 13,510.00 |
| Cationic Polyelectrolite,bag | 3 | 1,013.25 | 24 | 8,106.00 | 24 | 8,106.00 |

1. **Others**
   1. Opex Budget Utilization in FY2019

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| NO. | CHARGE CODE | | TOTAL BUDGET APPROVED  (RM) | ACTUAL UTILIZATION UNTIL THIS MONTH  (RM) | BUDGET UTILIZATION (%) | REMARKS |
| 1 | J503050003 | Material | 2,145,400.00 | 1,979,725.02 | 92% |  |
| Services | 2,484,400.00 | 290,921.25 | 12% |  |
| 2 | J503051003 | Material | 0.00 | 4,448.00 | 0% |  |
| Services | 0.00 | 0.00 | 0% |  |
| 3 | J503052003 | Material | 0.00 | 5,839.80 | 0% |  |
| Services | 0.00 | 3,939.00 | 0% |  |
| 4 | J503053003 | Material | 0.00 | 29,304.51 | 0% |  |
| Services | 0.00 | 0.00 | 0% |  |
| 5 | C503080 | Material | 6,000,000.00 | 3,675,317.32 | 61% | LAP bill |
| 6 | J504050003 | Material | 1,051,000.00 | 1,398,725.90 | 133% | M4 |
| Services | 124,000.00 | 412,784.84 | 333% |  |
| 7 | J504080431 | Material | 350,000.00 | 157,386.84 | 45% | M4 Environment |
| Services | 304,000.00 | 150,190.00 | 49% |  |
| 8 | J503010431 | Material | 675,000.00 | 810,562.66 | 120% | GF1 Environment |
| Services | 854,000.00 | 1,004,672.94 | 118% |  |
|  | **TOTAL** |  | **13,987,800.00** | **9,923,818.08** | 71% |  |  |

* 1. Capex Budget Utilization for FY2019:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | ITEM DESCRIPTION | ERMS PROJECT NO | BUDGET APPROVED  (RM) | ACTUAL (RM) | BUDGET UTILIZATION (%) | PO NO | DATE PO | DATE RECEIVED ITEM |
| 1 | OFFICE CHAIR (3 nos.)650x3 | EB-5030-19-54-9 | 1,950 | 1,287 | 66 | 20875618 | 19/4/2019 | 19/4/2019 |
| 2 | HIGH BACK CHAIR,650x9 | EB-5030-19-54-10 | 5,850 | 3,609 | 62 | 20873777 | 19/02/2019 | 21/3/2019 |
| 3 | SODIUM ANALYSER FOR SATURATED AND SUPERHEATED STEAM | GP-5030-19-E01 | 233,450 | 213,000 | 91 | 20878750 | 21/5/2019 | Project in progress |
| 4 | DRUM FLUX PUMP | EB-5030-19-52-12 | 9,050.00 | 9,050.00 | 100 | 20885917 | 15/10/2019 | 20/12/2019 |
|  |  |  |  |  | Average utilized = Nil% | 90 |  |  |

* 1. Contract status

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No | Contract Number | Description | Vendor | Contract Period | | Plan to tender | Contract Unit Price (RM) | Contract Quantity | Balance Quantity | Contract Value (RM) |
| From | To |
| 1 | TNBJ/KON/23/2019 | Sampling and Analyse Ambient Air Quality/Seawater/Ash Pond/Groundwater/Flue gas/Effluent WWTP & Sewage Treatment plant | Alam Sekitar Malaysia Sdn Bhd | 03.4.2019 | 02.4.2021 | Nov 2020 | NA | NA | 351,150 | 495,300.00 |
| 2 | TNBJ/KON/139/2019 | Supply used 48'' x 48'' wooden pallet | DYG (M) Sdn. Bhd. | 24.10.2019 | 23.10.2021 | Apr 2021 | RM22.00/PALLET | 1000 | 1000 | 22,000.00 |
| 3 | TNBJ/KON/481/2012(KKI) & TNBJ/KON/482/2012(KASB) | Mengangkat,merawat & melupuskan SW | Kualiti Alam Sdn Bhd | 28/2/2018 | 28.2.2021 | - | NA | NA | NA | Contract under TNB HQ |
| 4 | TNBJ/KON/52/2018 | Supply of bulk Hydrochloric acid 32% | Bekaltek Sdn Bhd | 29.5.2018 | 28.5.2020 | Dec 2019  Tendering Process | RM 0.60/kg | 1,450,000 KG (GF1) | 184,340 KG  (GF1) | 600,000 |
| 550,000 KG (GF2) | 205,110 KG  (GF2) |
| 6 | TNBJ/KON/57/2018 | Supply Of bulk Liquid Caustic Soda 48% | Bekaltek Sdn Bhd | 1.6.2018 | 31.5.2020 | Dec 2019  Tendering Process | RM 1.05/kg | 1,000,000 KG (GF1) | 46,480 KG  (GF1) | 1,250,000 |
| 1,000,000KG (GF2) | 673,510  KG  (GF2) | 1,250,000 |
| 7 | TNBJ/KON/51/2019 | Kontrak 2 Tahun Membekal Tenaga Kerja Bhgian Perk. Kimia&Alam Sekitar | Asis Fiona Enterprise | 1/5/2019 | 30.4.2021 | November 2020 | RM 12,350.21/month (Helper) | 24 month | RM 519,589.17 | 681,681.00 |
| RM 16,053.13/month (Technician) |
| 8 | TNBJ/KON/60/2019 | Menyelenggara 'Water Deionozer' Model Milli Q Integral 5 | MERCK. Sdn. Bhd. | 13/5/2019 | 12.5.2021 | Dec 2020 | NA | 24 month | 9,800 | 74,500 |
| 9 | TNBJ/KON5/2019 | To Supply Chemical 'Sodium Hypochlorite 10%' | Bekaltek Sdn Bhd | 2.1.2019 | 1.1.2021 | August 2020 | RM 0.99/kg | 150 drum  250 IBC | 0 drum  91 IBC | 385,640 |
| 10 | TNBJ/KON 17/2019 | To supply Flocculation Agents Anionic and Cationic Water Soluble Polyelectrolyte | Armada Exclusive Engineering Sdn. Bhd | 12.2.2019 | 11/2/2021 | October  2020 | Anionic  RM465/bag | 120 bag | 120 bag | 222,840 |
| Cationic  RM522/bag | 320 bag | 240 bag |
| 12 | TNB 527/2018 | Supply of High Purity Ammonia Solution 25% | Zastra Sdn. Bhd. | 30.3.2018 | 29.3.2021 | October 2020 | RM 918.00/drum | 750 drum | 230 drum | 688,500.00 |
| 13 | TNB 527/2018 | Supply of High Purity Ammonia Solution 28% | Zastra Sdn. Bhd. | 30.3.2018 | 29.3.2021 | TO STOP tender & use | RM 1,088.00/drum | 750 drum | 710 drum | 816,000.00 |
| 14 | TNB 527/2018 | Supply of PAC 10% | Zastra Sdn. Bhd. | 30.3.2018 | 29.3.2021 | TO STOP tender & use | RM 330.00/drum | 3000 drum | 1440 drum | 990,000.00 |
| 16 | TNBJ/KON 47/2018 | Supply PAC Powder | Time Marine Services Sdn. Bhd. | 10.5.2018 | 9.5.2020 | December 2019 | RM 67/bag | 8,800 bag | 4,720 bag | 589,600.00 |
| 15 | TNBJ/KON 49/2019 | Supply open top drum | AI Supplier | 18.4.2019 | 17.4.2021 | November 2020 | RM 39/drum | 2000 drum | 1900 drum | 78,000.00 |

* 1. AQMS Spare Parts Replacement

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No. | Spare part | Part Number | Date | Price, RM |
| 1 | |  | | --- | | Retrofit,Sync DMOD with Detector, 300E | | KIT000178 | 25 April 2019 | 5,079.38 |
| 2 | Dani TNBMH 456 Regulator | 90509005 | 12 June 2019 | 14,742.00 |
| 3 | 400E O3 Analyser : Sample pump | 077480200 | 12 June 2019 | 3,639.09 |
| 4 | 701 Zero Air Module : 4way valve | 036260200 | 12 June 2019 | 1,562.19 |
| 5 | PUMP THOMAS 688,220/240V 50HZ/60HZ | PU0000052 | 11 November 2019 | 5,422.52 |
| 6 | ASSY, PUMP M701, 200-240/50-60HZ,GAST | 56890100 | 11 November 2019 | 6,248.76 |
| 7 | CD, PMT (R328) NOX(PA) | 11930000 | 11 November 2019 | 7,282.70 |
| 8 | CD, PMT, SOX(R1527)(KB) | 13400000 | 11 November 2019 | 4,311.83 |

* 1. List of chemical equipment calibration

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **No.** | **Items** | **Serial Number** | **Range/Unit** | **Brand** | **Recommended**  **Calibration duration** | **Calibration date** | **Target next calibration** | **ISO quality record number** | **Remark/**  **Status** |
| **1** | **Calorimeter(CV)** | **10-004896** | **Joule/G** | **IKA 6000** | **Yearly** | **2/8/2019** | **2/8/2020** | **CHEM-715-01-QR-02** | **In house calibration** |
| **2** | **Sound Level Calibrator** | **2402770** | **94.00+-0.2db** | **Bruel & Kjaer** | **Yearly** | **12/03/2019** | **12/03/2020** | **CHEM-715-01-QR-27** |  |
| **3** | **Sound level meter** | **2394964** | **db** | **Bruel & Kjaer** | **Yearly** | **12/03/2019** | **12/03/2020** | **-** |  |
| **4** | **Thermometer** | **11005** | **-5’C to 110’C** | **ASTM 9C/1P 15C** | **Yearly** | **19/03/2019** | **19/03/2020** | **CHEM-715-01-QR-23** |  |
| **5** | **Thermometer** | **3095** | **-0.3’C to 41.4’C** | **ASTM 120C/1P 92C** | **Yearly** | **19/03/2019** | **19/03/2020** | **CHEM-715-01-QR-22** |  |
| **6** | **Thermometer** | **0611002437** | **-20’C to 110’C** | **Erico** | **Yearly** | **19/03/2019** | **19/03/2020** | **-** |  |
| **7** | **Thermometer** | **966** | **-0.3’C to 21.4’C** | **ASTM 44C/IP** | **Yearly** | **19/03/2019** | **19/03/2020** | **-** |  |
| **8** | **Thermometer** | **N/A** | **-10 oC - 250 oC** | **Fisherbrand** | **Yearly** | **19/03/2019** | **19/03/2020** | **-** |  |
| **9** | **Analytical Balance** | **1129513599** | **0-320g** | **Mettler Toledo** | **Yearly** | **24/1/2019** | **24/1/2020** | **CHEM-715-01-QR-15** |  |
| **10** | **Analytical Balance** | **1120311222** | **0-320g** | **Mettler Toledo** | **Yearly** | **24/1/2019** | **24/1/2020** | **CHEM-715-01-QR-16** |  |
| **11** | **Electronic Top Pan Balance** | **1120200486** | **0-5100g** | **Mettler Toledo** | **Yearly** | **24/1/2019** | **24/1/2020** | **CHEM-715-01-QR-30** |  |
| **12** | **Electronic Top Pan Balance** | **1128483895** | **0-5100g** | **Mettler Toledo** | **Yearly** | **24/1/2019** | **24/1/2020** | **CHEM-715-01-QR-31** |  |
| **13** | **Balance 3 ton chemical store 7** | **22044** | **3 ton** | **M -15** | **Yearly** | **24/1/2019** | **24/1/2020** | **-** |  |
| **14** | **Electronic Top Pan Balance** | **J8099904** | **0-200g** | **AND CO.Ltd** | **Yearly** | **24/01/2019** | **24/01/2020** | **CHEM-715-01-QR-32** |  |
| **15** | **Electronic Top Pan Balance** | **13010481** | **0-61kg** | **HP-60K** | **Yearly** | **24/01/2019** | **24/01/2020** | **CHEM-715-01-QR-33** |  |
| **16** | **Electronic Analytical Balance** | **28891685** | **0-210g** | **SARTORIUS AZ214** | **Yearly** | **24/01/2019** | **24/01/2020** | **-** | **-** |
| **17** | **TOC Analyser** | **13126921** | **Ppm/ppb** | **Sievers** | **Yearly** | **21/06/2019** | **21/06/2020** | **-** |  |
| **18** | **Spectrophotometer HACH DR3900** | **1560 203** | **Ppm/ppb** | **HACH** | **Yearly** | **19/12/2019** | **19/12/2020** | **-** | **Awaiting certificate** |
| **19** | **Karl Fisher 831 Coulometer** | **42322** | **PPM** | **Metrohm** | **Yearly** | **14/10/2019** | **14/10/2020** | **-** | **Awaiting certificate** |
| **20** | **Ion Chromatography** | **31107** | **Ppb of ion** | **Metrohm** | **Yearly** | **14/10/2019** | **14/10/2020** | **-** | **Awaiting certificate** |
| **21** | **Automatic sampler for ion chromatography** | **16131** | **-** | **Metrohm** | **Yearly** | **14/10/2019** | **14/10/2020** | **-** | **Awaiting certificate** |
| **22** | **Ion Chromatography** | **14122958** | **Ppb of ion** | **ICS 2100 Anion** | **Yearly** | **04/04/2019** | **04/04/2020** | **-** | **New Equipment** |
| **23** | **Ion Chromatography** | **11120151** | **Ppb of ion** | **Dionex ICS-1100** | **Yearly** | **04/04/2019** | **04/04/2020** | **CHEM-715-01-QR-35** |  |
| **24** | **Ion Chromatography** | **01080080** | **Ppb of ion** | **Dionex DX-120** | **Yearly** | **04/04/2019** | **04/04/2020** | **CHEM-715-01-QR-01** |  |
| **25** | **HGI Analyzer** | **-** | **HGI** | **ASTM** | **Yearly** | **25/03/2019** | **25/03/2020** | **CHEM-715-01-QR-28** | **In house calibration** |
| **26** | **Pocket Colorimeter II Chlorine** | **13070E226676** | **PPM** | **HACH** | **Yearly** | **01/08/2019** | **01/08/2020** | **-** |  |
| **27** | **Portable Turbidity meter 2100P** | **010300028330** | **0-1000NTU** | **HACH** | **Yearly** | **19/12/2019** | **19/12/2020** | **-** | **Awaiting certificate** |
| **28** | **Portable Turbidity meter 2100P** | **010300028329** | **0-1000NTU** | **HACH** | **Yearly** | **19/12/2019** | **19/12/2020** | **-** | **Awaiting certificate** |
| **29** | **Dissolved Oxygen Meter** | **14M1476AA** | **0-60PPM** | **YSI 5000** | **Yearly** | **28/02/2019** | **28/02/2020** | **-** | **-** |
| **30** | **DRB 200 Digital Reactor** | **0808 0C03 34** | **Temperature** | **HACH** | **Yearly** | **28/02/2019** | **28/02/2020** | **-** | **-** |
| **31** | **Spectrophotometer DR2800** | **1266194** | **PPM/PPB** | **HACH** | **Yearly** | **19/12/2019** | **19/12/2020** | **-** | **Awaiting certificate** |
| **32** | **Spectrophotometer DR2800** | **1270183** | **PPM/PPB** | **HACH** | **Yearly** | **19/12/2019** | **19/12/2020** | **-** | **Awaiting certificate** |
| **33** | **Particle Counter** | **401-52** | **ISO/NAS** | **PALL** | **Yearly** | **25/2/2019** | **25/2/2020** | **-** |  |
| **34** | **Karl Fisher 860 Thermoprep** | **14118** | **PPM** | **Metrohm** | **Yearly** | **14/10/2019** | **14/10/2020** | **-** | **Awaiting certificate** |
| **35** | **Karl Fisher 831 Coulometer** | **05159** | **PPM** | **Metrohm** | **Yearly** | **14/10/2019** | **14/10/2020** | **-** | **Awaiting certificate** |
| **36** | **Pocket Colorimeter II Chlorine** | **5953000** | **PPM** | **HACH** | **Yearly** | **01/08/2019** | **01/08/2020** | **-** | **Send for calibration** |
| **37** | **Calorimeter(CV)** | **100413774** | **Joule/G** | **IKA C6000** | **Yearly** | **21/08/2019** | **21/08/2020** | **-** | **Awaiting certificate** |
| **38** | **TGA 701** | **20820** | **Proximate analysis** | **LECO Model 604-100-700** | **Yearly** | **Nov 2019** | **Nov 2020** | **-** | **New equipment In house calibration** |
| **39** | **Visco Bath U tube** | **B (37270)** | **Cst** | **PSL** | **3 Yearly** | **-** | **-** | **-** | **Sent for calibration** |
| **40** | **Visco Bath U tube** | **C (37371)** | **Cst** | **PSL** | **3 Yearly** | **-** | **-** | **-** | **Sent for calibration** |
| **41** | **Visco Bath U tube** | **E (53499)** | **Cst** | **PSL** | **3 Yearly** | **-** | **-** | **-** | **Sent for calibration** |
| **42** | **Visco Bath U tube** | **F (35315)** | **Cst** | **PSL** | **3 Yearly** | **-** | **-** | **-** | **Sent for calibration** |
| **43** | **Visco Bath U tube** | **E (37445)** | **Cst** | **PSL** | **3 Yearly** | **-** | **-** | **-** | **Sent for calibration** |
| **44** | **Hydrometer** | **Low ST 15.5 oC** | **0.700-0.800** | **Brannan UK** | **3 Yearly** | **19/03/2019** | **19/03/2022** | **-** |  |
| **45** | **Hydrometer** | **SG 15.6 oC** | **1000-1200** | **Brannan UK** | **3 Yearly** | **19/03/2019** | **19/03/2022** | **-** |  |
| **46** | **Hydrometer** | **S28.9/28.9 oC** | **1050-1100** | **Zeal SP GR Medium** | **3 Yearly** | **19/03/2019** | **19/03/2022** | **-** |  |
| **47** | **Hydrometer** | **S28.9/28.9OC** | **1100-1150** | **Zeal UK** | **3 Yearly** | **19/03/2019** | **19/03/2022** | **-** |  |
| **48** | **Hydrometer** | **S28.9/28.9oC** | **1150-1200** | **Zeal UK** | **3 Yearly** | **19/03/2019** | **19/03/2022** | **-** |  |

Prepared by: Prepared by:

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