

Rev.3 วันที่ 21/6/2024 แก้ไข Detection Limit ของโลหะหนักโดยรายงานหน่วย mg/m3 ทุกพารามิเตอร์เพื่อให้สอดคล้อง กับมาตรฐาน

การตรวจวิเคราะห์คุณภาพอากาศ (Air Quality Analysis)

ประเภทตัวอย่าง : อากาศในปล่องระบาย - Stack Air Quality

ตารางที่ 1 สรุปขั้นตอนการเก็บตัวอย่างและความสามารถในการทดสอบด้วยห้องปฏิบัติการ [ฉบับที่ 5 ประเภทตัวอย่างระบบอุตสาหกรรม](#)

| ประเภทตัวอย่าง : อากาศในปล่องระบาย - Stack Air Quality |                                                 |                                               |                                                |                     |                            |              |                            |               |                                     |
|--------------------------------------------------------|-------------------------------------------------|-----------------------------------------------|------------------------------------------------|---------------------|----------------------------|--------------|----------------------------|---------------|-------------------------------------|
| Items                                                  | Parameter                                       | Method                                        | Reference Method / Analytical Technique        | Air Volume          | Sampling Rate / Period     | LOQ / Range  | Unit                       | Decimal point | Remark                              |
| แผนปฏิบัติการภาคสนาม                                   |                                                 |                                               |                                                |                     |                            |              |                            |               |                                     |
| 1                                                      | Smoke density (Opacity)                         | Ringelmann' s method                          | U.S. EPA Method 9 / Ringelmann' s Chart        | -                   | -                          | -            | %                          | 2             |                                     |
| 2                                                      | Oxide of Nitrogen                               | Chemiluminescence Method                      | U.S. EPA Method 7E / Nitrogen dioxide Analyzer | -                   | -                          | 0.1 - 100    | ppm                        | 1             | ใช้ Dilution Probe ร่วมในการตรวจวัด |
| 3                                                      | Sulfur Dioxide                                  | UV Fluorescence Method                        | U.S. EPA Method 6C / Sulfur dioxide Analyzer   | -                   | -                          | 0.4 - 100    | ppm                        | 1             | ใช้ Dilution Probe ร่วมในการตรวจวัด |
| 4                                                      | Carbon Monoxide                                 | Bag,Non-Dispersive Infrared Method            | U.S. EPA method 10 / Carbon monoxide analyzer  | -                   | -                          | 0.1 - 100    | ppm                        | 1             | ใช้ Dilution Probe ร่วมในการตรวจวัด |
| ส่วนทดสอบพื้นฐาน                                       |                                                 |                                               |                                                |                     |                            |              |                            |               |                                     |
| 1                                                      | Hydrogen Sulfide (H <sub>2</sub> S)             | Absorption, Iodometric Method                 | U.S. EPA Method 11 / Iodometric                |                     |                            | 8.0<br>6.0   | mg / m <sup>3</sup><br>ppm | 1             |                                     |
| 2                                                      | Sulfur Dioxide (SO <sub>2</sub> )               | Absorption Barium Thorin Titrimetric Method   | U.S. EPA Method 6 / Titration                  | 0.03 m <sup>3</sup> | Isokinetic<br>(30 min)     | 1.3<br>0.5   | mg / m <sup>3</sup><br>ppm | 1             |                                     |
| 3                                                      | Sulfuric acid (H <sub>2</sub> SO <sub>4</sub> ) | Isokinetic, Barium Thorin Titrimetric Method  | U.S. EPA Method 8 / Titration                  | 0.9 m <sup>3</sup>  | Isokinetic<br>(30 min)     | 0.05<br>0.01 | mg / m <sup>3</sup><br>ppm | 2             |                                     |
| 4                                                      | Total Particulate Matter (TSP)                  | Isokinetic, Sampling / Gravimetric Method     | U.S. EPA Method 5 / Gravimetric Method         | -                   | -                          | 0.1          | mg / m <sup>3</sup>        | 1             |                                     |
| ส่วนเครื่องมือทดสอบ                                    |                                                 |                                               |                                                |                     |                            |              |                            |               |                                     |
| 1                                                      | Oxide of Nitrogen (Nitrogen Dioxide ;           | Chemical Absorption, Colorimetric Method      | U.S. EPA Method 7 / Spectrophotometer          | 2.0 L               | Non-Isokinetic<br>(30 min) | 2.0<br>1.0   | mg / m <sup>3</sup><br>ppm | 1             |                                     |
| 2                                                      | Xylene                                          | Sorbent Adsorption, Gas Chromatography Method | US. EPA Method 18 / GC-FID                     | 0.21 m <sup>3</sup> | 0.7 L/min<br>(30 min)      | 2.05<br>0.47 | mg / m <sup>3</sup><br>ppm | 2             | SKC' Cat. No. 226-09                |
| 3                                                      | Vanadium (V)                                    | Isokinetic, Sampling,Digestion,ICP-OES Method | U.S. EPA Method 29 / ICP-OES                   | 0.9 m <sup>3</sup>  | Isokinetic<br>(30 min)     | 0.005        | mg / m <sup>3</sup>        | 3             | Advantage MFS<br>Cat No. GC5090 MM  |
| 4                                                      | Tin (Sn)                                        | Isokinetic, Sampling,Digestion,ICP-OES Method | U.S. EPA Method 29 / ICP-OES                   | 0.9 m <sup>3</sup>  | Isokinetic<br>(30 min)     | 0.010        | mg / m <sup>3</sup>        | 3             | Advantage MFS<br>Cat No. GC5090 MM  |
| 5                                                      | Selenium (Se)                                   | Isokinetic, Sampling,Digestion,ICP-OES Method | U.S. EPA Method 29 / ICP-OES                   | 0.9 m <sup>3</sup>  | Isokinetic<br>(30 min)     | 0.010        | mg / m <sup>3</sup>        | 3             | Advantage MFS<br>Cat No. GC5090 MM  |

| Items | Parameter                    | Method                                               | Reference Method / Analytical Technique | Air Volume         | Sampling Rate / Period    | LOQ / Range | Unit                | Decimal point | Remark                             |
|-------|------------------------------|------------------------------------------------------|-----------------------------------------|--------------------|---------------------------|-------------|---------------------|---------------|------------------------------------|
| 6     | Antimony (Sb)                | Isokinetic, Sampling,Digestion,ICP-OES Method        | U.S. EPA Method 29 / ICP-AES            | 0.9 m <sup>3</sup> | Isokinetic<br>(30 min)    | 0.010       | mg / m <sup>3</sup> | 3             | Advantage MFS<br>Cat No. GC5090 MM |
| 7     | Arsenic (As)                 | Isokinetic, Sampling,Digestion,ICP-OES Method        | U.S. EPA Method 29 / ICP-AES            | 0.9 m <sup>3</sup> | Isokinetic<br>(30 min)    | 0.010       | mg / m <sup>3</sup> | 3             | Advantage MFS<br>Cat No. GC5090 MM |
| 8     | Cadmium (Cd)                 | Isokinetic, Sampling,Digestion,ICP-OES Method        | U.S. EPA Method 29 / ICP-AES            | 0.9 m <sup>3</sup> | Isokinetic<br>(30 min)    | 0.005       | mg / m <sup>3</sup> | 3             | Advantage MFS<br>Cat No. GC5090 MM |
| 9     | Chromium (Cr)                | Isokinetic, Sampling,Digestion,ICP-OES Method        | U.S. EPA Method 29 / ICP-AES            | 0.9 m <sup>3</sup> | Isokinetic<br>(30 min)    | 0.005       | mg / m <sup>3</sup> | 3             | Advantage MFS<br>Cat No. GC5090 MM |
| 10    | Copper (Cu)                  | Isokinetic, Sampling,Digestion,ICP-OES Method        | U.S. EPA Method 29 / ICP-AES            | 0.9 m <sup>3</sup> | Isokinetic<br>(30 min)    | 0.005       | mg / m <sup>3</sup> | 3             | Advantage MFS<br>Cat No. GC5090 MM |
| 11    | Cobalt (Co)                  | Isokinetic, Sampling,Digestion,ICP-OES Method        | U.S. EPA Method 29 / ICP-AES            | 0.9 m <sup>3</sup> | Isokinetic<br>(30 min)    | 0.005       | mg / m <sup>3</sup> | 3             | Advantage MFS<br>Cat No. GC5090 MM |
| 12    | Lead and Inorganic Lead (Pb) | Isokinetic, Sampling,Digestion,ICP-OES Method        | U.S. EPA Method 29 / ICP-AES            | 0.9 m <sup>3</sup> | Isokinetic<br>(30 min)    | 0.005       | mg / m <sup>3</sup> | 3             | Advantage MFS<br>Cat No. GC5090 MM |
| 13    | Manganese (Mn)               | Isokinetic, Sampling,Digestion,ICP-OES Method        | U.S. EPA Method 29 / ICP-AES            | 0.9 m <sup>3</sup> | Isokinetic<br>(30 min)    | 0.005       | mg / m <sup>3</sup> | 3             | Advantage MFS<br>Cat No. GC5090 MM |
| 14    | Nickel (Ni)                  | Isokinetic, Sampling,Digestion,ICP-OES Method        | U.S. EPA Method 29 / ICP-AES            | 0.9 m <sup>3</sup> | Isokinetic<br>(30 min)    | 0.005       | mg / m <sup>3</sup> | 3             | Advantage MFS<br>Cat No. GC5090 MM |
| 15    | Mercury (Hg)                 | Isokinetic, Sampling,Cold Vapor Technique-AAS Method | U.S. EPA Method 101 / AAS               | 0.053 m3           | Isokinetic<br>(1.5 L/min) | 0.0001      | mg / m <sup>3</sup> | 4             | Advantage MFS<br>Cat No. GC5090 MM |

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การตรวจวิเคราะห์คุณภาพอากาศ (Air Quality Analysis)

ประเภทตัวอย่าง : อากาศในป่องระบาย - Stack Air Quality

ตารางที่ 2 สรุปข้อกำหนดการเก็บตัวอย่างและความสามารถในการทดสอบตัวอย่างของห้องปฏิบัติการ ที่ได้รับทะเบียนกับกรมโรงงานอุตสาหกรรม

| Items                  | Parameter                         | Method                                        | Reference Method / Analytical Technique      | Air Volume         | Sampling Rate / Period | LOQ / Range | Unit                | Decimal point | Remark                             |
|------------------------|-----------------------------------|-----------------------------------------------|----------------------------------------------|--------------------|------------------------|-------------|---------------------|---------------|------------------------------------|
| แผนปฏิบัติการภาคสนาม   |                                   |                                               |                                              |                    |                        |             |                     |               |                                    |
| 1                      | Sampling and Traverse point       | U.S. EPA Recommend (Method 1)                 | U.S. EPA Method 1 / Calculation              | -                  | -                      | -           | -                   | -             |                                    |
| 2                      | Velocity and Volumetric Flow rate |                                               | U.S. EPA Method 2 / Calculation              | -                  | -                      | -           | -                   | -             |                                    |
| 3                      | Oxygen                            | Electrochemical Sensor                        | Modified U.S. EPA 3 / Electrochemical Sensor | -                  | -                      | 0-20.9      | %                   | 1             |                                    |
| 4                      | Moisture Content                  |                                               | U.S. EPA Method 4 / Calculation              | -                  | -                      | -           | -                   | 2             |                                    |
| 5                      | Carbon dioxide (CO <sub>2</sub> ) | Electrochemical Sensor                        | Modified U.S. EPA 3 / Electrochemical Sensor | -                  | -                      | 0-20.9      | %                   | 2             |                                    |
| ส่วนงานทดสอบพื้นฐาน    |                                   |                                               |                                              |                    |                        |             |                     |               |                                    |
| 1                      | PM10,PM2.5                        | Isokinetic, Sampling / Gravimetric Method     | U.S. EPA Method 201A / Gravimetric Method    | -                  | -                      | 0.1         | mg / m <sup>3</sup> | 1             |                                    |
| ส่วนงานเครื่องมือทดสอบ |                                   |                                               |                                              |                    |                        |             |                     |               |                                    |
| 1                      | Aluminium (Al)                    | Isokinetic, Sampling,Digestion,ICP-OES Method | U.S. EPA Method 29 / ICP-AES                 | 0.9 m <sup>3</sup> | Isokinetic<br>(30 min) | 0.005       | mg / m <sup>3</sup> | 3             | Advantage MFS<br>Cat No. GC5090 MM |
| 2                      | Barium (Ba)                       | Isokinetic, Sampling,Digestion,ICP-OES Method | U.S. EPA Method 29 / ICP-AES                 | 0.9 m <sup>3</sup> | Isokinetic<br>(30 min) | 0.005       | mg / m <sup>3</sup> | 3             | Advantage MFS<br>Cat No. GC5090 MM |
| 3                      | Calcium (Ca)                      | Isokinetic, Sampling,Digestion,ICP-OES Method | U.S. EPA Method 29 / ICP-AES                 | 0.9 m <sup>3</sup> | Isokinetic<br>(30 min) | 0.100       | mg / m <sup>3</sup> | 3             | Advantage MFS<br>Cat No. GC5090 MM |
| 4                      | Iron (Fe)                         | Isokinetic, Sampling,Digestion,ICP-OES Method | U.S. EPA Method 29 / ICP-AES                 | 0.9 m <sup>3</sup> | Isokinetic<br>(30 min) | 0.005       | mg / m <sup>3</sup> | 3             | Advantage MFS<br>Cat No. GC5090 MM |
| 5                      | Magnesium (Mg)                    | Isokinetic, Sampling,Digestion,ICP-OES Method | U.S. EPA Method 29 / ICP-AES                 | 0.9 m <sup>3</sup> | Isokinetic<br>(30 min) | 0.100       | mg / m <sup>3</sup> | 3             | Advantage MFS<br>Cat No. GC5090 MM |
| 6                      | Beryllium (Be)                    | Isokinetic, Sampling,Digestion,ICP-OES Method | U.S. EPA Method 29 / ICP-AES                 | 0.9 m <sup>3</sup> | Isokinetic<br>(30 min) | 0.005       | mg / m <sup>3</sup> | 3             | Advantage MFS<br>Cat No. GC5090 MM |

| Items | Parameter                            | Method                                        | Reference Method / Analytical Technique | Air Volume          | Sampling Rate / Period | LOQ / Range  | Unit                       | Decimal point | Remark                             |
|-------|--------------------------------------|-----------------------------------------------|-----------------------------------------|---------------------|------------------------|--------------|----------------------------|---------------|------------------------------------|
| 7     | Silver (Ag)                          | Isokinetic, Sampling,Digestion,ICP-OES Method | U.S. EPA Method 29 / ICP-AES            | 0.9 m <sup>3</sup>  | Isokinetic<br>(30 min) | 0.005        | mg / m <sup>3</sup>        | 3             | Advantage MFS<br>Cat No. GC5090 MM |
| 8     | Sodium (Na)                          | Isokinetic, Sampling,Digestion,ICP-OES Method | U.S. EPA Method 29 / ICP-AES            | 0.9 m <sup>3</sup>  | Isokinetic<br>(30 min) | 0.100        | mg / m <sup>3</sup>        | 3             | Advantage MFS<br>Cat No. GC5090 MM |
| 9     | Zinc (Zn)                            | Isokinetic, Sampling,Digestion,ICP-OES Method | U.S. EPA Method 29 / ICP-AES            | 0.9 m <sup>3</sup>  | Isokinetic<br>(30 min) | 0.005        | mg / m <sup>3</sup>        | 3             | Advantage MFS<br>Cat No. GC5090 MM |
| 10    | Acetone                              | Sorbent Adsorption, Gas Chromatography Method | US. EPA Method 18 / GC-FID              | 0.21 m <sup>3</sup> | 0.7 L/min<br>(30 min)  | 1.88<br>0.79 | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. 226-09                |
| 11    | Benzene                              | Sorbent Adsorption, Gas Chromatography Method | US. EPA Method 18 / GC-FID              | 0.21 m <sup>3</sup> | 0.7 L/min<br>(30 min)  | 1.68<br>0.52 | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. 226-09                |
| 12    | Cyclohexanone                        | Sorbent Adsorption, Gas Chromatography Method | US. EPA Method 18 / GC-FID              | 0.21 m <sup>3</sup> | 0.7 L/min<br>(30 min)  | 2.26<br>0.56 | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. 226-09                |
| 13    | Ethanol (Ethyl alcohol)              | Sorbent Adsorption, Gas Chromatography Method | US. EPA Method 18 / GC-FID              | 0.21 m <sup>3</sup> | 0.7 L/min<br>(30 min)  | 1.88<br>1.00 | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. 226-09                |
| 14    | Ethylbenzene                         | Sorbent Adsorption, Gas Chromatography Method | US. EPA Method 18 / GC-FID              | 0.21 m <sup>3</sup> | 0.7 L/min<br>(30 min)  | 2.07<br>0.48 | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. 226-09                |
| 15    | Ethylacetate                         | Sorbent Adsorption, Gas Chromatography Method | US. EPA Method 18 / GC-FID              | 0.21 m <sup>3</sup> | 0.7 L/min<br>(30 min)  | 4.32<br>1.20 | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. 226-09                |
| 16    | Hexane                               | Sorbent Adsorption, Gas Chromatography Method | US. EPA Method 18 / GC-FID              | 0.21 m <sup>3</sup> | 0.7 L/min<br>(30 min)  | 4.23<br>1.20 | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. 226-09                |
| 17    | Isopropanol (Isopropyl alcohol); IPA | Sorbent Adsorption, Gas Chromatography Method | US. EPA Method 18 / GC-FID              | 0.21 m <sup>3</sup> | 0.7 L/min<br>(30 min)  | 1.87<br>0.76 | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. 226-09                |
| 18    | Methanol (Methyl alcohol)            | Sorbent Adsorption, Gas Chromatography Method | US. EPA Method 18 / GC-FID              | 0.21 m <sup>3</sup> | 0.7 L/min<br>(30 min)  | 0.94<br>0.72 | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. 226-09                |
| 19    | Methyl Ethyl Ketone (MEK)            | Sorbent Adsorption, Gas Chromatography Method | US. EPA Method 18 / GC-FID              | 0.21 m <sup>3</sup> | 0.7 L/min<br>(30 min)  | 1.92<br>0.65 | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. 226-09                |

| Items | Parameter                      | Method                                        | Reference Method / Analytical Technique | Air Volume          | Sampling Rate / Period    | LOQ / Range   | Unit                       | Decimal point | Remark                             |
|-------|--------------------------------|-----------------------------------------------|-----------------------------------------|---------------------|---------------------------|---------------|----------------------------|---------------|------------------------------------|
| 20    | Styrene                        | Sorbent Adsorption, Gas Chromatography Method | U.S. EPA Method 18 / GC-FID             | 0.21 m <sup>3</sup> | 0.7 L/min<br>(30 min)     | 2.16<br>0.51  | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. 226-09                |
| 21    | Toluene                        | Sorbent Adsorption, Gas Chromatography Method | U.S. EPA Method 18 / GC-FID             | 0.21 m <sup>3</sup> | 0.7 L/min<br>(30 min)     | 2.07<br>0.55  | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. 226-09                |
| 22    | Methylcyclohexane              | Sorbent Adsorption, Gas Chromatography Method | U.S.EPA Method18/SKC.Guide/ GC-FID      | 2-23 L              | 0.10 L/min<br>(1 hr)      | 4.02<br>1.00  | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-09             |
| 23    | Diethyl Ether or Ethyl Ether   | Sorbent Adsorption, Gas Chromatography Method | U.S.EPA Method18/SKC.Guide/ GC-FID      | 0.25-3 L            | 0.01-0.20 L/min<br>(1 hr) | 11.88<br>3.92 | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-09             |
| 24    | Methyl tert-Butyl Ether (MTBE) | Sorbent Adsorption, Gas Chromatography Method | U.S.EPA Method18/SKC.Guide/ GC-FID      | 2-96 L              | 0.01-0.20 L/min<br>(1 hr) | 3.08<br>0.86  | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-09             |
| 25    | Dichloromethane                | Sorbent Adsorption, Gas Chromatography Method | U.S.EPA Method18/SKC.Guide/ GC-FID      | 0.5-2.5 L           | 0.01-0.20 L/min<br>(1 hr) | 3.16<br>0.91  | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-09             |
| 26    | 1-Butanol /n-butyl alcohol     | Sorbent Adsorption, Gas Chromatography Method | U.S.EPA Method18/SKC.Guide/ GC-FID      | 2-10 L              | 0.01-0.20 L/min<br>(1 hr) | 2.31<br>0.76  | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-09             |
| 27    | 2-Butanol /sec-butyl alcohol   | Sorbent Adsorption, Gas Chromatography Method | U.S.EPA Method18/SKC.Guide/ GC-FID      | 2-10 L              | 0.01-0.20 L/min<br>(1 hr) | 2.31<br>0.76  | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-09             |
| 28    | Isobutyl alcohol (IBA)         | Sorbent Adsorption, Gas Chromatography Method | U.S.EPA Method18/SKC.Guide/ GC-FID      | 2-10 L              | 0.01-0.20 L/min<br>(1 hr) | 2.29<br>0.76  | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-09             |
| 29    | Thallium (Tl)                  | Isokinetic, Sampling,Digestion,ICP-OES Method | U.S. EPA Method 29 / ICP-AES            | 0.9 m <sup>3</sup>  | Isokinetic<br>(30 min)    | 0.010         | mg / m <sup>3</sup>        | 3             | Advantage MFS<br>Cat No. GC5090 MM |
| 30    | Ketones                        | Sorbent Adsorption, Gas Chromatography Method | NIOSH2555 (P.1-5) / PS pump / GC-FID    | 21 L                | 0.70 L/min<br>(1 hr)      | 1.88<br>0.79  | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. 226-09                |
| 31    | n-Heptane                      | Sorbent Adsorption, Gas Chromatography Method | NIOSH1500 (P.1-8) / PS pump / GC-FID    | 21 L                | 0.70 L/min<br>(1 hr)      | 3.89<br>0.95  | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. 226-09                |
| 32    | n-Butyl acetate                | Sorbent Adsorption, Gas Chromatography Method | NIOSH 1450(P.1-6) / PS pump / GC-FID    | 21 L                | 0.70 L/min<br>(1 hr)      | 4.75<br>1.00  | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. 226-09                |

| Items | Parameter         | Method                                        | Reference Method / Analytical Technique | Air Volume         | Sampling Rate / Period | LOQ / Range    | Unit                       | Decimal point | Remark                             |
|-------|-------------------|-----------------------------------------------|-----------------------------------------|--------------------|------------------------|----------------|----------------------------|---------------|------------------------------------|
| 33    | n-Pentane         | Sorbent Adsorption, Gas Chromatography Method | NIOSH 1500(P.1-8) / PS pump / GC-FID    | 21 L               | 0.70 L/min<br>(1 hr)   | 1.50<br>0.51   | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. 226-09                |
| 34    | Chloroform        | Sorbent Adsorption, Gas Chromatography Method | NIOSH1003 (P.1-7) / PS pump / GC-FID    | 21 L               | 0.70 L/min<br>(1 hr)   | 2.82<br>0.58   | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. 226-09                |
| 35    | Chlorobenzene     | Sorbent Adsorption, Gas Chromatography Method | NIOSH1003 (P.1-7) / PS pump / GC-FID    | 21 L               | 0.70 L/min<br>(1 hr)   | 2.64<br>0.57   | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. 226-09                |
| 36    | Formaldehyde      | Sorbent Adsorption, Gas Chromatography Method | NIOSH2541 (P.1-5) / PS pump / GC-FID    | 21 L               | 0.70 L/min<br>(1 hr)   | 0.31<br>0.25   | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. 226-118               |
| 37    | Hydrogen chloride | Sorbent Adsorption, IC Method                 | U.S. EPA Method 26A /IC                 | 0.12 m3            | 1 L/min<br>(30 min)    | 0.015<br>0.010 | mg / m <sup>3</sup><br>ppm | 3             | 0.1 N H2SO4 / 0.1 N NaOH           |
| 38    | Hydrogen fluoride | Sorbent Adsorption, IC Method                 | U.S. EPA Method 26A /IC                 | 0.12 m3            | 1 L/min<br>(30 min)    | 0.012<br>0.015 | mg / m <sup>3</sup><br>ppm | 3             | 0.1 N H2SO4 / 0.1 N NaOH           |
| 39    | Nitric            | Sorbent Adsorption, IC Method                 | U.S. EPA Method 26A /IC                 | 0.029 m3           | 1 L/min<br>(30 min)    | 0.026<br>0.010 | mg / m <sup>3</sup><br>ppm | 3             | Milli-Q Water                      |
| 40    | Chlorine          | Sorbent Adsorption, IC Method                 | U.S. EPA Method 26A /IC                 | 0.12 m3            | 1 L/min<br>(30 min)    | 0.029<br>0.010 | mg / m <sup>3</sup><br>ppm | 3             | 0.1 N H2SO4 / 0.1 N NaOH           |
| 41    | Molybdenum (Mo)   | Isokinetic, Sampling,Digestion,ICP-OES Method | U.S. EPA Method 29 / ICP-AES            | 0.9 m <sup>3</sup> | Isokinetic<br>(30 min) | 0.005          | mg / m <sup>3</sup>        | 3             | Advantage MFS<br>Cat No. GC5090 MM |
| 42    | Titanium (Ti)     | Isokinetic, Sampling,Digestion,ICP-OES Method | U.S. EPA Method 29 / ICP-AES            | 0.9 m <sup>3</sup> | Isokinetic<br>(30 min) | 0.005          | mg / m <sup>3</sup>        | 3             | Advantage MFS<br>Cat No. GC5090 MM |
| 43    | Boron (B)         | Isokinetic, Sampling,Digestion,ICP-OES Method | U.S. EPA Method 29 / ICP-AES            | 0.9 m <sup>3</sup> | Isokinetic<br>(30 min) | 0.005          | mg / m <sup>3</sup>        | 3             | Advantage MFS<br>Cat No. GC5090 MM |
| 44    | Silicon (Si)      | Isokinetic, Sampling,Digestion,ICP-OES Method | U.S. EPA Method 29 / ICP-AES            | 0.9 m <sup>3</sup> | Isokinetic<br>(30 min) | 0.005          | mg / m <sup>3</sup>        | 3             | Advantage MFS<br>Cat No. GC5090 MM |
| 45    | Potassium (K)     | Isokinetic, Sampling,Digestion,ICP-OES Method | U.S. EPA Method 29 / ICP-AES            | 0.9 m <sup>3</sup> | Isokinetic<br>(30 min) | 0.100          | mg / m <sup>3</sup>        | 3             | Advantage MFS<br>Cat No. GC5090 MM |

1. Method of Air Sampling and Analysis, APHA Intersociety Committee, 2017
2. NIOSH Manual of Analytical Methods (NMAM)
3. Code of Federal Regulation, U.S. EPA., 40 CFR Part 50, Part 60, 2000
4. Occupational Health and Safety Management System(OSHA) Analytical Methods Manual
5. International Standard Organization, ISO 11204:1995
6. Compendium of Methods for Determination of Inorganic Compound in Ambient Air, U.S. EPA., 1995
7. Annual Book of ASTM Standard, Section 11, 2001

(ประเภทตัวอย่าง : อากาศในบรรยากาศโดยทั่วไป - Ambient Air Quality)

[illegible]

| Items | Parameter                         | Method                     | Reference Method / Analytical Technique                | Air Volume                   | Sampling Rate / Period                 | LOQ / Range | Unit                | Decimal point | Remark                                  |
|-------|-----------------------------------|----------------------------|--------------------------------------------------------|------------------------------|----------------------------------------|-------------|---------------------|---------------|-----------------------------------------|
| 2     | Sulfur Dioxide (SO <sub>2</sub> ) | Pararosaniline Method      | U.S. EPA 40 CFR Part 50 Appendix A / Spectrophotometer | 288 L                        | 0.2 L/min<br>(24 hrs)                  | 0.01        | mg / m <sup>3</sup> | 2             |                                         |
| 3     | Aluminium (Al)                    | Filtration, ICP-OES Method | U.S. EPA Method IO-3.4 / High Volume - ICP-OES         | 1,590 – 2,447 m <sup>3</sup> | 39-60 ft <sup>3</sup> /min<br>(24 hrs) | 0.0001      | mg / m <sup>3</sup> | 4             | Advantage MFS<br>Cat. No. GA55 8 x 10 * |
| 4     | Antimony (Sb)                     | Filtration, ICP-OES Method | U.S. EPA Method IO-3.4 / High Volume - ICP-OES         | 1,590 – 2,447 m <sup>3</sup> | 39-60 ft <sup>3</sup> /min<br>(24 hrs) | 0.0001      | mg / m <sup>3</sup> | 4             | Advantage MFS<br>Cat. No. GA55 8 x 10 * |
| 5     | Arsenic (As)                      | Filtration, ICP-OES Method | U.S. EPA Method IO-3.4 / High Volume - ICP-OES         | 1,590 – 2,447 m <sup>3</sup> | 39-60 ft <sup>3</sup> /min<br>(24 hrs) | 0.0001      | mg / m <sup>3</sup> | 4             | Advantage MFS<br>Cat. No. GA55 8 x 10 * |
| 6     | Barium (Ba)                       | Filtration, ICP-OES Method | U.S. EPA Method IO-3.4 / High Volume - ICP-OES         | 1,590 – 2,447 m <sup>3</sup> | 39-60 ft <sup>3</sup> /min<br>(24 hrs) | 0.0001      | mg / m <sup>3</sup> | 4             | Advantage MFS<br>Cat. No. GA55 8 x 10 * |
| 7     | Cadmium (Cd)                      | Filtration, ICP-OES Method | U.S. EPA Method IO-3.4 / High Volume - ICP-OES         | 1,590 – 2,447 m <sup>3</sup> | 39-60 ft <sup>3</sup> /min<br>(24 hrs) | 0.0001      | mg / m <sup>3</sup> | 4             | Advantage MFS<br>Cat. No. GA55 8 x 10 * |
| 8     | Calcium (Ca)                      | Filtration, ICP-OES Method | U.S. EPA Method IO-3.4 / High Volume - ICP-OES         | 1,590 – 2,447 m <sup>3</sup> | 39-60 ft <sup>3</sup> /min<br>(24 hrs) | 0.0001      | mg / m <sup>3</sup> | 4             | Advantage MFS<br>Cat. No. GA55 8 x 10 * |
| 9     | Chromium (Cr)                     | Filtration, ICP-OES Method | U.S. EPA Method IO-3.4 / High Volume - ICP-OES         | 1,590 – 2,447 m <sup>3</sup> | 39-60 ft <sup>3</sup> /min<br>(24 hrs) | 0.0001      | mg / m <sup>3</sup> | 4             | Advantage MFS<br>Cat. No. GA55 8 x 10 * |
| 10    | Copper (Cu)                       | Filtration, ICP-OES Method | U.S. EPA Method IO-3.4 / High Volume - ICP-OES         | 1,590 – 2,447 m <sup>3</sup> | 39-60 ft <sup>3</sup> /min<br>(24 hrs) | 0.0001      | mg / m <sup>3</sup> | 4             | Advantage MFS<br>Cat. No. GA55 8 x 10 * |
| 11    | Iron (Fe)                         | Filtration, ICP-OES Method | U.S. EPA Method IO-3.4 / High Volume - ICP-OES         | 1,590 – 2,447 m <sup>3</sup> | 39-60 ft <sup>3</sup> /min<br>(24 hrs) | 0.0001      | mg / m <sup>3</sup> | 4             | Advantage MFS<br>Cat. No. GA55 8 x 10 * |
| 12    | Lead (Pb)                         | Filtration, ICP-OES Method | U.S. EPA Method IO-3.4 / High Volume - ICP-OES         | 1,590 – 2,447 m <sup>3</sup> | 39-60 ft <sup>3</sup> /min<br>(24 hrs) | 0.0001      | mg / m <sup>3</sup> | 4             | Advantage MFS<br>Cat. No. GA55 8 x 10 * |
| 13    | Magnesium (Mg)                    | Filtration, ICP-OES Method | U.S. EPA Method IO-3.4 / High Volume - ICP-OES         | 1,590 – 2,447 m <sup>3</sup> | 39-60 ft <sup>3</sup> /min<br>(24 hrs) | 0.0001      | mg / m <sup>3</sup> | 4             | Advantage MFS<br>Cat. No. GA55 8 x 10 * |
| 14    | Manganese (Mn)                    | Filtration, ICP-OES Method | U.S. EPA Method IO-3.4 / High Volume - ICP-OES         | 1,590 – 2,447 m <sup>3</sup> | 39-60 ft <sup>3</sup> /min<br>(24 hrs) | 0.0001      | mg / m <sup>3</sup> | 4             | Advantage MFS<br>Cat. No. GA55 8 x 10 * |

| Items | Parameter               | Method                        | Reference Method / Analytical Technique        | Air Volume                   | Sampling Rate / Period                 | LOQ / Range  | Unit                       | Decimal point | Remark                                  |
|-------|-------------------------|-------------------------------|------------------------------------------------|------------------------------|----------------------------------------|--------------|----------------------------|---------------|-----------------------------------------|
| 15    | Mercury (Hg)            | Filtration, AAS Method        | U.S. EPA Method IO-3.4 / High Volume - AAS     | 1,590 – 2,447 m <sup>3</sup> | 39-60 ft <sup>3</sup> /min<br>(24 hrs) | 0.0001       | mg / m <sup>3</sup>        | 4             | Advantage MFS<br>Cat. No. GA55 8 x 10 * |
| 16    | Nickel (Ni)             | Filtration, ICP-OES Method    | U.S. EPA Method IO-3.4 / High Volume - ICP-OES | 1,590 – 2,447 m <sup>3</sup> | 39-60 ft <sup>3</sup> /min<br>(24 hrs) | 0.0001       | mg / m <sup>3</sup>        | 4             | Advantage MFS<br>Cat. No. GA55 8 x 10 * |
| 17    | Potassium (K)           | Filtration, ICP-OES Method    | U.S. EPA Method IO-3.4 / High Volume - ICP-OES | 1,590 – 2,447 m <sup>3</sup> | 39-60 ft <sup>3</sup> /min<br>(24 hrs) | 0.0001       | mg / m <sup>3</sup>        | 4             | Advantage MFS<br>Cat. No. GA55 8 x 10 * |
| 18    | Sodium (Na)             | Filtration, ICP-OES Method    | U.S. EPA Method IO-3.4 / High Volume - ICP-OES | 1,590 – 2,447 m <sup>3</sup> | 39-60 ft <sup>3</sup> /min<br>(24 hrs) | 0.0001       | mg / m <sup>3</sup>        | 4             | Advantage MFS<br>Cat. No. GA55 8 x 10 * |
| 19    | Tin (Sn)                | Filtration, ICP-OES Method    | U.S. EPA Method IO-3.4 / High Volume - ICP-OES | 1,590 – 2,447 m <sup>3</sup> | 39-60 ft <sup>3</sup> /min<br>(24 hrs) | 0.0001       | mg / m <sup>3</sup>        | 4             | Advantage MFS<br>Cat. No. GA55 8 x 10 * |
| 20    | Titanium (Ti)           | Filtration, ICP-OES Method    | U.S. EPA Method IO-3.4 / High Volume - ICP-OES | 1,590 – 2,447 m <sup>3</sup> | 39-60 ft <sup>3</sup> /min<br>(24 hrs) | 0.0001       | mg / m <sup>3</sup>        | 4             | Advantage MFS<br>Cat. No. GA55 8 x 10 * |
| 21    | Vanadium (V)            | Filtration, ICP-OES Method    | U.S. EPA Method IO-3.4 / High Volume - ICP-OES | 1,590 – 2,447 m <sup>3</sup> | 39-60 ft <sup>3</sup> /min<br>(24 hrs) | 0.0001       | mg / m <sup>3</sup>        | 4             | Advantage MFS<br>Cat. No. GA55 8 x 10 * |
| 22    | Zinc (Zn)               | Filtration, ICP-OES Method    | U.S. EPA Method IO-3.4 / High Volume - ICP-OES | 1,590 – 2,447 m <sup>3</sup> | 39-60 ft <sup>3</sup> /min<br>(24 hrs) | 0.0001       | mg / m <sup>3</sup>        | 4             | Advantage MFS<br>Cat. No. GA55 8 x 10 * |
| 23    | Selenium (Se)           | Filtration, ICP-OES Method    | U.S. EPA Method IO-3.4 / High Volume - ICP-OES | 1,590 – 2,447 m <sup>3</sup> | 39-60 ft <sup>3</sup> /min<br>(24 hrs) | 0.0001       | mg / m <sup>3</sup>        | 4             | Advantage MFS<br>Cat. No. GA55 8 x 10 * |
| 24    | Acetone                 | Sorbent Adsorption, GC Method | ASTM D 3687-95 / GC-FID                        | 144 L                        | 0.10 L/min<br>(24 hrs)                 | 0.14<br>0.06 | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-01                  |
| 25    | Benzene                 | Sorbent Adsorption, GC Method | ASTM D 3687-95 / GC-FID                        | 144 L                        | 0.10 L/min<br>(24 hrs)                 | 0.12<br>0.04 | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-02                  |
| 26    | Cyclohexanone           | Sorbent Adsorption, GC Method | ASTM D 3687-95 / GC-FID                        | 144 L                        | 0.10 L/min<br>(24 hrs)                 | 0.16<br>0.04 | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-04                  |
| 27    | Ethanol (Ethyl alcohol) | Sorbent Adsorption, GC Method | ASTM D 3687-95 / GC-FID                        | 288 L                        | 0.10 L/min<br>(24 hrs)                 | 0.14<br>0.07 | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-05                  |

| Items | Parameter                             | Method                        | Reference Method / Analytical Technique | Air Volume | Sampling Rate / Period    | LOQ / Range  | Unit                       | Decimal point | Remark                 |
|-------|---------------------------------------|-------------------------------|-----------------------------------------|------------|---------------------------|--------------|----------------------------|---------------|------------------------|
| 28    | Ethylacetate                          | Sorbent Adsorption, GC Method | ASTM D 3687-95 / GC-FID                 | 144 L      | 0.10 L/min<br>(24 hrs)    | 0.32<br>0.09 | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-06 |
| 29    | Ethylbenzene                          | Sorbent Adsorption, GC Method | ASTM D 3687-95 / GC-FID                 | 144 L      | 0.10 L/min<br>(24 hrs)    | 0.15<br>0.03 | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-07 |
| 30    | Hexane                                | Sorbent Adsorption, GC Method | ASTM D 3687-95 / GC-FID                 | 144 L      | 0.10 L/min<br>(24 hrs)    | 0.32<br>0.09 | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-08 |
| 31    | Isopropanol (Isopropyl alcohol) ; IPA | Sorbent Adsorption, GC Method | ASTM D 3687-95 / GC-FID                 | 288 L      | 0.10 L/min<br>(24 hrs)    | 0.14<br>0.06 | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-09 |
| 32    | Methanol (Methyl alcohol)             | Sorbent Adsorption, GC Method | ASTM D 3687-95 / GC-FID                 | 144 L      | 0.10 L/min<br>(24 hrs)    | 0.07<br>0.05 | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-10 |
| 33    | Methyl Ethyl Ketone (MEK)             | Sorbent Adsorption, GC Method | ASTM D 3687-95 / GC-FID                 | 144 L      | 0.10 L/min<br>(24 hrs)    | 0.14<br>0.05 | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-11 |
| 34    | Styrene                               | Sorbent Adsorption, GC Method | ASTM D 3687-95 / GC-FID                 | 144 L      | 0.10 L/min<br>(24 hrs)    | 0.16<br>0.04 | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-12 |
| 35    | Toluene                               | Sorbent Adsorption, GC Method | ASTM D 3687-95 / GC-FID                 | 144 L      | 0.10 L/min<br>(24 hrs)    | 0.15<br>0.04 | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-13 |
| 36    | Xylene                                | Sorbent Adsorption, GC Method | ASTM D 3687-95 / GC-FID                 | 144 L      | 0.10 L/min<br>(24 hrs)    | 0.15<br>0.03 | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-14 |
| 37    | Methylcyclohexane                     | Sorbent Adsorption, GC Method | NIOSH 1500 (P.1-8) / PS pump / GC-FID   | 2-23 L     | 0.10 L/min<br>(1 hr)      | 0.32<br>0.08 | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-01 |
| 38    | Methyl acetate                        | Sorbent Adsorption, GC Method | NIOSH 1458 (P.1-8) / PS pump / GC-FID   | 0.2-10 L   | 0.10 L/min<br>(1 hr)      | 0.61<br>0.20 | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-01 |
| 39    | Diethyl Ether or Ethyl Ether          | Sorbent Adsorption, GC Method | NIOSH 1610 (P.1-4) / PS pump / GC-FID   | 0.25-3 L   | 0.01-0.20 L/min<br>(1 hr) | 0.12<br>0.04 | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-01 |
| 40    | Methyl tert-Butyl Ether (MTBE)        | Sorbent Adsorption, GC Method | NIOSH 1615 (P.1-4) / PS pump / GC-FID   | 2-96 L     | 0.01-0.20 L/min<br>(1 hr) | 0.13<br>0.04 | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-01 |

| Items | Parameter                     | Method                        | Reference Method / Analytical Technique | Air Volume | Sampling Rate / Period    | LOQ / Range    | Unit                       | Decimal point | Remark                 |
|-------|-------------------------------|-------------------------------|-----------------------------------------|------------|---------------------------|----------------|----------------------------|---------------|------------------------|
| 41    | Dichloromethane               | Sorbent Adsorption, GC Method | NIOSH 1005 (P.1-4) / PS pump / GC-FID   | 0.5-2.5 L  | 0.01-0.20 L/min<br>(1 hr) | 0.23<br>0.07   | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-01 |
| 42    | 1-Butanol /n-butyl alcohol    | Sorbent Adsorption, GC Method | NIOSH 1401 (P.1-4) / PS pump / GC-FID   | 2-10 L     | 0.01-0.20 L/min<br>(1 hr) | 0.17<br>0.06   | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-01 |
| 43    | 2-Butanol /sec-butyl alcohol  | Sorbent Adsorption, GC Method | NIOSH 1401 (P.1-4) / PS pump / GC-FID   | 2-10 L     | 0.01-0.20 L/min<br>(1 hr) | 0.17<br>0.06   | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-01 |
| 44    | Isobutyl alcohol (IBA)        | Sorbent Adsorption, GC Method | NIOSH 1401 (P.1-4) / PS pump / GC-FID   | 2-10 L     | 0.01-0.20 L/min<br>(1 hr) | 0.17<br>0.06   | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-01 |
| 45    | Methyl Isobutyl Ketone (MIBK) | Sorbent Adsorption, GC Method | OSHA 1004(P.1-27) / PS pump / GC-FID    | 0.25-12L   | 0.10 L/min<br>(1 hr)      | 0.14<br>0.03   | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-01 |
| 46    | Ketones                       | Sorbent Adsorption, GC Method | NIOSH 2555 (P.1-5) / PS pump / GC-FID   | 0.5-10L    | 0.01-0.20 L/min<br>(1 hr) | 0.14<br>0.06   | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-01 |
| 47    | n-Butyl acetate               | Sorbent Adsorption, GC Method | NIOSH 1450 (P.1-6) / PS pump / GC-FID   | 1-10L      | 0.01-0.20 L/min<br>(1 hr) | 0.38<br>0.08   | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-01 |
| 48    | n-Pentane                     | Sorbent Adsorption, GC Method | NIOSH 1500 (P.1-8) / PS pump / GC-FID   | -          | 0.01-0.20 L/min<br>(1 hr) | 0.11<br>0.04   | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-01 |
| 49    | Chloroform                    | Sorbent Adsorption, GC Method | NIOSH 1003 (P.1-7) / PS pump / GC-FID   | 1-50L      | 0.01-0.20 L/min<br>(1 hr) | 0.21<br>0.04   | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-01 |
| 50    | Chlorobenzene                 | Sorbent Adsorption, GC Method | NIOSH 1003 (P.1-7) / PS pump / GC-FID   | 1.5-40L    | 0.01-0.20 L/min<br>(1 hr) | 0.19<br>0.04   | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-01 |
| 51    | Formaldehyde                  | Sorbent Adsorption, GC Method | NIOSH 2541 (P.1-5) / PS pump / GC-FID   | 1-36L      | 0.01-0.10 L/min<br>(1 hr) | 0.01<br>0.01   | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. 226-118   |
| 52    | Hydrogen chloric              | Sorbent Adsorption, IC Method | OSHA ID-174SG / PS pump / IC            | 1-7.5 L    | 0.20 L/min<br>(24 hr)     | 0.015<br>0.010 | mg / m <sup>3</sup><br>ppm | 3             | SKC Cat. No. 226-10-03 |
| 53    | Hydrogen Bromide              | Sorbent Adsorption, IC Method | OSHA ID16SSG / PS pump / IC             | 1-96 L     | 0.20 L/min<br>(24 hr)     | 0.033<br>0.010 | mg / m <sup>3</sup><br>ppm | 3             | SKC Cat. No. 226-10-03 |

| Items | Parameter                  | Method                        | Reference Method / Analytical Technique                  | Air Volume  | Sampling Rate / Period | LOQ / Range    | Unit                       | Decimal point | Remark                                |
|-------|----------------------------|-------------------------------|----------------------------------------------------------|-------------|------------------------|----------------|----------------------------|---------------|---------------------------------------|
| 54    | Sulfuric Acid              | Sorbent Adsorption, IC Method | OSHA ID165SG / PS pump / IC<br>NIOSH 7908 / PS pump / IC | 1-96 L      | 0.20 L/min<br>(24 hr)  | 0.040<br>0.010 | mg / m <sup>3</sup><br>ppm | 3             | SKC Cat. No. 226-10-03<br>Fier (PTFE) |
| 55    | Phosphoric Acid            | Sorbent Adsorption, IC Method | OSHA ID165SG / PS pump / IC<br>NIOSH 7908 / PS pump / IC | 1-96 L      | 0.20 L/min<br>(24 hr)  | 0.040<br>0.010 | mg / m <sup>3</sup><br>ppm | 3             | SKC Cat. No. 226-10-03<br>Fier (PTFE) |
| 56    | Nitric                     | Sorbent Adsorption, IC Method | OSHA ID165SG / PS pump / IC                              | 1-96 L      | 0.20 L/min<br>(24 hr)  | 0.026<br>0.010 | mg / m <sup>3</sup><br>ppm | 3             | SKC Cat. No. 226-10-03                |
| 57    | Chlorine                   | Sorbent Adsorption, IC Method | OSHA ID-202 / PS pump / IC                               | 14 L        | 0.20 L/min<br>(24 hr)  | 0.029<br>0.010 | mg / m <sup>3</sup><br>ppm | 3             | 0.02% KI in Buffer solution           |
| 58    | Ammonia (NH <sub>3</sub> ) | Sorbent Adsorption, IC Method | NIOSH 6016 / PS pump / IC                                | 0.10 - 96 L | 0.20 L/min<br>(120min) | 0.200<br>0.280 | mg / m <sup>3</sup><br>ppm | 3             | SKC Cat. No. 226-10-06                |
| 59    | Hydrogen fluoride          | Sorbent Adsorption, IC Method | OSHA ID165SG / PS pump / IC                              | 60 L        | 0.2 L/min<br>(60min)   | 0.008<br>0.010 | mg / m <sup>3</sup><br>ppm | 3             | SKC Cat. No. 226-10-03                |

เอกสารอ้างอิง

1. Method of Air Sampling and Analysis, APHA Intersociety Committee, 2017
2. NIOSH Manual of Analytical Methods (NMAM)
3. Code of Federal Regulation, U.S. EPA , 40 CFR Part 50, Part 60, 2000
4. Occupational Health and Safety Management System(OSHA) Analytical Methods Manuel
5. International Standard Organization, ISO 11204:1995
6. Compendium of Methods for Determination of Inorganic Compound in Ambient Air, U.S. EPA , 1999
7. Annual Book of ASTM Standard, Section 11, 2001

Rev.3 วันที่ 21/6/2024 แก้ไข Detection Limit ของโลหะหนักโดยรายงานหน่วย mg/m3 ทุกพารามิเตอร์เพื่อให้สอดคล้อง กับมาตรฐาน

การตรวจวิเคราะห์คุณภาพอากาศ (Air Quality Analysis)

| (ประเภทตัวอย่าง : อากาศในบริเวณการทำงาน - Workplace Air Quality) |                                                 |                                                  |                                                    |            |                          |              |                            |               |                                      |
|------------------------------------------------------------------|-------------------------------------------------|--------------------------------------------------|----------------------------------------------------|------------|--------------------------|--------------|----------------------------|---------------|--------------------------------------|
| Items                                                            | Parameter                                       | Sampling/Method                                  | Reference Method / Analytical Technique            | Air Volume | Sampling Rate / Period   | LOQ / Range  | Unit                       | Decimal point | Remark                               |
| หมวกปฏิบัติกรกอนาม                                               |                                                 |                                                  |                                                    |            |                          |              |                            |               |                                      |
| 1                                                                | Illumination                                    | Lux Meter                                        | HS C 1906 / Lux meter                              |            | -                        | 0-5000       | lux                        | -             |                                      |
| 2                                                                | Sound (Leq, Lmin, Lmax, Ldn, Lp)                | Integrated Sound Level Method                    | ISO 11202 / Sound Level Meter                      |            | -                        | 40 - 140     | dB (A)                     | 1             |                                      |
| 3                                                                | Noise Octave band                               | Integrated Sound Level Method                    | AS/NZS 4476 1997 / Sound Level Meter               |            | -                        | 40 - 140     | dB (A)                     | 1             | 1/3 Octave band หรือ 1/1 Octave band |
| 4                                                                | Noise dose                                      | Integrated Sound Level Method                    | BS6402 / Noise Dosimeter                           |            | -                        | 0 - 9999     | % Dose                     | 2             |                                      |
| 5                                                                | Carbon Monoxide (CO)                            | Non-Dispersive Infrared Photometric Method       | U.S. EPA 10 (P.1-5) / Carbon Monoxide Analyzer     |            | -                        | 0.1 - 100    | ppm                        | 1             |                                      |
| 6                                                                | Ozone (O <sub>3</sub> )                         | UV Fluorescence Method                           | U.S. EPA method / Ozone Analyzer                   |            | -                        | 0.1 - 100    | ppm                        | 2             |                                      |
| 7                                                                | Heat Stress                                     | WBGT Method                                      | ACGIH / Grove + DI + Thermometer / calculation     | -          | -                        | 0 - 100      | oC                         | 2             |                                      |
| ส่วนงานทดสอบพื้นฐาน                                              |                                                 |                                                  |                                                    |            |                          |              |                            |               |                                      |
| 1                                                                | Total Dust (TD)                                 | Filtration, Gravimetric Method                   | NIOSH 0500 (P.1-3) / PS pump / Gravimetric         | 7-133 L    | 2 L/min (1 hr)           | 0.8          | mg / m <sup>3</sup>        | 1             | SKC Cat No. 225-8-01                 |
| 2                                                                | Respirable Dust (RD)                            | Cyclone - Filtration, Gravimetric Method         | NIOSH 0600 (P.1-3) / PS pump cyclone / Gravimetric | 20-400 L   | 1.70 L/min<br>(1 hr)     | 0.5          | mg / m <sup>3</sup>        | 1             | SKC Cat No. 225-8-01                 |
| 3                                                                | NaOH                                            | Acid-Base Titrimetric Method                     | NIOSH 7401(P.1-4) / PS pump / Titration            | 70-1000 L  | 1-4 L/min                | 0.4          | mg / m <sup>3</sup>        | 1             | SKC Cat No. 225-17-01                |
| 4                                                                | KOH                                             | Acid-Base Titrimetric Method                     | NIOSH 7401(P.1-4) / PS pump / Titration            | 70-1000 L  | 1-4 L/min                | 0.6          | mg / m <sup>3</sup>        | 1             | SKC Cat No. 225-17-01                |
| 5                                                                | LiOH                                            | Acid-Base Titrimetric Method                     | NIOSH 7401(P.1-4) / PS pump / Titration            | 70-1000 L  | 1-4 L/min                | 0.2          | mg / m <sup>3</sup>        | 1             | SKC Cat No. 225-17-01                |
| ส่วนงานเครื่องมือทดสอบ                                           |                                                 |                                                  |                                                    |            |                          |              |                            |               |                                      |
| 1                                                                | Ammonia                                         | Impingement Absorption - Colorimetric Method     | Modified NIOSH 6015(P.1-7) / Spectrophotometer     | 0.1-96 L   | 1 L/min<br>(1 hr)        | 0.01         | mg / m <sup>3</sup>        | 2             |                                      |
| 2                                                                | Nitrogen Dioxide                                | Impingement Absorption, Spectrophotometer Method | APHA 817(P.1-3) / Spectrophotometer                | 7.5 - 10 L | 0.5 L/min<br>(15-20 min) | 0.01         | ppm                        | 2             |                                      |
| 3                                                                | Sulfur Dioxide                                  | Impingement Absorption, Titrimetric Method       | APHA 823(P.1-3) / Titration                        | 26 L       | 0.21 L/min<br>(2 hrs)    | 0.30<br>0.11 | mg / m <sup>3</sup><br>ppm | 2             |                                      |
| 4                                                                | P,P'-diphenylmethane diisocyanate(MDI)<br>(MDI) | Impingement Absorption, Spectrophotometer Method | APHA 831(P.1-3) / Spectrophotometer                | 20 L       | 1 L/min<br>(20 min)      | 0.002        | ppm                        | 2             |                                      |
| 5                                                                | Aluminum (Al)                                   | Filtration, ICP-OES Method                       | NIOSH 7300(P.1-8) / PS pump / ICP-OES              | 5-100 L    | 2 L/min<br>(1 hr)        | 0.004        | mg / m <sup>3</sup>        | 3             | SKC Cat No. 225-5                    |
| 6                                                                | Antimony (Sb)                                   | Filtration, ICP-OES Method                       | NIOSH 7300(P.1-8) / PS pump / ICP-OES              | 50-2000 L  | 2 L/min<br>(1 hr)        | 0.021        | mg / m <sup>3</sup>        | 3             | SKC Cat No. 225-5                    |

| Items | Parameter                    | Sampling/Method            | Reference Method / Analytical Technique | Air Volume | Sampling Rate / Period | LOQ / Range | Unit                | Decimal point | Remark            |
|-------|------------------------------|----------------------------|-----------------------------------------|------------|------------------------|-------------|---------------------|---------------|-------------------|
| 7     | Arsenic & Compound (as As)   | Filtration, ICP-OES Method | NIOSH 7300(P.1-8) / PS pump / ICP-OES   | 5-2000 L   | 2 L/min<br>(1 hr)      | 0.010       | mg / m <sup>3</sup> | 3             | SKC Cat No. 225-5 |
| 8     | Barium (Ba)                  | Filtration, ICP-OES Method | NIOSH 7300(P.1-8) / PS pump / ICP-OES   | 50-2000 L  | 2 L/min<br>(1 hr)      | 0.004       | mg / m <sup>3</sup> | 3             | SKC Cat No. 225-5 |
| 9     | Cadmium & Compounds (as Cd)  | Filtration, ICP-OES Method | NIOSH 7300(P.1-8) / PS pump / ICP-OES   | 25-1500 L  | 2 L/min<br>(1 hr)      | 0.004       | mg / m <sup>3</sup> | 3             | SKC Cat No. 225-5 |
| 10    | Calcium & Compounds (as Ca)  | Filtration, ICP-OES Method | NIOSH 7300(P.1-8) / PS pump / ICP-OES   | 20-400 L   | 2 L/min<br>(1 hr)      | 0.208       | mg / m <sup>3</sup> | 3             | SKC Cat No. 225-5 |
| 11    | Chromium & Compounds (as Cr) | Filtration, ICP-OES Method | NIOSH 7300(P.1-8) / PS pump / ICP-OES   | 5-1000 L   | 2 L/min<br>(1 hr)      | 0.004       | mg / m <sup>3</sup> | 3             | SKC Cat No. 225-5 |
| 12    | Copper (Cu) (Dust & Fume)    | Filtration, ICP-OES Method | NIOSH 7300(P.1-8) / PS pump / ICP-OES   | 50-1500 L  | 2 L/min<br>(1 hr)      | 0.004       | mg / m <sup>3</sup> | 3             | SKC Cat No. 225-5 |
| 13    | Iron & Compounds (as Fe)     | Filtration, ICP-OES Method | NIOSH 7300(P.1-8) / PS pump / ICP-OES   | 5-1000 L   | 2 L/min<br>(1 hr)      | 0.004       | mg / m <sup>3</sup> | 3             | SKC Cat No. 225-5 |
| 14    | Lead (Pb)                    | Filtration, ICP-OES Method | NIOSH 7300(P.1-8) / PS pump / ICP-OES   | 50-2000 L  | 2 L/min<br>(1 hr)      | 0.004       | mg / m <sup>3</sup> | 3             | SKC Cat No. 225-5 |
| 15    | Magnesium (Mg)               | Filtration, ICP-OES Method | NIOSH 7300(P.1-8) / PS pump / ICP-OES   | 6-67 L     | 2 L/min<br>(1 hr)      | 0.208       | mg / m <sup>3</sup> | 3             | SKC Cat No. 225-5 |
| 16    | Manganese (Mn)               | Filtration, ICP-OES Method | NIOSH 7300(P.1-8) / PS pump / ICP-OES   | 5-200 L    | 2 L/min<br>(1 hr)      | 0.004       | mg / m <sup>3</sup> | 3             | SKC Cat No. 225-5 |
| 17    | Mercury (Hg)                 | Filtration - AAS Method    | NIOSH 6009(P.1-5) / PS pump / AAS       | 2 – 100 L  | 0.2 L/min<br>(1 hr)    | 0.00002     | mg / m <sup>3</sup> | 5             | SKC Cat No. 225-5 |
| 18    | Nickel & Compounds (as Ni)   | Filtration, ICP-OES Method | NIOSH 7300(P.1-8) / PS pump / ICP-OES   | 5-1000 L   | 2 L/min<br>(1 hr)      | 0.004       | mg / m <sup>3</sup> | 3             | SKC Cat No. 225-5 |
| 19    | Selenium (Se)                | Filtration, ICP-OES Method | NIOSH 7300(P.1-8) / PS pump / ICP-OES   | 13-2000 L  | 2 L/min<br>(1 hr)      | 0.021       | mg / m <sup>3</sup> | 3             | SKC Cat No. 225-5 |
| 20    | Silver (Ag)                  | Filtration, ICP-OES Method | NIOSH 7300(P.1-8) / PS pump / ICP-OES   | 250-2000 L | 2 L/min<br>(2-17 hr)   | 0.010       | mg / m <sup>3</sup> | 3             | SKC Cat No. 225-5 |
| 21    | Sodium (Na)                  | Filtration, ICP-OES Method | NIOSH 7300(P.1-8) / PS pump / ICP-OES   | 13-2000 L  | 2 L/min<br>(1 hr)      | 0.208       | mg / m <sup>3</sup> | 3             | SKC Cat No. 225-5 |
| 22    | Tin (Sn)                     | Filtration, ICP-OES Method | NIOSH 7300(P.1-8) / PS pump / ICP-OES   | 5-1000 L   | 2 L/min<br>(1 hr)      | 0.021       | mg / m <sup>3</sup> | 3             | SKC Cat No. 225-5 |
| 23    | Titanium (Ti)                | Filtration, ICP-OES Method | NIOSH 7300(P.1-8) / PS pump / ICP-OES   | 5-1000 L   | 2 L/min<br>(1 hr)      | 0.004       | mg / m <sup>3</sup> | 3             | SKC Cat No. 225-5 |
| 24    | Vanadium (V)                 | Filtration, ICP-OES Method | NIOSH 7300(P.1-8) / PS pump / ICP-OES   | 5-2000 L   | 2 L/min<br>(1 hr)      | 0.004       | mg / m <sup>3</sup> | 3             | SKC Cat No. 225-5 |

| Items | Parameter                             | Sampling/Method               | Reference Method / Analytical Technique | Air Volume | Sampling Rate / Period | LOQ / Range   | Unit                       | Decimal point | Remark                  |
|-------|---------------------------------------|-------------------------------|-----------------------------------------|------------|------------------------|---------------|----------------------------|---------------|-------------------------|
| 25    | Zinc & Compounds (Zn)                 | Filtration, ICP-OES Method    | NIOSH 7300(P.1-8) / PS pump / ICP-OES   | 5-2000 L   | 2 L/min<br>(1 hr)      | 0.004         | mg / m <sup>3</sup>        | 3             | SKC Cat No. 225-5       |
| 26    | Acetone                               | Sorbent Adsorption, GC Method | NIOSH 1300 (P.1-5) / PS pump / GC-FID   | 0.5-3 L    | 0.10 L/min<br>(30 min) | 13.17<br>5.54 | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-01  |
| 27    | Benzene                               | Sorbent Adsorption, GC Method | NIOSH 1501(P.1-7) / PS pump / GC-FID    | 5-30 L     | 0.10 L/min<br>(1 hr)   | 2.93<br>0.92  | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-01  |
| 28    | Cyclohexanone                         | Sorbent Adsorption, GC Method | NIOSH 1300(P.1-5) / PS pump / GC-FID    | 1-10 L     | 0.10 L/min<br>(1 hr)   | 3.96<br>0.99  | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-01  |
| 29    | Ethanol (Ethyl alcohol)               | Sorbent Adsorption, GC Method | NIOSH 1400(P.1-4) / PS pump / GC-FID    | 12 L       | 0.10 L/min<br>(1 hr)   | 3.29<br>1.75  | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-01  |
| 30    | Ethylacetate                          | Sorbent Adsorption, GC Method | NIOSH 1457 (P.1-4) / PS pump / GC-FID   | 0.1-10 L   | 0.10 L/min<br>(1 hr)   | 7.21<br>2.00  | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-01  |
| 31    | Ethylbenzene                          | Sorbent Adsorption, GC Method | NIOSH 1501 (P.1-7) / PS pump / GC-FID   | 1-24 L     | 0.10 L/min<br>(1 hr)   | 3.63<br>0.83  | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-01  |
| 32    | Hexane                                | Sorbent Adsorption, GC Method | NIOSH 1500(P.1-8) / PS pump / GC-FID    | 4 L        | 0.10 L/min<br>(1 hr)   | 7.05<br>2.00  | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-01  |
| 33    | Isopropanol (Isopropyl alcohol) ; IPA | Sorbent Adsorption, GC Method | NIOSH 1400(P.1-4) / PS pump / GC-FID    | 12 L       | 0.10 L/min<br>(1 hr)   | 3.28<br>1.33  | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-01  |
| 34    | Methanol (Methyl alcohol)             | Sorbent Adsorption, GC Method | OSHA 910(P.1-10) / PS pump / GC-FID     | 1-5 L      | 0.10 L/min<br>(30 min) | 3.96<br>3.02  | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-82  |
| 35    | Methyl Ethyl Ketone (MEK)             | Sorbent Adsorption, GC Method | OSHA 1004(P.1-27) / PS pump / GC-FID    | 0.25-12L   | 0.10 L/min<br>(1 hr)   | 3.35<br>1.14  | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-81A |
| 36    | Methyl Isobutyl Ketone (MIBK)         | Sorbent Adsorption, GC Method | OSHA 1004(P.1-27) / PS pump / GC-FID    | 0.25-12L   | 0.10 L/min<br>(1 hr)   | 3.34<br>0.81  | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-01  |
| 37    | Styrene                               | Sorbent Adsorption, GC Method | NIOSH 1501 (P.1-7) / PS pump / GC-FID   | 1-24 L     | 0.10 L/min<br>(1 hr)   | 3.78<br>0.89  | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-01  |
| 38    | Toluene                               | Sorbent Adsorption, GC Method | NIOSH 1501 (P.1-7) / PS pump / GC-FID   | 1-8 L      | 0.10 L/min<br>(1 hr)   | 3.63<br>0.96  | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-01  |
| 39    | Xylene                                | Sorbent Adsorption, GC Method | NIOSH 1501 (P.1-7) / PS pump / GC-FID   | 2-23 L     | 0.10 L/min<br>(1 hr)   | 3.58<br>0.83  | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-01  |
| 40    | Cumene                                | Sorbent Adsorption, GC Method | NIOSH 1501 (P.1-7) / PS pump / GC-FID   | 2-23 L     | 0.10 L/min<br>(1 hr)   | 3.60<br>0.73  | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-01  |
| 41    | Methylcyclohexane                     | Sorbent Adsorption, GC Method | NIOSH 1500 (P.1-8) / PS pump / GC-FID   | 2-23 L     | 0.10 L/min<br>(1 hr)   | 7.23<br>1.80  | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-01  |

| Items | Parameter                                | Sampling/Method               | Reference Method / Analytical Technique | Air Volume  | Sampling Rate / Period    | LOQ / Range   | Unit                       | Decimal point | Remark                 |
|-------|------------------------------------------|-------------------------------|-----------------------------------------|-------------|---------------------------|---------------|----------------------------|---------------|------------------------|
| 42    | Methyl acetate                           | Sorbent Adsorption, GC Method | NIOSH 1458 (P.1-8) / PS pump / GC-FID   | 0.2-10 L    | 0.10 L/min<br>(1 hr)      | 9.09<br>3.00  | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-01 |
| 43    | Diethyl Ether or Ethyl Ether             | Sorbent Adsorption, GC Method | NIOSH 1610 (P.1-4) / PS pump / GC-FID   | 0.25-3 L    | 0.01-0.20 L/min<br>(1 hr) | 11.88<br>3.92 | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-01 |
| 44    | Methyl tert-Butyl Ether (MTBE)           | Sorbent Adsorption, GC Method | NIOSH 1615 (P.1-4) / PS pump / GC-FID   | 2-96 L      | 0.01-0.20 L/min<br>(1 hr) | 3.08<br>0.86  | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-01 |
| 45    | Dichloromethane<br>or Methylene chloride | Sorbent Adsorption, GC Method | NIOSH 1005 (P.1-4) / PS pump / GC-FID   | 0.5-2.5 L   | 0.01-0.20 L/min<br>(1 hr) | 22.1<br>6.36  | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-01 |
| 46    | 1-Butanol /n-butyl alcohol               | Sorbent Adsorption, GC Method | NIOSH 1401 (P.1-4) / PS pump / GC-FID   | 2-10 L      | 0.01-0.20 L/min<br>(1 hr) | 4.86<br>1.60  | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-01 |
| 47    | 2-Butanol /sec-butyl alcohol             | Sorbent Adsorption, GC Method | NIOSH 1401 (P.1-4) / PS pump / GC-FID   | 2-10 L      | 0.01-0.20 L/min<br>(1 hr) | 4.86<br>1.60  | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-01 |
| 48    | Isobutyl alcohol (IBA)                   | Sorbent Adsorption, GC Method | NIOSH 1401 (P.1-4) / PS pump / GC-FID   | 2-10 L      | 0.01-0.20 L/min<br>(1 hr) | 4.81<br>1.59  | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. ST 226-01 |
| 49    | Beryllium (Be)                           | Filtration, ICP-OES Method    | NIOSH 7300(P.1-8) / PS pump / ICP-OES   | 1250-2000 L | 2 L/min<br>(1 hr)         | 0.004         | mg / m <sup>3</sup>        | 3             | SKC Cat No. 225-5      |
| 50    | Cobalt (Co)                              | Filtration, ICP-OES Method    | NIOSH 7300(P.1-8) / PS pump / ICP-OES   | 25-2000 L   | 2 L/min<br>(1 hr)         | 0.004         | mg / m <sup>3</sup>        | 3             | SKC Cat No. 225-5      |
| 51    | Molybdenum (Mo)                          | Filtration, ICP-OES Method    | NIOSH 7300(P.1-8) / PS pump / ICP-OES   | 5-67 L      | 2 L/min<br>(1 hr)         | 0.004         | mg / m <sup>3</sup>        | 3             | SKC Cat No. 225-5      |
| 52    | Thallium (Tl)                            | Filtration, ICP-OES Method    | NIOSH 7300(P.1-8) / PS pump / ICP-OES   | 25-2000 L   | 2 L/min<br>(1 hr)         | 0.021         | mg / m <sup>3</sup>        | 3             | SKC Cat No. 225-5      |
| 53    | Silicon (Si)                             | Filtration, ICP-OES Method    | NIOSH 7300(P.1-8) / PS pump / ICP-OES   | 5-1000 L    | 2 L/min<br>(1 hr)         | 0.010         | mg / m <sup>3</sup>        | 3             | SKC Cat No. 225-5      |
| 54    | Potassium (K)                            | Filtration, ICP-OES Method    | NIOSH 7300(P.1-8) / PS pump / ICP-OES   | 5-1000 L    | 2 L/min<br>(1 hr)         | 0.208         | mg / m <sup>3</sup>        | 3             | SKC Cat No. 225-5      |
| 55    | Ketones                                  | Sorbent Adsorption, GC Method | NIOSH 2555 (P.1-5) / PS pump / GC-FID   | 0.5-3.0 L   | 0.01-0.20 L/min<br>(1 hr) | 13.17<br>5.54 | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. 226-01    |
| 56    | n-Heptane                                | Sorbent Adsorption, GC Method | NIOSH 1500 (P.1-8) / PS pump / GC-FID   | -           | 0.01-0.20 L/min<br>(1 hr) | 6.97<br>1.70  | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. 226-01    |
| 57    | n-Butyl acetate                          | Sorbent Adsorption, GC Method | NIOSH 1450(P.1-6) / PS pump / GC-FID    | 1-10 L      | 0.01-0.20 L/min<br>(1 hr) | 8.55<br>1.80  | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. 226-01    |
| 58    | n-Pentane                                | Sorbent Adsorption, GC Method | NIOSH 1500(P.1-8) / PS pump / GC-FID    | -           | 0.01-0.20 L/min<br>(1 hr) | 2.63<br>0.89  | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. 226-01    |

| Items | Parameter                             | Sampling/Method               | Reference Method / Analytical Technique | Air Volume  | Sampling Rate / Period    | LOQ / Range    | Unit                       | Decimal point | Remark                                  |
|-------|---------------------------------------|-------------------------------|-----------------------------------------|-------------|---------------------------|----------------|----------------------------|---------------|-----------------------------------------|
| 59    | Chloroform                            | Sorbent Adsorption, GC Method | NIOSH 1003 (P.1-7) / PS pump / GC-FID   | 1-50 L      | 0.01-0.20 L/min<br>(1 hr) | 4.93<br>1.01   | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. 226-01                     |
| 60    | Chlorobenzene                         | Sorbent Adsorption, GC Method | NIOSH 1003 (P.1-7) / PS pump / GC-FID   | 1.5-40L     | 0.01-0.20 L/min<br>(1 hr) | 4.63<br>1.00   | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. 226-01                     |
| 61    | Formaldehyde                          | Sorbent Adsorption, GC Method | NIOSH 2541 (P.1-5) / PS pump / GC-FID   | 1-36L       | 0.01-0.10 L/min<br>(1 hr) | 0.12<br>0.10   | mg / m <sup>3</sup><br>ppm | 2             | SKC Cat. No. 226-118<br>รพฐรณ DL:1/2/24 |
| 62    | Hydrogen chloride                     | Sorbent Adsorption, IC Method | OSHA ID-174SG / PS pump / IC            | 100 L       | 0.5 L/min<br>(15 min)     | 0.015<br>0.010 | mg / m <sup>3</sup><br>ppm | 3             | SKC Cat. No. 226-10-03                  |
| 63    | Hydrogen Bromide                      | Sorbent Adsorption, IC Method | OSHA ID16SSG / PS pump / IC             | 96 L        | 0.2 L/min<br>(60min)      | 0.033<br>0.010 | mg / m <sup>3</sup><br>ppm | 3             | SKC Cat. No. 226-10-03                  |
| 64    | Sulfuric Acid                         | Sorbent Adsorption, IC Method | OSHA ID16SSG / PS pump / IC             | 96 L        | 0.2 L/min<br>(60min)      | 0.040<br>0.010 | mg / m <sup>3</sup><br>ppm | 3             | SKC Cat. No. 226-10-03                  |
| 65    | Phosphoric Acid                       | Sorbent Adsorption, IC Method | OSHA ID16SSG / PS pump / IC             | 96 L        | 0.2 L/min<br>(60min)      | 0.040<br>0.010 | mg / m <sup>3</sup><br>ppm | 3             | SKC Cat. No. 226-10-03                  |
| 66    | Ammonia (NH <sub>3</sub> )            | Sorbent Adsorption, IC Method | NIOSH 6016 / PS pump / IC               | 0.10 - 96 L | 0.2 L/min<br>(120min)     | 0.200<br>0.280 | mg / m <sup>3</sup><br>ppm | 3             | SKC Cat. No. 226-10-06                  |
| 67    | Nitric                                | Sorbent Adsorption, IC Method | OSHA ID16SSG / PS pump / IC             | 96 L        | 0.2 L/min<br>(60min)      | 0.026<br>0.010 | mg / m <sup>3</sup><br>ppm | 3             | SKC Cat. No. 226-10-03                  |
| 68    | Chlorine                              | Sorbent Adsorption, IC Method | OSHA ID-202 / PS pump / IC              | 60 L        | 0.5 L/min<br>(60min)      | 0.029<br>0.010 | mg / m <sup>3</sup><br>ppm | 3             | 0.02% KI in Buffer solution             |
| 69    | Hydrogen fluoride                     | Sorbent Adsorption, IC Method | OSHA ID16SSG / PS pump / IC             | 96 L        | 0.2 L/min<br>(60min)      | 0.008<br>0.010 | mg / m <sup>3</sup><br>ppm | 3             | SKC Cat. No. 226-10-03                  |
| 70    | Phosphorus (P)                        | Filtration, ICP-OES Method    | NIOSH 7300(P.1-8) / PS pump / ICP-OES   | 5-1000 L    | 2 L/min<br>(1 hr)         | 0.042          | mg / m <sup>3</sup>        | 3             | SKC Cat No. 225-5                       |
| 71    | Boron (B)                             | Filtration, ICP-OES Method    | NIOSH 7300(P.1-8) / PS pump / ICP-OES   | 5-1000 L    | 2 L/min<br>(1 hr)         | 0.010          | mg / m <sup>3</sup>        | 3             | SKC Cat No. 225-5                       |
| 72    | Sulfur dioxide                        | Filtration, IC Method         | NIOSH 6004 / PS pump / IC               | 4-200 L     | 1 L/min<br>(120min)       | 0.015<br>0.006 | mg / m <sup>3</sup><br>ppm | 3             | Treated Filter                          |
| 73    | Sulfuric Acid                         | Filtration, IC Method         | NIOSH 7908 / PS pump / IC               | 15-2000 L   | 1 L/min<br>(120min)       | 0.040<br>0.010 | mg / m <sup>3</sup><br>ppm | 3             | Fiter (PTFE)                            |
| 74    | Phosphoric Acid                       | Filtration, IC Method         | NIOSH 7908 / PS pump / IC               | 15-2000 L   | 1 L/min<br>(120min)       | 0.040<br>0.010 | mg / m <sup>3</sup><br>ppm | 3             | Fiter (PTFE)                            |
| 75    | Ammonium NH <sub>4</sub> <sup>+</sup> | Sorbent Adsorption, IC Method | NIOSH 6016 / PS pump / IC               | 0.10 - 96 L | 0.2 L/min<br>(120min)     | 0.017<br>0.023 | mg / m <sup>3</sup><br>ppm | 3             | SKC Cat. No. 226-10-06                  |

| Items | Parameter                                                              | Sampling/Method                            | Reference Method / Analytical Technique | Air Volume  | Sampling Rate / Period | LOQ / Range    | Unit                       | Decimal point | Remark                 |
|-------|------------------------------------------------------------------------|--------------------------------------------|-----------------------------------------|-------------|------------------------|----------------|----------------------------|---------------|------------------------|
| 76    | Ammonium Chloride (NH <sub>4</sub> Cl) as NH <sub>4</sub> <sup>+</sup> | Sorbent Adsorption, IC <sup>-</sup> Method | NIOSH 6016 / PS pump / IC               | 0.10 - 96 L | 0.2 L/min<br>(120min)  | 0.049<br>0.067 | mg / m <sup>3</sup><br>ppm | 3             | SKC Cat. No. 226-10-06 |

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Rev.5- 20/1/2569

## การตรวจวิเคราะห์คุณภาพน้ำ - ภาคของ (Water - Solid wastes Quality Analysis)

ตารางที่ 4. สรุปข้อมูลค่าความเข้มข้นและความสามารถในการทดสอบด้วยวิธีต่าง ๆ ตามชนิดของน้ำ

(ประเภทน้ำตัวอย่าง : น้ำเสีย (ขึ้นอยู่กับโรงงาน), น้ำดื่ม, น้ำประปา, น้ำบาดาล, น้ำทะเล และน้ำฝน)

หมายเหตุ : ส่วนงานที่ออกทดสอบ

| Items | Parameter                                | Method                                                                                   | Reference Method / Analytical Technique                         | Container | sample size (ml) | MDL    | LOQ    | Unit                     | Decimal point | Remark                              |
|-------|------------------------------------------|------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-----------|------------------|--------|--------|--------------------------|---------------|-------------------------------------|
| 1     | Arsenic (As)                             | Continuous Hydride Generation /Atomic Absorption Spectrometric Method                    | Standard Method Part 3114 B and 3114C / AAS                     | Plastic   | 500              | 0.0005 | 0.0020 | mg/l as As               | 4             | น้ำเสีย MDL/LOQ = 1.00/2.00 ug/l    |
| 2     | Barium (Ba)                              | Digestion, Inductively Coupled Plasma Method                                             | Standard Method part 3030F and 3120 B / ICP-OES                 | Plastic   | 500              | 0.001  | 0.03   | mg/l as Ba               | 2             | น้ำเสีย MDL/LOQ = 1/30 ug/l         |
| 3     | Cadmium (Cd)                             | Digestion, Inductively Coupled Plasma Method                                             | Standard Method part 3030F and 3120 B / ICP-OES                 | Plastic   | 500              | 0.001  | 0.03   | mg/l as Cd               | 2             | น้ำเสีย MDL/LOQ = 1/30 ug/l         |
| 4     | Chromium (Cr)                            | Digestion, Inductively Coupled Plasma Method                                             | Standard Method part 3030F and 3120 B / ICP-OES                 | Plastic   | 500              | 0.002  | 0.03   | mg/l as Cr               | 2             | น้ำเสีย MDL/LOQ = 0.0001/0.003 mg/l |
| 5     | Color                                    | ADMI Weighted-Ordinate Spectrophotometer Method                                          | Standard Method part 2120 F / Spectrophotometer                 | Plastic   | 500              | 10     | 20     | ADMI                     | 0             | น้ำเสีย MDL/LOQ = 2/30 ug/l         |
| 6     | Chromium Hexavalence (Cr <sup>6+</sup> ) | Filtration, Colorimetric Method                                                          | Standard Method part 3500-Cr B / Spectrophotometer              | Plastic   | 500              | 0.003  | 0.050  | mg/l as Cr <sup>6+</sup> | 3             | น้ำเสีย MDL/LOQ = 3.00/50.0 ug/l    |
| 7     | Copper (Cu)                              | Digestion, Inductively Coupled Plasma Method                                             | Standard Method part 3030F and 3120 B / ICP-OES                 | Plastic   | 500              | 0.001  | 0.03   | mg/l as Cu               | 2             | น้ำเสีย MDL/LOQ = 1/30 ug/l         |
| 8     | Cyanide (CN <sup>-</sup> )               | Distillation, Colorimetric Method                                                        | Standard Method part 4500 CN- C/E Spectrophotometer             | Plastic   | 500              | 0.008  | 0.020  | mg/l                     | 3             | น้ำเสีย MDL/LOQ = 8/20 ug/l         |
| 9     | Formaldehyde                             | Distillation, Colorimetric Method                                                        | คู่มือตรวจวัดน้ำเสีย, ตามกฎกระทรวงว่าด้วยการควบคุมการปล่อยมลพิษ | Plastic   | 100              | 0.20   | 0.50   | mg/l                     | 2             |                                     |
| 10    | Lead (Pb)                                | Digestion, Inductively Coupled Plasma Method                                             | Standard Method part 3030F and 3120 B / ICP-OES                 | Plastic   | 500              | 0.002  | 0.03   | mg/l as Pb               | 2             | น้ำเสีย MDL/LOQ = 2/30 ug/l         |
| 11    | Manganese (Mn)                           | Digestion, Inductively Coupled Plasma Method                                             | Standard Method part 3030F and 3120 B / ICP-OES                 | Plastic   | 500              | 0.0005 | 0.03   | mg/l as Mn               | 2             | น้ำเสีย MDL/LOQ = 0.0017/0.010 mg/l |
| 12    | Mercury (Hg)                             | Digestion, Cold Vapor Atomic Absorption Spectrometric Method                             | Standard Method part 3112 B / AAS                               | Plastic   | 500              | 0.0005 | 0.0010 | mg/l as Hg               | 4             | น้ำเสีย MDL/LOQ = 20/30 ug/l        |
| 13    | Nickel (Ni)                              | Digestion, Inductively Coupled Plasma Method                                             | Standard Method part 3030F and 3120 B / ICP-OES                 | Plastic   | 500              | 0.001  | 0.03   | mg/l as Ni               | 2             |                                     |
| 14    | Phenols                                  | Distillation, Direct Photometric Method                                                  | Standard Method part 5510 D / Spectrophotometer                 | Plastic   | 500              | 0.002  | 0.005  | mg/l                     | 3             |                                     |
| 15    | Trivalent Chromium (Cr <sup>3+</sup> )   | Digestion, Direct Aspiration-AAS Method;<br>Filtration, Colorimetric Method, Calculation | Standard Method part 3500-Cr B & part 3111B / AAS               | Plastic   | 500              | 0.05   | 0.10   | mg/l                     | 2             |                                     |
| 16    | Trivalent Chromium (Cr <sup>3+</sup> )   | Digestion, ICP-OES Method; Filtration, Colorimetric Method, Calculation                  | Standard Method part 3500-Cr B & part 3120B / ICP-OES           | Plastic   | 500              | 0.002  | 0.03   | mg/l                     | 2             |                                     |

| Items | Parameter                               | Method                                                                | Reference Method / Analytical Technique                            | Container | sample size (ml) | MDL    | LOQ    | Unit       | Decimal point | Remark                       |
|-------|-----------------------------------------|-----------------------------------------------------------------------|--------------------------------------------------------------------|-----------|------------------|--------|--------|------------|---------------|------------------------------|
| 17    | Zinc (Zn)                               | Digestion, Inductively Coupled Plasma Method                          | Standard Method part 3030F and 3120 B / ICP-OES                    | Plastic   | 500              | 0.005  | 0.03   | mg/l as Zn | 2             | if 17E10 MDL/LOQ = 5/30 ug/l |
| 18    | Free Chlorine                           | DPD Colorimetric Method                                               | Standard Method part 4500 Cl G / Spectrophotometer                 | Plastic   | 500              | 0.03   | 0.05   | mg/l       | 2             |                              |
| 19    | Selenium (Se)                           | Digestion, Hydride Generation /Atomic Absorption Spectrometric Method | Standard Method part 3030F, 3114 B and 3114C / AAS                 | Plastic   | 500              | 0.0005 | 0.0020 | mg/l       | 4             |                              |
| 20    | สารพิษ/สารเคมีกำจัดศัตรูพืช (Pesticide) | Liquid-Liquid Extraction Gas Chromatography                           | Standard Method part 6630B/GC and Standard Method part 6410B/GC-MS | Glass     | 2500             | 0.03   | 0.05   | ug/l       | 2             |                              |
|       | - alpha - BHC                           |                                                                       |                                                                    |           |                  | 0.02   | 0.05   | ug/l       | 2             |                              |
|       | - beta - BHC                            |                                                                       |                                                                    |           |                  | 0.03   | 0.05   | ug/l       | 2             |                              |
|       | - gamma - BHC                           |                                                                       |                                                                    |           |                  | 0.03   | 0.05   | ug/l       | 2             |                              |
|       | - delta - BHC                           |                                                                       |                                                                    |           |                  | 0.03   | 0.05   | ug/l       | 2             |                              |
|       | - Heptachlor                            |                                                                       |                                                                    |           |                  | 0.03   | 0.05   | ug/l       | 2             |                              |
|       | - Aldrin                                |                                                                       |                                                                    |           |                  | 0.03   | 0.05   | ug/l       | 2             |                              |
|       | - Heptachlor epoxide                    |                                                                       |                                                                    |           |                  | 0.03   | 0.05   | ug/l       | 2             |                              |
|       | - Endosulfan I                          |                                                                       |                                                                    |           |                  | 0.03   | 0.05   | ug/l       | 2             |                              |
|       | - p,p - DDE                             |                                                                       |                                                                    |           |                  | 0.03   | 0.05   | ug/l       | 2             |                              |
|       | - Dieldrin                              |                                                                       |                                                                    |           |                  | 0.03   | 0.05   | ug/l       | 2             |                              |
|       | - Endrin ketone                         |                                                                       |                                                                    |           |                  | 0.03   | 0.05   | ug/l       | 2             |                              |
|       | - Endosulfan II                         |                                                                       |                                                                    |           |                  | 0.03   | 0.05   | ug/l       | 2             |                              |
|       | - p,p - DDD                             |                                                                       |                                                                    |           |                  | 0.03   | 0.05   | ug/l       | 2             |                              |
|       | - Endrin Aldehyde                       |                                                                       |                                                                    |           |                  | 0.03   | 0.05   | ug/l       | 2             |                              |

| Items | Parameter            | Method | Reference Method / Analytical Technique | Container | sample size (ml) | MDL  | LOQ  | Unit | Decimal point | Remark |
|-------|----------------------|--------|-----------------------------------------|-----------|------------------|------|------|------|---------------|--------|
|       | - Endosulfan Sulfate |        |                                         |           |                  | 0.03 | 0.05 | ug/l | 2             |        |
|       | - trans Chlordane    |        |                                         |           |                  | 0.03 | 0.05 | ug/l | 2             |        |
|       | - cis Chlordane      |        |                                         |           |                  | 0.03 | 0.05 | ug/l | 2             |        |
|       | - DDT                |        | Standard Method part 6410B/GC-MS        |           |                  | 0.03 | 0.05 | ug/l | 2             |        |
|       | - Endrin             |        |                                         |           |                  | 0.05 | 0.10 | ug/l | 2             |        |
|       | - Methoxychlor       |        |                                         |           |                  | 0.03 | 0.05 | ug/l | 2             |        |

การตรวจวิเคราะห์คุณภาพน้ำ – การทดสอบ (Water – Solid wastes Quality Analysis)

ตารางที่ 6 ตารางข้อมูลของวิธีการวิเคราะห์และควบคุมคุณภาพน้ำตามมาตรฐานของกรมส่งเสริมการค้าระหว่างประเทศ (กรมส่งเสริมการค้าระหว่างประเทศ)

(หน่วยวัดตัวอย่าง : น้ำ, น้ำดื่ม, น้ำดื่ม, น้ำดื่ม, น้ำดื่ม, น้ำดื่ม, น้ำดื่ม, น้ำดื่ม, น้ำดื่ม, น้ำดื่ม)

หมายเหตุ : ส่วนประกอบอื่นของตัวอย่าง

| Items | Parameter                                          | Method                                       | Reference Method / Analytical Technique                          | Container | sample size (ml) | MDL    | LOQ   | Unit                                    | Decimal point | Remark  |
|-------|----------------------------------------------------|----------------------------------------------|------------------------------------------------------------------|-----------|------------------|--------|-------|-----------------------------------------|---------------|---------|
| 1     | Antimony (Sb)                                      | Digestion, Inductively Coupled Plasma Method | Standard Method part 3030F,3120 B / ICP-OES                      | Plastic   | 500              | 0.05   | 0.10  | mg/l as Sb                              | 2             |         |
| 2     | Aluminum (Al)                                      | Digestion, Inductively Coupled Plasma Method | Standard Method part 3030F,3120 B / ICP-OES                      | Plastic   | 500              | 0.022  | 0.10  | mg/l as Al                              | 2             |         |
| 3     | Boron (B)                                          | Digestion, Inductively Coupled Plasma Method | Standard Method part 3030F,3120 B / ICP-OES                      | Plastic   | 500              | 0.01   | 0.02  | mg/l as B                               | 2             |         |
| 4     | Calcium (Ca)                                       | Digestion, Inductively Coupled Plasma Method | Standard Method part 3030F,3120 B / ICP-OES                      | Plastic   | 500              | 0.50   | 1.00  | mg/l as Ca                              | 2             |         |
| 5     | Cadmium (Cd)                                       | Digestion, Inductively Coupled Plasma Method | Standard Method part 3030F,3120 B / ICP-OES                      | Plastic   | 500              | 0.0001 | 0.003 | mg/l as Cd                              | 3             | น้ำดื่ม |
| 6     | Cobalt (Co)                                        | Digestion, Inductively Coupled Plasma Method | Standard Method part 3030F,3120 B / ICP-OES                      | Plastic   | 500              | 0.01   | 0.02  | mg/l as Co                              | 2             |         |
| 7     | Copper                                             | Spectrophotometric Method                    | Standard Method part 2120 C / Spectrophotometer                  | Plastic   | 500              | 0.50   | 1.00  | Pb-Cu                                   | 2             |         |
| 8     | Iron (Fe)                                          | Digestion, Inductively Coupled Plasma Method | Standard Method part 3030F,3120 B / ICP-OES                      | Plastic   | 500              | 0.002  | 0.03  | mg/l as Fe                              | 2             |         |
| 9     | Lead (Pb)                                          | Digestion, Inductively Coupled Plasma Method | Standard Method part 3030F,3120 B / ICP-OES                      | Plastic   | 500              | 0.0017 | 0.010 | mg/l as Pb                              | 3             | น้ำดื่ม |
| 10    | Magnesium (Mg)                                     | Digestion, Inductively Coupled Plasma Method | Standard Method part 3030F,3120 B / ICP-OES                      | Plastic   | 500              | 0.50   | 1.00  | mg/l as Mg                              | 2             |         |
| 11    | Molybdenum (Mo)                                    | Digestion, Inductively Coupled Plasma Method | Standard Method part 3030F,3120 B / ICP-OES                      | Plastic   | 500              | 0.002  | 0.02  | mg/l as Mo                              | 2             |         |
| 12    | Nitrite (NO <sub>2</sub> <sup>-</sup> )            | Colorimetric Method                          | Standard Method part 4500-NO <sub>2</sub> B / Spectrophotometer  | Plastic   | 500              | 0.003  | 0.030 | mg/l as NO <sub>2</sub> <sup>-</sup>    | 3             |         |
| 13    | Nitrite-Nitrogen (NO <sub>2</sub> <sup>-</sup> -N) | Colorimetric Method                          | Standard Method part 4500-NO <sub>2</sub> B / Spectrophotometer  | Plastic   | 500              | 0.001  | 0.010 | mg/l as NO <sub>2</sub> <sup>-</sup> -N | 3             |         |
| 14    | Nitrate (NO <sub>3</sub> <sup>-</sup> )            | Colorimetric Method                          | Standard Method part 4500-NO <sub>3</sub> B / Spectrophotometer  | Plastic   | 500              | 0.09   | 0.44  | mg/l as NO <sub>3</sub> <sup>-</sup>    | 2             |         |
| 15    | Nitrate-Nitrogen (NO <sub>3</sub> <sup>-</sup> -N) | Colorimetric Method                          | Standard Method part 4500-NO <sub>3</sub> B / Spectrophotometer  | Plastic   | 500              | 0.02   | 0.10  | mg/l as NO <sub>3</sub> <sup>-</sup> -N | 2             |         |
| 16    | Potassium (K)                                      | Direct Aspiration-AAS Method                 | Standard Method part 3111 B / AAS                                | Plastic   | 500              | 0.008  | 0.025 | mg/l as K                               | 3             |         |
| 17    | Potassium (K)                                      | Digestion, Inductively Coupled Plasma Method | Standard Method part 3030F,3120 B / ICP-OES                      | Plastic   | 500              | 0.50   | 1.00  | mg/l as K                               | 2             |         |
| 18    | Selenium (Se)                                      | Digestion, Inductively Coupled Plasma Method | Standard Method part 3030F,3120 B / ICP-OES                      | Plastic   | 500              | 0.05   | 0.10  | mg/l as Se                              | 2             |         |
| 19    | Silica (SiO <sub>2</sub> )                         | Molybdosilicate Method                       | Standard Method part 4500-SiO <sub>2</sub> C / Spectrophotometer | Plastic   | 500              | 1.00   | 2.00  | mg/l as SiO <sub>2</sub>                | 2             |         |
| 20    | Silicon (Si)                                       | Digestion, Inductively Coupled Plasma Method | Standard Method part 3030F,3120 B / ICP-OES                      | Plastic   | 500              | 0.02   | 0.05  | mg/l as Si                              | 2             |         |
| 21    | Silver (Ag)                                        | Digestion, Inductively Coupled Plasma Method | Standard Method part 3030F,3120 B / ICP-OES                      | Plastic   | 500              | 0.0004 | 0.05  | mg/l as Ag                              | 2             |         |

| Items | Parameter                                          | Method                                                   | Reference Method / Analytical Technique                                     | Container | sample size (ml) | MDL    | LOQ    | Unit                                    | Decimal point | Remark                         |
|-------|----------------------------------------------------|----------------------------------------------------------|-----------------------------------------------------------------------------|-----------|------------------|--------|--------|-----------------------------------------|---------------|--------------------------------|
| 22    | Sodium (Na)                                        | Direct Aspiration-AAS Method                             | Standard Method part 3111 B / AAS                                           | Plastic   | 500              | 0.005  | 0.050  | mg/l as Na                              | 3             |                                |
| 23    | Sodium (Na)                                        | Digestion, Inductively Coupled Plasma Method             | Standard Method part 3030F,3120 B / ICP-OES                                 | Plastic   | 500              | 0.50   | 1.00   | mg/l as Na                              | 2             |                                |
| 24    | Sodium Absorption Ratio (SAR)                      | Calculation,Digestion, Inductively Coupled Plasma Method | Standard Method part 3030F,3120 B / ICP-OES                                 | Plastic   | 500              | 0.50   | 1.00   | -                                       | 2             |                                |
| 25    | Strontium (Sr)                                     | Digestion, Inductively Coupled Plasma Method             | Standard Method part 3030F,3120 B / ICP-OES                                 | Plastic   | 500              | 0.01   | 0.02   | mg/l as Sr                              | 2             |                                |
| 26    | Tin (Sn)                                           | Digestion, Inductively Coupled Plasma Method             | Standard Method part 3030F,3120 B / ICP-OES                                 | Plastic   | 500              | 0.05   | 0.10   | mg/l as Sn                              | 2             |                                |
| 27    | Titanium (Ti)                                      | Digestion, Inductively Coupled Plasma Method             | Standard Method part 3030F,3120 B / ICP-OES                                 | Plastic   | 500              | 0.01   | 0.02   | mg/l as Ti                              | 2             |                                |
| 28    | Thallium (Tl)                                      | Digestion, Inductively Coupled Plasma Method             | Standard Method part 3030F,3120 B / ICP-OES                                 | Plastic   | 500              | 0.05   | 0.10   | mg/l as Tl                              | 2             |                                |
| 29    | Vanadium (V)                                       | Digestion, Inductively Coupled Plasma Method             | Standard Method part 3030F,3120 B / ICP-OES                                 | Plastic   | 500              | 0.01   | 0.02   | mg/l as V                               | 2             |                                |
| 30    | Phosphate (PO <sub>4</sub> <sup>3-</sup> )         | Ascorbic Acid Method                                     | Standard Method part 4500-PO <sub>4</sub> -B/E / Spectrophotometer          | Plastic   | 500              | 0.03   | 0.46   | mg/l as P                               | 2             |                                |
| 31    | Phosphorus (P)                                     | Ascorbic Acid Method                                     | Standard Method part 4500-P-B/E / Spectrophotometer                         | Plastic   | 500              | 0.05   | 0.15   | mg/l as P                               | 2             |                                |
| 32    | Sulfate (SO <sub>4</sub> <sup>2-</sup> )           | Turbidimetric Method                                     | Standard Method part 4500-SO <sub>4</sub> <sup>2-</sup> / Spectrophotometer | Plastic   | 500              | 1.50   | 5.00   | mg/l as SO <sub>4</sub> <sup>2-</sup>   | 2             |                                |
| 33    | Surfactant (LAS)                                   | Anionic Surfactants as MBAS                              | Standard Method Part 5540 C / Spectrophotometer                             | Plastic   | 500              | 0.35   | 0.40   | mg/l as MBAS                            | 2             |                                |
| 34    | Surfactant (LAS)                                   | Anionic Surfactants as MBAS                              | Standard Method Part 5540 C / Spectrophotometer                             | Plastic   | 1000             | 0.08   | 0.10   | mg/l as MBAS                            | 2             | น้ำดื่ม                        |
| 35    | Fluoride (F <sup>-</sup> )                         | Ion-Selective Electrode Method                           | Standard Method part 4500-F-C / Spectrophotometer                           | Plastic   | 100              | 0.20   | 0.50   | mg/l as F                               | 2             |                                |
| 36    | Gold (Au)                                          | Digestion, Inductively Coupled Plasma Method             | Standard Method part 3030F,3120 B / ICP-OES                                 | Plastic   | 500              | 0.02   | 0.05   | mg/l as Au                              | 2             |                                |
| 37    | Phosphorus (P)                                     | Digestion, Inductively Coupled Plasma Method             | Standard Method part 3030F,3120 B / ICP-OES                                 | Plastic   | 500              | 0.50   | 1.00   | mg/l as P                               | 2             |                                |
| 38    | Chlorine (Residual)                                | Spectrophotometric Method                                | Standard Method part 4500-Cl G / Spectrophotometer                          | Plastic   | 500              | 0.03   | 0.05   | mg/l as Cl <sub>2</sub>                 | 2             |                                |
| 39    | Beryllium                                          | Digestion, Inductively Coupled Plasma Method             | Standard Method part 3030F,3120 B / ICP-OES                                 | Plastic   | 500              | 0.01   | 0.02   | mg/l as Be                              | 2             |                                |
| 40    | Nitrate (NO <sub>3</sub> <sup>-</sup> )            | Ion Chromatography Method                                | Standard Method part 4110B / Ion Chromatography                             | Plastic   | 500              | 0.10   | 0.50   | mg/l as NO <sub>3</sub> <sup>-</sup>    | 2             |                                |
| 41    | Nitrate-Nitrogen (NO <sub>3</sub> <sup>-</sup> -N) | Ion Chromatography Method                                | Standard Method part 4110B / Ion Chromatography                             | Plastic   | 500              | 0.02   | 0.11   | mg/l as NO <sub>3</sub> <sup>-</sup> -N | 2             |                                |
| 42    | Phenol                                             | Liquid-Liquid Extraction / GC-MS                         | Standard Method part 6410B                                                  | Glass     | 2500             | 0.0001 | 0.0010 | mg/l                                    | 4             | น้ำดื่ม                        |
| 43    | Phosphate - Phosphorus (PO <sub>4</sub> -P)        | Ascorbic Acid Method                                     | Standard Method part 4500-PO <sub>4</sub> -B/E / Spectrophotometer          | Plastic   | 500              | 0.05   | 0.15   | mg/l as P                               | 2             | น้ำดื่ม MDL-LOQ = 50 /150 ug/l |
| 44    | Ammonia Nitrogen (NH <sub>3</sub> -N)              | Distillation and Phenatic Method                         | Standard Method part 4500-NH <sub>3</sub> -N, F / Spectrophotometer         | Plastic   | 500              | 0.05   | 0.10   | mg/l as NH <sub>3</sub> -N              | 2             | น้ำดื่ม                        |

| Items | Parameter                  | Method                          | Reference Method / Analytical Technique                              | Container | sample size (ml) | MDL  | LOQ  | Unit                    | Decimal point | Remark |
|-------|----------------------------|---------------------------------|----------------------------------------------------------------------|-----------|------------------|------|------|-------------------------|---------------|--------|
| 45    | Ammonia (NH <sub>3</sub> ) | Distillation and Phenate Method | Standard Method part 4500-NH <sub>3</sub> -B, F. / Spectrophotometer | Plastic   | 500              | 0.06 | 0.12 | mg/l as NH <sub>3</sub> | 2             | ไม่พบ  |

Rev.1/2566 23/1/2566

#### การตรวจวิเคราะห์คุณภาพน้ำ – ภาคตะกอน (Water – Solid wastes Quality Analysis)

ตารางนี้ ใช้สำหรับผลการขึ้นตัวอย่างและความสามารถในการทดสอบตัวอย่างของห้องปฏิบัติการ **งานที่ขึ้นทะเบียนกับกรมโรงงานอุตสาหกรรม**

(ประเภทตัวอย่าง : น้ำเสียขึ้นทะเบียนกรมโรงงานฯ, น้ำ, น้ำเพื่ออุปโภค, น้ำประปา, น้ำผิวดิน, น้ำบาดาล และน้ำทะเล)

ส่วนรวม : ส่วนงานทดสอบพื้นฐาน

| Items | Parameter                                     | Method                                    | Reference Method / Analytical Technique                 | Container  | sample size (ml) | MDL | LOQ      | Unit                     | Decimal point | Remark |
|-------|-----------------------------------------------|-------------------------------------------|---------------------------------------------------------|------------|------------------|-----|----------|--------------------------|---------------|--------|
| 1.1   | Biochemical Oxygen Demand (BOD <sub>5</sub> ) | 5-Day BOD Test, Membrane Electrode Method | Standard Method part 5210 B, 4500-O G / DO meter        | Plastic    | 1000             | -   | 2.0      | mg/l                     | 1             |        |
| 1.2   | Biochemical Oxygen Demand (BOD <sub>5</sub> ) | 5-Day BOD Test, Azide Modification Method | Standard Method part 5210 B, 4500-O C / Titration       | Plastic    | 1000             | -   | 2.0      | mg/l                     | 1             |        |
| 2.1   | Chemical Oxygen Demand (COD)                  | In-house Method                           | Standard Method part 5220 C / Titration                 | Plastic    | 100              | -   | 40       | mg/l as O <sub>2</sub>   | 0             |        |
| 2.2   | Chemical Oxygen Demand (COD)                  | Titrimetric, Closed Reflux Method         | Standard Method part 5220 C / Titration                 | Plastic    | 100              | -   | 40       | mg/l as O <sub>2</sub>   | 0             |        |
| 3     | Free Chlorine                                 | Iodometric Method                         | Standard Method part 4500-B / Titration                 | Plastic    | 100              | -   | 0.50     | mg/l                     | 2             |        |
| 4     | Total Dissolved Solids (TDS)                  | Dried at 180 °C                           | Standard Method part 2540 G / Gravimetric               | Plastic    | 200              | -   | 25       | mg/l                     | 0             |        |
| 5.1   | Grease&Oil                                    | In-house Method                           | Standard Method part 5520 B / Gravimetric               | Glass      | 1000             | -   | 3.0      | mg/l                     | 1             |        |
| 5.2   | Grease&Oil                                    | Partition Gravimetric Method              | Standard Method part 5520 B / Gravimetric               | Glass      | 1001             | -   | 3.0      | mg/l                     | 1             |        |
| 6     | Sulfide (S <sub>2</sub> <sup>-</sup> )        | ZnS Precipitation, Iodometric Method      | Standard Method part 4500-S <sup>2-</sup> F / Titration | BOD bottle | 300              | -   | 0.50     | mg/l as H <sub>2</sub> S | 2             |        |
| 7     | pH                                            | Electrometric Method                      | Standard Method part 4500 H / pH meter                  | Plastic    | 50               | -   | 3.0-12.0 | -                        | 1             |        |
| 8     | Total Suspended Solids (TSS)                  | Dried at 103-105 °C                       | Standard Method part 2540 D / Grvimeric                 | Plastic    | 1000             | -   | 5        | mg/l                     | 0             |        |

| Items | Parameter                           | Method                               | Reference Method / Analytical Technique                 | Container  | sample size (ml) | MDL | LOQ  | Unit                       | Decimal point | Remark |
|-------|-------------------------------------|--------------------------------------|---------------------------------------------------------|------------|------------------|-----|------|----------------------------|---------------|--------|
| 9     | Temperature                         | Laboratory and Field Method          | Standard Method part 2550 B / Thermometer               | at field   |                  | -   | 1    | $^{\circ}\text{C}$         | 0             |        |
| 10    | Total Kjeldahl Nitrogen (TKN)       | Macro-Kjeldahl Method                | Standard Method part 4500-N <sub>org</sub> / Titration  | Plastic    | 500              | -   | 5    | mg/l as NH <sub>3</sub> -N | 0             |        |
| 11    | Hydrogen Sulfide (H <sub>2</sub> S) | ZnS Precipitation ,Iodometric Method | Standard Method part 4500-S <sup>2-</sup> P / Titration | BOD bottle | 300              | -   | 0.53 | mg/l as H <sub>2</sub> S   | 2             |        |

**การตรวจวัดภาวะคุณภาพน้ำ – ภาคตะกอน (Water – Solid wastes Quality Analysis)**

ตารางนี้ใช้สำหรับทำการวัดค่าต่าง ๆ ของตะกอนในภาคการทดสอบตัวอย่างของสิ่งปนเปื้อนต่าง ๆ ที่พบในน้ำ ซึ่งได้ขึ้นทะเบียนกับกรมโรงงานอุตสาหกรรม (ประเภทตัวอย่าง: น้ำ, น้ำเสีย, น้ำที่อุปโภค, น้ำประปา, น้ำดื่ม, น้ำบาดาล และน้ำทะเล)

หน่วยวัด : ส่วนในหมื่นโดยพื้นฐาน

| Items | Parameter                                    | Method                              | Reference Method / Analytical Technique                            | Container | sample size (ml) | MDL | LOQ   | Unit                       | Decimal point | Remark |
|-------|----------------------------------------------|-------------------------------------|--------------------------------------------------------------------|-----------|------------------|-----|-------|----------------------------|---------------|--------|
| 1     | Acidity                                      | Titration Method                    | Standard Method part 2310 B / Titration                            | Plastic   | 50               | -   | 20.00 | mg/l as CaCO <sub>3</sub>  | 1             |        |
| 2     | M-Alkalinity                                 | Titration Method                    | Standard Method part 2320 B / Titration                            | Plastic   | 50               | -   | 20.00 | mg/l as CaCO <sub>3</sub>  | 1             |        |
| 3     | P-Alkalinity                                 | Titration Method                    | Standard Method part 2320 B / Titration                            | Plastic   | 50               | -   | 20.00 | mg/l as CaCO <sub>3</sub>  | 1             |        |
| 4     | Ammonia Nitrogen (NH <sub>3</sub> -N)        | Distillation and Titrimetric Method | Standard Method part 4500-NH <sub>3</sub> <sup>+</sup> / Titration | Plastic   | 500              |     | 2     | mg/l as NH <sub>3</sub> -N | 1             |        |
| 5     | Calcium Hardness                             | EDTA Titrimetric Method             | Standard method part 3500-Ca B / Titration                         | Plastic   | 100              | -   | 3.0   | mg/l as CaCO <sub>3</sub>  | 1             |        |
| 6     | Chloride (Cl <sup>-</sup> )                  | Argentometric Method                | Standard Method part 4500-Cl <sup>-</sup> B / Titration            | Plastic   | 50               | -   | 5.0   | mg/l as Cl <sup>-</sup>    | 1             |        |
| 7     | Chlorine (Residual)                          | DPD Colorimetric Method             | Standard Method part 4500-Cl G / Test kit                          | Plastic   | 500              | -   | 0.1   | mg/l as Cl <sub>2</sub>    | 1             |        |
| 8     | Chlorine (Total)                             | DPD Colorimetric Method             | Modified Standard Method part 4500-Cl G / Test kit                 | Plastic   | 500              | -   | 0.1   | mg/l as Cl <sub>2</sub>    | 1             |        |
| 9     | Fixed Solids (FS)                            | Dried at 550 $^{\circ}\text{C}$     | Standard Method part 2540 E / Gravimetric                          | Plastic   | 200              | -   | 30.0  | mg/l                       | 1             |        |
| 10    | Hardness                                     | EDTA Titrimetric Method             | Standard Method part 2340 C / Titration                            | Plastic   | 100              | -   | 6.0   | mg/l as CaCO <sub>3</sub>  | 1             |        |
| 11    | Magnesium (Mg)                               | Calculation Method                  | Standard Method part 3500-Mg / Calculation                         | Plastic   | 100              | -   | 0.70  | mg/l as Mg                 | 1             |        |
| 12    | Magnesium Hardness                           | Calculation Method                  | Standard Method part 3500-Mg / Calculation                         | Plastic   | 100              | -   | 3.0   | mg/l as CaCO <sub>3</sub>  | 1             |        |
| 13    | Mix Liquor Suspended Solids (MLSS)           | Dried at 103-105 $^{\circ}\text{C}$ | Standard Method part 2540 C / Gravimetric                          | Plastic   | 200              | -   | 5     | mg/l                       | 1             |        |
| 14    | Mix Liquor Volatile Suspended Solids (MLVSS) | Dried at 550 $^{\circ}\text{C}$     | Standard Method part 2540 E / Gravimetric                          | Plastic   | 200              | -   | 5     | mg/l                       | 1             |        |

| Items | Parameter                               | Method                         | Reference Method / Analytical Technique                                     | Container | sample size (ml) | MDL  | LOQ  | Unit                                  | Decimal point               | Remark                                |
|-------|-----------------------------------------|--------------------------------|-----------------------------------------------------------------------------|-----------|------------------|------|------|---------------------------------------|-----------------------------|---------------------------------------|
| 15    | Organic Nitrogen                        | Macro-Kjeldahl Method          | Standard Method part 4500-N <sub>org</sub> / Titration                      | Plastic   | 500              | -    | 5    | mg/l as NH <sub>3</sub> -N            | 1                           | Org-N = TKN-(Ammonia-N)               |
| 17    | Conductivity                            | Laboratory Method              | Standard Method part 2510 B                                                 | Plastic   | 200              | -    | 0.1  | us/cm                                 | หัตถ์หน่วย 2 ส่วนหนึ่งหัตถ์ | อ่านจากเครื่อง                        |
| 18    | Salinity                                | Electrical Conductivity Method | Standard Method part 2520 B / Conductivity meter                            | Plastic   | 100              | -    | 0.01 | ppt                                   | หัตถ์หน่วย 2 ส่วนหนึ่งหัตถ์ | อ่านจากเครื่อง                        |
| 19    | Sludge Volume Index (SV <sub>30</sub> ) | Volumetric Method              | Standard Method part 2540 F / Volumetric                                    | Plastic   | 1000             | -    | 0.1  | ml/l                                  | 1                           |                                       |
| 20    | Sulfate                                 | Titrimetric Method             | Standard Method part 4500-SO <sub>4</sub> <sup>2-</sup> B / Titration       | Plastic   | 200              | -    | 2.00 | mg/l as SO <sub>4</sub> <sup>2-</sup> | 2                           |                                       |
| 21    | Total Dissolved Solids (TDS)            | Dried at 103-105 °C            | Modified Standard Method part 2540 B / Gravimetric                          | Plastic   | 200              | -    | 25   | mg/l                                  | 0                           |                                       |
| 22    | Turbidity                               | Nephelometric Method           | Standard Method part 2130 B / Turbidity meter                               | Plastic   | 50               | 0.01 | 0.01 | NTU                                   | หัตถ์หน่วย 2 ส่วนหนึ่งหัตถ์ | NTU=FTU=ซิลิกาทด                      |
| 23    | Volatile Fatty Acid                     | Titrimetric Method             | คู่มือวิเคราะห์น้ำเสีย ตามมาตรฐานวิธีกรมสิ่งแวดล้อมแห่งประทศไทย / Titration | Plastic   | 200              | -    | 1.00 | mg/l                                  | 1                           |                                       |
| 24    | Volatile Solids (VS)                    | Dried at 550 °C                | Standard Method part 2540 E / Gravimetric                                   | Plastic   | 200              |      | 3.0  | mg/l                                  | 1                           |                                       |
| 25    | Volatile Suspended Solids (VSS)         | Dried at 550 °C                | Standard Method part 2540 E / Gravimetric                                   | Plastic   | 200              |      | 3.0  | mg/l                                  | 1                           |                                       |
| 26    | Dissolved Oxygen(DO)                    | Azide Modification             | Standard Method part 4500-O C/Titration                                     | Plastic   | 300              | -    | 0.3  | mg/l                                  | 1                           |                                       |
|       | ส่วนงานจุลชีววิทยา                      |                                |                                                                             |           |                  |      |      |                                       |                             |                                       |
| 1     | Benthos                                 | Counting Chamber Method        | Standard Method part 10500 B / Counting                                     | ถุงดำ     | -                | -    | -    | ind/m <sup>2</sup>                    | 0                           | รายงานต่ำสุด =Not found               |
| 2     | Escherichia Coli Bacteria (E.coli)      | MPN Test                       | Standard Method part 9221 F / Fluorogenic Substrate , MPN                   | Glass     | 250              | -    | -    | MPN:100 ml                            | สามตัววาง MPN-              | รายงานต่ำสุด 1.1 (มีเต็ม) / 1.8 (น้ำ) |
| 3     | Total Coliform                          | MPN Test                       | Standard Method part 9221 B / Fermentation Technique , MPN                  | Glass     | 250              | -    | -    | MPN:100 ml                            | สามตัววาง MPN-              | รายงานต่ำสุด 1.1 (มีเต็ม) / 1.8 (น้ำ) |

| Items | Parameter                                 | Method                                                  | Reference Method / Analytical Technique                    | Container | sample size (ml) | MDL | LOQ | Unit                     | Decimal point    | Remark                                            |
|-------|-------------------------------------------|---------------------------------------------------------|------------------------------------------------------------|-----------|------------------|-----|-----|--------------------------|------------------|---------------------------------------------------|
| 4     | Thermotolerant coliforms (Fecal Coliform) | MPN Test                                                | Standard Method part 9221 E /Thermotolerant Coliform , MPN | Glass     | 250              | -   | -   | MPN:100 ml               | สามตัววาง MPN-   | รายงานต่ำสุด 1.1 (มีเต็ม) / 1.8 (น้ำ)             |
| 5     | Heterotrophic Bacteria (Total Bacteria)   | Heterotrophic plate count (Standard Plate Count Method) | Standard Method part 9215 B / Pour plate                   | Glass     | 250              | 1   | 1   | Colonies/cm <sup>3</sup> | 0                | *Heterotrophic plate count = Standard plate Count |
| 6     | Phytoplankton                             | Counting Chamber Method                                 | Standard Method part 10200 F / Counting                    | Plstic    | -                | -   | -   | Cell / l                 | 0                | รายงานต่ำสุด =Not found                           |
| 7     | Zooplankton                               | Counting Chamber Method                                 | Standard Method part 10200 G / Counting                    | Plastic   | -                | -   | -   | ind./l                   | 0                | รายงานต่ำสุด =Not found                           |
| 8     | S.Aureus                                  | Enrichment                                              | Standard Method part 9213 B                                | Glass     | 1000             | -   | -   | -                        | รายงาน พบ/ ไม่พบ | รายงานต่ำสุด =Not found                           |
| 9     | Salmonella sp.                            | Membrane Filter                                         | Standard Method part 9260 B                                | Glass     | 1000             | -   | -   | -                        | รายงาน พบ/ ไม่พบ | รายงานต่ำสุด =Not found                           |
| 10    | Clostridium perfringens                   | Compendium 2003,Chapter 34                              | Compendium 2003,Chapter 34                                 | Glass     | 1000             | -   | -   | -                        | รายงาน พบ/ ไม่พบ | รายงานต่ำสุด =Not found                           |

การตรวจวิเคราะห์คุณภาพน้ำ - การทดสอบ (Water - Solid wastes Quality Analysis)

ตามนี้ จะใช้ได้กับผลการวิเคราะห์ที่วัดค่าความเข้มข้นในหน่วยความเข้มข้นของสารเคมีเป็นร้อยละ

(ระบุค่าหน่วย น้ำ/ลิ้น )

ส่วนที่ ๑. ส่วนการเตรียมตัวอย่าง

| Items | Parameter                                | Method                                                                                | Reference Method / Analytical Technique                          | Container | sample size (ml) | MDL    | LOQ    | Unit                     | Decimal point | Remark                      |
|-------|------------------------------------------|---------------------------------------------------------------------------------------|------------------------------------------------------------------|-----------|------------------|--------|--------|--------------------------|---------------|-----------------------------|
| 1     | Antimony (Sb)                            | Digestion, Inductively Coupled Plasma Method                                          | Standard Method part3030F and 3120 B / ICP-OES                   | Plastic   | 500              | 0.05   | 0.10   | mg/l as Sb               | 2             |                             |
| 2     | Arsenic (As)                             | Continuous Hydride Generation-ICP-OES Method                                          | Standard Method part3030F and 3120 B / ICP-OES                   | Plastic   | 500              | 0.0010 | 0.0020 | mg/l as As               | 4             |                             |
| 3     | Arsenic (As)                             | Continuous Hydride Generation /Atomic Absorption Spectrometric Method                 | Standard Method Part 3114 B and 3114 C / AAS                     | Plastic   | 500              | 0.0005 | 0.0020 | mg/l as As               | 4             |                             |
| 4     | Barium (Ba)                              | Digestion, Inductively Coupled Plasma Method                                          | Standard Method part3030F and 3120 B / ICP-OES                   | Plastic   | 500              | 0.001  | 0.03   | mg/l as Ba               | 2             |                             |
| 5     | Beryllium (Be)                           | Digestion, Inductively Coupled Plasma Method                                          | Standard Method part3030F and 3120 B / ICP-OES                   | Plastic   | 500              | 0.005  | 0.01   | mg/l as Be               | 2             |                             |
| 6     | Cadmium (Cd)                             | Digestion, Inductively Coupled Plasma Method                                          | Standard Method part3030F and 3120 B / ICP-OES                   | Plastic   | 500              | 0.0001 | 0.003  | mg/l as Cd               | 3             |                             |
| 7     | Chromium (Cr)                            | Digestion, Inductively Coupled Plasma Method                                          | Standard Method part3030F and 3120 B / ICP-OES                   | Plastic   | 500              | 0.002  | 0.03   | mg/l as Cr               | 2             |                             |
| 8     | Cyanide (CN)                             | Distillation, Colorimetric Method                                                     | Standard Method part 4500 CN <sup>-</sup> C/E/ Spectrophotometer | Plastic   | 500              | 0.008  | 0.020  | mg/l                     | 3             |                             |
| 9     | Chromium Hexavalence (Cr <sup>6+</sup> ) | Filtration,Colorimetric Method                                                        | Standard Method part 3500-Cr B/ Spectrophotometer                | Plastic   | 500              | 0.003  | 0.050  | mg/l as Cr <sup>6+</sup> | 3             |                             |
| 10    | Lead (Pb)                                | Digestion, Inductively Coupled Plasma Method                                          | Standard Method part3030F and 3120 B / ICP-OES                   | Plastic   | 500              | 0.0017 | 0.010  | mg/l as Pb               | 3             |                             |
| 11    | Manganese (Mn)                           | Digestion, Inductively Coupled Plasma Method                                          | Standard Method part3030F and 3120 B / ICP-OES                   | Plastic   | 500              | 0.0005 | 0.03   | mg/l as Mn               | 2             |                             |
| 12    | Mercury (Hg)                             | Digestion, Cold Vapor Atomic Absorption Spectrometric Method                          | Standard Method part 3112 B / AAS                                | Plastic   | 500              | 0.0005 | 0.0010 | mg/l as Hg               | 4             |                             |
| 13    | Nickel (Ni)                              | Digestion, Inductively Coupled Plasma Method                                          | Standard Method part 3030F and 3120 B / ICP-OES                  | Plastic   | 500              | 0.001  | 0.02   | mg/l as Ni               | 2             | แก้ไข DL ตามมาตรฐานฉบับใหม่ |
| 14    | Phenols                                  | Distillation, Direct Photometric Method                                               | Standard Method part 5530 D / Spectrophotometer                  | Plastic   | 500              | 0.002  | 0.005  | mg/l                     | 3             |                             |
| 15    | Silver (Ag)                              | Digestion, Inductively Coupled Plasma Method                                          | Standard Method part 3030F and 3120 B / ICP-OES                  | Plastic   | 500              | 0.0004 | 0.05   | mg/l as Ag               | 2             |                             |
| 16    | Trivalent Chromium (Cr <sup>3+</sup> )   | Digestion,Direct Aspiration-AAS Method;<br>Filtration,Colorimetric Method,Calculation | Standard Method part 3500-Cr B & part 3111B /AAS                 | Plastic   | 500              | 0.05   | 0.30   | mg/l                     | 2             |                             |
| 17    | Trivalent Chromium (Cr <sup>3+</sup> )   | Digestion,ICP-OES Method;<br>Filtration,Colorimetric Method,Calculation               | Standard Method part 3500-Cr B & part 3120B / ICP-OES            | Plastic   | 500              | 0.002  | 0.03   | mg/l                     | 2             |                             |
| 18    | Vanadium (V)                             | Digestion, Inductively Coupled Plasma Method                                          | Standard Method part 3030F and 3120 B / ICP-OES                  | Plastic   | 500              | 0.01   | 0.02   | mg/l as V                | 2             |                             |
| 19    | Zinc (Zn)                                | Digestion, Inductively Coupled Plasma Method                                          | Standard Method part 3030F and 3120 B / ICP-OES                  | Plastic   | 500              | 0.005  | 0.03   | mg/l as Zn               | 2             |                             |

| Items | Parameter                        | Method                                                                | Reference Method / Analytical Technique      | Container | sample size (ml) | MDL     | LOQ     | Unit | Decimal point | Remark                      |
|-------|----------------------------------|-----------------------------------------------------------------------|----------------------------------------------|-----------|------------------|---------|---------|------|---------------|-----------------------------|
| 20    | Selenium (Se)                    | Digestion, Hydride Generation /Atomic Absorption Spectrometric Method | Standard Method part 3030F, 3114 B and 3114C | Plastic   | 500              | 0.0005  | 0.0020  | mg/l | 4             | แก้ไขตามมาตรฐาน 1 ม.ร. 2565 |
| 21    | Volatile organic compounds,VOCs) | Purge-and-Trap GC-MS                                                  | Standard Method part 6200B                   | Glass     | 40 *4            |         |         |      |               |                             |
| 1     | - Benzene                        |                                                                       |                                              |           |                  | 0.00025 | 0.00050 | mg/l | 5             |                             |
| 2     | - Bromodichloromethane           |                                                                       |                                              |           |                  | 0.00050 | 0.00050 | mg/l | 5             |                             |
| 3     | - Bromoform                      |                                                                       |                                              |           |                  | 0.00050 | 0.00050 | mg/l | 5             |                             |
| 4     | - Carbon tetrachloride           |                                                                       |                                              |           |                  | 0.00025 | 0.00025 | mg/l | 5             |                             |
| 5     | - Chlorobenzene                  |                                                                       |                                              |           |                  | 0.00025 | 0.00050 | mg/l | 5             |                             |
| 6     | - Chlorodibromomethane           |                                                                       |                                              |           |                  | 0.00050 | 0.00100 | mg/l | 5             |                             |
| 7     | - 1,2-Dichlorobenzene            |                                                                       |                                              |           |                  | 0.00025 | 0.00050 | mg/l | 5             |                             |
| 8     | - 1,3-Dichlorobenzene            |                                                                       |                                              |           |                  | 0.00025 | 0.00025 | mg/l | 5             |                             |
| 9     | - 1,4-Dichlorobenzene            |                                                                       |                                              |           |                  | 0.00025 | 0.00025 | mg/l | 5             |                             |
| 10    | - 1,1-Dichloroethane             |                                                                       |                                              |           |                  | 0.00025 | 0.00025 | mg/l | 5             |                             |
| 11    | - 1,2-Dichloroethane             |                                                                       |                                              |           |                  | 0.00025 | 0.00050 | mg/l | 5             |                             |
| 12    | - 1,1-Dichloroethylene           |                                                                       |                                              |           |                  | 0.00025 | 0.00050 | mg/l | 5             |                             |
| 13    | - cis-1,2-Dichloroethylene       |                                                                       |                                              |           |                  | 0.00050 | 0.00050 | mg/l | 5             |                             |
| 14    | - trans-1,2-Dichloroethylene     |                                                                       |                                              |           |                  | 0.00025 | 0.00050 | mg/l | 5             |                             |
| 15    | - 1,2-Dichloropropane            |                                                                       |                                              |           |                  | 0.00025 | 0.00050 | mg/l | 5             |                             |
| 16    | - 1,3-Dichloropropane            |                                                                       |                                              |           |                  | 0.00025 | 0.00050 | mg/l | 5             |                             |
| 17    | - Ethylbenzene                   |                                                                       |                                              |           |                  | 0.00025 | 0.00050 | mg/l | 5             |                             |
| 18    | - Methyl tert-butyl ether        |                                                                       |                                              |           |                  | 0.00025 | 0.00050 | mg/l | 5             |                             |
| 19    | - Naphthalene                    |                                                                       |                                              |           |                  | 0.00025 | 0.00100 | mg/l | 5             |                             |
| 20    | - Nitrobenzene                   |                                                                       |                                              |           |                  | 0.00025 | 0.00025 | mg/l | 5             |                             |
| 21    | - Styrene                        |                                                                       |                                              |           |                  | 0.00050 | 0.00100 | mg/l | 5             |                             |
| 22    | - 1,1,2,2-Tetrachloroethane      |                                                                       |                                              |           |                  | 0.00050 | 0.00050 | mg/l | 5             |                             |
| 23    | - Tetrachloroethylene            |                                                                       |                                              |           |                  | 0.00025 | 0.00050 | mg/l | 5             |                             |
| 24    | - Toluene                        |                                                                       |                                              |           |                  | 0.00025 | 0.00050 | mg/l | 5             |                             |
| 25    | - 1,2,4-Trichlorobenzene         |                                                                       |                                              |           |                  | 0.00025 | 0.00050 | mg/l | 5             |                             |
| 26    | - 1,1,1-Trichloroethane          |                                                                       |                                              |           |                  | 0.00025 | 0.00025 | mg/l | 5             |                             |

| Items | Parameter                         | Method                           | Reference Method / Analytical Technique | Container | sample size (ml) | MDL     | LOQ     | Unit | Decimal point | Remark                     |
|-------|-----------------------------------|----------------------------------|-----------------------------------------|-----------|------------------|---------|---------|------|---------------|----------------------------|
| 27    | - 1,1,2-Trichloroethane           |                                  |                                         |           |                  | 0.00025 | 0.00050 | mg/l | 5             |                            |
| 28    | - Trichloroethylene               |                                  |                                         |           |                  | 0.00025 | 0.00050 | mg/l | 5             |                            |
| 29    | - 1,3,5-Trimethylbenzene          |                                  |                                         |           |                  | 0.00025 | 0.00100 | mg/l | 5             |                            |
| 30    | - Vinyl acetate                   |                                  |                                         |           |                  | 0.00050 | 0.00100 | mg/l | 5             |                            |
| 31    | - Vinyl Chloride                  |                                  |                                         |           |                  | 0.00025 | 0.00025 | mg/l | 5             |                            |
| 32    | - m-Xylene                        |                                  |                                         |           |                  | 0.00025 | 0.00100 | mg/l | 5             |                            |
| 33    | - o-Xylene                        |                                  |                                         |           |                  | 0.00025 | 0.00100 | mg/l | 5             |                            |
| 34    | - p-Xylene                        |                                  |                                         |           |                  | 0.00025 | 0.00100 | mg/l | 5             |                            |
| 35    | - Xylene Total                    |                                  |                                         |           |                  | 0.00025 | 0.00100 | mg/l | 5             |                            |
| 22    | Volatile organic compounds/VOC/G  | Purge-and-Trap / GC-MS Method    | Standard Method part 6200B              | Glass     | 40 *4            |         |         |      |               |                            |
| 1     | - Acetone                         |                                  |                                         |           |                  | 0.00100 | 0.00100 | mg/l | 5             |                            |
| 2     | - Butanol                         |                                  |                                         |           |                  | 0.00100 | 0.00100 | mg/l | 5             |                            |
| 3     | - Carbon disulfide                |                                  |                                         |           |                  | 0.00200 | 0.00500 | mg/l | 5             |                            |
| 4     | - Chloroform                      |                                  |                                         |           |                  | 0.00100 | 0.00200 | mg/l | 5             |                            |
| 5     | - n-Hexane                        |                                  |                                         |           |                  | 0.00100 | 0.00200 | mg/l | 5             |                            |
| 6     | - Dichloromethane                 |                                  |                                         |           |                  | 0.00200 | 0.00200 | mg/l | 5             |                            |
| 23    | Semivolatile organic compounds #1 | Liquid-Liquid Extraction / GC-MS | Standard Method part 6410B              | Glass     | 2500             |         |         |      |               |                            |
| 1     | Acenaphthene                      |                                  |                                         |           |                  | 0.0005  | 0.0010  | mg/l | 4             |                            |
| 2     | Anthracene                        |                                  |                                         |           |                  | 0.0005  | 0.0010  | mg/l | 4             |                            |
| 3     | Ben(a)anthracene                  |                                  |                                         |           |                  | 0.0005  | 0.0010  | mg/l | 4             |                            |
| 4     | Ben(a)fluoranthene                |                                  |                                         |           |                  | 0.0005  | 0.0010  | mg/l | 4             |                            |
| 5     | Ben(b)fluoranthene                |                                  |                                         |           |                  | 0.0005  | 0.0010  | mg/l | 4             |                            |
| 6     | Ben(a)pyrene                      |                                  |                                         |           |                  | 0.00005 | 0.0001  | mg/l | 4             | เกิน DL ตามมาตรฐานวิธีตรวจ |
| 7     | Ben(a)ghi(peri)ene                |                                  |                                         |           |                  | 0.0005  | 0.0010  | mg/l | 4             |                            |
| 8     | But(2-chloroethyl) ether          |                                  |                                         |           |                  | 0.0005  | 0.0100  | mg/l | 4             |                            |
| 9     | But(2-ethylhexyl) phthalate       |                                  |                                         |           |                  | 0.0005  | 0.0010  | mg/l | 4             |                            |
| 10    | Butyl benzyl phthalate            |                                  |                                         |           |                  | 0.0005  | 0.0010  | mg/l | 4             |                            |
| 11    | Carbazole                         |                                  |                                         |           |                  | 0.0005  | 0.0010  | mg/l | 4             |                            |

| Items | Parameter                 | Method | Reference Method / Analytical Technique | Container | sample size (ml) | MDL    | LOQ    | Unit | Decimal point | Remark |
|-------|---------------------------|--------|-----------------------------------------|-----------|------------------|--------|--------|------|---------------|--------|
| 12    | m-Chloronitrobenzene      |        |                                         |           |                  | 0.0005 | 0.0100 | mg/l | 4             |        |
| 13    | 2-Chlorophenol            |        |                                         |           |                  | 0.0005 | 0.0010 | mg/l | 4             |        |
| 14    | Chrysene                  |        |                                         |           |                  | 0.0005 | 0.0010 | mg/l | 4             |        |
| 15    | Dibenz(a,h)anthracene     |        |                                         |           |                  | 0.0005 | 0.0010 | mg/l | 4             |        |
| 16    | Di-n-butyl phthalate      |        |                                         |           |                  | 0.0005 | 0.0100 | mg/l | 4             |        |
| 17    | 2,4-Dichlorophenol        |        |                                         |           |                  | 0.0005 | 0.0010 | mg/l | 4             |        |
| 18    | Diethyl Phthalate         |        |                                         |           |                  | 0.0005 | 0.0010 | mg/l | 4             |        |
| 19    | 2,4-Dimethylphenol        |        |                                         |           |                  | 0.0005 | 0.0010 | mg/l | 4             |        |
| 20    | 2,4-Dinitrotoluene        |        |                                         |           |                  | 0.0005 | 0.0010 | mg/l | 4             |        |
| 21    | 2,6-Dinitrotoluene        |        |                                         |           |                  | 0.0005 | 0.0010 | mg/l | 4             |        |
| 22    | Di-n-octyl phthalate      |        |                                         |           |                  | 0.0005 | 0.0010 | mg/l | 4             |        |
| 23    | Fluoranthene              |        |                                         |           |                  | 0.0005 | 0.0010 | mg/l | 4             |        |
| 24    | Fluorene                  |        |                                         |           |                  | 0.0005 | 0.0010 | mg/l | 4             |        |
| 25    | Hexachlorobenzene         |        |                                         |           |                  | 0.0005 | 0.0010 | mg/l | 4             |        |
| 26    | Hexachloro-1,3-butadiene  |        |                                         |           |                  | 0.0005 | 0.0010 | mg/l | 4             |        |
| 27    | Hexachlorocyclopentadiene |        |                                         |           |                  | 0.0005 | 0.0100 | mg/l | 4             |        |
| 28    | Hexachloroethane          |        |                                         |           |                  | 0.0005 | 0.0010 | mg/l | 4             |        |
| 29    | Indene(1,2,3-c)pyrene     |        |                                         |           |                  | 0.0005 | 0.0010 | mg/l | 4             |        |
| 30    | Isothiazine               |        |                                         |           |                  | 0.0005 | 0.0010 | mg/l | 4             |        |
| 31    | 2-Methylphenol (o-Cresol) |        |                                         |           |                  | 0.0005 | 0.0010 | mg/l | 4             |        |
| 32    | 2-Methylphthalate         |        |                                         |           |                  | 0.0005 | 0.0010 | mg/l | 4             |        |
| 33    | N-Nitrosodipropylamine    |        |                                         |           |                  | 0.0005 | 0.0010 | mg/l | 4             |        |
| 34    | Phenanthrene              |        |                                         |           |                  | 0.0005 | 0.0010 | mg/l | 4             |        |
| 35    | Phenol                    |        |                                         |           |                  | 0.0005 | 0.0010 | mg/l | 4             |        |
| 36    | Pyrene                    |        |                                         |           |                  | 0.0005 | 0.0010 | mg/l | 4             |        |
| 37    | 2,4,5-Trichlorophenol     |        |                                         |           |                  | 0.0005 | 0.0010 | mg/l | 4             |        |
| 38    | 2,4,6-Trichlorophenol     |        |                                         |           |                  | 0.0005 | 0.0010 | mg/l | 4             |        |

| Items | Parameter                          | Method                                       | Reference Method / Analytical Technique         | Container | sample size (ml) | MDL   | LOQ   | Unit       | Decimal point | Remark |
|-------|------------------------------------|----------------------------------------------|-------------------------------------------------|-----------|------------------|-------|-------|------------|---------------|--------|
| 24    | Semi-volatile organic compounds #2 | Liquid-Liquid Extraction / GC/MS             | Standard Method part 6410B                      | Glass     | 2500             | 0.030 | 0.050 | µg/l       | 3             |        |
| 1     | Aldrin                             |                                              |                                                 |           |                  | 0.030 | 0.050 | µg/l       | 3             |        |
| 2     | Chlordane                          |                                              |                                                 |           |                  | 0.030 | 0.050 | µg/l       | 3             |        |
| 3     | DDE                                |                                              |                                                 |           |                  | 0.030 | 0.050 | µg/l       | 3             |        |
| 4     | DDE                                |                                              |                                                 |           |                  | 0.030 | 0.050 | µg/l       | 3             |        |
| 5     | DDT                                |                                              |                                                 |           |                  | 0.030 | 0.050 | µg/l       | 3             |        |
| 6     | Dieldrin                           |                                              |                                                 |           |                  | 0.030 | 0.050 | µg/l       | 3             |        |
| 7     | Endosulfan                         |                                              |                                                 |           |                  | 0.030 | 0.050 | µg/l       | 3             |        |
| 8     | Endrin                             |                                              |                                                 |           |                  | 0.050 | 0.100 | µg/l       | 3             |        |
| 9     | Heptachlor                         |                                              |                                                 |           |                  | 0.030 | 0.050 | µg/l       | 3             |        |
| 10    | Heptachlor epoxide                 |                                              |                                                 |           |                  | 0.030 | 0.050 | µg/l       | 3             |        |
| 11    | alpha - BHC                        |                                              |                                                 |           |                  | 0.020 | 0.050 | µg/l       | 3             |        |
| 12    | beta - BHC                         |                                              |                                                 |           |                  | 0.030 | 0.050 | µg/l       | 3             |        |
| 13    | gamma - BHC                        |                                              |                                                 |           |                  | 0.030 | 0.050 | µg/l       | 3             |        |
| 14    | Methoxychlor                       |                                              |                                                 |           |                  | 0.030 | 0.050 | µg/l       | 3             |        |
| 26    | Aluminum (Al)                      | Digestion, Inductively Coupled Plasma Method | Standard Method part 3030F and 3120 B / ICP-OES | Plastic   | 500              | 0.022 | 0.10  | mg/l as Al | 2             |        |
| 27    | Copper (Cu)                        | Digestion, Inductively Coupled Plasma Method | Standard Method part 3030F and 3120 B / ICP-OES | Plastic   | 500              | 0.001 | 0.03  | mg/l as Cu | 2             |        |
| 28    | Iron (Fe)                          | Digestion, Inductively Coupled Plasma Method | Standard Method part 3030F and 3120 B / ICP-OES | Plastic   | 500              | 0.002 | 0.05  | mg/l as Fe | 2             |        |
| 29    | Molybdenum (Mo)                    | Digestion, Inductively Coupled Plasma Method | Standard Method part 3030F and 3120 B / ICP-OES | Plastic   | 500              | 0.002 | 0.02  | mg/l as Mo | 2             |        |

การตรวจวิเคราะห์คุณภาพน้ำ – ภาคตะกอน (Water – Solid wastes Quality Analysis)

หมายเหตุ: สรุปใช้กำหนดการเก็บตัวอย่างและความสามารถในการทดสอบตัวอย่างของห้องปฏิบัติการ ตามที่ขึ้นทะเบียนกับกรมโรงงานอุตสาหกรรม

(ประเภทตัวอย่าง : ดิน )

| Items | Parameter                  | Method                                                               | Reference Method / Analytical Technique                                                    | Container | sample size (g) | MDL  | LOQ  | Unit          | Decimal point | Remark                      |
|-------|----------------------------|----------------------------------------------------------------------|--------------------------------------------------------------------------------------------|-----------|-----------------|------|------|---------------|---------------|-----------------------------|
| 1     | Arsenic (As)               | Digestion,ICP-OES Method                                             | US EPA SW 846 Method 3050B and 6010C / ICP-OES                                             | Plastic   | 500             | 2.50 | 5.00 | mg/kg as As   | 2             |                             |
| 2     | Antimony (Sb)              | Digestion,ICP-OES Method                                             | US EPA SW 846 Method 3050B and 6010C / ICP-OES                                             | Plastic   | 500             | 2.50 | 5.00 | mg/kg as Sb   | 2             |                             |
| 3     | Barium (Ba)                | Digestion,ICP-OES Method                                             | US EPA SW 846 Method 3050B and 6010C / ICP-OES                                             | Plastic   | 500             | 0.50 | 1.00 | mg/kg as Ba   | 2             |                             |
| 4     | Beryllium (Be)             | Digestion,ICP-OES Method                                             | US EPA SW 846 Method 3050B and 6010C / ICP-OES                                             | Plastic   | 500             | 0.50 | 1.00 | mg/kg as Be   | 2             |                             |
| 5     | Cadmium (Cd)               | Digestion,ICP-OES Method                                             | US EPA SW 846 Method 3050B and 6010C / ICP-OES                                             | Plastic   | 500             | 0.10 | 0.15 | mg/kg as Cd   | 2             |                             |
| 6     | Chromium (Cr)              | Digestion,ICP-OES Method                                             | US EPA SW 846 Method 3050B and 6010C / ICP-OES                                             | Plastic   | 500             | 0.50 | 1.00 | mg/kg as Cr   | 2             |                             |
| 7     | Hexavalent Chromium (Cr6+) | Digestion,Colorimetric Method                                        | US EPA SW 846 Method 3060A and 7196A / Spectrophotometer                                   | Plastic   | 500             | 0.12 | 0.25 | mg/kg as Cr6+ | 2             | แก้ไข DL ตามมาตรฐานฉบับใหม่ |
| 8     | Lead (Pb)                  | Digestion,ICP-OES Method                                             | US EPA SW 846 Method 3050B and 6010C / ICP-OES                                             | Plastic   | 500             | 0.50 | 1.00 | mg/kg as Pb   | 2             |                             |
| 9     | Manganese (Mn)             | Digestion,ICP-OES Method                                             | US EPA SW 846 Method 3050B and 6010C / ICP-OES                                             | Plastic   | 500             | 0.50 | 1.00 | mg/kg as Mn   | 2             |                             |
| 10    | Mercury (Hg)               | Digestion,Cold Vapor Technique-AAS Method                            | US EPA SW 846 Method 3050B and 7471B / AAS                                                 | Plastic   | 500             | 0.10 | 0.20 | mg/kg as Hg   | 4             |                             |
| 11    | Nickel (Ni)                | Digestion,ICP-OES Method                                             | US EPA SW 846 Method 3050B and 6010C / ICP-OES                                             | Plastic   | 500             | 0.50 | 1.00 | mg/kg as Ni   | 2             |                             |
| 12    | Selenium (Se)              | Digestion,ICP-OES Method                                             | US EPA SW 846 Method 3050B and 6010C / ICP-OES                                             | Plastic   | 500             | 2.50 | 5.00 | mg/kg as Se   | 2             |                             |
| 13    | Silver (Ag)                | Digestion,ICP-OES Method                                             | US EPA SW 846 Method 3050B and 6010C / ICP-OES                                             | Plastic   | 500             | 1.00 | 2.50 | mg/kg as Ag   | 2             |                             |
| 14    | Trivalent Chromium (Cr3+)  | Digestion,ICP-OES Method; Filtration,Colorimetric Method,Calculation | US EPA SW 846 Method 3050B and 6010C / ICP-OES; Method 3060A and 7196A / Spectrophotometer | Plastic   | 500             | 0.12 | 0.25 | mg/kg as Cr   | 2             |                             |
| 15    | Vanadium (V)               | Digestion,ICP-OES Method                                             | US EPA SW 846 Method 3050B and 6010C / ICP-OES                                             | Plastic   | 500             | 0.50 | 1.00 | mg/kg as V    | 2             |                             |
| 16    | Zinc (Zn)                  | Digestion,ICP-OES Method                                             | US EPA SW 846 Method 3050B and 6010C / ICP-OES                                             | Plastic   | 500             | 0.50 | 1.00 | mg/kg as Zn   | 2             |                             |

| Items | Parameter                      | Method                   | Reference Method / Analytical Technique        | Container | sample size (g) | MDL   | LOQ   | Unit        | Decimal point | Remark                         |
|-------|--------------------------------|--------------------------|------------------------------------------------|-----------|-----------------|-------|-------|-------------|---------------|--------------------------------|
| 17    | Iron (Fe)                      | Digestion,ICP-OES Method | US EPA SW 846 Method 3050B and 6010C / ICP-OES | Plastic   | 500             | 10.4  | 50.0  | mg/kg as Fe | 1             | ขึ้นทะเบียนเพิ่มอีก 9 ส.ก 2568 |
| 18    | Aluminum (Al)                  | Digestion,ICP-OES Method | US EPA SW 846 Method 3050B and 6010C / ICP-OES | Plastic   | 500             | 9.3   | 50.0  | mg/kg as Al | 1             | ขึ้นทะเบียนเพิ่มอีก 9 ส.ก 2568 |
| 19    | Copper (Cu)                    | Digestion,ICP-OES Method | US EPA SW 846 Method 3050B and 6010C / ICP-OES | Plastic   | 500             | 0.55  | 1.00  | mg/kg as Cu | 2             | ขึ้นทะเบียนเพิ่มอีก 9 ส.ก 2568 |
| 20    | Molybdenum (Mo)                | Digestion,ICP-OES Method | US EPA SW 846 Method 3050B and 6010C / ICP-OES | Plastic   | 500             | 0.13  | 1.00  | mg/kg as Mo | 2             | ขึ้นทะเบียนเพิ่มอีก 9 ส.ก 2568 |
| 21    | Volatile organic compounds,VOC |                          |                                                | Glass     | 50              |       |       |             |               |                                |
| 1     | - Acetone                      | Purge-and-Trap / GC-MS   | US EPA SW 846 Method 5035A and 8260D           | Glass     | 50              | 0.005 | 0.010 | mg/kg       | 3             |                                |
| 2     | - Benzene                      | Purge-and-Trap / GC-MS   | US EPA SW 846 Method 5035A and 8260D           | Glass     | 50              | 0.005 | 0.010 | mg/kg       | 3             |                                |
| 3     | - Bromodichloromethane         | Purge-and-Trap / GC-MS   | US EPA SW 846 Method 5035A and 8260D           | Glass     | 50              | 0.005 | 0.010 | mg/kg       | 3             |                                |
| 4     | - Bromoform                    | Purge-and-Trap / GC-MS   | US EPA SW 846 Method 5035A and 8260D           | Glass     | 50              | 0.005 | 0.010 | mg/kg       | 3             |                                |
| 5     | - Butanol                      | Purge-and-Trap / GC-MS   | US EPA SW 846 Method 5035A and 8260D           | Glass     | 50              | 0.005 | 0.010 | mg/kg       | 3             |                                |
| 6     | - Carbon disulfide             | Purge-and-Trap / GC-MS   | US EPA SW 846 Method 5035A and 8260D           | Glass     | 50              | 0.005 | 0.010 | mg/kg       | 3             |                                |
| 7     | - Carbon tetrachloride         | Purge-and-Trap / GC-MS   | US EPA SW 846 Method 5035A and 8260D           | Glass     | 50              | 0.005 | 0.010 | mg/kg       | 3             |                                |
| 8     | - Chlorobenzene                | Purge-and-Trap / GC-MS   | US EPA SW 846 Method 5035A and 8260D           | Glass     | 50              | 0.005 | 0.010 | mg/kg       | 3             |                                |
| 9     | - Chlorodibromomethane         | Purge-and-Trap / GC-MS   | US EPA SW 846 Method 5035A and 8260D           | Glass     | 50              | 0.005 | 0.010 | mg/kg       | 3             |                                |
| 10    | - Chloroform                   | Purge-and-Trap / GC-MS   | US EPA SW 846 Method 5035A and 8260D           | Glass     | 50              | 0.005 | 0.010 | mg/kg       | 3             |                                |
| 11    | - 1,2-Dichlorobenzene          | Purge-and-Trap / GC-MS   | US EPA SW 846 Method 5035A and 8260D           | Glass     | 50              | 0.005 | 0.010 | mg/kg       | 3             |                                |
| 12    | - 1,3-Dichlorobenzene          | Purge-and-Trap / GC-MS   | US EPA SW 846 Method 5035A and 8260D           | Glass     | 50              | 0.005 | 0.010 | mg/kg       | 3             |                                |
| 13    | - 1,4-Dichlorobenzene          | Purge-and-Trap / GC-MS   | US EPA SW 846 Method 5035A and 8260D           | Glass     | 50              | 0.005 | 0.010 | mg/kg       | 3             |                                |
| 14    | - 1,1-Dichloroethane           | Purge-and-Trap / GC-MS   | US EPA SW 846 Method 5035A and 8260D           | Glass     | 50              | 0.005 | 0.010 | mg/kg       | 3             |                                |

| Items | Parameter                               | Method                 | Reference Method / Analytical Technique | Container | sample size (g) | MDL   | LOQ   | Unit  | Decimal point | Remark |
|-------|-----------------------------------------|------------------------|-----------------------------------------|-----------|-----------------|-------|-------|-------|---------------|--------|
| 15    | - 1,2-Dichloroethane                    | Purge-and-Trap / GC-MS | US EPA SW 846 Method 5035A and 8260D    | Glass     | 50              | 0.005 | 0.010 | mg/kg | 3             |        |
| 16    | - 1,1-Dichloroethylene                  | Purge-and-Trap / GC-MS | US EPA SW 846 Method 5035A and 8260D    | Glass     | 50              | 0.005 | 0.010 | mg/kg | 3             |        |
| 17    | - cis-1,2-Dichloroethylene              | Purge-and-Trap / GC-MS | US EPA SW 846 Method 5035A and 8260D    | Glass     | 50              | 0.005 | 0.010 | mg/kg | 3             |        |
| 18    | - trans-1,2-Dichloroethylene            | Purge-and-Trap / GC-MS | US EPA SW 846 Method 5035A and 8260D    | Glass     | 50              | 0.005 | 0.010 | mg/kg | 3             |        |
| 19    | - 1,2-Dichloropropane                   | Purge-and-Trap / GC-MS | US EPA SW 846 Method 5035A and 8260D    | Glass     | 50              | 0.005 | 0.010 | mg/kg | 3             |        |
| 20    | - 1,3-Dichloropropane                   | Purge-and-Trap / GC-MS | US EPA SW 846 Method 5035A and 8260D    | Glass     | 50              | 0.005 | 0.010 | mg/kg | 3             |        |
| 21    | - Ethylbenzene                          | Purge-and-Trap / GC-MS | US EPA SW 846 Method 5035A and 8260D    | Glass     | 50              | 0.005 | 0.010 | mg/kg | 3             |        |
| 22    | - n-Hexane                              | Purge-and-Trap / GC-MS | US EPA SW 846 Method 5035A and 8260D    | Glass     | 50              | 0.010 | 0.010 | mg/kg | 3             |        |
| 23    | - Methylene Chloride or Dichloromethane | Purge-and-Trap / GC-MS | US EPA SW 846 Method 5035A and 8260D    | Glass     | 50              | 0.005 | 0.010 | mg/kg | 3             |        |
| 24    | - Methyl tert-butyl ether               | Purge-and-Trap / GC-MS | US EPA SW 846 Method 5035A and 8260D    | Glass     | 50              | 0.005 | 0.010 | mg/kg | 3             |        |
| 25    | - Naphthalene                           | Purge-and-Trap / GC-MS | US EPA SW 846 Method 5035A and 8260D    | Glass     | 50              | 0.005 | 0.010 | mg/kg | 3             |        |
| 26    | - Nitrobenzene                          | Purge-and-Trap / GC-MS | US EPA SW 846 Method 5035A and 8260D    | Glass     | 50              | 0.005 | 0.010 | mg/kg | 3             |        |
| 27    | - Styrene                               | Purge-and-Trap / GC-MS | US EPA SW 846 Method 5035A and 8260D    | Glass     | 50              | 0.005 | 0.010 | mg/kg | 3             |        |
| 28    | - 1,1,2,2-Tetrachloroethane             | Purge-and-Trap / GC-MS | US EPA SW 846 Method 5035A and 8260D    | Glass     | 50              | 0.005 | 0.010 | mg/kg | 3             |        |
| 29    | - Tetrachloroethylene                   | Purge-and-Trap / GC-MS | US EPA SW 846 Method 5035A and 8260D    | Glass     | 50              | 0.005 | 0.010 | mg/kg | 3             |        |
| 30    | - Toluene                               | Purge-and-Trap / GC-MS | US EPA SW 846 Method 5035A and 8260D    | Glass     | 50              | 0.005 | 0.010 | mg/kg | 3             |        |
| 31    | - 1,2,4-Trichlorobenzene                | Purge-and-Trap / GC-MS | US EPA SW 846 Method 5035A and 8260D    | Glass     | 50              | 0.005 | 0.010 | mg/kg | 3             |        |
| 32    | - 1,1,1-Trichloroethane                 | Purge-and-Trap / GC-MS | US EPA SW 846 Method 5035A and 8260D    | Glass     | 50              | 0.005 | 0.010 | mg/kg | 3             |        |
| 33    | - 1,1,2-Trichloroethane                 | Purge-and-Trap / GC-MS | US EPA SW 846 Method 5035A and 8260D    | Glass     | 50              | 0.005 | 0.010 | mg/kg | 3             |        |

| Items | Parameter                         | Method                        | Reference Method / Analytical Technique | Container | sample size (g) | MDL   | LOQ   | Unit  | Decimal point | Remark |
|-------|-----------------------------------|-------------------------------|-----------------------------------------|-----------|-----------------|-------|-------|-------|---------------|--------|
| 34    | - Trichloroethylene               | Purge-and-Trap / GC-MS        | US EPA SW 846 Method 5035A and 8260D    | Glass     | 50              | 0.005 | 0.010 | mg/kg | 3             |        |
| 35    | - 1,3,5-Trimethylbenzene          | Purge-and-Trap / GC-MS        | US EPA SW 846 Method 5035A and 8260D    | Glass     | 50              | 0.005 | 0.010 | mg/kg | 3             |        |
| 36    | - Vinyl acetate                   | Purge-and-Trap / GC-MS        | US EPA SW 846 Method 5035A and 8260D    | Glass     | 50              | 0.005 | 0.010 | mg/kg | 3             |        |
| 37    | - Vinyl Chloride                  | Purge-and-Trap / GC-MS        | US EPA SW 846 Method 5035A and 8260D    | Glass     | 50              | 0.005 | 0.010 | mg/kg | 3             |        |
| 38    | - m-Xylene                        | Purge-and-Trap / GC-MS        | US EPA SW 846 Method 5035A and 8260D    | Glass     | 50              | 0.005 | 0.010 | mg/kg | 3             |        |
| 39    | - o-Xylene                        | Purge-and-Trap / GC-MS        | US EPA SW 846 Method 5035A and 8260D    | Glass     | 50              | 0.005 | 0.010 | mg/kg | 3             |        |
| 40    | - p-Xylene                        | Purge-and-Trap / GC-MS        | US EPA SW 846 Method 5035A and 8260D    | Glass     | 50              | 0.005 | 0.010 | mg/kg | 3             |        |
| 41    | - Xylene Total                    | Purge-and-Trap / GC-MS        | US EPA SW 846 Method 5035A and 8260D    | Glass     | 50              | 0.005 | 0.010 | mg/kg | 3             |        |
| 22    | Semivolatile organic compounds #1 |                               |                                         | Glass     | 2500            |       |       |       |               |        |
| 1     | Acenaphthene                      | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125 | 0.250 | mg/kg | 3             |        |
| 2     | Anthracene                        | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125 | 0.500 | mg/kg | 3             |        |
| 3     | Benzo[a]anthracene                | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125 | 0.250 | mg/kg | 3             |        |
| 4     | Benzo[b]fluoranthene              | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125 | 0.250 | mg/kg | 3             |        |
| 5     | Benzo[k]fluoranthene              | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125 | 0.250 | mg/kg | 3             |        |
| 6     | Benzo[a]pyrene                    | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125 | 0.500 | mg/kg | 3             |        |
| 7     | Benzo[ghi]perylene                | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125 | 0.250 | mg/kg | 3             |        |
| 8     | Bis(2-chloroethyl) ether          | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125 | 0.250 | mg/kg | 3             |        |
| 9     | Bis(2-ethylhexyl) phthalate       | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125 | 0.500 | mg/kg | 3             |        |
| 10    | Butyl benzyl phthalate            | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125 | 0.250 | mg/kg | 3             |        |

| Items | Parameter                 | Method                        | Reference Method / Analytical Technique | Container | sample size (g) | MDL   | LOQ   | Unit  | Decimal point | Remark |
|-------|---------------------------|-------------------------------|-----------------------------------------|-----------|-----------------|-------|-------|-------|---------------|--------|
| 11    | Carbazole                 | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125 | 0.250 | mg/kg | 3             |        |
| 12    | p-Chloroaniline           | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.500 | 1.250 | mg/kg | 3             |        |
| 13    | 2-Chlorophenol            | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125 | 0.250 | mg/kg | 3             |        |
| 14    | Chrysene                  | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125 | 0.250 | mg/kg | 3             |        |
| 15    | Dibenof[a,h]anthracene    | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125 | 0.250 | mg/kg | 3             |        |
| 16    | Di-n-butyl phthalate      | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125 | 0.250 | mg/kg | 3             |        |
| 17    | 2,4-Dichlorophenol        | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125 | 0.500 | mg/kg | 3             |        |
| 18    | Diethyl Phthalate         | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125 | 0.250 | mg/kg | 3             |        |
| 19    | 2,4-Dimethylphenol        | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125 | 0.500 | mg/kg | 3             |        |
| 20    | 2,4-Dinitrotoluene        | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125 | 0.500 | mg/kg | 3             |        |
| 21    | 2,6-Dinitrotoluene        | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125 | 0.500 | mg/kg | 3             |        |
| 22    | Di-n-octyl phthalate      | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125 | 0.500 | mg/kg | 3             |        |
| 23    | Fluoranthene              | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125 | 0.250 | mg/kg | 3             |        |
| 24    | Fluorene                  | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125 | 0.250 | mg/kg | 3             |        |
| 25    | Hexachlorobenzene         | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125 | 0.250 | mg/kg | 3             |        |
| 26    | Hexachloro-1,3-butadiene  | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125 | 0.250 | mg/kg | 3             |        |
| 27    | Hexachlorocyclopentadiene | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125 | 0.250 | mg/kg | 3             |        |
| 28    | Hexachloroethane          | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125 | 0.250 | mg/kg | 3             |        |
| 29    | Indeno[1,2,3-cd]pyrene    | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125 | 0.500 | mg/kg | 3             |        |

| Items | Parameter                         | Method                        | Reference Method / Analytical Technique | Container | sample size (g) | MDL    | LOQ    | Unit  | Decimal point | Remark |
|-------|-----------------------------------|-------------------------------|-----------------------------------------|-----------|-----------------|--------|--------|-------|---------------|--------|
| 30    | Iophorone                         | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125  | 0.250  | mg/kg | 3             |        |
| 31    | 2-Methylphenol (o-Cresol)         | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125  | 0.500  | mg/kg | 3             |        |
| 32    | 2-Methylnaphthalene               | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125  | 0.250  | mg/kg | 3             |        |
| 33    | N-Nitrosodi-n-propylamine         | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125  | 0.250  | mg/kg | 3             |        |
| 34    | Phenanthrene                      | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125  | 0.250  | mg/kg | 3             |        |
| 35    | Phenol                            | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125  | 0.250  | mg/kg | 3             |        |
| 36    | Pyrene                            | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125  | 0.250  | mg/kg | 3             |        |
| 37    | 2,4,5-Trichlorophenol             | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125  | 0.500  | mg/kg | 3             |        |
| 38    | 2,4,6-Trichlorophenol             | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.125  | 0.500  | mg/kg | 3             |        |
| 23    | Semivolatile organic compounds #2 |                               |                                         |           |                 |        |        |       |               |        |
| 1     | - alpha - BHC                     | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.0008 | 0.0012 | mg/kg | 4             |        |
| 2     | - beta - BHC                      | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.0008 | 0.0012 | mg/kg | 4             |        |
| 3     | - gamma - BHC                     | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.0008 | 0.0012 | mg/kg | 4             |        |
| 4     | - Heptachlor                      | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.0008 | 0.0012 | mg/kg | 4             |        |
| 5     | - Aldrin                          | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.0008 | 0.0012 | mg/kg | 4             |        |
| 6     | - Heptachlor epoxide              | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.0008 | 0.0012 | mg/kg | 4             |        |
| 7     | - Chlordane                       | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.0008 | 0.0012 | mg/kg | 4             |        |
| 8     | - Dieldrin                        | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.0008 | 0.0012 | mg/kg | 4             |        |
| 9     | - Endrin                          | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.0012 | 0.0025 | mg/kg | 4             |        |
| 10    | - DDD                             | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.0008 | 0.0012 | mg/kg | 4             |        |
| 11    | - DDT                             | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.0008 | 0.0012 | mg/kg | 4             |        |
| 12    | - Methoxychlor                    | Ultrasonic Extraction / GC-MS | US EPA SW 846 Method 3550C and 8270E    | Glass     | 2500            | 0.0008 | 0.0012 | mg/kg | 4             |        |

การตรวจวิเคราะห์คุณภาพน้ำ – ภาคตะกอน (Water – Solid wastes Quality Analysis)

ตารางที่ ๖ สรุปข้อกำหนดการเก็บตัวอย่างและความสามารถในการทดสอบตัวอย่างของห้องปฏิบัติการ **แผนที่ขึ้นทะเบียนกับกรมโรงงานอุตสาหกรรม**

(ประเภทตัวอย่าง : **ภาคตะกอน** ตามประกาศเรื่องสิ่งปฏิกูลที่ไม่ใช่สัตว์ และ ดิน )

ส่วนงาน : ส่วนงานเครื่องมือทดสอบ

| Items | Parameter      | Method                                                        | Reference Method / Analytical Technique                                                          | Container | sample size (g) | MDL          | LOQ          | Unit                      | Decimal point | Remark |
|-------|----------------|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-----------|-----------------|--------------|--------------|---------------------------|---------------|--------|
| 1     | Antimony (Sb)  | Waste Extraction , ICP-OES Method<br>Digestion,ICP-OES Method | US EPA SW 846 Method 1310A and 6010C / ICP-OES<br>US EPA SW 846 Method 3050B and 6010C / ICP-OES | Plastic   | 500             | 0.05<br>2.50 | 0.10<br>5.00 | mg/l as Sb<br>mg/kg as Sb | 2             |        |
| 2     | Arsenic (As)   | Waste Extraction , ICP-OES Method<br>Digestion,ICP-OES Method | US EPA SW 846 Method 1310A and 6010C / ICP-OES<br>US EPA SW 846 Method 3050B and 6010C / ICP-OES | Plastic   | 500             | 0.05<br>2.50 | 0.10<br>5.00 | mg/l as As<br>mg/kg as As | 2             |        |
| 3     | Barium (Ba)    | Waste Extraction , ICP-OES Method<br>Digestion,ICP-OES Method | US EPA SW 846 Method 1310A and 6010C / ICP-OES<br>US EPA SW 846 Method 3050B and 6010C / ICP-OES | Plastic   | 500             | 0.01<br>0.50 | 0.02<br>1.00 | mg/l as Ba<br>mg/kg as Ba | 2             |        |
| 4     | Beryllium (Be) | Waste Extraction , ICP-OES Method<br>Digestion,ICP-OES Method | US EPA SW 846 Method 1310A and 6010C / ICP-OES<br>US EPA SW 846 Method 3050B and 6010C / ICP-OES | Plastic   | 500             | 0.01<br>0.50 | 0.02<br>1.00 | mg/l as Be<br>mg/kg as Be | 2             |        |
| 5     | Cadmium (Cd)   | Waste Extraction , ICP-OES Method<br>Digestion,ICP-OES Method | US EPA SW 846 Method 1310A and 6010C / ICP-OES<br>US EPA SW 846 Method 3050B and 6010C / ICP-OES | Plastic   | 500             | 0.01<br>0.10 | 0.02<br>0.15 | mg/l as Cd<br>mg/kg as Cd | 2             |        |
| 6     | Chromium (Cr)  | Waste Extraction , ICP-OES Method<br>Digestion,ICP-OES Method | US EPA SW 846 Method 1310A and 6010C / ICP-OES<br>US EPA SW 846 Method 3050B and 6010C / ICP-OES | Plastic   | 500             | 0.01<br>0.50 | 0.02<br>1.00 | mg/l as Cr<br>mg/kg as Cr | 2             |        |
| 7     | Cobalt (Co)    | Waste Extraction , ICP-OES Method<br>Digestion,ICP-OES Method | US EPA SW 846 Method 1310A and 6010C / ICP-OES<br>US EPA SW 846 Method 3050B and 6010C / ICP-OES | Plastic   | 500             | 0.01<br>0.50 | 0.02<br>1.00 | mg/l as Co<br>mg/kg as Co | 2             |        |
| 8     | Copper (Cu)    | Waste Extraction , ICP-OES Method<br>Digestion,ICP-OES Method | US EPA SW 846 Method 1310A and 6010C / ICP-OES<br>US EPA SW 846 Method 3050B and 6010C / ICP-OES | Plastic   | 500             | 0.01<br>0.50 | 0.02<br>1.00 | mg/l as Cu<br>mg/kg as Cu | 2             |        |

| Items | Parameter                                | Method                                                    | Reference Method / Analytical Technique                         | Container | sample size (g) | MDL    | LOQ    | Unit        | Decimal point | Remark |
|-------|------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------------|-----------|-----------------|--------|--------|-------------|---------------|--------|
| 9     | Hexavalent Chromium ( $\text{Cr}^{6+}$ ) | Colorimetric Method/ Spectrophotometer                    | SW 846 Method 7196A / Spectrophotometer                         | Plastic   | 500             | 0.003  | 0.050  | mg/l as Cr  | 3             |        |
|       |                                          | Alkaline Digestion,Colorimetric Method/ Spectrophotometer | US EPA SW 846 Method 3060A and 7196A / Spectrophotometer        |           |                 | 0.40   | 2.00   | mg/kg as Cr | 2             |        |
| 10    | Lead (Pb)                                | Waste Extraction , ICP-OES Method                         | US EPA SW 846 Method 1310A and 6010C / ICP-OES                  | Plastic   | 500             | 0.01   | 0.02   | mg/l as Pb  | 2             |        |
|       |                                          | Digestion,ICP-OES Method                                  | US EPA SW 846 Method 3050B and 6010C / ICP-OES                  |           |                 | 0.50   | 1.00   | mg/kg as Pb |               |        |
| 11    | Mercury (Hg)                             | Waste Extraction, Cold Vapor Technique-AAS Method         | US EPA SW 846 Method 1310A and Standard Method part 3112 B/ AAS | Plastic   | 500             | 0.0005 | 0.0010 | mg/l as Hg  | 4             |        |
|       |                                          | Digestion,Cold Vapor Technique-AAS Method                 | US EPA SW 846 Method 3050B and 7471B / AAS                      |           |                 | 0.10   | 0.20   | mg/kg as Hg | 2             |        |
| 12    | Molybdenum (Mo)                          | Waste Extraction , ICP-OES Method                         | US EPA SW 846 Method 1310A and 6010C / ICP-OES                  | Plastic   | 500             | 0.01   | 0.02   | mg/l as Mo  | 2             |        |
|       |                                          | Digestion,ICP-OES Method                                  | US EPA SW 846 Method 3050B and 6010C / ICP-OES                  |           |                 | 0.50   | 1.00   | mg/kg as Mo |               |        |
| 13    | Nickel (Ni)                              | Waste Extraction , ICP-OES Method                         | US EPA SW 846 Method 1310A and 6010C / ICP-OES                  | Plastic   | 500             | 0.01   | 0.02   | mg/l as Ni  | 2             |        |
|       |                                          | Digestion,ICP-OES Method                                  | US EPA SW 846 Method 3050B and 6010C / ICP-OES                  |           |                 | 0.50   | 1.00   | mg/kg as Ni |               |        |
| 14    | Selenium (Se)                            | Waste Extraction , ICP-OES Method                         | US EPA SW 846 Method 1310A and 6010C / ICP-OES                  | Plastic   | 500             | 0.05   | 0.10   | mg/l as Se  | 2             |        |
|       |                                          | Digestion,ICP-OES Method                                  | US EPA SW 846 Method 3050B and 6010C / ICP-OES                  |           |                 | 2.50   | 5.00   | mg/kg as Se |               |        |
| 15    | Silver (Ag)                              | Waste Extraction , ICP-OES Method                         | US EPA SW 846 Method 1310A and 6010C / ICP-OES                  | Plastic   | 500             | 0.02   | 0.05   | mg/l as Ag  | 2             |        |
|       |                                          | Digestion,ICP-OES Method                                  | US EPA SW 846 Method 3050B and 6010C / ICP-OES                  |           |                 | 1.00   | 2.50   | mg/kg as Ag |               |        |
| 16    | Thallium (Tl)                            | Waste Extraction , ICP-OES Method                         | US EPA SW 846 Method 1310A and 6010C / ICP-OES                  | Plastic   | 500             | 0.05   | 0.10   | mg/l as V   | 2             |        |
|       |                                          | Digestion,ICP-OES Method                                  | US EPA SW 846 Method 3050B and 6010C / ICP-OES                  |           |                 | 2.50   | 5.00   | mg/kg as V  |               |        |
| 17    | Vanadium (V)                             | Waste Extraction , ICP-OES Method                         | US EPA SW 846 Method 1310A and 6010C / ICP-OES                  | Plastic   | 500             | 0.01   | 0.02   | mg/l as V   | 2             |        |
|       |                                          | Digestion,ICP-OES Method                                  | US EPA SW 846 Method 3050B and 6010C / ICP-OES                  |           |                 | 0.50   | 1.00   | mg/kg as V  |               |        |
| 18    | Zinc (Zn)                                | Waste Extraction , ICP-OES Method                         | US EPA SW 846 Method 1310A and 6010C / ICP-OES                  | Plastic   | 500             | 0.01   | 0.02   | mg/l as Zn  | 2             |        |
|       |                                          | Digestion,ICP-OES Method                                  | US EPA SW 846 Method 3050B and 6010C / ICP-OES                  |           |                 | 0.50   | 1.00   | mg/kg as Zn |               |        |

### การตรวจวิเคราะห์คุณภาพน้ำ – ภาคของแข็ง (Water – Solid wastes Quality Analysis)

ตารางนี้ 9 ระบุถึงเกณฑ์การเทียบเคียงค่าของและความสามารถในการทดสอบด้วยวิธีของห้องปฏิบัติการ ที่ไม่ได้ขึ้นทะเบียนกับกรมโรงงานอุตสาหกรรม

(ประเภทผลิตภัณฑ์ : ภาคของแข็ง ตามประกาศของสำนักงานปศุสัตว์แห่งชาติ)

ส่วนประกอบ : ส่วนงานเครื่องมือทดสอบ

| Items | Parameter      | Method                            | Reference Method / Analytical Technique        | Container | sample size (ml) | MDL   | LOQ  | Unit        | Decimal point | Remark |
|-------|----------------|-----------------------------------|------------------------------------------------|-----------|------------------|-------|------|-------------|---------------|--------|
| 1     | Aluminum (Al)  | Waste Extraction , ICP-OES Method | US EPA SW 846 Method 1310A and 6010C / ICP-OES | Plastic   | 500              | 0.05  | 0.10 | mg/l as Al  | 2             |        |
|       |                | Digestion,ICP-OES Method          | US EPA SW 846 Method 3050B and 6010C / ICP-OES |           |                  | 2.50  | 5.00 | mg/kg as Al | 2             |        |
| 2     | Boron (B)      | Waste Extraction , ICP-OES Method | US EPA SW 846 Method 1310A and 6010C / ICP-OES | Plastic   | 500              | 0.01  | 0.02 | mg/l as B   | 2             |        |
|       |                | Digestion,ICP-OES Method          | US EPA SW 846 Method 3050B and 6010C / ICP-OES |           |                  | 0.50  | 1.00 | mg/kg as B  | 2             |        |
| 3     | Calcium (Ca)   | Waste Extraction , ICP-OES Method | US EPA SW 846 Method 1310A and 6010C / ICP-OES | Plastic   | 500              | 0.05  | 0.10 | mg/l as Ca  | 2             |        |
|       |                | Digestion,ICP-OES Method          | US EPA SW 846 Method 3050B and 6010C / ICP-OES |           |                  | 25.0  | 50.0 | mg/kg as Ca | 1             |        |
| 4     | Iron (Fe)      | Waste Extraction , ICP-OES Method | US EPA SW 846 Method 1310A and 6010C / ICP-OES | Plastic   | 500              | 0.02  | 0.05 | mg/l as Fe  | 2             |        |
|       |                | Digestion,ICP-OES Method          | US EPA SW 846 Method 3050B and 6010C / ICP-OES |           |                  | 1.00  | 1.50 | mg/kg as Fe | 2             |        |
| 5     | Magnesium (Mg) | Waste Extraction , ICP-OES Method | US EPA SW 846 Method 1310A and 6010C / ICP-OES | Plastic   | 500              | 0.05  | 0.10 | mg/l as Mg  | 2             |        |
|       |                | Digestion,ICP-OES Method          | US EPA SW 846 Method 3050B and 6010C / ICP-OES |           |                  | 25.0  | 50.0 | mg/kg as Mg | 1             |        |
| 6     | Manganese (Mn) | Waste Extraction , ICP-OES Method | US EPA SW 846 Method 1310A and 6010C / ICP-OES | Plastic   | 500              | 0.01  | 0.02 | mg/l as Mn  | 2             |        |
|       |                | Digestion,ICP-OES Method          | US EPA SW 846 Method 3050B and 6010C / ICP-OES |           |                  | 0.50  | 1.00 | mg/kg as Mn | 2             |        |
| 7     | Potassium (K)  | Waste Extraction , ICP-OES Method | US EPA SW 846 Method 1310A and 6010C / ICP-OES | Plastic   | 500              | 0.50  | 1.00 | mg/l as K   | 2             |        |
|       |                | Digestion,ICP-OES Method          | US EPA SW 846 Method 3050B and 6010C / ICP-OES |           |                  | 25.00 | 50.0 | mg/kg as K  | 2             |        |
| 8     | Silicon (Si)   | Waste Extraction , ICP-OES Method | US EPA SW 846 Method 1310A and 6010C / ICP-OES | Plastic   | 500              | 0.02  | 0.05 | mg/l as Si  | 2             |        |
|       |                | Digestion,ICP-OES Method          | US EPA SW 846 Method 3050B and 6010C / ICP-OES |           |                  | 1.00  | 2.50 | mg/kg as Si | 2             |        |
| 9     | Sodium (Na)    | Waste Extraction , ICP-OES Method | US EPA SW 846 Method 1310A and 6010C / ICP-OES | Plastic   | 500              | 0.50  | 1.00 | mg/l as Na  | 2             |        |
|       |                | Digestion,ICP-OES Method          | US EPA SW 846 Method 3050B and 6010C / ICP-OES |           |                  | 25.0  | 50.0 | mg/kg as Na | 1             |        |
| 10    | Strontium (Sr) | Waste Extraction , ICP-OES Method | US EPA SW 846 Method 1310A and 6010C / ICP-OES | Plastic   | 500              | 0.01  | 0.02 | mg/l as Sr  | 2             |        |
|       |                | Digestion,ICP-OES Method          | US EPA SW 846 Method 3050B and 6010C / ICP-OES |           |                  | 0.50  | 1.00 | mg/kg as Sr | 2             |        |
| 11    | Tin (Sn)       | Waste Extraction , ICP-OES Method | US EPA SW 846 Method 1310A and 6010C / ICP-OES | Plastic   | 500              | 0.05  | 0.10 | mg/l as Sn  | 2             |        |
|       |                | Digestion,ICP-OES Method          | US EPA SW 846 Method 3050B and 6010C / ICP-OES |           |                  | 2.50  | 5.00 | mg/kg as Sn | 2             |        |
| 12    | Titanium (Ti)  | Waste Extraction , ICP-OES Method | US EPA SW 846 Method 1310A and 6010C / ICP-OES | Plastic   | 500              | 0.01  | 0.02 | mg/l as Ti  | 2             |        |
|       |                | Digestion,ICP-OES Method          | US EPA SW 846 Method 3050B and 6010C / ICP-OES |           |                  | 0.50  | 1.00 | mg/kg as Ti | 2             |        |
| 13    | Phosphorus (P) | Waste Extraction , ICP-OES Method | US EPA SW 846 Method 1310A and 6010C / ICP-OES | Plastic   | 500              | 0.50  | 1.00 | mg/l as P   | 2             |        |
|       |                | Digestion,ICP-OES Method          | US EPA SW 846 Method 3050B and 6010C / ICP-OES |           |                  | 25.00 | 50.0 | mg/kg as P  | 2             |        |

| Items | Parameter                              | Method                                                                                                                                                     | Reference Method / Analytical Technique                                                                                                                                                              | Container | sample size (ml) | MDL   | LOQ   | Unit  | Decimal point | Remark |
|-------|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------|-------|-------|-------|---------------|--------|
| 14    | Trivalent Chromium (Cr <sup>3+</sup> ) | Waste Extraction , ICP-OES Method, Filtration, Colorimetric Method,Calculation<br><br>Digestion,ICP-OES Method, Filtration,Colorimetric Method,Calculation | US EPA SW 846 Method 1310A and 6010C / ICP-OES ; Method 3060A<br>and 7196A / Spectrophotometer<br><br>US EPA SW 846 Method 3050B and 6010C / ICP-OES ; Method 3060A<br>and 7196A / Spectrophotometer | Plastic   | 500              | 0.003 | 0.050 | mg/l  | 2             |        |
|       |                                        |                                                                                                                                                            |                                                                                                                                                                                                      |           |                  | 0.40  | 2.00  | mg/kg | 2             |        |

เอกสารอ้างอิง

- 1 Standard Methods for the Examination of Water and Wastewater 23rd Edition, APHA, AWWA, WEF, 2017
- 2 United States Environmental Protection Agency, Acid Digestion of Sediments Sludge and Solis. SW-846 Method 3050C,3060A,3510C,3620C,6010C,7000B,7196A,7471B
- 3 Methods of Sewerage Analysis, 1976
- 4 ประกาศกระทรวงสาธารณสุขฉบับที่ 2548 เรื่อง การกำจัดสิ่งปฏิกูลหรือโสโครกที่ไม่ใช่สิ่ง 3, ราชกิจจานุเบกษา 125 มกราคม 2549 เล่มที่ 123 ตอนพิเศษ 114
- 5 คู่มือจัดการขยะมูลฝอยชุมชน ตามแนววิชาการแห่งชาติของกรมส่งเสริมการค้าภายใน พิมพ์ครั้งที่ 3, 2540
- 6 เกณฑ์คุณภาพสิ่งแวดล้อมสำหรับ สัมผัสครั้งที่ 3, 2544
- 7 เกณฑ์คุณภาพสิ่งแวดล้อมสำหรับ สัมผัสครั้งที่ 2, 2545