

SELECTED PSL PROJECTS IN LAST FIVE YEARS

PROJECT NAME AND LOCATION	START DATE	GROUP	BRIEF DESCRIPTION
International Paper Georgetown, South Carolina	01-Jan-02	Lime Kiln	Burner upgrade modeling and training package
Lafarge North America	15-Dec-01	Cement Kiln	Lafarge cement kiln burner trainer
International Paper, Kwidzyn. Poland	01-Oct-01	Recovery Boiler	Upgrade air system and evaluate air system designs
Willamette, USA	01-Sep-01	Recovery Boiler	Evaluate new air system design
Weyerhaeuser Prince Albert	01-Sep-01	Headbox	Model entire Valmet headbox and determine causes of the formation problems
Weyerhaeuser Longview	01-Oct-01	Lime Kiln	Determine using advanced modeling the swirl effect of the satellite cooler
Bubbling fluidized bed	01-Jan-02	Bark Boiler	Air system retrofit modeling to reduce flue gas temperature in the superheater to achieve design target
Weyerhaeuser Gasifier, New Bern, North Carolina, USA	01-May-01	Gasifier	Propose redesign of gasifier and model new design.
VCP Recovery Boiler, Jacarei, Brazil	1-Apr-01	Recovery Boiler	Worked with VCP and Anthony-Ross in the design of a new air system for a new boiler to be commissioned in 2002. Modeled base MHI/CBC boiler design and proposed modifications.
Weyerhaeuser Headbox at Springfield, Oregon, USA	1-Mar-01	Headbox	Headbox validation model for SP1 and experimental program.
Potlatch Clarifier, Lewiston, Idaho	1-Feb-01	Clarifier	Analysis of Potlatch Clarifier to find cause of high turbidity. Based on findings, redesigned feedwell and bustle pipe to significantly reduce turbidity.
Domtar Recovery Boiler, Quevillon, Quebec, Canada	1-Feb-01	Recovery Boiler	Analysis of Primary Air Port Cracking in the recovery boiler.
Bark Boiler Optimization Research Project, Vancouver, Canada	1-Jan-01	Bark Boiler	NRC co-funded Bark Boiler 2 year program to look into the optimization of bark boilers. Also to develop advanced simulation and training software specific to Bark Boilers.
Canfor Recovery Boiler, Prince George, BC, Canada	15-Dec-00	Recovery Boiler	Modeling and analysis of the Intercon recovery boiler. Evaluation of proposed modifications to the combustion air system in order to increase capacity by 10%.
Weyerhaeuser Lime Kiln, Grande Prairie, Canada	15-Dec-00	Lime Kiln	Analysis of the air flow and combustion process in the kiln. Goal was to gain an understanding of the physical processes to reduce the thermal fatigue on the brick liner and also to analyze the calcination process.
Pacifica Recovery Boiler, Powell River, BC, Canada	2-Oct-00	Recovery Boiler	Modeling and analysis of a new tertiary air system and incineration system for DNCG gases. Investigate designs to increase load and reduce emissions.
CMPC Recovery Boiler, Nacimiento, Chile	1-Oct-00	Recovery Boiler	Develop a new air system for a Mitsubishi recovery boiler air system built by CBC.
Willamette Bark Boiler, Campti, Louisiana, USA	1-Oct-00	Bark Boiler	Worked with IAE to validate and optimize a proposed four level air OFA system for a gasification bark boiler.
International Water-Guard Ultraviolet Disinfection Unit, Burnaby, BC, Canada	1-Sep-00	Flow Device	Develop a model to simulate the operation of IWG's proposed modification of standard inline water disinfection unit. After analysis, PSL proposed further modifications that increased efficiency a further 10%.
Gasmaster Water Boiler	1-Aug-00	Water Boiler	Consulting services for the design of a 4,000,000 Btu/hr boiler.
Weyerhaeuser Gasifier, New Bern, North Carolina, USA	1-Aug-00	Gasifier	Phase II of 3 phase project. Addition of wall model to Phase I model. Parametric analysis of operations. Preliminary redesign proposals.
Weyerhaeuser Digester, Kamloops, BC, Canada + other locations to be specified	1-Jul-00	Digester	DOE funded project to develop a complex 3D model for the physical processes in a continuous digester. Work in conjunction with Weyerhaeuser paper company and Oakridge National Labs to look into the corrosion of continuous digesters.
Celgar Clarifier, Castlegard, BC, Canada	1-Jul-00	Clarifier	Model convection flows in Clarifier. Redesign of the bustle pipe and feedwell to reduce turbidity.
CREOSCITEX Thermal Printer	1-Jun-00	Flow Device	Modeling and analysis of the effect of operating at high drum speed on the debris removal efficiency for the new Thermal II head under design. Modeling involves particulate tracking and the effects of multiple air jets and air curtain. Validation with experimental results.
Weyerhaeuser Lime Kiln, Springfield,	1-Jun-00	Lime Kiln	Worked with Weyerhaeuser on developing advanced technologies for the

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Oregon, USA.			interactive real-time simulation of lime kilns.
Weyerhaeuser Recovery Boiler, Dryden, Ontario, Canada	1-May-00	Recovery Boiler	Analysis of bed instabilities, and high unburned carbon, high sloughing on rear wall, noisy spouts. Propose redistribution of combustion air to resolve problems.
Weyerhaeuser Recovery Boiler, Plymouth, North Carolina, USA	1-Mar-00	Recovery Boiler	Modeling and analysis of current recovery boiler at the Plymouth mill. Modeling of proposed new boiler design under different operating conditions and high load.
Recovery Boiler	20-Jan-00	Recovery Boiler	Joint research project between PSL, Paprican, and RWDI to validate the recovery boiler model in terms of gas flow patterns, heat flux, and temperature.
Weyerhaeuser Gasifier, New Bern, North Carolina, USA	24-Nov-99	Gasifier	Phase I of 3 phase project. Develop a model for the air flow and gasification process for the malfunctioning gasifier. Analyze preliminary results.
Trans Canada Power Heat Recovery Unit, Calgary, Alberta, Canada	1-Oct-99	Recovery Boiler	Develop a method to analyze and predict the effect of flows entering a heat recovery boiler unit in which both the magnitude of the flow varies with time and for a flow with a strong swirling component.
Shang Dong Power Generation Coal Boiler, Huangtai, China	1-Aug-99	Power Boiler	Development of a custom model for coal-fired utility boiler. Focus of project was to solve issues of high temperature corrosion in the lower boiler near the burners.
Weyerhaeuser Lime Kiln, Springfield, Oregon, USA	1-Jul-99	Lime Kiln	Apply a newly developed model for limekilns to the springfield kiln. Validate model in terms of temperatures and emissions. Examine secondary air flow from hood and recommend operating conditions based on findings.
Weyerhaeuser Recovery Boiler, Flint River, Michigan, USA	14-Apr-99	Recovery Boiler	Evaluate different strategies for incinerating NCG and DNCG gases in the recovery boiler.
Weyerhaeuser Baffle Tank, Tacoma, Washington, USA	13-Jan-99	Flow Device	Analyze flow problems within a baffle tank. Propose design changes.
Simulator Phase II – Core Design	1-Jan-99	Simulator	Advanced Real-Time Modeling System. Developed internally by PSL and co-funded by IRAP.
Weyerhaeuser Power Boiler Heater, Grande Prairie, Alberta, Canada	1-Jan-99	Power Boiler	Model the ducting and heating section of the preheater downstream of the power boiler. Propose design changes to make the air flow more uniform to reduce plugging and corrosion.
Weyerhaeuser Recovery Boiler, Grande Prairie, Alberta, Canada	10-Nov-98	Recovery Boiler	Analysis of a new tertiary air system that will allow a 10% increase in steam production without significantly increasing pluggage.
Weldwood Recovery Boiler, Hinton, Alberta, Canada	1-Nov-98	Recovery Boiler	Modeling of the #2 Weldwood Hinton Recovery Boiler. Evaluation of air system upgrades including a new secondary air system and a high-capacity tertiary air fan.
Weyerhaeuser Bark Boiler, Valliant, Oklahoma, USA	1-Oct-98	Bark Boiler	Modeling study to reduce NOx emissions at Valliant.
Weyerhaeuser Recovery Boiler, various locations	1-Sep-98	Recovery Boiler	Modeling and analysis of various windbox dampers. Evaluate performance of each windbox damper.
Tasman Pulp Recovery Boiler, Tasman, New Zealand	10-Aug-98	Recovery Boiler	Subcontract to Anthony-Ross to model proposed retrofits to the existing air system in order to increase load and at the same time reduce emissions, specifically TRS.
Weyerhaeuser Mid-South Recovery Boiler,	15-Apr-98	Recovery Boiler	Preliminary evaluation of Kvaerner & Ahlstrom air system upgrades for the Mid South boiler.
Weyerhaeuser Kamloops #1 Recovery Boiler, Kamloops, BC, Canada	1-Apr-98	Recovery Boiler	Investigation of pluggage in the #1 recovery boiler.
Weyerhaeuser Plymouth Recovery Boiler, Plymouth, North Carolina, USA	1-Apr-98	Recovery Boiler	Investigation of frequent pluggage of the Plymouth boiler.
Weyerhaeuser Prince Albert Bark Boiler, Prince Albert, Saskatchewan, Canada	1-Feb-98	Bark Boiler	Develop a bubbling bed model to assist Weyerhaeuser engineers to evaluate options to, a) convert the existing recovery boiler to a bubbling fluid bed bark boiler, b) construct a new bubbling fluid bed boiler, and c) evaluate the characteristics of air systems by Kvaerner and B&W.
Ahlstrom Lime Kiln Burner, Ahlstrom, confidential location	1-Dec-97	Lime Kiln	Ahlstrom lime kiln burner fouling study.
Simulator Phase I – Proof of Concept	1-Sep-97	Simulator	Development of simulator concept and start research into the topic. The

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			project consists of developing the simulator idea explored during the proof of concept work done with Weyco and Oakridge.
Weyerhaeuser New Prince Albert Recovery Boiler, Prince Albert, Saskatchewan, Canada	1-Sep-97	Recovery Boiler	Model and evaluate the proposed new Prince Albert recovery boiler. The new boiler must support high loads without excess heat or carryover problems.
Weyerhaeuser Kamloops #1 Recovery Boiler, Kamloops, BC, Canada	1-Sep-97	Recovery Boiler	Modeling and analysis of proposed upgrades to the air system on the Kamloops Number 1 Recovery Boiler.
Weyerhaeuser Headbox Modeling, Tacoma, Washington, USA	1-Sep-97	Headbox	Project to develop 3D CFD models for Weyerhaeuser's Springfield and North Carolina mill headboxes.
Weyerhaeuser Columbus Recovery Boiler, Columbus, Ohio, USA	11-Jul-97	Recovery Boiler	Columbus Tertiary Air port evaluation and optimization.
Weyerhaeuser Longview Recovery Boiler, Longview, Washington	19-Jun-97	Recovery Boiler	Optimization of the Longview air system using two/four wall firing and completion of swirl.
Weyerhaeuser Grande Prairie Bark Boiler, Grande Prairie, Alberta, Canada	1-Jun-97	Bark Boiler	Modeling and optimization of the Grande Prairie bark boiler combustion air system.
Weyerhaeuser Prince Albert Recovery Boiler Startup, Prince Albert, Saskatchewan, Canada	15-May-97	Recovery Boiler	Analysis of the startup conditions. In particular, analyze the heat flux distribution to the floor tubes during startup, and compare to results for Kamloops #2.
Weyerhaeuser Columbus Upper Furnace Study, Columbus, Ohio, USA	1-Feb-97	Recovery Boiler	Modeling and analysis of the Columbus upper furnace to determine the reason for plugging at the entrance to the generating bank.
Canfor Recovery Boiler, Prince George, BC, Canada	15-Dec-96	Recovery Boiler	Modeling and analysis of the Canfor Recovery Boiler combustion air system. Proposed operational changes to reduce mechanical carryover.
Canfor Power Boiler, Prince George, BC, Canada	1-Dec-96	Power Boiler	Investigation of the Intercon Power Boiler. Evaluation of the air and fuel distribution systems.
Weyerhaeuser Valliant Bark Boiler, Valliant, Oklahoma, USA	1-Sep-96	Bark Boiler	Modeling of the Valliant bark boiler. Evaluate airflow patterns, fuel distribution patterns, and heat and combustion in the boiler. Validate with temperature and emission measurements.
Weyerhaeuser Valliant Modeling Study, Valliant, Oklahoma, USA	1-Feb-96	Recovery Boiler	Parameter modeling study of the air system for the Valliant recovery boiler.
Weyerhaeuser Grande Prairie Vent Gas Study, Grande Prairie, Alberta, Canada	1-Jan-96	Recovery Boiler	Investigation of the effects of the Chip Bin vent gas injection angle and the combustion air temperature.