enva

☐ Clonminam Industrial Estate,
Portlaoise, Co. Laois
Tel: 0502 78600
Fax: 0502 78699
Callsave 1850 504 504
Email: portlaoise@enva.ie

☑ Smithstown Industrial Estate,
Shannon,
Co. Clare
Tel: 061 707400
Fax: 061 707401
Email: shannon@enva.ie

☐ Ballycurreen Industrial Estate,
Kinsale Road, Cork
Tel: 021 4962554 / 4962518
Fax: 021 4962345
Email: cork@enva.ie

☐ MacAnulty Clear Drains,
JFK Road, Naas Road, Dublin 12
Tel: 01 4500333
Fax: 01 4569187
Email: dublin@enva.ie

www.enva.ie

Marie O'Connor,
Office of Licensing and Guidance,
Environmental Protection Agency,
Regional Inspectorate,
Inniscarra,
Co. Cork

The Environmental Protection Agency
14 NOV 2006
CORK

9th November 2006

License Number: W0041-01

REF: Enva Ireland Limited, S.E.W. AMMONIUM BIFLUORIDE RECOVERY PROCESS

Dear Ms O'Connor,

In response to your letter of 27th of October 2006 and our conversation of that day, I wish to clarify a number of points.

- The proposal in question is to carry out a three month trial of the recovery process. This would be time-limited and restricted to a specific quantity of materials. Following this a full report as well as any necessary amendments to the license would be made before commencing the process on an on-going basis. Our belief is that it should be possible to accommodate this trial under condition 4.12 and table E.1 of Schedule E which includes provision for "Development of waste processing capacity" and "Installation of waste processing equipment". If the decision is to go to full scale following the trial then a technical amendment may be required at that time.
- **Waste Characterisation:** The waste to be processed is ammonia-bifluoride waste and corresponds to EWC Code 060199 (06 = Wastes from inorganic chemical processes, 0601 = wastes from MFSU of acids, 060199 = wastes not otherwise specified. It originates from spent etching solution used by a producer involved in manufacture of electronic circuit boards. It is comprised as follows ~ 92% water, ~ 8% ammonium bifluoride, trace levels of nitrates and phosphates.
- **Duration:** As set out in the original letter of 27th September and the subsequent letter of 4th October 2006 the trial will commence upon completion of equipment installation and would cease three months later.
- **Expected Tonnage:** No new material will be accepted on site for the purposes of carrying out this trial. We propose to process a maximum of 3 tonnes per day (one batch) during the trial and no more than 50 tonnes in total during the trial. This material will be sourced from existing stock of waste on site.
- **Storage facilities:** Our facility is provided with local bunding for designated waste storage areas as well as remote bunding and emergency retention capacity. Waste is segregated in accordance with our license and as per UK guidance document HSG 71

for segregation and storage of dangerous substances. The acceptance and storage of this waste is already permitted under our license and this trial will not adversely affect the above arrangements.

- **Duration of Process and Emissions:** The first stage will involve adding the waste and lime to the reactor. Fluoride will be precipitated out and will be removed as a non-hazardous solid filtercake of calcium fluoride (EWC 190305). This stage will take approximately 3 hours. Diffuse emissions of ammonia from the headspace of the reactor will be drawn through the ductwork and scrubbers and hence removed from the air (see Second Stage). The fluoride will be captured as Calcium Fluoride in the filtercake and hence there will be no airborne emissions of fluoride whatsoever. After the first stage the ammonia liquor will be directed to the "ammonia recycling process" (air-striping column). Once two or three batches of ammonia liquor have been sent to the air-striping column the Second Stage will begin. The ammonia liquor will be recirculated within the stripper causing the ammonia to become airborne. This recirculation of liquor will continue for approximately 5 days until there is no more ammonia remaining in the liquor. As ammonia becomes airborne it is immediately ducted to the "acid recycle process" (first scrubber) where it comes into contact with sulphuric acid or nitric acid to form liquid ammonium sulphate/nitrate for use in the fertiliser industry. The air stream released from the first scrubber will go through a second scrubber containing weak acid which will remove any residual ammonia from the air stream before discharge. The resultant liquid will be transferred to the first scrubber once spent and will be strengthened. In this way the second scrubber, whose primary function is abatement, will also add to the overall waste recycling efficiency of the system. The stripper and two scrubbers will run simultaneously over approx 5 days.
  Once stage 2 is complete, liquid effluent from the stripper, which will be more than 99% water, will be removed from the system analysed and discharged under our existing effluent emission point and ELVs. In the highly unlikely event that this effluent were not suitable for discharge it would undergo further treatment as part of our existing licensed waste water treatment process on-site.
- **Abatement & Emissions:** The diagram provided earlier is a schematic drawing of the process. Diffuse ammonia emissions from the "reactor" are to be drawn through the "acid recycle process". Ducting from the extraction hood will connect into the outflow from the "ammonia recycle process". We apologise if the schematic did not make this clear.
  The purpose of the "ammonia recycle process" is to make the ammonia air borne. The airborne ammonia is then ducted to the "acid recycling process". Since any diffuse emissions from the reactor headspace are already airborne these can be directed to the "acid recycle process" also. There are two scrubbers within the system and their function is to remove as much ammonia from the air as possible. BAT reference documents relevant to the process indicate that efficiencies in excess of 99% are achievable with this technology. Based on even a 90% efficiency this would mean more than 99% of emissions will be removed. In any event a continuous monitor will detect ammonia levels and will trigger an alarm if these exceed permitted levels.
  There are no other atmospheric emissions from the stack. Waste filtercake is currently produced as part of a more general waste treatment process, filtercake from this specialised process will undergo the same leachate and toxicity testing prior to disposal.
  Treated effluent is currently discharged from the site under the existing license and parameters including ammonia are already tested. Before discharge of effluent from this trial process the same testing will be carried out.
  As outlined in the original letter of 27th September 2006 (a copy of which was attached to the letter of 4th October) the system was deliberately designed so that no

fugitive emissions will occur. Lessons from an earlier ammonia treatment plant (run until 2003) have been incorporated into the design of this system and these improvements are also outlined in the original letter of 27th September.

- **Stack Height & Diameter:** The stack height will be 7.5 meters high and 0.1 meter in diameter.
- **Maximum predicted volumetric flow rate:** One of the variables to be tested within the trial will be the optimum flow-rate. However, we can state that the absolute maximum flow rate will be 800Nm^3/hr. Mass flow is expected to be approximately 7.5 g/hr. As stated above, BAT would indicate in excess of 99% efficiency for this type of scrubber and we expect to meet this. Even if we only achieved 90% efficiency we should still be able to achieve emission levels well below 30mg/m3. Process efficiency is one of the parameters which we wish to test during the trial. In addition, the flow rate will be optimised to generate maximum efficiency in the scrubbers as this will result in greater revenue (through recovery of ammonia) and in turn lower atmospheric emissions. The maximum emission concentration figure mentioned in the letter of 27th September was based on air dispersion modelling results previously submitted to the Agency for plant with the same stack height and diameter (17th November 2003, Enterprise Ireland Report page 12). These results indicated that at flow rates of 800Nm3/hr emission concentrations of up to 510mg/m3 would result in values at all receptor locations below 1/40th relevant OELs and below the Danish C-Value for ammonia. However, as indicated above we expect emissions to be several orders of magnitude below this figure.
- **Emergency & Accident Response:** The entire site within which the plant will be located is provided with bunding and emergency spill retention facilities as indicated above. Two spill/water retention tanks with capacity of 190m^3 each are located on site.
  In the event of process failure the system is provided with shut-off valves on the ducting which can be closed to isolate the relevant section. Extract fans will also be shut down.
  The final discharge is to be monitored continuously and will trigger an alarm in the event that emissions exceed a predetermined specified level. The process will be shut down and isolated as necessary in the event that the alarm is triggered. Details of this monitor were submitted in our letter of 4th October.

I trust the above is satisfactory. Please indicate whether Enva may proceed with this trial. If you have any further queries in relation to this matter please do not hesitate to contact me on 061-707404 or 086-8367421 or at the above address in Shannon. Should the Agency wish to do so we are available to meet and discuss this proposal at your earliest convenience.

Yours sincerely,

David Burke
HSE & Compliance Manager.

ENCL.

- **None.**