

# **ATTACHMENT 1**

**ESA VAKKILAINEN**

Born in 1957 citizen of Finland

**Education**

Ph.D.

**Current Position**

Leading Technology Specialist - Recovery  
Pöyry Forest Industry Oy, Pulp Technology Division

**Languages**

Finnish, English, Swedish, French, German

**Specialty**

Recovery boilers, liquor chemistry, recovery technology

**Pöyry Experience**

Mr. Vakkilainen has joined Jaakko Pöyry Oy 1.8.2001 as a Recovery Specialist and Project Manager.

**Major Projects**

- |           |   |
|-----------|---|
| 2006      | Confidential Client, USA<br>Process Specialist. Mill operation studies.   |
| 2006      | UPM-Kymmene Oyj, Kuusankoski, Finland<br>Process Specialist. Implementation of new recovery line for a 700 000 ADt/a pulp mill. |
| 2005-     | Gunns Limited, Tasmanian Pulp Mill, Australia<br>Process Specialist for recovery. Pre-engineering of a new pulp line.           |
| 2004-2005 | Suzano Bahia Sul, Brazil<br>Process Specialist for recovery. Pre-engineering of a new 1 000 000 ADt/a pulp line.                |
| 2003-2005 | UPM-Kymmene Oyj, Kuusankoski, Finland<br>Project Manager. Pre-engineering of new recovery line for a 700 000 ADt/a pulp mill.   |
| 2003 -    | Recovery Boiler of the Future<br>Project Co-Ordinator for the National Development Project.                                     |

- 2003 Visy, Australia  
Process Specialist for recovery line. Recovery debottlenecking study.
- 2003-2004 Stora-Enso Oyj, Imatra, Finland  
Process Specialist for recovery. Power production efficiency improvement study for three pulp mills.
- 2002 Kymi-Paper Oy, Kuusankoski, Finland  
Project Manager. Feasibility Study for new recovery line for a 690 000 ADt/a pulp mill.
- 2002-2003 Veracel, Brazil  
Process Specialist for recovery. Feasibility study of strategic plan for 800 000 ADt/a pulp mill.
- 2002 Stora-Enso, Skoghall, Sweden  
Project Specialist for recovery boiler. Upgrade of old recovery line.
- 2002 Finnish recovery boiler users association  
Project Manager and Process Specialist. Development of recommendations for firing NCG in recovery boiler Study "NOx formation and reduction in recovery boilers".
- 2001-2003 UPM-Kymmene Oyj Wisaforest, Finland.  
Process Specialist for recovery line. Tender comparisons and technical discussions for the purchase of a new 4450 tds/d recovery boiler and 1000 t/h evaporation.
- 2001 Gap Insaat Yatirim Ve Dis Ticaret A.S., Turkey.  
Area Manager for recovery line. Feasibility study and basic engineering for a new 60 000 ADt/a non wood pulp and paper mill in Turkmenistan.

### Other Experience

- 2000-2001 Senior Development Manager, Andritz-Ahlstrom Corporation, Kraft Mill Business
- responsible for technical content in recovery boiler proposals
  - responsible for guarantees in recovery boiler proposals
  - development of standards for recovery boiler offerings
  - responsible for recovery boiler audits and performance tests.
- 1988-1991 Development Manager, CAE, A. Ahlström Osakeyhtiö, Varkaus
- management of CAE in Varkaus Boilerworks
  - steam and water circulation
  - black liquor combustion
  - kraft recovery boiler process
  - pressurized gasification of biofuels
  - fouling of heat transfer surfaces
  - off-design behaviour of steam generators.

- 1985-1988 Process Engineer, Ahlstrom Boiler Works, Varkaus
- combustion of biofuels
  - material and energy balances
  - heat transfer in steam generators
  - fluidized bed burning process
  - responsible for development of new generation of dimensioning programs for steam generator thermal design.
- 1984-1985 Assistant Professor of Power plants, Lappeenranta University of Technology
- furnace heat transfer
  - optimization of combined cycle processes
  - district heating
  - combustion of biofuels.
- 1981-1984 Researcher, Lappeenranta University of Technology
- small steam generator process, design and testing
  - solar technology for electricity generation
  - efficient use of energy and heat in industry.

### Academic Training

- 1975 Graduate from Bridgeport Community High School, Mich. USA.
- 1982 M.Sc (DI), Lappeenranta University of Technology.
- 1986 Licentiate of Technology (TkL), Lappeenranta University of Technology.
- 1990-1991 Special studies, Institute of Paper Science and Technology, Atlanta, Georgia.
- 1993 Ph.D. (TkT), Lappeenranta University of Technology.
- 1997 Docent, Helsinki University of Technology.
- 1998 Docent, Lappeenranta University of Technology.

### Patents

- |                                   |   |
|-----------------------------------|---|
| FI 954180                         | Process and Equipment for Handling Smelt.                               |
| US 2002043221 &<br>FI 20000002285 | Arrangement for feeding black liquor into a recovery boiler.            |
| US 6146604 & FI 104793 B          | Method to Reduce Nitrogen Oxide Emissions from Recovery Boiler Fluegas. |
| US 2002162491                     | Combustion air system for recovery boilers.                             |