USED LUBE OIL RE-REFINING

A SUCCESSFUL INVESTMENT

STP PRESENTATION

STP - Studi Tecnologie Progetti S.p.A.
Engineering & Contractor
P.le Ezio Tarantelli, 97 – 00144 Rome, Italy
stp@stpitaly.eu
Oil recycling proves its worth
Re-refining of used lube oil is an economically attractive recycling method in terms of resources conservation and environment protection. It allows processing of hazardous material in a safe and effective way to recover an high quality oil product.

This result in a strong economic incentive for re-refining considering oil price.

Re-refining can produce base oils Group I and II or VGO that is a suitable feedstock to FCC or HDC Refinery Units.

Used lube oil is generally a mixture of different types and grades of used lube oils, coming from motor crankcases and industry users.

Used lube oil is made up of a multitude of small individual batches collected at garages, maintenance shops, transportation companies and industries and depends on local situation, seasonal consumption, collection source and organization.

2 liters of Used Lube Oil

give

1,5 liters of Rerefined Oil
LUBE OIL LIFE CYCLE

Lube oil Production

Used Oil Re-Refining

Lube oil marketing

Lube oil user

Used lube oil Collection
used lube oil is collected and sent to re-refining…

to give Re-refined Base Oil for lubricants production
USED LUBE OIL RE-REFINING ADVANTAGES

- Environment Protection
- Energy consumption lower than for virgin base oil production
- High quality products and less dependence on imported oil

Re-refining is a strong economic incentive for environment protection and energy saving
SUCCESS OF RE-REFINING depends on the COLLECTION SYSTEM.

USED LUBE OIL COLLECTION

Collection of used lube oil is the starting point for a successful Re-refining. Re-refining depends on collection effectiveness and used lube oil availability. Efficient collection facilities are a necessity for Re-refining in relation to:

- Availability of used lube oil (quantity)
- Composition of used lube oil (quality)
USED LUBE OIL COLLECTION STRATEGY

- Investigation on used lube oil providers
- Division of the territory in Areas and Sectors
- Storage capacity of collection centres
- Transport network and drivers formation
- Pre-selection tests
- Segregation of contaminants
USED LUBE OIL RE-REFINING

USED LUBE OIL PRESELECTION TESTS

- PCB / PCT, wt ppm  25 max
- Cl, wt %  0.5 max
- S, wt %  1.5 max
- Saponification N°, mgKOH/g  20 max
- Heavy fuel oil (drop test)  pass
- Fatty acids (lux test)  pass
Re-refining removes all the contaminants from used lube oil to recover base lube oil product.

During the last years many factors have obliged re-refiners to look for alternative re-refining process, such as:

- increased use of additive packages in the formulation of lubricants and by consequence higher level of contaminants in the used oil
- increased amount of thermal degradation products due to longer mileage of the lubricants
- pollution problems related to the disposal of acid sludges and spent clay from the traditional acid/clay re-refining

Among the available today processes, STP Re-refining offers a low energy high yield operation, high quality products and absence of noxious wastes or by products.
STP is pioneer on Used Lube Oil Re-refining since 25 years.

STP has implemented several Re-refining Plants worldwide and is providing the last generation Re-refining Process based on unicum know-how.
Advantages of STP Re-refining Process

- Continuous Plant operation
- High flexibility towards feedstock quality and composition
- High process yield. The lube oil recovery is more than 95% of the lubricant fraction present in the used oil.
- High separation selectivity, removal of contaminants and production of high quality base oils
- Low energy and low utility consumption
- High on-stream efficiency without corrosion, fouling, coking
- Environment safeguarding operation and no use of acid and clays
- Management of all odorous compounds to eliminate malodorous and toxic emissions
- Capital investment and operating cost highly competitive
STP Re-refining Process

STP Re-refining process removes all the contaminants from the used lube oil and recovers a distillate product as VGO or high quality base oil either API Group I by chemical finishing or API Group II by hydrofinishing.

STP Re-refining process does not release harmful or pollutant wastes to be disposed and is therefore environment friend.

Effluents are oily drains and oily process water sent to treatment before disposal and off gas from vacuum ejector sets routed to thermal oxidizer to prevent smelling.
API Definitions for Base Oils

Guidelines on Base Oil Quality Assurance and Base Oil Interchange classify base stocks into six base stock groups according to defined physical and chemical characteristics as follows:

**Group I** Base stocks containing less than 90 mass percent saturates and/or greater than 0.03 mass percent sulphur and having a viscosity index greater than or equal to 80 and less than 120.

**Group II** Base stocks containing greater than or equal to 90 mass percent saturates and less than or equal to 0.03 mass percent sulphur and having a viscosity index greater than or equal to 80 and less than 120.
**API Definitions for Base Oils (cont’d)**

**Group III**  Base stocks containing greater than or equal to 90 mass percent saturates and less than or equal to 0.03 mass percent sulphur and having a viscosity index of greater than or equal to 120.

**Group IV**  Base stocks are polyalphaolefins (PAO)

**Group V**  All base stocks not included in Groups I, II, III, IV or VI.

**Group VI**  Base stocks are polyinternalolefins (PIO)

The analytical methods used in the definition of the above base stock groups are:

<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>TEST METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saturate content</td>
<td>ASTM D 2007</td>
</tr>
<tr>
<td>Viscosity index</td>
<td>ASTM D 2270</td>
</tr>
<tr>
<td>Sulphur content</td>
<td>ASTM D 2622</td>
</tr>
<tr>
<td></td>
<td>ASTM D 4294</td>
</tr>
<tr>
<td></td>
<td>ASTM D 4927</td>
</tr>
<tr>
<td></td>
<td>ASTM D 3120</td>
</tr>
</tbody>
</table>
STP Re-refining Process

Unit Operations

- Dehydration
- Gas oil removal
- Vacuum distillation
- Finishing and final fractionation
**Dehydration:** used oil is preheated to remove water, gasoline, VOC, light contaminants (solvents, glycols, lighter organic). Water is sent to treatment and lights (gasoline) are used as substitution fuel.

**Gasoil removal:** dehydrated oil is stripped under vacuum for light gasoil removal and flash point adjustment of lube oil.

**Vacuum distillation:** oil from gasoil stripper is sent to vacuum distillation to recover vacuum distillate oil fraction from “heavier than” contaminants. Vacuum distillation is carried out under high vacuum conditions, high temperature and by thin film evaporator.

Thin film evaporator achieves high selectivity and oil purification from metals, heavy polymers, carbon, dust.
Thin film evaporator is a vertical cylindrical shell enclosed in an heating jacket with an internal rotor distributing a thin layer of oil on the heated wall, by means of rotating blades.
By the action of rotor (electrically driven) high turbulence and back mixing occur in the thin layer of the oil film and product degradation at high temperature is avoided.

Main features of thin film evaporator are:
- short residence time in order of 10 seconds;
- high heat transfer rate through the film;
- efficient and regenerative cleaning of the contact surface

Cracking and fouling problems are avoided by keeping low residence time, low wall temperature and high flow turbulence.
Lube oil is recovered as distillate while heavy components, additives, metals and degradation products are concentrated in the bottom residue.
**OPERATING PRINCIPLE**

A Thin Film Evaporator consists of a cylindrical shell with internal rotor and external heating jacket.

**FEED**

The feed is distributed by the rotor blades and spread on the heated wall to form an highly turbulent thin layer.

**PRODUCTS**

Oil fractions are evaporated and flow out up towards the top.

Heavy components flow in a spiral path down to the bottom.
THIN FILM EVAPORATOR

FEATURES

- Short residence time and high turbulence in the film give high heat transfer coefficient and avoid overheating, cracking and fouling.

- High evaporation rate is obtained by a simple pass.

- High oil yield is achieved without degradation or polymerization of the oil.

- High onstream factor and easy maintenance.
**PROCESS DESCRIPTION (cont’d)**

- **Finishing and final fractionation**: vacuum distillate is further finished to improve product quality.

  Finishing is done by Chemical Reactor (VGO and Base oil API Group I) or Hydrofinishing (Base oil API Group II).

  Hydrofinishing provides deep removal of further contaminants such as chlorinated, sulfurous, and oxygenated organic compounds and polyaromatic hydrocarbons.

  Mild Hydrofinishing is also used to improve the colour of Bas oil API Group I.

  Severe Hydrofinishing is required to produce Base oils API Group II.

  Finished oil is then fractionated to produce light base oil and heavy base oil.
STP Re-refining Process Merits

✓ Eleven (11) Used Lube Oil Re-refining Plants implemented worldwide from 16,000 Ton/year to 120,000 Ton/year capacity

✓ Advanced vacuum system for high vacuum level stability, based on the combined use of steam ejectors and individual tubular condensers.

✓ High efficiency/low pressure drops structured packing in Vacuum Distillation and Final Fractionation, to reduce pressure drops and upgrade oil yield and product separation.

✓ Fixed blades Thin film evaporator to avoid coking and fouling.

✓ Special type of API pumps and instrumentation for critical services.
STP Re-refining Process Merits (cont’d)

✓ All pumps doubled to avoid plant shut down in case of pump failure.
✓ Full DCS/PLC plant automation for continuous operation.
✓ Indirect heating of heavy streams to prevent fouling.
✓ Special mechanical design for thermal flexibility, vacuum operation and fouling services.
✓ Use of antifouling to reduce maintenance and cleaning operation.
✓ Proprietary design of Base Oil Finishing for Group I and Group II
USED LUBE OIL RE-REFINING

PRODUCTS CHARACTERISTICS

LIGHT GASOIL

Specific gravity at 15 °C 0.850
End point, °C 370
Viscosity, cst at 40 °C 3-5
Sulfur, wt% 0.45 (after Hydrofinishing: 50 – 100 ppm)
Colour 2.5 (after Hydrofinishing: L 1.0)
Cetane Index 50-55
Flash point, °C 80

Gasoil can be used as substitution fuel in the Plant or as light fuel oil in industrial fired heaters and/or boilers.
**PRODUCTS CHARACTERISTICS**

**VGO**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distillation range, °C</td>
<td>370 - 550</td>
</tr>
<tr>
<td>Specific gravity at 15°C</td>
<td>0.868</td>
</tr>
<tr>
<td>Viscosity, cst @ 40°C</td>
<td>25-30</td>
</tr>
<tr>
<td>Flash point, °C</td>
<td>210 min</td>
</tr>
<tr>
<td>Sulfur, wt%</td>
<td>0.25</td>
</tr>
<tr>
<td>CCR, wt%</td>
<td>0.1 max</td>
</tr>
<tr>
<td>TAN, mgKOH/g</td>
<td>0.1 max</td>
</tr>
<tr>
<td>Ashes, wt%</td>
<td>0.2</td>
</tr>
<tr>
<td>Metals content, wt ppm</td>
<td>10 max</td>
</tr>
</tbody>
</table>

VGO is used as feedstock to FCC or HDC Refinery Units
## PRODUCTS CHARACTERISTICS

### RE-REFINED BASE OILS

**API GROUP II**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Light Base Oil</th>
<th>Heavy Base Oil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific gravity at 15 °C</td>
<td>0.870</td>
<td>0.885</td>
</tr>
<tr>
<td>Viscosity, cst at 40 °C</td>
<td>25-32</td>
<td>85-95</td>
</tr>
<tr>
<td>Sulfur, wt%</td>
<td>&lt;0.03</td>
<td>&lt;0.03</td>
</tr>
<tr>
<td>Saturates, wt%</td>
<td>≥90</td>
<td>≥90</td>
</tr>
<tr>
<td>CCR, wt%</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Colour</td>
<td>L 1.0</td>
<td>1.5</td>
</tr>
<tr>
<td>TAN, mg KOH/g</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Flash point, °C</td>
<td>220</td>
<td>260</td>
</tr>
<tr>
<td>Pour point, °C</td>
<td>-3</td>
<td>-6</td>
</tr>
<tr>
<td>Metals, ppm</td>
<td>absent</td>
<td>absent</td>
</tr>
</tbody>
</table>
## Products Characteristics

### Rerefined Base Oils

#### API Group II

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Light Base Oil</th>
<th>Heavy Base Oil</th>
</tr>
</thead>
<tbody>
<tr>
<td>VI</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>PCB, wt ppm</td>
<td>&lt;1</td>
<td>&lt;1</td>
</tr>
<tr>
<td>PCT, wt ppm</td>
<td>&lt;5</td>
<td>&lt;5</td>
</tr>
<tr>
<td>PNA, wt ppm</td>
<td>&lt;1000</td>
<td>&lt;1000</td>
</tr>
<tr>
<td>Cl, wt ppm</td>
<td>&lt;1</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Cu corrosion</td>
<td>1a</td>
<td>1a</td>
</tr>
<tr>
<td>Noack evaporation loss</td>
<td>15.0</td>
<td>2.5</td>
</tr>
<tr>
<td>Saponification N°</td>
<td>&lt;0.5</td>
<td>&lt;0.5</td>
</tr>
<tr>
<td>Demulsification N°</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Oxidation stability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CCR increase, %</td>
<td>0.10</td>
<td>0.15</td>
</tr>
<tr>
<td>Viscosity ratio @ 40°C</td>
<td>1.09</td>
<td>1.1</td>
</tr>
<tr>
<td>Color stability</td>
<td>1.0</td>
<td>1.0</td>
</tr>
</tbody>
</table>
## RE-REFINED BASE OILS

### API GROUP I

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Light Base Oil</th>
<th></th>
<th>Heavy Base Oil</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mild Hydrofinish</td>
<td>Chemical Treatment</td>
<td>Mild Hydrofinish</td>
<td>Chemical Treatment</td>
</tr>
<tr>
<td>Specific gravity at 15 °C</td>
<td>0.870</td>
<td>0.870</td>
<td>0.885</td>
<td>0.885</td>
</tr>
<tr>
<td>Viscosity, cst at 40 °C</td>
<td>25-32</td>
<td>25-32</td>
<td>85-95</td>
<td>85-95</td>
</tr>
<tr>
<td>Sulfur, wt%</td>
<td>0.05</td>
<td>0.25</td>
<td>0.05</td>
<td>0.30</td>
</tr>
<tr>
<td>CCR, wt%</td>
<td>&lt;0.01</td>
<td>0.05</td>
<td>&lt;0.01</td>
<td>0.07</td>
</tr>
<tr>
<td>Colour</td>
<td>1.0</td>
<td>2.0</td>
<td>1.5</td>
<td>2.5</td>
</tr>
<tr>
<td>TAN, mg KOH/g</td>
<td>&lt;0.01</td>
<td>0.03</td>
<td>&lt;0.01</td>
<td>0.05</td>
</tr>
<tr>
<td>Flash point, °C</td>
<td>220</td>
<td>220</td>
<td>260</td>
<td>260</td>
</tr>
<tr>
<td>Pour point, °C</td>
<td>-3</td>
<td>-3</td>
<td>-6</td>
<td>-6</td>
</tr>
<tr>
<td>Metals, ppm</td>
<td>absent</td>
<td>L 10</td>
<td>absent</td>
<td>L 10</td>
</tr>
</tbody>
</table>
RESIDUE contains high quantity of polymers and metals and can be used for asphalt blending, production of paving asphalt, bitumen protective covering or as fuel in the cement factories.
# OVERALL MATERIAL BALANCE

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Used Lube Oil</strong></td>
<td>100</td>
</tr>
</tbody>
</table>

## PRODUCTS

<table>
<thead>
<tr>
<th>Product</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Water and Light Ends</td>
<td>7</td>
</tr>
<tr>
<td>Light Gasoil</td>
<td>5</td>
</tr>
<tr>
<td>Lube Oil</td>
<td>75</td>
</tr>
<tr>
<td>Asphaltic Residue</td>
<td>13</td>
</tr>
</tbody>
</table>
Utilities Systems & Offsite facilities for Re-refining Unit

- Electric power system
- Steam system
- Cooling water system
- Compressed air system
- Sour Water Stripper
- Waste Water Treatment
- Thermal Oil System
- Thermal Oxidizer
- Hydrogen Plant (in case of Hydrofinishing)
- Fire fighting system
- Flare system (in case of Hydrofinishing)
- Used oil and Products storage and loading system
Utilities Consumption (per MT of Used Lube Oil)

<table>
<thead>
<tr>
<th></th>
<th>VGO or Base oil API Group I production</th>
<th>Base oil API Group II production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric power, Kwhr</td>
<td>25</td>
<td>65</td>
</tr>
<tr>
<td>Cooling water, m³</td>
<td>50</td>
<td>75</td>
</tr>
<tr>
<td>Steam, Kg/hr</td>
<td>400</td>
<td>680</td>
</tr>
<tr>
<td>Fuel, $10^3$Kcal (Thermal Oil System)</td>
<td>200</td>
<td>530</td>
</tr>
<tr>
<td>Chemical, Kg</td>
<td>7.5</td>
<td>-</td>
</tr>
<tr>
<td>Hydrogen, Nm³</td>
<td>(Note 1)</td>
<td>100 (Note 2)</td>
</tr>
</tbody>
</table>

Note:
1 – Hydrogen consumption in case of Mild hydrofinishing is 35 Nm³/Ton of distillate.
2 – Nm³/Ton of distillate.
OPERATION STAFF

Operating labour requirements is depending on Plant operating philosophy, site location, Plant implementation within an existing complex.

Typical labor and technical staff requirement of the Re-refining Unit is as follows:

<table>
<thead>
<tr>
<th>Role</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant Manager</td>
<td>1</td>
</tr>
<tr>
<td>Plant Operation</td>
<td></td>
</tr>
<tr>
<td>• Supervisor/Board person (1 per shift)</td>
<td>4</td>
</tr>
<tr>
<td>• Operators (2 per shift)</td>
<td>8</td>
</tr>
<tr>
<td>Maintenance/Workshop</td>
<td></td>
</tr>
<tr>
<td>• Supervisors</td>
<td>1</td>
</tr>
<tr>
<td>• Workers</td>
<td>4</td>
</tr>
<tr>
<td>Laboratory</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>20</td>
</tr>
</tbody>
</table>

The staffing estimate is provided as a guideline and is intended for preliminary assessment.
LAND AREA REQUIREMENT

The Used Oil Re-refining Unit is a very compact facility.

Typical layout area required for a 50,000 MTPY Re-refining Unit ISBL is as follows:

Production of Base Oil API Group I or VGO (without Hydrofinishing) 1,300 sq.mt
Production of Base Oil API Group II (with Hydrofinishing) 2,600 sq.mt
Used Lube Oil Re-refining

FLOW SCHEMES
USED LUBE OIL RE-REFINING

Used Lube Oil Re-refining

Block Scheme

1. DEHYDRATION
2. GASOIL STRIPPING
3. VACUUM DISTILLATION
4. FINISHING
5. FINAL FRACTIONATION

Inputs:
- USED OIL
- RESIDUE

Outputs:
- GASOIL
- WATER AND LIGHT ENDS
- SN 150
- SN 500
USED LUBE OIL RE-REFINING

Used Lube Oil Re-refining
VGO production
USED LUBE OIL RE-REFINING

Used Lube Oil Re-refining

Base oil API Group I production (without Hydrofinishing)
USED LUBE OIL RE-REFINING

Used Lube Oil Re-refining
Base oil API Group II and API Group I (Mild Hydrofinishing)
USED LUBE OIL RE-REFINING

Used Lube Oil Re-refining
Base oil API Group II and API Group I (Mild Hydrofinishing)
USED LUBE OIL RE-REFINING

Used Lube Oil Re-refining

PLANT 3D MODELING
Used Lube Oil Re-refining
PLANT 3D MODELING
USED LUBE OIL RE-REFINING

Used Lube Oil Re-refining

PLANT 3D MODELING
USED LUBE OIL RE-REFINING

Used Lube Oil Re-refining

PLANT 3D MODELING
USED LUBE OIL RE-REFINING

Used Lube Oil Re-refining

PLANT 3D MODELING
USED LUBE OIL RE-REFINING

STP REFERENCE PLANTS

STP - Studi Tecnologie Progetti S.p.A
Engineering & Contractor
P.le Ezio Tarantelli, 97 – 00144 Rome, Italy
stp@stpitaly.eu
USED LUBE OIL RE-REFINING

Client: TOTAL / VEOLIA – OSILUB
Gonfreville L’Orcher – France

Capacity: 120,000 Ton/year

Year: Completed 2012
USED LUBE OIL RE-REFINING

Client: TOTAL / VEOLIA – OSILUB
Gonfreville L’Orcher – France
Capacity: 120,000 Ton/year
Year: Completed 2012
Client: TOTAL / VEOLIA – OSILUB  
Gonfreville L’Orcher – France  
Capacity: 120,000 Ton/year  
Year: Completed 2012
USED LUBE OIL RE-REFINING

Client: TOTAL / VEOLIA – OSILUB
Gonfreville L’Orcher – France
Capacity: 120,000 Ton/year
Year: Completed 2012
USED LUBE OIL RE-REFINING

Client: TOTAL / VEOLIA – OSILUB
Gonfreville L’Orcher – France
Capacity: 120,000 Ton/year
Year: Completed 2012
USED LUBE OIL RE-REFINING

Client: TOTAL / VEOLIA – OSILUB
Gonfreville L’Orcher – France

Capacity: 120,000 Ton/year
Year: Completed 2012
USED LUBE OIL RE-REFINING

Client: TOTAL / VEOLIA – OSILUB
Gonfreville L'Orcher – France
Capacity: 120,000 Ton/year
Year: Completed 2012
USED LUBE OIL RE-REFINING

Client: TOTAL / VEOLIA – OSILUB
Gonfreville L’Orcher – France

Capacity: 120,000 Ton/year

Year: Completed 2012
USED LUBE OIL RE-REFINING

Client: TOTAL / VEOLIA – OSILUB
Gonfreville L'Orcher – France
Capacity: 120,000 Ton/year
Year: Completed 2012
USED LUBE OIL RE-REFINING

Client: TOTAL / VEOLIA – OSILUB
Gonfreville L’Orcher – France

Capacity: 120,000 Ton/year
Year: Completed 2012
USED LUBE OIL RE-REFINING

Client: TOTAL / VEOLIA – OSILUB
Gonfreville L’Orcher – France

Capacity: 120,000 Ton/year
Year: Completed 2012
Client: VEOLIA ES CANADA  
St. Hyacinthe, Quebec  
Capacity: 60,000 Ton/year  
Year: Completed 2013
USED LUBE OIL RE-REFINING

Client: VEOLIA ES CANADA
St. Hyacinthe, Quebec

Capacity: 60,000 Ton/year

Year: Completed 2013
USED LUBE OIL RE-REFINING

Client: VEOLIA ES CANADA
St. Hyacinthe, Quebec

Capacity: 60,000 Ton/year

Year: Completed 2013
USED LUBE OIL RE-REFINING

Client: VEOLIA ES CANADA
St. Hyacinthe, Quebec

Capacity: 60,000 Ton/year

Year: Completed 2013
Client: VEOLIA ES CANADA
St. Hyacinthe, Quebec

Capacity: 60,000 Ton/year

Year: Completed 2013
USED LUBE OIL RE-REFINING

Client: KLOC KSCC
Ahmadi, Kuwait

Capacity: 33,000 Ton/year

Year: In progress - Completion 2014
USED LUBE OIL RE-REFINING

Client: ECOIL ITALIA  
Capacity: 65,000 Ton/year  
Year: In progress - Completion 2014
USED LUBE OIL RE-REFINING

Client: SIRAL S.p.A.
Nola, Italy

Capacity: 30,000 Ton/year
Year: Completed 2007
Client: SIRAL S.p.A.
Nola, Italy

Capacity: 30,000 Ton/year

Year: Completed 2007
USED LUBE OIL RE-REFINING

Client: SIRAL S.p.A.
Nola, Italy

Capacity: 30,000 Ton/year

Year: Completed 2007
Client: SIRAL S.p.A.  
Nola, Italy

Capacity: 30,000 Ton/year

Year: Completed 2007
Client: KLOC Kuwait Lube Oil Company  
Ahmadi, Kuwait  
Capacity: 27,000 Ton/year  
Year: Completed 2000
USED LUBE OIL RE-REFINING

Client: KLOC Kuwait Lube Oil Company
Ahmadi, Kuwait

Capacity: 27,000 Ton/year
Year: Completed 2000
USED LUBE OIL RE-REFINING

Client: KLOC Kuwait Lube Oil Company
Ahmadi, Kuwait

Capacity: 27,000 Ton/year
Year: Completed 2000
Client: SOTULUB Société Tunisienne de Lubrifiants
Bizerte, Tunisia

Capacity: 20,000 Ton/year
Year: Completed 1999
USED LUBE OIL RE-REFINING

Client: GROUPO LWART
Lencois Paulista, Brazil

Capacity: 60,000 Ton/year

Year: Completed 1998
USED LUBE OIL RE-REFINING

Client: RAMOIL
Naples, Italy

Capacity: 30,000 Ton/year

Year: Completed 1996
USED LUBE OIL RE-REFINING

Client: SOTULUB Société Tunisienne de Lubrifiants
Bizerte Tunisie

Capacity: 16,000 Ton/year

Year: Completed 1989
USED LUBE OIL RE-REFINING

Client: SOTULUB Société Tunisienne de Lubrifiants
Bizerte Tunisie

Capacity: 16,000 Ton/year
Year: Completed 1989
USED LUBE OIL RE-REFINING

Client: EKVE/LPC
Aspropyrgos, Greece

Capacity: 25,000 Ton/year

Year: Completed 1985
USED LUBE OIL RE-REFINING

Client: EKVE/LPC  
Aspropyrgos, Greece

Capacity: 25,000 Ton/year

Year: Completed 1985
USED LUBE OIL RE-REFINING

Client: EKVE/LPC
Aspropyrgos, Greece

Capacity: 25,000 Ton/year

Year: Completed 1985
Carlo G. Lombardi

Carlo G. Lombardi is the Chief Executive Officer and Managing Director of STP, Studi Tecnologie Progetti S.p.A..

Carlo has more than 30 years experience in design and implementation of Used Lube Oil Re-refining Plants and is a recognized worldwide leading expert of Used Lube Oil Re-refining and one of the pioneer of the Re-refining technology based on thin film evaporator and hydrofinishing process.

Carlo has published several papers on Used Lube oil Re-refining and is lecturer at the Industrial Chemistry Institute of Chemical Engineering College, Rome University.
Carlo contribution to Re-refining research and development includes:

- Pilot testing for the application of thin film evaporator to Used Lube Oil Re-refining at HABERLAND Co., Dollbergen, Germany, year 1980
- Implementation of the first industrial Re-refining plant based on Film Evaporator at EKVE/LPC Industries, Aspropyrgos, Greece, year 1983 - 1985
- Cooperation with the Italian “Consortium of Used Lube Oil” to set up the procedures and regulations for the specification and collection of the Used Lube Oil in Italy, year 1984
- Cooperation with Tunisian Authorities to the assessment of regulation and quality specification of used lube oil and re-refined lube oil in Tunisia, year 1987
- Cooperation with REDOIL Italy, partner of Chall-Oils USA, for the formulation of finished lubricants from re-refined oils including Motor Oil, Transmission Fluids, White Oils, Industrial Oils, year 2005
- Cooperation with AGIP PETROLI, Italy, on lubricants production, marketing and selling, year 2006.
STP Publications and Conferences on Used Lube Oil Re-refining:


- *Modification of existing re-refining units and realization of new modular units*, NORA Conference and Trade Show, Palm Springs, USA, November 1999


Dear Mr. Lombardi,

I am pleased to advise that UNEP’s International Environmental Technology Centre has undertaken a project to develop a Compendium of Destruction Technologies for waste oils. The compendium will include both technologies for waste oil recycling as well as destruction technologies for non-recyclable oils through converting it into fuel and/or incinerating it. The objective is to assist developing countries with information on destruction technologies and to enable them to assess different technologies in order to select the one suitable for their local conditions.

We are working with the Institute of Management and Technology, India, on this project. Apart from the Compendium, we will also develop interactive software to facilitate the technology selection process. A draft version of the compendium and the interactive software will soon be ready.

In order to enrich the work with the knowledge and inputs from international experts, we are organizing an International Experts Workshop in New Delhi, India from 10 November to 2 December 2011. Noting your expertise and experience in the field of waste management, we would like to invite you as an expert to the workshop and request you to provide your valuable inputs. Please confirm your attendance to Mr. Suraj Prakash Chandok, Senior Programme Officer, Email: suraj.potchikumar@unep.org with copy to Ms. Karmen Denis, Programme Assistant, Email: karmen.denis@unep.org

The detailed agenda of the Workshop is attached. The venue of the workshop will be Hotel Chanakya (formerly Quest Palace), Unit of Eklavya Hotels Pvt. Ltd. Madhav Jyoti Singh Sagar, New Delhi - 110064. Upon receiving your confirmation, we will send you the draft compendium which will be discussed in the meeting.

In the light of STP’s status as a large multinational company, we look forward to your early confirmation and participation in the workshop.

Sincerely yours,

Matthias Cebi
Director

Mr. Carla Centeno Lombardi
CEO/Managing Director
STP S.p.A. Autolubriplus S.r.l.
Pianello, Via Trento, 97
31044 - Rovigo, Italy
E-mail: calombardi@spoil.it

Attachment: Agenda of the workshop
UNEP International Expert’s Workshop, New Delhi - India

International Experts’ Workshop on
Destruction Technologies for Waste Oils

Certificate of Participation

This is to certify that Mr./Ms. Carla Guidova Lombardi has participated in the International Workshop of experts for reviewing the draft manuscript of “Destruction Technologies for Waste Oils” held in New Delhi – India, during 30th Nov. 2011 to 2nd December 2011 in India, and has contributed in modifying the document. The workshop was organized by the United Nations Environment Programme UNEP-DTIE-IETC in collaboration with Birla Institute of Management Technology, Greater Noida – India.

Dr. H. Chaturvedi
Director, BIMTECH
USED LUBE OIL RE-REFINING

STP attendance to NORA Conference

at Palm Springs (USA)
USED LUBE OIL RE-REFINING

STP attendance to NORA Conference at Palm Springs (USA)

1999 LIQUID RECYCLING CONFERENCE AND TRADE SHOW
PALM SPRINGS – November 10 – 13, 1999

MODIFICATION OF EXISTING REREFINING UNITS
AND REALIZATION OF NEW MODULAR UNITS

Mr. Carlo G. Lombardi
Chief Executive Officer
S.T.P. - STUDIES TECHNOLOGIES PROJECTS S.r.l – Rome, Italy
CONTACT US

STP – Studi Tecnologie Progetti S.p.A.
Piazzale Ezio Tarantelli, 97
00144 – Rome, Italy

Tel. ++39-06-526257
Fax. ++39-06-52201078

E-mail: stp@stpitaly.eu
Web Site: www.stpitaly.eu