LAIT is a new joint venture between LOFARMA S.p.A., a leading pharmaceutical Italian company based in Milan and other partners connected with the wool industry (with a special focus on the wool combing sector).

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ALBERTO PERETTI email: alpe@lanolina.it

COMPANY MISSION

LAIT is an engineering and consulting firm 360° operating in the wool industry with a special focus on wool scouring and wool combing sector. In addition, LAIT operates a new technology for reducing COD content in wool scouring effluents through enhancement of wool grease yield extraction out of wool scouring effluents.

THE TEAM

Heritage of a long lasting history

We all draw our skills from the tradition and the state of the art know how of Pettinatura Italiana (PIV) that has been the undisputed leading combing mill in the world for more than one century (both for technology and size: just to give an idea at the times of PB30-PB31 we used to operate in our lines a total of 200 combing machines).

We have teached to many people that are currently managing combing mills worldwide the secrets of wool scouring and combing. Many others have just copied our solutions and are still imitating what we have invented many years ago.

We have been working for decades in partnership with the leading textile machines builders for enhancing automation and performances of the hardware.
We have been combing (on commission only) for the top wool traders and manufacturers for many decades. We have visited many combing mills worldwide and we saw that the evolution gap dividing PIV from the most of the other combing mill is still consistent. Few years ago PIV has stopped its activity but we believe there is a strong need for PIV know how in the combing sector right now.

**BUSINESS LINES**

**ENGINEERING AND CONSULTING**

LAIT ENGENEERING is the branch of the Company devoted to support who operates in different sectors of the wool industry and needs fresh efficient ideas for enhance their performance. The Company acts as a consultancy firm and support the Client till success.

We operate mainly in wool and animal fibres sector, from origin (combing) to spinning and/or fleece (felt, padding, nonwoven, isolating panels). We have a special focus in streamlining of wool scouring lines and optimisation of effluent treatment, as well as in design and engineering of wool combing plants.

**WOOL GREASE EXTRACTION**

Our top achievement is a state of the art plant for performing a disruptive process for improving the yield of wool grease recovering through centrifugation (after acid cracking).

The project was born mainly as a system for reducing the COD load of the ETP plant and get savings in ETP running costs.

Our assumption was easy: given that wool grease is the main responsible of COD and the most difficult contaminant to eliminate in the wool scouring effluents, let’s remove it as much as we can and the soonest! The goal of reducing ETP costs was immediately reached.

Then it came out the extracted wool grease was not just a waste but a fully tradable product: the effect on the yearly turnover and margins was consistent.

The outcome of the plant were so astonishing that the company decided to focus its activity on this specific business.

**WOOL SCOURING EFFLUENTS TREATMENT**

Biologic and sustainable know how in waste water treatment. LAIT staff has the world widest experience in operating a biological waste water treatment based on a 100% oxidation process (as everybody knows, biological treatment is the best and cheapest way to treat wool scouring effluents).
LAIT ENGINEERING is the branch of the Company devoted to support who operates in different sectors of the wool industry and needs fresh efficient ideas for enhance their performance. The Company acts as a consultancy firm and support the Client till success. We operate mainly in wool and animal fibres sector, from origin (combing) to spinning and/or fleece (felt, padding, nonwoven, isolating panels). We have a special focus in streamlining of wool scouring lines and optimisation of effluent treatment, as well as in design and engineering of wool combing plants.
FIELDS OF OPERATION

- Technology transfer
- Feasibility studies
- Start-ups
- Project management
- Budgeting and economic evaluation
- Quality
- Wastes treatment
- Medium & high level personnel education and training
- Lean thinking

We are aware that no one owns a complete knowledge, nor in its specific field. In this case, it is better to look for support by experts, instead of carry on costly and uncertain investigations.

HOW WE WORK

The Client having any question is welcome in our offices where his problem is explained. Other way: we can answer the questions also by phone, email, Skype, ecc.

First contact is always totally free.
Afterward, the Client may ask a preliminary study that will identify the items, means, required internal and external resources, time of execution, appraisal of the costs. An important point is that we grant to assist the Client in all phases. Our engineers and experts are supported - even required - by technicians and operators on-the-field until achievement of a 100% success of the task.
Our top achievement as a consulting firm is the state of the art plant for performing a disruptive process for wool grease recovering through centrifugation.

**LAIT WOOL GREASE EXTRACTION PLANT HIGHLIGHTS**

**Short description:**
LAIT has implemented and exploited in field a new proprietary process for the optimisation of wool scouring effluents treatment for achieving 2 targets jointly:
- 1. the increase of the quantity of recovered wool grease.
- 2. the reduction of the COD load of the effluent to be treated in the ETP.

LAIT’s core idea is to join the results of mechanical centrifugation to the acid cracking extraction for reaching the fraction of the water soluble lanolin that is inside the wool scouring effluents but cannot be separated using the standard centrifugation.
LAIT’s process has been implemented in 2009 and it has been running in Italy, in PIV’s premises, till 2011.

**Main achievements:**
They are basically 2, that must be considered achieved jointly:

1. Increase wool grease production (+50% - 70% on the output of the standard centrifugation). LAIT process supplies an extra quantity of a second grade quality wool grease (G2wg) easily marketable at a price ranging from 50% to 80% of the regular wool grease price.

2. Reduction of COD of the scouring effluents to be treated at the ETP: that means an average COD entering the ETP of only 2000 - 2500 instead of 25000 - 30000.

**THAT MEANS**
STRONG WOOL GREASE TURNOVER INCREASE WITH HIGH MARGINS THANKS TO VERY LOW EXTRACTION COSTS

Wool grease coming out of LAIT plant is a "2nd grade" acid cracked wool grease (named "G2wg" hereon): that means higher acid values, darker colour, and, finally, lower yield in refined products. This is why LAIT G2wg is a different product that should be kept and sold separately from the standard wool grease (from the technical point of view, a mix is possible anyway).

According to sample evaluations that have been made, the commercial value of LAIT G2wg is around 50%-80% of standard wool grease market price. Please note that LAIT project started in 2008, when regular Wool Grease market price was around 1,50-2,00 USD/kg (exw) (the market few years after topped at USD 7,50, then plummeted again) mainly as a system for reducing the COD load of the ETP plant and get savings in ETP running costs. Since the extraction costs of LAIT G2wg are around 0,40 USD/kg, the contribution to profits of LAIT G2wg sales was low and the project started as focused JUST on savings in the ETP plant.

Market conditions are now improving and LAIT wool grease extraction is a unique opportunity for achieving 2 key targets together (Savings in the ETP running costs together with sales and profits increase). This is a strong help for the combing mill adopting LAIT for keep on operating successfully in its competitive sector.

BIG SAVINGS ON ETP RUNNING COSTS, BY REDUCING THE COD LOAD OF WOOL SCOURING EFFLUENTS TO BE PROCESSED

As we said before, LAIT project was born as a system for reducing COD entering the ETP by removing the most of the wool grease: wool grease left in the scouring effluents after centrifugation is actually one of the main causes of the high COD load (25000-30000 COD) entering the ETP. Thanks to the high rate of wool grease recovery (50-70% of the left wool grease, but peaks of 90% have been achieved), in the mill where LAIT plant has been running COD was reduced to 1500 - 2000 on average (up to 700, in case of highest recovery rate) at the exit of LAIT plant, and to 2500 - 3500 at the ETP feeding point.
LAIT has over than twenty years of experience in the Textile Environmental Engineering field, waste water treatment plants for wool scouring effluents. The services we provide are the following:

- Planning and feasibility studies, according to specific customer requirements.
- Project development.
- Procurement of electro-mechanical equipment and machinery from leading international manufacturers.
- Streamlining of the water treatment process.
Biological treatment for COD and BOD

The removal of coarse solids and fibres is the first important step to preserving the functioning of all machinery and equipment in the plant. Generally the water is conveyed through an underground pipe and is lifted by submersible pumps to the accumulation tank. An accumulation and homogenization tank is necessary to cut the peak flow at the inlet and homogenise the quality of the water. This supplies the biological plant with a constant organic load 24 hours per day.

The biological treatment, based on a 100% oxidation process, is the heart of the plant and the air injection system through micro-bubbles is the most important aspect which allows a high oxygen transfer with minimal energy expenditure (a chemical/physical pretreatment of the effluent may be added for improving the final output to the river discharge limits).

Bacteria eats pollutants which are present in the water as COD and BOD and transform them into non hazardous substances for the environment (energy, CO2 and new organic matter which is can be used as fertilizer).

The biological process is completely natural and does not require any chemicals and this allows plants to operate with very low running costs. Excess organic material is pressed with special machines and can be used as fertilizer.

The purified water respects the legal water quality requirements for discharging into rivers, lakes, sea or it can be sent to a water recovery plant (depending on local laws).

<table>
<thead>
<tr>
<th>PARAMETERS</th>
<th>PERCENTAGE REMOVAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>COD</td>
<td>90%</td>
</tr>
<tr>
<td>BOD</td>
<td>99%</td>
</tr>
<tr>
<td>Suspended solids</td>
<td>99%</td>
</tr>
</tbody>
</table>

Water recovery

Up to 30-40% water recovery can be achieved using quartz filtration followed by resin filtration. Through ultra-filtration and reverse osmosis up to 90% water recovery can be achieved from waste water.
The following table shows the results of 2 rounds of tests carried out in April and May 2013 for detecting the average % of COD reduction in the wool scouring effluents coming from 2 combing mills after LAIT treatment (in a laboratory simulation, field conditions will generally give better results).
We are not able to estimate the final savings in the ETP running cost related to such reduction of 80% - 90% of the COD load of the entering effluents because this is a specific feature of each single plant (That information can be established just after carrying out a survey on the specific plant).

At this stage, please believe that a 80% - 90% COD reduction is very consistent and allows a really easier and cheaper management of the wool scouring effluents in the ETP allowing big savings in electrical power use, lower sludge output, less chemicals and so on.

LAIT personnel has a more than 20 years experience in running wool scouring effluents ETP, and may assist the client for evaluating savings and for tuning the ETP after (or before) starting LAIT treatment.

### Scouring effluents “combing mill in China” - laboratory test results - April 2013

<table>
<thead>
<tr>
<th>REF. TEST NUMBER</th>
<th>EFFLUENT DESCRIPTION</th>
<th>SAMPLE WEIGHT</th>
<th>% SEDIMENT</th>
<th>FLOATER WEIGHT</th>
<th>% RESIDUAL 105°C</th>
<th>% RESIDUAL 550°C</th>
<th>COD BEFORE TREATMENT (MG/L)</th>
<th>COD AFTER TREATMENT (MG/L)</th>
<th>COD REDUCTION %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1642</td>
<td>Effluent feeding main centrifuge</td>
<td>100,98</td>
<td>9,9</td>
<td>84,46</td>
<td>2,88</td>
<td>1,93</td>
<td>15.715</td>
<td>4.622</td>
<td>71%</td>
</tr>
<tr>
<td>1643</td>
<td>Return to scouring line - bowl 2</td>
<td>102,68</td>
<td>7,8</td>
<td>89,92</td>
<td>2,56</td>
<td>1,66</td>
<td>21.222</td>
<td>5.101</td>
<td>76%</td>
</tr>
<tr>
<td>1644</td>
<td>Main centrifuge waste to ETP</td>
<td>99,04</td>
<td>41,4</td>
<td>50,23</td>
<td>2,68</td>
<td>1,64</td>
<td>29.795</td>
<td>3.740</td>
<td>87%</td>
</tr>
<tr>
<td><strong>average</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>22.244</td>
<td>4.488</td>
<td>80%</td>
</tr>
</tbody>
</table>

### Scouring effluents “combing mill in Italy” - laboratory test results - May 2013

<table>
<thead>
<tr>
<th>REF. TEST NUMBER</th>
<th>EFFLUENT DESCRIPTION</th>
<th>SAMPLE WEIGHT</th>
<th>% SEDIMENT</th>
<th>FLOATER WEIGHT</th>
<th>% RESIDUAL 105°C</th>
<th>% RESIDUAL 550°C</th>
<th>COD BEFORE TREATMENT (MG/L)</th>
<th>COD AFTER TREATMENT (MG/L)</th>
<th>COD REDUCTION %</th>
</tr>
</thead>
<tbody>
<tr>
<td>2167</td>
<td>Wool scouring effluent 1</td>
<td>100,36</td>
<td>7,0</td>
<td>92,95</td>
<td>2,34</td>
<td>2,57</td>
<td>13.152</td>
<td>1.664</td>
<td>87%</td>
</tr>
<tr>
<td>2168</td>
<td>Wool scouring effluent 2</td>
<td>105,27</td>
<td>1,9</td>
<td>99,14</td>
<td>2,24</td>
<td>1,77</td>
<td>16.196</td>
<td>1.880</td>
<td>88%</td>
</tr>
<tr>
<td>2169</td>
<td>Wool scouring effluent 3</td>
<td>108,12</td>
<td>4,6</td>
<td>96,58</td>
<td>2,21</td>
<td>1,06</td>
<td>16.167</td>
<td>1.476</td>
<td>91%</td>
</tr>
<tr>
<td><strong>average</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>15.172</td>
<td>1.673</td>
<td>89%</td>
</tr>
</tbody>
</table>
Technology transfer agreement policy

**LAIT** process exploitation rights will be transferred through a technology transfer agreement (LAIT is not selling a plant, but transferring a know how of which the plant is just a part).

The technology transfer contract will be agreed on the basis of a profit sharing agreement:

the consideration for LAIT supply of technology is determined with reference to the expected gross margin coming from exploitation of the wool grease extraction plant (depending on the actual output of the plant) for the estimated plant life, plus the cost of technical equipment.
**Transfer price components**
The Technology transfer price is composed of 3 parts:

A. Hardware supply (Initial investment related to hardware supply, transport, installation and training);

B. Royalties (related to the expected yield of LAIT process during the plant life).

The following item is a further plus in favour of the mill:

C. FREE exploitation of LAIT technology after the expiry of the contract.

**Turnkey project**
LAIT hardware supply is a turnkey project: the plant will be delivered ready to work.

**Training**
Training of local personnel is included in the hardware initial investment amount. Local personnel will be trained on the job during the set up period, before final commissioning.

**Commissioning**
A maximum period of 6 months after installation is estimated for setting the system to its target yield before commissioning.

**Royalties**
Royalties are determined with reference to the expected gross margin (all the running costs of LAIT plant are born by the user) coming from exploitation of the wool grease extraction plant (depending on the actual output of the plant) for the estimated plant life.

- **Gross margin**: GROSS SALES - VARIABLE COSTS
- **Royalty percentage**: 35% of gross margin
- **Estimated plant life**: 10 years
- **Royalty period start**: on commissioning

If the user does not want to keep alive the relation with LAIT till the end of the royalty period. Royalties can be redeemed at any time before contract expiry date by actualisation of royalties not yet matured at the redemption date, with a discount of 30%.
LAIT wool grease ("Grade 2 wool grease - G2wg") is a separate business: the product comes out of an independent plant and there is no way of mixing with the standard WG (unless the mill has decided to). Hence it is very easy to measure LAIT plant performance and build a business plan on it.

For the same reason, while the plant is running it won’t be difficult keeping records of its job.

Please see the tables below, where LAIT G2wg output, its market price, the requested royalty for LAIT and the total contract turnover for each involved party are shown.

The first table represents the summary of the figures of the business of the regular wool grease extraction and marketing (that have been considered as assumptions of LAIT G2wg business plan).

<table>
<thead>
<tr>
<th>“REGULAR” WOOLGREASE EXTRACTION + ASSUMPTIONS</th>
<th>REGULAR WOOLGREASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>mill capacity (tons of greasy wool per year)</td>
<td>t/year</td>
</tr>
<tr>
<td>woolgresase recovery rate (%on greasy wool)</td>
<td>%</td>
</tr>
<tr>
<td>regular wool grease output</td>
<td>t/year</td>
</tr>
<tr>
<td>avg WG market price</td>
<td>USD/kg</td>
</tr>
<tr>
<td>gross sales</td>
<td>USDx1000</td>
</tr>
</tbody>
</table>

These data were estimated with reference to available actual figures.

In the following table there is the breakdown of the LAIT G2wg business plan. All the amounts of money are in USD.
The main assumptions are the following:

1. The % of wool grease left in the effluents after standard centrifugation (and available for LAIT treatment) is 5% of the greasy wool weight (that means on average a total of 10% on the greasy fibre, of which 5% recovered by the mill and 5% representing the base for LAIT job).
2. G2wg price is 50% of the current WG price (3.50 USD).
3. G2wG production variable costs is 0.40 USD/kg.
4. Profits share % is 35% for LAIT and 65% for the mill (the share is to be applied on the gross margin of LAIT G2wg business= G2wg sales-G2wg variable costs).

Under the above assumptions, 3 business cases are presented, according to 3 different possible extraction yield of LAIT plant (extraction yield= % of wool grease left in the scouring effluents after standard centrifugation that is recovered through LAIT treatment):

- **case 1**: extraction yield 50%
- **case 2**: extraction yield 60%
- **case 3**: extraction yield 70%

**IMPORTANT REMINDER**

Savings on the ETP running costs have not been included in the figures of the business plan while presenting LAIT project (for lack of information about the ETP operations) and must be added to the expected profits coming from G2Wg. 100% of the savings will be kept by the mill, no share on this for LAIT.

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**LAIT GRADE 2 WOOL GREASE (G2WG) BUSINESS PLAN**

<table>
<thead>
<tr>
<th>CASE 1 (YIELD 50%)</th>
<th>CASE 2 (YIELD 60%)</th>
<th>CASE 3 (YIELD 70%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>mill capacity (tons of greasy wool per year)</td>
<td>t/year</td>
<td>10,000</td>
</tr>
<tr>
<td>Wool grease left in the scouring effluents (%on greasy wool)</td>
<td>%</td>
<td>5%</td>
</tr>
<tr>
<td>LAIT Wool grease extraction yield</td>
<td>%</td>
<td>50%</td>
</tr>
<tr>
<td>LAIT Wool Grease recovered by LAIT (%on greasy wool)</td>
<td>%</td>
<td>2.5%</td>
</tr>
<tr>
<td>LAIT wool grease output</td>
<td>t/year</td>
<td>250</td>
</tr>
<tr>
<td>increase on regular wool grease output</td>
<td>+ %</td>
<td>+ 50 %</td>
</tr>
<tr>
<td>LAIT wool grease market value with regard to WG value</td>
<td>%</td>
<td>50%</td>
</tr>
<tr>
<td>LAIT wool grease avg expected market price</td>
<td>USD/kg</td>
<td>1.75</td>
</tr>
<tr>
<td>LAIT wool grease gross sales</td>
<td>USDx1000</td>
<td>438</td>
</tr>
<tr>
<td>average production variable costs</td>
<td>USD/kg</td>
<td>0.40</td>
</tr>
<tr>
<td>average production variable costs as % of G2W market price</td>
<td>%</td>
<td>22.9%</td>
</tr>
<tr>
<td>Total variable costs</td>
<td>USDx1000</td>
<td>-100</td>
</tr>
<tr>
<td>total gross margin (to be shared between LAIT and the mill)</td>
<td>USDx1000</td>
<td>338</td>
</tr>
<tr>
<td>unit gross margin</td>
<td>USD/kg</td>
<td>1.35</td>
</tr>
</tbody>
</table>

**PROFITS SHARE**

| royalty for LAIT | % | 35% | 35% | 35% |
| profits share for the mill | % | 65% | 65% | 65% |
| royalties for LAIT | USDx1000 | 118 | 142 | 165 |
| gross margin for the mill | USDx1000 | 219 | 263 | 307 |
| unit royalty for LAIT | USD/kg | 0.47 | 0.47 | 0.47 |
| unit gross margin for the mill | USD/kg | 0.88 | 0.88 | 0.88 |

We, finally, present the figures of the business for the contract term of 10 years, to give an idea of the potential of the LAIT deal.

**KEY FIGURES FOR THE CONTRACT TERM (10 YEARS)**

<table>
<thead>
<tr>
<th>CASE 1 (YIELD 50%)</th>
<th>CASE 2 (YIELD 60%)</th>
<th>CASE 3 (YIELD 70%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAIT plant life</td>
<td>years</td>
<td>10</td>
</tr>
<tr>
<td>Total LAIT wool grease production</td>
<td>t</td>
<td>2,500</td>
</tr>
<tr>
<td>Gross sales</td>
<td>USDx1000</td>
<td>4,375</td>
</tr>
<tr>
<td>Gross margin</td>
<td>USDx1000</td>
<td>3,375</td>
</tr>
<tr>
<td>royalties for LAIT</td>
<td>USDx1000</td>
<td>1,181</td>
</tr>
<tr>
<td>gross margin for the mill</td>
<td>USDx1000</td>
<td>2,194</td>
</tr>
<tr>
<td>EXPECTED PAY BACK PERIOD</td>
<td>years</td>
<td>3.2</td>
</tr>
</tbody>
</table>
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