Final Work Plan - California Regional PM10/PM2.5 Air Quality Study Ammonia Emissions Improvement Projects in Support of CRPAQS Aerosol Modeling and Data Analyses: Draft Ammonia Inventory Development (pages 2-18 to 2-19)

Industrial sources

Industrial sources have traditionally been inventoried based on reported emissions such as the SARA 313 Toxic Release Inventory (TRI) or the Air Resources Boards Air Toxics Database (ATEDS). This method allows emissions allocations as point sources, and, in the case of ATEDS, the assignment of appropriate release parameters. Reporting to ATEDS is based on facility size, as determined by criteria pollutant emissions. Reporting under SARA 313 has a very large threshold and excludes facilities with certain SIC codes. Therefore, many facilities that may have significant ammonia emissions are not included in these databases. Additionally, the number of individual facilities (Several thousand facilities were identified in the 1991 South Coast Air Basin inventory (Radian 1991) requires an unwarranted strain on resources.

The ENVIRON team will obtain data from major ammonia suppliers in the State, including UNOCAL, LaRoche Industries Incorporated and Hill Brothers Chemical Corporation for ammonia usage. This data will be aggregated to zip codes to protect the proprietary nature of the supplier data. Supplier data will be segregated by use for selective catalytic reduction, refrigeration, metal treating, blueprinting and wastewater treatment. Emission factors for each category are reported in the recent South Coast Air Basin inventory (ATC 2000). Suggested EIC/CES codes are presented in Table 2-9. Emission factors are:

- Refrigeration – Fugitive emissions from ammonia refrigeration occur as a result of system leaks. Therefore, by mass balance, each pound of ammonia supplied is also emitted. The emission factor is 100 percent of usage.

- NO_x Control – Ammonia is injected into the exhaust of boilers, gas turbines and other process equipment to reduce NO_x emissions. The injected ammonia reacts on a 1:1 molar ratio of NH_3 to NOx. Excess ammonia is added to attempt to react all NOx. Good engineering practice results in approximately 10 ppm of unreacted NH_3 released from the stack (BACT requirement) by reducing NOx from 100 ppm to 10 ppm. The 10 ppm of excess ammonia that does not react to reduce NOx, but is emitted directly to the atmosphere is called ammonia slip. The 10 ppm ammonia slip can be correlated to 10% of the ammonia injected. The emission factor is 10 percent of usage.

- Metal Heat Treating – Ammonia is used in the nitriding process to heat treat steel. Based on minimal escape during the nitriding process, approximately 10% of ammonia supplied is emitted. The emission factor is 10 percent of usage.

- Waste Water Treatment – Ammonia is used in wastewater treatment for neutralization. Based on minimal losses during transfer, upsets and improper

operation, approximately 15% of ammonia supplied is emitted because ammonia is highly soluble in water. The emission factor is 15 percent of usage.

- Blueprinting – Ammonia is used in blueprint processing. By mass balance, each pound of ammonia supplied is also emitted. The emission factor is 100 percent of usage.

Industrial source emissions will be allocated as area sources based on the ZIP code coverage.
In addition to those industrial source listed above, the CEIDARS database includes ammonia emission from geothermal sources which comprised approximately 1% of the statewide ammonia emission inventory. Emission form geothermal sources will be obtained form the ARB and included in the inventory as point sources.

Table 2-9. Suggested EIC/CES Codes for Industrial Sources.

EIC Description	EIC	CES
Refrigeration	499-995-0020-0001	47085
NO_x Control	499-995-0020-0002	47086
Metal Heat Treating	499-995-0020-0003	47087
Waste Water Treatment	499-995-0020-0004	47089
Blueprinting	499-995-0020-0005	47089