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ROMANIA

WASTE MINIMIZATION IMPACT PROGRAM

**EVALUATION OF THE WASTE MINIMIZATION
PROGRAM**

AT

SIGSTRAT S.A.

JUNE 25 - 26, 1997

**USAID/WEC COOPERATIVE AGREEMENT
NO. ANE-0004-A-00-0048-00**

**World Environment Center
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New York, New York 10016**

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Project Description:	N/A
Project Type:	WMIP Assessment
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Industrial Sector:	Lumber/Plywood/Chipboard
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Participants:	Sigstrat staff and WEC/PPC Team
Project:	N/A
Business Development:	N/A

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I. INTRODUCTION

A joint WEC/PPC team including Louis Gilde, Project Consultant, Robert Locke, Project Consultant, Vladimir Gheorghievici, Pollution Prevention Director, and Frank Szymborski, WEC Project Manager, visited Sigstrat which had participated in the WEC Waste Minimization Seminar.

The plant visit was to:

- Provide guidance and assistance in establishing an effective waste minimization program; and
- Ascertain the progress in the identification and implementation of the WMIP project.

During the discussions with the plant's technical staff, it became evident that Sigstrat is interested in developing a formal waste minimization program. However, due to a lack of funds, the plant proposed to concentrate their efforts on those projects that could contribute to reducing their production costs and/or improving product quality. In this regard, the plant requested WEC to provide additional expertise to improve manufacturing/process procedures.

WEC acknowledges the contribution made by the volunteer project consultants, Messrs. Louis Gilde and Robert Locke, who gave freely of their time and energy in assisting WEC in its Waste Minimization Impact Program in Romania.

II. EXECUTIVE SUMMARY

The WEC team visited Sigstrat S.A. June 25 & 26, 1997. This report identifies potential projects for improvements in the plywood, particle board and veneer factory. Problems are listed with suggested solutions and benefits. Efforts to undertake solutions should reduce operating costs, energy costs and air pollution.

The Sigstrat management has indicated an interest in a waste management program as evidenced by requesting WEC to visit this factory. Conservation is practiced by recapturing wood waste of every type such as defective product, sawdust, packaging and scrap.

Although there are no current major environmental impacts from the Sigstrat operation, management recognizes that measures may have to be taken in the future to ensure that the company meets future compliance requirements. As a result, positive interest in the WEC program has been expressed.

Development of an internal environmental management team is expected to result in adopting WEC's 10 step waste minimization program, following receipt of this report. A follow-up visit to encourage and assist in furthering the factory's accomplishments is essential if results are to be optimized.

III. FINDINGS

Introduction

We were impressed with the professionalism of the employees and management at Sigstrat S.A., Sighetul Marmatiei. It was obvious that the lack of financial resources limited what could be accomplished.

Although there are steps taken to reduce waste through recycling, frequently limitations of finances handicaps improvements in operations.

There was an expressed interest in adopting the WEC 10 step program of waste minimization. The formation of a committee to involve every worker in the factory was still in the planning stages at the time of the visit.

Potential Projects

VERNEER

Problems:

1. The log steaming basins are interlaced with 50 mm welded pipe as a heat exchanger between therm oil on the pipe side and water externally. The water is heated to create steam to saturate the logs with moisture. Heavy walled pipe is used to prolong the pipe life from corrosive affects of leachate from the logs. Premature failure occurs at the welded connections of the piping. There is an annual replacement program per steaming basin.
2. Bark removal results in an average 90 ton per month waste disposal problem. Although the annual disposal cost is minimal, the potential for an increase in cost cannot be ignored.

Solutions:

1. It is recommended that a substitute material such as schedule 5 stainless steel pipe be used instead of heavy wall pipe. Mechanical joints will avoid the problem of obtaining proper welded joints. The use of slip on flanges will eliminate concern for joint failure and increase the life of the heat exchanger system. By using schedule 5 pipe, bending of the pipe to make the "u" bends, will further minimize the number of joints needed. The use of stainless steel pipe will more than offset the annual cost of replacement of the currently used heavy wall pipe. A thinner wall pipe will improve the heat transfer rate and could possibly reduce the energy demand at the therm oil heat generator.

2. In the U.S., the bark would be ground and used as a mulch for agricultural purposes. This may be a potential solution for disposal. Otherwise, investigations should be made in the use as a fuel for employees.

PARTICLE BOARD

Problems:

1. A diesel fuel/wood flour dust fired furnace is used to create hot air for the wood chip drying kiln. Contained in the dust are abrasive particles from the sanding operation. This material drops out of the combustion chamber as a "glass-like" substance and coats the furnace bottom. Clean-out is a major chore.

2. Up to 5 tons per day of fine dried wood particulate is lost from the cyclones. This represents a raw material input of about 10 tons. The reported value of this loss is 14\$USD per ton.

3. At the Bison particle board, formaldehyde is released at the end of each cycle. This material is exhausted to atmosphere and is a potential negative air emissions impact. The formaldehyde as urea formaldehyde represents approximately 20% of the cost of production.

Solutions:

1. Reconfigure the combustion chamber of the furnace to either a fluidized bed or cyclone system. The purpose for either change has two positive results: 1) improve combustion efficiency; and 2) reduce the effect of the formation of glass from the abrasive containment of the wood flour dust. For the latter system, a one foot layer of coarse sand on the furnace floor would prevent the accumulation of glass on the bottom of the furnace and would be easier removed in contrast to chipping out the deposit.

2. A high efficiency cyclone to operate in series with the kiln discharge cyclone is recommended to complete the separation of fines from the exhaust gas. The collection of these fines can be used in the production of particle board. It is expected that the investment for the cyclone could be recovered in 4 years following installation.

3. A test should be made to determine if the steam/formaldehyde mixture exhausted at each cycle from the Bison press can be condensed. If so, then the cost of a full scale installation should be determined to ascertain if it is economical to recover the formaldehyde.

Benefits:

1. A substantial savings in labor cost can be appreciated by converting the log steaming basins to mechanically joined stainless steel thin walled pipe. Although the initial material costs may be greater than the overall replacement cost for one year, the long term life of schedule 5 stainless steel pipe will payback the investment per basin in less than three years. There is an expected savings from reduced energy demand on the therm oil system because of the improved thermal efficiency from the thin walled pipe. The log support grating must be substantial so that the heavy timbers do not damage the stainless steel pipe.
2. Bark disposal through employee removal will save in disposal cost without requiring any capital investment from the company.
3. Improved combustion efficiency at the drying kiln furnace is expected to result from the recommended changes. Further control over deposition of glass in the furnace will decrease labor costs for its removal and improve efficiency.
4. Collection of kiln particulate discharge will improve the overall cost control of particle board production by reducing the raw material costs. These costs are composed of labor and wood supply.

Remarks:

1. Institute immediately the WEC 10 step waste minimization program.
2. The WEC 10 step program only works if everyone from top management to the lowest employee is totally dedicated to the effort in action and deed.
3. This concept should not only be employed on existing operations but should be incorporated in the design and construction of new systems in the years ahead. Each employee needs to have the opportunity to suggest changes and experience the thrill of contribution to the overall company welfare and economic benefit.

Action Required:**SIGSTRAT**

1. Modify the log steaming basin(s) by changing to thin walled stainless steel piping using mechanical joints in lieu of welded 5 mm wall pipe.
2. Invite employees to remove tree bark for use as an energy source at their homes. Explore the potential use of ground bark as an agriculture mulch by-product.

3. Modify the kiln drying furnace to improve efficiency and control deposition of abrasive glass formation.
4. Investigate the installation of a high efficiency cyclone for final removal of fine particulate from the drying kiln.
5. Determine feasibility of capturing formaldehyde for recycle as a component of particle board production.

W.E.C.

1. Provide information on the latest technology of particle board production.
2. Provide design information of high efficiency cyclones for the wood industry.
3. Provide information on variable speed drives and ancillary equipment for proper control. Information regarding savings opportunities will be included.
4. Provide information on the wood furniture products industry and in particular on how invisible plywood voids are detected.
5. Provide information on the design of fluidized bed and cyclone fired type boilers.

APPENDIX I
(BUSINESS CARDS OF CONTACTS)

SIGSTRAT S.A.
Produces and Sells
Particle Board, Plywood, Veneer

Dipl. ENG. KERTÉSZ STEFAN
GENERAL MANAGER

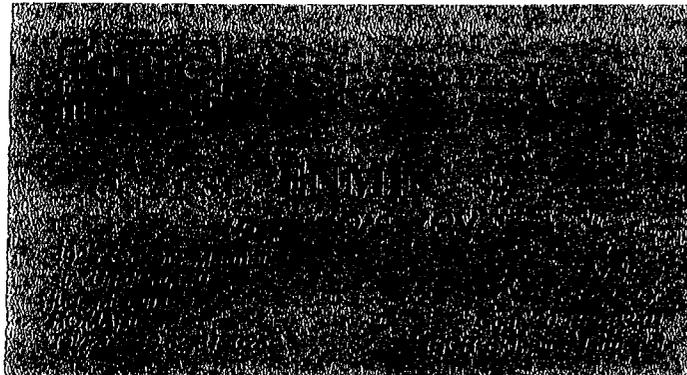
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SIGSTRAT S.A.
Produces and Sells
Particle Board, Plywood, Veneer

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TECHNICAL MANAGER

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APPENDIX II
(LIST OF MATERIAL FORWARDED TO SIGSTRAT S.A.)

Brochures and Other Pertinent Information Forwarded to Sigstrat S.A.

1. Medium Density Fiberboard
2. Particle Board - From Start to Finish
3. Engineered Wood - Essential Ecology
4. Engineered Wood - (Tape)