Report from field trip to Asuwei Park

Methane Management Survey Report

I. Survey Background

To actively promote the Sino-Norwegian cooperation project on methane emissions reduction, the project team conducted field investigations at the Asuwei Landfill and Incineration Plant in Beijing. Through detailed understanding of methane-related emission control measures, gas collection and treatment technology, and facility operations management, the study aims to optimize methane reduction strategies and provide scientific evidence for follow-up research and policy formulation.

II. Survey Process

1. On-Site Investigation at Asuwei Landfill

Landfill Overview:

The Asuwei Landfill is located in Changping District, operating since 1994 with a designed treatment capacity of 2000 tons/day. On May 24, 2019, it ceased receiving waste and is now undergoing full enclosure and ecological restoration, making it an important practical for studying landfill methane emissions and reduction technologies.

Methane Control Measures:

- **Gas Collection System:** The landfill utilizes an advanced gas collection system equipped with embedded pipes and extraction wells. This infrastructure effectively captures landfill gas (primarily methane) and directs it via centralized pipelines to treatment facilities.
- **Enclosure Technology:** The site is lined with high-density polyethylene (HDPE) membranes and covered with soil, forming a multi-layer barrier that significantly inhibits gas leakage. This design reduces methane emissions and minimizes environmental impact.
- **Landfill Gas Utilization:** Approximately half of the collected methane is used for electricity generation, which is supplied to the grid. The remaining portion is safely disposed of through flaring, ensuring the reduction of direct greenhouse gas emissions.

Routine Inspection & Maintenance:

- Comprehensive and regular inspections are carried out to maintain the integrity and functionality of all systems. This includes daily checks of gas extraction wells, leachate collection systems, and HDPE membrane conditions. Drones and sensors are employed for large-area and hard-to-reach zone monitoring. Preventive maintenance is performed promptly to address

any identified issues, ensuring continuous and efficient operation while minimizing environmental risks.

2. **On-Site Investigation at Asuwei Incineration Plant**

Incineration Plant Overview:

The Asuwei Incineration Plant has been operational since 2019 with a treatment capacity of 3000 tons/day. Advanced combustion and emission control technologies ensure compliance with emission standards. The focus of this investigation was to understand the sources of methane emissions during the incineration process and their control methods.

3. Facilities Inspection

Methane Collection and Treatment:

The survey team examined landfill methane collection facilities, gaining insight into the entire process from methane generation to collection, treatment, and final combustion. The incineration plant's performance and methane byproduct treatment technologies were also evaluated.

Leachate Treatment:

The landfill's leachate treatment system includes regulating tanks, anaerobic units, nitrification-denitrification pools, and membrane treatment technologies. These processes not only enhance leachate treatment efficiency but also significantly suppress methane generation, achieving source reduction.

Resource Utilization:

Heat generated during incineration is used for electricity generation, producing about 300 GWh annually to meet part of the local power demand. The ash from incineration is processed into building materials.

III. Survey Findings

1. Methane Emission Control Technology Applications

- The Asuwei Landfill enhanced its methane collection efficiency through upgrades to its pipe networks, collection wells, and HDPE membranes.
- Flare combustion of collected methane effectively reduces direct emissions, lowering total greenhouse gas emissions.
- The incineration plant uses advanced combustion equipment and monitoring systems to carefully manage potential methane emissions and ensure environmental compliance.

2. Infrastructure Construction and Operation for Methane Reduction

- Multistage leachate treatment effectively suppresses methane generation, reducing its content in leachate.

- Resource utilization measures such as waste heat power generation and slag recycling indirectly reduce methane emissions, demonstrating the reduction potential of circular resource use.

Figure 1: Field visit by the project team to Asuwei. Photo: ?

Figure 2: lvkjblawrbga. Photo: