

# ***INDUSTRIAL WATER MANAGEMENT***

## ***APPROPRIATE TECHNOLOGY***

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# *Appropriate Technology*

- *Wastewater characteristics*
- *Quality considerations*
- *Local resources*
- *Socio-political aspects*

# *Wastewater Characteristics*

- *Wastewater quality*
- *Wastewater flow*
- *Wastewater volume*
- *Pattern of flow*

# Wastewater Characteristics

- *Wastewater quality*
  - *is it from continuous or batch processing?*
  - *is it typical for the industry?*
  - *what type of contaminants are present*
    - *inorganic?*
    - *hard or soft COD?*
  - *how does the quality vary*
    - *diurnally?*
    - *seasonally?*
    - *with campaign manufacture?*

# Wastewater Characteristics

- *Wastewater flow*
- *Wastewater volume*
  - *what is the average daily or monthly volume*
- *Pattern of flow*
  - *is it continuous or intermittent*
  - *how variable is it*

# Quality Considerations

- *Discharge consent*
- *Quality for re-use*
- *Quality for recycle*

# Quality Considerations

- *Discharge consent*
  - *for sewer discharge*
  - *for discharge to surface water course*
- *Quality for re-use*
  - *what other water consumers are there?*
- *Quality for recycle*
  - *is there a specification?*
  - *is there a Standard that can be applied?*

# *Local Resources*

- *Utilities*
- *Chemicals*
- *Operating personnel*
- *Maintenance*

# Local Resources

## ➤ *Utilities*

- *are steam, cooling water, compressed air, etc available on site*
- *will it be necessary to provide a boiler, cooling tower, compressor*
- *is an electricity supply available*
- *is it reliable*
- *is standby generator and/or UPS needed*
- *what fuel?*

# Local Resources

## ➤ *Chemicals*

- *are any special chemicals needed (eg polymers or catalysts)*
- *are they available locally*
- *is a substitute acceptable*

# Local Resources

- *Operating personnel*
  - *what level of technical ability?*
  - *is a SCADA system appropriate or should control be manual?*
  - *what level of supervision is available?*

# Local Resources

## ➤ *Maintenance*

- *what level of technical ability is needed?*
- *can spares be manufactured locally?*
- *are special components necessary (eg membrane elements)?*
- *where is the nearest stockist?*
- *how long is delivery?*
- *what stocks are needed on site?*

# ***Socio-Political Aspects***

- *Appropriate*
- *Technology*
- *Sustainability*

# Socio-Political Aspects

## ➤ *Appropriate*

- *equipment suppliers in developed countries believe they can sell off their old technology at a profit in developing countries*
- *governments of developing countries believe that they will be popular if they import new technology from the developed world even if they have no supporting infrastructure*

# Socio-Political Aspects

## ➤ *Technology*

- *appropriate technology is simply the technology that will achieve the desired output (treated for discharge or recycle) quality and quantity from the available input (wastewater) quality and quantity in the light of the available local resources*

# Socio-Political Aspects

## ➤ *Technology*

- *photo-catalytic oxidation is not appropriate in N Europe where UV sources are expensive but is appropriate to tropical areas with free UV from sunlight*
- *be aware of the source of project finance - politicians*
- *sometimes overseas aid = overseas technology*

# ***Socio-Political Aspects***

## **➤ *Technology***

- *bankers and politicians usually have more influence than engineers in decision making***

# Socio-Political Aspects

## ➤ *Sustainability*

- *What is sustainability?*
- *Over what time frame?*
- *Within what boundaries?*
  - *environmental*
  - *political*
  - *economic*
  - *technological*