



Ministry of Environment and Forestry  
“Country Report of Remediation in Indonesia”

Prepared by Directorate of Hazardous Waste-Contaminated Site Remediation and Emergency Response

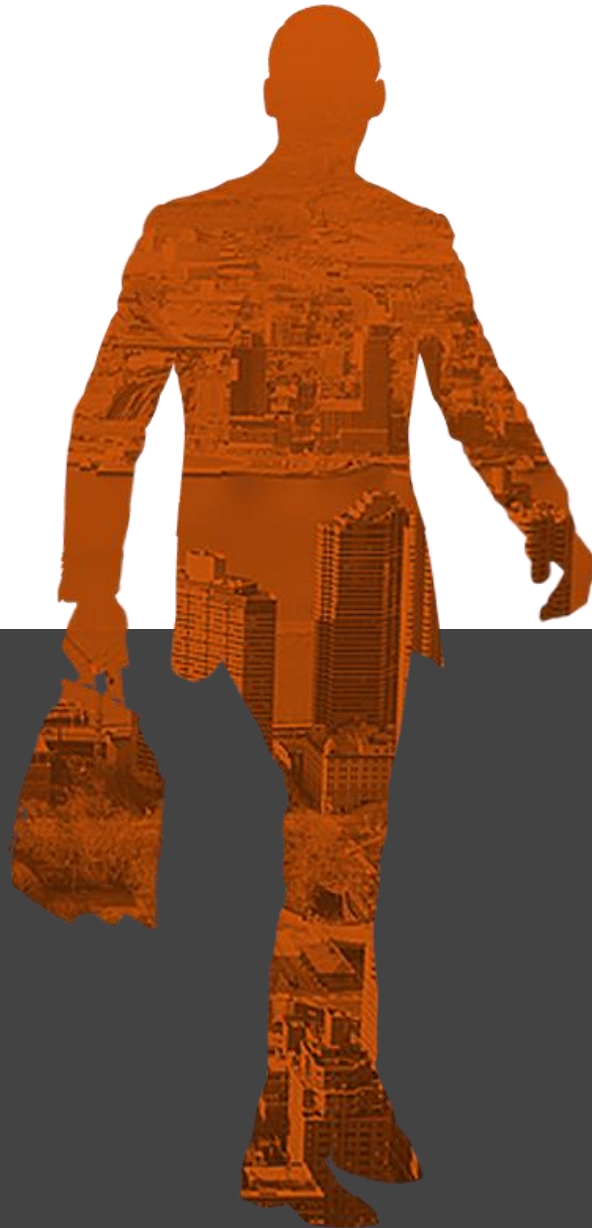


# Regulations

Constitution, Government Regulation, etc



# REGULATIONS



01

**Env. Act No. 32 / 2009**

Protection and Management of Environment

02

**Government Regulation No. 22 / 2021**

Implementation of Environment Protection and Management

03

**Ministerial Decree No. 101 / 2018**

Guidelines of Hazardous Waste-Contaminated Site Remediation

04

**Ministerial Decree No. 74 / 2019**

Emergency Program for Management of Hazardous Substance and Hazardous Waste

05

**Director General Regulation No. P.4 / 2016**

Guidelines of Hazardous Waste-Contaminated Site Identification and Inventory



## Background of Government Regulation Number 22 of 2021

To implement Article 22 and Article 185 point b of RI Constitution Number 11 of 2020 on Job Creation



**Article 22 :**  
a few clauses in Constitution of the Republic of Indonesia number 32 of 2009 on Protection and Management of Environment were altered



**Article 185 point b**  
All regulations off the outdated constitution changed by this constitution remain applicable as long as they do not oppose this constitution, and are obligated to be adapted accordingly for 3 months at most





# Clauses Regulated

## In Gov. Regulation No. 22 of 2021

- ❖ Environmental Agreement/EIA
- ❖ Protection and Management of Water Quality
- ❖ Protection and Management of Air Quality
- ❖ Protection and Management of Sea Quality
- ❖ Environmental Damage Control
- ❖ **Hazardous Waste and Non-Hazardous Waste Management**
- ❖ Environmental Remediation Fund (Environmental insurance)
- ❖ Construction and Supervision
- ❖ Administrative Sanction Application



# COVID-19 Pandemic

After COVID-19 pandemic outbreak

# Let's stay at home

A few policies applied in Indonesia since the occurrence of COVID-19 pandemic:

- ✓ Formation of Coronavirus Response Acceleration Task Force
- ✓ Obligation to comply with health protocols
- ✓ Work from home (WFH) and online-based homeschooling
- ✓ Large-scale social restrictions (Pembatasan Sosial Berskala Besar, PSBB)
- ✓ Free-of-charge vaccinations
- ✓ Implementation of restrictions on community activities (Pemberlakuan Pembatasan Kegiatan Masyarakat, PPKM)



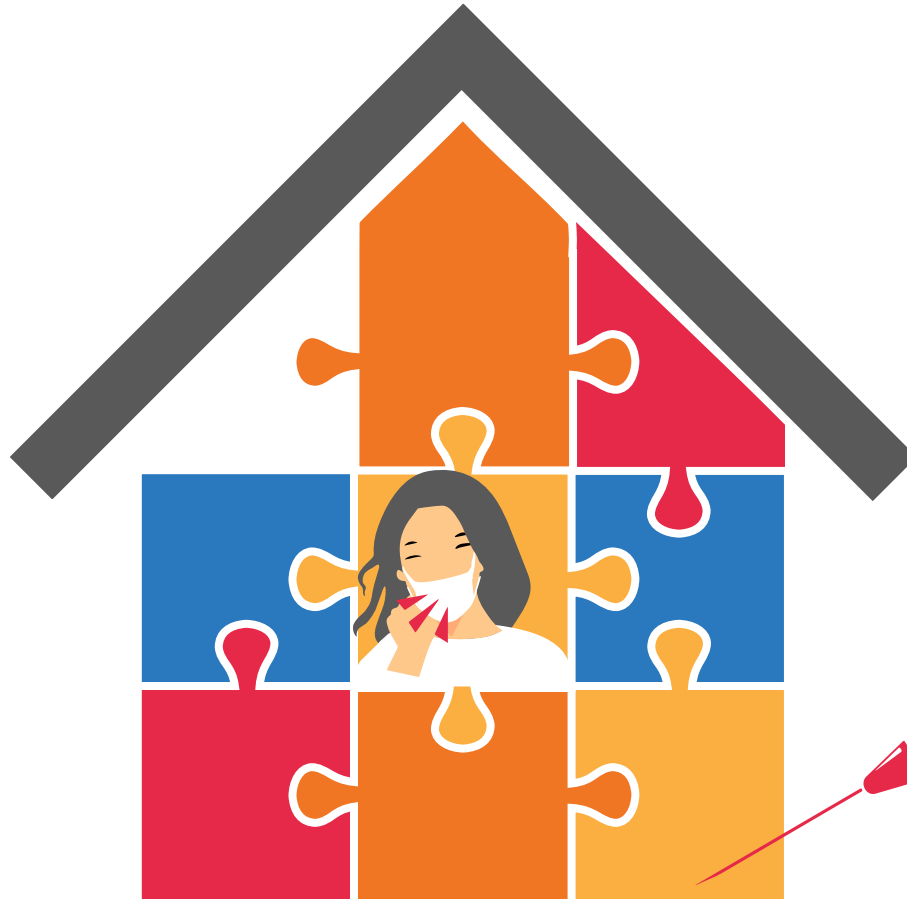


# “This is what we do”



## Optimizing the Technology for Infectious Waste Management

Since the COVID-19 breakout, all of the remediation projects have to be postponed, including the hazardous-contaminated soil management. One of the technologies used for soil remediation is incinerator, which also could be used for infectious waste management. In this case, we try to provide more incinerators during this pandemic.



**PANDEMIC**

**COVID-19**



# Support for COVID-19 handling

01

## Incinerator

Building a few units of incinerator in different locations for infectious waste

02

## Personal Protective Equipment

Provide some personal protective equipment such as: masks, gloves, face shield, one-piece coverall, etc.

03

## Public Socialization

Providing education about how to handle infectious waste such as masks, gloves, etc in different public media (TV, radio, social media, etc)

04

## Others

Suggesting people to stay at home and comply with social distancing rules as well as providing donations for those in need



# Remediation in Indonesia

Causes, Locations, Remediation Methods



# DISTRIBUTION MAP OF HAZARDOUS WASTE-CONTAMINATED SOIL REMEDIATION





According to Directorate of Hazardous Waste Contamination Remediation and Emergency Response's database, in 2020, total tonnage of hazardous waste-contaminated soil that has been managed to be remediated is around 600.000 ton, in which 500.000 ton of it was from oil and gas sector with hazardous wastes type of crude oil and sludge oil.

Thus, it can be concluded that oil and gas sector has the highest risk to contaminate the environment in Indonesia.



## Did You Know?

# Contaminated-soil from oil and gas sector

Oil spill cases due to the large amount of old wells and pipes in Indonesia or other causes (emergency situation), such as:

- Oil spill in Balikpapan Bay 2018
- Oil spill in Karawang 2019
- Fuel tank fire in Balongan 2021
- the latest case located in Langsa city, Aceh



Oil spill in Karawang 2019



Oil spill in Balikpapan Bay 2018



Fuel Tank fire in Balongan 2021



# Next Case . . .

## “Homework” That Needed to be Done

Transition of PT Chevron Pacific Indonesia (PT CPI) to PT Pertamina Hulu Rokan (PT PHR) that left remediation “homework” for the latter company (starting from 9<sup>th</sup> August 2021)

From all of the remediations that had been done by PT CPI since 2018 (about 159 locations), there are 269 other locations that have to immediately recovered by PT PHR.



# GROUNDWATER REMEDIATION

➤ Remediation focuses on in-situ groundwater remediation in order to reduce potential contaminant's mass underground and to prevent the potential of dissolved contaminant from migrating to outside the site

➤ **Technologies Used**

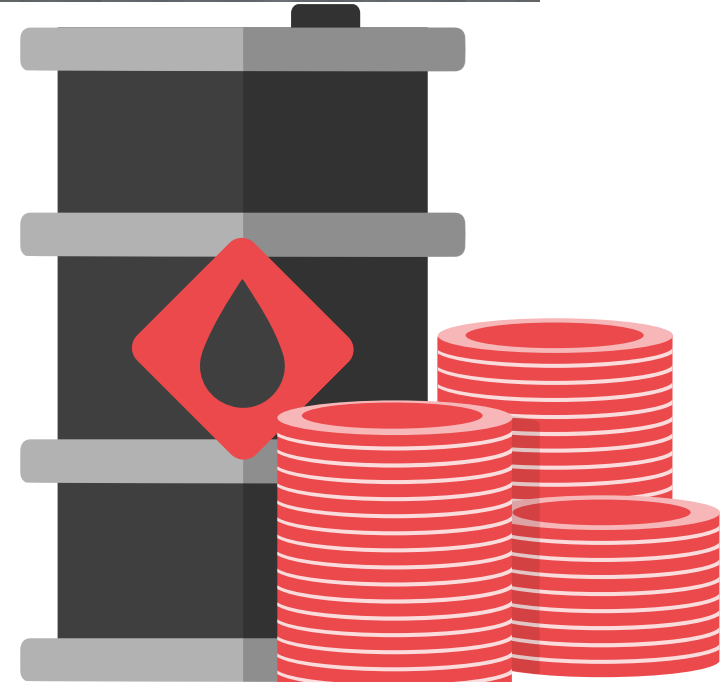
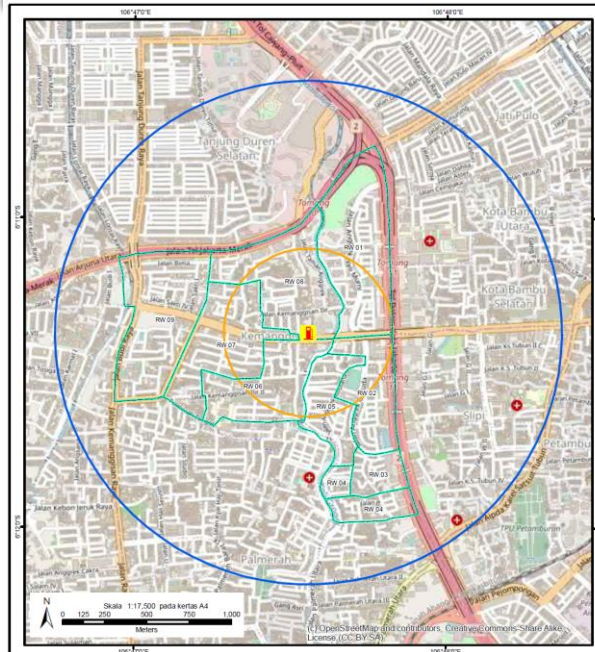
Soil Vapor Extraction (SVE) + enhanced Monitored Natural Attenuation (MNA)  
Air Sparging (AS) is also considered for supplement technology

➤ **Examples:**

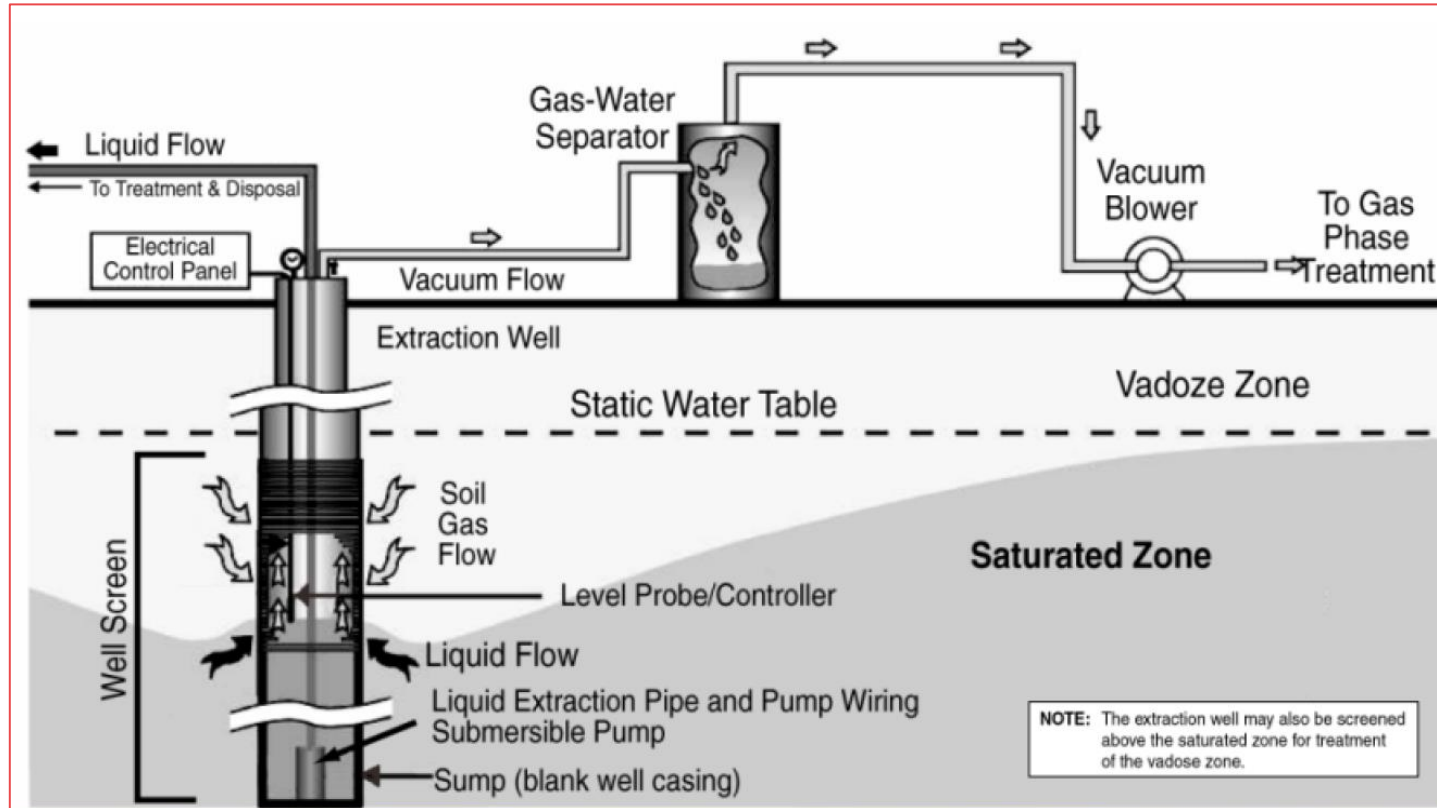
- SHELL gas station
- Pertamina gas station
- TOTAL gas station
- etc



A leakage was found in UST-4's ventilation duct (2014)



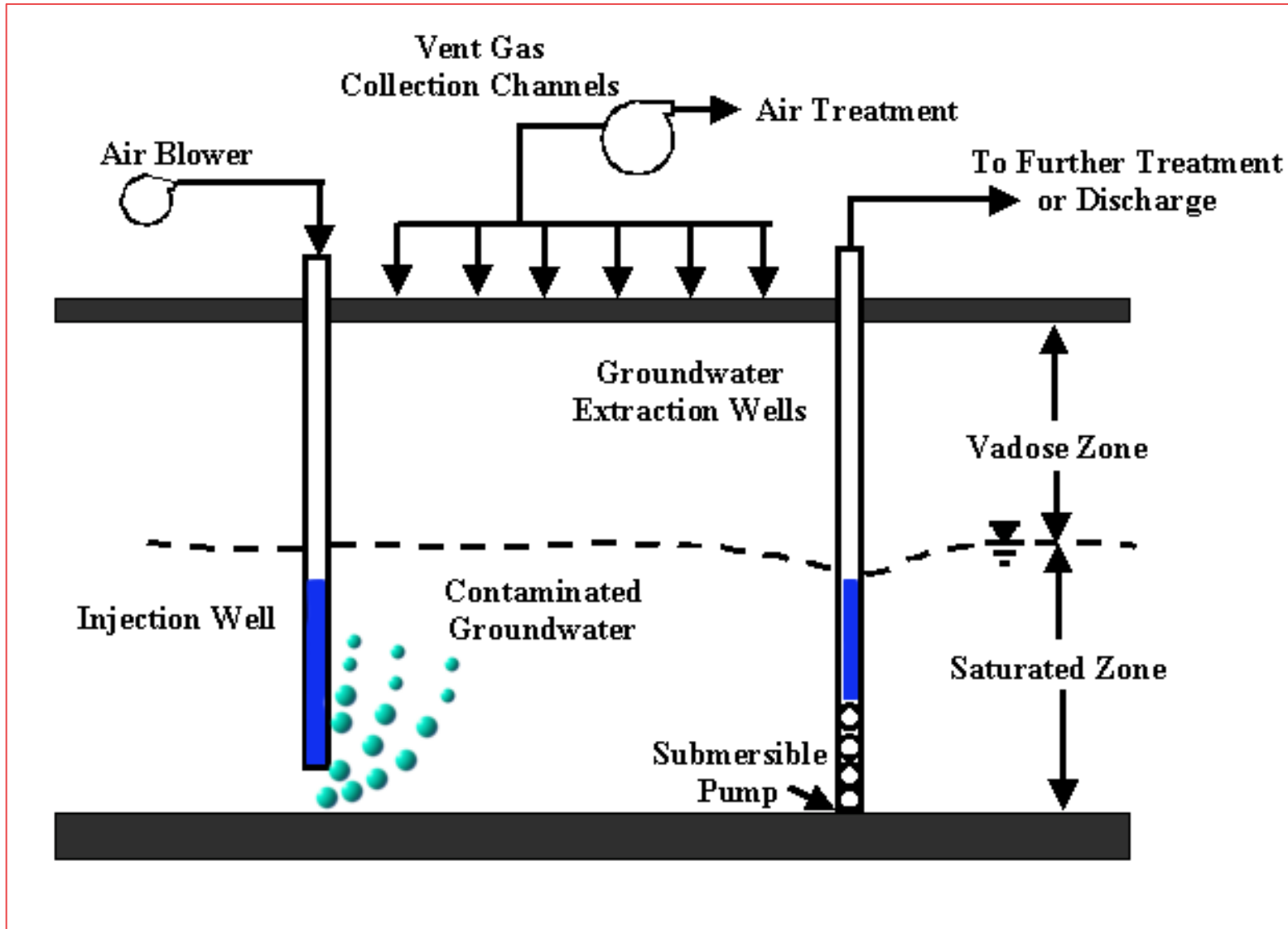
# SOIL VAPOR EXTRACTION (SVE)



- 1** | In-situ remediation technique that involves soil vapor extraction using vacuum blower
- 2** | SVE can receive contaminant absorbed into the ground in vadose zone
- 3** | Most effectively used in remediation of volatile contaminant in soil with moderate to high permeability (e.g. sand, loamy sand), as found in the site
- 4** | Uses positive or regenerative displacement blower to produce vacuum condition on SVE
- 5** | Extracted hydrocarbon vapor is generally destroyed through oxidation (thermal or catalytic) process or filtered using carbon

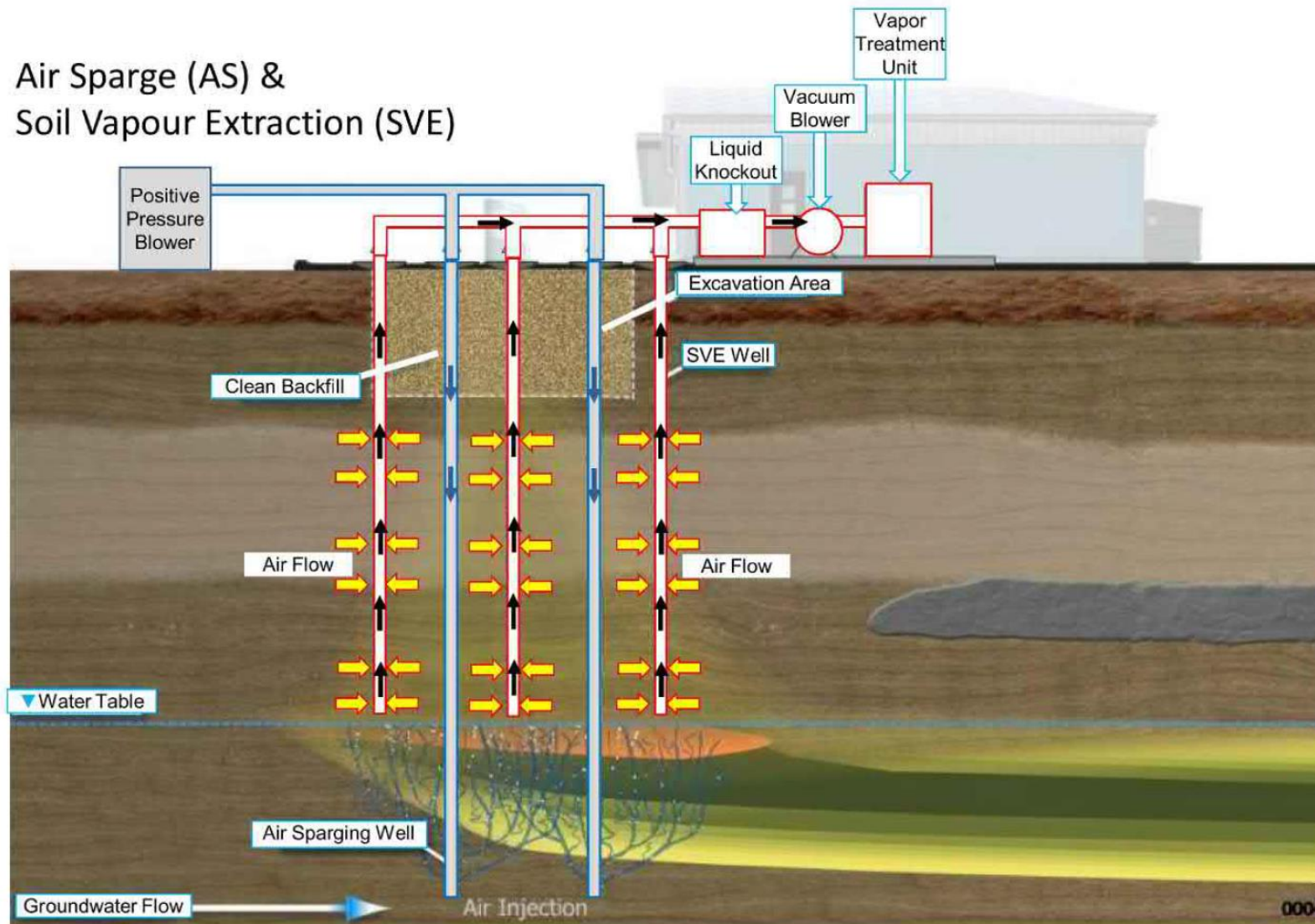


# AIR SPARGING (AS)



For hydrocarbon remediation in oil in saturated zone (dissolved in groundwater on capillary edge or absorbed by soil below groundwater surface)

# PRINCIPLE OF SVE AND AS



# GROUNDWATER MONITORING PROGRAM

01

Regulation of the Minister of Health number: 492/MENKES/PER/IV/2010 concerning Quality Requirements of Drinking Water

Threshold concentration for **benzene**: 0.01 mg/L  
Threshold concentration for MTBE is not stated

02

World Health Organization (WHO)

Health-based standard for MTBE isn't determined yet. Even if it's to be determined, the concentration will be far higher than the concentration it requires to inflict odor problem. The lowest concentration of MTBE with sensible taste and/or odor is 15 µg/L

03

Groundwater is sampled every 3 months throughout the remediation program

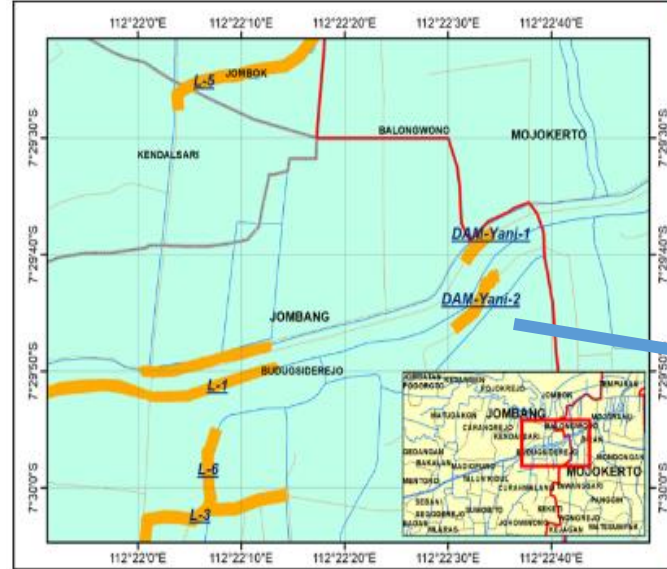
04

Parameters

Total Petroleum Hydrocarbon C<sub>6</sub> – C<sub>9</sub>, Total Petroleum Hydrocarbon C<sub>10</sub> – C<sub>36</sub>, BTEX, EOs (TBA, MTBE, DIPE, TAME, ETBE)

# Remediation in Jombang

Hazardous waste contaminated land that quite a lot to find in Jombang, East Java Province was caused by Aluminum smelting activity of local people. These wastes were used for river embankment, road, paddy embankment and some were left around the smelter.



**PETA LOKASI STUDI**  
**TERKONTAMINASI LIMBAH B3**  
**DAM-YANI KAB. JOMBANG**

Skala 1:10.000

0 0,1 0,2 0,3 0,4  
 Kilometers

**Legend**  
 Kontaminan

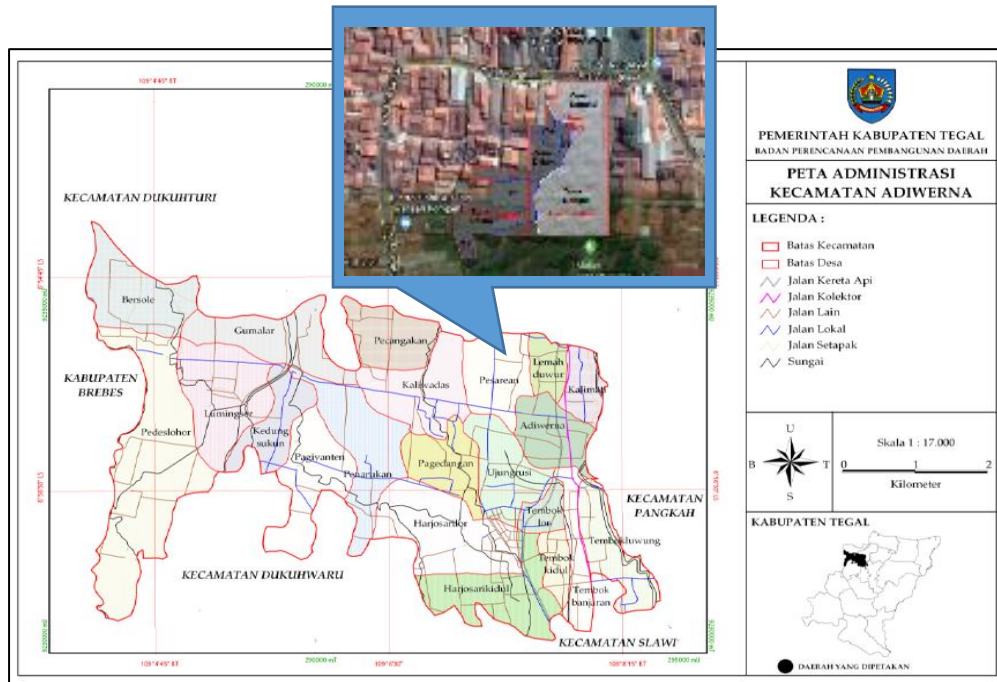


Segmen C1 – C7 di Bantaran Selatan 2, Sungai Ngotok Ring Kanal, Dusun Budug

Segmen D1 – D6 di Desa Budug, Kecamatan Sumobito



# Remediation in Tegal



- Pesarean Village, Tegal District is one of hazardous waste-contaminated site in Indonesia. it happened because of Metal smelting activities such as Lead, Aluminum, Copper, Brass or the recycling of accumulator waste by local people since 1980, even dated back before Independence of Republic Indonesia.



Before



After



# Alternative Technology for Hazardous Waste- Contaminated Soil Remediation

- Bioremediation
- Soil-washing
- Utilization for concrete brick or paving block creations
- Utilization for concrete products
- Incinerator
- Coprocessing as fuel material or raw material alternative in cement industry
- Landfill
- Other technologies in accordance with science and technology development



Batako,  
paving  
block



Substitusi bahan baku semen



Insinerator



# Future Plans

Cooperation plan with US EPA  
regarding remediation

# Future Plans



Cooperation plan with US EPA regarding remediation, such as:

## 1st Plan

Development and Improvement of The National System and Policy on Hazardous-Waste Contaminated Site Remediation

## 3rd Plan

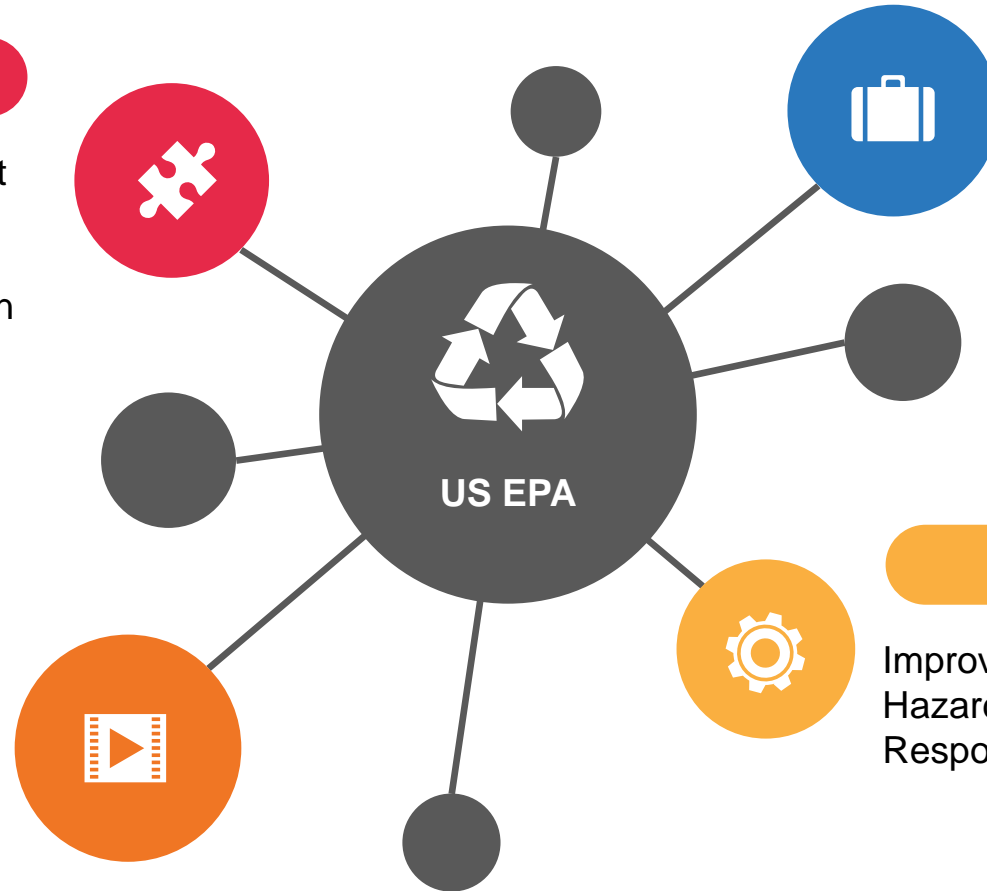
Improvement of Practices on Hazardous Waste-Contaminated Site Remediation

## 2nd Plan

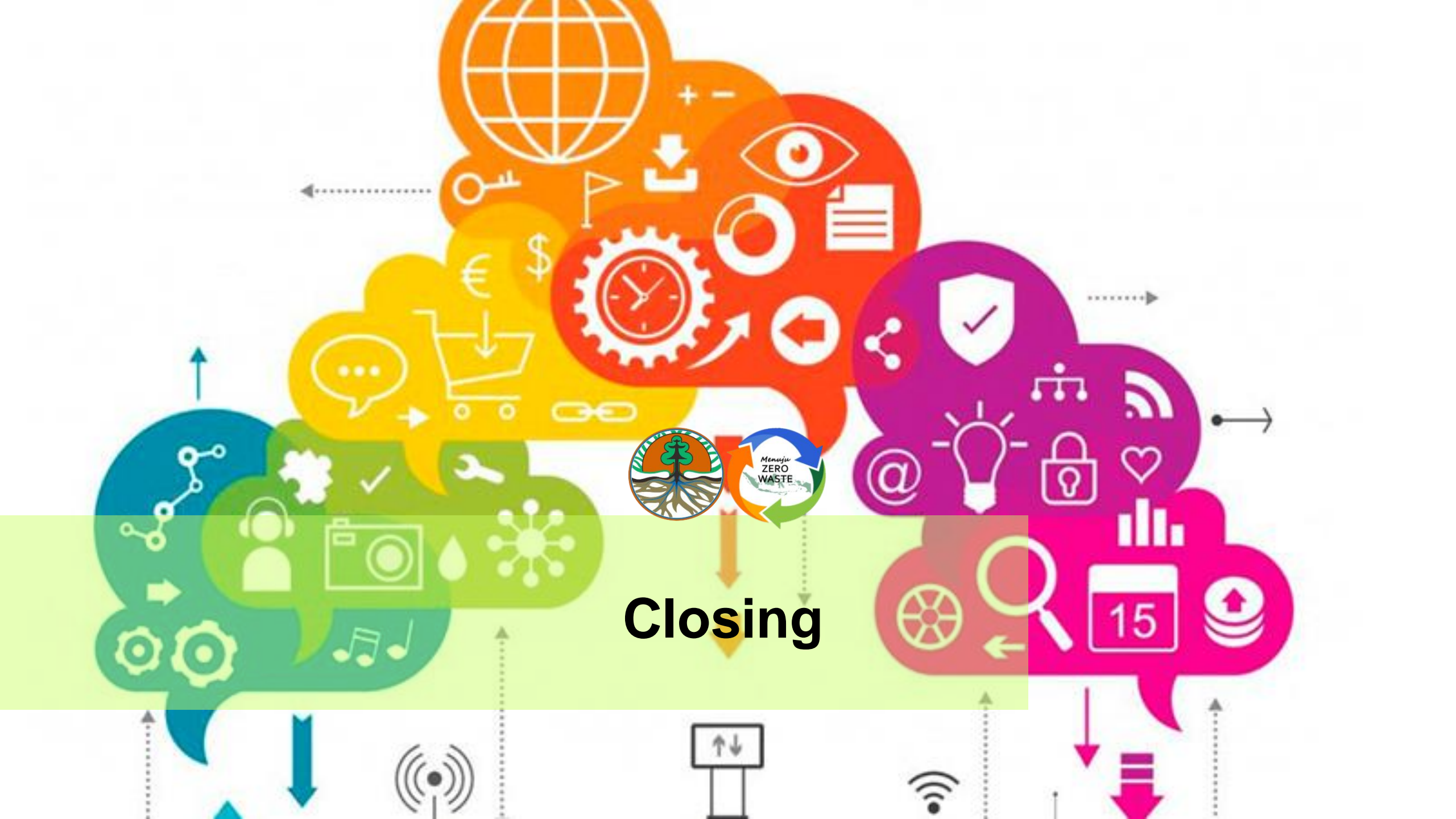
Development and Improvement of The National System and Policy on Hazardous Waste Emergency Response

## 4th Plan


Improvement of Practices on Hazardous Waste Emergency Response







**Closing**

A close-up photograph of a pair of hands cupping a small, vibrant green seedling with several leaves, growing out of a mound of dark, rich soil. The hands are positioned on either side of the soil, with fingers slightly curled to support it. The background is a soft, out-of-focus brown, suggesting a natural outdoor setting. The lighting is warm and natural, highlighting the textures of the soil and the skin of the hands.

*“The Earth, The Air, The  
Land and The Water are  
not an inheritance from  
our fore fathers but on  
loan from our children.  
So we have to handover  
tp them at least as it  
was handed over to us”*

*- Ghandi -*



THANK YOU

*“Let’s nurture our nature, so that we can  
have a better future”*

**For more information :**

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