CHAPTER 4

PROJECT OPTIONS

4.1 PROJECT OPTION

An essential part of an EIA is the considerations of options for the proposed project, so as to ensure that the chosen configuration is the best possible, chiefly environmentally and economically. The Project Options for the proposed Metals from Spent Catalyst Recovery Facility (SCaRF) considered here comprises:

a) Site options
b) Socioeconomic Options
c) Process options
d) No project option

4.2 Site Consideration

a) Land Ownership

Land ownership is a prerequisite for location approval by the authorities; the proposed project site industrial plot is owned by project proponent, Taiyo Koko. The Sales and Purchase agreement is shown in Appendix 1.

b) Site Suitability

The site possesses several suitability credits, namely:

1) Running in front of the site, as shown in **Figure 5.7(2)** is the Petronas Gas Malaysia pipeline, which enables the plant to:
   - utilise the clean fuel by directly tapping into the pipeline;
   - operate safely without any fuel storage.
2) It is located in a heavy industry area, being next to the Lynas plant.

3) Due to its location close to Lynas plant that also produces high value strategic metals for modern industries such as the electric vehicles, there is potential for future synergy between the two plants.
4) It is easily accessible to Kuantan and Kemaman ports.
5) It is close to petrochemical plants at Gebeng, Kertih, Paka, etc.
6) It is close to coast, thus the standard B of the EQ(IE)R 2009 applies for treated effluent discharge.

4.3 Socioeconomic Options

The setting up of the SCaRF is socioeconomically beneficial, amongst which are:

1) Valuable metals are recovered from waste catalyst, where both molybdenum and vanadium are required for steel alloys and high storage batteries, such as for electric vehicles.
2) The metals are currently mined mainly in China, Russia and South Africa with China being the largest world producer (at about 60% of world production in 2020) leading to extensive impacts of mining to produce these trace metals.
3) With the SCaRF plant, Malaysia becomes a producer of renewable Mo and V.
4) With renewable Mo and V, production of electric vehicles (EV), etc., becomes more sustainable, with potential for green credits, for manufacturers using Mo and V from SCaRF.

4.4 Process Option

In considering Process Options the aims are to ensure:

a) that the process installed would not pollute the environment;
b) that the process is technically proven and would not face technical difficulties that would jeopardise its operations.
c) that the process is commercially viable and would not face closure or abandonment in future due to costs, etc. ;

With respect to SCaRF, the following considerations apply:

- Environmental protection: The SCaRF process has been successfully implemented in Ako City, Japan and has satisfied the comprehensive Japanese emission control management. Details of the Ako plant operations can be seen in **Figure 5.5(3)**. The

SCaRF plant in Gebeng also uses clean energy in the form of natural gas from the gas line in front of its lot.

- Process technical viability: The process stages as listed in **Section 5.3.2** involve all well-established unit operations, thus are technologically and chemically manageable process units. These are unit operations similar to those currently employed in Malaysia, in metal recoveries from e-wastes and other metal bearing wastes.
- Commercial viability: Via the Ako plant (shown in **Figure 5.3(3) and 5.3(4)**) the project proponent is confident of the plant's viability and had spent several years planning for this SCaRF project.
- With the above, the only process options would be:
    - to continuously optimise the current unit operations;
    - to find reusers for the residues, such as alumina for production of green cement.

  The project proponent would be recommended to proactively seek the above, as these would reduce their operational costs.

4.5 "No Project" Option

With "No Project" the following scenario prevails:

- The spent catalyst would be buried in a secure landfill, thus shortening the secure landfill lifetime;
- Burying the spent catalyst constitutes disposal of a resource,
- Disposal of spent catalyst exposes the metals to leaching in future as metals never biodegrade;
- Without recovery, more mining for Molybdenum (Mo) and Vanadium (V) will be carried out, entailing deforestation, river pollution, etc., all of them contributing to global warming via reductions in green biomass and phytoplanktons;
- Mo and V will continue to deplete in global supply, affecting production of much needed high strength magnets essential for new developments such as electric vehicles, wind turbines, etc., all essential for combating global warming;
- Malaysia would not be an exporter of secondary Mo and V.

4.6 Conclusion on Project Option

Having considered various alternative options: from site, socioeconomics, process and "No Project" option, it is concluded that the options decided for this SCaRF are the best

possible, considering its location close to and within access to petrochemical and downstream industries, and with availability of clean gas fuel right in front of it; that the recovery of the highly valuable Molybdenum and Vanadium metals would reduce mining for them while making Malaysia an exporter of the metals and reducing secure landfill requirement for spent catalyst disposal; that the chosen process has been technically, environmentally and commercially proven via the same plant in Ako City, Japan, and that a “No Project” option would mean wastage of valuable metals and non-sustainable supply via mining.