# 添付資料 11-3:
# 成果2サブグループ会議

11-3-1 : 1st SG2
11-3-2 : 2nd SG2
11-3-3 : 3rd SG2

# 添付資料 11-3:
# 成果2サブグループ会議

## 11-3-1 : 1st SG2

Republic of the Philippines
Department of Environment and Natural Resources
**ENVIRONMENTAL MANAGEMENT BUREAU**
DENR Compound, Visayas Avenue, Diliman, Quezon City 1116
Telephone Nos.: (632) 927-15-17, 928-37-25; Fax No.; (632) 920-22-58
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# NOTICE OF MEETING

TO : **ALL SUB-GROUP MEMBERS (PROJECT OUTPUT 2 & 4)**

**Selected Concerned Government Agencies**

Engr. Reynaldo Esguerra – DOST-ITDI
Ms. Ruby de Guzman – DOE-REMB
Mr. Carlo Mari Crisregienald C. Tan – DILG-BLGS
Mr. Aldwin U. Urbina - NEDA-IPG
Ms. Justine Padiernos – PPPC

**Local Government Units (LGUs)**

Mr. Vincent Ferdinand Paul G. Vinarao – EPWMD/LGU Quezon City
Atty. Junine Aragones – LGU Cebu City
Atty. Dwight Domingo – LGU Davao City

**EMB Central Office**

Mr. Renato T. Cruz – EMB EQMD
Ms. Consolacion Crisostomo – EMB-PPPDD
Ms. Fatima Anneglo R. Molina – EMB- ERLSD
Atty. Carmelo R. Segui – EMB-LD
Engr. Jundy T. Del Socorro – EMB-EQMD-AQMS

**Project Output Coordinators**
Director Angelito V. Fontanilla – DENR-FASPS
Mr. Conrado A. Bravante, Jr. – DENR-FASPS
Ms. Marianica Philina L. Obmerga - DENR-FASPS
Engr. Nolan B. Francisco – EMB-SWMD/PMO
Ms. Elvira S. Pausing – EMB-SWMD/PMO
Mr. Takahiro Kamishita – JICA/JET

**All SWMD-PMO Staff**

FROM : **THE EMB DIRECTOR**

DATE/TIME/VENUE: **13 February 2019 (*Thursday*)/ 10:00 AM/ EMB-AQMTC Bldg.**

SUBJECT : ***1st SUB-GROUP MEETING (PROJECT OUTPUT 2)*:**
**ENHANCEMENT OF TARGET LGUS' CAPACITY FOR PLANNING, EVALUATION, FORMULATION AND SUPERVISION OF WTE PROJECT UNDER THE TECHNICAL COOPERATION PROJECT (TCP) RE CAPACITY DEVELOPMENT 1ON IMPROVING SOLID WASTE MANAGEMENT THROUGH ADVANCED/INNOVATIVE TECHNOLOGIES**

***1st SUB-GROUP MEETING (PROJECT OUTPUT 4)*:**
**ENHANCEMENT OF THE NATIONAL GOVERNMENTS AND TARGET LGUS' CAPACITY TO IDENTIFY ISSUES AND PROVIDE SUGGESTIONS/ RECOMMENDATIONS FOR OTHER SWM TECHNOLOGIES THAN WTE UNDER THE TECHNICAL COOPERATION PROJECT (TCP) RE CAPACITY DEVELOPMENT ON IMPROVING SOLID WASTE MANAGEMENT THROUGH ADVANCED/INNOVATIVE TECHNOLOGIES**

AGENDA:

1. Call to Order/Objectives of the Meeting
2. Presentation/Introduction of Sub-Group Members for Project Output 2 &4
3. Presentation/Discussions on the Outline of the Specific Activities under Project Output 2 & 4 including deliverables based from the Inception Report.
4. Presentation/Discussions on the following:
   a. **Project Output 2**
      i. Review of 10 years plan of LGUs (Quezon City, Davao City, Cebu City) addressing identification of WTE project, quantity of waste to be treated in WTE facility, consistency with LGU land use plan, etc.
      ii. Status of WTE projects in the target LGUs

   b. **Project Output 4**
      i. Review of 10 years plan of LGUs regarding other technologies than WTE
      ii. Observations on the present situation of SWM of target LGUs including advanced material recovery/treatment facility
   c. Proposed outline of the TCP Newsletter *(Sub-group members may provide proposals for the title of the Newsletter)*
   d. Capacity Assessment of Sub-group *members (Kindly fill up the attached checklist and send to the Secretariat via email (dimernelie@yahoo.com or deth25760945@gmail.com) by Friday 11 February 2020*)
   e. Participants to the Training in Japan
5. Finalization of the Comments/Agreements/Timelines
6. Way Forward

Your participation/attendance is enjoined.

**ENGR. WILLIAM P. CUÑADO**

# 1st Sub Group Meeting
for

## Output 2: Enhancement of Target LGUs' capacity on planning, evaluation, formulation & supervision of WTE projects

## Output 4: Enhancement of The National Government's Capacity to identify issues and provide suggestions/recommendations for other SWM technologies other than WTE

13th February 2020 (Thursday) 10:00 a.m.

The Technical Cooperation Project (TCP) for Capacity Development on Improving Solid Waste Management (SWM) through Advanced/Innovative Technologies



## Agenda

1. Call to Order
2. Objectives of the Meeting
3. Presentation on the Outline of the Specific Activities under Project Output 2 including deliverables based on the Inception Report
4. Presentation and discussions on the following:
   a. Output2
      i. Review of 10 years plan of LGUs (Quezon City, Davao City, Cebu City) addressing identification of WTE project, quantity of waste to be treated in WTE facility, consistency with LGU land use plan, etc.
      ii. Status of WTE projects in the target LGUs



## Agenda

b. Output4
   i. Review of 10 years plan of LGUs regarding other technologies than WTE
   ii. Observations on the present situation of SWM of target LGUs including advanced material recovery/treatment facility

Inter-output activities
   c. Proposed outline of the TCP Newsletter
   d. Participants in Training in Japan
   e. Kick-off Seminar
   f. Capacity Assessment of Sub-group members

5. Finalization of the comments/agreements/Timelines
6. Way Forward



## 2. Objectives of the meeting

- **Inter-Agency Technical Working Group (ITWG) was created under EMB Special Order No. 2019-347**. The ITWG shall serve as core group to undertake important tasks such as providing technical and operational guidance to the project.
- **The ITWG members shall create sub-groups within the members of the ITWG that would take a lead in the implementation of the project on a per output basis.**

| Sub group | Objectives |
|---|---|
| Output 1 | The enhancement of National Project Government's capacity for supporting and coordinating of LGU's WTE project |
| **Output 2** | **The enhancement of Target LGUs' capacity for Planning, Evaluation, Formulation and Supervision of WTE project.** |
| Output 3 | The enhancement of the National government's capacity of environmental monitoring for WTE project |
| **Output 4** | **The enhancement of the National Governments and target LGUs' capacity to identify issues and provide suggestions/ recommendations for other SWM technologies other than WTE.** |

## 2. Objectives of the meeting

☐ Members for Sub-Group for Output 2&4

| Agency/Office | | Members |
|---|---|---|
| Selected Concerned Government Agencies | DOST-Industrial Technology Development Institute | Engr. Reynaldo Esguerra |
| | DOE-REMB | Ms. Ruby De Guzman |
| | PPP Center | Ms. Justine Padiernos |
| | DILG | Mr. Carlo Mari Crisreoienald C. Tan |
| EMB Central Office | EMB-EQMD-Air Quality Management Section | Engr. Jundy T. Del Socorro |
| Target LGUs | Quezon City | (TBA) |
| | Cebu City | Atty. Junine Aragones |
| | Davao City | Atty. Dwight Domingo |
| Project Output Coordinators | DENR-Foreign Assisted and Special Project Service | Director Angelito V. Fontanilla |
| | EMB-Solid Waste Management Division/ Project Management Office | Engr. Nolan B. Francisco |
| | EMB-Solid Waste Management Division/ Project Management Office | Ms. Elvira S. Pausing |
| | JICA Experts Team | Mr. Takahiro Kamishita |
| | | Mr. Makoto Kosaka |
| | | Ms. Kyoko KIMURA |
| | | Ms. Iku Sato |



## 2. Objectives of the meeting

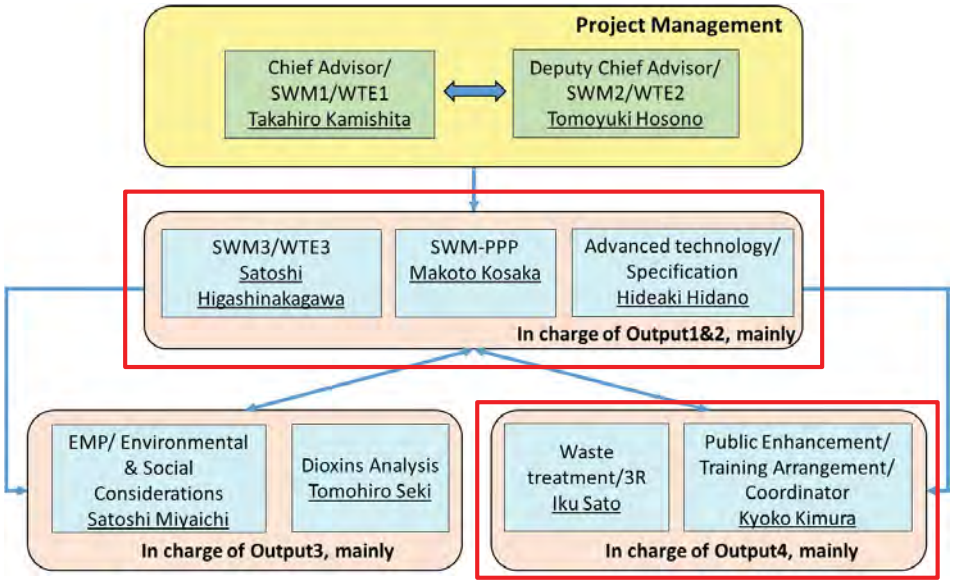
☐ Objectives of the meeting:

- **Kick-off** of the sub-group meeting
- **Share the specific activities** of Output 2&4
- **Explain/discuss the progress** of Output 2&4
- Inter-output Activities of the Project
  a. Training Plan in Japan related to SWM/WTE
  b. Proposed outline of the TCP Newsletter
  c. Seminar on 27th February
  d. Capacity Assessment of Sub-group members
- Others



## 3. Outline of the Specific Activities under Project Output 2 & 4

☐ Composition of the JICA Expert Team






## 3. Outline of the Specific Activities under Project Output 2

2-1: Review current situation on introducing WTE facilities in the target LGUs

2-2: Clarify current waste flow & amount, set target on waste reduction in the existing SWM 10-year plans

2-3: Evaluate LGUs' land use plan for WTE projects

2-4: Analyze & verify candidate WTE projects selected from the existing F/S, unsolicited/solicited proposals

2-5: Define points & issues to be addressed for formulating WTE projects in the target LGUs

2-6: Define proper responsibility of the target LGUs in promoting WTE projects under PPP scheme

2-7: Formulate technical specification of WTE facilities in each target LGU

2-8: Define points & issues to be addressed for supervising WTE projects in the target LGUs

添付資料11

## 3. Outline of the Specific Activities under Project Output 2

☐ Schedule

| | 2019 | 2020 | 2021 |
|---|---|---|---|
| 2.1 | | | |
| 2.2 | | | |
| 2.3 | | | |
| 2.4 | | | |
| 2.5 | | | |
| 2.6 | | | |
| 2.7 | | | |
| 2.8 | | | |
| Main activity | •Target setting for waste reduction<br>•Analysis on WTE projects in LGUs | •Technical specification of WTE facilities in each target LGU<br>•Inputs to Output 1 | |

☐ Deliverables

✓ Project report, Monitoring sheet, Specification of WTE

## 3. Outline of the Specific Activities under Project Output 4

☐ Schedule

| Activities | 1st Year Mar/'19 - Mar/'20 | 2nd Year Apr/'20 - Mar/'21 | 3rd Year Apr/'21 - Mar/'22 |
|---|---|---|---|
| 4.1 | | | |
| 4.2 | | | |
| 4.3 | | | |
| 4.4 | | | |
| 4.5 | | | |
| Main activity | •Grasp the current situation and Identify the current issues by National SWM strategy and 10 year SWM plan in the target LGUs. | •Collect the information of "Good practice/Good technology" of other SWM technologies in third countries.<br>•Summarize and provide suggestion/recommendation to improve utilization to target LGUs. | •Seminar for disseminating suggestion/recommendation is held. |

☐ Deliverables

✓ Project report, Monitoring Sheet



## 3. Outline of the Specific Activities under Project Output 4

☐ Output 4. National Government's and target LGUs' capacity to **identify issues and provide suggestion/recommendation for other SWM technologies** than WTE is enhanced.

☐ Specific activities

4.1 **Grasp the current situation** by National SWM strategy and 10 year SWM plan in the target LGUs.

4.2 **Identify the current issues** for other SWM technologies in the target LGUs.

4.3 Collect the information of **"Good practice/Good technology" of other SWM technologies in Japan/third countries**.

4.4 **Summarize and provide suggestion/recommendation** to improve utilization of other SWM technologies to target LGUs.

4.5 **Seminar** for disseminating suggestion/recommendation is held.



## Output 2

a. Review of 10 years plan of LGUs regarding WTE

b. Observations on the present situation of SWM of target LGUs including advanced material recovery/treatment facility

## 4.a.i. Review of 10 years plan of LGUs

Requirements in the Guidelines

- NSWMC Resolution (2016-669)
  - Section 5. Pre-Operation Phase: The following conditions must be met prior to registration of a WTE facility with the Bureau
    - The host LGU shall notify the Commission of any WTE facility that will be established within its jurisdiction by submitting an updated I0-year solid waste management plan
    - A WTE facility shall be located at a site consistent with the land use plan of the LGU and must always consider all environmental criteria on site selection including provision for buffer zone(s)
- DAO 2019-21(WTE Guidelines)
  - Section 5. Requirements: The following conditions must be met prior to registration of a WTE facility with the Bureau
    - The host LGU including the LGUs where the source of the feedstock will originated from shall ensure that the plan to establish and/or utilize WtE facility is integrated in their approved 10-year solid waste management plan consistent with the provisions of RA 9003.



## WTE project in the 10-year SWM plan

| | Quezon City | Davao City | Cebu City |
|---|---|---|---|
| Evaluation by NSWMC | Approved in August 2018 | Deliberation has undergone (TBC) | Deliberation has undergone (TBC) |
| Identification of WTE project | ● WTE is considered to adopt.<br>● Detailed information facility is missing<br>● Investment by private sector for WTE is counted | ● Planned to operate WTE(600tpd) in 2022<br>● Waste amount to be treated is quantified<br>● Operation cost is counted. | ● WTE(500tpd) is mentioned w/o detailed information<br>● Investment cost is counted |
| Consistency with land use plan | To be updated based on the proposed site (?) | Candidate sites are mentioned. To be updated in accordance with decision of site | To be updated in accordance with decision of site |
| Waste Material Flow | Some missing information | Material flow is elaborated with quantities | Very little information |



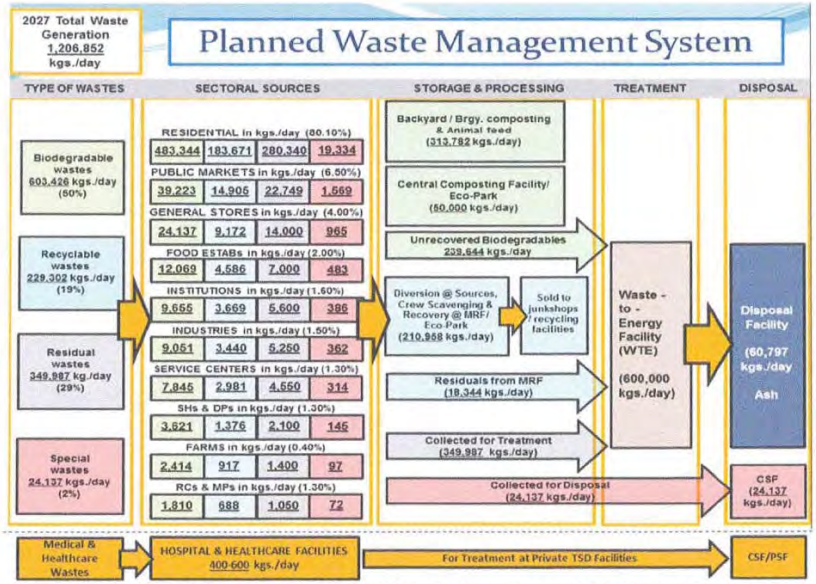
## Summary of WMB in Davao City

| Waste material balance | 2017 | 2022 | 2027 |
|---|---|---|---|
| **a) Waste Generation (kg/day)** | **990,703** | **1,099,623** | **1,208,544** |
| **b) Waste Collection (kg/day)** | **712,726** | **690,014** | **710,624** |
| **c) Waste Diversion (kg/day)** | **306,507** | **451,742** | **1,115,475** |
| c1) Diversion at source | 277,977 | 409,610 | 497,920 |
| c2) Crew scavenging | 15,442 | 10,446 | 9,185 |
| c3) Composting | 10,000 | 25,000 | 50,000 |
| c4) Material recovery | 3,088 | 6,686 | 18,370 |
| c5) WTE | 0 | 0 | 540,000 |
| Diversion rate | 31% | 41% | 92% |
| **d) Waste Disposal (kg/day)** | **684,195** | **647,882** | **93,069** |



## Planned WMF in Davao City

(attached to EMB Evaluation Form-4)




*Medical and Healthcare Wastes shall be managed accordingly to Joint DENR-DOH Administrative Order (JAO) No. 02, Series of 2005, "Policies and Guidelines on effective and proper handling, collection, transport, treatment, storage and disposal of health care wastes."*

Acronyms:
SHs – Slaughterhouses; DPs – Dressing Plants; RCs – Recreational Centers; MPs – Memorial Parks; TSD – Treatment Storage & Disposal; CSF – City Storage Facility; PSF – Private Storage Facility

## Observations on Davao City's Plan

- Consistent figures on waste generation, collection, diversion & disposal are summarized in a few tables in the plan. (Tables 45, 46, 53)
  - Regarded as good example of 10-year SWM plan.
- "Diversion rate" stipulated in "Philippine Development Plan (2011-2016)" should be divided into collection rate & LGU's diversion rate.
  - Current diversion rate may include uncollected waste & illegal dumping.
  - Current diversion rate mainly rely on diversion by households' efforts, but not LGU's SWM system.



## Observation on Davao City's Plan (cont.)

| | 2017 | 2022 | 2027 |
|---|---|---|---|
| Diversion rate (=c/a) | 31% | 41% | 92% |
| Collection rate (=b/(a-c1)) | 100% | 100% | 100% |
| LGU's diversion rate (= (c-c1)/b) | 4% | 6% | 87% |

  - Scavenging, composting & material recovery accounts for only 5%.
  - Relevance & effectiveness of WTE. (5% → 87%)
- Planned policy measures & budget plan seem consistent with WMB. (easy-to-understand)
  - Still, there are some insufficiency such as plan for incineration ash management for WTE.
    (It has to be detailed in WTE facility development plan.)



## Summary of WMB in Quezon City

| Waste material balance | 2015 | 2017 | 2024 |
|---|---|---|---|
| **a) Waste Generation (m3/day)** | **10,511** | **11,165** | **15,739** |
| **a) Waste Generation (t/day)** | **2,796** | **2,970** | **4,187** |
| **b) Waste Collection (t/day)** | | **2,873** | |
| **c) Waste Diversion (t/day)** | **1,576** | **1,776** | **3,140** |
| c1) Composting (t) | | 3,071 | |
| c2) Material recovery (t) | | 2,248 | |
| c3) WTE | | 0 | 1,700 |
| Diversion rate | 56% | 60% | 75% |
| **d) Waste Disposal (t/day)** | **1,220** | **1,194** | **1,047** |



## Observations on Quezon City's Plan

- Discussed only with waste generation, diversion & disposal amounts.
  - Unclear target for waste collection amount.
  - Unclear targets for composting & material recovery.
- Unable to assess if diversion target (75% in 2024) can be achieved
- Quantitative data is scattered & their units are not unified in the plan. (uneasy-to-understand)
- Capacity of the proposed facility including WTE (1,700 t/day) is not reflected in the approved plan.

# Summary of WMB in Cebu City

| Waste material balance | 2015 | 2019 | 2028 |
|---|---|---|---|
| **a) Waste Generation (kg/day)** | **861,719** | **906,335** | **1,015,351** |
| **b) Waste Collection (kg/day)** | **481,715** | | |
| **c) Waste Diversion (kg/day)** | | **589,118** | **866,196** |
| c1) Diversion at source | | | |
| c2) Crew scavenging | | | |
| c3) Composting | | | |
| c4) Material recovery | | | |
| c5) WTE | 0 | 0 | 500,000 |
| Diversion rate | | 65% | 85% |
| **d) Waste Disposal (kg/day)** | | **317,217** | **149,155** |



# Observations on Cebu City's Plan

- Little quantitative information in the plan…
  - Only estimated waste generation amount by WACS & diversion target determined by policy.
  - Even current situation of SWM is unclear.
- Unable to assess if diversion target (85% in 2028) can be achieved or not.
- Quantitative data is scattered in the plan. (uneasy-to-understand)



## 4.a.ii. Status of WTE projects in the target LGUs

| LGU | | Present status | WTE Site owner | Treatment Capacity | LGU's Obligation | Prj period |
|---|---|---|---|---|---|---|
| QC | Unsolicited | Being suspended (In the process of Swiss Challenge) | Private | ? 1,700 tpd (incl. WTE and MBT) | • Delivery of daily waste (specific amount)<br>• T/F<br>• ROW acquisition | ? 35 |
| Davao City | Solicited | F/S by consultant team by Japan Grant Aid is on-going | Public | ? 600 tpd (WTE) | • Delivery of daily waste (specific amount and calorific value)<br>• WTE site<br>• Disposal of ash | ? 20 |
| Cebu City | Unsolicited | Negotiation with OPS | Private | ? 800 tpd (WTE) | • Delivery of daily waste (specific amount) | ? 28 |



## Technical evaluation and suggestion on the WTE proposal to Cebu City is on-going

- Key issues
  - Capacity of facility, which has to be decided logically according to the waste generation and collection in LGU
  - Waste material flow in the 10-year SWM plan
  - Evaluation of the private proponent including reliable experience, validity of the proposed technology, and financial analysis
  - Risk/Obligation allocation (ROW, EIA, T/F etc.):
    - Guarantee by LGU
- How have QC and Davao City solved these issues?

添付資料11

## 4.b. Output 4

i. Review of 10 years plan of LGUs regarding other technologies than WTE

ii. Observations on the present situation of SWM of target LGUs including advanced material recovery/treatment facility



## 4.b.i Review of 10 years plan of LGUs regarding other technologies than WTE

### ☐ Quezon City

1. Ordinance of Waste Management
   - Separation at the source
   - Prohibition using of plastic bags
2. Organization of Waste Management
   - EPWMD is in charge of SWM
3. Budget of Waste Management
   - The general budget of LGUs is used
   - LGU does not collect garbage fee from residents.
4. Waste Generation Quantity and Quality
   - 2,970t/day、0.88kg/person/day
   - Biodegradable waste： 54%,
   - Recyclable waste:20%,
   - Residual waste: 26%,
   - Special waste: 7%



## 4.b.i. Review of 10 years plan of LGUs regarding other technologies than WTE

### ☐ Quezon City

5. Collection and Transportation of Waste
   - Biodegradable waste and the other waste are separated and collected.
   - The collected waste is refilled in the bigger trucks at the staging area.
6. Intermediate treatment facility /3R
   - MRFs are installed at 58 barangays, and MRS s are installed at 84 barangays.
   - 64 public recycling facilities exist.
   - 173 junkshops took EC.
7. Landfill
   - In 2017, Payatas landfill was closed. Now, LGU uses the landfill in Rizal Province.
   - So, the present transportation cost is bigger than before 2017 because of the distance to transport waste.
8. Education of Waste Management
   - Broacher is distributed to schools and residents.



## 4.b.i. Review of 10 years plan of LGUs regarding other technologies than WTE

### ☐ Davao City

1. Ordinance of Waste Management
   - Designate the waste discharging hours and method
   - Based on RA9003, barangays should install the MRF
2. Organization of Waste Management
   - CENRO is in charge of the SWM
   - Among the 182 barangays, 91 have BESWMC which is in charge of SWM.
3. Budget of Waste Management
   - LGU collects the garbage fee from residents.
   - The method of collection is depends on the barangays.
4. Waste Generation Quantity and Quality
   - 991t/day, 0.58kg/person/day
   - Biodegradable waste： 50%,
   - Recyclable waste :19%,
   - Residual waste : 29%,
   - Special waste: 2%

添付資料11

## 4.b.i. Review of 10 years plan of LGUs regarding other technologies than WTE

### ☐ Davao City

5. Collection and Transportation of Waste
   - 2 kinds of " mobile garbage bin" are installed on the main road; biodegradable waste and residual waste.
   - The collection rate is 70%. LGU collects wastes on main road and the barangays collect on other roads.
6. Intermediate treatment facility /3R
   - 16 barangays installed MRF. 8 MRFs do not function well because of shortage the budget for utility.
   - A lot of barangays can not install MRF because of the shortage the land and administrator.
7. Landfill
   - 600t/day waste are disposed of at New carmen landfill.
   - Waste over flowing at some parts and rough road
8. Education of Waste Management
   - 23 IEC personals implement the education about SWM at the school.



## 4.b.i. Review of 10 years plan of LGUs regarding other technologies than WTE

### ☐ Cebu City

1. Ordinance of Waste Management
   - Requires designated bags for discharge waste
2. Organization of Waste Management
   - CESET, CCENRO, BEOs and DPS under SWMD
   - Barangay captain organize BSWMCs.
3. Budget of Waste Management
   - The general budget of LGUs is used
   - LGU does not collect garbage fee from residents.
4. Waste Generation Quantity and Quality
   - 862t/day, 0.934kg/person/day
   - Biodegradable waste： 37%,
   - Recyclable waste:35%,
   - Residual waste: 28%,
   - Special waste: 0.1%



## 4.b.i. Review of 10 years plan of LGUs regarding other technologies than WTE

### ☐ Cebu City

5. Collection and Transportation of Waste
   - All kinds of waste are discharged with plastic bag.
   - LGU outsources collection and transportation from residents to landfill.
   - Wastes from 80 barangays are collected.
6. Intermediate treatment facility /3R
   - MRFs are installed at 15 barangays, but the situation is unknown.
   - Composting "Takakura methods" are operated at some barangays.
7. Landfill
   - After Inayawan landfill of LGU were closed at 2016, the waste are diposed of at private landfills.
8. Education of Waste Management
   - When a barangay request IEC, CCENRO provide some materials and recture for school and residents.



## 4.b.ii. Observations on the present situation of SWM of target LGUs including advanced material recovery/treatment facility

### ☐ Challenges for SWM in target LGUs

**Budget of Waste Management**

- With increasing residents and their waste generation, how to secure the budget for SWM?
- Challenges to collect the fee; e.g. How to agree with people for appropriate and reasonable rate of garbage fee
- Planned budget for SWM Plan can be allocated from central government? How can LGUs request increase of budget allocation?

Next Step

➢ Research the method to obtain budget and funding in other countries
➢ Analyze the suitable method to obtain funding for each LGU

**Waste Generation Quantity and Quality**

- Analysis and evaluation of the waste data (generation trend, physical composition, chemical composition etc.) by LGUs are still challenge

Next Step

➢ Refer to the WACS methods and data management in other countries

## 4.b.ii. Observations on the present situation of SWM of target LGUs including advanced material recovery/treatment facility

### ☐ Challenges for SWM in target LGUs

**Collection and Transportation of Waste**

- Incomplete segregation and separate collection

Next Step

- ➢ Research good example of segregation and separate collection of other countries
- ➢ Analyze the suitable segregation methods including type of wastes in segregation for each LGU

**Intermediate treatment facility /3R**

- Segregation does not make sense without recycling ways including recycling facilities.
- There is no budget and land for recycling facility.

Next Step

- ➢ Research the method of recycling for each kinds of waste in LGU
- ➢ Research the scheme of implementation; e.g. subsidy from national government, PPP and selling a by-product
- ➢ Analyze the suitable recycling facility and implementation scheme for each LGU



## 4.b.ii. Observations on the present situation of SWM of target LGUs including advanced material recovery/treatment facility

### ☐ Challenges for SWM in target LGUs

**Landfill**

- Necessity of the infrastructure rehabilitations for waste overflow and rough road

Next Step

- ➢ Identify needs the rehabilitation or new landfill
- ➢ Research the method of rehabilitation/construction and estimate required cost

**Education of Waste Management**

- Insufficient understanding of responsibilities of residents for SWM

Next Step

- ➢ List the item for SWM that should be understood by residents; e.g. reduce the waste, segregation, collection of garbage fee
- ➢ Research the IEC method for the items listed above
- ➢ Analyze the suitable method for each LGU



## 4.b.iii. Future activities of Output 4

### ☐ Schedule

| Activities | 1st Year Mar/'19 - Mar/'20 | 2nd Year Apr/'20 - Mar/'21 | 3rd Year Apr/'21 - Mar/'22 |
|---|---|---|---|
| 4.1 | Finished | Next Step | |
| 4.2 | | | |
| 4.3 | | | Presentation |
| 4.4 | | Information Collection | |
| 4.5 | | Analysis | |
| Sub-Group MTG | | 16-Jun | |
| Main activity | •Grasp the current situation and Identify the current issues by National SWM strategy and 10 year SWM plan in the target LGUs. | •Collect the information of "Good practice/Good technology" of other SWM technologies in third countries.<br>•Summarize and provide suggestion/recommendation to improve utilization to target LGUs. | •Seminar for disseminating suggestion/recommendation is held. |



## 4.c. Future activities of Output 4

### ☐ Allocation of the Activity 3

| Item | Research for "Good practice/Good technology" | The Organization in Charge |
|---|---|---|
| Budget | ➢ methods to obtain budget and funding in other countries | PPPC |
| Waste Generation Quantity and Quality | • WACS methods and data management in other countries | DOST |
| Collection and Transportation | • Good example of segregation and separate collection of other countries | Cebu City |
| Intermediate treatment facility /3R | • Method of recycling for each kinds of waste in LGU<br>• The scheme of implementation; e.g. subsidy from national government, PPP and selling a by-product | DOST<br>PPPC |
| Landfill | • Identify needs the rehabilitation or new landfill | Davao City |
| Education (IEC) | • List the item for SWM that should be understood by residents<br>• The IEC method for the items listed above | Quezon City |

## 4.b.iii. Future activities of Output 4

☐ Schedule

| Activities | 1st Year Mar/'19 - Mar/'20 | 2nd Year Apr/'20 - Mar/'21 | 3rd Year Apr/'21 - Mar/'22 |
|---|---|---|---|
| 4.1 | Finish | Next Step | |
| 4.2 | | | |
| 4.3 | | | |
| 4.4 | | | |
| 4.5 | | | |
| Sub-Group MTG | Collection Information | 16-Jun Consideration | Presentation |
| Main activity | •Grasp the current situation and Identify the current issues by National SWM strategy and 10 year SWM plan in the target LGUs. | •Collect the information of "Good practice/Good technology" of other SWM technologies in third countries.<br>•Summarize and provide suggestion/recommendation to improve utilization to target LGUs. | •Seminar for disseminating suggestion/recommendation is held. |



## 4.c. Proposed outline of the TCP Newsletter

Newsletter on this project will be published twice a year for the following purposes:

- To disseminate and share the progress of the project
- To share the products of the project (such as manuals)

The Newsletter will be published on the website and distributed at the related events.

| | | Page | Writer | deadline |
|---|---|---|---|---|
| | Cover | 1 | JET | |
| 1 | Greeting | 1 | - | - |
| 1.1 | Greeting from EMB | 0.5 | EMB | 21th-Feb.2020 |
| 1.2 | Greeting from JET | 0.5 | JET | 21th-Feb.2020 |
| 2 | Outline of SWM-AIT Project | 5 | - | - |
| 2.1 | About SWM-AIT Project | 0.4 | PMO | 21th-Feb.2020 |
| 2.2 | About TCP | 0.4 | JICA | 21th-Feb.2020 |
| 2.3 | PDM | 0.2 | JET | 21th-Feb.2020 |
| (1) | Output 1 | 1 | Sub-Group1 | 25th-Feb.2020 |
| (2) | Output 2 | 1 | Sub-Group2 | 25th-Feb.2020 |
| (3) | Output 3 | 1 | Sub-Group3 | 25th-Feb.2020 |
| (4) | Output 4 | 1 | Sub-Group4 | 25th-Feb.2020 |
| 3 | The Menber of SWM-AIT Project | 1 | JET | 21th-Feb.2020 |
| 3.1 | Organization Chart | | - | |
| (1) | JCC | | - | |
| (2) | Project Team | | - | |
| (3) | ITWG | | - | |
| (4) | JICA Expert Team | | - | |
| | TOTAL | 8 | | |

- Allocated 1 page
- Deadline: 25th Feb



## 4.c. Proposed outline of the TCP Newsletter

☐ Title of newsletter: (Examples)

- Road to Shokyaku ("combustion" in Japanese)

☐ Article for the 1st newsletter

(Examples)

Output2

- Introduction of WTE project in 3LGUs
  - ✓ Status of project, year of operation
  - ✓ Technology and treatment capacity
  - ✓ Messages to stakeholders
- WTE projects in other LGUs

Output4

- Good Practice in 3 LGUs

Common

- Expectations to TCP (What will learn? What will you achieve?)



## 4.d. Participants in 1st Training in Japan

☐ Proposed period:

- May 24 –June 6 (incl. traveling Philippines - Japan)

☐ Number of trainees:

- LGUs:1person/LGU in total 3
- Laboratory (ERLSD): 3
- EMB central (SWMD) : 3
- EMB region: 1person/region in total 3
- DOE, PPPC, DOST: 3

添付資料11

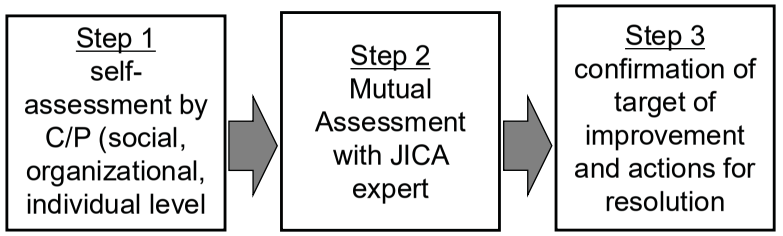
## 4.e. Kick off seminar

- Proposed date: February 27, 2020
- Draft Program: (distributed)



## 4.f. Capacity Assessment of Sub-group members

- Evaluation based on the Capacity Assessment Sheet
- Questions related with activities for outputs
- Evaluation may improve according to execution of activities
- 3times of assessment in project period (beginning, mid-term and end of the project)






## 5. Finalization of the comments/agreements/Timelines



## 6. Way Forward

Schedule of JCC, ITWG and sub-group meetings

| GROUPS | Ja | Fe | Mar | Ap | May | Jun | Jul | Au | Se | Oc | No | De |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ITWG | 24 | | | 23 | | | 16 | | 16 | | | |
| SUBGROUP | | | | | | | | | | | | |
| OP1 | | 18 | 5 | | 15 | | | 20 | | 12 | 5 | |
| OP2 | | 13 | | 16 | | | 9 | | 10 | | | |
| OP3 | | 10 | | | 14 | | | | | 8 | | |
| OP4 | | 13 | | | | 16 | | | | | | |
| JCC | | | | | | 18 | | | | 15 | | |



添付資料11

**Meeting Record**

| | |
|---|---|
| Title | Meeting with Subgroup for Output 2 & 4 |
| Date and Time | 10:33 AM, February 13, 2020 |
| Place | Environmental Management Bureau Building, Conference Room Department of Environment and Natural Resources Compound, Visayas Avenue, Diliman, Quezon City, 1101 Metro Manila |
| Organizer | JICA Expert Team, PMO (DENR EMB-SWMD) |
| Participants (name & title) | **Selected Government Agencies**<br>[DOST/ITDI/ERD]<br>Engr. Reynaldo T. Esguerra, Chief SRS<br><br>[DILG-BLGS]<br>Ms. Marla Clarisol L. Agas<br><br>[PPP Center]<br>Ms. Justine E. Padiernos<br><br>**Local Government Units (LGUs)**<br>[QC-EPWMD]<br>Mr. David John S. Vergara<br><br>[Davao-CENRO]<br>Engr. Elisa P. Madrazo<br>Engr. Orcullo Lakandiwa<br><br>[Cebu-CENRO]<br>Engr. Glory Rose C. Manatad<br><br>**EMB Central Office**<br>[EMB-Legal Division]<br>Ms. Fatima E. Millan<br><br>[DENR/EMB/PPPDD]<br>Ms. Mary Esther D. Ofiaza<br><br>[DENR/EMB/ERLSD]<br>Ms. Ma. Fatima Anneglo R. Molina<br><br>[FASPS/PMD]<br>Ms. Marianica Philina Obmerga, PEO<br><br>[EMB/SWMD/PMO]<br>Ms. Elvira S. Pausing<br>Ms. Rodeth F. Antonio<br><br>**JICA Expert Team**<br>Mr. Takahiro Kamishita, Chief Advisor<br>Mr. Makoto Kosaka, SWM-PPP<br>Ms. Kyoko Kimura, Expert of Public Enhancement, Training Arrange & Coordinator<br>Mr. Eric Cea, Project Secretary<br>Ms. Cynthia Rose C. Faylogna, Project Assistant |

| | |
|---|---|
| Main contents of the meeting | The meeting started at 10:33 AM with Ms. Pausing (as the Chairman) presenting the recap of the meeting agenda prepared by the PMO (EMB-SWMD). She solicited for any additional comments and other matters which may be included in the discussions from the participants. Without any modifications from the Subgroup members, Ms. Padiernos of PPPC moved for the adoption of the agenda, and seconded by Ms. Fatima of the EMB-Legal Division.<br><br>**Presentation/Introduction of Subgroup and Specific Activities**<br>▪ Ms. Pausing of PMO introduced the members of the Subgroup, then the meeting has been called. Likewise, she declared the presence of the quorum with a total of 8 participants.<br><br>**Discussions**<br>▪ Mr. Kamishita delivered the Outline of the Specific Activities under Project Output 2 including deliverables. He also highlighted the importance of the TCP as a mutual work; and explained that the Philippine counterpart and JET must exert equal efforts for the success of the project. Hence, suggested that from now on, the concerned government agencies must communicate with the group and work together. He continued to discuss the present scenario of the Solid Waste Management Condition of the 3 LGUs with the corresponding Project Schedule. The following discussions and agreements were defined in the meeting:<br><br>**<u>For Output 2:</u>**<br>***a. Review of 10 years plan of 3 LGUs (Quezon City, Davao City, Cebu City) addressing identification of WTE project, quantity of waste to be treated in WTE facility, consistency with LGU land use plan, etc.***<br>▪ Mr. Kamishita explained the result of interview about the updates for the 10 years MSWM plan of 3 LGUS:<br>1. Quezon City: QC-EPWMD reported that another WACS is required to consider the effect of new Plastic Ban of the LGU on waste amount and composition for deliberation of plan.<br>2. Cebu City: According to CCENRO, the SWM Plan needs to be updated and yet to be finalized.<br>3. Davao City: According to Davao CENRO, the 10-year SWM Plan was approved by the Commission last November 2019, and the Land Use Plan has also been updated.<br><br>▪ Mr. Kamishita shared the Waste Mass Balance (WMB) and Waste Mass Flow of 3 LGUs using the presentation. Only Davao city's WMB stated in 10 years MSWM Plan is well-written. On the other hand, QC's WMB has some missing data and inconsistency of the unit (t/d and m3/d). CC's WMS has many missing data. QC and CC are advised to collect these data to identify how much waste can be fed to the WTE.<br><br>***b. Status of WTE projects in the target LGUs***<br>▪ Mr. Kamishita explained the present status of WTE procurement in 3 LGUs using presentation material prepared based on the interview and study up to now. Followings are the discussions for each LGU.<br><br>**<u>b-1. Quezon City</u>** |

| | |
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| | ▪ DOST asked QC if the Swiss Challenge is still on going.<br>> QC-EPWMD affirmed to this. PPPC added that QC-EPWMD has not yet issued Notice of Award (NOA) for the proponent because there is a need to wait for the approval of the Sanggunian and the Mayor.<br>▪ Mr. Kosaka asked QC the calculation basis of WTE capacity of 1,700 tpd from the disposal quantity how much the city is presently disposing to SLF.<br>> QC-EPWMD responded that 3,000 t/day is being disposed but this residual amount will be changed due to newly enacted plastic ban ordinances. The QC-EPWMD explained that the Capacity of WTE was based on a lot of feasibility studies, one from ADB (conducted various WACS, basic waste quantity and composition, etc.), and the private proponent has also their own study. The QC verified 1700 tpd delivery commitment basically brought about by confirming and validating the data from the proponent and the city side. The private companies have their own proposals but PPPC and LGU needed to negotiate using their own data as a baseline to validate the proposals.<br>▪ Mr. Kamishita inquired on how QC will deal with the segregation. Since the WTE-DAO stated that the WTE facility shall accept segregated waste only.<br>> QC-EPWMD explained that the schedules for segregated waste will be arranged. During certain days, the biodegradables will only be collected, then the other days, the residuals and the bulky waste will be collected.<br>▪ Mr. Kamishita asked if the city verified the waste that will be transported to the WTE.<br>> QC-EPWMD answered that the proponent will adjust to that scheme.<br>▪ Mr. Kamishita inquired if the waste collected as residual waste shall be used as feedstock to WTE.<br>> PPPC clarified that the unacceptable wastes shall be returned to the LGU and such will be specified to the contract. She also emphasized that the city supports and encourage segregation.<br>▪ Ms. Pausing inquired if the residual waste should be segregated.<br>> QC-EPWMD responded that the residual wastes will go directly to the other facilities.<br>▪ Mr. Kosaka inquired whether 1,700 tpd of feedstock includes biodegradable waste as well as recyclables.<br>> QC-EPWMD affirmed to this, and added that the biodegradable wastes are for Mechanical Biological Treatment (MBT) and compost but QC-EPWMD was uncertain about the each capacity of MBT and WTE.<br><br>**b-2. Davao City**<br>▪ Davao CENRO explained the status of WTE procurement under Japan Grant Aid. Study for 600 tpd of WTE capacity as well as calorific value are conducted already.<br>▪ Mr. Kamishita inquired if there is NO unacceptable waste for the facility.<br>> Davao: No<br>> PPC:<br>> DOST:<br><br>**b-3. Cebu City**<br>▪ Mr. Kamishita explained that based on the request from Cebu City Administrator, JET is now supporting Cebu City for its evaluation of unsolicited WTE proposal from a private company.<br>▪ Mr. Kosaka explained that Cebu City's present stance for WTE is a bit risky compared to the other 2 cities because city wants to contract out all of MSW activities from collection to final disposal. In case of QC, QC contracts separately in collection and hauling, WTE and disposing ash. And DC directly collects and |

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| | transports the waste using the LGU's Garbage trucks, and the incineration ash is also to be hauled and disposed by LGU.<br>▪ Additionally, Mr. Kosaka explained one of the important issue is the setting up the capacity of WTE facility. In the proposal, proposed capacity of WTE is 800 tpd, in which 600 tpd is required to guarantee by city. However, the actual disposal quantity in SLF is only around 600 tpd. He added that there is maybe a gap to be addressed, however, there are very less information in CC's 10 years MSWM plan, so, Waste Mass Flow, how much city collect, recover and dispose, shall be investigated at first.<br>▪ CCENRO responded that the MSWM plan shall be updated accordingly. Based on WACS, biodegradables represent the biggest portion of the total waste. It should not be fed to the WTE, however, proposed WTE plan intend to incinerate all residual including them and present administration supports it.<br>▪ Mr. Kosaka added that JET is now requesting Cebu city to provide daily tonnage statistics in last 6 months to try to figure out the WTE capacity, how much city can guarantee to provide. It would be beneficial to this Sub-Group to share such discussions in next subgroup meeting.<br>▪ PPPC explained that Cebu City was specifically classified as a solicited project. Based on the study that was conducted, one of the key issues is the potential project site for the facility. PPPC inquired if there is a proposed site for Cebu since there is no available land for the facility.<br>> CCENRO emphasized that their SWM plan is not yet approved and there are no updates on the details since it was deliberated last October 2019. The proposed location from the proponent is close to the landfill so the hauled waste will be fed directly to the WTE facility. The specific lot is still yet to be finalized.<br>▪ PPPC inquired if there is a transfer station.<br>> CCENRO explained that the 10-year MSWM Plan was differed because the contracted private company is not compliant. There is a proposed new direction of the administration to have a waste directly delivered to the landfill instead of the transfer station. The city procured trucks and contracted a private hauler. She added that there is no available information since no data were turned over, and the finalization of plans were only made with the help of the EMB-VII.<br><br>***c. Other matters (definition of Residual, Diversion Rate, etc.), Way forward***<br>▪ Mr. Kamishita explained that the JET will continue to communicate directly with Cebu City for their WTE project since QC is almost finished with the procurement, and Davao City is already in the preparation of the procurement. The JET still welcomes the consultation with the 3 LGUs. Mr. Kamishita highlighted that QC and DC took a long time to decide many conditions of WTE that is why the JET would like to support Cebu city because they don't have any technical experts.<br>▪ Mr. Kosaka wanted to clarify if there is any unified formula for the "diversion rate" which all LGUs shall adapt<br>> DOST clarified that the Diversion Rate equals the Waste Diverted divided by the Waste generated. ($DR = WD \div WG$) Wherein the Waste diverted is equal to the Waste Generation minus Waste dumped to SLF.<br>> Mr. Kosaka pointed out a problem how to calculate diverted waste. Waste generated is calculated by waste gen per capita times population, and disposal quantity can be actual basis. I doubt all of their difference is truly diverted, it must contain illegal dumping otherwise no marine plastic comes into Manila bay. He emphasized that the diversion rate shall be well-defined.<br>> Mr. Kamishita explained that there is also a difference between Generation and collection waste.<br>>DOST projected that NSWMC is now discussing about the expansion of the |

| | |
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| | Categories of the waste (in addition on present categories; Biodegradable, Non-Biodegradable, Recyclable, and special waste) such as Residual with potentially diversion, YYY, ZZZ because all of recyclables cannot be recovered then disposed at landfill.<br>▪ DOST stated that the table in the presentation introducing 3 LGUs WTE projects, the amount of energy (MW) should be included.<br>> Mr. Kosaka clarified that the primary purpose of the WTE facility in Japan is on treatment and reduction of waste. Government side only requires the tonnage for treatment and does not require the power gen capacity.<br>> DOST was concerned about other people who will scrutinize the documents like DOE. He added that the energy generation could be included in the viability of the project.<br>▪ DOST also emphasized that the people who are opposing the WTE facility will increase if there is no energy being recovered. Hence, he commented that the energy generation should be disclosed so that the opposition will agree.<br>> Mr. Kamishita clarified that the WTE project would like to provide safe environment to people which means the primary purpose of WTE is environmental.<br>> Mr. Kosaka stated that the WTE doesn't generate profit from power then it cannot recover total investment that is why the LGU must pay for the tipping fee.<br><br>**<u>For Output 4</u>**<br><br>**a. Review of 10 years plan of LGUs regarding other technologies than WTE**<br><br>Ms. Kimura presented Output 4 and she requested that the participants of LGUs to confirm the descriptions in the presentation.<br><br>• The following revisions had been made based on the discussions for target LGUs' current situation.<br>➢ QC-EPWMD clarified as follows:<br>1. The city prohibits the distribution of plastic bags.<br>2. The Residual waste is 18.75%.<br>3. The Recyclable waste is 20.3%.<br>4. A total of 173 junkshops took ECC.<br>➢ Davao CENRO clarified as follows:<br>1. Some barangays have their own MRF but others do not. The MRFs are NOT monitored if these are still functional as of now. LGU will conduct the monitoring.<br>2. The city is arranging new Sanitary Landfills (SLF).<br>3. There has also been a problem in transferring MSW from residents' households to transfer station then to landfill sites.<br>4. The Davao LGU has the IEC Team. However, the perennial problem is the change of barangay officials, CCENRO is still updating designations for the responsibilities from time to time. It is recommended that barangays will organize their own teams and will provide data.<br>• The following issue were discussed.<br><u>Budget</u><br>➢ Davao CENRO inquired if the national government can fund the barangays for waste management project since LGU cannot provide all the budget. |

- Mr. Kamishita of JET mentioned that EMB has supported to develop MRF in the barangays.
- Davao City responded that funds are lacking because some barangays have small budget and there are no such allocations for SWM/SLFs.
- DOST inquired about the location where the materials are sent since there are no paper plants and gas plants in Davao. He mentioned that there are also no processing plants in Cebu, and there is only one in Luzon somewhere in Bataan. If this is the case, such challenges will include transportation. He recommended that DTI will identify market for recyclables.
- DOST also mentioned that China had stopped pet bottles manufacturing and only Coca-Cola is manufacturing as of the moment.
- Davao stated that the city has been segregating but there is no economic value for the recyclables.
- DOST specified that QC has PPP Activity, Davao has JICA's assistance, and Cebu has JET's assistance.
- Ms. Kimura of JET cited that each LGU could arrive to a profitable measure.

<u>WACS</u>

- NSWMC prepared the draft WACS Guideline.

<u>Intermediate treatment facility /3R</u>

- DOST explained that this is more of the business side. He further claimed that if the items can be sold at a higher value, then establishments will invest.
- Mr. Kamishita supported the claim. He emphasized that it will depend on the market value, and in developed countries, there is a support to the recycling facility from the government.
- DOST cited that it is a part of the strategy but has not yet approved.
- DOST stated that there is an initial effort for the laws governing recycling (eg. EPR) but has not yet taken care of. However, if you put additional cost of the product then price will increase; and the population would prefer the cheaper products.
- DILG suggested that LGUs that has Best practices shall also be considered and not only other countries. EMB has the lists. EMB affirmed to this.

<u>Landfill</u>

- Davao CENRO cited that existing landfills in Davao will be rehabilitated and the mayor wanted the LGU to look for a new location for the landfills. Zoning also is proposed, and SLFs will include the disposal of fly ash.
- DOST recommended that SLFs shall secure Environmental Compliance Certificate (ECC). He further questioned what exactly is expected and if the WACS methodology was subjected to discussions.

- Allocation which was the collecting the information of "Good practice/Good technology" of other SWM technologies in third countries was decided as below;
  - Ms. Kimura recommended that it would be better if concerned agencies will research on the good practices and the Organization in Charge for it shall be specified.
  - Organization in charge of research of good practice and good technologies

| Item | Research for "Good practice/Good technology" | The Organization in Charge |
|---|---|---|

| | | |
|---|---|---|
| Budget | methods to obtain budget and funding in other countries | PPPC |
| Waste Generation Quantity and Quality | WACS methods and data management in other countries | DOST |
| Collection and Transportation | Good example of segregation and separate collection of other countries | Cebu City |
| Intermediate treatment facility /3R | Method of recycling for each kinds of waste in LGU.<br>The scheme of implementation; e.g. subsidy from national government, PPP and selling a by-product | DOST<br>PPPC |
| Landfill | Identify needs the rehabilitation or new landfill | Davao City |
| Education (IEC) | List the item for SWM that should be understood by residents<br>The IEC method for the items listed above | Quezon City |

- Ms. Kimura said that for the next subgroup meeting, the results of the research will be shared as a part of the discussions. The FORMATS/TEMPLATES WILL BE SENT TO ALL within February 2020. The period of the research will be around March, April, and May.

**For Inter-output activities**

**I. Proposed outline of the TCP Newsletter**

*Title of the Newsletter

QC-EPWMD-Article Writer

- Introduction of WTE project in 3LGUs
  - Overview
  - Status of project, year of operation
  - Technology and treatment capacity
  - Messages to stakeholders
- (*Next writer will be Davao city or Cebu city)

- Good Practices in 3 LGUs
- Expectations to TCP
  - (What will you learn? What will you achieve?)
- (**each One third page)

**II. Participants of the Training in Japan**

- For the Participants of the Training in Japan:
  - The criteria for the participants had been set but still yet to be verified and evaluated. The invitation letters will be sent by JICA (Official Invitations).

**III. Kick-off Seminar**

- For the Kickoff Seminar:

| | |
|---|---|
| | ➢ The audiences are selected agencies of about 40 participants and not the general public. The invitation letters will be sent by PMO (Official Invitations).<br><br>**IV. Capacity Assessment of Sub-group members**<br>• For the Capacity Assessment:<br>➢ The members of the Subgroup for Output 2 & 4 shall fill-up the Capacity Assessment form to be submitted to PMO(EMB-SWMD) within the week.<br>**3. Finalization of the Comments/Agreements/Timelines**<br><br>**4. Ways Forward**<br><br>For the Newsletter (Output 2 & 4), the target readers will be the General Public.<br><br>**Adjournment**<br>With no other important matters to discuss, the meeting was adjourned at 2:14PM. |
| Request by JET | • Capacity Assessment Evaluation<br>• Newsletter Title Proposal and Articles from specified writers |
| Request by Subgroup Output 3 | • Continuous evaluation and support from JET. |
| References / Materials Presented | • Meeting Agenda prepared by PMO (EMB-SWMD) |
| Prepared by | Ms. Cynthia Rose C. Faylogna |

# 添付資料 11-3:
# 成果2サブグループ会議

## 11-3-2 : 2nd SG2

## LIST OF PARTICIPANTS

| NO. | NAME | AGENCY/OFFICE | CONFIRMED ATTENDEES |
|---|---|---|---|
| **CONCERNED GOVERNMENT AGENCIES** | | | |
| 1 | Mr. Nonilo Peña/Emelita A. Dimapilis | DOST-PCIEERD | |
| | Mr. Reynaldo L. Esguerra/Engr. Rochelle Retamar/Engr. Dante Vergara | DOSI-ITDI | |
| 2 | Ms. Ruby de Guzman/Mr. Romeo M. Galamgam (Yong)/Ms. Charisse Pascual | DOE-REMB | ✓ Ms. Ruby De Guzman<br>✓ Ms. Charise Jane D. Pascual |
| 3 | Mr. Carlo Mari Crisregienald C. Tan/Atty. Ma. Rhodora Flores/Ms. Maria Clarisol L. Agas | DILG-BLGS/NAPOLCOM Center | |
| 4 | Ms. Justine E. Padiernos/Atty. Phebean Belle A. Ramos-Lacuna/Ms. Maria Beatriz N. Quintos | PPP Center | ✓ Ms.Justine E. Padiernos |

## LIST OF PARTICIPANTS

| NO. | NAME | AGENCY/OFFICE | CONFIRMED ATTENDEES |
|---|---|---|---|
| **LOCAL GOVERNMENT UNITS** | | | |
| 5 | Mr. Vincent Ferdinand Paul G. Vinarao/Mr. David John S. Vergara | LGU Quezon City | ✓ |
| 6 | Atty. Dwight Domingo/Engr. Elisa Madrazo/Engr. Lakandiwa Orcullo | LGU Davao City | ✓ Atty. Zuleika T. Lopez & Engr. Elisa Madrazo |
| 7 | Ms. Glory Rose Manatad | LGU Cebu City | ✓ |
| **EMB FOCAL PERSONS** | | | |
| 8 | Ms. Consolacion Crisostomo/Ms. Meyeth Ofiaza | EMB-PPPDD | ✓ Ms. Consolacion Crisostomo |
| | Engr. Jundy T. Del Socorro/Engr. Wyona Kay C. Rativo | EMB-HWMS | ✓ Engr. Wyona Kay C. Rativo |

*TECHNICAL COOPERATION PROJECT (TCP) FOR THE CAPACITY DEVELOPMENT ON IMPROVING SOLID WASTE MANAGEMENT THROUGH ADVANCED/INNOVATIVE TECHNOLOGIES*

**2nd SUB-GROUP MEETING FOR PROJECT OUTPUT 2**

***ENHANCEMENT OF TARGET LGUs' CAPACITY FOR PLANNING, EVALUATION, FORMULATION AND SUPERVISION OF WASTER-TO-ENERGY (WtE) PROJECT***

*16 July 2020, Thursday, 9:00 AM (via MS Teams)*

## 2nd SUB-GROUP MEETING FOR PROJECT OUTPUT 2

*ENHANCEMENT OF TARGET LGUs' CAPACITY FOR PLANNING, EVALUATION, FORMULATION AND SUPERVISION OF WASTE-TO-ENERGY (WtE) PROJECT*

*16* July 2020, Thursday, 9:00 AM (*via on-line*)

### TENTATIVE AGENDA

1. **Call to Order/Meeting Objectives/Acknowledgement of Attendees and Adoption of Agenda** – *by EMB-SWMD-PMO*
2. **Summary of discussions during the last Sub-group Meeting** - *by JET*
3. **Presentations under Activity 2-4** *(in coordination with LGU Cebu City)*:
   a. JET Review on the proposal by a private company – *Engr. Makoto Kosaka, JET*
   b. Verification of Waste Amount to be Fed to WtE - by *LGU Cebu City*
4. **Presentations of LGU Quezon City and LGU Davao City:**
   - Lessons learned in the formulation of WtEs
   - Updating of the 10-year SWM Plans with Waste Flow and Consistency between the Project Site and Land Use Plan
5. **Presentation on the Tentative Observations and Suggestions under Activity 2-5** – *Engr. Takahiro Kamishita, JET*
6. **Discussions on the Updates/Status on the Preparation of the TCP Newsletter**
7. **Wrap-up** *(Required Actions/Agreements/Timelines)* - *Ms. Nikka Sales, JET*
8. **Other Matters**

添付資料11

## 2ND SUB-GROUP MEETING FOR PROJECT OUTPUT 1

*ENHANCEMENT OF NATIONAL GOVERNMENT'S CAPACITY FOR SUPPORTING AND COORDINATING OF LGU'S WTE PROJECT UNDER THE TECHNICAL COOPERATION PROJECT (TCP) RE CAPACITY DEVELOPMENT ON IMPROVING SOLID WASTE MANAGEMENT THROUGH ADVANCED/INNOVATIVE TECHNOLOGIES*

04 June 2020, Thursday, 9:00 AM (*via on-line*)

## ADJOURMENT

## LIST OF PARTICIPANTS

| NO. | NAME | AGENCY/OFFICE | CONFIRMED ATTENDEES |
|---|---|---|---|
| **PROJECT COORDINATORS** | | | |
| 9 | Dir. Angelito V. Fonatanilla/Mr. Eddie Abugan/Ms. Marianica Philina Obmerga | DENR-FASPS | ✓ Ms. Marianica Philina Obmerga |
| | Engr. Nolan B. Francisco/Ms. Elvira S. Pausing | EMB-SWMD-PMO | ✓ Ms. Elvira S. Pausing |
| **EMB-SWMD-PMO** | | | |
| 10 | Ms. Raquel Rosario Reyes | EMB-SWMD | ✓ |
| | Ms. Nelie Dimer | EMB-SWMD-PMO | ✓ |
| | Engr. Jedidiah Mangubat | EMB-SWMD | ✓ |
| | Engr. Roxanne Barcenas | EMB-SWMD | |
| | Ms. Rodeth Antonio | EMB-SWMD-PMO | |
| | Ms. Kris Jan Morada | EMB-SWMD | ✓ |

## LIST OF PARTICIPANTS

| NO. | NAME | AGENCY/OFFICE | CONFIRMED ATTENDEES |
|---|---|---|---|
| **JICA EXPERTS TEAM (JET)** | | | |
| 11 | Engr. Takahiro Kamishita | JICA Experts Team (JET) | ✓ |
| | Engr. Makoto Kosaka | JICA Experts Team (JET) | ✓ |
| | Engr. Satoshi Higashinakagawa | JICA Experts Team (JET) | ✓ |
| | Ms. Kyoko Kimura | JICA Experts Team (JET) | ✓ |
| | Engr. Nikka Sales | JICA Experts Team (JET) | ✓ |
| | Ms. Nikole Andrei Louise Mallare | JICA Experts Team (JET) | ✓ |
| | Mr. Eric Cea | JICA Experts Team (JET) | ✓ |

# ***How to setup the Capacity of WTE - in the Prep. of WTE conceptual plan – Result of Survey during 9th to 11th***

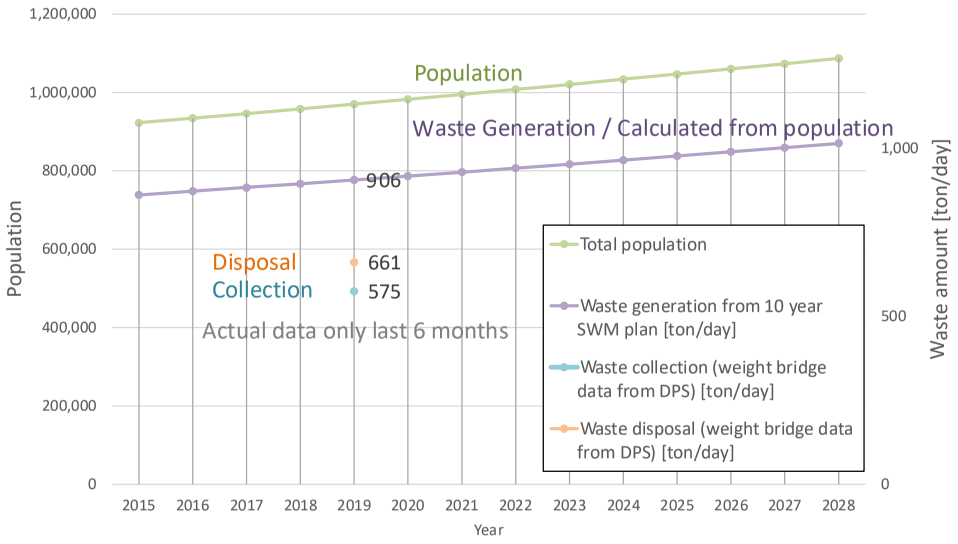
*JICA Expert Team (JET)*
*Technical Cooperation Project for Capacity Development on Improving Solid Waste Management through Advanced/Innovative Technologies*

## WTE Conceptual Plan

1. Confirmation of existing MSWM in the city,
   (1) Trends in population / waste generation,
   (2) Present waste treatment system (Waste Mass Flow),
   (3) Present issues in MSWM,
2. Facility Development Concept,
   (1) Define the Target Waste to be combusted,
   (2) New waste treatment system (Waste Mass Flow)
3. Setup the quantity to be treated by facility,
   Projection of population / waste generation per capita, future projection of waste quantity,
4. **Setup the capacity of WTE facility,**
5. Consideration of WTE facility site,
6. Setup the processing methods in WTE/MRF,
7. Utilization of excess heat
8. WTE project management plan

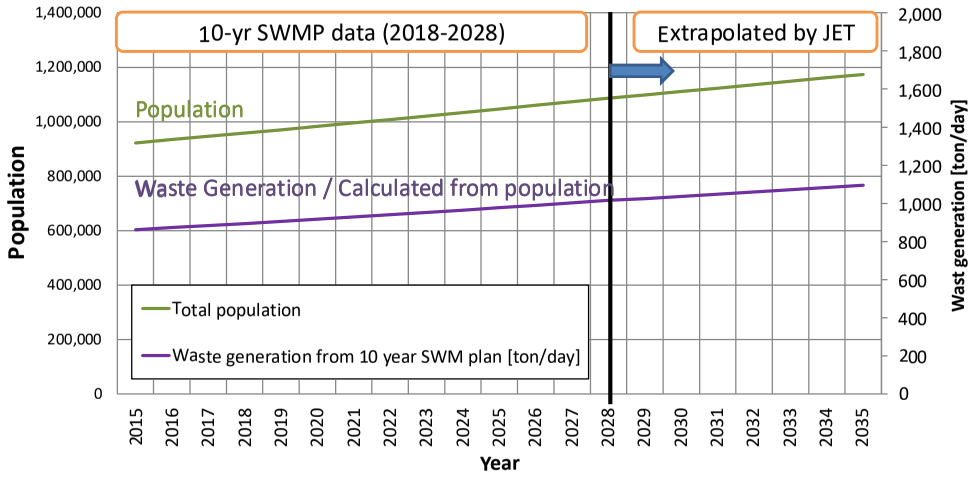
## Waste Quantity
- Generation -
- Collection -
- Disposal -

## Population and waste amount

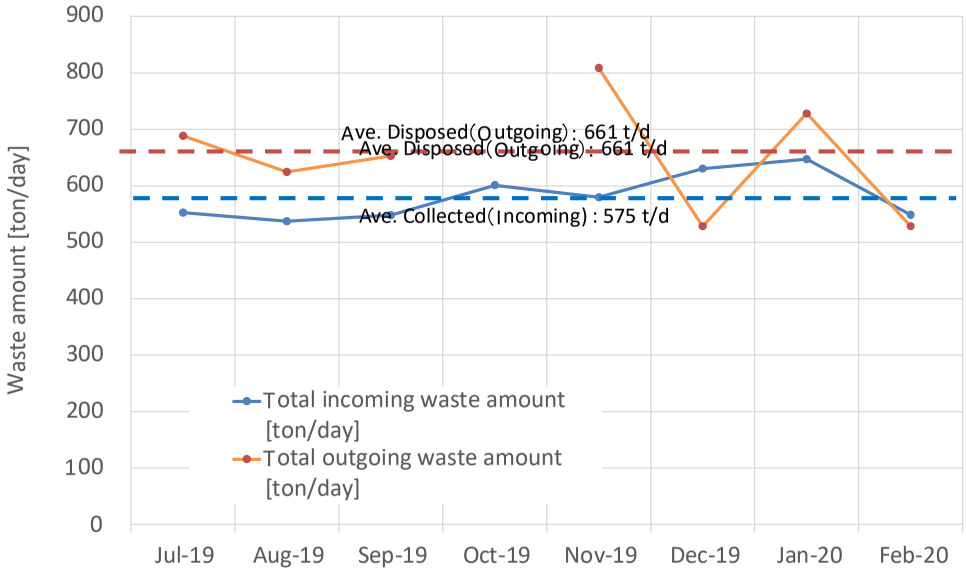



添付資料11

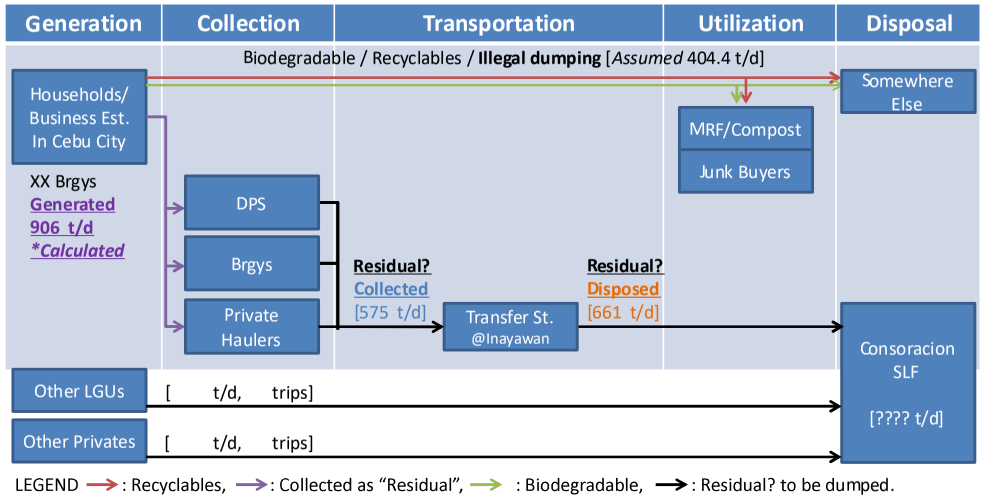
# Population and waste generation (10 year SWM-Plan and Future Extrapolation)




# Daily Waste (Collected/Disposed) from Weight Bridge data at Inayawan T/S




# Waste Mass Flow (WMF) in Cebu City (As of 2019)




# Waste Quality (Composition)

添付資料11

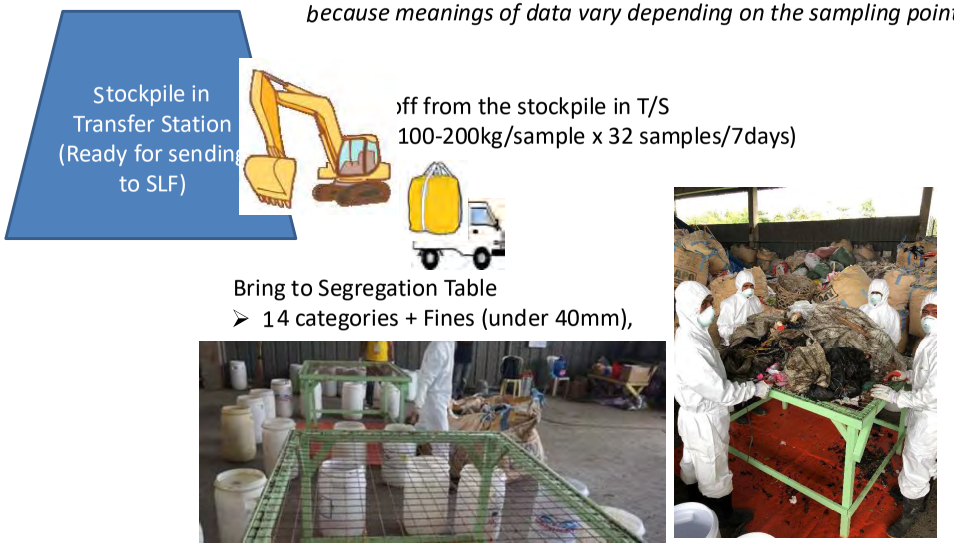
# Outline of ADB-WACS Mar2018

| | |
|---|---|
| Who | WACS team arranged by CCENRO supported by Motto McDonald<br>✓ 8 temp staffs<br>✓ 2 sorting teams = (4 waste pickers + 2 spare pickers) x 2?<br>✓ A waste specialist from Motto McDonald |
| When | 13 – 19 March 2018 (7 continuous days: 1 rainy + 6 sunny) |
| Where | Shed Yard nearby Inayawan T/S (deemed as Mansei Yard) |
| What | WACS (Waste Analysis and Characteristic Survey): 14 Categories,<br>Lab. Analysis (3 components): Combustible, Ash and Water<br>Lab. Analysis (Ultimate): Cl, S, Cd, Pb, Hg |
| Why | ??? |
| How | Sampling at Inayawan T/S and deliver it to the Yard (See next page) |
| How many | 32 samples (each day 4-6 samples) |

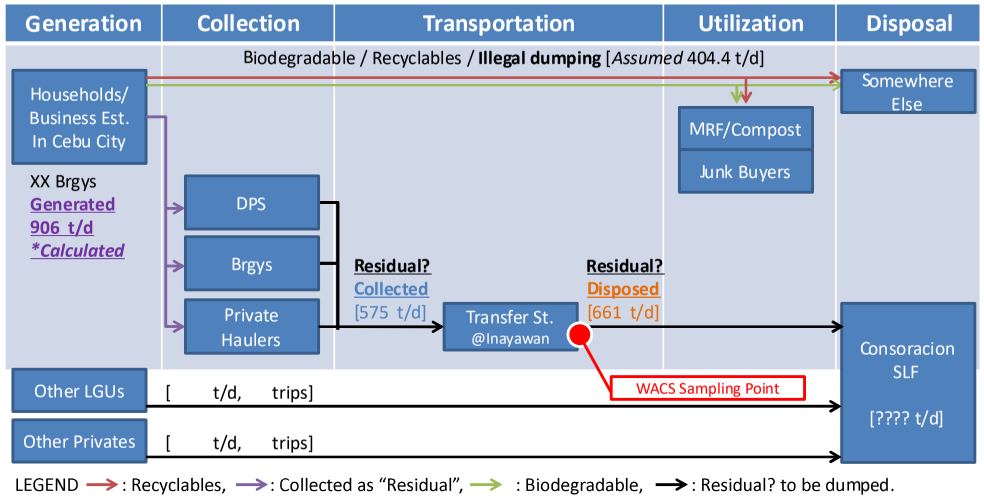
Source: Solid Waste Management PPP Project (Cebu) (49407-005) Interim Report - Appendices "2. Methodology"

# How to sample the **target waste**

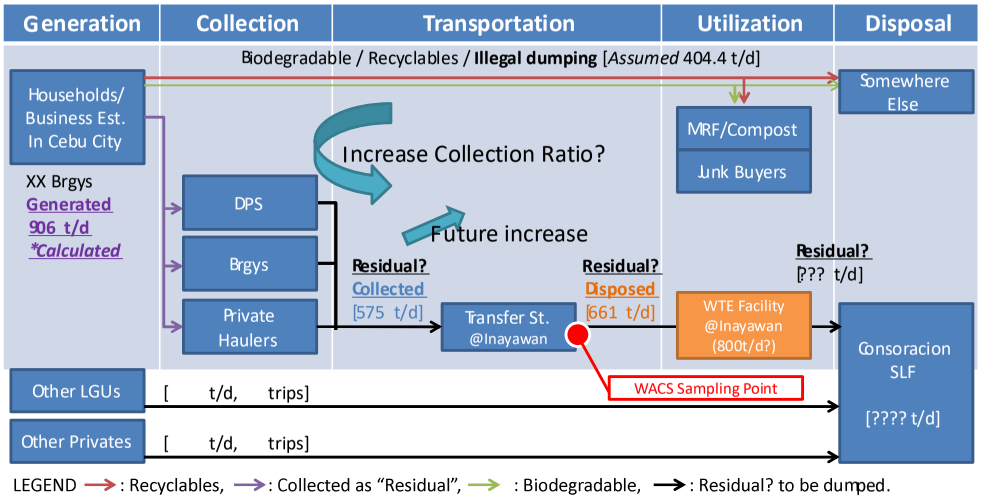
*It's fundamentally important where and how to sample the waste because meanings of data vary depending on the sampling point.*




# Waste Mass Flow (WMF) in Cebu City (As of 2019)

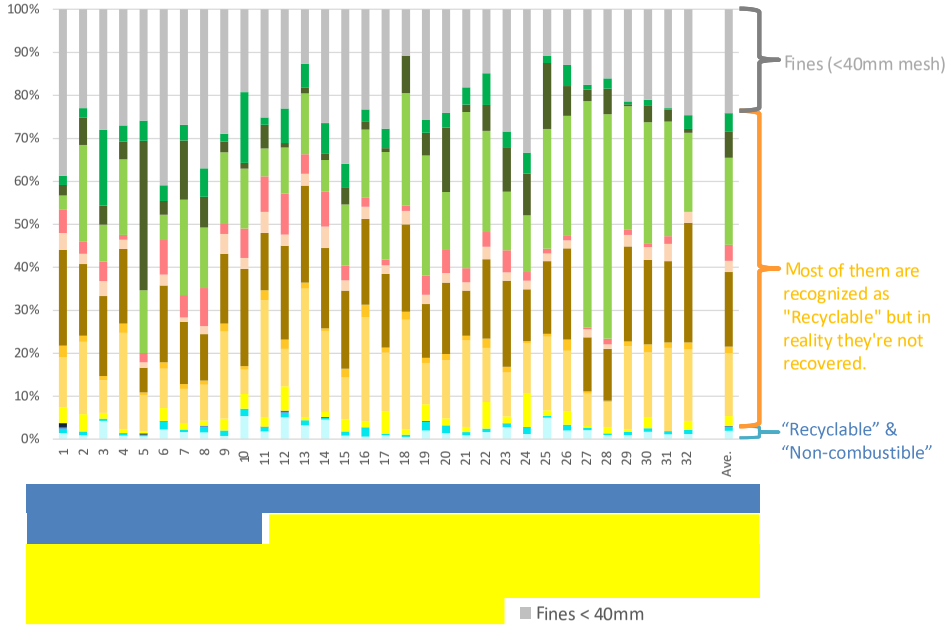



# Waste Mass Flow (WMF) in Cebu City (In Target Year of 20XX)

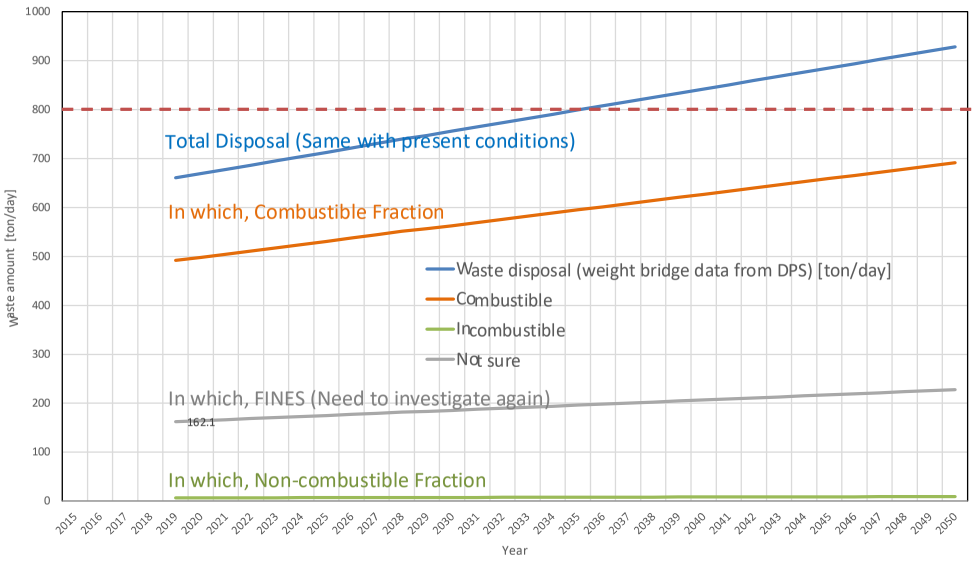



添付資料11

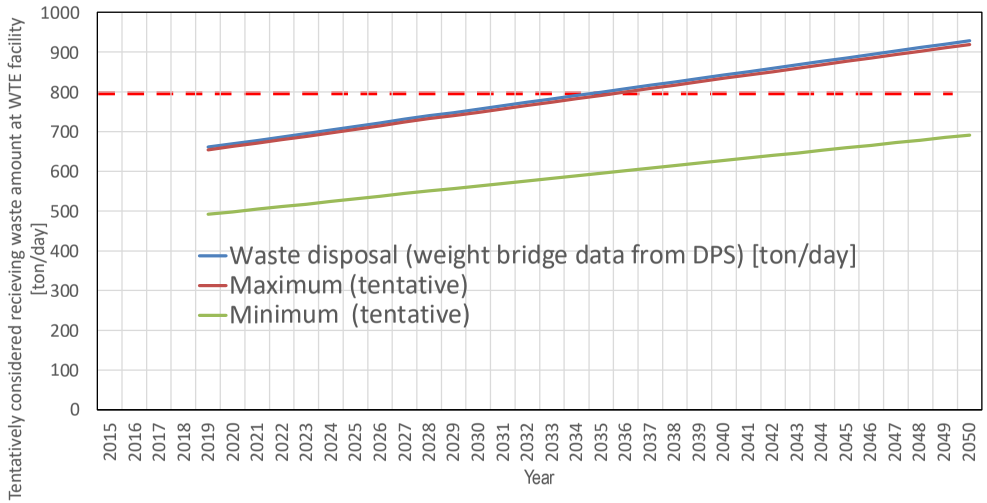
## Physical Composition Result of ADB-WACS




## Future Projection of Each Category of Waste




## Comparison with 800t/d of WTE facility




## Identified Issues and Recommendation (No. 1)

(1) Data management

- It is difficult to receive the data smoothly
- Possibility of counting durably
- Outgoing data is more than incoming data in most of monthly data from July to December

- Sharing electric data and unifying format
- Checking system of double counting (e.g. card by record of operation time, registration, etc)

添付資料11

# Identified Issues and Recommendation (No.2)

(1) 10 year SWM plan for WTE introduction

- It is necessary to prepare the 10 year SWM plan in line with WTE facility

- In this time, it is difficult to grasp how much waste is diverted at T/S, MRFs and at waste generation sources as well as illegal dumping, especially no collection area

- Prepare the format to measure the data of waste diversion.
- Necessary of continuous implementation of WACS at generation source

## Categories under WACS of ADB

| Item | Combustible or Incombustible | Item | Combustible or Incombustible |
|---|---|---|---|
| Paper and card | Combustible | Textiles | Combustible |
| Glass | Non-combustible | Food Waste | Combustible |
| Ferrous and non-ferrous metals | Non-combustible | Garden Waste | Combustible |
| Plastic bottles | Combustible | Other Putrescibles | Combustible |
| Plastic film | Combustible | Household Hazardous | Non-combustible |
| Dense plastics | Combustible | WEEE | Non-combustible |
| Miscellaneous combustibles | Combustible | Fines < 40mm | Not sure |
| Miscellaneous non-combustibles | Non-combustible | | |

# Summary of Study

- JET implemented preliminary study to consider incineration capacity based on ADB F/S study and current collected and disposal waste
- Basically, according to the contact with the private company of WTE, there is no lower limit of receiving waste amount and no limit of lower calorific value and the private company all the waste generated in Cebu City.
- It will be necessary to plan the waste amount receiving at incinerator considering in aspect of combustible or non-combustible
- It will be also necessary to consider the future waste treatment system based on the projections of waste

# Next Step

- JET assists the review of the draft contract with the private company for Cebu City
- If necessary, please contact with JET for supporting the WTE project in Cebu City

添付資料11

# QUEZON CITY

## BACKGROUND

- The Quezon City 10-Year Solid Waste Management (SWM) Plan was **approved by the NSWMC** on **October 22, 2010**.
- The thrust of the Plan is on waste reduction / diversion by encouraging the participation of different sectors of society especially by mobilizing the barangay councils to implement an ecological solid waste management program to manage recyclable and bio-degradable waste.
- The Plan update includes the strategies and initiatives to enhance overall compliance to the provisions of RA 9003

**Waste Analysis and Characterization Study (WACS) Results**

| Type of Waste | 2003 | 2013 |
|---|---|---|
| Biodegradable | 48 % | 53.95 % |
| Food/Kitchen Waste | 39 % | 43.17 % |
| Yard/Garden Waste | 7 % | 9.43 % |
| Others | 2 % | 1.35 % |
| Recyclable | 39 % | 20.30 % |
| Plastic | 16 % | 9.64 % |
| Paper | 17 % | 8.65 % |
| Glass/Bottle | 3 % | 1.15 % |
| Metals | 3 % | 0.86 % |
| Residual | 13 % | 25.76 % |
| Per Capita Waste Generation | .66 kg/person/day | .88 kg/ person/day |

# I. Updating the City's 10-Year SWM Plan

## BACKGROUND

- One of the major components of the 10-Year SWM Plan update is the establishment of a **Waste-to-Energy Facility**
- The City received three (3) Foreign Technical Assistance that were completed in 2017 to determine the feasibility of different Waste-to-Energy technologies suitable for the City.

| TITLE | IMPLEMENTING AGENCY |
|---|---|
| Feasibility Study for the Sustainable Development of Municipal & Organic Waste to Energy Plants | French Government through EIFFAGE International / Kosmos Energies |
| Feasibility Study for the Implementation of the Waste to Energy Project in Quezon City | Ministry of the Environment, Japan through Hitachi Zosen Corp., Inc. / EX Research Institute Ltd. |
| TA 8566 Reg: Mainstreaming Integrated Solid Waste Management in Asia | Asian Development Bank |

## WASTE DIVERSION TARGETS

### 2005 to 2014

| Year | Vol of Waste Gen/ Capita/ day with Increase of 2%/ annum based on WACS | Projected Population with 1.92% Growth Rate | Daily Waste Gen Based on Population (ton) | Waste Diver-sion Target (%) | Volume to be Diverted (ton) | Target Resi-dual (%) | Target Disposal Volume (ton) | WACS | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | $B_{io}$ (48%) | Recy-clable (39%) |
| 2005 | 0.69 | 2,392,701 | 1,651.00 | 20 | 330.19 | 80 | 1,320.77 | 792,463 | 643,876 |
| 2006 | 0.70 | 2,438,591 | 1,716.28 | 25 | 429.07 | 75 | 1,287.21 | 823,815 | 669,349 |
| 2007 | 0.72 | 2,485,379 | 1,784.19 | 29 | 517.41 | 71 | 1,266.77 | 856,413 | 695,836 |
| 2008 | 0.73 | 2,533,063 | 1,854.79 | 33 | 612.08 | 67 | 1,242.71 | 890,301 | 723,370 |
| 2009 | 0.75 | 2,581,658 | 1,928.18 | 37 | 713.42 | 63 | 1,214.75 | 925,526 | 751,992 |
| 2010 | 0.76 | 2,631,188 | 2,004.48 | 41 | 821.83 | 59 | 1,182.64 | 962,151 | 781,747 |
| 2011 | 0.78 | 2,681,669 | 2,083.79 | 45 | 937.70 | 55 | 1,146.08 | 1,000,222 | 812,681 |
| 2012 | 0.79 | 2,733,120 | 2,166.25 | 48 | 1,061.40 | 51 | 1,104.76 | 1,039,801 | 844,838 |
| 2013 | 0.81 | 2,785,558 | 2,251.97 | 53 | 1,193.54 | 47 | 1,058.42 | 1,080,946 | 878,288 |
| 2014 | 0.82 | 2,839,003 | 2,341.08 | 57 | 1,334.41 | 43 | 1,006.66 | 1,123,719 | 913,022 |

- For the Plan update, the aim is to divert more than **50%** of its waste generation for the next ten (10) years
- The diversion target set for 2018 to 2020 is 65%

### 2015 to 2024

| Year | Waste Generation per Capita per Day with Annual Increase of 3.33% (kilograms) | Projected Population (based on 2015 Census) | Daily Waste Generation Based on Projected Population | | Waste Diversion Target | Waste to be Diverted Per Day | | Waste to be Diverted Per Year | |
|---|---|---|---|---|---|---|---|---|---|
| | | | tons | cu.m. | % | tons | cu.m. | tons | cu.m. |
| 2015 | 0.9396 | 2,936,116 | 2,759 | 10,371 | 56.37% | 1,555 | 5,846 | 567,619 | 2,133,907 |
| 2016 | 0.9709 | 2,975,876 | 2,889 | 10,862 | 53.31% | 1,540 | 5,790 | 563,734 | 2,119,300 |
| 2017 | 1.0032 | 3,016,277 | 3,026 | 11,376 | 59.81% | 1,810 | 6,804 | 660,593 | 2,483,431 |
| 2018 | 1.0366 | 3,057,322 | 3,169 | 11,915 | 65.00% | 2,060 | 7,745 | 751,917 | 2,826,754 |
| 2019 | 1.0711 | 3,099,050 | 3,320 | 12,479 | 65.00% | 2,158 | 8,112 | 787,560 | 2,960,751 |
| 2020 | 1.1068 | 3,141,444 | 3,477 | 13,071 | 65.00% | 2,260 | 8,496 | 827,178 | 3,109,691 |
| 2021 | 1.1437 | 3,184,525 | 3,642 | 13,692 | 70.00% | 2,549 | 9,584 | 930,545 | 3,498,288 |
| 2022 | 1.1818 | 3,228,305 | 3,815 | 14,342 | 70.00% | 2,671 | 10,040 | 974,751 | 3,664,476 |
| 2023 | 1.2211 | 3,272,795 | 3,996 | 15,024 | 70.00% | 2,798 | 10,517 | 1,021,090 | 3,838,685 |
| 2024 | 1.2618 | 3,318,009 | 4,187 | 15,739 | 75.00% | 3,140 | 11,804 | 1,149,214 | 4,320,352 |

## VISION

**2010 Vision**

The vision of EPWMD is for Quezon City to be:
- A model city where all of its barangays are practicing waste segregation at source and segregated collection;
- A city with a model disposal facility where solid wastes are processed and converted to other useable resources;
- A city where solid waste avoidance and volume reduction is commonly practiced by the general public;
- A city where only residual waste are being collected by the City Contracted Haulers; and,
- A city where residents and transients comply with environmental laws and policies.

**Update**

"A model City for efficient, modernized and world-class solid waste management that utilizes innovative and cutting-edge systems and technologies to effectuate reliable waste reduction, segregation, recycling, composting, processing, collection and disposal while promoting sustainable development and ensuring overall compliance to pertinent laws, achieved through the active participation of environmentally-conscious stakeholders."

## PLAN STRATEGY

***"A model City for efficient, modernized and world-class solid waste management that utilizes innovative and cutting-edge systems and technologies to effectuate reliable waste reduction, segregation, recycling, composting, processing, collection and disposal"***

- Establish networks and linkages with other cities through membership in international organizations
- Engage local and international non-governmental organizations (NGOs), academe, private institutions and other relevant stakeholders
- Establish a state of the art Waste-To-Energy Facility
- Conduct research and studies on the following for future policy formulation:
  - Alternative for plastic bags, paper bags, other carry-out bags and packaging
  - Storage and set-out of wastes
  - Imposition of garbage fees for all types of generators
- Integrate junkshops, recyclers and kitchen waste collectors to the City's solid waste management systems/processes
- Upgrade collection fleet by shifting from open dump trucks to modern types of collection equipment such as compactors which are equipped with Global Positioning System (GPS) and tracking devices
- Establish a central command center and automated-based monitoring system
- Conduct post-closure care and maintenance activities at the closed Payatas Controlled Disposal Facility (PCDF) including possible landfill mining and land use conversion.

## PLAN STRATEGY

***"Promoting sustainable development and ensuring overall compliance to pertinent laws, achieved through the active participation of environmentally-conscious stakeholders"***

- Implementation of enhanced programs, projects and activities promoting comprehensive solid waste management.
- Strengthen partnerships and coordination with barangays and increase their capacities through regular conduct of dialogues, summits, orientations, seminars, workshops and similar activities as well as extend support for proper solid waste management in their respective jurisdiction specifically on segregation, recycling, composting, maintaining cleanliness, formulation and updating of solid waste management plan as well as establishment of materials recovery facility or system.
- Identify possible locations for barangay MRFs such open spaces, public schools, public markets and other City government-owned properties and assist barangay officials
- Identify and develop markets for recyclables, compost and other non-traditional wastes such as e-waste and link barangays to potential partners
- Introduce new technologies and systems on waste minimization, recycling, composting and resource recovery to barangay officials and the general public

## PLAN STRATEGY

*"Promoting sustainable development and ensuring overall compliance to pertinent laws, achieved through the active participation of environmentally-conscious stakeholders"*

- Implement strategic Information, Education and Communication (IEC)
- Encourage the general public to actively participate in the City's environmental initiatives and in the conceptualization or formulation of programs, projects and activities
- Strengthen enforcement of environmental laws and ordinances by increasing environmental enforcers at the City and Barangay levels through the conduct of deputation seminars.
- Continuously engage the police force to provide assistance in the implementation of environmental laws and ordinances.
- Establish incentive mechanisms for the different stakeholders.
- Develop systems and mechanisms that will enable the City Contracted Haulers to strictly monitor and enforce the dedicated collection of biodegradable and non-biodegradable wastes.

## FRAMEWORK

- Covers all sectors and addresses problems especially in the implementation of enhanced PPAs
- Ensure overall compliance to pertinent laws while promoting a comprehensive and sustainable solid waste management.
- 
- Reliable waste reduction /diversion through segregation, recycling, composting, and processing activities
- Active participation of environmentally-conscious stakeholders at the barangay and community levels.
- Waste reduction and diversion
- Forming partnerships with other cities and municipalities, both national and international
- Harmonization with NGOs, academes, and other concerned stakeholders
- Incentives and awards program

## SOLID WASTE MANAGEMENT SYSTEMS

- ✓ **Waste Reduction / Avoidance Initiatives**
- ✓ **Recycling and Composting Programs**
- ✓ **Proper Management of Special Wastes**
- ✓ **Awareness Campaign**
- ✓ **Modernization Strategies**
  - ➢ Waste-to-Energy
  - ➢ Biodigester Facility
  - ➢ Automated-based Monitoring System
  - ➢ Collection Equipment modernization

## MILESTONES

- ➢ 100% Barangay Compliance in establishing a Materials Recovery Facility/System
- ➢ All Barangays have an existing and active Barangay Solid Waste Management Committee and Solid Waste Management Plan
- ➢ Improved and intensified IEC campaigns inclusive of social and mass media avenues
- ➢ 100% junkshop, recyclers and kitchen waste collectors integration to the City's solid waste management systems/processes
- ➢ Institutionalized source reduction/avoidance or waste minimization strategies, policies and programs
- ➢ Established a Specialized drop-off facilities for Household Hazardous Waste (HHW)
- ➢ Successful implementation of a Disaster Waste Management project in the City
- ➢ Established a central command center and automated-based monitoring system

## MILESTONES

- Upgraded solid waste management collection fleet
- Established an effective, cost-efficient and environment friendly Waste-to-Energy Facility
- Reduced Greenhouse Gas Emissions in compliance to the City's international commitments
- Increased private sector and international organization partnerships as well as improved stakeholder participation
- Effective implementation and availability of incentive programs for barangays
- Successful Rehabilitation and Conversion of Payatas Controlled Disposal Facility and Quezon City Sanitary Landfill

## MONITORING PROGRAM

**Revising and Updating of the SWM Plan**

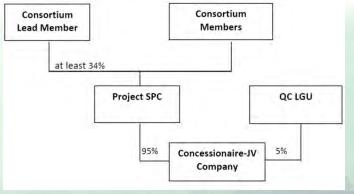
The process of SWM plan review should be regularly undertaken in a planned and scheduled fashion. A regular review of the progress with implementation of the action program is necessary to ensure that targets are being met in terms of service delivery, performance, diversion, etc.

- Submit an annual report to the National Solid Waste Management Commission for updates including PPAs implemented
- Regular Board Meeting of the City Solid Waste Management Board
- Monitoring of the MRF/MRS Projects in the Barangay
- Monitoring of the Waste Segregation Compliance by the Stakeholders
- Monitoring of the Collection and Transport of Wastes
- Monitoring of the Quantity of Waste Collected
- Monitoring of processed wastes
- Monitoring of the Disposal of Waste and of the Disposal Facility

# II. Lessons in Formulation of WTE

## The Unsolicited Proposal

- Background
  - The consortium composed of Metro Pacific Investments Corporation, Covanta Energy LLC, and Macquarie Capital Limited submitted the Project as an unsolicited proposal to the LGU
  - The Consortium was able to submit an Unsolicited Proposal as the QC Government has enacted its own PPP Code
- PPP-JV Structure




- Project Components:

| Biodegradable Source Separated Waste (SSO) Treatment Technology | |
|---|---|
| Waste treated | Bio-degradable Organic Fraction |

| Residual Combustible Waste (RCF) Treatment Technology | |
|---|---|
| Waste treated | Residual Combustible Non-Organic Fraction |

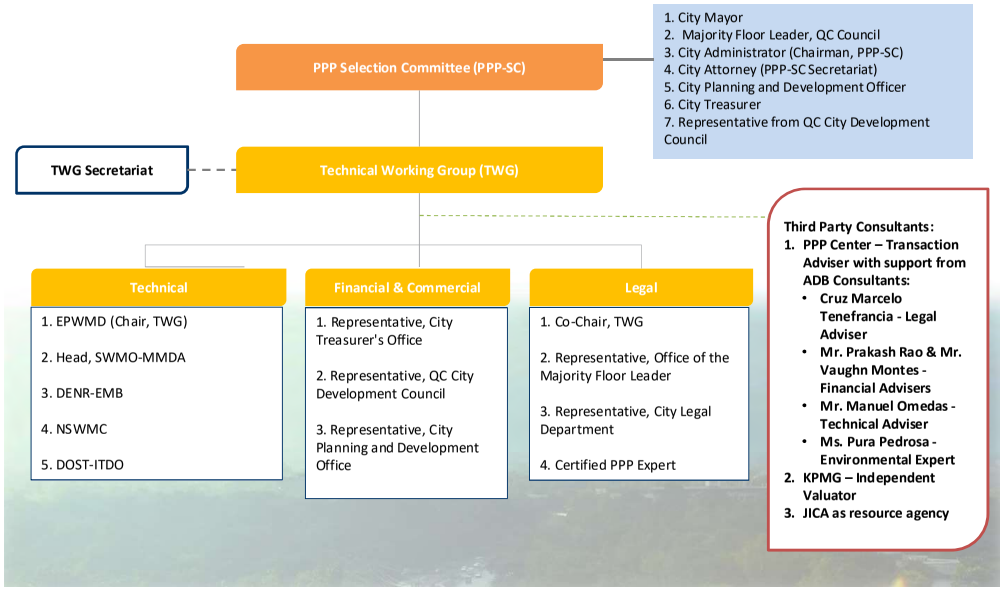
**Others**

Monofill for fly ash disposal

Other ancillary facilities, including continuous emission monitoring system, administration building, scale house, transmission lines, and utility systems and connections

添付資料11

# PPP-SC and TWG-WTE




# Unsolicited PPP Process


# THANK YOU!

添付資料11

# UPDATING OF 10-YEAR SWM PLAN FOR WTE

CITY GOVERNMENT OF DAVAO

## UPDATING OF THE 10-YEAR SWM PLAN FOR WTE

Background

Serious challenges in current solid waste management system:

- Limited landfill capacity to receive increasing amount of waste
- Risk of health hazard and pollution from the final disposal site
- Lack of facilities to reduce the volume of waste through recovery/recycling activities and intermediate treatment

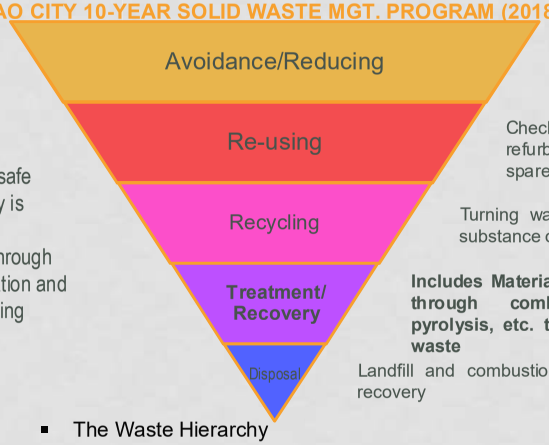
## UPDATING OF THE 10-YEAR SWM PLAN FOR WTE

WTE AS VIABLE TECHNOLOGY


- Expected benefits in introducing WtE to the City
  - Short-term benefits
    - Extending the life of landfill; and
    - Improving sanitary and environment condition
  - Medium and long-term benefits
    - Reduction of greenhouse gases (CO2 and CH4) in comparison with the current landfill emission;
    - Expansion of business opportunities and creating new jobs through the WtE; and
    - Utilization of additional 11 megawatt of power derived from WTE.

## UPDATING OF THE 10-YEAR SWM PLAN FOR WTE

DAVAO CITY 10-YEAR SOLID WASTE MGT. PROGRAM (2018-2027)




Using less material in design and manufacture.

Checking, cleaning, repairing, refurbishing, whole items or spare parts.

Turning waste into a new substance or product.

**Includes Material and Energy Recovery through combustion, gasification, pyrolysis, etc. to recover energy from waste**

Landfill and combustion without energy recovery

**VISION**: A healthy and safe environment in Davao City is sustained for present and succeeding generations through reduction of waste generation and increased resource including **ENERGY** recovery.

- The Waste Hierarchy

添付資料11

# UPDATING OF 10-YEAR PLAN FOR WTE

**DAVAO CITY 10-YEAR SOLID WASTE MGT. PROGRAM (2018-2027)**

Why WTE?

**MISSION**

In collaboration with key stakeholders and waste generators, Davao City will have an effective, efficient, SWM organization utilizing advanced SWM systems serving all its barangays.

TRENDS IN SW DISPOSAL

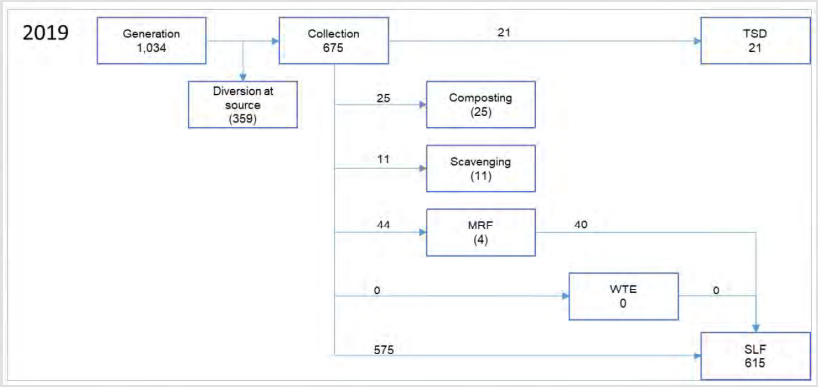
**Open dump** → **Controlled dump** → **Sanitary Landfill** → **SLF with Intermediate Treatment (Waste to Energy)**

- refer to a disposal are… solid wastes are indis… thrown or disposed o… planning and consid… environmental and h…
- refer to a disposal site at wh… solid waste is deposited in accordance with the minim… prescribed standards of site operation
- Refers to t… of solid wa… operated manner th… control ov… environme… the develo… the facility
- refer to energy recovery from waste, usually the conversion of non-recyclable waste materials into useable heat, electricity, or fuel through a variety of processes

# UPDATING OF 10-YEAR PLAN FOR WTE

**DAVAO CITY 10-YEAR SOLID WASTE MGT. PROGRAM (2018-2027)**

**MATERIAL FLOW**

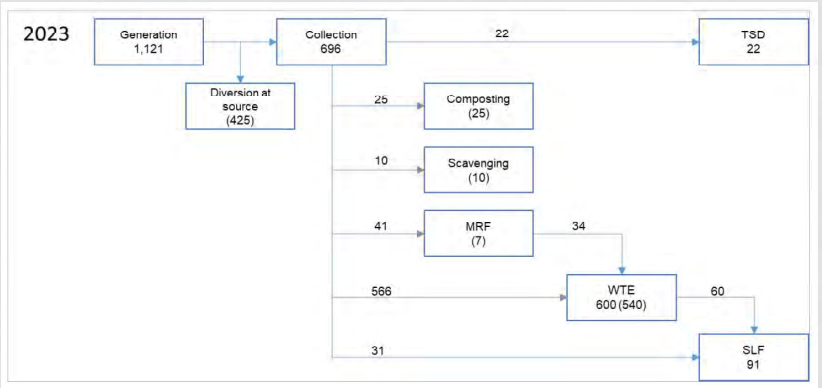



Percent Diversion = 39%

# UPDATING OF 10-YEAR PLAN FOR WTE

**DAVAO CITY 10-YEAR SOLID WASTE MGT. PROGRAM (2018-2027)**

**MATERIAL FLOW**



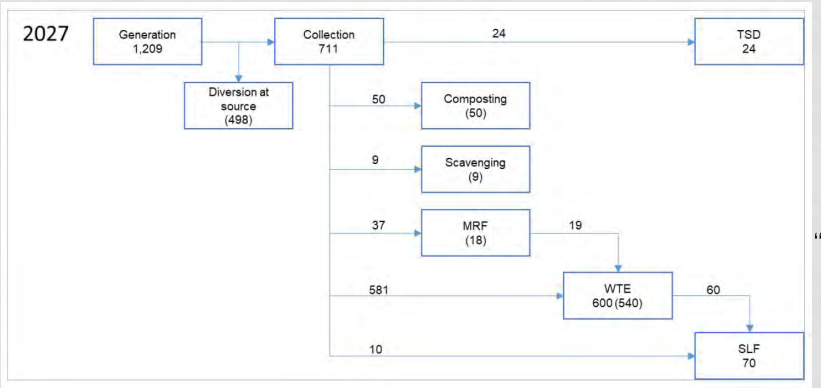

Percent Diversion = 90%

Percent of waste going to WtE = 53%

# UPDATING OF 10-YEAR PLAN FOR WTE

**DAVAO CITY 10-YEAR SOLID WASTE MGT. PROGRAM (2018-2027)**

**MATERIAL FLOW**




Percent Diversion = 92%

Percent of waste going to WtE = 49%

"Recycling should complement the WTE process to divert more waste away from the landfill."

添付資料11

"PROJECT FOR THE CONSTRUCTION OF WASTE-TO-ENERGY FACILITIES IN DAVAO CITY"

Project Site: Brgy. Biao Escuela, Tugbok Dist.
Current zoning classification:
Prime Agricultural Land
*With on-going application for reclassification*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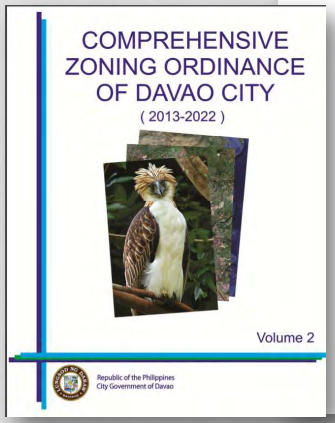


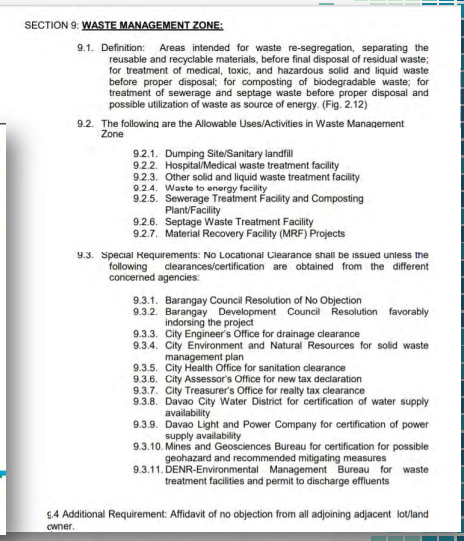

SECTION 9: **WASTE MANAGEMENT ZONE:**

9.1. Definition: Areas intended for waste re-segregation, separating the reusable and recyclable materials, before final disposal of residual waste; for treatment of medical, toxic, and hazardous solid and liquid waste before proper disposal; for composting of biodegradable waste; for treatment of sewerage and septage waste before proper disposal and possible utilization of waste as source of energy. (Fig. 2.12)

9.2. The following are the Allowable Uses/Activities in Waste Management Zone

9.2.1. Dumping Site/Sanitary landfill
9.2.2. Hospital/Medical waste treatment facility
9.2.3. Other solid and liquid waste treatment facility
9.2.4. Waste to energy facility
9.2.5. Sewerage Treatment Facility and Composting Plant/Facility
9.2.6. Septage Waste Treatment Facility
9.2.7. Material Recovery Facility (MRF) Projects

9.3. Special Requirements: No Locational Clearance shall be issued unless the following clearances/certification are obtained from the different concerned agencies:

9.3.1. Barangay Council Resolution of No Objection
9.3.2. Barangay Development Council Resolution favorably indorsing the project
9.3.3. City Engineer's Office for drainage clearance
9.3.4. City Environment and Natural Resources for solid waste management plan
9.3.5. City Health Office for sanitation clearance
9.3.6. City Assessor's Office for new tax declaration
9.3.7. City Treasurer's Office for realty tax clearance
9.3.8. Davao City Water District for certification of water supply availability
9.3.9. Davao Light and Power Company for certification of power supply availability
9.3.10. Mines and Geosciences Bureau for certification for possible geohazard and recommended mitigating measures
9.3.11. DENR-Environmental Management Bureau for waste treatment facilities and permit to discharge effluents

9.4 Additional Requirement: Affidavit of no objection from all adjoining adjacent lot/land owner.

# THANK YOU!

添付資料11

# *2nd* Sub Group Meeting

*"Tentative observations and suggestions"*

**Activity 2-5** Define points & issues to be addressed for formulating WTE projects in the target LGUs

16th July 2020 (Thursday)

The Technical Cooperation Project (TCP) for Capacity Development on Improving Solid Waste Management (SWM) through Advanced/Innovative Technologies



## Contents





# 1. Tentative Observation and Suggestion



## 1. Tipping fees for waste

**Observation**

- Present SWM cost shouldered by LGUs is NOT enough/reasonable to support desirable SWM
- Thus, some SWM components can not be improved to be appropriate level
- LGUs can not accept further increase of T/F (tipping fees) associated with WTE

**Suggestion**

- Cost for appropriate SWM shall be estimated based on actual needs and prices and be reflected in 10-year SWM plan as well as budgetary plan of LGUs
- T/F shall be reasonably decided based on the estimated cost above

## 2. Misunderstanding on SWM-PPP including WTE

**Observation**

- "Through PPP scheme, the waste can be converted to the money" is not true.
- Two types of PPP projects
  1. revenue generated and revenue sharable PPP project (such as toll road, power generation, water distribution projects)
  2. service fee payment based PPP
- SWM project is 2nd type, where service fee (T/F) shall be paid by LGU to private entity

**Suggestion**

- In SWM-PPP projects, LGUs shall pay T/F in the project period to private investor to recover their initial investment.
- Total government expenditure through project period is mostly same in both government-own and PPP in BOT or DBO. (it is called as "Public Sector Comparator" In Japan)



## 3. Responsibility of LGUs

**Observation**

- The meaning of "primarily responsibility of LGU" in RA9003 are really understood by LGUs?
- Waste Treatment and Cleanness Law (1970) of Japan
  - "even if LG contract out the construction, O&M of SWM to private entities, LGU still have all responsibilities of it."

**Suggestion**

- Any suspension of SWM is failure of LGU
  - private company failed to comply with environmental standard
  - bankrupt and cease operation
- All risks shall be removed in procurement of WTE project
  - Proper evaluation both technical and financial aspects
  - Avoidance/recovery plan before the start of SWM facility operation, so as to ensure non-stop operation of SWM
- LGUs shall continuously monitor performance of the WTE, while EMB regional office is in charge of monitoring too.



## 4. Needs of technical expertise in LGUs

**Observation**

- No experts on WTE technology in LGUs
  - LGUs need expertise to evaluate proposed projects that sometimes misleading and unrealistic
- LGUs that don't have technical capability, they tend to contract out all SWM activities to one private company.
  - Too much reliance on one company has much risks such as;
    - private company may cease the operation by their discretion if project is no longer profitable,
    - To find out successor of operation in particular patented/complex facility is not possible in short time,
    - private company requests LGUs to increase processing cost (T/F) and LGU is compelled to agree it

**Suggestion**

- LGU shall be prepared to have technical capability
- To hire experienced WTE expert in other countries
- NSWMC/DENR to train/educate/support for WTE projects



## 5. Solicited Approach based on SWM plan

**Observation**

- Difficulties for LGUs to evaluate unsolicited proposal without idea of "proper" development approach of WTE.

**Suggestion**

- LGUs to realize what SWM they need
- LGUs can specify and require what SWM they need by solicited approach
- Solicited approach for WTE to be considered, same like other public service infrastructure
- Waste Quality and Quantity:
  - LGUs must know its MSW stream and how much of waste, what kind waste they can supply to the WTE
- Scope of project:
  - LGUs to clarify components that LGU manages and private sector will be in charge of

## 6. Definition of waste category, 7. segregation in RA9003 8. Waste category in WACS

**Observation**

- IRR of RA9003,
  - In Rule VIII: "Waste segregation and collection shall be conducted at the barangay level specifically for **biodegradable/compostable** and **reusable/recyclable** wastes. The collection and disposal of **non-recyclable/non-recoverable** materials and special wastes shall be the responsibility of the city or municipality."
  - In Rule IX: The requirement for the segregation; "Responsibility for sorting and segregation of **biodegradable** and **non-biodegradable** wastes shall be at the household level"
- Some terms in these provision are not clear
  - Difference between "**non-recyclable/non-recoverable**" and "**residual**"?
  - "**Residual**" waste generated in LGUs commonly contains not only "**non-recyclable/non-recoverable**" materials but also "**biodegradable**", **reusable/recyclable**" material in case of neither appropriate segregation/recovery system nor sufficient demand in the local market of recyclables and compost



## 6. Definition of waste category, 7. segregation in RA9003 8. Waste category in WACS

**Suggestion**

- Definition of "residual waste"
  - "waste which can not be reduced, reused and recycled, in economically and/or technically, in the LGU's waste treatment system including material recovery and utilization industries and other circumstances"
- LGUs to define **materials** classified into the residual waste in their SWM plan.
- LGUs understand the meanings and necessity of WACS for "residual waste" to consider how to control/manage/minimize their "residual waste".
- Waste category in WACS shall be in **material** basis and not the **usage** basis so that treatment/recycling options by material can be studied.



## 9. Accumulated data of solid waste quantity and quality

**Observation**

- LGUs do not have waste quantity and quality data
  - with sufficient period
  - with weekly, seasonal and annual fluctuations

**Suggestion**

- LGUs to have "at least" statistic quantity data of MSW disposal because SWM processing facility shall need the information of "target waste" quantity, in planning any facility such as WTE or MRF
- Waste category in WACS in continuous manner is also required to prepare appropriate project capacity.
- In addition, simple WACS result is not enough/usable.
- Study report which includes implemented period (season, time), detail sampling and analytical procedure, etc. should be available for technical analysis



## 10. Address to Environmental NGOs

**Observation**

- The environmental NGOs, they sometimes put all incineration technologies in one basket. When they hear burning, they are automatically against it.

**Suggestion**

- Program must be developed to educate the LGUs how to consult with the NGOs.

## 11. Change of administration/Long-term WTE development plan

**Observation**

- Political risk (e.g. New elected government official might cause a change of decision) is the one of biggest risks for the private investor. It shall be taken by LGU side (and guaranteed by NG, etc.) for long-term contract.
- In case of QC, MPIC's proposal was evaluated and agreed with previous administration, but not yet agreed with present Mayor. This affects city's sanitation continuity plan as well as budget for MSWM.
- Similar change on the decision for WTE is observed for Cebu City due to change of city administration.

**Suggestion**

- LGUs to have a consistent long-term MSWM Plan including WTE development backed by LGUs' budgetary plan
- Long term plan to be disclosed so that citizens, politicians and investors can be aware of it



Any Comments from members?



添付資料11

PROJECT ACTIVITY : **2nd SUB-GROUP MEETING FOR PROJECT OUTPUT 2 (ENHANCEMENT OF TARGET LGUs' CAPACITY FOR PLANNING, EVALUATION, FORMULATION AND SUPERVISION OF WASTETO-ENERGY PROJECT)**
DATE/TIME : **16 July 2020, 9:00AM – 12:15PM (Philippine Time)**
VENUE : **Video Conference through Microsoft Teams**

| Agenda Topics | Issues/Discussions/Actions | Comments/Agreements/ Timelines | Required Actions/Responsible Agency/Person |
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| 1.) Call to Order | • Ms. Elvira Pausing of EMB-SWMD-PMO established the meeting which was duly called and declared a quorum based on the attendance of 10 out of 11 member agencies. | | |
| 2.) Adoption of the Agenda | • Ms. Pausing presented the agenda and asked the members if there are other matters that they need to discuss. She also reiterated the sequence of the meeting and later asked for the adoption of the agenda. | ➢ Agenda was moved for adoption with no comments and suggestions from the participants. | |
| 3.) Acknowledgement of Attendees | • Acknowledgement of Subgroup members of Project Output 2 members by Ms. Pausing. | | |
| 4.) Summary of discussions during the last Sub-group Meeting | • Engr. Takahiro Kamishita of JET gave a brief review of the discussions during the last Subgroup Meeting for Project Output 2 held last February 13, 2020. | ➢ No clarifications and/or alterations raised by the sub-group members. | |

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| 5.) Presentation and discussions on the topics under:<br><br>Activity 2-4:<br>a.) JET's Review on the Proposal of a Private Company for Cebu City's WTE | Engr. Makoto Kosaka of JET discussed the recommendations and comments of JET to the proposal of a private company for the WTE facility in Cebu City, as written on the March 2020 Progress Report of JET.<br><br>From the presentation of Engr. Kosaka, the following discussions and agreements were defined:<br><br>➢ Ms. Justine Padiernos of PPPC asked if the ADB study of Cebu City's SWM had been provided to JET.<br>➢ Engr. Kosaka confirmed that Cebu City provided the ADB study. However, he mentioned that the LGU did not follow the recommendations with regard to the location, capacity, etc. in the ADB study.<br>➢ Ms. Padiernos then added a comment that Cebu City would have a difficulty proceeding with the WTE project if relevant information, as discussed by Engr. Kosaka, has not been confirmed and clarified yet. The mentioned information are requirements of the LGU to the proponent.<br>➢ Engr. Kosaka also added a comment that JET recommends Cebu City to | ➢ JET recommends to conduct more discussions with LGU Cebu City (Admin Office & CCENRO) to confirm and clarify some matters on the draft contract of the private company. | ➢ JET recommends to conduct more discussions with LGU Cebu City (Admin Office & CCENRO) to confirm and clarify some matters on the draft contract of the private company. |

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| | make a facility plan as a part of solicited approach so that the city can compare the conformity with private proposal. He also shared the concerns on the technical capability of the current proponent.<br>➢ Ms. Padiernos suggested JET to discuss with PPPC, on a separate meeting, regarding further concerns on the Cebu City's progress on its WTE project. | ➢ JET & PPPC to further discuss on the following meeting some confirmations about the progress of the WTE project in Cebu City. | ➢ JET & PPPC to further discuss on the following meeting some confirmations about the progress of the WTE project in Cebu City. |
| Activity 2-4:<br>b.) Verification of Cebu City's Waste Amount to be Fed to WTE | Originally, this should have been presented by Engr. Glory Manatad of Cebu City ENRO. However due to an urgent meeting, Engr. Satoshi Higashinakagawa (Higashi) of JET explained the presentation in lieu of Engr. Manatad.<br><br>Engr. Higashi mainly discussed the result of the March 2020 field visit of JET to Cebu City for the verification of the waste amount proposed by private firm to be fed to the LGU's WTE. | ➢ JET to invite LGU Cebu City for further discussion to confirm and clarify information on the waste generation of Cebu City. | ➢ JET to invite LGU Cebu City for further discussion to confirm and clarify information on the waste generation of Cebu City. |
| LGU Quezon City's Presentation on:<br><br>a) Updating of the 10-year SWM Plan with Waste Flow and Consistency between the Project Site and Land Use Plan<br>b) Lessons learned in the formulation of WTEs | Mr. David Vergara of LGU Quezon City led the presentation. He informed the sub-group members that some information cannot be shared due to the non-disclosure agreement of the WTE project.<br><br>From the presentation of Mr. Vergara, the following discussions and agreements were defined: | | |

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| | • *Clarification on March 20202 Progress Report*<br>➢ Mr. Vergara addressed a minor clarification regarding the March 2020 Progress Report of JET, specifically on Table 2.18. He explained that for the case of Quezon City, increase in tipping fee had been anticipated and the same scheme for tipping fee implemented by MMDA will be adopted by the LGU.<br>➢ Engr. Kamishita acknowledged the clarification and mentioned that he would discuss some of the contents of the March 2020 Progress Report on his presentation.<br><br>• *Capacity of Incineration & Biodegradable Treatment Facility*<br>➢ Engr. Kosaka asked LGU Quezon City how did they set up the capacity of the incineration facility and the biodegradable treatment facility.<br>➢ Mr. Vergara answered that since the WTE Project was an unsolicited proposal; the capacity had already been identified by the proponents. According to Mr. Vergara, the consortium made due diligence on why they propose such capacity. The consortium also conducted their own WACS which supported their | | |

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| | proposed capacity. He added that there were more than one WACS conducted.<br>➢ Mr. Vergara further mentioned that the minimum delivery commitment / requirement of LGU Quezon City to the WTE is 1700 t/d., which has already incorporated the LGU's collection scheme.<br>➢ Engr. Kosaka further asked for a clarification regarding of the current waste generation/capacity of Quezon City.<br>➢ Mr. Vergara explained that the 1700 t/d was identified at the time of the proposal which was in 2016. He added that this capacity amount is not final yet since impacts of the City ordinances towards waste reduction will still be determined.<br>➢ Engr. Kosaka then reiterated his question about the capacity of the biodegradable treatment facility.<br>➢ Mr. Vergara clarified that the capacity of the biodegradable treatment facility is already part of the 1700 t/d.<br><br>• *Clarifications on Monofil Fly Ash and Aid on Technical Assistance*<br>➢ Engr. Kamishita then asked if whether the monofil for fly ash had been proposed by the MPIC JV without prior consultation/request with the LGU. | | |

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| | ➢ Mr. Vergara gave an affirmation to the question and explained that it is already included on the unsolicited proposal.<br>➢ Engr. Kamishita then asked if whether PPP-SC for WTE of Quezon City had seek assistance of technical expertise, especially on combustion technology, from third-party consultants.<br>➢ Ms. Padiernos then answered that before the unsolicited proposal was submitted, there were various studies (e.g ADB, NEDA) for Quezon City's SWM, which served as bases and verification of the proposal. She added that the LGU has its own daily monitoring of waste generation so they were able to negotiate the capacity proposed by the proponents based on their own WACS.<br>➢ Ms. Padiernos stated that there was an approval from PPP-JVSC to adopt the proposal of the proponent of LGU Quezon City.<br><br>• *Waste Collection Status under COVID-19 in Quezon City & Japan*<br>➢ Engr. Kamishita then moved on by asking Mr. Vergara regarding the status of waste collection service in Quezon City under the COVID-19 pandemic. He added a follow up if | | |

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| | whether there were any protection measures employed.<br>➢ Mr. Vergara responded that the inquiry is under the mandate of a dedicated task force and as of the moment, he does not have the specific details to answer it. He promised to give an update to JET regarding the inquiry once he gets confirmation from the dedicated task force.<br>➢ Ms. Padiernos asked JET what are the effects of the COVID-19 pandemic to waste generation in Japan.<br>➢ Engr. Kamishita answered that the amount of domestic waste generated increased. Protection measures were also employed especially for the waste collection workers. However, most of waste is incinerated in Japan so there is no significant effect in the treatment and final disposal facilities.<br><br>• *Clarifications on EPC Company*<br>➢ Engr. Satoshi Higashinakagawa (Higashi) asked LGU Quezon City if an EPC company had already been identified for the incineration facility and the biodegradable treatment facility.<br>➢ Mr. Vergara answered that as of the moment, EPC Company for the technologies has not been identified yet. | ➢ QC LGU to provide updates or share information to JET regarding the waste collection and disposal of QC under the COVID-19 Pandemic, once clarified from responsible persons. | ➢ QC LGU to provide updates or share information to JET regarding the waste collection and disposal of QC under the COVID-19 Pandemic, once clarified from responsible persons. |

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| | • *Request for Detailed Timeline of the LGU Quezon City's WTE Project*<br>➢ Ms. Pausing then asked if there is any detailed timeline, which LGU Quezon City can share to the meeting, on the completion/implementation of the LGU's WTE Project.<br>➢ Mr. Vergara answered that due to the COVID-19 situation, they cannot provide a detailed timeline as of the moment. But he updated that the proposal is currently being reviewed. | | |
| LGU Davao City's Presentation on:<br><br>a) Updating of the 10-year SWM Plan with Waste Flow and Consistency between the Project Site and Land Use Plan | Engr. Lakandiwa Orcullo of LGU Davao City led the presentation. He confirmed that he would only be elaborating on the updates of the 10-year SWM Plan since preparing for WTE project is a whole new lesson for the LGU.<br><br>From the presentation of Mr. Engr. Orcullo, the following discussions and agreements were defined:<br><br>• *Updates for LGU Davao City's WTE Project*<br>➢ Engr. Kamishita asked for updates on the status of the LGU's WTE project.<br>➢ Engr. Elisa Madrazo of LGU Davao City answered that as of the moment, they are waiting for the finalization of the feasibility study of consultant. The LGU also had a meeting with the | | |

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| | Department of Finance (DOF) recently and Engr. Madrazo added that they are just waiting for the subsidy approval.<br>➢ Ms. Consolacion Crisostomo of EMB-PPPDD informed the participants that the said subsidy would come from EMB. She then requested the LGU to share the findings of their feasibility study.<br>➢ Engr. Madrazo answered that revisions had been made on the feasibility study due to some concerns raised by the DOF. A recommendation by the DOF of increasing the tipping fee to 1,000 PHP/t was also discussed. She added that the executive and legislative branches of the LGU would have to discuss the recommendation first. She mentioned that the consultants were given two months to finish the feasibility study.<br>➢ Ms. Crisostomo inquired if whether the LGU had been coordinating with the EMB Regional Office.<br>➢ Engr. Madrazo gave an affirmation to the inquiry and added that they are seeking assistance especially on the processing of the WTE's ECC.<br>➢ Ms. Pausing also mentioned that the LGU Davao City and the EMB Regional offices are also coordinating with the DENR-FMS for the possibilities on the provision of | ➢ As per Ms. Crisostomo of EMB-PPPDD's request, LGU Davao City to provide update or to share findings of the feasibility study to EMB and to the project, once available. | ➢ As per Ms. Crisostomo of EMB-PPPDD's request, LGU Davao City to provide update or to share findings of the feasibility study to EMB and to the project, once available. |

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| | subsidy as requested by LGU Davao City. She also mentioned that pertinent documents have been prepared by DENR for the said request, however, it will still be up to the DBM's consideration and approval.<br>➢ Ms. Crisostomo then reminded LGU Davao City to share the findings of the feasibility study, once available.<br><br>• *Other Clarification*<br>➢ Ms. Raquel Rosario R. Reyes of EMB-SWMD asked about the type of incinerator that the LGU will use for its WTE project.<br>➢ Engr. Orcullo answered that the moving grate type will also be used by the LGU. | | |
| Activity 2-5:<br>Presentation on the Tentative Observations and Suggestions under Activity 2-5 | Engr. Takahiro Kamishita of JET discussed the tentative observations and suggestions for formulating WTE projects in the target LGUs which was written in the progress report 1 of TCP.<br><br>From the presentation of Engr. Kamishita, the following discussions and agreements were defined:<br><br>➢ Engr. Madrazo requested JET to share with the subgroup members the presentation file of Engr. Kamishita after the meeting. She justified that the | | |

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| | points discussed from the presentation will not only be helpful for the formulation of the WTE Project but also with the other projects of the LGUs.<br>➢ Mr. Kamishita agreed to the request and supported Engr. Madrazo's comment.<br><br>• *Support to the Suggestion of JET (10-year SWM Plan integration with LGU's Development Plan, Definition of Residual Waste)*<br>➢ Ms. Crisostomo asked for a validation from the present LGUs if whether measures written on their respective 10-year SWM Plan are being implemented at the LGU level. She justified that the 10-year SWM Plans are already approved by the NSWMC and so the LGUs are required to implement the measures stipulated on the plan and should be incorporated on the City's Development Plan.<br>➢ Mr. Vergara answered that LGU Quezon City's 10-year SWM Plan is part of its Development Plan and that the City has been implementing it. With regard to the WTE, it is a technology-based disposal solution but the technology of incineration has not been specified yet. LGU Quezon | | |

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| | City's plan is to just generally mention the WTE to the 10-year SWM Plan.<br>➢ Engr. Madrazo mentioned that the WTE Project has been planned for the last 5 years already and that the community is already aware of the project, but the WTE Project's specific concerns will be decided by the TWG. She updated that one of the main concerns of the project is the financial subsidy from the EMB Central Office. The LGU had already been awarded with the grant by Japan, but they are just waiting for the additional subsidy. She mentioned that other neighboring LGUs are already asking about the implementation of the WTE Project. But as of the moment, LGU Davao City is working on site development plan, with consultation from other agencies.<br>➢ Ms. Crisostomo added a comment that specifying such matter (e.g. technology to be used) is something to be considered by the LGU.<br>➢ Ms. Reyes opened a new discussion by expressing her support on JET's suggestion to specify the definition of residual waste. She mentioned that there is no specific definition of residual waste in the existing laws. She | | |

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| | suggested that this matter be taken up to the NSWMC.<br><br>• *Other Recommendations from JET*<br>➢ Engr. Kosaka requested LGUs Quezon City to compare the tipping fees presently applied and in future for WTE.<br>➢ Mr. Vergara mentioned that LGU Quezon City relied on the computation of the PPPC.<br>➢ Ms. Padiernos elaborated that the current cost of tipping fee in LGU Quezon City is 600 PHP and is shouldered by MMDA. The proponent's proposed tipping fee was higher compared to the current cost. She mentioned that the proponent justified that this increased fee will offset the hauling costs and will be beneficial in the long term. She added that the increased fee is bounded by the non-disclosure agreement, thus, it cannot be shared as of the moment.<br><br>• *Clarification on Subsidy Grant to LGU Davao City*<br>➢ Engr. Kamishita asked for a confirmation if DENR is discussing whether to grant subsidy to LGU Davao City for the WTE Project. He added a follow up if whether DENR has created a cost sharing scheme with | <u>Supplemental note on T/F by JET</u><br>*Firstly, Davao is presently dumping all the waste in their own New Carmen Landfill at free, which doesn't fully comply with the environmental standards in terms of leachate treatment, etc. But it should be considered if this landfill shall be rehabilitated to meet the standard, how much additional capital cost and operational cost will be needed.*<br>*So, DC shall compare this additional cost and proposed T/F (P1,000/t) for WTE because WTE will be of course fully complied with the standards.*<br><br>*On the other hand, MMDA is now paying P600/t for landfilling cost of QC. Then, proposed T/F for WTE (which was not discussed in this meeting, P1,400/t) shall be compared with this P600/t. Then, as Ms. Justine said, present transportation cost (to Rizal) can be mitigated this price difference then provide benefit to the city.* | |

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| | LGUs as such from the subsidy to Davao City.<br>➢ Ms. Crisostomo clarified that DENR proposed to give assistance to Davao City. But the proposed budget is yet to be approved by the Congress. Upon approval, next actions will be administered by DENR.<br>➢ Ms. Pausing added that DENR is already preparing the pertinent documents to be submitted to the Department of Budget and Management (DBM). She mentioned that a copy of the DENR memorandum stating that the requested subsidy is already included in the 2021 DENR budget proposal.<br>➢ Ms. Crisostomo further clarified that no legislative action had been made yet for the proposed budget. | | |
| 6.) Discussions on the Updates/Status on the Preparation of the TCP Newsletter | Mr. Eric Cea of JET updated the subgroup members regarding the progress on the TCP Newsletter preparation<br><br>➢ Ms. Pausing asked for a follow up on the requested assessment of the current progress of the Newsletter preparation.<br>➢ Mr. Cea updated that a follow up email regarding the submission of articles had already been sent.<br>➢ Engr. Sales added that only a few articles had been received yet. | ➢ JET to send another follow up regarding the submission of Newsletter deliverables. | ➢ JET to send another follow up regarding the submission of Newsletter deliverables. |

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| | ➢ Ms. Pausing reiterated her request during the last meeting regarding JET's assessment on the extent of the Newsletter preparation using the available information submitted by the sub-group members and to inform the group on the other important information/data to complete/finalize the said Newsletter.<br>➢ Engr. Kamishita suggested that they will share the preparation progress once substantial submissions had been received.<br>➢ Ms. Pausing updated that the assigned article regarding the DENR's Role on Waste-to-Energy Projects" is already on the process of review and approval. It will be shared to JET once approved. | ➢ EMB-SWMD-PMO to send assigned article for DENR, once approved. | ➢ EMB-SWMD-PMO to send assigned article for DENR, once approved. |
| 7.) Wrap-up/Required Actions/Agreements | Engr. Nikka Sales of JET wrapped up the earlier discussions and reiterated the agreed arrangements.<br>➢ Ms. Crisostomo suggested JET and EMB-SWMD-PMO to share with the meeting attendees all the presentation files and the meeting record for today's meeting.<br>➢ Ms. Pausing reminded the presenters to send the presentation files to JET and EMB-SWMD-PMO for consolidation.<br>➢ | ➢ LGUs Quezon City and Davao City to send their presentation files to JET/EMB-SWMD-PMO.<br>➢ JET/EMB-SWMD-PMO to consolidate and share the presentations and the meeting record to the subgroup members. | ➢ LGUs Quezon City and Davao City to send their presentation files to JET/EMB-SWMD-PMO.<br>➢ JET/EMB-SWMD-PMO to consolidate and share the presentations and the meeting record to the subgroup members. |

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| 8.) Way forward, Schedule of the next meeting | • Ms. Pausing discussed the proposed schedule for the next subgroup meeting.<br><br>➢ Ms. Pausing mentioned that originally, there is a proposed subgroup meeting for Output 2 which will be on Sept 10.<br><br>➢ Engr. Kamishita then confirmed that as of the moment, an exact date for the next subgroup meeting for Project Output 2 cannot be decided yet. He justified that JET needs to communicate with the 3 LGUs first, especially with Cebu City. Therefore, the September 10 proposal is just tentative and that JET will update the subgroup members before the said date.<br><br>➢ Engr. Kamishita reminded the meeting participants that confidential information is included on the presentations during the meeting; Thus, this information cannot be shared to the public same as the progress report of TCP.<br><br>• Adjournment<br><br>➢ There be no other matters to be discussed, Ms. Pausing adjourned the | ➢ JET to communicate with the 3 LGUs first, then update the subgroup members for a proposed date for the next subgroup meeting for Project Output 2. | ➢ JET to communicate with the 3 LGUs first, then update the subgroup members for a proposed date for the next subgroup meeting for Project Output 2. |

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| | meeting at 12:15 PM by extending her appreciation to all the Sub-group members and other participants who joined the meeting. | | |

# 添付資料 11-3:
# 成果2サブグループ会議

## 11-3-3 : 3rd SG2

# 3rd SGOP2 on 28May2021 Technical Presentation

*Makoto KOSAKA, SWM-PPP Expert*

*The Technical Cooperation Project (TCP) for Capacity Development on Improving Solid Waste Management (SWM) through Advanced/Innovative Technologies*



## Technical Presentation 3rd SGOP2 on 28May2021

1. Info-sharing of discussions in preparation of WTE Technical Standards in SGOP1,
   (1) Use the word of "Incineration",
   (2) Definition of "WtE Feedstock" as the target waste,

2. WTE Project Development
   (1) Necessity of facility plan for the proper evaluation of unsolicited proposal,
   (2) PPP project type / Correct understanding of WTE finance / Service provision Type PPP,
   (3) Responsibility of LGU,

3. Confirmation of the remaining activity of Output 2
   Activity 2-6 Sharing the status/discussions with PPPC
   Activity 2-7 (draft specifications): Confirmation of LGU needs



## 1. Info-sharing of discussions in preparation of WTE Technical Standards in SGOP1, (1) Use the word of "Incineration",

Final Draft WTE Technical Standards (JCC Approved)

Republic of the Philippines
Department of Environment and Natural Resources
**ENVIRONMENTAL MANAGEMENT BUREAU**
DENR Compound, Visayas Avenue, Diliman, Quezon City 1116
Telephone Nos: 927-15-17, 928-20-96
Email: emb@emb.gov.ph

**EMB MEMORANDUM CIRCULAR**
No. 2020 - ____

**SUBJECT : GUIDELINES FOR THE TECHNICAL STANDARDS OF WASTE-TO-ENERGY FACILITY ON APPROPRIATELY CONTROLED COMBUSTION ~~WASTE INCINERATION~~ WITH POWER GENERATION**



## 1. Info-sharing of discussions in preparation of WTE Technical Standards in SGOP1, (1) Use the word of "Incineration",

Discussed with ; DOST-ITDI, DENR-SWMD, NEDA-IPG, PPPC, DOE-REMB

| Cat. | Items | Commenter | Comments |
|---|---|---|---|
| Title | Waste-to-Energy Facilities on ~~Waste Incineration~~ Appropriately Controlled Combustion with Power Generation | DOST-ITDI DENR-EMB-SWMD | As the conclusion of 6th SGOP1 on 14Oct2020; Removal of the term "incineration" and substituting "Appropriately controlled combustion" instead to avoid controversial matter. > Then it was removed in 2nd draft. |
| | | NEDA-IPG | Suggest to clearly delineate the types of WTE technologies (e.g., incineration) |
| | | DOE-REMB | WTE facility involves not only power applications but also for non-power and other emerging WTE technologies. |
| | | DOE-REMB | On 14Oct2020, it was concluded not to use the term incinerate/incineration in the draft due to the social acceptability of said term. However, the said term is used in Senate Bill No.1789. |
| | | PPPC | Suggest to define "appropriately controlled combustion with power generation" |

参付資料11

## 1. Info-sharing of discussions in preparation of WTE Technical Standards in SGOP1, (2) Definition of "WTE Feedstock"



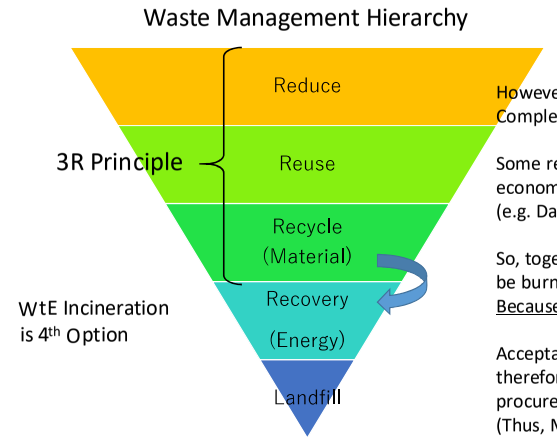
Discussed with ; DOE-REMB, DENR-SWMD, NEDA-IPG, PPPC, Quezon City,

| Source | Definitions of "WTE feedstock" | JET comments |
|---|---|---|
| DAO2019-21 | **Feedstock** refers to the segregated biodegradable or residual waste materials supplied to the WtE facility to generate heat or electricity | As stated in next slide, in many cases WtE has no choice to receive other than "segregated biodegradable or residual waste materials" (e.g. recyclables) so it shall be a bit more flexible. |
| | **Residual Waste** shall refer to any material generated after the implementation of 3Rs (Reduce, Reuse, Recycle) *with fuel value*. | The intention is to limit only 3R residuals with fuel value can be fed to WtE as "Feedstock". But this definition doesn't consider about 3R residuals w/o fuel value, such should also be generally categorized as "residual waste". |
| Senate Bill 1789 | **WTE feedstock** refers to the waste martials with calorific-value that are taken in for WTE processing in a WTE facility | In contrast with above, this definition lead recyclables to be fuel even if there is still opportunity for material recycle. |
| JET proposed definition in draft T/S | **WtE Feedstock** shall refer to any residual waste after the implementation of 3Rs (Reduce, Reuse, Recycle) by LGUs at optimum economical extent to be supplied to the facility for the purpose of recovering its thermal energy. | The concept of this is that LGUs have to design and implement maximum effort for the 3Rs at that moment. WTE can accept such remainings which has value to be energy as the feedstock. |



## 1. Info-sharing of discussions in preparation of WTE Technical Standards in SGOP1, (2) Definition of "WTE Feedstock"

The Technical Cooperation Project (TCP) for Capacity Development on Improving Solid Waste Management (SWM) through Advanced/Innovative Technologies JICA




However, in reality....
Complete implementation of 3R is long-cherished dream;

Some recyclable components are not exactly recycled due to economic or technology availability reasons.
(e.g. Davao region doesn't have plastic recycling factories)

So, together with non-recyclables, some recyclables shall also be burnt/converted to Energy.
Because it's better option than landfilling.

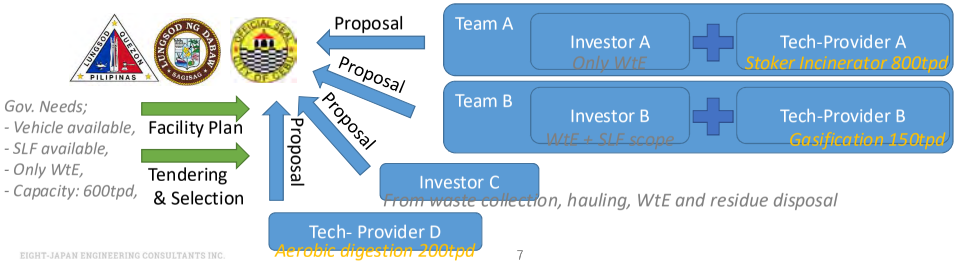
Acceptance criteria of WtE facility can't be specified uniformly, therefore, it shall be specified by each LGU in its WTE procurement.
(Thus, MSWM Master Plan and facility plan are essential.)



## 2. WTE Project Development, (1) Necessity of appropriate facility plan for the proper evaluation of unsolicited proposal

The Technical Cooperation Project (TCP) for Capacity Development on Improving Solid Waste Management (SWM) through Advanced/Innovative Technologies JICA

- ✓ It's a waste of time to compare different schemes / types / technologies of private proposals if there is no WTE facility plan made by LGU,
- ✓ Local government shall have **own** MSW Management strategy and specific facility development plan to ease evaluation/selection of the better private proposal,






## 2. WTE Project Development, Comparison of WtE Project Development

The Technical Cooperation Project (TCP) for Capacity Development on Improving Solid Waste Management (SWM) through Advanced/Innovative Technologies JICA

**[Typical procedure for MSW Incineration (WtE) facility development]** Public Private

| Phase | Japan | Indonesia | Philippines | Thailand |
|---|---|---|---|---|
| Concept/ Master Plan | MSWM* Master Plan (Long term plan) | MSWM* Master Plan (Long term plan) | MSWM* Master Plan (Long term plan) | MSWM* Master Plan (Long term plan) |
| | Waste characteristic survey | Waste characteristic survey | Waste characteristic survey | Waste characteristic survey |
| Study/Design Permits/ Facility Plan | Site Selection | OBC (Pre-FS) | Feasibility Study | Feasibility Study |
| | EIA/Permits/Public invol | EIA/Permits/Public invol | EIA/Permits/Public invol | EIA/Permits/Public invol |
| | Facility Plan/Tech select | FBC (FS) | Facility Plan/Tech select | Facility Plan/Tech select |
| Procurement Bid/Order | PPP applicability study | Bid/Selection | PPP applicability study | PPP applicability study |
| | Bid/Selection | | Unsolicited Proposal | Bid/Selection |
| | | | Swiss Challenge | |
| Construction | Construction | Construction | Construction | Construction |
| Operation | Operation | Operation | Operation | Operation |
| | DBO | BOT | BOT | BOT |

*MSW (Municipal Solid Waste) Management

## 2. WTE Project Development, (2) Correct understanding of Waste Management PPP,

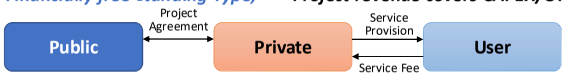


- ✓ There are 3 types of PPP projects, #1: Service provision, #2: Financially free-standing, and #3 Mixed,
- ✓ In general, waste treatment facilities are categorized in #1 and WtE is categorized in #3. They never fall into #2,
- ✓ However, in many private proposals say "no tipping fee", "power tariff covers all CAPEX/OPEX", etc. and never realize. LGUs shall have correct understanding of Waste-to-Energy financial situation in other countries.

*#1: Service Provision Type;* ***Public pays fee to Private partner's service provision incl. its CAPEX/OPEX***


*School, Government Building, Jail, Waste treatment facility, etc.*

*#2: Financially free-standing Type;* ***Project revenue covers CAPEX/OPEX / No financial support from Public***




*Toll Road, Airport, MRT, Parking, etc.*

*#3: Mixture Type (Waste-to-Energy Projects);* ***Project revenue <u>is not enough</u> to cover CAPEX/OPEX***




## 2. WTE Project Development, (3) Responsibility of LGU



- Extraction from Progress Report (2);
- It is necessary to clarify the real meaning of "primarily responsibility of LGU" in RA9003,
- Waste Treatment and Cleanness Law (1970) in Japan stated that "even if LG contract out the construction, O&M of SWM activities to private entities, LGU still have all responsibilities of it." This means that LGU shall have prevention/recovery plan before the commercial operation of SWM facility so as to keep continuous provision SWM to citizens at any cases if private company failed to comply with environmental standard or is bankrupt and cease to operate in any reasons.
- LGU shall realize the responsibility securing the environmental compliance of private partner in the SWM-PPP project while EMB regional office is one of the organizations for monitoring.



## 3. Confirmation of the remaining activity of Output 2, Activity 2-6 /



- To be provided by PPPC,



## 3. Confirmation of the remaining activity of Output 2, Activity 2-7 / Formulate the Technical Specification of WTE



- Confirmation of LGU needs
- Right table shows the progress of WTE projects as of April 2019;
- Based on recent updates, are there any technical supports which LGUs expect to JET to provide?
- Such as;
  (1) Tech specification,
  (2) Tender support,
  (3) FS (Facility plan),
  (4) Engineered M/P,
  (5) Monitoring Manual,
  etc.

| *LGU* | *M/P* | *Concept, F/S* | *Plan, B/D* | *RfP, ITB* | *Proposal* | *Contract* | *Const.* | *Operation* |
|---|---|---|---|---|---|---|---|---|
| Quezon City | ADB (2018-2027) | Unclear | Unclear | Adopt Unsolicited Proposal 2017.3 | Swiss Challenge 2018.10-2019.3 | 2019.3 | 2019-2022 (3yrs) | 2022-2057 (35yrs) |
| Davao City | 2008-2017 | JICA (2016) | Consultant Procurement | Not Yet Fixed | | | | |
| Cebu City | 2017-2026 | ADB-TA (2017-2019) | Not Yet Fixed | | | | | |

Unsolicited "Modified BOO" based procurement

Japan subsidized BOT

Under Study

Expected Implementation Period of JICA TCP (2019.2-2022.3)

PROJECT ACTIVITY : **3rd SUB-GROUP MEETING FOR PROJECT OUTPUT 2 (ENHANCEMENT OF TARGET LGU'S CAPACITY PLANNING, EVALUATION, FORMULATION AND SUPERVISION OF WASTE-TO-ENERGY PROJECT**
DATE/TIME : **25 May 2021, 9:00AM - 12:00AM (Philippine Time)**
VENUE : **Video Conference through Microsoft Teams**
MATERIALS : **https://bit.ly/3rdOP2SGMtg**

| Agenda Topics | Issues/Discussions/Actions | Comments/Agreements/ Timelines | Required Actions/Responsible Agency/Person |
|---|---|---|---|
| 1.) Call to Order/ Meeting Objectives/Acknowledgement of Attendees<br>(Ms. Elvira Pausing, EMB-SWMD-PMO) | ● Ms. Elvira Pausing of EMB-SWMD-PMO commenced the 3rd subgroup meeting for Project Output 2 when quorum was reached, and all presenters for the meeting have signed in.<br>● Ms. Pausing presented the agenda and asked the subgroup members if anything else needed to be discussed.<br>● Ms. Pausing acknowledged the presence of the participants, and briefly ran through the proceedings of the last subgroup meeting held | ● Agenda was moved for adoption with no comments and modifications from the participants. | |
| 2.) Review of the previous discussions from the last subgroup meeting<br>(Takahiro Kamishita, JET) | ● Mr. Takahiro Kamishita presented the meeting summary of the 2nd OP2 Subgroup Meeting.<br>● In the last meeting, JET discussed their review of the proposal of a private company for Cebu City's WTE, and presented preliminary recommendations to the said proposal.<br>○ QC LGU was also able to share updates to the WTE Project.<br>○ Presentation and tentative recommendations were also presented aligned to Activity 2-5. | | |
| 3a.) Technical Presentations and Discussions: WTE Target Waste<br>(Mr. Takahiro Kamishita, Mr. Makoto Kosaka, JET) | | | |

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| • Information sharing of discussions in preparation of WTE Technical standards in SGOP1.<br><br>- Use of the word **incineration**<br><br>- Definition of **WtE Feedstock** | ● Mr. Kosaka discussed the Draft WTE Technical Standards (TS) under Output 1. Currently already approved in the JCC Meeting, the following details were underscored from the TS:<br>● Mr. Kosaka shared that the term "**Appropriately Controlled Combustion**" was used instead of "incineration" to avoid the negative connotation that comes with the term "incineration."<br>● He then proceeds in the discussion of the definition of WTE Feedstock, emphasizing its difference with the definition under DAO 2019-21 and SB 1789. In the Draft TS, he discusses that the definition highlights that 3Rs must first be implemented and exhausted, and all remaining residual waste shall be the WtE feedstock to recover its thermal energy. Aligned with this he also presented the Waste Management Hierarchy, emphasizing that WTE incineration is a latter option only done after the 3Rs are executed. | ● Mr. Kosaka opened the floor for comments for the definitions presented (Appropriately Controlled Combustion, WTE Feedstock).<br>○ Ms. Pausing asked if the presented information has been incorporated in the Draft TS, and clarifies on how the comments from the body affect the Draft TS.<br>○ Mr. Kosaka clarifies that the objective of discussing this with the LGUs is to ensure alignment of understanding especially with Cebu City and Davao City, given that Quezon City was already part of the subgroup that developed the TS.<br>○ Engr. Madrazo asked about the calorific value that can be fed into the facilities. She clarifies that later on, they expect plastic use to decline and raises that this might affect the sustainability of the WTE facility.<br>○ Mr. Kosaka goes back to the objective of the facility which is to manage wastes so should waste generation decline over | |

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| | | the years, then the facility will have already served its purpose. However, he clarifies that plastic use may not completely be avoided but plastic reduction strategy shall be reflected in the Facility Plan.<br>○ Ms. Pausing requests for JET to provide the details of the calorific value given that this concern was also raised in the last OP1 SG Meeting.<br>○ Mr. Kamishita shares a table from the Draft BAT/BEP Guidelines showing the range of lower calorific values from the case studies.<br>○ Ms. Pausing inquired if JET has a more specific lower calorific value per material type and requested for JET to provide this in the next subgroup meeting.<br>● Mr. Kamishita asked the LGU representatives for confirmation on the alignment of understanding on the WTE feedstock definition.<br>○ Mr. Kamishita explains that materials such as low quality plastics, and other residual matters which do not have market value can be incinerated depending on the LGU's plan. | ● [JET] PMO requests for JET to provide further details on the lower calorific value for different material types, to be presented in the next subgroup meeting.<br>● [Cebu City LGU] Provide confirmation to the WTE Feedstock definition. |

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| | | ○ Engr. Louie Sabater of QCTFSWM agrees with the WTE Feedstock definition. He inquired on whether construction waste, a type of residual waste, may be fed into the facility as well.<br>○ Mr. Kamishita responds that for construction materials, it would depend on the waste but is generally not combustible, and that waste amount reduction is not expected through incineration.<br>○ Mr. Kosaka clarifies that technically, it may be accepted, but is not ideal given that cement and soil is not combustible and not reduced through processing. Mr. Kosaka suggests for pre-treatment to be done to the collected wastes if the incombustible portion would be higher than 20% of the total waste volume. | |
| • WTE Project Development<br>- Necessity of facility plan for the proper evaluation of unsolicited proposal | ● Mr. Kosaka explains that a Facility Plan should be made by LGUs, to ease the process of evaluation and selection of MSW Management proposals from private entities.<br>● He further discusses that in the Philippines, most of the facility development proposals come in an unsolicited approach, making it | | |

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| - PPP project type/ correct understanding of WtE finance/ Service provision type PPP | more important to clarify the LGU's strategies to ensure that the evaluation of unsolicited proposals is aligned with the masterplan of the LGU.<br>● Mr. Kosaka discusses the three PPP Project types: (1) Service provision, (2) Financially free-standing, and (3) mixed. From JET's experience with the BAT/BEP case reviews, all of the WTE-PPP Projects fall under either Type 1 or Type 3. | | |
| 3b.) Technical Presentations and Discussions: Remaining activities under Project Output 2<br><br>• Activity 2-6: Sharing of the status/discussions with PPPC<br>(Ms. Justine Padiernos, PPPC) | ● Ms. Justine Padiernos of PPPC provided a background on the current scope of assistance that JET provides to PPP Center, and on the expanded scope of the partnership.<br>● Back in 2020, JET's assistance is limited to the review of SWM PPP Guide and projects of the three target LGUs.<br>● With the expanded partnership, JET confirmed that technical assistance will also be provided for other LGUs other than the 3 targets by the TCP. JET shall also provide Knowledge Sharing Sessions and capacity development for PPP Center employees and other implementing agencies.<br>● PPPC shall provide JET the pertinent materials on the WTE projects, along with the PPP Guide on Unsolicited Joint Venture WTE projects for LGUs to solicit technical feedback from JET. | ● Ms. Pausing clarified the extent of the consent to be solicited from the implementing agencies.<br>○ Ms. Padiernos clarified that this consent shall cover clarifying the extent by which JET will be involved, and the depth of information that shall be allowed to be shared with JET. In a nutshell, PPPC shall serve as a middleman to filter the inquiries and requests to JET, and the information requested from the involved agencies.<br>● Ms. Pausing also asked if a timeline has already been established on this expanded partnership.<br>○ Ms. Padiernos shared that the current timeline spans until Dec 2020, and that the more detailed work plan and schedules are still being | |

| | | | |
|---|---|---|---|
| | | settled between PPPC and JET. | |
| • Activity 2-7 Preparation of technical specifications for WtE in each of the target LGUs; and Confirmation of LGUs' needs (Mr. Takahiro Kamishita, Mr. Makoto Kosaka, JET) | ● Mr. Kamishita would like to confirm the needs of the LGUs with respect to Activity 2-7. Considering that confidentiality concerns and current progress on the WTE Projects make it difficult to share pertinent information with JET, especially for Quezon City, Cebu City, and Davao City, JET would like to know if JET may be able to support them through other means such as:<br>○ Technical specification<br>○ Tender support<br>○ Facility Plan<br>○ Engineering M/P<br>○ Monitoring Manual, etc | ● Engr. Madrazo of Davao City LGU shares that they are just waiting for DENR for the subsidy to be provided for their WTE Project. They are also waiting for DOF to give them instructions on how to proceed. Consultants have already sent the FS to DOF for their review.<br>○ Ms. Kamishita clarified on the next steps if DOF decides positively on the matter, if their LGU can already move to a tender with the technical specification formulated by the FS consultant team.<br>○ Engr. Madrazo mentions that DENR subsidy is still being requested at the moment.<br>● Engr. Sabater shares that they are still awaiting for DENR on further instructions and are also still waiting for further turnover from Mr. Vergara.<br>○ Engr. Sabater clarifies that since they are still new to this engagement, they are still in the learning and turnover process in coordination with Mr. Vergara.<br>○ Ms. Pausing proposes for PMO and JET to meet with the team of Engr. Sabater separately to clarify these matters and to orient them properly to the TCP. | ● [Cebu City LGU, Quezon City LGU] Confirm the needs of their respective LGU aligned to Activity 2-7.<br>● [PMO, JET, Quezon City LGU] Setup a separate meeting to clarify the official representatives of QC LGU to the TCP. |

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| 4.) Wrap-up, Required Actions, and Agreements | Ms. Andrei Mallare of JET wrapped up the earlier discussions and reiterated the arrangements and timelines as agreed:<br><br>● [JET] PMO requests for JET to provide further details on the lower calorific value for different material types, to be presented in the next subgroup meeting.<br><br>● [Cebu City LGU] Provide confirmation to the WTE Feedstock definition.<br><br>● [Cebu City LGU, Quezon City LGU] Confirm the needs of their respective LGU aligned to Activity 2-7.<br><br>● [PMO, JET, Quezon City LGU] Setup a separate meeting to clarify the official representatives of QC LGU to the TCP. | ● Ms. Pausing clarifies with Engr. Sabater if Mr. Vergara will be replaced by the team of Engr. Sabater, or if they will just serve as supplementary support to the TCP.<br>○ Engr. Sabater replies that turnover of assignment to the TCP to their office is already facilitated, but are still unsure if they will serve as the new point person or just supplementary to the team of Mr. Vergara.<br>○ He further mentions that only the MOU and Records of Discussions have been shared with them with regards to the TCP. | |
| 5.) Way forward, Schedule of the next meetings | ● Ms. Pausing announced that the schedule of the next OP2 Subgroup Meeting is on July 14, 2021. | | |

# 添付資料 11-4:
# 成果3サブグループ会議

11-4-1 : 1st SG3
11-4-2 : 2nd SG3
11-4-3 : 3rd SG3
11-4-4 : 4th SG3

# 添付資料 11-4:
# 成果3サブグループ会議

## 11-4-1 : 1st SG3

# NOTICE OF MEETING

TO : **ALL SUB-GROUP MEMBERS (PROJECT OUTPUT 3)**

**Selected Concerned Government Agencies**

Engr. Reynaldo Esguerra – DOST-ITDI
Ms. Letty Abella – DOE-ECCD

**EMB Regional Focal Persons**

Engr. Alma Ferrareza - EMB NCR
Mr. John Roy Kyamko - EMB Region VII
Ms. Socorro A. Mallari - EMB Region XI

**EMB Central Office**

Engr. Jundy T. Del Rosario – EMB-EQD- AQMS
Engr. Marcelino N. Rivera, Jr. - EMB-EQMD

**Project Output Coordinators**
Ms. Fatima Anneglo R. Molina – EMB- ERLSD
Engr. Nolan B. Francisco – EMB-SWMD
Ms. Elvira S. Pausing – EMB-SWMD
Mr. Takahiro Kamishita – JICA/JET
Mr. Satoshi Miyaichi – JICA JET

**All SWMD-PMO Staff**

FROM : **THE EMB DIRECTOR**

DATE/TIME/VENUE: **10 February 2020 (*Monday*)/ 2:00 PM/ EMB-AQMTC Bldg.**

SUBJECT : ***1st SUB-GROUP MEETING*: ENHANCEMENT OF THE NATIONAL GOVERNMENT'S CAPACITY OF ENVIRONMENTAL MONITORING FOR WTE PROJECT UNDER THE TECHNICAL COOPERATION PROJECT (TCP) RE CAPACITY DEVELOPMENT ON IMPROVING SOLID WASTE MANAGEMENT THROUGH ADVANCED/INNOVATIVE TECHNOLOGIES.**

**AGENDA:**

1. Call to Order/Objectives of the Meeting
2. Presentation/Introduction of Sub-group Members for Project Output 3
3. Presentation on the Outline of the Specific Activities under Project Output 3 including deliverables based from the Inception Report
4. Presentation and discussions on the following:
    a. Results of review of the current capacity and gap analysis in EMB Central and Regional offices
    b. Proposed activities based on the gap analysis
    c. Training Plan in Japan related to Dioxins and Furans in ambient air, emission gas, and Soil/Surface water/Sediments
    *d.* Proposed outline of the TCP Newsletter *(Sub-group members may provide proposals for the title of the Newsletter)*
    e. Capacity Assessment of Sub-group *members (Kindly fill up the attached checklist and send to the Secretariat via email (dimernelie@yahoo.com or deth25760945@gmail.com) by Friday 07 February 2020*)
5. Finalization of the Comments/Agreements/Timelines
6. Way Forward

Your participation/attendance is enjoined.

**ENGR. WILLIAM P. CUÑADO**

1st Sub Group Meeting for Output 3:

# Enhancement of The National Government's Capacity of Environmental Monitoring for WTE Project under The Technical Cooperation Project (TCP) for Capacity Development on Improving Solid Waste Management (SWM) through Advanced/Innovative Technologies

10th February 2020 (Monday) 2:00 p.m.

EMB-AQMTC Bldg.



## Agenda

1. Call to Order
2. Objectives of the Meeting
3. Presentation on the Outline of the Specific Activities under Project Output 3 including deliverables based on the Inception Report
4. Presentation and discussions on the following:
   a. Results of review of the current capacity and gap analysis in EMB Central and Regional offices
   b. Future activities based on the gap analysis
   c. Training Plan in Japan related to Dioxins and Furans in ambient air, emission gas, and Soil/Surface water/Sediments
   d. Proposed outline of the TCP Newsletter
   e. Capacity Assessment of Sub-group members
5. Finalization of the comments/agreements/Timelines
6. Way Forward



## 2. Objectives of the meeting

- **Inter-Agency Technical Working Group (ITWG) was created under EMB Special Order No. 2019-347**. The ITWG shall serve as core group to undertake important tasks such as providing technical and operational guidance to the project.
- **The ITWG members shall create sub-groups within the members of the ITWG that would take a lead in the implementation of the project on a per output basis.**

| Sub group | Objectives |
|---|---|
| Output 1 | The enhancement of National Project Government's capacity for supporting and coordinating of LGU's WTE project |
| Output 2 | The enhancement of Target LGUs' capacity for Planning, Evaluation, Formulation and Supervision of WTE project. |
| **Output 3** | **The enhancement of the National government's capacity of environmental monitoring for WTE project** |
| Output 4 | The enhancement of the National Governments and target LGUs' capacity to identify issues and provide suggestions/ recommendations for other SWM technologies other than WTE. |



## 2. Objectives of the meeting

- Members for Sub-Group for Output 3

| Agency/Office | | Members |
|---|---|---|
| Selected Concerned Government Agencies | DOST-Industrial Technology Development Institute | Engr. Reynaldo Esguerra |
| | DOE-Energy Cooperation and Coordination Division | Ms. Letty Abella |
| EMB Central Office | EMB-EQMD-Air Quality Management Section | Engr. Jundy T. Del Socorro |
| | EMB-Environmental Quality Management Division | Engr. Marcelino N. Rivera, Jr. |
| EMB Regional Office | EMB National Capital Region | Engr. Alma Ferrareza |
| | EMB Region VII | Mr. John Roy Kyamko |
| | EMB Region XI | Ms. Socorro A. Mallare |
| Project Output Coordinators | DENR-Foreign Assisted and Special Project Service | Director Angelito V. Fontanilla |
| | EMB- Environmental Research and Laboratory Services Division | Ms. Fatima Anneglo R. Molina |
| | EMB-Solid Waste Management Division/ Project Management Office | Engr. Nolan B. Francisco |
| | EMB-Solid Waste Management Division/ Project Management Office | Ms. Elvira S. Pausing |
| | JICA Experts Team | Mr. Takahiro Kamishita |
| | JICA Experts Team | Mr. Satoshi Miyaichi |

## 2. Objectives of the meeting

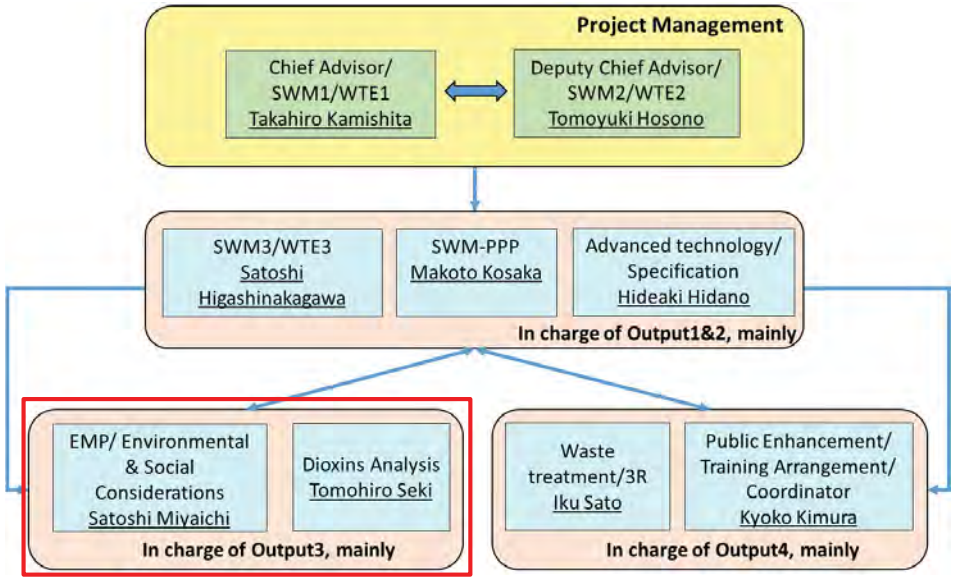
☐ Objectives of the meeting:

- **Kick-off** of the sub-group meeting
- **Share the specific activities** of Output 3
- **Explain/discuss the progress** of Output 3
  a. Results of review of the current capacity and gap analysis in EMB Central and Regional offices
  b. Future activities based on the gap analysis
  c. Training Plan in Japan related to Dioxins and Furans in ambient air, emission gas, and Soil/Surface water/Sediments
  d. Proposed outline of the TCP Newsletter
  e. Capacity Assessment of Sub-group members
- Others



## 3. Outline of the Specific Activities under Project Output 3

☐ Composition of the JICA Expert Team






## 3. Outline of the Specific Activities under Project Output 3

☐ Specific activities

3.1 **Review the current capacity/activities** for sampling/analysis/QA/QC of Dioxins and Furans (D&F)in ambient air, emission gas and other media (Soil/Surface water/Sediments) in Central and Regional EMB

3.2 **Analyze gap** between the present capacity of the central EMB and required capacity for proper sampling/analysis/QA/QC of D&F in ambient air, emission gas and other media (Soil/Surface water/Sediments) and **formulate the training plan**

3.3 **Prepare Standard Operation Procedures (SOP)** for sampling/analysis/QA/QC of D&F in **ambient air** and **emission gas**

3.4 **Conduct training of sampling/analysis/QA/QC** of D&F in **ambient air** and **emission gas** in central EMB

3.5 **Prepare Sampling Plan (Design)** for the collection of D&F in **ambient air**

3.6 **Implement sampling/analysis/QA/QC** of D&F in **ambient air** and **emission gas** by central EMB at existing SWM facilities based on SOP in output 3.3.



## 3. Outline of the Specific Activities under Project Output 3

☐ Schedule

| | 1st Year Mar/'19 - Mar/'20 | 2nd Year Apr/'20 - Mar/'21 | 3rd Year Apr/'21 - Mar/'22 |
|---|---|---|---|
| 3.1 | | | |
| 3.2 | | | |
| 3.3 | | | |
| 3.4 | | | |
| 3.5 | | | |
| 3.6 | | | |
| Main activity | • Formulating training plan based on the gap analysis | • Supporting preparation of the SOPs<br>• Training for sampling, analysis and QA/QC<br>• Supporting preparation of the sampling plan | • Supporting implementation of sampling, analysis and QA/QC<br>• Supporting modification of the SOPs |

☐ Deliverables

✓ Project report, Monitoring Sheet, SOP, Training reports

## 4.a. Results of review of the current capacity and gap analysis

- Current capacity was reviewed in terms of experiences, monitoring activities of compounds similar to D&F, sampling technique, quality management system, and organization & human resources.
- Gap analysis was conducted by comparing required capacity and current capacity at each monitoring process shown below:
  - ✓ Monitoring Planning
  - ✓ Sampling
  - ✓ Pretreatment
  - ✓ Analysis
  - ✓ QA/QC
  - ✓ Common items for monitoring(SOP, etc.)
  - ✓ Continuity of monitoring

- In summary, basic knowledge and technique which are required for D&F monitoring have already been acquired sufficiently. In fact, some training have already been started ahead of the schedule.



## 4.a. Results of review of the current capacity and gap analysis

- Key findings

Underline: identified gaps

**Monitoring Planning: Small gaps found, but not significant**

- Ambient air: Manual has been prepared. Periodical monitoring has been conducted, moreover monitoring for special events such as Pyro Olympic has been conducted based on the air quality simulation results.
- Emission gas: Manual has been prepared. Periodical monitoring has been conducted. Target facilities are identified clearly (Regulated by law or EIA type project)
- Water: Manual has been prepared. Periodical monitoring has been conducted.
- Sediment, Soil: Manual is now under preparation.



## 4.a. Results of review of the current capacity and gap analysis

- Key findings

**Sampling: Some gaps found, but not significant**

<Sampling>
- Ambient air: Similar type of samplers for D&F have been used for periodical monitoring of particulate matters such as PM and Lead by Regional offices, AQMS and ERLSD. Same type of samplers for D&F monitoring have been used for POPs monitoring by ERLSD, but not very often.
- Emission gas: Isokinetic sampling can be conducted by Regional offices and AQMS, moreover, Sampling Assessment Team is appointed by EMB Special Order No. 296/2018 and they can conduct Isokinetic sampling training. For ERLSD, sampling equipment for D&F has been procured but no experience of sampling. As of now, D&F samplings are conducted by accredited testers in Philippine.
- Water: Equipment already procured, sampling technique is same as POPs.
- Sediment, Soil: Manual is not prepared yet, but sampling technique is same as POPs.

<Transportation>
- Contamination control measures are not sufficient (not descried in the existing manuals).

<Storage>
- Storage room for D&F samples is prepared in ERLSD laboratory. Contamination control measures are not sufficient.



## 4.a. Results of review of the current capacity and gap analysis

- Key findings

**Pretreatment: Some gaps found**

<Conditioning capturing/adsorbent material>
- ERLSD has some experience of analysis of POPs, and methodology is similar to D&F. For preparation of capturing/adsorbent material for ambient air (PUF) and emission gas (XAD), ERLSD has experience but not enough.

<Extraction>
- Ambient air, Water, sediment and soil: ERLSD has basic operation technique by POPs analysis.
- Emission gas: No experience.
- Some equipment for D&F analysis (e.g. Automated Soxhlet Extractor) which has not been used in practical project yet.

<Cleanup>
- ERLSD has basic operation technique by POPs analysis.
- Some equipment for D&F analysis (e.g. Automated clean up system) which has not been used for practical project yet.

<Others>
- Some difficulties of acquiring organic solvent (dichloromethane: now applying for approval of import, nonane: no supplier in Philippine).

## 4.a. Results of review of the current capacity and gap analysis

☐ Key findings

**Analysis: Some significant gaps found**

<Operation of the GC/HRMS>

- Operation verifications of GC/HRMS has started since June 2019 but not finished yet. Before starting the training for D&F analysis, some verifications (calibration curve, detection limit, etc.) need to be done.
- DIOK (D&F analysis program) is very unique software, it will take some time to get used to it. It seems that the operation of the software controls/limits the operation verifications of the GC/HRMS.
- Experiences of operation/maintenance of the GC/HRMS are not enough.
- Now the GC can accommodate only one column, but the EPA method requires two types of column, so the lead time will be longer than the GC which has double column interface. (Column exchange will take almost one day)

<Others>

- ERLSD has a plan to analyze DL-PCBs in future (for research purpose) and standard solutions have already been procured. Samples of sediment or soil might contain high amount of DL-PCBs and they will behave as an interfering substance for D&F analysis, and affect the accuracy. Ideally, capacity of analysis of DL-PCBs also should be enhanced.



## 4.a. Results of review of the current capacity and gap analysis

☐ Key findings

**QA/QC: Some gaps found, but not significant**

☐ Internal QA/QC

<AQMS>

- Ambient air, emission gas: AQMS manages the calibration of sampler and measuring instruments. For calibrator of the stack sampler, it is not possible to receive the inspection which required in EPA method, in Philippine.

<ERLSD>

- Certified Reference Materials (CRM) of D&F have been procured for soil, clay loam and water. (water is for HRGC/MS/MS analysis)
- QA/QC for POPs analysis has been conducted appropriately, but since the D&F analysis hasn't been started, QA/QC method for D&F analysis hasn't developed yet.

☐ External QA/QC

<AQMS>

- All the stack sampling plans and results (conducted by accredited organization) are reviewed by AQMS and Regional office. Some of the samplings are conducted in the presence of staffs from AQMS and Regional office.

<ERLSD>

- Recognized laboratories must have an audit by ELRSD every year.



## 4.a. Results of review of the current capacity and gap analysis

☐ Key findings

**Common items for monitoring: Some gaps found, but not significant**

<Track records form>

- Emission gas sampling: Detailly defined in the Stack Testing Manual
- Ambient air sampling: Some of the track records are defined in the Air Quality Monitoring Manual, but not so detail as emission gas.
- Laboratory analysis: Track records for analysis are well managed by ERLSD, but since the D&F analysis hasn't been started, track records form for D&F analysis hasn't developed yet.

**SOPs: Some gaps found, but not significant**

- Emission gas sampling: There is no specific SOP for stack gas sampling, but procedures and track records are detailly described in the Stack Testing Manual.
- Ambient air sampling: There is no specific SOP for air quality sampling.
- Laboratory Analysis: Documentation management (preparation, review, approval) is appropriately conducted. For the existing SOP, sometimes descriptions are lacking in concreteness. As for the D&F analysis hasn't been started, SOPs for D&F analysis haven't developed yet.



## 4.a. Results of review of the current capacity and gap analysis

☐ Key findings

**Continuity of monitoring: Some gaps found**

<AQMS>

- Basically, stack samplings are conducted by the accredited organization. As of now, there are 3 to 4 accredited organization which can conduct D&F sampling (EPA method 23).
- Key technique for D&F is isokinetic sampling. EMB has some staffs who can conduct isokinetic sampling. (Sampling Assessment Team members can conduct training for isokinetic sampling)

<ERLSD>

- As of now, D&F analysis is conducted in abroad.
- In future, ERLSD will analyze D&F samples, whereas there is only one GC/HRMS. In case the GC/HRMS malfunction, lead time will be much longer.
- Organics laboratory unit in ERLSD will be in charge of D&F analysis. Ability of each staff is very high, but the number of staffs might not be sufficient if D&F monitoring started.

## 4.b. Future activities based on the gap analysis

- Training programs should be developed based on the result of the gap analysis.
- Though the gaps are not so many, some of them are significant or not negligible:

<Significant Gaps>

- Handling the GC/HRMS (Operation and inspection of GC/HRMS, Operation of DIOK software)

<Gaps (not negligible)>

- Pretreatment (especially for D&F-specific technique)
- Monitoring continuity

- Trainings for filling the gaps above mentioned should be enhanced.

- JET would like to **prioritize the training for ERLSD, especially for practical aspects of D&F pretreatment and analysis**.
- For sampling technique, most of the key issues can be handled by internal training in EMB, with AQMS cooperation. (Of course, JET will provide knowledge and experience of Japan.)



## 4.b. Future activities based on the gap analysis

- Just for the information, some training/advice have started ahead of the schedule.

◆ **GC/HRMS operation verification**

According to analysis result of standard solutions, JET found some problems that necessary to be solved:

- Changing calibration range to lower than the requirement of EPA method [essential]
- Reducing the amount of PFK introduced into HRMS [essential]
- Setting m/z for 37Cl-T4CDD [essential]
- Shortening the sampling time for some congeners as long as detection limits are satisfied [recommended]

◆ **GC/HRMS troubleshooting**

When the mass resolution power became lower than the required value, JET identified the problem was caused by the filament of HRMS that was newly exchanged. JET provided some notes for exchanging a filament of HRMS.

◆ **Introducing regulation values for sediments**

JET provided standard values for bottom sediments in Japan.

- Environmental standards (2002)
- Provisional removal standards (1975)
- Judgement criteria for land reclamation (1973)



## 4.b. Future activities based on the gap analysis

- Just for the information, some training/advice have started ahead of the schedule.

◆ **Recommendations for D&F analysis rooms and equipment**

JET provide some recommendations for ERLSD laboratory based on the inspection/ interview:

- Air ventilation system: Air intake facility is necessary for the rooms which have draft chamber
- Exhaust gas treatment system: Effluent from the exhaust gas treatment device should be separately collected from rainwater.
- Sample storage room: Ambient air samples (PUF) shouldn't be stored in the sample storage/ preparatory room, they should be stored in the cleanup room for low concentration samples.
- HRMS room: Creating the separate space (such as ante room) in front of the door on the HRMS room, and installing air conditioner and dehumidifier.
- Stack gas sampler: Especially for the nozzle, collection tube and the filter paper holder should be used separatory for high concentration samples.
- GC/HRMS: If double column GC interface is procured and installed, efficiency of the analysis will be higher and running cost will be cheaper. In case of GC/HRMS malfunction, another GC/HRMS is necessary if all the D&F samples will be analyzed in Philippine.



## 4.c. Training Plan in Japan related to Dioxins and Furans

- Tentatively scheduled **24th May (Sun) to 6th June (Sat): two weeks** including travel days
  - Curriculum for SWM/WTE and Dioxin monitoring are planned.
  - Number of attendees from EMB is expected within 15 in total, **ERLSD staffs are about 3** among them.
  - Out of 10 days training, **5.5 days will be allocated for dioxin-specific curriculum**:

| Component | Term | Contents |
|---|---|---|
| National level | 1 day | Dioxins management and researches at national level |
| | 0.5 day | Dioxins analysis certification system |
| Local government level | 1 day | Dioxins management and researches at local government level |
| Private lab. level | 3 days | 1 day for explaining outline of the lab. and QMS<br>2 days for analysis (including practical training) |

- Especially for the private lab. level training programs, specific requests are welcomed. Please inform us as soon as possible.

## 4.d. Proposed outline of the TCP Newsletter

Newsletter on this project will be published twice a year for the following purposes:

- To disseminate and share the progress of the project
- To share the products of the project (such as manuals)

The Newsletter will be published on the website and distributed at the related events.

| | | Page | Writer | deadline |
|---|---|---|---|---|
| | Cover | 1 | JET | |
| 1 | Greeting | 1 | - | - |
| 1.1 | Greeting from EMB | 0.5 | EMB | 21th-Feb.2020 |
| 1.2 | Greeting from JET | 0.5 | JET | 21th-Feb.2020 |
| 2 | Outline of SWM-AIT Project | 5 | - | - |
| 2.1 | About SWM-AIT Project | 0.4 | PMO | 21th-Feb.2020 |
| 2.2 | About TCP | 0.4 | JICA | 21th-Feb.2020 |
| 2.3 | PDM | 0.2 | JET | 21th-Feb.2020 |
| (1) | Output 1 | 1 | Sub-Group1 | 25th-Feb.2020 |
| (2) | Output 2 | 1 | Sub-Group2 | 25th-Feb.2020 |
| (3) | Output 3 | 1 | Sub-Group3 | 25th-Feb.2020 |
| (4) | Output 4 | 1 | Sub-Group4 | 25th-Feb.2020 |
| 3 | The Menber of SWM-AIT Project | 1 | JET | 21th-Feb.2020 |
| 3.1 | Organization Chart | | - | |
| (1) | JCC | | - | |
| (2) | Project Team | | - | |
| (3) | ITWG | | - | |
| (4) | JICA Expert Team | | - | |
| | TOTAL | 8 | | |

- Allocated 1 page
- Deadline: 25th Feb



## 4.d. Proposed outline of the TCP Newsletter

☐ What topics are eligible for the 1st newsletter???

- About Dioxins and Furans
  - ✓ What is Dioxin?
  - ✓ Necessity of appropriate monitoring
- Introduction of AQMS
  - ✓ Isokinetic sampling
- Introduction of ERLSD (about renovated laboratory)
  - ✓ How to analyze Dioxin
  - ✓ Renovated laboratory



## 4.e. Capacity Assessment of Sub-group members

| No. | Capacity to be Developed | Related Activity |
|---|---|---|
| Q3-1 | Member of ITWG subgroup for output3 understands its current capacity on dioxins & furans analysis in the central and regional EMB. | Activity 3-1 |
| Q3-2 | Member of ITWG subgroup for output3 can identify gaps between current and required capacity on dioxins & furans analysis in the central EMB. | Activity 3-2 |
| Q3-3 | Member of ITWG subgroup for output3 can formulate training program on dioxins & furans analysis in ambient air and emission gas for staff in the central laboratory of EMB based on the capacity gap analysis. | Activity 3-2 |
| Q3-4 | Member of ITWG subgroup for output3 can prepare SOP for sampling, analysis and QA/QC of dioxins & furans in ambient air and emission gas. | Activity 3-3 |
| Q3-5 | Staffs in the DENR-EMB (AQMS and ERLSD) receive training on dioxins & furans sampling & analysis in ambient air and emission gas. | Activity 3-4 |
| Q3-6 | DENR-EMB can formulate sampling plan (design) on dioxins & furans in ambient air. | Activity 3-5 |
| Q3-7 | DENR-EMB implements sampling, analysis and QA/AC of dioxins & furans in ambient air and emission gas in compliance with the SOPs. | Activity 3-6 |
| Q3-8 | DENR-EMB has a capacity to conduct analysis and QA/AC of dioxins & furans (including matrices other than ambient air and emission gas) 300 samples per year. | Activity 3-6 |



## 5. Finalization of the comments/agreements/Timelines

## 6. Way Forward

Schedule of ITWG and sub-group meeting for output 3 is tentatively agreed with PMO:

☐ ITWG
- 23rd April, 16th July, 16th September

☐ Sub-group meeting for output 3
- 14th May, 8th Oct

添付資料11

**Meeting Record**

| | |
|---|---|
| Title | Meeting with Subgroup Members for Project Output 3 |
| Date and Time | 2:10 PM, February 10, 2020 |
| Place/Venue | Environmental Planning and Policy Division (EPPD) Building, Department of Environment and Natural Resources Compound, Visayas Avenue, Diliman, Quezon City, 1101 Metro Manila |
| Organizer | JICA Expert Team, PMO (DENR EMB-SWMD), DENR EMB-ERLSD |
| Participants (name & title) | **Selected Government Agencies**<br>[DOST/ITDI/ERD]<br>Engr. Reynaldo T. Esguerra, Chief SRS<br><br>[DOE/EPPB/ECCD/ECCS]<br>Ms. Letty G. Abellla, Senior SRS<br><br>**EMB Regional Offices**<br>[DENR/EMB NCR]<br>Ms. Alma P. Ferareza, Senior EMS<br><br>[DENR-EMB VII]<br>Ms. Angelli Marie Jacynth Egar, EMS I<br><br>[DENR-EMB XI]<br>Ms. Maria Socorro A. Mallare, Supervising EMS<br><br>[FASPS/PMD]<br>Ms. Marianica Philina Obmerga, PEO<br><br>**EMB Central Office**<br>[DENR-EMB Central/EQMD/AQMS]<br>Ms. Wyona Kay C. Rativo, EMS II<br>Engr. Manuel Martin C. Escasura, Engineer II<br><br>[DENR/EMB/ERLSD]<br>Mr. Roger C. Evangelista Jr., SRS II<br><br>[DENR-EMB SWMD/PMO]<br>Ms. Elvira S. Pausing, Supervising EMS<br>Ms. Rodeth F. Antonio, MO<br>Ms. Nelie A. Dimer, EMS II<br><br>**JICA Expert Team**<br>Mr. Takahiro Kamishita, Chief Advisor<br>Mr. Satoshi Miyaichi, Environmental Monitoring/Environmental & Social Considerations<br>Mr. Eric Cea, Project Secretary<br>Ms. Cynthia Rose C. Faylogna, Project Assistant |
| Main contents of the meeting | The meeting started at 2:10 PM with Ms. Elvira S. Pausing discussing the meeting agenda prepared by the EMB-SWMD in coordination with JET. She then asked the members of the Subgroup for any additional comments and other matters which may be included in the discussions. Engr. Esguerra of DOST moved for the adoption of the agenda with no additional topics to be discussed and seconded by Ms. Ma. Socorro Mallare of EMB-XI. |

**1.Presentation/Introduction of Subgroup and Specific Activities**

Ms. Pausing of EMB-SWMD-PMO introduced the members of the Subgroup and then the members of the PMO while Mr. Takahiro Kamishita introduced the JET members.

Mr. Satoshi Miyaichi of JET presented the outline of the specific activities under Project Output 3 including deliverables.

**2.Discussions**

The following discussions took place during the meeting.

***a. Results and review of the current capacity and gap analysis in EMB Central and Regional offices***

- Ms. Pausing inquired about the recommendations from DOST regarding the expansion of the coverage for the analysis of dioxins and furans.
  - Engr. Reynaldo Esguerra of DOST recommended to include other potential sources of dioxins (e.g. biota) to be analyzed.
- Ms. Letty Abellla of DOE inquired about the manuals on how to monitor dioxins and furans.
  - Mr. Miyaichi assured to provide information on how to analyze the dioxins for other matrices at the training in Japan.
- Engr. Esguerra of DOST suggested that there should be an establishment of the tolerable daily intake of dioxin in the Philippines.
  - Mr. Miyaichi explained that the Capacity of the EMB-Laboratory is essential for this.
- Engr. Esguerra of DOST asked if the equipment for the analysis is to be provided as a part of the entire project.
  - Mr. Miyaichi clarified that the central laboratory has one and JICA will not provide any equipment under this project.

***b. Proposed activities based on gap analysis***

The following were discussed based on gap analysis:

1. *Sampling and Analysis Composition*
   - Engr. Esguerra of DOST emphasized that there was a project in preparing or deriving the emission factor from open burning. The project was supposedly to be implemented, however, there were no bidders for the project. He continued to clarify if the analysis will be a combination of ambient air and emission sampling.
     - Mr. Miyaichi of JET affirmed to this.
   - Engr. Esguerra of DOST also highlighted the contribution of open burning as a major source of dioxins and furans, and the EMB-ERLSD's role in Dioxins and Furans Analysis for Proficiency Testing.
     - No further objections had been made, hence, the statement was accepted.

2. *Trainings for EMB-Regional Laboratory personnel*
   - Ms. Ma. Soccoro Mallare of EMB-XI inquired if the Regional Offices' Capacity was reviewed. She highlighted that since the three regions will be dealing with the WTE Project in the future, the capacity must also be evaluated (not only in the Central Office).
     - Mr. Miyaichi of JET explained that sampling will be done by both central and regional offices, and the analysis of the samples will be done solely by the Central laboratory.
   - Ms. Mallare of EMB-XI asked if the samples will be transported to the Central laboratory for testing or analysis. The JET affirmed to this.

| | |
|---|---|
| | • Mr. Takahiro Kamishita of JET explained that some steps should be undertaken by EMB for training. In this project, the trainings be focused on the central EMB and will be conducted in the central laboratory. In the future after this project, trainings will be initiated by EMB central for the regional offices' laboratory personnel.<br>➢ Ms. Mallare of EMB-XI emphasized that there were no such trainings conducted by the Central to the Regional Offices.<br>• Mr. Evangelista of EMB-ERLSD clarified that trainings have been conducted by the central laboratory to the regional laboratories every year. The trainings include extraction, analysis, etc.<br>➢ Ms. Mallare of EMB-XI inquired if there were examinations for the trainees' evaluation after the seminar/training.<br>• EMB-ERLSD accepted the recommendation to have examinations after the training, so as to evaluate the skills and knowledge that were transferred during the said activity.<br><br>*3. Capacity of EMB-Central and EMB-Regional laboratories*<br>➢ Engr. Esguerra of DOST inquired if there is a plan to have laboratories on all the EMB-regional offices.<br>• Mr. Roger Evangelista of EMB-ERLSD mentioned that there is no available testing for organic pollutants yet.<br>➢ Ms. Mallare queried if there is a possibility of the re-establishment of the Center of Excellence.<br>• Mr. Evangelista responded that the plans in reviving the Center of Excellence per region is still yet to be capacitated. For dioxins, it is mainly for the central laboratory for now since the equipment and capacity is readily available only in the central laboratory.<br>➢ Ms. Pausing inquired about the status of the regional laboratory for the equipment needed for the analysis of the dioxins and furans.<br>• Mr. Evangelista clarified that EMB-VII submitted a proposal for the budget to the DENR for the laboratory equipment. He emphasized that there is a goal in capacitating everyone in the laboratory.<br><br>*4. Transporting of samples from Regional to Central laboratories*<br>➢ Ms. Mallare was concerned about the transporting of the samples. She believed that since the three regions will be having the WTE facility, it will be practical that the samples will be analyzed on the host region.<br>• Engr. Esguerra suggested that it should be a step by step process, however, if the region could support itself so it will be good to procure such equipment for analysis.<br>➢ Ms. Mallare said that it would be better if the plan will include the monitoring of the progress of the projects.<br>• Engr. Esguerra agreed to this and clarified that all the money that will be paid to DOST will be transferred to the National Treasury.<br>➢ Engr. Esguerra also explained that the budgets had been included in the yearly expenses, and there is no supplier yet for such kind of equipment.<br>• Mr. Evangelista raised the issue on rare manufacturing for such kind of equipment. He was also concerned that if all the regional offices will be provided but cannot be sustained in the future, then it will just be wasted.<br><br>*5. Central Laboratory Capacity for the Analysis of Samples* |

| | |
|---|---|
| | ➢ Ms. Pausing inquired if there is a specific recommendation for the analysis.<br>• Mr. Miyaichi emphasized that the team provided some comments and recommendations to the laboratory and will further continue to comment based on the JET's evaluation on the progress.<br>➢ Engr. Esguerra inquired about the status of the Physical Rearrangement of the laboratory.<br>• Mr. Miyaichi explained that the laboratory layout is good but some modifications were necessary.<br>➢ Mr. Evangelista explained that such recommendations made by JET have already been undertaken. The equipment needed are already in the procurement stage, and it will be operating 24/7.<br>• Ms. Abellla highlighted that a third party will be required to analyze the samples apart from EMB-Central Laboratory, and inquired about the participants for the training in Japan.<br><br>***c. Training Plan in Japan related to Dioxins and Furans in ambient air, emission gas, and Soil/Surface water/Sediments***<br>The scope of the training was presented by Mr. Miyaichi of JET. The discussions and agreements for the training were the following.<br>➢ Ms. Mallare asked if the LGU concerned will be included and emphasized that for the WTE Project in Davao, LGUs have been attending countless of trainings in Japan already; so, she recommended to send trainees from outside of the LGU.<br>• Ms. Abellla however explained that LGUs need to attend also because of the policy side. Such formulations of policies will soon be needed for the full implementation of the project.<br>➢ Mr. Kamishita suggested that the LGU and National Government can share the experience of training in Japan and discuss the WTE Project in the Philippines.<br>➢ Since there were no questions and additional suggestions on the scope of the training, the presented scope will be adopted.<br><br>***d. Proposed Outline of the TCP Newsletter (Sub-group members may provide proposals for the title of the Newsletter)***<br>➢ The Outline of the Newspaper was presented by Mr. Miyaichi, and Engr. Esguerra inquired who will be the target readers of the Newsletter.<br>• Mr. Miyaichi responded that the General Public will be the target readers.<br>➢ The following members of Subgroup for Output 3 had been assigned as writers per specific topic:<br><br>• DOST-Engr. Reynaldo Esguerra<br>o About Dioxins and Furans<br>▪ What is Dioxin?<br>▪ Necessity of appropriate monitoring<br><br>• AQMS-Ms. Wyona Kay C. Rativo<br>o Introduction of AQMS<br>o Isokinetic sampling<br><br>• ERLSD-Mr. Roger C. Evangelista Jr.<br>o Introduction of ERLSD (about the renovated laboratory) |

| | |
|---|---|
| | o How to analyze Dioxin<br>o Renovated laboratory<br><br>***e. Capacity Assessment of Sub-group members***<br>➢ The checklist/questionnaire was presented by JET for the members of the subgroup to answer. Some of the members submitted it during the meeting and the remaining agreed to send it via email.<br><br>**3. Finalization of the Comments/Agreements/Timelines**<br>There were no objections on the agreements, and the schedules for the submission of the required documents were declared final.<br><br>**4. Ways Forward**<br>The submission of the checklist for Capacity Assessment shall be on Wednesday (12th of February 2020).<br><br>**Adjournment**<br>With no other important matters to discuss, the meeting was adjourned at 4:00 PM. |
| Request by JET | • Submission of filled-up Capacity Assessment Evaluation sheet |
| Request by Subgroup Output 3 | • Continuous support from the JET for the evaluation. |
| References / Materials Presented | • Notice of Meeting prepared by PMO<br>• Meeting materials presented by JET |
| Prepared by | Ms. Cynthia Rose C. Faylogna |
| Reviewed by | **Elvira S. Pausing**<br>Assistant Project Manager, SWMD-PMO<br><br>**Takahiro Kamishita**<br>Chief Advisor, JET |
| Noted by | **Engr. Nolan B. Francisco**<br>OIC-Chief, SWMD |

# 添付資料 11-4:
# 成果3サブグループ会議

## 11-4-2 : 2nd SG3

Department of Environment and Natural Resources
ENVIRONMENTAL MANAGEMENT BUREAU
DENR Compound, Visayas Avenue, Diliman, Quezon City 1116
Tel.Nos. (632)927-1517; 928-3725; Fax No.(632)920-2258
Website: www.emb.gov.ph Email: recordsco@emb.gov.ph



# NOTICE OF MEETING

TO : **ALL DESIGNATED SUB-GROUP MEMBERS FOR PROJECT OUTPUT 3**

FROM : **THE DIRECTOR**
Environmental Management Bureau

SUBJECT : **2nd SUB-GROUP MEETING FOR PROJECT OUTPUT 3:** *Enhancement of The National Government's Capacity of Environmental Monitoring for WTE Project under the Technical Cooperation Project (TCP) for Capacity Development on Improving Solid Waste Management (SWM) through Advanced/Innovative Technologies*

DATE/TIME : **31 May 2021, Monday, 9:00 AM (*via MS Teams*)**

AGENDA :

1. Call to Order/ Meeting Objectives/ Acknowledgement of Participants *by SWMD-PMO*
2. Summary of discussions during the last meeting *by JET*
3. Presentations and discussions:
   a. Implementation updates/Progress of activities under Project Output 3 *by JET*
   b. Daily inspection and troubleshooting of the GC/HRMS *by JET*
   c. GC/HRMS operation verification *by EMB-ERLSD*
4. Wrap-up/ Required Actions by *Ms. Andrei Mallare, JET*
5. Other Matters

Your attendance/participation is enjoined.

**ENGR. WILLIAM P. CUÑADO**

# 2nd Subgroup Meeting
for

## Output 3: Enhancement of the National government's capacity of environmental monitoring for WTE project

31st May 2021

The Technical Cooperation Project (TCP) for Capacity Development on Improving Solid Waste Management (SWM) through Advanced/Innovative Technologies



## Contents





## Progress of OP3

| Activity | Contents | Status |
|---|---|---|
| 3-1 | Review of the current capacity and activities in central and regional EMB | Done |
| 3-2 | Analyze gap between the present capacity of the central EMB laboratory and required capacity and formulating training plans | Done, but the training plans are subject to be modified based on the progress. |
| 3-3 | Prepare Standard Operation Procedures (SOP) | Ongoing |
| 3-4 | Conduct training of sampling, analysis and QA/QC of Dioxins and Furans | Ongoing |
| 3-5 | Prepare Sampling Plan (Design) for ambient air samples | To be started |
| 3-6 | Implement sampling, analysis and QA/QC of Dioxins and Furans | To be started |

Continue to next slide



## Progress of OP3

Activities 3-3：Prepare Standard Operation Procedures (SOP)

- Current situation
  - ✓ ERLSD has drafted the SOPs for stationary sources (EPA method 23) and ambient air (EPA TO-09).
  - ✓ The draft SOPs were already shared with JET in May, and JET is now reviewing.
- Next step
  - ✓ After JET review the SOP for stationary sources, JET will send comments/findings to ERLSD, then ERLSD will finalize it. ERLSD and JET will have meetings if necessary.
  - ✓ As for SOP for ambient air, ERLSD will finalize based on the above activity.

添付資料11

## Progress of OP3

Activities 3-4：Conduct training of sampling, analysis and QA/QC of Dioxins and Furans

- Current situation

<Sampling>

✓ JET requested AQMS to provide some documents to make the training plan more concrete.

✓ AQMS is arranging the requested documents.

<Analysis and QA/QC>

✓ Before starting the training of target matrices (ambient air and stack gas) analysis, GC/HRMS operation verification is necessary. Due to several reasons such as difficulties in operating dedicated software and inexperience of local service provider, it took a while to accomplish the operation verification.

✓ Recently ELRSD has successed to complete some verification tests.



## Progress of OP3

- Next step

<Sampling>

✓ JET will make some recommendations for ERLSD regarding the preparation of sampling materials especially in terms of contamination control.

✓ JET will make some recommendations for AQMS if there is anything to be modified in the provided documents.

<Analysis>

✓ ERLSD will share the results with JET, and JET will review. If necessary, JET will make some recommendations based on Japanese experience.



## Reference Information: Steps for Introducing D/F Analysis

<Verification for GC/HRMS installation>

✓ Mass resolution test

✓ Standard solutions analysis test

<Verification for analysis method development>

✓ GC column performance test

✓ Initial Demonstration: Method blank, Detection limit, Precision and Recovery, Certified Reference Material analysis, etc.

- Ongoing QC Requirements (below items) should also be examined in this stage

<Ongoing QC Requirements>

✓ Implementation of routine QA/QC standards: Recovery of surrogates, Lock-mass stability, Ion abundance ratio, Field blanks, Duplicate test, QC check sample analysis, etc.

# GC-HRMS Tuning Procedure
# &
# Trouble Shooting

2021.5

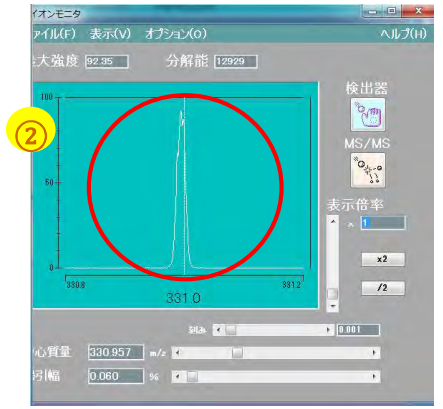
www.eurofins.com

## Contents



## GC-HRMS Tuning Procedure

## 1. Precautions to perform Auto Tuning (1)


① The following function can be opened from MS Controller Menu

- i Auto Tuning Dialog
- ii Mode Controller
- iii Ion Source Controller
- iv Lens Controller
- v Analyzer Controller
- vi Detector Controller
- vii Ion Monitor

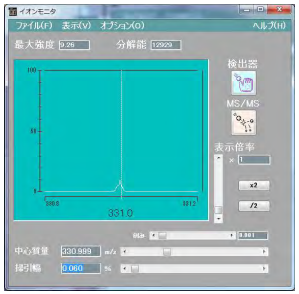
② While checking the ion monitor, adjust with the PFK valve so that the PFK peak does not saturate.

添付資料11

## ※ Precaution for PFK introduction valve


The structure of the PFK introduction valve is a **"needle valve".**

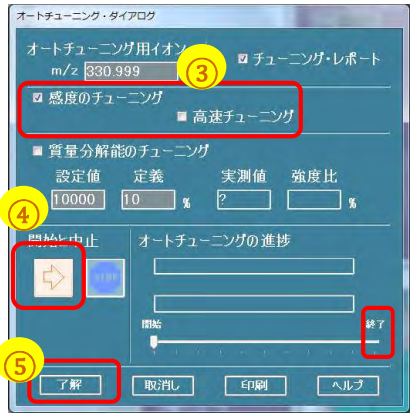
So that the amount of PFK cannot be reduced to zero.



**※ Be careful!**

**Not to overtighten and break**

## 1. Precautions to perform Auto Tuning (2)




Perform Full Auto Tuning for sensitivity

③ Check "Sensitivity tuning" and uncheck "High-speed tuning"

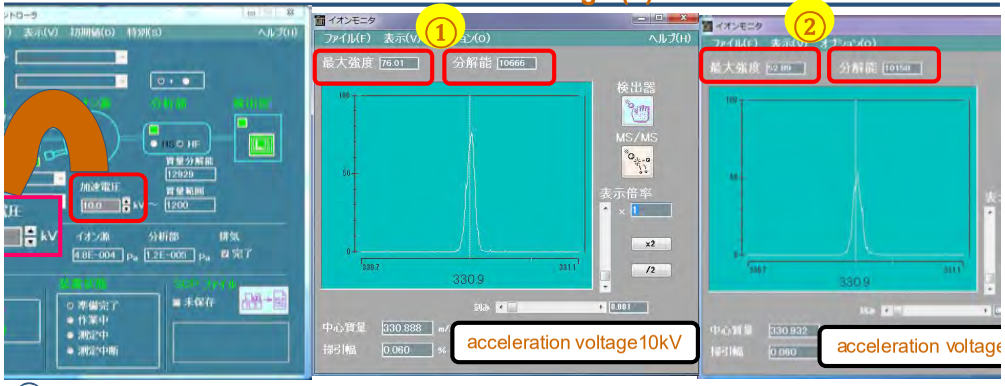
④ Click to start Tuning

⑤ Click OK when "Auto Tuning Progress" is complete

**Basically utilize full tuning!**

Because of "High-speed tuning" omits the some parameters, it should be done the second time or later, and it should be used properly as needed. When performing "High-speed tuning", do not remove the "Check" at ③ above.

## 2. Confirmation of resolution due to difference acceleration voltage. Confirmation of ion strength ratio due to difference acceleration voltage (1)




① After Auto Tuning, confirm that the resolution on the ion monitor is 10,000 or more.

※ if the resolution is less than 10000, resolution will not be satisfied during peak adjustment. Therefor perform Tuning again or manually change the parameters of the lens.

② Change the acceleration voltage on the "mode controller" to 7.5kV and check the resolution is 10,000 or more. In addition, ion strength is compared with ion strength at 10kV. We adjust the strength ratio to be about 10: 7.5.

## 2. Confirmation of resolution due to difference acceleration voltage. Confirmation of ion strength ratio due to difference acceleration voltage (2)

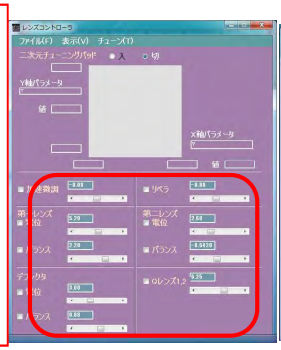
※If the resolution is less than 10000, resolution will not be satisfied during peak adjustment. Therefor to perform Tuning again or to adjust manually change the parameters of the lens.

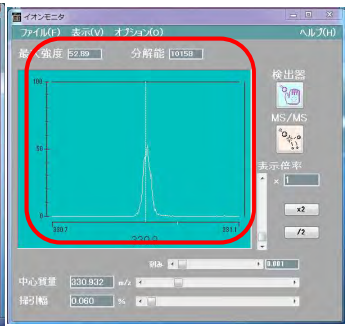
※Therefore, it is advisable to take screenshots of daily lens parameters and save them as the records.

※If the ionic strength ratio is extremely low at an acceleration voltage of 7.5 kV, adjustment is required. If adjustment cant be succeed, adjust the "Focus" as a last resort. However, since it is not a place to be adjusted frequently, it is better to make final adjustments after removing other causes.

**How to adjust the lens manually**

Manually adjust the parameters of each lens by moving the lens controller while checking the resolution and ion intensity ratio of the ion monitor.






添付資料11

## 2. Confirmation of resolution due to difference acceleration voltage. Confirmation of ion strength ratio due to difference acceleration voltage (3)

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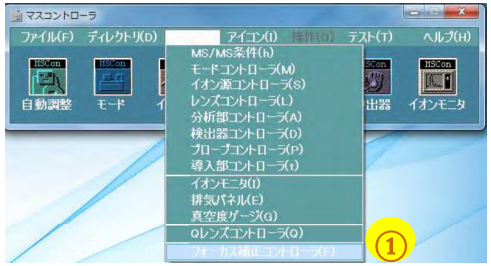
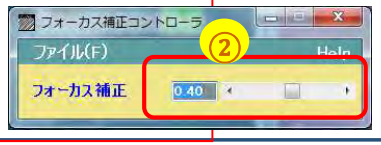
●How to adjust the Focus

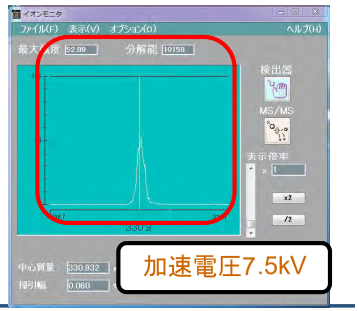
① From the mass controller menu, open "View" menu ⇒ select "Focus correction controller"

② Set the acceleration voltage to 7.5kV and adjust the lens settings so that the resolution is 10000 or higher and the peak intensity is maximized.

Then, alternately switch the acceleration voltage to 10kV and adjust so that the intensity ratio is appropriate.




## 3. Mass calibration by using PFK (1)

eurofins

①While looking at the ion monitor, adjust the PFK valve so that the peak intensity is approximately 50%.

②From DAWin Work manager menu, select

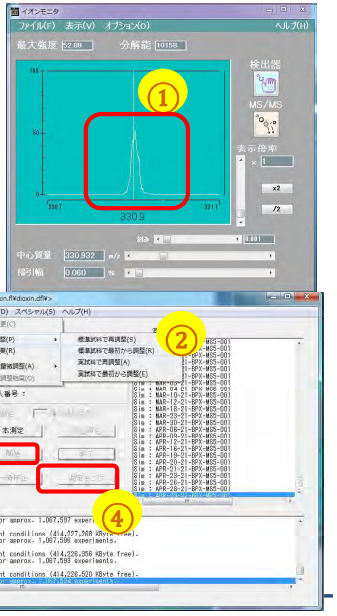
⇒Works(W)

⇒Precision adjustment SIM mass(P)

⇒Recalibrate from beginning with standard(R)

③Click "Start"

④Click "Measurement Monitor" to Display monitor screen.




## 3. Mass calibration by using PFK (2)

eurofins

⑤While peak adjustment is being performed, check the following ⑥ and ⑦ while watching the measurement monitor.

And make fine adjustments if needed.

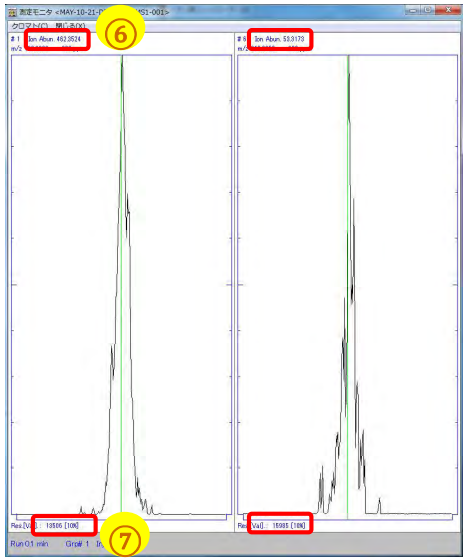
⑥Check if "Ion Abun" is not saturated (upper limit 1600). If saturated, adjust the PFK valve.

⑦Check the resolution dynamically.

※If it is under 10,000, following adjustment should be done.

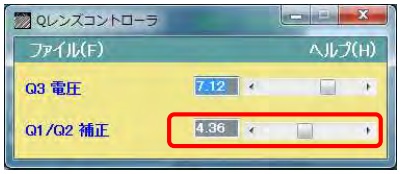
- Fine adjustment of lens controller 1 and 2
- Fine adjustment of Q-lens controller Q1/Q2

(Refer next slide …)




## 3. Mass calibration by using PFK (3)

eurofins



**How to open the Q-lens controller**

From "Mode controller" menu, Select

⇒View(V)

⇒ Q-lens controller (Q)

## 3. Mass calibration by using PFK (4)

eurofins

⑧ Check the Mass Calibration Results from DAWin Work Manager menu as follows.

Select “Work (W)”

⇒ Select “Precision adjustment SIM mass(P) “

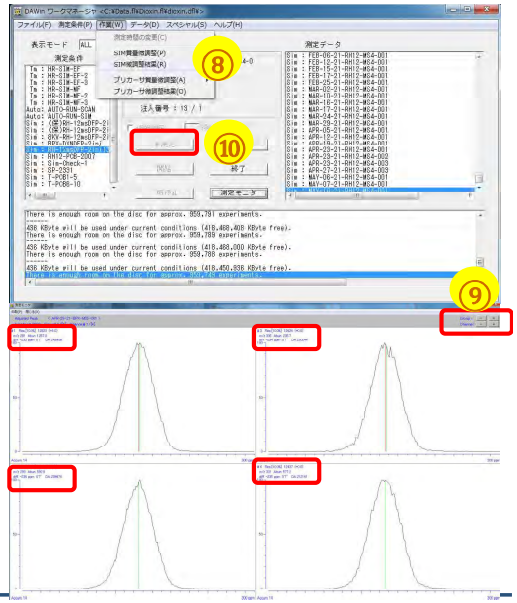
And Mass Calibration Results will be displayed

⑨ Confirm that all groups / channels are satisfied the following criteria.

- Res[10.0%] is more than 10000
- Abun is not saturated
- diff ⇒The other peaks should not be assigned

※If these are not satisfied, Repeat calibration again

⑩ If everything is okay, click “Measure" to finish the calibration.




## 4. Examples of screen shot pictures for Daily check as a “Record”

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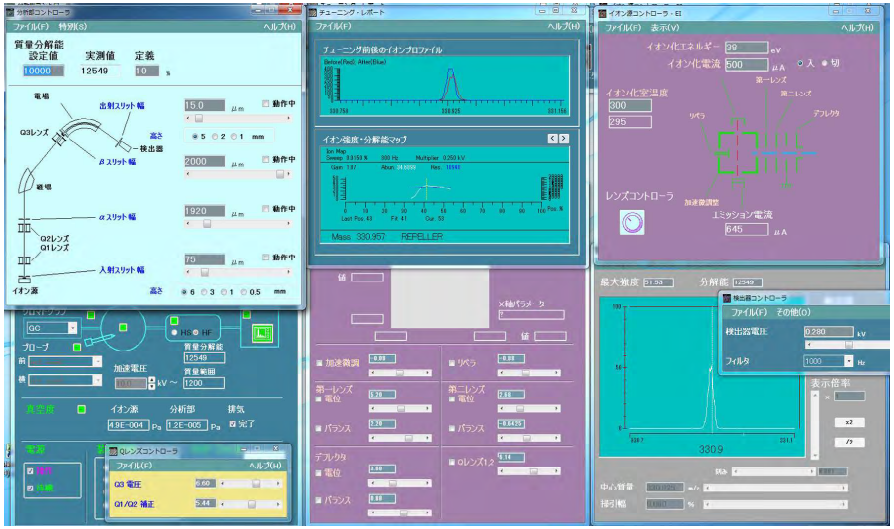
As an example, it is advisable to keep a record as follows.



it is on the back of the box

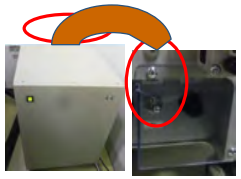
## Others. Counter-measure for PC freezes

eurofins

Sometimes the PC screen freezes due to heavy traffic.
In such a case, restart as follows.


① Click the "AbortMSsystem" icon to forcibly terminate the running application.

② Shut down the PC



③ Turn off the data system main power supply
(It is on the back of the box ⇒See the photo)

④ After a while, turn on the main power of the data system.


⑤ Re-Start the PC

⑥ Click the "Initialize APU" icon to initialize

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# Common Troubles and Causes

## Case 1.
## Ratio rate of Ion strengths is not matched or Poor resolution

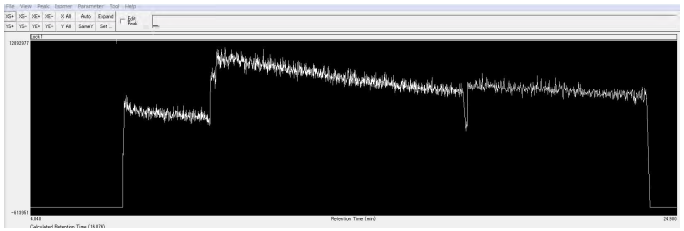
eurofins

### Possible Causes

- The ion source is dirty
- Malfunction of filament
- Effect of interference peak caused by sample matrix
- Accumulation of metal powder due to wear of isolation valve
- Incorrect Adjustment of split position
- Main slit is dirty

## Case 2.
## Large Fluctuates of Lock Mass

eurofins



### Possible Causes

- Malfunction of Filament
- Contamination of interfering components
- Leakage of connector
- Air leaking in the PFK introduction part
- Incorrect column tip position of the ion source (It is too long)
- Deterioration of seal in PFK valve
- Contamination of PFK itself

## Case 3.
## Large difference in RRcs or/and RRrs

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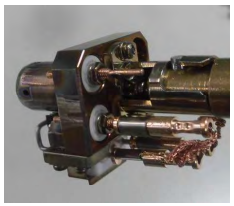
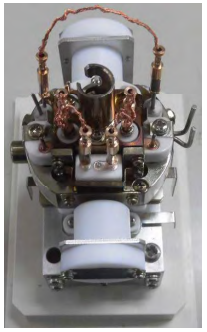
- Ion source is dirty
- Injection-related parts are dirty
- Tuning is not performed properly
- Filament failure
- Deterioration of column
- Distortion of ion source parts





* Statistical trend management is important for RRcs and RRrs.
Routinely comparing records with past values helps find the cause.

- Changes in RRrs of # 189 and # 167 ⇒ Column deterioration
- High RRrs of HxCDD and HxCDF ⇒ Column and filament deterioration

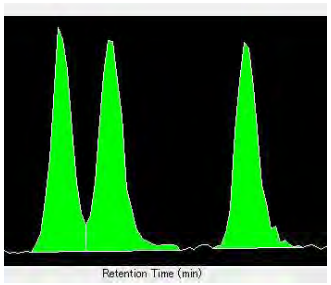
## Case 4.
## Sensitivity become low

eurofins

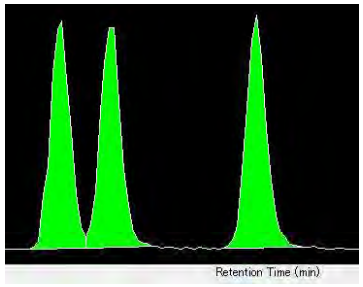
- Deterioration of column
- Carrier gas leakage (ex septum, connector, ferrule)
- Deterioration of filament
- Liner and gold-plated seal are dirty
- The cut surface of the column is not at a right angle
- The position of the column tip in the ionization chamber is not appropriate.
- The injection amount of GC-MS is set incorrectly.
- The syringe has deteriorated and the proper amount of sample solution cannot be injected (the movement of the plunger is stiff).
- Settings of Slit, lens, voltage, etc. are not reflected to the MS side
- The direction of the magnet of the ion source is reversed
- The set temperature has not been reached (The settings changed during maintenance have not been restored.)

## Case 5.
## Bat separation of chromatograms

- Deterioration of guard column (front side, back side)
- Deterioration of column
- The column is in contact with the wall of the GC column oven
- Interface temperature has not reached the set value
- Dirt in the carrier gas tubing




Bat




Good

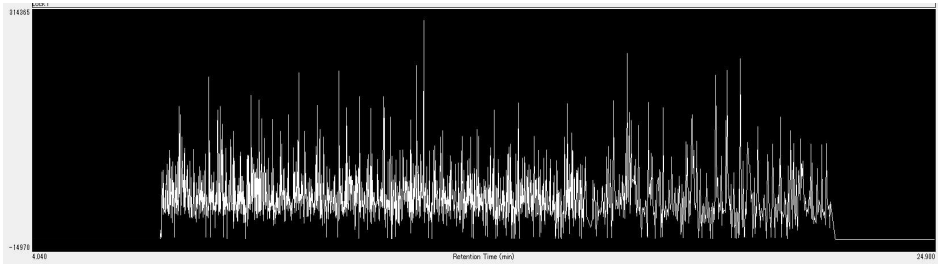
## Case 6.
## High noise revel, rising baseline

- Effect of interferents from sample.
- Contaminants from the previous sample are still present.
- Degradation of the column
- Defective of columns (Especially those with strong polarity columns)
- Excessive PFK
- Air leaking
- Deterioration of detector
- Inappropriate room temperature (not stable)

  *Be careful, not to let the wind of the air conditioner directly hit the HRMS also.

## Case 7.
## No peaks on the chromatogram

- The filament is cut off.
- The PFK peak is lost due to changes in the room temperature.
- Defective micro syringe (Test solution can not be taken.)
- Detector failure



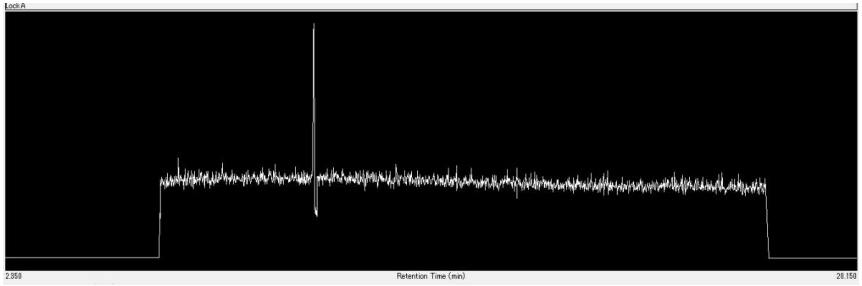

Example of Lock Mass when PFK is Lost

## Case 8.
## Peak of PFK is too weak or not detected

- The pipe connecting the PFK reservoir to the ion source is not properly installed.
- Wiring error of the ion source (poor connection, short circuit, etc.)
- Damage to the PFK adjustment valve
- Direction of the ion source magnet is reversed
- APU communication error
- Failure of circuit base

## Case 9.
## Electrical discharge is caused severely

- The ion source has not been burned out.
- The ion source is not polished properly, or polishing residue remains.
- The guard column in the ionization chamber is too long.
- The guard column in the ionization chamber is dirt with oil from hand




Rock mass when a discharge occurs

## Case 10.
## Problems that occur when the device is not operated for a long terms

- Damage to the circuit base due to condensation inside of the instrument during the air conditioner being turned off for long time
- Contamination or damage is caused because of condensation occurred inside of the MS due to the vacuum being released for a long time.

※For HRMS, do not release the vacuum beyond the ion source as much as possible. There is a risk of degradation of resolution and sensitivity that cannot be recovered.

It is recommended that routine maintenance be limited to the ion source, and that maintenance requiring vacuum reduction beyond the ion source be performed by the manufacturer.

Department of Environment and Natural Resources
Environmental Management Bureau
Environmental Research and Laboratory Services Division

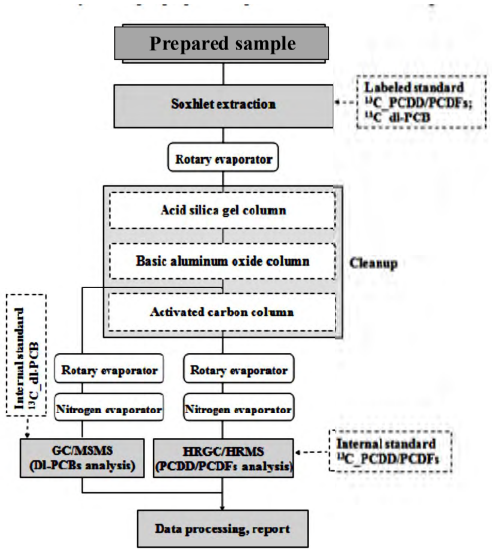
# Updates on Activities related to Dioxins and Furans Testing of the EMB Central Office

*Roger C. Evangelista, Jr., RCh*
Head, Organics Laboratory Unit
Environmental Laboratory Services Section

## OUTLINE

- Overview of PCDD/PCDF analysis in ambient air (US EPA TO-9A)
- Overview of PCDD/PCDF analysis in stationary source emissions (US EPA Method 23)
- Status of Method Verification

## PROCESS FLOW: PCDDs/PCDFs

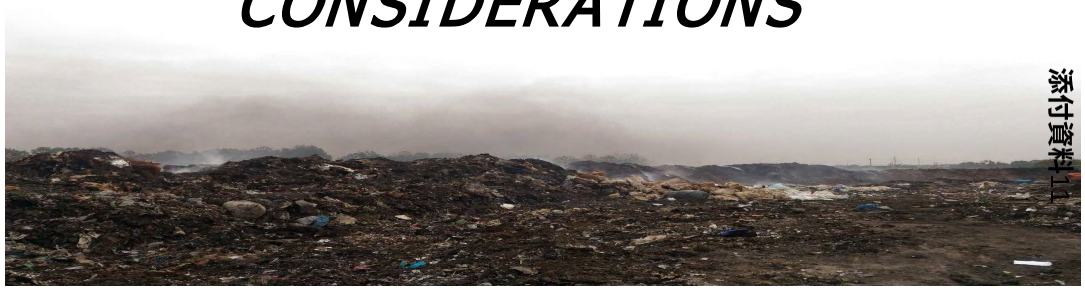



Source: UNIDO Training Course Technical Manual (2017)

*Part I*
**Determination of Polychlorinated, Polybrominated and Brominated/Chlorinated Dibenzo-p-Dioxins and Dibenzofurans in Ambient Air**

*US EPA Compendium Method TO-9A*

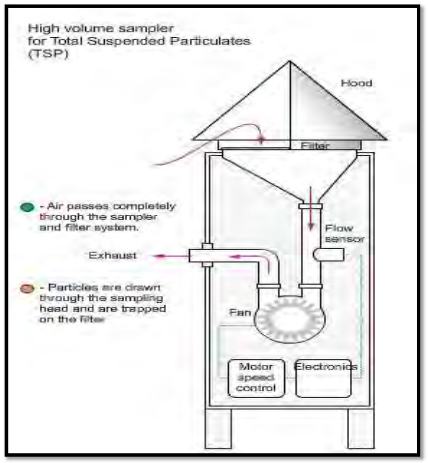
## *SAMPLING CONSIDERATIONS*



## SAMPLING METHOD

*High – Volume Sampling*

- Based on an "active" pump technique
- Intended to capture at least 325 to 400 $m^3$ ambient air in a 24-h sampling period




*Source:*
https://www.qld.gov.au/environment/pollution/monitoring/air/air-monitoring/ measuring/samplers

## SAMPLING REQUIREMENTS

Equipment:

HIGH-VOLUME AIR SAMPLER

Manufacturers include:
-Tisch Environmental, USA
-Sibata, Japan

HV-700R High-Volume Air Sampler
*Source: sibata.co.jp*

## SAMPLING REQUIREMENTS

Supplies:

**Quartz Fiber Filter**
(dimension will vary depending on the HV Sampler model)
-e.g. 203x254 mm for Sibata HV Samplers

***MUST* have undergone baking at 400 °C for 5 hours before use.**


## SAMPLING REQUIREMENTS

Supplies:

**Polyurethane Foam (PUF) plugs**
(dimension will vary depending on the HV Sampler model)

***MUST* have undergone the required pre-cleaning procedure to ensure "cleanliness"; *MUST BE CERTIFIED CLEAN***

**General considerations:**
-density of 0.022 g/$cm^3$
-polyether type
-should be slightly larger in diameter than the internal diameter of the cartridge

*Source: exportersindia.com*


*Source: Tisch Environmental*

添付資料11

# SAMPLING REQUIREMENTS

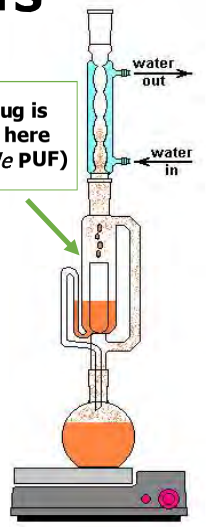
Supplies:

**Polyurethane Foam (PUF) plugs**
(dimension will vary depending on the HV Sampler model)

*PRE-CLEANING PROCEDURE:*
*Soxhlet extraction for 16 hours with pesticide-grade acetone, 4 cycles per hour; then dried under vacuum and inert atmosphere (60 °C for one day)*

**PUF plug is placed here (as *whole* PUF)**

**PUFs that are certified clean are spiked with the Field Fortification Standard (50µL of 16 pg/µL solution) *prior* to deployment.**

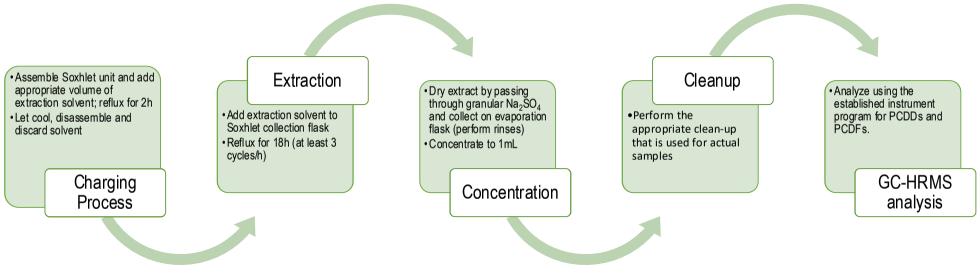



Source: wikipedia.com

# SAMPLING REQUIREMENTS

More on pre-cleaning of PUFs: **CERTIFICATION PROCESS**

*Extract 1 filter and PUF adsorbent cartridge by Soxhlet extraction and concentrate extracts for each lot of filters and cartridges sent to the field.*




*Note: Extraction Solvent is 10% v/v Diethyl Ether/ n-hexane*

*Acceptance Criteria for GC-HRMS results:*
*≤ 2-20 pg for tetra-, penta- and hexa-;*
*≤ 40-150 pg for hepta- and octa-CDDs*

*Validity of Certification:*
*30 days from date of Certification (if kept under sealed conditions)*

# SAMPLING REQUIREMENTS

Supplies:

**Glass Cartridge (Complete Assembly)**

*PRE-CLEANING PROCEDURE:*
*Washed with Acetone and n-hexane (pesticide-grade solvents)*


Source: Sibata Scientific Technology Ltd.

# SAMPLING REQUIREMENTS

Supplies:

**Aluminum foil**

**Sample cartridge aluminium shipping containers (if available)**

*PRE-CLEANING PROCEDURE:*
*Washed with Acetone and n-hexane (pesticide-grade solvents)*

Source: NCEM – VEA (UNIDO Training Course, 2017)

添付資料11

## SAMPLING REQUIREMENTS

Supplies:

- **Long Forceps (Stainless Steel)**
- **Wash Bottles with Pesticide Grade Acetone and n-hexane**
- **Lint-free wipers**
- **Teflon tape**
- **Labelling materials**
- **Waste receptacles [solids and liquids (solvents)]**

*PRE-CLEANING PROCEDURE FOR ALL STAINLESS STEEL ARTICLES:*
*Washed with Acetone and n-hexane (pesticide-grade solvents)*

## SAMPLING PROCEDURE

### II. Field QA/QC Requirements

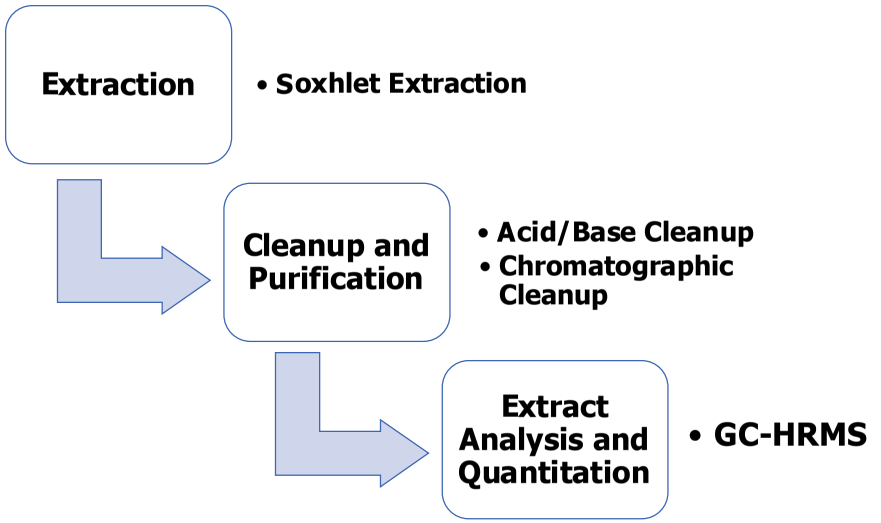
- Survey the site initially to evaluate its representativeness
- Ensure cleanliness of all sampling equipment (rinsates may be collected and analyzed as equipment blank)
- Calibrate air sampler prior to use
- Field Blank is required (filter and PUF) with each group of samples

*FIELD BLANK is treated exactly the same as the samples, except that no air is drawn through the filter/adsorbent cartridge assembly.*

**Determination of Polychlorinated, Polybrominated and Brominated/Chlorinated Dibenzo-p-Dioxins and Dibenzofurans in Ambient Air**

*US EPA Compendium Method TO-9A*

## *SAMPLE HANDLING AND ANALYSIS*




添付資料11

## SAMPLE EXTRACTION

*Extraction of Quartz Fiber Filters and PUF Plugs*

Exposed filter and PUF from the field

Packed into Soxhlet Apparatus (Toluene as extraction solvent)

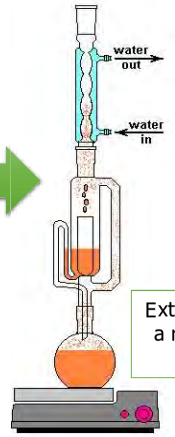
| Analyte | Concentration (pg/µL) |
|---|---|
| **Chlorinated Internal Standards** | |
| $^{13}C_{12}$-2,3,7,8-TCDD | 100 |
| $^{13}C_{12}$-1,2,3,7,8-PeCDD | 100 |
| $^{13}C_{12}$-1,2,3,6,7,8-HxCDD | 100 |
| $^{13}C_{12}$-1,2,3,4,6,7,8-HpCDD | 100 |
| $^{13}C_{12}$-OCDD | 100 |
| $^{13}C_{12}$-2,3,7,8-TCDF | 100 |
| $^{13}C_{12}$-1,2,3,7,8-PeCDF | 100 |
| $^{13}C_{12}$-1,2,3,4,7,8-HxCDF | 100 |
| $^{13}C_{12}$-1,2,3,4,6,7,8-HpCDF | 100 |
| **Brominated Internal Standards** | |
| $^{13}Cl_{12}$-2,3,7,8-TBDD | 0.86 |
| $^{13}C_{12}$-2,3,7,8-TBDF | 0.86 |
| $^{13}C_{12}$-1,2,3,7,8-PeBDF | 0.86 |

**Spiked with the $^{13}C$-labelled compounds in the Sample Fortification Solution (Internal Standard)**

## SAMPLE EXTRACTION

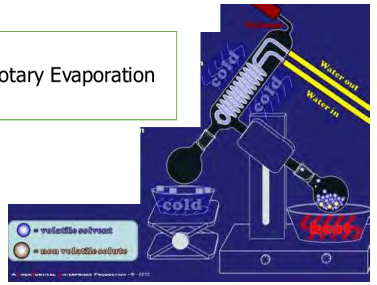
*Extraction of Quartz Fiber Filters and PUF Plugs*

Rinse the inside of the glass cylinder cartridge with Toluene, add rinsings into the Soxhlet apparatus




Extract for 16 hours with a rate of two drops per second

Rotary Evaporation




**After extraction, concentrate to 25 mL (without drying); Add 100 mL n-hexane (2x), evaporating each time to 25 mL (Let cool and add 25 mL hexane)**

*Part II*

**Determination of Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans From Stationary Sources**

*US EPA Method 23*

# *SAMPLING CONSIDERATIONS*


添付資料11

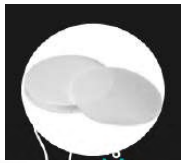
## SAMPLING MATERIALS

Rinse Solvents

Methylene Chloride, pesticide grade
Toulene, pesticide grade
Acetone, pesticide grade

# SAMPLING MATERIALS

GF Filter



Charge with toluene for 3 hours

Soxhlet Extraction

Extract for 16 hours

# SAMPLING MATERIALS

GF Filter

Drying with inert gas

Vacuum Oven


## SAMPLING MATERIALS

XAD-2 Resin

| Solvent | Procedure |
|---|---|
| Water | Initial rinse: Place resin in a beaker, rinse once with water, and discard. Fill with water a second time, let stand overnight, and discard. |
| Water | Extract with water for 8 hours. |
| Methanol | Extract for 22 hours. |
| Methylene Chloride | Extract for 22 hours. |
| Toluene | Extract for 22 hours. |

Sequential Extraction

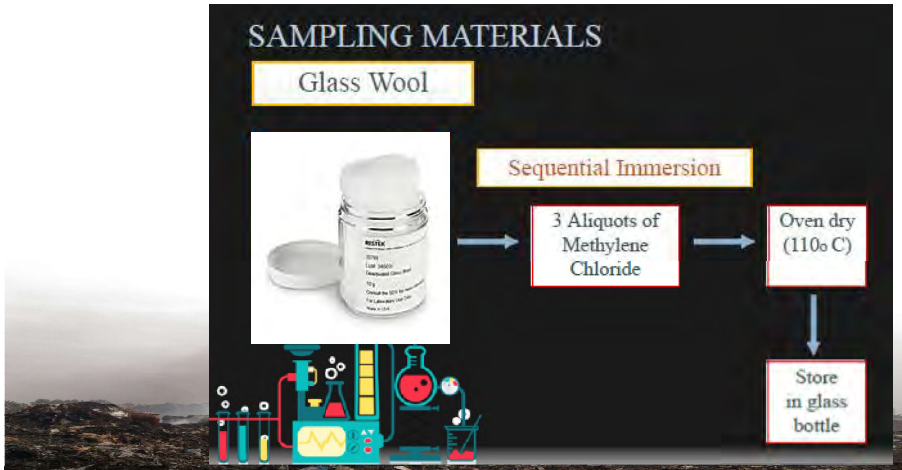
# SAMPLING MATERIALS

XAD-2 Resin

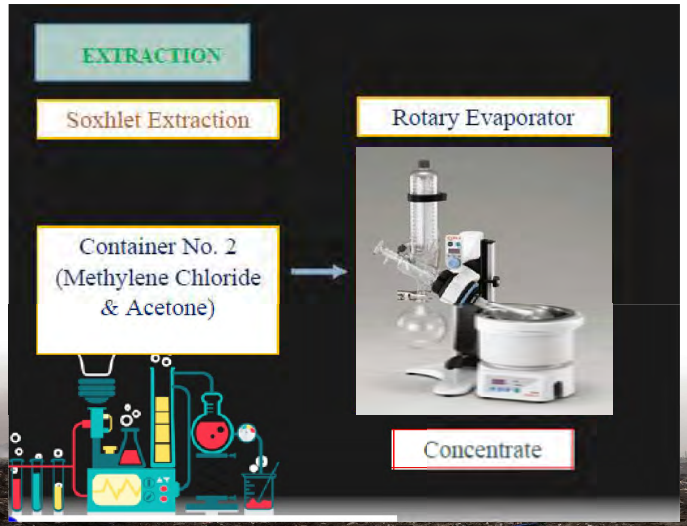
Vacuum Oven

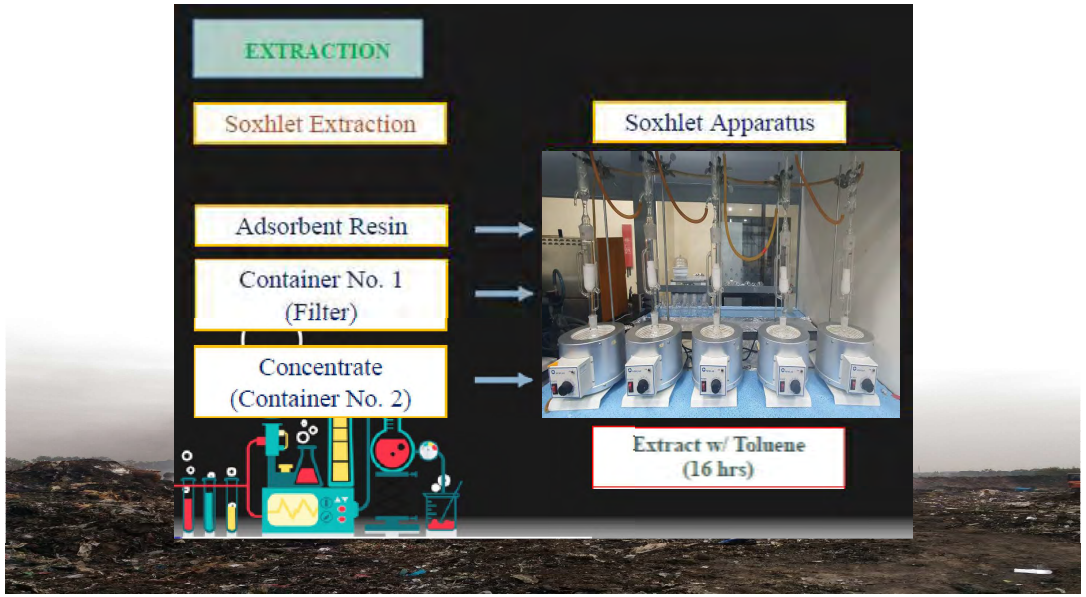
Drying with inert gas

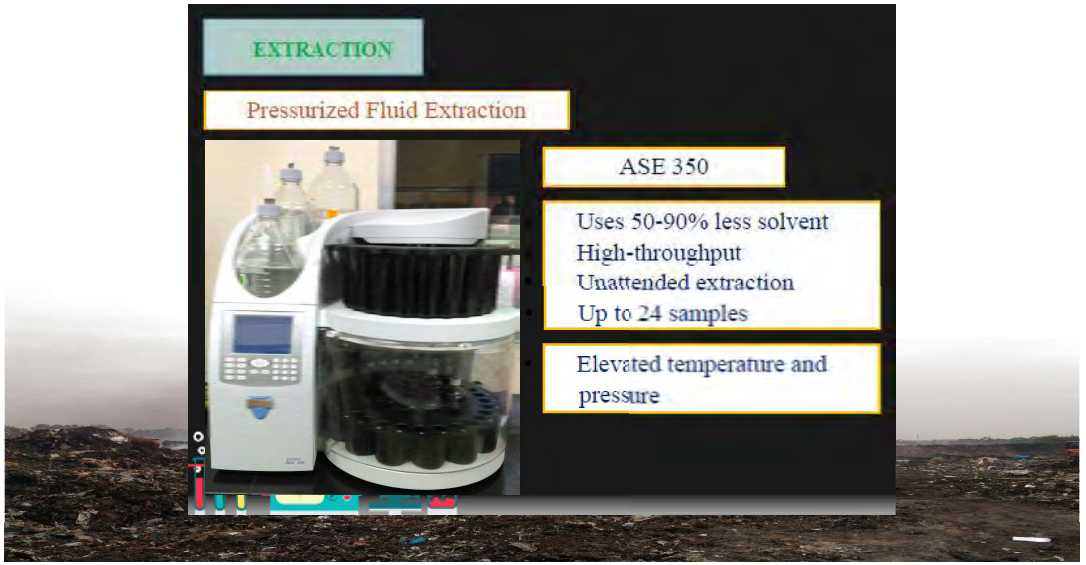

Amber bottles

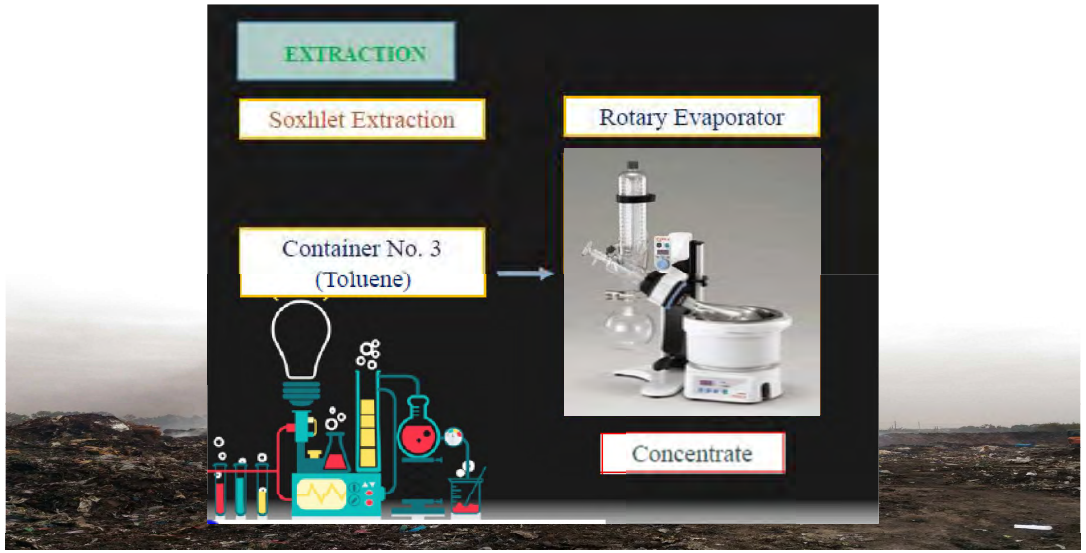








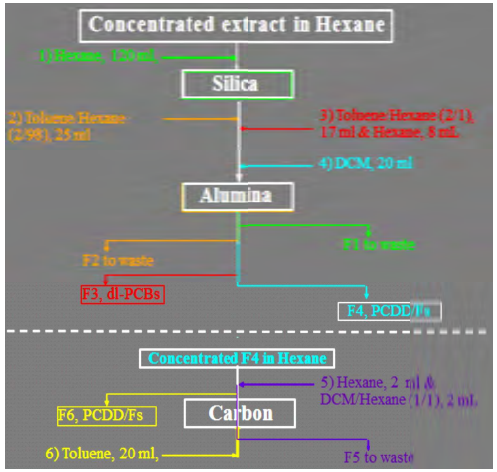

## SAMPLE CLEANUP

ACID/ BASE CLEANUP → SILICA COLUMN CLEANUP → ALUMINA COLUMN CLEANUP → CARBON COLUMN CLEANUP

*General Considerations:*

- Silica and Alumina adsorbents must be protected from moisture (activated using dry heat and cooled in a desiccated environment prior to use)
- Carbon column cleanup require the column to be reversed after sample loading and elution to obtain the target compounds
- Microevaporation under a stream of nitrogen may be necessary in between these clean-ups
- Cleanup standards (or Surrogates in the case of TO-9A) may be spiked prior to start of the cleanup process
- At the end of the cleanup sequence, add the required Recovery Standard prior to GC-HRMS analysis

# PCDDs/PCDFs/dl-PCB PURIFICATION




Source: UNIDO Training Course Technical Manual (2017)

## SAMPLE ANALYSIS

*Sample Extract Analysis:*

GC – HRMS Analysis in **Electron Impact (EI)** mode operating under **Selected Ion Monitoring (SIM)** detection technique

- Static mass resolution of 10,000 (10% valley) – must be checked at the beginning and at the end of each day (using Perfluorokerosene as standard)

## SAMPLE ANALYSIS


## SAMPLE ANALYSIS

*Sample Extract Analysis:*

Column Performance

- Use Column Performance test solution to confirm SIM parameter, retention time windows, and HRGC resolution of the compounds
- Separation for 2,3,7,8-TCDD and coeluting isomers should be resolved with a valley of 25% or more

## SAMPLE ANALYSIS

*Sample Extract Analysis:*

Initial Calibration

- Based on the internal standard approach; derived from extracted ion current profiles (EICPs)

## SAMPLE ANALYSIS

*Sample Extract Analysis:*

Calculations:

$$RRF(I) = \frac{(A_x \times Q_{is})}{(Q_x \times A_{is})}$$

$$RRF(II) = \frac{(A_{is} \times Q_{rs})}{(Q_{is} \times A_{rs})}$$

$$\overline{RRF} = \frac{RRF1 + RRF2 + RRF3 + RRF4 + RRF5}{5}$$

where:

$A_x$ = the sum of the integrated ion abundances of the quantitation ions (see Tables 10, 11 or 12) for unlabeled PCDDs/PCDFs, and PBDDs/PBDFs and BCDDs/BCDFs.

$A_{is}$ = the sum of the integrated ion abundances of the quantitation ions for the $^{13}C_{12}$-labeled internal standards (see Table 10, 11 or 12).

*[Note: Other $^{13}C_{12}$-labeled analytes may also be used as the recovery standard(s)]*

$A_{rs}$ = the integrated ion abundance for the quantitation ion of the $^{37}Cl_4$-2,3,7,8-TCDD recovery standard.

$Q_{is}$ = the quantity of the $^{13}C_{12}$-labeled internal standard injected, pg.

$Q_x$ = the quantity of the unlabeled PCDD/PCDF analyte injected, pg.

$Q_{rs}$ = the quantity of the $^{37}Cl_4$-2,3,7,8-TCDD injected, pg.

RRF(I) and RRF(II) = dimensionless quantities. The units used to express $Q_{is}$ and $Q_x$ must be the same.

## SAMPLE ANALYSIS

*Sample Extract Analysis:*

Calculations: Continuing Calibration

$$\%RRF = \frac{RRF_{cc} - \overline{RRF}}{\overline{RRF}} \times 100$$

$RRF_{cc}$ = the relative response factor for a specific analyte in the continuing calibration standard.

## SAMPLE ANALYSIS

*Sample Extract Analysis:*

Identification Criteria

Criteria used for identification of PCDDs and PCDFs in samples are as follows:

- The integrated ion abundance ratio M/(M+2) or (M+2)/(M+4) shall be within 15 percent of the theoretical value. The acceptable ion abundance ranges are shown in Tables 19 and 20.
- The ions monitored for a given analyte, shown in Tables 10, 11, and 12, shall reach their maximum within 2 seconds of each other.
- The retention time for the 2,3,7,8-substituted analytes must be within 3 seconds of the corresponding $^{13}C_{12}$-labeled internal standard, surrogate, or alternate standard.
- The identification of 2,3,7,8-substituted isomers that do not have corresponding $^{13}C_{12}$-labeled standards is done by comparison to the analysis of a standard that contains the specific congeners. Comparison of the relative retention time (RRT) of the analyte to the nearest internal standard with reference (i.e., within 0.005 RRT time units to the comparable RRTs found in the continuing calibration or literature).
- The signal-to-noise ratio for the monitored ions must be greater than 2.5.
- The analysis shall show the absence of polychlorinated diphenyl- ethers (PCDPEs). Any PCDPEs that co-elute (± 2 seconds) with peaks in the PCDF channels indicates a positive interference, especially if the intensity of the PCDPE peak is 10 percent or more of the PCDF.

## SAMPLE ANALYSIS

*Sample Extract Analysis:*

Extraction Efficiency - %recovery of the 9 $^{13}C_{12}$-labelled PCDD/PCDF Internal Standards measured in the extract using:

$$\%R_{is} = \frac{[A_{is} \times Q_{rs} \times 100]}{[Q_{is} \times A_{rs} \times RRF(II)]}$$

where:

$\%R_{is}$ = percent recovery (extraction efficiency).
$A_{is}$ = the sum of the integrated ion abundances of the quantitation ions (see Tables 10, 11 or 12) for the $^{13}C_{12}$-labeled internal standard.
$A_{rs}$ = the sum of the integrated ion abundances of the quantitation ions (see Table 10, 11 or 12) for the $^{37}Cl_4$- or $^{13}C_{12}$-labeled recovery standard; the selection of the recovery standard(s) depends on the type of homologues.
$Q_{is}$ = quantity of the $^{13}C_{12}$-labeled internal standard added to the sample before extraction, pg.
$Q_{rs}$ = quantity of the $^{37}Cl_4$ - or $^{13}C_{12}$ -labeled recovery standard added to the sample extract before HRGC-HRMS analysis, pg.
RRF(II) = calculated mean relative response factor for the labeled internal standard relative to the appropriate labeled recovery standard.

## SAMPLE ANALYSIS

*Sample Extract Analysis:*

Calculation of Concentration $C_x = \frac{[A_x \times Q_{is}]}{[A_{is} \times V_{std} \times RRF(I)]}$

where:

$C_x$ = concentration of unlabeled PCDD/PCDF, PBDD/PBDF or BCDD/BCDF congener(s), pg/m$^3$.
$A_x$ = the sum of the integrated ion abundances of the quantitation ions (see Table 11, 12 or 13) for the unlabeled PCDDs/PCDFs, or PBDDs/PBDFs or BCDFs.
$A_{is}$ = the sum of the integrated ion abundances of the quantitation ions (see Table 11, 12 or 13) for the respective $^{13}C_{12}$-labeled internal standard.
$Q_{is}$ = quantity of the $^{13}C_{12}$-labeled internal standard added to the sample before extraction, pg.
$V_{std}$ = standard volume of air, std m$^3$.
RRF(I) = calculated mean relative response factor for an unlabeled 2,3,7,8-substituted PCDD/PCDF obtained in Section 13.4.

## SAMPLE ANALYSIS

*Sample Extract Analysis:*

Calculation of Concentration $C_x = \frac{[A_x \times Q_{is}]}{[A_{is} \times V_{std} \times RRF(I)]}$

where:

$C_x$ = concentration of unlabeled PCDD/PCDF, PBDD/PBDF or BCDD/BCDF congener(s), pg/m$^3$.
$A_x$ = the sum of the integrated ion abundances of the quantitation ions (see Table 11, 12 or 13) for the unlabeled PCDDs/PCDFs, or PBDDs/PBDFs or BCDFs.
$A_{is}$ = the sum of the integrated ion abundances of the quantitation ions (see Table 11, 12 or 13) for the respective $^{13}C_{12}$-labeled internal standard.
$Q_{is}$ = quantity of the $^{13}C_{12}$-labeled internal standard added to the sample before extraction, pg.
$V_{std}$ = standard volume of air, std m$^3$.
RRF(I) = calculated mean relative response factor for an unlabeled 2,3,7,8-substituted PCDD/PCDF obtained in Section 13.4.

## QUALITY ASSURANCE/ QUALITY CONTROL

- Use of traceable standards/ CRMs
- Criteria for HRGC-HRMS initial and continuing calibration
- Analytical criteria for identification
- Internal standards are spiked to all test samples, method blanks, field blanks, and lab control samples prior to extraction
- Field Fortification solution is spiked to filters of all samplers, including field blanks, immediately prior to operation or is spiked to all PUF plugs prior to shipping them to the field for sampling to determine and document the sampling efficiency.

# QUALITY ASSURANCE/ QUALITY CONTROL

**15.9 QA/QC requirements for data:**

| Criteria | Requirements |
|---|---|
| The data shall satisfy all indicated identification criteria | Discussed in Section 14.2 |
| Method efficiency achieved for $^{13}C_{12}$-labeled tetra-, penta-, hexa-CDDs/CDFs and PBDDs/PBDFs | 50 to 120% |
| Method efficiency achieved for $^{13}C_{12}$-labeled HpCDD and OCDD | 40 to 120% |
| Accuracy achieved for PHDDs and PHDFs in method spike at 0.25 to 2.0 pg/m$^3$ concentration range | 70 to 130% |
| Precision achieved for duplicate method spikes or QA samples | ± 30% |
| Sampler efficiency achieved for $^{13}C_{12}$-1,2,3,4-TCDD | 50 to 120% |
| Method blank contamination | Free of contamination that would interfere with test sample results. |
| Method detection limit range for method blank and field blank (individual isomers) | 0.02 to 0.25 pg/m$^3$ |

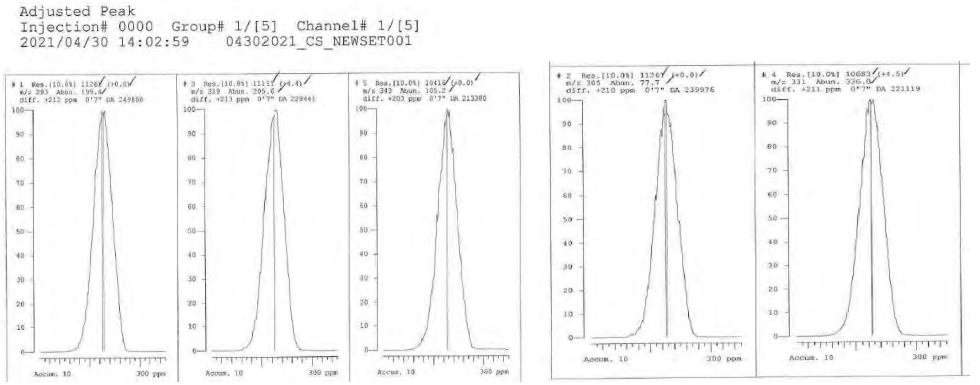
## *Part III*

## *STATUS OF METHOD VERIFICATION IN THE ERLSD*

## GCHRMS Tuning

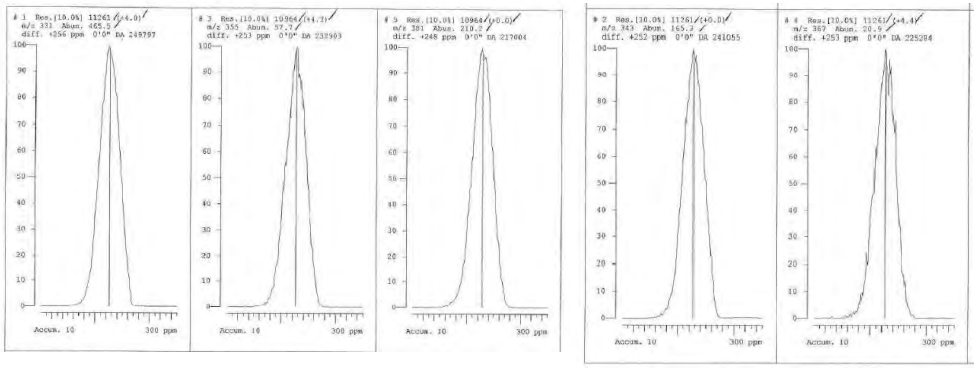
- Tuning activities this 2021 has continuously met the criteria for acceptance of results which are as follows:
  - Maximum intensity of PFK @7kV (>70% of peak intensity in 10 kV)
  - Resolution > 10,000 @ 10kV during full tuning for each group
  - Ion abundance of <1,600 for each mass monitored per group
  - Difference of <50 ppm from the highest and lowest ppm values per group
  - Percent adjustment errors within ±5% for each mass monitored per group

## GCHRMS Tuning – Sample Data



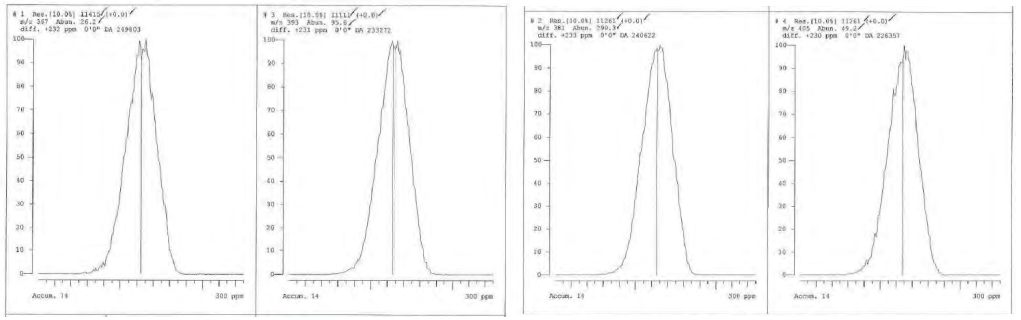
# GCHRMS Tuning – Sample Data

Adjusted Peak
Injection# 0000 Group# 2/[5] Channel# 1/[5]
2021/04/30 14:02:59 04302021_CS_NEWSET001



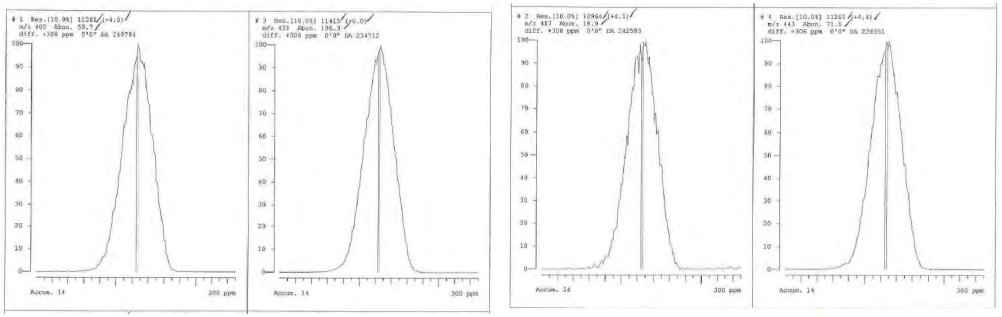
# GCHRMS Tuning – Sample Data

Adjusted Peak
Injection# 0000 Group# 3/[5] Channel# 1/[4]
2021/04/30 14:02:59 04302021_CS_NEWSET001



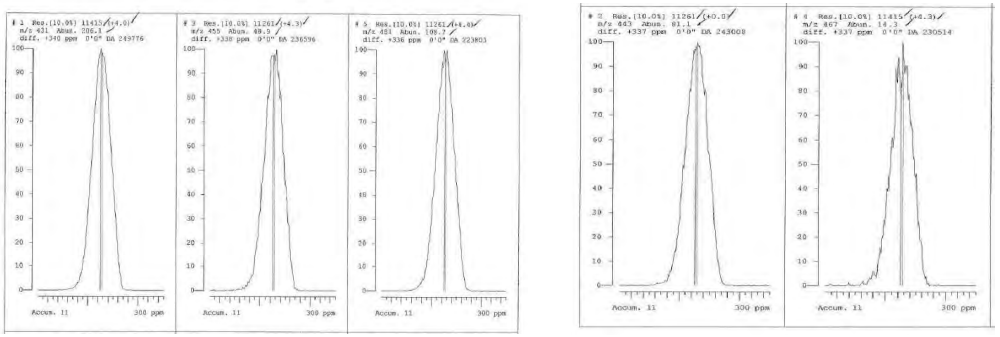
# GCHRMS Tuning – Sample Data

Adjusted Peak
Injection# 0000 Group# 4/[5] Channel# 1/[4]
2021/04/30 14:02:59 04302021_CS_NEWSET001



# GCHRMS Tuning – Sample Data

Adjusted Peak
Injection# 0000 Group# 5/[5] Channel# 1/[5]
2021/04/30 14:02:59 04302021_CS_NEWSET001



添付資料11

# Calibration

- Using the 7-level expanded calibration standards for PCDDs/PCDFs

Injection Data JEOL DioK V4.02 2021/05/25 09:49:40 Page

InjectionData: Id.J72 ()
DataName: z:\DioK_Data\MassData\04302021_CS_NEWSET001.mfl

| No | Injection | Type | InjectionNo | Date | Sample | Note | Conc | Processed | Weight | Extract |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | TOLUENE | UNK | 1 | | TOLUENE | | CSL | | 1 | 1 |
| 2 | TOLUENE_02 | UNK | 2 | | TOLUENE_02 | | CSL | | 1 | 1 |
| 3 | CSLDF-1 | CAL | 3 | | CSLDF-1 | | CSL | | 1 | 1 |
| 4 | CSLDF-2 | CAL | 4 | | CSLDF-2 | | CSL | | 1 | 1 |
| 5 | CSLDF-3 | CAL | 5 | | CSLDF-3 | | CSL | | 1 | 1 |
| 6 | CS0.5DF-1 | CAL | 6 | | CS0.5DF-1 | | CS0.5 | | 1 | 1 |
| 7 | CS0.5DF-2 | CAL | 7 | | CS0.5DF-2 | | CS0.5 | | 1 | 1 |
| 8 | CS0.5DF-3 | CAL | 8 | | CS0.5DF-3 | | CS0.5 | | 1 | 1 |
| 9 | TOLUENE_03 | UNK | 9 | | TOLUENE_03 | | CSL | | 1 | 1 |
| 10 | CSL-1 | CAL | 10 | | CSL-1 | | CSL | | 1 | 1 |
| 11 | CSL-2 | CAL | 11 | | CSL-2 | | CSL | | 1 | 1 |
| 12 | CSL-3 | CAL | 12 | | CSL-3 | | CSL | | 1 | 1 |
| 13 | CS0.5-1 | CAL | 13 | | CS0.5-1 | | CS0.5 | | 1 | 1 |
| 14 | CS0.5-2 | CAL | 14 | | CS0.5-2 | | CS0.5 | | 1 | 1 |
| 15 | CS0.5-3 | CAL | 15 | | CS0.5-3 | | CS0.5 | | 1 | 1 |
| 16 | CS1-11 | CAL | 16 | | CS1-11 | | CS1 | | 1 | 1 |
| 17 | CS1-12 | CAL | 17 | | CS1-12 | | CS1 | | 1 | 1 |
| 18 | CS1-13 | CAL | 18 | | CS1-13 | | CS1 | | 1 | 1 |
| 19 | CS2-11 | CAL | 19 | | CS2-11 | | CS2 | | 1 | 1 |
| 20 | CS2-12 | CAL | 20 | | CS2-12 | | CS2 | | 1 | 1 |
| 21 | CS2-13 | CAL | 21 | | CS2-13 | | CS2 | | 1 | 1 |
| 22 | CS3-11 | CAL | 22 | | CS3-11 | | CS3 | | 1 | 1 |
| 23 | CS3-12 | CAL | 23 | | CS3-12 | | CS3 | | 1 | 1 |
| 24 | CS3-13 | CAL | 24 | | CS3-13 | | CS3 | | 1 | 1 |
| 25 | CS4-11 | CAL | 25 | | CS4-11 | | CS4 | | 1 | 1 |
| 26 | CS4-12 | CAL | 26 | | CS4-12 | | CS4 | | 1 | 1 |
| 27 | CS4-13 | CAL | 27 | | CS4-13 | | CS4 | | 1 | 1 |
| 28 | CS5-11 | CAL | 28 | | CS5-11 | | CS5 | | 1 | 1 |
| 29 | CS5-12 | CAL | 29 | | CS5-12 | | CS5 | | 1 | 1 |
| 30 | CS5-13 | CAL | 30 | | CS5-13 | | CS5 | | 1 | 1 |
| 31 | TOLUENE_04 | UNK | 31 | | TOLUENE_04 | | CSL | | 1 | 1 |

# Calibration

- Using the 7-level expanded calibration standards for PCDDs/PCDFs

DqData: DB5_DIOXIN_CAL_05042021
Calculation: SUM Channel, Calibrated RRF

| No | Type | Compound | Isomer | Av-RRF | SD | %RSD | OK | RRF | Error | RRF | Error | RRF | Error | RRF | Error | RRF |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | CSL-1 | | CSL-2 | | CSL-3 | | CS1-11 | | CS1-12 |
| 1 | QNT | T4CDD | 2378 | 1.1943 | 0.1078 | 9.0 | OK(10) | 1.4007 | 0.2064 | 1.3806 | 0.1863 | 1.2749 | 0.0807 | 1.2068 | 0.0125 | 1.1777 |
| 2 | QNT | P5CDD | 12378 | 1.1790 | 0.0796 | 6.8 | OK(10) | 1.3124 | 0.1334 | 1.4065 | 0.2274 | 1.3590 | 0.1800 | 1.1747 | -0.0043 | 1.1851 |
| 3 | QNT | H6CDD | 123478 | 1.1569 | 0.0822 | 7.1 | OK(10) | 1.3031 | 0.1462 | 1.3087 | 0.1518 | 1.3752 | 0.2182 | 1.1722 | 0.0153 | 1.1996 |
| 4 | QNT | H6CDD | 123678 | 1.1350 | 0.0768 | 6.8 | OK(10) | 1.2591 | 0.1241 | 1.3426 | 0.2076 | 1.3154 | 0.1804 | 1.1489 | 0.0139 | 1.1361 |
| 5 | QNT | H6CDD | 123789 | 1.1955 | 0.0732 | 6.1 | OK(10) | 1.3372 | 0.1418 | 1.3867 | 0.1912 | 1.3499 | 0.1544 | 1.2165 | 0.0210 | 1.1759 |
| 6 | QNT | H7CDD | 1234678 | 1.1457 | 0.0857 | 7.5 | OK(10) | 1.3298 | 0.1841 | 1.3566 | 0.2109 | 1.3216 | 0.1759 | 1.1775 | 0.0318 | 1.1461 |
| 7 | QNT | O8CDD | 12346789 | 1.1256 | 0.0831 | 7.4 | OK(10) | 1.3262 | 0.2007 | 1.3141 | 0.1886 | 1.2862 | 0.1607 | 1.1390 | 0.0134 | 1.1397 |
| 8 | QNT | T4CDF | 2378 | 1.1561 | 0.0840 | 7.3 | OK(10) | 1.2819 | 0.1259 | 1.3593 | 0.2032 | 1.3849 | 0.2288 | 1.1818 | 0.0257 | 1.1748 |
| 9 | QNT | P5CDF | 12378 | 1.0542 | 0.0762 | 7.2 | OK(10) | 1.1986 | 0.1443 | 1.2296 | 0.1754 | 1.2506 | 0.1964 | 1.0671 | 0.0129 | 1.0606 |
| 10 | QNT | P5CDF | 23478 | 1.1600 | 0.0814 | 7.0 | OK(10) | 1.3306 | 0.1706 | 1.3162 | 0.1563 | 1.3659 | 0.2060 | 1.1851 | 0.0252 | 1.1658 |
| 11 | QNT | H6CDF | 123478 | 1.0997 | 0.0620 | 5.6 | OK(10) | 1.2178 | 0.1181 | 1.2328 | 0.1331 | 1.2571 | 0.1573 | 1.1208 | 0.0211 | 1.0820 |
| 12 | QNT | H6CDF | 123678 | 1.0627 | 0.0838 | 7.9 | OK(10) | 1.2315 | 0.1688 | 1.2518 | 0.1891 | 1.2681 | 0.2055 | 1.0675 | 0.0048 | 1.0696 |
| 13 | QNT | H6CDF | 234678 | 1.1350 | 0.0637 | 5.6 | OK(10) | 1.2923 | 0.1573 | 1.2687 | 0.1337 | 1.2616 | 0.1265 | 1.1384 | 0.0034 | 1.1523 |
| 14 | QNT | H6CDF | 123789 | 1.0683 | 0.0884 | 8.3 | OK(10) | 1.2341 | 0.1658 | 1.2680 | 0.2197 | 1.2764 | 0.2081 | 1.0724 | 0.0041 | 1.0677 |
| 15 | QNT | H7CDF | 1234789 | 1.0705 | 0.0878 | 8.2 | OK(10) | 1.2205 | 0.1500 | 1.2707 | 0.2001 | 1.2842 | 0.2137 | 1.0761 | 0.0056 | 1.1036 |
| 16 | QNT | O8CDF | 12346789 | 1.4057 | 0.0844 | 6.0 | OK(10) | 1.5872 | 0.1815 | 1.5717 | 0.1660 | 1.6242 | 0.2185 | 1.4076 | 0.0019 | 1.3905 |
| 17 | IS | 13C-T4CDD | 2378 | 1.0870 | 0.0230 | 2.1 | OK(10) | 1.0619 | -0.0251 | 1.0876 | 0.0007 | 1.0850 | -0.0020 | 1.0694 | -0.0175 | 1.0803 |
| 18 | IS | 13C-P5CDD | 12378 | 0.8778 | 0.0621 | 7.1 | OK(10) | 0.8490 | -0.0288 | 0.8464 | -0.0314 | 0.8449 | -0.0330 | 0.8432 | -0.0346 | 0.8416 |
| 19 | IS | 13C-H6CDD | 123478 | 1.0277 | 0.0169 | 1.6 | OK(10) | 1.0319 | 0.0043 | 1.0245 | -0.0032 | 1.0382 | 0.0105 | 1.0376 | 0.0099 | 1.0098 |
| 20 | IS | 13C-H6CDD | 123678 | 1.0763 | 0.0143 | 1.3 | OK(10) | 1.0590 | -0.0173 | 1.0522 | -0.0241 | 1.0631 | -0.0132 | 1.0832 | 0.0069 | 1.0774 |
| 21 | IS | 13C-H7CDD | 1234678 | 0.9582 | 0.0192 | 2.0 | OK(10) | 0.9727 | 0.0096 | 0.9598 | -0.0033 | 0.9737 | 0.0105 | 0.9641 | 0.0010 | 0.9864 |
| 22 | IS | 13C-O8CDD | 12346789 | 0.8716 | 0.0257 | 2.9 | OK(10) | 0.8630 | -0.0089 | 0.8626 | -0.0092 | 0.8679 | -0.0039 | 0.8804 | 0.0086 | 0.8682 |
| 23 | IS | 13C-T4CDF | 2378 | 1.8283 | 0.0267 | 1.5 | OK(10) | 1.8411 | 0.0128 | 1.8030 | -0.0253 | 1.8113 | -0.0170 | 1.8129 | -0.0154 | 1.8512 |
| 24 | IS | 13C-P5CDF | 12378 | 1.6564 | 0.0846 | 5.1 | OK(10) | 1.6281 | -0.0284 | 1.6329 | -0.0235 | 1.6137 | -0.0427 | 1.6033 | -0.0531 | 1.6312 |
| 25 | IS | 13C-P5CDF | 23478 | 1.6804 | 0.1184 | 7.1 | OK(10) | 1.6209 | -0.0395 | 1.6427 | -0.0178 | 1.6242 | -0.0363 | 1.5851 | -0.0754 | 1.5335 |
| 26 | IS | 13C-H6CDF | 123478 | 1.6939 | 0.0603 | 3.6 | OK(10) | 1.7263 | 0.0324 | 1.7251 | 0.0312 | 1.7131 | 0.0192 | 1.7383 | 0.0444 | 1.7094 |
| 27 | IS | 13C-H6CDF | 123678 | 1.8245 | 0.0353 | 1.9 | OK(10) | 1.8243 | -0.0002 | 1.8274 | 0.0028 | 1.8156 | -0.0095 | 1.8508 | 0.0262 | 1.8288 |
| 28 | IS | 13C-H6CDF | 234678 | 1.6151 | 0.0423 | 2.6 | OK(10) | 1.6408 | 0.0257 | 1.6220 | 0.0070 | 1.6317 | 0.0167 | 1.6751 | 0.0600 | 1.6465 |
| 29 | IS | 13C-H6CDF | 123789 | 1.5113 | 0.0206 | 1.4 | OK(10) | 1.5170 | 0.0057 | 1.5391 | 0.0279 | 1.5136 | 0.0023 | 1.5317 | 0.0204 | 1.5050 |
| 30 | IS | 13C-H7CDF | 1234678 | 1.6967 | 0.0549 | 3.2 | OK(10) | 1.7899 | 0.0931 | 1.7116 | 0.0149 | 1.6998 | 0.0031 | 1.7169 | 0.0202 | 1.7044 |
| 31 | IS | 13C-H7CDF | 1234789 | 1.3679 | 0.0383 | 2.8 | OK(10) | 1.3665 | -0.0014 | 1.3737 | 0.0057 | 1.3476 | -0.0203 | 1.4035 | 0.0356 | 1.3387 |
| 32 | RS | 13C-T4CDD | 1214 | | | | | | | | | | | | | |

# Calibration

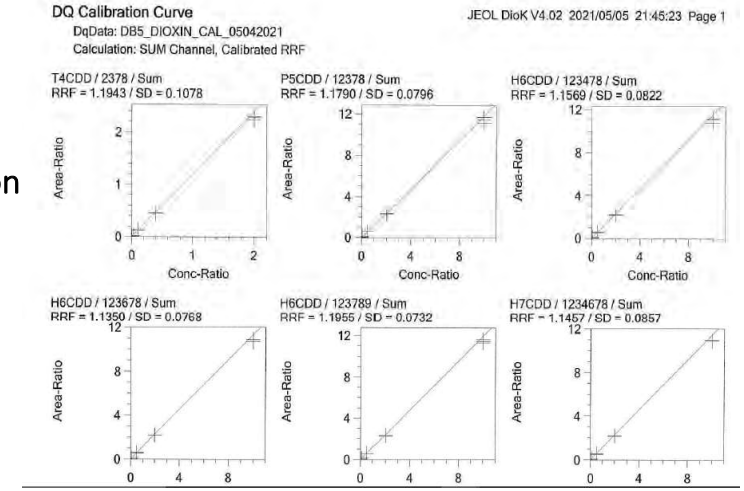
- Using the 7-level expanded calibration standards for PCDDs/PCDFs

DQ RRF Calibration JEOL DioK V4.02 2021/05/05 21:44:49 Page

| No | Type | Compound | Isomer | Av-RRF | SD | %RSD | OK | RRF | Error | RRF | Error | RRF | Error | RRF | Error | RRF |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | CSL-1 | | CSL-2 | | CSL-3 | | CS1-11 | | CS1-12 |
| 33 | RS | 13C-H6CDD | 123789 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 34 | QNT | H7CDF | 1234678 | 1.0338 | 0.0820 | 7.9 | OK(10) | 1.1373 | 0.1036 | 1.2494 | 0.2156 | 1.2136 | 0.1798 | 1.0720 | 0.0383 | 1.0587 |
| 35 | | T4CDD | Total | 1.1943 | 0.1078 | 9.0 | - | 1.4007 | 0.2064 | 1.3806 | 0.1863 | 1.2749 | 0.0807 | 1.2068 | 0.0125 | 1.1777 |
| 36 | | H6CDD | Total | 1.1617 | 0.0754 | 6.5 | - | 1.2991 | 0.1374 | 1.3456 | 0.1840 | 1.3465 | 0.1849 | 1.1783 | 0.0167 | 1.1698 |
| 37 | | H7CDD | Total | 1.1457 | 0.0857 | 7.5 | - | 1.3298 | 0.1841 | 1.3566 | 0.2109 | 1.3216 | 0.1759 | 1.1775 | 0.0318 | 1.1461 |
| 38 | | O8CDD | Total | 1.1256 | 0.0831 | 7.4 | - | 1.3262 | 0.2007 | 1.3141 | 0.1886 | 1.2862 | 0.1607 | 1.1390 | 0.0134 | 1.1397 |
| 39 | | T4CDF | Total | 1.1561 | 0.0840 | 7.3 | - | 1.2819 | 0.1259 | 1.3593 | 0.2032 | 1.3849 | 0.2288 | 1.1818 | 0.0257 | 1.1748 |
| 40 | | P5CDF | Total | 1.1071 | 0.0783 | 7.1 | - | 1.2644 | 0.1574 | 1.2731 | 0.1660 | 1.3085 | 0.2014 | 1.1258 | 0.0187 | 1.1133 |
| 41 | | H6CDF | Total | 1.0909 | 0.0737 | 6.8 | - | 1.2434 | 0.1525 | 1.2593 | 0.1684 | 1.2656 | 0.1746 | 1.0997 | 0.0088 | 1.0927 |
| 42 | | H7CDF | Total | 1.0501 | 0.0838 | 8.0 | - | 1.1733 | 0.1233 | 1.2589 | 0.2088 | 1.2448 | 0.1947 | 1.0739 | 0.0238 | 1.0784 |
| 43 | | O8CDF | Total | 1.4057 | 0.0844 | 6.0 | - | 1.5872 | 0.1815 | 1.5717 | 0.1660 | 1.6242 | 0.2185 | 1.4076 | 0.0019 | 1.3905 |
| 44 | | P5CDD | Total | 1.1790 | 0.0796 | 6.8 | - | 1.3124 | 0.1334 | 1.4065 | 0.2274 | 1.3590 | 0.1800 | 1.1747 | -0.0043 | 1.1851 |

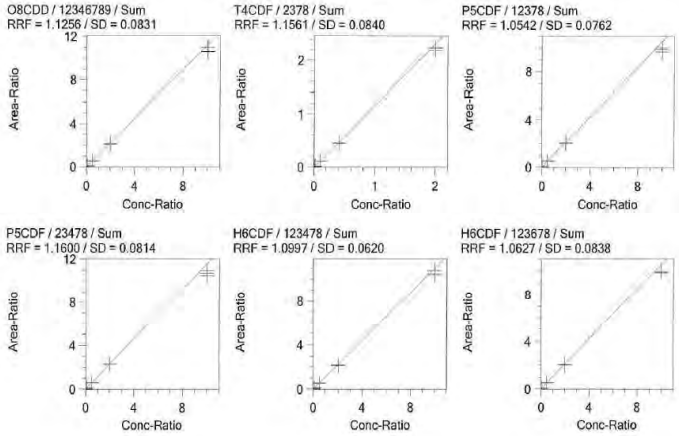
# Calibration

- Using the 7-level expanded calibration standards for PCDDs/PCDFs



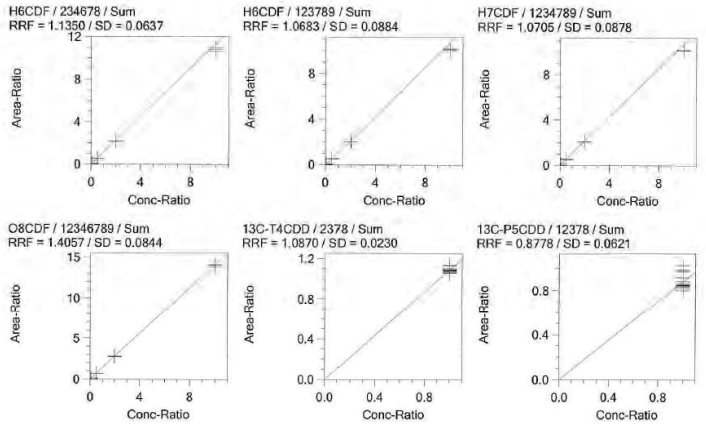
# Calibration

- Using the 7-level expanded calibration standards for PCDDs/PCDFs



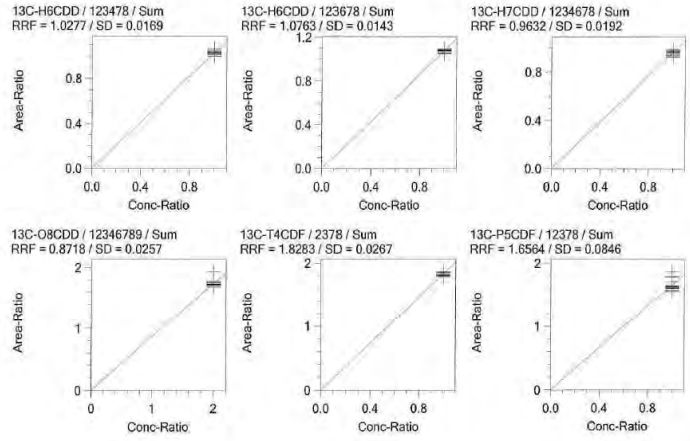

# Calibration

- Using the 7-level expanded calibration standards for PCDDs/PCDFs



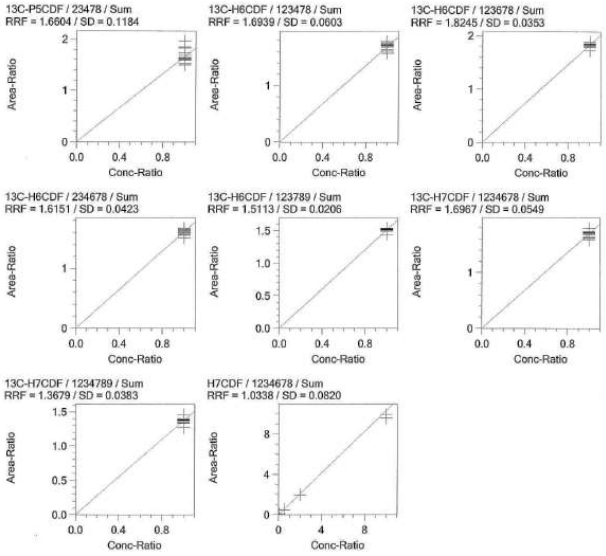

# Calibration

- Using the 7-level expanded calibration standards for PCDDs/PCDFs




# Calibration

- Using the 7-level expanded calibration standards for PCDDs/PCDFs



## Next steps

- Conduct of Window-defining and isomer specificity tests
- Analysis of laboratory-spiked samples for determination of detection limits, accuracy and precision levels, and other method performance indicators
- Measurement uncertainty calculations

THANK YOU!

PROJECT ACTIVITY : **2nd SUB-GROUP MEETING FOR PROJECT OUTPUT 2 (ENHANCEMENT OF NATIONAL GOVERNMENTS' CAPACITY OF ENVIRONMENTAL MONITORING FOR WTE PROJECT)**
DATE/TIME : **31 May 2021, 9:00AM - 10:30AM (Philippine Time)**
VENUE : **Video Conference through Microsoft Teams**
MATERIALS : **http://bit.ly/2ndOP3SGMtg**

| Agenda Topics | Issues/Discussions/Actions | Comments/Agreements/ Timelines | Required Actions/Responsible Agency/Person |
|---|---|---|---|
| **1.) Call to Order/ Meeting Objectives/Acknowledgement of Attendees**<br>(Ms. Elvira Pausing, EMB-SWMD-PMO) | ● Ms. Elvira Pausing of EMB-SWMD-PMO commenced the 2nd subgroup meeting for Project Output 3 when quorum was reached representing 5 of the 7 invited agencies, and all presenters for the meeting have signed in.<br>● Ms. Pausing presented the agenda and asked the subgroup members if anything else needed to be discussed.<br>● Ms. Pausing acknowledged the presence of the participants, and briefly ran through the proceedings of the last subgroup meeting held last February 10, 2020. | ● Agenda was moved for adoption with no comments and modifications from the participants. | |
| **2.) Review of the previous discussions from the last subgroup meeting**<br>(Mr. Takahiro Kamishita, JET) | ● Mr. Takahiro Kamishita presented the meeting summary of the 1st OP3 Subgroup Meeting.<br>● In the last meeting, JET reported the results and review of the current capacity and gap analysis in EMB Central and Regional Offices. It was pointed out that though the meeting was held in February 2020, activities for Project Output 3 have already commenced as early as 2019. | ● | |
| **3.) Presentations and discussions:**<br>**a. Implementation updates/ Progress of activities under Project Output 3**<br>(Mr. Satoshi Miyaichi, JET) | ● Mr. Miyaichi discussed the activities under Output 3, noting that 3-1 and 3-2 are already done and 3-3 and 3-4 are currently underway.<br>● For Activity 3-3: Prepare SOPs<br>○ ERLSD has drafted SOPs for stationary sources and ambient air, and were already shared with | | ● [JET] Provide comments to the SOPs |

| | | | |
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| | JET. JET is currently reviewing SOP for stationary sources based on the discussion on 15th December 2020, and will provide feedback to ERLSD to allow them to finalize the SOPs accordingly.<br>● For Activity 3-4: Conduct Training of sampling, analysis and QA/QC of dioxins and furans<br>○ Sampling- AQMS is still preparing the requested documents from JET<br>■ JET will make recommendations for ERLSD on the preparation of sampling materials especially on contamination control.<br>○ QA/QC and analysis - GC/HRMS verification is necessary, ongoing in ERLSD<br>■ ERLSD to share the verification results with JET for review. | ● Ms. Pausing requested a timeline for the next steps in the project.<br>○ Mr. Miyaichi agreed, and mentioned that this timeline will be settled after the | ● [AQMS] Respond to the follow up inquiries by JET (from email thread):<br>- From the Stack Testing Manual: The following four documents are mentioned in the manual, but cannot be found in the document.<br>- References provided to EMB Central and Regional Offices<br>- F23-1<br>- LP 23a<br>- L23-1<br>- Provide following calibration records from AQMS<br>- Actual example of record of (a) stack sampler calibration, and (b) high-volume air sampler calibration<br>● [JET, ERLSD, PMO, FASPS] Finalize the timeline for the next steps in the project in the next coordination meeting. |

| | | | |
|---|---|---|---|
| | | upcoming coordination meeting with ERLSD. | |
| **3.) Presentations and discussions:**<br>**b. Daily inspection and troubleshooting of GC/HRMS**<br>(Mr. Tomohiro Seki, JET) | ● Mr. Seki opened his presentation by discussing how this will be useful for ERLSD to perform troubleshooting, and perform tuning of the GC/HRMS equipment. He however notes that ERLSD has relayed that the equipment is running smoothly now.<br>● In his presentation, he discussed the tuning procedure and the precautions that need to be observed in the process. He also touched on the common troubles experienced by the equipment, the usual causes of these issues, and how these can be prevented. He added that if ERLSD could tell JET specifically what they were having trouble with GC/HRMS operation, JET could add troubleshooting for that. | | |
| **3.) Presentations and discussions:**<br>**c. GC/HRMS operation verification by EMB-ERLSD**<br>(Mr. Roger Evangelista, EMB-ERLSD) | ● Mr. Evangelista presented an overview of PCDD/PCDF analysis in ambient air and stationary source emissions aligned to US EPA TO-9A and US EPA Method 23 respectively.<br>● He discussed the high-volume sampling method, sample handling, and analysis, for both ambient air and stationary source emissions.<br>○ Mr. Evangelista discusses the equipment and materials that ERLSD uses to implement the procedures.<br>○ He also underscores the requirements that each material needs to go through before being used for the procedure, such as the certification process for the | | ● [ERLSD] Share presentation materials with JET and OP3 subgroup, including the documentation of the verification works for the GC/HRMS. |

| | | | |
|---|---|---|---|
| | pre-cleaning procedure for each of the supplies needed.<br>○ The sample cleanup procedure was also discussed, sharing that the procedure is similar for both US EPA TO-9A and US EPA Method 23.<br>● He discussed the status of the verification works for GC/HRMS mentioning that the criteria for acceptance of results were all achieved, showing a sample data of GC/HRMS Tuning that was run last April 30, 2021.<br>● Lastly, the next steps for the verification works were shared which included the conduct of window-defining and isomer specificity tests, analysis of performance indicators, and measurement of uncertainty calculations. | | |

| | | | |
|---|---|---|---|
| **4.) Wrap-up, Required Actions, and Agreements** | • Ms. Andrei Mallare of JET wrapped up the earlier discussions and reiterated the arrangements and timelines as agreed.<br><br>• [JET] Provide comments to the SOPs<br>• [AQMS] Respond to the follow up inquiries by JET (from email thread):<br>- From the Stack Testing Manual: The following four documents are mentioned in the manual, but cannot be found in the document.<br>- References provided to EMB Central and Regional Offices<br>- F23-1<br>- LP 23a<br>- L23-1<br>- Provide following calibration records from AQMS<br>- Actual example of record of (a) stack sampler calibration, and (b) high-volume air sampler calibration<br><br>• [JET, ERLSD, PMO, FASPS] Finalize the timeline for the next steps in the project in the next coordination meeting.<br>• [ERLSD] Share presentation materials with JET and OP3 subgroup, including the documentation of the verification works for the GC/HRMS. | • Mr. Jundy Del Socorro clarified the requested calibration records on whether this pertains to a specific equipment. He wraps up by agreeing to share calibrations records for all relevant equipment. | |
| **5.) Way forward, Schedule of the next meetings** | • Ms. Pausing announced that the 3rd OP3 Subgroup Meeting is tentatively set on September 8, 2021. | | |