Contract NO: COOP-CT -2005- 018157

ADOXPOL

Advanced Industrial Wastewater Treatment with Ozone Oxidation and Flotation Technique for Maximum Water Reuse

Co-operative Research (CRAFT)

Publishable final activity report
Date of issue of this report: May 2008

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Project Coordinator: NORMEX AS Document revision: 0

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1 Project execution

1.1 Project information

CONTRACT NO: COOP-CT-2005- 018157
TITLE OF PROJECT: ADOXPOL

Advanced Industrial Wastewater Treatment with Ozone Oxidation and Flotation Technique for Maximum Water Reuse

COORDINATOR: NORMEX AS
SME EXPLOITATION MANAGER: NORMEX AS
Project web site www.adoxpol.com

1.2 List of project contractors

PROJECT PARTICIPANTS				
Participant No.	**Participant name**	**Participant short name**	**Country**	**Participant Role**
1	NORMEX AS	NORMEX	Norway	Coordinator Exploitation Manager
2	Statiflo International Ltd	Statiflo	UK	SME proposer
3	ASIO Ltd	Asio	Czech Republic	SME proposer
4	Stogda Ship Design & Engineering	Stogda	Poland	SME proposer
5	Hydro Eco Invest	Hydro Eco	Poland	SME proposer
6	Salsnes Filter	Salsnes	Norway	SME proposer
7	Model Group AG	Model Group	Switzerland	LE End user
8	The National Institute of Technology, Norway	TI	Norway	RTD performer
9	Production Engineering	Pera	UK	RTD performer

	Research Association			
10	Fraunhofer TEG	TEG	Gemany	RTD performer
11	Napro Pharma	Napro	Norway	SME end user

1.3 Objectives

The overall objective of the project is to develop a cost-effective, sustainable and advanced system for wastewater treatment that fulfills the need of the European industry to meet emission standards and apply water recycling.

1.4 Work accomplished and results

A prototype wastewater treatment system has been developed which consists of the following innovative components:

- A novel ozone mixing and dispersion unit that generates microbubbles and performs even bubble dispersion for maximizing contact

between water and ozone
- Innovatively configured to step reactor for ozone flotation
- Pre-filtration unit with innovative mesh cloth with pore sizes of 60 microns and above
- A computer based processes control system for monitoring key water quality parameters and control of ozone dosage and gas flow.

The mass production costs of the system is competitive.

The prototype has undergone functional tests at an abattoir in the Czech Republic, and at a fish oil and capsules manufacturing plant in Norway. Results attained show that the technological objectives are achievable for effluents from food processing plants.

1.5 Impact

The developed technology can be applied by the manufacturing industry to meet increasingly stringent legislative requirements cost effectively. Moreover, the ADOXPOL technology contributes to improvement of water quality in European recipients in line with the intensions of the Framework Water Directive.

2 Disemination and use

A significant effort have been done to disseminate and commercially exploit the results of the project. Once new results are protected, commercial products will be launched in the near future

2.1 Exploitable knowledge and its Use

Exploitable Knowledge (description)	**Exploitable product(s) or measure(s)**	**Sector(s)** of application	Timetable for commercial use	Patents or other IPR protection	**Owner** & Other Partner(s) involved
Method for effective gas/liquid mixing	Ozone/gas injector	• Aqua culture, fisheries, • Fish oil industry • Meat • Dairies • Process industry for fruit and vegetables	Starting 2009	NO	Normex, Statiflo
Knowledge on optimal configuration of flotation process.	Flotation chamber	• Aqua culture, fisheries, • Fish oil industry • Meat • Dairies • Process industry for fruit and vegetables	Starting 2009	NO	Normex, Asio
Enhanced prefiltration of effluents from process industry	Filter unit	• Aqua culture, fisheries, • Fish oil industry • Meat • Dairies • Process industry for fruit and vegetables	Starting 2009	NO	Salsnes Filter
The Adoxpol system	Wastewater cleaning	• Aqua culture,	Starting 2009	Normex is in dialog with the	Normex

Exploitable Knowledge (description)	**Exploitable product(s) or measure(s)**	**Sector(s)** of application	Timetable for commercial use	Patents or other IPR protection	**Owner** & Other Partner(s) involved
	system	fisheries, • Fish oil industry • Meat • Dairies • Process industry for fruit and vegetables		patenting office ZACCO to outline scale and scope of protection.	
New knowledge on generation of micro bubbles		• Aqua culture, fisheries, • Fish oil industry • Meat • Dairies • Process industry for fruit and vegetables	Starting 2009		Statiflo, Normex
New knowledge on design of ozone/effluent reaction tank		• Aqua culture, fisheries, • Fish oil industry • Meat • Dairies • Process industry for fruit and vegetables	Starting 2009		Asio

2.2 Dissemination of knowledge

Planned/ actual dates	Type of action	Type of audience	Countries addressed	Size of audience	Partner responsible/involved
Sep 2006	Poster and Brochures at IWA Water Congress and Exibition, Beijing	Delegates to the IWA Congress & Exibition	Worldwide	> 10000	TI, Normex
Dec 2006	Project website	General public	Worldwide		TI
Nov 2006	Presentation at Workshop on Technology Challenges and Market Opportunities in Waste Water Treatment", EU Commission	Industry, R&D, Authorities	International		TI
Aug 2007	AquaNor – an international fish farming exhibition Trondheim, Norway. Adoxpol promoted in the fish farming industry	Industry and R&D	International		Salsnes, Normex & TI
November 2007	Business Leader Seminar, (Toppleder-konferansen 07) Trondheim, Norway	Industry and R&D	National		Normex
May 2007	The Research Council of Norway organizing in Stavanger Business Park a seminar about SME opportunities in EU's 7th Framework Program. Normex gave a presentation of the Adoxpol project	Industry and R&D	National		Normex
2007	Visit to three Polish companies inquiring possible Adoxpol implementation. - Sokolow – meat processing - Ipaper – producer of paper - Bakoma - processing of fruit and vegetables	Industry	International		Stogda
July 2007	Business visits in Mexico promoting Adoxpol to relevant and potential customers: - Selecta Guaymas - a large company operating within fish and food processing - Yavaros – a large company operating within fish and food processing - Delfuerte - a large company operating within fish and food processing	Industry	International		Normex
Dec 2007	Two Chilean companies visited Adoxpol demonstration plant at Napro Pharma in Brattvåg: - Elgolfo - Aquaculture and fish processing - Camanchaca - Aquaculture and fish processing - Alimentos Marinos FA Alimar - Aquaculture and fish processing	Industry	International		Normex & Napro Pharma
Dec 2007	Aguas Sipera – consulting company operating within water cleaning industry – industry process water and municipal water	Industry	International		Normex
Mar 2008	Trip to Chile, city of Puerto Montt, participate at AQUASUR 2008 and revisit the Chilean companies - Elgolfo Camanchaca Alimentos Marinos FA Alimar	Industry and R&D	International		Normex
May 2008	IFAT 2008 – Munich 15th International Trade Fair for Water - Sewage - Refuse –	Industry and R&D			Normex

	Recycling				
March / April 2008	Nordic Green – San Fransisco - presentaion of Adoxpol about start up and investors				

2.3 Publishable results

The Consortium has decided not to disclose more public project information than what is described in this document for pending IPR protection.