PART V

A NON-TECHNICAL SUMMARY OF THE INFORMATION OBTAINED ACCORDING TO AFORESAID HEADINGS

trakya yenişehir cam sanayıta.s.

CLEAR FLOAT GLASS FACTORY ENVIRONMENTAL IMPACT ASSESSMENTS REPORT

Starting its operations in 1935 with a capacity of 3.000 tons, Sisceam, the first ever glass production Company in Turkey, has now become one of the leaders of the glass industry renowned worldwide and in Europe.

Sisecam Group operates under four main groups which consist of Clear Float Glass, Packing, Glass Household Goods and Chemicals production, which spans everything from production of raw material to supply of commodities to local and international markets.

Sisecam Group's affiliate Frakya Cam Sanayi A.S., the only float glass producer in Turkey, operates in two different locations in the country through 4 float production lines with a constant production capacity of \$30,000 tons.

Producing goods by employing the most advanced technologies of our day, Trakya Cam Sanayi A.Ş. has habitually continued itself to spearhead development in Turkish glass industry by constantly increasing its capacity and production range, and with passing of time it has further bolstered its strong position in the global float glass markets.

In float glass sector, Trakya Cam Sanayi A.S. serves the markets with its vast glass products range consisting of various standards and types of glass products manufactured at its Luleburgaz. Mersin and Caytrova factories. Among its products are float and frosted glass, mirror, laminated glass, tempered glass, flashed glass and automotive glass in varying shapes, hues and thicknesses.

The long-term production-sales-stock balancing forecasts made in parallel to Trakya Cam Sanayi A.Ş.'s "Regional Leadership" vision, have suggested that the world is going to experience a capacity shortage in float glass production by the year 2007. This shortage is attributed to the snowballing growth of float glass demand in Turkey during the recent periods matching the Company's huge increase of float glass sales to the domestic markets, and the rapid surge in use of raw glass in the Community. In this respect, in addition to the ongoing construction of the float glass factory in Bulgaria, the company has become obliged to invest in building of its fifth float glass production line in Turkey.

In order to satisfy this argent need Trakya Cam Sarayi A.S. has planned to establish a company titled Trakya Yenişehir Cam San. A.Ş. in an aim to proceed establishment of its 5th float glass production factory in the town of Yenişehir, Bursa, at Yenişehir Organized Industrial Zone (OSB) over the land glot covering 330.669 square meters out of the total land portion of 738.663 m² that had been allotted to Sisecam Group.

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The 225.000 tons/year capacity float glass line that is planned to be launched at the beginning of 2007 will cater the needs of the local markets and inter-Community raw glass consumption. And unique from the other float glass lines of Trakya Cam, this factory will produce colorless glass, 80% which will consist of jumbo products; therefore, its operations are to be performed with much greater efficiency. The Company plans to finance 53% of the project which amounts to EURO 93.000.000 from its equity capital and 47% through term-payment investment loan to be funded by an international loan Institutions.

The float technology which is accepted as the most advanced technology worldwide will be used for float glass production. Float glass is produced by floating molten glass (metal) on molten tin to ensure parallel and faultless surfaces at both sides of glass to facilitate obtaining high optical quality.

The glass facility that was planned to have a gross glass production capacity of 264.623ton/year (725 ton/day) will incorporate batch preparation, float glass melting furnace, forming (tinning bath), float glass cooling, float glass processing, surface coating/plating, finished products warehouse, nitrogen gas and compressed air generation, water processing and cooling, emergency power generation system and steam production system.

As the raw material input for production of glass batch sand, sodu, dolomite, calcer, sodium sulfate, coal and broken glass will be used.

The water conditioning chemicals to be used in water preparation for glass production, nitrogen and hydrogen gasses used for tinning bath, and mechanical oil used at various stages are among the supplementary materials.

Centralized marketing of the finished products is to be performed by Float Glass Group Marketing and Sales Deputy Chairmanship; and the finished products produced by the Company will be stored at the sheltered finished products warehouse and shipped out from there.

The land plot covering 350.669 m² located in Bursa-Yonischir Organized Industrial Zone 1* Region in Yenischir town of Bursa was selected by Trakya Yenischir Cam Sanayi A.S. as the construction site for the scheduled "Float Glass" factory.

Since Burca-Yenişchir OIZ is currently under development, there are no erected buildings in the site. Site selection at OIZ area was made according to decision taken on 16.08.2000 during a meeting by participation of relevant authorities and institutions; and consequent upon further scrutiny by these institutions some chances were made on the settlement plan, and the final boundaries of the region were laid down accordingly. OIZ is characterized as an "integrated OIZ".

A meeting was hold by Yenişehir OIZ Enterprises Management Board for allotment of the industrial development size to Trakya Yenişehir Cam Sanayi A.S. and a final decision was reached for allotment of the cited site.

The project site boundaries face Akdere and Subaşı Village roads. Göksu (kocasu) river flows from the northern direction of the OIZ where the State Water Authority's irrigation areas and concentration sites are 11-12. At the South, East and Western sides of OIZ there are 3-20% sloping

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Subs: Barbaros Suvian No. 77 K. 1 D. 1 Base ins. (197. No. (0212) 255 19 05 - 258 89 55 Foot (0212) 227 40 89 Shekky V.D.: 736 046 3074 grounds where patches of grain, harley, out and sugar beet and sunflower plantations are concentrated. There also are patches of tree groups and shrubs.

Approximately 100.000 m³ excavation will be made for the construction works covering a development site of 65.455 square meters within the total project area of 330669 m². The vegetal soil of 15.000 m³ in the project area will be stripped from the top soil and stored at a location in the project area with an inclination not greater than 5% for further landscaping and leveling works. Approx. 85.000 m³ of excavation material beneath the vegetal soil will be used for leveling of the site's base ground, and the excessive excavation material is to be discarded at dumping sites to be directed by the Municipality in compliance with the Excavation Material and Demolition Sites Debris Control Directive.

Water Usage

For the planned float glass factory 22,5 m³/day drinking and utility water is needed for the workers, and 25 m³/day for dust proofing activity to be performed whilst the construction phase.

At the time the factory is launched into operation drinking and utility water will be needed for the processes involving steam boiler, cooling water system, soft water unit (regeneration), glass washing, hydrogen generation, reverse esmosis unit for household usage purposes, ion exchanger units (reverse washing + regeneration), and glass washing (pre-surface coating process), and for the employees to be hired for the facility.

The water requirement consist of 30m³/day for drinking- utility purposes of the employees during the operation phase, and the overall water requirement amounts to 210.150 m³/year for the entire process.

The required quantities of water both during construction and production phases will be supplied through water wells of IME, and in case of any short supply of water from OIZ sources, such shortage will be made up through water reservoirs with the respective capacities of 2.500 tons and 750 tons as owned and operated by Yenischir Municipality.

Wastewater Generation and Discharge

Consequent upon water consumption by 150 personnel during the construction stage wastewater amounting to 22,5m³/day will be generated.

Again, the estimated wastewater generated by consumption of the employees will be 22,5m³/day, and industrial wastewater production from a number of processes.

Water is not directly used at float glass production. However, when the dust formed on the surface of the glass produced washing with water becomes necessary. Therefore, the Company plans to collect the wasarvater, filter and soften it for recycling. Furthermore, the boiler feed water and cooling water blow offs may also be considered as the wastewater sources to be recycled. In this respect the boiler water blow off is estimate to be 525 Ton/year and cooling water blow off is approx. 11.000 Ton/year. The conditioners to be used in the boiler and cooling waters are organic based, hence not to contain and generate any significant pollutants.



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Accordingly, the wastewaters originating from the manufacturing process is to be directly discharged without necessitating any treatment.

For the surface coating processes, the deminaralize water used for washing of glass is discharged after use. Since no additives are added to the washing process, the wastewater is not expected to contain any significant pollutants. For production of demineralized water reverse osmosis and anion-cation exchanging resin systems are employed. The wastewater disposed from the reverse osmosis unit time to time will not contain any pollutants. And, the wastewater formed during regeneration of anion-cation exchanging resins will first is neutralized and to be discharged after verification that the water complies with the values listed on the Table no 20.1 of the Water Pollution Control Directive.

Until the planned Yenjachir Wastewater Treatment Plant is launched into operation, the household quality wastewater generated during processing will be treated at compact type treatment facility and discharged according to requirements. The wastewater generated at the facility will initially be treated at the wastewater treatment plants and after ensuring compliance with the discharge standards as prescribed under the "Wuter Pollution Control Directive, Communiqué for Technical Procedures" in the Chapter for "Usage of Treated Water at Irrigation" and to be used for watering of the landscaping areas in vicinity of the factory. However, if the treated water is increased after usage or if the necessary standards relating to use of treated waters for irrigation can not be met, its compliance with the receiving environment standards according to the "Water Pollution Control Directive is to be ensured and the treated water discharged to Göksu river flowing at 100 meters distance to the factory site.

After Yenişehir Wastewater Treatment Plant is finished the wastewater generated in the factory will be discharged into sewerage systems following pre-treatment (if necessary) in order to ensure compliance with the standards to be set out by OIZ management.

Solid Waste

The solid waste generated during the land betterment and construction stages of the factory are consist of the, excavation debris, solid household waste from the employees and the waste from construction works. Maintenance and repair of the vehicles used during construction works will be performed at the negrest technical service; hence, no waste oil is expected to be generated from the vehicles.

150 employees will be employed during the land betterment and construction stages and 105 kg/day solid household waste generated by these will be collected at sealed discharge containers placed at varying locations in the project site, provided recyclable wastes are collected within separate containers. Out of these the recyclable waste will be supplied to recycling firms and the non-recyclable waste will be collected at sealed discharge containers and conveyed to the incinerators as designated by Yenişehir Municipality.

With respect to the excavation works to be made during the land betterment and construction stages of the factory the top 15 cm thick vegetal soil will be stripped off and stored within the project site and to be used for any future landscaping works or land leveling activities. The portion beneath the vegetal soil is to be used with respect to land grading and leveling activities, and the excess debricate disposed off the dumping sites to be directed by the Municipality.

Sube: Barbares Suburi No. 77 K. 1 D. 1 Depairs 7197. Tel: (0212) 251 576 - 256 88 86 Fax: (0212) 227 46 98 Redskey VD.: 736 046 3074 Translated from Turkish into English in full complishes with the original text.
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The debris (i.e. iron pieces, blocks, steel, sheet metal, packing material and any similar solid wastes) generated during land betterment and construction works will be collected as scrap material and stored in the project site, thereafter, the recyclable waste to be sold as scrap material and non-recyclable waste will be dumped off the incineration area to be designated by Yenişehiz Municipality.

And the solid waste generated during operation is classified as the household quality wastewater to be generated from the employees, industrial process waste, treated sludge from the treatment plant and medical solid waste generated from the dispensary.

On the other hand, glass waste generated due to quality control at float glass production stages as out-of-production rejects will be recycled into glass batch as "broken glass". However, the broken glass generated during various stages of surface coating processes can not be recharged into the furnace, hence as to be disposed off by selling for recycling purposes. Similarly, the dust collected during unloading, weighing, hauling, etc. of glass raw material in dust collection filters will be redumped into the raw material silos for reuse at production.

During the process waste oil, lubricants, batteries, accumulators, fluorescent light bulbs, packing material wastes, used targers, solid household waste, medical solid waste, treatment sludge and scrap material (plastics, wood, metal and paper) will be generated.

For all solid waste generated during production stages of the project the rules and regulations prescribed by the Solid Waste Control Directive, Waste Oils and Lubricants Control Directive, Waste batteries and Accumulators Control Directive, Dangerous Wastes Control Directive, and the Medical Wastes Control Directive are to be fully complied with.

Impact on Air Pollution

Within the scope of the project emissions is generated from the construction works (i.e. collection, transportation champing and storing of excavated material), from fuel burning by the heavy and light weight earth moving engines, and from the operating stage activities (glass melting furnace, diesel generators, waste heat boiler and batch preparation department).

Emissions generated from Excavation works

On grounds the total dust emission value calculated for the construction stage of the project is 1,146 kg/hr, there would be no need for determination of the air quality contribution values. The factory will fully comply with the provisions of meeting the air quality standards relating to bulk dust containing material stored at open space as prescribed under the provisions of Article 39 for the Industrial Source Air Follution Control Directive (EKHKK Directive).

Furthermore, in order to minimize dusting in the open field various measures will be taken and implemented such as watering at the emission source, filling and discharging without harling material, and covering the vehicles with tents and keeping the top layers of the material with 10% moisture, etc.



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Emissions Generated by the Transportation Vehicles

The quantity of emissions generated from fuel burning of the vehicles used either during construction works or at operating stages varies according to the fuel type, age, maintenance level and speed of the earth moving engines, and the works performed at the construction site; consistent with these, average emission factors were designated by taking into consideration all these factors.

The mass flow rates of the emissions generated from the vehicles employed for the project works was estimated on the basis of average 10 hours per day simultaneous work of 4 light and 4 heavy weight earth moving engines operating with 40 km/hr speed according to the provisions of Industrial Source Air Polision Control Directive.

According to the calculations the total quantity of emissions generated by these vehicles were much lower than the limit values for "contribution of the factory to air pollution" as indicated under the provisions of Article 40 of the Industrial Source Air Pollution Control Directive which was entered into force by announcement at the Official Gazette bearing the date and no 07.10.2004-25606; therefore, there would be no need for determination of the total air pollution values. Hence, emissions to be generated from the vehicles will not have significant impact on the existing air quality.

Emissions Generated from the Process

Dust emission generated during raw material loading, feeding, and mixing processes at the batch department. However, considering that the processes are made in the batch preparation department in a full contained environment and bag filters are to be used for dust suppression, we expect a very low level dust emission (i.e. value below 10 mg/Nm²).

This average dust emission value of 10 mg/Nm³ expected to be generated from dustfreeing units (bag filters) is much below the limit value of 75 mg/Nm³ as prescribed by the provisions of Article 39 of the Industrial Source Air Pollution Control Directive.

A portion of the thermal energy of the flue gas coming from the glass melting flurace is regenerated by passing it through waste heat boilers before emission into the atmosphere. It is estimated that the flue gas will enter the waste heat boilers at a temperature range of 350°C and come out around 175-200°C. The steam generated with thermal energy from the difference of these temperatures planned to be used at necessary points during the operation. No additional emissions will be generated, because the waste heat boiler does not use any fuel.

The emission values of the steam boiler which is planned to serve as the stand-by heat source at the factory are fairly lower than the limits prescribed by the EKHKK Directive.

The hydrogen gas to be used at the bath unit is generated from natural by gas separation method and this unit is estimated to use 100 Nm³/hr natural gas. Accordingly, the flue gas flow rate was calculated to be 4500 Nm²/hr for which EKHKK Directive does not incorporate any limit value.

During the power shortages at the factory, two generators will be operated in order to supply energy to critical units of the furnace production line, and the emission from the diesel oil used

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as a fuel will naturally generate some emission. We expect very low emission levels because the operating times will be minimal.

A side-firing and regenerative glass melting furnace with the capacity of 725 tons/day is planned to be installed in Yenişehir factory. And the thermal heat of flue gas from the glass melting furnace is to be regenerated by passing it through waste heat boilers before emission into the atmosphere. Due to the firing process the glass melting furnace to be used at production will generate some emission.

By taking into consideration all these factors the designated average flue gas flow rate, flue gas height, flue gas temperature and O₂ content were determined. The Industrial Source Air Pollution Control Directive Article 42, Paragraph B, Subparagraph 3.1 dictates that "flue height has to be determined with assistance of abacus", and the flue height determined with abacus was seen to be complying with the limit values prescribed by the Industrial Source Air Pollution Control Directive.

To create viable precidence, reference has been made to the readings of flue gas emission values from Trakya Factory, smother affiliate to Sisecam Float Glass Group, and it was foreseen that viable estimates may be made with respect to glass melting furnace flue gas emission concentrations of Yenischit factory. According to the examinations and analyses conducted it was determined that dust SO₂₁, NO_{2k}, (NO₂ type), CO, HF and HCI emission levels are in full compliance with the limit values of the Directive.

Under the EKHKK Directive Article 7 Paragraph h it was ruled: "in case the mass flow rates indicated in Article 40 Table 40.1 are exceeded at newly established facilities, the operator of such facility will be obliged to calculate the contribution values to air pollution by employing an internationally recognized dispersion model in order to measure the air pollution levels and determine the polluting factor of the factory as per the rules dictates under Article 40".

With respect to examination of the values foreseen with regards to estimated emission levels, NO_X emission mass flow rate appears to exceed the limit values. Therefore, in order to determine dispersion profiles of all gas and dust emissions generated by the factory, ISCST3 (Industrial Source Complex – Short Ferm 3) Model which was developed by EPA, USA and approved by the same institution for conduction of environmental impact assessment studies, was used to conduct an air dispersion modeling study.

Modeling was made by duly taking into consideration all emission sources from the facility (glass melting furnace; hydrogen generation plant and the steam boiler) and the dispersion profile of the probable emission generated from the facility (NO_{x1} , SO_2 , PM, HCI and HF) within the existing maistonological and topographical conditions. Modeling works have been realized within the space covering 13,5 km x 13,5 km that is formed in an manner to encompass an orbicular area which radius is fifty folds of the flue height (i.e. 130 m x 50 = 6.500 m as prescribed under the provisions of EKHKK Directive Article 40).

The result of the study reveals: in consideration of the emission calculations which is generated by the facility and the Air Quality Contribution levels as determined by implementation of ISCST3 modeling, the probable emissions from the facility will not have any significant impact

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on the existing air quality: therefore, the facility will not pose any risks or danger to human health or the environment.

In addition to this Yenişehir Float Glass Factory Project will be subject to obtaining emission permits according to the rules of EKHKK Directive; hence, upon its launch into production, due emission measurements will be made and the relevant emission permit will be obtained. For the measurements to be taken at the facility compliance with the provisions indicated in Article 41 for taking measurements and the limit values, as well as the conditions will be observed and implemented accordingly.

Noise Levels

Noise is generated during the construction works by the vehicles and equipment employed and from the operations at the units during at launch of the facility into production.

According to the calculations, after approximately 100 meters the noise levels remains below 70 dBA level indicated in Table 5 of "Unvironmental Noise Assessment and Management Directive".

On grounds the preparatory works to be performer on the open field, taking due measurements to avoid noise pollution will be very difficult. Noise levels will vary during the course of the day, but since the operation is to be performed during daytime noise pollution will have been limited. If deemed necessary ear protection devices such as headphones, ear plugs, protective gear, etc. will be supplied to workers as prescribed under the Labor Law no 4857.

The nearest settlement area to the factory is Subaşı village located at some 1,2 km distance, hence the noise levels are of insignificant degree for the distance of 1,2 km; therefore, the inhabitants would not be negatively affected from the noise level generated at the factory.

Furthermore, the factory will comply with the rules prescribed by the Part 4, Article 26 of the "Construction Sites Noise Assessment Criteria" under the Environmental Noise Assessment and Management Directive, and the factory will use vehicles which traffic inspections, exhaust measurements and overhaul have been duly performed.

On grounds the machinery and equipment to be used at operation phase of Yenischir Float Glass Factory which is envisaged to be established hereunder, are unique for the process, the noise pollution levels determination studies performed by "Industrial Relations Directorate" of Trakya Factory, also an affiliate of Sisecam Group, have been used; and according to due calculations made with reference thereof the noise levels were determined to be within the limit values as foreseen approx. 4 meters for day time and approx. 10 meters for night time levels under the prescriptions of Table 4 of the Environmental Noise Assessment and Management Directive.

The nearest settlement area to the factory is Subaşı village located at some 1,2 km distance, and hence, the noise levels are of insignificant degree for the distance of 1,2 km; therefore, the inhabitants would not be negatively affected from the noise level generated at the factory.

With respect to the noise which may be produced during the construction works at the project site the provisions elipulated under Article 25 captioned "Environmental Noise Criteria for



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Industrial facilities" and Article 10 "Obligations of the Operator" under the Environmental Noise Assessment and Management Directive will be duly complied with, maintenance and overhauling of the machinery and equipment will be performed and inspected on timely basis.

Furthermore, after launching into operation noise measurements will be made on regular basis, and in case the noise levels seem to exceed the designated limit values ear protection devices such as headphones, ear plugs, protective gear, etc. will be supplied to workers as prescribed under the Labor Law no 4857.

Impact on Human Health and Environment

Job accidents and any petential health problems during the entire construction phase of the project are considered as the impact on human health.

The incidents which are risky and dangerous for human health and environment occurring during the operation phase will consist of raw and supplementary material usage risks in the production process.

In order to minimize these risks, the company will exert due care to employ properly trained and licensed earth moving engine drivers. In addition, the work shifts for the construction workers will be restricted to 10 hours a day, the workers will be distributed proper protective equipment and clothing (i.e. protective glasses, gloves, helinet, safety belts and harnesses, etc), and the company will carefully follow up their usage at required works and locations.

With respect to workers health and job safety in the factory, the provisions of "Workers Health and Job Safety" Directives dated 09.12.2003 with no 25311 will be duly complied with and the necessary conditions to be met accordingly.

Industrial Relations Directorate" of Sisecum Group will provide workers health and job safety training to the entire personnel and the personnel will undergo six monthly periodical medical checks by the factory health department.

Furthermore, the company will ensure the factory workers to have proper personal protection against the chemicals with the protective material meeting the standards indicated in the material safety data sheets, especially for protection of respiratory system, eyes, face, skin, and body.

Emergency Action Plan

In order to avoid any job accidents at the facility, verbal and written instructions will be given to the personnel with respect to operating conditions of the machinery, equipment and the chemicals and any probable risks relevant thereof. Maintenance of the machinery and equipment will be regularly made, and therefore, any probable accident hazards will have been minimized.

In order to ensure immediate interception of any job accidents, fire, etc. occurring at the factory, fire fighting equipment and systems (i.e. carbon-dioxide bottles, bucket, shovels, fire extinguishing tools), first aid material, etc. will be made available according to the rules of the existing Directives at sites easily accessible by all. In case of any probable job accidents, in order

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Subset Sayson of Burgary No. 77 K. 1 D. 1 Beginney/187. No. (1994) 368 80 96 - 200 80 80 Plant (02:18) 227 40 10 Kadday V.D.: 736 046 3074 to ensure emergency intervention the company will permanently position health personnel at the factory.

Emergency Action Plan (AMP) will be prepared for intervention at any emergency situations at the project site. The Emergency Action Team (AME) will receive adequate training for intervention at emergency situations; these trainings will be offered regularly and periodical maintenance and inspections of the vehicles, gear and equipment will be ensured. If any emergency situations occur at the project site such as job accidents, floods, earthquake, fire, etc. the first person detecting the incident will warn the other units by operating the alarm. AME will initially call and inform the relevant institutions such as hospitals, fire department, police etc., and ensure the action or rescue teams to arrive at the site of the incident. Whenever required, emergency medical action will be provided by the on site medical personnel and AME until the rescue and medical teams have arrived, and thereupon, the victims will be safely transported to the relevant health centers.

In order to avoid any risks the factory's on-duty teams will out out and deactivate all power systems within the factory, and immediately insulate combustible material and equipment in vicinity of any fires broken out from electricity.

Consequently, the entire environmental impact assessment for the "Float Glass" factory project which Sisecam Group's Float Glass affiliate Trakya Cam Sanayi A.S. plans to built in Bursa, Yenişehir OlZ, and provided all issues and undertakings which have been indicated in FIA Report, the project is determined to be extremely beneficial in terms of creating a quintessential precedent for the other industries to take position at the newly developed OlZ in Yenişehir Town, and for the overall contributions it will make to Yenişehir industry and the national economy.



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