A Report on The Environmental Problem of

M/S. Frigerio Conserva Allana Limited,

Mourigram, Andul, Howrah

and

The Recommendations for Improvement of Environmental Performance of the Industry

14th September, 2005

West Bengal Pollution Control Board

10A, Block-LA, Sector – III,
Salt Lake City, Kolkata – 700 098

M/s. Frigerio Conserva Allana Ltd. situated at Mourigram, Howrah is a large scale integrated abattoir-cum-agro based food processing industry. It uses live stocks (buffalo & cow), horticulture products and fresh water/marine fishes as raw material for the production of processed meat, fish, fruits and vegetables. However, the unit is predominantly an abattoir and meat-processing unit with production of bone and meat meal and tallow as by product. The unit started operation in the year 2000. Abattoir-cum-meat processing industry is a critically water polluting industry which generates large quantities of obnoxious liquid effluent with high organic load. The plant used for rendering various materials namely carcass bones, inedible offal, blood & other body fluid, and minced waste meat, fish & vegetable, which is used in any conventional integrated abattoir for the production of bone and meet meal and tallow as by products is inherently a seriously malodur generating unit. From the inception, there are perpetual public complaints against the industry regarding environmental mismanagement especially in reference to the malodour emanating from the industry and discharge of untreated or partially treated liquid effluent outside the factory premises in railway borrow pit. The industry had to be closed by the West Bengal Pollution Control Board on several occasions for indisciplined environmental behaviour. In recent times, (end of August, 2005) the Board again received public complaints against the industry. The Board in response set up a Committee comprising of the following Board officials to study the state of environmental management in the industry and suggest short and long term recommendations to improve the environmental performance of the industry.

THE COMMITTEE:

1. Dr. D. Chakraborty, Chief Scientist, WBPCB
2. Shri R. K. Ghosh, Chief Engineer, WBPCB
3. Shri Subir Mitra, Sr. Env. Engineer, (Planning & Projects), WBPCB
4. Dr. T. K. Gupta, Sr. Env. Engineer Camac Street Circle Office, WBPCB
5. Shri S. Narayan, Environmental Engineer & In-Charge, Howrah Regional Office WBPCB – **Convenor** of the Committee

The Committee visited the industry on 6th September, 2005 when the industry was not in operation (closed by the direction of the Board). The committee had detailed discussion with Mr. Rashid Kadimi, & Mr. J. N. Atal, both directors from the Corporate Office at Mumbai of M/s. Frigerio Conserva.Allana and Mr. Ashraf Merchant, General Manager of the Industry at Mourigram regarding the environmental problem of the industry and its management, studied different unit operations of the industry, the infrastructure facility available for environmental management and analyzed the possible reasons for its inefficiency/failure. The committee prepared its report after analysis of the problem (both technical and management) and suggested steps to be taken by the industry for improvement of its environmental performance.

(Dr. D. Chakraborty) **(R. K. Ghosh)** **(Subir Mitra)**

(Dr. T. K. Gupta) **(S. Narayan)**

1.0 Introduction:

M/s. Frigerio Conserva Allana Limited (FCAL), situated at Mourigram in the district Howrah, is a large scale abattoir-cum- meat processing and agro based food processing industry. The industry uses live-stock (buffalo & Cow), horticulture produce and fresh water/marine fishes as raw materials for the production of processed meat, fish and vegetable. Meat and bone meal & tallow are also produced as by product in the rendering plant by steam cooking of various of inedible items namely carcass bones, inedible offals, blood, minced waste meat, fish and vegetable. The unit started production in February 2000. The factory is located close to Mourigram Railway Station, Howrah with major settlements close by and spread over an area of 32 acres of land. The industry abstracts about 1000 Kiloliter ground water per day for various requirement and generates 700 kiloliters of highly polluted water per day.

The product profile of M/S. FCAL as available from their "Consent to Operate Application" is given below. However, their main manufacturing activity is slaughtering of live-stocks for the production of processed meat and related byproducts as mentioned earlier.

Input (MT/day)	Output(MT/day)	Byproducts (MT/day
Buffalo, sheep & goat – **325**	Frozen/chilled meat and canned meat of buffalo, sheep & goat – **80**	Sterilized meat cum bone meal (MBM) - **35**
		Mutton tallow – **7.5**
		Raw hide - **35**
		Horns & hooves - **8**
		Blood – **6 KL/day**
Fish - **100**	Frozen packed fish – **80**	Nil
Fruits & vegetables - **160**	Frozen & canned fruits and vegetables – **80**	Nil

The West Bengal Pollution Control Board (WBPCB) has been receiving persistent complaints against the factory from the local people since the year 2000 for emanating offensive odour and occasional discharge of coloured liquid waste water (seemingly untreated/partially treated) to the railway borrow pit of the South Eastern Railway situated adjacent to and contiguous to the South-East peripheral wall of the factory. Also, an incident of ammonia leak from the refrigeration plant was reported on 05th December, 2000. The Board had to take various regulatory actions including suspension of manufacturing process, imposition of Bank Guarantee etc. for ensuring environmental discipline in the industry.

2.0 The environmental pollution potential and the available environmental problem abatement infrastructure of the unit

The abattoir and meat processing unit is a water intensive, critically water polluting industry. The unit at Mourigram, Howrah generates about 700 kiloliters of obnoxious liquid effluent from its process operation containing high concentration of putrefiable

organic matter. If the waste water is not immediately treated biologically for adequate degradation of organic matter and discharged outside to the railway borrow pit, this is likely to be putrefied with generation of unacceptable odour. The industry has commissioned two sets of conventional activated sludge plants for the treatment of liquid waste generated in the factory. The treated waste is discharged through kachcha drain followed by two small lagoons within the factory premises connected in series to outside railway borrow pit. One of the activated sludge plants is generally used for treatment of liquid waste. The other one is reported to be used for maintaining the microbial culture required for the operation for the biological treatment plant and occasionally put to use for treatment of liquid waste in case the other remains non-operational. The sludge generated in the biological treatment plant is stored in sludge pit before the same is disposed off outside.

Besides the generation of liquid effluent discussed above, the integrated abattoir-cum-meat processing unit is also a major source of offensive malodour from its rendering plant. The rendering plant is used for steam cooking of animal carcass, the bones and other inedible offal for production of bone and meat meal and animal tallow. Unless the material referred above are rendered immediately after the slaughtering process , the odour problem from the rendering plant becomes much more serious than that of rendering freshly generated materials. The industry has commissioned a two stage scrubbing-cum-cooling arrangement for treatment of the odoriferous spent gases generated in the cooker before the same is passed through a large bio-filter, conventionally used for abatement of odours in rendering plants.

Besides the rendering plant, storage of undigested paunch material and the bio-sludge generated in the ETP are also likely to putrefy unless it is regularly disposed off in an environmentally friendly manner. A large quantity of undigested paunch material (12 Mt. to 15 Mt./day) is generated while slaughtering the live-stocks. It is reported by the industry that the paunch is lifted by two contractors engaged by the Company to dispose it outside the factory premises.

3.0 Analysis of environmental problem and its management

A. Liquid Effluent:

The industry has commissioned two sets of conventional activated sludge plants (ASP) for treating the liquid waste. However, only one of the two ASP system available, is utilized for treating the liquid waste at any point of time. The other one used for maintaining the microbial culture required for the biological treatment system. In both the ASPs two stage aeration is available. It is report by the industry that the average flow of raw effluent to ETP is 72 KL/hour. Considering this flow rate of raw effluent to the ETP system and considering the volume of the two aeration basins available for oxidative degradation of liquid waste, the hydraulic retention time in aeration basins seems to be sufficient for satisfactory biological treatment of liquid effluent highly amenable to biodegradation. However, on many occasions including in recent times, inspection and sample collection followed analysis of samples by the Board Officials revealed that the effluent failed to comply with the discharge standard by wide margin. This can only happen if the effluent treatment plant is operated

intermittently rather than continuously or the operational parameters including F/M ratio, oxygen content in the aeration basins, and MLSS growth are not maintained properly as per the design requirement. These parameters along with sludge volume index (HVI) an indicator of sludge settling characteristics are not at all monitored by the industry. Discharge of partially treated effluent (coloured effluent is an indicator of partial treatment) to the small lagoons inside the factory premises and ultimately to the railway borrow pit outside will lead to anaerobic decomposition of the partially treated liquid waste generating unacceptable odour in the surrounding areas.

B. Odour Control in Rendering Plant:

In Rendering Plant bones, tissues, fat offals, minced meat/fishes and blood etc. are grinded followed by cooking in a reactor at about 85^{o}C. The cooked mass is then processed through a decanter/centrifuged for separation of solid and liquid. The solid (bone and meat meal) is dried at 130^{o}C and then powdered in hammer mill before packing. The liquid is taken to a separator for isolating tallow fact. The spent gas from the reactor and drier is passed through two stage scrubbing-cum-cooling arrangement before treating through the rectangular bio-filter for removal of odour from the spent gas stream. Although this system should be more or less adequate for removing odour from the spent gas of the rendering plant, the efficiency of the system is largely dependant on whether the renderable materials are fed fresh to the cooker or had to be stored before cooking for various reasons. In case of the later, the system may not be sufficient for satisfactory odour control. Besides, in a properly designed odour control system, the hot gas stream from the cooker and the drier is generally taken to a condenser cooled with chilled water to condense the major part of odoriferous organic materials present in the waste gas stream before being passed through bio-filter. This system is not available in the industry. Besides, the primary emission of the odour from the cooker and drier, there may be various areas of secondary emissions of odoriferous gases which have not been covered under odour control system. These are cooker inlet door, cooker discharge door, decanter, tallow storage tank etc. This secondary point of odour generation should also be connected to the odour control system by installing hood at appropriate places and linked to waste gas stream pipe through installation of adequate ducting pipes.

The bio-filter installed for removal of odour from the rendering plant was commissioned about five years back. The normal life span of such filter is five years. Maintenance of proper moisture and microbial growth in the bio-filter is of paramount importance for its efficient operation. To keep it efficiently operational, it is advisable that the bio-filter should be regenerated by doing overhauling of the internal layering of the same by putting new organic mass (in the instant case rise husk) and the bed material and inoculating the same with fresh microbial culture.

C. Decomposable bio-sludge and undigested paunch material:

Large quantity (12 Mt. to 15 Mt./day) of paunch material is generated everyday from the slaughtering operation of the live-stocks. This is stored in concrete floor under shed which is open to the atmosphere. The bio-sludge is stored in sludge drying pit.

Both these materials are decomposable and can be a source of malodour if not managed properly through regular disposal. The inspecting team found that the solid waste management in the industry is very poor and large quantities of bio-sludge and paunch material have been found to be accumulated in open fields (No. of places) within the factory premises suggesting a poor disposal of the same.

D. Management issues related to environmental abatement infrastructure:

The technical team of the Board is of the opinion that although the hardwire infrastructure available for pollution abatement seems to be adequate for maintaining environmental norms, there is hardly any management of the same to keep it efficiently functional. The industry neither engaged any competent agency to take care of the environmental infrastructure nor employed any personnel competent to efficiently operate the infrastructure available. None of the people, the committee met during the visit, (other than the two directors coming from the corporate office from Mumbai) has any understanding about the functioning of the environmental abatement systems including effluent treatment plants, odour control system in rendering plant and management of various solid waste. Considering the nature of the industry and its environmental problem commissioning of adequate hardwire environmental infrastructure will hardly help the industry in solving its environmental problem unless the same is managed efficiently. This issue is totally ignored by the management of the company.

4. Recommendations:

Short-term:

1. **The industry should immediately engage a competent agency or permanently post environmental professionals in the industry for efficient management of the available environmental abatement infrastructure. The committee feels that pending fulfillment of the same the industry may think in terms of suspending its manufacturing operation. The office of the environment manager should be set up next to effluent treatment plant.**

2. The industry should start regular monitoring of the performance indicator of the effluent treatment system. These includes Mixed Liquor Suspended Solid (MLSS) Mixed Liquor Volatile Suspended Solid (MLVSS), Food to Microbes Ratio (F/M), Sludge Volume Index (SVI), Dissolves Oxygen (DO) in the aeration basins and Carbon/Nitrogen/ Phosphorus ratio. While the DO & SVI to be monitored everyday the other parameters can be monitored once in a month.

3. The influent and final effluent quality to be monitored for Chemical Oxygen Demand (COD) and Biological Oxygen Demand (BOD) daily and the results of such analysis to be made available to the Board at the end of each month.

4. The fat trap to be regularly skimmed for removal of arrested fats. The fat trap (being one of the possible sources of odour if allowed to be decomposed) to be covered with replaceable cover with gas exit pipe fitted with small active carbon column.

5. Considering the inefficient functioning of effluent treatment system, it is advisable that the effluent generated to be equally distributed in the two sets of activated sludge treatment systems available to take care of high hydraulic and organic loading providing larger retention time in the aeration basins and also resulting in lower organic loading in the biological treatment system. This recommendation had to be made as the calculated HRT (on the basis of data available from the industry) is not matching with the efficiency of the degradation of organic effluent in one set of activated sludge plant. This can be tried on a trial basis for the time being.

6. The accumulated solid waste (bio-sludge and paunch material) in different open places within the premises should be removed immediately and disposed off outside in an environmental friendly manner. This dirty open places with heavily grown grasses filthy with accumulation of decomposable solid waste should be utilized for flower gardening as much as practicable.

7. Under no circumstances the industry should render decomposed or even stale raw materials. If the renderable material is to be stored even for a short time this should be stored in chiller room to avoid any decomposition.

8. The industry should immediately (this rainy season) start to develop a green belt along the boundary of the factory premises by planting trees with broad leaves.

Long-term:

1. To increase the efficiency of the odour control system the industry should commission a condenser to be cooled with chilled water to remove the large part of the odoriferous organic matter before the waste gas stream is passed through scrubbers/cooler followed by bio-filter.

2. The bio-filter should be re-commissioned with change of organic layer (rise husk), and inoculation of fresh microbial culture as the bio-filter has already been functional for about five years. A temperature sensor should be installed to check the temperature of the gas stream before it entrance the bio-filter.

3. Various secondary emission points of odoriferous gases including cooker inlet door, cooker discharge door, decanter, tallow storage tank and drier should be linked to the odour control system through installation of suction hood and ducting in proper places. The proper drafting in this regard is to be maintained.

4. The first lagoon where the treated effluent is discharged is to be excavated to a depth of 1.5 m. to convert it into an oxidative lagoon acting as a polishing pond. The second lagoon can be cultured with water hyacinth. The excavated sludge and the accumulated sludge in sludge pit to be composted.

5. As a long term solution the paunch material and bio-sludge may be either incinerated by installation of an incinerator fitted with air pollution control system or if sufficient calorific value is available this can be also stabilized through a bio-gas generating plant.