CZECH UNIVERZITY OF LIFE SCIENCES PRAGUE

Faculty of environmental sciences
Department of applied ecology

Authorisation of the Environmental Impact Assessment of the export project

Urea Revamping project – building of compression unit

May 2014

CONTENT:

1. Background documents for the preparation of authorisation of the environmental impact assessment of the export project

1.1 The legislative framework

- Integrated Environment Permit no. SB dated SB 84/30.10.2007, revised on 20.03.2012;
- Water Management Permit no. 82 dated 28 March 2014, with a phasing plan;
- Water Directive 2000/60/EC;
- Directive IPPC —, DIRECTIVE 2010/75/UE — on industrial emissions, transposed in the national legislation through Law 278/2013 on industrial emissions;
- EC-BAT: Integrated Pollution Prevention and Control, Reference Document on Best Available
- Techniques for the Manufacture of Large Volume inorganic chemicals - ammonia, acids and fertilizers, august 2007;
- EINSENEA Procedure and Guidance 2010;
- GD no. 135/2010 an the approval of the application Methodology of environmental impact assessments for public and private projects;
- SD no. 1408/2008 on the classification, labelling and packaging of hazardous substances;
- GD no. 1156/2006 on the limitation of the noise emissions levels of equipment;
- GD no. 188/2002 for the approval of norms regarding wastewater discharge conditions in the aquatic environment (NTPA 001);
- GD n. 235/2007 on used oils management;
- SD no. 352J2005 on the modification and completion of GD no. 188/2002 for the approval of norms regarding wastewater discharge conditions in the aquatic environment;
- GD no. 445/2009 on the Environmental Impact Assessment of certain public and private projects;
- GD no. 493/2006 on the minimum requirements on health and safety;
- GD no, 621/2005 on the management of packaging and packaging waste, with subsequent modifications and completions;
- GD no. 804/2007 on activities which present major accident hazard involving hazardous substances;
- GD no. 856/2002 on the management of waste and for the approval of the waste list including hazardous waste;
- Law 107/1996 (Water Law) with subsequent modifications and completions
- Law 104/2011 on air quality;
- Law 278/2013 on industrial emissions;

- MWEP Order no. 863/2002 on the approval of the guidelines applicable for the phasing of the frame procedure on environmental impact assessment;
- Regulation 1146/2002 on reference objectives for the classification of surface water quality;
- GEO no. 78/2000 on the regime of waste, approved through Law 426/2001 with subsequent modifications and completions;
- GEO no. 152/2005 on the integrated prevention and control of pollution, with subsequent modifications and completions;
- PMBH Mureş — "Mures Hydrographic Basin Management Plant", edition dated December 22 2009;
- Site Assessment for SC AZOMURES SA Tg. Mures, devetoped by SC PROCHIM SA Bucharest,
- October 2004;
- Environmental Report ,National plan of development on hydrographic basins / Spaces dated March 26 2013;
- Security report — Revised in April 2014, developed by SC IPAOCHIM SA Bucharest ; Annex 8. Urea plant;
- Synthesis regarding water quality in the Mures Hydrographic Basin /2013;
- Environmental impact assessment study of activities conducted SC AZOMUREŞ SA 2004, developed by SC IPROCHIM SA Bucharest
- Volume 2 — Air emission levels assessment study,
- Volume 3 — Water emission levels assessment study,
- Volume 1 — Environmental Impact Assessment,
- STAS 10009-88 on urban acoustics;
- STAS 10144/1-80 Traffic of industrial work equipment within site management and on public roads;
- Geotechnical study of SC GEO-TECH SAL;

INTERNAL REFERENCE DOCUMENTS OF AZOMURES

- The Statement of General Company Policy in Quality Assurance and Environment Protection;
- Product Stewardship Policy;
- Major Accident Prevention Policy;
- Internals environmental procedures:
- PM-31 -004 On waste management;
- PM-31-006 Prevention of soil pollution and maintenance of the site;
- PM-31-009 on the management of chemical substances and products;
- PM-31 -011 on preparing for emergency situations and response capacity;
- PPPA Pollution Prevention and Control Plant for Potentially Pollutant Water Sources;
- PUI Internal Emergency plan;

2. Basic characteristics of the export project

Project Title:	Urea Revamping project
Main activity profile:	Production of fertilizers and nitrogen compounds and production of other basic organic chemicals (melanine).
Project Location (State):	Romania
Information on the project proprietor:	S. C. AZOMURES S. A.
The general contractor:	CHEMOPROJECT NITROGEN a.s.
Author of EIA for analyzed objective:	S. C. ARHIGRAF S. R. L.
Capacity:	There are some operational cases which will be enabled by revamped plant. **Case 1** ("melamine integration case"): Production of 1,235 MTPD of urea granules, and in parallel 190 MTPD of urea melt (as 100% urea) for the melamine plant; all off-gases from the melamine plant to be received in the Urea Solution Plant; no feed to the UAN plant. **Case 2** ("reduced capacity case"): Production of 665 MTPD of urea granules, and in parallel 190 MTPD of urea melt (as 100% urea) for the melamine plant; all off-gases from the melamine plant to be received in the Urea Solution Plant; no feed to the UAN plant. **Case 3** ("max C02 case"): Production of 1,425 MTPD of urea granules; no melamine integration; no feed to the UAN plant. **Case 4** ("UAN case"): Production of 535 MTPD of urea granules, and in parallel 700 MTPD of urea solution (as 100% urea) for the UAN plant and 190 MTPD of urea melt (as 100% urea) for the melamine plant; all off-gases from the melamine plant to be received in the Urea Solution Plant.

The present project is part of the „Urea Plant Revamping" investment, which comprises of the following objectives:

- US 01 New Storage hall for the carbon dioxide compressor and afferent electrical substation;
- US 02 Construction of production unit, Urea Solution Plant;
- UF 01 Urea Finishing Section and afferent Electrical Substation.

Object US 01

New storage hall for the carbon dioxide compressor and afferent electrical substation" will service the new urea solution plant, by providing the necessary compressed carbon dioxide and supplying the new electrical equipment, According to the Mures E.P.A.s Phase Decision no. 7882 dated 2001.2014, this object is not subject to Environmental Impact Assessment and adequate evaluation.

Object UF 01

Urea Finishing Section and afferent electrical substation" will replace the current urea granulation system, with a granulation tower, with a system of significantly improved efficiency, based on the fluid bed granulation technology. The additional reduction of ammonia and urea dust emission will be made through the purification of the gases evacuated in two washing staged. In this first stage, the Gates pass through a wash scrubber for removing urea dust, and in the second stage they pass through an acid wash scrubber for retaining ammonia traces. The afferent electrical substation will ensure the electrical energy supply of all new equipment in the Urea Finishing Section. According to the Mures E.P.A.'s Phase Decision no. 7880 dated 13.02.2014, this object is not subject to Environmental Impact Assessment and adequate evaluation.

Object US 02

Construction of Production Unit Urea Solution Plant will replace the current technology of urea solution production (total recycling technology), with a technology based on carbon dioxide stripping (both under STAMICARBON license). The additional reduction of the ammonia emissions from this wet stage of the technological process will be made by collecting all gaseous flows containing ammonia and sending them to the new Urea Finishing Section UF O1 (dry stage of the technological process), to be purified in wash scrubbers. Thus, the gaseous flows which contain ammonia, together with the Gates coming from the granulation process, already cleaned of urea dust in the first wash scrubber are sent to the second acid wash scrubber, for retaining ammonia traces. This object is subject of the environmental impact assessment, and in the stage of defining the field of evaluation, it was decided that the regulation procedure should be continued by developing the Environmental Impact Assessment (EIA) and the Security Report (SR).

2.1 Description of the project

The Project comprises of the following units:

Urea solution plant:

US 01	New CO_2 compression unit;
US 02	New urea solution unit;
US 03	Existing urea solution unit upgrade/revamp;
US 04	Interconnections and tie-ins;
US 05	Control system;
US 06	Underground networks;
US 07	Roads and pavements;

Urea finishing section:

UF 01	New urea granulation;
UF 02	Existing section upgrade;
UF 03	(not used);
UF 04	(not used);
UF 05	Control system;
UF 06	Underground networks;
UF 07	Roads and pavement

The installation concept of plant's revamping supposes the erection of the new part of the revamped plant during operation of the existing plant. Some modification of existing plant will be executed during planed shut-down In Year 2014 and new part will be connected to existing plant during separate shut-down planed on June 2015.

US 01 New CO_2 compression units

The new CO_2 compressor will be installed with capacity necessary for increasing of the revamped plant production. The compressor will be placed in new compressor house which will be located in the space between existing compressor house of Urea solution plant and new central control room. The preliminary dimension of the compressor house is 18 x 27m with overall height approx. 18 m.

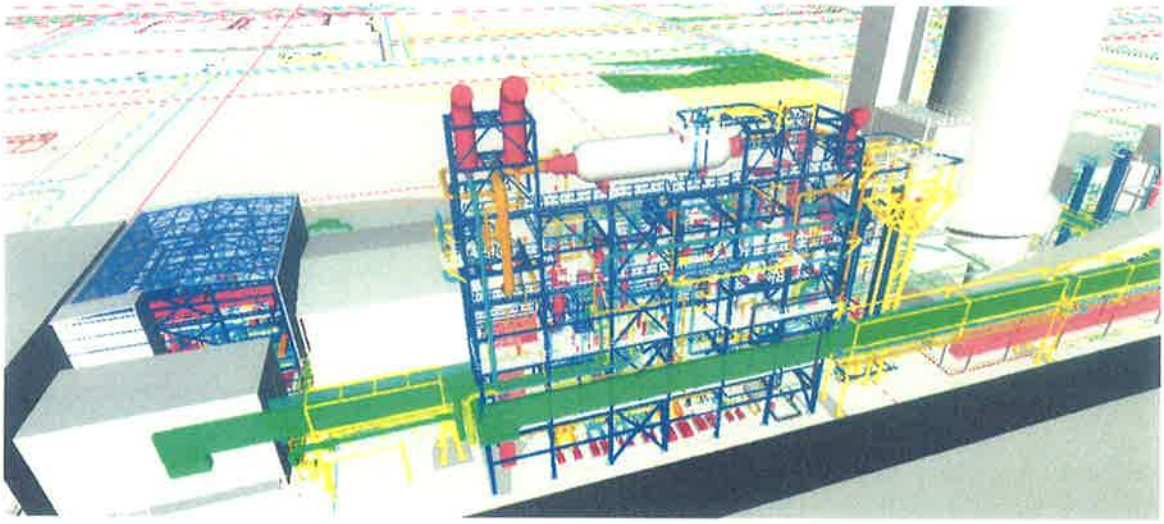
US 02 New urea solution units

The existing urea solution plant is consisting from two lines, which share some common equipment (e.g. waste water treatment section). The original concept of the plant is based on Stamicarbon total recycle conventional technology. The process will be modified by modem Stamicarbon's CO_2 stripping process where the new high pressure section is

established and new low pressure recirculation section and evaporation section will complete the technology.

The new part of the process will be installed at open steel structure placed near the existing plant (dimensions 7,5 x 36 m with height 34 m approx., see figure No. 1).

Figure No. 1 US 02 New solution units



US 03 Existing urea solution unit upgrade/revamp

The existing urea solution plant must be connected to the new part US 02 and particularly modified for increasing of the capacity and improvement of technical level of the plant.

US 04 Interconnection and tie-ins

This unit serves for Interconnection of the revamped urea solution plant with new urea finishing section by piping and cables. The utility fluids (steam, instrument air etc.) shall be placed at pipe rack and connected from battery limit of the project. The pipe race length is 135 m approx. with supposed width about 3,4 – 4,5 m.

US 05 Control system

New distributed control system will install for controlling urea solution plant (existing and new part). The signals related to safety shall be connected to the new emergency shut – down system. The separate technical room will be built for installation of control system for new part (part or the electrical substation). The operator´s and engineering stations will be placed in the new central control room.

S 06 Underground networks

This unit covers necessary underground connections of water and sewerage for new units:

- Drinking water for safety showers;
- Cooling water;

- Rain water sewerage;
- Re-laying of existing networks.

US 07 Roads and pavements

The purpose of this unit is ensuring of access to new units with using of the new roads and pavements connected to existing plant road system.

New finishing section (Urea granulation)

The new granulation section will be erected on free area near the existing urea storage building. The installation of the urea finishing section will be done during operation of the existing urea solution plant including the mechanical connection with the existing transport toute from urea solution plant to the storage building.

UF 01 New urea granulation

Stamicarbon fluid bed granulation process will be used for production of the urea granules. The granular urea is produced in the granulator by film spraying of liquid urea onto seed material in fluidized state. The granules are cooled, stored after that and transported into the storage. The fluidizing air polluted by urea dust and ammonia traces is washed by water and nitric acid before releasing into atmosphere via stack for keeping the emission limits. The urea granulation technology shall be placed in the new separate building with overall preliminary dimensions 40 x 28 m and height 42 m (see figure No.2).

Figure No. 2. New urea granulation

UF 02 Existing section upgrade

The modification of existing building is included in this unit:

- Creating of opening for conveyor;
- Anchoring for conveyor supporting structures;
- Steel platform for conveyor driver station including its anchoring.

UF 03 **(not used)**
UF 04 **(not used)**

UF 05 Control system

The process will be controlled by distributed control system with the similar concept as described for US 05 (separate technical room and the operator´s and engineering station will be placed in the new central control room).

UF 06 Underground networks

Necessary underground connections from existing networks to new granulation unit are part of these units:

- Drinking water for safety showers;
- Cooling water;
- Rain water sewerage;
- Re-laying of existing networks.

UF 07 Roads and pavements

The purpose of this unit is ensuring of access to new units with using of the new roads and pavements connected to existing plant road system.

2.2 Main objectives of the project

- Replacing the conventional technology with total recycling with a technology based on carbon dioxide stripping;
- Increasing production capacity from 900 tons/day to 1.425 tons/day;
- increasing flexibility of the plant according to production flow and market requirements, and a better integration with the Ammonia, Ammonium Nitrate and Melamine Plants;
- Reduction of the raw materials specific consumption;
- Ammonia recovery from the flows with ammonia content, by collecting them and sending them to be purified in the wash scrubber system from the new Urea Finishing Section;
- increasing environmental performances by revamping the water treatment plant in view of treating the water flows after revamping and limiting the ammonia and urea concentration in the purified process condensate to the admitted limits;
- Automated control of the entire technological flow from the revamped unit, from the Central Command Room, by installing a distributed control system (DCS). In addition

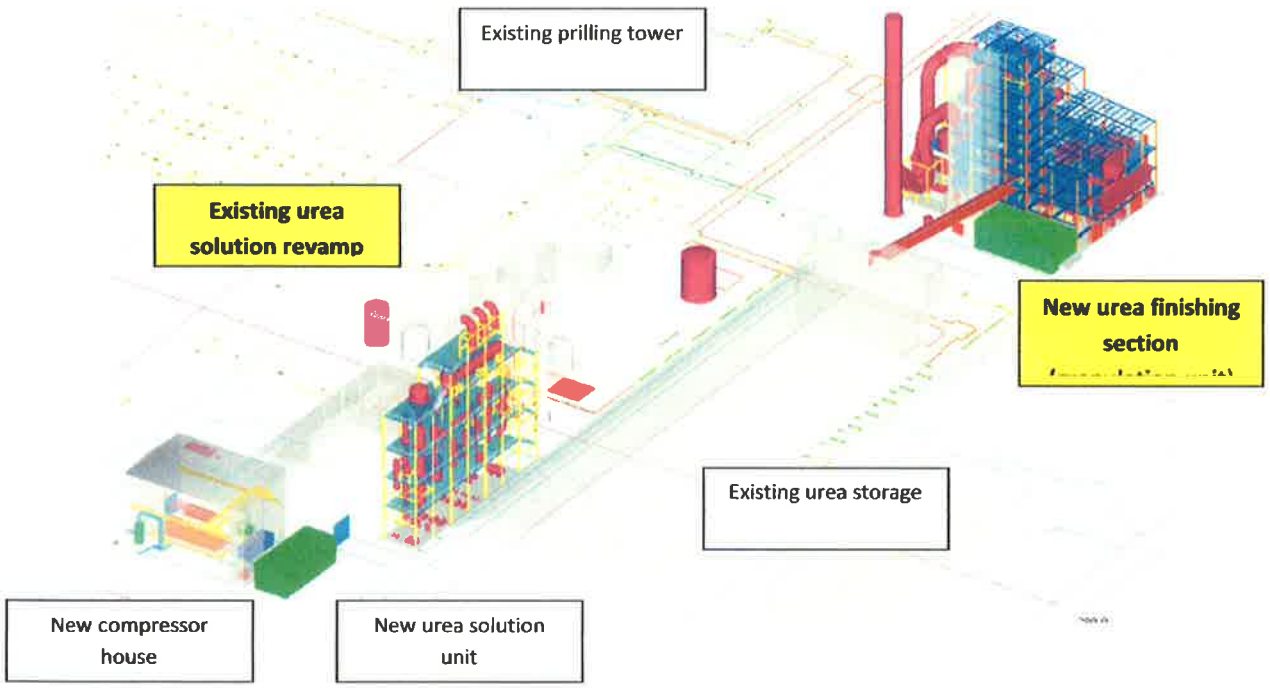
to the process monitoring and control system (DCS), an emergency shutdown system (ESD) will be integrated in the new control system of the plant;

- Implementing a new fire detection and alarm system;
- Increasing safety in operation by reducing operating pressure and temperature in the synthesis part of the technological process.

Expected duration of execution: Trial operation from August 2015 until November 2015.
Acceptance of the project November 2015

Duration of the function: There is no limit duration of the component. It depends on the company´s economical and strategic management.

Figure No. 3 General design of the project



3. Data on inputs and outputs from the environmental point of view

3.1 Inputs

Water

Drinking water is supplied from the city's drinking water network, through a Dn 150 mm connection pipe to the drinking water main in Gh. Doja Street and a Dn 150 mm connection pipe to the drinking water main in Libertaii Street, according to public connection and drinking water supply public service contract no. 00245 /27.12.2011.

Technological water is supplied from the main surface source, from the Mures River, through catchment dam no, 2, managed by the Mures Basinal Administration.

Fire extinguishing water is supplied from the same surface source as the technological water.

Name	Unit	Authorized average quantity (m^3 / year)	Actual water consumption	
			year 2012	year 2013
Drinking water	m^3 / year	495.000	509.384	497 836
Technological water (raw)	m^3 / year	13.140.000	12.216.997	11.543.579

Soil

There is no additional needs on soil occupy. The project is located in AZOMURES S.A. industrial platform is in the western extremity of Tg. Mures municipality's industrial area, at about 4 km from the city's centre, on 300 Gh. Doja Street, Mures County. Geographical coordinates: 24,506413 N longitude, 46,515375 E latitude.

Due to the fact that the company is located in an industrial area, there are no protected areas from the soil or geology point of view or sensitive areas.

3.2 Outputs

Air

During the construction and instalment works, emissions in atmosphere can be generated by exhaust gases of the machines and equipment specific for the execution period, and by the dust from the surfaces on which they move.

The emissions generated are reduced in quantity due to the reduced number of machines and to the fact that not much manoeuvring is necessary, consequently there will only be an insignificant impact, in the immediate surroundings of the plant. Small quantities of gases will be generated from the oxyacetylene and / or electric welding.

Sources of emission and pollutants generated during operation phase

The Urea Plant (US D1) and the Urea Finishing Section (UF 01) will have increased capacities and will be serviced by purification plants adapted to these capacities.

The sources of emissions in air only result from the Finishing Section, from stack 2X0804 (X-663). The emissions contain urea dust and ammonia traces. No air emissions result from the Urea Solution Plant. The sources of urea dust in the Finishing Section are specific, stationary and dynamic equipment: fluid bed granulator, fluid bed cooler, final cooler, screens, crusher, bunkers, and dissolving vessels. All gases disengaged from these sources are collected and sent to the wash scrubber system, from where they are disengaged in the atmosphere.

Ammonia traces come from the urea solution plant, and are engaged in the Finishing Section with the urea melt and then with the gases coming mainly from the fluid bed granulator, and the fluid bed cooler.

Emission limits for these gases are estimated to reach the following authorized parameters:

- Urea dust from stack 2X0804 (X-663), acid wash scrubber 2C0802 (C-662): 25 mgINm3, compared to 50 mg/Nm3authorizeci and 15 - 30 mgINm3in EC-BAT 2007;
- Ammonia from stack 2X0804 (X-663), acid wash scrubber 2C0802 (C-662): 15 mgINm3, compared to 30 mgINm3authorized and t0 - 30 mgINm3in EC-BAT 2007.

Present situation

Objective / Plant	Measurement point	Emission source code	Parameter determined	Output Nm³/h	Functioning hours	Emissions yearly average 2013 mg/Nm³	Pollutant quantity kg/year
Urea Dept. / Urea Plant	Granulation tower – 6 stacks	401 A/B/C/D/E/F	NH3	900.000	7.728	24,85	172.837
			Urea dust			14,31	99.529
	Residual gas wash column	2C 0502M	NH3	100		37,34	29

After revamping

Objective / Plant	Measurement point	Emission source code	Parameter determined	Specific quantity (g/ton)	Functioning hours / year (330 days / year)	Guaranteed emissions mg/Nm³	Pollutant quantity kg/year
Urea Plant / Finishing Section UF01	Exhaust stack from the acid wash scrubber – 1 stack	2X0804 (X-663)	NH3	85	7.920	15	39.971,25
			Urea dust	142		25	66.775,5

Noise

For the execution of the various categories of works, the specific machines and equipment used during execution may represent a possible source of noise and vibrations.
Noise level associated to the various equipment used are:

- front loader 73 — 83 dB;
- mobile crane 75 — 85 dB;
- generator 73 — 85 dB;
- dump truck 85 dB.

Waste

Estimated amounts of waste during construction phase:

Name of waste*	Estimated generated quantity	Physical state (Solid – S, Liquid – L, Semisolid – SS)	Waste code* (according to GD 856/2002)
Earth and rocks, ballast remains	15 t	S	17 05 04 17 01 08
Mixtures of concrete, bricks, tiles and ceramic material other than those specified at 17 01 06*	2,0 t	S	17 01 07
Waste from constructions and demolitions – steel and iron	3 t	S	17 04 05 20 01 40
Packaging waste – packaging containing residue or contaminated with hazardous substances	0,2 t	S	15 01 10*

Name of waste*	Estimated generated quantity	Physical state (Solid – S, Liquid – L, Semisolid – SS)	Waste code* (according to GD 856/2002)
Waste from constructions and demolitions – plastic material	0,75 t	S	17 02 03
Waste from constructions and demolitions – cables, other than those specified at 17 04 10*	1,0 t	S	17 04 11
Oily waste and liquid fuel waste – mineral unclorurated motor oils, transmission and greasing oils; other transmission and greasing oils; mineral unclorurated hydraulic oils	1,0 t	L	13 02 05* 13 01 10*
Municipal and industrial assimilable waste - mixed municipal waste	n.d.	S	20 03 01

The estimated quantities of waste generated in the operation phase are:

- Used metallic pieces and parts non-hazardous waste, codes 17 04 05, 20 01 40, municipal and assimilable waste fractions collected separate met 0,5 tons/year;
- Used oil category I 0,5 tons/year.
- The urea solution production plant does not produce any waste during functioning. The raw materials introduced are fully transformed in liquid and solid final products.

During operation, current practices regarding waste management will not change and no additional measures of selective collection or separate storage of the waste are necessary.

Transport or modification existing roads

Carriageways will be created for the two buildings, which will be connected to the roads on the premises.

4. Data on the condition of the environment in the territory where the export project will be implemented

Social, economic and cultural aspects of the area

From the social point of view the area which can be defined as potentially affected by project realisation and project operation is about 30-40 km around Tirgu-Mures. In the context of potentially affected regions next municipality are situated over there.

Municipality	Estimated number of inhabitants
Tirgu-Mures	134.000
Cristesti	5.824
Ungheni	6.945
Iernut	8.705
Panet	6.033
Sancraiu de Mures	7.489
Ogra	2.387
Acatari	4.738
Sangiorgiu de Mures	9.304
Santana	5.723
Livezeni	3.266
Corunca	2.785
Acatari	4.738
Nades	2.484
Craciunesti	4.470
Gheorghe Doja	2.982
Tarnaveni	22.075
Reghin	33.281
Ludus	15.328

Total region inhabitants (approximately): 580.000

Average national net salary (2013): 1615 lei (about 360 Euro)
Average region net salary (2013): 1357 lei (300 Euro)
Average net salary in the new plant (estimation): 1500 lei (about 330 Euro)

Air

AZOMURES surrounding localities potentially affected by pollution:

- Tirgu-Mures
- Cristesti
- Ungheni
- Panet
- Sancraiu de Mures
- Craciunesti

In 2013, on AZOMURES industrial platform, there were 36 stationary sources of emissions in air, out of which 17 sources of emissions disengaged NH_3.

The cumulated effects due to the other surrounding plants are studied for pollutants with similar effects and the stationary emissions with ammonia and urea dust content are shown in the table below:

Objective / Plant	Measurement point	Emission source code	Parameter determined	Output Nm^3/h	Functioning hours	Emissions yearly average 2013 mg/Nm^3	Pollutant quantity kg/year
Ammonia / Ammonia III	Stripping column process condensate	103E	NH_3	10.937	6.720	9,66	710
Ammonia / Ammonia IV	Stripping column process condensate	103E	NH_3	10.937	7.128	18,3	1.427
Nitric Acid / Nitric Acid II	Residual gas exhaust nozzle	27	NH_3	116.784	6.463	1,28	966
Nitric Acid / Nitric Acid III	Residual gas exhaust nozzle	L01	NH_3	129.758	6.075	0,6	473
Nitric Acid / Nitric Acid IV	Residual gas exhaust nozzle	T01	NH_3	156.253	6.621	1,2	1.241
Ammonium Nitrate / Ammonium Nitrate I+II	Granulation towers (10 stacks)	M1004-M1013	NH_3	520.000	7.632	1,9	7.540
Ammonium Nitrate / Ammonium Nitrate I+II	Gas evacuation after the scrubber	M 3201	NH_3	276.732	7.632	17,56	37.087
Ammonium Nitrate / Ammonium Nitrate III	Granulation tower	V1201	NH_3	516.000	4.680	13,34	32.214
Ammonium Nitrate / Ammonium	Fluid bed evacuation	K0305	NH_3	108.000	4.680	3,11	1.572

Objective / Plant	Measurement point	Emission source code	Parameter determined	Output Nm³/h	Functioning hours	Emissions yearly average 2013 mg/Nm³	Pollutant quantity kg/year
Nitrate III							
Liquid fertilizers – UAN	UAN + Urea vessel	LV4+LV5	NH_3	720	3.072	19,83	44
Urea / Revamped Urea	Exhaust stack from acid wash scrubber – 1 stack	**2X0804 (X-663)**	NH_3 Urea dust		7.920	15 25	39.971 66.776
NPK / Production hall	Granulation tower – joint stack for gases from F and NOx gas washing (1309), NH3 gas washing (1310), vessel aspiration (V1320)	2401	NH_3	58.573	7.752	3,71	1.685
NPK / Production hall	CaCO3 filter aspiration	1327/VO	NH_3	45.500	7.752	24,5	8.642
NPK / Production hall	Granulation tower – evacuation (10 fans) 1A-10A	1A – 10A	NH_3	1.117.000	7.752	8,6	74.467
NPK / phospho-ammonia water concentration plant	BO4 evacuation in atmosphere	BO4	NH_3	100	7.541	8,32	6,27
Melamine / Ejector	PE2 urea melt concentration phase ejector	PE2	NH_3	659	6.360	8,66	36
Total pollutant quantity – cumulated – in kg/year – after Urea Plant revamping							
NH_3 (kg/year)							**208.081**
Urea dust (kg/year)							**66.776**

Fauna and Flora

The project is located in an industrial area, no other lands, greens areas, animal species or habitats are affected. The functioning of the new Urea Solution Plant and Urea Plant after revamping will lead to the significant reduction of the impact on fauna and flora in the areas neighbouring AZOMURES. According to the assessments regarding the impact on fauna and flora, it is estimated that it will be insignificant during the construction stage, and much diminished in the operational stage compared to the present situation and on the long term.

Forests and landscape

The industrial platform is located in the western part of Tg.Mures municipality's industrial area, at about 4 km away from the center of the city. The location of the plant is neighboured by the industrial area on AZOMURES premises. The production unit will be consistent with the general image of the area and will not modify the general landscape character.

5. Comprehensive characteristics and evaluation of effects of the export project on the population and on the environment

5.1 The expected significant environmental impacts

Air Quality

Significant reduction of impact about 76,8 % reduction of the NH_3 quantity and 32,9% reduction of the urea dust quantity in the gases evacuated from the stack of the finishing section.

Significant reduction of impact, reduction of emission concentration: NH_3 to 15 mg/Nm^3, urea dust to 25 mg/Nm^3.

Noise and vibration

For the execution of the various categories of works, the specific machines and equipment used during execution may represent a possible source of noise and vibrations. Another potential source of noise during the execution of the investment is represented by the mechanical machines transporting the materials necessary for execution of the works. All equipment used during execution will comply with the level of acoustic power imposed by GD 1756/2006 regarding the limitation of noise emissions levels in the environment produced by equipment intended for use outside buildings.

The urea solution production process has local insignificant sources of noise. The main sources of noise during operation will be the transfer pumps. The urea solution plant will replace certain equipment in the existing plant with more performant ones, so any noise level, combined with the existing sources, will not increase.

Water Quality

The technological water necessary on site is ensured from the surface intake, from Mures River, through catchment dam no, 2, managed by the Mures Basinal Administration.

The necessary amount of technological water for the urea solution plant, including the quantity estimated for the new production capacities, has been authorized according to Water Management Permit no. 82 dated 28.03.2014.

From the execution phase of the project, no technological water will result, consequently no impact on water quality is prognosed.

The probability of occurrence of a quantifiable or significant impact on water quality during the construction phase is very reduced, considering the type of activities.

The wastewaters resulted from the construction activities will generate a direct insignificant impact, in the case of domestic wastewaters, which will be discharged in the municipal sewerage network. It is estimated that the project's impact on water quality will be insignificant and short term for the construction phase.

For the operating phase, one of the project's objective is the revamping of the wastewater treatment plant in view of treating the wastewater flows resulted after revamping, and compliance of the ammonia and urea concentrations of the purified process condensate with the admitted limits, according to the Integrated Environmental Permit and BREF-BAT documentation.
After project implementation, the same types of wastewaters will result. These will be treated on site, in a new treatment plant.

Soil

During implementation of the project

- Uncontrolled storage of waste;
- Accidental leaks of petrol products from the activity of the machines and vehicles;
- Modifications of drainage conditions due to excavation works;
- Erosion processes of the stripped soil.

During exploitation

- Pollutant emissions from the finishing section;
- Negative modification of soil and subsoil elements caused by accidental leaks / spilling of raw materials or auxiliary materials during transport and manipulation;
- Negative modification of soil and subsoil elements caused by exfiltrations of ranks and sewerage networks;
- Uncontrolled storage and elimination of waste and hazardous substances;

Socio-economic aspects

- Creating new workplaces during the construction phase;
- Increasing investments in Tg. Mures municipality;
- Increasing the quality of life of the employees by giving them the possibility to operate modern equipment and machines;
- The significant improvement of the quality of life of the sensitive receptors, the inhabitants of Tg. Mures municipality and neighbouring communes by reducing the ammonia and dust emissions resulting in the present production process, following the completion of the integrated project Urea Plant Revamping, which includes the production unit and the urea solution plant.

All these aspects will contribute to the economic growth of the area.

Cultural aspect

Considering the specific character of the works, as well as their location within the municipality's perimeter, we cannot discuss about any impact on cultural or ethnic conditions, or on the areas cultural patrimony.

5.2 Comparison of solution

In order to assessment the environmental impact of the investment Urea Plant Revamping - Building of Production Unit, Urea Solution Plant on the location on Azomures SA Tirgu Mures premises, the "0" (non – action) alternative was considered, for the situation without project implementation, and the alternative with the implementation of the project (active variant) for increasing capacity and compliance to environmental requirements.

For the identification of significant impacts all activities affected by project implementation were considers, as well as environmental receptors and potential interactions between components and activities.

From the assessment of impact, as a comparison between the present situation (non – action variant) and after the implementation of the Urea Plant Revamping project (active variant), on the location and within the S.C. AZOMURES S.A. industrial platform, the following are obvious:

- Impact on surface waters is significantly reduced compared to the present situation, and cumulated impact on waters is a positive;
- Impact on soil and ground waters is maintained to the present level;
- Impact on atmospheric air after commissioning is significantly reduced compared to the present situation, and basically modifies the present impact, bringing a visible positive impact.

6. Summary evaluation of compliance with the rules under consideration exports for environmental protection

The available project documentation and impact assessment of the construction and operation on the environment **" Urea Revamping project – building of compression unit "** in the village Mures, Republic of Romania at this stage of development very reliable. The negative impacts do not exceed the limits set by laws and regulations.
Based on the available data the export project corresponds to the relevant Romanian and European limits and the key parameters are compatible with the standards of the World Bank.

6.1 Comparison of chosen technologies with Best Available Techniques BAT

Reference Document on Best Available Techniques for the Manufacture of Large Volume Inorganic Chemicals, Ammonia, Acids and Fertilizers, 2007" (EC-BAT 2007).
According to EC-BAT 2007, the basic objectives of revamping a conventional plant with stripping technology are:

- Increase of production capacity;
- Decrease of the raw material specific consumption;
- Reduction of pollution;
- Reduction of maintenance costs;

According to EC-BAT 2007, the basic principle of revamping implies combining condensation and synthesis in one equipment, a principle applied also to this project, in the following configuration:

- Stripper + combined equipment (condenser/synthesis pre-reactor) + synthesis reactor.

In the case of this project, the combined equipment is the pool condenser.

- The recycling technology applied and the proposed plant and equipment, as well as the process parameters are compliant with BAT/BREF provisions;
- The specific raw material consumptions, per ton of produced urea, are compliant with BAT/BREF provisions;
- The wastewater emissions resulted from process condensate and draining will comply to BAT/BREF conditions;
- The air emissions resuRed from the Urea Solution Plant are collected and sent for purification and ammonia recovery in the wash scrubber system in the new Finishing Section. Purification of the gases discharged from the Finishing Section will by compliant, both from the qualitative and quantitative point of view, with BAT/BREF requirements.

7. Unique final evaluation of the acceptability or unacceptability of the impact of the project on the environment

7.1 Mitigation measures during operation of the project

Air Quality (reduction air pollution)

During the implementation of the investment no decontamination equipment or additional protective measures are necessary.

During operation phase

For the minimization of pollutant emissions in the atmosphere and compliance to the limits foreseen by the legislation in force, the following mitigation measures have been established:

- replacement of the current Urea Finishing system with granulation tower, with a system of significantly higher efficiency, based on the fluid bed granulation technology;
- increasing environmental performances by reducing dust and ammonia emissions which result in the current granulation process;
- recovering the ammonia from the flows with ammonia content sent from the Urea Solution Pant, by washing them in the scrubber of the Granulation Section;
- maintaining the gas decontamination systems in optimum parameters;
- compliance with the daily technical inspection procedures, the regular technical inspections procedures;
- continuous compliance and monitoring of operating parameters;
- continuous monitoring of ammonia and urea dust emissions at the gas evacuation stak of the Finishing Section;
- installing a modem central command and control system, with the integration of the existing equipment;
- conducting the technological processes from the Central Command Room, a project connected to the revamping projects of the Urea and Ammonia Plant, implemented in parallel;
- updating all existing electrical and measurement and control equipment which are reused and replacing those which are technically obsolete.

Water Quality

In order to prevent any impact on water quality, the following measures will be taken:

- ensuring the proper functioning of the separative collection system of the various wastewater categories;
- full compliance with the treatment technology, according to the operation manual;

- monitoring of the end quality parameters of the treated waters, with the standard frequency and methods imposed by regulatory documents:
- maintaining in good conditions the soil waterproofing arrangements (concrete platforms, concrete access roads).

Soil (reduction of damage and contamination of the soil)

No.	Pollution source	Prevention and mitigation measures
Construction phase		
1	Uncontrolled storage of waste	Adequate management of waste at the work point: - Training of personnel regarding the selective collecting of waste - Selective collection of construction waste and handing over to authorized operators in view of recovery / elimination; - Installment of ecologic trash cans for the selective collection of domestic waste, handing over the recyclable part to an authorized operator in view of reuse and the biodegradable part to the sanitation services operator.
2	Accidental leakage of petrol products from machine and vehicle activity	In order to prevent soil and subsoil contamination with petrol products or oils discharged in case of accidental spills, a platform was arranged on site, for the parking of vehicles / machines, absorbent materials are available (sand, turf, etc.), and special equipment is used for urgent intervention in case of accidental leaks of petrol products and / or used oils;
3	Temporary occupation of the soil with construction materials and / or excavated materials	Construction materials will be stored in special established and arranged areas for a short period of time, and the excavated material will be used as filling or will be handed over to an authorized operator for elimination and reuse
4	Modifications of drainage conditions due to excavation works	- Excavation works will be executed according to the project and legislation in force, considering the hydrogeological structure of the area; - No excavation works will be executed in extreme meteorological conditions (rain, storm, etc).
5	Erosion process of stripped soil	Stripping works will be executed during a short period of time, on a reduced area, and will observe the legislation in force and the project;
Operation phase		
1	Pollutant emissions in the atmosphere resulted from the Finishing Section plant with negative influence on soil	In order to prevent atmospheric pollutant from sedimenting, with negative influences on the soil and subsoil, the following measures were considered: - Introducing a technology with increased performance, based on fluid bed granulation - Reduction of emissions in air by washing the dust in the wash scrubbers

7.2 General conclusions

Most of the effects incurred due to the implementation of this project are significantly positive. Revamping of the Urea Plant will reduce, to a significant extent, the current sources of pollution and will allow using safer technological procedures and processes, which will take place in strictly controlled regime.

The Urea Plant Revamping project will lead to increased safety for the operating personnel and for the environment, by reducing significantly the ammonia and dust emissions in the air from the surrounding areas, and thus for the inhabitants of Tg. Mures municipality and adjacent communes.

Components of the Environment	Suitable	Not Suitable	Not evaluated	Notes
Effects on the population, including socio-economic impacts	yes			
Impacts on air and climate	yes, with condition			In the next stage of the project documentation it is necessary to include the establishment of an emission monitoring system for basic pollutants.
Impacts on noise situation	yes			
Impacts on surface and groundwater	yes, with condition			Guarantee the parameter levels of the wastewater by regular analysis of treated wastewater samples.
Impacts on soil	yes			
Influences on the geological environment and natural resources	yes			
Impacts on fauna, flora and ecosystems	yes			
Impacts on landscape	yes			
Impacts on tangible assets and cultural heritage	yes			
overall assessment	yes, with the abovementioned conditions of each component			

By fulfilling the conditions and satisfying the building parameters, the realization of the export project " Urea Revamping project – building of compression unit " in the city of Mures, Republic of Romania is acceptable in terms of environmental impact.

8. Materials, which are used in the report

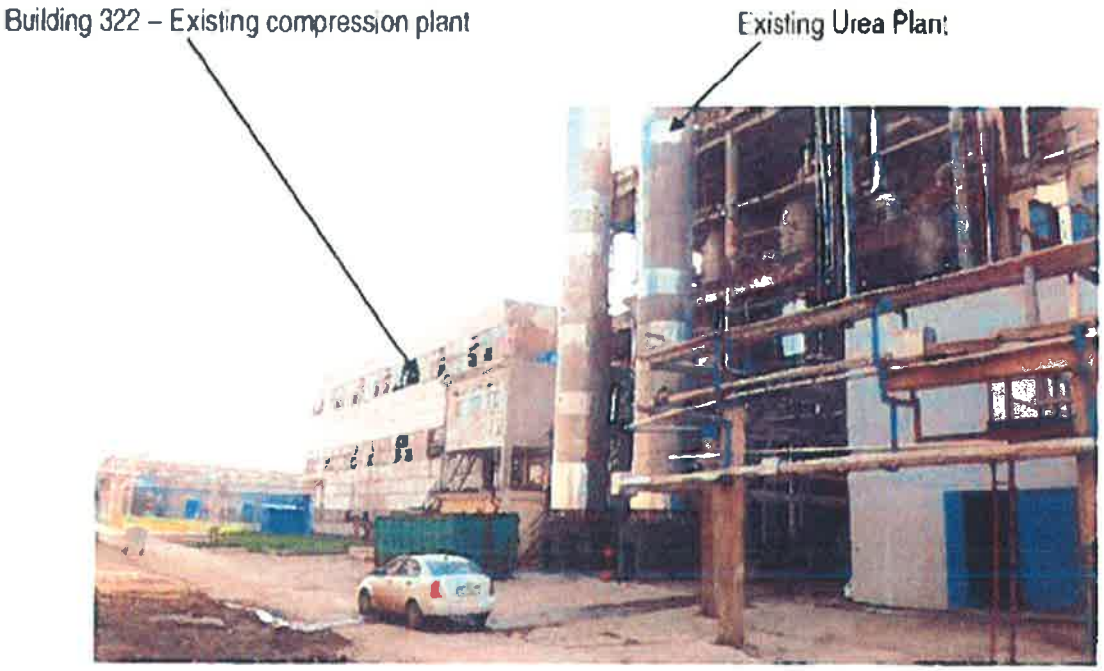
- Security report -Revised in April2014, developed by SC IPROCHIM SA Bucharest; Annex 8. Urea Plant;
- Synthesis regarding water quality in the Mures Hydrographic Basin12013
- Environmental Impact Assessment study of activities conducted SC AZOMURES SA, 2004, developed by SC IPROCHIM SA Bucharest;
  - Volume 2 -Air emission levels assessment study;
  - Volume 3 -Water emission levels assessment study;
  - Volume 7 – Environmental Impact Assessment;
- STAS 10009-88 on urban acoustics;
- STAS 1014411-80 Traffic of industrial work equipment within site management and on public roads;
- Geotechnical study of SC GEO-TECH SAL;
- www.stamicarbon..com/urea-technologies;

Internal reference documents of AZOMURES

- The Statement of General Company Policy in Quality Assurance and Environment Protection;
- Product Stewardship Policy;
- Major Accident Prevention Policy;
- Internal environmental procedures:
  - PM-31-004 on waste management;
  - PM-31-006 Prevention of soil pollution and maintenance of the site;
  - PM-31-009 on the management of chemical substances and products;
  - PM-31-011 on preparing for emergency situations and response capacity;
- PPPA Pollution Prevention and Control Plant for Potentially Pollutant Water Sources;

8.1 Site Pictures (present state, before project realisation)

US01 location – Compressor hall and electrical substation



US02 location – Urea solution plant

Existing Urea Plant

UF01 location – Urea finishing section and electrical substation

9. Authors of Authorisation of the environmental impact assessment of the export project

Ing. Vladimír Zdražil	Department of applied ecology, Faculty of environmental science, Czech university of life science Prague, Kamýcká 129, 165 21, Prague – Suchdol. tel.: +420 22438 6207, zdrazil@knc.czu.cz
Ing. Zdeněk Keken	Department of applied ecology, Faculty of environmental science, Czech university of life science Prague, Kamýcká 129, 165 21, Prague – Suchdol. tel.: +420 22438 3709, keken@knc.czu.cz

Date of the realization of the authorisation of the environmental impact assessment of the export project:

May 2014

Signature of relevant person responsible for Authorisation of the environmental impact assessment of the export project:

.....

Ing. Vladimír Zdražil