

# CIC



Conserve energy  
through oil recycling



خدمت فرسکیتزن سی. ای. سی. سنڈیرین برحد  
CIC ENVIRONMENTAL SERVICES SDN. BHD.

## Mission Statement

"We will do our very best to conserve the limited energy resources through oil recycling for sustainable developments to make this earth a pleasant place to live in.

## Introduction

In 1996, the Brunei Shell Petroleum Company invited tenders of waste oil treatment and recycling centre. Its own facility was nearing the end of its operational life so the input of a specialist contractor to design, build and operate a new facility was sought. After an extensive and thorough tender process, CIC Environmental Services Sdn Bhd was awarded the contract.

The waste treatment plant officially opened on 22 June 1998 in Kuala Belait, Brunei Darussalam. It is designed to process waste oil and oily water up to 5,000 tonnes per year.

CIC Environmental Services is a joint venture company between Cathay Scientific Instrument Company (Brunei), Inland Technologies Inc. (Canada) and Canora Brunei Environment Ltd. (Canada).

## Objectives

The treatment facility is designed for the following functions:

1. Receive waste oil and oily water delivered in drums or vacuum trucks.
2. Perform laboratory analysis of oil and wastewater.
3. Recover oil for heating fuel.
4. Treat oily water within environmentally safe standards prior to discharge.
5. Receive, wash and store drums prior to disposal or re-use

## Waste Management

Customers sending waste oil are required to issue a waste disposal form or consignment note with every shipment. This allows us to identify the source of the waste. The types of waste we accept are used lubricating oil, crude oil, oily water and other hydrocarbon based fluids. Vehicles delivering the waste oil are weighed before and after unloading, to determine the weight of waste oil delivered.

To ensure appropriate on-site waste control, the facility operates its own laboratory for screening of oil for potential contaminants such as PCB's, chlorinated hydrocarbons or other hazardous compounds. Waste oil with contaminants exceeding the limits shown in Table 1 have to be disposed by other methods in line with international standards.

The laboratory analysis results also determine whether the incoming waste should be treated using the oil recovery system or the waste water treatment process.

Contaminant	Acceptable limits (mg/kg)
Arsenic	5
Cadmium	2
Chromium	10
Lead	100
PCB	5
Total halogens	1000

Table 1. Acceptable limits of contaminants in used oil.



Waste oil is delivered to our plant, then will be weighed out before carrying out a sequence of examination.



The laboratory houses various analytical equipments which are used for determining the level of contaminants in waste oil and water before and after the treatment process.

## Waste Oil Recovery System

The oil recovery system is a batch process which allows blending of different wastes to meet the required product specifications. This is accomplished by transfer of raw waste oil from various 65m<sup>3</sup> holding tanks to a batch tank. The blended oil is then circulated through a fine mesh strainer to filter out any solids, before being pumped into a 20m<sup>3</sup> batch flash drum. In this drum, the mixture is circulated through a furnace which heats the oil to 100°C.

Light hydrocarbon and water vapour are evolved from the flash drum during heating. These vapours condense as they pass through the heat exchangers and drain to an overhead product separator. An overflow baffle plate inside this vessel

separates the light oil and water. Light oil is pumped out to fuel the furnace while the distilled water is discharged to the water treatment plant.

Meanwhile, heavy oil inside the batch flash drum continues to be heated until the temperature reaches 140°C. The product is now dehydrated and will be analyzed before being sold as industrial fuel.

Properties	Value
Density	0.88-0.89 g/ml
Water by distillation	<1%
Flashpoint	>60°C
KJ/Kg	42,800-43,000
Viscosity	30-80 Cst @40°C

Table 2. Typical specification of CIC's Re-processed Industry Fuel.



Draining oil drums.

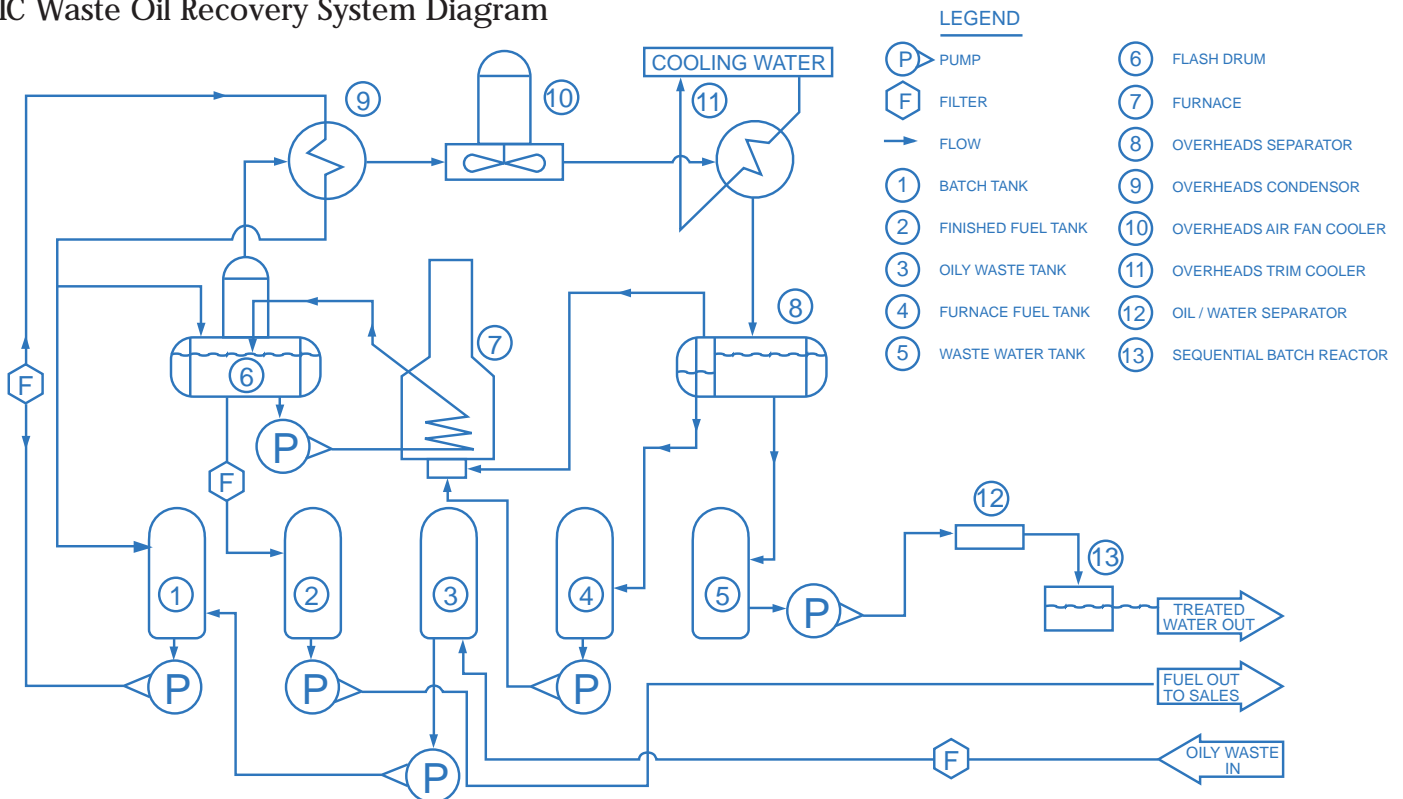


Furnace.



Oil Filtration.

## CIC Waste Oil Recovery System Diagram





## Water Treatment Process

The oily water treatment system is comprised of:

1. Oil/water separator
2. Sequential Batch Reactor (SBR)
3. Sludge basin

The oil/water separator is divided into three chambers arranged in series. The first chamber works as a sedimentation tank to trap sand and other particles. As the oily water flows across the second chamber, fixed friction plates in the water stream initiate oil/water separation. The third chamber acts as a polishing chamber, trapping any remaining oil which manages to pass through the second chamber.

The effluent from the oil/water separator, flows next into the Sequential Batch Reactor. The SBR is a concrete basin installed with a coarse bubble aeration system. It works by using the metabolic reactions of microorganisms to convert organic matter, which is a carbon and energy source for cell growth,

into new cell tissue and carbon dioxide. Effluent from the SBR is discharged to the municipal sewage treatment plant. Samples are taken regularly to make sure that the quality complies with the wastewater discharge regulations.

To maintain a balance between the microorganisms and the amount of food, it is necessary to remove excess sludge (biological solids) periodically. Excess sludge is transferred to the sludge holding basin by an air-lift pump.



Oily wastewater undergoes a series of treatment including the use of microorganism.



Periodic collection of sample to ensure the effluent is within the internationally acceptable standards

## Drums Processing Area



All drums will undergo a cleaning process before being crushed to a smaller form.



Crushed drums are stored in piles for collection.



Washed drums storage.

## Product

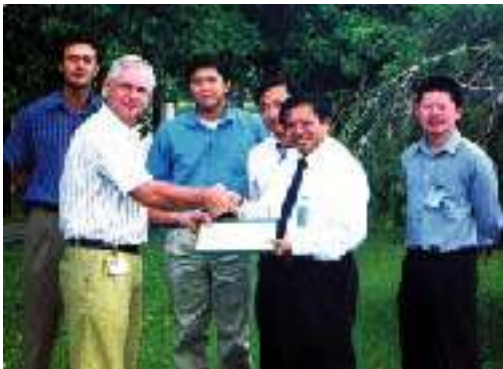
Oil recovered from our treatment plant is in compliance with international standards. Recovered oil which is also commonly known as Re-processed Industry Fuel is widely used as energy fuel at asphalt plants, in brickwork factories and textile factories.

## To the public

Each year, CIC Environmental Services is visited by various institutions such as schools and companies from all over Brunei Darussalam. We strongly encourage these visits and are very much obliged to share the knowledge and solutions we have in waste oil management. Our main objective is to minimise the damaging effects the commercial activities can bring to the environment. Through these visits and some environmental awareness projects we have organised for school children, we believe that commitment and responsibility will follow in most, if not all, of Brunei's people to protect and preserve the environment for the future generations to hold.



Minister of Development, Yang Amat Mulia Pengiran Indera Wijaya Pengiran Dr Haji Ismail Bin Pengiran Haji Damit declared the Waste Treatment Plant officially opened.



Dato Razak presenting the first certificate environmental practice to Johan Kwant.



CIC participation in Brunei Shell Petroleum's Corporate Health, Safety and Environment Week.



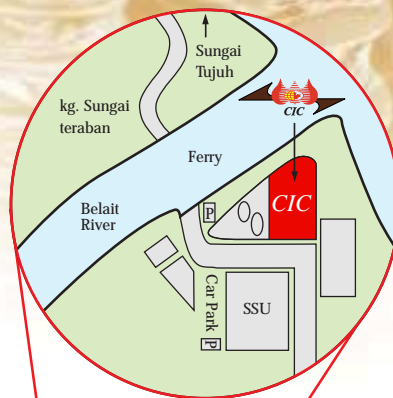
Visitors at the Shell Environment week.



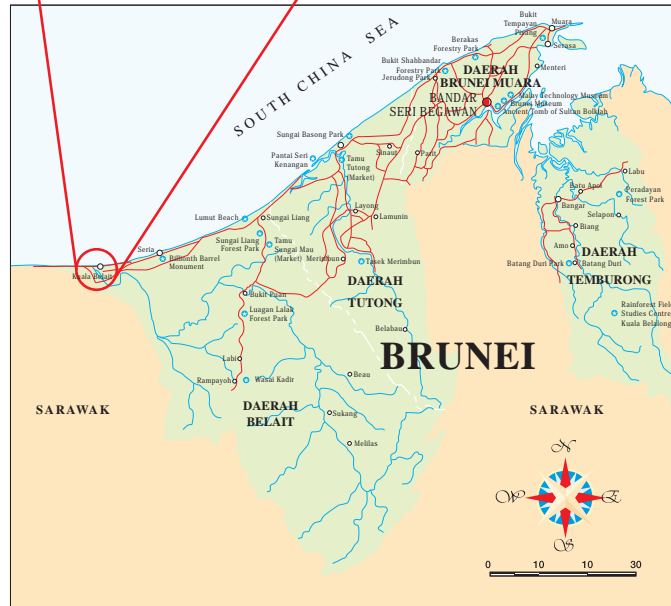
CIC welcomes schoolchildren as part of its environment awareness campaign.



A painting from Interschool Painting and Essay Competition on Recycled Oil.



### Our Location



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